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Andrew Pelloso
Lori Kendrow

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
WW-16J

SEP 22 2006

Ms. Martha Clark Mettler
Office of Water Quality
Indiana Department of Environmental Management
100 N. Senate Ave.
Mail Code IGCN 1315
Indianapolis, IN 46204-2251

Dear Ms. Clark Mettler:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the final Total Maximum Daily Loads (TMDLs) for the Wabash River in Indiana. The segments are listed in Table 4 of the enclosed decision document. The Indiana Department of Environmental Management's (IDEM's) TMDLs were developed for *E. coli*, nitrogen, and nitrates, and address the recreational (*E. coli*) and aquatic life use impairments (nutrients, dissolved oxygen, pH, and biotic community). Based on this review, U.S. EPA has determined that Indiana's TMDLs for *E. coli and* nutrients meet the requirements of Section 303(d) of the Clean Water Act and U.S. EPA's implementing regulations at 40 C.F.R. Part 130. Therefore, U.S. EPA hereby approves TMDLs for the Wabash River in Indiana. The statutory and regulatory requirements, and U.S. EPA's review of Indiana's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Indiana's effort in submitting these TMDLs, addressing eight *E. coli* impairments, and look forward to future TMDL submissions by the State of Indiana. If you have any questions, please contact Mr. Kevin Pierard, Chief of the Watersheds and Wetlands Branch at 312-886-4448.

Sincerely yours,

for Jo Lynn Traub
Director, Water Division

SEP 28 11 34 AM '06
OFFICE OF WATER QUALITY

Enclosure

cc: Andrew Pelloso, IDEM

bcc: Christine Anderson
James Cha

TMDL: Nutrient and Pathogen TMDLs for the Wabash River, Illinois and Indiana
Approval Date: SEP 22 2006

DECISION DOCUMENT FOR THE APPROVAL OF THE WABASH RIVER (MAINSTEM) TMDL

Section 303(d) of the Clean Water Act (CWA) and U.S. Environmental Protection Agency's (U. S. EPA) implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for U.S. EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and U.S. EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for U.S. EPA to determine if a submitted TMDL is approvable. These TMDL review guidelines are not themselves regulations. They are an attempt to summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. Any differences between these guidelines and U.S. EPA's TMDL regulations should be resolved in favor of the regulations themselves.

1. Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from non-point sources, the TMDL should include a description of the natural background. This information is necessary for U.S. EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

(1) the spatial extent of the watershed in which the impaired waterbody is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);

(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and
(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyll a and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comment:
The headwaters of the Wabash River are located in west-central Ohio and flows approximately 30 miles before crossing into Indiana. From the Ohio/Indiana state line, the Wabash River flows approximately 475 miles to its confluence with the Ohio River below Mount Vernon. The lower Wabash River forms the boundary with Illinois. The Wabash River watershed drains two-thirds of Indiana's 92 counties, and a significant portion of the watershed drains Illinois (See Figure 2-1 of the TMDL Report). While small towns and cities (notably Terre Haute and Lafayette) are located along the river (urban land-use), the most predominate land-use is agriculture.

The Indiana Department of Environmental Management (IDEM) listed various segments of the Wabash River as impaired for various parameters (i.e. nutrients, *E. coli*, pH, impaired biotic communities, dissolved oxygen, total dissolved solids (TDS) and a fish consumption advisory for mercury and PCBs) on the 2006 303(d) list (See Table 2-3 of the TMDL Report). The Illinois Environmental Protection Agency (IEPA) listed its portion of the Wabash River (IL B_06) as impaired for fecal coliform. The phosphorus, nitrate, and pathogen loads established for the Wabash River are expected to address nutrients, dissolved oxygen, biota, pH, and *E. coli* impairments in Indiana, as well as the fecal coliform impairment in Illinois. TDS and fish consumption advisories for both mercury and PCBs are not addressed by these TMDLs and will be addressed at a later time.

The TMDL Report (Pages 3 and 4) describes the relationship between nutrient loads and its effect on dissolved oxygen (as a result of algal growths), pH levels, and biota:

Effects on Algal Growths and Dissolved Oxygen: Excess nutrients in the water column promote the growth of organic plant material such as algae and macrophytes. Algae are typically the largest producers and consumers of oxygen in a river. A shift in the algae community greatly affects dissolved oxygen levels. Oxygen is produced by photosynthesis during daylight hours. Plants and algae consume this oxygen at night through respiration. These, in addition to other processes, affect the amount of dissolved oxygen in the water column. Oxygen depletion occurs when the balance between oxygen consumption and production is altered, causing excessive oxygen consumption or

reduced oxygen production. This resultant imbalance is attributed to excessive algae in the water column.

Effects on Biota and pH: Dissolved oxygen concentrations become extremely high during daytime hours (due to photosynthesis), and fall to extremely low levels during the night (due to respiration), causing fatal conditions for oxygen-breathing aquatic life (i.e. biota).

Additionally, plants use carbon dioxide during the day (as a result of photosynthesis) which causes alkaline carbonates and bicarbonates to predominate in the water, resulting in a rise in pH levels. When excessive algal blooms exist, the pH of the water can fluctuate dramatically within a 24 hour period, and small fish become stressed by these rapid pH changes.

In most cases, total nitrogen and phosphorus concentrations limit algae growth, and are considered the limiting agents. IDEM therefore determined that using nitrate (a key component of total nitrogen) and phosphorus as a surrogate for dissolved oxygen, pH, and biota impairments is appropriate for this TMDL. Limiting nitrate and phosphorus will control algal growth, which will have an effect on dissolved oxygen, pH, and biota. As nutrient loads are reduced, algal growths are expected decrease, and dissolved oxygen levels are expected to increase. A decrease in algal growths is also expected to stabilize pH levels in the waterbody. Stabilized pH levels in addition to an increase in dissolved oxygen levels will improve the impaired biotic community, and water quality standards will be attained.

The Wabash River (mainstem) is impacted by both point and non-point sources. Point sources are discussed in section 2.4 of the TMDL Report and include wastewater treatment plants, regulated storm water, combined sewer overflows (CSO), and Concentrated Animal Feeding Operations (CAFOs). Non-point sources of the impairment include non-regulated storm water runoff, agricultural activities, Sanitary Sewer Overflows (SSOs), and wildlife.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this first element.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)). U. S. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is

attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comment:
The TMDL Report for the Wabash River TMDLs describe the applicable water quality standards, addressing the designated uses for recreation in both Illinois and Indiana and aquatic life in Indiana, and identifies numeric water quality targets.

Recreation

Indiana

For Indiana, 327 IAC 2-1-6(a) establishes the total body contact recreational use *E. coli* WQS for all waters in the non-Great Lakes system as follows: "*E. coli* bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period."

Illinois

For Illinois, 35 IAC 302.209 [2003] establishes the General Use Water Quality Standard for fecal coliform bacteria. This water quality standard specifies that during the months of May through October, based on a minimum of five samples taken over not more than a 30 day period, fecal coliform bacteria counts shall not exceed the geometric mean of 200 cfu /100 ml, nor shall more than 10 percent of the samples during any 30 day period exceed 400 cfu/100 ml. This standard protects for Primary Contact (i.e., swimming) use of Illinois waters by humans.

Because Illinois's recreational use standard is based on fecal coliform and Indiana's recreational use standard is based on E. coli, a translator was used during the modeling process to maintain consistency for determining the appropriate pathogen loads. The TMDL assumes that a fecal coliform count of 200 cfu/100mL and an *E. coli* count of 125 cfu/100mL were similar, since both would cause approximately 8 illnesses/1000 swimmers in fresh waters (Page 27 of the TMDL Report).

Aquatic Life

Indiana

Nutrients

For nutrients, no numeric water quality criteria exist to protect the aquatic life use designation. Indiana currently uses benchmarks to determine nutrient impairments. When

two or more of the following benchmarks are exceeded, then IDEM considers the waterbody to be impaired for nutrients:

- Total phosphorus should not exceed 0.3 mg/L.
- Nitrate + nitrite should not exceed 10 mg/L.
- Dissolved oxygen should not be below the water quality standard of 4.0 mg/L and should not consistently be close to the standard (i.e., in the range of 4.0 to 5.0 mg/L). Values should also not be consistently higher than 12 mg/L and average daily values should be at least 5.0 mg/L per calendar day.
- No pH values should be less than 6.0 or greater than 9.0. pH should also not be consistently close to the standard (i.e., 8.7 or higher).
- Algae growth should not be "excessive" based on field observations by trained staff.

pH
For Indiana, 327 IAC 2-1-6(a) establishes numeric criteria for pH, which states that no pH values should be less than 6.0 or greater than 9.0.

Dissolved Oxygen
For Indiana, 327 IAC 2-1-6(a) establishes numeric criteria for dissolved oxygen, which requires dissolved oxygen to be maintained above 4 mg/L.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. U.S. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. U.S. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

TMDLs must take into account *critical conditions* for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and non-point source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate non-point source loadings, e.g., meteorological conditions and land use distribution.

Comment:

Violations

As previously stated, Indiana does not have a numeric water quality standard for nutrients. Instead, the violation of two or more benchmarks is used to determine nutrient impairments. IDEM found that total phosphorus (TP) concentrations exceeded the benchmark of 0.30 mg/L at many sampling stations, although median concentrations were generally less than the benchmark. It was also found that median concentrations slightly decreased from upstream to downstream. Nitrate+nitrite concentrations exceeded the 10 mg/L benchmark at most sampling stations, although median concentrations were generally less than 5 mg/L. Median nitrate+nitrite concentrations at the upper and lower Wabash River stations were slightly less than those at the middle stations. Those stations in the middle Wabash River showed more variability in median concentrations when compared to the upper and lower stations. For dissolved oxygen, only a few stations violated the minimum benchmark value of 4.0 mg/L, while the maximum value of 12.0 mg/L was frequently exceeded at majority of sampling stations. Median dissolved oxygen concentrations fluctuated between 8 mg/L and 11 mg/L along all monitored Wabash River segments. For pH, median values were ~8.00 along the entire Wabash River, with slightly higher values at the middle Wabash River sampling stations. Greater variability of pH values in the middle Wabash River was observed, where pH values exceeded the benchmark of 9.00 more frequently than stations in the upper and lower segments. The minimum benchmark value of 6.00 was violated once in the lower Wabash River.

Eutrophication

Nutrient loadings from wastewater treatment plants can increase the amount of algal blooms (i.e., large quantities of phytoplankton) in the water. When the phytoplankton dies, this dead organic matter serves as a food source for bacteria. Consequently, there is an increase in the growth and reproduction of bacteria. The oxygen needed by bacteria is taken from the dissolved oxygen supply in the water, which can eventually deplete dissolved oxygen levels. As a result, fish and organisms are unable to survive because their oxygen source is being depleted. Once these fish and organisms die, the decaying organic matter releases nutrients back into the water body, which perpetuates the water quality problem.

In rivers, the eutrophication process usually occurs in a linear fashion, depending on the river flow. Nutrients discharged into the river are normally carried downstream and its effects (i.e. algal blooms) are seen downstream of the nutrient source. ("Environmental Science, The Way the World Works" pages 278-280). Therefore, nutrient TMDLs were

developed for the Wabash River upstream of the Vermilion River, addressing all impaired Wabash River segments from the Indiana/Ohio state line to the confluence of the Wabash and Vermilion Rivers (Pages 3 and 17 of the TMDL Report).

Modeling

Both nutrient and pathogen TMDLs were developed using the CE-QUAL-RIV1 (RIV1) model for the Wabash River main stem along with observed and statistical estimates of tributary pollutant loads. This approach allows for a detailed analysis of pollutant trends as they relate to time and space within the Wabash River main stem. Allocations were made to the three general source categories which include National Pollutant Discharge Elimination System (NPDES) facilities that discharge directly to the Wabash River, subwatersheds draining directly to the Wabash River, and significant Wabash River tributaries. It should be noted that for CSOs, baseline conditions were determined using data representative of existing water quality conditions, and did not assume that CSO discharges met water quality standards. However, the assumption was made during the allocation process that CSOs discharged at the water quality standard for purposes of determining appropriate CSO allocations.

RIV1 contains a hydrodynamic model that predicts flow, depths, velocities, elevation of surface water and other hydraulic characteristics. These flow results are then used in a second component of RIV1 to predict water quality for twelve variables: temperature, carbonaceous biochemical oxygen demand (CBOD), organic nitrogen, ammonia nitrogen, nitrate + nitrite nitrogen, dissolved oxygen, organic phosphorus, dissolved phosphorus, algae, dissolved iron, dissolved manganese, and coliform bacteria.

One of the assumptions made when modeling the nutrient loads was that Ohio's TMDL would be fully implemented and the targets for nitrate and reductions for phosphorus would be realized as the Wabash River crosses into Indiana (Page 11 of the TMDL Report).

Strengths and Weaknesses: The RIV1 model was chosen to determine the TMDLs because backwater effects that are significant in the Wabash River can be addressed. In addition, RIV1 directly evaluates the impact of point sources because the model can be segmented to provide output directly downstream of significant point sources. RIV1, however, does not simulate water quality in two or three dimensions. IDEM and IEPA believes that this is unnecessary for this project and would require additional resources. However, the EPA believes the weaknesses discussed are outweighed by the strengths of the TMDL approach, and this approach is appropriate based upon the availability of resources and information at the time the TMDLs were developed.

Calibration: Calibration of the model began with hydrology data, which was followed by temperature data, and finally nitrate, total phosphorus, dissolved oxygen, *E. coli*, and chlorophyll *a* data. Calibration of these data indicates an acceptable agreement between observed and simulated stream flows as well as water quality conditions. Once simulated conditions "match" observed conditions, TMDLs are determined. A certain amount of error is allowed when matching observed conditions to simulated conditions. When calibrating flow, the model error ranged from 3% to 18%, depending on the location. The

R^2 value (an indicator of how well the model fits the data) for observed and predicted monthly flows ranged from 0.85 to 0.89. Full calibration statistics are identified in Appendix H of the TMDL Report.

Loading Capacities

Loading capacities are identified in the TMDL Report (Tables 4-1 through 4-15) and are briefly discussed below.

Phosphorus: The loading capacities for phosphorus are represented in Table 4-2 (calculated for Wabash River at J. Edward Roush Lake), Table 4-5 (calculated for Wabash River upstream of Lafayette), and Table 4-8 (calculated for Wabash River at confluence with Vermilion River) and are presented as daily loads for each month of the calendar year.

Nitrates: The loading capacities for nitrates are represented in Table 4-3 (Wabash River at J. Edward Roush Lake) and Table 4-6 (Wabash River upstream of Lafayette) and are presented as daily loads for each month of the calendar year.

Pathogens: The loading capacities for pathogens for the state of Indiana are represented in Table 4-1 (Wabash River at J. Edward Roush Lake), Table 4-4 (Wabash River upstream of Lafayette), Table 4-7 (Wabash River at confluence with Vermilion River), Table 4-10 (Wabash River at Indiana/Illinois state line), Table 4-12 (Wabash River at Hutsonville), and Table 4-14 (Wabash River at confluence with Ohio River).

The loading capacities for pathogens for the state of Illinois are represented in Table 4-11 (Wabash River at Indiana/Illinois state line), Table 4-13 (Wabash River at Hutsonville), and Table 4-15 (Wabash River at confluence with Ohio River).

The loading capacities for pathogens in both Indiana and Illinois are presented as daily loads for each month of the recreational season.

Critical Condition: For nutrients (i.e. phosphorus and nitrates), there are two critical conditions. The critical condition for loading is during high flow events (storm events) and the critical condition for water quality impact is low flow (summer season), when the nutrients are released into the waterbody and increase algal growth and lower DO, resulting in impaired biotic communities and pH disturbances. For pathogens, the critical condition is high flow, when loads from tributaries increase. All modeling and calculations were developed to be protective for these critical conditions (Page 40 of the TMDL Report).

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this third element.

4. Load Allocations (LAs)

U. S. EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future non-point sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and non-point sources.

Comment:
Separate LAs were specified for the larger tributaries draining directly to the Wabash River to provide information on the significance of each and to help prioritize watershed management efforts. One final LA was included for all smaller tributaries and direct drainage areas (Appendix I of the TMDL Report).

For implementation purposes, IDEM identified the percent reductions necessary in each significant tributary (Tabe 4-16 of the TMDL Report) to meet the load allocations identified at each assessment location (Table 4-1 – 4-15 of the TMDL Report) where TMDLs are assigned.

IDEM identified certain Wabash River tributaries (see Table 4-16 of the TMDL Report) as non-point source contributors of phosphorus and pathogen loads to the Wabash River during storm events and other periods of high flow. It was determined by IDEM that a 4% reduction in phosphorus loads from the following tributaries is needed: Deer Creek, Eel River, Mississinewa River, Pipe Creek, Salamonie River, Tippecanoe River, and Wildcat Creek. The resulting load allocations for phosphorus are identified in Table 4-2, Table 4-5, and Table 4-8 of the TMDL Report and are presented as daily loads for each month of the calendar year.

For pathogens, it was determined that a 80%-90% reduction was needed from the following tributaries: Deer Creek, Eel River, Embarras River, Little Vermilion River, Little Wabash River, Mississinewa River, Patoka River, Pipe Creek, Salamonie River, Sugar Creek, Tippecanoe River, Vermilion River, White River, and Wildcat Creek. The resulting load allocations for pathogens are identified in Table 4-1, 4-4, 4-7, 4-10, 4-11, 4-12, 4-13, 4-14, and 4-15 of the TMDL report and are presented as daily loads for each month of the calendar year.

IDEM determined that non-point reductions in nitrates were not needed to attain water quality standards because this TMDL approach assumes that Ohio's nitrate TMDL is fully implemented, and therefore, nitrate levels in Indiana would not need to be reduced if Ohio's targets are met (Page 11 of the TMDL Report).

Potential non-point sources of phosphorus and pathogens to the Wabash River tributaries that need to be addressed include, but are not limited to, sheet/rill erosion from field, tile drainage, animal operations, fertilizer applications, and failing or illicit connections.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this fourth element.

5. Wasteload Allocations (WLAs)

U.S. EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permitees should be notified of any deviations from the initial individual WLAs contained in the TMDL. U.S. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comment:
Nutrients
Individual WLAs were calculated for NPDES permitted facilities, CSOs, and Municipal Separate Storm Sewer Systems (MS4) communities that discharge directly to the Wabash River (See Page 39 and Appendix I of the TMDL Report). Those facilities that discharge directly to the Wabash, but whose flow averaged less than 1 cfs were not used in the RIV1 model due to their small flow (Page 22 of the TMDL Report) since these pollutant loads are considered negligible. Existing and allowable loads from the MS4 communities were based on an area-weighted approach (that is, the area of the MS4 community divided by the area of the subwatershed, multiplied by estimated subwatershed loads).

IDEM determined that all wastewater facilities with design flows greater than 1 MGD have permit limits for *E. coli*, and therefore were not considered to be significant sources of pathogens. These facilities, however, do not have permit limits for nitrate or total phosphorus and therefore may be significant sources of these pollutants. Industrial facilities and power plants were not considered as sources of pathogens or nutrients due to the nature of these facilities and their discharge (Page 22 of the TMDL Report).

Phosphorus
During the allocation process it was found that estimated total phosphorus loads from some NPDES facilities represented a large proportion of the load in the river, especially during the low flow months of June through September. Estimated phosphorus loads from WWTPs were determined to account for more than 50 percent of the load during low flow conditions downstream of Lafayette. These estimated WWTP loads were reduced to meet the instream phosphorus benchmark of 0.30 mg/L. A literature value of 7 mg/L was used to estimate WWTPs loads during the modeling process, which may have over-estimated the actual loads as the values in the literature generally range from 3 to 10 mg/L. Actual phosphorus loads are unknown and literature values were used because facilities are not required to monitor total phosphorus concentrations in their effluent discharge.

The TMDL approach for phosphorus is based upon the premise that the NPDES facility loads are reduced by assuming a total phosphorus limit of 1 mg/L. According to IDEM, an effluent phosphorus concentration of 1 mg/L is a typical permit standard in areas of the United States where phosphorus limits are set. This approach is appropriate based on the most recent and available information at the time the TMDL was developed. As stated in the implementation section of the TMDL Report, additional sampling is recommended for phosphorus and the TMDL strategy may be amended as new information is developed in the watershed to better account for contributing sources of the impairment and to determine where load reductions are most appropriate (Page 39 of the TMDL Report).

Nitrates
It was determined that reductions in nitrate were not needed from the individual permitted facilities, however WLAs were still assigned. These WLAs represent the nitrate targets needed to meet water quality standards. Nitrate WLAs were assigned because this TMDL approach assumes that Ohio's nitrate TMDL is fully implemented, and therefore, nitrate levels in Indiana would not need to be reduced if Ohio's targets are met (Page 11 of the TMDL Report).

No reductions of *E. coli*, fecal coliform, or nitrates were determined to be needed from the individual WWTP permitted facilities. However, reductions from the MS4 communities and CSOs are needed. When modeled, these sources react similarly to non-point sources, since these sources are also driven by wet-weather events. The model determined that sources driven by wet-weather needed to be reduced by 80%-90% for pathogens, and approximately 4% for phosphorus. The resultant WLAs are identified in Appendix I of the TMDL Report.

<u>Pathogens</u>
One CAFO within 2000 feet of the Wabash River mainstem exists, and IDEM and IEPA do not believe that this CAFO is a significant source of nutrients or pathogens to the river. The WLA for this CAFO is 0. In addition, numerous CAFOs within the Wabash watershed were found and identified as potential sources. Loads from these CAFOs are

captured in the tributary and subwatershed loads that drain directly to the Wabash River (Page 24 of the TMDL Report) and for which TMDLs were developed.

Thirteen CSO communities are located along the Wabash River and are potential sources of both nutrients and pathogens (Page 23 of the TMDL Report). As previously stated, discharges from CSOs were reduced and the resultant WLAs are identified in Appendix I of the TMDL Report and are expressed as daily loads.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this fifth element.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). U.S. EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comment:
An explicit 5% MOS was incorporated for pathogen and nutrient TMDLs. IEPA and IDEM believes that this is an adequate MOS because the RIV1 model showed an R^2 value ranging from 0.85-0.89, indicating a good fit between the model and observed and predicted data. There is an additional implicit MOS for pathogen loads in Illinois, since TMDL loads were designed to be protective from April – October. Illinois's water quality standard, however, is protective from May – October. This provides an extra level of assurance that loads are reduced at a level needed to meet Illinois's water quality standard for pathogens.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this sixth element.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variations (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Comment:
Seasonal variation was accounted for during the development of both nutrient and pathogens TMDLs. The model used continuous simulation, where daily water quality conditions were modeled over a period of several years. Thus, seasonal variations in hydrologic conditions and source loadings were inherently taken into account when the TMDLs were developed. Pollutant concentrations were simulated on a daily basis and daily concentrations were compared to TMDL targets to determine allocations. Daily maximum loads were identified for each month to address the changing loading capacity associated with monthly flows and seasonality in accordance with the fecal coliform and *E. coli* water quality standards (Page 40 of the TMDL Report).

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this seventh element.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur, U.S. EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that non-point source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for U.S. EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

U.S. EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by non-point sources. However, U.S. EPA cannot disapprove a TMDL for non-point source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comment:
Section 6.0 of the TMDL Report describes activities that will help ensure that the allocations of the TMDL will be implemented and provided the following information:

<u>NPDES Permitted Dischargers</u>
For the permitted dischargers that have only total residual chlorine limits in their current permits, IDEM's TMDL program proposes that *E. coli* limits and monitoring be added when the next permit renewals are issued.

Furthermore, because the phosphorus loads from NPDES facilities had to be estimated, it is recommended that effluent monitoring be added to the wastewater treatment plant permits. Additional in-stream monitoring should also be performed. If the monitoring confirms that the wastewater treatment plant loads represent a large proportion of low flow Wabash River loads, this will need to be addressed by IDEM and the individual facilities after the sampling results are available.

There are 13 CSO communities that discharge to the Wabash River watershed. These facilities are currently in the NPDES Long Term Control Plan permitting process. This process will address any concern about CSO discharges causing or contributing to the violation of the *E. coli* or nutrient water quality standards.

Storm Water General Permit Rule 13
MS4 permits are being issued in the state of Indiana. The seven MS4 communities located along the Wabash River watershed are: Huntington, Wabash, Peru, Lafayette, Terre Haute, Vincennes, and Logansport. Once these permits, as well as all other MS4 permits in the Wabash River watershed, have been issued and implemented, they will improve the water quality in the watershed. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). These permits will be used to address storm water impacts in the Wabash River watershed.

Confined Feeding Operations and Confined Animal Feeding Operations
CFOs and CAFOs are required to manage manure, litter, and process wastewater pollutants in a manner that does not cause or contribute to the impairment of water quality standards. CFOs and CAFOs in the Wabash River watershed must meet this requirement.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this eighth element.

9. Monitoring Plan to Track TMDL Effectiveness

U.S. EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and non-point sources, and the WLA is based on an assumption that non-point source load reductions will occur. Such a TMDL should provide assurances that non-point source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comment:
IDEM
Monitoring of the Wabash River (mainstem) will take place during IDEM's five-year rotating basin schedule and/or once the TMDL implementation occurs. Monitoring will

be adjusted as needed to assist in continued source identification and elimination. Monitoring by IDEM will occur at an appropriate frequency to determine if Indiana's water quality standards are being met. When these results indicate that the waterbody is meeting standards, the waterbody will then be removed from the 303(d) list during the appropriate listing cycle.

IEPA
Monitoring of the Illinois portion of the Wabash River will take place as part of Illinois' Ambient Water Quality Monitoring Network consisting of fixed-station sampling to support the data need of surface waters. Monitoring will occur at a six-week sampling frequency, and will be analyzed for fecal coliform to determine its compliance with the water quality standard. When these results indicate that the waterbody is meeting standards, the waterbody will then be removed from the 303(d) list during the appropriate listing cycle.

U.S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this ninth element.

10. Implementation

U.S. EPA policy encourages Regions to work in partnership with States/Tribes to achieve non-point source load allocations established for 303(d)-listed waters impaired by non-point sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that non-point source LAs established in TMDLs for waters impaired solely or primarily by non-point sources will in fact be achieved. In addition, U.S. EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. U.S. EPA is not required to and does not approve TMDL implementation plans.

Comment:
U.S. EPA is not required to and does not approve TMDL implementation plans. However, section 6.0 of the TMDL Report provides information on implementation activities for pathogens and nutrients.

In addition to the regulatory activities identified under the "Reasonable Assurance" section of this Decision Document, the following non-regulatory (non-point source) activities were identified in the TMDL Report:

Watershed Projects
There are a number of watershed projects ongoing throughout the Wabash River watershed, including the development of a variety of watershed management plans by various entities (See Appendix J of the TMDL Report). The information gathered from these plans will provide more specific information regarding the types of management efforts that are needed within each Wabash River tributary watershed. Furthermore, IDEM has Watershed Specialists assigned to different areas of the state. These

Watershed Specialists are available to assist stakeholders with starting a watershed group, facilitating planning activities, and serving as a liaison between watershed planning and TMDL activities in the Wabash River watershed.

Potential Future Activities

Nonpoint source pollution, which is a cause of nutrient and pathogen impairments in this watershed, can be reduced by the implementation of BMPs. BMPs are practices used in agriculture, forestry, urban land development, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, changing a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Livestock owners, farmers, and urban planners can implement BMPs outside of a watershed management plan, but the success of BMPs is typically enhanced if coordinated as part of a watershed management plan. Following are examples of BMPs that may be used to reduce *E. coli* and nutrient loads:

- Riparian Area Management - Management of riparian areas protects stream banks and river banks with a buffer zone of vegetation, either grasses, legumes, or trees.
- Manure Collection and Storage - Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run off into surface waters or leach down into ground water.
- Contour Row Crops - Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.
- Manure Nutrient Testing - If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid overapplication and run-off.
- Drift Fences - Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keeps animals out and prevents direct input of *E. coli* to the stream.
- Pet Clean-up / Education - Education programs for pet owners can improve water quality of runoff from urban areas.
- Septic Management/Public Education - Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some anthropogenic sources of pathogens.

U. S. EPA finds that IEPA and IDEM approach is acceptable.

11. Public Participation

U.S. EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own

continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, U.S. EPA has explained that final TMDLs submitted to U.S. EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When U.S. EPA establishes a TMDL, U.S. EPA regulations require U.S. EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If U.S. EPA determines that a State/Tribe has not provided adequate public participation, U.S. EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by U.S. EPA.

Comment:
Public participation is described in Section 5.0 of the TMDL Report. Public meetings were held within the Wabash River watershed to discuss the various stages of TMDL development and solicit public input at the following times and locations:

- October 11, 2005 in Huntington, Indiana
- October 11, 2005 in Lafayette, Indiana
- October 12, 2005 in Robinson, Illinois
- January 26, 2006 in Poseyville, Indiana
- January 31, 2006 in Bluffton, Indiana
- February 1, 2006 in Logansport, Indiana
- February 1, 2006 in Wabash, Indiana
- February 9, 2006 in Terre Haute, Indiana
- February 9, 2006 in Vincennes, Indiana
- July 11, 2006 in Huntington, Indiana
- July 12, 2006 in Hutsonville, Illinois

Public comments were received on the draft TMDL Report at the public meetings and during the 30-day public comment period (held July 11, 2006 – August 11, 2006). IEPA and IDEM reviewed these public comments and the U.S. EPA believes that these comments were adequately addressed (Appendix K of the TMDL Report).

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this eleventh element.

12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a *technical review* or *final review and approval*. Each final TMDL submitted to U.S. EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for U.S. EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and U.S. EPA's duty to review, the

TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

Comment:

U.S. EPA received the Wabash River TMDL Report from IEPA on September 6, 2006, and from IDEM on September 8, 2006. Each TMDL Report was accompanied by a submittal letter dated September 6, 2006, and September 8, 2006, respectively. In both submittal letters, IEPA and IDEM stated: "The Total Maximum Daily Load (TMDL) report for the Wabash River is submitted for U.S. EPA's final review and approval under Section 303(d) of the Clean Water Act." The submittal letter included the name and location of the waterbody assessment unit and the pollutants of concern. They include fecal coliform for Illinois, and *E. coli* and nutrients for Indiana. TMDLS have been calculated for fecal coliform, *E. coli*, total phosphorus, and nitrates.

U. S. EPA finds that the TMDL document submitted by IEPA and IDEM satisfies all requirements concerning this twelfth element.

13. Conclusion

After a full and complete review, U.S. EPA finds that the TMDLs for the Wabash River satisfy all of the elements of approvable TMDLs. The TMDL Report identifies 3 pollutants: phosphorus, nitrates, and pathogens.

Illinois: This approval is for a total of 3 TMDLs (Table 4a of the Decision Document) addressing 1 fecal coliform impairment (Table 5 of the Decision Document).

Indiana: This approval is for a total of 12 TMDLs (Table 4b of the Decision Document) addressing 162 impairments (Table 5 of the Decision Document).

To assist in implementation, IDEM identified those basins and Hydrologic Unit Codes (HUC) (identified in Table 5 of the Decision Document) that need to be targeted to meet the TMDL allocations identified in Tables 4a and 4b

U.S. EPA's approval of these TMDLs does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. U.S. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. U.S. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 4a: U.S. EPA approved TMDLs (Illinois)

TMDL Location	Phosphorus TMDL	Nitrate TMDL	Fecal coliform TMDL
Wabash River at J. Edward Roush Lake	-	-	-
Wabash upstream of Lafayette	-	-	-
Wabash River at confluence with Vermilion	-	-	-
Wabash River at Illinois/Indiana state line			X
Wabash River at Hutsonville			X
and Wabash River at confluence with Ohio			X

Table 4b: U.S. EPA approved TMDLs (Indiana)

TMDL Location	Phosphorus TMDL	Nitrate TMDL	*E. coli* TMDL
Wabash River at J. Edward Roush Lake	X	X	X
Wabash upstream of Lafayette	X	X	X
Wabash River at confluence with Vermilion	X	X	X
Wabash River at Illinois/Indiana state line			X
Wabash River at Hutsonville			X
Wabash River at confluence with Ohio			X

Table 5: Waterbodies and Impairments Addressed by Basin

Basin/Waterbody	Segment ID	Phosphorus	Nitrate	Pathogens	Impairments Addressed
Upper Wabash (05120101)					
Wabash River	INB0141_T1023	X	X	X	*E. coli*, Nutrients
Wabash River	INB0161_T1025				*E. coli*, IBC, Nutrients
Wabash River	INB0162_00				*E. coli*, Nutrients
Wabash River	INB0164_T1001				*E. coli*, Nutrients
Wabash River	INB0171_T1002				*E. coli*, Nutrients
Wabash River	INB01E1_M1010				*E. coli*, Nutrients
Wabash River	INB01E3_M1011				*E. coli*, Nutrients
Wabash River	INB01E3_M1029				*E. coli*, Nutrients
Wabash River	INB01F1_M1012				*E. coli*, Nutrients
Wabash River	INB01F2_M1013				*E. coli*, Nutrients
Wabash River	INB01F5_M1014				*E. coli*, Nutrients
Wabash River	INB01F8_M1015				*E. coli*, Nutrients
Wabash River	INB01F9_M1016				*E. coli*, Nutrients
Wabash River	INB01FA_M1017				*E. coli*, Nutrients
Wabash River	INB01G1_M1018				*E. coli*, Nutrients
Wabash River	INB01G3_M1019				*E. coli*, Nutrients
Wabash River	INB01G4_M1020				*E. coli*, Nutrients
Wabash River	INB01J2_M1021				*E. coli*, Nutrients
Wabash River	INB01J4_M1022				*E. coli*, Nutrients
Wabash River - Below Huntington Lake Dam	INB0192_T1009				*E. coli*, Nutrients
Wabash River - Threemile Creek	INB0163_00				*E. coli*, Nutrients

Basin/Waterbody	Segment ID	Phosphorus	Nitrate	Pathogens	Impairments Addressed
Wabash River And Tributary	INB0164_00				*E. coli*, Nutrients
Wabash River Mainstem	INB0172_T1003				*E. coli*, Nutrients
Wabash River Mainstem	INB0173_T1004				*E. coli*, Nutrients
Wabash River Mainstem	INB0174_T1005				*E. coli*, Nutrients
Wabash River Mainstem	INB0175_T1006				*E. coli*, Nutrients
Wabash River Mainstem	INB0176_T1007				*E. coli*, Nutrients
Middle Wabash-Deer (05120105)					
Wabash River	INB0511_M1001				*E. coli*, Nutrients
Wabash River	INB0521_M1002				*E. coli*, Nutrients
Wabash River	INB0532_M1003				*E. coli*, Nutrients
Wabash River	INB0533_M1004				*E. coli*, Nutrients
Wabash River	INB0534_M1005	X	X	X	*E. coli*, Nutrients
Wabash River	INB0573_M1012				*E. coli*, Nutrients
Wabash River - Mainstem	INB0561_M1010				*E. coli*, Nutrients
Wabash River - Mainstem	INB0562_M1011				*E. coli*, Nutrients
Middle Wabash – Little Vermilion (05120108)					
Wabash River	INB0813_M1001	X	X	X	*E. coli*, IBC, Nutrients
Wabash River	INB0814_M1002				*E. coli*, Nutrients
Wabash River	INB0839_M1006				*E. coli*, Nutrients
Wabash River	INB0881_M1015				*E. coli*, Dissolved Oxygen, Nutrients, pH
Wabash River	INB0882_M1016				*E. coli*, Nutrients
Wabash River	INB0884_M1017				*E. coli*, Nutrients, pH
Wabash River	INB0886_M1018				*E. coli*, Nutrients, pH
Wabash River	INB0891_M1019				*E. coli*, Nutrients, pH
Wabash River	INB0894_M1020				*E. coli*, Nutrients
Wabash River	INB08F2_M1024				*E. coli*, Nutrients
Wabash River	INB08M1_M1031				*E. coli*, Nutrients
Wabash River	INB08M3_M1032				*E. coli*, Nutrients
Wabash River	INB08M4_M1033				*E. coli*, Nutrients
Wabash River - Attica	INB0871_M1014				*E. coli*, Nutrients, pH, Dissolved Oxygen
Wabash River - Below Independence	INB083B_M1007				*E. coli*, Nutrients
Wabash River - Cayuga Gen Sta To Mill Cr	INB08E1_M1050				*E. coli*, Nutrients
Wabash River - County Line To Little Pine Creek	INB0835_M1005				*E. coli*, Nutrients

Basin/Waterbody	Segment ID	Phosphorus	Nitrate	Pathogens	Impairments Addressed
Wabash River - Granville Brdg To Flint Creek	INB0833_M1004				*E. coli*, Nutrients
Wabash River - Ltl Vermillion R To Sugar Cr	INB08E6_M1051				*E. coli*, Nutrients
Wabash River - Mill Cr To Below Ltl Vermillion R	INB08E6_M1022				*E. coli*, Nutrients
Wabash River - Sugar Cr To Ltl Raccoon Cr (Vermillion)	INB08F1_M1023				*E. coli*, Nutrients
Wabash River - Vermilion R To Cayuga Gen Sta	INB08E1_M1021				*E. coli*, Nutrients
Wabash River D/S Of Wea Creek	INB0831_M1003				*E. coli*, Nutrients
Middle Wabash – Busseron (05120111)					
Wabash River	INB1145_M1003				*E. coli*
Wabash River	INB1174_M1005				*E. coli*
Wabash River	INB1194_M1007				*E. coli*
Wabash River	INB11C4_M1009				*E. coli*
Wabash River	INB11F1_M1010				*E. coli*
Wabash River	INB11F3_M1011				*E. coli*
Wabash River	INB11H1_M1014				*E. coli*
Wabash River	INB11H2_M1015				*E. coli*
Wabash River	INB11J1_M1017				*E. coli*
Wabash River	INB11K4_M1018				*E. coli*
Wabash River	INB11M1_M1019				*E. coli*
Wabash River	INB11M3_M1020				*E. coli*
Wabash River - Otter Creek To Above Wabash Gen Sta Outfall	INB1142_M1002			X	*E. coli*
Wabash River - Spring Creek To Otter Creek	INB1138_M1001				*E. coli*
Wabash River - Wabash Gen Sta To Lost Creek	INB1142_M1025				*E. coli*
Wabash River-Ashmore Creek (Ill)	INB1176_M1006				*E. coli*
Wabash River-Buzzard Pond	INB11F4_M1012				*E. coli*
Wabash River-Riverview	INB11A5_M1008				*E. coli*
Wabash River-Terre Haute Area	INB1156_M1004				*E. coli*
Lower Wabash (05120113)					
Wabash River	INB1311_M1001			X	*E. coli*

Basin/Waterbody	Segment ID	Phosphorus	Nitrate	Pathogens	Impairments Addressed
Wabash River	INB1315_M1002				*E. coli*
Wabash River	INB1316_M1003				*E. coli*
Wabash River	INB1331_M1004				*E. coli*
Wabash River	INB1333_M1005				*E. coli*
Wabash River	INB1354_M1007				*E. coli*
Wabash River	INB1361_M1008				*E. coli*
Wabash River	INB1381_M1009				*E. coli*
Wabash River	INB1382_M1010				*E. coli*
Wabash River	INB13A1_M1011				*E. coli*
Wabash River	INB13A3_M1012				*E. coli*
Wabash River	INB13A4_M1013				*E. coli*
Wabash River	INB13C1_M1015				*E. coli*
Wabash River	INB13C2_M1016				*E. coli*
Wabash River	INB13D1_M1017				*E. coli*
Wabash River	INB13D2_M1018				*E. coli*
Wabash River-Greathouse Creek (III)	INB1341_M1006				*E. coli*
Wabash River-Wabash Levee Ditch (III)	INB13A5_M1014				*E. coli*
Wabash River	IL_B-06				Fecal Coliform