Memorandum

To: *TMDL Development Team*

From: *Dan Bounds, Kim Siemens*

Date: *July 19, 2016*

Subject: *Decision Memorandum – Milwaukee River Basin TMDL Development*

The purpose of this memorandum is to document direction and decisions made by the TMDL Development Team for the Milwaukee River, Kinnickinnic River, Menomonee River, and Milwaukee Harbor Estuary TMDLs. The meeting date when decisions were made is provided. This decision document has been revised as direction or decisions were made or changed.

TMDL Reaches

- Allocations will be established for all "major" streams regardless of whether they are 303(d) listed. The 303(d) list of impaired waters starts the TMDL process but does not define the scope of it. A reach may not have been sampled enough to meet the requirements for listing, but the reach may still be impaired. All reaches contribute load downstream and all reaches need to meet water quality standards. *[5/29/2012 TMDL Development Team meeting]*

- TMDL reaches will be composed of several WQI model reaches to increase flexibility for implementation. The WQI model reaches will be unchanged to maintain the current model structure. Flow will be defined by the most downstream WQI model reach and loads will be totaled for the WQI model subbasins tributary to the TMDL reach. Reaches are combined based on 303(d) list extents, locations of water quality standard changes, point source locations, and major flow changes. *[9/25/2012 TMDL Development Team meeting]*

- None of the lakes in the Milwaukee River Basin are listed as impaired for the TMDL parameters. To maintain the established TMDL reaches, allocations are not separately calculated for the lakes. If further evaluation of lake water quality is warranted, WDNR will perform a lake management plan for the area directly draining to the lake. *[1/27/2015 TMDL Development Team meeting]*

Baseline Loads

- <u>Background loads</u>: Baseline background loads will be estimated from the forest and wetland land covers in the Water Quality Initiative (WQI) models. *[1/12/2012 TMDL Development Team meeting]*

- Agricultural loads: Baseline agricultural loads will be calculated from the general cropland land cover and the pasture land cover in the WQI models. *[1/12/2012 TMDL Development Team meeting]*

- Point source loads:

  - If a point source is covered by a WPDES permit with specified limits, the baseline flow and load will be set at the permit limits. If no permit limit exists, actual measured data will be used to determine the baseline flow and load. To be represented at the same performance standard, all POTW baseline total phosphorus (TP) loads will be based upon a 1.0 mg/L effluent concentration limit unless the permit limit is currently less than 1.0 mg/L. *[1/12/2012 TMDL Development Team meeting, 2/5/2013 TMDL Development Team meeting]*

  - Dischargers that do not have permit limits for TP, TSS, or bacteria must still receive a wasteload allocation (WLA) for that pollutant if that pollutant is present in the discharge. For example, non-contact cooling water (NCCW) discharges are covered by a general permit without an explicit limit. *[2/8/2012 TMDL Development Team meeting]*

  - Non-contact cooling water (NCCW) discharges are covered by a general permit without an explicit limit, though many discharges include phosphorus. Baseline TP loads for these sources will be based on available concentration data from WDNR or an assumed municipal residual concentration, where applicable. For dischargers using City of Milwaukee water, a TP concentration of 0.515 mg/L will be used based on discussions with Milwaukee Water Works. *[2/8/2012 TMDL Development Team meeting, 2/5/2013 TMDL Development Team call, 10/3/2012 email from Jim Fratrick]*

  - General permitted loads: Baseline loads for non-NCCW general permitted sources in the MS4 area are included in the baseline MS4 load. Baseline loads for non-NCCW general permitted sources outside of the MS4 area are included in the non-permitted urban baseline load.

- MS4 loads:

  - Baseline MS4 loads will be estimated from the non-background and non-agricultural land covers in the WQI models. The MS4 portion of the load from these land covers will be determined based on the proportion of TMDL subbasin area that lies within a permitted municipal boundary. *[9/25/2012 TMDL Development Team meeting]*

  - The Combined Sewer Service Area will not be considered part of the MS4 area because runoff within this area does not discharge to a surface water, but instead is treated at Jones Island. *[9/25/2012 TMDL Development Team meeting]*

– The "trapping factors" in the future condition WQI model will be reset to reflect the level of TSS reduction required by current regulations. Each municipality will be given a wasteload allocation for each reach to which they discharge. *[2/20/2012 TMDL Development Team call]*

– Trapping factors for the portion of the Lake Michigan Direct Drainage Area that discharges to the estuary will not be adjusted because this area is a small percentage of the total drainage area. The nonpoint source loads delivered to the storm sewer system from the Lake Michigan Direct Drainage Area will be unchanged from the WQI models. *[2/12/2013 TMDL Development Team call]*

■ Non-Permitted Urban (NPU) loads: Baseline loads for NPU areas will be calculated from the non-background and non-agricultural land covers based on the proportion of the TMDL subbasin area that is outside of a permitted MS4 municipal boundary. *[2/19/2013 TMDL Development Team meeting]*

■ WisDOT loads: WisDOT does not currently have a WPDES permit, but has a memorandum of understanding (MOU) with WDNR and is considered to be regulated through the MOU. Mapping of WisDOT areas within the study area was not completed as of 4/2/2013 so the WisDOT allowable load will be considered to be within the allowable load for each MS4 that WisDOT lies within. *[11/27/2012 and 4/2/2013 TMDL Development Team calls]*

■ Milwaukee County loads: Similar to WisDOT, Milwaukee County loads will be considered to be within the allowable load for each MS4 that Milwaukee County land lies within. *[11/27/2012 TMDL Development Team call]*

■ CAFO loads: Baseline CAFO loads will be set to zero as discharges are not permitted. Land spreading loads are included in the nonpoint source loads. *[1/12/2012 TMDL Development Team meeting]*

■ SSO loads: Baseline SSO loads will be set to zero, as SSOs are not permitted. Flows and loads for SSOs represented in the WQI models are set to zero. *[1/12/2012 TMDL Development Team meeting]*

■ CSO loads: Existing CSO permits allow up to six CSO discharges per year. MMSD has achieved an average of only three CSOs per year and has complied with all requirements for implementation of a Long-Term Control Plan, as required by the U.S. Environmental Protection Agency. In response to these conditions, the TMDL does not calculate baseline CSO loads or establish CSO allocations. For this study, CSO wasteload allocations for all three pollutants will be set at zero. The allocation of zero is not intended to translate into an immediate requirement for zero discharge, but rather, continued compliance with the

approved MMSD Long-Term CSO Control Plan and WPDES permits, which are ultimately aimed at long-term goals for CSO abatement. *[6/12/2012 TMDL Development Team call]*

Allowable Loads (TMDLs) and Allocations

■ A Reserve Capacity (RC) will be included in all four TMDLs to account for future discharges and other sources not defined through TMDL development. *[2/8/2012 TMDL Development Team meeting]*

  – The RC will be set at 5% of the controllable portion of the total allowable load for each reach for TSS and TP parameters. An RC will not be established for the bacteria TMDLs. *[1/29/2013 TMDL Development Team call]*

■ Margin of Safety (MOS) – The MOS will be considered implicit in the calibration of the models and conservativeness built into the allocation calculations. *[2/5/2013 TMDL Development Team call]*

■ The contribution of flow from the TMDL reach subbasin (referred to as the "incremental reach flow") will be used to calculate the fecal coliform allowable loads. Further details are provided in the next bullet point regarding seasonal variation and flow conditions. The local reach flow is calculated by taking the modeled WQI streamflow for a given TMDL reach and subtracting the modeled WQI streamflows for the upstream TMDL reaches. *[2/26/2016 TMDL Development Team call]*

■ Seasonal variation will be accounted for by calculating allowable loads for various flow conditions:

  – Bacteria TMDLs will be calculated using a load duration curve approach. While the TMDL is defined by the entire load duration curve, allocations will be provided for the 5th, 25th, 50th, 75th, and 95th percentile flow conditions (based on EPA guidance) for the local reach (i.e., incremental flows) calculated from the 10-year (1988-1997, May through September only) WQI modeled flow dataset. *[8/21/2012 and 7/24/2013 TMDL Development Team calls]*

    o For the Milwaukee River watershed, the various percentile flows will be calculated parametrically for each TMDL reach. The load duration curve will be based on the five flow conditions listed above plus flows for the 1st and 99th percentiles. *[7/17/2014 Working Session with WDNR and SEWRPC and 10/14/2014 Development Team call]*

  – TP and TSS TMDLs will be calculated for each calendar month based on the 4th lowest average cumulative flow (streamflow) for that month as calculated from the 10-year (1988-1997) flow dataset from the WQI models. *[3/7/2014 TMDL Development Team call]*.

The allowable load for this total cumulative flow is the allowable load for the entire area upstream of that point. To calculate the allowable load for just the local TMDL subbasin contributing to each reach (an "incremental" allowable load), the allowable load for all upstream reaches is subtracted from the allowable load calculated with the cumulative flows.

- o For the Milwaukee River watershed, the 4th lowest flow will be calculated parametrically as the 33.3bar percentile flow for each TMDL reach and each month. *[7/17/2014 Working Session with WDNR and SEWRPC]*

- TP TMDLs will account for the higher phosphorus criterion (0.100 mg/L) in downstream mainstem reaches by adding a "differential load" to the allowable load calculated for the individual 0.100 mg/L reach. The differential load is the difference between the two criteria applied to the flow contributed by the reaches with the 0.075 mg/L criterion. *[2/26/2016 TMDL Development Team call]*

  - o To optimize equity among the 0.100 mg/L reaches, the differential load will be calculated using the total flow contributed by the 0.075 mg/L reaches and proportioned to the 0.100 mg/L reaches according to each reach's incremental flow contribution. *[3/8/2016 TMDL Development Team call]*

- Bacteria TMDLs will be developed for fecal coliform, which is the current regulatory pathogen indicator organism.

  - Baseline flow and load data used for the bacteria TMDLs and allocations will be compiled from the recreation season period of May through September *[6/26/2012 TMDL Development Team call, 7/11/2012 TMDL Development Team call]*

  - The 10 percent exceedence threshold portion of the water quality standard will be used to calculate allowable fecal coliform loads because it was found to be more restrictive. *[7/11/2012 TMDL Development Team meeting]*

  - For reaches with variance standards under NR104, the non-variance standards will be used to calculate allowable loads because waters downstream of the variance waters are subject to more stringent standards. The most stringent downstream standard generally drives the analysis results and the *E. coli* standards in the Outer Harbor are more stringent than the variance water standards. There are also other variance waters with more stringent downstream standards, for example Indian Creek, Lincoln Creek, and Underwood Creek. *[5/28/2013 Team Memo "Developing TMDL Load Allocations for Bacteria With and Without Variance Water Standards", 5/28/2013 TMDL Development Team call]*

–   The water quality standard for the outer harbor of the estuary is in terms of *E. coli.* To compare modeled concentrations at the assessment points to the water quality standard, the *E. coli* standard will be converted to a fecal coliform concentration using a translator developed by the UWM School of Freshwater Sciences. *[1/12/2012 TMDL Development Team meeting]*

   o   Based on the work performed by the UWM School of Freshwater Sciences, a translator of 0.6 (ratio of *E. coli* to fecal coliform) will be used. *[4/30/2013 TMDL Development Team call]*

■   Allowable TSS loads will be based on a target concentration of 12 mg/L as developed by WDNR. *[8/21/2012 TMDL Development Team call]*

■   Allowable loads to each water segment will be allocated proportionally according to each source's relative baseline load contribution. *[2/8/2012 TMDL Development Team meeting]*

   Allocations will be developed for the following sources:

   –   Background (this will be a set-aside load with no reduction from baseline)
   –   Agricultural
   –   Non-permitted urban areas
   –   Individual permits
   –   General permits – NCCW
   –   General permits – Other (this will be a set-aside load with no reduction from baseline)
   –   MS4s

■   Background loads for the Milwaukee River watershed will be calculated by performing regressions of background load versus incremental reach flow derived from the LSPC model output and then solving for the background load given the incremental 33.3bar percentile flow. *[7/17/2014 Working Session with WDNR and SEWRPC]*

■   General permitted loads: General permitted sources in the MS4 area will be covered by the MS4 allocation. General permitted sources outside of the MS4 area will be covered by a portion of the baseline non-permitted urban load that is set aside with no reduction. Exceptions and specifics are listed below:

   –   Loads from non-NCCW general permitted sources within the MS4 area will be covered by the MS4 WLA. *[5/1/2012 TMDL Development Team call]*

   –   Loads from non-NCCW general permitted sources outside of the MS4 area will be covered by a WLA that is 5% of the non-permitted urban baseline load for TP and TSS. There will be no set-aside for bacteria loads from general permits because bacteria is not expected in general permitted discharges. *[1/8/2013 TMDL Development Team call]*

- o General permitted loads for the Milwaukee River watershed will be calculated by performing regressions of non-permitted urban load versus incremental reach flow derived from the LSPC model output, solving for the non-permitted urban load given the incremental 33.3bar percentile flow, and then calculating 5% of that load. *[7/17/2014 Working Session with WDNR and SEWRPC]*

- Allowable point source loads (individual permits and NCCW) will be allocated to individual dischargers based upon each discharger's portion of the baseline load. *[2/8/2012 TMDL Development Team meeting]*

Resulting Concentrations

- TMDL-based water quality concentrations in the estuary will be evaluated at select assessment point locations that were established for the SEWRPC Regional Water Quality Management Plan Update (RWQMPU). The most downstream assessment point will be at the opening of the breakwall (identified as the assessment point LM-8 in the RWQMPU). *[1/12/2012 TMDL Development Team meeting]* Comparison of modeled concentrations to the TP and TSS water quality targets will be performed on a growing season (May through October) median basis. *[3/12/2013 Development Team call and 3/13/2013 email from Kevin Kirsch]*

TMDL Document

- Discussion of required percent reduction to achieve the TMDL will not be included in the TMDL document, but will be presented in the implementation plan that will be developed for each watershed *[1/12/2012 TMDL Development Team meeting]*. This was later changed as WDNR requested that percent reductions for the MS4, agriculture, and non-permitted urban TP and TSS allocations be provided in the TMDL document for implementation purposes. *[12/6/2013 TMDL Development Team call]*