Sediment TMDLs for Sugar-Honey Creeks Watershed's Impaired Streams

Perennial Stream A (SPP1)
Perennial Stream B (TM2)
Perennial Stream D (B4)
Perennial Stream E (B5)
North Branch Spring Brook (SB1)
Spring Creek

(April 29, 2002)
(November 18, 2002)
(December 30, 2002)
(cover page corrected March 18, 2003)

These sediment TMDLs are for impaired streams in the Sugar Creek and Honey Creek Watershed, a 167 square mile area located in Walworth and Racine Counties in southeast Wisconsin, within the Fox River Basin. The following six streams were listed on the 1998 303(d) list as a medium priority and are impaired due to nonpoint sources:

- Perennial Stream A (SPP1);
- Perennial Stream B (TM2);
- Perennial Stream D (B4);
- Perennial Stream E (B5);
- North Branch Spring Brook (SB1); and
- Spring Creek.

A seventh impaired stream located in the Sugar Creek and Honey Creek Watershed, Perennial Stream TA4, is point source dominated and is not included in this set of TMDLs. Figure 1 shows the locations and the contributing drainage areas (subbasins) for each of the impaired segments. Chapter 2 of the Nonpoint Source Control Plan for the Sugar/Honey Creek Priority Watershed Project contains a description of the geology, soils, topography, etc. of the watershed.

The existing use of all six streams, is LFF, Limited Forage Fishery, although biological surveys conducted in 1995 may have categorized some stream segments differently. All of the stream segments have limited capacity due to low flow, naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of tolerant forage fish and aquatic life. One stream segment has the potential to be a cold water fishery, capable of supporting a community of cold water fish species. The other five segments have the potential to be warm water sport fisheries, capable of supporting an abundant diverse community of forage fish and other aquatic life. They are all listed as medium priority waters on the 303(d) list.

Table 1 provides a summary of the current (1990) land usage and the projected land use in 2010 for the impaired subbasins. All values are reported in acres.

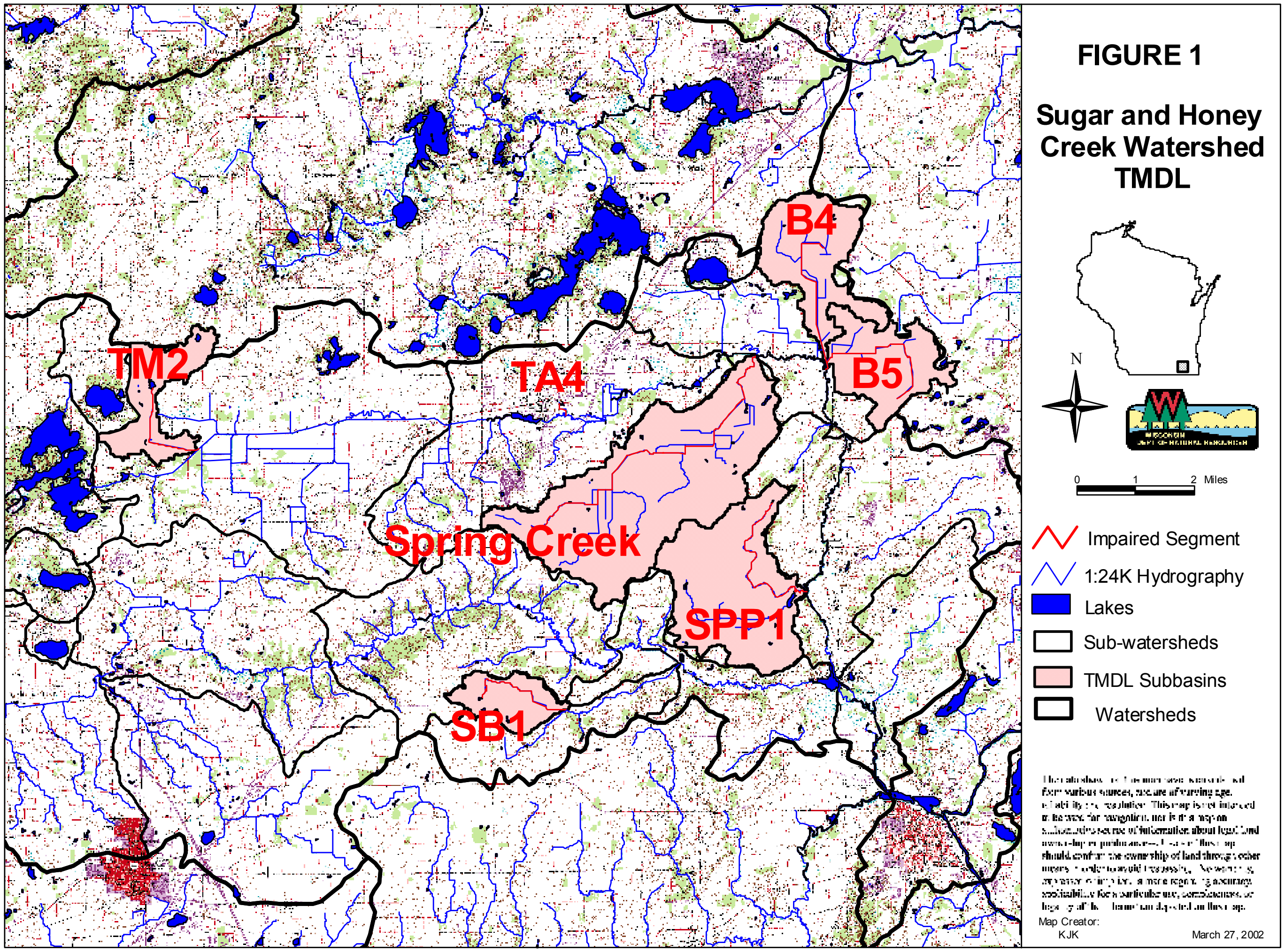
FIGURE 1
Sugar and Honey Creek Watershed TMDL
N
0 1 2 Miles
Impaired Segment
1:24K Hydrography
Lakes
Sub-watersheds
TMDL Subbasins
Watersheds
B4
B5
TM2
TA4
Spring Creek
SPP1
SB1
Map Creator:
KJK
March 27, 2002

TABLE 1
LANDUSE SUMMARY
(reported in acres)

Land Use	SPP1		TM2		B5		B4		Spring Creek		SB1	
	Current	2010	Current	2010	Current	2010	Current	2010	Current	2010	Current	2010
Cropland	2051	2014	698	687	1111	1081	1331	1295	4358	4312	562	632
Urban	144	181	41	52	116	146	139	175	177	223	58	32
Grassland	34	34	8	8	17	17	20	20	23	23	9	4
Pasture	93	93	5	5	26	26	32	32	103	103	13	25
Woodlot	383	383	55	55	77	77	92	92	280	280	39	73
Wetland	532	532	90	90	271	271	325	325	386	386	137	54
Water	25	25	4	4	8	8	9	9	3	3	4	3
Totals	***3262***	***3262***	***901***	***901***	***1626***	***1626***	***1947***	***1947***	***5330***	***5330***	***822***	***822***

The Nonpoint Source Control Plan for the Sugar/Honey Creek Watershed Project divides the watershed into several subwatersheds. All six subbasins are contained in larger subwatersheds and in some cases only represent a small portion of the subwatershed. Updated land use was obtained using GIS and partitioning land use values by an area weighted method.

Like the Sugar/Honey Creek watershed as a whole, each of the six subbasins is dominated by agricultural land.

- **Perennial Stream A (SPP1)** is located in the Spring Prairie subwatershed and is 2.9 miles long with a drainage area of 5.13 square miles. The stream is listed as imparied for its entire length for habitat degradation and turbidity. A 1995 biological assessment classified this as a Cold Water communities stream based on low-flow water temperature assessment (12.6 degrees C). Its official existing use is a Limited Forage Fishery community stream. The headwaters of this stream have been almost entirely eliminated through the use of drain tiles. The stream then flows through a spring fed, natural lowland forest/wetland section before entering a channelized region. It ultimately flows through a well-buffered wetland area before entering Honey Creek.

  Excessive sedimentation, 0.5 to 2.0 feet of soft sediment, has been measured in the channel upstream of its confluence with Honey Creek. The habitat rating changes from "good" in the upstream reach to "fair" upstream of the confluence with Honey Creek. (For more information see description in appraisal report under section on Spring Prairie Subwatershed.)

  The sources of the problem are from agricultural uses. The factors causing water quality degradation in this stream segment are cropland erosion, historical channelization and pasturing, drain tiles and bank debrushing (loss of shade). Stream temperatures have also increased due to surface runoff. Stream temperatures were observed to be 18.2 degrees C in July 1995.

Recommendations in the watershed plan are to reduce suspended solids, protect the springs and surrounding wetlands, discourage future wetland drainage activities, maintain a buffer strip, discourage future bank debrushing and provide shading, and discourage future dredging and wetland drainage activities. Its potential use is a cold water fishery. The codified use is a warm water sport fishery.

- **Perennial Stream B (TM2)** is located in the Upper Honey subwatershed and flows for 1.9 miles with a contributing drainage area of 2.1 square miles. It is listed as impaired for its entire length for habitat degradation. According to a 1995 biological survey, the existing use of the stream is Warm Water Forage Fish community stream. It is officially classified as a Limited Forage Fishery community stream, and codified as a Limited Forage Fishery.

  Fish habitat is rated as "poor" throughout the stream, indicating deposition of sediment throughout the stream. . (For more information see description in appraisal report under section on Upper Honey Subwatershed.)

  Conditions affecting the water quality and aquatic habitat of this stream include erosion, historic channelization, drain tiles, bank debrushing, loss of fish and macroinvertebrate habitat, sedimentation, and nutrient enrichment. The cause of these problems is agricultural uses, including cropland runoff, drain tiles, and channelization. Sediment quantities deposited at the mouth of TM2 indicate that is a moderate contributor of sediment and nutrients to Honey Creek.

  Recommendations in the watershed plan are to reduce suspended solids, establish buffers, discourage future dredging and wetland drainage activities, provide shading to the streams, and discourage future bank debrushing. Its potential use is a Warm Water Forage Fishery. It is unlikely to meet the codified use of Warm Water Sport Fishery because of the impairments listed above.

- **Perennial Stream D (B4) –** is located in the Beulah Station subwatershed. It flows for 2.6 miles and has a contributing drainage area of 3.04 square miles. It is listed impaired for its entire length for habitat degradation, turbidity and sedimentation. Its official existing use is a Limited Forage Fish communities stream however, a 1995 biological survey classifies the existing use of this stream as a Warm Water Forage Fishery. The stream has been channelized due to drainage activities. Land use in the upper portion is agriculture and wetland in the lower portion.

  Fish habitat is rated as "fair" throughout the stream, indicating deposition of sediment throughout the stream. . (For more information see description in appraisal report under section on Beulah Station Subwatershed.)

Fish and macroinvertebrate habitat have been disturbed through agricultural nonpoint sources of pollution. Cropland runoff has introduced sediment, and nutrients. Both the fish habitat and stream system habitat evaluation rated the stream “Fair” due mostly to the perimeter of the stream channel being laden with silt and sand.

Recommendations in the watershed plan are to reduce suspended solids, establish buffers, and discourage future dredging and wetland drainage activities. Its potential use is a Warm Water Fishery.

- **Perennial Stream E (B5)** - is located in the Beulah Station subwatershed. It flows for 2.8 miles to its confluence with Honey Creek with the entire segment listed as impaired by habitat degradation, turbidity, and sedimentation. It has a contributing drainage area of 2.54 square miles. Its existing use is a Limited Forage Fish communities stream. Impairments include loss of fish and macroinvertebrate and wildlife habitat, stream flow fluctuation or low flow, trophic and community imbalance, and excessive turbidity. The source of impairment is agricultural nonpoint sources of pollution, including channelization and cropland runoff.

  Both the fish habitat and a stream system habitat evaluation rated the stream system as “Poor” due to siltation of gravel and cobble substrates and riffles. (For more information see description in appraisal report under section on Beulah Station Subwatershed.)

  Recommendations in the watershed plan are to reduce suspended solids, establish buffers, and discourage future dredging and wetland drainage activities. Its potential use is a Warm Water Forage Fishery. It is not likely to achiever its codified use as a Warm Water Sports Fishery due to the impairments listed above.

- **Spring Creek** flows for a total of 6.3 miles in the Spring Creek subwatershed. It has a contributing drainage area of 8.9 square miles with the entire reach listed as impaired for habitat degradation, turbidity, and sedimentation. The existing use of the entire stream is a Limited Forage Fishery, but a 1995 biological inventory classified it as a Warm Water Sport Fishery. The headwaters of Spring Creek have been historically channelized and are impacted by agricultural land uses. Further downstream, it flows through natural lowland forest before entering another channelized agricultural area. Spring Creek ultimately flows into a well-buffered wetland area downstream before its confluence with Honey Creek.

  Excessive quantities of soft sediment (greater than 2 feet in some areas) have impaired aquatic habitat. More site-specific information is as follows:

Location	Description of Habitat
Upstream (~ 5 miles from mouth)	Habitat rated “fair” to “good”
At Carver School Road (~3 miles from mouth)	Fine or soft sediment has filled half of the stream depth. The

	water depth averages 0.75' over 0.79' feet of fine or soft sediment. Embeddedness ranges from 30 to 100%.
Near mile 1.0 (~1 mile from mouth	Excessive quantities of soft sediment. Habitat rated "poor".
At mouth (confluence with Honey Creek)	Excessive quantities of soft sediment. Habitat rated "fair" to "poor".

(For more information see description in appraisal report under section on Spring Creek Subwatershed.)

Water quality in this stream has been degraded because of the agricultural land use, including channelization, wetland drainage via drain tiles, cropland runoff, streambank pasturing, and inadequate runoff filtration buffers. The impacts are sedimentation, and nutrient enrichment. Recommendations in the watershed plan are to reduce suspended solids, establish buffers, and discourage future dredging and wetland drainage activities. Its potential use is a Warm Water Sport Fishery.

- **Spring Brook, North Branch (SB1)** is located in the Spring Brook subwatershed. It originates from a pond and flows 2.6 miles to the confluence with Spring Brook. SB1 has a contributing drainage area 1.3 square miles. The entire reach is listed as impaired for habitat degradation, turbidity, and sedimentation. The lower reaches of this branch have been channelized and flow through agricultural fields. Its current classified existing use is as a Limited Forage Fishery

  The impairments in the lower reaches include lack of adequate substrate and habitat to support a healthy fishery. Cobble, gravel, and woody debris are 75 to 100 percent embedded in fine sediments. Undercut banks are inundated with fines and the sides of the channel and pools have soft sediment from 0.5 to 1.0 foot deep.

  The cause of the problems is agricultural use, including cropland erosion and drain tiles, and channelization of the stream. Recommendations in the watershed plan are to reduce sedimentation and nutrient inputs to the stream through the use of buffers, provide shading to the streams to improve habitat, and discourage future channelization of the streams. Its potential use is a Warm Water Forage Fishery. It is unlikely to meet the codified classification as a Warm Water Sport Fishery due to the limitations listed above.

For all of the streams described above, the sedimentation impairment is year round. The depth of the sediment deposit or the spatial extent of the sediment deposit may increase or decrease throughout the year, but the habitat degradation remains under the current sediment loading conditions. The sediment reaching the stream comes during runoff events from rainfall and snowmelt. Therefore, for these TMDLs, the critical condition for controlling sediment is storm runoff events.

Water Quality Standards

The streams listed above in the Sugar and Honey Creek Watershed are not currently meeting applicable narrative *water quality criterion* as defined in NR 102.04 (1); Wis. Admin. 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 the 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 body of water, shall not be present in such amounts as to interfere with public rights in waters of the state, (b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the states, (c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state."

This criterion describes the acceptable water quality conditions and guides the WDNR in setting a numeric target pollutant concentration. The application of a narrative criterion for the Sugar and Honey Creek Watershed necessitates the development of a site-specific in-water value for the purpose of this TMDL.

Codified designated uses for these streams are identified in s. NR 102.04(3), Wis. Adm. Code, as follows:

> **COLD:** Cold Water Communities; capable of supporting a community of cold water fish and other aquatic life. This classification includes all the streams referenced in *Wisconsin Trout Streams*.
>
> **WWSF:** Warm Water Sport Fish Communities; capable of supporting a community of warm water sport fish or of serving as a spawning area for warm water sport fish.
>
> **WWFF**: Warm Water Forage Fish Communities; capable of supporting an abundant diverse community of forage fish and other aquatic life.
>
> **LFF:** Limited Forage Fish Communities; are communities capable of supporting only a limited community of forage fish and aquatic life.

Existing Sediment Loads

For purposes of this TMDL the nonpoint source pollutant of concern is sediment. The land uses for the six listed segments that generate the majority of the load are agriculture and urban (residential and transportation). The other major land use categories found in the subbasins consist of grassland, pasture, woodlots, and wetland. All contribute negligible sediment loads (<1% of total load). The Sugar/Honey Creek Watershed in dominated by agriculture with approximately 71% of the land devoted to agricultural activities. Less that 12% of the watershed is developed. None of the segments are located immediately adjacent to large urban areas however the Sugar/Honey Creek Watershed contains two municipal areas, Elkorn and East Troy. Both of these municipalities are experiencing growth with the surrounding areas contained in the six impaired segments experiencing urban growth primarily in the form of residential development.

Table 2 provides a summary of the sediment loads for the six impaired segments. The sources are limited to urban lands and agricultural cropland. Sediment from stream bank erosion was calculated using the NRCS spreadsheet model and was examined at the watershed scale. Sediment loads from stream banks are being addressed through stabilization and buffers. Buffers are being used as a factor of safety for these TMDLs. The reduction in sediment loads under future conditions (2010) can be attributed to the conversion of farmland into suburban development and pastureland.

TABLE 2
AVERAGE ANNUAL SEDIMENT LOADS TO STREAMS
(Loads reported in tons)

Land Use	SPP1		TM2		B5		B4		Spring Creek		SB1	
	Current	2010	Current	2010	Current	2010	Current	2010	Current	2010	Current	2010
Cropland	1808	1775	464	457	896	872	1073	1044	5296	5240	682	675
Urban	19	24	7	8	17	22	21	26	17	21	3	3
Totals	***1827***	***1799***	***471***	***466***	***914***	***894***	***1094***	***1070***	***5313***	***5262***	***685***	***678***

Values are derived from the Honey- Sugar Creeks Priority Watershed Plan. Where the drainage area to an impaired water is less than the sub-watershed used in watershed plan, the loads are prorated in proportion the difference in area.

Brief Discussion of Models

- The WINHUSLE model calculates average annual soil erosion based on actual field conditions, existing best management practices and crop rotations, from the Universal Soil Loss Equation and then routes the sediment from field to field to stream using runoff methods generally accepted by the Natural Resources Conservation Service (NRCS). Sediment load reductions were then estimated by applying best management practices to specific fields. Modeling was based on 1996 conditions. The model was applied to all land areas, thus included "background" values. Given the very high percent of the land area in agricultural and urban land uses, background values are very small. The model calculates sediment reaching the streams. It does not route sediment along the stream. As such, there is not a single point where the load is calculated.

- The NRCS spreadsheet model uses field data for the three-dimensional volume of eroding stream banks on an average annual basis. Field measurements are taken to determine the length and height of the exposed face of the eroding bank. A "clue sheet" on visual parameters is used in the field to estimate the rate or recession, the third dimension. The resulting volume represents the mass of sediment eroded or scoured from the bank on and average annual basis. Densities based on the soil type are used to determine mass of sediment (generally described in Tons/year). Analysis was based on 1996 field conditions.

- The Source Load and Management Model estimates annual pollutant loads (sediment and phosphorus) from urban areas based on the type of urban land use and soils. Management practices are then applied to determine the pollutant load reduction. Modeling was based on 1996 conditions and conditions projected for 2020.

Total Load Capacity, Wasteload Allocation and Load Allocation

The objective of the TMDL is to produce conditions in both segments that will result in water quality standards being met, including meeting the potential use of establishing a coldwater fishery for SPP1 and a Warm Water Forage Fishery or Sport Fishery for the other 5 listed streams.

A class II trout fishery is described in NR 1.02(7)(b), Wis. Adm. Code as follows:

> "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 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."

A Warm Water Forage Fishery is defined in NR 102.04(3)(C) as follows: "This subcategory includes surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life." A Warm Water Sport Fishery is defined in NR 102.04(3)(b) as: "surface waters capable of supporting a community of warm water sport fish or serving as a spawning area for warm water sport fish".

Total Load Capacity:

Based on review of all the information and professional judgment of Department water quality staff, a total load capacity for sediment in these streams as shown in the table below has been determined. The average annual loads are consistent with load reductions and loading capacities called for in other streams in the same part of the state. The Department intends to monitor the stream and evaluate whether the load reductions are being achieved and whether the stream is responding as anticipated. If additional reduction is needed, the intent of the Department is to revise this TMDL and assign a lower load capacity. If the expected results are achieved with a lower sediment load reduction, the Department intends to pursue either "delisting" of these streams and the need for the TMDL will be eliminated or revise this TMDL to assign a more appropriate total load capacity. The BMPs are designed to be particularly effective in addressing the critical high flow events.

Given the gradient of the stream, the extent of sedimentation – both spatial coverage and depth, a 30% reduction in sediment has been identified by Department field staff. The Total Load Capacity for each stream corresponding to this reduction is provided in Table 3.

TABLE 3
TOTAL LOAD ALLOCATION FOR SEDIMENT
(AVERAGE ANNUAL BASIS)

Stream	Sediment (average annual tons)
Perennial Stream SPP1	1,259
Perennial Stream TM2	326
Perennial Stream B5	625
Perennial Stream B4	749
Spring Creek	3,671
North Br. Spring Brook SB1	475

Wasteload Allocation: There are no point sources discharging to the stream segments addressed in this TMDL. Therefore, the wasteload allocation is zero. If a point source were proposed for one of the tributaries one of the following would need to occur:

- An effluent limit of zero sediment load and phosphorus would be required 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 is set to correspond to the total load capacity, given that the wasteload allocation is zero and the margin of safety is implied. The load allocation is equal to the total load capacity since the wasteload allocation is zero and the marginal of safety is implicit. The feasibility of the load reduction is tested against the following reductions that correspond to what can be achieved through implementation of nonpoint source performance standards:

- Reduce overall pollutant loading from the 1990 baseline by 20% the year 2010. This will be accomplished through retro-fitting of existing BMPs.

- Reduce future pollutant loads from urban areas by 75%. This will be implemented through the proposed performance standard (NR 151) which requires reduction in total suspended solids of 80%.

- Achieve high levels of sediment reduction from construction sites. This will be implement through the proposed performance standard (NR 151) which requires reduction in sediment loads of 80%.

In addition, the feasibility is tested against both current and projected (2010) conditions to determine whether the total load capacity can be maintained under growth conditions. From the analysis, it was determined that urban growth will result in a slight reduction of loads. Therefore the analysis and identification of load allocations is based on the 2010 conditions.

In the analysis for year 2010 conditions, it is assumed that all development from 1990 to 2010 will have post-construction storm water management practices incorporated into the development. The storm water management practices are assumed to be at least 75% effective in the control of sediment.

The tables below identify the load allocations and test the feasibility of the nonpoint source performance standards to achieve the total load capacity.

TABLE 4
LOAD ALLOCATION FOR PERENNIAL STREAM SPP1
(SUBBASIN OF SPRING PRAIRE SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		1775	30%	533	1243
1990 Urban		19	20%	4	15
1990 -- 2010 Urban		5	75%	4	1
Total	***1259***	***1799***	*30%*	***540***	***1259***

TABLE 5
LOAD ALLOCATION FOR PERENNIAL STREAM TM2
(HONEY CREEK SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		457	30%	137	320
1990 Urban		7	20%	1	6
1990 -- 2010 Urban		1	75%	1	0
Total	***326***	***465***	*30%*	***139***	***326***

TABLE 6
LOAD ALLOCATION FOR PERENNIAL STREAM B5
(SUBBASIN OF BEULAH STATION SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		872	30%	262	610
1990 Urban		17	20%	3	14
1990 -- 2010 Urban		5	75%	4	1
Total	***625***	***894***	*30%*	***269***	***625***

TABLE 7
LOAD ALLOCATION FOR PERENNIAL STREAM B4
(SUBBASIN BEULAH STATION SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		1044	30%	313	731
1990 Urban		21	20%	4	17
1990 -- 2010 Urban		5	75%	4	1
Total	***749***	***1070***	*30%*	***321***	***749***

TABLE 8
LOAD ALLOCATION FOR SPRING CREEK
(SPRING CREEK SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		5240	30%	1572	3668
1990 Urban		3	20%	1	2
1990 - 2010 Urban		1	75%	1	<1
Total	***3671***	***5244***	*30%*	***1573***	***3671***

TABLE 9
LOAD ALLOCATION FOR NORTH BRANCH SPRING BROOK (SB1)
(SUBBASIN OF SPRING BROOK SUBWATERSHED)

Sediment (average annual tons)	Load Allocation	Annual Load	% Reduction	Load Reduction	Reduced Load
Cropland		675	30%	203	473
1990 Urban		3	20%	1	2
1990 - 2010 Urban		1	75%	1	<1
Total	***475***	***679***	*30%*	***204***	***475***

Margin of Safety

A margin of safety is provided implicitly in three ways. The first way is through conservative assumptions in the efficiencies in the best management practices used in the modeling. For example, control of sediment from transitional urban (construction sites) can exceed 80 percent, if practices are applied and maintained properly. Control levels for some best management practices may exceed 90%. Similarly, the 75% projected control of sediment for development for the period 1990 to 2010 is at a low end of the range for wet detention basins, based on acceptable design criteria. For the given soils, higher values (such as 80 to 85%) may be possible.

The second way is through implementation of additional best management practices – especially for agricultural lands which contribute more than 90% of the sediment. The primary example is the establishment of vegetative buffers along streams through programs, such as the Conservation Reserve Enhancement Program. Vegetative buffers along streams were not included in the modeling for the load allocation. In October 2001, the Conservation Reserve Enhancement Program was approved for portions of Wisconsin, including the Sugar/Honey Creek Watershed. Implementation of the Conservation Reserve Enhancement Program in this watershed will continue through 2007. Given that the vegetated buffers for these soils and sloped are at least 75% effective in controlling sediment in overland flow and overland flow contributes about 20% of the sediment load, establishment of riparian vegetative buffers should result in 10 to 15% greater control of sediment. In addition, establishment and maintenance of vegetated buffers and practices to encourage infiltration of urban stormwater that are required as part of Wisconsin's non-agricultural nonpoint source performance standards implementation.

The third way is through wetland restoration. Much of the watershed is drained and farmed wetland. Wetlands may be restored through the USDA Wetland Reserve Program. A major wetland restoration project is underway in the headwaters of Sugar Creek. Future projects may take place in the drainage areas to these impaired waters.

Seasonal Variation

There is no seasonal variation in the sedimentation impairment within the stream of any of these streams. The extensive sedimentation occurs year round. Given the nature of the problem, there is no evidence to indicate that the depth or areal extent of the sediment deposits varies throughout a year. Under some stream flow regimes, sediment reaching the stream is deposited on the bed, and at other times, sediment is scoured and transported downstream. Over time the net result has been an accumulation of sediments in and along the streams under the current amounts of sediment reaching the stream.

Sediment delivery, on the other hand, varies both seasonally and with the intensity of the rainfall events.[1] 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.

Public Participation – A Citizen Advisory Committee was established and met regularly during the planning phase of the priority watershed project, between January, 1995 and November, 1996. This was one mechanism of receiving public input on the project. A draft if the priority watershed plan was sent out for internal (DNR) and external review in October, 1996. A public hearing and informational meeting on the plan was held on November 19, 1996 at the Walworth County Courthouse Annex. Ample time was allocated to incorporate public comments into the final plan which was approved by the Wisconsin Land and Water Conservation Board on February 11, 1997. Since the load allocation in each of these TMDLs is consistent with the Sugar – Honey Creeks 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 land areas draining to the impaired waters. As such, the specific requirement to demonstrate "reasonable assurance" of nonpoint source load allocations is not entirely applicable. However, in the spirit of demonstrating implementation of the TMDLs, the following information is provided:

> Implementation of this TMDL is provided through implementation of Wisconsin's 319 management plan.

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[1] 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.

In general, Wisconsin's section 319 Management Plan (approved by EPA in 2000) describes the variety of financial, technical and educational programs in the state. In addition, it describes the "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, the six streams described here are part of a larger priority watershed project, Sugar/Honey Creek Priority Watershed Project. As part of a financing plan for priority watershed and priority lake projects, long-term state cost sharing and local staff funding is committed to the Sugar/Honey Creek Priority Watershed Project. A copy of the plan is attached to this TMDL.

In addition, as described in the priority watershed plan, specific sites within the Sugar/Honey Creek Priority Watershed have been designated as critical sites for enforcement under the provisions of s. 281.20 and 281.65, Wis. Stats. Landowners have three years to voluntarily enter into cost share agreements. If a landowner does not participate by the specified time, the WDNR may take enforcement action to order the installation of needed best management practices at which point cost share assistance is also reduced by 50%. 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, pending approval of administrative rules.

In addition, as mentioned above in the discussion on Margin of Safety, farmers may enroll in the Conservation Reserve Enhancement Program or similar programs to establish vegetated buffers on cropland and marginal pastures.

It is also anticipated that the regulatory agricultural and non-agricultural performance standards and performance standards called for in Wisconsin Statutes will be implemented in the Sugar/Honey Creek watershed. It is the stated intent in administrative rules passed by the Natural Resources Board that watersheds with impaired waters will have the highest priority for enforcement.

Monitoring

The WDNR intends to monitor the impaired streams after implementation of the Sugar/Honey Creek Priority Watershed Project is complete. The scheduled completion dates are 2006 for portions of the watershed in Racine County and 2008 for those portions in Walworth County. The monitoring will consist of metrics contained in the Department's baseline protocol for wadeable streams, such as the Index of Biological Integrity (IBI) and habitat assessments evaluating both fish habitat and stream system habitat. Based on the 2006/2008 monitoring, the need for additional monitoring will be determined.

Attachments:

1. Honey-Sugar Creek Priority Watershed Surface Water Resource Appraisal Report, December 1996.

2. Nonpoint Source Control Plan for the Sugar/Honey Creek Priority Watershed Project, February 1997.