1**TMDL:** Parsons Creek Watershed, Wisconsin
Date:

DECISION DOCUMENT FOR THE APPROVAL OF THE PARSONS CREEK WATERSHED, WISCONSIN, TMDL

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements for approvable TMDLs. Additional information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation. Use of the term "should" below denotes information that is generally necessary for EPA to determine if a submitted TMDL is approvable. These TMDL review guidelines are not themselves regulations. They are an attempt to summarize and provide guidance regarding currently effective statutory and regulatory requirements relating to TMDLs. Any differences between these guidelines and EPA's TMDL regulations should be resolved in favor of the regulations themselves.

1.Identification of Waterbody, Pollutant of Concern, Pollutant Sources, and Priority Ranking

The TMDL submittal should identify the waterbody as it appears on the State's/Tribe's 303(d) list. The waterbody should be identified/georeferenced using the National Hydrography Dataset (NHD), and the TMDL should clearly identify the pollutant for which the TMDL is being established. In addition, the TMDL should identify the priority ranking of the waterbody and specify the link between the pollutant of concern and the water quality standard (see section 2 below).

The TMDL submittal should include an identification of the point and nonpoint sources of the pollutant of concern, including location of the source(s) and the quantity of the loading, e.g., lbs/per day. The TMDL should provide the identification numbers of the NPDES permits within the waterbody. Where it is possible to separate natural background from nonpoint sources, the TMDL should include a description of the natural background. This information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation.

The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as:

(1) the spatial extent of the watershed in which the impaired waterbody is located;
(2) the assumed distribution of land use in the watershed (e.g., urban, forested, agriculture);
(3) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources;
(4) present and future growth trends, if taken into consideration in preparing the TMDL (e.g., the TMDL could include the design capacity of a wastewater treatment facility); and

(5) an explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments; chlorophyl *a* and phosphorus loadings for excess algae; length of riparian buffer; or number of acres of best management practices.

Comments:
Spatial Extent: The Wisconsin Department of Natural Resources (WDNR) developed TMDLs for total suspended solids (TSS), ammonia, and phosphorus for the Parsons Creek watershed in Fond du Lac County, Wisconsin. By implementing measures to reduce the sediment and nutrient loadings, the TMDLs will address sedimentation, aquatic toxicity, degraded habitat and hydrologic problems in the watershed. Table 1 below identifies the waterbody segment covered by the TMDL submittal as it appears on the Wisconsin 2006 303(d) list. WDNR also determined that additional segments were impaired by phosphorus, ammonia, and sediment, and developed TMDLs for those segments as well (Table 1 below; Table 1 of the TMDL).

Parsons Creek is approximately 4.7 miles long, and flows north into the East Branch of the Fond du Lac River (Page 3 of the TMDL). The East Tributary is 3 miles in length, and flows into Parsons Creek. WDNR initially listed the lower 2.58 miles as impaired on the 2004 303(d) list, but during TMDL development, determined that additional upstream sections of the creek were impaired as well. WDNR designated the Hobb's Wood subwatershed of Parsons Creek as impaired due to sediment and nutrients. This includes two segments, the originally listed Parsons Creek (from 0-2.58 miles) as well as the Parsons Creek segment (from 2.58-3.49 miles) downstream from the junction with the East Tributary (Figure 1 of the TMDL). The upstream portion of Parsons Creek (the Church Road subwatershed, from 3.49-5.68 miles) was listed as impaired due to sediment, as was the East Tributary (from 0.01-1.89 miles). The Parsons Creek watershed has a drainage area of approximately 22 square km.

Distribution of land use: Land use in the Parsons Creek watershed is mainly agricultural, dominated by row cropping (36%), and alfalfa/pasturing (36%). There are also some forested areas (8%) and quarry (8%). In many locations, heavy pasturing and cropping practices adjacent to stream banks are causing sediment runoff to the stream. The upper portion of the creek (Church Road subwatershed) has been tiled and drained for farming. Relatively steep slopes are present, contributing to erosion to the creek (Page 5 of the TMDL). The lower portion of Parsons Creek has been altered as well, although there are portions that contain good habitat. However, upstream water quality has impacted even these reaches (Page 4 of the TMDL). The East Tributary flows near two quarries, which may be impacting the hydrology. Run-off is also an issue in this segment (Page 5 of the TMDL).

Pollutant of concern: The pollutants of concern are TSS, ammonia, and phosphorus.

Pollutant sources: WDNR states that there are two point sources located on or discharging to the watershed (Page 10 of the TMDL). Five quarries are located in the watershed, two of which are permitted under general NPDES permits for process wastewater discharge. These two facilities have TSS limits in the permits, and have been in compliance with the permits. WDNR does not consider these facilities to be significant contributors to the TSS loads (Page 10 of the TMDL). Nonpoint sources identified in the TMDL submittal as contributing to the impairment include streambank erosion and run-off from agricultural activities related to row crop

operations. Livestock operations in the watershed are also likely contributors of nutrients to the waterbodies, as well as run-off from rowcrops.

Surrogate measures: To address the sedimentation and degraded habitat impairments, WDNR determined that sediment (specifically TSS) is the pollutant that must be addressed to attain the designated use. Fine sediment covers the stream substrate and fills in pools, reducing the suitable habitat for fish and macroinvertebrate communities. Filling-in of pools reduces the amount of available cover for juvenile and adult fish. Sedimentation of riffle areas reduces the reproductive success of fish by reducing the exposed gravel substrate necessary for appropriate spawning conditions. Streambank erosion also widens the streams, resulting in reduced cover for fish. Sedimentation also increases turbidity, reducing light penetration necessary for photosynthesis in aquatic plants. Increased turbidity also reduces the feeding efficiency of visual predators and filter feeders, and lowers the respiratory capacity of aquatic invertebrates by clogging their gill surfaces (page 10 of the TMDL).

To address the aquatic toxicity impairments, WDNR determined that phosphorus and ammonia are the pollutants that must be addressed to attain the designated use (Page 11 of the TMDL). Phosphorus enters the stream mainly bound to soil particles that transport it during runoff from overgrazed pastures adjacent to the stream channel. Phosphorus and ammonia can enter the system through nutrient rich manure spread within close proximity (e.g. 30 feet) of the stream, as well as from livestock in the stream. Phosphorus loading in water bodies can cause eutrophication of streams and reservoirs, and is characterized by excessive plant growth, dense algal growth, and higher fluctuations of DO levels due to algal oxygen production during photosynthesis, consumption of oxygen during respiration at night, and bacterial consumption of oxygen in the decaying process of dead algae and plant material. Severe dissolved oxygen fluctuations stress fish and aquatic insects. Depleted dissolved oxygen levels that fall below 6 mg/l are not suitable for the survival of salmonids and other cold water fish species (Page 13 of the TMDL). Ammonia can be toxic to fish and other biota, depending on the pH and temperature.

Priority Ranking: According to Wisconsin's 303(d) list for 2006, the impaired waterbody segment has a high priority ranking.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this first element.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribal water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. (40 C.F.R. §130.7(c)(1)).
EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

The TMDL submittal must identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the

pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical (e.g., chromium) contained in the water quality standard. The TMDL expresses the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorus and the numeric water quality target is expressed as Dissolved Oxygen (DO) criteria). In such cases, the TMDL submittal should explain the linkage between the pollutant of concern and the chosen numeric water quality target.

Comments:
The Problem Statement Section of the TMDL describes designated uses and numeric criteria applicable to this watershed.

Use Designation and Sedimentation Standard: The goal of the Parsons Creek TMDL is to reduce sediment, ammonia, and phosphorus loads to a level sufficient to meet the narrative water quality standard (WQS) and the stream's designated uses. The designated uses applicable to the impaired segments are set forth at Section NR 102.04(3) intro, (a), (b) and (c) of the WAC. The designated uses for the impaired segments are Coldwater (Trout II or Trout III)(Table 1 below; Table 1 and Appendix C of the TMDL).

To meet these designated uses, WDNR identified the narrative standard set forth at Section NR 102.04 (1) intro and (a) of the Wisconsin Administrative Code (WAC) as the applicable standard for excessive sedimentation and phosphorus. This standard states in part, "Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state." WDNR considers sedimentation to be an objectionable deposit, and high nutrient levels as leading to high levels of algal and plant growths.

The WQS for ammonia is found in Appendix D of the TMDL. The WQS is in table format, as pH and fish type determine the maximum level of ammonia.

Targets: To address the sediment load in the waterbodies, WDNR determined that an instream concentration for total suspended solids (TSS) would meet the designated uses. This target was based upon achieving significant reductions during high flow and normal flow conditions , as well as for a median and maximum concentration, as well as research from the United States Geological Survey (Page 16-18 of the TMDL). High flows were determined to be the storm flows, and apply to the upper 5% of flows (Page 17 of the TMDL). WDNR also determined median and maximum daily TSS target concentrations, by using the statistical process discussed in draft EPA guidance "Options for Expressing Daily Loads in TMDLs" (USEPA 2007). The data for TSS shows that exceedences are occurring under high flows (Page 18 of the TMDL).

Sediment 'Normal Flow' Median Target Concentration:	8 mg/L TSS
Sediment 'Normal Flow' Maximum Target Concentration:	28 mg/L TSS
Sediment 'High Flow' Median Target Concentration:	59 mg/L TSS
Sediment 'High Flow' Maximum Target Concentration:	230 mg/L TSS

WDNR determined that a phosphorus concentration of 0.06 mg/l is needed to meet the water quality standard and designated use for waters designated as Coldwater Class I (Page 26 of the TMDL). This target was based upon the total phosphorus (TP) concentrations in other similar streams where the biology was meeting the designated use, as well as research from the United States Geological Survey.

Since ammonia has a numeric criteria, no surrogate was needed. WDNR determined the acute target based upon the highest pH seen in the creek, 8.7. This results in an ammonia target of 1.47 mg/l (Appendix D of the TMDL). WDNR also determined the "average" target and loads based upon the average pH from April-October in Parsons Creek. This target is 2.59 mg/l. This TMDL approval is based upon the acute target.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this second element.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

A TMDL must identify the loading capacity of a waterbody for the applicable pollutant. EPA regulations define loading capacity as the greatest amount of a pollutant that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)).

The pollutant loadings may be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). If the TMDL is expressed in terms other than a daily load, e.g., an annual load, the submittal should explain why it is appropriate to express the TMDL in the unit of measurement chosen. The TMDL submittal should describe the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In many instances, this method will be a water quality model.

The TMDL submittal should contain documentation supporting the TMDL analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling. EPA needs this information to review the loading capacity determination, and load and wasteload allocations, which are required by regulation.

TMDLs must take into account *critical conditions* for steam flow, loading, and water quality parameters as part of the analysis of loading capacity. (40 C.F.R. §130.7(c)(1)). TMDLs should define applicable *critical conditions* and describe their approach to estimating both point and nonpoint source loadings under such *critical conditions*. In particular, the TMDL should discuss the approach used to compute and allocate nonpoint source loadings, e.g., meteorological conditions and land use distribution.

Comments:
Loading capacity:
Ammonia: The loading capacity for ammonia for the two segments of Parsons Creek are found in the table below (Table 5 of the TMDL; Table 2 below). WDNR determined the loading capacity using the simple mass-balance method. WDNR used the highest pH to determine the lowest (most protective) ammonia concentration, then multiplied that by the lowest reasonable

flow to determine the loading capacity Page 12 of the TMDL). WDNR also determine additional loads based upon possible flows in the creek.

Table 2 Ammonia TMDL summary for Parsons Creek (Hobb's Wood subwatershed)

		Load capacity values at varying flows			Wasteload & Load Allocations	
pH	**Acute Max Conc. Limit (NH3-N mg/L)**	**% Flow exceedance (low, med, high flows)**	**Flow (cfs)**	**Max daily load (lb/d)**	**Waste Load Allocation**	**Load Allocation**
8.7 (highest documented pH)	1.47	90%	1.2	**9.51**	0	**9.51**
		50%	2.6	20.60	0	20.60
		10%	5.6	44.37	0	44.37
8.4 (average pH Apr.-Oct.)	2.59	90%	1.2	16.75	0	16.75
		50%	2.6	36.30	0	36.30
		10%	5.6	78.18	0	78.18

TSS: The total loading capacities of TSS for the Parsons Creek watershed are found in Table 3 below. WDNR determined the loading capacity using the load duration method, and therefore the loading capacities are flow-based (Page 16 of the TMDL).

Table 3 TSS TMDL summary for the Parsons Creek watershed

	Load capacity values at varying flows				Wasteload & Load Allocations		
					WLA *	LA	
	% Flow exceedance (low, med, high flows)	**Flow (cfs)**	**Median daily load (lb/d)**	**Max daily load (lb/d)**	**Max. (lb/d)**	**Median (lb/d)**	**Max. (lb/d)**
'Normal flow' target (for flows <8 cfs) (use 8 mg/L median and 28 mg/L max. target conc.)	100%	.62	27	94	7	20	87
	90%	1.2	52	181	14	38	167
	50%	2.0	86	302	24	62	278
	10%	5.6	242	845	66	176	779
'High flow' target (for flows >8 cfs) (use 59 mg/L median and 230 mg/L max target conc.)	5%	8.0	2544	9918	94	2450	9824
	2%	14.6	4643	18100	94	4549	18006

* total WLA

Phosphorus: The loading capacity for phosphorus for the two segments of Parsons Creek are found in the Table 4 below . WDNR determined the loading capacity using the load duration method, and therefore the loading capacities are flow-based (Page 26 of the TMDL).

Table 4 Phosphorus TMDL summary for Parsons Creek (Hobb's Wood subwatershed)

	Load capacity values at varying flows				Wasteload & Load Allocations		
					WLA	LA	
	% Flow exceedance (low, med, high flows)	Flow (cfs)	Median daily load (lb/d)	Max daily load (lb/d)	Median & Max (lb/d)	Median (lb/d)	Max. (lb/d)
'Normal flow' target (for flows <8 cfs) (use 0.06 mg/L median and . 19 mg/L max. target conc.)	90%	1.2	0.4	1.2	0	0.4	1.2
	50%	2.6	0.8	2.7	0	0.8	2.7
	10%	5.6	1.8	5.7	0	1.8	5.7
'High flow' target (for flows >8 cfs) (use high flow calculation)	5%	8	6.4	NA	0	6.4	NA
	2%	14.6	21.3	NA	0	21.3	NA

Method for cause and effect relationship:
The loading capacities for TSS and phosphorus were determined by WDNR using the load duration curve method (LDC) (Page 20 of the TMDL). TSS, ammonia, and phosphorus concentrations were measured in cooperation with the U.S. Geological Survey (USGS) over a three-year period (Page 3 of the TMDL). A very simplified explanation is provided below.

1. Flow data - First, continuous flow data are required, and are provided by temporary USGS gages over a three-year period on Parsons Creek. The data reflect a range of natural occurrences from high flows to low flows.
2. Water Quality data - This dataset is the monitored TSS, ammonia, and phosphorus data from 1997-2001 sampling.
3. Load Duration Curves (Figures 3 and 5 of the TMDL) - The plots are derived from the flow data and water quality data described above. Existing monitored water pollutant loads, represented by the points on the plot, are compared to target loads, the water quality target line. As discussed above in Section 2 for TSS, WDNR determined several targets depending on pollutant, flow, and median/maximum. If the existing loads are below (less than) the appropriate target line, no reduction needs to occur. Conversely, if the existing loads are above (greater than) the target load, a reduction is necessary to reach the target.
4. Analysis - The final step is to link the geographic locations of load reductions needed to the flow conditions under which the exceedences occur. Flow conditions where TSS and phosphorus exceedences are occurring, represented by the graph, are identified to determine what potential sources and management practices will address the impairments. The TSS LDC (Figure 3 of the TMDL) shows that the exceedences occur at all flows, but the greatest exceedences occur under higher flows. The phosphorus LDC (Figure 5 of the TMDL) shows exceedences over high flow (Page 28 of the TMDL). By knowing the flow conditions under which exceedences are occurring, WDNR can focus implementation activities on those sources most likely to contribute loads.

1The load duration plots show under what flow conditions the water quality exceedences occur. Those exceedences at the right side of the graph occur during low flow conditions; exceedences on the left side of the graphs occur during higher flow events, such as storm runoff.

Using the load duration curve approach allows WDNR to determine which implementation practices are most effective for reducing TSS and phosphorus loads based on flow magnitude. For example, if loads are significant during storm events, implementation efforts can target those best management practices (BMPs) that will most effectively reduce storm water runoff. This allows for a more efficient implementation effort. Meeting this loading capacity should result in attainment of water quality standards. The load duration curve is a cost-effective TMDL approach, to address the reductions necessary to meet WQS for TSS and phosphorus.

Weaknesses of the TMDL analysis are that non-point source (NPS) load allocations were not assigned to specific sources within the watershed, and the identified sources of TSS and phosphorus were assumed based on the data collected in the watershed, rather than determined by detailed monitoring and sampling efforts. Moreover, specific source reductions were not quantified. However, the State did use the Soil and Water Assessment Tool (SWAT) to identify and predict the impacts of land use changes on pollutant loadings (Page 26 of the TMDL). U.S. EPA believes the strengths of the State's proposed TMDL approach outweigh the weaknesses and that this methodology is appropriate based upon the information available. In the event that TSS and phosphorus levels do not meet WQSs in response to implementation efforts described in the TMDL, the TMDL implementation strategy may be amended as new information on the watershed is developed, to better account for contributing sources of the impairment and to determine where reductions in the Parsons Creek watershed are most appropriate.

*Critical condition**:***
Ammonia: WDNR identified the critical condition as summer, when higher temperatures and lower flows are prevalent (Page 12 of the TMDL). The LDC method accounted for this critical condition by determining the loads under various flow conditions, including the low flows.

TSS: WDNR identified the critical condition for the loading of sediments to the Parsons Creek watershed as generally during spring run-off and intense summer rainfalls, although stream bank erosion occurs year-round (Page 16 of the TMDL). The impacts of sediment on the biotic community occur year-round as well, as it impacts the spawning and feeding habits.

Phosphorus: The critical condition for phosphorus is similar, as loading occurs at the same time. The critical condition for phosphorus for water quality impacts is in the summer when low flows and algal growth occur, causing the fluctuations in DO (Page 25 of the TMDL). The U.S. EPA believes the assumptions and modeling process used to determine the loading capacity are acceptable.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this third element.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity attributed to existing and future nonpoint sources and to natural background. Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. §130.2(g)). Where possible, load allocations should be described separately for natural background and nonpoint sources.

Comments:
The load allocations (LAs) for the impaired segments for TSS, ammonia, and phosphorus are found in Tables 2-4 above (Tables 5, 7, and 8 of the TMDL). Since WDNR developed the TSS and phosphorus TMDLs using the LDC method, the LAs are based upon flow regimes, as well as median/maximum concentration and normal/high flow.

WDNR developed the TMDLs for ammonia using a mass-balance approach, but determined additional allocations based upon potential flow (Table 2 above; Table 5 of the TMDL). For TSS, the exceedences occur over most flow regimes. For phosphorus, the only flow regime where current phosphorus loading exceeds the loading capacity and LA is under "high" flow (<5% flow) for Parsons Creek (Hobb's Wood subwatershed) (Section 3 above; Page 28 of the TMDL). Nonpoint sources (NPS) identified in the TMDL report as contributing to the impairments in the impaired segments include the run-off from agricultural activities, livestock in the streams, and streambank erosion.

Although WDNR did not develop loads based upon land use, the SWAT model was used to determine the impacts from changes in land use (Table 9 of the TMDL). This information will be used by WDNR to determine more accurately from where the loads of phosphorus, TSS, and ammonia are coming from, and likely result in more efficient implementation activities.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this fourth element.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to individual existing and future point source(s) (40 C.F.R. §130.2(h), 40 C.F.R. §130.2(i)). In some cases, WLAs may cover more than one discharger, e.g., if the source is contained within a general permit.

The individual WLAs may take the form of uniform percentage reductions or individual mass based limitations for dischargers where it can be shown that this solution meets WQSs and does not result in localized impairments. These individual WLAs may be adjusted during the NPDES permitting process. If the WLAs are adjusted, the individual effluent limits for each permit issued to a discharger on the impaired water must be consistent with the assumptions and requirements of the adjusted WLAs in the TMDL. If the WLAs are not adjusted, effluent limits contained in the permit must be consistent with the individual WLAs specified in the TMDL. If a draft permit provides for a higher load for a discharger than the corresponding individual WLA in the TMDL, the State/Tribe must demonstrate that the total WLA in the TMDL will be achieved through reductions in the remaining individual WLAs and that localized impairments will not result. All permitees should be notified of any deviations from the initial individual WLAs contained in the TMDL. EPA does not require the establishment of a new TMDL to reflect these revised allocations as long as the total WLA, as expressed in the TMDL, remains the same or decreases, and there is no reallocation between the total WLA and the total LA.

Comments:
WDNR did not identify point sources discharging ammonia or phosphorus to the Parsons Creek watershed, and set the waste load allocation at **0** for these pollutants.

For TSS, WDNR identified two quarries, Michel's Materials – Hamilton #84 Quarry, and Oakfield Stone Company, Inc. – Byron Quarry (Page 21 of the TMDL). Both facilities have a settling pond which receives process wastewater from stone washing and stormwater. The ponds discharge periodically when full into drainage ways and travel ¼-1/2 miles to Parsons Creek. WDNR determined that the ponds at both facilities discharge during the "high" flow regime (<5% flow exceedance) as defined in the LDC method. During "normal" flow, discharges are occasional, and rarely reach Parsons Creek. WDNR determined the WLAs by multiplying the maximum observed flow by the TSS permit limits, and determined that the greatest WLA for each facility is **47 lb/day TSS**.

Table 5 TSS WLA summary for the Parsons Creek watershed

Wastewater Source	FIN # (Site ID)	WPDES Permit #	TSS Conc. Permit Limit (mg/L)	% Flow exceedance (low, med, high flows)	Individual WLA (amount discharged) (lb/d TSS)
Michel's Materials (Hamilton #84 Quarry)	3644	WI-0046515-04-01	40	100%	3.5
				90%	7
				50%	12
Oakfield Stone Co., Inc. (Byron Quarry)	33311	WI-0046515-04-01	40	10%	33
				5%	47
				2%	47

Appendix E of the TMDL discusses options that may be considered when the permits are reviewed by WDNR.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this fifth element.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety (MOS) to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)). EPA's 1991 TMDL Guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comments:
Ammonia: WDNR provided an implicit MOS for Parsons Creek (Page 15 of the TMDL). WDNR believes that the ammonia criteria are inherently conservative, as the criteria are based upon little or no mortality, and are based upon a two to one safety factor to determine lethal levels. WDNR all determined the loading capacity based upon acute values; the longer-term

chronic values were analyzed, and it was determined that meeting the 1.47 mg/l acute concentration would meet the chronic criteria (Page 14 of the TMDL). WDNR also noted that ammonia toxicity is pH-dependent. A very small change in pH can reduce the toxicity significantly (Appendix D of the TMDL). The pH used to determine the TMDL loading is the highest pH value seen in Parsons Creek, and is very rare. Implementation activities designed to reduce phosphorus will likely reduce pH levels, and even a slight reduction will have an impact (Page 15 of the TMDL).

TSS: WDNR provided an implicit MOS for Parsons Creek (Page 15 of the TMDL). WDNR used the SWAT model to determine the impacts of implementation activities on reducing TSS loads. The estimates of sediment reductions needed are considered by WDNR to be overestimated for two reasons. First, the model was set-up to address total suspended sediments, which is the finer portion of the sediment load washing off the streams. In reality, there will be larger soil particles which will be more likely to be trapped by the best management practices (BMPs) considered in the watershed. Second, no grassed buffer strips were simulated. These strips filter out sediment, and are common BMPs that could be implemented under various programs, as outlined in the implementation section (Page 33 of the TMDL).

Phosphorus: WDNR provided an implicit MOS for Parsons Creek (Page 15 of the TMDL). As discussed above, the use of grassy buffer strips were not modeled, and will reduce sediment entering the waterbody. Since the phosphorus is often attached to the sediment, reducing sediment loads will reduce phosphorus loads as well (Page 30 of the TMDL). The model also assumed nutrient stabilization, where the existing nutrient-rich soil kept out of the stream as much as possible. WDNR also believes the reducing phosphorus use, such as through nutrient-management plans, less use of commercial phosphorus fertilizers, etc., will reduce phosphorus levels, as whatever sediment does enter the creek will have less phosphorus attached.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this sixth element.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The TMDL must describe the method chosen for including seasonal variations. (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1)).

Comments:
WDNR accounted for seasonal variations by using 3 years of continuous flow data in developing the TMDLs (Page 20 of the TMDL). In addition, WDNR sampled monthly for three years, and specifically at high-flow events, to capture the impacts of various seasonal changes.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this seventh element.

8. Reasonable Assurances

When a TMDL is developed for waters impaired by point sources only, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired only by nonpoint sources. However, EPA cannot disapprove a TMDL for nonpoint source-only impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations.

Comments:
To reduce the pollutant loads into the Parsons Creek watershed, WDNR discussed several options for reasonable assurance and implementation activities (Pages 31-34 of the TMDL). These include:

- As discussed in Section 5 above, the two point source facilities will have their permits re-evaluated as needed to comply with the WLAs.
- Establishment of riparian buffers on cropland through voluntary farm assistance programs such as the Conservation Reserve Enhancement Program (CREP), and the Conservation Reserve Program (CRP) which takes highly erodible land out of agricultural use.
- Implementation of runoff management practices including terraces, diversions and contour strips through the use of the Environmental Quality Incentive Program (EQIP). Through this program, landowners get a 75% reimbursement for the installation of runoff management practices.
- Installation of practices to reduce runoff pollution, through targeted runoff management (TRM) grants administered by WDNR and the Fond du Lac County Land and Water Conservation Department. The TRM program is a competitive grant program that provides financial assistance to control polluted runoff from both rural and urban sites.
- Fond du Lac County provides has a history of assisting in implementing the Priority Watershed program. The county currently has a Priority Watershed project underway for the Fond du Lac River, which includes Parsons Creek. Through this effort, funding is available for cost sharing implementation BMPs in the watershed. .

- Enforcement of Section NR 151 of the Wisconsin Administrative Code (WAC) which pertains to agricultural and urban runoff. WDNR and local governments can only enforce performance standards contained in NR 151 when government cost sharing is made available to a landowner for installation of BMPs .

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this eighth element.

9. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions and, such TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDL are occurring and leading to attainment of water quality standards.

Comments:
WDNR intends to monitor the Parsons Creek watershed based on the progress of implementation of the TMDL, including sites where implementation of TRM grant projects are underway or completed. In addition the stream will be monitored on a 5 to 6 year interval as part of WDNR baseline monitoring program to note trends in overall stream quality (Page 34 of the TMDL). Monitoring will include Index of Biotic Integrity (IBI), the Hilsenhoff Biotic Index (HBI), the current habitat assessment tool, and sampling of water quality parameters.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this ninth element.

10. Implementation

EPA policy encourages Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired by nonpoint sources. Regions may assist States/Tribes in developing implementation plans that include reasonable assurances that nonpoint source LAs established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. In addition, EPA policy recognizes that other relevant watershed management processes may be used in the TMDL process. EPA is not required to and does not approve TMDL implementation plans.

Comments:
The submitted TMDL report does not contain a formal implementation plan, since it is not required as a condition for TMDL approval under the current U.S. EPA regulations. However, WDNR has identified ongoing activities which have been identified under the reasonable assurance section. As previously discussed, WDNR used the SWAT model to determine the effectiveness of various implementation BMPs to assess the effects on sediment loads, and the related phosphorus loads.

While this information was reviewed, it did not form a basis for the decision.

11. Public Participation

EPA policy is that there should be full and meaningful public participation in the TMDL development process. The TMDL regulations require that each State/Tribe must subject calculations to establish TMDLs to public review consistent with its own continuing planning process (40 C.F.R. §130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval should describe the State's/Tribe's public participation process, including a summary of significant comments and the State's/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. §130.7(d)(2)).

Provision of inadequate public participation may be a basis for disapproving a TMDL. If EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Comments:
The public comment period for the Parsons Creek watershed TMDL report was from July 24, 2007 through August 22, 2007. On July 24, 2006 a news release for the public notice of the TMDL report was sent to various entities including: newspapers, television stations, radio stations, interest groups, and interested individuals. The news release indicated the public comment period and how to obtain copies of the public notice and draft TMDL report. In addition, copies of the TMDL report were available upon request and on WDNR's website: http://www.dnr.wi.gov/org/water/wm/wqs/303d/Draft_TMDLs.html. 1 A public information session was held on July 26, 2007, to discuss the draft TMDL. The meeting was held at the Moraine Park Technical College, and 24 citizens attended. WDNR received comments from the public during the comment period, which were appropriately answered (Appendix F of the TMDL).

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this eleventh element.

12. Submittal Letter

A submittal letter should be included with the TMDL submittal, and should specify whether the TMDL is being submitted for a *technical review* or *final review and approval*. Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final review and approval, should contain such identifying information as the name and location of the waterbody, and the pollutant(s) of concern.

Comments:

U.S. EPA received the Parsons Creek watershed TMDL addressing phosphorus, ammonia, and TSS, on September 5, 2007, accompanied by a submittal letter dated August 31, 2007. The submittal letter states that this is the final TMDL submittal for Parsons Creek and its East Tributary.

1The U.S. EPA is approving TMDLs for the same pollutants (phosphorus, ammonia, and sediment) in the additional segments that were not on WDNR's 2006 303(d) list (Table 1 below). While developing the Parsons Creek TMDL project, WDNR determined that additional segments of Parsons Creek and East Tributary were impaired by TSS, ammonia, and phosphorus. The segments were discussed in the draft TMDL (dated July 24, 2007). The public had the opportunity to comment on these additional impaired segments in the TMDL during the WDNR public comment period. These segments were included in the final TMDL submitted to U.S. EPA. The TMDL report discusses the impairments for all the segments in the watershed, and WDNR determined TMDL allocations and calculations addressing all segments including the additional segments, as WDNR developed the TMDLs on a watershed basis.

U.S. EPA believes it was reasonable for WDNR to develop TMDLs for the previously unlisted segments in the watersheds at the same time it was developing TMDLs for the listed segments. Because the public has had the opportunity to comment on the decision to include this additional segment within the TMDL, as well as the calculations used to establish the TMDL, U.S. EPA believes it is appropriate to approve the additional TMDLs at this time.

EPA finds that the TMDL document submitted by WDNR satisfies all requirements of this twelfth element.

13. Conclusion

After a full and complete review, EPA finds that the TMDL for Parsons Creek watershed satisfies all of the elements of an approvable TMDL. This document addresses 8 TMDLs for 4 waterbody segments and 9 impairments from the 2006 and upcoming 2008 Wisconsin 303(d) list.

EPA's approval of this TMDL does not extend to those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove TMDLs for those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under the CWA Section 303(d) for those waters.

Table 1 Waterbodies and Impairments Addressed

Waterbody Name	WBIC	TMDL ID	Stream Miles	Existing Use	Codified Use	Pollutant	Impairment
Parson's Creek	136000	611	0-2.58 (2.58 mi)	Cold Water Community (Class 2 Trout)	Warm Water Forage Fish	TSS, phosphorus, ammonia	Sedimentation, degraded habitat, aquatic toxicity
Parson's Creek*	136000	NA	2.58-3.49 (.91 mi)	Cold Water Community (Class 1 Trout)	Cold Water Community (no trout)	TSS, phosphorus, ammonia	Sedimentation degraded habitat
Parsons Creek* (Church Road)	136000	NA	3.49-5.68 (2.19 mi)	Cold Water Community (Class 1 Trout)	Cold Water Community (no trout)	TSS	Sedimentation degraded habitat
East Tributary*	136200	NA	.01-1.89 (1.88 mi)	Cold Water Community (Class 1 Trout)	Warm Water Forage Fish	TSS	Sedimentation degraded habitat

* To be listed in 2008