

Sediment TMDL for Trump Coulee Creek

March 23, 2004

This Total Maximum Daily Load (TMDL) for sediment addresses sedimentation and degraded habitat impairment conditions in the Trump Coulee Creek, a tributary to the Trempealeau River. The TMDL identifies load allocations and management actions that will restore the biological integrity of this stream. Trump Coulee Creek is identified as a high priority water in the 2002 303(d) list.

Although Trump Coulee Creek is listed for both sedimentation and dissolved oxygen impairments, this TMDL is limited to the sediment aspects. WDNR staff believe the control of manure in runoff from a single animal feeding operation was the cause of the dissolved oxygen problem. When monitoring results are available, WDNR intends to pursue “delisting” of the dissolved oxygen impairment.

Background

Trump Coulee Creek is located in one of 16 subwatersheds that make up the Upper Trempealeau River Watershed. Trump Coulee Creek is 8.0 miles in length with a 15.7 square mile watershed. The headwaters are in Jackson County with the downstream segments in Trempealeau County. The stream is currently supporting a warm water forage fishery. However, according to assessments conducted by WDNR water biologists, it has the potential to support a Class II cold water fishery in the upper 2.0 miles and a Class III cold water fishery in the lower 6.0 miles. The stream’s substrate is predominately shifting sand and silt with little or no gravel exposed in the riffle areas. Instream cover is generally scarce throughout the stream length. Stream banks are trampled by cattle, leaving little overhanging vegetation. As with other coulee streams, loose sediment covers a sandy, unstable substrate. As a result, much of the length of the stream is wide and shallow, not the narrow and deep cross-section characteristic of a healthy cold water stream in the driftless area of the state. The sediment load is also elevating water temperatures, but not to the level to call it an impairment.

The extensive coverage of the substrate with silt and soft organic sediment limits the areas of exposed gravel necessary for reproduction. It also greatly reduces the primary food sources that depend on clean interstitial areas. The relative smoothness of the substrate also minimizes areas for smaller forage fish to get out of faster currents. Sediment has been identified as the pollutant causing these impairments. As such, the extensive coverage of the substrate with sediment constitutes “an objectionable deposit” under the narrative water quality standards criterion in s. NR 102.04(1)(a) cited below in the “Water Quality Standards” section.

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The extensive sedimentation is a year-round situation. As such, there is no “critical condition”. This is not to say that there is not variation on the sediment carried in runoff to a stream. (See section on Seasonal Variation below).

A description of the population, soils, topography, geology and other physical characteristics of the Upper Trempealeau River Watershed is contained in Chapter 2 of *A Nonpoint Source Control Plan for the Upper Trempealeau River Priority Watershed Project*. For a map of the Trump Coulee Creek Subwatershed, please see Map 3-12 in Chapter 3 of the Plan.

Water Quality Standards

Trump Coulee Creek for its entire length is not currently meeting applicable narrative *water quality criterion* as defined in NR 102.04 (1); Wis. Adm. Code:

“To preserve and enhance the quality of waters, standards are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all waters including the mixing zone and effluent channel meet the following conditions at all times and under all flow conditions: (a) *Substances that will cause objectionable deposits on the shore or in the bed of a water, shall not be present in such amounts as to interfere with public rights in waters of the state.*”

Excessive sedimentation is considered as an objectionable deposit.

The designated uses applicable to Trump Coulee Creek are as follows:

S. NR 102.04(3) intro, (a) and (b), Wis. Adm. Code:

"FISH AND OTHER AQUATIC LIFE USES. The department shall classify all surface waters into one of the fish and other aquatic life subcategories described in this subsection. Only those use subcategories identified in pars. (a) to (c) shall be considered suitable for the protection and propagation of a balanced fish and other aquatic life community as provided in the federal water pollution control act amendments of 1972, P.L. 92-500; 33 USC 1251 et.seq.

"(a) *Cold water communities*. This subcategory includes surface waters capable of supporting a community of cold water fish and aquatic life, or serving as a spawning area for cold water fish species. This subcategory includes, but is not restricted to, surface waters identified as trout water by the department of natural resources (Wisconsin Trout Streams, publication 6-3600 (80)).

"(b) *Warm water sport fish communities*. This subcategory includes surface waters capable of supporting a community of warm water sport

fish or serving as a spawning area for warm water sport fish.

“ (c) *Warm water forage fish communities.* This subcategory includes surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.”

Presently, Trump Coulee Creek supports a warm water forage fishery with the potential to support a cold water fishery – class II trout in the upper 2.0 miles and class III in the lower 6.0 miles. It does not have a codified designated use of cold water fishery.

Existing Sediment Loads

Steep topography, narrow valleys and numerous streams characterize the Upper Trempealeau River watershed, including the Trump Coulee Creek subwatershed.

As shown in Tables 3-3 and 3-4 of the Nonpoint Source Control Plan for the Upper Trempealeau River Priority Watershed Project, most of the sediment entering Trump Coulee Creek is as follows:

Table 1. Sediment loading for Trump Coulee Creek. All values are in average annual tons of sediment reaching the stream.

	Average Annual Tons of Sediment to Stream	%
Croplands	206	59
Pasture, grassland and other uplands	7	
Stream banks	145	39
Gullies	9	2
Total	367*	100

* The figures in this table are consistent with Tables 3-3 and 3-4 of the *Nonpoint Source Control Plan for the Upper Trempealeau River Priority Watershed Project*. However, due to a calculation error in Table 3-3 of the Plan, the total value varies from the total given in the Plan. The error has been identified and corrected for this TMDL.

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All estimates of sediment load are made using the WINHUSLE Model (information on model previously submitted to EPA Region 5). This model uses results from the Universal Soil Loss Equation with runoff based on NRCS TR-55 routed from the field to the stream.

Total Load Capacity, Wasteload Allocation and Load Allocation

The objective of this TMDL is to produce habitat conditions in Trump Coulee Creek that meet narrative water quality standards and support a cold water trout fishery, as described in NR 1.02(7)(b), Wis. Adm. Code, as follows:

“A class III trout stream is a stream or portion thereof that:

- a. Requires the annual stocking of trout to provide a significant harvest, and
- b. Does not provide habitat suitable for the survival of trout throughout the year, or for natural reproduction of trout.”

“A class II trout stream is a stream or portion thereof that:

- a. Contains a population of trout made up of one or more age groups, above the age [of] one year, in sufficient numbers to indicate substantial survival from one year to the next, and
- b. May or may not have natural reproduction of trout occurring; however, stocking is necessary to fully utilize the available trout habitat or to sustain the fishery.”

Total Load Capacity

Based on a review of the data for Trump Coulee Creek, in the best professional judgment of Department water quality staff, the total load capacity assigned to Trump Coulee Creek is an average annual amount of sediment of 243 tons¹. However, the Department will monitor the stream to track the anticipated response. If the load reduction is sufficient to achieve the load capacity and the stream has not adequately responded, the load capacity will be reviewed and lowered appropriately. In the event that the stream adequately responds with a load reduction that is still above the load capacity, the Department will either pursue “de-listing” of the stream (possibly making this TMDL irrelevant) or will revise (upward) the load capacity.

Wasteload Allocation

Since there are no point sources in the watershed the wasteload allocation is zero. If a point source discharge were proposed, one of the following would need to occur:

¹ As measured (calculated) for the mouth of Trump Coulee Creek.

- An effluent limit of zero sediment load would be included in the WPDES permit.
- An offset would need to be created through some means, such as pollutant trading.
- A re-allocation of sediment load would need to be developed and approved by EPA.

Load Allocation

The load allocation corresponds to the total load capacity since the wasteload allocation is zero and the margin of safety is implicit. To achieve the load capacity, a 33% reduction in average annual sediment load based on mid-1990s conditions is needed. The sediment load allocation for mid-1990s conditions in the Trump Coulee Creek subwatershed is summarized in Table 2.

Table 2. Sediment load allocation for Trump Coulee Creek. All values are expressed in average annual tons of sediment reaching the stream.

Category	Load Allocation (Tons)	Annual Load (Tons)	Percent Reduction	Reduction in Load (Tons)	Reduced Annual Load (Tons)
Cropland and other Agricultural Lands and Uplands	X	213	~ 30%	66	147
Gullies	X	9	0	0	9
Stream banks (primarily agricultural)	X	145	40%	58	87
Totals:	243	367	~ 33%	124	243

From Table 4-11 of the Nonpoint Source Control Plan for the Upper Trempealeau River Priority Watershed Project.

The total annual loading capacity for sediment is the sum of the wasteload allocation and the load allocation, as expressed in the following equation:

$$\begin{array}{rcl}
 \text{Loading Capacity} & = & \text{WLA} \\
 243 \text{ Tons/Yr} & & 0 \text{ Tons/Yr} \\
 & & + \\
 & & \text{LA} \\
 & & 243 \text{ Tons/Yr}
 \end{array}$$

Margin of Safety

An implicit margin of safety is used for this TMDL. Additional load reduction should be achieved through implementation of additional best management practices (BMPs) in the watershed. A primary example is the establishment of vegetative buffers along streams through activities such as the Conservation Reserve Enhancement Program (CREP). Vegetative buffers along streams were not included in estimating the load allocations due to the fact that they could not be modeled. A portion of the watershed in Jackson County is within a CREP-eligible area. The Conservation Reserve Program Continuous Sign-up Program is to be implemented in Trempealeau County. Therefore, additional practices will be installed beyond what was included in analysis.

Furthermore, use of the Alternative Conservation System, implemented in about 30% of cropland in the subwatershed, represents a conservative value for effectiveness of BMPs; actual reduction could be double on certain farms or fields. State-enacted performance standards require a greater level of control than what would be achieved through Alternative Conservation Systems. For example, under an Alternative Conservation System, practices to control soil loss on a field could be designed to achieve a soil loss of about 8 Tons per acre per year. Under implementation of the performance standards, practices would be designed to achieve a soil loss of about 4 Tons per acre per year.

Seasonal Variation

There is no seasonal variation in the sedimentation of this stream. Sediment is a “conservative” pollutant and does not degrade over time or during different critical periods of the year. The extensive sedimentation occurs year-round. Under some stream flow regimes, sediment is deposited, and at other times, sediment is scoured and transported downstream. Much of the sediment in this stream remains within the confines of the stream until major floods scour some of the accumulated sediment. However, over time the net result has been an accumulation of sediments in and along the stream under the current amounts of sediment reaching the stream.

Undoubtedly, the amount of sediment reaching Trump Coulee Creek through major rainfall and snowmelt runoff events varies throughout the year.² However, most of the sediment enters during spring runoff and intense summer rainstorms. Considerable sediment also enters the stream from eroding stream banks during runoff events. The best management practices to achieve the load allocation are selected and designed to function for 10-year or 25-year, 24-hour design storms, providing substantial control for the major rainfall events.

² The reader should clearly differentiate between sedimentation – the deposition of sediment – and the sediment as a pollutant reaching the stream. The first is a year-round situation where the depth of the sediment deposition may vary in response to flood flows in the stream. The second is the pollutant itself, which reaches the stream during storm events.

Public Participation

Consistent with the Wisconsin DNR Continuing Planning Process and as required by Sections NR 120.08 (Watershed Plans), and NR 121.07(1), (Water Quality Management Plans), Wis. Adm. Code, there was public participation on the Upper Trempealeau River Priority Watershed Project Plan. There were public meetings in the developmental stage of the plan, and a public hearing was held on the Upper Trempealeau River Priority Project Plan on August 29, 1994. None of the public comments suggested changes to the plan. It appears no written comments were submitted. The Jackson and Trempealeau Counties Land Conservation Committees, Wisconsin DNR and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) approved the plan. Since the load allocation in this TMDL is consistent with the Upper Trempealeau River Priority Watershed Plan, the Department believes the public participation process used for the priority watershed project meets the intent of public participation requirements for a TMDL.

Reasonable Assurance

There are no point sources in the watershed. So, the reasonable assurance provisions apply only to nonpoint sources. Implementation of this TMDL is provided through Wisconsin's section 319 Management Plan. The 319 Plan (approved by EPA in 2000) describes the variety of financial, technical and educational programs available in the state. In addition, the plan describes "back-up" enforcement authorities for nonpoint source management in Wisconsin. The primary state program described in the 319 Management Plan is the Wisconsin Nonpoint Source Water Pollution Abatement Program (Section 281.65 of the Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code).

Specific to this TMDL, Trump Coulee Creek is part of a larger watershed project, the Upper Trempealeau River Priority Watershed Project. As part of a financing plan for priority watershed projects, long-term state cost-sharing and local staff funding was committed to the Upper Trempealeau River Priority Watershed Project. A copy of the watershed plan is attached to this TMDL.

No new or additional enforcement authorities are proposed under this TMDL. However, future enforcement of nonpoint source performance standards and prohibitions will likely take place in the watershed. It is also anticipated that regulatory agricultural and non-agricultural performance standards and performance standards called for in Wisconsin Statutes will be implemented in the Upper Trempealeau River watershed. Administrative rules passed by the Natural Resources Board indicate that watersheds with impaired waters will have the highest priority for enforcement.

Farmers may also enroll in the Conservation Reserve Enhancement Program or similar programs to establish vegetated buffers on cropland and marginal pastures as well as

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the Conservation Reserve Program, which takes highly erodible lands out of agricultural use.

Another option available to landowners in the watershed is the Targeted Runoff Management (TRM) grant program through the WDNR. The TRM program is a competitive grant program that provides financial assistance to control polluted runoff from both rural and urban sites. The grant period is two years, and the maximum cost-share rate is 70% of eligible costs.

Monitoring

The WDNR intends to monitor Trump Coulee Creek in the summer of 2005, after implementation of the Upper Trempealeau River Priority Watershed Project is complete. The monitoring will consist of metrics contained in the WDNR's baseline protocol for wadeable streams, such as the Index of Biological Integrity (IBI) and the current habitat assessment tool. Based on the 2005 monitoring, the need for further monitoring will be determined.

References

Baun, Ken and Sarah Snowden. 1988. The Wisconsin Nonpoint (WIN) Model, Version 2.2. Pub. No. WR-207-88.

Wis. Dept. of Natural Resources. 1995. Nonpoint Source Control Plan for the Upper Trempealeau River Priority Watershed Project. Pub. No. WR-419-95.

Wis. Dept. of Natural Resources. 1996. Buffalo-Trempealeau River Basin Water Quality Management Plan. Pub. No. WR-228-96REV.