



Missouri
Department of
Natural Resources

TRIBUTARY TO HICKORY CREEK TMDL
EPA COMMENTS

TMDL submitted to EPA
June 8, 2010

Hickory Creek
WBID # 0589

Grundy County, Mo.

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

Hoke, John

From: Adkins.Tabatha@epamail.epa.gov
Sent: Tuesday, July 20, 2010 3:07 PM
To: Hoke, John
Subject: Comments on Tributary to Hickory Creek

John,

Listed are the EPA comments on Tributary to Hickory Creek. Thanks.

TJ

1. Pg 16, Explain implicit MOS. Need to elaborate on what those conservative assumptions/targets were.
2. Appendix B.3, pg 24, lists NFR data and TMDL allocations are in TSS. Citing NFR data without any explanation is confusing because NFR is never mentioned in the TMDL.
3. 4.1 page 12 the last sentence is repeated on page 13. "oxygen. This capacity is mainly..."
4. Noticed that no precipitation data was included. This is a deviation from other MO TMDLs.
5. Page 7, Point sources, need to expand the paragraph ... other MO TMDLs indicate:
" For the purposes of TMDL development, point sources are defined as sources regulated through the National Pollutant Discharge Elimination System (NPDES) program. Missouri has its own program for administering the NPDES program, referred to as the Missouri State Operating Permit System (MSOP). The NPDES and MSOP programs are the same and for the purposes of this document we will use the term "NPDES." The following regulated entities are included in this source category."

Specifically mention that there are no permitted or regulated entities, to clarify.
6. Ecoregion and EDU targets are not clearly visible. A table would aid in visibility.
Along with this, page 13 indicates that TSS EDU target is 10 mg/L.
Please clarify if this is the proper target. Other recent TMDLs indicated the target to be 5.75 mg/L.
7. Add to appendix the info sheet on "Development of Nutrient Targets Using Ecoregion Nutrient Criteria with LDCs". Explanation in TMDL and reference on this development for nutrient targets needs to be clearer.
8. 4.1.1, pg 13, no specific EDU information is listed here or in appendix. The appendix A is a general description of the process. Most of the earlier TMDLs listed the EDU, streams and gages used.
9. 2.0 Sourcing, pg 7 - no mention of illicit straight pipe discharges.
10. Please help clarify the source of the TSS. From the explanation given so far, the TMDL seems to state the source of nutrients and TSS are from failing septic systems and livestock with direct stream access. Although the riparian habitat discussion implies it is a fairly good buffer and seems to contradict the statement regarding livestock access. Also, the estimate is that there are only 11 people in the watershed. At previous TMDL estimates of 2.5 people/ septic tank, that's four septic tanks total in the watershed. The sourcing information with other TMDL information provides a confusing

and contradictory argument regarding the magnitude and location of probable sources.

11. Section 3: Cites WBID 389 which should be 589.

12. 3.4 Specific Criteria WQS citation should be 20-7.031(3)

13. Section 3.5 WQ Targets: This section argues that ecoregion nutrient values were exceeded (p. 11), but no TN samples exceeded and only two of five samples exceeded for TP (p. 3&7). It seems from the original data that only TSS was typically high. The argument about the problems with nutrients and TSS and the sources appeared disjointed. Clarify the supporting argument for saying nutrient levels in Trib are too high.

Review of TMDL Model for the Tributary to Hickory Creek (WBID 589)

14. Page 20. Appendix A. It would be best to re-write Appendix A to reflect the data used in the TMDL. The narrative provided in the appendix is a generic description of the modeling methodology. This should be more specific to the current application. For example, the plot showing the normalized flow duration curves and the corresponding table should be for the gages used to generate the synthetic FDC for the Tributary to Hickory Creek watershed. The plot of the relationship of sediment yield as a function of flow should be for the ecoregion data used in the TMDL.

15. Page 24. Table B.1. The table indicates different flow periods. It is not clear what common period of record was used in the deriving the synthetic flow duration for the watershed. Please provide a graph of the normalized flow durations of the 4 USGS gages and the corresponding synthetic normalized flow duration (review of spreadsheet shows that different time periods were used; the synthetic flow duration should be developed using flow data from several gages using a common time period).

16. Page 24. Please provide plots of the ecoregion TN and TP load - flow relationships.

Tabatha Adkins, TMDL Coordinator
Water Quality Management Branch-WWPD,
USEPA Region 7
901 North 5th Street
Kansas City, KS 66101
913.551.7128
adkins.tabatha@epa.gov

EPA comments for the Tributary to Hickory Cr. TMDL and Department response

- 1. Pg 16, Explain implicit MOS. Need to elaborate on what those conservative assumptions/targets were.*

Additional language regarding the rationale for an implicit margin of safety has been included in the document. The margin of safety language is similar to that found in the approved Willow Branch TMDL.

- 2. Appendix B.3, pg 24, lists NFR data and TMDL allocations are in TSS. Citing NFR data without any explanation is confusing because NFR is never mentioned in the TMDL.*

References to non-filterable residue (NFR) have been changed to total suspended solids (TSS) in the table.

- 3. 4.1 page 12 the last sentence is repeated on page 13. "oxygen. This capacity is mainly...."*

The duplicate sentence has been deleted.

- 4. Noticed that no precipitation data was included. This is a deviation from other MO TMDLs.*

Previous Missouri TMDLs have included precipitation data when those TMDLs directly used these data in the analyses (e.g., rainfall-runoff calculations). The other Missouri TMDL to which the above comment likely refers is the Hickory Creek TMDL (WBID: 0442). For consistency among these two TMDLs, precipitation data has been added to the Tributary to Hickory Creek TMDL as Appendix C.

- 5. Page 7, Point sources, need to expand the paragraph ... other MO TMDLs indicate: "For the purposes of TMDL development, point sources are defined as sources regulated through the National Pollutant Discharge Elimination System (NPDES) program. Missouri has its own program for administering the NPDES program, referred to as the Missouri State Operating Permit System (MSOP). The NPDES and MSOP programs are the same and for the purposes of this document we will use the term "NPDES." The following regulated entities are included in this source category."*

The TMDL document includes similar language in Section 2.1 and Footnote 6, which state that "Point sources are typically those regulated through the Missouri State Operating Permit program" and "The Missouri State Operating Permitting program is Missouri's program for administering the federal National Pollutant Discharge Elimination System (NPDES)

program”. The Department believes this language, which has been used in other approved Missouri TMDLs, is acceptable and addresses the comment above.

Specifically mention that there are no permitted or regulated entities, to clarify.

A statement has been added to clarify there are no permitted or regulated facilities in the Tributary to Hickory Creek watershed.

- 6. Ecoregion and EDU targets are not clearly visible. A table would aid in visibility. Along with this, page 13 indicates that TSS EDU target is 10 mg/L. Please clarify if this is the proper target. Other recent TMDLs indicated the target to be 5.75 mg/L.*

A table (Table 6) has been added to Section 3.5 of the document and presents TSS, TN, and TP target criteria used to develop the Tributary to Hickory Creek TMDL. Staff have verified that the TSS target of 10 mg/L is appropriate and was provided by EPA Region 7 in the TSS LDC spreadsheets used for the TMDL. The TSS target was derived using USGS gaging station data collected in the ecological drainage unit (EDU) in which Tributary to Hickory Creek is located.

It is important to note that ecoregions and ecological drainage units represent spatially different areas. Ecoregions at the Level III scale may cover several states, while ecological drainage units tend to be spatially smaller and the data represent water quality conditions within the defined area. Previous TMDLs may have contained similar nutrient ecoregion target values due to the impaired waters residing within the same ecoregion. TSS ecological drainage unit concentrations will vary based upon the USGS gaging station data used in the target analysis. This appears to be the difference between the 10 mg/L TSS target value used for the Tributary to Hickory Creek TMDL and the 5.75 mg/L target value used for other TMDLs.

- 7. Add to appendix the info sheet on “Development of Nutrient Targets Using Ecoregion Nutrient Criteria with LDCs”. Explanation in TMDL and reference on this development for nutrient targets needs to be clearer.*

The information contained in “Development of Nutrient Targets using EPA Recommended Ecoregion Nutrient Criteria with Load Duration Curves” has been added as Appendix B. The appendix has been updated to include data and information specific to the Tributary to Hickory Creek TMDL.

- 8. 4.1.1, pg 13, no specific EDU information is listed here or in appendix. The appendix A is a general description of the process. Most of the earlier TMDLs listed the EDU, streams and gages used.*

Footnote 13 has been revised to include specific information on the ecological drainage

unit (EDU) for the Tributary to Hickory Creek TMDL (Central Plains/Grand/Chariton). Appendix A has also been updated to include information on the EDU and USGS stream gages used in the synthetic flow analysis.

9. 2.0 Sourcing, pg 7 – no mention of illicit straight pipe discharges.

Text addressing illicit straight pipe discharges has been added to the point source section of the document (Section 2.1).

10. Please help clarify the source of the TSS. From the explanation given so far, the TMDL seems to state the source of nutrients and TSS are from failing septic systems and livestock with direct stream access. Although the riparian habitat discussion implies it is a fairly good buffer and seems to contradict the statement regarding livestock access. Also, the estimate is that there are only 11 people in the watershed. At previous TMDL estimates of 2.5 people/septic tank, that's four septic tanks total in the watershed. The sourcing information with other TMDL information provides a confusing and contradictory argument regarding the magnitude and location of probable sources.

The nonpoint source section of the document (Section 2.2) has been revised to include additional language that clarifies potential sources of nutrients and sediment to Tributary to Hickory Creek. A separate section has also been added to the TMDL to summarize the potential sources of nutrients and sediment to the impaired segment (Section 2.3).

11. Section 3: Cites WBID 389 which should be 589.

The water body ID has been changed to 589. Thank you for bringing this typo to our attention.

12. 3.4 Specific Criteria WQS citation should be 20-7.031(3)

The citation for Missouri's General Criteria has been changed to 10 CSR 20-7.031(3). Thank you for bringing this typo to our attention.

13. Section 3.5 WQ Targets: This section argues that ecoregion nutrient values were exceeded (p. 11), but no TN samples exceeded and only two of five samples exceeded for TP (p. 3&7). It seems from the original data that only TSS was typically high. The argument about the problems with nutrients and TSS and the sources appeared disjointed. Clarify the supporting argument for saying nutrient levels in Trib are too high.

The Department agrees there may not be a significant problem with nutrients in Tributary to Hickory Creek. The Department also agrees that sediment does appear to be a problem in the

impaired water body. However, the approach used by EPA and the Department to address “unknown” impairments to Consent Decree waters includes setting load capacities for both nutrients and sediment. TMDLs for both total nitrogen and total phosphorous are therefore necessary to address the unknown impairment of Tributary to Hickory Creek. Should water quality data indicate no reductions in nutrients (i.e., nitrogen) are necessary, this portion of the TMDL need not be implemented. The text in Section 3.5 and Section 1 (Introduction) have been revised to indicate that only sediment and phosphorous concentrations exceeded applicable water quality targets in the impaired segment.

14. Page 20. Appendix A. It would be best to re-write Appendix A to reflect the data used in the TMDL. The narrative provided in the appendix is a generic description of the modeling methodology. This should be more specific to the current application. For example, the plot showing the normalized flow duration curves and the corresponding table should be for the gages used to generate the synthetic FDC for the Tributary to Hickory Creek watershed. The plot of the relationship of sediment yield as a function of flow should be for the ecoregion data used in the TMDL.

The language and figures found in Appendix A (Development of Suspended Sediment Targets using Reference Load Duration Curves) were provided to the Department by EPA Region 7 for use in the Hickory Creek and other Consent Decree TMDLs. The methods and procedures contained in the write-up were intended to be generic in nature and allow for expedited development of TMDLs using the reference load duration curve approach. However, the Department recognizes the benefit of re-writing Appendix A to reflect the data and information used in the Tributary to Hickory Creek TMDL. To this end, Appendix A has been revised as requested.

15. Page 24. Table B.1. The table indicates different flow periods. It is not clear what common period of record was used in the deriving the synthetic flow duration for the watershed. Please provide a graph of the normalized flow durations of the 4 USGS gages and the corresponding synthetic normalized flow duration (review of spreadsheet shows that different time periods were used; the synthetic flow duration should be developed using flow data from several gages using a common time period).

The calculations and data used to develop the synthetic flow duration curve for the watershed were provided to the Department by EPA Region 7. Review of the spreadsheet shows that a period of record from October 1, 1989 until September 30, 2009 was used to derive the synthetic flow duration curve. This extended period of time allows the flow record to be of sufficient length to calculate reliable percentiles of flow (typically 20 years or more). If the period of record had not been extended, a much shorter period of record (10 years) would have been used to derive the synthetic flow duration curve. A shorter period of record would have yielded results that were less robust and contained greater uncertainty. As requested in the comment, a graph of the normalized flow durations for the four USGS gages and the corresponding synthetic normalized flow duration has been included in Appendix B.

16. Page 24. Please provide plots of the ecoregion TN and TP load – flow relationships.

The calculations and data used to develop the ecoregion TN and TP load – flow relationships were provided to the Department by EPA Region 7. As requested in the comment, graphs showing TN and TP load – flow relationships have been added to Appendix B.

Hoke, John

From: Hoke, John
Sent: Monday, October 25, 2010 5:06 PM
To: 'Adkins.Tabatha@epamail.epa.gov'
Subject: RE: Tributary to Hickory Creek

TJ,

Table 6 has been updated to correctly reflect the 10 mg/L TSS target for this water body. I've placed the revised version on the Department's FTP site with today's date. Let me know if you have questions or need additional edits. Thanks

John Hoke
Env. Specialist IV, TMDL Unit Chief
Water Quality Monitoring & Assessment
Missouri Department of Natural Resources
Phone: (573) 526-1446 Fax: (573) 522-9920

-----Original Message-----

From: Adkins.Tabatha@epamail.epa.gov [mailto:Adkins.Tabatha@epamail.epa.gov]
Sent: Monday, October 25, 2010 4:45 PM
To: Hoke, John
Subject: Tributary to Hickory Creek

John,

One edit to Tributary to Hickory. Basically it looks like that 5.75 mg/L was inadvertently put into Table 6 as the target. MDNRs response was that 10 mg/L is the correct target. Thanks.

TJ

6. Ecoregion and EDU targets are not clearly visible. A table would aid in visibility. Along with this, page 13 indicates that TSS EDU target is 10 mg/L. Please clarify if this is the proper target. Other recent TMDLs indicated the target to be 5.75 mg/L.

A table (Table 6) has been added to Section 3.5 of the document and presents TSS, TN, and TP target criteria used to develop the Tributary to Hickory Creek TMDL. Staff have verified that the TSS target of 10 mg/L is appropriate and was provided by EPA Region 7 in the TSS LDC spreadsheets used for the TMDL. The TSS target was derived using USGS gaging station data collected in the ecological drainage unit (EDU) in which Tributary to Hickory Creek is located.

It is important to note that ecoregions and ecological drainage units represent spatially different areas. Ecoregions at the Level III scale may cover several states, while ecological drainage units tend to be spatially smaller and the data represent water quality conditions within the defined area. Previous TMDLs may have contained similar nutrient ecoregion target values due to the impaired waters residing within the same ecoregion. TSS ecological drainage unit concentrations will vary based upon the USGS gaging station data used in the target analysis. This appears to be the difference between the 10 mg/L TSS target value used for the Tributary to Hickory Creek TMDL and the 5.75 mg/L target value used for other TMDLs.

EPA101210 - Please change the TSS target in Table 6 to 10 mg/l. Table 7 was calculated based on 10 mg/l. The 5.75 mg/l is the EDU 25th percentile value but since it is below the limit of detection, it is appropriate to target the 10 mg/l (limit of detection). Add a

footnote to Table 6.

Tabatha Adkins, TMDL Coordinator
Water Quality Management Branch-WWPD,
USEPA Region 7
901 North 5th Street
Kansas City, KS 66101
913.551.7128
adkins.tabatha@epa.gov

From: "Hoke, John" <john.hoke@dnr.mo.gov>
To: Tabatha Adkins/R7/USEPA/US@EPA
Date: 10/13/2010 09:08 AM
Subject: RE: Hickory Creek

TJ,

Revised versions of the Hickory Creek (WBID: 0442) and Tributary to Hickory Creek (WBID: 0589) TMDLs have been placed on the Department's FTP site in the "Outgoing\TMDL" folder. Let me know if you have questions or need additional edits. Thanks

John Hoke
Env. Specialist IV, TMDL Unit Chief
Water Quality Monitoring & Assessment
Missouri Department of Natural Resources
Phone: (573) 526-1446 Fax: (573) 522-9920

-----Original Message-----

From: Adkins.Tabatha@epamail.epa.gov [mailto:Adkins.Tabatha@epamail.epa.gov]
Sent: Tuesday, October 12, 2010 2:29 PM
To: Hoke, John
Subject: Hickory Creek

John,

Need small edits to Hickory. Comments 14 and 16 (same notation).
Thanks.

TJ

(See attached file: Hickory Cr 442 submittal-101210.rtf)

Tabatha Adkins, TMDL Coordinator
Water Quality Management Branch-WWPD,
USEPA Region 7
901 North 5th Street

Kansas City, KS 66101
913.551.7128
adkins.tabatha@epa.gov