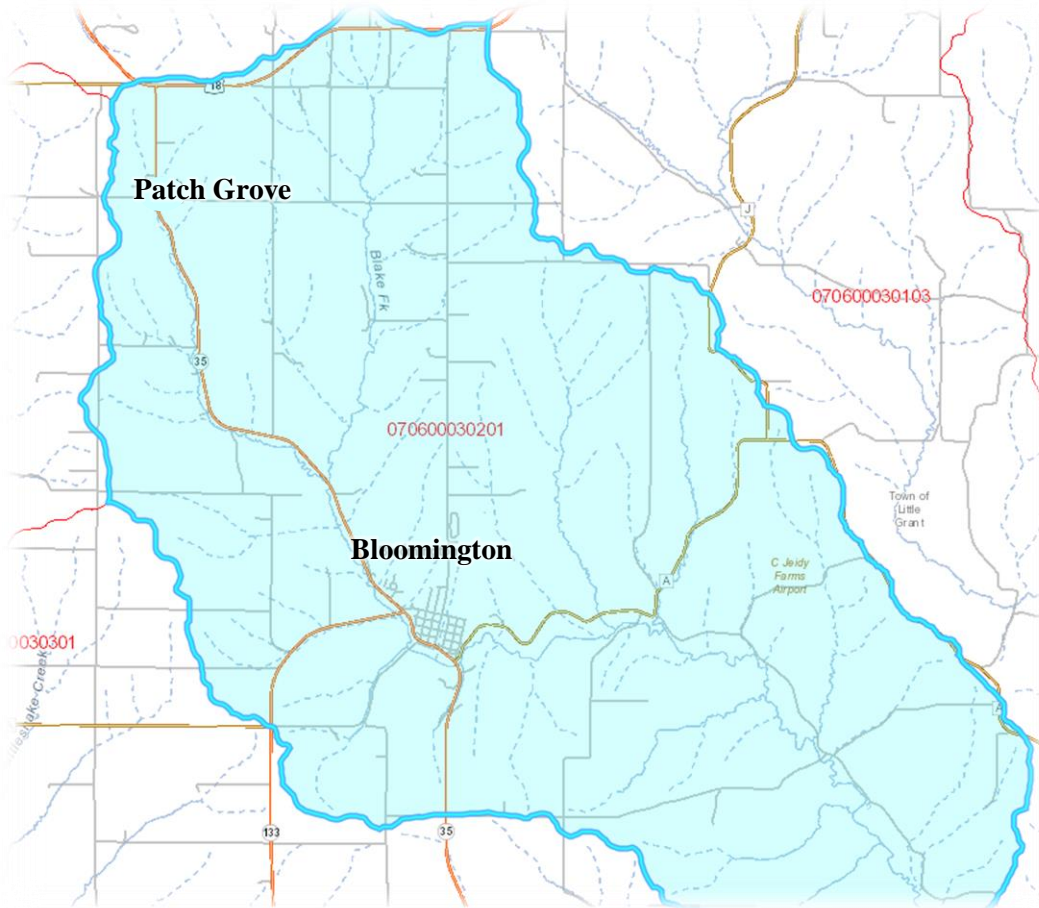


# WATER QUALITY TRADING PLAN

July 12, 2021



**Village of Patch Grove**  
**Wastewater Treatment Facility**  
WPDES Permit No. WI-002275-08-0  
S.T.H. '35', SW ¼, SE ¼, Sec 4, T5N, R5W  
Patch Grove, Wisconsin 53817

Prepared by:

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*Project Number: D20-005*

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## Attachments

- 1) Notice of Intent to Conduct Water Quality Trading
- 2) Water Quality Trading Checklist
- 3) Location & Topography Map
- 4) Wastewater Treatment Facility Flow Schematic
- 5) HUC-12 Watershed Map
- 6) Wetland Map
- 7) Soils Map and Testing Data
- 8) Current State of Eroding Streambanks Documentation
- 9) NRCS Streambank Erosion Estimator Report
- 10) Operation and Maintenance (O&M) Plan
- 11) WQT Plans and Specifications

**I. Executive Summary -**

This Water Quality Trading Plan summarizes the Village of Patch Grove’s (Village) plan to utilize Water Quality Trading (WQT) for compliance with the final total phosphorus limit as provided in the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit #WI 0022705-08-0. The Wastewater Treatment Facility (WWTF) treated 0.044 MGD in 2019 and 0.053 MGD in 2020. The WWTF had an average effluent Total Phosphorus (TP) concentration of 0.63 mg/L in 2020. The WWTF will be required to perform chemical treatment and use WQT Credits to offset approximately 174 lbs. of TP in order to meet the final annual six-month average limit of 0.075 mg/L and a monthly average limit of 0.225 mg/L, which will become effective April 1, 2023 if the Village does not reapply for the Multi-Discharger Variance (MDV).

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of best management practices (BMPs). These credits will be used to demonstrate compliance with the final total phosphorus limit as proposed in the WPDES Permit.

As demonstrated in modeling results from Table 1.1, the WWTF has the ability to register approximately 201 credits. The implementation of this WQT Plan will result in compliance with the final TP limits. The WWTF intends to monitor TP credit usage and intends to perform construction of additional BMPs as needed for future effluent TP to comply with WPDES Permits Limits. A new Water Quality Trading Plan will be submitted at that time for new BMP practices and credit production.

**Table 1.1 – Modeling Results**

<b>Reach</b>	<b>Current Phosphorus Loading (lbs./yr.)</b>	<b>Proposed Phosphorus Loading (lbs./yr.)</b>	<b>Proposed Phosphorus Reductions (lbs./yr.)</b>	<b>Trade Ratio</b>	<b>Proposed Phosphorus Credits</b>
1 (Right)	280	0	280	2.2:1	127
1 (Left)	161	0	161	2.2:1	73
<b>Total</b>					<b>201</b>

**NOTE:**

**Trade Ratio** = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1

**Delivery** = 0 (Trading within same HUC-12 Watershed)

**Downstream** = 0 (For trades upstream of Outfall 001)

**Downstream** = 0.2 (For trades downstream of Outfall 001)

**Equivalency** = 0 (Not necessary of Total Phosphorus)

**Uncertainty:** *Streambank Stabilization with Habitat Restoration* = 2

## **II. Background -**

The purpose of this Water Quality Trading Plan (Plan) is to describe the Village's use of Water Quality Trading to comply with the total phosphorus limits as provided in the Village's WPDES Permit #WI-0022705-08-0. The Plan was developed following the Notice of Intent to Conduct Water Quality Trading, provided in Attachment #1. The Water Quality Trading Checklist Form 3400-208 is provided in Attachment #2.

The Village of Patch Grove is located in Grant County along Wisconsin State Trunk Highway '35' and U.S. Route '18' in southwestern Wisconsin. The Village operates and maintains a Wastewater Treatment Facility (WWTF) which serves a population of approximately 198 residents.

The Village is comprised primarily of residential development and is situated along the Blake Fork. The area consists of rolling hills with the grade typically sloping between 5% and 15%. The topography of the area is provided in Attachment #3.

The existing sanitary sewer collection consists of approximately 52 sanitary manholes and 13,207 feet of eight-inch (8") sanitary sewer. The gravity sanitary sewer main varies in composition between concrete, clay, and PVC. The manholes vary in composition between brick, block, and precast structures.

The Village of Patch Grove owns and operates a WWTF that utilizes an extended-aeration activated sludge system. Wastewater enters the WWTF by first passing through a comminutor. Wastewater then proceeds to the extended-aeration activated sludge tank. Starting on January 1, 2020, the Village began a Chemical Addition Pilot Study adding 0.5 gallons/day of RE-300 to the activated sludge tank. Sludge is settled out in the final clarifier. Effluent is aerated and sampled prior to being discharged by an effluent pump station to the Tributary to Blake Fork. Activated sludge is either returned to the head of the process for further treatment or wasted to aerobic sludge holding tanks, where it is digested and stored prior to land application on DNR-approved sites. The current WWTF treats 0.053 MGD on an annual average with a design flow of 0.055 MGD. Please see Attachment #4 for the WWTF flow schematic. The Village of Patch Grove's WWTF has one (1) receiving water and effluent discharge location, Outfall 001: Tributary to Blake Fork (Middle Grant River Watershed, GP05 – Grant-Platte River Basin).

The monthly average influent and effluent flows and loadings at the WWTF for 2019 and 2020 are provided in Table 2.1 and Table 2.2, respectively.



**Table 2.1 – 2019 Monthly Averages**

Month	Flow (MGD)	BOD <sub>5</sub> (mg/L)		Suspended Solids (mg/L)		Total Phosphorus (mg/L)		Total Phosphorus (lbs./day)	
		Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. ('19)	0.040	120	5	125	7	-	1.13	0.38	
Feb. ('19)	0.035	46	3	46	11	-	1.57	0.46	
Mar. ('19)	0.044	113	4	121	13	-	1.23	0.45	
Apr. ('19)	0.035	148	6	129	13	-	1.41	0.41	
May ('19)	0.038	133	5	177	8	-	1.59	0.50	
June ('19)	0.034	113	3	99	8	-	1.61	0.46	
July ('19)	0.027	101	3	123	6	-	1.47	0.33	
Aug. ('19)	0.024	101	2	127	5	-	1.99	0.40	
Sept. ('19)	0.057	84	3	104	7	-	1.25	0.59	
Oct. ('19)	0.063	63	4	93	9	-	0.82	0.43	
Nov. ('19)	0.061	70	5	103	10	-	0.92	0.47	
Dec. ('19)	0.070	67	5	99	10	-	0.74	0.43	
<b>Annual Average =</b>	<b>0.044</b>	<b>97</b>	<b>4</b>	<b>112</b>	<b>9</b>	<b>-</b>	<b>1.31</b>	<b>0.44</b>	

**Table 2.2 – 2020 Monthly Averages**

Month	Flow (MGD)	BOD <sub>5</sub> (mg/L)		Suspended Solids (mg/L)		Total Phosphorus (mg/L)		Total Phosphorus (lbs./day)	
		Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. ('20)	0.059	120	6	88	10	-	0.72	0.35	
Feb. ('20)	0.053	73	5	113	11	-	0.83	0.37	
Mar. ('20)	0.066	89	5	103	16	-	0.94	0.52	
Apr. ('20)	0.075	76	8	88	14	-	0.54	0.34	
May ('20)	0.044	76	4	136	14	-	0.60	0.22	
June ('20)	0.073	89	3	115	13	-	0.49	0.30	
July ('20)	0.062	43	2	62	11	-	0.39	0.20	
Aug. ('20)	0.044	82	3	121	8	-	0.70	0.26	
Sept. ('20)	0.045	72	2	135	10	-	0.70	0.26	
Oct. ('20)	0.043	124	4	134	13	-	0.62	0.22	
Nov. ('20)	0.039	83	3	122	10	-	0.49	0.16	
Dec. ('20)	0.034	111	3	119	10	-	0.52	0.15	
<b>Annual Average =</b>	<b>0.053</b>	<b>87</b>	<b>4</b>	<b>111</b>	<b>12</b>	<b>-</b>	<b>0.63</b>	<b>0.28</b>	

To reduce effluent TP, the Village has made efforts to optimize TP reduction at the WWTF. The Village has also implemented source reduction measures such as investigating potential TP

contributors. The Village has checked local businesses for Phosphorus contribution and will continue its investigation of Phosphorus contributors.

During the initial evaluation of sanitary dischargers, it was determined that the businesses were not major contributors of Phosphorus. Currently, the Village has been able to maintain an average Total Phosphorus effluent of 0.63 mg/L which is well within the WPDES interim limit of 6.0 mg/L. The Village will continue to investigate options for TP removal at the WWTF.

Additionally, the Village has investigated watershed compliance alternatives such as Water Quality Trading (WQT) and Adaptive Management (AM). Utilizing the results from PRESTO, the watershed of the WWTF has a nonpoint source ratio of 32:68 and is considered to be nonpoint-source dominated. Stream monitoring in 2013 confirmed that the Blake Fork was an impaired water due to TP. Water Quality Based Effluent Limits (WQBELs) for TP were calculated based on a background concentration of 0.159 mg/L from the Blake Fork. In 2015, the Blake Fork was determined to have a degraded biological community. Following discussion with the County and initial investigation, the Village elected to move forward with WQT. The Village intends to perform WQT projects within the Village's Hydrological Unit Code – 12 (HUC-12) watershed #070600030201 as provided in Attachment #5.

Flow and loading data from 2020 was utilized to determine credits needed. Annual effluent TP was estimated at 102 lbs. The final limit would allow annual discharge of 12 lbs. The Village would be required to offset at least 90 lbs. of effluent TP. Calculations for required WQT reductions are provided below.

1) The current annual Phosphorus loading discharged at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.053 MGD  
Average Phosphorus concentration = 0.63 mg/L

$$0.63 \text{ mg/L} \times 0.053 \text{ MGD} \times 8.34 \times 365 \text{ days/yr.} = \mathbf{102 \text{ lbs./yr.}}$$

2) The proposed allowable annual Phosphorus mass limit at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.053 MGD  
Proposed Seasonal Phosphorus Concentration Limit = 0.075 mg/L

$$0.075 \text{ mg/L} \times 0.053 \text{ MGD} \times 8.34 \times 365 \text{ days/yr.} = \mathbf{12 \text{ lbs./yr.}}$$

3) Reduction of Total Phosphorus required at WWTF -  
102 lbs./yr. – 12 lbs./yr. = **90 lbs./yr.**

To provide an adequate safety factor for credits generated, the Village will generate credits to meet the Maximum Monthly Phosphorus Discharge. The calculation for credits required to meet the Maximum Monthly Phosphorus Discharge is provided below:

$$\text{Maximum Month Flow (Q)} = 0.066 \text{ MGD}$$

Maximum Month Phosphorus Concentration = 0.94 mg/L

Proposed Seasonal Phosphorus Concentration Limit = 0.075 mg/L

$(0.94 - 0.075) \text{ mg/L} \times 0.066 \text{ MGD} \times 8.34 \times 365 \text{ days/yr.} = \mathbf{174 \text{ lbs./yr.}}$

### **III. Location and Description of Credit Generation Sites –**

The Village discharges to unnamed Tributary to Blake Fork (Middle Grant River Watershed, GP05 – Grant-Platte River Basin) at Outfall 001. As mentioned previously, the Village intends to perform WQT projects within the Village’s HUC-12 #070600030201. The Village plans to perform streambank stabilization which will utilize grading and/or riprap to prevent the erosion of sediment from the streambanks. Streambank stabilization will not only prevent sediment from entering the stream, but will also prevent phosphorus, nitrogen, and other pollutants from discharging to Blake Fork. See Figure 3.1 for additional project location information.



**Figure 3.1 – Stream Reach location in relation to Outfall 001.**

#### IV. Methods for Nonpoint Source Load Reduction –

The Village needs to acquire at least 174 WQT trading credits to offset mass of TP discharged at the WWTF. The Plan identifies trading practices that will reduce TP runoff by more than 442 lbs. and will utilize a 2.2:1 trade ratio for downstream trades. Downstream trade ratios were determined by Table 4.1 as provided by the Wisconsin DNR.

**Table 4.1 – Downstream Trading Factor**

Percent Difference Between Credit User's Load and Total Load at the Point of the Credit User's Point of Standards Application	Downstream Trading Factor
<25%	0.1
<50%	0.2
<75%	0.4
≥75%	0.8

$$\text{Percent Difference} = \frac{1 - (Q_e \times C_e) / (Q_e \times C_e + Q_s \times C_s)}{1} \times 100 = 31\%$$

$$31\% < 50\%$$

$$\text{Downstream Trading Factor} = 0.2$$

- Q<sub>s</sub> = Receiving water flow (7Q2) = 0.14 cfs
- Q<sub>e</sub> = Design flow = 0.055 MGD = 0.08 cfs
- C<sub>s</sub> = Background concentration of TP = 0.159 mg/L
- C<sub>e</sub> = Effluent concentration of TP = 0.63 mg/L

The WQT practices identified for this Water Quality Trading Plan has the ability to generate approximately 201 TP credits/year indefinitely as long as trading practices are maintained.

##### A. Methods Used to Generate Load Reductions

For streambank stabilization, the Village has the ability generate TP load reductions through streambank grading and/or riprapping of approximately 4,751 lineal feet of streambank.

Streambank Stabilization will be performed as per NR 328 *Shore Erosion Control Structures in Navigable Waterways*, NRCS 580 *Streambank and Shoreline Protection*, and NRCS 395 *Stream Habitat Improvement and Management*. Streambank shaping and riprapping will eliminate the discharge of sediment to the stream. The streambank stabilization project will occur within HUC-12 #070600030201 in order to generate TP credits. Standard Plans and Specifications for the Project Site will be provided by a Professional Engineer. The Village will also acquire all required permits and authorizations for the Project.

To register credits, the Village has entered into trade agreements with Property Owners pursuant to *s. 283.84(1)(b), Wis. Stats.*

**B. History of Project Site**

The Project Site is planned within the Middle Grant River Watershed along the Blake Fork. The land for Reach #1 is primarily used for pasture with minimal native trees and vegetative cover. No mapped wetlands will be impacted by the WQT Project as indicated in Attachment #6 – Wetland Map. The streambanks have experienced significant erosion as the Blake Fork Watershed has been developed and cleared for agricultural and residential use. The banks are bare with slumps, rills, and severe vegetative overhang throughout. Severe erosion indicators such as undercuts, slumps, tree roots, fallen trees and significant annual changes to the channel are readily visible throughout the site. The erosion indicators demonstrate the lateral recession rate is Severe based on the NRCS Recession Rate Table. An average recession rate of 0.5 feet/year was utilized for modeling purposes.

**C. Model Used to Derive Load Reductions**

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of BMPs. These credits will be used to demonstrate compliance with the final total phosphorus limit as proposed in the WPDES Permit. Modeling results are provided in Table 4.2. If the Plan or model inputs change during construction, the Village will submit to the DNR the revised models and calculations to more accurately reflect and number of credits generated.

**Table 4.2 – Modeling Results**

Reach	Current Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Reductions (lbs./yr.)	Trade Ratio	Proposed Phosphorus Credits
1 (Right)	280	0	280	2.2:1	127
1 (Left)	161	0	161	2.2:1	73
<b>Total</b>					<b>201</b>

**NOTE:**

**Trade Ratio** = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1

**Delivery** = 0 (Trading within same HUC-12 Watershed)

**Downstream** = 0 (For trades upstream of Outfall 001)

**Downstream** = 0.2 (For trades downstream of Outfall 001)

**Equivalency** = 0 (Not necessary of Total Phosphorus)

**Uncertainty:** *Streambank Stabilization with Habitat Restoration* = 2

Soil testing has been completed to determine TP concentrations within the soil. Soil sampling was performed every 100 feet and included the use of a soil sampler which pulled ¾” cores at 8” depth. Approximately six (6) cores were taken at each

sampling location to provide a representative sample. Soils maps and soil testing data is provided in Attachment #7. An onsite evaluation has been conducted to estimate stream bank recession rate. The data, narrative, and photos documenting the current state of eroding stream banks are provided in Attachment #8.

With the collected data, the NRCS Streambank Erosion Estimator was used to calculate TP loss from the eroding streambank. The modeling data for the NRCS Streambank Erosion Estimator is available in Attachment #9. The streambank grading and riprap design will eliminate streambank recession thus eliminating TP inputs within the Project area. For the Habitat Restoration portions of the WQT Plan, the Village will be working with Bradd Sims (DNR Fisheries Biologist) to incorporate habitat improvements into the Project Plans.

Blake Fork has experienced agricultural and urban development within the watershed and has issues caused by sedimentation which was included in Wisconsin DNR evaluation for *Platte River Region*. The watershed has also experienced reduction of large woody debris along the streambanks due to agricultural development which reduces available habitat and bank roughness. Streambank improvements will reduce sediment which was identified as the #1 reason for habitat degradation in the Blake Fork. The Project will also implement in-stream habitat structures such as single logs and bed logs. These structures are intended to increase available cover for juvenile and adult fish. These structures will also influence stream hydrology by creating pools and riffles which are stream formations essential to macroinvertebrates, fish, and other aquatic life. The quantity and location of habitat structures is provided in Table 4.3 below.

**Table 4.3 – Habitat Structures**

Reach	Single Bank Log	Bed Log
1	4	4

**D. Operation and Maintenance**

An Operation and Maintenance (O&M) Plan is provided in Attachment #10. The O&M plan describes how the Stream Stabilization Practices will be operated and maintained. The O&M Plan also addresses response procedures for Practice Registration, Noncompliance Notification, and Notification of Trade Agreement Termination.

As previously mentioned, Village is planning to perform streambank stabilization by implementing BMPs along the Blake Fork streambanks. The stabilization practices will be installed and maintained per the Plans and Specifications as provided in Attachment #11. BMPs are to follow NR 328 Shore Erosion Control Structures in Navigable Waterways, NRCS 580 Streambank and Shoreline Protection, and NRCS 395 Stream Habitat Improvement and Management. Restoration landscaping and seeding will be installed following construction and will be closely monitored for a minimum of two (2) growing seasons to ensure the new seeding grows and erosion is not prevalent. Weeds and invasive vegetation growth will be addressed if present. The

riprap will be inspected following heavy rain events at a minimum. Inspection will be used to determine appropriate actions in order to maintain the riprap for continuous and ongoing streambank stabilization and TP credit generation.

The BMPs will be inspected annually by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of this WQT Plan.



## V. Trade Timeline –

Schedule for Installation of the above mentioned trading practices for Total Phosphorus Credit Generation for TP compliance is provided in Table 5.1 below.

**Table 5.1 – Trade Timeline**

<b>Item</b>	<b>Completion Timeline</b>
Site Investigation	Summer 2020
Conceptual Design	Fall 2020
Final Design	Spring 2021
Construction Permits	Summer 2021
DNR Review of Final Design	Fall 2021
Construction of BMPs	Fall 2021 – Fall 2022
Phosphorus Credit Registration	Fall 2022
Use of Phosphorus Credits by Village of Patch Grove (Ongoing for Permit Compliance)	April 1, 2023

Credits will be used by the Village beginning April 1, 2023. Credits will continue as long as the trading practices are maintained as outlined in this WQT Plan.

## **VI. Inspection Reporting –**

### **A. Tracking Procedures**

The Village will track credits used monthly. The Village will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The Village will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

### **B. Inspection**

Inspection of the BMPs shall occur during construction phase to ensure they are installed per the design and meet all applicable codes and permits. Once completed, inspections of the established BMPs shall occur each month at a minimum or following heavy rain events. A licensed professional engineer will perform an annual certification to ensure the practice is performing as designed and the Village remains in compliance.

The inspection reports will include:

- i. Name and contact information of the inspector
- ii. Inspection Date
- iii. Relevant standards set forth in the Design Plan or Operation and Maintenance Plan
- iv. Issues identified
- v. When and how any issues identified were addressed
- vi. When and how any issues identified will be addressed in the future

Inspection reports generated during each routine or after rain event inspection will be included with the Annual Water Quality Trading Report submitted by the Village to DNR. Annual inspections by a professional engineer will typically occur in April or May. This time of year is ideal for evaluating the condition of BMPs as it follows the freeze/thaw which poses the greatest potential for changes to the BMPs. Minimal vegetation cover will allow for adequate visual inspection.

### **C. Management Practice Registration Form**

The Village will file a completed registration form 3400-207 for Water Quality Trading Management Practice Registration separately from this Plan.

### **D. Annual Water Quality Trading Report Submittal**

The following shall be submitted to the DNR by January 31 of each year:

- i. The number of pollutant reduction credits (lbs./month) used each month of the previous year to demonstrate compliance;
- ii. A summary of the annual inspection of the practice that generated any of the pollutant reduction credits used during the previous year, this inspection shall be completed by a licensed Professional Engineer;
- iii. All monthly inspection reports;

- iv. Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports;
- v. A list of all noncompliance and the correction measures and timing to address the issues throughout the year; and
- vi. An updated WQT plan if management practices have or will change.

**E. Monthly Certification of Management Practices**

Each month, the Village will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

“I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained.”

**F. Notification of Failure to Generate Credits**

The Village will notify DNR by telephone call to DNR’s regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by Village are not being generated as outlined in this Water Quality Trading Plan.

The Village will submit a written notification within five days after the Village recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the Village to submit the written notice with the next regularly scheduled monitoring report required by Village’s WPDES Permit.

The written notice will contain a description of how and why the TP credits are not being generated as outlined in the Water Quality Trading Plan, the steps taken or planned to prevent reoccurrence of the identified problems and the length of time anticipated it will take to address the issue.

The Village will work to rectify the problem as laid out in the Operation and Maintenance Plans.

**G. Conditions under which Management Practices May Be Inspected**

Any DNR authorized officer, employee, or representative has the right to access and inspect the credit generating practice so long as the Village’s trade agreement with the property owner(s) and this Water Quality Trading Plan remain in effect.

**VII. Certification –**

The undersigned hereby certifies that this Water Quality Trading Plan is accurate and correct to the best of his knowledge.

Village of Patch Grove Wastewater Treatment Facility

By: William F Morgan

William Morgan  
Village President  
Village of Patch Grove  
112 North Street  
P.O. Box 168  
Patch Grove, WI 53817  
Telephone: (608) 994-2200  
Email: patchgroveclerk@gmail.com

# Attachment #1

**Notice:** Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information				
Permittee Name Village of Patch Grove		Permit Number WI- 0022705		Facility Site Number
Facility Address STH '35' South; SW 1/4 of SE 1/4 of Section 4, T5N, R5W			City Patch Grove	State WI
			ZIP Code 53817	
Project Contact Name (if applicable) Jordan Fure (Delta 3 Eng.)		Address 875 South Chestnut Street		City Platteville
				State WI
				ZIP Code 53818

Project Name  
Proposed 2022 Stream Improvements - Blake Fork

Receiving Water Name Tributary to Blake Fork	Parameter(s) being traded Total Phosphorus	HUC 12(s) 070600030201
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Is the permittee in a point or nonpoint source dominated watershed?  
 (See PRESTO results - <http://dnr.wi.gov/topic/surfacewater/presto.html>)

Point source dominated  
 Nonpoint source dominated

Credit Generator Information	
Credit generator type (select all that apply):	<input type="checkbox"/> Permitted Discharge (non-MS4/CAFO) <input checked="" type="checkbox"/> Urban nonpoint source discharge <input type="checkbox"/> Permitted MS4 <input checked="" type="checkbox"/> Agricultural nonpoint source discharge <input type="checkbox"/> Permitted CAFO <input type="checkbox"/> Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?  Yes; HUC 12: \_\_\_\_\_  
 No  
 Unsure

Are any of the credit generators downstream of the applicant?  Yes  
 No  
 Unsure

Will a broker/exchange be used to facilitate trade?  Yes; Name: \_\_\_\_\_  
 No  
 Unsure

Point to Point Trades (Traditional Municipal / Industrial Discharge, MS4, CAFO)				
Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure



Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

Page 2 of 2

**Point to Nonpoint Trades (Non-permitted Agricultural, Non-Permitted Urban, etc.)**

List the practices that will be used to generate credits:

Streambank Stabilization

Method for quantifying credits generated:  Monitoring  
 Modeling, Names: NRCS Streambank Erosion Estimator  
 Other: \_\_\_\_\_

Projected date credits will be available: 10/15/2022

**The preparer certifies all of the following:**

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer

*Jordan Finner*

Date Signed

12/8/2020

**Authorized Representative Signature**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative

*William F. Meyer*

Date Signed

6-10-2021

## Attachment #2



**Notice:** Pursuant to s. 283.84, Wis. Stats., this form must be completed by any WPDES permittee that intends to pursue pollutant trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

**Applicant Information**

Permittee Name Village of Patch Grove		Permit Number WI- 0022705	Facility Site Number	
Facility Address State Trunk Highway '35' (SW 1/4 of SE 1/4 of Sec 4, T5N, R5W)		City Patch Grove	State WI	ZIP Code 53817
Project Contact Name (if applicable) Jordan Fure (Delta 3 Eng.)	Address 875 South Chestnut Street	City Platteville	State WI	ZIP Code 53818
Project Name Patch Grove Stream Improvements Project - Blake Fork				
Receiving Water Name Blake Fork	Parameter(s) being traded Total Phosphorus	HUC 12(s) 070600030201		

**Credit Generator Information**

Credit generator type (select all that apply):

<input type="checkbox"/> Permitted Discharge (non-MS4CAFO)	<input type="checkbox"/> Urban nonpoint source discharge
<input type="checkbox"/> Permitted MS4	<input checked="" type="checkbox"/> Agricultural nonpoint source discharge
<input type="checkbox"/> Permitted CAFO	<input type="checkbox"/> Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?  Yes; HUC 12: \_\_\_\_\_  
 No

Are any of the credit generators downstream of the applicant?  Yes  
 No

Will a broker/exchange be used to facilitate trade?  Yes (include description and contact information in WQT plan)  
 No

**Point to Point Trades (Traditional Municipal / Industrial, MS4, CAFO)**

Are each of the point source credit generators identified in this section in compliance with their WDPES permit requirements?  Yes  
 No

Discharge Type	Permit Number	Name	Contact Information	Trade Agreement Number
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				

## Water Quality Trading Checklist

Form 3400-208 (1/14)

Page 2 of 3

### Point to Point Trades (Traditional Municipal / Industrial, MS4, CAFO) cont.

Does plan have a narrative that describes:		Plan Section
a. Summary of discharge and existing treatment including optimization	<input type="radio"/> Yes <input type="radio"/> No	
b. Amount of credit being generated	<input type="radio"/> Yes <input type="radio"/> No	
c. Timeline for credits and agreements	<input type="radio"/> Yes <input type="radio"/> No	
d. Method for quantifying credits	<input type="radio"/> Yes <input type="radio"/> No	
e. Tracking and verification procedures	<input type="radio"/> Yes <input type="radio"/> No	
f. Location of credit generator in proximity to receiving water and credit user	<input type="radio"/> Yes <input type="radio"/> No	
g. Other: _____	<input type="radio"/> Yes <input type="radio"/> No	

### Point to Nonpoint Trades (Non-Permitted Urban, Agricultural, Other)

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
<input type="radio"/> Urban NPS <input checked="" type="radio"/> Agricultural NPS <input type="radio"/> Other	Streambank Stabilization	NRCS Streambank Erosion Estimator		<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Only in part

Does plan have a narrative that describes:		Plan Section
a. Description of existing land uses	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
b. Management practices used to generate credits	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
c. Amount of credit being generated	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
d. Description of applicable trade ratio per agreement/management practice	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
e. Location where credits will be generated	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section III
f. Timeline for credits and agreements	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section V
g. Method for quantifying credits	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV



## Water Quality Trading Checklist

Form 3400-208 (1/14)

Page 3 of 3

Does plan have a narrative that describes:		Plan Section
h. Tracking procedures	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
i. Conditions under which the management practices may be inspected	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section VI
j. Reporting requirements should the management practice fail	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section VI
k. Operation and maintenance plan for each management practice	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
l. Location of credit generator in proximity to receiving water and credit user	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section III
m. Practice registration documents, if available	<input type="radio"/> Yes <input checked="" type="radio"/> No	
n. History of project site(s)	<input checked="" type="radio"/> Yes <input type="radio"/> No	Section IV
o. Other: _____	<input type="radio"/> Yes <input type="radio"/> No	

**The preparer certifies all of the following:**

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer <i>Jordan Fine</i>	Date Signed 6/8/2021
---	-------------------------

**Authorized Representative Signature**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative <i>William J. Meyer</i>	Date Signed 6-10-2021
---	--------------------------

# Attachment #3

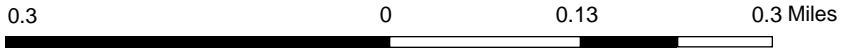
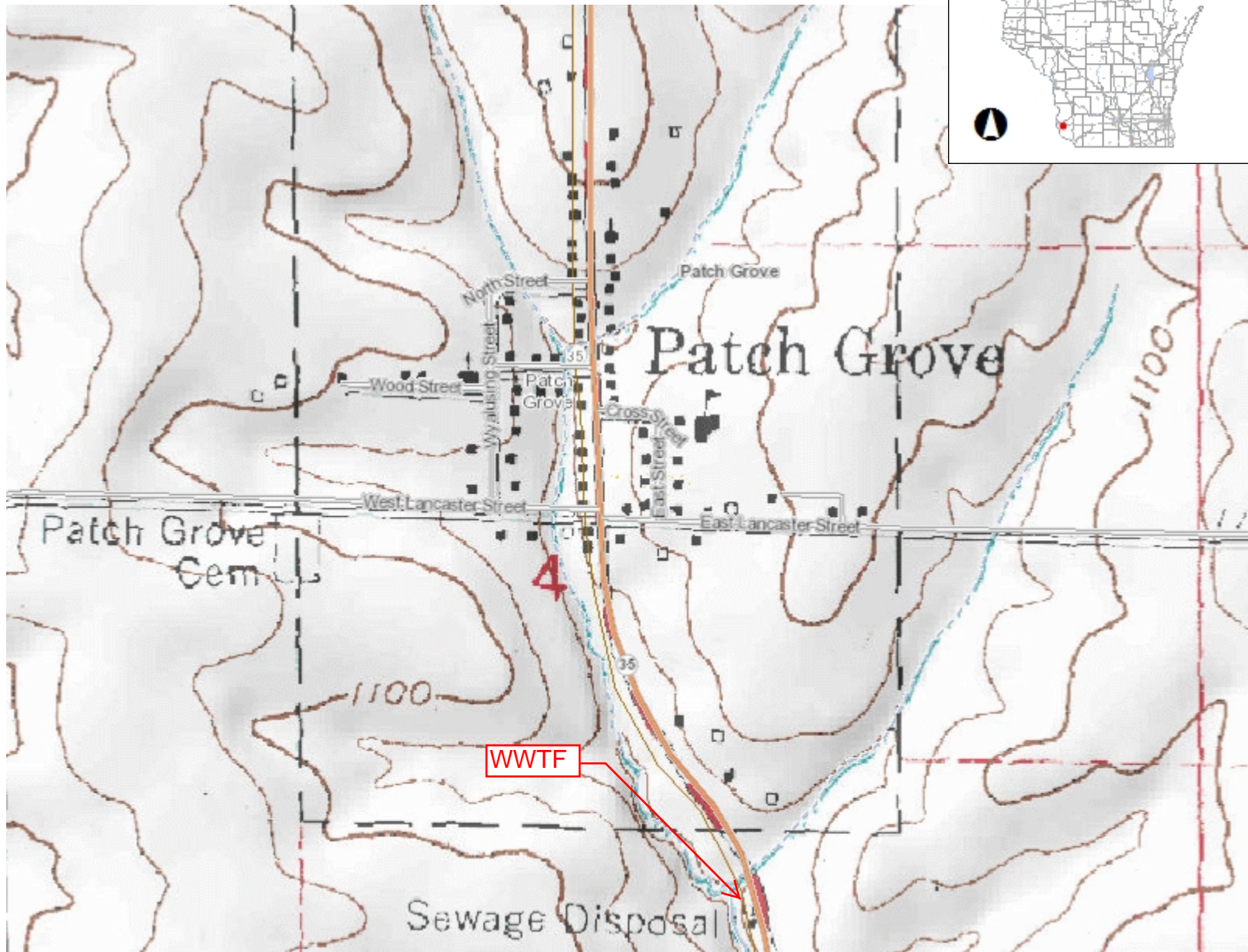


# Location and Topography Map



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
- Interstate Highway
- State Highway
- US Highway
- County and Local Roads**
- County HWY
- Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- 24K USGS Quad Index - Level 7 - 16



NAD\_1983\_HARN\_Wisconsin\_TM

1: 7,920

**DISCLAIMER:** The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

## Notes

# Attachment #4



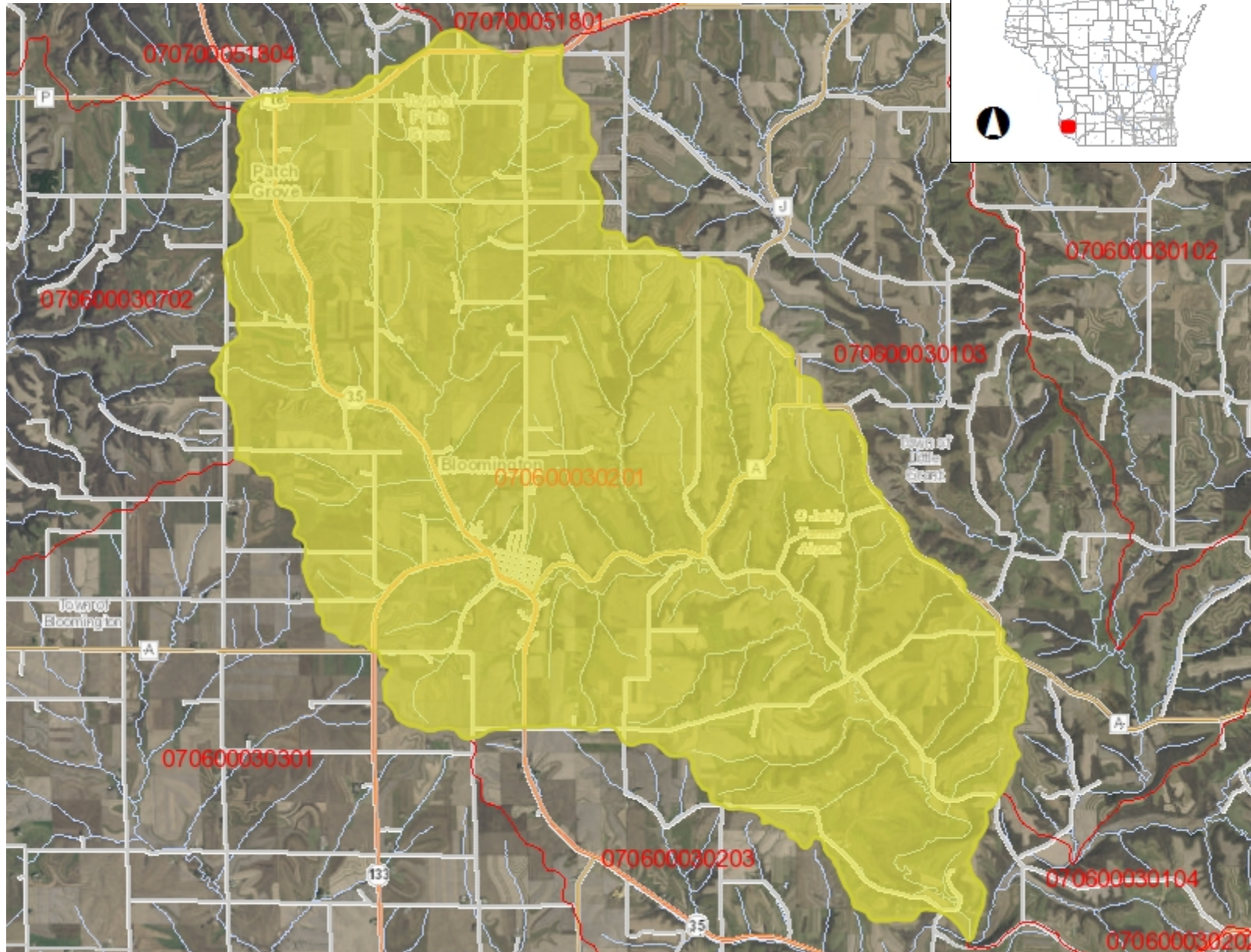


# Attachment #5

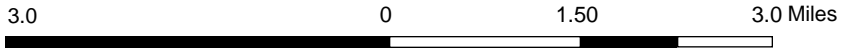




# HUC-12 Watershed Map



- Legend**
- 12-digit HUCs (Subwatersheds)
  - Municipality
  - State Boundaries
  - County Boundaries
  - Major Roads**
    - Interstate Highway
    - State Highway
    - US Highway
  - County and Local Roads**
    - County HWY
    - Local Road
  - + Railroads
  - Tribal Lands
  - Rivers and Streams
  - Intermittent Streams
  - Lakes and Open water
  - Index to EN\_Image\_Basemap\_Leaf\_Off



NAD\_1983\_HARN\_Wisconsin\_TM

1: 95,040

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## Notes

# Attachment #6





# Wetland Map



## Legend

- Wetland Identifications and Confirmations
- Wetland Class Points**
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/draind wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas**
  - Wetland
  - Upland
- Filled Areas
- Wetland Class Points**
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/draind wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas**
  - Wetland
  - Upland
- Filled Areas
- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads

## Notes

0.3 0 0.13 0.3 Miles

NAD\_1983\_HARN\_Wisconsin\_TM

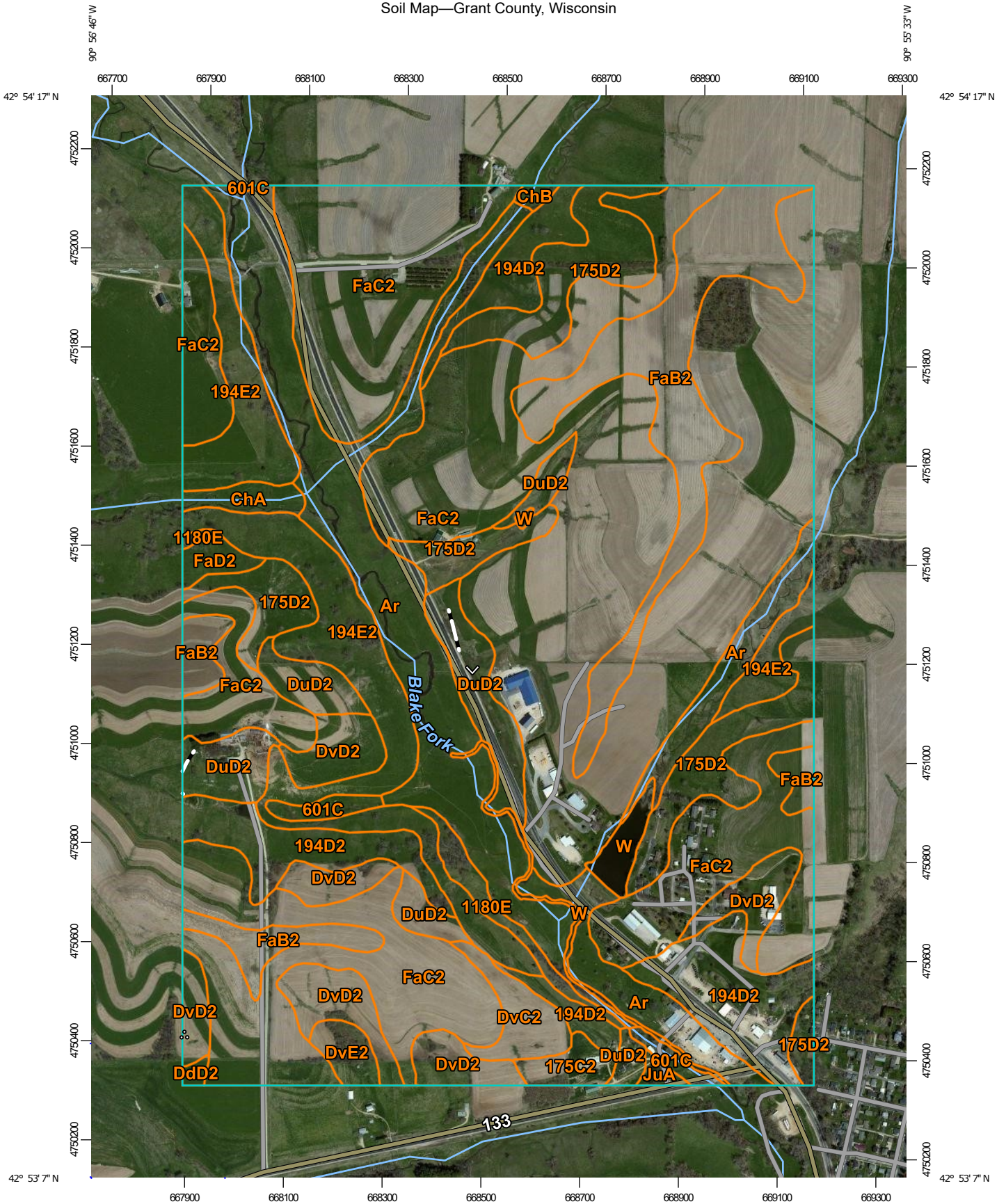
1: 7,920

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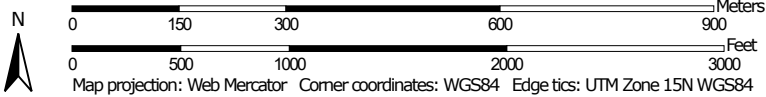
# Attachment #7



Soil Map—Grant County, Wisconsin



Map Scale: 1:10,600 if printed on A portrait (8.5" x 11") sheet.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grant County, Wisconsin

Survey Area Data: Version 15, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 2, 2011—Aug 21, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
175C2	Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded	3.4	0.6%
175D2	Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded	37.2	6.5%
194D2	Newglarus silt loam, moderately deep, 12 to 20 percent slopes, moderately eroded	36.8	6.4%
194E2	Newglarus silt loam, moderately deep, 20 to 30 percent slopes, moderately eroded	45.8	7.9%
601C	Beavercreek cobbly fine sandy loam, 3 to 12 percent slopes, occasionally flooded	3.6	0.6%
1180E	Newglarus-Dunbarton, very stony, silt loams, 20 to 30 percent slopes, very rocky	4.5	0.8%
Ar	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	70.1	12.2%
ChA	Chaseburg silt loam, moderately well drained, 0 to 2 percent slopes	3.1	0.5%
ChB	Chaseburg silt loam, moderately well drained, 2 to 6 percent slopes	0.7	0.1%
DdD2	Dodgeville soils, 10 to 15 percent slopes, moderately eroded	0.6	0.1%
DuD2	Newglarus complex, 12 to 20 percent slopes, moderately eroded	24.7	4.3%
DvC2	Dubuque soils, deep, 6 to 10 percent slopes, moderately eroded	5.8	1.0%
DvD2	Dubuque soils, deep, 10 to 15 percent slopes, moderately eroded	27.1	4.7%
DvE2	Dubuque soils, deep, 15 to 20 percent slopes, moderately eroded	3.2	0.5%
FaB2	Fayette silt loam, 2 to 6 percent slopes, moderately eroded	44.2	7.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FaC2	Fayette silt loam, 6 to 12 percent slopes, moderately eroded	256.8	44.6%
FaD2	Fayette silt loam, 12 to 20 percent slopes, moderately eroded	2.4	0.4%
JuA	Judson silt loam, 0 to 3 percent slopes	0.9	0.2%
W	Water	5.3	0.9%
<b>Totals for Area of Interest</b>		<b>576.1</b>	<b>100.0%</b>



### Total Phosphorus Analysis

Field ID	Sample ID	P (ppm)
Reach #1 (Meoska Property)	48W	578.9
Reach #1 (Meoska Property)	50W	441.8
Reach #1 (Meoska Property)	52W	373.5
Reach #1 (Meoska Property)	54W	647.6
Reach #1 (Meoska Property)	56W	566.9
Reach #1 (Meoska Property)	58W	424.8
Reach #1 (Meoska Property)	60W	341.5
Reach #1 (Meoska Property)	62W	619
Reach #1 (Meoska Property)	64W	422.2
Reach #1 (Meoska Property)	66W	704.8
Reach #1 (Meoska Property)	68W	548.6
Reach #1 (Meoska Property)	70W	704.9
Reach #1 (Meoska Property)	72W	933.4
Reach #1 (Meoska Property)	74W	366.6
Reach #1 (Meoska Property)	78W	671.5
Reach #1 (Meoska Property)	80W	780.2
Reach #1 (Meoska Property)	82W	700.5
Reach #1 (Meoska Property)	84W	450.4
Reach #1 (Meoska Property)	86W	746.6
Reach #1 (Meoska Property)	88W	580.4
Reach #1 (Meoska Property)	90W	684.8
Reach #1 (Meoska Property)	92W	462.7
Reach #1 (Meoska Property)	94W	752.5
Reach #1 (Meoska Property)	96W	767.1
Reach #1 (Meoska Property)	98W	597.9
Reach #1 (Meoska Property)	100W End	1010
Reach #1 (Meoska Property)	47E	401.3
Reach #1 (Meoska Property)	49E	357.7
Reach #1 (Meoska Property)	51E	620.6
Reach #1 (Meoska Property)	53E	424.3
Reach #1 (Meoska Property)	55E	588.3
Reach #1 (Meoska Property)	57E	527.1
Reach #1 (Meoska Property)	59E	641.5
Reach #1 (Meoska Property)	61E	337.9
Reach #1 (Meoska Property)	63E	447.5
Reach #1 (Meoska Property)	65E	724.2
Reach #1 (Meoska Property)	67E	453.2
Reach #1 (Meoska Property)	69E	839.1
Reach #1 (Meoska Property)	71E	360.7
Reach #1 (Meoska Property)	73E	548.7
Reach #1 (Meoska Property)	75E	708.7
Reach #1 (Meoska Property)	76E	767.5

Reach #1 (Meoska Property)	77E	517.6
Reach #1 (Meoska Property)	79E	504.1
Reach #1 (Meoska Property)	81E	497.1
Reach #1 (Meoska Property)	83E	673.4
Reach #1 (Meoska Property)	85E	643
Reach #1 (Meoska Property)	87E	398.1
Reach #1 (Meoska Property)	89E	439.3
Reach #1 (Meoska Property)	91E	552.4
Reach #1 (Meoska Property)	93E	484.5
Reach #1 (Meoska Property)	95E	788.2
Reach #1 (Meoska Property)	97E	509.7
Reach #1 (Meoska Property)	99E	494.6



# Attachment #8

**I. Introduction**

The lateral recession rate of the eroding bank is a critical component for the NRCS Streambank Erosion Estimator. The following documentation provides the justification for the lateral recession rates used in the NRCS Streambank Erosion Estimator. Lateral recession rate was estimated based on the photos provided, description, and on site evaluation. The following includes representative photos of Project Reaches to be stabilized through installation of Best Management Practices (BMPs).

**II. Reach 1**



Image 1 – Bare bank, severe undercut with slump and vegetative overhang.





Image 2 – Bare bank and severe undercut with slump.



Image 3 – Bare bank, severe undercut and vegetative overhang.





Image 4 – Bare bank, severe undercut with slump and vegetative overhang.



Image 5 – Bare bank, severe undercut with slump and vegetative overhang.





Image 6 – Bare bank, severe undercut with slump and vegetative overhang.



Image 7 – Bare bank, severe undercut with rills, slump, and vegetative overhang.





Image 8 – Bare bank, severe undercut with slump and vegetative overhang.



Image 9 – Bare bank, severe undercut with slump, exposed culvert, and vegetative overhang.





Image 10 – Bare bank, severe undercut with slump and vegetative overhang.



Image 11 – Bare bank, severe undercut with rills, slump, and vegetative overhang.





Image 12 – Bare bank, severe undercut with slump and vegetative overhang.



Image 13 – Bare bank, severe undercut with slump and vegetative overhang.

# Attachment #9

## NRCS Excel Workbook Estimating 'Other' Erosion Types June 2006

Annual soil loss predictions for conservation planning purposes are made with current soil loss prediction technology (RUSLE2). RUSLE2 estimates sheet, rill and interrill erosion. Erosion that is seasonal in nature and caused by concentrated flow, however, is not predicted by RUSLE2.

This workbook provides conservation planners with simple tools and processes to help estimate the amount of erosion occurring in ephemeral gullies, classic gullies and on streambank erosion sites.

### **Definitions:**

Rill Erosion: consists of the removal of soil by concentrated water running through little streamlets, or headcuts. Detachment in a rill occurs if the sediment in the flow is below the amount the load can transport and if the flow exceeds the soil's resistance to detachment. As detachment continues or flow increases, rills will become wider and deeper. Rills may be of any size but are usually less than four inches deep. Rills are:

- <> generally parallel on the slope, but may converge,
- <> generally of uniform spacing and dimension,
- <> generally appear at different locations on the landscape from year to year,
- <> generally shorter than ephemeral cropland gullies,
- <> usually end at a concentrated flow channel, or an area where the slope flattens and deposition occurs,
- <> are on the same portion of the slope that is used to determine the length of slope (L) for RUSLE2,
- <> many small, but conspicuous channels running in the direction of slope gradient

Rill erosion is considered in the RUSLE2 calculations.

Ephemeral Gully Erosion: Small erosion channels formed on crop fields as a result of concentrated flow of runoff water. These channels are routinely eliminated by tillage of the field but return following subsequent runoff events. Ephemeral Gullies are small enough to be eliminated (temporarily) with the use of typical farm tillage equipment and they:

- <> recur in the same area of concentrated flow each time they form,
- <> frequently form in well-defined depressions in natural drainage ways,
- <> are generally wider, deeper, and longer than the rills in the field,

Ephemeral Gullies are **not** calculated by the RUSLE2 program.

Gully Erosion: Permanent gullies are formed when channel development has progressed to the point where the gully is too wide and too deep to be tilled across. These channels carry large amounts of water after rains and deposit eroded material at the foot of the gully. They disfigure landscape and make the land unfit for growing crops. Gullies:

- <> may grow or enlarge from year to year by head cutting and lateral enlarging,
- <> often occur in depressions or natural drainage ways,
- <> may begin as ephemeral gullies that were left in the field untreated,
- <> may, over time, become partially stabilized by grass, weeds or woody vegetation,

Gully erosion is not calculated by the RUSLE2 program.



**Streambank Erosion:** The wearing away of streambanks by flowing water. The removal of soil from streambanks is typically caused by the direct action of stream flow and/or wind/wave action, typically occurring during periods of high flow. Streambank erosion:

<> is a natural process that generally increases when unprotected streambanks (e.g. no woody vegetation) are subject to the actions of flowing water and ice damage.

<> is a common occurrence on many Vermont river channels that are experiencing geomorphic adjustments

The soil loss from ephemeral gullies, gullies and streambank erosion areas can be estimated by calculating the volume of soil removed by erosion processes. The volume of soil loss can be multiplied by the typical unit weight of the soil (based on soil texture) which is eroded. Approximate soil unit weights are expressed below<sup>1</sup>:

Soil Texture	Estimated Dry Density lb/ft <sup>3</sup>
Gravel	110
Sand	105
Loamy Sand	100
Sandy Loam	100
Fine Sandy Loam	100
Sandy Clay Loam	90
Silt Loam	85
Silty Clay Loam	85
Silty Clay	85
Clay Loam	85
Organic	22

**Procedure for estimating Ephemeral Soil Erosion:**

The following formula will be used to calculate annual estimated ephemeral gully erosion:

$$\frac{\text{Ephemeral Gully Length} \times \text{Gully Average Width} \times \text{Gully Average Depth}}{2000} \times \text{Soil Weight (lbs/ft}^3\text{)} \times \text{Occurrences per Year} = \text{Estimated Soil Loss (Tons per Year)}$$

\* Ephemeral gully erosion may reform multiple times per year, and under certain conditions it may not form in a given year. The voided volume which would be calculated after a runoff event is not necessarily representative of an annual rate, but is representative of only the specific event. This erosion can be calculated for individual storms and can be summed for a yearly estimate.

<sup>1</sup> Data from published soil surveys, laboratory data, and soil interpretation record are to be used where available. Parent materials, soil consistency, soil structure, pore space, soil texture, and coarse fragments all influence unit weight.

**Procedure for estimating Gully Soil Erosion:**

The following formula will be used to calculate annual estimated classic gully erosion:

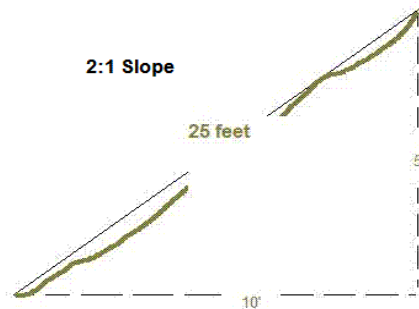
$$\frac{\text{Gully Length} \times (\text{Average Width} \times \text{Average Depth} \times 0.5) \times \text{Soil Weight (lbs/ft}^3)}{2000} \div \text{Formation Years} = \text{Estimated Soil Loss Per Year (Tons)}$$

**Procedure for estimating Streambank Soil Erosion (Direct Volume Method):**

The following formula will be used to calculate annual estimated streambank erosion unless a field measurement procedure<sup>2</sup> is used:

$$\frac{\text{Stream Bank Length} \times \text{Eroding Bank Height} \times \text{Lateral Recession Rate (FT/YR)} \times \text{Soil Weight (lb)}}{2000} = \text{Estimated Soil Loss Per Year (Tons)}$$

\*\* Eroding bank height is measured along the bank, not the vertical height of bank. Example: if vertical height of an eroding streambank is 5 feet, and the bank is on a 2:1 slope, the total eroding bank distance is 25 feet -- 1/2 (Base X Height).



\*\*\*The average annual recession rate is the thickness of soil eroded from a bank surface (perpendicular to the face) in an average year.

Stream bank erosion sometimes presents itself as a major occurrence in a given year, whereas the same bank may not erode significantly for a period of years if no major runoff events occur. Recession rates need to be calculated as an average of years when erosion does and does not occur. Recession rate is not calculated as the erosion occurring after a single event.

Use available resources to assist in the estimation of recession rate: use past and present aerial photography, old survey records, and any other information that helps to determine the bank condition at known times in the past. When such information is lacking or insufficient, field observations and professional judgement are needed to estimate recession rates.

It is often not possible to directly measure recession rates in the field. Therefore, the following table has been included which relates recession rates to narrative descriptions of banks eroding at different rates (Table from NRCS Wisconsin guidance).

Lateral Recession Rate (ft/yr)	Category	Description
0.01-0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06-0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips.
0.3-0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross section becomes U-shaped as opposed to V-shaped.
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross section is U-shaped and stream course may be meandering.

**2** The best way to quantify streambank erosion is to measure it directly in the field. The basic procedure in measuring streambank erosion is to survey, flag, or in some way fix a "before" image of the channel you are evaluating in order to establish the baseline condition. Changes due to erosion can then be monitored over time by going back to the study area and re-measuring from the fixed reference points. Channel cross-sections can be surveyed and plotted on a periodic basis to monitor change. Stakes or pins can be driven into channel banks flush with the surface. The amount of stake or pin exposed due to erosion is the amount of change at the streambank erosion site between your times of observation. The time required to monitor a site often precludes this method of data collection. The Direct Volume Method can be used to estimate streambank erosion at your site.

Acknowledgements: This Excel workbook was created as a planning tool for use by conservation planners. The basic format and content of the tool is a compilation of various similar tools, processes and procedures employed by NRCS in several states including: Indiana, Iowa, Kansas, Maryland, Michigan, Missouri, Nebraska, Oklahoma, South Dakota and Wisconsin. Some of the terminology in the 'Definitions' section of this Readme document closely mirrors these sources.

**NRCS Streambank and Irrigation Ditch Erosion Estimator (Direct Volume Method)**

Farmer / Cooperator Name:   
 Tract Number:

Evaluated By:   
 Evaluation Date:

<i>Field Number</i>	<i>Eroding Strmbnk Reach #; or Ditch Side/Bottom</i>	<i>Eroding Bank or Ditch Length (Feet)</i>	<i>Eroding Bank Height; or Ditch Bottom Width* (Feet)</i>	<i>Area of Eroding Strmbank or Ditch (FT<sup>2</sup>)</i>	<i>Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)</i>	<i>Estimated Volume (FT<sup>3</sup>) Eroded Annually</i>	<i>Soil Texture</i>	<i>Approximate Pounds of Soil per FT<sup>3</sup></i>	<i>Estimated Soil Loss (Tons/Year)</i>	<i>Soil Total Phosphorus (ppm)</i>	<i>Estimated Phosphorus Loss (Pounds/Year)</i>
Meoska	1 (Right)	2,470	5.0	12,424	0.50	6,212.1	Silt Loam	85	264.0	531	280
Meoska	1 (Left)	2,281	3.2	7,345	0.50	3,672.4	Silt Loam	85	156.1	517	161
						<b>9884.5</b>			<b>420.1</b>		<b>442</b>

# Attachment #10



# Water Quality Trading Operation and Maintenance Plan

## **Introduction:**

The Water Quality Trading (WQT) Operation and Maintenance (O&M) Plan is meant to be a working document and should be updated as new trading practices are implemented. Currently, the Operation and Maintenance Plan revolves around the Best Management Practice (BMP) construction along the Blake Fork. The attached *BMP Inspection Form* should be completed during annual inspections of BMPs and following major storm events. Inspection forms shall be retained for at least five (5) years to ensure compliance with the WQT Plan.

## **Publicly Owned BMP:**

Village representative to complete inspection form annually and following major storm events. The form will then be provided to the Director of Public Works following inspection. The Village will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR.

**Currently, no BMP projects are planned to occur on Publicly owned property.**

## **Privately Owned BMP:**

Village representative to complete inspection form annually and following major storm events. The form will then be provided to the Director of Public Works following inspection. The Village will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Maintenance expenses will be incurred by either by the Village or Private Property Owner depending on agreement with the Village. The Private Property Owner will be allowed to perform maintenance activities at the expense of the Private Property Owner. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR.

## **Quality Assurance:**

Riprap gradation and composition shall be provided for each source of material. Streambank shaping and riprap shall be installed per the Grant County Land Conservation Department and NRCS Standards. Contractors to supply rock that is approved by the NRCS and meets criteria in Wisconsin Construction Spec.9.

## **Installation:**

- Staking provided by the Land Conservation Department.
- Do not place riprap over frozen or spongy subgrade surfaces.
- Place riprap as indicated on Construction Plans. Do not dump rip-rap over the bank.
- Blend riprap with existing bank.
- Spread spoil out in a layer of less than 6" and seed down. Do not spread soil in wetlands.
- All disturbed areas and spoil must be seeded and mulched.
- Install habitat structures per Plans and Specifications.

**Practice Registration:**

The purpose of the “Water Quality Trading Management Practice Registration” form is to report to WDNR that a management practice identified in the trading plan has been properly installed and is established and effective. This information will be used to track implementation progress, verify compliance and perform audits, as necessary. A registration form should be submitted for every management practice that has been identified in the trading plan. If practices are established prior to trading plan submittal, registration forms may be submitted with the trading plan. Otherwise, registration forms should be submitted during the permit term as practices become effective or with the annual report. A blank *Water Quality Trading Management Practice Registration Form 3400-207* is attached and should be submitted following implementation of the trading practice.

**Tracking Procedures:**

The Village will track credits used monthly. The Village will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The Village will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

**Inspections/Maintenance Considerations:**

- A *BMP Inspection Form* is attached.
  - Site: As noted on Construction Plans
  - Condition of BMP: Excellent; Good; Fair; or Poor
  - Maintenance Estimate: Provide an estimate for how long the maintenance will take to complete or a dollar value for completion. This will help determine if the Village will perform the work or if the Village will hire another entity to perform the work.
  - Date Completed: Following completion of the required maintenance, input the date of completion.
  - Comments: Provide the required maintenance activity along with any other useful information. If the cell provided is not large enough for Comments, write “See Back of Sheet” and provide comments on the reverse side of the Form.
- Following installation, inspect the disturbed areas closely over the next few months to ensure that seeding grows.
- BMPs may settle or shift especially after flooding events or freeze/thaw.
- May need to control weed and brush growth.
- Inspect stabilized areas as needed.
- At a minimum, inspect after major storm events.
- If a BMP has been damaged, repair it promptly to prevent a progressive failure.
- If repairs are needed repeatedly at a location, evaluate the site to determine if the original design conditions have changed.

**Routine Maintenance Items that can be performed by Village:**

- Evaluate BMP condition
  - Reconstruct/replace BMPs that have settled, shifted, or washed out.
- Manage Vegetation
  - Remove invasive/noxious plants.

- Manage Garbage
  - Remove garbage and other debris that could otherwise impair the streambank stability.

**Monthly Certification:**

Each month, the Village will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

“I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained.”

**Annual Inspection:**

An annual inspection of the BMPs will be performed by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of the WQT Plan.

**Noncompliance:**

The Village will notify DNR by telephone call to DNR’s regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by Village are not being generated as outlined in this Water Quality Trading Plan.

The Village will submit a written notification within five days after the Village recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the Village to submit the written notice with the next regularly scheduled monitoring report required by Village’s WPDES Permit.

The written notification should include:

- Description of noncompliance and cause.
- Period of noncompliance including dates and times.
- Schedule for attaining compliance including time and steps toward compliance.
- Plan to prevent reoccurrence of the noncompliance.

**Notification of Trade Agreement Termination:**

If a trade agreement or the trading plan needs to be terminated during the permit term, the permittee should submit a Notice of Termination to the wastewater engineer/specialist to inform WDNR of the termination. WDNR staff should use this information to determine if a permit modification is required due to the termination, the termination will result in non-compliance, or other permit actions are required due to the termination. When credits are reduced or eliminated for any reason, the permittee is still required to meet their WQBELs without any grace period. To prevent noncompliance with WQBELs, changes to trading plans must be addressed before credits are lost. Modifying the permit/trading plan will require at least 180 days. A blank *Notification of Water Trade Agreement Termination Form 3400-209* is attached and should be submitted to WDNR prior to practice termination, no later than the submittal date of the annual report.

# BMP Inspection Form

Date \_\_\_\_\_

Inspector \_\_\_\_\_

Reason for Inspection \_\_\_\_\_

Reach	Condition of BMP	Required Maintenance	Maintenance Estimate (Time or Cost)	Date Completed	Comments
1 (Right)					
1 (Left)					



**Notice:** Pursuant to s. 283.84, Wis. Stats., this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information				
Permittee Name		Permit Number WI-	Facility Site Number	
Facility Address			City	State ZIP Code
Project Contact Name (if applicable)		Address	City	State ZIP Code
Project Name				

Broker/Exchange Information (if applicable)		
Was a broker/exchange be used to facilitate trade? <input type="radio"/> Yes <input type="radio"/> No		
Broker/Exchange Organization Name		Contact Name
Address	Phone Number	Email

Trade Registration Information (Use a separate form for each trade agreement)					
Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
<input type="radio"/> Urban NPS <input type="radio"/> Agricultural NPS <input type="radio"/> Other					
County	Closest Receiving Water Name		Land Parcel ID(s)	Parameter(s) being traded	

**The preparer certifies all of the following:**

- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed
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Authorized Representative Signature	
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	
Signature of Authorized Representative	Date Signed

Leave Blank – For Department Use Only		
Date Received	Trade Docket Number	
Entered in Tracking System <input type="checkbox"/> Yes	Date Entered	Name of Department Reviewer

**Notice:** Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

**Applicant Information**

Permittee Name		Permit Number WI-	Facility Site Number	
Facility Address			City	State ZIP Code
Project Contact Name (if applicable)	Address	City		State ZIP Code
Project Name				

**Credit Generator Information**

Credit generator type (select all that apply):

<input type="checkbox"/> Permitted Discharge (non-MS4/CAFO)	<input type="checkbox"/> Urban nonpoint source discharge
<input type="checkbox"/> Permitted MS4	<input type="checkbox"/> Agricultural nonpoint source discharge
<input type="checkbox"/> Permitted CAFO	<input type="checkbox"/> Other - Specify:

Trade Agreement number(s) to be terminated including affected land parcel ID(s):

Amount of trading credit being terminated	Effective date of termination
---	-------------------------------

Reason for termination

Is this agreement being updated or replaced?

Yes  
 No  
 Unsure

Will this termination result in non-compliance with the effective limit or other permit requirements?

Yes; Name: \_\_\_\_\_  
 No  
 Unsure

**The preparer certifies all of the following:**

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer	Date Signed
-----------------------	-------------

**Authorized Representative Signature**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed
--	-------------

# Attachment #11















