

Missouri  
Department of  
Natural Resources

DRAFT CREVE COEUR CREEK TMDL  
PUBLIC COMMENTS

Public Notice  
June 22 – Aug. 6, 2012

**Creve Coeur Creek  
WBID # 1703**

St. Louis County, Mo.

Missouri Department of Natural Resources  
Water Protection Program  
PO Box 176  
Jefferson City, MO 65102-0176  
800-361-4827 / 573-751-1300

U.S Environmental Protection Agency (EPA) regulations require that total maximum daily loads (TMDLs) be subject to public review (40 CFR 130.7). The Missouri Department of Natural Resources placed the draft Creve Coeur Creek bacteria TMDL on a 45-day public notice and comment period from June 22, 2012 to Aug. 6, 2012. Comments were received from the following groups or individuals:

City of Bridgeton  
City of Chesterfield  
City of Florissant  
City of Hazelwood  
City of Independence  
City of Springfield  
City of Woodson Terrace  
Home Builders Association of St. Louis & Eastern Missouri  
Metropolitan St. Louis Sewer District  
St. Louis County Office of the County Executive



August 3, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ('TMDL') proposal. With this letter, the City of Bridgeton requests the Missouri Department of Natural Resources ('Department') rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues.

The City of Bridgeton appreciates the Department's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

We appreciate the opportunity to provide these comments. The City of Bridgeton is committed to working with the Department to ensure that Missouri's waters are protected through application of good science and stakeholder input. In support of this approach, the City of

Bridgeton requests meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by the Department to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact myself at 314-373-3812 if you have any questions or would like to discuss these issues further.

Sincerely,

A handwritten signature in blue ink, appearing to read "B-P" followed by a horizontal line.

Brian Petersen  
Assistant City Engineer  
City of Bridgeton

Cc: Robert E. Gunn, Director of Public Works



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690 Chesterfield Pkwy W • Chesterfield MO 63017-0760  
Phone: 636-537-4000 • Fax 636-537-4798 • [www.chesterfield.mo.us](http://www.chesterfield.mo.us)

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August 3, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ("TMDL") proposal. With this letter, the City of Chesterfield requests the Missouri Department of Natural Resources ("Department") rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues.

We appreciate the Department's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis

Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.

- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

We appreciate the opportunity to provide these comments, and we are committed to working with the Department to ensure that Missouri's waters are protected through application of good science and stakeholder input. In support of this approach, we request meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by the Department to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact me at 636-537-4764 if you have any questions or would like to discuss these issues further.

Sincerely,



Brian K. McGownd, P.E.  
Public Works Director/City Engineer

Cc: Mike Herring, City Administrator  
Mike Geisel, Director of Public Services  
William R. Allen, Principal Engineer - MSD



# CITY OF FLORISSANT

*Honorable Thomas P. Schneider, Mayor*

August 3, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

**Subject:** Public Comments for Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ('TMDL') proposal. With this letter, the City of Florissant requests the Missouri Department of Natural Resources ('Department') rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues.

The City of Florissant appreciates the Department's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

| CITY HALL  | POLICE DEPARTMENT  | PARKS DEPARTMENT   | HEALTH DEPARTMENT   | MUNICIPAL COURT  |
|--|--|--|---|--|
| 955 Rue St. Francois<br>Florissant, MO 63031<br>314 / 921-5700<br>Fax: 314 / 921-7111<br>TDD: 314 / 839-5142 | 1700 North Highway 67<br>Florissant, MO 63033<br>314 / 831-7000<br>Fax: 314 / 830-6045 | #1 James J. Eagan Drive<br>Florissant, MO 63033<br>314 / 921-4466<br>Fax: 314 / 839-7672 | #1 St. Ferdinand Drive<br>Florissant, MO 63031<br>314 / 839-7654<br>Fax: 314 / 839-7656 | 1055 Rue St. Francois<br>Florissant, MO 63031<br>314 / 921-3322<br>Fax: 314 / 839-7663 |

[www.florissantmo.com](http://www.florissantmo.com)

We appreciate the opportunity to provide these comments. The City of Florissant is committed to working with the Department to ensure that Missouri's waters are protected through application of good science and stakeholder input. In support of this approach, the The City of Florissant requests meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by the Department to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact Tim Barrett, P.E., City Engineer at 314-839-7643 if you have any questions or would like to discuss these issues further.

Sincerely,



Thomas P. Schneider  
Mayor

Cc: Mr. Louis B. Jearls, Jr., P.E., Director of Public Works  
Mr. Timothy J. Barrett, P.E., City Engineer



**The City of Hazelwood**



August 6, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Submitted by email to: [john.hoke@dnr.mo.gov](mailto:john.hoke@dnr.mo.gov)

Subject: Public Comments for Total Maximum Daily Load for Watkins Creek, Creve Coeur Creek, Fishpot Creek, and Gravois Creek

Dear Mr. Hoke:

I may submit additional comments for the creeks other than Creve Coeur Creek, but with the public comment deadline of 8-06-2012 for Creve Coeur Creek I am submitting the following:

1. The efforts of DNR to improve our environment in general are always welcome.
2. The costs should largely be the responsibility of those who create the mandates with the exception of flagrant violations.
3. The analysis of causes should meet rigorous scientific standards. Measurements of pollution should be done by trained professionals following rigorous protocols. The causes/sources of the pollution should be clearly related to the measurements in a statistically valid study. I do not believe the creek studies noted above meet reasonable scientific methods, so the conclusions are suspect.
4. The proposed solutions should address the sources. Few, if any MS4s are the cause of bacteria that negatively affects human health. Therefore the study should go beyond MS4/stormwater factors.
5. If any MS4s are scientifically related, they should be ranked in order of importance, as should non-MS4 sources so the public funds can be appropriately aimed at the likely sources.
6. The MS4s in the study have omitted MoDOT. This is worthy of more discussion and likely inclusion for remediation until better science is used overall to determine pollutants that are related to the bacteria.
7. Sanitary Sewer Overflows (SSOs) may be linked to bacteria (along with other causes beyond the scope of MS4s). A massive new multi-BILLION dollar program is just being launched by MSD to reduce SSOs. It is premature to suggest remedies to bacteria without considering the elimination of SSOs. In addition, it could cost BILLIONS more to implement the response to bacteria as a result of the DNR studies focused on MS4s, so it is essential to "get it right". These two efforts (and others) should not be done in isolation. They need to be highly integrated to be environmentally effective and to be cost-effective.

Given these and other implications, I strongly recommend that more stakeholders be involved in a process that involves more rigorous scientific methods and meaningful public input. We are ready, willing and able to work with DNR on new approaches to real solutions regarding creek issues and would encourage such partnerships.

Sincerely,

Earl Bradfield, City Planner  
City of Hazelwood

**City Hall & Public Works**  
t: 314.839.3700  
f: 314.839.0249  
415 Elm Grove Lane

**City Maintenance**  
t: 731.8701  
f: 731.4240  
115 Ford Lane

**Fire Department**  
t: 731.3424  
f: 731.1976  
6800 Howdershell Road

**Municipal Court**  
t: 839.2212  
f: 838.5169  
415 Elm Grove Lane

**Parks & Recreation**  
t: 731.0980  
f: 731.0989  
1186 Teson Road

**Police Department**  
t: 839.3700  
f: 838.5169  
415 Elm Grove Lane



# City of Independence

## WATER POLLUTION CONTROL DEPARTMENT

P.O. Box 1019 • INDEPENDENCE, MISSOURI 64051-0519 • (816) 325-7711 • FAX (816) 325-7722

*AN EQUAL OPPORTUNITY EMPLOYER*

August 6, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load (TMDL) proposal. With this letter, the City of Independence Water Pollution Control Department (WPC) requests that the Missouri Department of Natural Resources (Department) rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues. WPC supports the comments submitted by the Metropolitan St. Louis Sewer District.

WPC appreciates the Department's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft bacteria TMDLs for urban water bodies. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any bacteria TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions for Municipal Separate Storm Sewer System (MS4) permits in the Clean Water Act and storm water regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

We appreciate the opportunity to provide these comments. WPC is committed to working with the Department to ensure that Missouri's waters are protected through application of good science and

John Hoke, MDNR  
August 6, 2012

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stakeholder input. In support of this approach, WPC requests meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by the Department to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact Dorris Bender at [dbender@indepmo.org](mailto:dbender@indepmo.org) or (816) 325-7711 if you have any questions or would like to discuss these issues further.

Sincerely,



Dorris L. Bender  
Environmental Compliance Manager

c: Dick Champion, Jr.



August 6, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur  
Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

The City of Springfield would like to offer a comment letter into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ("TMDL") proposal.

Springfield not only wants to comment on this TMDL but also on the manner the was issued for public comment. Springfield commends the efforts of the Missouri Department of Natural Resource's (Department) to gain stakeholder input before permits are issued for public comment so both the Department and permittee can incorporate comments where both parties agree. This allows the Department to issue permit language that is acceptable to both parties in the most complete draft form that can be achieved. It is my understanding that this TMDL (and other TMDLs) are being issued without prior knowledge of the permittee. I don't believe this serves either the Department or the permittee at all.

Springfield requests that the Department:

- Provide a 14 day comment period to the permittee before any permit is issued, including TMDLs. This used to be a common practice by the Department.
- The City of Springfield is requesting that the Creve Coeur Creek TMDL be delayed until additional public participation is completed, public meetings, workshops, etc.

The City of Springfield appreciates the Department's efforts to protect Missouri's water resources. However, Springfield is concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential

**DEPARTMENT OF ENVIRONMENTAL SERVICES**

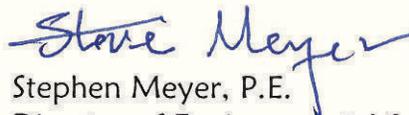
840 Boonville Avenue, P.O. Box 8368      Springfield, Missouri 65801-8368  
phone: (417) 864-1919      fax: (417) 864-1929  
homepage: [www.springfieldmo.gov](http://www.springfieldmo.gov)      e-mail: [city@springfieldmo.gov](mailto:city@springfieldmo.gov)

cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following short list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the “maximum extent practicable” provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

Springfield appreciates the opportunity to provide these comments on actions of the Department. Springfield is committed to working with the Department to ensure that Missouri’s waters are protected, while addressing issues of concern in a smart and effective manner through application of good science and stakeholder input. In support of this approach, however, Springfield requests that the Department provide meaningful public participation with permittees to justify the need for a TMDL and to further address the defects and concerns in those TMDLs prior to finalization, to make it the best rule for the good of the environment. Please contact me at 417-864-1919 if you have any questions or would like to discuss these issues further.

Sincerely,

A handwritten signature in blue ink that reads "Steve Meyer".

Stephen Meyer, P.E.  
Director of Environmental Services  
Springfield Missouri

CC: Law Department – Springfield Missouri  
MSD – John Lodderhose  
DNR – John Madras

**TECHNICAL COMMENTS ON TOTAL MAXIMUM DAILY LOAD (TMDL) FOR CREVE COEUR CREEK  
ST. LOUIS COUNTY, MISSOURI  
(PUBLIC NOTICE VERSION, JUNE 22 THROUGH AUGUST 6, 2012)**

The Metropolitan St. Louis Sewer District (MSD or the District) has several technical implementation and other concerns with the bacteria total maximum daily load (TMDL) to establish wasteload and load allocations to protect whole body contact recreation - category B (WBCR-B) in Creve Coeur Creek<sup>1</sup>. The District is concerned about the potential ramifications of the Creve Coeur Creek TMDL as well as the several others recently public noticed for waterbodies within MSD's service area. Due to the complexity of understanding water quality conditions within urban streams, the TMDL calculation process, and the potential major impacts to the District, local governments, private development, other businesses and to residents, it was not possible (despite a substantial effort and expenditure of resources) to fully analyze and comment on the TMDL within the 45-day public comment period. Additional time is needed to conduct a thorough review and have constructive dialogue with the Missouri Department of Natural Resources (MDNR or the Department).

The District believes that the basic approach to developing the TMDL (use of a load duration curve with existing water quality data, lack of appropriate implementation planning considerations, etc.) is not scientifically sound and must be improved. The District requests revision of the TMDL with more stakeholder coordination to ensure that the most appropriate TMDL is established based on sound, current, and defensible science. Any TMDL should also include development of a phased TMDL, which would be consistent with the U.S. Environmental Protection Agency's (USEPA) new Integrated Municipal Stormwater and Wastewater Planning Approach Framework (USEPA, 2012)

Furthermore, the District requests meeting with the Department to discuss the technical implementation and other comments provided below with respect to not only the Creve Coeur Creek TMDL but all other TMDLs for waters within the District. We believe resolution of the comments below will allow the Department to develop legally compliant, more appropriate TMDLs for urban streams.

**1. LAND USE AND WATERSHED INFORMATION**

**a. The TMDL land use and watershed information must be supplemented with more accurate, local data.**

The land use statistics presented in Section 2.4 of the draft TMDL are based on data collected at 30-meter resolution obtained from Thematic Mapper imagery (MoRAP, 2005). At this resolution the data are insufficient for purposes of providing accurate land use statistics (e.g., impervious area).

Additionally, the metadata file states the following:

- "Data only appropriate for regional scale assessments."
- "Data has not been subjected to accuracy assessment. No accuracy stated or implied."

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<sup>1</sup> The draft TMDL is located at: <http://dnr.mo.gov/env/wpp/docs/1703-creve-coeur-ck-tmdl.pdf>.

Therefore, with these comments the District is providing the Department with more detailed GIS layer of land use data in the St. Louis area. The attached figure provides several key findings that may aid subsequent revisions to all TMDLs in the District's service area, which are discussed below.

First, this assessment demonstrates that over 200 parcels along Creve Coeur Creek are not served by the District's sewer system. Therefore, wastewater generated at the developed portion of these parcels is likely managed with on-site systems (e.g., septic systems or lagoons). Obviously, these point or non-point sources could significantly impact the water quality of Creve Coeur Creek. Second, the three major highway corridors (I-270, I-64, and MO-141) are significant portions of the watershed area (approximately 6%) and must be included in the TMDL as these are managed under the Missouri Department of Transportation municipal separate storm sewer system (MS4) permit.

These datasets can and must be considered, accounted for and used in the TMDL (and in revisions to the TMDL) and implementation plan, including for such purposes as source identification and characterization, load and wasteload allocation calculations, and prioritization of implementation actions. The District requests that MDNR consider such data with subsequent revisions to the TMDLs.

## **2. DEFINING THE PROBLEM (WATER QUALITY DATA ANALYSIS)**

- a. Recreational season datasets that are skewed, predominantly composed of wet-weather samples, or are greater than 7 years old are not representative and therefore should not be used to calculate TMDL components.**

The TMDL indicates that 67 *E. coli* samples were used in the loading analysis (Table 4 in the TMDL) collected from 1997 to 2010 by MSD and USGS. According to the TMDL, data from years with greater than five samples were assessed against the WBCR-B criterion; the remaining samples were used to supplement existing load calculations in the TMDL. Given the rationale for the data age requirement in Missouri's Listing Methodology Document is representativeness (i.e., reduce potential influence of temporal trends), only data collected from 2005 onward and having at least five samples per recreational season should be used to develop TMDL components.

- b. Discrete bacteria samples are not representative of daily average *E. coli* loads in the Creve Coeur Creek watershed.**

It appears as though the Department applied daily average flows measured at USGS Station 06935890 (adjusted upwards by a factor of 1.2568) to the discrete bacteria samples to calculate existing loads. We are concerned that the discrete bacteria samples are not representative indicators of daily average bacteria loads in the watershed. Discrete bacteria samples may be skewed towards wet-weather events. Concentrations measured during these events likely represent the highest bacteria levels that would have occurred on the sampling date and therefore are not accurately reflect daily average bacteria concentrations in the stream.

As a result, applying first flush sampling results as a daily average value overestimates existing loading in Creve Coeur Creek. The Department should use an alternative modeling approach which appropriately translates discrete bacteria and instantaneous flow samples to daily or seasonal values that can be compared to the WBCR-B criterion.

**c. The flow adjustment approach over-estimates current bacteria loads within the classified segment of Creve Coeur Creek.**

The Department apparently applied a single linear adjustment factor (1.2568) to correct flow data measured from USGS station 06935890 for the drainage area of the classified segment. These corrected flows were then applied to sample data collected from three different monitoring sites, regardless of the watershed area upstream of the sampling site. This flow correction approach is not appropriate due to non-linear hydrologic scaling relationships and non-uniform distribution of outfalls often found in urban watershed. In addition, by using a single flow adjustment factor, bacteria loading is overestimated. A correct approach for estimating load would be to develop a unique non-linear adjustment factor for each sample site. If a linear adjustment factor is retained in the TMDL evaluation, a unique adjustment factor should be calculated for each monitoring location based on the ratio of its watershed area to the watershed area at the USGS gaging station. We request that the Department reevaluate the linear flow adjustments in the Creve Coeur Creek TMDL.

**d. Additional justification regarding the application of censored data is needed to determine representativeness.**

Several bacteria sample results were censored and reported as either “less than” or “greater than” values. For calculation purposes, “less than values” were halved and “greater than” values were doubled. The TMDL states on pages 9 and 32 that this methodology is consistent with the Department assessment protocols but does not specify or describe these protocols. We are less concerned with the practice of halving “less than” values than we are with doubling “greater than” values. For “less than” values, the initial value is generally low and there is a lower bound (zero) beyond which the value cannot be adjusted. For “greater than” values, the initial value is generally high and there is no corresponding upper bound that limits the data adjustment. Doubling “greater than” values is inherently arbitrary and speculative and may significantly inflate bacteria loading estimates. The Department must employ alternative approaches that are not arbitrary and that do not incorrectly overestimate loading values associated with “greater than” values.

**e. The effect of data transcription or site identification discrepancies must be considered in any future TMDL.**

The District notes that five *E. coli* values reported in Appendix A of the TMDL differ from those in USGS and District databases. These values are listed below:

| Station* | Date      | Appendix A Value (col/100 mL) | Value (col/100 mL) |
|----------|-----------|-------------------------------|--------------------|
| 06935890 | 2/10/1999 | 750                           | 280                |
| 06935890 | 4/15/1999 | 4,000                         | 4,600              |
| 06935890 | 6/16/1999 | 1,400                         | 1,300              |
| 06935890 | 8/2/1999  | 230                           | 130                |
| 06935890 | 10/2/2006 | 79                            | 75                 |

\*USGS station code. This station is identified in Appendix A as “Creve Coeur Cr. @ Hwy 340.”

In addition, the MSD sample collected on 6/14/2005 (640 col/100 mL) is listed twice in Appendix A – once for the “Creve Coeur Cr. @ Creve Coeur Mill Rd.” site and once for the “Creve Coeur Cr. @ Mill Bridge Rd.” site. The Department must resolve these discrepancies in any future or revised TMDL for Creve Coeur Creek.

### **3. SOURCE INVENTORY AND ASSESSMENT**

- a. The TMDL should analyze, consider, and take into account the importance of bacterial sources in the context of human health risks and this factor should be an important aspect of TMDL development and implementation planning.**

Recent quantitative microbial risk assessments (QMRAs) conducted by USEPA contractors have shown that setting appropriate recreational indicator bacteria limits (i.e., corresponding to illness rates of 8-9 per 1,000 WBCR exposures) requires an understanding of bacteria sources (Schoen and Ashbolt, 2010 and Soller et al., 2010). These studies illustrate that some non-human sources of bacteria pose a lower risk than human sources of bacteria. These studies are discussed in more detail in Item 4.b below. Due to these new research findings, the Department must either defer TMDL adoption until after additional source identification studies can be conducted or adopt a phased TMDL. A phased TMDL should include source identification studies to be conducted prior to the implementation of load reduction activities, and provides a mechanism to incorporate the findings of those studies into the TMDL and implementation approach.

- b. The source assessment should distinguish between natural or background sources of bacteria versus anthropogenic sources.**

Sources of bacteria indicator organisms, particularly *E. coli*, are complicated in urban environments. The Creve Coeur Creek watershed has some areas of dense development but also large areas of forested or undeveloped land covers, particularly along the riparian corridor. These more naturalized environments support a significant amount of wildlife that could be significant sources of bacteria indicators. In addition, *E. coli* has been associated with soil, plants, and stream sediments, which complicates source assessment. Stream sediments have been viewed as a significant source of *E. coli* through regrowth and resuspension processes. These natural or background sources of bacteria are often uncontrollable and likely do not pose significant risk to human health. The Department must evaluate these sources and the lower risk to human health in the TMDL source inventory and assessment.

- c. The TMDL should not use the USGS microbial source tracking study to relate bacteria concentrations to presence of upstream sanitary sewer overflows.**

The referenced USGS study was funded by the District in an effort to better understand the influence of sanitary sewer overflows (SSOs), combined sewer overflows (CSOs), and treated wastewater discharges on local receiving waters, including Creve Coeur Creek. The District opposes the use of the regression between bacteria concentrations and upstream SSOs since this relationship is only strong due to the inclusion of the Missouri and Mississippi Rivers in the dataset. These rivers, due to their watershed size and associated land uses, are not representative of receiving waters such as Creve Coeur Creek that are influenced by SSOs and not CSOs. The District supports the potential use of microbial source tracking for future phases of the TMDL or implementation planning, particularly using new techniques that are more suitable for sanitary surveys.

**d. More detailed, local information must be analyzed and used in assessing bacteria sources.**

The District and local governments have extensive data that can be mined to more accurately assess bacteria sources in the watershed. The District's data were discussed briefly under comments related to land use and land cover. These data also include sanitary and storm sewer information that must be used to assess potential locations of on-site wastewater management system and stormwater outfalls. The District requests that the Department incorporate these data in the TMDL source assessment. In addition, local information related to on-site wastewater management system inspections must be included in the TMDL rather than relying on national performance data. Further, there needs to be characterization of specific general and stormwater permit holders and discharges from their facilities. For example, Claymont Estates Pond and Village of Green Trails Dam could be significant sources of bacteria from waterfowl. In addition, several readily identified sources within the watershed are ignored in the TMDL including, horse stables on Baxter Road, Principia on Hwy. 40, and Hunter Estate on Hwy. 141. The Department must revise the TMDL to analyze and account for these arbitrarily omitted sources.

**e. The water quality improvements and load reduction by the District's upcoming elimination of constructed SSOs and other sanitary sewer improvements must be taken into account.**

The TMDL source inventory and assessment suggests that SSO contributions to the potential water quality impairment are significant. The District has been aggressively implementing actions to reduce SSOs and improve sanitary sewer systems within its service area, including committing in a Federal Consent Decree to eliminate all constructed SSOs and to continue to develop and implement a Capacity, Management, Operations, and Maintenance (CMOM) program<sup>2</sup>. MDNR is a party to the Federal lawsuit and will receive copies of MSD's submittals under the Federal Consent Decree. The water quality improvements and load reductions resulting from the District's efforts must be accounted for in estimating future load reduction requirements.

**f. The language regarding "the presence of sewerage system infrastructure", "mismanagement", and "sewage discharge" on page 12 and any subsequent references should be deleted.**

This is broad-sweeping language that implies that simply the presence of a sewerage system will result in non-attainment of the WBCR-B designated uses. This statement is inaccurate and should be deleted.

**g. The Missouri Department of Transportation (MoDOT) MS4 permit should be incorporated into the TMDL as a point source and must be included in the wasteload allocation.**

The I-270, I-64 and MO-141 highway corridors comprise a significant portion of the watershed (6%) and a likely higher percentage of the watershed's impervious area. In fact, the Hwy. 141 corridor has underwent recent and significant expansion in the watershed. These corridors should be controlled under the MoDOT MS4 permit. Pitt et al. (2004) demonstrates that highways significantly contribute to bacteria loading during wet weather conditions, with median fecal coliform densities ranging from 730 to 1,700 col/100 mL.

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<sup>2</sup> The CMOM Program will include detailed performance goals for the prioritization, cleaning, inspection, and rehabilitation of the entire sewer system. Implementation of the Federal Consent Decree will also include continued implementation of the District's Fats, Oils, and Grease (FOG) Program, the development and implementation of a Private Inflow and Infiltration Reduction Program, a Building Backup Response Plan, and a Non-Capacity Related SSO Response Plan.

Therefore, the MoDOT MS4 permit must be referenced as a point source in the TMDL and included within the wasteload allocation. Failure to include the MoDOT MS4 permit in the revised TMDL would be arbitrary and capricious and not otherwise be in accordance with the law.

**h. The reference to MS4 stormwater management plans should be revised.**

The source assessment and inventory section pertaining to the MS4 permit held by the District and co-permitted local governments states that stormwater management plans are to be developed to “prevent the input of harmful pollutants” (pages 15 to 16). The District requests that the Department revise the TMDL to state that these plans are to be developed to “reduce the discharge of pollutants from the MS4 system to the maximum extent practicable,” consistent with state and USEPA regulations.

**i. The District’s Supplemental Environmental Project (SEP) to eliminate some septic systems should be put into proper perspective.**

As referenced in the TMDL, the District committed to a SEP to eliminate some septic systems within our jurisdiction as part of the recent Federal Consent Decree. This project was undertaken in connection with the settlement of an enforcement action, United States, State of Missouri, and the Missouri Coalition for the Environment Foundation v. Metropolitan St. Louis Sewer District, No 4:07-CV-01120-CEJ, taken on behalf of the U.S. Environmental Protection Agency, the State, and the Coalition under the Clean Water Act. The specified expenditure for this SEP is only \$1.6 million to be used for low income homeowners. This money may also be used to repair defective private laterals. Therefore it is unlikely that the SEP will result in a significant reduction of bacteria within the Creve Coeur Creek watershed. The District requests that the TMDL be revised to accurately describe the limitations of the SEP so that local landowners and stakeholders have a realistic expectation that additional actions will be needed to address failing septic systems.

**4. APPLICABLE WATER QUALITY STANDARDS AND NUMERIC TARGET**

**a. The water quality condition targeted by the TMDL is not sufficiently linked with human health risk in the Creve Coeur Creek watershed.**

The TMDL targets a WBCR-B *E. coli* criterion of 206 col/100 mL as a recreational season (April 1 through October 31) geometric mean. This criterion is based on the USEPA 1986 bacteria criteria document (‘1986 criteria’). While a geometric mean of 206 col/100 mL is the approved WBCR-B criterion, this criterion is not appropriate for several waterbodies within our jurisdiction because the underlying epidemiological studies are 1) poorly correlated with risk, 2) rooted in two unsupported assumptions, 3) not representative of inland flowing waters, and 4) largely focused on publicly-owned treatment work (POTW) impacted waters.

USEPA’s 1986 criteria are based on a poor regression from relatively few epidemiological studies. The epidemiological studies supporting this criterion were conducted on just two lakes over three years – i.e., Lake Erie and at Keystone Lake (which is about 60 miles east of Tulsa, Oklahoma) in 1979, 1980, and 1982. At the 95 percent confidence level, results from these studies indicate the corresponding mean *E. coli* density for the WBCR-B protection level (i.e., 10 illnesses per 1,000 swimmers or 1.0% risk) range anywhere from approximately 120 col/100 mL to 500 col/100 mL (USEPA, 1984).

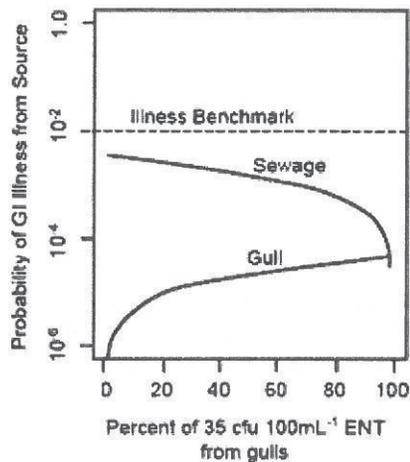
The 1986 criteria are also rooted in two unsupported assumptions (Wymer, 2007). This stems from the fact that USEPA set the 1986 *E. coli* criteria to have the same level of protection as the previously recommended fecal coliform criterion of 200 col/100 mL. The fecal coliform criterion was translated from a prior total coliform criterion, which was based on epidemiological studies dating back to 1948. In order to make this translation, in 1968 the National Technical Advisory Committee (NTAC) assumed fecal coliforms comprised about 18% of total coliforms in all waters (i.e., first unsupported assumption). Second, the NTAC arbitrarily halved the indicator density at which a detectable health effect occurred (i.e., from 400 to 200 col/100 mL in fecal coliform) assuming this would result in zero risk (i.e., second unsupported assumption).

The 1986 criteria have also been criticized as inapplicable for flowing waters, as they are based on studies from two lakes (i.e., Lake Erie and Keystone Lake) selected for the lack of nonpoint source pollution. Flowing waters (e.g., streams and rivers) present some unique challenges and characteristics that are not addressed by the 1986 criteria (USEPA, 2007a). Inland flowing waters are very diverse in terms of water flow, water volume, size, morphology of stream beds, land use, and anthropogenic impacts (WERF, 2009). Additionally, exposures in lakes and flowing waters differ. The 1986 criteria include no consideration for these differences such as providing allowances to reflect the differences in hydrologic regime (e.g., extreme high flows) (USEPA, 2007a).

In addition to the issues noted above, the lake studies on which the 1986 criteria are based focused on POTW-impacted waters. However, the relative human health risks from exposure to recreational waters impacted by non-human sources or by poorly or untreated human fecal matter are not well understood (Soller et al., 2010; USEPA 2007b). A growing body of evidence suggests relative risks differ depending on the source (e.g., feces from fowl and some large animals present substantially lower risk than from humans) (Soller et al., 2010). The 1986 criteria do not take these differences into account. Tools, such as QMRA, could be employed to provide more scientifically-defensible and valid criteria based upon actual human health risk. QMRA is a powerful tool for exploring the relative risks under different exposure scenarios (e.g., storm vs. non-storm event, *E. coli* from animal feces vs. POTW) (WERF, 2009). Given these considerations, the Department should reconsider bacteria targets and adjust them as appropriate in subsequent TMDL revisions.

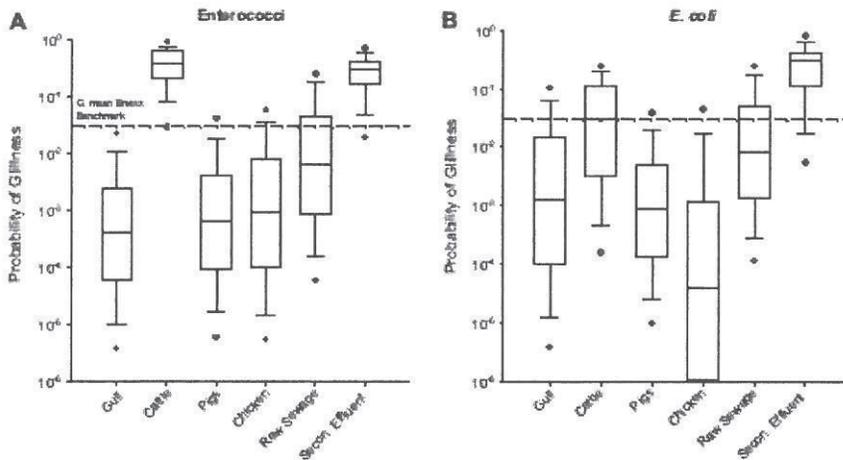
**b. The TMDL target should consider the effects of bacteria source on human health risk.**

Recent QMRAs by USEPA contractors have shown that setting appropriate recreational indicator bacteria limits (i.e., corresponding to illness rates of 8-9 per 1,000 WBCR exposures) requires an understanding of bacteria sources (Schoen and Ashbolt 2010, Soller et al. 2010). As shown in Figure 4 from Schoen and Ashbolt (2010), when percent of bacteria from non-human sources (in this case gulls, as shown on the x-axis) is above roughly 80%, the cumulative illness risk (or the sum of the gull and human/sewage risk curves) is roughly half the USEPA's tolerable illness rate (as indicated by the "illness benchmark" horizontal line). Stated another way, when the percent of bacteria indicators from human fecal sources is low, default recreational criteria are overprotective and can be safely increased. Further supporting this understanding, as shown in Figure 3b from Soller et al.(2010), predicted illness risks associated with recreational contact with a variety of fecal sources all at uniform concentrations of 126 col/100ml *E. coli* indicate that illness rates (and therefore appropriate recreational limits) are very much a function of bacteria source. While some source tracking information is available within the USGS study, a phased TMDL approach would allow the collection of additional source data, which is essential given the very rough nature of the USGS source tracking methods.



**FIGURE 4.** Comparison of median illness risk for adults when total ENT concentration (at 35 cfu 100 mL<sup>-1</sup>) is attributed to a mixture of primary POTW effluent (sewage) and seagull feces (gulls).

Source: Schoen and Ashbolt (2010).



**Fig. 3 – Run 2 probability of GI illness.** Run 2 probability of GI illness from ingestion of water containing fresh faecal pollution at densities of 35 cfu 100 mL<sup>-1</sup> ENT (3A) and 126 cfu 100 mL<sup>-1</sup> E. coli (3B). Predicted risk (median, interquartile range, 10th and 90th percentiles, and 5th and 95th percentiles) for fresh gull, cattle and pig faeces, and chicken litter. Human impacts are presented for primary sewage (Human 1) and secondary disinfected effluent (Human 2). The illness benchmark represents a geometric mean probability of illness of 0.03.

Source: Soller et al. (2010)

In addition, we offer the following information regarding bacteria source and natural background contributions that substantiate selection of alternative water quality targets for TMDLs:

- California bacteria TMDLs that consider monitoring data from reference watersheds when setting criteria exceedance rates  
[http://www.waterboards.ca.gov/losangeles/board\\_decisions/basin\\_plan\\_amendments/technical\\_documents/bpa\\_78\\_R10-006\\_td.shtml](http://www.waterboards.ca.gov/losangeles/board_decisions/basin_plan_amendments/technical_documents/bpa_78_R10-006_td.shtml).

- California Basin Plan Amendments that incorporate Natural Source Exclusion into Water Quality Standards  
[http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/basin\\_plan/issue\\_7.shtml](http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/issue_7.shtml)).

## **5. MODELING APPROACH, LOADING CAPACITY, LOAD AND WASTELOAD ALLOCATION, AND MARGIN OF SAFETY**

- a. The modeling approach and Loading Capacity calculated for Creve Coeur Creek is inconsistent with Missouri's recreational water quality criteria and Total Maximum Daily Load guidance developed by the U.S. Environmental Protection Agency.**

Missouri's WBCR-B criterion (206 col/100 mL) is expressed as a recreational season geometric mean, with the stipulated recreation season spanning from April 1 to October 31 (10 CSR 20-7.031). Therefore, the bacteria criterion applicable to the currently classified segment of Creve Coeur Creek has a seven-month averaging period.

Technical guidance developed by the USEPA (2007c) clearly indicates that development of the Loading Capacity Curve should be calculated by multiplying the appropriate daily criterion by the average daily flow value. The Department apparently multiplied the seven-month criterion by a daily flow value to obtain the Loading Capacity for Creve Coeur Creek.

In USEPA (2007c) guidance (see Appendix A), USEPA discusses approaches to convert non-daily criteria to daily values for use in the Load Duration Curve approach. Included in Appendix B of USEPA (2007c) is a bacteria example calculation that converts a non-daily bacteria criterion to a daily value using statistical procedures outlined in USEPA (1986). Such an example is directly applicable to Creve Coeur Creek.

While Missouri water quality standards do not include a short-term (e.g., daily) criterion for protection of WBCR-B, the process included in USEPA (2007c) should be used to develop a water quality target to evaluate loading capacity using a Load Duration Curve approach with the understanding that the recreational season geometric mean should be used to determine water quality standards compliance. The Department should recalculate the Loading Capacity (and TMDL components) for Creve Coeur Creek based on an appropriate TMDL target that considers the correct averaging period. Such an approach may include development of a daily TMDL target based on statistical characteristics of bacteria datasets collected in Creve Coeur Creek. An example of an alternative daily TMDL target analysis is provided in the next comment. The District wishes to emphasize that daily *E. coli* targets suggested above be considered implementation goals to achieve the primary criterion (i.e., recreational season geometric mean).

- b. The load duration curve must be adjusted so that sample data and TMDL target have comparable averaging periods.**

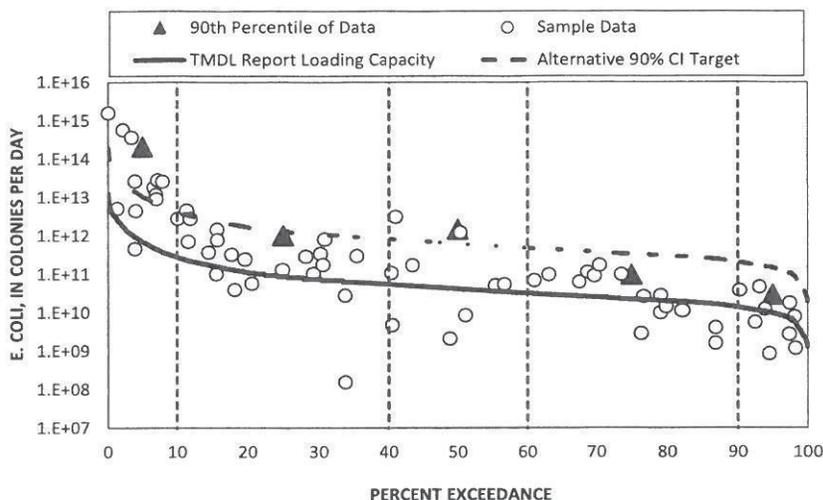
As discussed above, technical guidance developed by the USEPA (2007c) suggests that load duration curves should be calculated from data and criteria that have the same averaging period. Data used in the TMDL report did not have the same averaging period. In the TMDL, the Department multiplied the recreational season geometric mean criterion by a daily flow value to obtain the loading capacity for Creve Coeur Creek. This loading capacity was then compared to daily bacteria measurements and geometric means of data from various daily flow exceedance intervals.

The correct way to calculate the TMDL using a Load Duration Curve would be to either 1) convert the bacteria and flow data into recreational season geometric mean values and compare them to the geometric mean water quality criterion or 2) convert the recreational season water quality criterion to a daily value and compare it to the daily data. Either method would provide a more accurate representation of existing loading conditions relative to intended water quality criterion. The first method of converting the sample data to a recreational season geometric mean is complicated by the fact that limited data are available from most years to calculate a representative geometric mean value. However, the second method of converting the average water quality criterion into a daily value is a straightforward process. Appendix B of USEPA's (2007c) technical guidance includes an example bacteria calculation that converts a non-daily bacteria criterion to a daily value using statistical procedures outlined in USEPA (1986). This example is directly applicable to Creve Coeur Creek and is illustrated in the following paragraphs.

The USEPA (1986) method used to develop the alternative daily statistical targets for *E. coli* is based on both the inherent variability in water quality data (as measured by the log standard deviation) and the assumed log-normal relationship between the geometric mean and statistical maximum value of bacteria data. Once calculated, this statistical maximum value can be interpreted as a daily target that is protective of the long-term average criterion, even when it is exceeded a certain percentage of the time. The USEPA approach therefore also provides a method for assigning a degree of caution based on the expected use intensity of the water. For example, USEPA's 1986 method included a high degree of caution (75% confidence) that can be assigned for heavily used waters while a lower degree of caution (95% confidence) can be assigned for waters with limited use.

We applied this alternative target approach to data ( $n = 67$ ,  $\log SD = 0.92$ ) collected from Creve Coeur Creek (WBID 1703). The alternative target was developed using the 90% confidence interval (CI) factor as this level likely corresponds to infrequent use of Creve Coeur Creek ("lightly used full body contact" from USEPA 1986). We view this as a highly conservative calculation since the District is not aware of any WBCR uses that have occurred within flowing segments of Creve Coeur Creek. The result of applying a daily alternative target indicates that reductions are limited to flow exceedance ranges of 40% to 60% and 90% to 100% (see Figure below). The District notes that reductions in the 90% to 100% exceedance range are infeasible (see comment 5.g.) and would require implementation of stormwater controls that are not practicable (see comment 5.j.).

## WBID 1703



### Comparison between the MDNR-calculated TMDL and Alternative Statistical Maximum 90% Confidence Interval Target for the Classified Section of Creve Coeur Creek.

Note 1: There were inconsequential differences between the distributions of recreational season and annual flow data. To maintain consistency with the TMDL report, watershed-adjusted flow data used by Department were used to calculate both loading capacity curves.

If the Department chooses to retain the load duration curve approach, the approach must be adjusted so that the sample data and water quality criterion are expressed with the same averaging periods. The method outlined above is the most appropriate way to express the data and criterion as daily values while still maintaining consistency with the recreational geometric mean water quality criterion.

**c. Methods used to determine the Loading Capacity result in a Margin of Safety that is unrealistic, excessive, and significantly overestimates uncertainty.**

As noted in an earlier comment, the Loading Capacity curve depicted in the TMDL is apparently based on use of the 206 col/100 mL geometric average. In other words, the 206 col/100 mL target could be considered a daily not-to-exceed target. By implementing the criterion as a daily value, the Department is protecting a geometric mean condition well below the WBCR-B criterion according to USEPA (1986) guidance. By using this approach, the implied geometric mean target is 22 col/100 mL, assuming the statistical distribution of the Creve Coeur Creek water quality data (i.e., 0.92 log standard deviation). Such an assumption creates an arbitrary and unrealistically large and scientifically unsupportable margin of safety that is approximately 10 times greater than intended by the current draft of the TMDL.

**d. An explicit Margin of Safety is not needed as bacteria are treated as a conservative parameter in the Load Duration Curve modeling approach.**

As noted in other comments, the Department has apparently grouped data collected at multiple sites into the Load Duration Curve developed for a single location in the watershed. It is well acknowledged in the technical literature and USEPA (2001) guidance the bacteria indicators are not conservative parameters.

Rather, organisms undergo decay and settling processes when introduced into the water column, as well as potentially regrowth in sediments and resuspension. Thus, measurements collected several miles upstream of the impaired segment are not 'instantaneously transported' to a single point of compliance represented by a Load Duration Curve. Treating bacteria as a conservative parameter represents an implicit margin of safety and renders additional explicit safety factors unnecessary.

**e. The Load Duration Curve approach provides a very limited linkage between watershed processes and bacteria fate and transport mechanisms.**

The Load Duration Curve approach for TMDL development may be an expedient means to determine TMDL components. However, quantitatively evaluating improvements likely to result from implementing management scenarios (e.g., land use practices, structural Best Management Practices, sanitary sewer improvements, etc.) is precluded by this empirical approach. In comparison, a numerical watershed model (e.g., SWAT, HSPF, SWMM etc.) provides a quantitative link between watershed improvements and calculated changes in bacteria densities. A watershed model offers several implementation advantages over a Load Duration Curve approach including but not limited to: (1) a more accurate estimate of loading capacity during the recreational season, (2) identification of critical source areas, (3) consideration of fate and transport mechanisms, (4) a framework to assess data collected at different times/locations (i.e., Creve Coeur Creek), (5) a framework to allocate loads to meaningful discharge categories, and (6) optimization and selection of management scenarios to help best achieve water quality standards with available resources.

Achieving the currently proposed TMDL load reductions in Creve Coeur Creek would take decades (or longer), require significant investments, and would not allow resources to be targeted at restoring uses during the periods where the creek is most likely to be used for recreation (low flows). The TMDL should be based upon a meaningful tool that links in-stream criteria with the landscape processes that generate and transport bacteria. A more robust modeling tool is needed to deal with the complexities of bacteria fate and transport in an urban environment, and to avoid an arbitrary result and unnecessary and costly expenditures that would be unsupported by a meaningful reduction in risk or other benefits to human health or the environment.

**f. If the load duration curve approach is retained, the Department should calculate separate load duration curves for each monitoring site in the watershed.**

As discussed above, we believe that a more robust modeling tool is needed to correctly account for the complexities of bacteria fate and transport in an urban environment. However, if the Department retains the load duration curve approach, it must be modified to accurately reflect conditions in the classified segment. In the absence of specifying decay and settling to more accurately quantify bacteria loads from upstream sites, a load duration curve should be developed using data only for those sites located in the classified section. This modeling approach would better reflect conditions in the classified reach. If calculated using appropriate flow adjustment factors (see earlier comments), individual load duration curves could also be developed for sites outside of the classified reach. Analysis of these curves may be useful in helping to identify critical source areas in the watershed, therefore allowing implementation resources to be focused to achieve the greatest public health benefit.

**g. The Creve Coeur Creek TMDL should consider feasible management options and actual risk during wet weather conditions.**

According to Cleland (2002) as cited by TCEQ (2007), the upper parts of the Load Duration Curve may represent flow conditions that exceed feasible management. Specifically, the experts that TCEQ enlisted state in their report:

“Exceedances occurring at the low flows may require regulatory actions to control point sources. At the mid-range and high flows, management measures directed towards nonpoint sources could be developed. At some point in the flow frequency, control of pollutant sources becomes unfeasible. Pollutant loadings at these high flow events typically exceed design specifications for control actions. For this reason, it may be reasonable to exclude data and loadings that occur at flooding conditions.”

In addition, we note that high flows may also represent reduced illness risk because: (1) whole body contact recreation may be non-existent, and (2) velocities may exceed those considered safe for swimming by Hyra (1978). The Department should incorporate these factors that present lower risk during the 0% to 10% exceedance interval when estimating load reduction needs. A revision could be implemented by selecting a higher confidence interval when identifying a daily TMDL target using USEPA (1986) bacteria criteria guidelines.

**h. Wasteload allocations and TMDL targets must consider natural sources.**

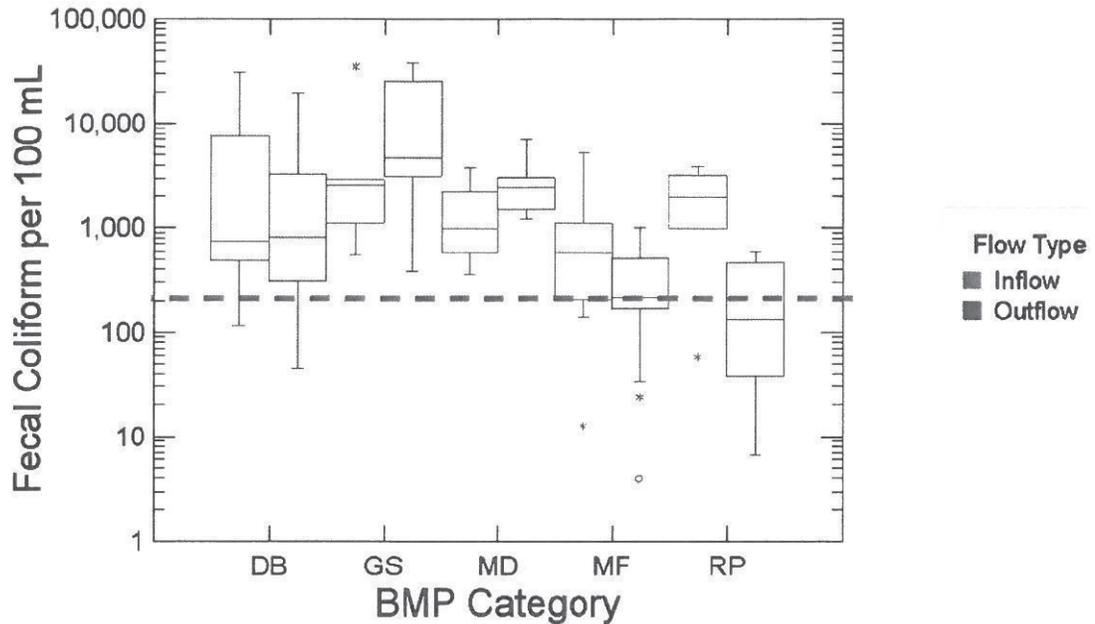
Pathogenic indicator bacteria, such as *E. coli*, are contributed to streams, rivers, and lakes by various sources including natural sources (e.g., deer, raccoons, waterfowl, soils, sediments, plants, and decaying organic matter, etc.). Natural or wildlife contributions should be considered when setting TMDL bacteria targets and developing wasteload allocations. The District submits that the Department must evaluate natural bacteria loads and the corresponding human health risks. Such evaluations must be used to make appropriate wasteload allocations for stormwater permittees.

**i. Wasteload allocation and implementation expectations must consider the limitations of treatment provided by structural and non-structural best management practices.**

The District believes that technical feasibility must be considered when implementing any TMDL provisions into MS4 permits. Such a position is supported by the Maximum Extent Practicable (MEP) standard and minimum control measures approach embodied in the Clean Water Act. The reality of the MEP standard is supported by results generated by the International Stormwater Best Management Practice (BMP) Database (BMP DB). The BMP DB is a warehouse for performance data of various urban stormwater BMPs. Recently, data from the BMP DB were used to evaluate the performance of various structural BMPs in treating bacteria (see below for figure, with permission). Results from this analysis suggest that typical flow-through and passive control BMPs may not be capable of consistently achieving WBCR criteria, depending upon the expressed average period or duration. The ability of other BMPs, such as infiltration or capture/reuse systems, are constrained by soil infiltration conditions, available open space, land availability, reuse opportunities, and infrastructure or utility conflicts. The MEP standard must be employed in implementing MS4 controls, including the development and implementation of the Creve Coeur Creek TMDL.

Please note that the entire BMP DB report on Fecal Indicator Bacteria can be found at:  
<http://www.bmpdatabase.org/Docs/BMP%20Database%20Bacteria%20Paper%20Dec%202010.pdf>

**Figure 11. Box Plots of BMP Study Geometric Means for Fecal Coliform by Selected BMP Category**



Notes: DB = Detention Basin; GS = Grass Strip/Swale; MD = Manufactured Device; MF = Media Filter; RP = Retention Pond

**j. The TMDL should be revised to exclude extremely high flow events.**

During high stream flows (which occur less than 10% of the time), stream velocities and turbulence may exceed those necessary or appealing for safe recreation (Whole Body Contact Recreation). It is arbitrary and unreasonable to require the highest bacteria percent reduction (Table 8) when flows may be unsafe for recreation or not feasibly managed. The Missouri Effluent Regulations (20 CSR 10-7.015) recognize this situation by allowing a “temporary suspension of accountability for bacteria standards” during periods of wet weather.

The District is very concerned that the TMDL could result in stormwater management requirements that go beyond those already adopted for compliance with the MS4 permit (e.g., requiring capture and treatment of volumes greater than 90<sup>th</sup> percentile daily storm depth). Such additional requirements exceed the MEP provisions of the District’s MS4 permit and extend beyond the intent of the Phase II stormwater regulations. Thus, the draft TMDL may create stormwater performance objectives that are arbitrary, and are not required by law, not enforceable, and not necessary to protect recreational uses. The Department should reevaluate the load reduction targets for flows that are generated by precipitation events greater than the 90<sup>th</sup> percentile storm.

**k. It is not clear if sanitary sewer overflows (SSOs) are included in the wasteload allocation.**

On page 24 (second paragraph), the draft TMDL indicates that wasteload allocations for SSOs are considered zero. In the following sentence, the Department states that SSOs are included in the wasteload allocation. These two sentences appear to be contradictory and should be clarified.

**l. It is arbitrary and unrealistic to assign permit holders a wasteload allocation equal to zero.**

Section 7 suggests that permit holders listed in Table 5 are to be prescribed a wasteload allocation of zero. No scientifically supportable TMDL allocation scheme or technical basis supports a wasteload allocation of zero. The District notes unavoidable natural background loads, the limits of treatment achievable through implementation of structural BMPs, and the need for a watershed model to distribute wasteload allocations to spatially explicit locations or discharge categories. All permitted entities, including the Missouri Department of Transportation, must be assigned wasteload allocations. In addition, the municipal MS4 co-permittees should also be included in the wasteload allocations.

**m. The wasteload allocation included in the TMDL is inaccurate given the technical defects with the Load Duration Curve approach.**

The wasteload allocation assigned to the District's MS4 permit was based upon the Load Duration Curve approach. For the reasons described above, these calculations and all wasteload allocations must be reevaluated and adjusted, as appropriate.

## **6. IMPLEMENTATION PLAN**

**a. Maximize grant funding to assist with TMDL implementation.**

The District understands that Section 319 grant funding guidance requires that grant awards be directed at addressing nonpoint source pollution concerns and watershed restoration activities. The TMDL indicates the watershed does not include any nonpoint source discharges, but this does not mean that Section 319 funding is not available to help with TMDL implementation activities. Section 319 grant guidance published by EPA (see 68 FR 205) specifically states:

“Section 319 funds may be used to fund any urban stormwater activities that are not specifically required by a draft or final NPDES permit.”

The section also describes other urban runoff management activities that could be eligible for Section 319 funding, including technical assistance to local stormwater programs, monitoring needed to design and evaluate the effectiveness of implementation strategies, best management practices for pollution prevention and runoff control except those required by a draft or final NPDES permit, information and education programs, technology transfer and training, and development and implementation of policies, regulations, and local ordinances to address stormwater runoff. The Department should more explicitly state what 319 funding will be sought and how that funding could be used to assist in TMDL implementation efforts.

**b. TMDL implementation should allow sanitary sewer improvements to proceed prior to other restoration activities.**

The District strongly urges the Department to postpone TMDL implementation to allow sanitary sewer improvement efforts to be completed. The District, USEPA, the Department, and with some input from the Missouri Coalition for the Environment (as well as the District stakeholders) spent several years determining the best approach to implementing sanitary sewer improvements. This approach, as well as a post-construction monitoring plan, is embodied in a Federal Consent Decree.

After all SSO projects have been completed, the CMOM Program has been fully developed and implemented, and in-stream water quality has been assessed for at least two years, the Department should evaluate whether the creek is impaired and delist the creek if appropriate. If the creek is still impaired, then the TMDL should be revisited and the requirement to move forward with load reduction efforts may be appropriate via the addition of enhanced MS4 program implementation and BMPs. This could include more focused illicit discharge detection and elimination, conducting sanitary surveys, addressing septic system failures, and other bacteria-focused BMPs.

**c. The TMDL implementation plan should include the opportunity to develop site-specific recreational use criteria.**

The District believes that it is possible to develop a more accurate, site-specific water quality target for the TMDL that is protective of human health for Creve Coeur Creek and allows the District and other stakeholders to more efficiently target limited financial resources across all of MSD's watersheds. This can be accomplished through the use of state-of-the-art quantitative polymerase chain reaction (qPCR) detection methods, human-specific indicator or marker species measurements, pathogen measurements (if needed), quantitative microbial risk assessment and the latest microbial source tracking techniques. This is also discussed in item 4.a above. The Department should include at least a two to three year period in the implementation schedule to allow this to be completed.

**d. The TMDL should be re-written to be a phased TMDL that includes revision of the water quality target(s), collection of additional data and information, and adjustments to the wasteload and load allocations.**

The Creve Coeur Creek TMDL and all subsequent TMDLs that the Department develops for waterbodies within the District's service area will impose requirements on the District and other stakeholders to reduce pollutant loads. The Department should recognize that in most instances, the District's ratepayers will bear a disproportionate burden for implementing the TMDL. USEPA's new integrated municipal stormwater and wastewater planning approach (USEPA 2012) is intended to help states and communities

"assist municipalities on their critical paths to achieving the human health and water quality objectives of the Clean Water Act by identifying efficiencies in implementing requirements that arise from distinct wastewater and stormwater programs, including how to best prioritize capital investments."

The TMDL does not fully integrate, and is not sufficiently consistent with, the Federal Consent Decree that binds the District along with USEPA and the Coalition. This decree addresses mitigation of sanitary sewer overflows and post-construction monitoring which will help ensure that any recreational use impairments in Creve Coeur Creek are addressed. The implementation plan for the TMDL should also consider the additional requirements for stormwater sources that will be imposed through the District's MS4 program. The implementation plan must include further source characterization, monitoring, assess beneficial use attainment, sanitary sewer improvements and CMOM efforts, and evaluation of on-site wastewater systems. Because of the disproportionate cost that the District's ratepayers are bearing, additional stormwater controls should only be pursued if needed and appropriate and after "lower hanging fruit" controls have been identified.

Given USEPA's new framework, the Department has added flexibility to integrate the Creve Coeur Creek TMDL and other urban stream TMDLs within the District's service area into a more comprehensive facility planning approach. Under USEPA's framework, there are many options that could be considered. The District recommends that the Department conduct a stakeholder meeting(s) on these options to evaluate how best to consider this new approach with respect to restoring urban streams within the District's service area.

**e. The timing and necessity for TMDL issuance and implementation should take into account Federal Consent Decree obligations and resource allocations.**

The District is presently implementing water quality improvements prescribed by a Federal Consent Decree. These improvements will further reduce bacteria concentrations in Creve Coeur Creek. Issuance and implementation of the TMDL prior to completing the referenced improvement arbitrarily creates the potential for resource allocation conflicts and a high potential for other inconsistent and conflicting obligations. Such conflicts also arise from the coarse TMDL source and allocation analysis dictated by the Load Duration Curve method. In other words, the TMDL does not quantify the relative contributions from various source categories, permittees, or critical subwatersheds. Attempting to implement a TMDL without a meaningful source analysis has the potential to arbitrarily divert resources away from areas or sources most in need of improvement. Therefore, any TMDL implementation plan must incorporate and integrate the Federal Consent Decree requirements and improvements, CMOM activity, and monitoring of the resulting stream water quality prior to any additional efforts to improve wet weather conditions.

**f. The potential cost, technical complexity, and stakeholder interest in the TMDL warrants additional public participation.**

The District notes that Missouri's Public Participation Plan stipulates that public meetings be held when appropriate. Further, because the Department is developing a standard, a public hearing opportunity is required under RSMo Section 644.036. Moreover, the District believes that public meetings are appropriate due to the potentially significant infrastructure planning and capital costs associated with implementing the TMDL. For the purposes of rough estimation, we estimate that installing stormwater treatment retrofits to the MEP could cost from \$10,000 to \$30,000 per developed urban acre. This estimate was based upon rough local cost calculations and costs gathered from other MS4 programs that have TMDL drivers. Since the Creve Coeur Creek watershed is composed of approximately 12,300 urban acres, the District is concerned that the cost of stormwater implementation could range from \$123 million to \$369 million. Therefore, public meetings are certainly warranted and appropriate (and required by law) prior to finalizing the TMDL. The District requests to move forward in a collaborative manner with the Department in developing TMDLs for waters within or intersected by District boundaries.

**g. The implementation plan should target water quality criteria, rather than specific load reductions, as its ultimate goal.**

Section 12 of the TMDL report indicates that the TMDL is considered to be successfully implemented when loading reductions listed in Table 8 are achieved. The District understands that the purpose of the TMDL process is to establish loading levels needed to meet water quality standards, and that achieving the estimated reductions should result in standards being attained.

However, given the technical issues and uncertainties associated with the MDNR's TMDL development approach, water quality standards likely will be achieved well before all loading reductions in Table 9 are met. The District asserts that the Section 12 must be modified to state that the TMDL is considered to be successfully implemented when water quality standards, rather than the estimated loading reductions, are achieved. Furthermore, the Department should not develop implementation plans on a pollutant-by-pollutant basis for waters having multiple impairments (e.g., chloride). Instead, any implementation plan developed by the Department must integrate and account for all pollutants demonstrated to exceed water quality standards so that control measures and funding schedules can be coordinated and optimized.

## 7. REASONABLE ASSURANCE

### a. The TMDL should include other District actions planned for the watershed in the discussion about reasonable assurance.

The TMDL does not address the actions that MSD is required to take in the Creve Coeur Creek watershed (and other watersheds) under the above referenced Federal Consent Decree that must count towards reasonable assurance that the TMDL will be implemented. These actions include sewer lining, supplemental environmental projects, sanitary sewer improvements, continued development and implementation of a CMOM Program, as well as other actions. TMDL requirements must be integrated with the Federal Consent Decree obligations to avoid conflicting obligations, unnecessary expenditures, and other arbitrary and/or duplicative requirements.

### b. The TMDL should rely on the maximum extent practicable (MEP) standard for reasonable assurance in stormwater permits.

The District is very concerned about the mention of *effluent limits* in stormwater permits in the discussion of reasonable assurance. In 1987, Congress amended the Clean Water Act (CWA) to expand the National Pollutant Discharge Elimination System (NPDES) permitting program to include pollutants discharged in certain types of stormwater runoff. Section 402(p) was added, which states, in part:

**§ 402(p) Municipal and Industrial Storm Water Discharges. (3) Permit Requirements.**

**(A) Industrial Discharges.** *Permits for discharges associated with industrial activity shall meet all applicable provisions of this section and section 301 [Related to effluent Limitations].*

**(B) Municipal Discharge.** *Permits for discharges from municipal storm sewers (i) may be issued on a system- or jurisdiction-wide basis; (ii) shall include a requirement to effectively prohibit non-storm water discharges into the storm sewers; and (iii) shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants [emphasis added].*

The stormwater permitting program defined in the statute explicitly incorporated the phrase "*reduce the discharge of pollutants to the maximum extent practicable*" (known as the MEP standard) into the regulations and the resulting permits.

The District believes that the CWA only imposes the MEP standard on MS4 permit holders and that the imposition of effluent limitations in municipal stormwater permits is not authorized. Section 402(p)(A) regarding discharges associated with industrial activities clearly references the Section 301 effluent standards (rather than the MEP standard), whereas Section 403(p)(B) regarding discharges from municipal storm sewers employs the MEP standard (rather than the 301 effluent standards).

The imposition of effluent limits on MS4 permit holders would not comply with Section 402(p), and will exceed the Department's jurisdiction and authority. Based on the applicability of the MEP standard, the District urges the Department to include reference to the MS4 being revised to include the implementation of appropriate and incremental BMPs to reduce the discharge of pollutants from the municipal storm sewer system to the maximum extent practicable, but only if, after sanitary sewer improvements and other required efforts are complete, water quality does not meet applicable water quality standards.

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August 3, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ('TMDL') proposal. With this letter, the City of Woodson Terrace requests the Missouri Department of Natural Resources ('Department') rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues.

The City of Woodson Terrace appreciates the Department's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

We appreciate the opportunity to provide these comments. The City of Woodson Terrace is committed to working with the Department to ensure that Missouri's waters are protected through application of good science and stakeholder input. In support of this approach, the City of Woodson Terrace requests meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by the Department to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact Doug Zaiz at 314-427-2600 if you have any questions or would like to discuss these issues further.

Sincerely,

A handwritten signature in black ink, appearing to read 'Doug Zaiz', with a stylized flourish at the end.

Doug Zaiz  
Director/Public Works  
City of Woodson Terrace

HOME  
BUILDERS  
ASSOCIATION  
OF ST. LOUIS  
& EASTERN  
MISSOURI  
—  
10104  
OLD OLIVE  
STREET ROAD  
—  
ST. LOUIS,  
MISSOURI  
63141-5908  
—  
314 994 7700  
—  
FAX  
314 432 7185  
—  
WEBSITE  
WWW.STLHBA.COM

August 6, 2012

John Hoke, Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
Water Protection Program  
P.O. Box 176  
Jefferson City, MO 65102

Public Comments for Total Maximum Daily Load for Creve Coeur Creek, St. Louis County

Dear Mr. Hoke:

On behalf of the Home Builders Association of St. Louis and Eastern Missouri (HBA) and its 600 member companies, I thank you for the opportunity to provide comments in response to the Missouri Department of Natural Resources' proposed Total Maximum Daily Load (TMDL) for Creve Coeur Creek.

The HBA's membership consists of firms that participate in all levels of residential development and construction. Members live and work in the communities in which they build, and regularly plan and design projects to optimize environmental protection and resource conservation. The HBA supports the Missouri Department of Natural Resources in its consistent efforts to preserve the state's natural assets.

However, the HBA finds concerns with draft TMDLs for waterbodies within the City of St. Louis and St. Louis County because these TMDLs can be detrimental to future development. Specifically, for Creve Coeur Creek, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis City and County. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, the Department should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If the Department continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.
- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.



HOME  
BUILDERS  
ASSOCIATION  
OF ST. LOUIS  
& EASTERN  
MISSOURI

10104  
OLD OLIVE  
STREET ROAD

ST. LOUIS,  
MISSOURI  
63141-5908

314 994 7700

FAX  
314 432 7185

WEBSITE  
WWW.STLHBA.COM

The HBA appreciates your willingness to consider comments from the home building industry. Like the Missouri Department of Natural Resources, the HBA believes Missouri waters should be protected through the application of sound science and stakeholder input. In support of this approach, the HBA requests meaningful public participation be sought and that at least one (or as many as needed) public meeting be hosted to determine and justify the need for a TMDL. Additionally, before any TMDL is finalized, the HBA believes the defects and concerns noted above must be addressed. Do not hesitate to contact me if you have any questions or would like to further discuss. I can be reached at 314.994.7700 ext. 116 or [SchwartzE@hbastl.com](mailto:SchwartzE@hbastl.com).

Regards,



Emily Schwartz Post  
Assistant Staff Vice President for Public Policy

cc: HBA Environmental Affairs Committee  
HBA St. Louis County Board of Trustees  
Pat Sullivan, Executive Vice President, HBA  
Emily Wineland, Staff Vice President for Public Policy, HBA





**Metropolitan St. Louis  
Sewer District**

2350 Market Street  
St. Louis, MO 63103

August 6, 2012

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

***Subject: Public Comments for and Request for Public Meetings Regarding Total Maximum Daily Load for Creve Coeur Creek located in St. Louis County, Missouri***

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ("TMDL") proposal. With this letter, the Metropolitan St. Louis Sewer District ("District") requests the Missouri Department of Natural Resources ("Department") withdraw or delay finalizing this TMDL until several technical problems with the proposed draft TMDL are addressed.

The District recognizes the significant technical challenges and complexities in developing accurate TMDLs in urban environments. Further, the District appreciates the ongoing dedication by Department professionals in protecting Missouri's water resources. The focus of this comment letter is to assist the Department's TMDL development process by providing additional information, analysis, and insights associated with the Creve Coeur Creek watershed system. The District is concerned about the need for and the potential ramifications and implementation feasibility of the Creve Coeur Creek TMDL as well as the several others recently public noticed for waterbodies within the MSD service area.

Due to the complexity of understanding water quality conditions within urban streams, the TMDL calculation process, and the potential major impacts to the District, local governments, private development, other businesses, and to residents, it was not possible (despite a substantial effort and expenditure of resources) to fully analyze and comment on the TMDL within the 45-day public comment period. Additional time is needed to conduct a thorough and complete review and have constructive dialogue with the Department. The District also believes that the approach to developing the TMDL (use of a load duration curve with existing water quality data, source characterization methods, lack of appropriate implementation planning considerations, etc.) must be corrected and improved if the Department pursues a Creve Coeur Creek TMDL in the future.

Some of our comments of significant concern are summarized by the District in this transmittal letter. Additional and more detailed comments are provided in Attachment A that, when addressed, will significantly improve the TMDL.

1. **The TMDL does not adequately consider all sources of bacteria that may be impacting Whole Body Contact Recreation-Category B (WBCR-B) attainment in Creve Coeur Creek.** The TMDL discounts bacteria contribution from other permitted stormwater discharges (46 other permitted discharges listed in Table 5). The Missouri Department of Transportation MS4, which was not considered, comprises a significant portion of the watershed (approximately 6%) and a likely higher percentage of the watershed's impervious area.

In addition, there are over 200 unsewered parcels within the watershed which are a significant source of bacteria and must not be ignored. The TMDL must consider all sources of bacteria rather than solely focus on the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit. The failure to consider and address all these sources is arbitrary and legally and technically unsupportable.

2. **The TMDL components are inconsistent with Missouri's recreational use water quality criterion.** Missouri's WBCR Category B criterion (206 colonies/100 mL) is expressed as a recreational season (seven month) geometric mean. According to guidance issued by the U.S. Environmental Protection Agency (USEPA), loading capacity estimates using the Load Duration Curve approach should be developed using criteria with a daily averaging period. For those criteria not expressed as daily values (such as Missouri's bacteria criterion), the USEPA guidance offers multiple options to align averaging periods. The Department must revise the TMDL to employ the correct criterion averaging period if the load duration curve approach is retained.
3. **The District is very concerned that the TMDL could result in stormwater management requirements that go beyond those already adopted for compliance with the MS4 permit and the Federal Consent Decree.** The District's design requirements include capture and treatment of the 90<sup>th</sup> percentile daily storm depth in water quality best management practices (BMP) to meet the permit requirement of implementing BMPs to the maximum extent practicable (MEP). Additional TMDL requirements would exceed the MEP provisions of the District's MS4 permit and extend beyond the Phase II stormwater regulations. Further, the District has recently entered into the federal consent decree. To avoid arbitrary, duplicative and unnecessary costs and requirements, any TMDL implementation approach must incorporate and take into account the Federal Consent Decree requirements.
4. **The TMDL should include a phased or adaptive management component for implementation and future revisions due to the uncertainties and complexities with this study.** A phased or adaptive management approach is imperative given the issues outlined above and the complexity of urban hydrologic processes. The TMDL should prioritize future implementation activities based upon a recreational use risk analysis that considers limitations induced by high flow conditions and sources of bacteria. For example, human sources of bacteria occurring during baseflow conditions should be the first priority since these sources are of highest risk. Additionally, load reduction requirements should be contingent upon Creve Coeur Creek not achieving its recreational water quality criterion. The TMDL proposed by the Department acknowledges an adaptive management approach by referring to a future implementation plan; however, this approach should be explicitly set forth within the TMDL. The District requests early involvement of all permitted entities, local governments, and other stakeholders in development of any implementation plan.

The District believes that the Creve Coeur Creek TMDL approach must be improved if it is to achieve its goals, and if it is to be legally and technically sound and supportable. Further, any revision of the TMDL must be conducted with more stakeholder coordination to ensure that an appropriate and legally compliant TMDL is established.

This should include development of a phased TMDL, which would be consistent with USEPA's new Integrated Municipal Stormwater and Wastewater Planning Approach Framework.

We appreciate the opportunity to provide these comments. The District is committed to working with the Department to ensure that Missouri's waters are protected through application of good science and stakeholder input. In support of this approach, the District requests both a technical and a public meeting with the Department to discuss these comments and identify a collaborative path forward prior to finalizing the TMDL. Please contact John Lodderhose, PE at 314-436-8714 if you have any questions and to discuss these issues further.

Sincerely,



Susan M. Myers  
General Counsel

cc: John Lodderhose  
Bruce Litzsinger  
Bill Allen  
Jay Hoskins  
Kristol Whatley  
Rich Unverferth

attachments: Technical Comments  
Map

## ATTACHMENT A

### TECHNICAL COMMENTS ON TOTAL MAXIMUM DAILY LOAD (TMDL) FOR CREVE COEUR CREEK ST. LOUIS COUNTY, MISSOURI (PUBLIC NOTICE VERSION, JUNE 22 THROUGH AUGUST 6, 2012)

The Metropolitan St. Louis Sewer District (MSD or the District) has several technical implementation and other concerns with the bacteria total maximum daily load (TMDL) to establish wasteload and load allocations to protect whole body contact recreation - category B (WBCR-B) in Creve Coeur Creek<sup>1</sup>. The District is concerned about the potential ramifications of the Creve Coeur Creek TMDL as well as the several others recently public noticed for waterbodies within MSD's service area. Due to the complexity of understanding water quality conditions within urban streams, the TMDL calculation process, and the potential major impacts to the District, local governments, private development, other businesses and to residents, it was not possible (despite a substantial effort and expenditure of resources) to fully analyze and comment on the TMDL within the 45-day public comment period. Additional time is needed to conduct a thorough review and have constructive dialogue with the Missouri Department of Natural Resources (MDNR or the Department).

The District believes that the basic approach to developing the TMDL (use of a load duration curve with existing water quality data, lack of appropriate implementation planning considerations, etc.) is not scientifically sound and must be improved. The District requests revision of the TMDL with more stakeholder coordination to ensure that the most appropriate TMDL is established based on sound, current, and defensible science. Any TMDL should also include development of a phased TMDL, which would be consistent with the U.S. Environmental Protection Agency's (USEPA) new Integrated Municipal Stormwater and Wastewater Planning Approach Framework (USEPA, 2012)

Furthermore, the District requests meeting with the Department to discuss the technical implementation and other comments provided below with respect to not only the Creve Coeur Creek TMDL but all other TMDLs for waters within the District. We believe resolution of the comments below will allow the Department to develop legally compliant, more appropriate TMDLs for urban streams.

#### 1. LAND USE AND WATERSHED INFORMATION

##### a. The TMDL land use and watershed information must be supplemented with more accurate, local data.

The land use statistics presented in Section 2.4 of the draft TMDL are based on data collected at 30-meter resolution obtained from Thematic Mapper imagery (MoRAP, 2005). At this resolution the data are insufficient for purposes of providing accurate land use statistics (e.g., impervious area).

Additionally, the metadata file states the following:

- "Data only appropriate for regional scale assessments."
- "Data has not been subjected to accuracy assessment. No accuracy stated or implied."

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<sup>1</sup> The draft TMDL is located at: <http://dnr.mo.gov/env/wpp/docs/1703-creve-coeur-ck-tmdl.pdf>.

Therefore, with these comments the District is providing the Department with more detailed GIS layer of land use data in the St. Louis area. The attached figure provides several key findings that may aid subsequent revisions to all TMDLs in the District's service area, which are discussed below.

First, this assessment demonstrates that over 200 parcels along Creve Coeur Creek are not served by the District's sewer system. Therefore, wastewater generated at the developed portion of these parcels is likely managed with on-site systems (e.g., septic systems or lagoons). Obviously, these point or non-point sources could significantly impact the water quality of Creve Coeur Creek. Second, the three major highway corridors (I-270, I-64, and MO-141) are significant portions of the watershed area (approximately 6%) and must be included in the TMDL as these are managed under the Missouri Department of Transportation municipal separate storm sewer system (MS4) permit.

These datasets can and must be considered, accounted for and used in the TMDL (and in revisions to the TMDL) and implementation plan, including for such purposes as source identification and characterization, load and wasteload allocation calculations, and prioritization of implementation actions. The District requests that MDNR consider such data with subsequent revisions to the TMDLs.

## **2. DEFINING THE PROBLEM (WATER QUALITY DATA ANALYSIS)**

### **a. Recreational season datasets that are skewed, predominantly composed of wet-weather samples, or are greater than 7 years old are not representative and therefore should not be used to calculate TMDL components.**

The TMDL indicates that 67 *E. coli* samples were used in the loading analysis (Table 4 in the TMDL) collected from 1997 to 2010 by MSD and USGS. According to the TMDL, data from years with greater than five samples were assessed against the WBCR-B criterion; the remaining samples were used to supplement existing load calculations in the TMDL. Given the rationale for the data age requirement in Missouri's Listing Methodology Document is representativeness (i.e., reduce potential influence of temporal trends), only data collected from 2005 onward and having at least five samples per recreational season should be used to develop TMDL components.

### **b. Discrete bacteria samples are not representative of daily average *E. coli* loads in the Creve Coeur Creek watershed.**

It appears as though the Department applied daily average flows measured at USGS Station 06935890 (adjusted upwards by a factor of 1.2568) to the discrete bacteria samples to calculate existing loads. We are concerned that the discrete bacteria samples are not representative indicators of daily average bacteria loads in the watershed. Discrete bacteria samples may be skewed towards wet-weather events. Concentrations measured during these events likely represent the highest bacteria levels that would have occurred on the sampling date and therefore are not accurately reflect daily average bacteria concentrations in the stream.

As a result, applying first flush sampling results as a daily average value overestimates existing loading in Creve Coeur Creek. The Department should use an alternative modeling approach which appropriately translates discrete bacteria and instantaneous flow samples to daily or seasonal values that can be compared to the WBCR-B criterion.

**c. The flow adjustment approach over-estimates current bacteria loads within the classified segment of Creve Coeur Creek.**

The Department apparently applied a single linear adjustment factor (1.2568) to correct flow data measured from USGS station 06935890 for the drainage area of the classified segment. These corrected flows were then applied to sample data collected from three different monitoring sites, regardless of the watershed area upstream of the sampling site. This flow correction approach is not appropriate due to non-linear hydrologic scaling relationships and non-uniform distribution of outfalls often found in urban watershed. In addition, by using a single flow adjustment factor, bacteria loading is overestimated. A correct approach for estimating load would be to develop a unique non-linear adjustment factor for each sample site. If a linear adjustment factor is retained in the TMDL evaluation, a unique adjustment factor should be calculated for each monitoring location based on the ratio of its watershed area to the watershed area at the USGS gaging station. We request that the Department reevaluate the linear flow adjustments in the Creve Coeur Creek TMDL.

**d. Additional justification regarding the application of censored data is needed to determine representativeness.**

Several bacteria sample results were censored and reported as either “less than” or “greater than” values. For calculation purposes, “less than values” were halved and “greater than” values were doubled. The TMDL states on pages 9 and 32 that this methodology is consistent with the Department assessment protocols but does not specify or describe these protocols. We are less concerned with the practice of halving “less than” values than we are with doubling “greater than” values. For “less than” values, the initial value is generally low and there is a lower bound (zero) beyond which the value cannot be adjusted. For “greater than” values, the initial value is generally high and there is no corresponding upper bound that limits the data adjustment. Doubling “greater than” values is inherently arbitrary and speculative and may significantly inflate bacteria loading estimates. The Department must employ alternative approaches that are not arbitrary and that do not incorrectly overestimate loading values associated with “greater than” values.

**e. The effect of data transcription or site identification discrepancies must be considered in any future TMDL.**

The District notes that five *E. coli* values reported in Appendix A of the TMDL differ from those in USGS and District databases. These values are listed below:

| Station* | Date      | Appendix A Value (col/100 mL) | Value (col/100 mL) |
|----------|-----------|-------------------------------|--------------------|
| 06935890 | 2/10/1999 | 750                           | 280                |
| 06935890 | 4/15/1999 | 4,000                         | 4,600              |
| 06935890 | 6/16/1999 | 1,400                         | 1,300              |
| 06935890 | 8/2/1999  | 230                           | 130                |
| 06935890 | 10/2/2006 | 79                            | 75                 |

\*USGS station code. This station is identified in Appendix A as “Creve Coeur Cr. @ Hwy 340.”

In addition, the MSD sample collected on 6/14/2005 (640 col/100 mL) is listed twice in Appendix A – once for the “Creve Coeur Cr. @ Creve Coeur Mill Rd.” site and once for the “Creve Coeur Cr. @ Mill Bridge Rd.” site. The Department must resolve these discrepancies in any future or revised TMDL for Creve Coeur Creek.

### **3. SOURCE INVENTORY AND ASSESSMENT**

**a. The TMDL should analyze, consider, and take into account the importance of bacterial sources in the context of human health risks and this factor should be an important aspect of TMDL development and implementation planning.**

Recent quantitative microbial risk assessments (QMRAs) conducted by USEPA contractors have shown that setting appropriate recreational indicator bacteria limits (i.e., corresponding to illness rates of 8-9 per 1,000 WBCR exposures) requires an understanding of bacteria sources (Schoen and Ashbolt, 2010 and Soller et al., 2010). These studies illustrate that some non-human sources of bacteria pose a lower risk than human sources of bacteria. These studies are discussed in more detail in Item 4.b below. Due to these new research findings, the Department must either defer TMDL adoption until after additional source identification studies can be conducted or adopt a phased TMDL. A phased TMDL should include source identification studies to be conducted prior to the implementation of load reduction activities, and provides a mechanism to incorporate the findings of those studies into the TMDL and implementation approach.

**b. The source assessment should distinguish between natural or background sources of bacteria versus anthropogenic sources.**

Sources of bacteria indicator organisms, particularly *E. coli*, are complicated in urban environments. The Creve Coeur Creek watershed has some areas of dense development but also large areas of forested or undeveloped land covers, particularly along the riparian corridor. These more naturalized environments support a significant amount of wildlife that could be significant sources of bacteria indicators. In addition, *E. coli* has been associated with soil, plants, and stream sediments, which complicates source assessment. Stream sediments have been viewed as a significant source of *E. coli* through regrowth and resuspension processes. These natural or background sources of bacteria are often uncontrollable and likely do not pose significant risk to human health. The Department must evaluate these sources and the lower risk to human health in the TMDL source inventory and assessment.

**c. The TMDL should not use the USGS microbial source tracking study to relate bacteria concentrations to presence of upstream sanitary sewer overflows.**

The referenced USGS study was funded by the District in an effort to better understand the influence of sanitary sewer overflows (SSOs), combined sewer overflows (CSOs), and treated wastewater discharges on local receiving waters, including Creve Coeur Creek. The District opposes the use of the regression between bacteria concentrations and upstream SSOs since this relationship is only strong due to the inclusion of the Missouri and Mississippi Rivers in the dataset. These rivers, due to their watershed size and associated land uses, are not representative of receiving waters such as Creve Coeur Creek that are influenced by SSOs and not CSOs. The District supports the potential use of microbial source tracking for future phases of the TMDL or implementation planning, particularly using new techniques that are more suitable for sanitary surveys.

**d. More detailed, local information must be analyzed and used in assessing bacteria sources.**

The District and local governments have extensive data that can be mined to more accurately assess bacteria sources in the watershed. The District's data were discussed briefly under comments related to land use and land cover. These data also include sanitary and storm sewer information that must be used to assess potential locations of on-site wastewater management system and stormwater outfalls. The District requests that the Department incorporate these data in the TMDL source assessment. In addition, local information related to on-site wastewater management system inspections must be included in the TMDL rather than relying on national performance data. Further, there needs to be characterization of specific general and stormwater permit holders and discharges from their facilities. For example, Claymont Estates Pond and Village of Green Trails Dam could be significant sources of bacteria from waterfowl. In addition, several readily identified sources within the watershed are ignored in the TMDL including, horse stables on Baxter Road, Principia on Hwy. 40, and Hunter Estate on Hwy. 141. The Department must revise the TMDL to analyze and account for these arbitrarily omitted sources.

**e. The water quality improvements and load reduction by the District's upcoming elimination of constructed SSOs and other sanitary sewer improvements must be taken into account.**

The TMDL source inventory and assessment suggests that SSO contributions to the potential water quality impairment are significant. The District has been aggressively implementing actions to reduce SSOs and improve sanitary sewer systems within its service area, including committing in a Federal Consent Decree to eliminate all constructed SSOs and to continue to develop and implement a Capacity, Management, Operations, and Maintenance (CMOM) program<sup>2</sup>. MDNR is a party to the Federal lawsuit and will receive copies of MSD's submittals under the Federal Consent Decree. The water quality improvements and load reductions resulting from the District's efforts must be accounted for in estimating future load reduction requirements.

**f. The language regarding "the presence of sewerage system infrastructure", "mismanagement", and "sewage discharge" on page 12 and any subsequent references should be deleted.**

This is broad-sweeping language that implies that simply the presence of a sewerage system will result in non-attainment of the WBCR-B designated uses. This statement is inaccurate and should be deleted.

**g. The Missouri Department of Transportation (MoDOT) MS4 permit should be incorporated into the TMDL as a point source and must be included in the wasteload allocation.**

The I-270, I-64 and MO-141 highway corridors comprise a significant portion of the watershed (6%) and a likely higher percentage of the watershed's impervious area. In fact, the Hwy. 141 corridor has underwent recent and significant expansion in the watershed. These corridors should be controlled under the MoDOT MS4 permit. Pitt et al. (2004) demonstrates that highways significantly contribute to bacteria loading during wet weather conditions, with median fecal coliform densities ranging from 730 to 1,700 col/100 mL.

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<sup>2</sup> The CMOM Program will include detailed performance goals for the prioritization, cleaning, inspection, and rehabilitation of the entire sewer system. Implementation of the Federal Consent Decree will also include continued implementation of the District's Fats, Oils, and Grease (FOG) Program, the development and implementation of a Private Inflow and Infiltration Reduction Program, a Building Backup Response Plan, and a Non-Capacity Related SSO Response Plan.

Therefore, the MoDOT MS4 permit must be referenced as a point source in the TMDL and included within the wasteload allocation. Failure to include the MoDOT MS4 permit in the revised TMDL would be arbitrary and capricious and not otherwise be in accordance with the law.

**h. The reference to MS4 stormwater management plans should be revised.**

The source assessment and inventory section pertaining to the MS4 permit held by the District and co-permitted local governments states that stormwater management plans are to be developed to “prevent the input of harmful pollutants” (pages 15 to 16). The District requests that the Department revise the TMDL to state that these plans are to be developed to “reduce the discharge of pollutants from the MS4 system to the maximum extent practicable,” consistent with state and USEPA regulations.

**i. The District’s Supplemental Environmental Project (SEP) to eliminate some septic systems should be put into proper perspective.**

As referenced in the TMDL, the District committed to a SEP to eliminate some septic systems within our jurisdiction as part of the recent Federal Consent Decree. This project was undertaken in connection with the settlement of an enforcement action, United States, State of Missouri, and the Missouri Coalition for the Environment Foundation v. Metropolitan St. Louis Sewer District, No 4:07-CV-01120-CEJ, taken on behalf of the U.S. Environmental Protection Agency, the State, and the Coalition under the Clean Water Act. The specified expenditure for this SEP is only \$1.6 million to be used for low income homeowners. This money may also be used to repair defective private laterals. Therefore it is unlikely that the SEP will result in a significant reduction of bacteria within the Creve Coeur Creek watershed. The District requests that the TMDL be revised to accurately describe the limitations of the SEP so that local landowners and stakeholders have a realistic expectation that additional actions will be needed to address failing septic systems.

**4. APPLICABLE WATER QUALITY STANDARDS AND NUMERIC TARGET**

**a. The water quality condition targeted by the TMDL is not sufficiently linked with human health risk in the Creve Coeur Creek watershed.**

The TMDL targets a WBCR-B *E. coli* criterion of 206 col/100 mL as a recreational season (April 1 through October 31) geometric mean. This criterion is based on the USEPA 1986 bacteria criteria document (‘1986 criteria’). While a geometric mean of 206 col/100 mL is the approved WBCR-B criterion, this criterion is not appropriate for several waterbodies within our jurisdiction because the underlying epidemiological studies are 1) poorly correlated with risk, 2) rooted in two unsupported assumptions, 3) not representative of inland flowing waters, and 4) largely focused on publicly-owned treatment work (POTW) impacted waters.

USEPA’s 1986 criteria are based on a poor regression from relatively few epidemiological studies. The epidemiological studies supporting this criterion were conducted on just two lakes over three years – i.e., Lake Erie and at Keystone Lake (which is about 60 miles east of Tulsa, Oklahoma) in 1979, 1980, and 1982. At the 95 percent confidence level, results from these studies indicate the corresponding mean *E. coli* density for the WBCR-B protection level (i.e., 10 illnesses per 1,000 swimmers or 1.0% risk) range anywhere from approximately 120 col/100 mL to 500 col/100 mL (USEPA, 1984).

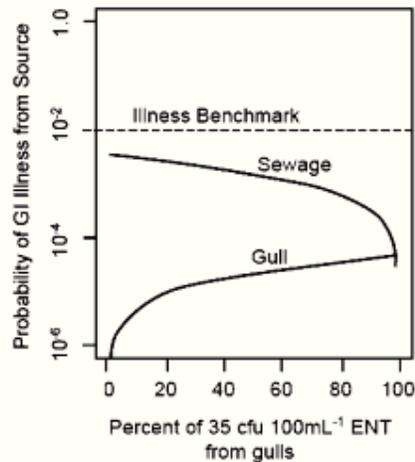
The 1986 criteria are also rooted in two unsupported assumptions (Wymer, 2007). This stems from the fact that USEPA set the 1986 *E. coli* criteria to have the same level of protection as the previously recommended fecal coliform criterion of 200 col/100 mL. The fecal coliform criterion was translated from a prior total coliform criterion, which was based on epidemiological studies dating back to 1948. In order to make this translation, in 1968 the National Technical Advisory Committee (NTAC) assumed fecal coliforms comprised about 18% of total coliforms in all waters (i.e., first unsupported assumption). Second, the NTAC arbitrarily halved the indicator density at which a detectable health effect occurred (i.e., from 400 to 200 col/100 mL in fecal coliform) assuming this would result in zero risk (i.e., second unsupported assumption).

The 1986 criteria have also been criticized as inapplicable for flowing waters, as they are based on studies from two lakes (i.e., Lake Erie and Keystone Lake) selected for the lack of nonpoint source pollution. Flowing waters (e.g., streams and rivers) present some unique challenges and characteristics that are not addressed by the 1986 criteria (USEPA, 2007a). Inland flowing waters are very diverse in terms of water flow, water volume, size, morphology of stream beds, land use, and anthropogenic impacts (WERF, 2009). Additionally, exposures in lakes and flowing waters differ. The 1986 criteria include no consideration for these differences such as providing allowances to reflect the differences in hydrologic regime (e.g., extreme high flows) (USEPA, 2007a).

In addition to the issues noted above, the lake studies on which the 1986 criteria are based focused on POTW-impacted waters. However, the relative human health risks from exposure to recreational waters impacted by non-human sources or by poorly or untreated human fecal matter are not well understood (Soller et al., 2010; USEPA 2007b). A growing body of evidence suggests relative risks differ depending on the source (e.g., feces from fowl and some large animals present substantially lower risk than from humans) (Soller et al., 2010). The 1986 criteria do not take these differences into account. Tools, such as QMRA, could be employed to provide more scientifically-defensible and valid criteria based upon actual human health risk. QMRA is a powerful tool for exploring the relative risks under different exposure scenarios (e.g., storm vs. non-storm event, *E. coli* from animal feces vs. POTW) (WERF, 2009). Given these considerations, the Department should reconsider bacteria targets and adjust them as appropriate in subsequent TMDL revisions.

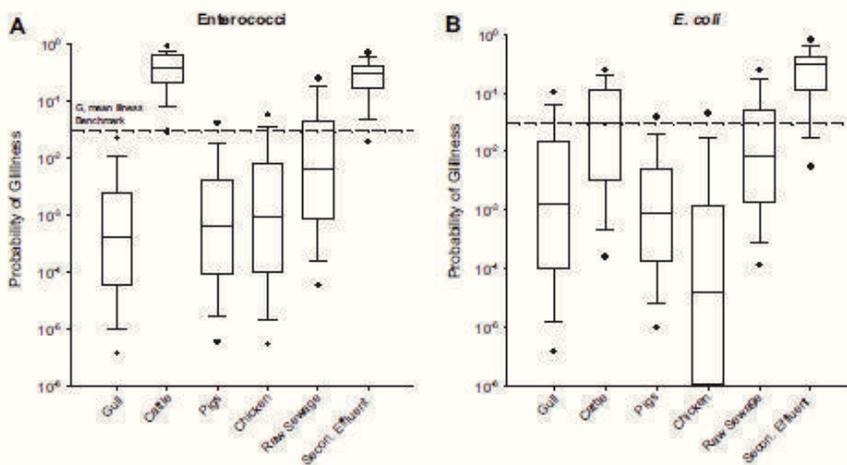
**b. The TMDL target should consider the effects of bacteria source on human health risk.**

Recent QMRAs by USEPA contractors have shown that setting appropriate recreational indicator bacteria limits (i.e., corresponding to illness rates of 8-9 per 1,000 WBCR exposures) requires an understanding of bacteria sources (Schoen and Ashbolt 2010, Soller et al. 2010). As shown in Figure 4 from Schoen and Ashbolt (2010), when percent of bacteria from non-human sources (in this case gulls, as shown on the x-axis) is above roughly 80%, the cumulative illness risk (or the sum of the gull and human/sewage risk curves) is roughly half the USEPA's tolerable illness rate (as indicated by the "illness benchmark" horizontal line). Stated another way, when the percent of bacteria indicators from human fecal sources is low, default recreational criteria are overprotective and can be safely increased. Further supporting this understanding, as shown in Figure 3b from Soller et al.(2010), predicted illness risks associated with recreational contact with a variety of fecal sources all at uniform concentrations of 126 col/100ml *E. coli* indicate that illness rates (and therefore appropriate recreational limits) are very much a function of bacteria source. While some source tracking information is available within the USGS study, a phased TMDL approach would allow the collection of additional source data, which is essential given the very rough nature of the USGS source tracking methods.



**FIGURE 4.** Comparison of median illness risk for adults when total ENT concentration (at 35 cfu 100 mL<sup>-1</sup>) is attributed to a mixture of primary POTW effluent (sewage) and seagull feces (gulls).

Source: Schoen and Ashbolt (2010).



**Fig. 3 – Run 2 probability of GI illness.** Run 2 probability of GI illness from ingestion of water containing fresh faecal pollution at densities of 35 cfu 100 mL<sup>-1</sup> ENT (3A) and 126 cfu 100 mL<sup>-1</sup> E. coli (3B). Predicted risk (median, interquartile range, 10th and 90th percentiles, and 5th and 95th percentiles) for fresh gull, cattle and pig faeces, and chicken litter. Human impacts are presented for primary sewage (Human 1) and secondary disinfected effluent (Human 2). The illness benchmark represents a geometric mean probability of illness of 0.03.

Source: Soller et al. (2010)

In addition, we offer the following information regarding bacteria source and natural background contributions that substantiate selection of alternative water quality targets for TMDLs:

- California bacteria TMDLs that consider monitoring data from reference watersheds when setting criteria exceedance rates  
[http://www.waterboards.ca.gov/losangeles/board\\_decisions/basin\\_plan\\_amendments/technical\\_documents/bpa\\_78\\_R10-006\\_td.shtml](http://www.waterboards.ca.gov/losangeles/board_decisions/basin_plan_amendments/technical_documents/bpa_78_R10-006_td.shtml).

- California Basin Plan Amendments that incorporate Natural Source Exclusion into Water Quality Standards  
[http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/basin\\_plan/issue\\_7.shtml](http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/issue_7.shtml)).

## **5. MODELING APPROACH, LOADING CAPACITY, LOAD AND WASTELOAD ALLOCATION, AND MARGIN OF SAFETY**

- a. The modeling approach and Loading Capacity calculated for Creve Coeur Creek is inconsistent with Missouri's recreational water quality criteria and Total Maximum Daily Load guidance developed by the U.S. Environmental Protection Agency.**

Missouri's WBCR-B criterion (206 col/100 mL) is expressed as a recreational season geometric mean, with the stipulated recreation season spanning from April 1 to October 31 (10 CSR 20-7.031). Therefore, the bacteria criterion applicable to the currently classified segment of Creve Coeur Creek has a seven-month averaging period.

Technical guidance developed by the USEPA (2007c) clearly indicates that development of the Loading Capacity Curve should be calculated by multiplying the appropriate daily criterion by the average daily flow value. The Department apparently multiplied the seven-month criterion by a daily flow value to obtain the Loading Capacity for Creve Coeur Creek.

In USEPA (2007c) guidance (see Appendix A), USEPA discusses approaches to convert non-daily criteria to daily values for use in the Load Duration Curve approach. Included in Appendix B of USEPA (2007c) is a bacteria example calculation that converts a non-daily bacteria criterion to a daily value using statistical procedures outlined in USEPA (1986). Such an example is directly applicable to Creve Coeur Creek.

While Missouri water quality standards do not include a short-term (e.g., daily) criterion for protection of WBCR-B, the process included in USEPA (2007c) should be used to develop a water quality target to evaluate loading capacity using a Load Duration Curve approach with the understanding that the recreational season geometric mean should be used to determine water quality standards compliance. The Department should recalculate the Loading Capacity (and TMDL components) for Creve Coeur Creek based on an appropriate TMDL target that considers the correct averaging period. Such an approach may include development of a daily TMDL target based on statistical characteristics of bacteria datasets collected in Creve Coeur Creek. An example of an alternative daily TMDL target analysis is provided in the next comment. The District wishes to emphasize that daily *E. coli* targets suggested above be considered implementation goals to achieve the primary criterion (i.e., recreational season geometric mean).

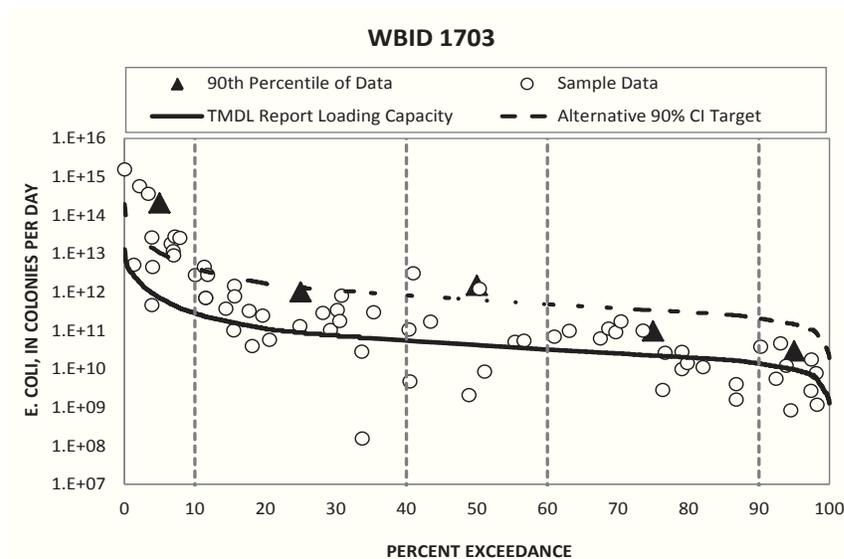
- b. The load duration curve must be adjusted so that sample data and TMDL target have comparable averaging periods.**

As discussed above, technical guidance developed by the USEPA (2007c) suggests that load duration curves should be calculated from data and criteria that have the same averaging period. Data used in the TMDL report did not have the same averaging period. In the TMDL, the Department multiplied the recreational season geometric mean criterion by a daily flow value to obtain the loading capacity for Creve Coeur Creek. This loading capacity was then compared to daily bacteria measurements and geometric means of data from various daily flow exceedance intervals.

The correct way to calculate the TMDL using a Load Duration Curve would be to either 1) convert the bacteria and flow data into recreational season geometric mean values and compare them to the geometric mean water quality criterion or 2) convert the recreational season water quality criterion to a daily value and compare it to the daily data. Either method would provide a more accurate representation of existing loading conditions relative to intended water quality criterion. The first method of converting the sample data to a recreational season geometric mean is complicated by the fact that limited data are available from most years to calculate a representative geometric mean value. However, the second method of converting the average water quality criterion into a daily value is a straightforward process. Appendix B of USEPA's (2007c) technical guidance includes an example bacteria calculation that converts a non-daily bacteria criterion to a daily value using statistical procedures outlined in USEPA (1986). This example is directly applicable to Creve Coeur Creek and is illustrated in the following paragraphs.

The USEPA (1986) method used to develop the alternative daily statistical targets for *E. coli* is based on both the inherent variability in water quality data (as measured by the log standard deviation) and the assumed log-normal relationship between the geometric mean and statistical maximum value of bacteria data. Once calculated, this statistical maximum value can be interpreted as a daily target that is protective of the long-term average criterion, even when it is exceeded a certain percentage of the time. The USEPA approach therefore also provides a method for assigning a degree of caution based on the expected use intensity of the water. For example, USEPA's 1986 method included a high degree of caution (75% confidence) that can be assigned for heavily used waters while a lower degree of caution (95% confidence) can be assigned for waters with limited use.

We applied this alternative target approach to data ( $n = 67$ ,  $\log SD = 0.92$ ) collected from Creve Coeur Creek (WBID 1703). The alternative target was developed using the 90% confidence interval (CI) factor as this level likely corresponds to infrequent use of Creve Coeur Creek ("lightly used full body contact" from USEPA 1986). We view this as a highly conservative calculation since the District is not aware of any WBCR uses that have occurred within flowing segments of Creve Coeur Creek. The result of applying a daily alternative target indicates that reductions are limited to flow exceedance ranges of 40% to 60% and 90% to 100% (see Figure below). The District notes that reductions in the 90% to 100% exceedance range are infeasible (see comment 5.g.) and would require implementation of stormwater controls that are not practicable (see comment 5.j.).



**Comparison between the MDNR-calculated TMDL and Alternative Statistical Maximum 90% Confidence Interval Target for the Classified Section of Creve Coeur Creek.**

Note 1: There were inconsequential differences between the distributions of recreational season and annual flow data. To maintain consistency with the TMDL report, watershed-adjusted flow data used by Department were used to calculate both loading capacity curves.

If the Department chooses to retain the load duration curve approach, the approach must be adjusted so that the sample data and water quality criterion are expressed with the same averaging periods. The method outlined above is the most appropriate way to express the data and criterion as daily values while still maintaining consistency with the recreational geometric mean water quality criterion.

**c. Methods used to determine the Loading Capacity result in a Margin of Safety that is unrealistic, excessive, and significantly overestimates uncertainty.**

As noted in an earlier comment, the Loading Capacity curve depicted in the TMDL is apparently based on use of the 206 col/100 mL geometric average. In other words, the 206 col/100 mL target could be considered a daily not-to-exceed target. By implementing the criterion as a daily value, the Department is protecting a geometric mean condition well below the WBCR-B criterion according to USEPA (1986) guidance. By using this approach, the implied geometric mean target is 22 col/100 mL, assuming the statistical distribution of the Creve Coeur Creek water quality data (i.e., 0.92 log standard deviation). Such an assumption creates an arbitrary and unrealistically large and scientifically unsupportable margin of safety that is approximately 10 times greater than intended by the current draft of the TMDL.

**d. An explicit Margin of Safety is not needed as bacteria are treated as a conservative parameter in the Load Duration Curve modeling approach.**

As noted in other comments, the Department has apparently grouped data collected at multiple sites into the Load Duration Curve developed for a single location in the watershed. It is well acknowledged in the technical literature and USEPA (2001) guidance the bacteria indicators are not conservative parameters.

Rather, organisms undergo decay and settling processes when introduced into the water column, as well as potentially regrowth in sediments and resuspension. Thus, measurements collected several miles upstream of the impaired segment are not 'instantaneously transported' to a single point of compliance represented by a Load Duration Curve. Treating bacteria as a conservative parameter represents an implicit margin of safety and renders additional explicit safety factors unnecessary.

**e. The Load Duration Curve approach provides a very limited linkage between watershed processes and bacteria fate and transport mechanisms.**

The Load Duration Curve approach for TMDL development may be an expedient means to determine TMDL components. However, quantitatively evaluating improvements likely to result from implementing management scenarios (e.g., land use practices, structural Best Management Practices, sanitary sewer improvements, etc.) is precluded by this empirical approach. In comparison, a numerical watershed model (e.g., SWAT, HSPF, SWMM etc.) provides a quantitative link between watershed improvements and calculated changes in bacteria densities. A watershed model offers several implementation advantages over a Load Duration Curve approach including but not limited to: (1) a more accurate estimate of loading capacity during the recreational season, (2) identification of critical source areas, (3) consideration of fate and transport mechanisms, (4) a framework to assess data collected at different times/locations (i.e., Creve Coeur Creek), (5) a framework to allocate loads to meaningful discharge categories, and (6) optimization and selection of management scenarios to help best achieve water quality standards with available resources.

Achieving the currently proposed TMDL load reductions in Creve Coeur Creek would take decades (or longer), require significant investments, and would not allow resources to be targeted at restoring uses during the periods where the creek is most likely to be used for recreation (low flows). The TMDL should be based upon a meaningful tool that links in-stream criteria with the landscape processes that generate and transport bacteria. A more robust modeling tool is needed to deal with the complexities of bacteria fate and transport in an urban environment, and to avoid an arbitrary result and unnecessary and costly expenditures that would be unsupported by a meaningful reduction in risk or other benefits to human health or the environment.

**f. If the load duration curve approach is retained, the Department should calculate separate load duration curves for each monitoring site in the watershed.**

As discussed above, we believe that a more robust modeling tool is needed to correctly account for the complexities of bacteria fate and transport in an urban environment. However, if the Department retains the load duration curve approach, it must be modified to accurately reflect conditions in the classified segment. In the absence of specifying decay and settling to more accurately quantify bacteria loads from upstream sites, a load duration curve should be developed using data only for those sites located in the classified section. This modeling approach would better reflect conditions in the classified reach. If calculated using appropriate flow adjustment factors (see earlier comments), individual load duration curves could also be developed for sites outside of the classified reach. Analysis of these curves may be useful in helping to identify critical source areas in the watershed, therefore allowing implementation resources to be focused to achieve the greatest public health benefit.

**g. The Creve Coeur Creek TMDL should consider feasible management options and actual risk during wet weather conditions.**

According to Cleland (2002) as cited by TCEQ (2007), the upper parts of the Load Duration Curve may represent flow conditions that exceed feasible management. Specifically, the experts that TCEQ enlisted state in their report:

“Exceedances occurring at the low flows may require regulatory actions to control point sources. At the mid-range and high flows, management measures directed towards nonpoint sources could be developed. At some point in the flow frequency, control of pollutant sources becomes unfeasible. Pollutant loadings at these high flow events typically exceed design specifications for control actions. For this reason, it may be reasonable to exclude data and loadings that occur at flooding conditions.”

In addition, we note that high flows may also represent reduced illness risk because: (1) whole body contact recreation may be non-existent, and (2) velocities may exceed those considered safe for swimming by Hyra (1978). The Department should incorporate these factors that present lower risk during the 0% to 10% exceedance interval when estimating load reduction needs. A revision could be implemented by selecting a higher confidence interval when identifying a daily TMDL target using USEPA (1986) bacteria criteria guidelines.

**h. Wasteload allocations and TMDL targets must consider natural sources.**

Pathogenic indicator bacteria, such as *E. coli*, are contributed to streams, rivers, and lakes by various sources including natural sources (e.g., deer, raccoons, waterfowl, soils, sediments, plants, and decaying organic matter, etc.). Natural or wildlife contributions should be considered when setting TMDL bacteria targets and developing wasteload allocations. The District submits that the Department must evaluate natural bacteria loads and the corresponding human health risks. Such evaluations must be used to make appropriate wasteload allocations for stormwater permittees.

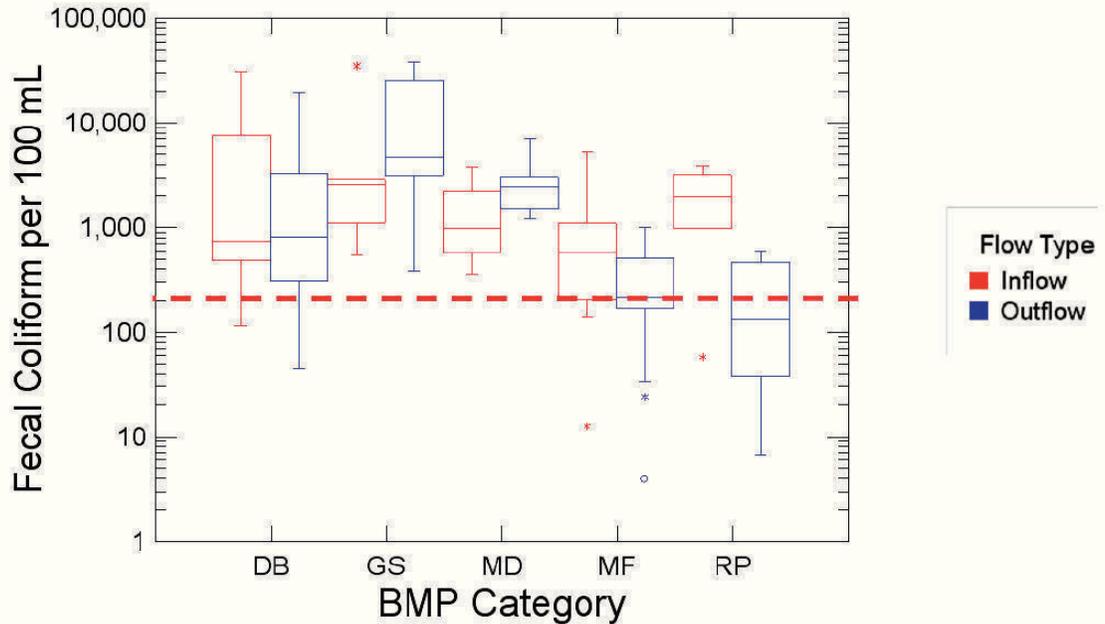
**i. Wasteload allocation and implementation expectations must consider the limitations of treatment provided by structural and non-structural best management practices.**

The District believes that technical feasibility must be considered when implementing any TMDL provisions into MS4 permits. Such a position is supported by the Maximum Extent Practicable (MEP) standard and minimum control measures approach embodied in the Clean Water Act. The reality of the MEP standard is supported by results generated by the International Stormwater Best Management Practice (BMP) Database (BMP DB). The BMP DB is a warehouse for performance data of various urban stormwater BMPs. Recently, data from the BMP DB were used to evaluate the performance of various structural BMPs in treating bacteria (see below for figure, with permission). Results from this analysis suggest that typical flow-through and passive control BMPs may not be capable of consistently achieving WBCR criteria, depending upon the expressed average period or duration. The ability of other BMPs, such as infiltration or capture/reuse systems, are constrained by soil infiltration conditions, available open space, land availability, reuse opportunities, and infrastructure or utility conflicts. The MEP standard must be employed in implementing MS4 controls, including the development and implementation of the Creve Coeur Creek TMDL.

Please note that the entire BMP DB report on Fecal Indicator Bacteria can be found at:

<http://www.bmpdatabase.org/Docs/BMP%20Database%20Bacteria%20Paper%20Dec%202010.pdf>

**Figure 11. Box Plots of BMP Study Geometric Means for Fecal Coliform by Selected BMP Category**



Notes: DB = Detention Basin; GS = Grass Strip/Swale; MD = Manufactured Device; MF = Media Filter; RP = Retention Pond

**j. The TMDL should be revised to exclude extremely high flow events.**

During high stream flows (which occur less than 10% of the time), stream velocities and turbulence may exceed those necessary or appealing for safe recreation (Whole Body Contact Recreation). It is arbitrary and unreasonable to require the highest bacteria percent reduction (Table 8) when flows may be unsafe for recreation or not feasibly managed. The Missouri Effluent Regulations (20 CSR 10-7.015) recognize this situation by allowing a “temporary suspension of accountability for bacteria standards” during periods of wet weather.

The District is very concerned that the TMDL could result in stormwater management requirements that go beyond those already adopted for compliance with the MS4 permit (e.g., requiring capture and treatment of volumes greater than 90<sup>th</sup> percentile daily storm depth). Such additional requirements exceed the MEP provisions of the District’s MS4 permit and extend beyond the intent of the Phase II stormwater regulations. Thus, the draft TMDL may create stormwater performance objectives that are arbitrary, and are not required by law, not enforceable, and not necessary to protect recreational uses. The Department should reevaluate the load reduction targets for flows that are generated by precipitation events greater than the 90<sup>th</sup> percentile storm.

**k. It is not clear if sanitary sewer overflows (SSOs) are included in the wasteload allocation.**

On page 24 (second paragraph), the draft TMDL indicates that wasteload allocations for SSOs are considered zero. In the following sentence, the Department states that SSOs are included in the wasteload allocation. These two sentences appear to be contradictory and should be clarified.

**I. It is arbitrary and unrealistic to assign permit holders a wasteload allocation equal to zero.**

Section 7 suggests that permit holders listed in Table 5 are to be prescribed a wasteload allocation of zero. No scientifically supportable TMDL allocation scheme or technical basis supports a wasteload allocation of zero. The District notes unavoidable natural background loads, the limits of treatment achievable through implementation of structural BMPs, and the need for a watershed model to distribute wasteload allocations to spatially explicit locations or discharge categories. All permitted entities, including the Missouri Department of Transportation, must be assigned wasteload allocations. In addition, the municipal MS4 co-permittees should also be included in the wasteload allocations.

**m. The wasteload allocation included in the TMDL is inaccurate given the technical defects with the Load Duration Curve approach.**

The wasteload allocation assigned to the District's MS4 permit was based upon the Load Duration Curve approach. For the reasons described above, these calculations and all wasteload allocations must be reevaluated and adjusted, as appropriate.

**6. IMPLEMENTATION PLAN**

**a. Maximize grant funding to assist with TMDL implementation.**

The District understands that Section 319 grant funding guidance requires that grant awards be directed at addressing nonpoint source pollution concerns and watershed restoration activities. The TMDL indicates the watershed does not include any nonpoint source discharges, but this does not mean that Section 319 funding is not available to help with TMDL implementation activities. Section 319 grant guidance published by EPA (see 68 FR 205) specifically states:

“Section 319 funds may be used to fund any urban stormwater activities that are not specifically required by a draft or final NPDES permit.”

The section also describes other urban runoff management activities that could be eligible for Section 319 funding, including technical assistance to local stormwater programs, monitoring needed to design and evaluate the effectiveness of implementation strategies, best management practices for pollution prevention and runoff control except those required by a draft or final NPDES permit, information and education programs, technology transfer and training, and development and implementation of policies, regulations, and local ordinances to address stormwater runoff. The Department should more explicitly state what 319 funding will be sought and how that funding could be used to assist in TMDL implementation efforts.

**b. TMDL implementation should allow sanitary sewer improvements to proceed prior to other restoration activities.**

The District strongly urges the Department to postpone TMDL implementation to allow sanitary sewer improvement efforts to be completed. The District, USEPA, the Department, and with some input from the Missouri Coalition for the Environment (as well as the District stakeholders) spent several years determining the best approach to implementing sanitary sewer improvements. This approach, as well as a post-construction monitoring plan, is embodied in a Federal Consent Decree.

After all SSO projects have been completed, the CMOM Program has been fully developed and implemented, and in-stream water quality has been assessed for at least two years, the Department should evaluate whether the creek is impaired and delist the creek if appropriate. If the creek is still impaired, then the TMDL should be revisited and the requirement to move forward with load reduction efforts may be appropriate via the addition of enhanced MS4 program implementation and BMPs. This could include more focused illicit discharge detection and elimination, conducting sanitary surveys, addressing septic system failures, and other bacteria-focused BMPs.

**c. The TMDL implementation plan should include the opportunity to develop site-specific recreational use criteria.**

The District believes that it is possible to develop a more accurate, site-specific water quality target for the TMDL that is protective of human health for Creve Coeur Creek and allows the District and other stakeholders to more efficiently target limited financial resources across all of MSD's watersheds. This can be accomplished through the use of state-of-the-art quantitative polymerase chain reaction (qPCR) detection methods, human-specific indicator or marker species measurements, pathogen measurements (if needed), quantitative microbial risk assessment and the latest microbial source tracking techniques. This is also discussed in item 4.a above. The Department should include at least a two to three year period in the implementation schedule to allow this to be completed.

**d. The TMDL should be re-written to be a phased TMDL that includes revision of the water quality target(s), collection of additional data and information, and adjustments to the wasteload and load allocations.**

The Creve Coeur Creek TMDL and all subsequent TMDLs that the Department develops for waterbodies within the District's service area will impose requirements on the District and other stakeholders to reduce pollutant loads. The Department should recognize that in most instances, the District's ratepayers will bear a disproportionate burden for implementing the TMDL. USEPA's new integrated municipal stormwater and wastewater planning approach (USEPA 2012) is intended to help states and communities

“assist municipalities on their critical paths to achieving the human health and water quality objectives of the Clean Water Act by identifying efficiencies in implementing requirements that arise from distinct wastewater and stormwater programs, including how to best prioritize capital investments.”

The TMDL does not fully integrate, and is not sufficiently consistent with, the Federal Consent Decree that binds the District along with USEPA and the Coalition. This decree addresses mitigation of sanitary sewer overflows and post-construction monitoring which will help ensure that any recreational use impairments in Creve Coeur Creek are addressed. The implementation plan for the TMDL should also consider the additional requirements for stormwater sources that will be imposed through the District's MS4 program. The implementation plan must include further source characterization, monitoring, assess beneficial use attainment, sanitary sewer improvements and CMOM efforts, and evaluation of on-site wastewater systems. Because of the disproportionate cost that the District's ratepayers are bearing, additional stormwater controls should only be pursued if needed and appropriate and after “lower hanging fruit” controls have been identified.

Given USEPA's new framework, the Department has added flexibility to integrate the Creve Coeur Creek TMDL and other urban stream TMDLs within the District's service area into a more comprehensive facility planning approach. Under USEPA's framework, there are many options that could be considered. The District recommends that the Department conduct a stakeholder meeting(s) on these options to evaluate how best to consider this new approach with respect to restoring urban streams within the District's service area.

**e. The timing and necessity for TMDL issuance and implementation should take into account Federal Consent Decree obligations and resource allocations.**

The District is presently implementing water quality improvements prescribed by a Federal Consent Decree. These improvements will further reduce bacteria concentrations in Creve Coeur Creek. Issuance and implementation of the TMDL prior to completing the referenced improvement arbitrarily creates the potential for resource allocation conflicts and a high potential for other inconsistent and conflicting obligations. Such conflicts also arise from the coarse TMDL source and allocation analysis dictated by the Load Duration Curve method. In other words, the TMDL does not quantify the relative contributions from various source categories, permittees, or critical subwatersheds. Attempting to implement a TMDL without a meaningful source analysis has the potential to arbitrarily divert resources away from areas or sources most in need of improvement. Therefore, any TMDL implementation plan must incorporate and integrate the Federal Consent Decree requirements and improvements, CMOM activity, and monitoring of the resulting stream water quality prior to any additional efforts to improve wet weather conditions.

**f. The potential cost, technical complexity, and stakeholder interest in the TMDL warrants additional public participation.**

The District notes that Missouri's Public Participation Plan stipulates that public meetings be held when appropriate. Further, because the Department is developing a standard, a public hearing opportunity is required under RSMo Section 644.036. Moreover, the District believes that public meetings are appropriate due to the potentially significant infrastructure planning and capital costs associated with implementing the TMDL. For the purposes of rough estimation, we estimate that installing stormwater treatment retrofits to the MEP could cost from \$10,000 to \$30,000 per developed urban acre. This estimate was based upon rough local cost calculations and costs gathered from other MS4 programs that have TMDL drivers. Since the Creve Coeur Creek watershed is composed of approximately 12,300 urban acres, the District is concerned that the cost of stormwater implementation could range from \$123 million to \$369 million. Therefore, public meetings are certainly warranted and appropriate (and required by law) prior to finalizing the TMDL. The District requests to move forward in a collaborative manner with the Department in developing TMDLs for waters within or intersected by District boundaries.

**g. The implementation plan should target water quality criteria, rather than specific load reductions, as its ultimate goal.**

Section 12 of the TMDL report indicates that the TMDL is considered to be successfully implemented when loading reductions listed in Table 8 are achieved. The District understands that the purpose of the TMDL process is to establish loading levels needed to meet water quality standards, and that achieving the estimated reductions should result in standards being attained.

However, given the technical issues and uncertainties associated with the MDNR's TMDL development approach, water quality standards likely will be achieved well before all loading reductions in Table 9 are met. The District asserts that the Section 12 must be modified to state that the TMDL is considered to be successfully implemented when water quality standards, rather than the estimated loading reductions, are achieved. Furthermore, the Department should not develop implementation plans on a pollutant-by-pollutant basis for waters having multiple impairments (e.g., chloride). Instead, any implementation plan developed by the Department must integrate and account for all pollutants demonstrated to exceed water quality standards so that control measures and funding schedules can be coordinated and optimized.

## 7. REASONABLE ASSURANCE

### a. The TMDL should include other District actions planned for the watershed in the discussion about reasonable assurance.

The TMDL does not address the actions that MSD is required to take in the Creve Coeur Creek watershed (and other watersheds) under the above referenced Federal Consent Decree that must count towards reasonable assurance that the TMDL will be implemented. These actions include sewer lining, supplemental environmental projects, sanitary sewer improvements, continued development and implementation of a CMOM Program, as well as other actions. TMDL requirements must be integrated with the Federal Consent Decree obligations to avoid conflicting obligations, unnecessary expenditures, and other arbitrary and/or duplicative requirements.

### b. The TMDL should rely on the maximum extent practicable (MEP) standard for reasonable assurance in stormwater permits.

The District is very concerned about the mention of *effluent limits* in stormwater permits in the discussion of reasonable assurance. In 1987, Congress amended the Clean Water Act (CWA) to expand the National Pollutant Discharge Elimination System (NPDES) permitting program to include pollutants discharged in certain types of stormwater runoff. Section 402(p) was added, which states, in part:

**§ 402(p) Municipal and Industrial Storm Water Discharges. (3) Permit Requirements.**

**(A) Industrial Discharges.** *Permits for discharges associated with industrial activity shall meet all applicable provisions of this section and section 301 [Related to effluent Limitations].*

**(B) Municipal Discharge.** *Permits for discharges from municipal storm sewers (i) may be issued on a system- or jurisdiction-wide basis; (ii) shall include a requirement to effectively prohibit non-storm water discharges into the storm sewers; and (iii) shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants [emphasis added].*

The stormwater permitting program defined in the statute explicitly incorporated the phrase “*reduce the discharge of pollutants to the maximum extent practicable*” (known as the MEP standard) into the regulations and the resulting permits.

The District believes that the CWA only imposes the MEP standard on MS4 permit holders and that the imposition of effluent limitations in municipal stormwater permits is not authorized. Section 402(p)(A) regarding discharges associated with industrial activities clearly references the Section 301 effluent standards (rather than the MEP standard), whereas Section 403(p)(B) regarding discharges from municipal storm sewers employs the MEP standard (rather than the 301 effluent standards).

The imposition of effluent limits on MS4 permit holders would not comply with Section 402(p), and will exceed the Department's jurisdiction and authority. Based on the applicability of the MEP standard, the District urges the Department to include reference to the MS4 being revised to include the implementation of appropriate and incremental BMPs to reduce the discharge of pollutants from the municipal storm sewer system to the maximum extent practicable, but only if, after sanitary sewer improvements and other required efforts are complete, water quality does not meet applicable water quality standards.

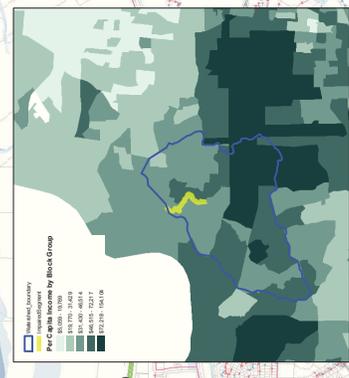
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# Non-Sewered Property within Creve Coeur Creek Watershed, June 2012

- Legend**
- Watershed boundary
  - Constructed SSO
  - Storm sewer, Active
  - Improved Channel
  - Other BMP
  - Bio-retention/Raingarden
  - Permeable Pavement
  - Impaired Segment
  - Structures
  - Open Water
  - Open Space
- Watershed Parcels**
- Confirmed Non-Sewered
  - Unconfirmed Non-Sewered
  - MODOT R.O.W.
  - Sewered



| Category                 | Parcel Count  | Percent of Parcels | Area Acreage     | Percent of Area |
|--------------------------|---------------|--------------------|------------------|-----------------|
| Confirmed Non-Sewered    | 176           | 17%                | 9,930            | 6%              |
| Unconfirmed Non-Sewered  | 18,970        | 99%                | 13,982.68        | 88%             |
| <b>Total Non-Sewered</b> | <b>19,146</b> | <b>100%</b>        | <b>13,992.61</b> | <b>94%</b>      |
| Sewered                  | 47            | 0%                 | 51.93            | 0%              |
| <b>Total</b>             | <b>19,193</b> | <b>100%</b>        | <b>14,044.54</b> | <b>100%</b>     |

Creve Coeur watershed total impervious = 27.4%





OFFICE OF THE COUNTY EXECUTIVE  
SAINT LOUIS COUNTY  
41 SOUTH CENTRAL AVENUE  
SAINT LOUIS, MISSOURI 63105

CHARLIE A. DOOLEY  
COUNTY EXECUTIVE

August 6, 2012

(314) 615-7016  
TTY (314) 615-4411

Mr. John Hoke  
Chief, Watershed Protection Section  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Subject: Public Comments for Total Maximum Daily Load for Creve Coeur Creek  
located in St. Louis County and St. Louis City, Missouri

Dear Mr. Hoke:

This comment letter is offered into the administrative record during the public notice period associated with the Creve Coeur Creek Total Maximum Daily Load ('TMDL') proposal. With this letter, St. Louis County requests the Missouri Department of Natural Resources (MoDNR) rescind and/or revise the TMDL because the proposed TMDL contains several technical and implementation issues.

St. Louis County appreciates MoDNR's efforts to protect Missouri's water resources. However, we are concerned about the potential impacts of the currently proposed Creve Coeur Creek TMDL and several other draft TMDLs for waterbodies within St. Louis County and City. Given the complexity and potential cost of implementing bacteria TMDLs in urban areas, MoDNR should delay finalizing any St. Louis area TMDLs until additional public participation activities (e.g., public meetings, workshops, etc.) are completed. If MoDNR continues to insist on finalizing a Creve Coeur Creek TMDL, the following list of technical defects and concerns must be addressed:

- The TMDL approach does not adequately distinguish between bacteria sources within the watershed. Distinguishing between such sources is necessary to ensure that implementation efforts will achieve the water quality target.
- The final TMDL must not include requirements that exceed the "maximum extent practicable" provisions within the St. Louis Metropolitan Small Municipal Separate Storm Sewer System (MS4) permit, extending beyond the Phase II stormwater regulations.
- The TMDL must use an adaptive management approach that includes implementation activities based upon achieving the highest water quality improvements at the lowest cost.

We appreciate the opportunity to provide these comments. St. Louis County is committed to working with MoDNR to ensure that Missouri's waters are protected through

Creve Coeur Creek  
August 6, 2012  
Page Two

application of good science and stakeholder input. In support of this approach, St. Louis County requests meaningful public participation be sought and that at least one (or as many as may be needed) public meeting be hosted by MoDNR to determine and justify the need for a TMDL and to further address the defects and concerns noted above, before any TMDL is finalized. Please contact Glenn Powers at 314.615.2515 if you have any questions or would like to discuss these issues further.

Sincerely,

A handwritten signature in cursive script that reads "Charlie A. Dooley".

Charlie A. Dooley  
County Executive

Cc: Garry W. Earls  
Sheryl Hodges D.E., P.E., L.P.G.  
Glenn Powers  
Gail Choate  
Ray Gawlik