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

REPLY TO THE ATTENTION OF:
WW-16J

SEP 30 2011

Bonny F. Elifritz
Chief, Watershed Planning & Restoration Section
Indiana Department of Environmental Management
100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015

Dear Ms. Elifritz:

The U.S. Environmental Protection Agency has conducted a complete review of the final Total Maximum Daily Loads (TMDLs) for the Cicero Creek Watershed, including support documentation and follow up information. The Cicero Creek Watershed is located in central Indiana in parts of Boone, Clinton, Hamilton and Tipton Counties. The TMDLs address recreational use impairments due to bacteria (*E. coli*).

EPA has determined that the Cicero Creek Watershed TMDLs meet the requirements of Section 303(d) of the Clean Water Act and EPA's implementing regulations set forth at 40 C.F.R. Part 130. Therefore, EPA approves Indiana's 27 bacteria TMDLs addressing recreational use and aquatic habitat impairments. The statutory and regulatory requirements, and EPA's review of Indiana's compliance with each requirement, are described in the enclosed decision document.

We wish to acknowledge Indiana's efforts in submitting these TMDLs and look forward to future TMDL submissions by the State of Indiana. If you have any questions, please contact Mr. Peter Swenson, Chief of the Watersheds and Wetlands Branch, at 312-886-0236.

Sincerely,

Tinka G. Hyde
Director, Water Division

Enclosure

cc: Staci Goodwin, IDEM
Ernie Johnson, IDEM

TMDL: Cicero Creek Watershed, in Boone County, Clinton County, Hamilton County and Tipton County, Indiana
Date: September 30, 2011

DECISION DOCUMENT FOR THE CICERO CREEK WATERSHED, INDIANA BACTERIA (*E. COLI*) TMDLS

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/Spatial Extent:

The Cicero Creek watershed is located in central Indiana in the counties of Boone, Clinton, Hamilton, and Tipton. The watershed is approximately 225 square miles in size (HUC-10, #0512020106). In the upper part of the watershed, the waters flow in a northeasterly direction to the main stem of Cicero Creek. Once in the main stem, the waters flow in a southerly direction toward the outlet point near Noblesville, Indiana. The Cicero Creek TMDLs address 231 stream miles in the watershed which are impaired for recreational use by bacteria (*E. coli*).

Land Use:

Land use information was compiled by the Indiana Department of Environmental Management (IDEM) from the USGS Gap Analysis Program (GAP). The data source for the land use information was a 1992 GAP data set that identified and mapped different land use categories within the watershed. In 1992, the Cicero Creek watershed was composed of 94.1% agriculture, 2.6% wetland, 1.3% forest, 1.0% open water and 1.0% urban (See Table 1 of this Decision Document). During the water quality sample collection event in 2006 IDEM reported that land use within the watershed was still primarily agricultural with a mix of forest and wetland land uses and additional suburban growth near the edges of city areas.

Table 1: Land use approximations in Cicero Creek watershed (percentage of total watershed area)

Cicero Creek Watershed		
	Percentage of total watershed area	***Total watershed area = approx. 225 square miles***
	(%)	*(square miles)*
Agriculture	94.1	211.73
Wetland	2.6	5.85
Forest	1.3	2.93
Open Water	1.0	2.25
Urban	1.0	2.25

Problem Identification:

Reaches in the Cicero Creek watershed, which were designated as being impaired by bacteria exceedances (*E. coli*), were originally listed on the 1998 Indiana 303(d) list. These reaches were determined to be impaired by observed bacteria counts in excess of water quality standards (WQS). IDEM completed water quality sampling in the Cicero Creek watershed in 2001 and 2006 and found additional segments with *E. coli* WQS violations. Indiana's 2008 303(d) list included impaired waters within the Cicero Creek watershed which were assessed via the 2006 water quality sampling event. All reaches identified in the Cicero Creek watershed TMDL (See

Table 2 of this Decision Document, "Assessment Unit" column) will be included in the 2012 Indiana 303(d) list.

In preparation for the Cicero Creek watershed TMDL, IDEM completed a reassessment of water quality data collected in the Cicero Creek watershed in 2006. This reassessment was completed in the spring of 2011 in order to determine the extent of the impairment and to identify potential water quality impacts to stream segments. IDEM believes that understanding the potential impacts to surface water segments helps to identify similarities between stream reaches and the tributaries that feed into the stream reach. From this understanding IDEM was able to ascertain whether there were additional stream reaches, normally tributaries upstream of the water quality sampling point, which may be contributing to the water quality degradation of that particular reach.

IDEM based their reassessment on water quality data collected within the watershed. In this case, water quality data collected during 2006 was used to start the reassessment process in the Cicero Creek watershed. Each impaired reach was reassessed on a case by case basis and the representativeness of water quality sampling points in or near those reaches was examined. In addition to considering the water quality data, IDEM examined:

- The magnitude of the impairment.
- Whether or not other TMDLs have been completed in nearby reaches.
- Hydrology and topography of the subwatershed.
- Land uses within the subwatershed.
- National Pollutant Discharge Elimination System (NPDES) facility locations and outfalls.
- Concentrated Animal Feeding Operation (CAFOs) and Confined Feeding Operation (CFOs) locations within an 5-mile radius of the sampling location.
- Aerial photography of the sampling location.

IDEM documented its resegmentation approach in Attachments B and G of the final TMDL submittal.

Table 2: Summary of Impairments in the Cicero Creek watershed

Assessment Unit	Description	County	Impairment	Impaired Beneficial Use
INW0161_00	Prairie Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0162_01	Cicero Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0162_01A	Cicero Creek - Unnamed Tributary	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0163_01	Cicero Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0163_T1001	Dixon Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0164_01	Cicero Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0164_T1001	Cicero Creek - Unnamed Tributary	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0164_T1002	Buck Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0165_01	Cicero Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0165_01A	Cicero Creek - Unnamed Tributary	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0165_T1001	Tobin Ditch	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0165_T1002	Bacon Prairie Creek	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0165_T1003	Buscher Ditch	Tipton	Bacteria (*E. coli*)	Recreational Use
INW0166_01	Cicero Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0166_T1001	Sloan Ditch	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0166_T1002	Weasel Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0167_01	Little Cicero Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0167_T1001	Teter Branch	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0168_01	Little Cicero Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0168_T1001	Bennett Ditch	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0168_T1002	Taylor Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0169_01	Hinkle Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW0169_T1001	Jones Ditch	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW016A_01	Cicero Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW016A_T1001	Bear Slide Creek	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW016A_T1002	Morse Reservoir Inlet	Hamilton	Bacteria (*E. coli*)	Recreational Use
INW016A_T1003	Sly Run	Hamilton	Bacteria (*E. coli*)	Recreational Use

Overall, 27 segments in the Cicero Creek watershed were identified as impaired for recreational use by bacteria (*E. coli*). The 27 segments identified from the 2006 water quality monitoring efforts address approximately 231 miles of impaired streams. IDEM communicated that the 27 segments in Table 2 of this Decision Document will be included in the 2012 Indiana 303(d) list.

Priority Ranking:

The Cicero Creek watershed TMDL was prioritized to be completed at this time based on the IDEM rotating basin approach. In this approach available assessment resources are concentrated or targeted in defined watersheds for a specified period of time, thus allowing for water quality data to be collected and assessed in a spatially and temporally "focused" manner. Over time, every portion of the state is targeted for monitoring and assessment.

IDEM utilizes a rotating basin approach to monitor water quality unless there is a significant reason to deviate from the rotating basin schedule. Deviations can lead to waterbodies being upgraded or downgraded in priority depending on: the specified designated use and whether water quality standards are being met, the magnitude of the impairment, deviations to allow an appropriate amount of time for implementation practices to take hold, and instances where there is no water quality guidance available or guidance is currently being developed.

Pollutants of Concern:
The pollutant of concern for this TMDL is bacteria (*E. coli*). In this TMDL, IDEM identified 27 segments of the Cicero Creek watershed for violations of *E. coli* water quality standards.

Source Identification (point and nonpoint sources):
Point Source Identification: The potential point sources to the Cicero Creek are:

Wastewater Treatment Plants (WWTP): Wastewater treatment facilities may contribute bacteria (*E. coli*) loads to surface waters through facility discharges of treated wastewater. Permitted treatment facilities must discharge treated wastewater according to their NPDES permit. The WWTP within the Cicero Creek watershed which were assigned a wasteload allocation (WLA) were:

- Town of Atlanta WWTP (IN0022306).
- Town of Arcadia WWTP (IN0021334).
- Town of Sheridan WWTP (IN0031071).
- City of Tipton WWTP (IN0021474).

Municipal Separate Storm Sewer Systems (MS4): Stormwater can transport bacteria to surface water bodies during or shortly after storm events. The MS4 communities within the Cicero Creek watershed which were assigned a WLA were:

- Hamilton County MS4 (INR040066).
- Town of Atlanta MS4 (incorporated into Hamilton County's MS4 permit (INR040066)).
- Town of Arcadia MS4 (INR040004).
- Town of Sheridan MS4 (incorporated into Hamilton County's MS4 permit (INR040066)).
- City of Westfield (west) MS4 (INR040109).
- City of Noblesville MS4 (INR040127).
- Town of Cicero MS4 (INR040066, co-permittee with Hamilton County).

Stormwater contributions from NPDES permitted facilities with E. coli discharge limits: Runoff from urban areas (urban, residential, commercial or industrial land uses) may contribute *E. coli* to local water bodies. Stormwater from urban areas, which drain impervious surfaces, may introduce bacteria to surface waters. Urban bacteria sources can include wildlife or pet wastes. IDEM identified one NPDES permitted facility in the Cicero Creek watershed which has an *E. coli* discharge limit and *E. coli* monitoring plan included in its current NPDES permit. This facility, Gas America (IN0059943), was assigned a WLA.

Combined Sewer Overflows (CSOs): CSOs may transport bacteria to surface waters during overflow events brought on by stormwater inputs. There is one CSO community in the Cicero Creek watershed, the City of Tipton.

Concentrated Animal Feeding Operations (CAFO): CAFO facilities may transport bacteria to surface waters during storm events (via stormwater runoff). CAFO facilities are generally not allowed any pollutant discharges from their facilities. Illegal discharges from CAFO sites may transport bacteria to surface waters. CAFO feedlots in the Cicero Creek watershed are required to operate under the conditions of their NPDES permit. There are six CAFO facilities in the Cicero Creek watershed.

Nonpoint Source Identification: The potential nonpoint sources to the Cicero Creek watershed are:

Septic systems: Septic systems generally do not discharge directly into a waterbody, but their effluents may leach into groundwater or pond at the surface where they can be washed into surface waters via stormwater runoff events. Failing septic systems are a potential source of *E. coli* in the watershed. All the counties in the watershed follow the state IAC 16-1-4-9 and IAC 36-1-6-2 rules regarding septic systems. Failures are typically identified through public complaints and through the sale of older properties that have not passed inspection.

Confined Feeding Operations (CFO) and small livestock operations: CFO and smaller facilities may transport bacteria to surface waters during storm events (via stormwater runoff). CFOs are required to obtain state, but not federal permits. Those permits generally do not allow any discharges. Illegal discharges from CFO sites may transport bacteria to surface waters. There are seven CFOs in the Cicero Creek watershed. The State of Indiana is responsible for monitoring CFO facilities. Smaller animal facilities which fall beneath the animal threshold limits for a CFO designation (non-CAFO small animal facilities), may add *E. coli* to surface waters via wastewater from the facilities, near-stream pastures, manure spreading onto fields, and livestock with access to stream environments.

Stormwater runoff from agricultural land use practices: Runoff from agricultural lands (feedlots, pastures and fields) can contain significant amounts of bacteria. Manure spread onto fields is often a source, and may be exacerbated by field-tile drainage lines, which channelize the stormwater flows and reduce the time available for bacteria to die-off. Land applied manure may also reach surface waters via overland runoff and via macropore/preferential flow pathways. Stormwater runoff related to manure stockpiles and manure storage facilities may also contribute *E. coli* to stream environments in the Cicero Creek watershed.

Unrestricted livestock access to streams: Livestock with access to stream environments may add bacteria directly to the surfaces waters or resuspend particles which had settled on the stream bottom. Direct deposit of animal wastes may result in very high localized bacteria counts and may also contribute to downstream impairments.

Urban runoff: Runoff from urban areas (urban, residential, commercial or industrial land uses) can contribute *E. coli* to local water bodies. Stormwater from urban areas, which drain

impervious surfaces, may introduce bacteria to surface waters. Urban bacteria sources can include wildlife or pet wastes.

Wildlife: Deer, geese, ducks, raccoons, turkeys, and other animals can contribute *E. coli* loads to the Cicero Creek watershed.

Future Growth:
IDEM provided information on future growth potential in the Cicero Creek watershed. IDEM compiled U.S. census data, on the county wide scale, for each of the counties within the Cicero Creek watershed. Between 2000 and 2010 there was significant growth in Hamilton County (which occupies 53.7% of the Cicero Creek watershed). Hamilton County, which includes the Towns of Cicero, Noblesville, and parts of Westfield, increased in population by approximately 35% between 2000 and 2010. The other counties in the Cicero Creek watershed did not show similar growth. IDEM did not choose to incorporate this information into the calculation of the TMDLs for the Cicero Creek watershed. No portion of the loading capacity for *E. coli* was assigned to a future growth/reserve capacity value.

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the first criterion.

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:
Designated Uses:
The designated uses for the waterbodies within the Cicero Creek watershed are for total body contact recreation use. Total body contact recreation use is confined to the recreation season, April 1 through October 31 of the calendar year, pursuant to 327 IAC 2-1.5-8(e).

Standards & Targets:
The total body contact recreational use *E. coli* WQS for all waters in the non-Great Lakes system are as follows:

(3) For full body contact recreational uses, *E. coli* bacteria shall not exceed the following:
(A) One hundred twenty-five per 100 milliliters as a geometric mean based on not less than five samples equally spaced over a 30 day period.
(B) Two hundred thirty-five per 100 milliliters in any 1 sample in a 30 day period, except that in cases where there are at least 10 samples at a given site, up to 10 percent of the samples may exceed 235 cfu (colony forming units) or MPN (most probable number) per 100 milliliters where:

(i) the *E. coli* exceedances are incidental and attributable solely to *E. coli* resulting from the discharge of treated wastewater from a wastewater treatment plant as defined at IC 13-11-2-258; and
(ii) the criterion in clause (A) is met. However, a single sample shall be used for making beach notification and closure decisions.

(Indiana Administrative Code 327 IAC 2-1.5-8(e)(3))

The Cicero Creek watershed TMDL *E. coli* target is: from April 1through October 31. *E. coli* shall not exceed **125 cfu/100 mL** as a geometric mean based on not less than five samples equally spaced over a 30-day period.

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the second criterion.

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 steam 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:

IDEM determined the loading capacities (pages 12-19 of the final TMDL document) for the impaired waterbodies in the Cicero Creek watershed based on the *E. coli* WQS. The *E. coli* WQS was **125 cfu/100 ml** (geometric mean of five samples equally spaced over a 30-day period). IDEM believes the geometric mean portion of the WQS provides the best overall characterization of the status of the watershed. The EPA agrees with this assertion, 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* loading capacity calculations, however, mass is not always an appropriate measure because *E. coli* is expressed in terms of organism counts. IDEM chose to use a concentration as the target. This approach is consistent with the 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 Cicero Creek watershed, IDEM used Indiana's water quality standards for *E. coli* (125 cfu/100 mL). 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). Therefore, a loading capacity set at the WQS will assure that the water does not violate WQS. IDEM's *E. coli* TMDL approach is based upon the premise that all discharges (point and nonpoint) must meet the WQS when entering the waterbody. If all sources meet the WQS at discharge, then the waterbody should meet the WQS and the designated use.

IDEM used the load duration curve (LDC) approach to calculate bacteria loading at the outlet points of subwatersheds (HUC-12 scale) within the Cicero Creek watershed. Impaired reaches were assigned to their respective subwatershed based on the location of the reach within the Cicero Creek watershed. LDCs were also utilized to assist watershed managers in choosing correct implementation activities for mitigation in each subwatershed. IDEM included an explanation for their approach on pages 12-14 in the "Linkage Analysis and *E. coli* Load Duration Curves" section.

Flow duration curves (FDC) were created for each of subwatersheds within the Cicero Creek watershed. The FDC were developed from flow frequency tables based on recorded and scaled flow volumes measured at a USGS gage on Cicero Creek in Cicero, Indiana (USGS #0335000). Flows at this location were utilized to characterize the flows in sub-basins upstream from the gage location. The flow data focused on dates within the recreation season

(April 1 – October 31). Dates outside of the recreation season were excluded from the flow record.

FDC graphs have flow duration interval (percentage of time flow exceeded) on the X-axis and discharge (flow per unit time) on the Y-axis. The FDC were transformed into LDC by multiplying individual flow values by the water quality standard (125 cfu/ 100 mL) and then by a conversion factor. The resulting points are plotted onto a load duration curve graph. LDC graphs, for the Cicero Creek watershed TMDLs, have flow duration interval (percentage of time flow exceeded) on the X-axis and *E. coli* concentrations (number of bacteria per unit time) on the Y-axis. The Cicero Creek watershed LDC used *E. coli* measurements in billions of bacteria per day. The curved line on a LDC graph represents the TMDL of the respective flow location and the flow conditions observed at that location.

IDEM completed water quality monitoring in the Cicero Creek watershed basin in 2006 and measured *E. coli* concentrations at specific sampling points within the watershed. *E. coli* values from these efforts were converted to individual sampling loads by multiplying the sample concentration by the instantaneous flow measurement observed/estimated at the time of sample collection. The individual sampling loads were plotted on the same figure with the created LDC.

The LDC plots were subdivided into five flow regimes; high flows, wet weather flows, normal range flows, dry weather flows, and low flows. High flows are exceeded 0 – 10 % of the time, wet weather flows are exceeded 10 – 40 % of the time, normal range flows are exceeded 40 – 60 % of the time, dry weather flows are exceeded 60 – 90 % of the time and low flows are exceeded 90 – 100 % of the time. The LDC plots, showing the individual sampling loads and the LDC, display under what flow conditions water quality exceedances occur. Individual sampling loads which plot above the LDC represent violations of the WQS and the allowable load under those flow conditions at those locations. The difference between individual sampling loads plotting above the LDC and the LDC, measured at the same flow is the amount of reduction necessary to meet WQS (see Attachments C & D of the final TMDL document).

The strengths of using the LDC method are that critical conditions and seasonal variation are considered in the creation of the FDC by plotting hydrologic conditions over the flows measured during the recreation season. Additionally, the LDC methodology is relatively easy to use and cost-effective. The weaknesses of the LDC method are that nonpoint source allocations cannot be assigned to specific sources, and specific source reductions are not quantified. Overall, IDEM believes and EPA concurs that the strengths outweigh the weaknesses for the LDC method.

Implementing the results shown by the LDC requires watershed managers to understand the sources contributing to the water quality impairment and which Best Management Practices (BMPs) may be the most effective for reducing bacteria loads based on flow magnitudes. Different sources will contribute bacteria loads under varying flow conditions. For example, if loads are significant during storm events, implementation efforts can target BMP that will reduce stormwater runoff and consequently bacteria loading into surface waters. This allows for a more efficient implementation effort.

TMDLs were calculated for each subwatershed in the Cicero Creek watershed. WLA were assigned to NPDES permitted facilities and MS4 communities, where appropriate in each individual subwatershed. Load allocations (LA) were not split amongst individual nonpoint contributors (ex. stormwater runoff from agricultural land use practices, failing septic systems, livestock in stream environments etc.). Instead, load allocations were represented as one value for each TMDL. Tables 3 through 12 show the TMDL values over the various flow regimes for each subwatershed in the Cicero Creek watershed.

Table 3: Prairie Creek TMDL summary (HUC-12 051202010601)

Listed Segments: INW0161_00

NPDES Facilities	None In Subwatershed				
MS4 Communities	None In Subwatershed				
CSO Communities	None In Subwatershed				
CAFOs	None In Subwatershed				
CFOs	David Glunt (ID# 1416), Becks Hybrids (ID#2231)				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.258
LA	1989.444	423.872	148.630	30.277	7.432
WLA	**	**	**	**	**
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** There are no NPDES permitted facilities within the Subwatershed, therefore a WLA was not calculated for the Subwatershed (WLA = 0)

Table 4: Cicero Ditch TMDL summary (HUC-12 051202010602)

Listed Segments: INW0162_01, INW0612_01A

NPDES Facilities	None In Subwatershed				
MS4 Communities	None In Subwatershed				
CSO Communities	None In Subwatershed				
CAFOs	Michael & Nancy Cline (ING804384) & Autumn Rose LLC (ING804848)				
CFOs	Somerset Farm (ID# 4353)				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.258
LA	1989.444	423.872	148.630	30.277	7.432
WLA	**	**	**	**	**
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** CAFO facilities are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed to discharge pollutants from their facilities. IDEM did not calculate a WLA for this subwatershed (WLA = 0).

Table 5: Dixon Creek-Cicero Creek TMDL summary (HUC-12 051202010603)

Listed Segments: INW0163_01, INW0163_T1001

NPDES Facilities	None In Subwatershed				
MS4 Communities	None In Subwatershed				
CSO Communities	None In Subwatershed				
CAFOs	Stafford Farms (ING802032)				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.258
LA	1989.444	423.872	148.630	30.277	7.432
WLA	**	**	**	**	**
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** CAFO facilities are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed to discharge pollutants from their facilities. IDEM did not calculate a WLA for this subwatershed (WLA = 0).

Table 6: Buck Creek-Cicero Creek TMDL summary (HUC-12 051202010604)

Listed Segments: INW0164_01, INW0164_T1001, INW0164_T1002

NPDES Facilities	None In Subwatershed				
MS4 Communities	None In Subwatershed				
CSO Communities	Tipton (8 CSOs)***				
CAFOs	Phil Overdorf Farms Inc (ING800710)				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.258
LA	1989.444	423.872	148.630	30.277	7.432
WLA	**	**	**	**	**
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** CAFO facilities are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed to discharge pollutants from their facilities. IDEM did not calculate a WLA for this subwatershed (WLA = 0).

*** WLA from CSOs were set at the *E. coli* water quality standard (125 cfu / 100 mL)

Table 7: Tobin Ditch-Cicero Creek TMDL summary (HUC-12 051202010605)

Listed Segments: INW0165_01, INW0165_01A, INW0165_T1001, INW0165_T1002, INW0165_T1003

NPDES Facilities	Tipton WWTP (IN0021474), Atlanta WWTP (IN0022306)				
MS4 Communities	None In Subwatershed				
CSO Communities	Tipton (8 CSOs)***				
CAFOs**	Schoettmer Prime Pork Farm Inc (ING804087)				
CFOs	R&A Swine (ID# 3731), A&J Livestock LLC (ID# 711)				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2020.356	480.831	175.007	43.503	18.120
LA	1995.033	429.461	154.219	35.866	13.021
WLA	3.287	3.287	3.287	3.287	3.287
Margin Of Safety: 10%	22.036	48.083	17.501	4.350	1.812

* Values were adjusted for rounding

** CAFO facilities are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed to discharge pollutants from their facilities.

*** WLA from CSOs were set at the *E. coli* water quality standard (125 cfu / 100 mL)

Table 8: Weasel Creek-Cicero Creek TMDL summary (HUC-12 051202010606)

Listed Segments: INW0166_01, INW0166_T1001, INW0166_T1002

NPDES Facilities	Arcadia WWTP (IN0021334)				
MS4 Communities	Atlanta (1.40%), Arcadia (2.53%)**				
CSO Communities	None In Subwatershed				
CAFOs***	Bryant Premium Pork LLC (ING802683)				
CFOs	Bryant Premium Pork LLC (ID# 841)				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2211.931	472.407	166.583	35.079	9.697
LA	1902.225	405.131	141.929	28.752	6.907
WLA	88.513	20.035	7.996	2.819	1.820
Margin Of Safety: 10%	221.193	47.241	16.658	3.508	0.970

* Values were adjusted for rounding

** MS4 WLA includes a 3.94% (1.40% + 2.53%) area of the watershed allocated to the MS4 areas

*** CAFO facilities are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed to discharge pollutants from their facilities.

Table 9: Teter Branch-Cicero Creek TMDL summary (HUC-12 051202010607)

Listed Segments: INW0167_01, INW0167_T1001

NPDES Facilities	Sheridan WWTP (IN0031071)				
MS4 Communities	Sheridan (1.93%)**				
CSO Communities	None In Subwatershed				
CAFOs	None In Subwatershed				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2212.859	473.334	167.511	36.007	10.623
LA	1946.574	414.516	145.167	29.346	6.990
WLA	44.999	11.485	5.593	3.060	2.571
Margin Of Safety: 10%	221.286	47.333	16.751	3.601	1.062

* Values were adjusted for rounding

** MS4 WLA includes a 1.93% area of the watershed allocated to the MS4 area

Table 10: Little Cicero Creek TMDL summary (HUC-12 051202010608)

Listed Segments: INW0168_01, INW0168_T1001, INW0168_T1002

NPDES Facilities	None In Subwatershed				
MS4 Communities	None In Subwatershed				
CSO Communities	None In Subwatershed				
CAFOs	None In Subwatershed				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.258
LA	1989.444	423.872	148.630	30.277	7.432
WLA	**	**	**	**	**
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** There are no NPDES permitted facilities within the Subwatershed, therefore a WLA was not calculated for the Subwatershed (WLA = 0)

Table 11: Hinkle Creek TMDL summary (HUC-12 051202010609)

Listed Segments: INW0169_01, INW0169_T1001

NPDES Facilities	Gas America (IN0059943)				
MS4 Communities	Westfield (west) (1.43%)**				
CSO Communities	None In Subwatershed				
CAFOs	None In Subwatershed				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.144	33.641	8.257
LA	1352.550	288.175	101.048	20.584	5.052
WLA	636.894	135.697	47.582	9.693	2.379
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** MS4 WLA includes a 1.43% area of the watershed allocated to the MS4 area

Table 12: Morse Reservoir-Cicero Creek TMDL summary (HUC-12 051202010610)

Listed Segments: INW016A_01, INW016A_T1001, INW016A_T1002, INW016A_T1003

NPDES Facilities	None In Subwatershed				
MS4 Communities	Noblesville (28.69%), Cicero (5.23%), Westfield (east) (2.08%)**				
CSO Communities	None In Subwatershed				
CAFOs	None In Subwatershed				
CFOs	None In Subwatershed				
Flow Regime TMDL analysis *E. coli* (billion bacteria/day)*	**Very High Flows**	**Higher Flow Conditions**	**"Normal" Flows**	**Lower Flow Conditions**	**Low Flows**
Duration Interval	0 - 10 %	10 - 40 %	40 - 60 %	60 - 90 %	90 - 100 %
TMDL = LA + WLA + MOS	2210.493	470.969	165.145	33.640	8.258
LA	1193.299	254.245	89.151	18.160	4.458
WLA	796.145	169.627	59.480	12.116	2.974
Margin Of Safety: 10%	221.049	47.097	16.514	3.364	0.826

* Values were adjusted for rounding

** MS4 WLA includes a 36.02% area of the watershed allocated to the MS4 areas

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the third criterion.

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:

The load allocation section is found on page 20 of the final TMDL document. IDEM determined the load allocation calculations for each of the subwatershed TMDLs based on the Indiana water quality standard for *E. coli* WQS (125 cfu/100 mL). The *E. coli* water quality standard was applicable across all flow conditions in the subwatershed. IDEM identified several nonpoint *E. coli* sources in this TMDL report. These nonpoint sources include: wildlife (deer, geese, ducks, raccoons, turkeys and other animals), failing septic systems, run-off from non-regulated small-scale livestock operations, livestock with access to stream areas, and agricultural runoff (via manure spreading and tile drains). IDEM did not determine individual load allocation values for each of these potential nonpoint source considerations, but allocated the nonpoint sources into one LA value.

IDEM explained that there are efforts underway by local Soil and Water Conservation Districts (SWCDs) to improve water quality and reduce nonpoint source inputs. These efforts involve identifying nonpoint sources and the appropriate mitigation strategies to lessen the impact of these inputs.

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the fourth criterion.

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 permittees 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 allocations are addressed on page 20 of the final TMDL document. IDEM determined the WLA calculations for NPDES permitted facilities based on the Indiana water quality standard for *E. coli* (125 cfu/100 mL) and the design flow of the facility. IDEM identified four WWTPs and one other facility with an *E. coli* discharge limit in its NPDES permit. Those facilities within the Cicero Creek watershed are:

- Town of Atlanta WWTP (IN0022306).
- Town of Arcadia WWTP (IN0021334).
- Town of Sheridan WWTP (IN0031071).
- City of Tipton WWTP (IN0021474).
- Gas America (IN0059943).

All of the MS4 communities within the Cicero Creek watershed are assigned a WLA of 125 cfu/100 mL. IDEM explained that some of the MS4 communities fall within the boundaries of larger MS4 communities (for example the Town of Atlanta is within Hamilton County). EPA determined that all NPDES permitted MS4 communities, regardless of their location within the Cicero Creek watershed, are assigned a WLA of 125 cfu/100 mL. The NPDES permitted MS4 communities within the Cicero Creek watershed are:

- Hamilton County MS4 (INR040066).
- Town of Atlanta MS4 (incorporated into Hamilton County's MS4 permit (INR040066)).

- Town of Arcadia MS4 (INR040004).
- Town of Sheridan MS4 (incorporated into Hamilton County's MS4 permit (INR040066)).
- City of Westfield (west) MS4 (INR040109).
- City of Noblesville MS4 (INR040127).
- Town of Cicero MS4 (INR040066, co-permittee with Hamilton County).

There is one CSO community in the Cicero Creek watershed. The WLA for the CSO community was set to the water quality standard for *E. coli* (WLA = 125 cfu/100 mL) across all flow conditions. There are six CAFO facilities in the Cicero Creek watershed. CAFO feedlots in the Cicero Creek watershed are required to operate under the conditions of their NPDES permit. CAFO facilities are generally not allowed any pollutant discharges from their animal housing facilities or other associated sites. WLAs from CAFO facilities were set at zero (WLA = 0 per 100 mL).

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the fifth criterion.

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:
The determination of the Margin of Safety (MOS) is addressed on page 21 of the final TMDL document. The Cicero Creek watershed TMDLs utilized implicit and explicit MOS practices to ensure that WQS will be met. Both the implicit and explicit MOS practices utilized in these TMDLs served to reduce uncertainty in setting the allocations for the Cicero Creek watershed TMDLs.

The implicit MOS incorporated conservative assumptions in the calculation of the Cicero Creek watershed TMDLs. No rate of decay, or die-off rate of pathogen species, was used in the TMDL calculations or in the creation of load duration curves for *E. coli*. Bacteria have a limited capability of surviving outside their hosts, and normally a rate of decay would be incorporated. IDEM determined that it was more conservative to use the WQS (125 cfu/100 mL) and not to apply a rate of decay, which could result in a discharge limit greater than the WQS.

As stated in *EPA's Protocol for Developing Pathogen TMDLs* (EPA 841-R-00-002), many different factors affect the survival of pathogens, including the physical condition of the water.

These factors include, but are not limited to sunlight, temperature, salinity, and nutrient deficiencies. These factors vary depending on the environmental condition/circumstances of the water, and therefore it would be difficult to assert that the rate of decay caused by any given combination of these environmental variables was sufficient enough to meet the WQS of 125 cfu/100 mL and 235 cfu/100ml. Thus, it is more conservative to apply the State's WQS as the MOS, because this standard must be met at all times under all environmental conditions.

Additionally, the Cicero Creek watershed TMDLs calculated an explicit MOS. The explicit MOS was set at 10% of the allowable load for all flow conditions (see Tables 3 to 12 of this Decision Document). Ten percent is considered an appropriate explicit MOS based the natural fluctuations of *E. coli* measurements and the relatively small sample size of field data collected by IDEM in the Cicero Creek watershed. IDEM did not translate the explicit MOS into reduced WLAs and LAs (concentration based allocations were set equal to the *E. coli* WQS). EPA does not recognize IDEM's explicit MOS. Nevertheless, EPA finds that the implicit MOS is adequate to meet the MOS requirement.

The EPA finds that the TMDL document submitted by IDEM contains an appropriate MOS satisfying the requirements of the sixth criterion.

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 in the Cicero Creek watershed TMDLs was addressed by calculating the TMDL using the *E. coli* water quality standard for the recreation season (April 1 through October 31). The development of the LDCs utilized flow measurements from a USGS gage in Cicero, IN which were collected over a variety of flow conditions observed during the recreation season. The LDCs developed from these flow records represented a range of flow conditions and thereby accounted for seasonal variability over the recreation season.

The Cicero Creek watershed TMDLs for *E. coli* were developed as concentration based TMDLs (measured in billions of bacteria per day), which require WQS to be met regardless of flow condition within the recreation season. The State of Indiana does not have an applicable full body contact *E. coli* water quality standard for the remainder of the calendar year (November 1 through March 31). By meeting the WQS during the summer recreation season, it was assumed that the loading capacity values would be protective of water quality during the remainder of the calendar year (November through March).

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the seventh criterion.

8. Reasonable Assurance

When a TMDL is developed for waters impaired by point sources only, the issuance of a 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 Cicero Creek watershed TMDL outlines reasonable assurance activities in pages 21-25 of the final TMDL document. The reasonable assurance practices discussed in the final TMDL document are structured toward meeting the bacteria water quality standards. Mitigation practices which fall outside of regulatory authority will require commitment from state agencies and local stakeholders to carry out the suggested actions. The recommendations made by IDEM will be successful at improving water quality if the appropriate local groups work to implement these recommendations.

The Hamilton County SWCD has been involved in public outreach activities which have targeted stakeholders in rural and urban communities. These programs have focused on educating local stakeholders on runoff and stormwater reduction strategies and other stormwater pollution issues. The Tipton County SWCD has also been active in the Cicero Creek watershed by promoting and installing BMPs to reduce stormwater inputs to surface waters. BMPs utilized by the Tipton County SWCD have included: vegetated filter strips in riparian areas, cover crops, septic system maintenance, and efforts to educate local stakeholders on stormwater mitigation practices. IDEM anticipates that both of these SWCDs will continue to lead local efforts in the Cicero Creek watershed.

Other state led efforts will include: the enforcement of NPDES discharge permits, working with MS4 communities to ensure that these entities meet water quality standards, and other land and water resource protection efforts sponsored by state agencies. All permitted dischargers with a

sanitary component (*E. coli* limit) will be required to attain WQS and reduce the bacteria inputs to surface waters of the Cicero Creek watershed.

Continued water quality monitoring within the basin is supported by IDEM. Additional water quality monitoring results will provide insight into the success or failure of BMP systems designed to reduce bacteria loading to the surface waters of the Cicero Creek watershed. Local watershed managers, using water quality monitoring data, will be able to reflect on the progress, or lack of progress, of the various pollutant removal strategies and would have the opportunity to change course if observed progress is unsatisfactory.

Implementation efforts can be achieved through federal, state and local action. Federal funding, via the Section 319 grants program, the Conservation Reserve Program (CRP) (via the USDA-NRCS), the Indiana Wetlands Reserve Program (via the USDA-NRCS), and the Environmental Quality Incentives Program (USDA-NRCS), can provide monetary support to implement voluntary nonpoint source programs within the Cicero Creek watershed. The Hamilton County SWCD encourages landowners within the county to participate in the CRP program in order to reduce soil erosion, improve water quality and enhance wildlife habitat. Those participating receive assistance from the USDA-NRCS and the State of Indiana.

The 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:
Water quality monitoring in the Cicero Creek watershed will occur on IDEM's nine-year rotating basin schedule or once TMDL implementation BMPs are incorporated in the watershed. The IDEM monitoring efforts are designed to assess water quality improvements with respect to *E. coli* concentrations. Water quality monitoring will also test the efficiency of pollution reduction strategies.

During the monitoring period, watershed managers will determine the appropriate monitoring cycle for the Cicero Creek watershed. The monitoring schedule will be adjusted, as needed, to improve source identification and source elimination efforts. IDEM will monitor whether *E. coli* targets are being achieved and adjust the Cicero Creek watershed BMP strategy accordingly to meet these water quality targets.

The EPA finds that the TMDL document submitted by IDEM satisfies the requirements of the ninth criterion.

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:

Implementation strategies are outlined in the "Potential Future Activities" Section (pages 25-27 of the final TMDL document). Local partners will bear the responsibility for assisting in the management of public lands and waters within the Cicero Creek watershed. These partners will also be tasked with finding creative adaptive management strategies to meet changing water quality conditions within the watershed. The focus of all of the implementation strategies will be to reduce bacterial inputs to the surface waters in the Cicero Creek watershed. The main bacteria reduction strategies include:

Septic System Improvements: Local septic management programs and educational opportunities can aid in the reduction of septic pollution. Educating the public on proper septic maintenance, finding and eliminating illicit discharges and repairing failing systems will lessen the impacts of septic derived bacterial inputs to the Cicero Creek watershed.

Reducing Livestock Access to Stream Environments: The installation of exclusion fencing near stream and river environments will prevent direct access to surface water environments for livestock, installing alternative water supplies, and installing stream crossings between pastures, may reduce the influxes of bacteria and improve water quality within the watershed.

Manure Collection and Storage Practices: Manure has been identified as a source of bacteria. Bacteria can be transported to surface water bodies via stormwater runoff. Bacteria laden water can also leach into groundwater resources. Improved strategies in the collection, storage and management of manure can minimize the bacterial impacts on surface and groundwater systems. Repairing manure storage facilities or building roofs over manure storage areas may also aid in decreasing the amount of bacteria in stormwater runoff.

Riparian Area Management Practices: Protection of stream and river banks within the watershed through planting of vegetated/buffer areas with grasses, legumes, shrubs or trees will filter stormwater runoff before the runoff enters the main stem or tributaries of the Cicero Creek watershed.

Agricultural Land Management Practices: Runoff from cropland and pastures combined with the application of manure to fields in the late summer are a likely source of bacteria found in stormwater runoff from agricultural areas. Planting vegetation along riparian areas (riparian

buffers) will aid to slow down water and allow it to filter through the vegetation before entering surface water environments. IDEM also advocates employing agricultural BMP strategies such as: contour row cropping, no-till farming and integrated crop management.

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

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:
IDEM held a TMDL kickoff meeting on May 25, 2011 at the Hamilton County East Public Library in Noblesville, Indiana. During the kickoff meeting, IDEM communicated the goals of the TMDL efforts within the Cicero Creek watershed, explained the TMDL development process, and solicited contact information from stakeholders in attendance.

In August 2011, IDEM held a second meeting at the Hamilton County East County Public Library where they presented an overview of the draft Cicero Creek watershed TMDL and provided members of the audience the opportunity to provide public comment. IDEM posted the draft TDML online at (http://www.in.gov/idem/nps/3852.htm). The 30-day public comment period was started on August 2, 2011 and ended on September 2, 2011. IDEM did not receive any public comments on the Cicero Creek TMDL. IDEM submitted the final TMDL and submittal letter to the EPA on September 14, 2011.

The EPA finds that the TMDL document submitted for the Cicero Creek watershed by IDEM satisfies the requirements of 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:

The EPA received the final Cicero Creek watershed TMDL document, submittal letter, and public meeting documentation from IDEM on September 14, 2011. The transmittal letter explicitly stated that the final TMDLs for the Cicero Creek watershed (HUC-10, #0512020106) for bacteria (*E. coli*) were being submitted to EPA pursuant to Section 303(d) of the Clean Water Act for EPA review and approval. The letter clearly stated that this was a final TMDL submittal under Section 303(d) of CWA. The letter also contained the name of the watershed as it appears on Indiana's 303(d) list, and the causes/pollutants of concern. These TMDLs were submitted per the requirements under Section 303(d) of the Clean Water Act and 40 CFR 130. The Cicero Creek watershed addresses 27 impaired segments for bacteria (*E. coli*). Table 2 of this Decision Document outlines the pollutant and impaired segments.

The EPA finds that the TMDL transmittal letter submitted for the Cicero Creek watershed by IDEM satisfies the requirements of this twelfth element.

13. Conclusion

After a full and complete review, the EPA finds that the 27 *E. coli* TMDLs for the Cicero Creek watershed in Boone, Clinton, Hamilton and Tipton counties, satisfy all of the elements of approvable TMDLs. This approval is for 27 TMDLs addressing 19 waterbodies/impairments identified in Table 2 of this Decision Document. These TMDLs address recreational use impairments.

The EPA's approval of these TMDLs extends to the waterbodies which are identified in Table 2 of this Decision Document, with the exception of any portions of the water bodies that are within Indian Country, as defined in 18 U.S.C. Section 1151. The EPA is taking no action to approve or disapprove TMDLs for those waters at this time. The EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.