OTTER LAKE
SHORELINE EROSION CONTROL PROJECT

Financial Assistance Agreement 3190709
November 3, 2009

Prepared by: Otter Lake Water Commission
Dennis Ross, General Manager
PO Box 468, Virden, IL 62690
(217) 965-1566

Prepared for: Illinois Environmental Protection Agency
Bureau of Water
Watershed Management Section
1021 North Grand Ave. East, P.O. Box 19276
Springfield, Illinois 62794-9276

This report was prepared using U.S. Environmental Protection Agency funds under Section 319 of the Clean Water Act distributed through the Illinois Environmental Protection Agency. The findings and recommendations herein are not necessarily those of the funding agencies.

Project Partners:

Owner:	Otter Lake Water Commission Dennis Ross, General Manager PO Box 468, Virden, IL 62690 (217) 965-1566
Contractor:	Otter Lake Water Commission Dennis Ross, General Manager PO Box 468, Virden, IL 62690 (217) 965-1566
Funding: **60%**	Illinois Environmental Protection Agency Illinois Clean Lakes Program and Section 319 Program P.O. Box 19276 Springfield, Illinois 62794-9276
Funding: **40%**	Otter Lake Water Commission PO Box 468 Virden, IL 62690 (217) 965-1566

Otter Lake is located in Macoupin County Illinois; and is owned and operated by the Otter Lake Water Commission. The lake was built as a water supply for the towns of Auburn, Divernon, Girard, Pawnee, Thayer and Virden. In recent years the towns of Nilwood and Tovey were added as well as two water districts.

Otter Lake Data

Surface Area	765 acres
Maximum Depth	54 feet
Average Depth	21 feet
Storage Capacity	16,065 acre feet
Watershed	12,992 acres
Lake Type	Damned Stream
Year Constructed	1968
Public Access	Yes

Otter Lake has experienced significant amounts of sediment accumulation and degrading of its shoreline. This situation has contributed to increased levels of phosphorus and manganese. Phosphorus is a nutrient source for algae.

Otter Lake has seen high counts of blue green algae in recent years. Further testing for 2 methylisoborneal (MIB) and geosmin were conducted confirming high counts of these taste and odor causing compounds. The presence of these compounds have increased both treatment expense and customer complaints. Reduction of phosphorus from nonpoint source pollution should reduce algae blooms on the lake. This project is one of many efforts being undertaken by the Water Commission to reduce nonpoint source pollution and in turn improve the finished water quality to the towns it serves.

A Phase One: Diagnostic-Feasibility Study of Otter Lake was completed in October 1999. A number of management practices were identified for implementation to improve water quality. The Commission applied to Illinois EPA for financial assistance to help with the implementation of some of the recommendations in the Phase One study. The IEPA awarded the Commission a Section 319 Grant reference number 3190709 to be fulfilled between the dates of August 27, 2007 and December 31, 2009 for shoreline stabilization and tree planting.

PROJECT INTRODUCTION

According to the Phase One: Diagnostic-Feasibility Study of Otter Lake (Oct. 1999. Shun Dar Lin, William C. Bogner & Ramank Raman) Otter Lake had 160,102 feet of shoreline identified as severely to minimally eroded. The project proposed to stabilize 16,000 feet of shoreline using placement of riprap and bald cypress seedlings. All stabilization work would be done by the Commission using their own equipment.

A construction permit was obtained from the US Army Corp of Engineers, following guidelines of the General Permit. Permit number MVS-2009-233 was issued on April 28, 2009, copy attached to this report.

RIP-RAP METHODS

Two basic rip-rap designs were selected for this project. The first being "Lean Revetment, the second is known as the "Breakwater with Transitional Wetland". Both methods require filter fabric to be installed and pinned prior to the placement of the rip-rap. Design schematics are included in this report. Hank Sutton, President of Macoupin Boat Works supplied the design for the Breakwater with Transitional Wetland; this is a technique that was used on Kinkaid Lake in southern Illinois. Most of the areas of installation on Otter Lake were far by better suited for the Breakwater method. While this method requires more rip-rap, the performance in areas with higher banks is unsurpassed. This method is impractical when laying rip-rap by hand.

Over the project period the Commission installed 14,063 tons of RR# rip-rap, approximately 827 barge loads. This rip-rap provided protection to 14,567 feet of shoreline. The average rate of rip-rap placed was 1 ton per foot of shoreline.

On May 30, 2007 the Commission took delivery of a mechanical barge for placing rip-rap for shoreline erosion control. This barge was also used in conjunction with the In-Lake Sedimentation Control Project (3190212).

Mechanical Barge being loaded with John Deere 210 Backhoe.

Mechanical Barge being loaded with Cat 928F Front End Loader.

During the first year of this project the Commission loaded the Mechanical Barge with an existing John Deere 210 backhoe. This two wheel drive backhoe was equipped with a 1 yard bucket, loading of the barge took approximately 17 scoops. The hopper on the Mechanical Barge holds 17 tons of RR3 rip-rap. While this method did produce results, it became apparent that loading time was excessive.

Pictured on left is the Cat 928F Front End Loader and the John Deere 210 backhoe is on the right.

On April 22, 2009 the Commission purchased a 1994 Cat 928F rubber tired front end loader. This loader is four wheel drive with a 3 yard bucket. Loading the barge is completed with 5 scoops using this loader. This improvement in equipment increased our production significantly.

Three man crew laying rip-rap along shoreline.

Operators cab on mechanical barge.

A three man crew was utilized in the project. One employee operated the mechanical barge. Including loading, piloting barge to the rip-rap site and unloading the barge. A second employee operated the "push boat". This small jon boat was used to move the barge laterally along the shore as the rip-rap was placed.

The push boat is used to position the mechanical barge when unloading.

While the barge operator can control the speed of the belt and the height of the drop, the position of the belt laterally must be done by hand. The third employee controls the end of the conveyor belt on the mechanical barge. This is accomplished by having the employee stand in the water, with steel toed hip waders, moving the fixed conveyor back and forth to control the placement of the rip-rap. This employee also operates the barge used to bring the filter fabric to the jobsite, also known as the "paper barge".

The conveyor belt is controlled side to side by hand while placing the rock.

While the mechanical barge is returning to the loading site, the other two employees make final hand adjustments of the rip-rap, clear brush or place filter fabric for the next load of rip-rap.

Installing filter fabric from paper barge.

TREE PLANTING

Planting bald cypress trees in tubex tree shelters at the edge of the shoreline.

In addition to the rip-rap, 1,200 trees were also planted in conjunction with this project. Survival rates of these trees are being tracked.

Approximately, 800 Bald Cypress trees were planted at the waters edge with Tubex shelters. Planting of these trees has been an ongoing effort by the Commission. Past experience has shown first year rates to be very good, over 75 percent, but rates decline through year five. A reasonable expectation in the fifth year would be 50 percent.

Established water willows.

Water willows were transplanted from Beaver Dam State Park south of Carlinville, Illinois eight years ago with very positive results. The water willows have spread to several

shallow water shorelines that would not have been high priority rip-rap areas. The trees planted in 2008 were purchased through the Macoupin County Soil and Water Conservation District, trees for 2009 were donated to the project.

Approximately, 400 assorted hardwood trees were also planted as an ongoing reforesting project. These trees are planted in areas where adjoining landowners have cleared Commission property. Clearings were done without the Commissions approval. The Commissions active roll on the lake coupled with several letters has minimized additional clearings. This has proven to be an effective method to deter this type of encroachment. While measuring the reduction of sediment loading may be impossible, some areas have seen reduction in paths used by ATV's. Maps detailing the location of trees planted is included with this report.

Bald cypress trees approximately 6 years old.

PROJECT REIMBURSEMENT

	Project Cost	OLWC 40%	IEPA 60%
Agreement	$394,316.00	$157,726.00	$236,590.00

Invoice #	Total	Match	Invoiced
# 1	8,773.07	3,509.23	5,263.84
# 2	24,694.02	9,877.61	14,816.41
# 3	25,090.01	10,036.00	15,054.01
# 4	26,245.50	10,498.20	15,747.30
# 5	25,848.49	10,339.40	15,509.09
2009-01	4,187.29	1,674.92	2,512.37
2009-02	12,370.68	4,948.27	7,422.41
2009-03	53,505.11	21,402.04	32,103.07
2009-04	39,231.00	15,692.40	23,538.60
2009-05	71,284.40	28,513.77	42,770.63
2009-06	28,912.39	11,564.96	17,347.43
2009-07	51,398.85	20,559.55	30,839.30
2009-08	27,424.21	13,758.67	13,665.54
TOTAL	**$398,965.02**	**$162,375.02**	**$236,590.00**

EXAMPLES OF WORK PERFORMED

Shoreline area # 11 before rip-rap was laid.

Stabilized shoreline from area # 11.

Shoreline area # 10 before rip-rap was laid.

Stabilized shoreline from area # 10.

Shoreline area # 9 before rip-rap was laid.

Stabilized shoreline from area # 9.

Shoreline area # 15 before rip-rap was laid.

Stabilized shoreline from area # 15.

Shoreline area # 13 before rip-rap was laid.

Stabilized shoreline from area # 13.

BANK STABILIZATION

Shoreline	Feet of Shoreline Stabilized	Sediment Load Reduction (ton/year)	Phosphorus Load Reduction (lb/year)	Nitrogen Load Reduction (lb/year)
Proctor Cove – Bank #1	115’	5	5	9
North Proctor Cove – Bank # 1	600’	48	48	96
North Proctor Cove – Bank # 2	1140’	18	18	36
South Proctor Cove – Bank # 1	450’	36	36	72
South Proctor Cove – Bank # 2	1272’	20	20	41
02-2009 Report – Bank # 1	532’	13	13	26
Bank A Area 1 – Bank # 1	324’	1	1	3
Bank A Area 2 – Bank # 1	303’	2	2	4
Bank A Area 4 – Bank # 1	576’	3	3	7
Bank A Area 6 – Bank # 1	490’	2	2	4
Area 8 – Bank # 1	300’	1	1	2
Area 8 – Bank # 2	332’	20	20	40
Bank A Area 13 – Bank # 1	243’	1	1	3
Bank A Area 14 – Bank # 1	600’	4	4	7
Bank A Area 14 – Bank # 2	216’	1	1	2
Bank A Area 15 – Bank # 1	550’	3	3	7
Bank A Area 15 – Bank # 2	330’	1	1	3
10/20/2009 Report – Bank # 1	2316’	4	4	7
10/20/2009 Report – Bank # 2	2870’	172	172	344
Area 13 – Bank # 1	195’	3	3	6
Area 13 – Bank # 2	309’	12	12	25
TOTAL	**14,063’**	**370**	**370**	**744**

SUMMARY

Total dollars spent on this project were $398,965.02, in an effort to ensure all grant funds were utilized the Commission slightly overfunded the project. The goal was to protect 16,000 feet of shoreline with this grant. Final numbers show 14,657 feet of shoreline were protected with RR3 rip-rap or 91% of the goal. The remaining 1,433 feet of shoreline were protected by the planting of 800 bald cypress trees and 400 hardwood trees. Each cypress tree will stabilize several feet of shoreline. However, time to reach maturity and survival rates will be factors.

Rip-rap laid by volunteers at Otter Lake Campground.

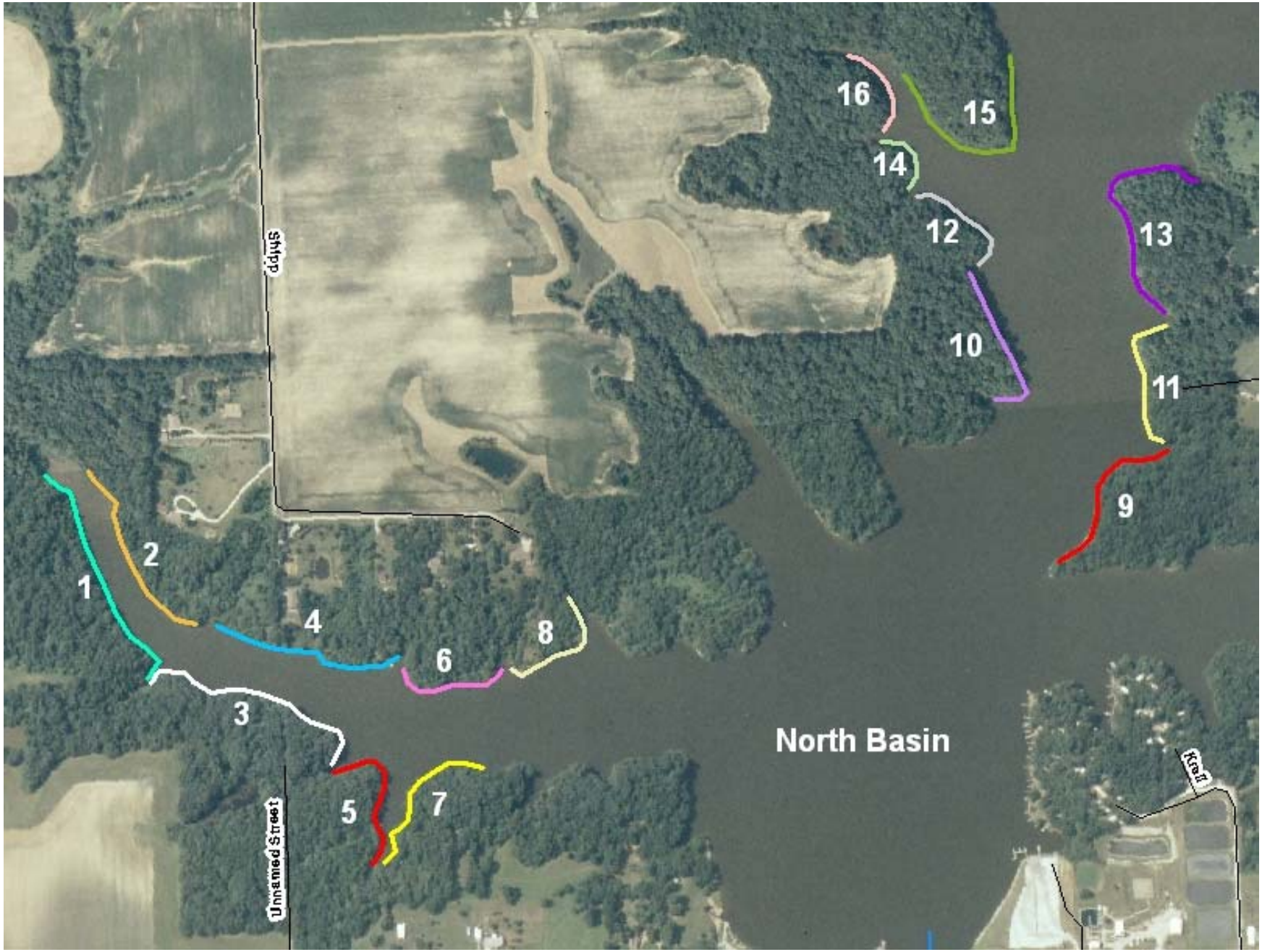
Additional shoreline work was done during this project by volunteers at the campgrounds. Campers were excited to see this project take form. They in turn agreed to lay rip-rap around boat docks, by hand. These areas were much too small to access with the mechanical barge. An additional 560 feet of shoreline were protected using this volunteer hand placement method.

A highlight of this project is the use of multiple state and federal programs and grants for a common cause. During the same timeframe of this Section 319 grant two other projects were underway. One, a NRCS Wildlife Habitat Improvement Project (NRCS-WHIP) grant on the forested area owned by the Commission surrounding Proctor Cove. The other project was a C-2000 project (# BRPSPG-07) on adjoining landowners property which was completed in August 2008. The NRCS-WHIP grant was awarded to the Commission to manage 125 acres of oak-hickory woodlands, surrounding Proctor Cove, in a manner that protects and increases critical

Redheaded Woodpecker habitat, promotes native plant communities and reduces nonpoint pollution impacts to water quality. The project included heavy mechanical clearing of invasive bush honeysuckle in the area east of Proctor Cove and hand clearing of the remaining areas around Proctor Cove. The purpose of C-2000 project was to restore oak-hickory woodlands in the Otter Lake watershed for the targeted wildlife species Redheaded Woodpecker, promote native plant communities, minimize agricultural non-point pollution impacts to water quality, and work with local landowners as well as government organizations to accomplish necessary watershed management goals. Total cost of this project was reported to be $108,120 with matching funds provided by USFWS-Partners for Fish and Wildlife $20,000, NRCS-WHIP $34,590 and Pheasants Forever $3,530. C-2000 funds provided the remaining $50,000.

Both of these projects will improve wildlife habitat and restore the understory of areas immediately adjacent to Otter Lake. The improved understory will serve as a filter strip to reduce runoff entering Otter Lake.

Additional plans for Otter Lake Water Commission include two current Section 319 applications. The first would implement best management practices in the watershed as identified in the Hodges Creek Watershed TMDL Report (November 2006). The second application would continue shoreline erosion control on Otter Lake. An inventory of the entire shoreline is proposed for 2010. This inventory will quantify shoreline protected, shoreline needing protection, shoreline needing maintenance, and shoreline needing no work. This inventory will be used for future projects on Otter Lake. A Forest Management Plan has recently been completed for all properties (approximately 750 acres) owned by the Commission surrounding Otter Lake. This plan provides a step by step plan to manage these lands. Again the methods are different than this current Section 319 project, but the goals and results are very much in step. Multiple funding options will be considered for the Forest Management project.

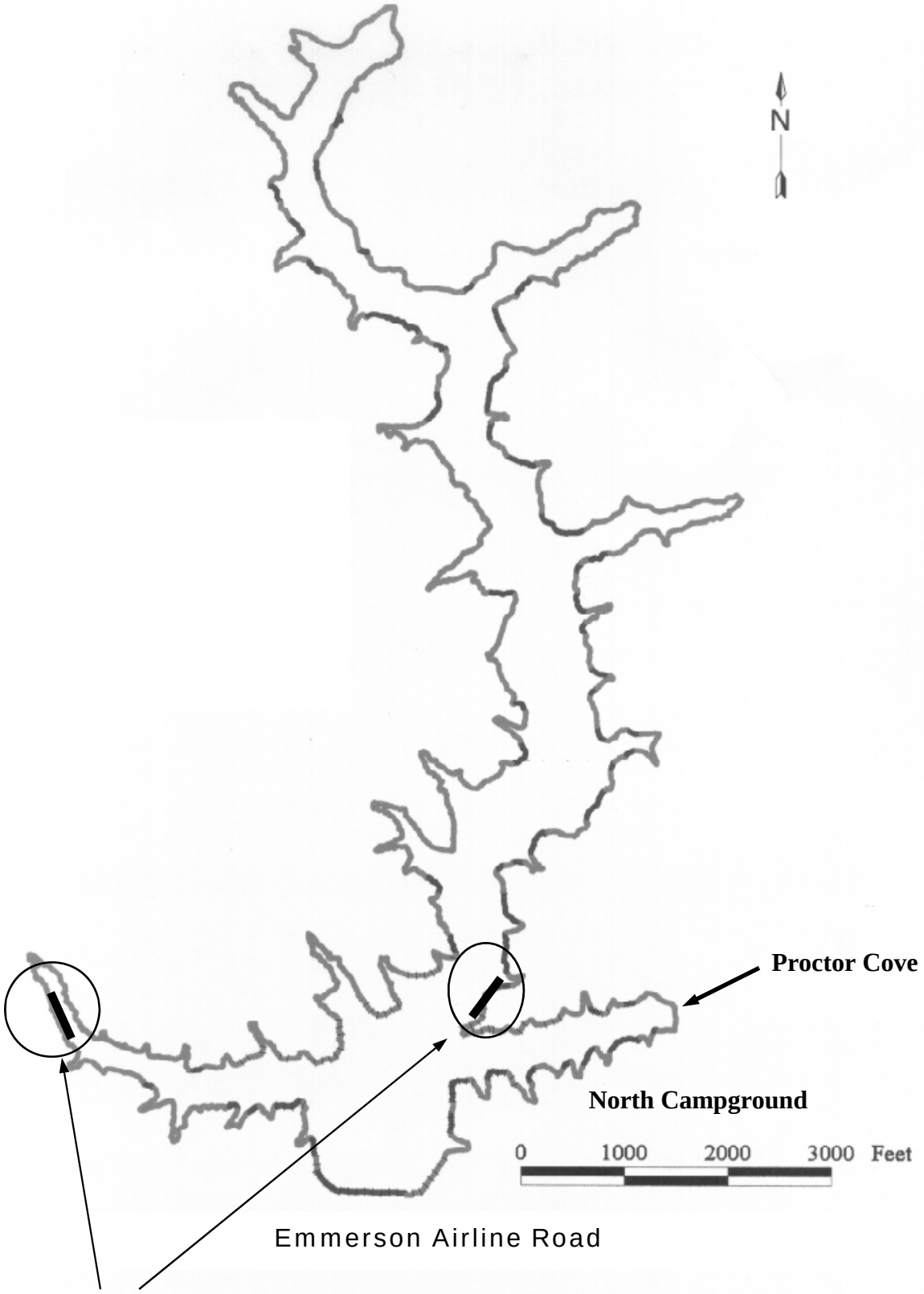

16
15
14
12
13
10
11
9
1
2
4
8
6
3
5
7
North Basin
Shipp
Unnamed Street
Kraft

West Campground Rip-rap Laid By Volunteers.

South East Campground Rip-rap Laid By Volunteers.

North Campground Rip-rap Laid By Volunteers.

Otter Lake Water Commission
Shoreline Erosion Control Project (319 07 09)



Deep water areas requiring more than normal amounts of rip-rap.

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

	Example
BMP Number:	3190709 · 3199802001
	Proctor Cove 2007

Please select a soil textural class:

- ○ Sands, loamy sands
- ○ Sandy loam
- ○ Fine sandy loam
- ○ Loams, sandy clay loams, sandy clay
- ○ Silt loam
- ◉ Silty clay loam, silty clay
- ○ Clay loam
- ○ Clay
- ○ Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		115	0	500	
Height (ft)		2	0	15	
Lateral Recession Rate (ft/yr)*		0.5	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** Indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	5	1	6
Phosphorus Load Reduction (lb/year)	5	1	6
Nitrogen Load Reduction (lb/yr)	9	1	10

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

		Example
BMP Number:	319 07 09	3199802001
	Proctor Cove	
	north of North Campgmd	

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		600	1140	500	
Height (ft)		4	2	15	
Lateral Recession Rate (ft/yr)*		0.5	0.2	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	48	18	66
Phosphorus Load Reduction (lb/year)	48	18	66
Nitrogen Load Reduction (lb/yr)	96	36	132

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3382).

	Example
BMP Number:	319 07 09 3199802001
	Proctor Cove
	South side of cove

Please select a soil textural class:

- ( ) Sands, loamy sands
- ( ) Sandy loam
- ( ) Fine sandy loam
- ( ) Loams, sandy clay loams, sandy clay
- ( ) Silt loam
- (•) Silty clay loam, silty clay
- ( ) Clay loam
- ( ) Clay
- ( ) Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		450	1272	500	
Height (ft)		4	2	15	
Lateral Recession Rate (ft/yr)*		0.5	0.2	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** Indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	36	20	56
Phosphorus Load Reduction (lb/year)	36	20	56
Nitrogen Load Reduction (lb/yr)	72	41	113

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

		Example
BMP Number:	3190212	3199802001

Report dated 02-09

Please select a soil textural class:

- ○ Sands, loamy sands
- ○ Sandy loam
- ○ Fine sandy loam
- ○ Loams, sandy clay loams, sandy clay
- ○ Silt loam
- ◉ Silty clay loam, silty clay
- ○ Clay loam
- ○ Clay
- ○ Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		532	0	500	
Height (ft)		2	0	15	
Lateral Recession Rate (ft/yr)*		0.3	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	13	1	14
Phosphorus Load Reduction (lb/year)	13	1	14
Nitrogen Load Reduction (lb/yr)	26	1	27

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions, please print a copy of this worksheet and attach it to the "BMP Application Form" for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number: 319 07 09 — Example: 3199802001
Bank "A"
Area #1

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		324	0	500	
Height (ft)		2	0	15	
Lateral Recession Rate (ft/yr)*		0.05	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	1	1	2
Phosphorus Load Reduction (lb/year)	1	1	2
Nitrogen Load Reduction (lb/yr)	3	1	4

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number:	319 07 09	Example 3199802001
	Bank "A"	
	Area #2	

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		303	0	500	
Height (ft)		3	0	15	
Lateral Recession Rate (ft/yr)*		0.05	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** Indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	2	1	3
Phosphorus Load Reduction (lb/year)	2	1	3
Nitrogen Load Reduction (lb/yr)	4	1	5

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions, please print a copy of this worksheet and attach it to the "BMP Application Form" for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

	Example
BMP Number:	319 07 09 3199802001
	Bank "A"
	Area #4

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		576	0	500	
Height (ft)		3	0	15	
Lateral Recession Rate (ft/yr)*		0.05	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	3	1	4
Phosphorus Load Reduction (lb/year)	3	1	4
Nitrogen Load Reduction (lb/yr)	7	1	8

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number:		Example
	319 07 09	3199802001
	Bank "A"	
	Area #6	

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- • (Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		490	0	500	
Height (ft)		2	0	15	
Lateral Recession Rate (ft/yr)*		0.05	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	2	1	3
Phosphorus Load Reduction (lb/year)	2	1	3
Nitrogen Load Reduction (lb/yr)	4	1	5

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

	Example
BMP Number:	319 07 09 3199802001

7/14/09 Area #8
revised

Please select a soil textural class:

- ( ) Sands, loamy sands
- ( ) Sandy loam
- ( ) Fine sandy loam
- ( ) Loams, sandy clay loams, sandy clay
- ( ) Silt loam
- (•) Silty clay loam, silty clay
- ( ) Clay loam
- ( ) Clay
- ( ) Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		300	332	500	
Height (ft)		2	3	15	
Lateral Recession Rate (ft/yr)*		0.05	0.5	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	1	20	21
Phosphorus Load Reduction (lb/year)	1	20	21
Nitrogen Load Reduction (lb/yr)	2	40	42

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions, please print a copy of this worksheet and attach it to the "BMP Application Form" for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number: 319 07 09 (Example: 3199802001)
Bank "A"
Area #13

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		243	0	500	
Height (ft)		3	0	15	
Lateral Recession Rate (ft/yr)*		0.05	0	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	1	1	2
Phosphorus Load Reduction (lb/year)	1	1	2
Nitrogen Load Reduction (lb/yr)	3	1	4

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number: 319 07 09 (Example: 3199802001)
Bank "A"
Area #14

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter	Bank #1	Bank #2	Example	
Length (ft)	600	216	500	
Height (ft)	3	2	15	
Lateral Recession Rate (ft/yr)*	0.05	0.05	0.5	
Soil P Conc (lb/lb soil)** DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)** DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	4	1	5
Phosphorus Load Reduction (lb/year)	4	1	5
Nitrogen Load Reduction (lb/yr)	7	2	9

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

BMP Number: 319 07 09 3199802001 (Example)
Bank "A"
Area #15

Please select a soil textural class:

- (Sands, loamy sands
- (Sandy loam
- (Fine sandy loam
- (Loams, sandy clay loams, sandy clay
- (Silt loam
- (● Silty clay loam, silty clay
- (Clay loam
- (Clay
- (Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		550	330	500	
Height (ft)		3	2	15	
Lateral Recession Rate (ft/yr)*		0.05	0.05	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	3	1	5
Phosphorus Load Reduction (lb/year)	3	1	5
Nitrogen Load Reduction (lb/yr)	7	3	9

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

		Example
BMP Number:	3190212	3199802001
	20-Oct-09	

Please select a soil textural class:

- ○ Sands, loamy sands
- ○ Sandy loam
- ○ Fine sandy loam
- ○ Loams, sandy clay loams, sandy clay
- ○ Silt loam
- ◉ Silty clay loam, silty clay
- ○ Clay loam
- ○ Clay
- ○ Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		2316	2870	500	
Height (ft)		2	3	15	
Lateral Recession Rate (ft/yr)*		0.02	0.5	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

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.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	4	172	176
Phosphorus Load Reduction (lb/year)	4	172	176
Nitrogen Load Reduction (lb/yr)	7	344	352

Bank Stabilization

Please fill in the gray areas only. If estimating for just one bank, put "0" in areas for Bank #2.
Once you have successfully estimated the sediment and nutrient load reductions,
please print a copy of this worksheet and attach it to the "BMP Application Form"
for submittal to the Illinois EPA.
If you have any questions, please contact the Illinois EPA's NPS Unit at (217/782-3362).

		Example
BMP Number:	3190709	3199802001
	23-Oct-09	
	area #13	

Please select a soil textural class:

- ○ Sands, loamy sands
- ○ Sandy loam
- ○ Fine sandy loam
- ○ Loams, sandy clay loams, sandy clay
- ○ Silt loam
- ◉ Silty clay loam, silty clay
- ○ Clay loam
- ○ Clay
- ○ Organic

Parameter		Bank #1	Bank #2	Example	
Length (ft)		195	309	500	
Height (ft)		2	2	15	
Lateral Recession Rate (ft/yr)*		0.2	0.5	0.5	
Soil P Conc (lb/lb soil)**	DEFAULT	0.0005	0.0005	0.0005	**
Soil N Conc (lb/lb soil)**	DEFAULT	0.001	0.001	0.001	**

*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 judgement may be required to estimate the LRR. Please refer to the narrative descriptions in Table 1.
** indicates default values for P and N soil concentrations

Table 1

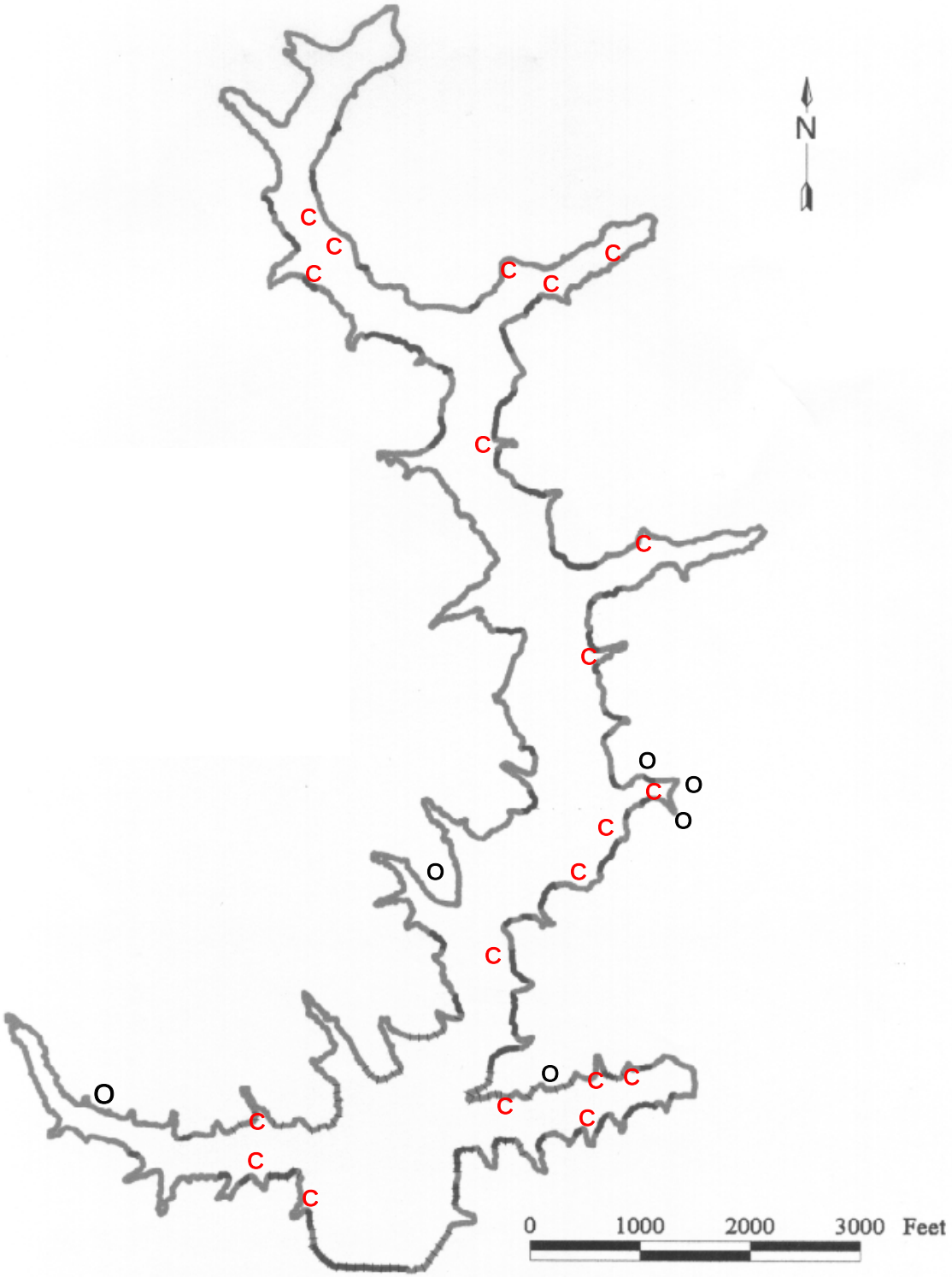
LRR (ft/yr)	Category	Description
0.01 - 0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang.
0.06 - 0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang.
0.3 - 0.5	Severe	Bank is bare with rills and severe vegetative overhang. 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 more 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), as 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).

Estimated Load Reductions

	Bank #1	Bank #2	Total
Sediment Load Reduction (ton/year)	3	12	15
Phosphorus Load Reduction (lb/year)	3	12	15
Nitrogen Load Reduction (lb/yr)	6	25	31

Otter Lake Water Commission
2008 Tree Planting
(500 Cypress and 200 Hardwood)



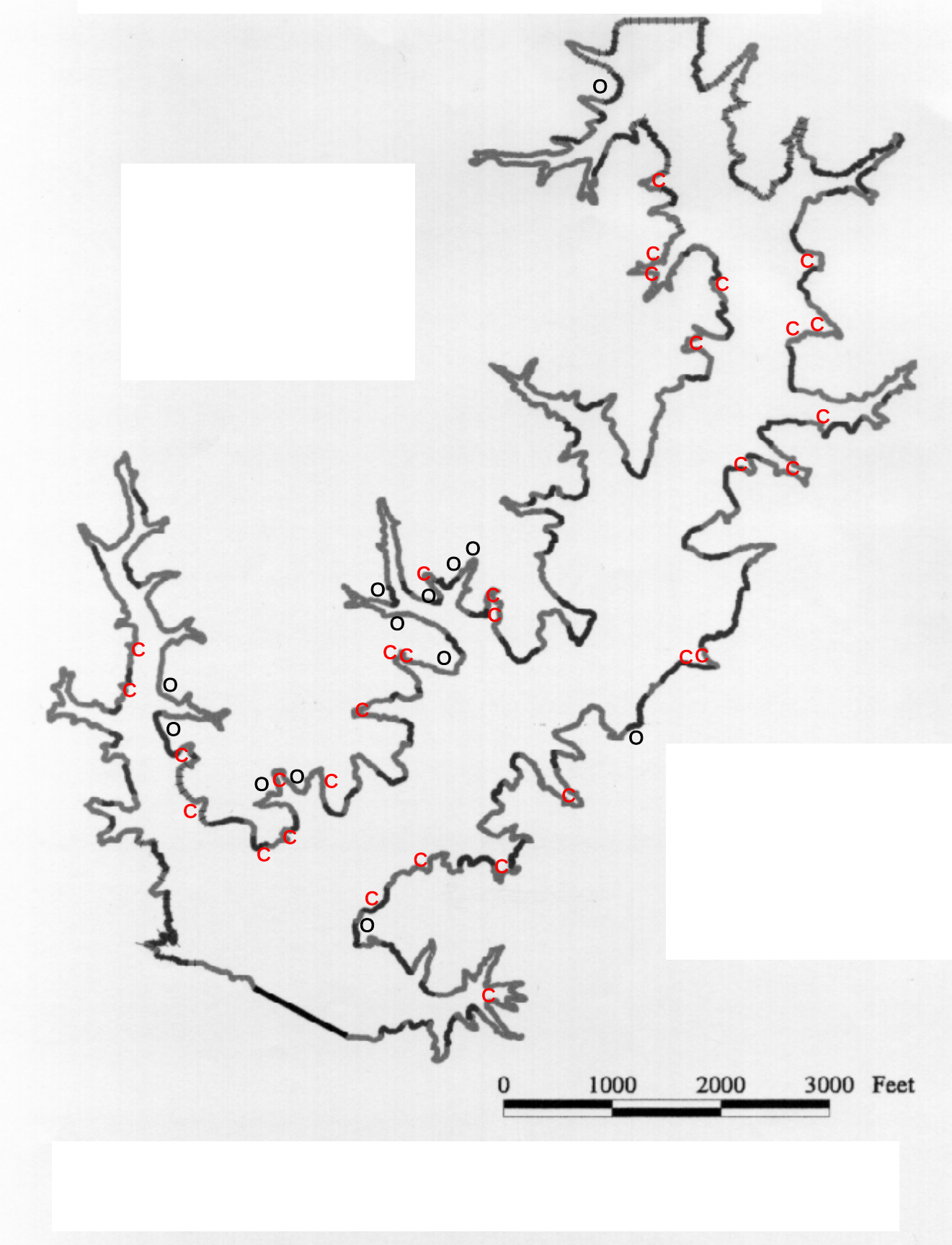
Emmerson Airline Road

C = Cypress Trees

O = Oak & Walnut Trees

2008 Tree Planting

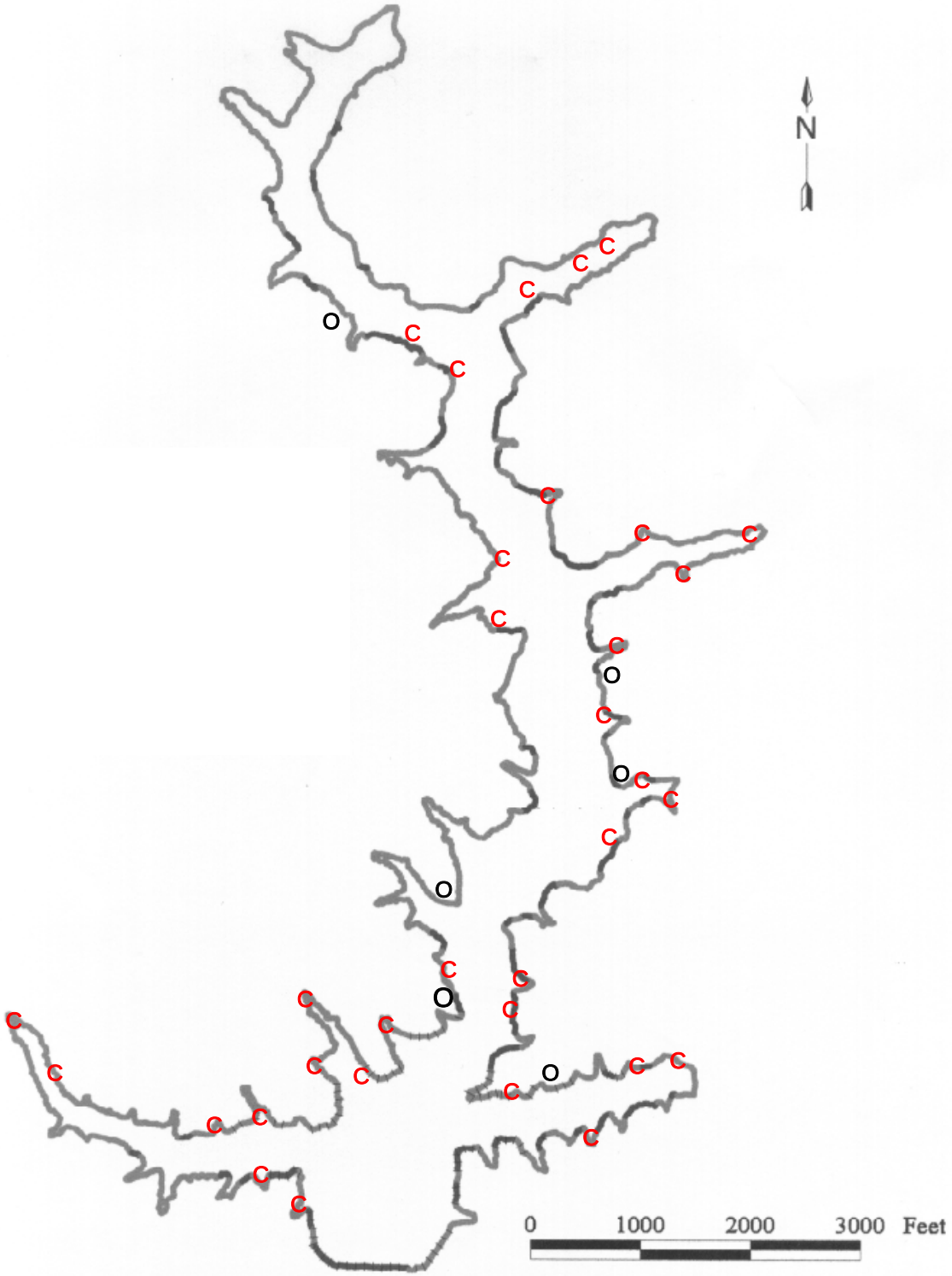
Emmerson Airline Road



C = Cypress Trees

O = Oak & Walnut Trees

Otter Lake Water Commission
2009 Tree Planting
(300 Cypress and 200 Hardwood)



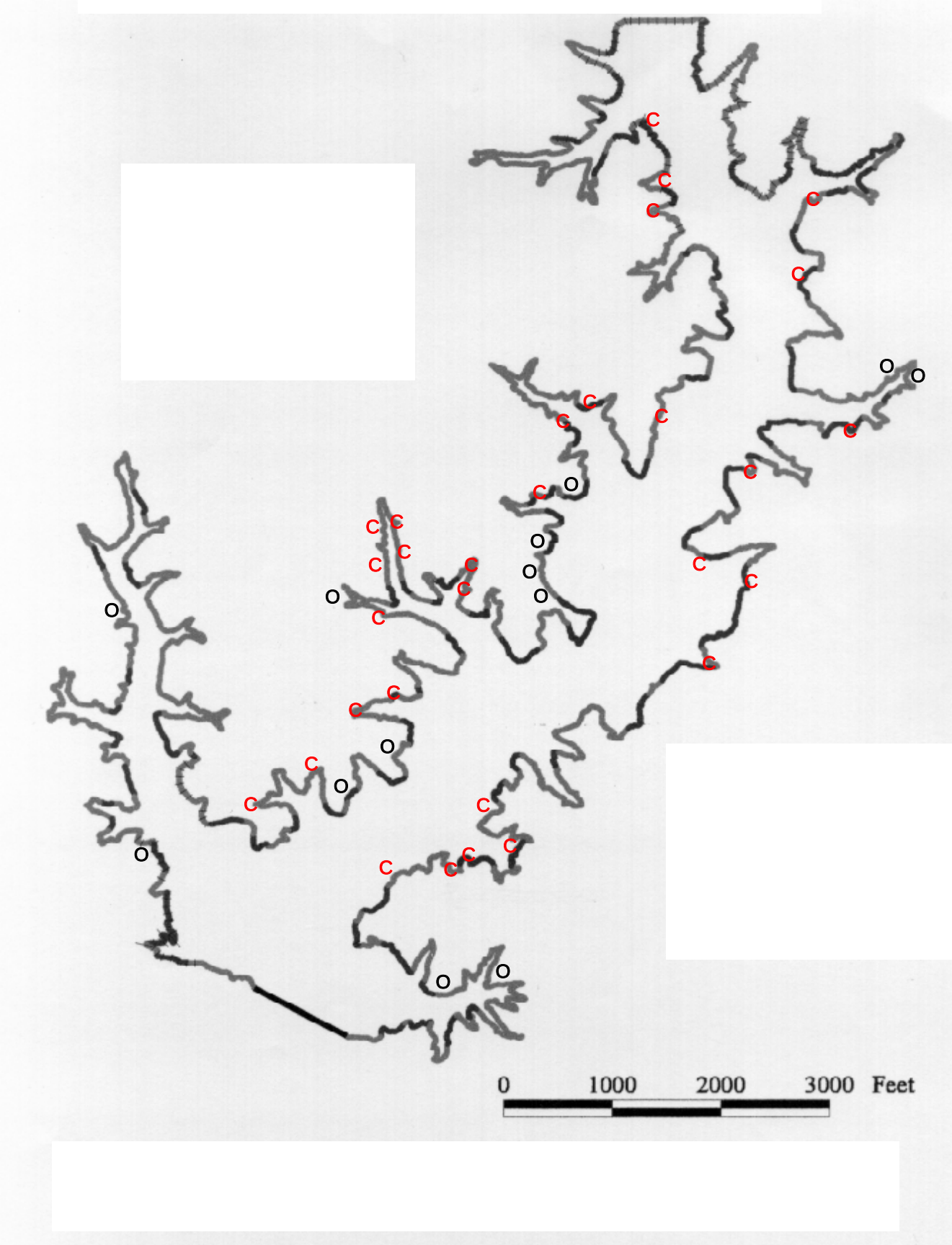
Emmerson Airline Road

C = Cypress Trees

O = Oak & Walnut Trees

2009 Tree Planting

Emmerson Airline Road



C = Cypress Trees

O = Oak & Walnut Trees

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

April 28, 2009

Regulatory Branch
File Number: MVS-2009-233

Mr. Dennis Ross
Otter Lake Water Commission
6475 W. Montgomery Rd.
Virden, Illinois 62690

Dear Mr. Ross:

We are in receipt of your April 15, 2009, application, requesting authorization to stabilize a series of banks within the North Basin of Otter Lake. The intent of the activity is to use A-3 rip-rap at a rate of 1.25 tons per foot, placed from a barge, over sixteen sites not exceeding one-thousand linear feet. A map has been attached to this authorization letter to reference the site number with its location. The applicant will be placing rip-rap along a one-thousand linear foot section at site 1, one-thousand linear feet along site 2, nine-hundred linear feet along site 3, eight-hundred linear feet along site 4, eight-hundred linear feet along site 5, four-hundred linear feet along site 6, seven-hundred and twenty linear feet along site 7, four-hundred and eighty linear feet along site 8, eight-hundred linear feet along site 9, eight-hundred linear feet along site 10, six-hundred linear feet along site 11, five-hundred linear feet along site 12, nine-hundred and sixty linear feet along site 13, four-hundred linear feet along site 14, one-thousand linear foot along site 15 and four-hundred and fifty linear foot along site 16. The proposed activity qualifies for authorization conveyed by General Permit SLD-IRP-16/173. Enclosed is a copy of the Regional Permit 16 and conditions and management practices with which you must comply. The activity site is located in Sections 31and 32, Township 12 North, Range 07 West, in Macoupin County, Illinois. Otter Lake is an impoundment of Otter Creek a secondary tributary of Macoupin Creek, a primary tributary of the Illinois River.

In accordance with Title 33 CFR 323.3(a) and Title 33 CFR 325.5(c), the District Engineer reissued a General Permit (SLD-IRP-16) on March 13, 2009. This General Permit authorizes bank stabilization activities in waters of the United States in the state of Illinois under the authority of Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). It is necessary that you notify the Regulatory Branch, in writing, prior to commencement of work and, within 30 days of completion complete and return **ATTACHMENT A** (enclosed) or this permit will be considered null and void.

Please sign **both** copies of the enclosed permit. One copy should be retained for your records and **one copy of the general permit must be mailed back to the Regulatory Branch for our files**.

APR 3 0 2009

The St. Louis District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete the enclosed postage paid card or go to our Customer Service Survey found on our web site at http://per2.nwp.usace.army.mil/survey.html.

If you have any questions regarding this general permit, feel free to contact Tyson Zobrist at (314) 331-8578. Any further correspondence concerning this project should state the file number: MVS-2009-233.

Sincerely,

Charles Frenker

for Keith McMullen
Illinois Section Chief
Regulatory Branch

CC:

Mr. James Allison
Illinois Environmental Protection Agency

Mr. Paul Mauer
Illinois Department of Natural Resources

ATTACHMENT A

COMPLETED WORK CERTIFICATION

Permit Number: MVS-2009-233 (SLD-IRP-16/173)

Name of Permittee: Mr. Dennis Ross, Otter Lake Water Commission

Date of Issuance: April 28, 2009

Upon completion of the activities authorized by this general permit, sign this certification and return it to the following address:

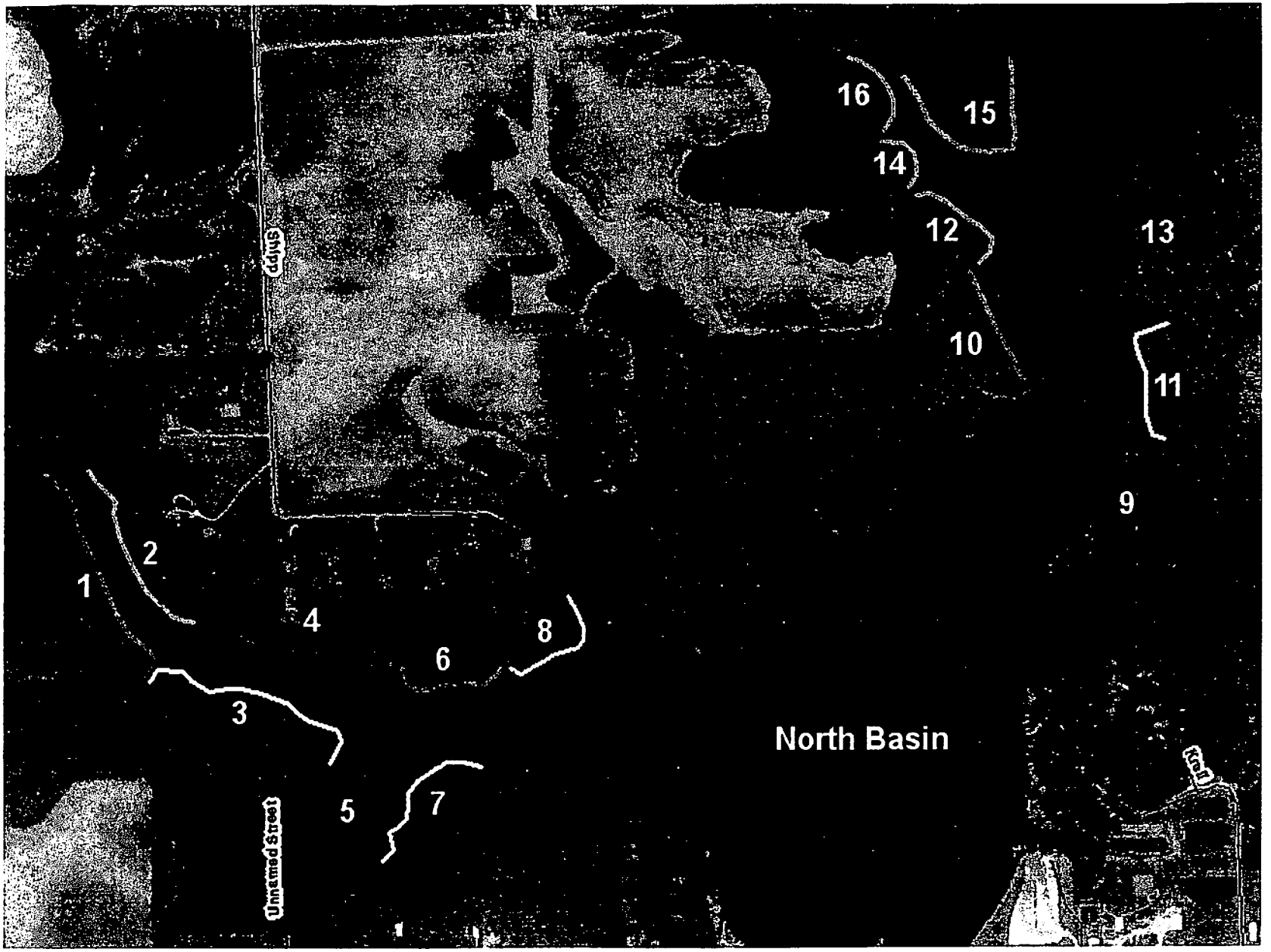
Mr. Keith McMullen
U.S. Army Corps of Engineers
Attn: Regulatory Branch (CO-F)
1222 Spruce Street
St. Louis, Missouri 63103-2833

Please note that your permitted activities are subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with the permit you are subject to permit suspension, modification or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit and conditions.

_____ _____

Signature of Permittee **Date**


Sharp
Unnamed Street
North Basin
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NOTIFICATION OF APPEAL PROCESS (NAP) FACT SHEET AND REQUEST FOR APPEAL (RFA) FORM

Applicant: **Mr. Dennis Ross**	File Number: **MVS-2009-233**	Date: **04/28/2009**
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
X	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION

If you have questions regarding this decision and/or the appeal process you may contact:

Tyson Zobrist, PM
U.S. Army Corps of Engineers
1222 Spruce Street
St. Louis, Missouri 63103-2833
Phone: (314) 331-8587 Fax: (314) 331-8741

If you only have questions regarding the appeal process you may also contact:

James B. Wiseman, Jr.
Administrative Appeals Officer
CEMVD-PD-KM (Mississippi Valley Division)
P.O. Box 80 (1400 Walnut Street)
Vicksburg, MS 39181-0080
Phone: (601) 634-5820 Fax: (601) 634-5816

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

COMPLIANCE CERTIFICATION

Special conditions "a" of this permit document requires that you submit a certification regarding the completed work and any required mitigation. This certification page satisfies this condition if it is provided to the St. Louis District at the address shown at the bottom of this page upon completion of the project.

APPLICATION NUMBER: MVS-2009-233

APPLICANT: Dennis Ross, Otter Lake Water Commission

PROJECT LOCATION: Otter Lake, North Basin, Section 31 and 32, Township 12 North, Range 07 West, Macoupin County, Illinois

a. I certify that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions.

b. I certify that any required mitigation was completed in accordance with the permit conditions.

c. Your signature below, as permittee, indicates that you have completed the authorized project as certified in paragraphs a and b above.

(PERMITTEE)

11/17/09
(DATE)

Return this certification to:

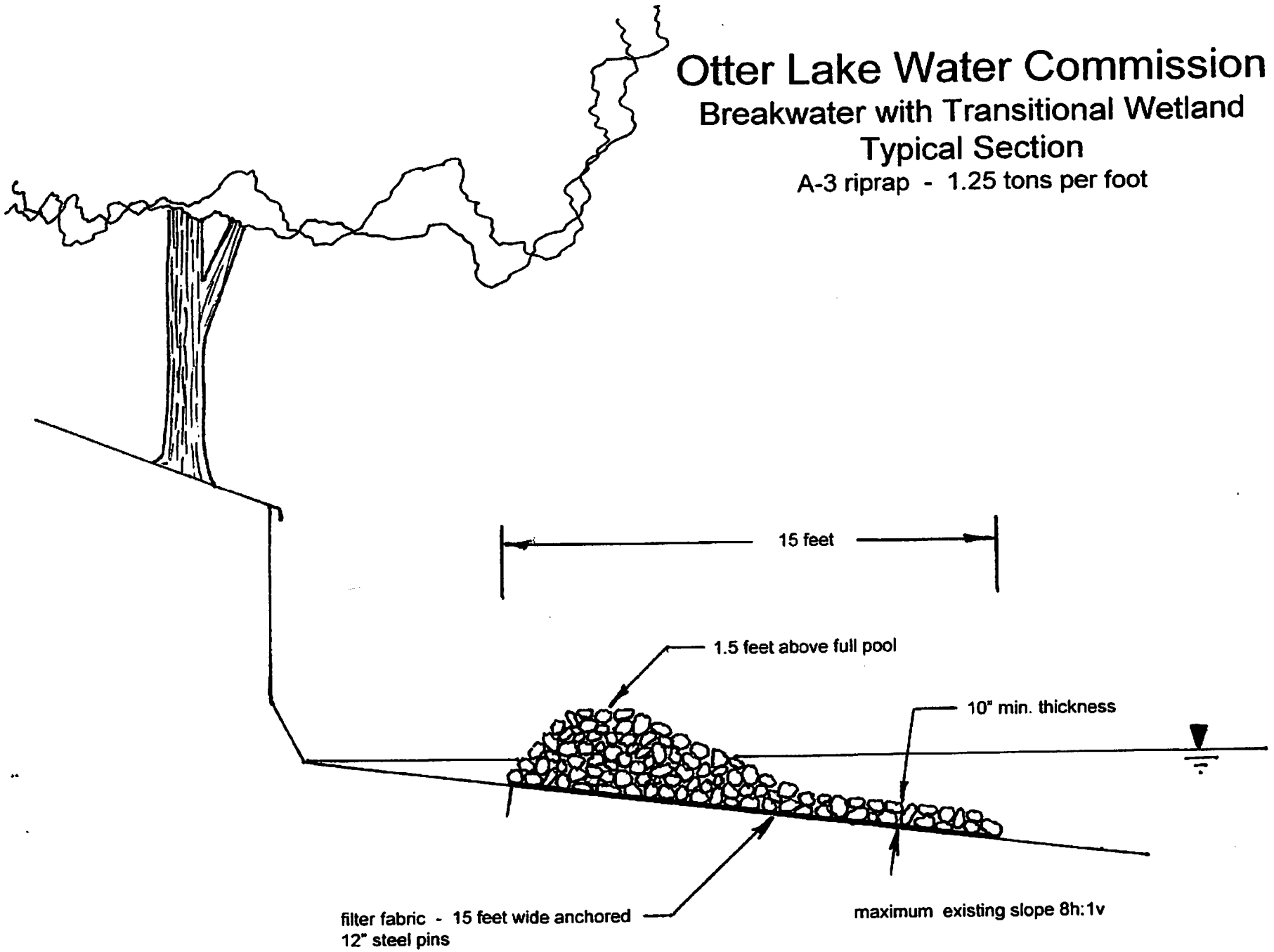
U.S. Army Corps of Engineers
ATTN: CEMVS-OD-F (MVS-2009-233)
1222 Spruce Street
St. Louis, MO 63103

Otter Lake Water Commission

Breakwater with Transitional Wetland

Typical Section

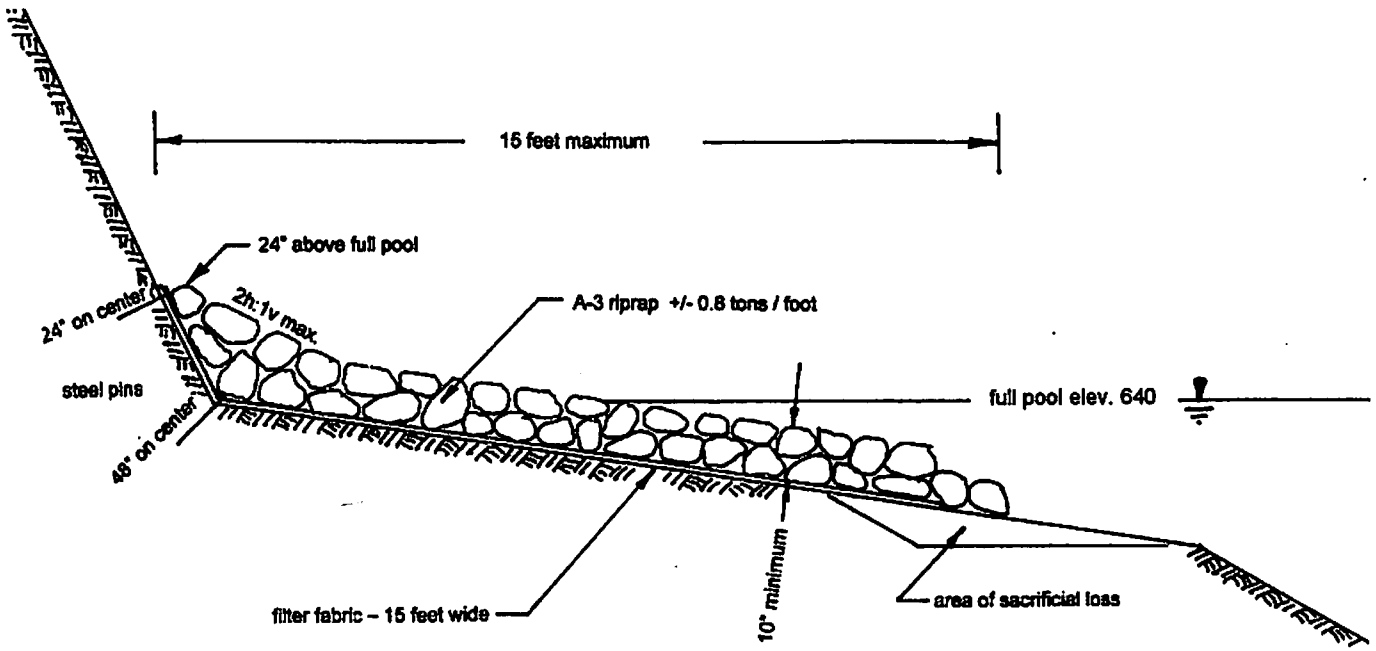
A-3 riprap - 1.25 tons per foot



H. Sutton, April 6, 2007

Otter Lake Water Commission

Lean Revetment - Typical Section



Note: This design is recommended for use where the littoral slope is steeper than 8h:1v

H. Sutton April 6, 2007