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

JUL 31 2006

REPLY TO THE ATTENTION OF:

WW-16J

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

Dear Ms. Mettler:

The United States Environmental Protection Agency (U.S. EPA) conducted a complete review of the final Total Maximum Daily Load (TMDL) submittal, including supporting documentation and information, for *E. coli* in 13 segments of the Big Blue River watershed, which is located in Henry and Rush Counties, Indiana. Based on this review, U.S. EPA determined that Indiana's TMDL for one pollutant (*E. coli*) for these 13 waterbody segments meets 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, by this letter, U.S. EPA hereby approves 13 TMDLs for the Big Blue River watershed. 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 appreciate your hard work in this area and the submittal of the TMDLs as required. If you have any questions, please contact Mr. Kevin Pierard, Chief of the Watersheds and Wetlands Branch at 312-886-4448.

Sincerely yours,

Jo Lynn Traub,
Director, Water Division

Enclosure

cc: Andrew Pelloso, IDEM

TMDL: Big Blue River Watershed, Indiana
Date: JUL 31 2006

DECISION DOCUMENT FOR APPROVAL OF THE BIG BLUE RIVER WATERSHED TMDL IN INDIANA

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and 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 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 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 nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for 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:

Location Description: The Big Blue River watershed is an eight digit (05120204) hydrologic unit code (HUC) watershed located in the Driftwood River Basin in east-central Indiana (Figure 1 of the TMDL submittal). The TMDL addresses approximately 53 square miles of the Big Blue River watershed in Henry and Rush Counties, Indiana. The Big Blue River originates in the northern Henry County and flows north into Summit Lake. The Big Blue River turns southwest after Summit Lake and flows into northwest Rush County past the Town of Carthage, eventually joining the Driftwood River near Edinburgh, Indiana.

The TMDL submittal addresses the impaired segments of the Big Blue River watershed from its headwaters to its confluence with Six Mile Creek, approximately six miles downstream of Carthage. The Big Blue River watershed TMDL addresses impairments in the Big Blue River, and its tributaries including Montgomery Creek, Buck Creek, Duck Creek, and Little Blue River. These streams are impaired by elevated levels of *E. coli* during the recreational season.

All thirteen (13) of the impaired segments addressed in this TMDL are located in the Driftwood River Basin. The impaired segments included in Table 1 of the TMDL submittal are found below:

Waterbody Name	Segment ID Number	Length (Miles)	Impairment
Big Blue River	INW0411_T1001; INW0412_T1002; INW0414_T1003; INW0415_T1004; INW0418_T1005; INW041B_T1006; INW041C_T1007; INW041D_T1008; INW041E_T1009	34.50	*E. coli*
Montgomery Creek	INW041B_00	4.61	*E. coli*
Buck Creek	INW0419_01	1.66	*E. coli*
Duck Creek	INW0417_00	6.75	*E. coli*
Little Blue River	INW0413_00	6.35	*E. coli*

Listing Information: In 2004, Indiana's section 303(d) list cited segments of the Big Blue River as being impaired for *E. coli.* Based on data collected in 2002, a reassessment of the watershed was completed by IDEM. The reassessment documented elevated levels of *E.coli* in several tributaries of the Big Blue River, including Montgomery Creek, Buck Creek, Duck Creek, and Little Blue River. The reassessment included sampling of twenty-one (21) sites in the watershed (see Figure 2 of the TMDL submittal). IDEM sampled each site five times, spaced over a 30-day period from June 3, 2002 to July 17 2002. IDEM's sampling protocol is consistent with the monitoring frequency requirements included in Indiana's water quality standard (WQS) for *E.coli* (see Section 2 below). The single sample maximum and geometric mean standards were exceeded at twenty (20) of the twenty-one (21) sites. In addition, historical data collected by IDEM documented elevated levels of *E.coli* from 1991 to 2004.

Based on the reassessment IDEM added Montgomery Creek, Buck Creek, Duck Creek, and Little Blue River to the 2006 303(d) List, approved by EPA on May 23, 2006.

Topography and Land Use: Based on 1992 data, approximately 66% of the landuse in the Big Blue River watershed is agricultural (TMDL submittal, Figure 3). Remaining landuse consists of 19% grass/pasture, 9% palustrine wetlands, 4% urban and 2% water. A comparison of 1992 landuse information with aerial photos taken 2003 shows little change along the Big Blue River.

Pollutant of concern: The pollutant of concern is *E. coli.*

Pollutant sources: There are both point sources and nonpoint sources of *E. coli* in the Big Blue River watershed. The nonpoint sources include:

Wildlife – deer, geese, ducks, raccoons, turkeys, and other animals;

Septic systems

County Health Departments within the watershed report septic failures but have not established failure rates (according to IDEM communication with Henry and Rush County health departments);

Confined Feeding Operations (CFOs) and Concentrated Animal Feeding Operations (CAFO)

There are five (5) active CFOs in the Big Blue River watershed (Figure 6, Appendix of the TMDL submittal), none of which are considered CAFOs by IDEM. The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state". The active CFOs in the Big Blue River watershed do not have open enforcement actions at this time. Therefore, these operations are not considered by IDEM to be a significant source of *E. coli* for the Big Blue River watershed. However, IDEM stated (page 8, Source Linkage Section of the TMDL submittal), that CFOs

could be sources of *E. coli* during high flow conditions identified on the water quality duration curves, and that "[t]hese facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility." IDEM also mentioned (email correspondence, IDEM, 7/21/2006), that locations for applying manure are chosen so that run off of manure will not occur during rain events. Regarding potential discharges at CFOs, IDEM indicated that spills or discharges, resulting from malfunctions or manure runoff from a high rain event, will be treated as an enforceable violation (email correspondence, IDEM, 7/26/2006);

Small Livestock Operations

There are also many small livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available; however, these small livestock operations may be a source of the *E. coli* impairment.

Point sources include:

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers

There are 13 NPDES permitted dischargers in the Big Blue River watershed (Appendix 1, Figure 4 of the TMDL). Seven of the thirteen permitted dischargers have a sanitary component to their discharge and, as a result, have *E. coli* limits. These facilities are not considered by IDEM to be significant sources of the *E. coli*.

Three of the thirteen permitted dischargers have no sanitary component to their discharge or have a pretreatment limit, and are not considered by IDEM to be significant sources of the *E. coli* impairment.

Two of the thirteen permitted dischargers have Total Residual Chlorine (TRC) limits, but will have *E.coli* limits added to their permits by IDEM during the next permit renewal cycle. One facility, Kennard Municipal STP (IN0040151), operated with an expired permit in 2002 and is currently working with IDEM to upgrade their plant and achieve compliance. Kennard STP reapplied for a permit and will migrate from TRC limits to *E. coli* limits when the enforcement action is resolved and their new permit is issued. Although these facilities may have had upsets during periods of high rainfall and flooding, IDEM does not consider these facilities to be significant sources of *E. coli*.

A summary of NPDES sources, by permit type, is included below.

Table 1. NPDES Permits in the Big Blue River Watershed *(from TMDL submittal, Appendix 1)*

Facilities with *E. coli* Limits

Permit No.	Facility Name	Receiving Waters
IN0031399	Blue River Valley Jr/Sr HS	Tributary to Big Blue
IN0045063	Days Inn WWTP	Big Blue River
IN0040177	Knightstown Municipal WWTP	Big Blue River
IN0043966	Gasamerica Services, Inc	Montgomery Creek
IN0024937	Carthage Municipal STP	Big Blue River
IN0023914	New Castle Municipal STP	Big Blue River
	(Permit Admin extended, 2nd Public Notice 10-28-2005)	
IN0041181	Golden Pebble Estates MHP	Duck Creek
	(Permit issued 4-26-2005 will have *E. coli* limits)	

Facilities with Total Residual Chlorine Limits

Permit No.	Facility Name	Receiving Waters
IN0048011	Summit Lake State Park	Big Blue River
IN0059617	Knightstown Crossing WWTP	Montgomery Creek

Expired Facilities [*with TRC Limits*] under enforcement

Permit No.	Facility Name	Receiving Waters
IN0040151	Kennard Municipal STP	Montgomery Creek
	Facility is under enforcement, lagoon no longer meets state requirements	

Facilities with no Sanitary Component

Permit No.	Facility Name	Receiving Waters
IN0001350	Jefferson-Smurfit Corps (US)	Big Blue River
IN0045284	Allegheny Ludlum Steel	Big Blue River
ING080205	Speedway 5229	Big Blue River

Storm Water General Permit Rule 13

IDEM identified New Castle as the only municipal separate storm sewer system (MS4) community in the watershed. IDEM considers the MS4 to be a potential source of *E. coli* to the Big Blue River, but found it difficult to determine if the MS4 community is a significant source of *E. coli*.

Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs)

IDEM considers CSOs and SSOs significant sources of *E. coli* in the Big Blue River watershed. There is one CSO community identified by IDEM along the Big Blue River (Figure 5, Appendix 2 of the TMDL submittal). The City of New Castle has eight CSOs, including four outfalls into the Big Blue River, and single outfalls into Baker Branch, Bowery Brook, Castle Run, and Mound Run (email correspondence, IDEM, 7/25/2006).

New Castle submitted a CSO Long Term Control (LTC) Plan to IDEM in December 2004. According to IDEM (email correspondence, IDEM, 7/21/2006), the goal of the LTCP is to insure that any discharge from a CSO does not cause or contribute to a violation of the *E. coli* WQS. The specifics on how this will be accomplished will be outlined in the LTCP itself. New Castle also has an SSO that discharges to the Big Blue River.

The Town of Carthage is not identified by IDEM as a CSO community and is not required to submit a CSO LTC plan. Carthage does have three SSOs (Figure 5, Appendix 2 of the TMDL submittal), two of which discharge into Carthage Creek, and one that discharges to the Big Blue River. SSOs are not permitted by IDEM and are considered illegal discharges.

IDEM's water quality duration curve analyses, summarized in Section 3 of this decision document, indicate that the highest levels of *E. coli* are found throughout the watershed during mid-range to high flow conditions. High *E. coli* values, associated with mid-range to high flow conditions, are indicative of *E. coli* transportation by field tiles and overland flow (TMDL submittal, page 10).

Priority ranking: IDEM scheduled this TMDL based on the data available from the basin-rotation schedule, which represents the most accurate and current information on water quality within the waterbodies covered by this TMDL (Page 2 of the TMDL). IDEM's TMDL development schedule corresponds with their basin-rotation water quality monitoring schedule. The development of most of IDEM's TMDLs is based on this schedule to take advantage of all available resources. Prioritization is based on whether the designated uses are being met, the magnitude of the impairment, and other plans for the watershed. For example, some watershed groups may want to implement some best management practices (BMPs) and assess their success without a TMDL.

EPA finds that the TMDL submittal from 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)). 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 Numeric Target Section of the TMDL submittal describes designated uses and numeric criteria applicable to this watershed.

Use Designation: The impaired designated use for the waterbodies in the Big Blue River watershed is for full body contact recreational use during the recreational season, April 1st through October 31st.

Numeric Standards: Indiana Administrative Code 327 IAC 2-1-6(d) established the full body contact recreational use *E. coli* Water Quality Standard (WQS) for all waters in the state of Indiana 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.**"

Targets: The target for these TMDLs is the standard as stated in the previous paragraph, for both the geometric mean portion and the single sample maximum portion, which is applicable from April 1st through October 31st (Page 3 of TMDL submittal "Numeric Targets" Section; and Personal Communication, IDEM, 7/21/2006). If the numeric standard is met, the river will meet the assigned designated use (327 IAC 2-1-6(d)). As discussed in the "TMDL Development" Section of the TMDL submittal, the water quality duration curves, representing the allowable load of *E. coli,* were calculated using both the single sample maximum and geometric mean standards as target lines.

EPA finds that the TMDL submittal from 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. 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. 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 nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comment:

Loading capacity: IDEM has determined that the loading capacity for the impaired waterbodies is the water quality standard; that is, 125 cfu/100 ml (geometric mean of 5 samples equally spaced over a 30 day period) and a sample maximum of 235 cfu/100 ml (Personal Communication, IDEM, 7/21/2006). The water quality duration curves representing the allowable load of *E. coli*, or the loading capacity, were calculated by IDEM using the single sample maximum and geometric mean standards of 235 *E. coli* per 100 ml and 125 *E. coli* per 100 ml, respectively.

IDEM believes the geometric mean portion of the WQS provides the best overall characterization of the status of the watershed. EPA agrees with this, as stated in the preamble of "The Water Quality Standards for Coastal and Great Lakes Recreation Waters Final Rule" (69 FR 67218-67243, November 16, 2004) on page 67224 "...the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation, and more directly linked to the underlying studies on which the 1986 bacteria criteria were based." IDEM will be relying on the geometric mean portion of the WQS to track implementation activity and results.

Typically, loading capacities are expressed as a mass per time (e.g. pounds per day). For *E. coli*, however, states often use concentration to measure loading capacity rather than mass per time, with concentration being the amount of matter in a given volume. This approach is consistent with EPA's regulations which define "load" as "an amount of matter . . . that is introduced into a receiving water. . . ." (40 CFR §130.2). To establish the loading capacities for the Big Blue River Watershed, IDEM used Indiana's WQS for pathogens which has a geometric mean for a 30 day period and a single sample maximum of an amount of bacteria colonies per 100 milliliters of receiving water. Thus, the loading capacity is expressed as a concentration, i.e. the amount of bacteria colonies per volume of water. A loading capacity is "the greatest amount of loading that a water can receive without violating water quality standards." (40 CFR §130.2). Loading capacity set at the WQS will assure that the water does not violate WQS.

Method for cause and effect relationship: IDEM developed *E. coli* water quality and load duration curve analyses for six sampling sites in the Big Blue River watershed (Attachments B and C of the TMDL), including the Big Blue River mainstem, a station at the base of the watershed, and stations at each of the four primary tributaries. Measured flow data are used to develop the water quality and load duration curves. The U.S. Geological Survey (USGS) flow gage on the Big Blue River at Carthage was used to generate the duration curves for the watershed.

The water quality and load duration curve analysis considers how stream flow conditions relate to a variety of pollutant loadings and their sources (point and nonpoint). The water quality duration curves (Attachment B) were included in the TMDL as a visual representation of the flow conditions at which the *E. coli* WQS violations occur. Details on how the duration curves were developed are included on pages 6, 7 and 10 of the TMDL.

In general, the first step is to develop flow duration curves, which relate flow values measured at each monitoring station to the percent of time those flow values are met or exceeded. Flows are ranked from extremely low flow, exceeded nearly 100% of the time, to extremely high flow which is rarely exceeded.

Flow duration curves are then used to develop water quality duration and load duration curves by multiplying flow values along the curve by the applicable WQS for *E.coli* (see Attachments B and C of the TMDL submittal). The water quality duration curves, representing the allowable load in terms of concentration (loading capacity) of *E. coli,* were calculated using the single sample maximum and geometric mean standards as target lines. IDEM plotted *E.coli* data on the water quality duration curves to provide a visual display of water quality conditions in the watershed, in terms of *E.coli* concentrations (in cfu/100ml units). The *E. coli* data points that are above the target lines exceed the WQSs, those that fall below the target lines meet the WQSs.

The load duration curves (see Attachment C of the TMDL submittal) provide a visual display of water quality conditions in the watershed in terms of daily *E. coli* load (in cfu/day units) compared to WQS target lines. IDEM also plotted *E. coli* load data on the load duration curves by multiplying *E. coli* sample concentration data by the flow associated with each sample collection event. The *E. coli* load data points that are above the curve exceed the WQS-based loading target, those that fall below the curve meet the loading target.

Analysis of the data, through the use of load and water quality duration curves, for the Big Blue River watershed indicates that higher *E. coli* impacts occur during mid to high flow conditions. IDEM identified the majority of sources of *E. coli* as nonpoint and wet weather sources, which include small animal operations, wildlife, CSOs, and leaking and failing septic tanks (TMDL submittal, page 9). *E. coli* load also enters the watershed through dry weather sources (point sources).

Then the next step is to determine where reductions need to occur. A summary of the required reductions for the Big Blue River watershed is included in the table below:

Table 2. Water Quality Duration Curve Analysis Summary Table

Waterbody Name	Monitoring Site ID	*E. coli* Geometric Mean *(cfu/100mL)*	% Reduction in *E.coli* loadings Required to meet WQS	Flow Range with Highest E. coli Values
Big Blue River	WED010-0034	431	71%	mid-range to high flow
Montgomery Creek	WED010-0019	432	71%	mid-range to high flow
Buck Creek	WED010-0009	307	59%	mid-range to high flow
Duck Creek	WED010-0010	841	85%	mid-range to high flow
Little Blue River	WED010-0013	325	62%	mid-range to high flow

IDEM developed a water quality duration curve analysis for the furthest point downstream on the Big Blue River. The analysis indicated that a 68% reduction in *E. coli* loadings would be required in order to meet WQS. This analysis included all data points in the watershed, including tributaries, and provides a general reduction estimate for the entire watershed.

The overall *E. coli* loading reductions needed on individual creeks within the watershed, summarized in the table above, show strong similarities. IDEM states that these similarities reflect the consistent nature of *E. coli* impairment throughout the watershed.

Critical conditions: E. coli sources to the Big Blue River watershed arise from a mixture of dry and wet weather-driven conditions. There is no critical condition for flow because the *E. coli* limit must be met under all flow conditions in this TMDL. The water quality standards will be met regardless of flow conditions during the recreational season.

EPA finds that the TMDL submittal from IDEM satisfies all requirements concerning this third element.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint 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 nonpoint sources.

Comment:

Load Allocation: The Load Allocation Section of the TMDL submittal and supporting material (Personal Communication, IDEM, 7/21/2006) identifies the load allocation for the

segments in the watershed as equal to the Water Quality Standard. As stated in Section 2 above and on page 3 of the TMDL submittal, the standard is 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."

IDEM calculated the geometric means and reductions needed for each sampling site in the watershed (Appendix 4 of the TMDL, Table 2 above). The load duration curves for the Big Blue River watershed can be used to determine a daily mass loading, if needed. The daily mass loading will vary depending on stream flow. These curves will be used by IDEM to target those critical flow regimes for implementation (Page 11 of the TMDL), and to determine the reduction needed for each sampling site in the watershed (Table 2 above). Thus, rather than determine reductions based upon land use types or source categories, the reductions are based upon geographical location.

IDEM determined the percent reduction necessary to meet WQS by comparing the geometric mean for each segment with the load allocation (see the *Water Quality Duration Curve Analysis Summary* Table in Section 3, above; and pages 7 and 8 of the TMDL submittal). Section 1 of this decision document includes a discussion of nonpoint sources in the watershed.

EPA finds that the TMDL submittal from IDEM satisfies all requirements concerning this fourth element.

5. Wasteload Allocations (WLAs)

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. These individual WLAs may be adjusted during the NPDES permitting process. 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. 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:

Wasteload Allocation (WLA): As mentioned previously, there are thirteen permitted dischargers in the Big Blue River watershed. Ten of the thirteen permitted dischargers have a sanitary component to their discharge. Seven of the thirteen permitted dischargers already have *E. coli* limits in their permits. Three of the thirteen permitted dischargers have total residual chlorine limits in their permits and will receive *E. coli* limits in their next permit cycle. Three of the thirteen do not have a sanitary component in their discharge or are a pretreatment permit that is connected to another WWTP for additional treatment.

The Waste Load Allocation Section of the TMDL submittal and supporting material (email correspondence, IDEM, 7/18/2006) identifies the waste load allocation for all facilities subject to NPDES regulation (see Table 1 above, and Appendix 1 of the TMDL), as equal to the Water Quality Standard.

The WLA for prohibited discharges from SSOs and septic systems with straight pipe discharges directly to streams is set at zero (0.0).

The City of New Castle has eight CSOs, including four outfalls into the Big Blue River, and single outfalls into Baker Branch, Bowery Brook, Castle Run, and Mound Run (see Appendix 2 of the TMDL submittal). New Castle submitted a CSO Long Term Control (LTC) Plan to IDEM in December 2004. The WLA for the New Castle CSOs discharging to Big Blue River, Baker Branch, Castle Run, and Mound Run, is set at the WQS, or the monthly geometric mean of 125 cfu/100ml and a single sample maximum of 235 cfu/100ml, from April 1st through October 31st. The New Castle CSO discharging to Bowery Brook (identified as outfall# 003C) is a prohibited CSO, and therefore has a WLA set at zero (email correspondence, IDEM, 7/25/2006).

According to IDEM, the City of New Castle is the only municipal separate storm sewer system (MS4) community in the watershed. IDEM considers the MS4 to be a potential source of *E. coli* to the Big Blue River, but found it difficult to determine if the MS4 community is a significant source of *E. coli*. This permit will be used to address storm water impacts in the Big Blue River 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). The WLA for City of New Castle MS4 is set at the WQS, or the monthly geometric mean of 125 cfu/100ml and a single sample maximum of 235 cfu/100ml, from April 1st through October 31st (email correspondence, IDEM, 7/18/2006).

EPA finds that the TMDL submittal from 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)). 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:

This TMDL uses an implicit margin of safety because no rate of decay was used for the pathogens. Since pathogenic organisms have a more limited capability of surviving outside their hosts, a rate of decay would normally be used. Applying a rate of decay into a TMDL calculation could result in a discharge limit greater than the water quality standard.

IDEM determined that applying the *E. coli* WQS to all flow conditions and with no rate of decay for *E. coli* is a conservative approach that provides for greater protection of the water quality.

EPA finds that the TMDL submittal from IDEM contains an appropriate MOS satisfying 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 is addressed by expressing the TMDL in terms of the *E. coli* WQS for full body contact during the recreational season (April 1st through October 31st) as defined by 327 IAC 2-1-6(d). There is no applicable full body contact *E. coli* WQS during the remainder of the year in Indiana. Because this is a concentration-based TMDL, *E. coli* WQS will be met regardless of flow conditions in the applicable season.

EPA finds that the TMDL submittal from 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 nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint 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:

The TMDL outlines several Reasonable Assurance activities, summarized below:

National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers
Three of the thirteen permitted dischargers have total residual chlorine limits in their permits and will receive *E. coli* limits in their next permit cycle.

According to IDEM, the City of New Castle is currently in the Long Term Control Plan (LTCP) permitting process. The goal of the LTCP is to insure that any discharge from CSO does not cause or contribute to a violation of the *E. coli* WQS. The specifics on how this will be accomplished will be outlined in the LTCP itself.

IDEM will continue to monitor and work with the New Castle and Carthage SSO facilities to eliminate these types of prohibited discharges.

Storm Water General Permit Rule 13
The City of New Castle is the only MS4 community in the Big Blue River watershed identified by IDEM. The MS4 permit, once issued by IDEM and implemented by New Castle, will address storm water impacts in the Big Blue River 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).

Confined Feeding Operations (CFOs) and Confined Animal Feeding Operations (CAFOs)
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 *E. coli* WQS.

Watershed Projects
IDEM has recently hired a Watershed Specialist for this area of the state. The Watershed Specialist will be 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 Big Blue River watershed.

Watershed Groups
Henry and Rush County along with the Friends of the Big Blue River have shown an interest in forming a group to address the impairments in the Big Blue River watershed.

Potential Future Activities
Nonpoint source pollution, which is a primary cause of *E. coli* impairment in this watershed, can be reduced by the implementation of "Best Management Practices" (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. 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 would be enhanced if coordinated as part of a watershed management plan.

EPA finds that this criterion has been adequately addressed.

9. Monitoring Plan to Track TMDL Effectiveness

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 nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint 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 will monitor the Big Blue River watershed on a 5-year rotating basin schedule or when a portion of the TMDL implementation is in place. Monitoring will be adjusted as needed for continued source identification and determination of whether standards are being met.

EPA finds that this criterion has been adequately addressed.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include

reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comment:

There are several suggestions for BMPs in the TMDL watershed. They include structural or managerial practices that may be used to reduce *E. coli* runoff (TMDL submittal, page 13), such as:

- **Riparian Area Management**
  Management of riparian areas protects stream banks and riverbanks 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 groundwater.

- **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 over application and runoff.

- **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.

Other implementation activities identified in the TMDL include:

- **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 *E. coli*.

EPA reviews, but does not approve, implementation plans. EPA finds that this criterion has been adequately addressed.

11. Public Participation

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, EPA has explained that final TMDLs submitted to 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 EPA establishes a TMDL, EPA regulations require 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 EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Comment:

The TMDL was public noticed from April 18, 2006 to May 18, 2006. A stakeholder meeting was held to provide an overview of the draft TMDL and provide an opportunity for public comments. The stakeholder meeting took place on April 18, 2006, at the Big Blue River Conservancy District in New Castle, Indiana. Copies of the draft TMDL were posted on the IDEM's Web site at: http://www.ai.org/idem/water/planbr/wqs/tmdl/documents.html. EPA sent in comments on the draft TMDL and they were adequately addressed in the final TMDL. IDEM received one comment letter from the public. The comments were adequately addressed by IDEM.

EPA finds that the TMDL submittal from Indiana 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 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 EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and 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:

EPA received the Big Blue River watershed TMDL on July 20, 2006, accompanied by a submittal letter dated July 11, 2006. In the submittal letter, IDEM stated that the TMDL

accompanying the letter is the Final TMDL submission for the State of Indiana for the Big Blue River watershed, which is impaired for *E.coli*. Thirteen segments are listed in the submittal letter.

13. Conclusion

After a full and complete review, EPA finds that the IDEM submittal determines standard - based concentrations for a total of 13 TMDLs for the Big Blue River watershed, Henry and Rush Counties, Indiana. The allocations satisfy all of the elements of an approvable TMDL. This approval concerns the waterbody segments and impairments set forth in the Table provided on page 2 of the TMDL submittal, and on page 2 of this decision document. Impairments addressed in these TMDLs are pathogens from the pollutant *E. coli*.

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