



**PROFESSIONAL SERVICES**

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# MEMO

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**To:** Water Resources Management Commission  
**From:** Eric J. Thompson, P.E.  
**Subject:** Pheasant Branch Creek Streambank Erosion Assessment  
**Date:** September 13, 2006

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## Introduction

This memorandum summarizes the findings of an inspection of streambank erosion along Pheasant Branch Creek between the confluence pond and Pheasant Branch Marsh. This inspection was completed over the course of two site visits conducted on August 13, 2006 and August 21, 2006. The findings of the August inspections were correlated with a previous visit to the creek conducted on May 5, 2006 when a series of three sediment samples were collected for analysis of phosphorus concentrations.

## Methods

This evaluation was completed using the method outlined in the document, "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" by L.J. Steffen, 1982. The Wisconsin Natural Resources Conservation Service reproduced this information in the document "Field Office Technical Guide" dated 2003.

## Findings

The field investigation identified 66 locations where there was significant streambank erosion. The approximate total length of streambank affected by erosion is 4,800 feet. The annual quantity of eroded material at the 66 locations is approximately 880 tons per year. The total approximate phosphorus load associated with this erosion is 62 pounds per year.

There are 10 sites that individually contribute 30 tons/yr of sediment to the creek. Collectively these sites produce 60% of the total annual sediment load.

For comparison purposes, the *preliminary* findings of the water quality modeling being completed as part of this project indicate that the total non-point source sediment load (TSS) from the urban areas of the City is 711 tons/year.

## Recommendation

While the streambank erosion documented in this memorandum does not represent a significant phosphorus load to the creek (and Pheasant Branch Marsh, and Lake Mendota) it does represent a significant sediment load. It is recommended that the City implement repairs to the 10 priority sites identified in this memorandum.

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### Offices in Illinois, Iowa, Minnesota, and Wisconsin

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ID	Length (ft)	Height (ft)	Recession Rate	Recession Rate (ft/yr)	Soil Texture	Soil Density (pcf)	Sediment Load (tons/yr)	Phosphorus Concentration (ppm)	Phosphorus Load (lbs/yr)
1	50	15	Moderate	0.10	SL	100	3.8		
2	30	10	Moderate	0.10	SL	100	1.5		
3	70	15	Severe	0.40	SL	100	21.0		
4	30	15	Slight	0.05	SL	100	1.1		
5	50	15	Moderate	0.10	SL	100	3.8		
6	20	10	Moderate	0.20	SL	100	2.0		
7	60	10	Severe	0.40	S	100	12.0	18.0	0.4
8	40	15	Severe	0.30	S	100	9.0		
9	50	8	Moderate	0.06	SL	100	1.2		
10	30	8	Slight	0.05	SL	100	0.6		
11	20	10	Moderate	0.10	Si	85	0.9		
12	180	8	Slight	0.02	Si	85	1.2	30.0	0.1
13	60	30	Severe	0.40	SL	100	36.0		
14	30	3	Slight	0.05	Si	85	0.2		
15	60	40	Very Severe	0.50	S	100	60.0		
16	60	5	Slight	0.05	SL	100	0.8		
17	50	10	Moderate	0.06	SL	100	1.5		
18	50	50	Very Severe	0.50	S	100	62.5		
19	50	40	Severe	0.40	S	100	40.0		
20	60	8	Moderate	0.10	S	100	2.4		
21	30	5	Slight	0.05	SL	100	0.4		
22	30	3	Slight	0.05	SL	100	0.2		
23	30	8	Moderate	0.10	SL	100	1.2		
24	80	40	Very Severe	0.50	S	100	80.0		
25	1000	6	Moderate	0.06	SL	100	18.0		
26	70	5	Moderate	0.06	SL	100	1.1		
27	30	5	Slight	0.05	S	100	0.4		
28	100	8	Moderate	0.10	SL	100	4.0		
29	30	8	Moderate	0.20	SL	100	2.4		
30	60	20	Severe	0.30	SL	100	18.0		
31	40	6	Severe	0.30	S	100	3.6		
32	40	6	Moderate	0.10	S	100	1.2		
33	70	6	Moderate	0.10	Si	85	1.8		
34	30	6	Moderate	0.20	S	100	1.8		
35	60	8	Moderate	0.10	S	100	2.4	58.0	0.3
36	150	8	Severe	0.30	S	100	18.0		
37	60	8	Moderate	0.06	SL	100	1.4		
38	70	15	Severe	0.30	S	100	15.8		
39	70	15	Moderate	0.20	S	100	10.5		
40	80	10	Moderate	0.10	SL	100	4.0		
41	110	15	Severe	0.30	SL	100	24.8		
42	30	15	Slight	0.05	SL	100	1.1		
43	80	25	Severe	0.30	SL	100	30.0		
44	70	10	Severe	0.40	SL	100	14.0		
45	50	30	Severe	0.40	S	100	30.0		
46	40	12	Severe	0.40	S	100	9.6		
47	150	40	Severe	0.40	S	100	120.0		
48	50	8	Slight	0.05	SL	100	1.0		
49	50	25	Moderate	0.10	SL	100	6.3		
50	50	15	Moderate	0.10	S	100	3.8		
51	70	30	Severe	0.30	SL	100	31.5		
52	40	6	Slight	0.05	SL	100	0.6		
53	50	10	Moderate	0.10	SL	100	2.5		
54	60	15	Moderate	0.10	SL	100	4.5		
55	70	15	Moderate	0.10	SL	100	5.3		
56	70	25	Severe	0.40	S	100	35.0		
57	70	12	Moderate	0.10	SL	100	4.2		
58	50	25	Severe	0.30	S	100	18.8		
59	50	25	Moderate	0.10	S	100	6.3		
60	50	15	Severe	0.30	S	100	11.3		
61	60	20	Moderate	0.20	Si	85	10.2		
62	60	12	Moderate	0.10	SL	100	3.6		
63	30	10	Moderate	0.10	SL	100	1.5		
64	50	15	Moderate	0.20	SL	100	7.5		
65	60	30	Severe	0.30	SL	100	27.0		
66	50	30	Severe	0.30	SL	100	22.5		
<b>Average</b>								35.3	
<b>Total</b>	4,750						880.0		62.2
<b>Priority Sites Total</b>							525.0		37.1

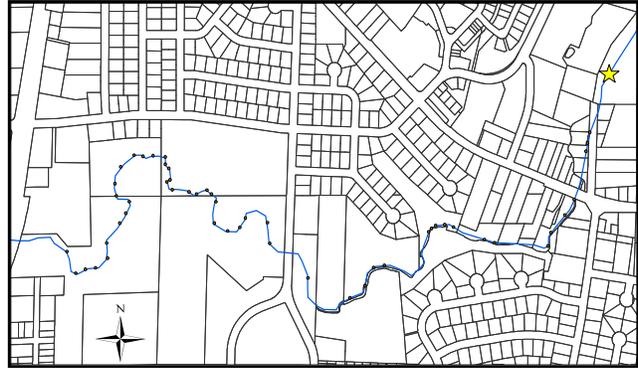
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 1  
 Location: Approximately 945' downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	3.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

"Reproduced by Wisconsin NRCS. 2003. Streambank Erosion, printed in *Field Office Technical Guide*."

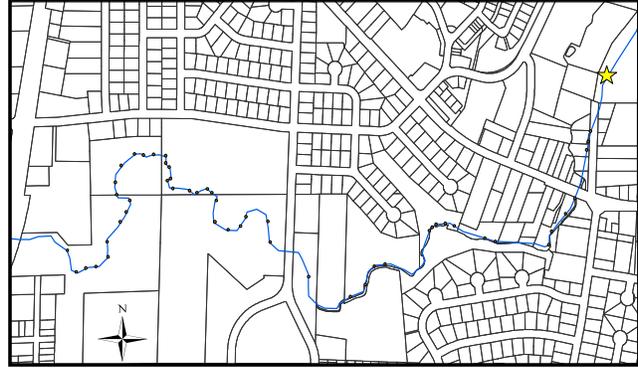
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 2  
 Location: Approximately 945' downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

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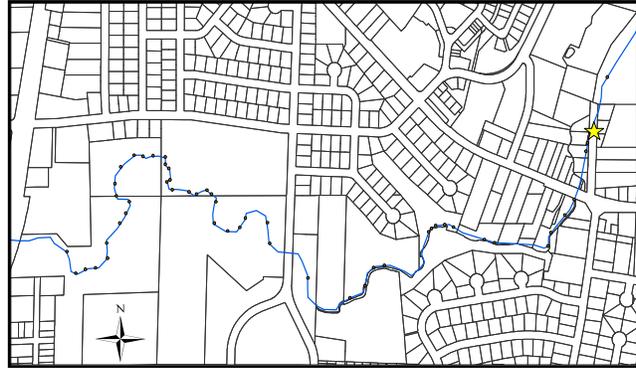
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 3  
**Location:** Approximately 460' Downstream of Century Ave.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	21

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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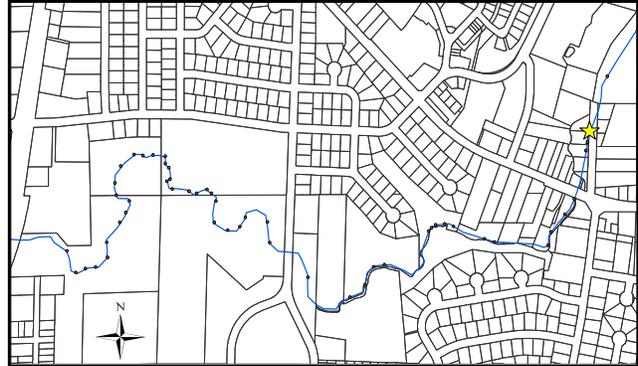
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 4  
 Location: Approximately 460' Downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.1

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

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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 streamcourse or gully may be meandering.

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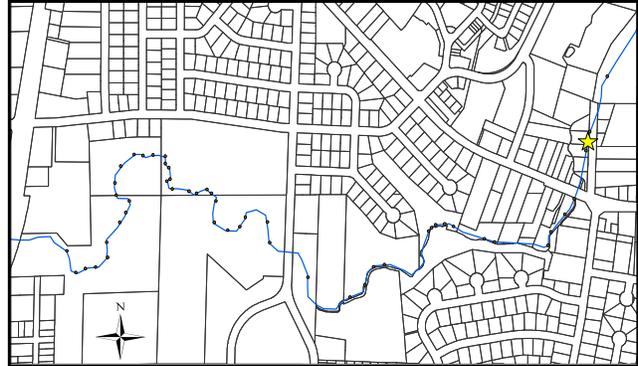
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 5  
 Location: Approximately 385' Downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	3.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

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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 streamcourse or gully may be meandering.

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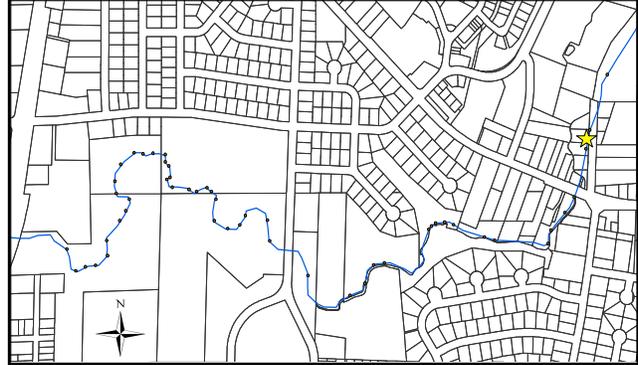
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 6  
 Location: Approximately 385' Downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	20
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	2.0

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

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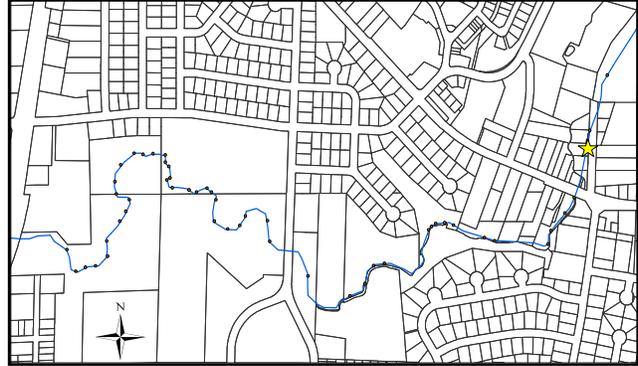
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 7  
 Location: Approximately 315' Downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	1.8E-05
Stream Bank Erosion (tons/yr)	12

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

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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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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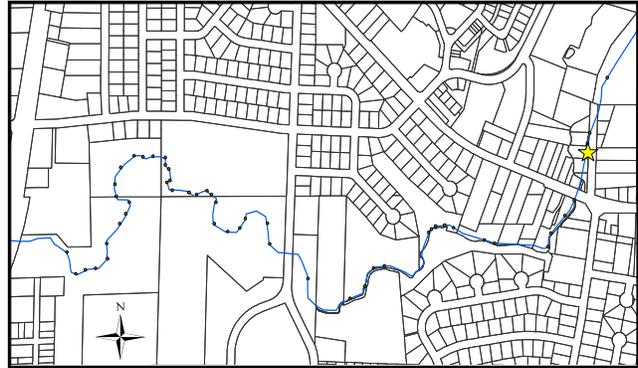
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 8  
 Location: Approximately 315' Downstream of Century Ave.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	40
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	9.0

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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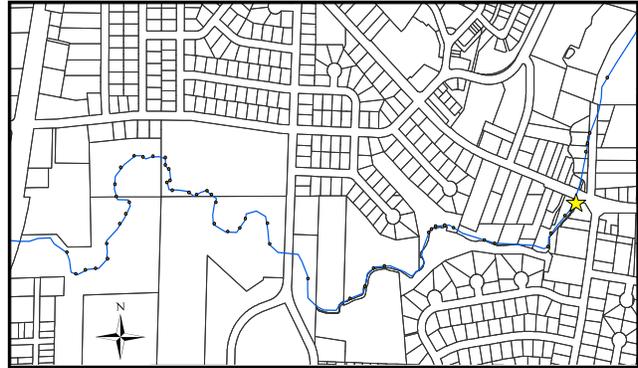
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 9  
 Location: Approximately 3,500' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.06
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.2

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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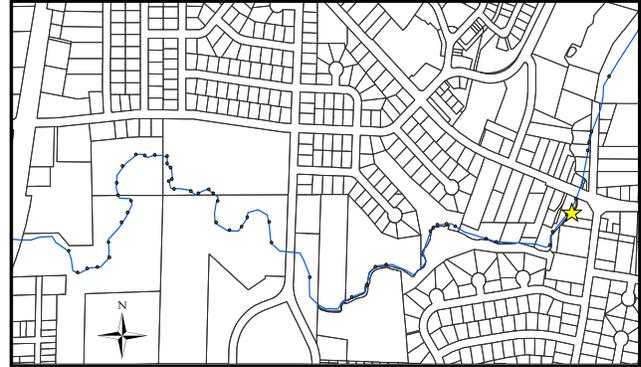
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 10  
 Location: Approximately 3,350' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	30
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.60

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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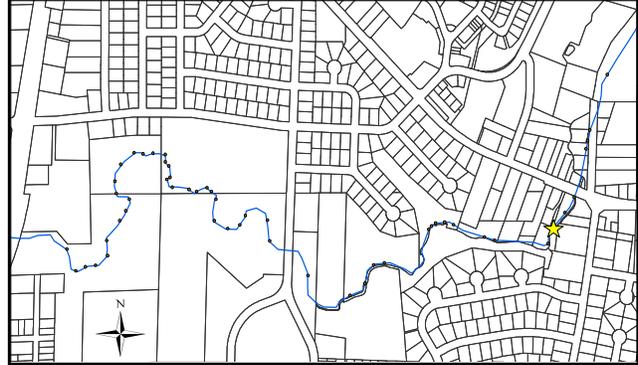
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 11  
**Location:** Approximately 3,150' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input checked="" type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	20
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	85
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.85

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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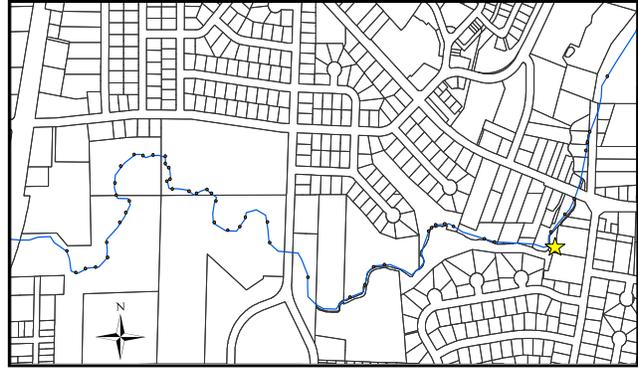
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 12  
**Location:** Approximately 3,050' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input checked="" type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	180
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.02
Soil Unit Weight (lb/ft <sup>3</sup> )	85
Soil P Concentration (lb/lb soil)	3.0E-05
Stream Bank Erosion (tons/yr)	1.2

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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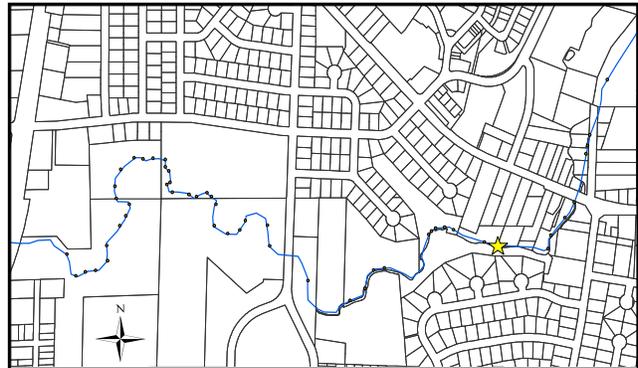
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 13  
 Location: Approximately 2,550' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	30
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	36

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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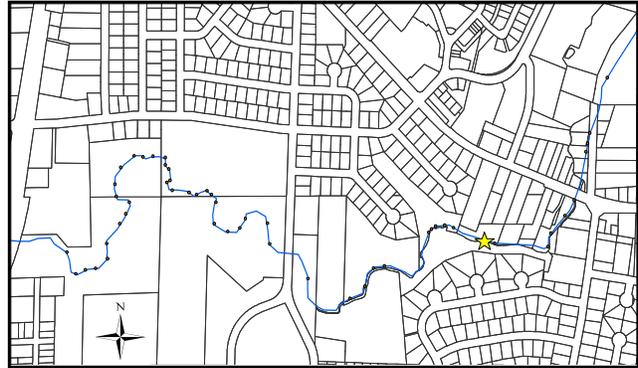
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 14  
**Location:** Approximately 2,500' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input checked="" type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	3
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	85
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.19

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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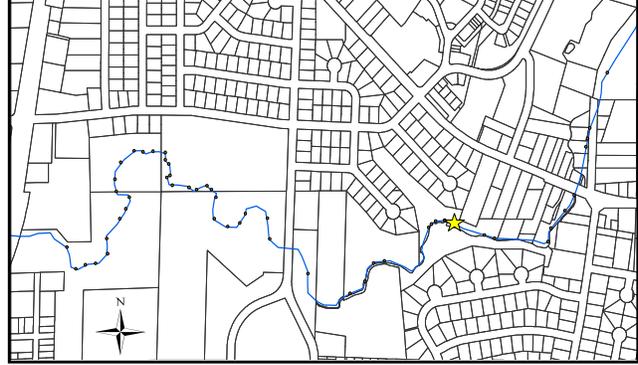
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 15  
**Location:** Approximately 2,200' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	60
Height (ft)	40
Lateral Recession Rate (ft/yr)**	0.5
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	60

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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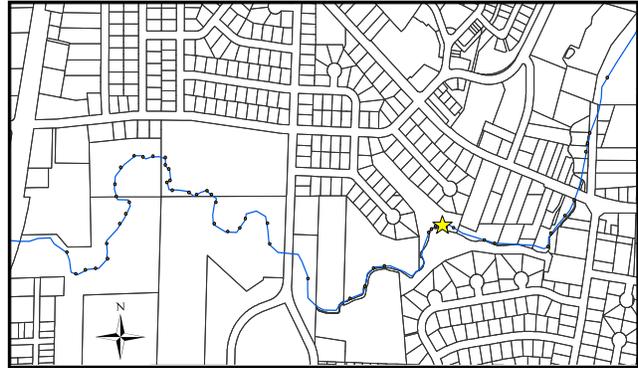
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 16  
**Location:** Approximately 2,100' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	5
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.75

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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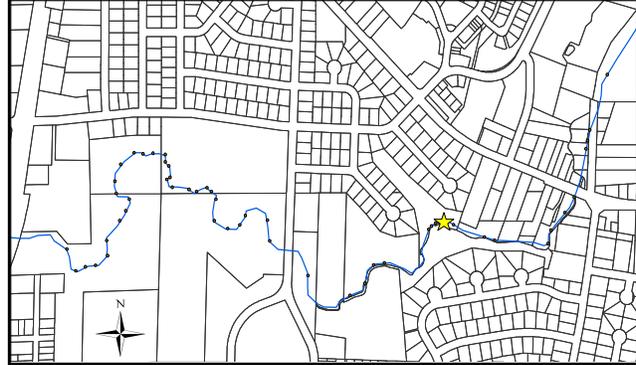
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 17  
**Location:** Approximately 2,100' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.06
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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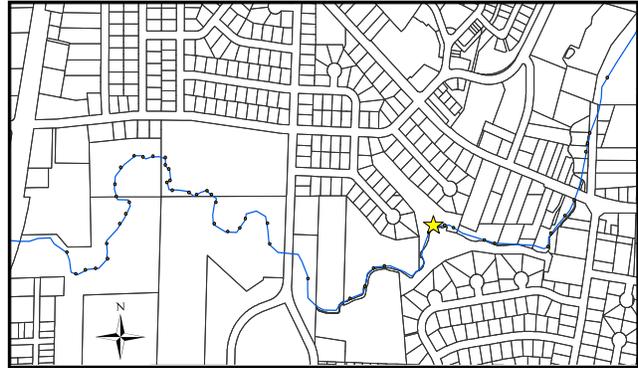
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 18  
**Location:** Approximately 2,050' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	50
Lateral Recession Rate (ft/yr)**	0.5
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	63

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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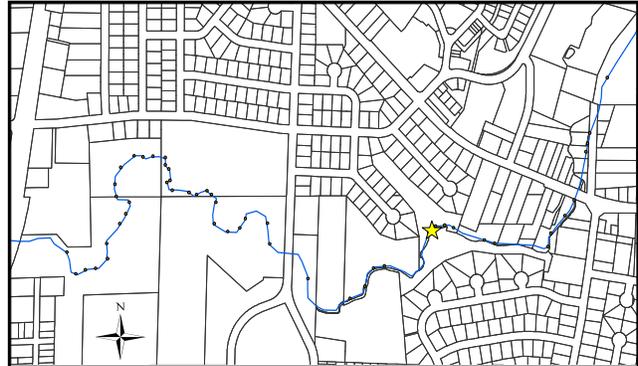
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 19  
**Location:** Approximately 2,000' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	40
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	40

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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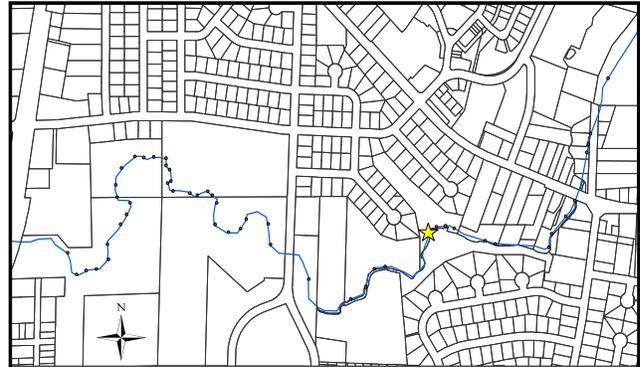
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 20  
**Location:** Approximately 1,950' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	2.4

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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# Streambank Erosion Estimation

Location ID Number: 21

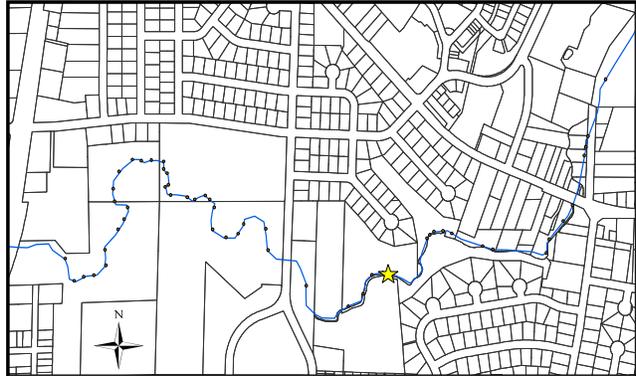
Location: Approximately 1,350' Downstream of Park St.

Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	5
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.38

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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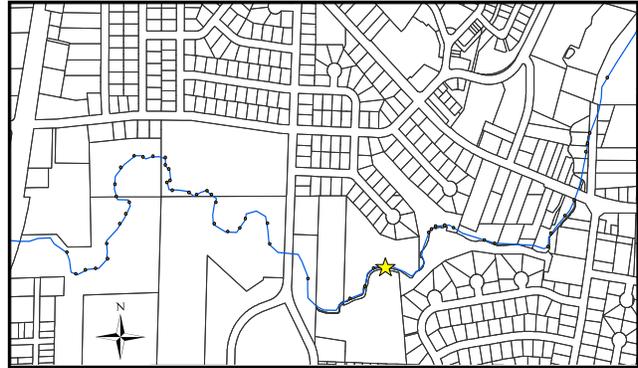
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 22  
 Location: Approximately 1,350' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	30
Height (ft)	3
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.23

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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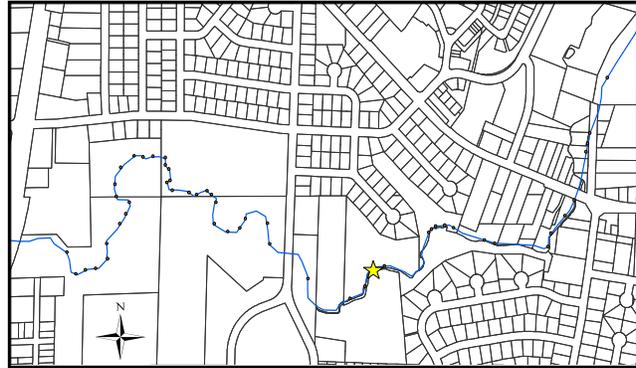
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 23  
 Location: Approximately 1,250' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.2

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

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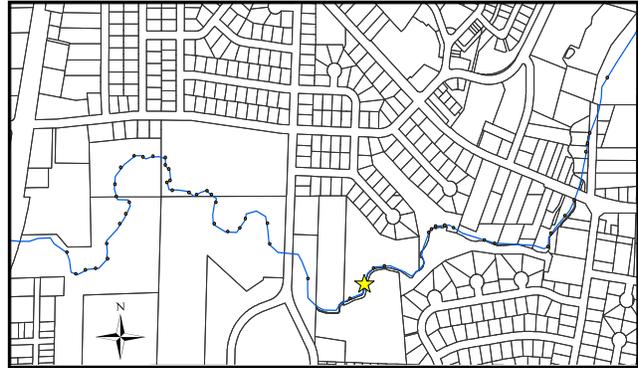
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 24  
**Location:** Approximately 1,050' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	80
Height (ft)	40
Lateral Recession Rate (ft/yr)**	0.5
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	80

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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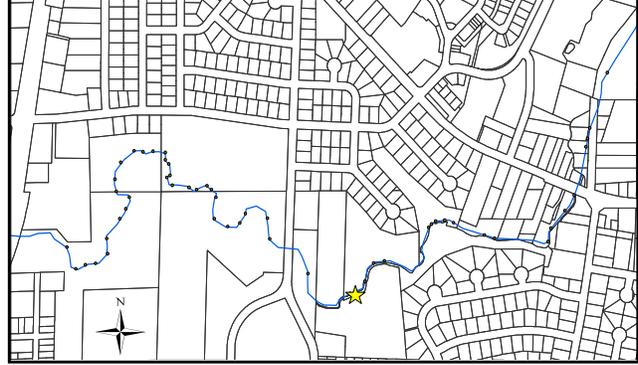
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 25  
 Location: Approximately 850' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	100
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.06
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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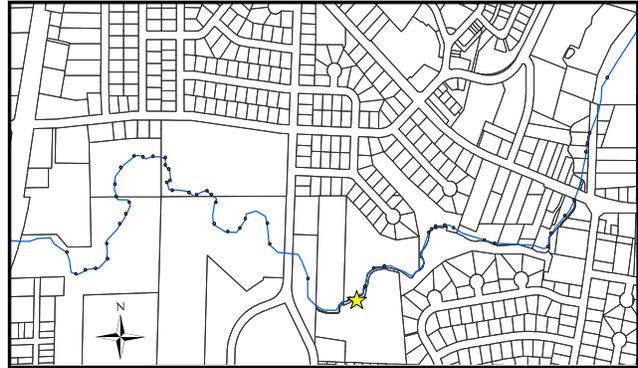
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 26  
**Location:** Approximately 850' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	70
Height (ft)	5
Lateral Recession Rate (ft/yr)**	0.06
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.1

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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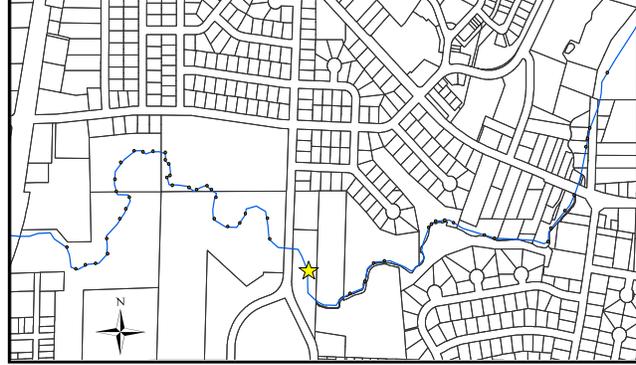
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 27  
 Location: Approximately 300' Downstream of Park St.  
 Date Sampled: 8/13/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	5
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.38

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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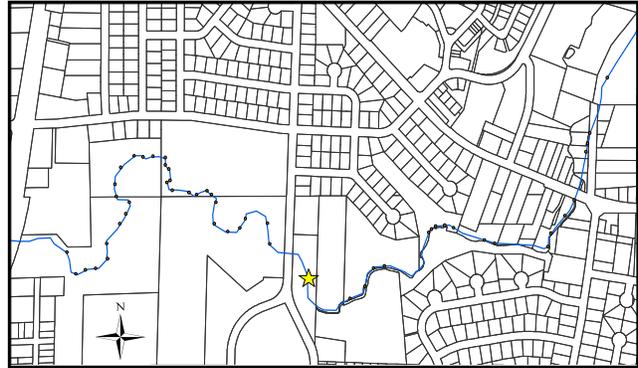
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 28  
**Location:** Approximately 300' Downstream of Park St.  
**Date Sampled:** 8/13/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	100
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	4.0

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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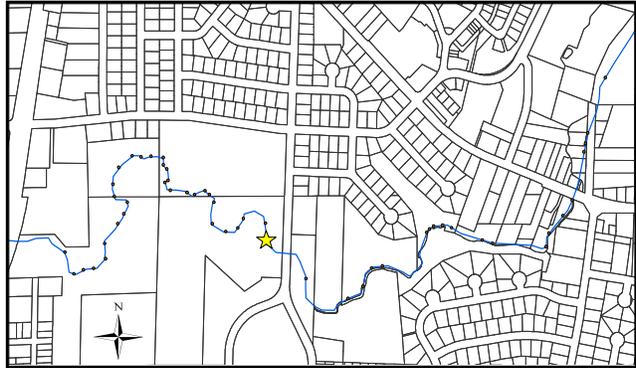
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 29  
 Location: Approximately 4,250' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	30
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	2.4

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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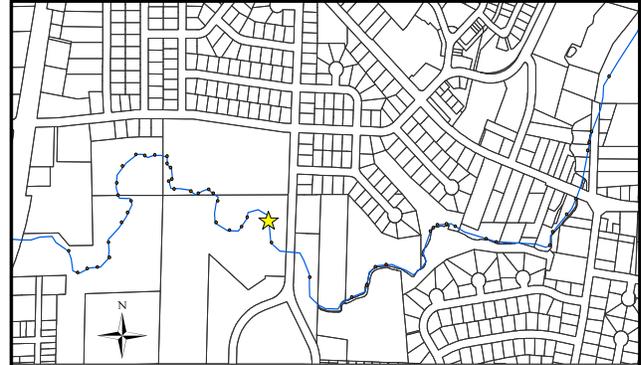
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 30  
 Location: Approximately 4,050' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	60
Height (ft)	20
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	18

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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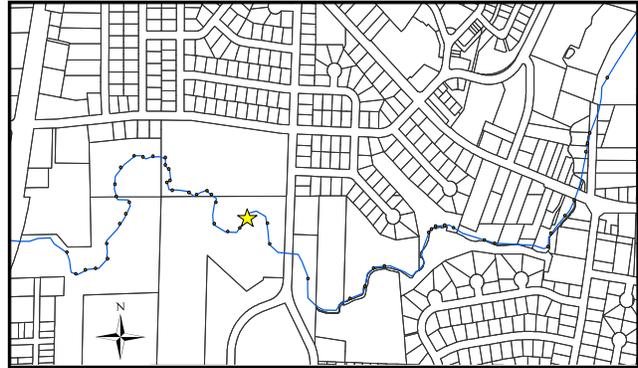
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 31  
 Location: Approximately 3,750' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	40
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	3.6

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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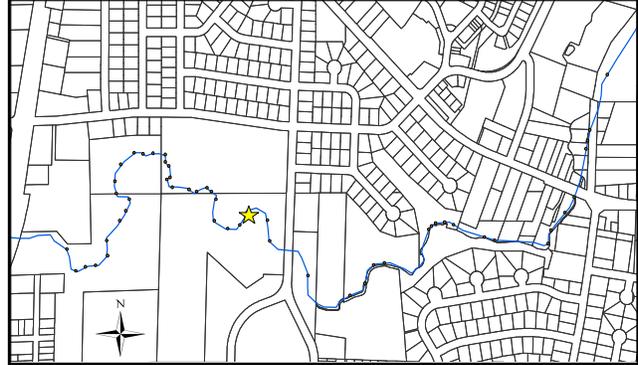
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 32  
**Location:** Approximately 3,750' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	40
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.2

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (ft/yr)	Category	Description
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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 streamcourse or gully may be meandering.

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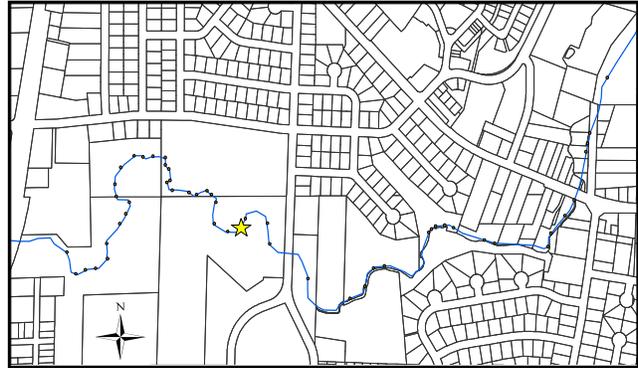
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 33  
 Location: Approximately 3,650' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input checked="" type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	70
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	85
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (ft/yr)	Category	Description
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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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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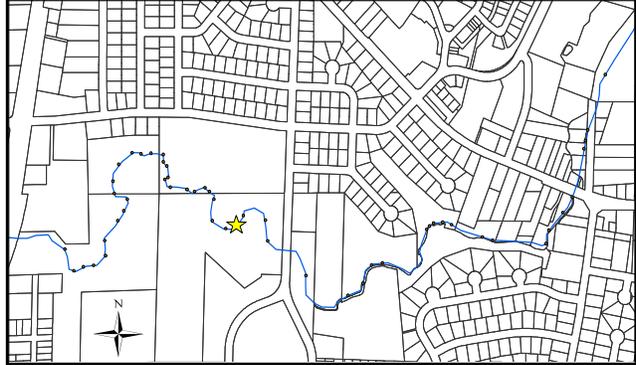
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 34  
**Location:** Approximately 3,650' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	30
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (ft/yr)	Category	Description
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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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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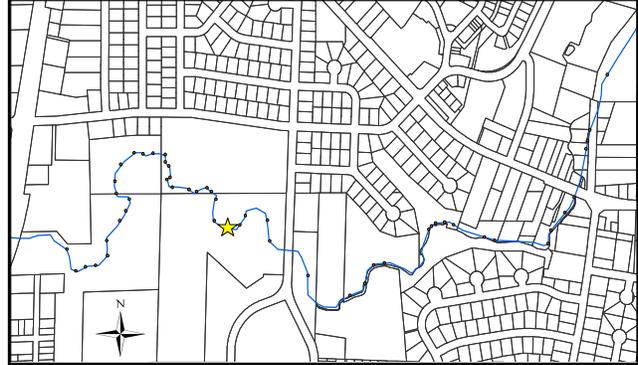
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 35  
**Location:** Approximately 3,550' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	60
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	5.8E-05
Stream Bank Erosion (tons/yr)	2.4

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

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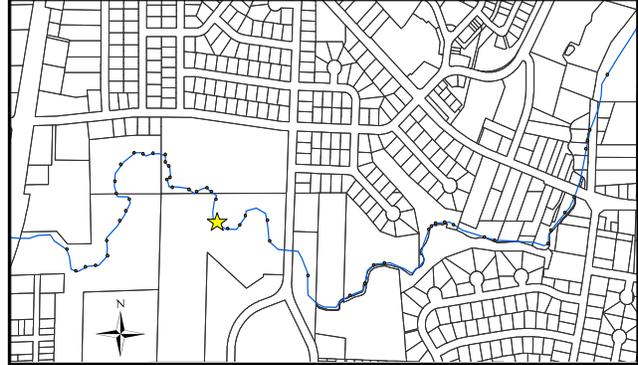
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 36  
 Location: Approximately 3,400' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	150
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	18

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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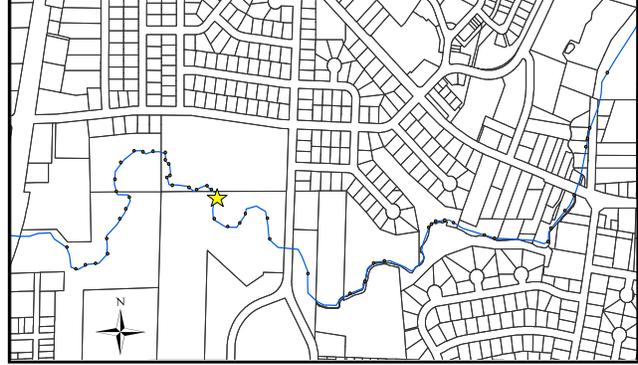
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 37  
 Location: Approximately 3,300' Downstream from the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.06
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.4

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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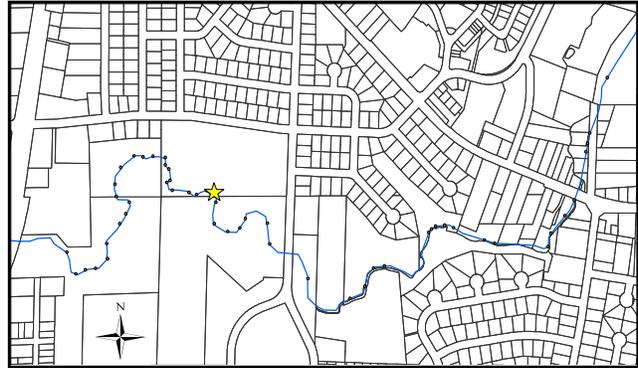
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 38  
 Location: Approximately 3,200' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	70
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	16

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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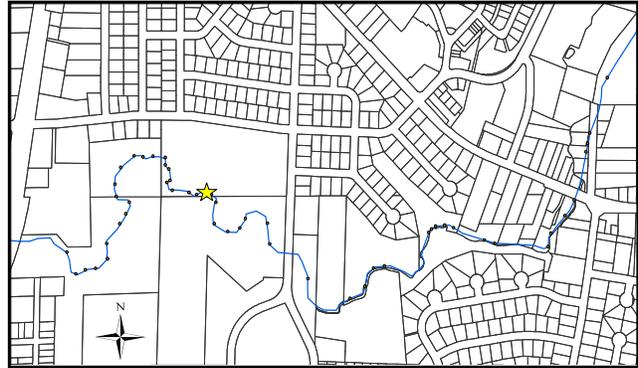
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 39  
**Location:** Approximately 3,100' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	11

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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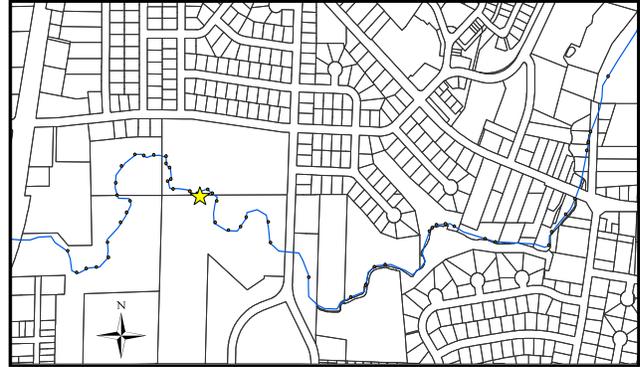
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 40  
 Location: Approximately 3,000' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	80
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	4.0

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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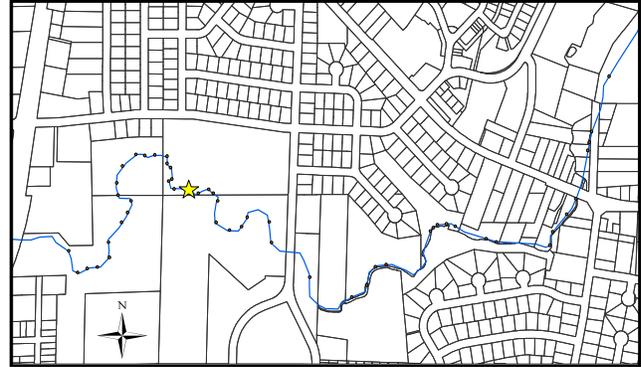
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 41  
**Location:** Approximately 2,950' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	110
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	25

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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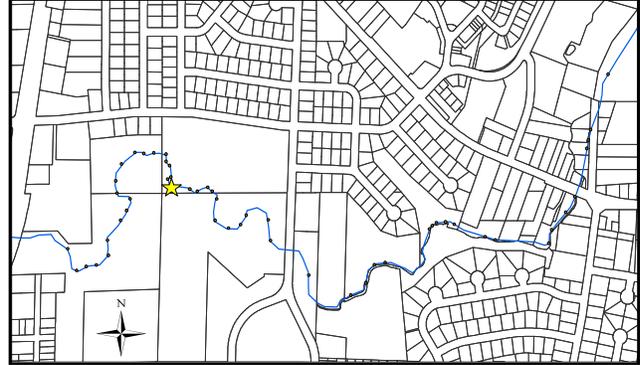
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 42  
 Location: Approximately 2,750' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.1

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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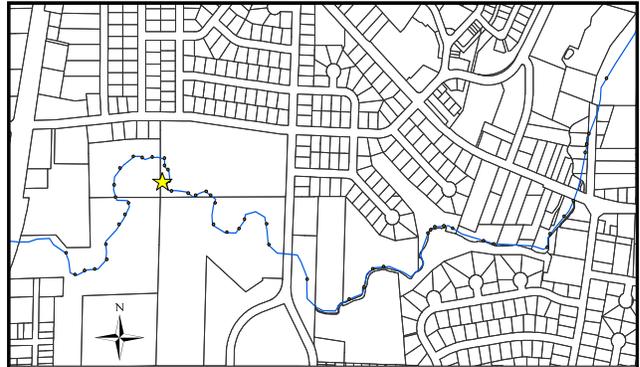
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 43  
 Location: Approximately 2,650' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	80
Height (ft)	25
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	30

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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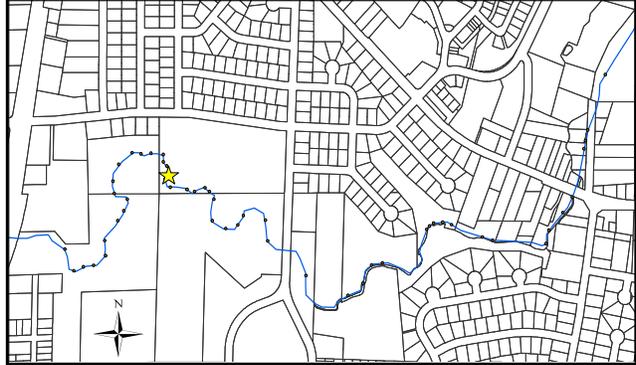
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 44  
 Location: Approximately 2,650' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	14

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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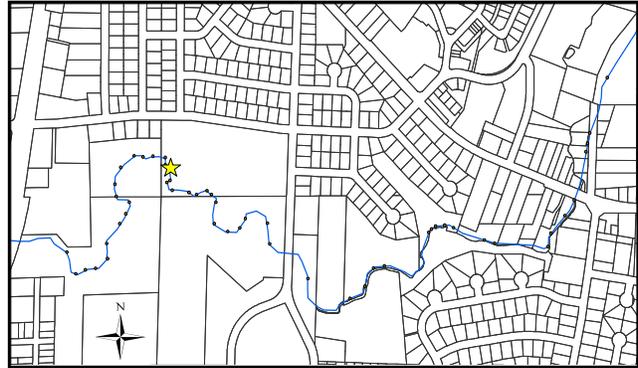
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 45  
 Location: Approximately 2,550' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



## Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

## Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	30
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	30

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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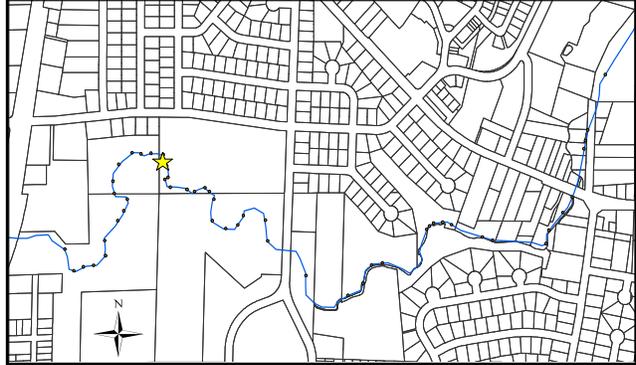
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 46  
 Location: Approximately 2,525' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	40
Height (ft)	12
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	9.6

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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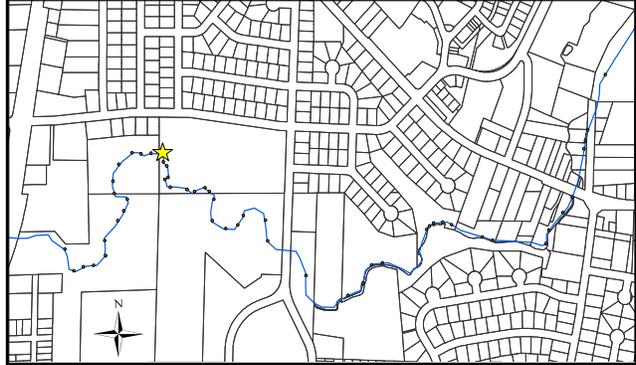
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 47  
**Location:** Approximately 2,500' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	150
Height (ft)	40
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	120

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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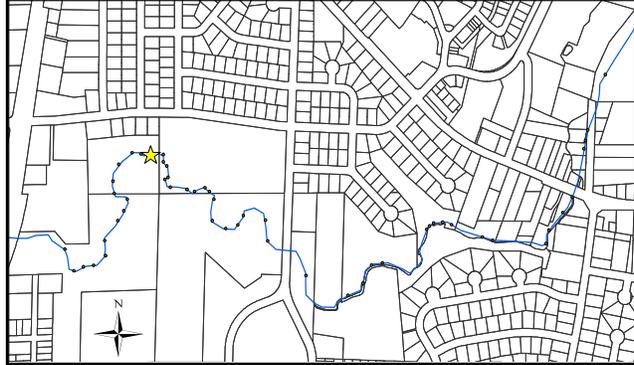
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 48  
 Location: Approximately 2,350' Downstream from West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	8
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.0

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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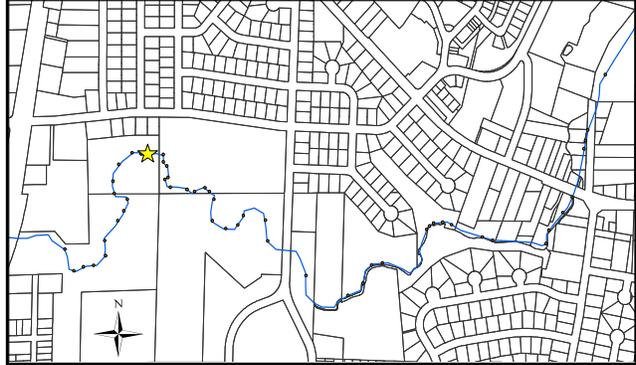
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 49  
**Location:** Approximately 2,350' Downstream from West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	25
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	6.3

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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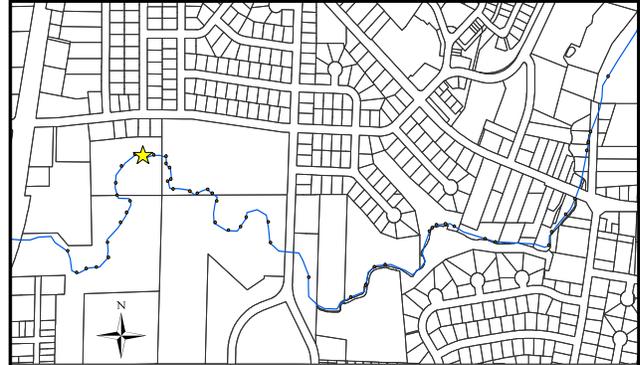
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 50  
 Location: Approximately 2,250' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	3.8

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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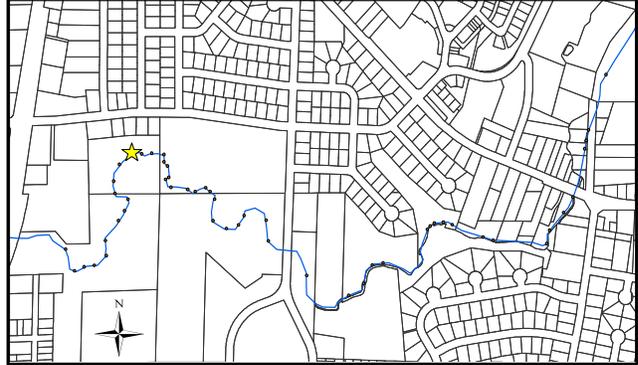
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 51  
 Location: Approximately 2,150' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	30
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	32

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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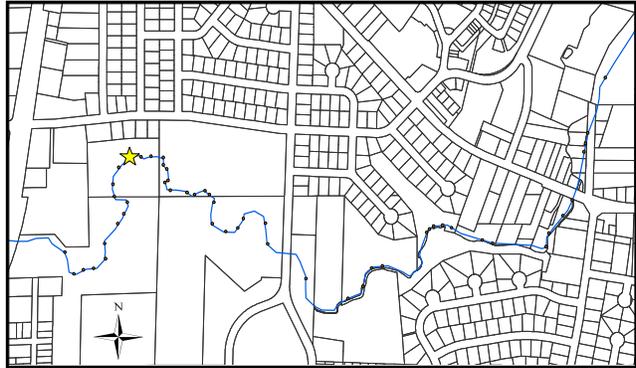
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 52  
**Location:** Approximately 2,150' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	40
Height (ft)	6
Lateral Recession Rate (ft/yr)**	0.05
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	0.60

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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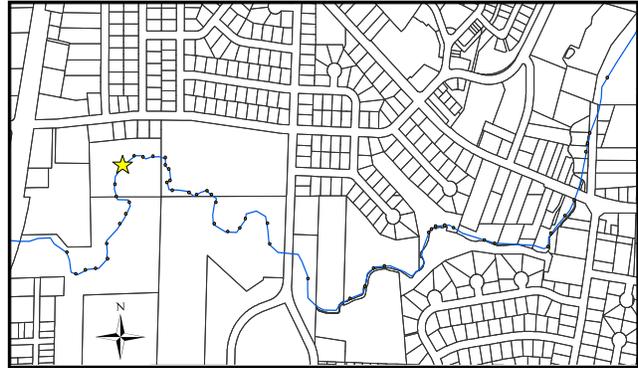
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 53  
**Location:** Approximately 2,000' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	2.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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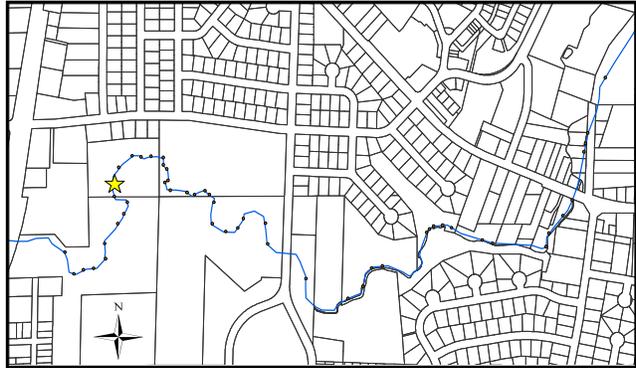
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 54  
 Location: Approximately 1,900' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	4.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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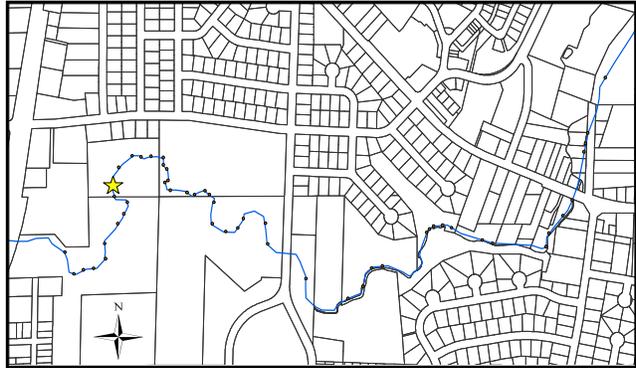
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 55  
**Location:** Approximately 1,900' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	5.3

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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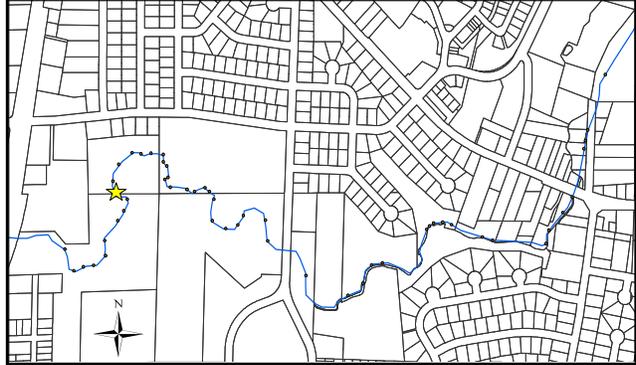
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 56  
**Location:** Approximately 1,800' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	70
Height (ft)	25
Lateral Recession Rate (ft/yr)**	0.4
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	35

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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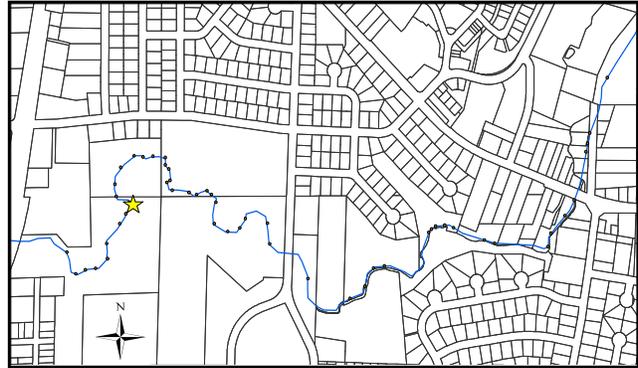
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 57  
**Location:** Approximately 1,650' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	70
Height (ft)	12
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	4.2

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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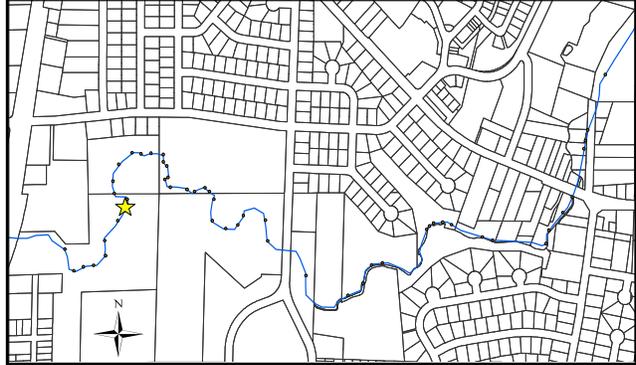
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 58  
 Location: Approximately 1,550' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	25
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	19

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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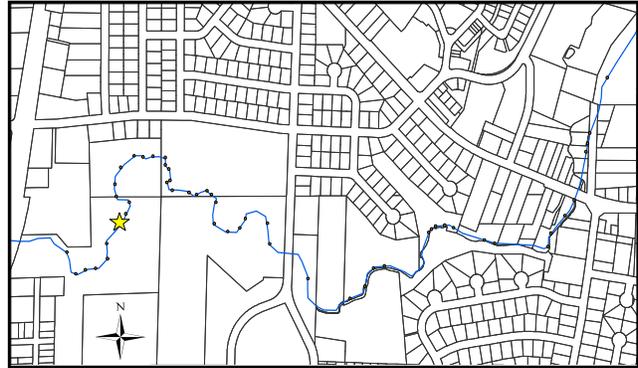
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 59  
**Location:** Approximately 1,450' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	50
Height (ft)	25
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	6.3

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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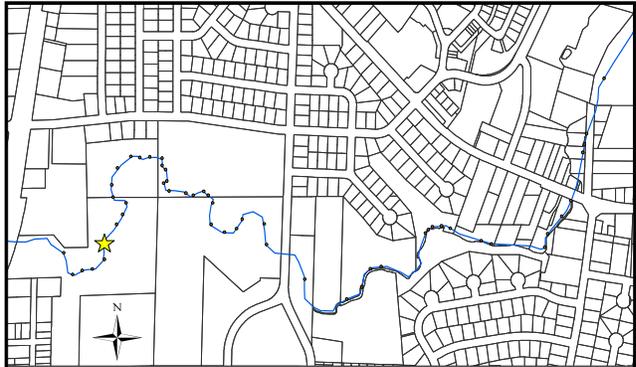
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 60  
 Location: Approximately 1,250' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input checked="" type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	11

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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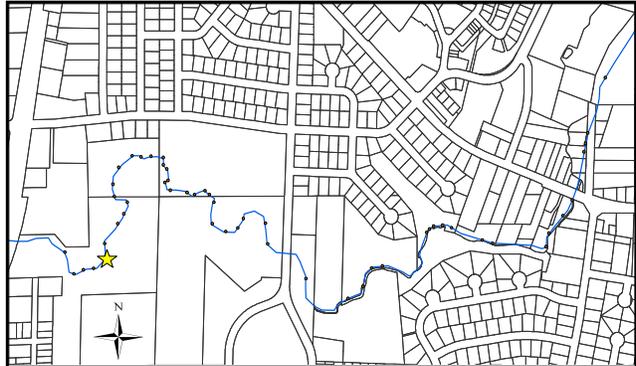
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 61  
**Location:** Approximately 1,150' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input checked="" type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	20
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	85
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	10

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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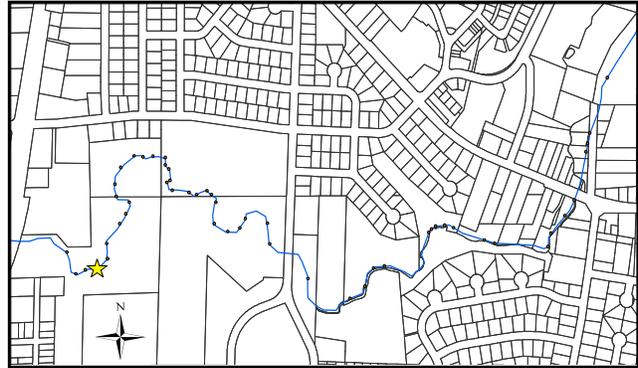
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 62  
**Location:** Approximately 1,000' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	60
Height (ft)	12
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	3.6

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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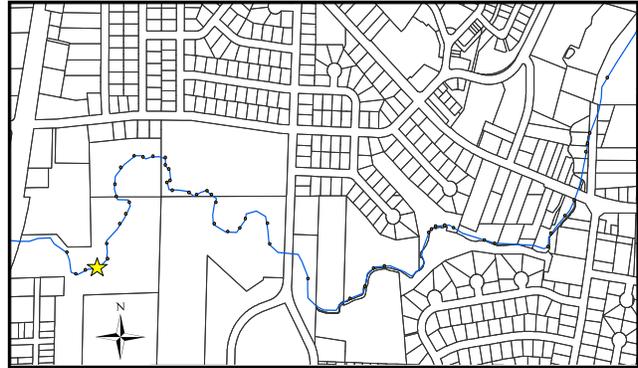
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 63  
**Location:** Approximately 1,000' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	30
Height (ft)	10
Lateral Recession Rate (ft/yr)**	0.1
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	1.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

**Source:** Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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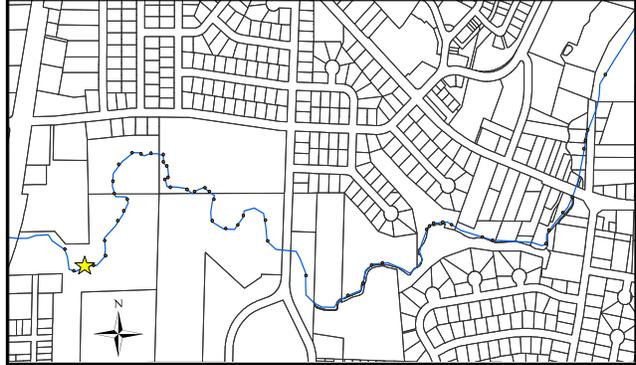
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 64  
 Location: Approximately 900' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	15
Lateral Recession Rate (ft/yr)**	0.2
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	7.5

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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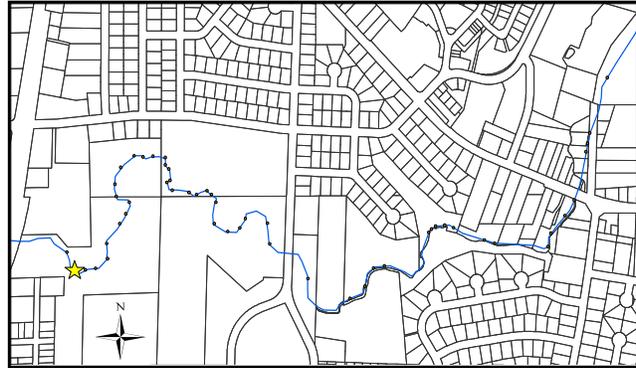
# Streambank Erosion Estimation

City: Middleton, WI  
 Watercourse: Pheasant Branch Creek  
 Location ID Number: 65  
 Location: Approximately 825' Downstream of the West Beltline Hwy  
 Date Sampled: 8/21/2006

Photo of Streambank Erosion



★ Location of Streambank Erosion



### Soil Textural Class Information (Check One)

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

### Streambank Characteristics

Parameter	
Stream Side (LEFT or Right)*	RIGHT
Length (ft)	60
Height (ft)	30
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	27

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (ft/yr)	Category	Description
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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 streamcourse or gully may be meandering.

Source: Steffen, L.J. 1982. Channel Erosion (personal communication), printed in "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual," June 1999 Revision; Michigan Department of Environmental Quality - Surface Water Quality Division - Nonpoint Source Unit. EQP 5841 (6/99).

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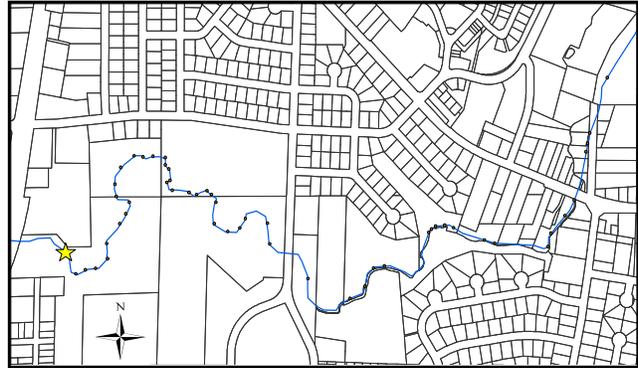
# Streambank Erosion Estimation

**City:** Middleton, WI  
**Watercourse:** Pheasant Branch Creek  
**Location ID Number:** 66  
**Location:** Approximetaly 600' Downstream of the West Beltline Hwy  
**Date Sampled:** 8/21/2006

**Photo of Streambank Erosion**



**★ Location of Streambank Erosion**



**Soil Textural Class Information (Check One)**

Soil Texture	Unit Weight (lb/ft <sup>3</sup> )	Soil Texture	Unit Weight (lb/ft <sup>3</sup> )
<input type="checkbox"/> Gravel	110 - 120	<input type="checkbox"/> Silt	75-90
<input type="checkbox"/> Gravely Loam	110 - 120	<input type="checkbox"/> Clay	60-70
<input type="checkbox"/> Sand	90 - 110	<input type="checkbox"/> Loam	80-100
<input checked="" type="checkbox"/> Sandy Loam	90 - 110		

**Streambank Characteristics**

Parameter	
Stream Side (LEFT or Right)*	LEFT
Length (ft)	50
Height (ft)	30
Lateral Recession Rate (ft/yr)**	0.3
Soil Unit Weight (lb/ft <sup>3</sup> )	100
Soil P Concentration (lb/lb soil)	
Stream Bank Erosion (tons/yr)	23

\*Stream Side is defined as the 'left' or 'right' side of the stream when facing in the direction of stream flow.

\*\*Lateral Recession Rate (LRR) is the rate at which bank deterioration has taken place and is measured in feet per year. This rate may not be easily determined by direct measurement. Therefore best professional judgment may be required to estimate the LRR. Please refer to the table below for typical values.

LRR (ft/yr)	Category	Description
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