# EPA Region 7 TMDL Review

**TMDL ID:** MO_3652 **State:** MO

**Doeument Name:** LITTLE OSAGE RIVER

**Basin(s):** OSAGE - LITTLE OSAGE RIVER BASIN, OSAGE RIVER BASIN

**HUC(s):** 10290103

**Water body(ies):** LITTLE OSAGE R., LITTLE OSAGE RIVER

**Tributary(ies):** BEE CREEK, EAST FORK BEE CREEK, EAST LABERDIE CREEK, ELK CREEK, IRISH CREEK, MARAIS DES CYGNES, MARMATON RIVER, SOUTH FORK LITTLE OSAGE RIVER, TRIBUTARY TO MUDDY CREEK, UNNAMED TRIBUTARY TO LITTLE OSAGE RIVER, UNNAMED TRIBUTARY TO NORTH FORK LITTLE OSAGE RIVER, UNNAMED TRIBUTARY TO REED CREEK

**Pollutant(s):** LOW DISSOLVED OXYGEN, TOTAL NITROGEN, TOTAL PHOSPHORUS, TOTAL SUSPENDED SOLIDS

**Submittal Date:** 3/3/2010 **Approved:** Yes

**Submittal Letter**

*State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to 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 EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.*

This TMDL doeument was formally submitted by the Missouri Department of Natural Resources (MDNR). The United States Environmental Protection Agency (EPA) received this document by mail on March 3, 2010. Revisions to this document were rceeived by email on May 3, 2010 and May 19, 2010.

**Water Quality Standards Attainment**

*The water body's loading capacity (LC) 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. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.*

The Little Osage River TMDL was developed to address the low dissolved oxygen (DO) impairment of the Little Osage River segment MO_3652. A TMDL is needed for the Little Osage River because it is not meeting the WQS for DO. Low DO is an issue because coneentrations have been measured at less than the WQS of 5 milligrams per liter (mg/L). DO in streams may be affected by several factors including water temperature, the amount of deeaying organic matter in the stream, turbulence at the air-water interface, and the amount of photosynthesis oceurring in plants within the stream. Organie matter can eome from wastewater effluent as well as agricultural and urban runoff. Nitrogen and phosphorus can also contribute to low DO problems because they can aeeelerate algae growth in streams. Algae growth in streams is most frequently assessed based on the amonnt of chlorophyll a in the water. The algae consume DO during respiration at night and have the potential to remove large amounts of DO from the stream. The breakdown of dead, decaying algae also removes oxygen from water.

Pollutants which result in oxygen concentrations below saturation are fine particle size bottom sediment, high nutrient levels (nitrogen and phosphorus), and suspended particles of organie matter. Because these three pollutants vary to a large extent based on anthropogenic influences, they are appropriate targets for a TMDL written to address an impairment of low DO.

Organic matter can accumulate on the bottom of streams, where the rate at which it decays and consumes oxygen is measured as sediment oxygen demand (SOD). SOD is a combination of all of the oxygen-consuming processes that occur at or just below the sediment/water interface. The processes that occur within this area of the stream bed can account for a large fraction of the oxygen consumption in a stream. Most of the SOD at the surface of the sediment is due to the biological decomposition of organic material and the bacterially facilitated nitrification of ammonia. SOD can also be affected by water depth, current velocity, and temperature. The TMDL indicates that an 82 percent reduction is needed in SOD, which can be done through reductions in TSS and nutrients to meet the DO WQS of 5 mg/L.

To address nutrient levels, the EPA nutrient ecoregion reference concentrations were used. For the ecoregion where Little Osage River is located, the reference concentration for total nitrogen (TN) is 0.855 mg/L, for total phosphorus (TP) is 0.092 mg/L, and for chlorophyll a it is 2.8 micrograms per liter (ug/L). This TMDL will not specifically target chlorophyll a, but will use a linkage between nutrient concentrations and chlorophyll a response to achieve the ecoregion reference concentrations.

There are many quantitative indicators of sediment, such as total suspended solids (TSS), turbidity, and bedload sediment, which are appropriate to describe sediment in rivers and streams. Because fine particle size sediment and suspended particles of organic matter are derived from similar loading conditions, TSS will be used to represent both. TSS was selected as one of the numeric targets for this TMDL because it enables the use of the highest quality data available, including permit conditions and monitoring data.

The TMDLs for TN, TP, and TSS were determined using load duration curves (LDCs). These reductions in nutrients and sediment protects the warm water aquatic life use of the stream and the TMDLs should result in WQS attainment. The LC for TN and TP is defined by a LDC set at the ecoregion reference concentrations. The LC for TSS is defined by a LDC set at the 25th percentile of TSS measurements available in the ecological drainage unit (EDU). The LCs for TN, TP, and TSS at the 50 percent flow exceedance, for the Missouri portion of the watershed are 112.5 pounds per day (lbs/day), 12.49 lbs/day and 1.2 tons/day, respectively. The LCs for TN, TP, and TSS at the 50 percent flow exceedance, for the entire watershed are 341 lbs/day, 37.9 lbs/day and 3.6 tons/day, respectively. The Missouri portion is 33 percent of the total watershed.

**Numeric Target(s)**

*Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL 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 water quality criterion for DO for all Missouri streams, except cold water fisheries, is a daily minimum of 5 mg/L (10 CSR 20-7.031 Table A).

The designated beneficial uses of the Little Osage River are:
- Livestock and Wildlife Watering,
- Protection of Warm Water Aquatic Life,
- Protection of Human Health (Fish Consumption), and
- Whole Body Contact Recreation - Category B.

The use that is impaired is Protection of Warm Water Aquatic Life.
*The impaired use is incorrectly identified as Whole Body Contact Recreation on the 2008 303(d) List. This will be corrected to Protection of Warm Water Aquatic Life on the 2010 303(d) List (per footnote 3, page ii of the TMDL).*

DO is affected by several factors including water temperature, the amount of decaying organic matter in the stream, turbulence at the air-water interface and the amount of photosynthesis occurring in plants within the stream. Organic matter can also accumulate on the bottom of streams, where the rate at which it decays and consumes oxygen is measured as SOD. SOD is a combination of all of the oxygen-consuming processes that occur at or just below the sediment/water interface and account for a large fraction of the oxygen consumption in a stream.

Nitrogen and phosphorus can also contribute to low DO problems because they can accelerate algae growth in streams. Algae growth in streams is most frequently assessed based on the amount of chlorophyll a in the water. The algae consume DO during respiration and have the potential to remove large amounts of DO from the stream, particularly at night when DO is not produced through photosynthesis. The breakdown of dead, decaying

algae also removes oxygen from water.

To address nutrient levels, the EPA nutrient ecoregion reference concentrations were targeted. To address TSS the 25th percentile of all TSS measurements available in the EDU were targeted. The TMDL LDC's represent flow under all possible stream conditions. The advantage of a LDC approach is that it avoids the constraints associated with using a single-flow critical condition and is applicable under all flow conditions. The LCs for TN, TP, and TSS at the 50 percent flow exceedance for the entire watershed are 341 lbs/day, 37.9 lbs/day and 3.6 tons/day, respectively. The LCs for TN, TP, and TSS at the 50 percent flow exceedance for the Missouri portion of the watershed are 112.5 lbs/day, 12.49 lbs/day and 1.2 tons/day, respectively.

Pollutant(s) of concern

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.*

The data available suggests that high nutrient loads are contributing to excessive algal growths in the Little Osage River. The excessive algal growths, in turn, are causing low DO to occur late at night when the algae are consuming but not producing oxygen. Large amounts of algae may also be contributing to low DO when the plants die and decay. To address nutrient levels, the EPA nutrient ecoregion reference concentrations were used. For the ecoregion where the Little Osage River is located, the reference concentration for TN is 0.855 mg/L, and for TP is 0.092 mg/L. The LC for TN and TP is defined by LDCs set at the ecoregion reference concentrations. An established link between nutrient concentrations and chlorophyll a response was used to achieve the ecoregion reference concentrations and define this TMDL as a numeric value.

Another essential component of developing a TMDL is establishing a relationship between the source loadings and resulting water quality. For this TMDL, the relationship between the source loadings of SOD and nutrients on DO is generated by the water quality model QUAL2K. The processes employed in QUAL2K address nutrient cycles, algal growth, and DO dynamics. The results of the model indicate that an 82 percent reduction in SOD is required to meet the DO WQS of 5 mg/L.

A TMDL establishing an allocation for suspended solids was developed. In cases where sufficient pollutant data for the impaired stream is not available a reference approach is used. In this approach, the target or LC for pollutant loading is the 25th percentile of all data available within the EDU in which the water body is located. An established link between TSS and sediment was used to define this TMDL as a numeric value.

The sum of the WLA, LA, and MOS for all pollutants are set to not exceed the LC. Reductions in concentration for all pollutants should ensure the DO WQS of 5 mg/L are met.

Source Analysis

*Important assumptions made in developing the TMDL, 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. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.*

There are four municipalities located within the Little Osage River watershed in Missouri. Hume and Rich Hill in Bates County, with wastewater treatment plants in Missouri, discharge to the north into tributaries of the Marais des Cygnes River. Stotesbury and Metz, each with populations under one hundred people, do not have centralized municipal wastewater treatment. Therefore, there are no municipal wastewater treatment facilities or municipal separate storm sewer systems (MS4s) that discharge into the Missouri part of the watershed.

There are four facilities with general permits and one general storm water permit, within the Little Osage watershed in Missouri. Of these five facilities, two discharge to the downstream end of the impaired segment. One of these, a limestone quarry, is unlikely to be a source of nutrients or organic material that could be contributing to the dissolved oxygen impairment. The other, a fertilizer manufacturing facility, is authorized to discharge only storm water during high flow events. Given the location of this facility downstream of where the

impairment was actually assessed, and the fact that critical conditions for low dissolved oxygen are considered during periods of low flow, it is unlikely that storm water discharge from this facility is a significant contributor to the low dissolved oxygen impairment. The other three facilities, a meat processing plant and two poultry concentrated animal feeding operations (CAFOs), are downstream of the impaired segment. Their locations, along with the fact that they are all no-discharge facilities, would indicate that they are not contributing to the assessed low DO impairment that is being addressed in this TMDL.

Missouri Permits

| Facility | Permit Number | Design Flow Million Gallons/Day |
|---|---|---|
| Rich Hill Meat Processing | MOG822104 | General Permit |
| Rich Hill/Seagraves Quarry (Limestone) | MOG490983 | General Permit |
| Paul Leatherman (Poultry CAFO) | MOG010411 | General Permit |
| Steven Schmidt (Poultry CAFO) | MOG010419 | General Permit |
| Midwest Fertilizer, Inc. | MOR240450 | Storm water Permit |

The portion of the Little Osage River watershed within the State of Kansas contains four permitted municipal wastewater dischargers. Each of these municipal facilities is a small, lagoon type system with individual design flows less than 40,000 gallons per day. There are no MS4s in the Kansas portion of the watershed. There are seven active livestock facilities within the Kansas portion of the watershed that are either certified or permitted by the State of Kansas. The total number of Kansas animal units attributed to all of these facilities is 2,219.

Kansas Permits

| Facility | Permit Number | Design Flow Million Gallons/Day |
|---|---|---|
| Blue Mound WWTP | MMC05OO02 | 0.03 |
| Fulton WWTP | MMC12OO01 | 0.025 |
| Kincaid WWTP | MMC17OO01 | 0.03 |
| Prescott WWTP | MMC37OO02 | 0.04 |
| Stewart Manufacturing Corp. | I-MC25-NO01 | No discharge |
| Continental Coal - Lost Creek Mine | I-MC37-PO02 | No discharge |

Kansas Livestock Facilities

| **Permit Number** | Kansas Animal Units* |
|---|---|
| A-MCLN-S022 | 988 |
| A-MCLN-M005 | 355 |
| A-MCBB-M002 | 287 |
| A-MCBB-M005 | 143 |
| A-MCBB-M006 | 250 |
| A-MCBB-L007 | 33 |
| A-MCBB-L008 | 98 |
| **Certificate Number** | |
| A-MCLN-MA07 | 140 |
| A-MCBB-MA18 | 56 |

*According to KSA 65-171d(c)(3), in Kansas one animal unit equals approximately 0.7 mature dairy cattle, 10 swine weighing 55 pounds or less, and 2.5 swine weighing greater than 55 pounds.

There are two permitted CAFOs in the Missouri watershed downstream of the impaired segment, but the presence of lower density livestock populations could be contributing to the nutrient and sediment loads in the Little Osage River. The cattle are most likely located on the approximately 57,570 acres of grassland/pastureland in the Missouri side of the watershed, and runoff from these areas can be potential sources of nutrients and oxygen-consuming substances. Animals grazing in pasture areas deposit manure directly upon the land surface and, even though a pasture may be relatively large and animal densities low, the manure will often be concentrated near the feeding and watering areas in the field. These areas can quickly become barren of plant cover, increasing the possibility of erosion and contaminated runoff during a storm event. Grassland makes

up 41.6 percent of the Missouri watershed land use and 57.5 percent of the Kansas portion.

Illieit straight pipe discharges of household waste are potential point sources in agricultural areas. These are diseharges straight into streams or land areas and are different than illicitly eonnected sewers. There is no speeific information on the number of illicit straight pipe discharges of household wastes in the Little Osage River watershed.

Failing septic systems are sources of nutrients that can reach nearby streams through both surfaee runoff and ground water flows. The exact number of onsite wastewater systems in the Little Osage River watershed is unknown. An estimate was made based on approximately 4,374 people in the rural watershed area and 1,760 in the Missouri portion. With 2.5 persons per household this gives 1,750 systems potentially in the entire watershed with 704 of those in Missouri.

Storm water runoff from urban areas can be a significant source of nutrients and oxygen-consuming substances. Phosphorus loads from residential areas can be comparable to or higher than loading rates from agricultural areas. Warmer storm runoff from urban areas such as parking lots and buildings can lead to higher water temperatures that lower the DO saturation capacity of streams. Excessive discharge of suspended solids from urban areas can also lead to streambed siltation problems. Since approximately 1.7 percent of the Little Osage River watershed is classified as urban, and 70 percent of this urban land use is within Missouri, it is unlikely urban storm water runoff is a significant source of substances and conditions contributing to the pollutants of concern.

Lands used for agricultural purposes can be a source of nutrients and oxygen-consuming substances. Accumulation of nitrogen and phosphorus on cropland occurs from decomposition of residual crop material, fertilization with chemical and manure fertilizers, atmospheric deposition, wildlife excreta, and irrigation water. The land use/land cover data indicates that approximately 35.7 percent of the Missouri watershed consists of cropland and 21.3 percent of the Kansas portion is classified as cropland.

Vernon County is home to 30 percent of all pecan farms in the state, and roughly 71 percent of all acreage devoted to growing pecans. In addition to requiring fertilization, pecan orchards can also be subject to livestock grazing, a management strategy designed to minimize ground cover. Both practices can be sources of nutrients to the Little Osage River, particularly during periods of flooding.

An additional potential source of nutrients from agricultural lands may come from the application of poultry manure to cropland and livestock pastures. Too much manure applied at the wrong times can result in excess nutrients and organic matter reaching nearby streams. While poultry production in Missouri is concentrated in the southwest region of the state, waste generated from these facilities is land applied as far north as Vernon County. Another potential source of poultry litter may be the two poultry operations located downstream in the watershed.

Other types of land use in Missouri includes forest and woodland (5.8 percent), wetlands (10 percent), herbaceous and open water total 5.6 percent of the watershed land uses.

Riparian areas can be sources of natural background material that could possibly contribute to the low DO problem. Leaf fall from vegetation near the water's edge, aquatic plants, and drainage from organically rich areas like wetlands are all natural sources of materials that consume oxygen.

In the absence of an NPDES permit, the discharges associated with sources were applied to the LA, as opposed to the WLA for purposes of this TMDL. The decision to allocate these sources to the LA does not reflect any determination by EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing these TMDLs with some sources treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the alloeated pollutant in this TMDL 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. WLA in addition to that alloeated here is not available.

Any CAFO that does not obtain an NPDES permit must operate as a no discharge operation. Any discharge from an unpermitted CAFO is a violation of Section 301. It is 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 (e.g., in excess of 25-year and 24-hour frequency/duration) or are from a man-made conveyance. However, many large CAFOs (mostly the poultry and swine sectors) contend that they do not discharge nor propose to discharge therefore are not required to obtain an NPDES

permit. It is EPA's opinion that many of the "no discharge" CAFOs do 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 do not discharge or propose to discharge. Furthermore, there are many animal feeding operations (AFOs) that meet the definition of a medium CAFO (i.e., discharge via a man-made conveyanee) but are unpermitted and have not limited their impact on waters by applying Best Professional Judgment to effluent reductions.

Any permitted CAFOs identified in this TMDL would have been assigned WLA. AFOs and unpermitted CAFOs are considered under the LA because we do not currently have enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL does not reflect a determination by EPA that such 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 an AFO or CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in this TMDL as approved.

All known sources have been considered.

**Allocation - Loading Capacity**

*Submittal identifies appropriate WLA for point, 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 phase II TMDL the change in LC will be documented in this section.*

The LCs for TN, TP, and TSS at the 50 percent flow exceedance, for the Missouri portion of the watershed, are 112.5 lbs/day, 12.49 lbs/day and 1.2 tons/day, respectively. For TN, TP, and TSS: the LAs are set equal to the LCs, the MOS is implicit, and the sum of the WLA and LA do not exceed the LC.

**WLA Comment**

*Submittal lists individual WLAs 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 WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. 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 phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.*

At the present time, there are no site specific Missouri State Operating Permits (MSOPs) that have an established design flow in the Little Osage watershed. Therefore, no portion of the TMDL LC will be allocated to point sources and WLAs are set at zero for the 23.6 mile Missouri segment of the Little Osage River (3652).

**LA Comment**

*Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.*

The LAs for the Little Osage River TMDL are for all nonpoint sources of TN, TP, and TSS. The LAs were calculated based on the total of all headwater and lateral inflow loads used in the QUAL2K model for the allocation scenario model run. The LAs are intended to allow the DO target to be met at all locations within the stream. Because there are no point sources in the Missouri portion of the watershed, no WLAs were assigned and the TMDL LC and LA for each flow will be equal. The Missouri portion of the LA of the Little Osage River watershed is 33 pereent of the entire watershed LA.

As an example, at the 50 percent flow exeeedance for the Missouri portion of the watershed, the LA for TN is 112.5 lbs/day, for TP is 12.49 lbs/day and for TSS 1.2 tons/day.

**Margin of Safety**

*Submittal describes explicit and/or implicit MOS 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 phase II TMDL any differences in MOS will be documented in this section.*

An implieit MOS was incorporated into the TMDL based on conservative assumptions applied to the QUAL2K

model and used in the development of the TMDL LDCs. Conservative assumptions included targeting the 25th percentile of TSS concentrations and to establish WLAs under critical low flow conditions.

**Seasonal Variation and Critical Conditions**

*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 WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.*

The impairment of Little Osage River is low DO. The critical condition would be during low flow conditions. Using QUAL2K for this TMDL development during these conditions will be protective year round, since the TMDL LDC represents flow under all possible stream conditions and seasons, and avoids the constraints associated with using a single-flow critical condition. Low DO can also occur due to increased nutrients and organic sediments being carried into the water body through storm water runoff. These conditions are more likely to occur during seasonal periods having significant precipitation. Seasonal variation has been implicitly taken into account within the TMDL calculations.

**Public Participation**

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

This water quality limited segment of the Little Osage River is included on the EPA-approved 2008 303(d) List for Missouri. The public notice period for the draft Little Osage River TMDL was from November 13, 2009, to December 28, 2009. The public notice, the TMDL Information Sheet, and this document were posted on the MDNR Web site, making them available to anyone with Internet access. The public notice announcement was also sent to a variety of interest groups. Since the Little Osage River originates in Kansas, a public notice announcement was also sent to the Kansas Department of Health and Environment, Bureau of Water. Comments received and MDNR's response to those comments, have been placed in the Little Osage River administrative record file. Three comments were received and responded to.

**Monitoring Plan for TMDL(s) Under 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 WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].*

Post-TMDL monitoring of all relevant water quality parameters will be scheduled and conducted by MDNR approximately three years after the TMDL is approved, or in a reasonable period of time following the implementation of nonpoint source best management practices.

MDNR will routinely examine physical habitat, water quality, and invertebrate and fish community data collected by other state and federal agencies in order to assess the effectiveness of TMDL implementation. One example of such data is that generated by the Resource Assessment and Monitoring Program administered by the Missouri Department of Conservation. This program randomly samples streams across Missouri on a five- to six-year rotating schedule.

**Reasonable Assurance**

*Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA 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.*

Reasonable assurances are not required within this TMDL because all permitted point sources have received a WLA of zero. MDNR has the authority to issue and enforce MSOPs. Regardless, all permitted facilities within the Missouri portion of the impaired watershed will be inspected prior to next permit renewal to determine if best management practices or permit conditions are needed to ensure the facilities are not contributing nutrients or oxygen demanding substances to the Little Osage River. The inspections will include an assessment of the condition of the facilities and whether upgrades or additional measures are necessary.