



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 7

11201 Renner Boulevard  
Lenexa, Kansas 66219

13 JUL 2015

Ms. Sara Parker Pauley, Director  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, Missouri 65102

RE: Approval of TMDL document for Fishpot Creek

Dear Ms. Pauley:

This letter responds to the submission from the Missouri Department of Natural Resources, received by the U.S. Environmental Protection Agency, Region 7, on January 7, 2015, for a Total Maximum Daily Load document which contained a TMDL for *Escherichia coli*. Fishpot Creek was identified on the 2014 Missouri Section 303(d) List as impaired for *E. coli*. This submission fulfills the Clean Water Act statutory requirement to develop TMDLs for impairments listed on a state's § 303(d) List. The specific impairment (water body segment and pollutant) are:

| <u>Water Body Name</u> | <u>WBIDs</u> | <u>Cause</u>            |
|------------------------|--------------|-------------------------|
| Fishpot Creek          | MO_2186      | <i>Escherichia coli</i> |

The EPA has completed its review of the TMDL document with supporting documentation and information. By this letter, the EPA approves the submitted TMDL. Enclosed with this letter is the Region 7 TMDL Decision Document which summarizes the rationale for the EPA's approval of the TMDL. The EPA believes the separate elements of the TMDL described in the enclosed document adequately address the pollutants of concern, taking into consideration seasonal variation and a margin of safety.

Although the EPA does not approve the monitoring or implementation plans submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDL and determine if future revisions are necessary or appropriate to meet applicable water quality standards. The EPA recognizes that technical guidance and support are critical to determining the feasibility of achieving the goals outlined in this TMDL document. Therefore, the implementation plan in this TMDL provides information regarding implementation efforts to achieve the loading reductions identified.



The EPA appreciates the thoughtful effort that the MDNR has put into this TMDL. We will continue to cooperate with and assist, as appropriate, in future efforts by the MDNR to develop TMDLs.

Sincerely,



Karen A. Flournoy  
Director  
Water, Wetlands and Pesticides Division

Enclosure

cc: Mohsen Dkhili, MDNR



## EPA Region 7 TMDL Review

**TMDL ID:** MO\_2186  
**Document Name:** FISHPOT CREEK

**State:** MO

**Basin(s):** MERAMEC, UPPER MISSISSIPPI-MERAMEC  
**HUC(s):** 07140102  
**Water body(ies):** FISHPOT CR.  
**Tributary(ies):** NONE  
**Cause(s):** ESCHERICHIA COLI (E. COLI)

**Submittal Date:** 1/7/2015

**Approved:** Yes

### Submittal Letter and Total Maximum Daily Load Revisions

*The state submittal letter indicates final TMDL(s) for specific pollutant(s) and water(s) were adopted by the state, and submitted to the EPA for approval under Section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by the EPA, date of receipt of any revisions and the date of original approval if submittal is a revised TMDL document.*

The Missouri Department of Natural Resources submitted the TMDL document to the U.S. Environmental Protection Agency on January 7, 2015. A revised TMDL document was received by the EPA on February 10, 2015.

### Water Quality Standards Attainment

*The targeted pollutant is validated and identified through assessment and data. The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. The TMDL(s) and associated allocations are set at levels adequate to result in attainment of applicable water quality standards [40 CFR § 130.7(c)(1)]. A statement that the WQS will be attained is made.*

The listing of Fishpot Creek as impaired by *Escherichia coli* bacteria was approved by the EPA on August 26, 2014 due to elevated concentrations of *E. Coli* bacteria. The state's 2014 listing methodology determines a water to be impaired by bacteria if the geometric mean in a given recreational season exceeds the water quality criteria in any of the last three years for which there are available data: Fishpot Creek is impaired according to this listing methodology. The MDNR's 303(d) submittal to the EPA listed urban runoff and storm sewers as the likely sources of impairment. The TMDL document directly addresses the Fishpot bacteria impairment by establishing an *E. coli* bacteria impairment. Data analysis from the listing process and the TMDL document development are presented in the TMDL document. The data demonstrates that high *E. coli* bacteria concentrations are present in Fishpot which exceeds Missouri's water quality criterion for Fishpot's whole body contact recreation category B designated use.

Recreational season *E. coli* data for Fishpot Creek (2006 – 2010)\*

| <b>Year</b> | <b>Sampling Events</b> | <b>Geometric Mean</b> | <b>Minimum</b> | <b>Maximum</b> | <b>WBC Category**</b> | <b>WBC Criterion</b> | <b>Exceedance</b> |
|-------------|------------------------|-----------------------|----------------|----------------|-----------------------|----------------------|-------------------|
| 2006        | 4                      | 76                    | 50             | 270            | B                     | 206                  | --                |
| 2007        | 7                      | 157                   | 9              | 4,600          | B                     | 206                  | No                |
| 2008        | 6                      | 92                    | 27             | 230            | B                     | 206                  | No                |
| 2009        | 7                      | 1,189                 | 285            | 14,100         | B                     | 206                  | Yes               |
| 2010        | 4                      | 393                   | 52             | 1,090          | B                     | 206                  | --                |

\* The units for all *E. coli* values are counts per 100 milliliters of water. Years with fewer than five samples within the recreational season are not assessed for compliance with the whole body contact recreation criterion.

\*\* WBC = whole body contact recreation

Fishpot Creek's loading capacity for *E. coli* bacteria is identified on the load duration curve presented in the TMDL document. The water quality standard for whole body contact recreation category B at any flow exceedance will be attained per the loading capacity established by the TMDL document. For example, at the 50 percent flow exceedance, the loading capacity is 9.03E+08 counts per 100 milliliters per day.

The TMDL allocations for *E. coli* bacteria are set at levels adequate to attain all applicable water quality standards in Fishpot Creek.

#### **Designated Use(s), Applicable Water Quality Standard(s) and Numeric Target(s)**

*The submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria, and a numeric target. If the TMDL(s) is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

The following designated uses for Fishpot Creek are in the Missouri water quality standards at 10 CSR 20-7.031-Table H, and in the Missouri Use Designation Dataset (version 1) described at 10 CSR 20-7.031(1)(P). The MUDD includes the EPA approved use determinations:

- Livestock and wildlife protection
- Irrigation
- Protection and propagation of fish, shellfish and wildlife – warm water habitat
- Human health protection
- Secondary contact recreation
- Whole body contact recreation category B

The whole body contact recreation category B designated use for Fishpot Creek is impaired by *E. coli* bacteria. Whole body contact recreation includes activities in which there is direct human contact with surface water that results in complete body submergence, thereby allowing accidental ingestion of the water as well as direct contact with sensitive body organs, such as the eyes, ears and nose. (Category A waters include water bodies that have been established as public swimming areas and waters with documented existing whole body contact recreational uses by the public. Category B applies to waters designated for whole body contact recreation, but are not contained within category A.)

In Missouri's water quality standards at 10 CSR 20-7.031(5)(C) and Table A, specific numeric criteria are given for the protection of the whole body contact recreation use. For category B waters, *E. coli* bacteria counts, measured as a geometric mean of at least five samples collected during the recreation season, shall not exceed 206 counts per 100 milliliters of water. The state's recreational season is defined in 10 CSR 20-7.031(5)(C) being from April 1 to October 31.

The TMDL established for *E. coli* bacteria is protective of all the designated uses for Fishpot Creek.

#### **Pollutant(s) of Concern**

*A statement that the relationship is either directly related to a numeric water quality standard, or established using surrogates and translations to a narrative WQS is included. An explanation and analytical basis for expressing the TMDL(s) through surrogate measures, or by translating a narrative water quality standard to a numeric target is provided (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae). For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and a margin of safety that do not exceed the loading capacity. If the submittal is a revised TMDL document, there are refined relationships linking the load to water quality standard attainment. If there is an increase in the TMDL(s), there is a refined relationship specified to validate that increase (either load allocation or wasteload allocation). This section will compare and validate the change in targeted load between the versions.*

A TMDL is needed for Fishpot Creek because the MDNR has determined that this stream is not meeting the state bacteria water quality criterion for whole body contact recreation category B use. Data collected from Fishpot Creek by the United States Geological Survey, the MDNR and the Metropolitan St. Louis Sewer District show exceedances of the state's whole body contact recreation category B criterion of 206 *E. coli* bacteria counts per 100 milliliters of water. This assessment is based on the geometric mean of samples collected during the state's recreational season, April 1 through October 31. For TMDL purposes, bacteria data collected from Fishpot Creek within the last five years, 2006-2010 were used. These data are expected to be the most representative of the

stream's current condition. Table 4 and Figure 6 in the TMDL document summarize bacteria data collected from the impaired segment of Fishpot Creek during the 2006 – 2010 recreational seasons. Figure 7, in the TMDL, summarizes *E. coli* bacteria data by month for this same period. All available *E. coli* bacteria data collected from Fishpot Creek, including any data collected outside the recreational season, are contained in Appendix A.

High counts of *E. coli* bacteria may be an indication of increased risk of pathogen-induced illness to humans. Found in the intestines of humans and warm-blooded animals, *E. coli* are bacteria that are used as indicators of the risk of waterborne disease from pathogenic bacteria or viruses. Infections due to pathogen-contaminated waters include gastrointestinal, respiratory, eye, ear, nose, throat and skin diseases. To address these potential health risks, this TMDL targets instream bacteria levels using *E. coli* bacteria as the primary measurement parameter. Selection of *E. coli* bacteria as the numeric target enables the use of the highest quality data available and provides consistency with Missouri's water quality standards.

For Fishpot Creek, the load duration approach was used. When stream flow gage information is available, a load duration curve is useful in identifying and differentiating between storm-driven and steady-input sources. The load duration approach may be used to provide a visual representation of stream flow conditions under which pollutant criteria exceedances have occurred, to assess critical conditions and to estimate the level of pollutant load reduction necessary to meet the surface water quality targets in the stream. Average daily flow data for Fishpot Creek were directly available from July 18, 1996 to May 2, 2011, from the United States Geological Survey gaging station United States Geological Survey 07019120 Fishpot Creek at Valley Park, MO. Flow data from this gage was adjusted to the impaired watershed based on the ratio of the impaired watershed area to the gage drainage area of 9.58 square miles. A detailed discussion of the methods used to develop the bacteria load duration curve is presented in Appendix B of the TMDL document.

A load duration curve also identifies the maximum allowable daily pollutant load for any given day as a function of the flow occurring that day, which is consistent with the EPA guidance. The EPA guidance recommends that all TMDLs and associated pollutant allocations be expressed in terms of daily time increments and suggests that there is flexibility in how these daily increments may be expressed. The EPA guidance indicates that where pollutant loads or water body flows are highly dynamic, it may be appropriate to use a load duration curve approach, provided that such an approach identifies the allowable daily pollutant load for any given day as a function of the flow occurring on that day. In addition, for targets that are expressed as a concentration of a pollutant, it may be appropriate to use a table or graph to express individual daily loads over a range of flows as a product of a water quality criterion multiplied by stream flow and a conversion factor.

The concentration value of 206 counts per 100 milliliters of water serves as the numeric target for the TMDL. There is a direct link between the *E. coli* bacteria TMDL target and the water quality standards using the numeric water quality criterion of 206 counts per 100 milliliters, applicable to Fishpot Creek whole body contact recreation category B use. This targeted concentration will be expressed as a daily load that varies by flow using a load duration curve.

$$LC = \text{Flow} \times 206 \text{ counts}/100 \text{ mL} \times C$$

Loading at or below the TMDL curve will result in achieving the state's whole body contact B water quality criterion. Because the whole body contact category B criterion is a geometric mean, fluctuations in instantaneous bacteria concentrations are expected and individual bacteria measurements greater than the TMDL target do not in and of themselves indicate an exceedance of water quality standards.

### Source Analysis

*Important assumptions made in developing the TMDL document, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. The submittal demonstrates all significant sources have been considered. If this is a revised TMDL document any new sources or removed sources will be specified and explained.*

*In the absence of a national pollutant discharge elimination system permit, the discharges associated with sources were applied to the load allocation, as opposed to the wasteload allocation for purposes of this TMDL document. The decision to allocate these sources to the LA does not reflect any determination by the EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing these TMDL(s) with some sources treated as LAs, the EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the allocated pollutant in this TMDL document are found to*

be, or become, NPDES-regulated discharges, their loads must be considered as part of the calculated sum of the WLAs in this TMDL document. Any WLA in addition to that allocated here is not available.

St. Louis County covers an area of 523 square miles and, according to 2010 census data, has a population of 999,021 people. The population of the Fishpot Creek watershed is not directly available; however, using U.S. Census Bureau census block data from 2010, the population of the Fishpot Creek watershed can be estimated at approximately 38,752 people. The U.S. Census Bureau categorizes the entire watershed area as an urban area. The EPA defines this urban area as an entity requiring storm water regulations through municipal separate storm sewer permits.

Land use calculations are based on data from 2000 to 2004 at 30-meter resolution obtained from Thematic Mapper imagery.

Land use in the Fishpot Creek watershed

| Land Use Type             | Acres | Sq. Miles | Percentage |
|---------------------------|-------|-----------|------------|
| Impervious                | 378   | 0.59      | 5.51 %     |
| High-Intensity Urban      | 38    | 0.06      | 0.55 %     |
| Low-Intensity Urban       | 4,426 | 6.92      | 64.48 %    |
| Row and Close-grown Crops | 22    | 0.03      | 0.32 %     |
| Grassland                 | 926   | 1.45      | 13.49 %    |
| Forest & Woodland         | 1,000 | 1.56      | 14.57 %    |
| Herbaceous                | 6     | 0.01      | 0.09 %     |
| Wetland                   | 19    | 0.03      | 0.28 %     |
| Open Water                | 18    | 0.03      | 0.26 %     |
| Barren                    | 31    | 0.05      | 0.45 %     |
| Total:                    | 6,864 | 10.73     | 100.00 %   |

Source: MoRAP 2005b

Although the land use dataset categorizes specific areas as impervious, impervious areas exist in all urban land use categories due to the presence of roads, parking lots, driveways and rooftops. The Metropolitan St. Louis Sewer District, which is a public agency responsible for management of wastewater and some storm water in the watershed, estimates the total imperviousness of the watershed to be approximately 30 percent. This amount of imperviousness in the watershed is significant as stream degradation associated with imperviousness has been shown to first occur at about 10 percent imperviousness and to increase in severity as imperviousness increases.

The watershed is predominantly an urban environment with areas categorized as urban or impervious accounting for over 70 percent of the watershed. The 5.51 percent of the Fishpot Creek Watershed characterized as impervious is defined in the land use dataset as being area dominated by streets, parking lots and buildings. Impervious low-intensity urban (primarily residential) is the majority use of the land area at 64.5 percent. The second most abundant land use type in the watershed is forest and woodland, which accounts for 14.6 percent of the watershed area. Grassland accounts for only about 13 percent of the watershed area. Because of the urban nature of the watershed, areas classified as grassland may include golf courses, cemeteries, parks, school playgrounds and other urban green spaces.

The Grand Glaize wastewater treatment facility, permit number MO-0101362, located about one mile east of the watershed. Although the treatment facility is located outside the watershed, the presence of the sewerage system infrastructure within the Fishpot Creek watershed is a potential source of bacteria due to possible overflows. Sanitary sewer overflows are untreated or partially treated sewage releases from a sanitary sewer system. Overflows could occur for a variety of reasons including blockages, line breaks, sewer defects, lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures and vandalism. Sanitary sewer overflows can occur during either dry or wet weather and at any point in the collection system, including manholes. Such overflows are unpermitted and unauthorized by the federal Clean Water Act.

There are 13 permitted facilities in the Fishpot Creek watershed. Only one of these permitted facilities has a site-specific non-domestic wastewater permit and is authorized to discharge storm water. The remaining facilities have general storm water permits, including two small municipal separate storm sewer systems, or municipal separate storm sewer system, permits. There are no permitted CAFO facilities or domestic wastewater dischargers in the watershed.

Storm water (MO-R) permits in the Fishpot Creek watershed (Oct. 18, 2012)

| Permit No. | Facility Name  | Discharge Type | Receiving Stream      | Permit Expires |
|------------|--|----------------|-----------------------|----------------|
| MO-RA01867 | The Arbors at Hanna  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA01839 | Arbor Valley Plat 3, Lots 84 – 89  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA01749 | Lemar Park   | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA01464 | Valley Park Flood Protection Program   | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA01359 | Hanna Road Bridge Replacement  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA00662 | Arbor Valley, Plat 1 – 3   | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA00337 | C.A.P. Carpet  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-RA00158 | Elco Cadillac  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2017       |
| MO-R040005 | Metropolitan St. Louis Sewer District and co-permittees' Small MS4           | Storm Water    | multiple              | 6/12/2013      |
| MO-R040063 | Missouri Dept. of Transportation Small Municipal Separate Storm Sewer System | Storm Water    | multiple              | 6/12/2013      |
| MO-R23A081 | Senoret Chemical Co Inc.   | Storm Water    | Trib. to Fishpot Cr.* | 3/11/2015      |
| MO-R10D963 | Tuscan Valley  | Storm Water    | Trib. to Fishpot Cr.  | 2/7/2012       |
| MO-R109W23 | Oak Valley   | Storm Water    | Trib. to Fishpot Cr.  | 3/7/2012       |

\*Permit mistakenly identifies receiving stream as a tributary to Gravois Creek.

There is one constructed sanitary sewer overflow, installed to relieve the sanitary sewers from excess flow caused by inflow and infiltration of storm water during high rain events, located within the watershed. A United States Geological Survey study of the sources of E. coli bacteria in other metropolitan St. Louis area streams with similar climatic conditions, land use and bacteria sources as those found in the Fishpot Creek watershed estimated that at least one-third of the measured, in-stream E. coli bacteria originated from humans. The study also indicated that there is a correlation between E. coli bacteria densities and the number of upstream sanitary sewer overflows. For these reasons, the sanitary sewer overflow is considered a significant potential contributor of E. coli bacteria to Fishpot Creek, although it has not discharged since October 2010 and is scheduled for elimination in 2018.

In general, urban runoff has been found to carry high levels of bacteria and can be expected to cause exceedances of water quality criteria for bacteria during and immediately after storm events in most streams throughout the country. Heavily paved areas and open areas where soil erosion is common can produce E. coli bacteria contaminated runoff. For these reasons, urban runoff is a significant potential contributor of bacteria to Fishpot Creek. As noted in the table above, there are two small municipal separate storm sewer system permits in the Fishpot Creek watershed. Municipal separate storm sewer system permits authorize the discharge of urban storm water runoff.

Storm water discharges of urban runoff within the entire Fishpot Creek watershed are regulated through municipal separate storm sewer system permits. For this reason, urban storm water runoff is considered a point source for this TMDL. Although storm water discharges are untreated, small municipal separate storm sewer system permit holders must develop, implement and enforce storm water management plans to reduce the contamination of storm water runoff and prohibit illicit discharges. These plans must include measurable goals, must be reported on annually and must meet six minimum control measures. These six minimum control measures are public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and pollution prevention. Entities within the Fishpot Creek watershed that are regulated under the municipal separate storm sewer system permits, noted in the table above, include the Missouri Department of Transportation and the Metropolitan St. Louis Sewer District and its co-permittees, which in the Fishpot Creek watershed include St. Louis County and the municipalities of Ballwin, Ellisville, Manchester, Valley Park and Winchester Neighbors.

Regarding the remaining general and non-municipal separate storm sewer system and storm water permits in the table above, the department assumes activities in the watershed will be conducted in compliance with all permit

conditions, including monitoring and discharge limitations. It is expected that compliance with these permits will result in bacterial loadings at or below applicable targets. For these reasons, these facilities are not expected to cause or contribute to the bacterial impairment of Fishpot Creek. If at any time the department determines that the water quality of streams in the watershed is not being adequately protected, the department may require the owner or operator of the permitted site to obtain a site-specific operating permit per 10 CSR 20-6.010(13)(C).

Although livestock sources and animal feeding operations appear to be insignificant or non-existent in the Fishpot watershed, any concentrated animal feeding operation that does not obtain a National Pollutant Discharge Elimination System permit must operate as a no discharge operation. Any discharge from an unpermitted CAFO is a violation of Section 301 of the Clean Water Act. It is the EPA's position that all CAFOs should obtain an NPDES permit because it provides clarity of compliance requirements, authorization to discharge when the discharges are the result of large precipitation events such as in excess of the 25-year and 24-hour frequency/duration event or are from a man-made conveyance. However, many large CAFOs contend that they do not discharge and therefore are not required to obtain an NPDES permit. It is the EPA's opinion that many of the "no discharge" CAFOs may not have adequate land application area to ensure the agronomic uptake of land applied waste or are not designed, constructed, operated or maintained so that they will not discharge. Furthermore, there are likely many animal feeding operations that meet the definition of a medium CAFO, i.e., discharge via a man-made conveyance, but are unpermitted and have not limited their impact on waters by applying best professional judgment to effluent reductions, pursuant to a permit.

Animal feeding operations are considered under the load allocation because there is currently not enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL document does not reflect a determination by the EPA that such a facility does not meet the definition of a CAFO nor that the facility does not need to obtain a permit. To the contrary, a CAFO that discharges or proposes to discharge has a duty to obtain a permit. If it is determined that any such operation is a CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in the TMDL document as approved.

The TMDL document's listing of all known sources of *E. coli* bacteria to Fishpot Creek watershed seems complete.

#### **Allocation - Loading Capacity**

*The submittal identifies appropriate loading capacities, wasteload allocations for point sources and load allocations for nonpoint sources. If no point sources are present, the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a revised TMDL document the change in loading capacity will be documented in this section. All TMDLs must give a daily number. Establishing TMDL "daily" loads consistent with the U.S. Court of Appeals for the D.C. circuit decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015, (April 25, 2006).*

A TMDL calculates the loading capacity of a water body and allocates that load among the various pollutant sources in the watershed. The loading capacity is the maximum pollutant load that a water body can assimilate and still meet water quality standards. The LC is the sum of the wasteload allocation, load allocation and the margin of safety:

$TMDL = LC = \Sigma WLA + \Sigma LA + MOS$ , where  $\Sigma WLA$  is the sum of the wasteload allocations,  $\Sigma LA$  is the sum of the load allocations and MOS is the margin of safety.

For Fishpot Creek, the bacteria TMDL is expressed as *E. coli* bacteria counts per day using a load duration curve. To develop the LDC, the TMDL target concentration is multiplied by the flow and a conversion factor to generate the maximum allowable load at different flows. Figure 10 in the TMDL document, and copied below, is the bacteria TMDL duration curve calculated for Fishpot Creek. The y-axis describes bacteria loading as counts per day, which are plotted against the flow duration intervals on the x-axis, which represent the frequency for which a particular flow is met or exceeded. The LDC represents the loading capacity as a solid curve over the range of flows. Bacteria data collected from Fishpot Creek during the recreation season are charted as well. Flows in the figure illustrate general base-flow and surface storm water runoff conditions consistent with the EPA guidance on using the LDC method for TMDL development. The table below presents selected TMDL loading capacities and TMDL allocations for Fishpot Creek at various flow exceedances along the LDC.

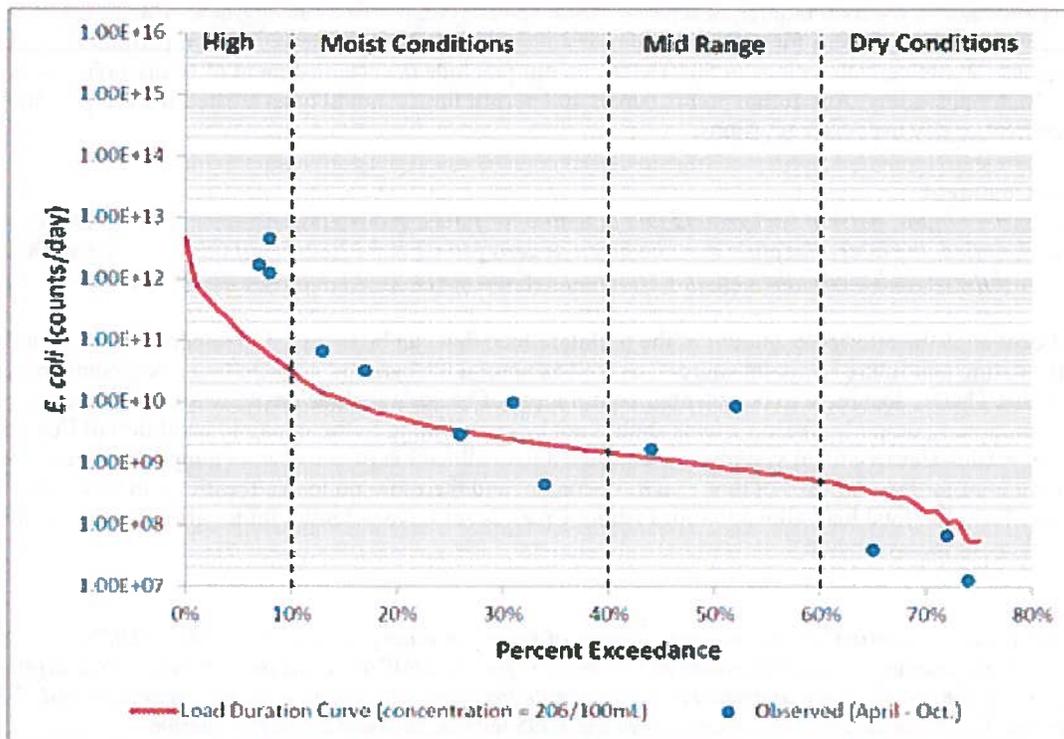


Figure 10. Fishpot Creek, WBID 2186, load duration curve

Selected *E. coli* Bacteria TMDL values for Fishpot Creek\*

| Percentile Flow Exceedance | Flow (cfs) | TMDL (counts/day) | municipal separate storm sewer system WLA (counts/day) | LA (counts/day) |
|----------------------------|------------|-------------------|--|-----------------|
| 95                         | 0.00       | 0.00E+00          | 0.00E+00   | 0.00E+00        |
| 75                         | 0.01       | 5.65E+07          | 5.65E+07   | 0.00E+00        |
| 50                         | 0.18       | 9.03E+08          | 9.03E+08   | 0.00E+00        |
| 25                         | 0.72       | 3.61E+09          | 3.61E+09   | 0.00E+00        |
| 10                         | 6.37       | 3.21E+10          | 3.21E+10   | 0.00E+00        |

\*cfs= cubic feet per second; WLA = wasteload allocation; LA = load allocation

### Wasteload Allocation Comment

The submittal lists individual wasteload allocations for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to a water quality standard excursion, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLA. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a revised TMDL document, any differences between the original TMDL(s) WLA and the revised WLA will be documented in this section.

The wasteload allocation is the allowable amount of the pollutant load that can be allocated to existing or future point sources. Typically, point sources are permitted with limits for a given pollutant that are the most stringent of either technology-based effluent limits or water quality-based effluent limits. Technology-based effluent limits are based upon the expected capability of a treatment method to reduce the pollutant to a certain concentration. Water quality-based effluent limits represent the most stringent concentration of a pollutant that a receiving stream can assimilate without exceeding applicable water quality standards at a specific location. The total wasteload allocations in the Fishpot Creek watershed over a range of flows are presented in Table 7 of the TMDL document (and copied in the table above). For example, at the fifty percentile flow exceedance, the WLA is 9.03E+08 counts per day.

Since the entire watershed area is regulated through municipal separate storm sewer system permits and there are no other permitted facilities found to significantly contribute bacteria loads to Fishpot Creek, the entire wasteload

allocation is allocated to the total municipal separate storm sewer system area as an aggregated wasteload allocation. Thus, the WLA is zero for each of the non-municipal separate storm sewer system permitted facilities in the watershed. Wasteload allocations in this TMDL do not preclude the establishment of future point sources of potential bacterial loading. Any future point sources and permit limits should be evaluated with respect to the TMDL document or any necessary revisions.

#### **Load Allocation Comment**

*All nonpoint source loads, natural background and potential for future growth are included. If no nonpoint sources are identified, the load allocation must be given as zero [40 CFR § 130.2(g)]. If this is a revised TMDL document, any differences between the original TMDL(s) LA and the revised LA will be documented in this section.*

The load allocation is the allowable amount of the pollutant load that can be assigned to nonpoint sources and includes all existing and future nonpoint sources, as well as natural background contributions. Nonpoint sources identified in this TMDL document to be potential contributors of bacteria include onsite wastewater treatment systems. If functioning properly, these systems should not be contributing to the impaired condition of Fishpot Creek. Onsite wastewater treatment systems are assigned a load allocation of zero. Other nonpoint sources are considered minimal for the purposes of this TMDL document and therefore no load allocations are assigned for these sources. Thus, the total load allocation for Fishpot Creek is zero. No potential future growth of nonpoint sources are likely in the watershed.

#### **Margin of Safety**

*The submittal describes explicit and/or implicit margins of safety for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a revised TMDL document, any differences in the MOS will be documented in this section.*

A margin of safety is required in the TMDL calculation to account for uncertainties in scientific and technical understanding of water quality in natural systems. The margin of safety is intended to account for such uncertainties in a conservative manner. Based on the EPA guidance, the margin of safety can be achieved through two approaches:

Explicit - Reserve a portion of the loading capacity as a separate term in the TMDL.

Implicit - Incorporate the margin of safety as part of the critical conditions for the wasteload allocation and the load allocation calculations by making conservative assumptions in the analysis.

The margin of safety for this TMDL is implicit due to conservative assumptions in the modeling of this TMDL, the use of multiple years of flow gage data collected under all flow conditions to create a robust TMDL calculation and the reduced uncertainty of the sources of impairment and their remediation through the Metropolitan St. Louis Sewer District's consent decree. Additionally, bacteria decay rates weren't applied and the direct recreation-season geometric mean was used for estimating the Clean Water Act required daily loading value.

#### **Seasonal Variation and Critical Conditions**

*The submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of the WQS. If this is a revised TMDL document, any differences in conditions will be documented in this section.*

Missouri's water quality criteria for the protection of whole body contact recreation are applicable during the recreational season defined as being from April 1 to October 31. The TMDL load duration curve in Figure 10 of the TMDL document (and presented above in this document) represent stream flow under all conditions and uses flow data collected in all seasons. For this reason, the *E. coli* Bacteria targets and allocations established in this TMDL document will be protective throughout the recreation season and during flow conditions associated with storm driven flow events, including flows associated with seasonal rain patterns when bacteria loading is more likely. The advantage of a load duration curve approach is that all flow conditions are considered and the constraints associated with using a single-flow critical condition are avoided.

Implementation of the TMDL for *E. coli* bacteria during the critical recreational season will result in the year round protection of water quality and meet designated uses.

## **Public Participation**

*The submittal describes required public notice and public comment opportunities, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].*

A 45-day public notice and comment period for this TMDL document was held from June 29, 2012 to August 13, 2012. Comments received and the Missouri Department of Natural Resource's responses to those comments will be maintained on file with the department and on the Fishpot Creek TMDL record webpage at <http://dnr.mo.gov/env/wpp/tmdl/2186-fishpot-cr-record.htm>. In addition to this public notice and comment period, the department hosted a meeting to provide information to the public regarding the TMDL process and the overall goals of this and other bacteria TMDLs developed for impaired streams in St. Louis County. The public meeting was held on September 12, 2012, from 6 pm to 8 pm at the Daniel Boone Branch of the St. Louis County Library at 300 Clarkson Road in Ellisville. The meeting agenda, the department's presentation and an attendance sheet are available online on the Fishpot Creek TMDL record webpage.

Due to comments received during the 2012 public comment period and revisions made to the state's water quality standards in 2014, changes to the TMDL document were necessary. For this reason, a second public comment period was held for 90 days from May 23, 2014 to August 21, 2014. This public comment period included the Creve Coeur Creek TMDL as well as TMDLs for Coldwater Creek, Fishpot Creek and Watkins Creek. Due to requests from the Metropolitan St. Louis Sewer District and members of the Partnership for Tomorrow, this comment period was extended an additional 60 days to October 21, 2014. Members of the Partnership for Tomorrow include the Associated General Contractors of St. Louis, the Home Builders Association of St. Louis and Eastern Missouri, the Missouri Growth Association, the St. Louis Association of Realtors, the St. Louis County of Construction Consumers and the St. Louis Regional Chamber.

During the public comment period, the department met with groups who wanted to share their concerns regarding the TMDL document. The department met twice during the public comment period with the Metropolitan St. Louis Sewer District, once on July 22, 2014, and again on October 2, 2014. The department also met with the Missouri Department of Transportation during the public comment period on June 24, 2014, to discuss their concerns with the TMDL document and again on October 9, 2014, to discuss potential bacteria monitoring and implementation of the TMDL document. A third meeting, requested in public comments submitted by the Metropolitan St. Louis Sewer District, was held with the district on December 30, 2014.

Groups that directly received the public notice announcement include the Missouri Clean Water Commission, the Missouri Water Quality Coordinating Committee, the Missouri Department of Conservation, the Missouri Department of Transportation, the St. Louis County Soil and Water Conservation District, St. Louis County Department of Health, St. Louis County Public Works, the University of Missouri Extension, the Greenway Network Inc., the Missouri Coalition for the Environment, the St. Louis County Council, the Metropolitan St. Louis Sewer District, developers of the Fishpot Creek watershed management plan, Stream Team volunteers living in or near the watershed, the Missouri Stream Team Watershed Coalition, any affected permitted entities, the four state legislators representing areas within the watershed and any other individual or group who submitted comments during the first public comment period in 2012. For both public comment periods, the department posted the notice, the water body TMDL document information sheets and the TMDL document on the department website, making them available to anyone with access to the Internet. Additionally, the department maintains an email distribution list via GovDelivery.com for notifying subscribers regarding significant TMDL document updates or activities.

## **Monitoring Plan for TMDL(s) Under a Phased Approach**

*The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards, and a schedule for considering revisions to the TMDL(s) (where a phased approach is used) [40 CFR § 130.7]. If this is a revised TMDL document, monitoring to support the revision will be documented in this section. Although the EPA does not approve the monitoring plan submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDLs and determine if future revisions are necessary or appropriate to meet applicable water quality standards.*

The MDNR has not yet scheduled post-TMDL monitoring for Fishpot Creek. No additional monitoring plans are currently scheduled for this water body because monitoring is usually scheduled and carried out by the department approximately three years after the approval of the TMDL.

The MDNR will routinely examine water quality data collected by other local, state and federal entities in order to assess the effectiveness of TMDL implementation. These entities may include the United States Geological

Survey, the EPA, the Missouri Department of Health and Senior Services, the Missouri Department of Conservation, county health departments and the Metropolitan St. Louis Sewer District. In addition, certain quality-assured data collected by universities, municipalities, private companies and other volunteer groups may potentially be considered for monitoring water quality following TMDL implementation.

### **Reasonable Assurance**

*Reasonable assurance only applies when less stringent wasteload allocation are assigned based on the assumption that nonpoint source reductions in the load allocation will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads. States are not required under Section 303(d) of the Clean Water Act to develop TMDL implementation plans and the EPA does not approve or disapprove them. However, this TMDL document provides information regarding how point and nonpoint sources can or should be controlled to ensure implementation efforts achieve the loading reductions identified in this TMDL document. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in this TMDL document. Therefore, the discussion of reduction efforts relating to point and nonpoint sources can be found in the implementation section of the TMDL document, and are briefly described below.*

*The states have the authority to issue and enforce state operating permits. Inclusion of effluent limits into a state operating permit and requiring that effluent and instream monitoring be reported to the state should provide reasonable assurance that instream water quality standards will be met. Section 301(b)(1)(C) requires that point source permits have effluent limits as stringent as necessary to meet WQS. However, for wasteload allocations to serve that purpose, they must themselves be stringent enough so that (in conjunction with the water body's other loadings) they meet WQS. This generally occurs when the TMDL(s)' combined nonpoint source load allocations and point source WLAs do not exceed the WQS-based loading capacity and there is reasonable assurance that the TMDL(s)' allocations can be achieved. Discussion of reduction efforts relating to nonpoint sources can be found in the implementation section of the TMDL document.*

Section 303(d)(1)(C) of the federal Clean Water Act requires that TMDLs be established at a level necessary to implement applicable water quality standards. As part of the TMDL process, consideration must be given to the assurances that point and nonpoint source allocations will be achieved and water quality standards attained. Where TMDLs are developed for waters impaired by point sources, reasonable assurance is derived from the National Pollutant Discharge Elimination System, NPDES. The wasteload allocations for municipal separate storm sewer systems will be implemented through the NPDES municipal separate storm sewer system permits with the ultimate goal to employ an iterative process using best management practices to the maximum extent practicable, assessment and refocused BMPs to the MEP, leading toward attainment of water quality standards.

The consent decree established as part of the *United States of America and the State of Missouri, and Missouri Coalition for the Environment Foundation v. Metropolitan St. Louis Sewer District*, requires specific eliminations and reductions of point sources in the Metropolitan St. Louis Sewer District's service area, for which Fishpot Creek is a part. This court-approved decree will provide an additional reasonable assurance of bacteria reductions in Fishpot Creek from point sources over a 23-year period.

Much of the Fishpot Creek watershed is serviced by the Metropolitan St. Louis Sewer District's Grand Glaize wastewater treatment plant located about one mile east of the Fishpot Creek watershed. Due to the availability of this sewer system and a St. Louis County ordinance requiring that a sewer connection to a building be made when a sanitary sewer line is within 200 feet of the property, many onsite wastewater system eliminations have been made. The consent decree also requires the implementation of a supplemental environmental project to decommission some septic tanks and repair or replace laterals to low-income residents within the Metropolitan St. Louis Sewer District's service area. This project could aid in reducing bacteria contributions from onsite wastewater systems within the watershed, however overall reductions are dependent upon availability of funding for this supplemental project. (Any references to the implementation of the supplemental environmental project shall include the following reference: "This project was undertaken in connection with the settlement of an enforcement action, *United States of America and the State of Missouri, and Missouri Coalition for the Environment Foundation v. Metropolitan St. Louis Sewer District*, No. 4:07-CV-1120-CEJ, taken on behalf of the EPA, State and the Coalition under the Clean Water Act".) Progress toward meeting water quality standards in Fishpot Creek is expected to be long-term and will primarily be a continuation of current, ongoing or legally required activities, such as the consent decree mentioned above. The MDNR's stated intent for the implementation plan was to not impose any additional activities beyond those already being undertaken to satisfy existing regulations or legal requirements.

Storm water discharges of urban runoff within the entire Fishpot Creek watershed are regulated through municipal separate storm sewer system permits. For this reason, urban storm water runoff is considered a point source for this TMDL. Although storm water discharges are untreated, small municipal separate storm sewer system permit holders must develop, implement and enforce storm water management plans to reduce the contamination in storm water runoff and prohibit illicit discharges. These plans must include measurable goals, must be reported on annually and must meet six minimum control measures. These six minimum control measures are public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and pollution prevention. Entities within the Fishpot Creek watershed that are regulated under the municipal separate storm sewer system permits include the Missouri Department of Transportation and the Metropolitan St. Louis Sewer District and its co-permittees, which in the Fishpot Creek watershed include St. Louis County and the municipalities of Ballwin, Ellisville, Manchester, Valley Park and Winchester Neighbors.

A variety of grants and loans may be available to assist watershed stakeholders with developing and implementing watershed plans, controls and practices to meet the required load allocations in the TMDL document and demonstrate additional reasonable assurance.

