



Missouri
Department of
Natural Resources

DRAFT MARMATON RIVER TMDL
PUBLIC COMMENTS

Second Public Notice
July 8, 2010 – August 22, 2010

Marmaton River
WBID # 1308

Vernon County, Mo.

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

RECEIVED
2010 AUG 23 PM 1:10
WATER PROTECTION PROGRAM

August 17, 2010

John Hoke, Environmental Specialist, TMDL Unit Chief
Mo Department of Natural Resources Water Pollution Program
Water Quality Monitoring and Assessment Section
Lewis and Clark State Office Building
1101 Riverside Drive, P.O Box 176
Jefferson City, MO 65102-0176

RE: Comments Regarding Revised Draft Marmaton River Total Maximum Daily Load or TMDL for Vernon and Barton Counties

Dear Mr. Hoke:

The Citizens Watershed Committee (CWC) for the Marais des Cygnes, Marmaton, and Little Osage River Watersheds are respectfully request your agency's considerations regarding this organization's concerns and issues presented in the second public notice "Revised Draft Total Maximum Daily Load (TMDL) for the Marmaton River", released for public comment July 8, 2010 to August 22, 2010. The water body identification # 1308, hydrologic unit code 10290104 found in Vernon and Barton Counties. ..

Listed below are the concerns found within the Revised Draft TMDL expressed by the CWCs partner membership:

Comment #1: The CWC has stated during a previous review of the first Draft TMDL that a critical parameter, water quantity is not addressed which has a direct impact on the streams DO, temperature and aquatic life. The CWC upon review of this Revised Draft TMDL strongly believes that this critical parameter, water quantity has to be addressed regardless of the differences between the two states water laws in order to protect the integrity of the water quality and aquatic life without undue burden any entity. These two states need to arrive at a common purpose for the natural resources of this watershed. The CWC and its partners strongly urge USEPA, US Army COE MO Department of Conservation and MO Department of Natural Resources jointly develop and implement with Kansas natural resource agencies a policy that would augment stream water flow from impounded surface waters to improve water quality and sustain aquatic life throughout the stream reach.

The stream recharge is from runoff not groundwater recharge, as sometimes alluded to by the author in the text. The 102 reservoirs are holding back large volumes of water, 27,110.4 ac-ft for normal pool stages and 41,913.4 acre-feet at emergency pool stage, if released in a concerted low flow. It has been explained to the CWC previously that more than 60% of these watersheds are already in retention mode, holding back vital water recharge important to the health of these streams and will continue to get worse if this is allowed to persist with Kansas aggressive impoundment building. Mr. Hoke in his reply letter July 21, 2010 acknowledges that quantity is a factor but further states that this is not in the purview of this TMDL. Yet in another section of this same TMDL response letter, this agency is quick to justify sediment oxygen demand (SOD) which we feel is similar, a part of the DO but not a separate parameter.

EPA DOCUMENT NUMBER: EPA-823-B-97-002

DATE: March 1997

"Technical Guidance Manual for Performing Wasteload Allocations, Book II: Streams and Rivers
-Part 1: Biochemical Oxygen Demand/Dissolved Oxygen and Nutrients / Eutrophication"

<http://www.epa.gov/waterscience/standards/tmdl/guidance.pdf>

RE: Comments Regarding Revised Draft Marmaton River Total Maximum Daily Load or TMDL for Vernon and Barton Counties (Cont'd)

“2.3.4.4 Sediment Oxygen Demand

Benthic decomposition of organic material is defined as the stabilization of the volatile suspended solids that have settled to the streambed. These deposits are stabilized by the biological activity of many different organisms including bacteria. As these organic materials are associated with suspended solids, the discharge of settleable waste components may form a sludge blanket below a wastewater outfall. After a period of time, organic materials may accumulate, since the deposition rate of particulate material is greater than the decomposition and physical loss rate.

Although these processes are distinct, they are typically quantified together because in situ measurements combine oxygen uptake and separation of the processes would result in added model complexity. Because of its complexity, it is difficult to estimate SOD analytically and independently.

Such a framework explains some, but not all, of the processes associated with SOD and is still being tested.”

Comment #2: Revised Draft Report *Section 3.2.3 Onsite Wastewater Treatment Systems:* The paragraph states that the density of rural OWTS is 2,815 in Missouri with 2.5 per system. The number of systems is based upon inaccurate data considering that some of these systems are rural subdivisions with a single package treatment system, not on individual OWTS. Two rural subdivisions in close proximity to a municipality are also “hooked” via lift station into the municipality. These two alone account for 76 estimated OWTS in this report. Other rural subdivisions with greater than 5 homes are regulated by MODNR as a point source, not as an individual regulated by MO DHSS.

The very last sentence “*Overall, EPA reports that the statewide failure rate of onsite wastewater systems in Missouri is 30 to 50 percent (EPA 2002)*” quotes an EPA training manual. According to EPA document EPA600/R-00/008, Chapter 1: Section 1.4, page 9, “**Although estimates of system failure rates have been collected from 28 states (Table 1-3) no state has directly measured its own failure rate and definitions of failure vary (Nelson et al., 1999)**”. The 30-50% failure rate is extreme giving the fact that the number of anecdotal failures reported by Vernon and Barton County officials is not supported by data or by the EPA Manual quoted. Thirty complaint requests does not state equivocally that they have failed. This complaint could be anything from a contractor failing to installed properly or other administrative issues. Barton County stated their system failure were leaning towards more commercial businesses which are not individual OWTS, regulated by MO DHSS, rather point source systems regulated by MO DNR.

Throughout this document the author maintains there is groundwater pollution from failing systems. How is that so when the subsoil is slow to very slow permeability with very minimal area of bedrock exposure? Review of the reference document (Table 1-3) used, generalizes the area of potential pollution is from “**backup, surface or groundwater pollution**” for the entire state. Soils and geology of the watershed precludes the particular chance for groundwater pollution. Recommend this assumption be removed or modified to accurately depict the watershed conditions.

Comment #3: Reference Page 12, paragraph 3, author indicates that three (3) WWTPs and a Bio-diesel Processing Plant (Prairie Pride) have a combined designed wastewater discharge flow of 0.325 MGD but **Table 3** shows facility ID Number MO-0134139 at designed wastewater discharge flow of 1.578 MGD. Why is there such a variation between these two design flows?

RE: Comments Regarding Revised Draft Marmaton River Total Maximum Daily Load or TMDL for Vernon and Barton Counties (Cont'd)

Sincerely,



Danny Hahn, President
Citizens Watershed Committee
Watershed Resident Bates County
[816] 297-2747



Kennon Shaw, Commissioner
Southern Vernon County
Citizens Watershed Committee
[417] 448-2502



Randy W. Pike, Vice-President
Citizens Watershed Committee
Commissioner, Northern Bates County
[660] 679-8626



Bonnie McCord, Presiding Commissioner
Vernon County Commission
[417] 448-2505

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Kip A. Stetzler, Acting Director

www.dnr.mo.gov

September 21, 2010

Mr. Danny Hahn, President
Citizens Watershed Committee
Route 2, Box 415
Adrian, MO 64720

RE: Response to Comments on the Draft Marmaton River Total Maximum Daily Load

Dear Mr. Hahn:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by the Citizens Watershed Committee (CWC) for the Marais des Cygnes, Marmaton and Little Osage River Watersheds on the draft Marmaton River Total Maximum Daily Load (TMDL). This letter responds to comments received from the CWC on August 17, 2010 during the second public notice period for this TMDL. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

***Comment #1:** The CWC has stated during a previous review of the first Draft TMDL that a critical parameter, water quantity is not addressed which has a direct impact on the streams DO, temperature and aquatic life. The CWC upon review of this Revised Draft TMDL strongly believes that this critical parameter, water quantity has to be addressed regardless of the differences between the two states water laws in order to protect the integrity of the water quality and aquatic life without undue burden any entity. These two states need to arrive at a common purpose for the natural resources of this watershed. The CWC and its partners strongly urge USEPA, US Army COE, MO Department of Conservation and MO Department of Natural Resources jointly develop and implement with Kansas natural resource agencies a policy that would augment stream water flow from impounded surface waters to improve water quality and sustain aquatic life throughout the stream reach.*

The stream recharge is from runoff not groundwater recharge, as sometimes alluded to by the author in the text. The 102 reservoirs are holding back large volumes of water, 27,110.4 ac-ft for normal pool stages and 41,913.4 acre-feet at emergency pool stage, if released in a concerted low flow. It has been explained to the CWC previously that more than 60% of these watersheds are already in retention mode, holding back vital water recharge important to the health of these streams and will continue to get worse if this is allowed to persist with Kansas aggressive impoundment building. Mr. Hoke in his reply letter July 21, 2010 acknowledges that quantity is a factor but further states that this is not in the purview of this TMDL. Yet in another section of this same TMDL response letter, this agency is quick to justify sediment oxygen demand (SOD) which we feel is similar, a part of the DO but not a separate parameter.

The Department notes that water quantity, in terms of stream flow, is addressed as a contributing factor associated with low dissolved oxygen at several points in the TMDL. In fact, low stream flow is considered within the TMDL to be the critical condition contributing to the formation of low dissolved oxygen conditions. This factor is taken into consideration in the development of the water quality model used to set pollutant loads. However, as noted in the Department's response to the CWC's April 2, 2010 comment letter, low flow conditions do not as such represent a pollutant and, as a result, flow is not a target of this TMDL. Additional language has been added to the first paragraph of Section 5.3 to address this point. Because low flow is not a pollutant, potential factors that may affect flow, such as the construction of surface water impoundments, are not outlined in the source assessment of the TMDL (Section 3). However, to provide additional information, language has been added to Section 2.4 of the TMDL that details land area in the watershed regulated by impoundments. Language has also been added to Section 12.2 of the TMDL to address low flow as an issue that may warrant attention during TMDL implementation.

Comment #2 (Sec. 2.1, Para. 3): Revised Draft Report Section 3.2.3 Onsite Wastewater Treatment Systems. The paragraph states that the density of rural OWTS is 2,815 in Missouri with 2.5 per system. The number of systems is based upon inaccurate data considering that some of these systems are rural subdivisions with a single package treatment system, not on individual OWTS. Two rural subdivisions in close proximity to a municipality are also "hooked" via lift station into the municipality. These two alone account for 76 estimated OWTS in this report. Other rural subdivisions with greater than 5 homes are regulated by MODNR as a point source, not as an individual regulated by MO DHSS.

As noted in the second paragraph of Section 3.2.3 of the TMDL, the exact number of onsite wastewater treatment systems in the Marmaton River watershed is unknown. The number of these systems estimated to be in the watershed is just that – an estimate. However, to be as accurate as possible, the estimated number is based upon the best information and data readily available to the Department. In any case, the estimated value is intended for informational purposes only and is not used as a modeling parameter or to set pollutant load allocations.

The very last sentence "Overall, EPA reports that the statewide failure rate of onsite wastewater systems in Missouri is 30 to 50 percent (EPA 2002)" quotes an EPA training manual. According to EPA document EPA600/R-00/008, Chapter 1: Section 1.4, page 9, "Although estimates of system failure rates have been collected from 28 states (Table 1-3) no state has directly measured its own failure rate and definitions of failure vary (Nelson et al., 1999)". The 30-50% failure rate is extreme giving the fact that the number of anecdotal failures reported by Vernon and Barton County officials is not supported by data or by the EPA Manual quoted. Thirty complaint requests does not state unequivocally that they have failed. This complaint could be anything from a contractor failing to installed properly or other administrative issues. Barton County stated their system failure were leaning towards more commercial businesses which are not individual OWTS, regulated by MO DHSS, rather point source systems regulated by MO DNR.

The Department acknowledges that the estimated failure rate of 30 to 50 percent is a general number. It is also true that EPA document EPA 600/R-00/008¹ does indicate that no state has directly measured its own failure rate and that definitions of failure vary from state to state. However, although definitions of failure may vary, Table 1-3 of this document does specify the definition of failure used by each state in estimating their failure rates (Missouri's definition being "Backup, surface or ground water contamination"). In addition, the statement in the EPA document following the one quoted above indicates that "Most available data are the result of incidents that directly affect public health or are obtained from homeowners' applications for permits to replace or repair failing systems". This would appear to suggest that, if anything, 30 to 50 percent is a low estimate. The next paragraph in this document states, "Because ground and surface water contamination by onsite systems has rarely been confirmed through targeted monitoring, total failure rates and onsite system impacts over time are likely to be significantly higher than historical statistics indicate". In fact, it is estimated on page 52 of the "Marais des Cygnes, Marmaton and Little Osage River Watershed Management Action Plan" that approximately 70 percent of onsite wastewater treatment systems in the state are functioning improperly. Regardless of the exact number of failing or poorly functioning onsite systems, the purpose of the discussion in Section 3.2.3 of the TMDL is simply to present information identifying failing onsite wastewater treatment systems as one possible source of pollutants, among others, within the watershed.

Also, as noted in the Department's July 21, 2010 response to the CWC's previous comment letter, several county health department inspectors from across the state (including in the area of the Marmaton River watershed) have indicated that they believe the number of complaints they receive regarding onsite wastewater treatment systems represents a very small proportion of the actual number of failing systems. The Department therefore believes that it is inaccurate to assume that the number of complaints reported by the Vernon County Health Department represents the maximum number of failing systems there could potentially be in the county.

Throughout this document the author maintains there is groundwater pollution from failing systems. How is that so when the subsoil is slow to very slow permeability with very minimal area of bedrock exposure? Review of the reference document (Table 1-3) used, generalizes the area of potential pollution is from "backup, surface or groundwater pollution" for the entire state. Soils and geology of the watershed precludes the particular chance for groundwater pollution. Recommend this assumption be removed or modified to accurately depict the watershed conditions.

The TMDL contains one reference, in Section 3.2.3, to failing septic systems potentially impacting nearby streams through "groundwater flows". This has been corrected to read "subsurface flow". The Department appreciates the CWC for identifying this error.

Comment #3: *Reference Page 12, paragraph 3, author indicates that three (3) WWTPs and a Bio-diesel Processing Plant (Prairie Pride) have a combined designed wastewater discharge flow of 0.325 MGD but Table 3 shows facility ID Number MO-0134139 at designed wastewater discharge flow of 1.578 MGD. Why is there such a variation between these two design flows?*

¹ EPA (U.S. Environmental Protection Agency). 2002. Onsite Wastewater Treatment System Manual. EPA/625/R-00/008. U.S. Environmental Protection Agency, Office of Water, Washington, DC, and Office of Research and Development, Cincinnati, OH.

Mr. Danny Hahn
Page Four

The paragraph in question attributes the 0.325 MGD flow as non-storm water discharge. The Prairie Pride biodiesel plant has a total design flow of 1.578 MGD, but only 0.07488 MGD of that flow is attributed to non-storm water discharge. This flow, combined with the discharges from the Bronaugh, Liberal, and Rolling Meadows subdivision wastewater treatment plants, adds up to 0.325 MGD. Table 3 and paragraph 3 of page 12 in the TMDL have been updated for clarification.

Thank you again for your comments and participation in the TMDL process. If you should have questions or would like to discuss this TMDL further, please feel free to contact me at (573) 526-1446, by e-mail at john.hoke@dnr.mo.gov or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM



John Hoke, Chief
TMDL Unit
Watershed Protection Section

JH/lsm

July 7, 2010

Mr. John Hoke
Missouri Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
P.O. Box 176
Jefferson City, MO 65102

Subject: Pre-Public Notice Comments on the Draft Marmaton River Total Maximum Daily Load Report

Dear Mr. Hoke:

On behalf of the City of Nevada ('City') and Allgeier Martin Consulting Engineers, Geosyntec Consultants (Geosyntec) appreciates the opportunity to address the draft Marmaton River Total Maximum Daily Load (TMDL) report during this pre-public comment review period. As previously discussed, the TMDL has significant and potentially costly implications for the City's wastewater treatment facility (WWTF). Therefore, it is in the City's best interest that the TMDL be technically feasible and based on sound science and reasoning. To this end, the City greatly appreciates the Department's efforts to date in addressing concerns expressed in our previous comment letter and meeting.

The City is particularly supportive of developing the Little Drywood Creek TMDL at a later time separate from the Marmaton River TMDL. Postponing development of the Little Drywood Creek TMDL will allow more time for development of an appropriate site-specific dissolved oxygen (DO) criterion. Additionally, the City had significant concerns with the Little Drywood Creek water quality model used to develop the previous draft wasteload allocation. Postponing development of the Little Drywood Creek TMDL allows for use of a more reasonable 5-day carbonaceous biochemical oxygen demand (CBOD₅) wasteload allocation (i.e., 7.75 mg/L as opposed to 3.25 mg/L). The City maintains their concerns regarding the water quality model, but, if necessary, will address these at a later time.

The City also supports changes made to Section 12 (Implementation Plans) of the draft TMDL. Changes made to Section 12 address most of the City's concerns regarding the need for a more flexible and adaptive management framework. In particular, the City appreciates the additional emphasis placed on developing appropriate site-specific criteria. The City also appreciates the

John Hoke
July 7, 2010
Page 2

approach for phasing in nutrient limits, but nevertheless maintains that the Department has not provided adequate justification for nutrient limits.

Additionally, the City is supportive of most all other changes made to the draft TMDL. Some of these changes include relabeling BOD₅ as CBOD₅ and moving the instream monitoring requirements to Section 12 (Implementation Plans). These, along with several other minor revisions made in response to our comment letter, help provide for needed clarity and flexibility.

Again, the City appreciates the Department's efforts in developing the Marmaton TMDL. In general, the City is supportive of most changes made to the draft TMDL document. The City is not providing comments on the technical merits of the water quality model at this time, but may do so during the official public comment period. Additionally, the City still has concerns regarding the potential for nutrient limits and the pending Little Drywood Creek TMDL. Furthermore, the City maintains there is a need for alternative DO criteria and/or designated uses in Little Drywood Creek and Marmaton River. Please let us know of any questions or additional information you may need and thanks again for your continued efforts and cooperation.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Wallace".

Tom Wallace
Senior Project Manager

cc: JD Kehrmann, City of Nevada
Chris Erisman, P.E., Allgeier Martin Consulting Engineers
Dean Willis, P.E., Allgeier Martin Consulting Engineers

August 12, 2010

Mr. John Hoke
Missouri Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
P.O. Box 176
Jefferson City, MO 65102

**Subject: Public Notice Comments on the Second Draft Marmaton River Total
Maximum Daily Load Report**

Dear Mr. Hoke:

On behalf of the City of Nevada ('City') and Allgeier Martin Consulting Engineers, Geosyntec Consultants (Geosyntec) appreciates this opportunity to comment on the second draft of the Marmaton River Total Maximum Daily Load (TMDL). We note that the Missouri Department of Natural Resources ('Department') has already made several positive modifications to the first draft TMDL. The City is particularly supportive of the Department's decision to address Little Drywood Creek at a later date in a separate TMDL. However, the City has new concerns regarding the water quality model developed in support of the revised TMDL, which are addressed below.

A review of the TMDL project files suggests the Department used the incorrect water quality model for deriving the 5-day carbonaceous biochemical oxygen demand (CBOD₅) wasteload allocation (WLA) for the Nevada Wastewater Treatment Facility (WWTF). Apparently, there are two QUAL2K water quality models for Little Drywood Creek in the Department's files. The first model (MarQ2KW-Alloc0909-LDC-Final.xls) appears to have been developed in October 2009 and includes the current draft TMDL CBOD₅ WLA recommendation of 7.75 mg/L (henceforth referred to as the 'October model'). The second model (LDC2.9-AllocR4.xls) appears to have been developed in November 2009 and was calibrated to data collected in Little Drywood Creek on August 27, 2008 (henceforth referred to as the 'November model'). The calibrated rates and velocities in the November model differ from the uncalibrated October model. Therefore, the City requests the Department utilize the calibrated November QUAL2K model to derive the WLA that will result in an instream CBOD₅ concentration of 2.0 mg/L at the Marmaton River confluence.

Although the City is recommending the Department utilize the calibrated November QUAL2K model for the Marmaton TMDL, the City is not necessarily supportive of this model or its use for developing the Little Drywood Creek TMDL at a later date. The City maintains the same concerns regarding the water quality model expressed in its first comment letter dated April 2, 2010. Primarily, the water quality model is unverified and the Little Drywood Creek dissolved oxygen (DO) criterion of 5 mg/L appears to be inappropriate. However, for purposes of the Marmaton TMDL, the Little Drywood Creek model is not being used to develop a CBOD₅ WLA protective of the DO criterion. Rather, it is being used to develop a CBOD₅ WLA that results in a CBOD₅ concentration of 2.0 mg/L at the Marmaton River confluence. Therefore, the City is more inclined to accept the results of the calibrated November QUAL2K model due to its limited purpose.

Additionally, the City has concerns regarding the hydraulic characterization of Little Drywood Creek in both (i.e., the October and November) QUAL2K models. Flow-depth and flow-velocity power functions utilized in the October model were based on USGS gage data in the Marmaton River, which is inappropriate for characterizing Little Drywood Creek. Flow-depth and flow-velocity power functions utilized in the November model are based on a single flow measurement made in Little Drywood Creek. It is unclear how a single flow measurement is translated into a power function. In either case, the methodologies appear inadequate and the predicted velocities are likely unrealistically high. Note that the October and November models indicate instream velocities of 0.6 and 0.14 feet per second (fps), respectively; whereas the predictive formula developed by Boning (1974)¹ suggests an instream velocity of 0.08 fps based on the slopes included in the QUAL2K models. The City contends that water quality models developed for a TMDL should be calibrated with a travel time dye study. However, if a travel time study is not an option, the City recommends the Department utilize Boning's (1974) travel time predictive formula or at least the flow-velocity power function utilized in the November model. Although the methodology used to develop the November power function equations is highly questionable, the results most closely match Boning's travel time predictive formula and appear to be based on data from Little Drywood Creek.

Furthermore, the City notes that the October model utilizes the incorrect headwater flow. As noted in the Department's water quality model documentation for the November model (LDCModelReport-1109.doc), the estimated upstream 7Q10 in Little Drywood Creek is 0.57 cubic feet per second (cfs). The October model, which includes the current draft TMDL CBOD₅ WLA recommendation of 7.75 mg/L, inappropriately uses a 7Q10 value of 0.70 cfs for Little

¹ Boning, C.W., 1974, Generalization of stream travel rates and dispersion characteristics from time-of-travel measurements: U.S. Geological Survey Journal of Research, v.2, no.4, p. 495-499.

John Hoke
August 12, 2010
Page 3

Drywood Creek. The City requests the Department model the CBOD₅ WLA with the correct 7Q10 flow of 0.57 cfs.

We greatly appreciate this opportunity to comment on the second draft of the Marmaton River TMDL in addition to the opportunity to comment on the pre-public notice second draft TMDL. As discussed in this comment letter, the City has new concerns that the recommended CBOD₅ WLA developed for the Nevada WWTF appears to be based on the wrong model for Little Drywood Creek. The City recommends the Department recalculate the appropriate CBOD₅ WLA based on the calibrated model rates found in the November model (LDC2.9-AllocR4.xls). Reach average velocities in the November model are likely much more realistic and should yield a higher CBOD₅ WLA.

Please let us know of any questions or additional information you may need and thanks again for your availability to address the City's comments and concerns regarding the draft TMDL.

Sincerely,

A handwritten signature in black ink that reads "Tom Wallace". The signature is cursive and somewhat stylized.

Tom Wallace
Senior Project Manager

cc: JD Kehrmann, City of Nevada
Chris Erisman, P.E., Allgeier Martin Consulting Engineers
Dean Willis, P.E., Allgeier Martin Consulting Engineers



STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Jeremiah W. (Jay) Nixon, Governor • Kip A. Stetzler, Acting Director

www.dnr.mo.gov

September 21, 2010

Mr. Tom Wallace
Geosyntec Consultants
1123 Wilkes Boulevard, Suite 400
Columbia, MO 65201

RE: Response to Comments on the Draft Marmaton River Total Maximum Daily Load

Dear Mr. Wallace:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by Geosyntec Consultants (Geosyntec) on behalf of the City of Nevada and Allgeier Martin Consulting Engineers on the draft Marmaton River Total Maximum Daily Load (TMDL). This letter responds to comments received from Geosyntec on August 12, 2010 during the second public notice period for this TMDL. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

Comment #1: *A review of the TMDL project files suggests the Department used the incorrect water quality model for deriving the 5-day carbonaceous biochemical oxygen demand (CBOD₅) wasteload allocation (WLA) for the Nevada Wastewater Treatment Facility (WWTF). Apparently, there are two QUAL2K water quality models for Little Drywood Creek in the Department's files. The first model (MarQ2KW-Alloc0909-LDC-Final.xls) appears to have been developed in October 2009 and includes the current draft TMDL CBOD₅ WLA recommendation of 7.75 mg/L (henceforth referred to as the 'October model'). The second model (LDC2.9-AllocR4.xls) appears to have been developed in November 2009 and was calibrated to data collected in Little Drywood Creek on August 27, 2008 (henceforth referred to as the 'November model'). The calibrated rates and velocities in the November model differ from the uncalibrated October model. Therefore, the City requests the Department utilize the calibrated November QUAL2K model to derive the WLA that will result in an instream CBOD₅ concentration of 2.0 mg/L at the Marmaton River confluence.*

The Department notes that the October model for the Marmaton River is calibrated. While the model is not calibrated for Little Drywood Creek per se, it is calibrated for the Marmaton River using data from that water body. This is appropriate because the goal of the TMDL is to establish load and wasteload allocations that will be protective of the dissolved oxygen minimum criterion of 5 mg/L in the Marmaton River.

Comment #2: *Although the City is recommending the Department utilize the calibrated November QUAL2K model for the Marmaton TMDL, the City is not necessarily supportive of this model or its use for developing the Little Drywood Creek TMDL at a later date. The City maintains the same concerns regarding the water quality model expressed in its first comment letter dated April 2, 2010. Primarily, the water quality model is unverified and the Little Drywood Creek dissolved oxygen (DO) criterion of 5 mg/L appears to be inappropriate. However, for purposes of the Marmaton TMDL, the*

Little Drywood Creek model is not being used to develop a CBOD₅ WLA protective of the DO criterion. Rather, it is being used to develop a CBOD₅ WLA that results in a CBOD₅ concentration of 2.0 mg/L at the Marmaton River confluence. Therefore, the City is more inclined to accept the results of the calibrated November QUAL2K model due to its limited purpose.

The Department notes the City of Nevada maintains concerns regarding the water quality model, as expressed during both the first and second public comment periods. However, the Department maintains the QUAL2K model used for the Marmaton River TMDL is appropriate and refers the City to responses provided following the first public comment period for further explanation.

As noted correctly in the comment above, the water quality model for the Marmaton River TMDL results in a CBOD₅ concentration in Little Drywood Creek of 2.0 mg/L at the confluence with the Marmaton River. Although Little Drywood Creek must still meet water quality standards and remains on the 303(d) List of impaired waters, modeling efforts in support of the Marmaton River TMDL need not demonstrate compliance with water quality standards within Little Drywood Creek. Protection of water quality standards within Little Drywood Creek will be addressed through the terms and conditions contained within the Nevada WWTP operating permit and any future TMDL developed for the water body.

Comment #3: *Additionally, the City has concerns regarding the hydraulic characterization of Little Drywood Creek in both (i.e., the October and November) QUAL2K models. Flow-depth and flow-velocity power functions utilized in the October model were based on USGS gage data in the Marmaton River, which is inappropriate for characterizing Little Drywood Creek. Flow-depth and flow-velocity power functions utilized in the November model are based on a single flow measurement made in Little Drywood Creek. It is unclear how a single flow measurement is translated into a power function. In either case, the methodologies appear inadequate and the predicted velocities are likely unrealistically high. Note that the October and November models indicate instream velocities of 0.6 and 0.14 feet per second (fps), respectively; whereas the predictive formula developed by Boning (1974) suggests an instream velocity of 0.08 fps based on the slopes included in the QUAL2K models. The City contends that water quality models developed for a TMDL should be calibrated with a travel time dye study. However, if a travel time study is not an option, the City recommends the Department utilize Boning's (1974) travel time predictive formula or at least the flow-velocity power function utilized in the November model. Although the methodology used to develop the November power function equations is highly questionable, the results most closely match Boning's travel time predictive formula and appear to be based on data from Little Drywood Creek.*

The Marmaton River is a TMDL Consent Decree¹ water and must have a TMDL completed and approved by December 31, 2010. Due to time constraints associated with the Consent Decree, conducting a travel time dye study on Little Drywood Creek was not an option at this time. Also, because of a number of uncertainties in accurately applying Boning's travel time predictive formula to Little Drywood Creek, that method was not used. Instead, an instream velocity of 0.6 fps was estimated for Little Drywood Creek based on the proportion of lateral inflow using a mass balance approach. This value was developed using hourly flow data from the USGS gages on the Marmaton River near Richards and Nevada, Mo. The Department considers this to be a reasonable approach, and it is one that is supported by EPA.

¹ Consent Decree refers to the 2001 Consent Decree entered in the case of American Canoe Association, et al. v. Carol M. Browner, et al., No. 98-1195-CV-W in consolidation with No. 98-4282-CV-W, February 27, 2001.

Mr. Tom Wallace
Page Three

In regard to the City's recommendation that an alternate instream velocity be used (0.14 fps), the Department notes that using lower instream velocities in the QUAL2K model would result in lower decay rates and lower reaeration rates. Reductions in these parameters would ultimately result in lower CBOD₅ wasteload allocations for the Nevada WWTP.

Comment #4: Furthermore, the City notes that the October model utilizes the incorrect headwater flow. As noted in the Department's water quality model documentation for the November model (LDCModelReport-1109.doc), the estimated upstream 7Q10 in Little Drywood Creek is 0.57 cubic feet per second (cfs). The October model, which includes the current draft TMDL CBOD₅ WLA recommendation of 7.75 mg/L, inappropriately uses a 7Q10 value of 0.70 cfs for Little Drywood Creek. The City requests the Department model the CBOD₅ WLA with the correct 7Q10 flow of 0.57 cfs.

Both 7Q10 values were estimated based on USGS flow data from gages near Ft. Scott, Kansas and Nevada, Mo. using the Statistical Software Package developed by the U.S. Army Corps of Engineers' Hydrologic Engineering Center (HEC-SSP). From the two values, a power curve was fitted using the drainage areas of the gages. The 0.7 cfs 7Q10 value was obtained from the difference of the predicted 7Q10 flow at the confluence of Little Drywood Creek with the Marmaton River, including the Little Drywood Creek drainage area, and the predicted 7Q10 at the confluence excluding the Little Drywood Creek area. The 0.57 cfs 7Q10 value was obtained by determining the difference in 7Q10s at the upstream/downstream boundaries of the Marmaton River model and expressing this as per square mile of drainage area. Using the drainage area of Little Drywood Creek, the 7Q10 for Little Drywood Creek at the confluence was estimated. Both of these methods of calculating 7Q10 are acceptable and supported by EPA. The Department will continue to use the 7Q10 value of 0.7 cfs used in the October model and in the current draft of the TMDL. The Department notes that using the lower 7Q10 value (0.57 cfs) would likely result in a lower CBOD₅ wasteload allocation than the current recommendation of 7.75 mg/L.

Thank you again for your comments and participation in the TMDL process. If you should have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446, john.hoke@dnr.mo.gov or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM



John Hoke, Chief
TMDL Unit
Watershed Protection Section

JH/lsm

c: J.D. Kehrmann, City Manager, City of Nevada
(110 South Ash, Nevada, MO 64772)

Hoke, John

From: Bob Bacon [bob@erc-env.org]
Sent: Friday, August 20, 2010 4:06 PM
To: Hoke, John
Subject: TMDL for the Marmaton River

Hi John,

I was just reading through your Draft TMDL for the Marmaton River since this watershed includes one of our EWRAP streams. I noticed that the Little Drywood Creek data from our project has been included as part of this TMDL, which is great. However, I also noticed that you included the 2008 data collected by DNR at LDC2 and LDC5, which had some problems. This data was generated with the early generation Eureka sondes, which has some significant calibration issues. These sondes positively biased the data at low DO concentrations. I have statistically corrected and validated this data so that we could use it in our 2008 Regional DO Report (almost complete). In addition to the 2008 DNR data I also have validated data for LDC1, LDC2 and LDC3 (using YSI sondes including extended deployment). This correction and additional data might not be important or affect your modeling efforts. Since I don't fully understand the QUAL2k model and how the LDC data might affect the results, I thought I better share this information with you ASAP. I will send you the 18+ MB 2008 EWRAP validated data file via DropSend today. I would have released this data to you sooner, but I have had a lot of irons in the fire this past year.

Also, note EWRAP was an ERC project and that MEC was our contractor. Thus, the EWRAP data is ERC data and not our contractor's data. A lot of folk get this confused since we are such a small shop and since we work together on several of the same projects.

Thanks a lot and have a great weekend.

Bob Bacon, Director of Aquatic Services
bob@erc-env.org

Environmental Resources Coalition (ERC)
3118 Emerald Lane, Suite 110
Jefferson City, Missouri 65109
(573) 634-7078 (office)
(573) 619-1366 (cell phone)
(573) 634-7829 (fax)
www.erc-env.org

Whipps, Bill

From: Hoke, John
Sent: Thursday, September 23, 2010 10:15 AM
To: 'Bob Bacon'
Cc: Whipps, Bill
Subject: RE: TMDL for the Marmaton River

Bob,

The Department appreciates the data and information provided by ERC through the EWRAP project. To better reflect the source of these data in the draft Marmaton River TMDL, Table 2 of the document has been revised based on your comment. The table now attributes the data to ERC and references MEC Water Resources as the data collector.

In response to your comment/question below, the dissolved oxygen data used in the modeling for the draft Marmaton River TMDL was obtained from grab samples and not the sonde data collected for the EWRAP project. Because the sonde data were not used, the modeling results were not affected and no data correction was necessary. We do, however, appreciate ERC bringing this issue to our attention.

Thank you again for your interest and involvement in the TMDL process. If you should have questions or would like to discuss this TMDL further, please let me know.

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

From: Bob Bacon [mailto:bob@erc-env.org]
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To: Hoke, John
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9/23/2010

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Bob Bacon, Director of Aquatic Services

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