Engineering Design and Natural Resources Assessment

Clear Lake Watershed
Steuben County, Indiana

January, 2011

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

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Prepared for:
Clear Lake Township Land Conservancy, Inc.
Clear Lake Town Hall
5950 Gecowets Drive, Clear Lake
Fremont, Indiana 46767

Prepared by:
Davey Resource Group
A Division of The Davey Tree Expert Company
1500 North Mantua Street
P.O. Box 5193
Kent, Ohio 44240
800-828-8312

3846 New Vision Drive
Fort Wayne, Indiana 46845
260-969-5990

Table of Contents

Tables

Figures

Appendices

A. Engineering Feasibility Study Letter
B. Existing Water Quality Data
C. Wetlands Inventory Maps
D. ORAM Data Sheets
E. Photographs
F. Implemented Wetlands Ordinances
G. Indiana Model Wetlands Ordinance

Executive Summary

The purpose of the Clear Lake Watershed Engineering Design and Natural Resources Assessment was to identify and evaluate potential projects and produce engineered design plans for two feasible projects that would improve water quality in the Cyrus Brouse Ditch Subwatershed, conduct a survey of critical areas in other subwatersheds, and inventory and assess the quality of critical wetlands in the entire Clear Lake Watershed.

No feasible projects were identified at the time the Engineering Feasibility Study was conducted and, therefore, engineering designs were not produced. However, numerous best management practices (BMPs) were identified that, if implemented, would likely improve water quality. Potential project partners and funding sources were identified for each recommended BMP.

Existing water quality data, data from a windshield survey, multiple years of aerial photographs, and concerns brought forward by Clear Lake Watershed stakeholders were used to identify potential critical areas and other areas of concern in the watershed. Ultimately, three critical areas and three areas of concern were identified. Recommendations were made to address these areas.

A landscape-level inventory and quality assessment of all wetlands in the Clear Lake Watershed were conducted using remote sensing techniques to help identify critical wetlands in the Clear Lake Watershed. Field evaluations were also conducted on a subset of wetlands in the watershed to help ensure accuracy of mapped wetlands and further identify significant wetlands. The Ohio Rapid Assessment Method for Wetlands (ORAM) version 5.0 was used to rate the quality of wetlands. ORAM evaluates 6 metrics including wetlands size; upland buffers and surrounding land use; hydrology attributes; habitat alteration and development; special wetlands communities types; and vegetation, interspersion, and microtopography.

Local government wetlands ordinances were presented as a means to protect critical wetlands. Example ordinances from Indiana and Ohio are included in this report.

Acknowledgements

This study was made possible by funding from the Indiana Department of Natural Resources (IDNR) Lake and River Enhancement (LARE) program and the Clear Lake Township Land Conservancy, Inc. (CLTLC). Davey Resource Group (Davey) project team members conducted fieldwork, data collection, report writing and mapping, public outreach, and provided project oversight. The Davey project team consisted of Chad Appleman, Alicia Douglass, Kasey Krouse, Todd Crandall, Kevin Surbella, and Karen Wise. Derek Frederickson and Jim Breckler of Engineering Resources, Inc. were project team members who contributed to the Engineering Feasibility Study.

Individuals who provided project feasibility consultation include: Andy Ward with Ohio State University; Joe Draper with the Nature Conservancy; Brad Baldwin with the Indiana Department of Environmental Management; Kayleen Hart with the Steuben County Soil and Water Conservation District; Larry Gilbert and Aaron Bressler with the Steuben County Surveyor's Office; Kent Tracey, Alysson Oliger, and Patricia Clune with the Indiana Department of Natural Resources; Barb Anderson with the United States Army Corps of Engineers; Richard Neff with the Natural Resources Conservation Service; and Dan Oberst. Angela Sturdevant with the IDNR LARE program provided data on average Indiana water quality parameter results. Sue Myers provided water quality data collected in the Clear Lake Watershed by the Steuben County Lakes Council.

Special thanks are due to Clear Lake Watershed volunteers and CLTLC board members Annie Skinner, Mary Jo Fitzenrider, Joann Stanley, Bruce Spangler, Tom Kaiser, and Jim Skinner who organized and promoted this project as well as the numerous landowners and property caretakers who granted permission for project team members to access their land at some point during the course of this study, including: Clear Lake Lutheran Chapel; Brad Miller; Luke Siebert; Byram and Suzanne Dickes; Lisa Momper; Marjorie Yackee; David and Lisa Eichler; Dan and John Oberst; Steve Jackson; Paul Crawford; Clear Lake Township Land Conservancy, Inc.; James Mann; Nancy Hewes; Paul Haberly and Mary Fisher; Richard Oxenger; Rhonda Hansen; Kelyn and Penny Ireland; Marbo Farms, Inc.; Ned and Frances Salsbury; Bonnie Brown; Joe and Melanie Moore; and John Scharlach.

Special thanks are also due to the many stakeholders who participated in this project by attending public meetings.

Introduction

Clear Lake Township Land Conservancy, Inc. (CLTLC) is an organization whose mission is to promote the preservation of natural resources in Clear Lake Township, Indiana. The CLTLC seeks to accomplish its mission through public education, land preservation, and scientific research.

The CLTLC pursued and was awarded funding from the Indiana Department of Natural Resources (IDNR), Lake and River Enhancement (LARE) program to conduct an Engineering Design and Natural Resources Assessment (study) in the Clear Lake Watershed. The purpose of the study was to investigate the feasibility of potential projects and design two projects that would improve water quality in the Cyrus Brouse Ditch Subwatershed, conduct a survey of critical areas in other subwatersheds, and inventory and assess the quality of critical wetlands in the entire Clear Lake Watershed.

The 4,419-acre (1,788-hectare) Clear Lake Watershed is located in northeastern Steuben County, Indiana (Figure 1). The watershed study area is bisected by State Route (SR) 120 (Figure 2).

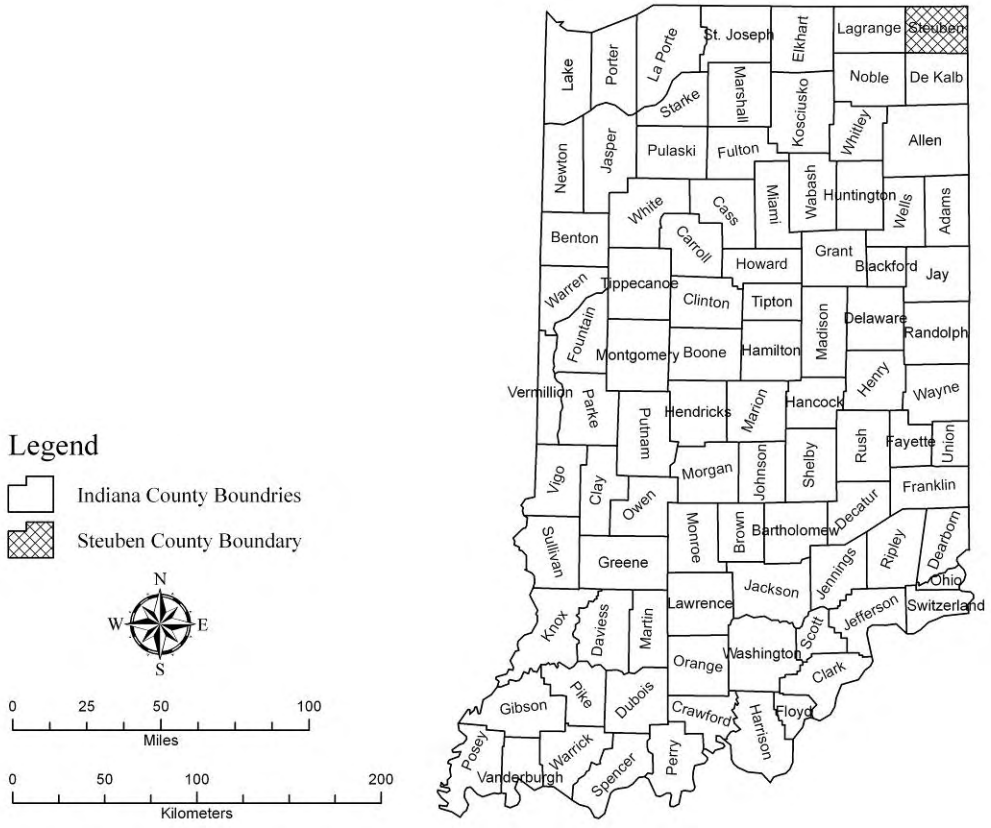

Figure 1. Location of Steuben County, Indiana

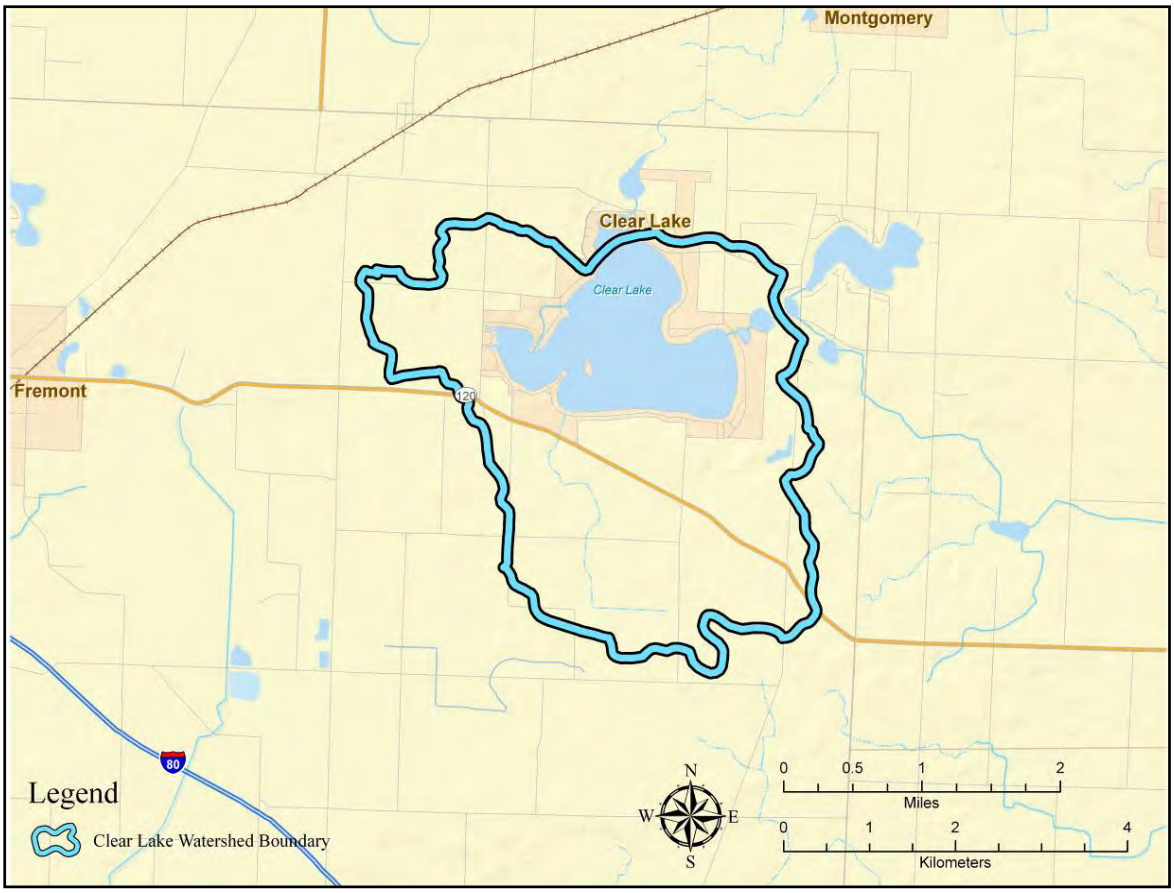

Figure 2. Clear Lake Watershed Study Area

Engineering Feasibility and Design Study

Davey and its subcontractor, Engineering Resources, Inc., along with much contribution of CLTLC members, conducted an exhaustive engineering feasibility study of potential projects to improve water quality in the Cyrus Brouse Ditch Subwatershed. This study began October, 2009 and was completed April, 2010. No cost-effective engineered practices were identified that, if constructed, would result in a marked improvement in surface water quality; however, numerous best management practices (BMPs) were recommended that may be implemented in the short and long term. A letter summarizing the results of the engineering feasibility study can be found in Appendix A.

It was later determined that engineered drawings were needed for streambank stabilization on the Marbo Farms property where the Cyrus Brouse Ditch Lateral 5 tile becomes an open ditch. The Davey project team produced engineered streambank stabilization design plans and obtained necessary permits from the United States Army Corps of Engineers and the Indiana Department of Environmental Management. The Steuben County Surveyor's Office agreed to implement the plan.

Survey of Critical Areas in Subwatersheds

A critical area can be defined as a source of an identified water quality problem that one is attempting to correct. The hydrology of the Clear Lake Watershed was analyzed including drainage patterns and existing water quality data to help identify potential critical areas and other areas of concern. In addition, aerial photographs of the Clear Lake Watershed taken in 1998, 2003, and 2005–2009 were examined for potential critical areas and areas of concern in the watershed (IGS, 2010). Windshield surveys of the Clear Lake Watershed subwatersheds excluding the Cyrus Brouse Ditch Subwatershed were conducted on April 20, May 4–5, and May 25, 2010. Findings from a watershed analysis study completed in 1993 were reviewed, and input regarding potential critical areas from CLTLC volunteers was also considered.

Secondary Source Data

Watershed Analysis Study

A watershed analysis study was completed for Clear Lake on June 11, 1993 by J.F. New & Associates. This study includes information on land use and highly erodible soils in the Cyrus Brouse Ditch, Harry Teeters Ditch, Alvin Patterson Ditch, and Peter Smith Ditch Subwatersheds. The study also provided recommendations to promote water quality improvements in each subwatershed.

Existing Water Quality Data

Hoosier Riverwatch is a water quality monitoring program sponsored by the State of Indiana since 1994 which trains volunteers to collect water samples and conduct simple tests to determine water quality results. While Hoosier Riverwatch data water quality data results are not determined by a certified lab, an analysis of averaged Hoosier Riverwatch data compared to averaged data that was professionally analyzed showed differences to be insignificant (IDEM, 2008). Therefore, it is assumed that Hoosier Riverwatch data can provide useful information regarding water quality in the Clear Lake Watershed.

Hoosier Riverwatch data has been collected in the Clear Lake Watershed since May, 1996 (IDNR, 2010). Data has been collected at the Clear Lake outlet at Round Lake dam, in five different locations along the Harry Teeters Ditch, the outlet of Cyrus Brouse Ditch to the Lake, the outlet of the Alvin Patterson Ditch to the Lake, and the outlet of the Peter Smith Ditch to the Lake. Hoosier Riverwatch data parameters collected and included in Appendix B are dissolved oxygen (DO), *Escherichia coli* (*E. coli*) concentrations, pH, total phosphate, nitrate, and turbidity (Hoosier Riverwatch, 2010). Additional water quality data collected in the Clear Lake Watershed by the Steuben County Lakes Council is also included in Appendix B (S. Myers, personal communication, November 17, 2010).

Indiana Administrative Code[1] (327 IAC 2-1-6) establishes minimum surface water quality standards for different parameters. Indiana water quality standards for aquatic life state that DO shall not be less than 4.0 milligrams per liter (mg/L) at any time and shall average at least 5.0 mg per calendar day. *E. coli* bacteria shall not exceed 235 colony-forming units (cfu) per 100 milliliters in any 1 sample in a 30-day period for full body contact recreational uses. Indiana water quality standards for aquatic life specify that no pH values shall be below 6.0 or above 9.0 (327 IAC 2-1-6).

There is not an Indiana water quality standard for total phosphorus, nitrate, or turbidity. The median total phosphorus value in northern Indiana lakes based on 2003 data collected as part of the Indiana Volunteer Lake Monitoring Program is 0.03 mg/L with a range of 0.01-0.16 mg/L, and the total phosphorus average in Indiana streams based on data collected by IDEM from 1995-2000 is 0.2 mg/L with a range of 0.03-38.4 mg/L (A. Sturdevant, personal communication, August 27, 2010). IDEM has set a draft total maximum daily load total phosphorus target at 0.3 mg/L (IDEM, 2010). The USEPA reference condition value for total phosphorus in Ecoregion VII Subecoregion 56 is 0.031 mg/L (USEPA, 2000). The average nitrate concentration in Indiana surface water is 12.32 mg/L. A draft total maximum daily load target of 10.0 mg/L has been set by IDEM for nitrate (IDEM, 2010). Unpolluted waters generally have a nitrate concentration below 4 mg/L, and the average turbidity value for Indiana surface water is 36 NTU (IDNR, 2008). The USEPA reference condition turbidity value is 14.50 NTU in Ecoregion VII Subecoregion 56 (USEPA, 2000).

High turbidity values have been recorded at the outlets to the Lake of the Cyrus Brouse Ditch, and Harry Teeters Ditch, while moderately high turbidity values were recorded at the outlets to the Lake of the Alvin Patterson Ditch and Peter Smith Ditch on multiple occasions since 2008. High nitrates have been recorded at the Cyrus Brouse Ditch and Peter Smith Ditch outlets. Moderately high nitrate values have been recorded in the Harry Teeters Ditch and Alvin Patterson Ditch. High *E. coli* counts have been recorded at the Cyrus Brouse Ditch, Alvin Patterson Ditch, and Harry Teeters Ditch outlets on multiple occasions in recent years. Low DO levels were also documented on multiple occasions at the Alvin Patterson Ditch outlet.

Hoosier Riverwatch data indicated several instances of high total phosphate at many sites in the watershed. Total phosphate is not a typical Hoosier Riverwatch parameter and the values for this parameter in the Hoosier Riverwatch database do not appear to be in line with data collected by the Steuben County Lakes Council and analyzed by a laboratory; thus, little credence was given to the interpretation of this parameter in this report.

[1] Indiana General Assembly. Indiana Administrative Code Database. Available online at <http://www.in.gov/legislative/iac/>. Accessed June 22, 2010.

Hydrology

Watershed Drainage

The Clear Lake Watershed is part of the West Branch Watershed (HUC 04100003020). The West Branch Watershed is part of the St. Joseph River (Lake Erie) Watershed (HUC 04100003). The St. Joseph River debouches to the Maumee River in Fort Wayne, Indiana. The Maumee River debouches to Lake Erie northeast of Toledo, Ohio.

A total of 5 subwatersheds were delineated in the Clear Lake Watershed as part of this study using the watershed delineation tool developed by Choi and Engle (2010). The watershed delineation tool delineates land area draining to a particular set of coordinates based on 7.5-minute USGS topographical map spatial data. The approximate locations of ditch outlets to the Lake as observed on an aerial photograph were used to delineate subwatersheds. Adjustments were made to the digitally generated subwatershed boundaries where field observations indicated altered drainage patterns. Knowledge of the extent of subwatershed land area draining to each sample site location can help land use planners prioritize areas for conservation practice implementation based on water quality data.

Subwatersheds delineated include the Cyrus Brouse Ditch Subwatershed which totals 1,166 acres (472 hectares), the Harry Teeters Ditch Subwatershed which totals 887 acres (359 hectares), the Lake Anne Subwatershed which totals 203 acres (82 hectares), the Alvin Patterson Ditch Subwatershed which totals 83 acres (34 hectares), and the Peter Smith Ditch Subwatershed which totals 320 acres (129 hectares). The balance of the Clear Lake Watershed is considered the Clear Lake Subwatershed and totals 1,760 acres (712 hectares).

Critical Areas and Areas of Concern Identification

Water Quality Data Interpretation

A critical area in a watershed is an area that is contributing to a known water quality problem. Davey sought to identify critical areas in subwatersheds excluding the Cyrus Brouse Ditch Subwatershed based on available water quality data. Too little water quality data is currently available for the Lake Anne Subwatershed to draw meaningful conclusions. Water quality problems identified from existing data include high turbidity, high nitrate concentrations, low DO concentrations, and high *E. coli* concentrations.

Turbidity is a measure of clarity of water. Suspended solids in the water column scatter and absorb light, reducing the clarity of water and increasing the turbidity value. Particulate material suspended in a water sample may include sediment and other particles such as decaying organic matter, algae, and microbes. Turbidity in the Clear Lake Watershed is likely due in part to in-channel erosion and runoff from agricultural land.

Common sources of excess nitrates are human and animal wastes and runoff containing lawn and agricultural fertilizers. Nitrates can lead to increased aquatic plant growth and eutrophication. Potential sources of nitrates in the Peter Smith Ditch watershed include possible failing septic systems, livestock manure, and fertilizer runoff. Very low to no evidence of *E. coli*, a fecal contaminant indicator, at this sample site suggests that fertilizer runoff is most probably the source of observed nitrates.

DO is influenced by factors such as stream temperature and velocity, as well as by total suspended solids, nutrient, and organic waste concentrations. Low DO levels at the Alvin Patterson Ditch outlet can most likely be attributed to slow stream velocity and high suspended solids reflected in turbidity measurements. Suspended solids in this location are more likely attributed to algae, microbes, and organic matter than sediment.

E. coli bacteria are found in the lower intestine and feces of warm-blooded animals. Some strains of *E. coli* can cause illness when they enter the body through the mouth, nose, eyes, ears, or cuts in the skin. The presence of *E. coli* in water is a good indicator of fecal contamination and the presence of other bacteria harmful to human health. Typical sources of *E. coli* in water are combined sewer overflows, malfunctioning septic systems, and wildlife and livestock manure. Horses were observed upstream of the sample site on the Alvin Patterson Ditch during a windshield survey. Analysis of topographic data suggests that surface drainage which likely carries animal wastes from the horse lot is conveyed to the Alvin Patterson Ditch. In addition, wildlife may be another large contributor to *E. coli* concentrations in this subwatershed. Large quantities of wildlife including wild turkeys have been reported to be present in the area.

Windshield Survey

Multiple tile riser inlets were observed throughout the Clear Lake Watershed with the exception of the Alvin Patterson Ditch Subwatershed. Volunteers mapped the approximate locations of inlets that are visible from roadways (Figure 3). Without vegetation, such as grasses, surrounding the inlets, “first flush” stormwater laden with high levels sediment and nutrients can be discharged to the tile system and eventually reach the Lake.

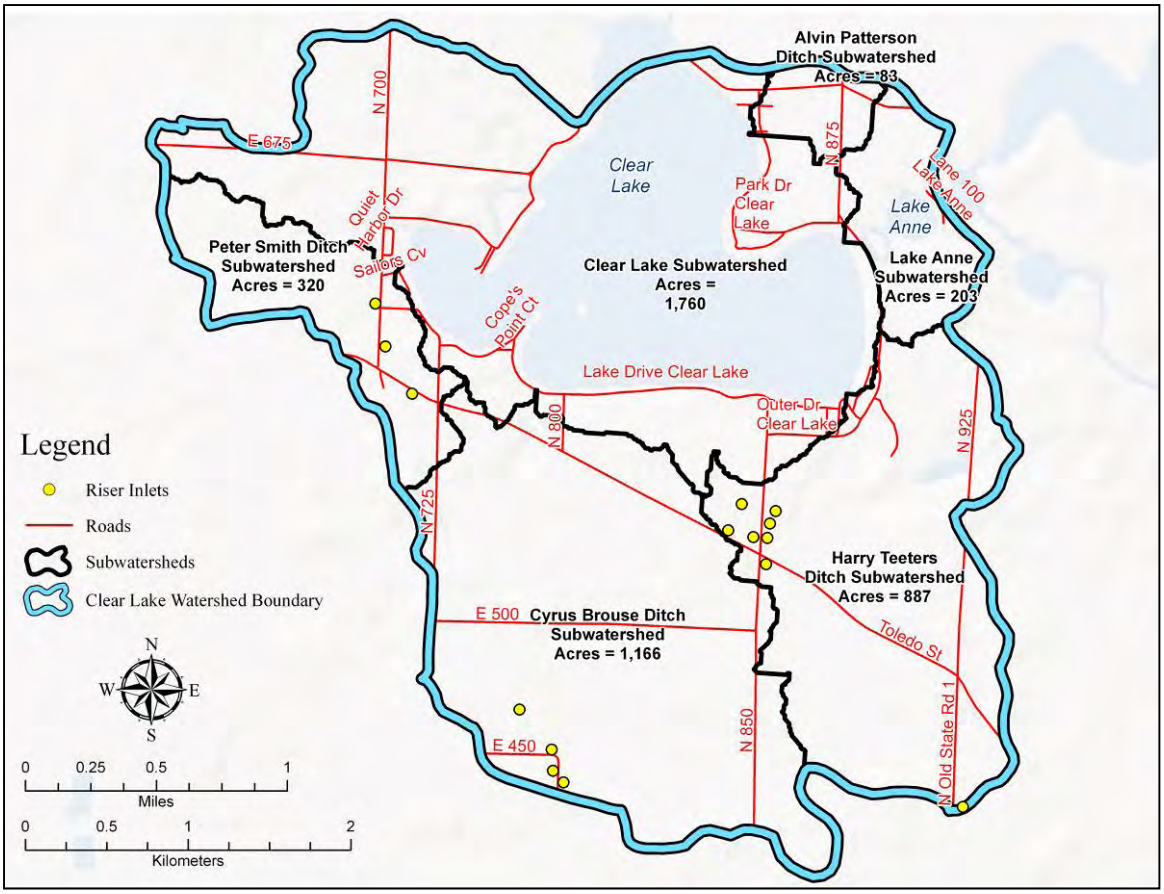

Figure 3. Tile Inlet Risers Map

Tile inlet risers were noted in a horse pasture located south of SR 120 in the Peter Smith Ditch Subwatershed (Photograph 1). In addition to sediment, inlets located in areas where livestock are pastured have the capacity to introduce additional nutrients as well as *E. coli* and other fecal coliforms into the tile system.

A second horse pasture was observed on East County Road (CR) 700 North in the Alvin Patterson Ditch Subwatershed. Stockpiled manure was observed within the pasture lot.

Photograph 1 (05-05-10). *A yellow tile inlet riser in a horse pasture is depicted in this photograph.*

Aerial Photointerpretation

An analysis of aerial photographs of the Clear Lake Watershed taken in 1998, 2003, and 2005–2009 was conducted to identify potential critical areas not visible from roadways. It appears that gully erosion was once occurring in a field west of and adjacent to North CR 700 East and north of SR 120. The field does not appear to be regularly tilled, and potential areas for gully erosion to occur appear to be stabilized with perennial vegetation. However, the second field to the west of North CR 700 East does appear to be in active row-crop production, and aerial photography suggests there is potential gully erosion occurring in this field as water drains from a wetlands in the row-cropped field to the field stabilized with perennial vegetation.

Additional Stakeholder Concerns

Leaf disposal in wetlands around the Lake from lake shore properties is a concern that has been expressed by some lake residents. Significant quantities of leaves were observed in both wetlands and upland locations (Photograph 2).

Photograph 2 (05-25-10). *A significant quantity of residential leaf litter has been discarded in both wetlands and upland natural areas.*

Koeneman Lake receives surface water from the downstream end of the county maintained segment of the Harry Teeters Ditch. Koeneman Lake also receives overland surface flow from other upstream land in the subwatershed. This Lake very likely effectively traps sediment and attenuates various pollutants that flow into it. Questions have arisen as to whether or not it may be beneficial to dredge Koeneman Lake. The water in Koeneman Lake visually appeared turbid when the Lake was visited by Davey biologists on May 5, 2010. Hoosier Riverwatch water quality data from 1999 and 2000 were collected at the outlet of Harry Teeters Ditch to Koeneman Lake and at the outlet of Koeneman Lake. After draining from Koeneman Lake, water passes through a large wetlands complex prior to draining to Clear Lake. Hoosier Riverwatch water quality data were also collected at approximately the same time at the outlet of the wetlands to Clear Lake. Based on four sampling events, the data

weakly suggests that nitrates were filtered out of the water column in Koeneman Lake and further filtered out in the wetlands. However, higher turbidity was observed in water exiting Koeneman Lake than in water entering the Lake. Turbidity levels then decreased after the water passed through the wetlands complex. This data may suggest that there is indeed a build-up of loose sediment and organic particles in Koeneman Lake. However, other factors such as the exact sampling location and water velocity may have influenced water quality results.

Summary and Recommendations

Multiple potential critical areas were evaluated in the Clear Lake subwatersheds excluding the Cyrus Brouse Ditch Subwatershed. Critical areas are areas contributing to a known water quality problem. Potential critical areas for which there are insufficient data to determine known water quality problems are recorded as areas of concern.

Critical Areas in the Clear Lake Watershed

- Tile inlet risers without grass buffers in the Peter Smith Ditch and Harry Teeters Ditch Subwatersheds are likely entry points of sediment into the drainage system resulting in elevated turbidity levels. Grass buffers should be planted and maintained around all tile inlet risers. Funding may be available for tile inlet riser buffers on agricultural land through the Natural Resources Conservation Service (NRCS).

- The horse pasture on East CR 700 North is likely a contributor to elevated *E. coli* concentrations in the Alvin Patterson Ditch Subwatershed. High bacteria concentrations in this location may also influence turbidity and DO levels. To alleviate the potential of this site as a pollutant source, a few recommendations should be considered. A manure management plan should be implemented. If a manure management plan exists, its effectiveness should be evaluated and plan updated accordingly. Secondly, the pathway of surface water draining from the pasture should be determined. If pasture surface water runoff is flowing directly to a tile or surface ditch, a BMP should be implemented to reduce *E. coli* and other pollutant levels. Finally, relocating the horse pasture may net the largest positive results.

- The presence of gully erosion in the second field west of North CR 700 East and north of SR 120 has not been field verified. However, it is likely a contributor of sediment in the Peter Smith Ditch Subwatershed. Sediment is known to carry nutrients that impact water quality. A grass waterway or water and sediment control basin (WASCOB) should be constructed to minimize erosion. These practices are relatively inexpensive to implement, and funding for both practices may be available through the NRCS.

Areas of Concern in the Clear Lake Watershed

Photograph 3 (05-05-10). *Koeneman Lake water appeared murky.*

- The horse pasture located south of SR 120 is considered an area of concern due to the fact that tile riser inlets in the pasture have the potential to introduce *E. coli* and other fecal coliforms into the tile system despite the current absence of significant *E. coli* concentrations in water quality data collected in the Peter Smith Ditch.
- There is no water quality data indicating that the decomposition of leaves from yard waste discarded in wetlands is contributing to water quality problems. However, significant yard wastes in wetlands may contribute to increased nutrient concentrations as decomposition occurs. Smothering of wetlands vegetation by yard wastes also reduces the capacity of wetlands to filter pollutants from the water passing through them.
- Koeneman Lake may or may not have reached its capacity to act as a settling basin at the end of the Harry Teeters Ditch (Photograph 3). Further analysis should be conducted using a dredge sampler to determine the depth of sediment build-up within Koeneman Lake prior to determining whether or not it is advisable to dredge this waterbody.

Inventory and Quality Assessment of Critical Wetlands

Wetlands are areas where soils are saturated at or near the surface at a frequency and duration long enough to support a dominance of wetlands plants and the development of hydric soils (Environmental Laboratory, 1987). Wetlands serve many functions upon which people and animals depend. Wetlands detain and retain stormwater, thereby attenuating downstream flooding, filter nutrients and sediments from water, help to keep surface water flowing during dry periods, and recharge groundwater aquifers. Many animal species depend on wetlands for food, shelter, and breeding. Plants that are a source of food and the raw materials for many medicines are found in wetlands. Wetlands clearly benefit the pharmaceutical, agriculture, tourism, and recreational industries, to name a few.

Objective

One task of this study included an inventory and quality assessment of critical wetlands in the entire Clear Lake Watershed. It is difficult to define a critical wetlands as multiple factors which contribute to any given wetlands value to mankind and all wetlands have some value. In general, the more direct a hydrological connection of a wetlands to Clear Lake, the closer the wetlands is in proximity to the Lake, even if lacking a hydrological connection, a wetlands' size, species diversity, and species composition, and a wetlands source of hydrology are primary factors that influence a wetlands' value in the Clear Lake Watershed. Davey conducted an inventory and quality assessment of all wetlands in the Clear Lake Watershed using remote sensing techniques to help identify critical wetlands in the Clear Lake Watershed. Field evaluations were also conducted on a subset of the watershed wetlands to help ensure accuracy of mapped wetlands and further identify critical wetlands.

Methodology

Wetlands Inventory

Approximately 30 years ago, the U.S. Fish and Wildlife Service (USFWS) mapped the extent and status of wetlands as part of the National Wetlands Inventory (NWI) program. The process entailed examining aerial photographs and other available spatial information, and tracing the locations of wetlands on USGS topographic base maps. The accuracy of NWI maps are limited by the quality of 1980's aerial photographs and changing land use practices since the NWI maps' inception.

Using similar techniques, Davey conducted a landscape-level wetlands inventory and included limited ground truthing to heighten accuracies. Utilizing ESRI ArcGIS®, Davey layered NRCS hydric soils data and 2-foot topographical contour data over Spring, 2009 aerial photographs to identify and digitally map wetlands boundaries. Spring aerial photographs are best for indentifying hydrology associated with forested and seasonal wetlands. Digitized NWI data, Spring, 2005 aerial photographs, and Summer, 2003, 2005–2008 National Agricultural Imagery Program (NAIP) aerial photographs available from IndianaMap were also utilized to assist with accuracy in wetland boundary determination and identification of vegetation community types.

The accuracy of the wetlands sizes and locations as mapped by Davey are limited by the quality of the aerial photographs and topographic data. Upland inclusions may be found within the boundaries of mapped wetlands. The wetlands map produced is not a field-level wetlands delineation study, and it should not be used in lieu of a wetlands delineation for land development purposes.

Wetlands Quality Assessment

Wetlands quality categories were estimated using remote sensing for each mapped wetlands once the wetlands boundaries, sizes, and vegetation community types were determined. The Ohio Rapid Assessment Method for Wetlands (ORAM) Version 5.0 was used as the basis for wetlands quality ratings (Mack, 2001). ORAM evaluates 6 metrics, including: wetlands size; upland buffers and surrounding land use; hydrology attributes; habitat alteration and development; special wetlands communities types; and vegetation, interspersion, and microtopography.

ORAM classifies wetlands as Category 1, Category 2, and Category 3 wetlands. Category 1 wetlands are often hydrologically isolated, have low species diversity, no significant habitat or wildlife use, limited potential to achieve beneficial wetlands functions, and/or a predominance of non-native species. Category 3 wetlands are characterized by superior habitat, superior hydrological functions, or high recreational functions. They have high levels of diversity and high proportions of native species. The broad range of good quality wetlands that fall between Category 1 and Category 3 are classified as Category 2. These wetlands may naturally be of moderate quality or they may have been Category 3 wetlands in the past that have been degraded to Category 2 wetlands by disturbance.

Ground Truthing

Wetlands hydrologically connected to Clear Lake via a surface channel or county tile and isolated wetlands on the same parcels as connected wetlands as well as isolated wetlands located in very close proximity to the Lake were selected for field evaluations to evaluate and increase the accuracy of remote-sensing wetlands boundary mapping and quality assessment techniques. Permission was granted to make field visits to 4 out of 7 wetlands with a surface connection to the Lake and 4 out of 15 wetlands hydrologically connected to the Lake via a county tile (Wetland 27 has both a surface connection and tiled connection to the Lake). In addition, 12 isolated wetlands were also visited. A total of 19 wetlands were visited in the field including Wetlands 11, 12, 14, 15, 21, 22, 27, 33, 81, 86–94, and 97. Wetland 27 was visited in the field and evaluated on December 14, 2009 as part of the engineering feasibility study. Wetlands 21 and 22 were evaluated from CR 675 East on May 4, 2010. All other wetlands were evaluated within the wetlands boundary on either May 4 or May 5, 2010 by Davey Biologists Alicia Douglass and Kasey Krouse. Field evaluations included complete ORAM field assessments and identification of dominant and/or notable vegetation species present.

A 12-channel Trimble® Pro XRS™ global positioning system (GPS), a GPS that is capable of producing submeter accuracy when differentially corrected, was used to collect wetlands boundary data in scattered locations along wetlands boundaries to evaluate the accuracy of remote-sensing wetlands boundary mapping.

Results

This wetland inventory process indicates that approximately 336 acres (136 hectares) of wetlands are present in the Clear Lake Watershed. Wetlands boundaries drawn using remote sensing techniques were found to typically be within ± 50 feet of GPS boundary data collected in the field which is within acceptable parameters for a landscape-level wetlands inventory. Mapped wetlands are depicted in Appendix C.

Estimated ORAM categories for 3 out of the 19 wetlands evaluated in the field were increased one category as a result of field investigations. ORAM data sheets can be found in Appendix D. Table 1 on the following page lists the map grid sheet on which each wetlands can be found as well as each wetlands' vegetation community type, hydrological connection to the Lake, ORAM category, ORAM score, and mapped acreage. Pictures for wetlands evaluated in the field can be found in Appendix E.

Table 1. Wetlands Inventory Data

Map ID	Map Grid	Vegetation Community Type[1]	Connected to Clear Lake via Surface Channel	Connected to Clear Lake via County Tile	ORAM Category	ORAM Score	Size (Acres)
1	A1	farmed			1		0.15
2	B1	PFO			2		0.6
3	B1	PSS			3		3.49
4	B1	PEM/PFO			2		1.81
5	B1	PSS			3		1.2
6	B1	PEM			1		0.28
7	B1	PEM			2		6.33
8	B1	farmed			1		0.28
9	B1	PEM			1		0.37
10	A2	PEM			1		1.28
11	A2, B2	PFO/PSS	x		3	84	19.78
12	A2	PFO			3	63	3.42
13	B2	farmed			1		0.12
14	A2, B2	PEM			2	37	1.31
15	B2	PEM	x		2	55	8.22
16	B2	PFO			2		4.49
17	B2	PFO			2		0.07
18	B2	PFO			2		0.09
19	B2	PFO			2		0.14
20	B2	PEM			1		0.11
21	A1, B1	PEM			1	29	2.53
22	B1	PEM			2	33	3.81
23	B1	PEM/PFO	x		2		1.86
24	C1	farmed		x	2		0.51
25	C2	PEM			1		0.77
26	C2	PFO/PSS			2		0.39
27	C2	PEM/PSS/PFO	x	x	2	45.5	4.15
28	C2	PFO			2		0.14
29	C2	PEM/PSS			1		0.07
30	D2	PFO			2		0.78
31	D2	PFO			2		1.04
32	D2	PEM/PFO			2		1.9
33	D2	PEM		x	1	26	2.23
34	D2	PFO		x	2		8.94
35	D2	PFO			2		0.59
36	D2	PFO			2		0.44
37	D2	PFO		x	2		0.3
38	D2	PFO			2		0.29
39	D2	PFO			2		1.8
40	D2, E2	PEM/PSS			1		0.88
41	D2	PFO/PSS	x		2		6.24
42	D2	PFO/PSS			3		11.22
43	D2	PFO			2		0.13

Table 1. Wetlands Inventory Data (Cont'd.)

Map ID	Map Grid	Vegetation Community Type[1]	Connected to Clear Lake via Surface Channel	Connected to Clear Lake via County Tile	ORAM Category	ORAM Score	Size (Acres)
44	D2	PSS/PEM			2		0.66
45	D2	PFO			2		0.02
46	D2	PFO		x	2		2.53
47	D2	PFO			2		5.88
48	D2	PFO			2		0.16
49	D2	PFO			2		0.27
50	C2, D2	PFO			2		0.27
51	D2	PEM			1		0.25
52	D2	PFO		x	2		0.97
53	D2	PFO			2		0.06
54	D2	PEM		x	1		0.8
55	D2, E2	PFO	x		2		9.13
56	E2	PFO			2		0.14
57	E2	PEM			2		0.88
58	D2, E2	PFO			2		1.48
59	D2, D3, E2, E3	PFO		x	2		11.59
60	E3	PEM			2		0.12
61	E3	PEM/PFO		x	2		1.2
62	D3	PFO/PSS/OW/farmed		x	2		24.76
63	D3	PFO			2		0.12
64	D3	PFO/OW/farmed		x	2		2.55
65	D3	farmed			1		0.23
66	D3	PSS/PFO			2		0.45
67	D3	PFO		x	2		3.29
68	D3	PEM			1		0.26
69	D3	PEM/farmed			1		0.17
70	D3	PEM/farmed			1		0.05
71	D3	PSS/farmed			1		0.24
72	C3	PFO			2		7.37
73	C3	PEM			2		0.12
74	C3	POW/PEM			2		6.68
75	C3	PEM			2		0.05
76	C3	PFO/PSS			2		2.54
77	C3	PFO			2		0.31
78	C2	farmed			1		0.13
79	C2	farmed			1		0.09
80	C2	PFO			2		0.39
81	C2, C3	PFO/PSS	x		3	85	62.57
82	C3	PFO			2		0.11
83	C3	PFO			2		0.08
84	C3	PFO			2		0.27
85	C3	PFO			2		0.37
86	C3	PFO			3	62	0.33

Table 1. Wetlands Inventory Data (Cont'd.)

Map ID	Map Grid	Vegetation Community Type[1]	Connected to Clear Lake via Surface Channel	Connected to Clear Lake via County Tile	ORAM Category	ORAM Score	Size (Acres)
87	C3	PFO			3	70	1.24
88	C3	PFO			2	47	1.51
89	C2	PEM/PSS			2	38	1.2
90	C2	PFO/PSS			3	66	7.13
91	B3	PSS			3	69	1.35
92	B3	PSS/OW			3	70	1.66
93	B3	PFO			3	65	0.34
94	A3, B3	PFO/PEM/OW		x	3	84	39.14
95	B3	PFO			2		1.04
96	A3	PFO/PEM			2		6.03
97	A2, A3	PFO		x	3	71.5	20.06
98	A2	PFO			2		0.69
99	A2	PSS/PEM			2		0.2

[1]PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub; OW = open water

According to the ORAM protocol, groundwater as a source of a wetlands hydrology cannot be scored without observed or documentary evidence of seeps or other signs of groundwater. No evidence of groundwater inputs to wetlands was observed in the field. However, groundwater inputs to numerous wetlands in the Clear Lake Watershed are suspected. In some circumstances, it is possible that positive documentation of groundwater inputs could increase a wetlands category rank.

A total of 21 wetlands in the Clear Lake Watershed are Category 1 wetlands, 64 wetlands are Category 2, and 14 wetlands are Category 3. Wetlands 11, 15, 23, 27, and 81 have a surface connection either directly to Clear Lake or to an open county drain that debouches to Clear Lake. Based on aerial photointerpretation, Wetlands 41 and 55 are also believed to have a surface connection to a county drain that debouches to Clear Lake. Out of the wetlands with a surface connection to the Lake, Wetlands 11 and 81 are Category 3 and the remaining wetlands are Category 2.

High-quality vegetation communities including characteristic bog species were observed in Wetlands 90 and 97 by Davey biologists and Wetland 94 by a watershed volunteer. Each species in the state of Indiana is assigned a coefficient of conservatism score on a scale of 0 to 10 based on the likelihood that the species is likely to occur in a landscape that is relatively unaltered from what is believed to be a pre-settlement condition (Rothrock, 2004). A coefficient of conservatism of 0 is the lowest score and assigned to species such as *Taraxacum officinale* (common dandelion); whereas, a 10 is the highest score and assigned to typically more sensitive species such as *Larix laricina* (American larch). Numerous species having high coefficient of conservatism scores were observed in Wetlands 90 and 97. Some of these high-quality species and their associated scores are depicted in Table 2.

Wetlands 94 and 97 have a direct surface connection to the Lake. Wetland 90 does not have a direct surface connection to the Lake, but is located in very close proximity to the Lake. Due to their unique vegetation communities and close proximity to the Lake, these wetlands have very high appeal for conservation potential. Clear Lake Township Land Conservancy, Inc. currently owns a portion of Wetland 97.

Table 2. High-Quality Wetlands Species Observed in the Clear Lake Watershed

Scientific Name	Common Name	Coefficient of Conservatism	Wetland 90	Wetland 94[1]	Wetland 97
Betula alleghaniensis	yellow birch	10	x	x	x
Caltha palustris	common marsh-marigold	7	x		x
Fraxinus nigra	black ash	7	x		
Ilex verticillata	common winterberry	8	x		
Larix laricina	American larch	10	x	x	x
Osmunda cinnamomea	cinnamon fern	9	x	x	x
Symplocarpus foetidus	skunk-cabbage	8	x		x
Thelypteris palustris	eastern marsh fern	7			x
Toxicodendron vernix	poison sumac	10	x	x	x
Trientalis borealis	American starflower	10			x
Vaccinium corymbosum	highbush blueberry	9		x	x

[1]Species identifications in Wetland 94 were made by a watershed volunteer.

Clear Lake Township Land Conservancy, Inc. also owns a portion of Wetland 15. Wetland 15 is located in close proximity to and has a direct surface connection to the Lake. It is also heavily dominated by invasive species, particularly *Phalaris arundinacea* (reed canarygrass), and has low species diversity. Wetland 15 is recommended as the highest priority wetlands for wetlands restoration in the watershed.

Protection of Critical Wetlands

Concern has been expressed regarding protecting significant wetlands in the Clear Lake Watershed. These concerns are warranted, because wetlands help safeguard water quality, provide groundwater recharge and discharge, provide floodwater abatement, limit potential for erosion, and provide habitat and recreational opportunities (USEPA, 2001). One method that has been used by some communities to protect wetlands is to develop a local wetlands ordinance that gives the local community the ability to go beyond the minimum wetlands protection regulations administered by the United States Army Corps of Engineers and the Indiana Department of Environmental Management.

Few local governments evaluate wetlands impacts in Indiana. However, such oversight is quite common in other geographic locations. Appendix F contains examples of local government wetlands ordinances from the City of Auburn, Indiana; the Town of Beverly Shores, Indiana; the City of LaPorte, Indiana; Bloomfield Township, Michigan; and the City of Aurora, Ohio, as well as a document from the Chagrin River Watershed Partners, Inc., that summarizes local government stream and wetlands riparian setback regulations from 39 different county, city, and township governments in the Chagrin River Watershed in Ohio.

Some ordinances strictly pertain to dredging and fill activities within a wetlands' boundary. Other ordinances institute riparian setbacks, a zone of space within so many feet of a wetlands' edge where activities are limited. In Auburn, Indiana, a setback of 25 feet is required from all established Wetland Districts when constructing a building structure, street, alley, driveway, or parking area. In Ohio, riparian setback widths are often dictated by the quality category of a wetlands. Thus, a Category 3 wetlands would have a wider riparian setback width than a Category 2 wetlands or a Category 1 wetlands which may not have a setback at all. A model wetlands ordinance for Indiana communities developed by Michael Walter, a licensed Indiana attorney, can be found in Appendix G.

One public concern associated with properties having riparian setbacks is a decline in real estate value. However, a study conducted by Mikelbank in 2006 indicated that there is no statistical evidence to support the idea that setbacks negatively influence the value of either developed or undeveloped land. On the contrary, multiple studies have shown that water quality or perceived water quality significantly affects real estate value (Epp and Al-Ani, 1979; Steinnes, 1992; Leggett and Bockstael, 2000).

Davey recommends that CLTLC conduct a thorough evaluation of existing local wetlands ordinances, evaluate its wetlands protection goals, and contact a reputable attorney to guide the ordinance development process to ensure the ordinance is not in violation of any land use rights or other laws.

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Appendix A
Engineering Feasibility Study Letter

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

April 7, 2010

Corporate Headquarters

1500 North Mantua Street

P.O. Box 5193

Kent, Ohio 44240-5193

330.673.5685

Toll Free 1.800.828.8312

Fax: 330.673.0860

Local Office

3846 New Vision Drive

Fort Wayne, Indiana 46845-1708

260.969.5990

Fax: 260.969.5992

Annie Skinner
Clear Lake Township Land Conservancy
Clear Lake Town Hall
5950 Gecowets Drive, Clear Lake
Fremont, Indiana 46737

RE: *Engineering Feasibility Study*—Cyrus Brouse Ditch Subwatershed, 1,166 Acres, Clear Lake Township, Steuben County, Indiana

Dear Ms. Skinner:

Davey Resource Group (Davey) was retained by the Clear Lake Township Land Conservancy (CLTLC) to conduct an *Engineering Design and Natural Resources Assessment* project in the Clear Lake Watershed (HUC 04100003020010). A subtask of this project included an *Engineering Feasibility Study* to determine the effectiveness of several potential engineered practices to improve water quality in the Cyrus Brouse Ditch Subwatershed (study area). The 1,166-acre Cyrus Brouse Ditch Subwatershed is located south of Clear Lake in Clear Lake Township, Steuben County, Indiana. This study was funded by an Indiana Department of Natural Resources (IDNR) Lake and River Enhance (LARE) Program grant with a match provided by the CLTLC.

The CLTLC initiated this study because users of Clear Lake have made qualitative observations of increased sediment deposition as well as algae and weedy plant growth near the Cyrus Brouse Ditch outlet to the Lake. Sediment sources in the study area include erosion from agricultural fields, areas under development, streambanks, and gravel roadways. When sediment enters a waterbody, it carries phosphorus and other water pollutants attached to it. Phosphorus and nitrogen also enter waterways from many other sources, such as commercial and manure fertilizers, leaking septic tanks, and other animal wastes. Nutrients including phosphorus and nitrogen contribute to increased algae blooms in a waterbody and possibly eutrophication, which is detrimental to many aquatic organisms. An important objective of this project is to evaluate best management practices (BMPs) and projects that, if implemented, could potentially improve water quality entering the Lake from Cyrus Brouse Ditch by reducing the loss of sediment and nutrients from land in the study area and preventing these materials from entering the Cyrus Brouse Ditch and ultimately Clear Lake.

Prior to the start of this project, the CLTLC with the input of local stakeholders identified several areas in the watershed where practices could be implemented to improve water quality. Most of these projects were of significant size and would require engineered plans. However, before starting engineering design work, the feasibility of implementing each practice needed to be studied. An engineering feasibility study began with a walk of the Cyrus Brouse Ditch, which was conducted on November 10, 2009. During this process, Davey searched for other potential areas where beneficial practices could be implemented to improve water quality. In addition to Davey staff, other participants in this walk included

Davey's subcontractor, Engineering Resources, Inc. (ER), as well as CLTLC and local landowners. A second walk was conducted on January 19, 2010 to further evaluate feasibility of potential projects. Participants in this walk included Davey, ER, CLTLC, IDNR, United States Army Corps of Engineers (USACE), The Nature Conservancy (TNC), Steuben County Soil and Water Conservation District (SWCD), and a representative from the Steuben County Surveyor's Office. Davey and ER have evaluated the feasibility of designing multiple proposed engineered practices in the study area previously identified by the CLTLC and other practices identified during the walks.

Davey recommends implementation of one engineered practice and multiple BMPs to improve water quality in the study area. This letter provides information on recommended BMPs to improve water quality in the Cyrus Brouse Ditch Subwatershed and on the feasibility of implementing each of the engineered practices proposed during the duration of the project.

The Steuben County Geographic Information Systems (GIS) department provided 0.6-meter (2-foot) topographical contour data as well as additional digital data including 2009 aerial photographs and parcel boundaries that aided in this study (C. Hoover, personal communication, October 22, 2009).

RECOMMENDED BMPS

BMPs are simple, yet effective and often inexpensive, practices designed to minimize environmental degradation. Structural BMPs can be used to practicably reduce the amount of sediment, nutrients, and other pollutants that drain from land to waterways. Implementation of BMPs is the highest priority action item to improve water quality in the study area. A significant amount of pollutants can be impeded from reaching the Cyrus Brouse Ditch by implementing BMPs. Preventing pollutants from reaching the ditch in the first place negates the need to install a larger quantity of more costly engineered practices to filter pollutants from the water after they have entered the ditch. Some pollutants will continue to reach the ditch regardless of the number and efficiency of BMPs implemented. Engineered practices are also recommended to further reduce the concentrations of pollutants in waterways. Specific BMPs recommended for the study area include filter strips, grass waterways, road repair and upgrades, streambank erosion control, repairing tile blowouts, and a water and sediment control basin.

Filter Strips

Filter strips are bands of sod-forming grasses, legumes, and forbs planted adjacent to the edges of waterways and water bodies that retard the transport of sediment, nutrients, and pesticides to those water bodies. Filter strips are relatively inexpensive to install and maintain and offer substantial water-quality benefits. The Spreadsheet Tool for the Estimation of Pollutant Load (STEPL) Region 5 Load Estimation Model Version 4.0 designed for the U.S. Environmental Protection Agency lists the following pollutant removal efficiencies for filter strips on agricultural land: total nitrogen 70 percent; total phosphorus 75 percent; and sediment 65 percent (Tetra Tech, 2006).

Several cost-share programs help farmers establish filter strips along streams and ditches, including the Conservation Reserve Program (CRP) and Environmental Quality Incentives Program (EQIP) administered by the Natural Resources Conservation Service (NRCS). The NRCS provides site-specific plans for filter strips based on site slope and drainage area. Filter strips can also be funded through LARE as part of a watershed land treatment project.

Area of Potential Beneficial Use: Salsbury Property
Crops are planted annually within a few feet of the top of the ditch bank along much of Cyrus Brouse Ditch on the Salsbury property (Photograph 1). Filter strips are recommended to be installed along the entire length of Cyrus Brouse Ditch on this property.

Photograph 1 (11-10-09). *Corn is planted within a few feet of the edge of the Cyrus Brouse Ditch bank.*

<u>Grass Waterways</u>

Grass waterways are drainage swales in farm fields constructed where gully erosion is a recurring problem. Generally, construction involves minor grading to form a trapezoidal or parabolic channel followed by seeding with a sod-forming grass that functions to stabilize the soils and further filter pollutants from surface flow. Pollutant removal efficiencies for grass waterways are similar to those for filter strips. Grass waterways can be funded through CRP and EQIP administered by the NRCS, and through LARE as part of a watershed land treatment project.

Area of Potential Beneficial Use: Scharlach Property
Analysis of 2009 aerial imagery indicates the presence of at least one gully and possibly more in an agricultural field owned by John Scharlach in the headwaters of Cyrus Brouse Ditch Subwatershed. A grass waterway in this location will stabilize eroding soils in the agricultural field as well as slow the flow of surface water and filter out pollutants prior to the pollutants reaching the Cyrus Brouse Ditch. Conventional plowing was performed on part of the field in fall, 2009. Davey will assist the CLTLC to utilize available resources to determine that all practicable measures and practices are implemented on the farm to stabilize soil and sediment and reduce nutrient runoff to Cyrus Brouse Ditch.

Area of Potential Beneficial Use: DeWitt Property
Erosion has been observed occurring adjacent to and south of County Road (CR) 500 North and east of CR 725 East on the DeWitt property. Analysis of 2009 aerial imagery indicates that gully erosion has extended further south into the field than is indicated in Photograph 2. Steuben County GIS data indicate that the gully erosion is not within the Steuben County Highway Department (SCHD) right-of-way, and gully erosion adjacent to the road may extend into the field as much as 12 meters (40 feet) beyond the right-of-way. In addition, 2009 aerial imagery indicates that gully erosion may have also occurred in a second location in the same field. A grass waterway is recommended to be constructed adjacent to and south of CR 500 North on the DeWitt property to stabilize gully erosion instead of installation of check dams or other bioengineered practices to halt erosion due to the fact that the erosion is occurring outside of the road right-of-way and in an agricultural field. There are cost-share and/or incentive payment monies available for installation of a grass waterway in agricultural fields, and it is unlikely to find funding sources for other projects that would have the same function. One or more grass waterways on the DeWitt property will help stabilize eroding soils and filter out pollutants prior to them reaching a nearby tile inlet for Cyrus Brouse Ditch Lateral 5.

Photograph 2 (11-10-09). *Erosion is occurring along the south side of County Road 500 North and east of County Road 725 East.*

Road and Roadway Ditch Repair and Improvements

Area of Potential Beneficial Use: County Road 500 North

CR 500 North is a gravel road which traverses a low area in the topography east of CR 725 East (Photograph 3). It is reported that this section of road repeatedly floods, resulting in a significant quantity of sediment and fine particulate matter washing away from the road and into a tile inlet for Cyrus Brouse Ditch Lateral 5. Local residents have stated that the SCHD has replaced road fill material in this location on multiple occasions. In addition, erosion is occurring within the county road right-of-way in the ditch adjacent to the road.

Photograph 3 (03-11-10). *Sediment and fine particulate matter washes from CR 500 North into the Cyrus Brouse Ditch subwatershed drainage system.*

Davey recommends that approximately 0.40 kilometers (0.25 miles) of CR 500 North and its berm east of the CR 500 North intersection with CR 725 East be elevated and chip sealed to prevent further sediment loss from the road to waterways in the Cyrus Brouse Ditch Subwatershed. The ditch within the county road right-of-way should also be stabilized at the same time that road repairs are conducted. Rock check dams in the ditch would be beneficial. The appropriate entity to pay for and conduct the road chip sealing and roadway ditch improvements is the SCHD.

Area of Potential Beneficial Use: County Road 450 North and 725 East

There is evidence that some erosion may be occurring near the southwest side of the bend in CR 450 North to CR 725 East. Sediment in this location may be washing from the field and into a culvert beneath the road or from the road surface and into a ditch that has been dug across the Jackson property to Cyrus Brouse Ditch. Erosion may be minimized in this location by placing a rock check dam near the culvert on the southwest side of the road.

Photograph 4 (11-10-09). *Erosion is occurring on the ditch bank above a culvert on the upstream side of Cyrus Brouse Ditch.*

Streambank Erosion Control

Streambank erosion is a natural process, but it can be accelerated by man-induced changes in a watershed. Alteration of natural stream conditions and changing land use patterns can lead to channel instability and land loss among other effects that contribute above-average sediment levels in waterways. Natural and man-induced streambank erosion is occurring in multiple places in the Cyrus Brouse Ditch Subwatershed (Photograph 4). Streambank erosion is occurring along the length of the deeply incised Cyrus Brouse Ditch channel in multiple locations as a result of historic channel manipulations resulting in increased bank shear stress. This type of streambank erosion is not easily treated with a BMP. Specific areas of historic man-induced streambank erosion that can and should be treated using BMPs have been identified on the Salsbury and Marbo Farms properties.

Area of Potential Beneficial Use: Salsbury Property

Erosion of the Cyrus Brouse Ditch bank is occurring above and on the upstream side of a culvert in the ditch on the Salsbury property (Photograph 4). One practice to minimize erosion in this location would be hard armoring the bank with riprap. The Steuben County Surveyor's Office is the only known source of funding for this activity. A Section 404 permit from the USACE and a Section 401 Water Quality Certification from the Indiana Department of Environmental Management (IDEM) will be necessary. If this work is not conducted by the Steuben County Surveyor's Office, a Flood Control Act permit from IDNR Division of Water will also be necessary.

In lieu of hard armoring the bank with riprap, Davey recommends that this culvert be replaced with a larger and adequately sized culvert . An engineered practice for the Salsbury property is described in the "Engineered Practices" section of this report. It would be appropriate to incorporate specifications for the replacement of the culvert in the design of the engineered practice.

Area of Potential Beneficial Use: Marbo Farms Property

Streambank erosion is occurring on the Marbo Farms property where the tiled portion of Cyrus Brouse Ditch Lateral 5 becomes an open channel (Photograph 5). Surface water draining from the upslope agricultural field to the channel is contributing to bank cutback as surface water flows down the bank. An appropriate structure, such as a drop inlet structure, should be installed to convey surface water to the ditch bottom so as to prevent further bank cutback around the tile. The existing eroded banks must be reshaped and stabilized using hard armoring or bioengineered practices. Kent Tracey of IDNR stated during the January 19, 2010 field walk that he could provide suggestions of possible BMPs. Aaron Bressler of the Steuben County Surveyor's Office stated that his office would be willing to fund and conduct bank repair and install appropriate BMPs. At this time, it is believed that the Steuben County Drainage Board is the only source of funding for this work. A Section 404 permit from the USACE and a Section 401 Water Quality Certification from IDEM may be necessary depending on final project design. A Flood Control Act permit from IDNR Division of Water will be necessary if the work is not conducted by the Steuben County Surveyor's Office.

Photograph 5 (12-14-09). *Streambank erosion is occurring where Cyrus Brouse Ditch Lateral 5 outlets from a tile to an open stream.*

Area of Potential Beneficial Use: Scharlach Property

Streambank erosion has occurred on the Scharlach property where overflow from wetlands drains to Cyrus Brouse Ditch. Davey recommends installation of geotextile erosion control materials in this location. There are no known sources of funding for this practice in this location.

Tile Repairs and Inlet Filters

Area of Potential Beneficial Use: Teeters, Salsbury, Eichler, and Smith Properties

There have been numerous reports of tile blowouts appearing on private and county tiles in the study area. Specifically watershed stakeholders have reported tile blowouts on the Teeters, Salsbury, Eichler, and Smith properties. Dilapidated tiles should be repaired and soils stabilized around blowouts to prevent excess pollutants from entering the tile system. There are no known sources of funding for private tile repair. Davey suggests CLTLC work with the Steuben County Surveyor's Office to conduct and fund repairs on county tiles.

Davey recommends that tiles passing through wetlands areas such as on the Eichler property contain a weir so as to maintain wetlands hydrology, but allow drainage of excess water to occur. Davey specifically recommends that tile repairs on the Eichler property not be conducted until after CR 500 North road and roadway ditch repair and improvements have been conducted.

Davey also recommends grass buffers be installed around all existing tile inlets. Tile inlet buffers can be funded through multiple programs administered by the NRCS including, but not necessarily limited to, CRP and EQIP. Tile inlet buffers can also be funded through LARE as part of a watershed land treatment project.

Water and Sediment Control Basin

Water and sediment control basins (WASCOBs) consist of an earthen berm or a combination of a berm and shallow depression constructed perpendicular to the direction of slope of an agricultural field, usually in an area where concentrated flow is observed, to trap water and sediment running off cropland upslope of the structure. WASCOBs reduce gully erosion by controlling flow within the drainage area. Water is usually released slowly via infiltration or a tile riser inlet connected to a subsurface drainage tile. WASCOBs can be effective in reducing sedimentation of nearby waters when grass buffers are maintained around tile inlets to filter water prior to it reaching a subsurface drainage tile. Designers of WASCOBs should specify a grass seed mixture in the WASCOB and inform farmers to maintain the vegetation.

WASCOBs require light engineering design work and can be funded through the EQIP program administered by the NRCS and through LARE as part of a watershed land treatment project. The NRCS engineers WASCOBs at no cost for landowners that use EQIP cost-share funds to construct the structures. A similar practice such as a sediment basin, which would retain water longer than a WASCOB, may be funded through a LARE engineering design and implementation grant.

Area of Potential Beneficial Use: Scharlach Property

Davey recommends installation of a WASCOB and an optional sediment basin on the Scharlach property in association with a grass waterway. At least one WASCOB should be constructed within the swale that traverses the field to reduce erosion and formation of gullies in this location. In addition to allowing pollutants to settle out of the surface flow that reaches it, a WASCOB in this location will slow the flow of surface water draining from the field and entering the study area waterways. Slowing the flow of surface water from the field will reduce in-channel erosion where this water eventually enters Cyrus Brouse Ditch. At a minimum, a grass buffer should be installed around the WASCOB tile riser inlet to further filter sediment and nutrients prior to water entering the tile system. For maximum water quality benefit, the WASCOB could be installed in conjunction with a grass waterway, and the current tile outlets on the north side of the field would open to a small sediment basin prior to draining to the woods north of the field.

ENGINEERED PRACTICES

Engineered practices evaluated include a grade stabilization structure on the Oberst property, a water level control structure on the Eichler property, creation of wetlands on the Salsbury and Ireland properties, creation of wetlands or a sediment pond on the Moore property, installation of a sediment pond on the Jackson property, and installation of a two-stage ditch on the Salsbury property. It was determined that a total of 17.3 hectare-meters (13.0 acre-feet) of water storage capacity would be necessary to treat all first flush storm flow draining from the entire Cyrus Brouse Ditch Subwatershed through water quality wetlands and sediment basin. The first flush storm event was based on a typical storm defined as 2.5 centimeters (1 inch) of rain in 24 hours.

Grade Stabilization Structure–Oberst Property

Installation of a grade stabilization structure to enhance existing wetlands was proposed along Cyrus Brouse Ditch on the Oberst property. A field inspection revealed that the banks of the Cyrus Brouse Ditch are very stable on the Oberst property, and it is suspected that little sediment and nutrients are entering the ditch from upstream sources. Consequently, a grade stabilization structure in this location has little potential for water quality improvement. Moreover, installation of a grade stabilization structure will result in some disruption to the currently stable streambanks. It is not recommended that this practice be implemented in this location due to lack of water quality improvement benefits.

Water Level Control Structure–Eichler Property

Installation of a water level control structure was proposed to be installed on the tiled portion of Cyrus Brouse Ditch Lateral 5 on the Eichler property. The purpose of this practice would be to pond a greater volume of water in wetlands on the Eichler property for a slightly longer duration to increase denitrification rates in surface flow water during storm flow events, and to reduce the quantity of water reaching the open channel portion of Cyrus Brouse Ditch Lateral 5 at any given time. Elevation data collected by the Steuben County Surveyor's Office indicates that there is 30.5 centimeters (12 inches) of fall between the lowest known elevation on CR 500 North and the lowest known elevation along the northern edge of the Eichler property. Due to the minimal elevation fall between the road and the northern edge of the Eichler property, ponding of water in this location would result in increased flooding of CR 500 North. To substantiate this concern, it has been reported that CR 500 North frequently floods in this location with current drainage conditions on the Eichler property. This practice was determined to not be feasible because of safety concerns associated with the potential of the road becoming flooded more often and at higher depths.

Wetlands–Salsbury Property

Wetlands restoration/creation was proposed on the Salsbury property near Cyrus Brouse Ditch and the Marbo Farms woods where Cyrus Brouse Ditch Lateral 5 enters Cyrus Brouse Ditch. A field inspection revealed significant topography in this location making it unsuitable for wetlands creation. Wetlands are currently present in the location where Cyrus Brouse Ditch Lateral 5 drains to Cyrus Brouse Ditch on the Marbo Farms and Ireland properties. It is not recommended that this practice be implemented in this location due to the unsuitability of the site for this practice.

Wetlands Site A–Ireland Property

Wetlands restoration and enhancement was proposed in two separate locations on the Ireland property. Ireland Site A is located north of the location where the tiled portion Cyrus Brouse Ditch Lateral 5 becomes an open stream on the Marbo Farms property. It was proposed that storm flow from the Cyrus Brouse Ditch Lateral 5 tile be rerouted northward to the Ireland property and discharge to an existing wetlands basin that would be enhanced and allow for filtering of sediment and nutrients in the water. Elevation data collected in the field by the Steuben County Surveyor's Office revealed that the bottom elevation of the tile opening on the Marbo Farms property is 319.16 meters (1,047.11 feet), and the elevation of the top of water on the lowest portion of the Ireland property is 319.15 meters (1,048.36 feet). The lower elevation of the Cyrus Brouse Ditch Lateral 5 tile compared with the Ireland property makes it impossible to convey water from the tile to the wetlands. Consequently, this proposed practice was determined to not be feasible.

Wetlands Site B–Ireland Property

Ireland Site B is located adjacent to Cyrus Brouse Ditch on the easternmost portion of the Ireland property. The concept of diverting water from Cyrus Brouse Ditch to the existing wetlands in this location to enhance the wetlands and allow for further filtering of sediment and nutrients was evaluated. Based on available topographical data, it was determined that a maximum of 0.9 hectare-meters (0.7 acre-feet) of water storage capacity can realistically be created in this location through excavation of 9,328 cubic meters (12,200 cubic yards) of soil. Such a small water storage capacity will by itself provide little overall water quality when compared with the size of the upstream watershed and corresponding amount of water that will go untreated. Costs for excavation alone at a price of $4 per cubic yard are estimated at $48,800. This estimate excludes costs for a water diversion structure in Cyrus Brouse Ditch, plant materials, planting labor, and any costs associated with obtaining permits. It would be necessary to obtain a Section 404 permit from the USACE, a Section 401 Water Quality Certification from IDEM, a Flood Control Act permit, and possibly a Ditch Reconstruction permit from the IDNR Division of Water. Permission for the project would also be required from the Steuben County Drainage Board. It is not recommended that this practice be implemented in this location due to the high cost to low-water quality benefit ratio.

Wetlands/Sediment Pond–Moore Property

Installation of a sediment pond was proposed on the Moore property, and wetlands creation was also considered in this location. Analysis of topographical data and size of the upstream watershed revealed that there is insufficient space for either of these practices in this location to provide a significant improvement to Cyrus Brouse Ditch water quality. Specifically, it was determined that 0.8 hectare-meters (0.6 acre-feet) of water storage capacity can realistically be created in this location through excavation of 3,976 cubic meters (5,200 cubic yards) of soil. Costs for excavation alone at a price of $4 per cubic yard are estimated at $20,800. This estimate excludes costs for a water diversion structure in Cyrus Brouse Ditch, plant materials, planting labor, and any costs associated with obtaining permits. It would be necessary to obtain a Section 404 permit from the USACE, a Section 401 Water Quality Certification from IDEM, and a Flood Control Act permit from the IDNR Division of Water. Permission for the project would also be required from the Steuben County Drainage Board. Additionally, a plan for long-term maintenance and monitoring plan of the site would also be necessary. It is not recommended that either practice be implemented in this location due to the high cost to low-water quality benefit ratio.

Sediment Pond–Jackson Property

Installation of a sediment pond was also proposed on the Jackson property west of Cyrus Brouse Ditch. Analysis of available topographical data revealed that a sediment pond in this location could provide a notable amount of water storage capacity. A total of 4.9 hectare-meters (3.7 acre-feet) of water storage capacity could be created in this location through excavation of 32,111 cubic meters (42,000 cubic yards) of soil. Costs for excavation alone at a price of $4 per cubic yard are estimated at $168,000. This estimate excludes costs for a water diversion structure in Cyrus Brouse Ditch, plant materials, planting labor, and any costs associated with obtaining permits. It would be necessary to obtain a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the Indiana Department of Environmental Management (IDEM), and Flood Control Act permit from the IDNR Division of Water. Permission for the project would also be required from the Steuben County Drainage Board. Analysis of the upstream watershed suggests that there are only a few significant pollutant sources upstream of the proposed sediment pond location. Implementation of BMPs at the pollutant sources would provide measureable water-quality benefits at a much lower cost. If BMPs are implemented upstream of this proposed engineered practice location, it is not recommended that this practice be implemented due to the resulting high cost to low-water quality benefit ratio.

Two-Stage Ditch–Salsbury Property

The majority of headwater streams in Indiana have been converted to ditches having incised, trapezoidal channels. These channels have historically been maintained in a fashion so as to straighten the flow pathway and eliminate a stream's natural floodplain. This results in a high-energy system and high rates of shear stress on the channelized ditch banks. Consequently, ditch bank erosion and instability is a common result. Cyrus Brouse Ditch is a typical incised, trapezoidal ditch (Photograph 6). In a two-stage ditch design, the ditch banks are excavated outward above the ordinary high watermark so as to restore a floodplain to the stream. During storm flow events, energy is dissipated as water flows across the floodplain reducing bank shear stress and subsequent sediment loading to the stream (Photograph 7). Construction of two-stage ditches has shown to reduce nitrate loads to improve water quality (Tank, 2010). Installation of a two-stage ditch design was proposed on the Salsbury property. Specifically, a two-stage channel was proposed to be installed approximately from the culvert crossing the ditch in the northern half of the field to the northern property boundary totaling approximately 610 linear meters (2,000 linear feet). The two-stage channel would be designed to taper back down to a traditional shaped ditch near the northern property boundary. The existing undersized culvert in the ditch should be replaced with a larger, appropriately sized culvert as part of the two-stage ditch project to reduce erosion occurring on the bank on the upstream side of the culvert. The Steuben County Surveyor's Office has expressed willingness to replace the culvert as part of a two-stage ditch project.

Photograph 6 (12-14-09). *Cyrus Brouse Ditch is a deeply incised, trapezoidal channel.*

Photograph 7 (12-14-09). *Streambank erosion is occurring within the Cyrus Brouse Ditch channel as a result of shear stress during storm flow events.*

Cost estimates associated with earthwork range from $10-15 per linear foot based on previous costs incurred by The Nature Conservancy (J. Draper, personal communication, January 19, 2010). The Wells County, Indiana Surveyor reports total installation cost estimates of approximately $25 per linear foot (J. Hahn, personal communication, December 1, 2009). Davey recommends budgeting approximately $75,000 for this project. This estimate excludes costs for plant materials, planting labor, and any costs associated with obtaining permits.

The USACE has determined that Cyrus Brouse Ditch is a jurisdictional waterway. It will be necessary to share project plans with the USACE to determine if a Section 404 permit is necessary. Assuming it will be necessary to apply for a Section 404 permit from the USACE, it will also be necessary to apply for a Section 401 Water Quality Certification from IDEM. Providing the Steuben County Drainage Board accepts this practice as a project conducted on their behalf, it will not be necessary to apply for a Flood Control Act permit from IDNR. IDNR should be notified of the project by the Steuben County Surveyor's Office. The Salsbury property is jointly owned by Ned Salsbury and Frances Orten. Mr. Salsbury has given verbal approval to proceed with designing a two-stage ditch on the property on behalf of him and Ms. Orten.

The Steuben County Surveyor's Office has expressed interest in overseeing construction of the project and planting labor. LARE has expressed interest in funding 75 percent of project implementation expenses. The Nature Conservancy has also expressed interest in providing technical guidance and a minimal amount of funding pending available funds. The SWCD and NRCS have also expressed a willingness to assist with projects. EQIP funds may be available through the NRCS Cooperative Conservation Partnership Initiative (CCPI). The Northeast Indiana Chapter of Pheasants Forever may provide seed and plant up to five acres of upland prairie habitat on the property should Mr. Salsbury become a member.

Davey strongly recommends installation of a two-stage ditch on the Salsbury property as a feasible engineered practice for improving water quality in the Cyrus Brouse Ditch Subwatershed. Project designers should work closely with Mr. Salsbury to ensure the project meets his approval and to establish as much natural area around the project area as possible. Davey also strongly recommends water quality sampling be conducted on the Cyrus Brouse Ditch before and after implementation of a two-stage ditch design.

CONCLUSIONS AND RECOMMENDATIONS

BMPs

Implementation of BMPs is the highest priority action item to improve water quality in the Cyrus Brouse Ditch Subwatershed. The purpose is to keep more sediment and pollutants from reaching Cyrus Brouse Ditch in the first place. After lengthy evaluations and contributions from many individuals, Davey identified multiple sites where BMPs can and should be implemented. Table 1 ranks the specific recommended BMP locations identified in the Cyrus Brouse Ditch Subwatershed. Special emphasis should be placed on the first 5 recommended BMPs.

In addition to these BMPs, Davey recommends that watershed stakeholders are careful to ensure that other general BMPs are applied throughout the Clear Lake Watershed in the future. For instance, soil exposed for construction purposes adjacent to or near a waterbody or on a site over one acre should have silt fences installed and be stabilized with vegetative material as soon as appropriate in accordance with standard Rule 5 requirements. Tile risers should have grass buffers maintained around them to help filter pollutants from surface water before it drains to the tile system. Farmers should implement nutrient management plans and conduct soil testing to prevent excess nutrient application on fields and consequently runoff. And, impacts to and fill of existing wetlands should be minimized. All wetlands impacts and dumping of fill should be authorized by appropriate permits from the USACE and IDEM.

Table 1. Rank of Recommended BMPs

Priority Rank	Practice	Parties Responsible for Practice Implementation
1	Streambank erosion control – Marbo Farms Property	CLTLC shall conduct initial coordination with the Steuben County Surveyor's Office. The Surveyor's Office will be responsible for funding and conducting the repair.
2	WASCOB and/or grass waterways and sediment basin – Scharlach property	Davey shall conduct initial coordination with the landowner and the NRCS. The NRCS and landowner will ultimately be responsible for project design, funding, and implementation of WASCOBs and grass waterways.
3	Grass waterways – DeWitt property	CLTLC shall conduct initial coordination with the landowner and NRCS. The NRCS and landowner will ultimately be responsible for project design, funding, and implementation. This BMP should be prioritized higher than a WASCOB and grass waterway on the Scharlach property after installation of a two-stage ditch.
4	Filter strips – Salsbury property	Davey shall conduct initial coordination with the landowner and NRCS. The NRCS and landowner will ultimately be responsible for project design, funding, and implementation.
5	Road and roadway ditch repair and improvements – CR 500 North east of CR 725 East	CLTLC shall conduct initial coordination with the Steuben County Highway Department. The Highway Department will ultimately be responsible for funding and implementation.
6	Streambank erosion control – Salsbury property	CLTLC shall conduct initial coordination with the Steuben County Surveyor's Office providing this issue is not addressed as part of a two-stage ditch project. The Surveyor's Office will be responsible for funding and conducting the repair.
7	Tile repair and inlet filters – multiple locations	CLTLC shall conduct initial coordination with landowners, the Steuben County Surveyor's Office, and the NRCS as appropriate for each tile scenario.
8	Streambank erosion control – Scharlach property	CLTLC shall conduct coordination with the landowner and determine a funding source.
9	Rock check dam – Road bend from CR 450 North to CR 725 East	CLTLC shall conduct initial coordination with the Steuben County Highway Department. The Highway Department will ultimately be responsible for funding and implementation.

Engineered Practices

Engineered practices should be installed as appropriate to further filter pollutants from the Cyrus Brouse Ditch Subwatershed waterways. Davey has determined that implementation of a two-stage ditch design on the Salsbury property to be the most feasible engineered practice in the study area. Construction costs, the ability to obtain the necessary permits, potential for Cyrus Brouse Ditch water quality improvement, and landowner interest in project implementation were factors considered in determining feasibility.

Davey will continue to work with CLTLC and landowners as well as other project partners to develop engineered project designs and implementation plans. Davey will apply for all necessary permits to conduct engineered projects except for permits which must be acquired by the Steuben County Surveyor's Office.

Davey recommends that Hoosier Riverwatch data be collected at the Cyrus Brouse Ditch inlet to Clear Lake and at CR 500 N on a monthly basis prior- and post-construction of a two-stage ditch. Data collection should preferentially take place during storm flow conditions.

If you have any questions regarding this Engineering Feasibility Study for the Clear Lake Cyrus Brouse Ditch Subwatershed, please do not hesitate to contact Chad Appleman or me at 260-969-5990. Thank you for the opportunity to assist you with this important project.

Sincerely,

Alicia Douglass

Alicia Douglass
Biologist/Project Manager

c.f. Kent Tracey, IDNR LARE
Derek Frederickson, Engineering Resources, Inc.

Attachment A
References

Tank, Jennifer L. January 7, 2010. *The Efficacy of Two-Stage Ditch Management for Reduction in Sediment and Nitrogen Export*. 2010 Indiana Association of Soil and Water Conservation Districts Annual Conference. Indianapolis, Indiana.

Tetra Tech, Inc. 2006. *Spreadsheet Tool for the Estimation of Pollutant Load (STEPL) User's Guide*, Version 4.0. Fairfax, Virginia. 59 pp.

Appendix B
Existing Water Quality Data

Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
143: Clear Lake outlet at Round Lake dam	8/24/1996	Clear/Sunny	Clear/Sunny	9	8	**0.05**	0	0	0
143: Clear Lake outlet at Round Lake dam	9/7/1996	Rain	Clear/Sunny	8	7.8	**0.15**	0.1	1	0
143: Clear Lake outlet at Round Lake dam	5/4/1997	Clear/Sunny	Rain	12	7.7	0	0	3	0
143: Clear Lake outlet at Round Lake dam	7/12/1997	Clear/Sunny	Clear/Sunny	9	7.9	0	0	2	0
143: Clear Lake outlet at Round Lake dam	9/27/1997	Clear/Sunny	Clear/Sunny	9	7.8	0	0	2	0
143: Clear Lake outlet at Round Lake dam	4/4/1998	Overcast	Overcast	10	8	**0.1**	0.2	2	0
143: Clear Lake outlet at Round Lake dam	8/7/1998	Overcast	Overcast	7	7.7	0	0	1	0
143: Clear Lake outlet at Round Lake dam	10/3/1998	Showers	Overcast	7	7.8	**0.1**	0	2	0
143: Clear Lake outlet at Round Lake dam	4/10/1999	Clear/Sunny	Stormy	10	7.8	0	0	2	20
143: Clear Lake outlet at Round Lake dam	4/7/2000	Overcast	Overcast	12	8	0	0	1	40
143: Clear Lake outlet at Round Lake dam	7/13/2000	Clear/Sunny	Clear/Sunny	9	7.8	**0.04**	0	3	0
143: Clear Lake outlet at Round Lake dam	10/17/2000	Overcast	Overcast	8	7.6	0	0	1.25	0
143: Clear Lake outlet at Round Lake dam	4/8/2001	Clear/Sunny	Stormy	11	7.8	0	0	2	0
143: Clear Lake outlet at Round Lake dam	7/23/2001	Clear/Sunny	Stormy	7	7.6	0	0	2	0

[1]Alternating line colors indicate different sample site locations.
[2]Red text indicates that the parameter result is not meeting Indiana water quality standards.
[3]Red text indicates that the parameter result exceeds state averages. Blue text indicates the value exceeds USEPA reference condition, but is below average for Indiana waters.
[4]Red text indicates that the parameter result exceeds state the average. Blue text indicates that the parameter result exceeds the value for unpolluted waters in Indiana, but is below the state average.

Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
143: Clear Lake outlet at Round Lake dam	10/22/2001	Overcast	Overcast	10	7.8	0	0	1	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	6/29/1996	Clear/Sunny	Clear/Sunny	4	7.6	1.5	0	4	33
145: Harry Teeters Ditch swamp outlet at Lake Drive	7/28/1996	Overcast	Clear/Sunny	5	7.5	1	0	10	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/6/1997	Clear/Sunny	Rain	8	7.4	0.15	1	5	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	5/26/1997	Clear/Sunny	Clear/Sunny	6	7.5	0.6	2	10	165
145: Harry Teeters Ditch swamp outlet at Lake Drive	6/21/1997	Overcast	Stormy	4	7.5	0.75	0.6	3	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	8/17/1997	Overcast	Overcast	4	7.5	0.45	0.25	15	33
145: Harry Teeters Ditch swamp outlet at Lake Drive	10/31/1997	Overcast	Overcast	6	7.5	0	0	3	80
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/11/1998	Clear/Sunny	Rain	9	7.5	0.3	2.5	30	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	6/20/1998	Clear/Sunny	Clear/Sunny	4	7.7	0.8	0.55	8	100

[1]Alternating line colors indicate different sample site locations.
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[3]Red text indicates that the parameter result exceeds state averages. Blue text indicates the value exceeds USEPA reference condition, but is below average for Indiana waters.
[4]Red text indicates that the parameter result exceeds state the average. Blue text indicates that the parameter result exceeds the value for unpolluted waters in Indiana, but is below the state average.

Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
145: Harry Teeters Ditch swamp outlet at Lake Drive	8/29/1998	Overcast	Overcast	4	7.5	0.6	0.1	1	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	10/31/1998	Overcast	Overcast	3	7.3	0.7	0	2	40
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/17/1999	Overcast	Rain	13	8	0.1	1.5	6	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/14/2000	Clear/Sunny	Clear/Sunny	9	7.4	0	0.55	2	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	8/28/2000	Overcast	Showers	5	7.5	0.65	0	4	20
145: Harry Teeters Ditch swamp outlet at Lake Drive	11/14/2000	Overcast	Overcast	8	7.6	0.15	0	5	20
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/8/2001	Clear/Sunny	Stormy	12	7.7	0.15	0	3	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	7/23/2001	Clear/Sunny	Stormy	4	7.3	0.7	0	5	40
145: Harry Teeters Ditch swamp outlet at Lake Drive	10/22/2001	Overcast	Overcast	4	7.4	0.25	0.55	3	20

[1]Alternating line colors indicate different sample site locations.
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[4]Red text indicates that the parameter result exceeds state the average. Blue text indicates that the parameter result exceeds the value for unpolluted waters in Indiana, but is below the state average.

Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
145: Harry Teeters Ditch swamp outlet at Lake Drive	11/15/2008	Rain	Rain	6	7	-	0	15.01	367
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/22/2009	Clear/Sunny	Rain	12	7.5	-	0	15.01	0
145: Harry Teeters Ditch swamp outlet at Lake Drive	8/23/2009	Overcast	Showers	4.5	7.5	-	2.2	17	615
145: Harry Teeters Ditch swamp outlet at Lake Drive	10/15/2009	Overcast	Showers	7	7	-	2.2	15	233
145: Harry Teeters Ditch swamp outlet at Lake Drive	4/21/2010	Clear/Sunny	Overcast	10	7.5	-	-	15.01	100
145: Harry Teeters Ditch swamp outlet at Lake Drive	7/25/2010	Clear/Sunny	Overcast	5	8	-	0	15.01	833
145: Harry Teeters Ditch swamp outlet at Lake Drive	8/8/2010	-	-	-	-	-	-	-	333
145: Harry Teeters Ditch swamp outlet at Lake Drive	9/12/2010	Clear/Sunny	Rain	3	8	-	0	50	133
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	5/25/1996	Clear/Sunny	Clear/Sunny	20	7.6	0.3	0.25	5	66
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	6/15/1996	Clear/Sunny	Rain	8	7.7	0.1	0.04	5	264

[1]Alternating line colors indicate different sample site locations.
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Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	7/13/1996	Clear/Sunny	Clear/Sunny	6	7.5	**0.1**	0.04	7	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	8/10/1996	Clear/Sunny	Clear/Sunny	8	7.5	**0.15**	0	5	132
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/19/1997	Clear/Sunny	Clear/Sunny	11	7.5	**0.25**	0.1	5	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	7/19/1997	Clear/Sunny	Clear/Sunny	6	7.5	**0.1**	0	12	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	9/27/1997	Clear/Sunny	Clear/Sunny	8	7.6	**0.1**	3	10	80
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/4/1998	Clear/Sunny	Clear/Sunny	11	7.8	**0.1**	0.95	4	20
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	7/11/1998	Clear/Sunny	Clear/Sunny	7	7.6	0	0	4	40
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	11/3/1998	Showers	Overcast	7	7.5	**0.1**	0.15	5	20
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/10/1999	Clear/Sunny	Stormy	10	7.6	**0.2**	**4.5**	4	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	8/7/1999	Overcast	Overcast	8	7.7	0	0	2	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	10/23/1999	Showers	Overcast	7	7.5	0	0	0	20

[1]Alternating line colors indicate different sample site locations.
[2]Red text indicates that the parameter result is not meeting Indiana water quality standards.
[3]Red text indicates that the parameter result exceeds state averages. Blue text indicates the value exceeds USEPA reference condition, but is below average for Indiana waters.
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Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/7/2000	Overcast	Overcast	13	8	0.12	0.44	5	60
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	7/13/2000	Clear/Sunny	Clear/Sunny	8	7.6	0.32	4.27	6.25	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	10/17/2000	Overcast	Overcast	7	7.4	0.05	0.5	4	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/14/2001	Overcast	Overcast	10	7.5	0	9	7	40
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	8/6/2001	Clear/Sunny	Clear/Sunny	7	7.7	0.15	0	7	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	10/23/2001	Overcast	Stormy	8	7.3	0.25	3.5	100.01	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	8/28/2008	Overcast	Clear/Sunny	7	7.5	-	0	100.01	133
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	11/5/2008	Clear/Sunny	Clear/Sunny	7	8.5	-	0	15.01	33
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/23/2009	Clear/Sunny	Rain	10	7	-	8.8	15.01	0
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	8/17/2009	Showers	Storms	7	7	-	15.4	63	567
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	10/15/2009	Overcast	Showers	8	7.5	-	8.8	15	133

[1]Alternating line colors indicate different sample site locations.
[2]Red text indicates that the parameter result is not meeting Indiana water quality standards.
[3]Red text indicates that the parameter result exceeds state averages. Blue text indicates the value exceeds USEPA reference condition, but is below average for Indiana waters.
[4]Red text indicates that the parameter result exceeds state the average. Blue text indicates that the parameter result exceeds the value for unpolluted waters in Indiana, but is below the state average.

Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	4/21/2010	Clear/Sunny	Overcast	10	7.5	-	-	15.01	167
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	7/25/2010	Clear/Sunny	Storms	7	7.5	-	2.2	20	133
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	9/17/2010	-	-	-	-	-	-	<15	260
146: Cyrus Brouse Ditch 100 ft south of Lake Drive	9/21/2010	Clear/Sunny	Rain	5	8.5	-	2.2	15	167
Cyrus Brouse Ditch near SR 120	9/17/2010	-	-	-	-	-	-	15	560
Cyrus Brouse Ditch upstream of Lateral 5	9/17/2010	-	-	-	-	-	-	20	400
Cyrus Brouse Ditch downstream of Lateral 5	9/17/2010	-	-	-	-	-	-	< 15	280
318: Harry Teeters Ditch Koeneman Lake outlet	4/17/1999	Overcast	Overcast	10	7.5	0.25	2	9	0
318: Harry Teeters Ditch Koeneman Lake outlet	4/14/2000	Clear/Sunny	Clear/Sunny	16	8.3	0	2	3	0
318: Harry Teeters Ditch Koeneman Lake outlet	8/28/2000	Overcast	Showers	8	7.4	0.5	0	7	0
318: Harry Teeters Ditch Koeneman Lake outlet	11/15/2000	Clear/Sunny	Clear/Sunny	8	7.7	0.05	0	5	0

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Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
Harry Teeters Ditch on Koeneman Lake upstream of waterfall	8/8/2010	-	-	-	-	-	-	-	33.3
Harry Teeters Ditch on the upstream end of Koeneman Lake	8/8/2010	-	-	-	-	-	-	-	**1,165**
319: Harry Teeters Ditch Koeneman Lake inlet	4/17/1999	Overcast	Rain	9	7.6	**0.25**	1.5	8	0
319: Harry Teeters Ditch Koeneman Lake inlet	4/14/2000	Clear/Sunny	Clear/Sunny	14	7.9	0	3.5	2	20
319: Harry Teeters Ditch Koeneman Lake inlet	8/28/2000	Overcast	Clear/Sunny	8	7.6	**0.25**	0.75	2	0
319: Harry Teeters Ditch Koeneman Lake inlet	11/15/2000	Clear/Sunny	Clear/Sunny	10	7.4	0	0	2	0
320: Harry Teeters Ditch High Hope Camp driveway	4/17/1999	Overcast	Rain	9	7.5	**0.2**	0	1	0
320: Harry Teeters Ditch High Hope Camp driveway	4/14/2000	Clear/Sunny	Clear/Sunny	7	6.7	**0.15**	0	3	0
320: Harry Teeters Ditch High Hope Camp driveway	8/28/2000	Overcast	Overcast	**3**	7	**0.25**	0.2	4	0
320: Harry Teeters Ditch High Hope Camp driveway	11/14/2000	Overcast	Overcast	6	6.8	**0.2**	0	3	20
321: Harry Teeters Ditch in woods	4/17/1999	Overcast	Rain	10	7.6	**0.15**	**4.5**	6	0

[1]Alternating line colors indicate different sample site locations.
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Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
321: Harry Teeters Ditch in woods	4/14/2000	Clear/Sunny	Clear/Sunny	12	7.8	0	4.5	2	0
321: Harry Teeters Ditch in woods	8/28/2000	Overcast	Overcast	8	7.8	0.05	0	5	0
321: Harry Teeters Ditch in woods	11/15/2000	Clear/Sunny	Clear/Sunny	10	7.6	0	0	2	0
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	8/28/2008	Overcast	Clear/Sunny	1.5	7	-	0	0	0
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	11/5/2008	Clear/Sunny	Clear/Sunny	2.5	6.5	-	0	15.01	300
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	4/22/2009	Clear/Sunny	Rain	6	6.5	-	0	15.01	0
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	8/20/2009	Overcast	Storms	1	6.5	-	2.2	15	500
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	10/15/2009	Showers	Showers	3	6.5	-	8.8	15	0
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	4/21/2010	Clear/Sunny	Overcast	7	6.5	-	-	15.01	33
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	7/25/2010	Clear/Sunny	Overcast	1	6.5	-	0	15.01	400

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Hoosier Riverwatch Data									
Site[1]	Date	Current Weather	Past Weather	Dissolved Oxygen (ppm)[2]	pH	Total Phosphate (mg/L)[3]	Nitrate (mg/L)[4]	Turbidity (NTU)[3]	*E. coli* (cfu/100mL)[2]
1374: Alvin Patterson Ditch east of Lake Drive at tile inlet	9/12/2010	Clear/Sunny	Rain	1.5	6.5	-	8.8	15.01	200
1375: Peter Smith Ditch at CR 700 E and Marina Bay	8/28/2008	Overcast	Clear/Sunny	6	7	-	2.2	0	0
1375: Peter Smith Ditch at CR 700 E and Marina Bay	11/5/2008	Clear/Sunny	Clear/Sunny	7	7	-	4.4	15.01	0
1375: Peter Smith Ditch at CR 700 E and Marina Bay	4/23/2009	Clear/Sunny	Rain	7	6.5	-	0	20	0
1375: Peter Smith Ditch at CR 700 E and Marina Bay	8/17/2009	Overcast	Storms	5	6.5	-	15.4	36	20
1375: Peter Smith Ditch at CR 700 E and Marina Bay	10/15/2009	Overcast	Showers	8	6.5	-	8.8	15	100
1375: Peter Smith Ditch at CR 700 E and Marina Bay	4/21/2010	Clear/Sunny	Overcast	4.5	7	-	-	15.01	0
1375: Peter Smith Ditch at CR 700 E and Marina Bay	9/21/2010	Clear/Sunny	Rain	4	7.5	-	22	15	0
1375: Peter Smith Ditch at CR 700 E and Marina Bay	7/25/2010	Clear/Sunny	Storms	5	7	-	22	15.01	0
Lake Anne entrance to Clear Lake west of Lake Drive	9/17/2010	-	-	3.5	6.5	-	0	40	300

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[4]Red text indicates that the parameter result exceeds state the average. Blue text indicates that the parameter result exceeds the value for unpolluted waters in Indiana, but is below the state average.

Steuben County Lakes Council Data							
Site[1]	**Date**	**Total Phosphorus (mg/L)**	**TSS (mg/L)[2]**	**Dissolved Oxygen (ppm)[3, 4]**	**pH**	**Specific Conductivity (µS)**	***E. coli* (cfu/100mL)[4]**
Cyrus Brouse Ditch[3]	10/31/2007	0.024	7.2	7.28	7.58	-	214
Cyrus Brouse Ditch	5/20/2010	0.06	**186**	-	-	-	21
Cyrus Brouse Ditch	7/16/2010	0.03	3	7.08	7.51	847	**1,360**
Cyrus Brouse Ditch	8/17/2010	0.03	12	6.84	-	873	**1,360**
Clear Lake Outlet[3]	10/31/2007	0.02	3.6	8.62	8.29	-	3
Clear Lake Outlet	10/6/2008	0.01	4	7.48	7.83	330	112
Clear Lake Outlet	5/22/2009	BDL[5]	BDL[5]	9.58	8.48	317.4	164[6]
Clear Lake Outlet	07/22/2009	<0.01	<1	8	8.48	347.9	156
Clear Lake Outlet	08/27/2010	BDL[3]	1	6.05	8.04	345.6	8
Clear Lake Outlet	5/20/2010	0.02	4	-	-	-	<1
Clear Lake Outlet	7/16/2010	<0.01	3	6.77	8.22	332.8	6
Clear Lake Outlet	8/17/2010	0.01	7	6.93	8.18	325.1	18
Harry Teeters Ditch[3]	10/31/2007	0.115	6.8	**1.74**	7.25	-	22
Alvin Patterson Ditch[3]	10/31/2007	0.047	0.0	**2.53**	7.12	-	112
Peter Smith Ditch[3]	10/31/2007	0.012	1.2	5.81	7.33	-	0

[1]Alternating line colors indicate different sample site locations.
[2]Blue text indicates the parameter exceeds an IDEM draft TMDL target derived from a monthly average winter limit for NPDES lake dischargers set at 30.0 mg/L in 327 IAC 5-10-4 (IDEM, 2010)
[3]See following data sheets for more detailed information and additional parameters.
[4]Red text indicates that the parameter result is not meeting Indiana water quality standards.
[5]BDL = below laboratory detection limit
[6]Sample was collected on 5/28/2009.

Results:

Figure 5 Cyrus Browse Ditch

Parameter	Cyrus Browse Ditch	IDEM Mean Stream Data
	10/31/2007	St. Joseph Wtrshd 2000-2005
pH	7.58	n/d
D.O. (ppm)	7.26	7.14
Temp. (deg C)	8.20	19.91
ORP (mV)	-76	n/d
B.O.D. (5day ppm)	3	
Nitrite/Nitrite (ppm)	0.19	3.52
Nitrate (ppm)	0.19	n/d
Nitrite (ppm)	0.00	n/d
Total Phosphorus (ppm)	0.024	0.382
Total Suspended Solids (ppm)	7.2	36
E-coli (CFU/100ml)/(MPN)	214	1895.58
Total Phos. Loading Kg/day	**0.0424**	n/d
Total Nitrate Loading Kg/day	**0.3360**	n/d
Tss Loading Kg/day	**12.7324**	n/d
*0 indicates below lab detection limit		

Cyrus Browse Ditch, Clear Lake

A dissolved oxygen level of 7.14 PPM was high enough to sustain fish and other gill breathing aquatic life in Cyrus Browse Ditch. Temperature, ORP, B.O.D., Nitrates, Nitrites, total phosphorus and total suspended solids measurements were all normal and well below their corresponding averages from the IDEM Data for the St. Joseph River Watershed streams. At 214 CFU the Cyrus Browse E-coli count was the highest from the Clear Lake data, but still falls below the level of most swim advisories and well below the IDEM average of 1895.58 CFU. Loading for total phosphorus, nitrates and total suspended solids were relatively low.

Figure 6 Harry Teeters Ditch

Parameter	Harry Teeters Ditch	IDEM Mean Stream Data
	10/31/2007	St. Joseph Wtrshd 2000-2005
pH	7.25	n/d
D.O. (ppm)	1.74	7.14
Temp. (deg C)	7.10	19.91
ORP (mV)	-59	n/d
B.O.D. (5day ppm)	6	n/d
Nitrite/Nitrite (ppm)	0.00	3.52
Nitrate (ppm)	0.00	n/d
Nitrite (ppm)	0.00	n/d
Total Phosphorus (ppm)	0.115	0.382
Total Suspended Solids (ppm)	6.8	36
E-coli (CFU/100ml)/(MPN)	22	1895.58
Total Phos. Loading Kg/hr	**0.0759**	n/d
Total Nitrate Loading Kg/hr	**0.0000**	n/d
Tss Loading Kg/hr	**4.4876**	n/d
*0 indicates below lab detection limit		

Harry Teeters Ditch, Clear Lake

A dissolved oxygen level of 1.74 PPM was probably far too low to sustain fish and other gill breathing aquatic life in Harry Teeters Ditch. One possible cause for this is the ongoing decomposition of large amounts of leaf litter and other detritus present in the stream at the time of measurement. Temperature, ORP, and B.O.D. were normal. Nitrates and Nitrites were both below lab detection limits. Total phosphorus was the highest of the Clear Lake samples at .115 ppm, but was still below the IDEM data average of .382 ppm. Total suspended solids was normal and this stream showed a low E-coli count of 22 CFU. Loading for total phosphorus, nitrates and total suspended solids were relatively low.

Figure 7 Alvin Patterson Ditch (looking at upstream side of culvert leading to lake)

Parameter	Alvin Patterson Ditch	IDEM Mean Stream Data
	10/31/2007	St. Joseph Wtrshd 2000-2005
pH	7.12	n/d
D.O. (ppm)	2.53	7.14
Temp. (deg C)	7.10	19.91
ORP (mV)	-55	n/d
B.O.D. (5day ppm)	4	n/d
Nitrite/Nitrite (ppm)	0.23	3.52
Nitrate (ppm)	0.23	n/d
Nitrite (ppm)	0.00	n/d
Total Phosphorus (ppm)	0.047	0.382
Total Suspended Solids (ppm)	0.0	36
E-coli (CFU/100ml)/(MPN)	112	1895.58
Total Phos. Loading Kg/day	0.0108	n/d
Total Nitrate Loading Kg/day	0.0533	n/d
Tss Loading Kg/day	0.0000	n/d
Flow Rate (CFM)	5.69	
*0 indicates below lab detection limit		

Alvin Patterson Ditch, Clear Lake

A dissolved oxygen level of 2.53 PPM was probably too low to sustain fish and some other gill breathing aquatic life in Alvin Patterson Ditch. As with Harry Teeters Ditch, one possible cause for this is the ongoing decomposition of large amounts of leaf litter from the overhanging tree canopy. Temperature, ORP, and B.O.D. were normal. Nitrates were low and Nitrites were below lab detection limits. Total phosphorus, total suspended solids, and E-coli measurements were also relatively low and well below the IDEM data averages. Loading for total phosphorus, nitrates and total suspended solids were relatively low. The flow rate of this stream at the time of sampling was minuscule at 5.69 Cubic feet per minute (CFM).

Figure 8 Clear Lake Outlet (looking at upstream side of bridge)

Parameter	Clear Lake Outlet	IDEM Mean Stream Data
	10/31/2007	St. Joseph Wtrshd 2000-2005
pH	8.29	n/d
D.O. (ppm)	8.62	7.14
Temp. (deg C)	10.90	19.91
ORP (mV)	-110	n/d
B.O.D. (5day ppm)	4	n/d
Nitrite/Nitrite (ppm)	0.00	3.52
Nitrate (ppm)	0.00	n/d
Nitrite (ppm)	0.00	n/d
Total Phosphorus (ppm)	0.020	0.382
Total Suspended Solids (ppm)	3.6	36
E-coli (CFU/100ml)/(MPN)	3	1895.58
Total Phos. Loading Kg/day	**0.2381**	n/d
Total Nitrate Loading Kg/day	**0.0000**	n/d
Tss Loading Kg/day	**43.0730**	n/d
Flow Rate (CFM)	293.60	
*0 indicates below lab detection limit		

Clear Lake Outlet

As expected all parameters measured in the Clear Lake outlet were reflective of good water quality. A Dissolved Oxygen level of 8.62 ppm was sufficient to support gill breathing fish and macroinvertebrates. Nitrites and Nitrates were both below lab detection limits. A pH of 8.29 was approximately a full point higher than the Clear Lake stream data, probably as a result of it's slightly more buffered calcium-rich waters. The water quality was reflective of the good water quality of Clear Lake waters at the time of sampling. Calculating the flow rate accurately was problematic with the large cross-sectional area of the outlet. In future sampling it may be advisable to conduct sampling or flow rate measurements at the Round Lake outlet, just down stream of Clear Lake.

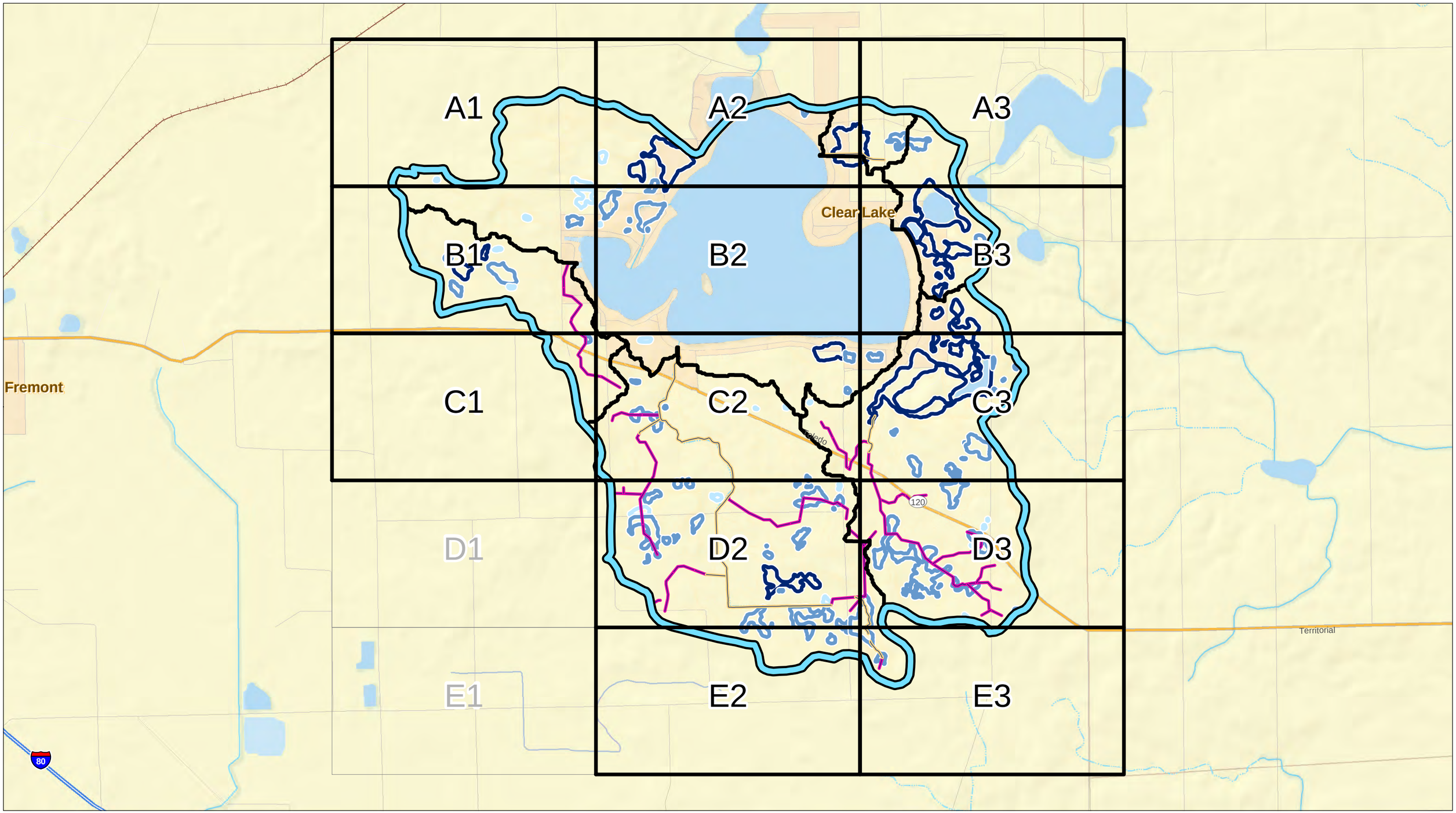
Figure 9 Peter Smith Ditch (looking at culvert entering channel)

Parameter	Peter Smith Ditch	IDEM Mean Stream Data
	10/31/2007	St. Joseph Wtrshd 2000-2005
pH	7.33	n/d
D.O. (ppm)	5.81	7.14
Temp. (deg C)	12.70	19.91
ORP (mV)	-65	n/d
B.O.D. (5day ppm)	3	n/d
Nitrate/Nitrite (ppm)	5.39	3.52
Nitrate (ppm)	5.39	n/d
Nitrite (ppm)	0.00	n/d
Total Phosphorus (ppm)	0.012	0.382
Total Suspended Solids (ppm)	1.2	36
E-coli (CFU/100ml)/(MPN)	0	1895.58
Total Phos. Loading Kg/day	0.0021	n/d
Total Nitrate Loading Kg/day	0.9570	n/d
Tss Loading Kg/day	0.2131	n/d
Flow Rate (CFM)	4.36	
*0 indicates below lab detection limit		

Peter Smith Ditch, Clear Lake

A dissolved oxygen level of 5.81 PPM was probably just high enough to sustain fish and other gill breathing aquatic life in this small ditch. Temperature, ORP, B.O.D., Nitrites, total phosphorus and total suspended solids measurements were all normal and well below their corresponding averages from the IDEM Data for the St. Joseph River Watershed streams. This small stream had the highest Nitrate levels measured for the Clear Lake sampling at 5.39 ppm and was above the IDEM average (for nitrate+nitrite) of 3.52 ppm. E-coli was not detected. Because of the low flow rate of 4.36 CFM daily loadings for total phosphorus, nitrates and total suspended solids were relatively low.

Appendix C
Wetlands Inventory Maps



Roads
Contours
Open County Drains
Tiled County Drains

Wetlands: ORAM Categories

Category 1
Category 2
Category 3

Subwatershed
Clear Lake Watershed

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid Overview

0 0.25 0.5 1

Miles

Wetlands Inventory:
This map shows wetlands that were identified using aerial photograph interpretation, hydric soils data, and topographic contours. Wetlands were field verified where accessible. Not all mapped wetlands were field verified. The accuracy of the wetlands sizes and locations are limited by the quality of the aerial photographs and topographic information. Upland inclusions may be found within mapped wetlands boundaries. This map shows large and significant wetlands as well as smaller wetlands when they could be identified on aerial photographs. This is not a wetlands delineation study, and this map should not be used in lieu of a wetlands delineation for land development purposes. For further information please contact Davey Resource Group at 260-969-5990.

Data Source: ISDP 2009 orthophotograph, IndianaMap, Steuben County GIS Department, and Davey Resource Group

Projected Coordinate System: NAD 1983 State Plane, Indiana East, Foot US

Roads

Contours

Open County Drains

Tiled County Drains

Wetlands: ORAM Categories

Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid A1

0 250 500 1,000

Feet

Wetlands Inventory:
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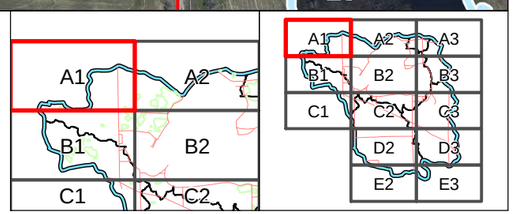

Roads

Contours

Open County Drains

Tiled County Drains

Wetlands: ORAM Categories

Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid A2

0 250 500 1,000

Feet

Wetlands Inventory:
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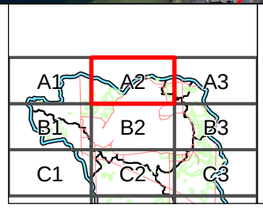
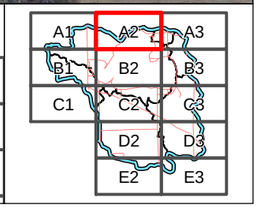
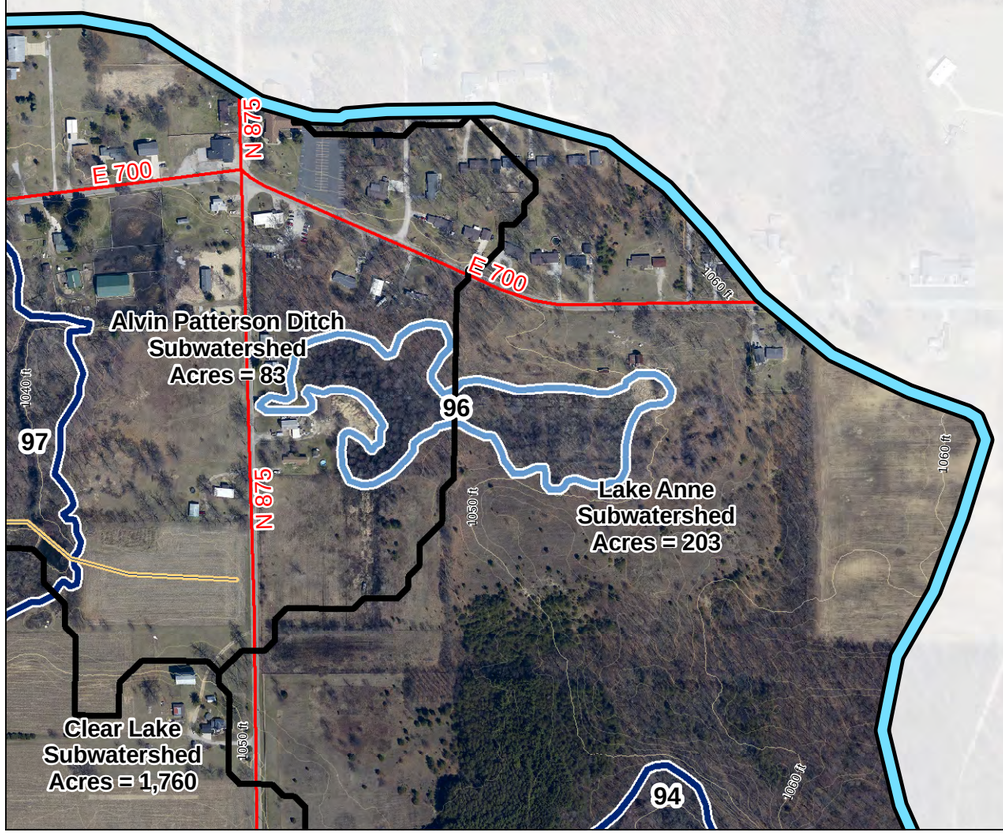
Projected Coordinate System: NAD 1983 State Plane, Indiana East, Foot US







Roads

Contours

Open County Drains

Tiled County Drains

Wetlands: ORAM Categories

Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid A3

0 250 500 1,000

Feet

Wetlands Inventory:
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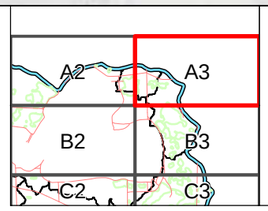
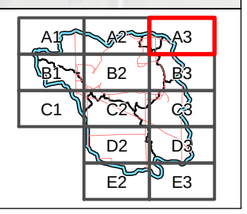
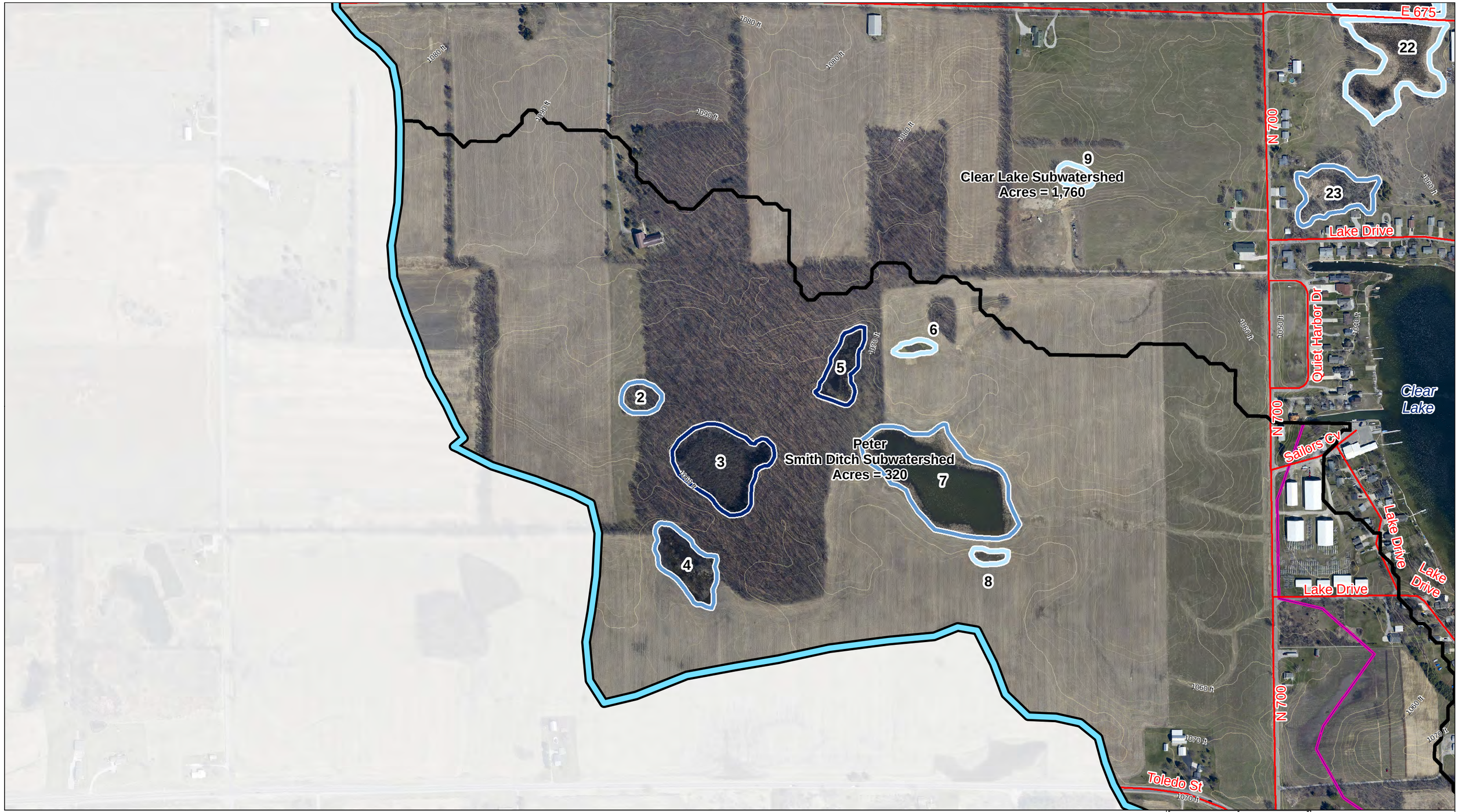
Data Source: ISDP 2009 orthophotograph, IndianaMap, Steuben County GIS Department, and Davey Resource Group

Projected Coordinate System: NAD 1983 State Plane, Indiana East, Foot US







Roads

Contours

Open County Drains

Tiled County Drains

Wetlands: ORAM Categories

Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid B1

0 250 500 1,000

Feet

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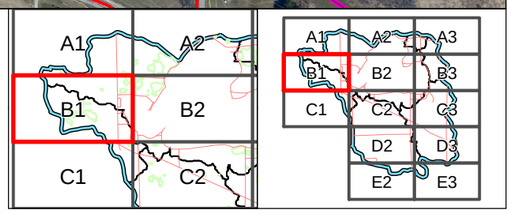

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Map Grid B2

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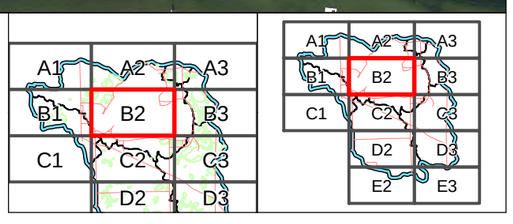

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Clear Lake Watershed

DAVEY RESOURCE GROUP

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Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid B3

0 250 500 1,000

Feet

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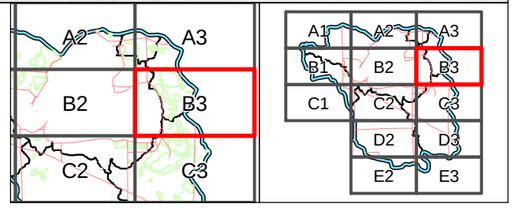

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Clear Lake Watershed

DAVEY RESOURCE GROUP

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Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid C1

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Feet

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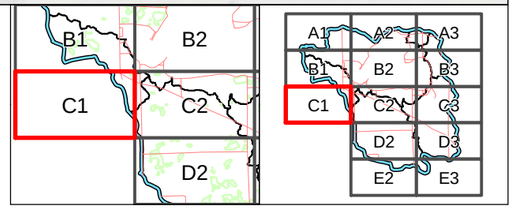

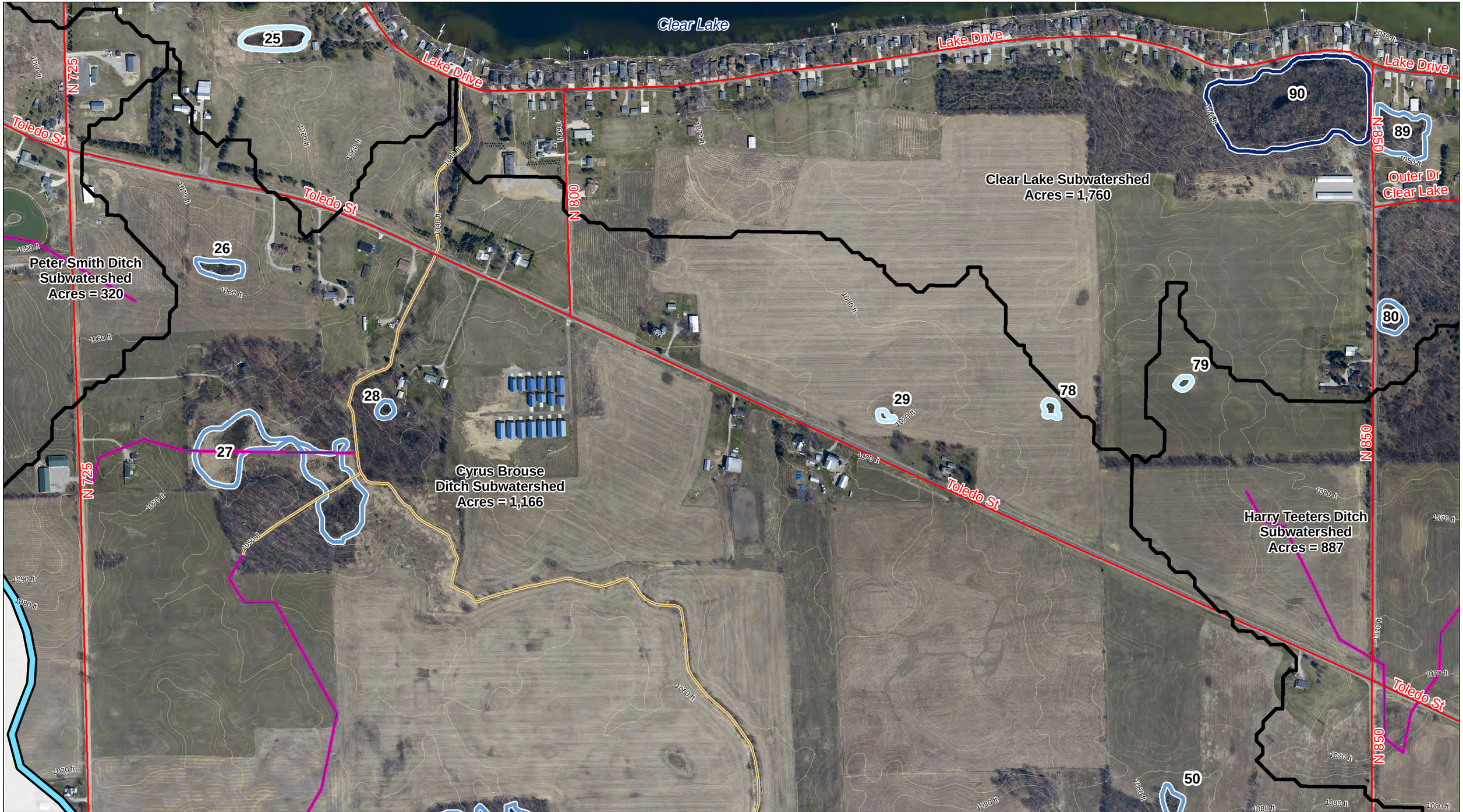

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Contours

Open County Drains

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Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid C2

0 250 500 1,000

Feet

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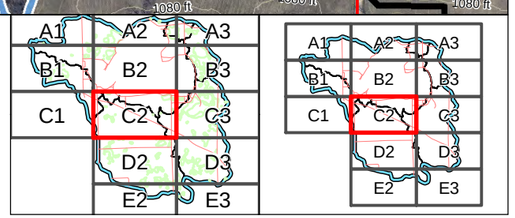

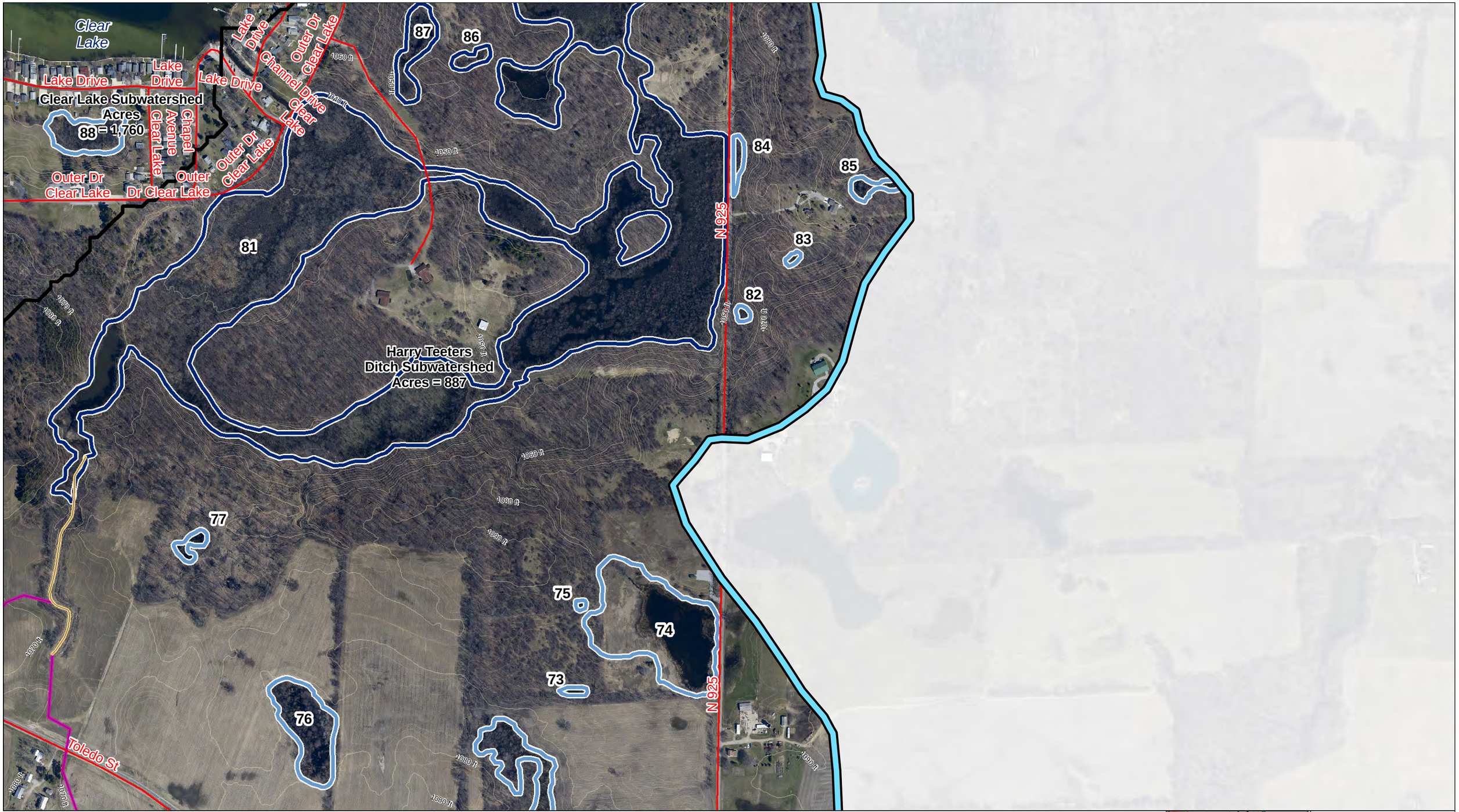

Roads

Contours

Open County Drains

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Category 1

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Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

N

Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid C3

0 250 500 1,000

Feet

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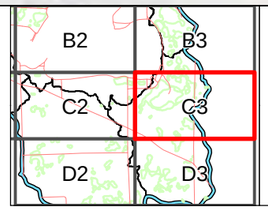

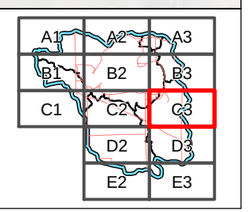

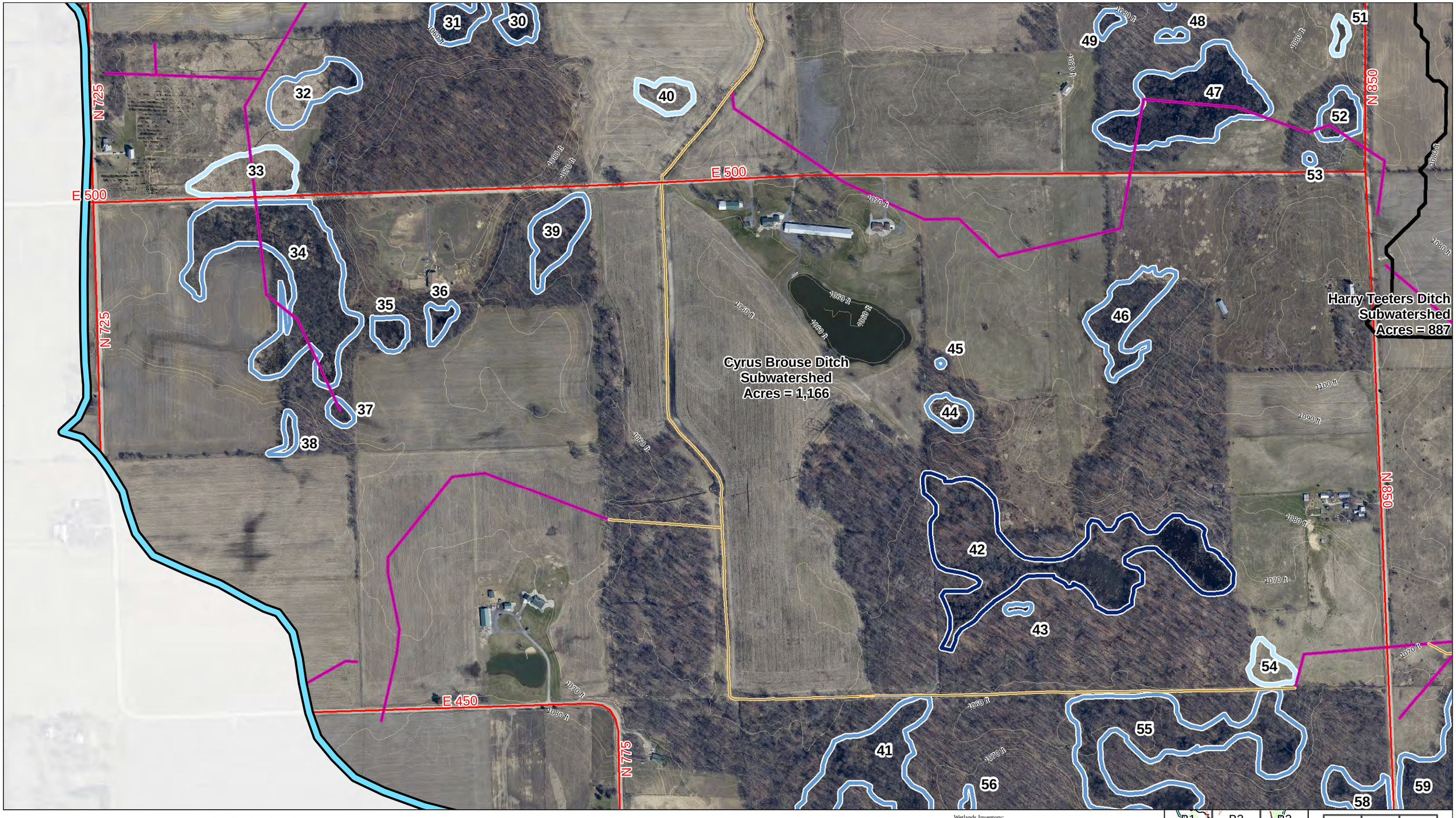

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Contours

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Wetlands: ORAM Categories

Category 1

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Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

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Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid D2

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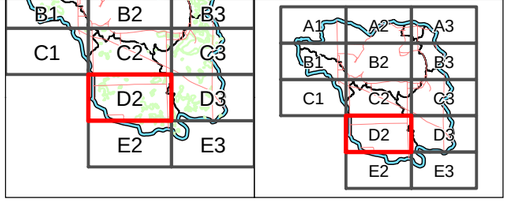

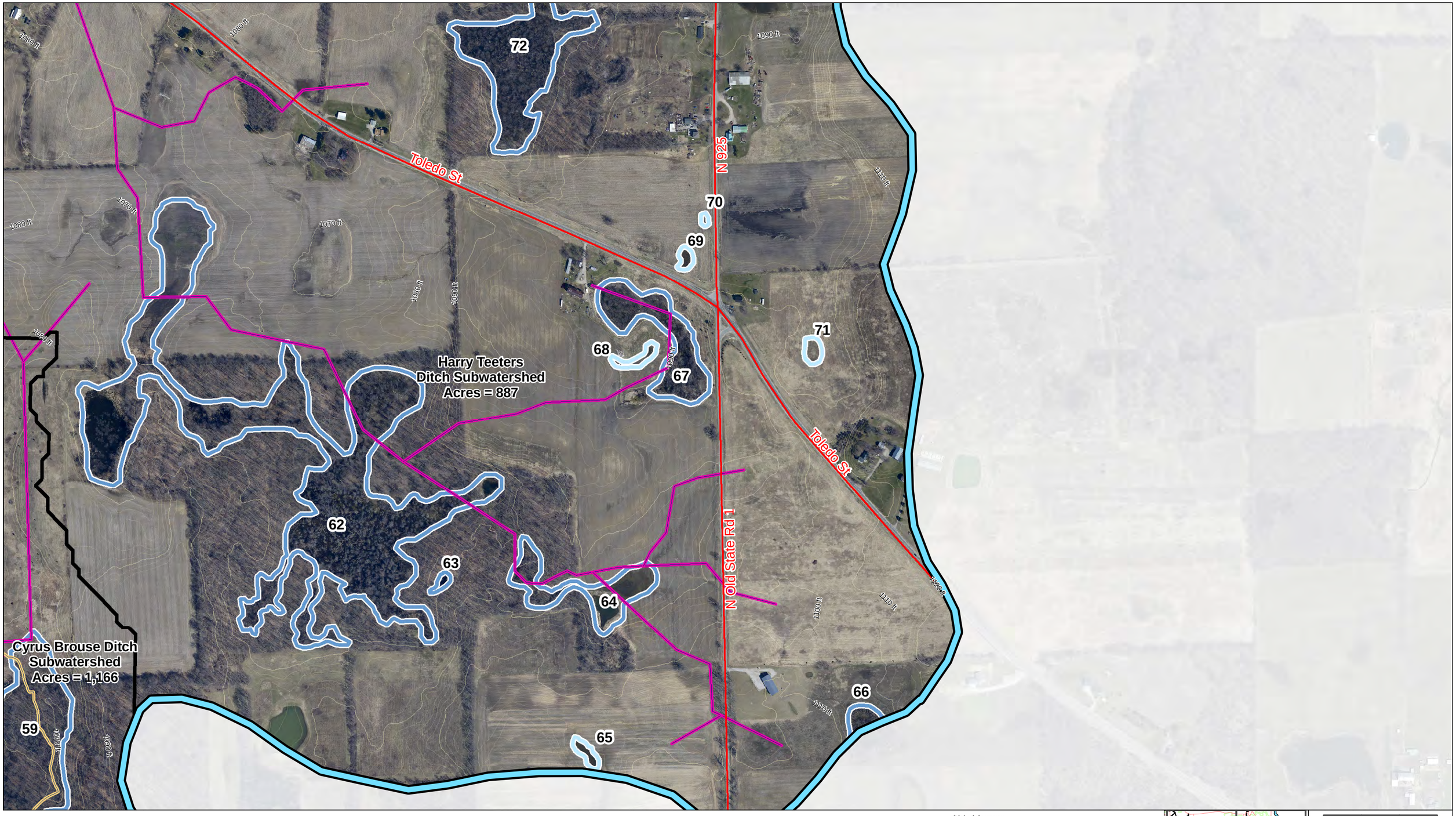

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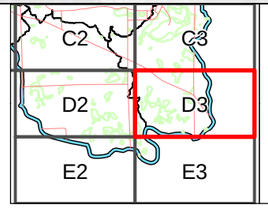

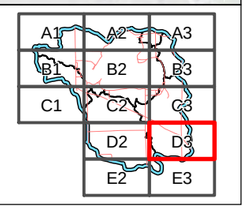

Roads

Contours

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Wetlands: ORAM Categories

Category 1

Category 2

Category 3

Subwatershed

Clear Lake Watershed

DAVEY RESOURCE GROUP

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Clear Lake Watershed Study Area

4,419 Acres, Steuben County, Indiana

Map Grid E2

0 250 500 1,000

Feet

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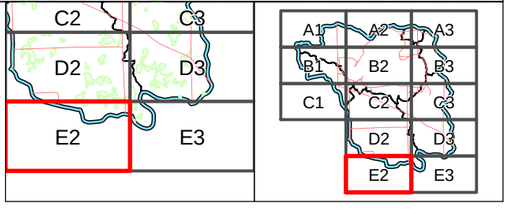

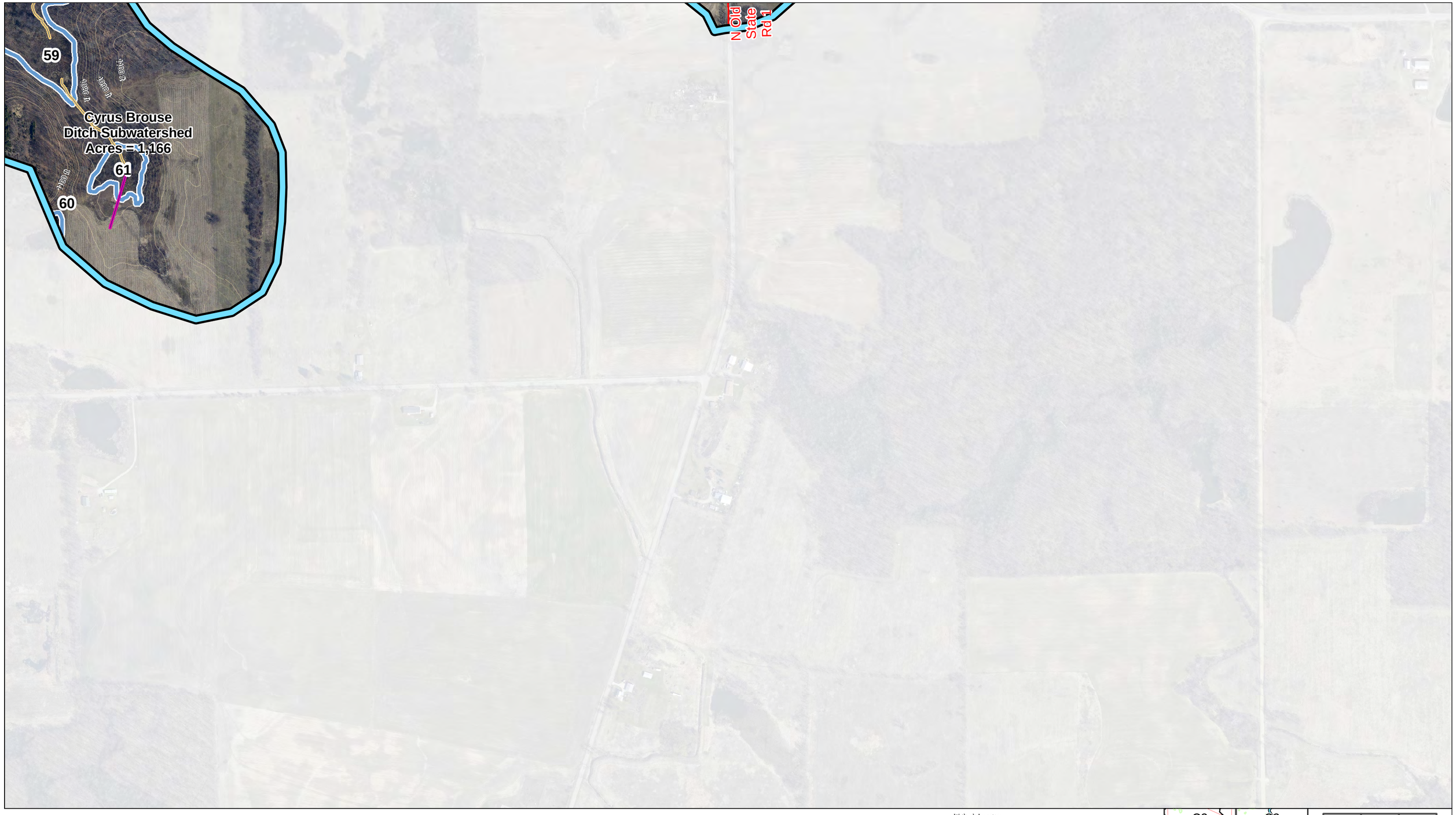

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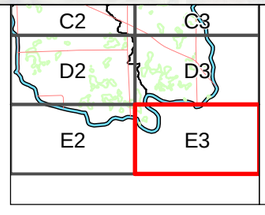

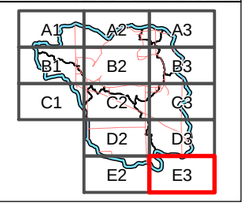

Appendix D
ORAM Data Sheets

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 5, 2010
Wetlands:	Wetland 11	**Rater:**	Alicia Douglass

4 Subtotal | 4 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [x] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

13 Subtotal | 9 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [x] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

39 Subtotal | 26 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other- list

59 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

59 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 5, 2010
Wetland:	Wetland 11	Rater:	Alicia Douglass

59 subtotal first page

64 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

84 Subtotal | 20 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
3	Emergent
2	Shrub
3	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

x	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
x	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

3	Vegetated hummocks/tussocks
2	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

84 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 5, 2010
Wetlands:	Wetland 12	**Rater:**	Alicia Douglass

3 Subtotal | 3 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

17 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

37 Subtotal | 20 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [x] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

55 Subtotal | 18 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [x] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

55 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 5, 2010
Wetland:	Wetland 12	**Rater:**	Alicia Douglass

55 subtotal first page

55 (Subtotal) 0 (Points)

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

63 (Subtotal) 8 (Points)

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
2	Shrub
	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
x	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
x	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
2	Coarse woody debris >15 cm (6")
1	Standing dead > 25 cm (10") dbh
1	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

63 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 2 or 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 14	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

27 Subtotal | 11 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [x] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [x] dredging
- [ ] other- list

41 Subtotal | 14 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

x

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [x] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

41 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetland:	Wetland 14	**Rater:**	Alicia Douglass

41 subtotal first page

41 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

37 Subtotal | -4 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
	Shrub
	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
x	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

x	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

37 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: modified 2

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 15	**Rater:**	Alicia Douglass

3 Subtotal | 3 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

12 Subtotal | 9 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [x] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

30 Subtotal | 18 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.

(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.

(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [x] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [x] dredging
- [ ] other- list

42 Subtotal | 12 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.) x

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [ ] None or none apparent (9)
- [x] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [x] dredging
- [ ] farming
- [ ] nutrient emrichment

42 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetland:	Wetland 15	**Rater:**	Alicia Douglass

42 subtotal first page

47 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

55 Subtotal | 8 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
1	Shrub
2	Forest
	Mudflats
1	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
x	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
x	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
1	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
1	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

55 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 2

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 21	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

5 Subtotal | 3 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [x] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

17 Subtotal | 12 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other- list

31 Subtotal | 14 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [x] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

31 subtotal this page

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 21	Rater:	Alicia Douglass

31 subtotal first page

31 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

29 Subtotal | -2 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
	Shrub
	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

x	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
1	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

29 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 1

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 22	**Rater:**	Alicia Douglass

3 Subtotal | 3 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

10 Subtotal | 7 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [x] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

22 Subtotal | 12 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.

(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.

(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

36 Subtotal | 14 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [x] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

36 subtotal this page

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 22	Rater:	Alicia Douglass

36 subtotal first page

36 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

33 Subtotal | -3 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
	Shrub
	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

x	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

33 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: 1 or 2 gray zone

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	December 14, 2009
Wetlands:	Wetland 27	**Rater:**	Alicia Douglass

3 Subtotal | 3 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 13 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [x] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

27.5 Subtotal | 11.5 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [ ] Recovered (7)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[x] ditch	[ ] point source (nonstormwater)
[ ] dike	[x] filling/grading
[x] tile	[ ] road bed/RR track
[ ] weir	[ ] dredging
[ ] stormwater input	[ ] other- list

42.5 Subtotal | 15 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[ ] mowing	[ ] shrub/sapling removal
[ ] grazing	[ ] herbaceous/aquatic bed removal
[ ] clearcutting	[ ] sedimentation
[ ] selective cutting	[ ] dredging
[ ] woody debris removal	[ ] farming
[ ] toxic pollutants	[ ] nutrient emrichment

42.5 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	December 14, 2009
Wetland:	Wetland 27	**Rater:**	Alicia Douglass

42.5 subtotal first page

42.5 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

45.5 Subtotal | 3 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
1	Shrub
1	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
x	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

x	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
1	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
1	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

45.5 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 2

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 5, 2010
Wetlands:	Wetland 33	Rater:	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

9 Subtotal | 7 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [x] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

15 Subtotal | 6 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [x] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [ ] Recovered (7)
- [x] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [x] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other- list

29 Subtotal | 14 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [x] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

29 subtotal this page

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 5, 2010
Wetland:	Wetland 33	Rater:	Alicia Douglass

29 subtotal first page

29 (Subtotal) 0 (Points)

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

26 (Subtotal) -3 (Points)

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
	Shrub
	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

x	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

26 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 1

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 5, 2010
Wetlands:	Wetland 81	**Rater:**	Alicia Douglass

6 Subtotal | 6 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [x] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

20 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

41 Subtotal | 21 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [x] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[ ] ditch	[ ] point source (nonstormwater)
[ ] dike	[✓] filling/grading
[✓] tile	[✓] road bed/RR track
[ ] weir	[ ] dredging
[ ] stormwater input	[ ] other- list

60 Subtotal | 19 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[ ] mowing	[ ] shrub/sapling removal
[ ] grazing	[ ] herbaceous/aquatic bed removal
[ ] clearcutting	[ ] sedimentation
[✓] selective cutting	[ ] dredging
[ ] woody debris removal	[ ] farming
[ ] toxic pollutants	[ ] nutrient emrichment

60 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 5, 2010
Wetland:	Wetland 81	Rater:	Alicia Douglass

60 subtotal first page

65 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

85 Subtotal | 20 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

2	Aquatic bed
2	Emergent
2	Shrub
3	Forest
	Mudflats
1	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

x	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
3	Coarse woody debris >15 cm (6")
1	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

85 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 86	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

33 Subtotal | 17 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [x] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

52 Subtotal | 19 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [x] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

52 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 86	Rater:	Alicia Douglass

52 subtotal first page

57 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

62 Subtotal | 5 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
	Emergent
	Shrub
2	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
x	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
1	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
1	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

62 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 2 or 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 5, 2010
Wetlands:	Wetland 87	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

35 Subtotal | 19 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [x] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

55 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

55 subtotal this page

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 5, 2010
Wetland:	Wetland 87	Rater:	Alicia Douglass

55 subtotal first page

60 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

70 Subtotal | 10 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
	Emergent
2	Shrub
2	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
1	Coarse woody debris >15 cm (6")
1	Standing dead > 25 cm (10") dbh
2	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

70 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 88	**Rater:**	Alicia Douglass

Subtotal	Points
3	3

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

Subtotal	Points
7	4

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [x] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

Subtotal	Points
19	12

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

Subtotal	Points
36	17

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [ ] None or none apparent (9)
- [x] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [x] mowing
- [ ] grazing
- [x] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

36 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 88	Rater:	Alicia Douglass

36 subtotal first page

36 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

47 Subtotal | 11 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
	Emergent
3	Shrub
2	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
x	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

47 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 2

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 89	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

5 Subtotal | 3 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [x] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

18 Subtotal | 13 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other- list

32 Subtotal | 14 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [ ] Recovered (3)
- [x] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

32 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 89	Rater:	Alicia Douglass

32 subtotal first page

37 | 5 — Subtotal | Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

38 | 1 — Subtotal | Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
1	Emergent
	Shrub
2	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
x	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

38 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: modified 2

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 90	**Rater:**	Alicia Douglass

3 Subtotal | 3 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [x] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

6 Subtotal | 3 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [x] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

22 Subtotal | 16 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [x] filling/grading
- [x] road bed/RR track
- [ ] dredging
- [ ] other- list

42 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

42 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetland:	Wetland 90	**Rater:**	Alicia Douglass

42 subtotal first page

47 (Subtotal) 5 (Points)

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

66 (Subtotal) 19 (Points)

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
3	Emergent
3	Shrub
3	Forest
	Mudflats
1	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
x	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

3	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
2	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

66 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 91	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

36 Subtotal | 20 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [x] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.

(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.

(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

56 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

56 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 91	Rater:	Alicia Douglass

56 subtotal first page

61 (Subtotal) 5 (Points)

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

69 (Subtotal) 8 (Points)

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
	Emergent
	Shrub
3	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
x	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

69 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**5/4/2010**	May 4, 2010
Wetlands:	Wetland 92	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

37 Subtotal | 21 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.

(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.

(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

57 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

57 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetland:	Wetland 92	**Rater:**	Alicia Douglass

57 subtotal first page

57 Subtotal | 0 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

70 Subtotal | 13 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

3	Aquatic bed
	Emergent
2	Shrub
	Forest
	Mudflats
1	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
x	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

70 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetlands:	Wetland 93	**Rater:**	Alicia Douglass

2 Subtotal | 2 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

16 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

34 Subtotal | 18 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [ ] Semi- to permanently inundated/saturated (4)
- [x] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other- list

54 Subtotal | 20 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [x] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

54 subtotal this page

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 93	Rater:	Alicia Douglass

54 subtotal first page

59 (Subtotal) 5 (Points)

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

65 (Subtotal) 6 (Points)

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
	Emergent
	Shrub
3	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
x	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
2	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

65 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 94	**Rater:**	Alicia Douglass

5 Subtotal | 5 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [x] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

19 Subtotal | 14 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [x] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

40 Subtotal | 21 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [ ] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [x] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [ ] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[✓] ditch	[ ] point source (nonstormwater)
[ ] dike	[ ] filling/grading
[ ] tile	[ ] road bed/RR track
[ ] weir	[✓] dredging
[ ] stormwater input	[ ] other- list

59 Subtotal | 19 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

[ ] mowing	[ ] shrub/sapling removal
[ ] grazing	[ ] herbaceous/aquatic bed removal
[ ] clearcutting	[ ] sedimentation
[ ] selective cutting	[ ] dredging
[ ] woody debris removal	[ ] farming
[ ] toxic pollutants	[ ] nutrient emrichment

59 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	Date:	May 4, 2010
Wetland:	Wetland 94	Rater:	Alicia Douglass

59 subtotal first page

64 | 5 — Subtotal | Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

84 | 20 — Subtotal | Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

1	Aquatic bed
3	Emergent
2	Shrub
3	Forest
	Mudflats
3	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

x	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
	Nearly Absent <5% cover (0)
x	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

	Vegetated hummocks/tussocks
	Coarse woody debris >15 cm (6")
1	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
moderate	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

84 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

ORAM v. 5.0 Field Form Quantitative Rating

Site:	Clear Lake Township, Steuben County, Indiana	**Date:**	May 4, 2010
Wetlands:	Wetland 97	**Rater:**	Alicia Douglass

4 Subtotal | 4 Points

Metric 1. Wetland Area (size). (max 6 pts)

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [x] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [ ] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

8 Subtotal | 4 Points

Metric 2. Upland buffers and surrounding land use. (max 14 pts)

2a. Calculate average buffer width (select one, do not double check)

- [ ] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [x] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use (select one or double check & average)

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [ ] LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- [x] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

31.5 Subtotal | 23.5 Points

Metric 3. Hydrology. (max 30 pts)

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [ ] Other groundwater (3)
- [x] Precipitation (1)
- [ ] Seasonal/Intermittent surface water (3)
- [x] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [x] Between stream/lake and other human use (1)
- [x] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only 1.

- [ ] >0.7 (27.6in) (3)
- [x] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [ ] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation.
(select one or double check & average)

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime.
(select one or double check & average)

- [x] None or none apparent (12)
- [x] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [x] ditch
- [ ] dike
- [ ] tile
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [x] dredging
- [ ] other- list

50.5 Subtotal | 19 Points

Metric 4. Habitat Alteration and Development. (max 20 pts.)

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [x] Recovered (3)
- [ ] Recovering (2)
- [ ] Recent or no recovery (1)

4b. Habitat development. Select one.

- [x] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [ ] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [x] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient emrichment

50.5 subtotal this page

ORAM v. 5.0 Field Form Quantitative Rating

Site: Clear Lake Township, Steuben County, Indiana		**Date:**	May 4, 2010
Wetland:	Wetland 97	**Rater:**	Alicia Douglass

50.5 subtotal first page

55.5 Subtotal | 5 Points

Metric 5. Special Wetlands. (max 10 pts.)

Check all that apply and score as indicated

	Bog (10 pts)
	Fen (10 pts)
	Old Growth Forest (10 pts)
x	Mature forested wetland (5 pts)
	Lake Erie coastal/tributary wetland-unrestricted hydrology (10 pts)
	Lake Erie coastal/tributary wetland-restricted hydrology (5 pts)
	Lake Plain Sand Prairies (Oak Openings) (10 pts)
	Relict Wet Prairies (10 pts)
	Known occurrence state/federal threatened or endangered species (10)
	Significant migatory songbird/waterfowl habitat or usage (10 pts)
	Category 1 Wetland. See Question 1 of Qualitative Rating. (-10 pts)

71.5 Subtotal | 16 Points

Metric 6. Plant Communities, interspersion, microtopography. (max 20 pts.)

6a. Wetland Vegetation Communities

Score all present using 0 to 3 scale

	Aquatic bed
3	Emergent
2	Shrub
3	Forest
	Mudflats
	Open water
	Other (list)

6b. Horizontal (plan view) interspersion

Select only one

	High (5)
	Moderately high (4)
	Moderate (3)
	Moderately low (2)
	Low (1)
x	None (0)

6c. Coverage of invasive plants.

Refer to Table 1 ORAM long form for list.

Add or deduct points for coverage

	Extensive >75 % cover (-5)
	Moderate 25-75% cover (-3)
	Sparse 5-25% cover (-1)
x	Nearly Absent <5% cover (0)
	Absent (1)

6d. Microtopography

Score all present using 0 to 3 scale

3	Vegetated hummocks/tussocks
2	Coarse woody debris >15 cm (6")
	Standing dead > 25 cm (10") dbh
3	Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1 ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
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low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
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Mudflat and Open Water Class Quality

0	Absent <0.1 ha (0.2471 acres)
1	Low 0.1 ha to <1 ha (0.2471 acres to 2.47 acres)
2	Moderate 1 ha to <4 ha (2.47 acres 9.88 acres)
3	High 4 ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

71.5 **GRAND TOTAL (max 100 pts)** Provisional Wetland Category: Category 3

Appendix E
Photographs

Photograph 1 (05-05-10). This portion of Wetland 11 is a sedge meadow dominated by *Carex stricta* (uptight sedge).

Photograph 2 (05-05-10). This portion of Wetland 11was dominated by immature tree species. Most of Wetland 11 consisted of mature forest and scrub-shrub habitat.

Photograph 3 (05-05-10). Wetland 12 contained a significant amount of *Phalaris arundinacea* (reed canary grass), an invasive species, but it also contained native scrub-shrub habitat.

Photograph 4 (05-04-10). Wetland 14 is an emergent wetlands dominated by *Phalaris arundinacea*.

Photograph 5 (05-05-10). The east portion of Wetland 15 was dominated by wetlands shrubs.

Photograph 6 (05-04-10). This photograph of the channel through Wetland 15 was taken on property owned by the Clear Lake Land Conservancy.

Photograph 7 (05-04-10). Wetland 21 is a degraded emergent wetlands. CR 675 East split Wetland 21 from Wetland 22.

Photograph 8 (05-04-10). Wetland 22 is an emergent wetlands dominated by *Phalaris arundinacea* (reed canary grass). CR 675 East split Wetland 22 from Wetland 21.

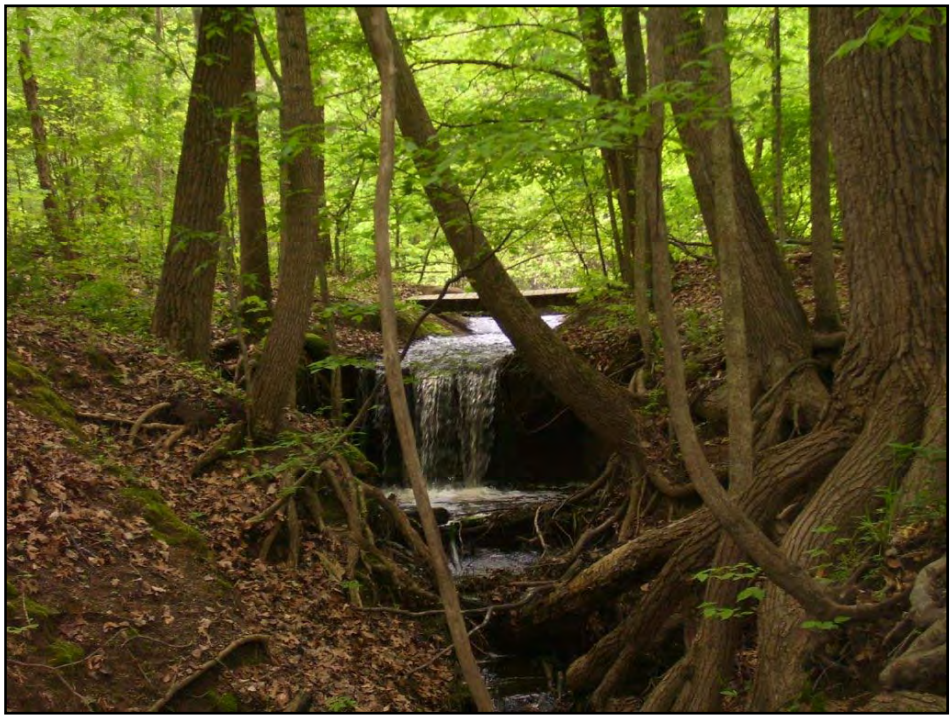
Photograph 9 (12-14-09). Wetland 27 was visited in winter as part of the Engineering Feasibility Study. Wetland 27 primarily consists of emergent and scrub-shrub habitat, but also includes a small forested component.

Photograph 10 (05-05-10). Wetland 33 is an emergent wetlands dominated by *Phalaris arundinacea* (reed canary grass).

Photograph 11 (05-05-10). Wetland 81 is a large wetlands complex with multiple vegetation communities including a deepwater emergent aquatic bed and scrub-shrub habitat.

Photograph 12 (05-05-10). Most of Wetland 81 is a typical forested wetlands. *Iris virginica* (Virginia blueflag) is a common wetlands species depicted in this photograph.

Photograph 13 (05-05-10). Koeneman Lake is mapped as part of Wetland 81. Koeneman Lake is owned by Clear Lake Township Land Conservancy, Inc.



Photograph 14 (05-05-10). The outlet of Koeneman Lake in Wetland 81 is depicted in this photograph.

Photograph 15 (05-04-10). Wetland 86 is a small, shallow forested wetlands.

Photograph 16 (05-05-10). Wetland 87 is a forested and scrub-shrub wetlands community.

Photograph 17 (05-05-10). Wetland 88 is dominated by shrubs including *Cephalanthus occidentalis* (common buttonbush) and *Cornus* spp. (dogwood spp.).

Photograph 18 (05-04-10). Wetland 90 had some unique wetlands species including *Betula allegheniensis* (yellow birch), *Larix laricina* (American larch), and *Toxicodendron vernix* (poison sumac).

Photograph 19 (05-04-10). Wetland 91 is a vernal pool.

Photograph 20 (05-04-10). Wetland 92 has a deepwater component surrounded by *Cephalanthus occidentalis* (common buttonbush).

Photograph 21 (05-04-10). Wetland 93 is a forested wetlands.

Photograph 22 (05-04-10). Wetland 94 contains multiple community types including Lake Anne. This photograph depicts a scrub-shrub portion of the wetlands dominated by *Cephalanthus occidentalis* (common buttonbush).

Photograph 23 (05-04-10). A significant portion of Wetland 94 is forested.

Photograph 24 (05-04-10). Wetland 97 contained numerous unique wetlands species having high coefficient of conservatism values including *Betula allegheniensis* (yellow birch) and *Osmunda cinnamomea* (cinnamon fern).

Photograph 25 (05-04-10). This photograph depicts *Vaccinium corymbosum* (highbush blueberry) that was observed in Wetland 97.

Photograph 26 (05-04-10). This photograph of Wetland 97 was taken on property owned by Clear Lake Township Land Conservancy, Inc.

Appendix F
Implemented Wetlands Ordinances

City of Auburn, Indiana

ZONING CODE: WETLANDS CONSERVATION

150.810 GENERAL PROVISIONS

A) Purpose

The intent of this subchapter is to prevent harm to the human and natural environment from water pollution, increased flooding, and loss of ground water supply that may result when natural wetlands are drained, filled, or otherwise subjected to uses incompatible with public health, safety, and welfare. This purpose is consistent with Policy L-9 of Auburn's Comprehensive Master Plan. The provisions of this subchapter are intended to achieve this purpose by:

1) Identifying wetlands within the planning and zoning jurisdiction of the city that are large enough to have significant environmental functions;

2) Establishing regulations that permit reasonable economic use of important wetland areas consistent with sound wetland conservation practices;

3) Guiding development adjacent to important wetland areas to prevent harm to wetlands and protect property from potential flood damage; and

4) Establishing procedures to assure compliance with the Federal Clean Water Act and with state regulations that may affect wetlands.

B) Definitions

Words used in this section are intended to have their common-sense meanings unless defined otherwise. The definitions and rules of construction that apply to the rest of the Auburn Zoning Ordinance are intended to apply to this subchapter unless a different definition or rule is provided for.

Development

Any improvement or change to property brought about by human activity, including, but not limited to, buildings and other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations.

Fill Material

Any solid material that displaces water or reduces water holding capacity.

Hydric Soil

A soil that is saturated, flooded, or ponded long enough during the growing season to develop deficiencies in oxygen as a result of excessive water content.

Hydrophytic Vegetation

Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Plant life that falls under this category are included in *National List of Plant Species that Occur in Wetlands: North Central (Region 3),* Reed, R.B., Jr. National Fish Wildl. Serv. Biol. Rep 88 (26.3) 99 pg.

National Wetlands Inventory (NWI)

A series of maps produced by the Fish and Wildlife Service of the United States Department of the Interior showing the location and classification of wetlands in standard topographic areas.

National Water Storage Capacity

The maximum volume of water a wetland can contain up to its ordinary high watermark without alterations to its natural grade or contour.

Ordinary High Watermark

In general terms, a mark delineating permanent or periodic inundation or prolonged soil saturation sufficient to create conditions that support hydrophytic vegetation and include hydric soils.

Overlay District

A zoning district that is overlaid upon other zoning districts. Land in an overlay district may be used in a manner permitted in the underlying district only if and to the extent that such use is also permitted in the overlay district.

Periodic Maintenance

Ordinary inspection and repair of facilities accessory to use of a wetland. This includes erosion control, removal of silt, and non-hydrophytic vegetation from a wetland in ways that do not substantially disturb hydrophytic plant and animal life. Period maintenance does not include any modification of a wetland's contour or natural water storage capacity.

Wetland

An area which supports predominantly aquatic or hydrophytic vegetation contains hydric soils, and is permanently or seasonally saturated with water and displays a hydrology typically associated with a wetland as described in the Unified Federal Method. Said method described in Wetland Training Institute, Inc. *1989 Field Guide for Delineating Wetlands*; Unified Federal Method. WTI 89-1 131 pp.

Wetland Hydrology

Commonly referred to as the wetness of an area. An area has Wetland Hydrology when saturated or inundated at some point in time during an average rainfall year. The criteria for Wetland Hydrology as outlined in the *Field Guide for Delineating Wetlands* must be met to achieve Wetland Hydrology. These criteria use the Unified Federal Method for Wetland Delineation as referred to in 150.810.

C) Wetland Overlay Districts

The Wetland (W) Districts established by 150.810 are overlay districts.

D) Application

1) This section does not apply to:
   a) Artificially constructed ponds, drainage ditches, storm water detention/retention basins, gravel quarries, or waste treatment lagoons, except to the extent that such uses are restricted or prohibited in Wetland (W) Districts;
   b) Wetlands in areas governed by Section 700 (Flood Plain Management) of the Auburn Zoning Ordinance; or to
   c) Wetlands or portions thereof for which federal or state permits for fill were issued prior to the enactment of 150.810 or prior to the extension of the planning and zoning jurisdiction of the city over the areas for which the permits were issued.
2) Notwithstanding 150.810(D)(1)(c), if a wetland has been divided by the discharge or placement of fill material, the separated parts shall be considered a single wetland.
3) Wetlands of different National Wetlands Inventory (NWI) classifications that are contiguous to one another shall be considered a single wetland.

E) Zoning Administrator

The Zoning Administrator shall review all applications for improvement location permits to assure compliance with 150.810. In determining the boundary of a wetland, the Zoning Administrator may seek the advice and assistance of appropriate federal and state agencies, and private firms.

F) Other Affected Agencies

All federal and state permits, approvals, or letters of non-applicability must be obtained prior to any city permit application.

150.820 WETLAND (W) DISTRICT

A) Designation

A Wetland (W) District is any wetland area other than those exempted in 150.810(D)(1) at least five acres in size that appears on the most current National Wetlands Inventory (NWI) map or maps published by the U.S. Fish and Wildlife Service for areas subject to the planning and zoning jurisdiction of the city. The most current edition of the applicable NWI map or maps and any subsequent revisions thereto are hereby adopted by reference and declared to be part of 150.820. The Wetland (W) District must also meet the guidelines of the Unified Federal Method of Wetland Delineation and be verified by field observation.

1) The National Wetlands Inventory (NWI) shows only the general location of wetlands. Precise delineation shall be made by the applicant for an improvement location permit through the performance of a full field survey applying the Unified Federal Method. All permit applications for development in a Wetland (W) District or on a tract containing or abutting:
   a) Wetland (W) District shall be accompanied by a scaled drawing showing the district boundary. The applicant shall submit evidence documenting the results of the boundary survey to the Zoning Administrator. The Zoning Administrator shall verify the accuracy of the boundary delineation and may make adjustments to it.
   b) The Zoning Administrator may waive the delineation requirement if he determines that a development will have no adverse impact on the wetland area.
2) Because the Zoning Administrator may incur extraordinary costs in verifying the accuracy of an applicant's boundary delineation, the Plan Commission may set reasonable fees for verification over and above the basic fee for an improvement location permit, subject to approval of the Common Council.
3) When requested by the applicant, the Zoning Administrator shall perform the delineation, employing the experts as needed. The applicant shall be charged for the costs incurred.
4) Any person aggrieved by the Zoning Administrator's determination of the district boundary may appeal the determination to the Board of Zoning Appeals.
5) In applying for an improvement location permit, the applicant consents to allowing the Zoning Administrator and agents and employees of the Zoning Administrator's office to enter upon the applicant's land for the purpose of performing their duties under this section.

B) Permitted Uses

The following uses are permitted by right, provided they do not involve erecting a building or structure, opening an excavation, depositing or discharging fill material, dredging, earth moving, extending existing drainage systems, or creating new drainage systems.

1) Agricultural uses, except animal feed lots, but including general farming, grazing, gardening, sustained-yield forestry, nurseries, and the erection and maintenance of wire agricultural fences;
2) Hunting, trapping, and fishing, where not otherwise prohibited by law;
3) Parks, when left in a natural state, wildlife and nature preserves, recreational uses, including swimming, boating, and natural surface hiking and bridle paths, and educational and scientific uses;
4) Uses incidental to the enjoyment of residential property.

C) Special Uses

The following special uses may be permitted by special use permit provided that all required federal and state permits have been obtained:

1) Temporary structures accessory to permitted uses not intended for human habitation or sheltering livestock;
2) Boat anchorages or moorings and piers constructed as improvements to parks or residential property;
3) Private or municipal wells;
4) Public infrastructure, other than buildings and electrical substations, but including public utilities, street, and bridges, provided that:
    a) There is no practical alternative route outside the wetland;
    b) The public need cannot be met by existing facilities or the modification thereof;
    c) The proposed facility shall be designed to permit the unimpeded circulation of water in the wetland, control runoff from paved surfaces in accordance with 150.820(C)(5) below, and otherwise minimize adverse impacts on the wetland's natural functions;
    d) Any filling, excavating, or draining must be necessary for the construction and maintenance of the proposed facility and done in a way that minimized adverse impacts on the wetland's natural functions;
    e) Underground utilities must be installed in watertight conduits; and
    f) The proposed construction shall not disturb waterfowl breeding areas during breeding season.
5) Off-site storm water detention/retention, provided a wetland utilization plan is prepared by the applicant and approved by the Board of Zoning Appeals showing actual use of the wetland, steps for monitoring surface and subsurface water quality, and a schedule of periodic maintenance of the wetland while in use as a storm water detention/retention facility; and further provided that net flow does not exceed the wetland's natural water storage capacity and appropriate pretreatment is applied to the storm water to prevent silt, debris, and chemical pollutants from entering the wetland.

a) No special use permit for storm water detention/retention use of a wetland shall involve decreasing the natural water storage capacity of a Wetland (W) District or placing more than 25% of the surface area of the detention/retention pond in the Wetland (W) District. The natural outflow of the Wetland (W) District shall not be changed as to increase the normal pool elevation. Minor alteration of a wetland's contour may be permitted for the installation of facilities accessory to storm water inflow.

b) No more than one detention/retention pond may be placed within a Wetland (W) District.

c) Any portion of a Wetland (W) District used for storm water detention/retention shall remain part of the Wetland (W) District.

d) A constructed outflow drainage system to a DeKalb County Drainage Board regulated drain requires approval of the DeKalb County Drainage Board through the DeKalb County Surveyor's office.

150.830 GENERAL DEVELOPMENT STANDARDS

In order to guide development outside a Wetland (W) District to prevent harm to wetlands inside the district, no building, structure, street, alley, driveway, or parking area shall be placed closer than 25 horizontal feet from the boundary of a Wetland (W) District; all uses within 50 horizontal feet of the boundary shall have flood protection grades at least 2 feet above the ordinary high watermark; and no storm water runoff from a development shall be directed into a Wetland (W) District except as provided in 150.820(C)(5).

150.840 NON-CONFORMING USES

A) Any building, structure or other use that does not conform to this subchapter is a nonconforming use and is subject to the provisions set out herein.

B) 1) A non-conforming use may be altered, enlarged, or extended, provided:

a) The lowest ground floor elevation of the new construction is at least 2 feet above the ordinary high watermark;

b) The proposed alterations, enlargements, or extensions do not increase the value of the use by more than 40% of its pre-improvement market value, excluding the value of land; and

c) No extension of a non-conforming use that does not conform to the setback requirements of 150.830(A) shall be constructed in the direction of a Wetland (W) District.

2) A non-conforming use that is damaged by flood, fire, explosion, natural disaster, or the public enemy may be restored to its original dimensions and condition provided the damage does not reduce the value of the use, excluding the value of land, by more than 40% of its pre-damage value.

150.850 BOARD OF ZONING APPEALS

A) The Board of Zoning Appeals may grant variances from the provisions of 150.850, provided the applicant established that:

1) The grant of the proposed variance complies with I.C. 36-7-4-918.4 and subsequent amendments thereto; and that

2) The grant of the proposed variance will not adversely affect the water quality, volume of ground water supply, or flood storage capacity of the Wetland (W) District.

B) Variances shall give the minimum relief necessary to alleviate the applicant's hardship.

C) No variance shall be granted which permits storm water runoff from a street, parking area, or the roof of an industrial or commercial building to be directed into a Wetland (W) District.

D) Variances and special use permits may be granted only on the condition that all required federal and state permits have been obtained.

E) Whenever a variance or special use permit is granted for a use which may alter the grade or contour of land in a Wetland (W) District, the Board of Zoning Appeals shall require that, upon completion of the proposed construction, the land will be restored as closely as possible to its original grade and contour.

F) No variance or special use permit shall be granted that results in a net loss of wetland area. Where all or part of a wetland in a Wetland (W) District would be destroyed or substantially altered by a proposed development, the Board of Zoning appeals shall require mitigation, by the developer and his successors, according to the following standards:

1) Acre-for-acre replacement of the same or a better type of wetland providing the environmental benefits that would be lost because of the proposed development;

2) Replacement wetlands shall be located adjacent to the Wetland (W) District in which the losses have been sustained and shall become part of the District;

3) Periodic maintenance of replacement wetlands shall be carried out for a reasonable period of time to control erosion, remove nuisance vegetation, and assure the establishment and survival of predominantly hydrophytic vegetation;

4) The Board of Zoning Appeals shall require replacement of wetland losses even when the applicant has received federal or state approval for the proposed construction without mitigative conditions;

5) If replacement of the same or a better type of wetland is not possible adjacent to the Wetland (W) District in which the projected losses would be sustained, the Board of Zoning Appeals may consider replacement at ratios greater than 1:1 of a lesser quality wetland adjacent to the Wetland (W) District.

6) The authorization of replacement wetlands shall not be used as a means of permitting avoidable losses of natural wetlands.

WETLAND PROTECTION
Title XV: Land Usage
Chapet 154: Zoning and Subdivisions

§ 154.220 TITLE, FACT AND PURPOSE.

(A) Title. This subchapter may be cited as the Beverly Shores Wetland Protection Ordinance.

(B) Findings of fact.

(1) The wetlands of Beverly Shores are indispensable and fragile natural resources with significant development constraints due to flooding, erosion, and soil limitations. In their natural state, wetlands serve humans and nature. They provide habitat areas for fish, wildlife, and vegetation; water quality maintenance and pollution control; flood control; shoreline erosion control; natural resource education; scientific study; open space; and recreation opportunities.

(2) A considerable number of these important natural resources have been lost or impaired by draining, dredging, filling, excavating, building, pollution, and other acts. Piecemeal or cumulative losses may, over time, destroy remaining wetlands. Damaging or destroying wetlands threaten public safety and the general welfare.

(3) It is, therefore, necessary for Beverly Shores to ensure maximum protection for wetlands by discouraging development activities in wetlands and those activities at adjacent upland sites that may adversely affect wetlands and to encourage restoration of already degraded or destroyed systems.

(C) Purpose.

(1) It is the policy of Beverly Shores to:

(a) Encourage or require planning to avoid or minimize damage to wetlands wherever prudent or feasible;

(b) Require that activities not dependent upon a wetland location be located at upland sites;

(c) Allow wetland losses only where all practicable measures have been applied to reduce those losses that are unavoidable and in the public interest;

(d) Provide for compensation in the form of wetland restoration or creation to offset further losses; and

(e) Provide for the protection of wetlands under additional ordinances already adopted by Beverly Shores.

(2) Furthermore, activities must not threaten public safety or cause nuisances by:

(a) Blocking flood flows, destroying flood storage area, or destroying storm barriers, thereby raising flood heights or velocities on other land and increasing flood damages;

(b) Causing water pollution through any means, including location of waste water disposal systems in wet soils, unauthorized application of pesticides, herbicides, and algaecides; disposal of solid wastes or storm water runoff at inappropriate sites; or the creation of unstabilized fills;

(c) Increasing erosion; or

(d) Increasing runoff of sediment and storm water.

(3) In addition, it is the policy of Beverly Shores that activities in or affecting wetlands do not destroy natural wetland functions important to the general welfare by:

(a) Decreasing breeding, spawning, nesting, wintering, feeding, or other critical habitat for fish and wildlife, including rare, threatened, and endangered plant and animal species and commercially and recreationally important wildlife;

(b) Interfering with the exchange of nutrients needed by fish or other forms of wildlife;

(c) Decreasing groundwater recharge;

(d) Destroying sites needed for education and scientific research as outdoor biophysical laboratories, living classrooms, and training areas;

(e) Interfering with public rights in waters and the recreation opportunities for fishing, boating, hiking, bird watching, photography, camping, and other activities in wetlands; or

(f) Destroying aesthetic and property values.

(Ord. 208, passed 12-19-1983) Penalty, see § 154.999

§ 154.221 DEFINITIONS.

For the purpose of this subchapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

BUFFER. A naturally vegetated area or vegetated area established or managed to protect wetlands from human disturbances.

CREATION. A human activity bringing a wetland into existence at a site in which it did not formerly exist.

FUNCTIONS. The beneficial roles wetlands serve, including storage, conveyance, and attenuation of flood waters and storm waters; groundwater recharge and discharge; protection of water quality and reduction of sediment and erosion; production of waterfowl, game, and nongame birds, mammals, and other living resources; protection of habitat for rare, threatened, and endangered species; food chain support for a broad range of wildlife and fisheries; educational, historical, and archeological value protection; and scenic, aesthetic, and recreational amenities.

HYDROPHYTIC VEGETATION. Macrophytic plant life growing in water or a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

IN-KIND. The restoration or creation of a wetland with vegetation and other characteristics closely approximating those of a specific wetland.

OFF SITE. Restoration or creation of a wetland at a location not adjacent to (or within 25 feet of) a previous, specified wetland.

ON SITE. Restoration or creation of a wetland adjacent to (or within 25 feet of) a previous, specified wetland.

OUT-OF-KIND. The restoration or creation of a wetland with vegetation or other characteristics not resembling those of a specified wetland.

PRACTICABLE ALTERNATIVE. An alternative to the proposed project that would accomplish the basic purpose of the project and avoid or have less adverse impact on a wetland.

REGULATED ACTIVITY. An activity with a significant impact on wetlands, including:

(1) The removal, excavation, or dredging of soil, sand, gravel, minerals, organic matter, or materials of any kind;

(2) The changing of existing drainage characteristics, sedimentation patterns, flow patterns, or flood retention characteristics;

(3) The disturbance of the wetland water level or water table by drainage, impoundment, or other means;

(4) The dumping or discharging of material, or the filling of a wetland with material;

(5) The placing of fill or the grading or removal of material that would alter existing topography;

(6) The driving of piles, placement of obstructions, and erection or repair of buildings or structures of any kind;

(7) The destruction or removal of plant life that would alter the character of a wetland; and

(8) The conduct of an activity that results in a significant change of water temperature, a significant change of physical or chemical characteristics of wetland water sources, or the introduction of pollutants.

RESTORATION. A human activity that returns a wetland or former wetland from a disturbed or altered condition with lesser acreage or functions to a previous condition with greater wetland acreage or functions.

WETLAND. An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

(Ord. 208, passed 12-19-1983)

§ 154.222 LANDS TO WHICH SUBCHAPTER APPLIES.

(A) Wetland District.

(1) This subchapter shall apply to all lands in or within 25 feet of a wetland located within the jurisdiction of Beverly Shores. Areas shown on the official wetland map as being wetlands are presumed to be wetlands consistent with the definitions thereof.

(2) Wetlands not shown on the official wetlands map are presumed to exist in Beverly Shores and are hereby designated to be within the wetlands and are protected under all of the terms and provisions of this subchapter. The official wetlands map shows only the general location of wetlands and should be consulted by persons contemplating activities in or near wetlands before engaging in a regulated activity.

(3) The official wetlands map, together with all explanatory matter thereon and attached thereto, is hereby adopted by reference and declared to be a part of this subchapter. The official wetlands map shall be on file in the office of the Clerk-Treasurer.

(B) Rules for interpretation of wetland district boundaries.

(1) The boundaries of a wetland shall ordinarily be determined by the applicant through the performance of a field survey applying the wetland definition.

(2) The official wetlands map is to be used as a guide to the general location of wetlands.

(3) The applicant is required under § 154.225(B) to show a wetland boundary on a scaled drawing submitted as part of the permit application.

(4) Wetland delineations shall be performed in accordance with the procedures specified in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands and any subsequent amendments thereto. Evidence documenting the results of the boundary survey may be required by the Beverly Shores Plan Commission.

(5) The Beverly Shores Building Commissioner, when requested by the applicant, may waive the delineation and, in the applicant, may waive the delineation and, in lieu of direct action by the applicant, perform the delineation.

(a) The Beverly Shores Building Commissioner may use remote sensing, hydrologists, soil scientists, or other experts as needed to perform the delineation.

(b) The applicant may be charged for costs incurred in accordance with the provisions of § 154.225(B).

(6) Where the Beverly Shores Building Commissioner performs a wetland determination at the request of the applicant, the applicant may appeal the determination to the Beverly Shores Plan Commission which shall have the authority to review the evidence presented to the Beverly Shores Building Commissioner and to obtain additional information as it deems necessary to review the Beverly Shores Building Commissioner's determination. The decision of the Beverly Shores Plan Commission shall be considered a final determination.

(7) Where the applicant has provided a determination of the wetland boundary, the Beverly Shores Plan Commission shall verify the accuracy of, and may render adjustments to, the boundary delineation.

(8) In the event the adjusted boundary delineation is contested by the applicant, the Beverly Shores Plan Commission may attempt to set mutually agreeable boundaries; or, when an attempt is unsuccessful, shall, at the applicant's expense, obtain competent expert services to render a final delineation.

(Ord. 208, passed 12-19-1983)

§ 154.223 PERMIT REQUIREMENTS; ENFORCEMENT.

(A) Permit requirements, compliance.

(1) No activity in or within 25 feet of a wetland may be conducted without a permit from the Beverly Shores Board of Zoning Appeals and full compliance with the terms of this subchapter and other applicable regulations.

(2) All activities that are not permitted as of right or as special permit uses shall be prohibited.

(B) Temporary emergency permit.

(1) Notwithstanding the provisions of this subchapter or any other law to the contrary, the Beverly Shores Building Commissioner may issue a temporary wetlands permit through oral or written authorization, provided a written permit is accomplished within 5 days, if he or she deems that an unacceptable threat to life or severe loss of property will occur if an emergency permit is not granted.

(2) The emergency permit may be terminated at any time without process upon a determination by the Beverly Shores Building Commissioner that the action was not or is no longer necessary to protect human health or the environment.

(3) The Beverly Shores Board of Zoning Appeals may, within 90 days of the emergency permit, require that the action be reconsidered as an after-the-fact permit, subject to any or all of the terms and provisions of this subchapter.

(C) Enforcement.

(1) The Beverly Shores Plan Commission, its agents, officers, and employees shall have authority to enter upon privately owned land for the purpose of performing their duties under this subchapter and may take or cause to be made examinations, surveys, or sampling as the Beverly Shores Plan Commission deems necessary.

(2) The Beverly Shores Plan Commission shall have authority to enforce this subchapter; a permit issued thereto; and a violation or threatened violation thereof by violation notices, administrative orders, and civil and criminal actions. All costs, fees, and expenses in connection with these actions may be recovered as damages against the violator.

(3) Law enforcement officials or other officials having police powers shall have authority to assist the Beverly Shores Plan Commission in enforcement.

(4) Any person who commits, takes part in, or assists in any violation of any provision of this subchapter is guilty of a misdemeanor and may be fined no more than $20,000, which may be amended from time to time by the Town Council, for each offense. Each violation of this subchapter shall be a separate offense, and, in the case of a continuing violation, each day's continuance shall be deemed to be separate and distinct offense.

(5) (a) In the event of a violation, the Beverly Shores Plan Commission shall have the power to order wetland restoration and creation measures for the damaged or destroyed wetland area by the person or agent responsible for the violation.

(b) If the responsible person or agent does not complete these measures within a reasonable time following the order, the Town of Beverly Shores may restore the affected wetland to its prior condition and create or restore other wetlands for the purpose of offsetting losses sustained as a result of the violation. The person or agent responsible for the original violation shall be liable to the Town of Beverly Shores for the cost of those actions.

(6) To guide restoration and creation actions, the Beverly Shores Plan Commission shall have the power to order the violator to develop a plan as described in § 154.225(H) for the approval of the Beverly Shores Board of Zoning Appeals.

(D) Abrogation and greater restrictions.

(1) It is not intended that this subchapter repeal, abrogate, or impair any existing state and federal laws, regulations, easements, covenants, and deed restrictions.

(2) However, where this subchapter imposes greater restrictions, the provisions of this subchapter shall prevail.

(E) Interpretation. The provisions of this subchapter shall be held to be minimum requirements in their interpretation and application and shall be liberally construed to serve the purposes of this subchapter.

(Ord. 208, passed 12-19-1983) Penalty, see § 154.999

§ 154.224 USES BY RIGHT; SPECIAL PERMIT USES IN WETLAND.

(A) Uses by right. The following uses shall be allowed as a right within a wetland to the extent that they are not prohibited by any other ordinance or law and provided they do not require structures, grading, fill, draining, or dredging except as provided herein or authorized by special permit:

(1) Conservation or preservation of soil, water, vegetation, fish, shellfish, and other wildlife;

(2) Outdoor recreational activities, including fishing, trapping, bird watching, hiking, boating, horseback riding, swimming, and canoeing;

(3) The harvesting of wild crops, such as marsh hay, ferns, moss, wild rice, berries, tree fruits, and seeds in a manner that is not injurious to natural reproduction of crops and provided the harvesting does not require alteration of the wetland by changing existing wetland water conditions or sources, tilling of soil or planting of crops:

(4) Education, scientific research and nature trails; and

(5) Uses by right that do not require a special permit and that may involve filling, flooding, draining, dredging, ditching, or excavating to the extent specifically provided herein: maintenance or repair of lawfully located roads or structures and of facilities used in the service of the public to provide transportation, electric, gas, water, telephone, telegraph, telecommunication, or other services, provided that the roads, structures, or facilities are not materially changed or enlarged and written notice prior to the commencement of work has been given to the Beverly Shores Plan Commission and provided that the work is conducted using best management practices to ensure that flow and circulation patterns, and chemical and biological characteristics of the wetland, are not impaired and that any adverse effect on the aquatic environment will be minimized.

(B) Special permit uses. Regulated activities other than those specified in division (A) above may not be conducted except upon application to the Beverly Shores Board of Zoning Appeals and issuance of a special permit.

(Ord. 208, passed 12-19-1983)

§ 154.225 STANDARDS AND PROCEDURES FOR SPECIAL USE PERMITS.

(A) Special permits.

(1) Application for a special permit to conduct a regulated activity shall be made in duplicate to the Beverly Shores Board of Zoning Appeals on forms furnished by that office. Permits shall ordinarily be valid for a period of 1 year from the date of issue and shall expire at the end of that time unless a longer period is specified by the Beverly Shores Board of Zoning Appeals upon issuance of the permit.

(2) An extension of an original permit may be granted upon written request to the Beverly Shores Board of Zoning Appeals by the original permit holder or the successor in title.

(3) The Beverly Shores Board of Zoning Appeals may require additional hearings if, in its judgment, the original intent of the permit is altered or extended by the renewal or if the applicant failed to abide by the terms of the original permit.

(4) The request for renewal of a permit shall follow the same form and procedure as the original application except that the Beverly Shores Board of Zoning Appeals shall have the option of not holding a hearing if the original intent of the permit is not altered or extended in any significant way.

(B) Permit applications.

(1) Unless the Beverly Shores Board of Zoning Appeals waives 1 or more of the following information requirements, applications for a special permit for a regulated activity shall include:

(a) The purposes of the project and an explanation of why the proposed activity requires a wetland location or access to wetlands, or cannot be located at other sites;

(b) A site plan drawn to scale showing the wetland boundary as determined by field survey, the width, depth, and length of all existing and proposed structures, roads, watercourses, and drainageways; water, waste water and storm water facilities; utility installations within 200 feet of a wetland; and the relationship of the proposed activity and any potentially affected wetland to the entire parcel of land owned by the applicant;

(c) A description of the wetland or wetlands that will be affected by the regulated activity, including a sketch plan at the scale of 1 inch equals 10 feet for the wetland within 200 feet of the site; the area that may be filled or impacted, vegetation type; wetland water sources; and a general characterization of the habitat, wildlife, and common plants;

(d) Soil types on the site and the exact locations and specifications for all proposed draining, filling, grading, dredging, and vegetation removal, including the amounts and methods;

(e) Adjacent land use; and

(f) Elevations of the site and adjacent lands within 200 feet of the site at contour intervals of no greater than 5 feet.

(2) The Beverly Shores Board of Zoning Appeals may require additional information, including, but not limited to:

(a) Documentation and evidence of a wetland boundary determination by field survey;

(b) An assessment of wetland functional characteristics;

(c) Documentation of the ecological, aesthetic, economic, or other values of a wetland;

(d) A study of flood, erosion, or other hazards at the site;

(e) Evidence of any protective measures that might be taken to reduce those hazards; and

(f) Any other information deemed necessary to verify compliance with the provisions of this subchapter or to evaluate the proposed use in terms of the purposes of this subchapter.

(3) Any person who wants to know whether a proposed activity or an area is subject to this subchapter may request in writing a determination from the Beverly Shores Board of Zoning Appeals. A request for determination shall contain plans, data, and other information as may be specified by the Beverly Shores Board of Zoning Appeals.

(4) (a) At the time of an application or request for determination, the applicant shall pay a filing fee specified by the Beverly Shores Board of Zoning Appeals.

(b) Filing fees, which may be amended from time to time by the Town Council, of up to $2,500 may be required to evaluate the application or request for determination.

(c) These fees may be used to retain expert consultants who will provide services pertaining to wetland boundary determinations, functional assessment, and mitigation measures, as deemed necessary by the Beverly Shores Board of Zoning Appeals.

(5) Upon receipt of the completed application, the Beverly Shores Board of Zoning Appeals shall notify the individuals and agencies having jurisdiction over or an interest in the matter including the Army Corps of Engineers, the Environmental Protection Agency, and the Indiana Department of Environmental Management to provide individuals and agencies an opportunity to comment.

(6) The Beverly Shores Board of Zoning Appeals shall establish a mailing list of all interested persons and agencies who wish to be notified of the applications.

(C) Public hearing and recommendations.

(1) No later than 60 days after receipt of the permit application and after at least 10 days advance notice of the hearing has been published in 2 newspapers in Porter County representing the 2 political parties receiving the highest number of votes in Beverly Shores in the last preceding election for the Secretary of State and posted at the Beverly Shores Town Hall and the Beverly Shores Post Office and mailed certified mail return receipt requested to the record owners of property within 300 feet of the applicant's property, the Beverly Shores Board of Zoning Appeals shall hold a public hearing on the application, unless the Beverly Shores Building Commissioner finds that the activity is so minor as to not affect the wetland and the Beverly Shores Board of Zoning Appeals concurs.

(2) (a) All hearings shall be open to the public.

(b) Minutes of the hearing shall be made.

(c) The Beverly Shores Board of Zoning Appeals shall make the final determination on all special permit applications.

(3) Any person may present evidence and testimony at the hearing. At the hearing, the applicant shall have the burden of demonstrating that the proposed activity will be in accordance with the purposes of this subchapter and the standards set forth below.

(D) Standards for special permits. The Beverly Shores Board of Zoning Appeals, after according consideration to the comments of the general public, other affected municipalities and counties and federal and state agencies with jurisdiction over the area in question, shall issue a wetland permit only if it is found that the regulated activity is determined to be in the public interest in accordance with § 154.225(F) below and that the applicant has demonstrated by a preponderance of the evidence that the regulated activity:

(1) Is water-dependent or requires access to the wetland as a central element of its basic function, or is not water-dependent but has no practicable alternative;

(2) Will result in minimum feasible alteration or impairment to the wetland's functional characteristics and its existing contour, vegetation, fish, and wildlife resources and hydrological conditions;

(3) Will not jeopardize the continued existence of species that appear on federal or state rare, threatened, or endangered species lists;

(4) Will not cause significant degradation of groundwater or surface-water quality;

(5) Complies with all applicable state, local, and federal laws, including those related to sediment control, pollution control, floodplain zoning, and on-site waste water disposal;

(6) Will provide a wetland buffer area of not less than 25 feet between the wetland and upland activities for those portions of a regulated activity that need not be conducted in the wetland; and

(7) Complies with other standards contained in this subchapter, including those pertaining to wetland creation and restoration as required.

(E) Practicable alternative test.

(1) For all permit applications, an alternative site for the proposed activity shall be considered practicable if it is available and the proposed activity can be carried out on that site after taking into consideration costs, existing technology, infrastructure, and logistics, in light of overall project purposes.

(2) There is no practicable alternative if the applicant demonstrates all of the following to the satisfaction of the Beverly Shores Board of Zoning Appeals:

(a) The basic purpose of the project cannot reasonably be accomplished using 1 or more other sites in the general region that would avoid or result in less adverse impact on a wetland;

(b) The basic purpose of the project cannot be accomplished by a reduction in the size, scope, configuration, or density of the project as proposed or by changing the design of the project in a way that would avoid or result in fewer adverse effects on the wetland; and

(c) In cases where the applicant has rejected alternatives to the project as proposed due to constraints such as inadequate zoning, infrastructure or parcel size, the applicant has made reasonable attempts to remove or accommodate such constraints.

(F) Public interest test. In determining whether a proposed regulated activity in any wetland is in the public interest, the Beverly Shores Board of Zoning Appeals shall consider the following:

(1) The extent of the public need for the proposed activity;

(2) The extent and permanence of the beneficial or detrimental effects that the proposed regulated activity may have on the public and private uses for which the property is suited;

(3) The quality of the wetland that may be affected and the amount of wetland to be disturbed;

(4) The economic value of the proposed regulated activity to the general area; and

(5) The ecological value of the wetland and probable impact on public health and safety, fish, plants, and wildlife.

(G) Special use permit conditions.

(1) The Beverly Shores Board of Zoning Appeals may attach conditions to the granting of a special use permit as deemed necessary to carry out the purposes of this subchapter.

(2) These conditions may include but are not limited to:

(a) Limitations on minimum lot size for any regulated activity;

(b) Requirements that structures be elevated on piles and otherwise protected against natural hazards;

(c) Modification of waste disposal and water supply facilities;

(d) Imposition of operational control, sureties, and deed restrictions concerning future use and subdivision of lands, such as flood warnings, preservation of undeveloped areas in open space use, and limitation of vegetation removal;

(e) Dedication of easements to protect wetlands;

(f) Establishment of vegetated buffer zones separating and protecting the wetland from proposed activities;

(g) Erosion control and storm water management measures;

(h) Setbacks for structures and restrictions on fill, deposit of soil and other activities in the wetland;

(i) Modification in project design to ensure continued water supply to the wetland and circulation of water;

(j) Creation or restoration of an area of wetland; and

(k) Development of a plan to guide actions involving the creation of a new wetland or the restoration of a damaged or degraded wetland.

(3) The Beverly Shores Board of Zoning Appeals may require a bond in an amount and with surety and conditions sufficient to secure compliance with the conditions and limitations set forth in the permit.

(4) The particular amount and the conditions of the bond shall be consistent with the purposes of this subchapter. In the event of a breach of any condition of any bond, the Beverly Shores Board of Zoning Appeals may institute an action in a court of competent jurisdiction upon the bond and prosecute the same to judgment and execution.

(H) Wetland restoration and creation.

(1) As a condition of a permit issued or as an enforcement action under this subchapter, the Beverly Shores Board of Zoning Appeals may require that the applicant engage in the restoration or creation of wetlands in order to offset, in whole or in part, the losses resulting from an applicant's or violator's actions.

(2) In making a determination of whether a like requirement will be imposed, and if so, the degree to which it would be required, the Beverly Shores Board of Zoning Appeals will consider the following:

(a) The long- and short-term effects of the action upon the wetland and associated aquatic ecosystem, and the reversible or irreversible nature of the impairment or loss;

(b) The type and benefit of the wetland functions and associated resources lost;

(c) The type, size, and location of the wetland altered, and the effect it may have upon the remaining system or watershed of which the wetland is a part;

(d) Observed or predicted trends with regard to the gains or losses of this type of wetland in the watershed, in light of natural and human processes;

(e) The cost and likely success of the possible compensation measures in relation to the magnitude of the proposed project or violation; and

(f) The degree to which the applicant has demonstrated a good-faith effort to incorporate measures to minimize and avoid wetland impacts within the proposed project.

(3) The applicant or violator may prepare or be required by the Beverly Shores Board of Zoning Appeals to develop a wetland restoration or creation plan for review and approval of the Beverly Shores Board of Zoning Appeals. The creation or restoration of wetlands shall not be an alternative to the standards set forth in division (D) above but shall be used only to compensate for unavoidable losses.

(4) The plan should state the location, by metes and bounds description, of the proposed site; ownership; size, type, and complete ecological assessment (flora, fauna, hydrology, wetland functions, and the like) of the wetland being restored or the area where a new wetland will be created; and the natural suitability of the proposed site for establishing the replacement wetland (*i.e.*, water source and drainage patterns, topographic position, wildlife habitat opportunities, value of the existing area to be converted, and the like).

(5) In addition, plane view and cross-sectional, scaled drawings; topographic survey data, including slope percentage and final grade elevations; and other technical information are required in sufficient detail to explain, illustrate, and provide for:

(a) Soil and substrate conditions; topographic elevations; grading and excavation; erosion and sediment control needed for wetland construction and long-term survival;

(b) Planting plans specifying plant species types, quantities, locations, size, spacing or density; source of plant materials, propagules or seeds; timing, season, water and nutrient requirements for planting; and where appropriate, measures to protect plants from predation;

(c) Water-quality parameters, water source, water depths, water-control structures and water-level maintenance practices needed to achieve the necessary ambient water conditions and hydrocycle/hydroperiod characteristics;

(d) Mid-course corrections and a 3-year monitoring and replacement plan establishing responsibility for removal of exotic and nuisance vegetation and permanent establishment of the wetland system and all its component parts; and

(e) A demonstration of fiscal, administrative, and technical competence of sufficient standing to successfully execute the overall project.

(I) Wetland restoration and creation alternatives.

(1) Ordinarily, the applicant or violator shall undertake restoration or creation efforts on or adjacent to the site where permanent losses have been sustained or where restoration of a former wetland is possible. Replication “in-kind” of the impacted wetland will be the preferred alternative for creation or restoration efforts.

(2) Where the applicant has demonstrated to the satisfaction of the Beverly Shores Board of Zoning Appeals that this approach is infeasible due to technical constraints, such as parcel or wetland size or wetland type, or that a wetland of a different type or location is strongly justified based on regional needs or the functional value of the impacted wetland, the Beverly Shores Board of Zoning Appeals may accept or recommend an alternative proposal.

(3) The proposal may involve monetary compensation as provided for in this section or the creation or restoration “out-of-kind” and “off site”.

(4) The Beverly Shores Board of Zoning Appeals shall set reasonable fees for compensation of wetland losses based upon the amount that would be required to perform on-site, in-kind restoration, or creation.

(5) Where the Beverly Shores Board of Zoning Appeals determines that the public interest is better served, the Beverly Shores Board of Zoning Appeals may require a fee in lieu of direct action on behalf of the applicant or violator to initiate restoration or creation projects.

(6) The fees shall be held in escrow for the express use of wetland creation and restoration projects and shall not be commingled with other funds.

(J) Suspension; revocation.

(1) The Beverly Shores Board of Zoning Appeals may suspend or revoke a permit if it finds that the applicant has not complied with the conditions or limitations set forth in the permit or has exceeded the scope of the work set forth in the permit.

(2) The Beverly Shores Board of Zoning Appeals shall cause notice of its denial, issuance, conditional issuance, revocation or suspension of a permit to be published in a daily newspaper having a broad circulation in the area wherein the wetland lies.

(Ord. 208, passed 12-19-1983)

§ 154.226 NONCONFORMING ACTIVITIES.

A regulated or use activity that was lawful before the passage of this subchapter, but which is not in conformity with the provisions of this subchapter, may be continued subject to the following.

(A) No activity shall be expanded, changed, enlarged, or altered in any way that increases its value at the time of its becoming a nonconforming structure, unless the structure is permanently changed to a conforming use.

(B) No structural alteration or addition to any nonconforming structure over the life of the structure shall exceed 50% of all its value at the time of its becoming a nonconforming structure, unless the structure is permanently changed to a conforming use.

(C) If a nonconforming use or activity is discontinued for 12 consecutive months, any resumption of the activity shall conform to this subchapter.

(D) If any nonconforming use or activity is destroyed by human activity or an act of God, it shall not be resumed except in conformity with the provisions of this subchapter.

(E) Activities or adjuncts thereof that are or become nuisances shall be not entitled to continue as nonconforming activities.

(Ord. 208, passed 12-19-1983) Penalty, see § 154.999

§ 154.227 JUDICIAL REVIEW.

(A) All final decisions of Beverly Shores Board of Zoning Appeals concerning denial, approval or conditional approval of a special permit shall be reviewable in the Porter Circuit Court.

(B) Based on these proceedings and the decision of the court, Town Council of the Town of Beverly Shores may, within the time specified by the court, elect to:

(1) Institute negotiated purchase or condemnation proceedings to acquire an easement or fee interest in the applicant's land;

(2) Approve the permit application with lesser restrictions or conditions; or

(3) Institute other appropriate actions ordered by the court that fall within the jurisdiction of the Town Council.

(Ord. 208, passed 12-19-1983)

§ 154.228 AMENDMENTS.

These regulations and the official wetlands map may from time to time be amended in accordance with procedures and requirements in the general statutes and as new information concerning wetland locations, soils, hydrology, flooding, or botanical species peculiar to wetlands become available.

(Ord. 208, passed 12-19-1983)

§ 154.999 PENALTY.

(A) Any person, firm or corporation violating any of the provisions of this chapter shall be deemed guilty of a Class C infraction and each person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this chapter is committed, continued, or permitted, and upon conviction of any like violation that person shall be punishable by a fine, which may be amended from time to time by the Town Council, of not more than $2,500 per day.

(B) The owner or tenant of any building, structure, premises or part thereof, and any architect, builder, contractor, agent or other person who commits, participates in, assists in, or maintains a violation may be found guilty of a separate offense and suffer the penalties herein provided.

(Ord. 208, passed 12-19-1983)

ARTICLE VI. PROTECTION OF WETLANDS AND LAKES

***State law references:** Water rights and resources, IC 13-2-1-1 et seq.; municipal jurisdiction over watercourses, IC 36-1-3-9; municipal authority over certain streams and waterways, IC 36-10-4-22.

DIVISION 1. GENERALLY

Sec. 82-561. Definitions.

Words used in this article are intended to have their common and ordinary meanings, unless more specifically defined. The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Development means any improvement or change to property brought about by human activity, including, but not limited to, buildings and other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations.

Fill material means any solid material when placed in a wetland or lake that displaces water or reduces water holding capacity.

Hydric soil means a soil that is saturated, flooded, or otherwise covered with water long enough during the growing season to develop deficiencies in oxygen as a result of excessive water content.

Hydrophytic vegetation means plant life growing in water or a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Examples of hydrophytic plants are listed in: *National List of Plant Species that Occur in Wetlands: Indiana,* Reed, P. B., Jr., 1988, U.S. Fish and Wildlife Service, Washington, D.C. Biol. Rep 88(26.3).

National wetlands inventory (NWI) means a series of maps produced by the Fish and Wildlife Service of the United States Department of the Interior, in coordination with the maps produced by the U.S. Geologic Survey, showing the location and classification of certain identified wetlands in standard topographic areas.

Natural water storage capacity means the maximum volume of water a wetland can contain up to its ordinary high water mark without alterations to its natural grade or contour.

Ordinary high water mark, in wetlands, means a mark delineating permanent or periodic inundation or prolonged soil saturation sufficient to create conditions that support hydrophytic vegetation and include hydric soils.

Periodic maintenance means ordinary inspection and repair of facilities accessory to use of a wetland. This includes erosion control and removal of sediment, nuisance species, and excess vegetation from a wetland in ways that do not substantially disturb other hydrophytic plant and animal life. Periodic maintenance does not include any modification of a wetland's contour or natural water storage capacity.

Practical alternative means an alternative to a proposed project that would accomplish the basic purpose of the project and avoid or have less adverse impact on a wetland or lake.

Regulated activity means an activity with a significant impact on wetlands and lakes, including, but not limited to:

(1) Removal, excavation, or dredging of soil, sand, gravel, minerals, organic matter, or materials of any kind;

(2) Changing of existing characteristics for drainage, sedimentation patterns, flow patterns, or flood retention;

(3) Disturbance of the wetland or lake water level or water table by drainage, impoundment, or other means;

(4) Dumping or discharging of material, or the filling of a wetland or lake with material;

(5) Placing of fill or the grading or removal of material that would alter existing topography;

(6) Driving of piles, placement of obstructions, and erection or repair of buildings or structures of any kind;

(7) The destruction or removal of native plant life that would degrade the character of a wetland or lake; and

(8) Any activity that results in a significant change of water temperatures, a significant change of physical or chemical characteristics of wetland or lake water sources, or the introduction of pollutants.

Shoreline, for both natural and artificial lakes, the Average Normal Water Level as established under IC 13-2-13-1 et seq., and administered under supervision of the state department of natural resources, shall establish the shoreline under this article.

Wetland means an area which:

(1) Supports predominantly aquatic or hydrophytic vegetation;

(2) Contains hydric soils;

(3) Is saturated with water permanently, or at least some time during the growing season; and

(4) Displays an hydrology typically associated with a wetland.

Wetland district means any area which includes any or all of the following:

(1) A wetland;

(2) The area within 25 feet of a wetland;

(3) The area within 25 feet of the shoreline of a public freshwater lake.

Wetland hydrology means wetness of an area. An area has wetland hydrology when saturated or inundated at some time during the growing season.

Wetlands map means that the portion of the national wetlands inventory which includes the city, and which shows wetlands and lakes located within the city's geographic area. The national wetlands inventory, as periodically updated, is incorporated herein by reference. Copies of this map are on file in the offices of the City Engineer and of the Zoning Administrator.

(Ord. No. 5-91, §§ 21.06.010--21.06.160, 1-21-91; Ord. No. 4-92, § 1, 2-17-92)

Cross references: Definitions generally, § 1-2.

Sec. 82-562. Findings of fact.

(a) The wetlands and lakes of the city are indispensable and fragile natural resources with significant development constraints due to flooding, erosion, and soil limitations. In their natural state, wetlands and lakes function to serve people and nature. They provide water quality maintenance and pollution control; groundwater recharge and discharge; storage, conveyance and attenuation of floodwaters and storm waters; sediment and shoreline erosion control; habitat areas for fish, wildlife, and vegetation; natural resource education; scientific study; open space; and recreation opportunities.

(b) A considerable number of these important natural resources have been lost or impaired by draining, dredging, filling, excavating, building, pollution, and other acts. Piecemeal or cumulative losses may, over time, destroy remaining wetlands and lakes. Damaging or destroying wetlands and lakes threatens public safety and the general welfare.

(c) It is, therefore, necessary for the city to ensure maximum protection for its wetlands and lakes by regulating development activities in wetlands and those adjacent upland sites that may adversely affect wetlands and lakes.

(Ord. No. 5-91, § 21.03.010, 1-21-91)

Sec. 82-563. General purpose.

(a) It is the purpose of the city to require planning to avoid or minimize damage to wetlands and lakes; to require that activities not dependent upon a wetland or shoreline location be located at other sites; to allow wetland and lake degradation only where unavoidable and in the public interest; and to provide for the protection of wetlands and lakes.

(b) This article recognizes that the state has regulated water rights and resources through IC 13-2-1-1 et seq., and specifically regulates public freshwater lakes through IC 13-2-11.1-1 et seq. It is the intent of this article to enhance and extend the protection of lakes and wetlands within the city, deferring to state and federal jurisdiction where conflicting provisions cannot be reconciled.

(Ord. No. 5-91, § 21.03.020, 1-21-91)

Sec. 82-564. Public safety purpose.

It is the purpose of this article to make certain that activities affecting wetlands and lakes must not threaten public safety or cause nuisances by:

(1) Blocking flood flows, destroying flood storage areas, or destroying storm barriers, thereby raising flood heights or velocities on other land and increasing flood damages;

(2) Causing water pollution through any means, including location of septic systems in wet soils, unauthorized application of pesticides, herbicides, and algacides; disposal of solid wastes or surface water runoff at inappropriate sites; or the creation of unstabilized fills;

(3) Increasing erosion; or

(4) Increasing runoff of sediment and surface water.

(Ord. No. 5-91, § 21.03.030, 1-21-91)

Sec. 82-565. Preservation purpose.

It is the purpose of this article that activities in or affecting wetlands and lakes do not destroy natural wetland functions important to the general welfare by:

(1) Decreasing breeding, spawning, nesting, wintering, feeding, or other critical habitat for fish and wildlife, including rare, threatened, and endangered plant and animal species and commercially and recreationally important wildlife;

(2) Decreasing groundwater recharge;

(3) Destroying sites needed for education and scientific research as outdoor biophysical laboratories, living classrooms, and training areas;

(4) Interfering with public rights in waters and the recreation opportunities for hunting, fishing, boating, hiking, bird watching, photography, camping, and other activities in wetlands and lakes; or

(5) Destroying aesthetic and property values.

(Ord. No. 5-91, § 21.03.040, 1-21-91)

Sec. 82-566. Authority.

This article is adopted under the authority of IC 36-1-3-1 et seq., home rule, and IC 36-7-4-600 et seq., local planning and zoning - 600 series - zoning ordinance.

(Ord. No. 5-91, § 21.03.050, 1-21-91)

Secs. 82-567--82-575. Reserved.

DIVISION 2. LANDS TO WHICH ARTICLE APPLIES

Sec. 82-576. Wetland district.

This article shall apply to all wetland districts located within the city.

(Ord. No. 5-91, § 21.09.010, 1-21-91)

Sec. 82-577. Lands included.

For the purposes of this division, wetlands shall include:

(1) Any area designated as a wetland on the wetlands map; and
(2) Any area, even though not designated as a wetland on the wetlands map, that fits the definition of a wetland.

(Ord. No. 5-91, § 21.09.020, 1-21-91)

Sec. 82-578. Rules for wetland determination.

The following rules shall be followed in determining what is a wetland:

(1) The wetlands map may only show general location of a wetland, may fail entirely to show a wetland, or may show an area to be a wetland where none exists;
(2) The final determination whether or not an area is a wetland shall be based upon those characteristics of a wetland as provided in the definition of "wetland" in section 82-561;
(3) In determining whether an area is a wetland, reference shall be made to and guided by, and field observations shall be conducted in accordance with, the methods as set forth and described in:

    Federal Interagency Committee for Wetland Delineation, 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication. 76 pp. plus appendices.

(Ord. No. 5-91, § 21.09.030, 1-21-91)

Sec. 82-579. Shorelines of freshwater lakes.

Determination of the shoreline of a public freshwater lake within the city is under the jurisdiction of the state pursuant to I.C. 14-26-4-1 et seq., and any amendment thereto. This article recognizes the legally established average normal level of a lake as the shoreline for interpretation of wetland district boundaries.

(Ord. No. 5-91, § 21.09.040, 1-21-91; Ord. No. 3-2007, § 1, 1-22-07)

Sec. 82-580. Building permit applications.

Whenever the City Engineer receives any application for a building permit, he shall refer the permit to the Zoning Administrator, who shall then refer to the wetlands map and/or a field observation to determine whether or not the requested permit would result in a regulated activity within a wetland district, or which may affect a wetland district in any way. If so, the building permit shall be denied until and unless the applicant complies with the provisions of this article.

(Ord. No. 5-91, § 21.09.050, 1-21-91)

Secs. 82-581--82-590. Reserved.

DIVISION 3. PERMITS; ENFORCEMENT

Sec. 82-591. Permits required.

No activity regulated under this article, nor any use in a wetland district permitted as a special use or as a variance, shall be undertaken or commenced without a permit from the Zoning Administrator and full compliance with the terms of this article and other applicable regulations. All activities that are not permitted as of right or as variance or special use shall be prohibited.

(Ord. No. 5-91, § 21.12.010, 1-21-91)

Sec. 82-592. Enforcement.

The Zoning Administrator and the Board of Zoning Appeals, its agents, officers, and employees, shall have the authority to enforce this article under the same terms and conditions and with the same penalties applicable to article III of this chapter.

(Ord. No. 5-91, § 21.12.020, 1-21-91)

Sec. 82-593. State and federal regulations.

Notwithstanding any other provisions of this article, a permit, special use, or variance for any use or activity involving or affecting any wetland district which requires any federal and/or state permits, approvals, waivers or letters of nonapplicability shall be granted only on condition that, and subject to, the requirement that the person applying for such permit, special use, or variance obtain all such federal and/or state permits, approvals, waivers, or letters of nonapplicability.

(Ord. No. 5-91, § 21.02.030, 1-21-91)

Sec. 82-594. Consent.

Any person who applies for any permit shall also consent to allowing the Zoning Administrator, or any other person acting under authority of the Zoning Administrator, to enter upon that person's land for the purpose of performing any duties imposed upon the Zoning Administrator, including the Zoning Administrator's obligations to see that the provisions of this article are complied with.

(Ord. No. 5-91, § 21.12.040, 1-21-91)

Secs. 82-595--82-605. Reserved.

DIVISION 4. WETLAND DISTRICT USES

Sec. 82-606. General development standards.

In order to guide development outside a wetland district to prevent harm to wetlands and lakes inside the district, the following standards are established:

(1) No building, structure, street, alley, driveway, or parking area shall be placed within a wetland district.

(2) Any building constructed within 50 horizontal feet of a wetland district shall have its lowest floor level at least two feet above the ordinary high water mark.

(3) No surface water runoff from a development, including any commercial development, real estate subdivision, or construction or any building or other structure, shall be directed or permitted to flow into a wetland district, except as permitted by subsection 82-608(4), provided, however, that nothing in this article shall prohibit the construction of a single-family dwelling, even though the surface water runoff from such dwelling may flow into a wetland district.

(4) No soil storage pile shall be placed within 200 feet of a wetland district unless a permit to do so is obtained in the manner provided for in Division 3 of this article. Sediment from all soil storage piles placed within 200 feet of the boundary of a wetland district shall be controlled by placing straw bales, filter fence, or other appropriate containment barriers around the piles. Soil loss from any construction site within 200 feet of a wetland district shall be controlled by appropriate practices to limit erosion as recommended by the United States Department of Agriculture.

(Ord. No. 5-91, § 21.15.010, 1-21-91; Ord. No. 4-92, § 2, 2-17-92)

Sec. 82-607. Permitted uses.

The following uses are allowed in a wetland district by right and require no permit:

(1) Agricultural uses, such as general farming, grazing, gardening, haying, and forestry;

(2) Hunting, trapping, and fishing, where not otherwise prohibited by law;

(3) Parks, when left in a natural state, wildlife and nature preserves, recreational uses, including swimming, boating, and natural-surface hiking and bridle paths, and educational uses;

(4) Temporary residential piers as are otherwise allowed by the state department of natural resources without permitting;

(5) Periodic maintenance of lakes, wetlands and park facilities, and maintenance and repair of streets, roads, highways, and public utilities by the city or by the appropriate public utility or agency, provided that:

a. Such uses are not enlarged or extended;

b. Such maintenance or repair is done in a way that minimizes or avoids adverse impact on the wetland district;

c. The city, or public agency or utility, complies with state and federal regulations and permitting requirements.

(6) Maintenance of existing boat channels by the city, provided that the necessary permit has been obtained from the state department of natural resources under IC 13-2-11.1-1 et seq. All dredging shall be limited as set forth in section 82-608(5); and

(7) Construction, improvement, altering, or any other work done on state or federal highways by the state department of transportation or any other agency of the state charged with the responsibility for the maintenance and construction of state and federal highways, regardless of the impact or effect any such maintenance, construction or alteration may have on any wetland or wetland district; provided, however, that such construction complies with all applicable state and federal environmental and permitting requirements.

(Ord. No. 5-91, § 21.15.020, 1-21-91)

Sec. 82-608. Special uses.

The following special uses may be permitted as a special use, provided that all required federal and state permits have been obtained:

(1) Boat anchorages and moorings which are a necessary accessory use to parks or residential property;

(2) Private or municipal wells;

(3) Public facilities, including, but not limited to, utility installations, highways, streets, bridges, public parks, and recreational facilities, provided that:

a. There is no practical alternative route or place for these facilities to be constructed outside the wetland;

b. The public need cannot be met by existing facilities or the modification thereof;

c. The facility when constructed will permit the unimpeded circulation of water in the wetland, control runoff from paved surfaces in accordance with subsection (4)a.-d. of this section, and otherwise minimize adverse impacts on the wetland's natural functions;

d. No filling, excavating, or draining of the wetland area will be permitted unless necessary for construction and periodic maintenance of the proposed facility and done in a way that minimizes adverse impacts on the wetland's natural functions;

e. All underground utilities are installed in watertight conduits; and

f. Construction and use of the proposed facility will not disturb native biological communities and breeding seasons.

(4) Off-site surface water detention/retention, including surface water runoff from any area outside a wetland district, provided a wetland utilization plan is prepared by the applicant and approved by the Board of Zoning Appeals showing actual use of the wetland which meets the following criteria:

a. Surface water runoff from any area outside of a wetland district may be directed to a wetland or lake only when free of debris and substantially free of chemical pollutants and sediment, and only at rates which do not disturb vegetation or increase turbidity. Sheet flow or other overland filtering of runoff is encouraged;

b. Each plan shall include appropriate pretreatment measures to prevent sediment, debris, and chemical pollutants from entering the wetland or lake, where such flow poses a risk to water quality;

c. Each plan shall include a plan for control of the net flow so it does not exceed the wetland's natural water storage capacity, result in marked depletion of water, or a substantial change in the natural outflow;

d. Steps for monitoring surface and subsurface water quality and a schedule of periodic maintenance of the wetland while in use as a storm water detention/retention facility shall be included in each proposed detention/retention plan.

(5) Except as may be permitted as necessary to a special use, dredging in a designated wetland district will not be allowed. When such a special use permit is granted, it shall allow only such dredging as will not have a net adverse effect on the ecological and hydrological characteristics of the wetlands. Dredging, when allowed, shall be limited as follows:

a. It shall be located as to minimize the impact on vegetation;

b. It shall not affect natural water flow;

c. The size of the dredged area shall be limited to the minimum required for the proposed action;

d. Disposal of any dredged material shall include proper erosion, pollution, and nutrient control measures;

e. Dredging in any wetland area is prohibited during waterfowl breeding season or fish spawning season, unless it is determined by the Zoning Administrator that the wetland is not used for such breeding or spawning.

(Ord. No. 5-91, § 21.15.030, 1-21-91)

Sec. 82-609. Nonconforming uses.

A regulated activity that was lawful before January 21, 1991, but which is not in conformity with the provisions of this article, may not be expanded, changed, enlarged, altered, or reconstructed in any way, if destroyed by fire, flood, or other disaster, without the approval of the Board of Zoning Appeals after a public hearing conducted according to the provisions of section 82-625. A nonconforming use or activity that is discontinued for 12 consecutive months shall not be resumed.

(Ord. No. 5-91, § 21.15.040, 1-21-91)

Secs. 82-610--82-620. Reserved.

DIVISION 5. VARIANCES; SPECIAL USES

Sec. 82-621. Powers of board.

The Board of Zoning Appeals of the city shall have the power to:

(1) Grant variances from the strict provisions of this article;

(2) Permit special uses as described in section 82-608 in the manner provided for, and subject to the limitations contained in this division;

(3) Take action to enforce the provisions of this article in accordance with the powers granted in division 3 of this article;

(4) Make a determination of the boundaries of a wetland district where the affected property owner and Zoning Administrator are unable to agree on such boundaries, as provided in section 82-625(2).

(Ord. No. 5-91, § 21.18.010, 1-21-91)

Sec. 82-622. Variances.

The Board of Zoning Appeals may grant a variance only if:

(1) The variance is granted to alleviate a hardship;

(2) The granting of the variance complies with the procedural requirements of IC 36-7-4-918.4 as it now exists or as it may be amended; and

(3) The granting of the variance complies with all other provisions of this division.

(Ord. No. 5-91, § 21.18.020, 1-21-91)

Sec. 82-623. Special use.

The Board of Zoning Appeals may permit a special use only if:

(1) The special use is listed as a permitted special use in section 82-608;

(2) If a special use as described in section 82-608(3), (4) or (5) is granted, that all of the requirements of subsections (3), (4), and (5) are complied with; and

(3) The permitting of the special use complies with all other provisions of this division.

(Ord. No. 5-91, § 21.18.030, 1-21-91)

Sec. 82-624. Prohibitions.

The Board of Zoning Appeals may not either grant a variance or permit a special use that:

(1) Would have a substantial adverse effect on water quality, volume of ground water supply, or flood storage capacity of the wetland district;

(2) Provides anything more than the minimum relief necessary to either alleviate the hardship, if a variance, or to provide for the special use;

(3) Has not already been approved by any federal or state agency whose approval is required, unless the granting of the variance or special use is conditioned upon, and subject to, the obtaining of such approval;

(4) Allows the alteration of the grade or contour of land in a wetland district unless, upon completion of any proposed construction or other work that altered the grade or contour, the land is to be restored as closely as possible to its original grade and contour;

(5) Allows a net loss of wetland area. Where all or part of a wetland in a wetland district would be destroyed or substantially altered by a proposed development, the Board of Zoning Appeals shall require mitigation by the person receiving the variance or special use permit and his successors in interest according to the following standards:

a. The authorization of replacement wetlands shall not be used as a means of permitting avoidable losses of natural wetlands;

b. Replacement wetlands shall be based on a one-to-one acre ratio and shall provide similar or greater environmental benefits than those lost because of the proposed development;

c. Replacement wetlands shall be located adjacent to the wetland district in which the losses are sustained and shall become part of the district;

d. If replacement of a similar wetland is not possible adjacent to the wetland district where losses would be sustained, the Board of Zoning Appeals may consider replacement at ratios greater than one-to-one of a wetland at a comparable location;

e. The Board of Zoning Appeals may require the posting of a bond or other performance guarantee sufficient to assure to the city the satisfactory completion of replacement wetlands;

f. Periodic maintenance of replacement wetlands shall be carried out for a minimum of three years to control erosion, remove nuisance vegetation, and assure the establishment and survival of predominantly hydrophytic vegetation; and

g. The Board of Zoning Appeals shall require replacement of wetland losses even when the person or persons requesting the variance or special use has received federal or state approval for the proposed construction without mitigation.

(Ord. No. 5-91, § 21.18.040, 1-21-91)

Sec. 82-625. Special use and variance procedures.

Any person seeking either a special use or variance shall:

(1) File a written petition with the Secretary of the Board of Zoning Appeals and with the Zoning Administrator of the city at least 15 days before any regularly scheduled meeting of the board. This application shall include:

a. The purposes of the project and an explanation of why the proposed activity requires a wetland location or access to wetlands, or cannot be located at other sites;

b. A site plan drawn to scale showing the wetland district boundary and actual wetland boundary as determined by field survey; the width, depth, and length of all existing and proposed structures, roads, watercourses, drainageways; water, wastewater and stormwater facilities; utility installations within 200 feet of the wetland; and the relationship of the proposed activity and any potentially affected wetland to the entire parcel of land owned by the applicant;

c. A description of the wetland that will be affected by the regulated activity, including a site plan drawn to scale for the entire wetland; the area that may be impacted; vegetation types; soil type; wetland water sources; and a general characterization of the habitat, wildlife, and common plants;

d. Adjacent land use; and

e. Elevations of the site and adjacent lands within 200 feet of the site at contour intervals of no greater than five feet.

(2) The Zoning Administrator shall verify the accuracy of, and may render adjustments to, the boundaries of the wetland and the wetland district, as shown on the site plan required by subsection (1)b. of this section. If the adjusted boundary delineation is contested by the applicant, the Zoning Administrator may attempt to set mutually agreeable boundaries, or, when such an attempt is unsuccessful, may obtain competent expert services at the applicant's expense, to assist in the boundary determination.

(3) Give public notice that complies with the requirements of state law and any rule or regulation that may be adopted by the Board of Zoning Appeals.

(4) Following the public hearing, submit proposed findings of ultimate facts on each point required either by state statute or this article, including any findings required by this article or by IC 36-7-4-918.4 together with findings of evidentiary facts, based on evidence presented to the board, that supports the ultimate facts.

(Ord. No. 5-91, § 21.18.050, 1-21-91)

Sec. 82-626. Grant of variance or permit.

The Board of Zoning Appeals may grant a variance, or permit a special use:

(1) After conducting a public hearing, if proper public notice has been given; if,

(2) The board makes the findings, based upon the evidence presented, that this article requires.

(Ord. No. 5-91, § 21.18.060, 1-21-91)

ARTICLE V. – WETLANDS

Sec. 14-116. – Findings.

It is recognized by the township board that wetland conservation is a matter of township concern inasmuch as a loss of a wetland, and, particularly, in accumulation with other losses of wetlands, will deprive the people of the township, or others, of flood and/or storm control, wildlife habitat, protection of subsurface water resources and provision of valuable watersheds and recharging groundwater supplies, pollution treatment, erosion control and sources of nutrients, and it is further recognized by the township board that rapid growth, the spread of development, and increasing demands upon natural resources, have resulted in the shrinkage of the critically necessary domain of wetlands and have had the effect of encroaching on, despoiling, polluting, or eliminating many wetlands, and other natural resources, and the public trust therein, and that preservation of the remaining wetlands in an undisturbed and natural condition shall be and is necessary to maintain important physical, aesthetic, recreational, and economic assets for existing and future residents of the township and of this state.

(Ord. No. 473, art. I, § 1.1, 6-13-1994)

Sec. 14-117. – Intent and purpose.

It is the purpose and intent of this article, in view of the findings specified in section 14-136, to promote and maintain a harmonious and compatible land use balance within the township and to obviate the nuisance condition which would arise with the indiscriminate development of existing wetland areas; to provide for the protection, preservation, proper maintenance, and use of township wetlands in order to minimize disturbance of and to them; to prevent damage caused by erosion, scarification, sedimentation, turbidity, and/or siltation; to provide for the protection of soils capable of providing necessary filtration for the maintenance of aquifer stability; to protect against loss of wildlife, fish, or other beneficial aquatic organisms, or vegetation, and also against the destruction of natural habitat; to minimize the phenomenon of environmental deterioration; to secure safety from the dangers of flood and pollution, to prevent loss of life, property damage, and other losses and risks associated with flood conditions; to protect individual and community riparian rights; to preserve the location, character, and extent of natural drainage courses; and to provide for the enforcement of this article and coordination of the enforcement of appropriate local, county, and state ordinances or statutes and corresponding agencies.

(Ord. No. 473, art. I, § 1.2, 6-13-1994)

Sec. 14-118. – Validity and necessity.

The township board declares that this article is essential to the health, safety, economic and general welfare of the people of the township, and to the furtherance of the policy set forth in article 4, section 52 of the Constitution of the State of Michigan and the Michigan Environmental Protection Act, Public Act No. 451 of 1994 (MCL 324.101 et seq.) and specifically wetlands protection under part 303 of such Act (MCL 324.30301 et seq.).

(Ord. No. 473, art. I, § 1.3, 6-13-1994)

Sec. 14-119. – Construction and application.

(a) The following rules of construction apply in the interpretation and application of this article:

(1) In the case of a difference of meaning or implication between the text of this article and any caption or illustration, the text shall control.

(2) Particulars provided by way of illustration or enumeration shall not control general language.

(3) Ambiguities, if any, shall be construed liberally in favor of the protection and preservation of natural resources.

(b) It is the intent of this article to promote flood protection; however, this article cannot be relied upon for determining where floods may occur.

(Ord. No. 473, art. I, § 1.4, 6-13-1994)

Sec. 14-120. – Definitions.

The following words, terms, and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Aquatic vegetation means plants and plant life forms which naturally occur in, at, near, or predominantly near water.

Board and wetlands board means the Charter Township of Bloomfield Planning Commission.

Contiguous means any of the following:

(1) A permanent surface water connection or other direct physical contact with an inland lake or pond, a river, or stream.

(2) A seasonal or intermittent direct surface water connection to an inland lake or pond, a river, or stream.

(3) A wetland is partially or entirely located within 500 feet of the ordinary high water mark of an inland lake or pond or a river or stream, unless it is determined by the township in accordance with Rule 281.924 of the Administrative Rules adopted by the state department of environmental quality, land and water management division, wetland protection that there is no surface water or groundwater connection to these waters.

(4) Two or more areas of wetland separated only by barriers, such as dikes, roads, berms, or other similar features, but with any of the wetland areas contiguous under the criteria described in subsections (1), (2), or (3) of this definition.

Deposit means to fill, place, grade, or dump.

Director means the township supervisor for the Charter Township of Bloomfield, or the supervisor's designate.

Material means soil, sand, gravel, clay, peat, vegetation, debris, and refuse, or any other substance, organic or inorganic.

Operation means the making of additions or deposits, performing any construction or excavation activity, removing, improving, and/or developing land in any manner, or any combination thereof.

Ordinary high-water mark means the line between upland and bottom land which persists through successive changes in water levels, below which the presence and action of the water is so common or recurrent that the character of the land is markedly distinct from the upland and is apparent in the soil itself, the configuration of the surface of the soil and the vegetation. On an inland lake which has the level established by law, it means the high established level. Where water returns to its natural level as a result of the permanent removal or abandonment of a dam, it means the natural ordinary high-water mark.

Owner means any person who has dominion over, control of, title to, and/or any other proprietary interest in designated wetland and/or watercourse areas, or title to an obstruction, natural or otherwise, to wetland and watercourse properties.

Remove means and includes to dig, dredge, suck, pump, bulldoze, dragline, or blast.

Runoff means the surface discharge of precipitation to a watercourse or low area. Delayed runoff can occur from sudden warming after winter precipitation accumulated as snow and/or ice.

Seasonal means any intermittent or temporary operation which occurs annually and is subject to interruption from changes in weather, water level, or time of year, and may involve annual removal and replacement of an operation, obstruction, or structure.

Soils:

(1) Poorly drained soils are those general organic soils from which water is removed so slowly that the soil remains wet for a large part of the time. The water table is commonly at or near the surface during a considerable part of the year. Poorly drained conditions are due to a high-water table, to a slower permeable layer within the soil profile, to seepage, or to some combination of these conditions.

(2) Very poorly drained soils are those soils from which water is removed from the soil so slowly that the water table remains at or on the surface a greater part of the time. Soils of this drainage class usually occupy larger or depressed sites and are frequently ponded.

Structure means any assembly or materials above or below the surface of the land or water, including but not limited to, houses, buildings, plants, bulkheads, piers, docks, rafts, landings, dams, sheds, or waterway obstructions.

Temporary means a time period as specified in the use permit, or if unspecified, shall mean an uninterruptible time period less than nine months in duration.

Upland means the land area adjoining a lake, stream, or watercourse, above the ordinary high-water mark, uses for which are essentially nonaquatic.

Wetlands means land characterized by the presence of water at a frequency and duration sufficient to support and that under normal circumstances does support wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh. For purposes of this article, a "wetland" must be two acres, or more, in size, including the area of any contiguous inland lake, pond, river, or stream. If the land area is less than two acres in size, it may nonetheless be considered a "wetland" if it is determined that the protection of the area is essential to the preservation of the natural resources of the state from pollution, impairment, or destruction, and the owner of the property has been so notified.

Words not specifically defined, in this section, shall have meanings generally understood in the wetlands and water regulation discipline, and otherwise shall have the meanings generally ascribed to them in common usage.

(Ord. No. 473, art. II, §§ 2.1, 2.2, 6-13-1994)

State law reference—Wetland definitions, MCL 324.30301.

Sec. 14-121. – Prohibitions.

It shall be unlawful for any person to do or assist in any of the following unless and until a written permit is obtained from the township pursuant to this article.

(1) Deposit or permit to be deposited any material, including, without limitation, structures, into, within or upon any wetland.

(2) Remove or permit to be removed any material from any wetland.

(3) Dredge, fill, or land balance wetlands.

(4) Construct, place, enlarge, extend, or remove a temporary, seasonal, or permanent operation or structure in any wetlands, including any temporary, seasonal, or permanent dock which serves or is intended to serve more than one single-family home, lot, or parcel.

(5) Construct, extend, enlarge, or connect any conduit, pipe, culvert, or open a closed drainage facility erected for the purpose of carrying stormwater runoff from any residential site of two or more single-family residences or from a multiple residence, commercial site, industrial site, parking area, unimproved private or public road, or any other land use permitting discharge or silt, sediment, organic or inorganic materials, chemicals, fertilizers, flammable liquids, or any substance producing turbidity, except through an interceptor, retention or settling, filter or treatment facility designed to control and eliminate the pollutant before discharged to any wetland, provided the design of such facility must first be approved by the township or the state department of environmental quality.

(6) Construct, enlarge, extend, or connect any private or public sewage or waste treatment plant discharge to any wetland except in accordance with the latest requirements of and permit by the county, state, and/or the United States, to the extent that such entities have jurisdiction.

(7) Drain, or cause to be drained, any water from a wetland.

(Ord. No. 473, art. III, § 3.1, 6-13-1994)

State law reference—Prohibited activities, MCL 324.30304.

Sec. 14-122. – Activities not requiring a permit.

A permit under this article shall not be required for uses exempted from permit requirement under Section 30305 of Public Act No. 451 of 1994 (MCL 324.30305).

(Ord. No. 473, art. III, § 3.2, 6-13-1994)

Sec. 14-123. – Application process; permit; fees.

(a) Application for a township wetland permit shall be made on the form supplied by the state department of environmental quality.

(b) Each person applying for a township wetland permit shall make application directly with the township, through the township clerk.

(c) Upon receipt, the township clerk shall forward a copy of each application to the state department of environmental quality.

(d) The wetland board, with the assistance of the township's consultants in those cases deemed by the township to be appropriate, shall review the application pursuant to this article.

(e) The application shall be modified, approved, or denied within 90 days after receipt, subject to the following provision: the applicant for an approval required in conjunction with site plan review or subdivision approval shall, at the time of submission, elect to have the application processed under either subsection (1) or (2) of this section:

(1) The wetland application shall be reviewed immediately, either prior to or concurrent with the review of the site plan, plat, or other proposed land use submitted by the applicant, with the understanding that the land use review may not be completed at the time the decision is rendered on the wetland application. Election of this alternative may require a reopening of the wetland application if the land use approval is inconsistent with the wetland approval; or,

(2) The wetland application shall be reviewed and acted upon concurrent with the review of the site plan, plat, or other proposed land use submitted by the applicant, and the 90-day review period limitation specified in Section 30307(6) of Public Act No. 451 of 1994 (MCL 324.30307(6)) shall thereby be extended accordingly.

(f) The denial of a permit shall be accompanied by a written reason for denial. The failure to supply complete information with a permit application may be reason for denial of a permit.

(Ord. No. 473, art. IV, § 4.1, 6-13-1994)

Sec. 14-124. – Application review.

The review procedure shall be as follows:

(1) Following receipt of an application for a permit for a proposed activity or operation other than one single-family dwelling, the township clerk shall send a notice of the application by first-class mail to the owners of property abutting the proposed project, based upon the records on file at the township. Such notice shall also be sent to all members of the township board and to all persons, subdivision associations, and lake associations registered with the township, if directly associated with, or impacted by, the project, as determined by the clerk, and to the adjoining governmental entities if the wetland at issue extends into such entities. The notice shall include either a copy of the permit application or a summary of the proposed activity or operation, and a specification of the time, date, and place of a public hearing to be conducted on the application. Public comment shall be received, either in writing prior to the date of hearing, or in person at the hearing. Such application shall be reviewed by the wetlands board, which shall conduct the public hearing and review the application in accordance with the standards and criteria set forth in section 14-126. If the proposed activity or operation is found to conform with the standards and criteria of section 14-126 and with all of the requirements of this article, a permit shall be issued in conformance with section 14-127 with or without specified conditions. If the application fails to meet such standards, criteria and requirements, the wetlands board shall deny the permit.

(2) If the proposed activity or operation involves the construction or alteration of one single-family dwelling which is not part of other construction or development by the same person or entity on adjoining property, following receipt of an application, the clerk shall forward the application to the township supervisor, or the supervisor's designee, and shall send a notice by first class mail to all persons and entities specified in subsection (1) of this section. The notice shall include either a copy of the permit application or summary of the proposed activity or operation, and a specification that comments regarding the proposed activity or operation will be received by the township clerk for a period of 15 days following the date of the notice. At the end of the 15-day period, the township supervisor, or the supervisor's designee, shall review the application in accordance with the standards and criteria set forth in section 14-126 taking into consideration all comments received pursuant to the notice sent as provided above. The township supervisor, or the supervisor's designee, shall determine whether the assistance of the township's wetland consultant shall be required in each case. If the proposed activity or operation is found to conform with the standards and criteria of section 14-126, and with all of the requirements of this article, the township clerk shall issue a permit in conformance with section 14-127 with or without specified conditions. If the application fails to meet such standards, criteria, and requirements, the township clerk shall deny the permit. A permit issued under this subsection shall not be effective for 15 days from the date of issuance. Upon issuance of the permit, a notice of issuance shall, concurrent with the issuance of the permit, be transmitted by first-class mail to any person or entity who has filed comments in response to the notice sent in accordance with this subsection.

(3) Review of the permit application by the township wetlands consultant may be required, at the discretion of the wetlands board or township supervisor, or the supervisor's designee, as the case may be. Any costs associated with the wetlands consultant shall be paid out of monies escrowed in advance by the applicant.

(4) Following approval of a wetland application, a wetland permit shall be issued upon determination that all other requirements of ordinance and law have been met, including site plan, plat, or land use approval, as applicable, and including issuance of a permit by the state department of environmental quality, if required under part 303 of Public Act No. 451 of 1994 (MCL 324.30301 et seq.). In cases where a state department of environmental quality permit allows activities not permitted by the wetland approval granted under this article, the restrictions of the approval granted under this article shall govern.

Ord. No. 473, art. IV, § 4.2, 6-13-1994)

Sec. 14-125. – Appeal.

Any person aggrieved by a decision or an application may request relief as may be available in the circuit court.

(Ord. No. 473, art. IV, § 4.2, 6-13-1994)

Sec. 14-126. – Review standards and criteria.

In arriving at a determination with respect to the issuance of a permit under this article, the township supervisor, or the supervisor's designee, and/or the wetlands board shall take into consideration at least the following standards and criteria:

(1) A permit shall be issued only if the proposed project or activity is clearly in the public interest, and is otherwise lawful in all respects.

(2) In determining whether the activity is in the public interest, the benefit that would reasonably be expected to accrue from the proposal shall be balanced against the reasonably foreseeable detriments of the activity, taking into consideration the local, state, and national concern for the protection and preservation of natural resources from pollution, impairment, and/or destruction. If, as a result of such a balancing, there remains a debatable question whether the proposed project and/or activity is clearly in the public interest, a permit shall not be issued. The following general criteria shall be applied in undertaking this balancing test:

a. The relative extent of the public and private need for the proposed activity.

b. The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity.

c. The extent and permanence of the beneficial or detrimental effects which the proposed activity may have on the public and private use to which the area is suited, including the benefits the wetland provides.

d. The probable impact of the proposal in relation to the cumulative effect created by other existing and anticipated activities in the watershed.

e. The probable impact on recognized historic, cultural, scenic, ecological, or recreational values and on the public health or fish or wildlife.

f. The size and quality of the wetland being considered.

g. The amount and quality of remaining wetland in the area.

h. Proximity to any waterway.

i. Economic value, both public and private, of the proposed land change to the general area.

j. The necessity for the proposed project.

(3) A permit shall not be issued unless it is shown that:

a. An unreasonable disruption of aquatic resources will not result;

b. The proposed activity is primarily dependent upon being located in the wetland; and

c. A feasible and prudent alternative does not exist.

(4) The manner in which the activity is proposed to be undertaken will result in the minimum negative impact upon the wetland and attendant natural resources under all of the circumstances.

(Ord. No. 473, art. IV, § 4.3, 6-13-1994)

Sec. 14-127. – Permit contents.

The permit issued under this article shall contain at least the following:

(1) The name, address, and telephone number of the person to whom the permit has been issued;

(2) The name, address, and telephone number of the owner of the property on which the activity or operation shall occur;

(3) A statement of all conditions imposed in connection with the issuance of the permit;

(4) Any required time period for commencement of one or more operations;

(5) The date by which any construction, removal, deposit, or operation must be completed; *i.e.,* the expiration date of the permit;

(6) The amount of any cash bond or irrevocable letter of credit and the institution issuing such irrevocable letter of credit as determined necessary by the township engineer or wetlands board, as the case may be, to ensure compliance with the permit as issued;

(7) The following statement: "All operations permitted or approved by this permit shall be conducted in such a manner as will cause the least possible damage and encroachment or interference with natural resources and natural processes within wetlands;"

(8) The legal description of the parcel to which the permit pertains;

(9) All soil erosion permit requirements shall be met prior to any operation; and

(10) Any and all necessary temporary drainage measures, as approved, shall be undertaken to ensure that no temporary or permanent blockages of drainage result.

(Ord. No. 473, art. IV, § 4.4, 6-13-1994)

Sec. 14-128. – Posting of permit.

Upon issuance of a permit and prior to the undertaking of any on-site work, the persons to whom the permit has been issued shall post a copy of the permit on the property in a conspicuous place which is accessible for inspection and reading by the public.

(Ord. No. 473, art. IV, § 4.5, 6-13-1994)

Sec. 14-129. – Fees.

(a) With the filing of an application, a deposit shall be made payable to the township in an amount specified by resolution of the township board, intended to cover all fees, including inspection, public hearing, and monitoring fees.

(b) If an environmental statement, environmental assessment, or an environmental impact study is required, or if other consultant fees are required to be expended in reviewing the application, a further deposit shall be made in an amount determined by the supervisor, or the supervisor's designee, at the time the township imposes or learns of the requirement of such submission and/or consultants based upon the nature and extent of the study and/or consultations.

(c) All amounts of deficiency shall be paid, and all amounts of overage shall be returned, prior to or concurrent with final action on the application.

(Ord. No. 473, art. IV, § 4.6, 6-13-1994)

Sec. 14-130. – Concurrent jurisdiction.

The township shall have jurisdiction for the regulation of wetlands under this article concurrent with the jurisdiction of the state department of environmental quality.

(Ord. No. 473, art. V, § 5.1, 6-13-1994)

Sec. 14-131. – Responsibility of property owner for obtaining permit.

(a) Issuance of a permit under this article shall not relieve a property owner from obtaining a permit from the state department of environmental quality and/or from the Army Corps of Engineers or other agency, if required.

(b) Issuance of a permit by the state department of environmental quality and/or Army Corps of Engineers shall not relieve a property owner from obtaining a permit under this article if a permit is required by the terms of this article, and all permit requirements under this article shall be met.

(Ord. No. 473, art. V, §§ 5.2, 5.3, 6-13-1994)

Sec. 14-132. – Property tax assessment.

If a permit is denied for a proposed wetland use, a land owner may appear at the annual board of review for the purpose of seeking a revaluation of the affected property for assessment purposes to determine its fair market value under the use restriction.

(Ord. No. 473, art. VI, 6-13-1994)

Sec. 14-133. – Wetland mapping.

The township board has adopted a wetland inventory map, showing an inventory of wetland within the municipality.

(Ord. No. 473, art. VII, § 7.1, 6-13-1994)

Sec. 14-134. – Property owners to be notified.

(a) Upon amendment of the wetland map, the township shall notify each record owner of property on the property tax roll of the township that the wetland map has been amended, where the map may be reviewed, and that the owner's property may be designated as a wetland on the inventory map, and that the township has an ordinance regulating wetland. Such notice shall also inform the property owner that the wetland map does not necessarily include all of the wetlands within the township that may be subject to the wetlands ordinance.

(b) The wetland map shall not create any legally enforceable presumptions regarding whether property that is or is not included on the inventory map is or is not in fact a wetland.

(Ord. No. 473, art. VII, § 7.2, 6-13-1994)

Sec. 14-135. – Investigation and initial wetlands determination; cessation of activities.

(a) This article is intended to apply in those cases in which a project or activity has been commenced, and the township receives notice or otherwise learns that activities may be occurring in regulated wetlands without a permit.

(b) In those cases where the township learns that activities may be occurring in a regulated wetland without a permit, the township will make an initial determination, in the reasonable discretion of the respective township official, whether there may be an activity occurring which requires a permit, *i.e.*, whether there may be a violation of this article.

(c) In a case in which the township makes a determination that there may be a violation of this article, upon notice from the township, the property owner and all persons actively engaged in activities in the wetlands which may be a violation, shall stop all such activities immediately, in which case the property owner, or the property owner's agent, shall make an election to either:

(1) Apply for a permit under this article; or

(2) Request an official determination by the township on whether a permit shall be required.

(d) In the event a property owner, or the property owner's agent, requests an official determination as provided in subsection (c)(2) of this section, an escrow in an amount reasonably determined to cover the costs of the township's wetland consultant in connection with such determination shall be established with the township for such purpose.

(e) If a notice to cease activities has been issued by the township in accordance with this article, such activities shall not continue, and shall not again commence until such time as a permit has been issued under this article, or a determination has been made that a permit is not required.

(Ord. No. 473, art. VIII, §§ 8.1—8.5, 6-13-1994)

Sec. 14-136. – Violations; penalties.

(a) Any person who shall violate the provisions of this article shall be responsible for a municipal civil infraction, subject to the following penalties:

(1) Fines. The following civil fines shall apply in the event of a determination of responsibility for a municipal civil infraction, unless a different fine is specified in connection with a particular ordinance:

a. First offense. The civil fine for a first offense violation shall be in an amount of $75.00 plus costs and other sanctions, for each offense.

b. Repeat offense. The civil fine for any offense which is a repeat offense shall be in an amount of $150.00 plus costs and other sanctions for each offense.

(2) Enforcement. In addition to ordering the defendant determined to be responsible for a municipal civil infraction to pay a civil fine, costs, damages and expenses, the judge or magistrate shall be authorized to issue any judgment, writ, or order necessary to enforce, or enjoin violation, of this article.

(3) Continuing offense. Each act of violation, and on each day upon which any such violation shall occur, shall constitute a separate offense.

(4) Remedies not exclusive. In addition to any remedies provided for by this article, any equitable or other remedies available may be sought.

(b) The judge or magistrate shall be authorized to impose costs, damages, and expenses as provided by law.

(c) A municipal civil infraction shall not be a lesser included offense of a criminal offense or of an ordinance violation which is not a civil infraction.

(Ord. No. 473, art. IX, § 9.1, 6-13-1994; Ord. No. 503, § 33, 4-27-1998)

CHAPTER 1157
Riparian Areas and Wetlands
(Ord. 2006-077. Passed 6-26-06.)

1157.01 RIPARIAN AREAS AND RIPARIAN SETBACKS

(a) Purpose. The purpose of this Section 1157.01 and related Sections of this Chapter is to protect and promote the public health, safety, and welfare by regulating the use of riparian areas; that is, those areas abutting rivers, streams, and other natural watercourses upon which the impacts of stormwater runoff, water pollution, erosion, siltation, and other development impacts may become concentrated and which areas are necessary to preserve the ecological health and natural functions of watercourses for the common good. It is intended that these regulations, administered in concert with other regulations affecting development practices throughout the City, will benefit the properties which are within, or which contain parts of, riparian areas, benefit the City as a whole, and benefit areas outside of and downstream of the City which are affected by impacts on the City's riparian areas. More specifically, these regulations are intended to:

(1) Reduce flood impacts and downstream flood hazard risks by absorbing peak flows, slowing velocity of flood waters and regulating base flow.

(2) Stabilize the banks of watercourses to reduce bank erosion and the downstream transport of sediments eroded from watercourse banks.

(3) Reduce pollutants in watercourses during periods of high flows by filtering, settling, and transforming pollutants already present in watercourses.

(4) Reduce pollutants in watercourses by filtering, settling, and transforming pollutants in runoff before they enter watercourses.

(5) Provide watercourse habitats with shade and food.

(6) Reduce the presence of aquatic nuisance species to maintain a diverse aquatic system.

(7) Provide habitat to a wide array of wildlife by maintaining diverse and connected riparian vegetation.

(8) Benefit the City by minimizing encroachment on watercourse channels and the need for costly engineering solutions such as dams, retention basins, gabion baskets, and rip rap to protect structures and reduce property damage and threats to the safety of watershed residents; and by contributing to the scenic beauty and environment of the City, and thereby preserving the character of the City, the quality of life of the residents of the City, and corresponding property values.

(9) Reduce or prevent construction of buildings and other construction in riparian areas which are characterized by conditions such as high groundwater, flooding, erosion, and soil limitations, which prohibit normal construction practices and require special protective measures for construction and long-term maintenance. Also, reduce or prevent such construction which now, or in the future, may be damaged by flooding resulting from increased runoff due to upstream impacts.

(10) Minimize the creation of lots which are in whole or part difficult or impractical for the establishment of permitted uses within the respective districts due to the presence of riparian areas.

(11) Enable the City to more effectively execute its responsibilities in administration and enforcement of applicable federal and state regulations.

(12) Establish local regulations that are compatible with and supportive of the regulations enacted in other communities within the same watersheds, in the interest of protecting and enhancing the characteristics of these shared natural resources.

b) Applicability. The provisions of this Section 1157.01 and related Sections of this Chapter shall apply to all lands designated as within the riparian setbacks in Section 1157.01(c).

(c) Establishment of Riparian Areas and Riparian Setbacks. The following areas are riparian areas and riparian setbacks:

(1) Riparian areas generally. Any area abutting the ordinary high water mark of a watercourse, also known as the stream channel, and which may be indicated by changes in vegetation, slope, or bank materials, evidence of scouring, and stain lines, shall be riparian areas. The location and extent of a riparian area shall be determined and documented as approved by the City.

(2) Riparian setbacks generally. Any area described by the following subsections shall be a riparian setback. The location and extent of a riparian setback shall be determined and documented as approved by the City.

A. Minimum Riparian Setback. Any area of land which abuts a watercourse, extending outward in a horizontal direction from the ordinary high water mark of a watercourse a distance of not less than twenty-five (25) feet or a greater distance as specified in subsection (c)(3) hereof.

B. Floodplain. Where the 100-year floodplain is wider than the minimum riparian setback on either or both sides of a watercourse, then the minimum riparian setback shall be extended to the outer edge of the 100-year floodplain. The 100-year floodplain shall be defined by Federal Emergency Management Agency (FEMA) or a site-specific floodplain delineation in conformance with standard engineering practices and approved by the Director of Planning and Zoning. Any costs associated with reviewing this site-specific floodplain delineation may be assessed by the City to the applicant.

C. Wetlands. Where wetlands are identified within or abutting the minimum riparian setback, the minimum riparian setback shall be extended to include the full extent of the wetland plus a wetland setback extending beyond the boundary of these wetlands as provided in Section 1157.02. Wetlands shall be delineated through a site survey prepared by a qualified wetlands professional retained by the landowner using delineation protocols accepted and approved by the U.S. Army Corps of Engineers at the time an application is made under this regulation. The delineation shall include a determination of category of wetland, in conformity with the requirements of Ohio law. Any costs associated with reviewing these delineations may be assessed by the City to the applicant.

(3) Specified riparian areas and riparian setbacks. The following specified areas, in addition to any others described in subsections (c)(2) and (3) hereof, shall be riparian areas and riparian setbacks subject to the provisions of this Chapter:

A. Aurora Branch of the Chagrin River. The watercourse known as the Aurora Branch of the Chagrin River shall have a minimum riparian setback of not less than seventy-five feet (75') on either side, extending outward in a horizontal direction from the ordinary high water marks of the watercourse.

B. For any watercourse draining a watershed area of between one half (0.5) a square mile and twenty (20) square miles, the minimum riparian setback shall be seventy-five (75) feet.

1157.02 WETLAND SETBACKS

(a) Purpose. The purpose of this Section 1157.02 and related Sections of this Chapter is to establish controls to protect and promote the public health, safety, and welfare by regulating the use of the areas surrounding wetlands. It is anticipated that these regulations, administered in concert with other regulations affecting development practices throughout the City, will benefit properties which are within, or which contain parts of, wetlands, will benefit the City as a whole, and will benefit areas outside of the City which are affected by impacts on the City's wetlands. More specifically, these regulations are intended to:

(1) Preserve the flood control, water quality, and runoff stabilization functions of wetlands;

(2) Preserve the wildlife habitat and plant association functions of wetlands;

(3) Permit use of land surrounding wetlands in a manner consistent with these regulations.

(4) Reduce or prevent construction of buildings and other improvements in wetland setbacks that may be characterized by conditions such as high groundwater, flooding, erosion, and soil limitations, which prohibit normal construction practices and require special protective measures for construction and long-term maintenance.

(5) Minimize the creation of lots which are in whole or part difficult or impractical for the establishment of permitted uses within the respective districts due to the presence of wetlands.

(6) Enable the City to more effectively execute its responsibilities in administration and enforcement of applicable federal and state regulations.

(7) Protect surface water and groundwater quality by filtering pollutants from stormwater runoff.

(8) Promote the recharge of natural groundwater resources.

(b) Applicability. The provisions of this Section 1157.02 and related Sections of this Chapter shall apply to all lands designated as within the wetland setbacks in Section 1157.02 (c).

(c) Establishment of Wetland Areas and Wetland Setbacks.

(1) The following areas are wetland areas:

A. All wetlands ranked by an appropriate wetland evaluation methodology accepted and approved by Ohio EPA as Ohio EPA Category 2 Wetlands.

B. All wetlands ranked by an appropriate wetland evaluation methodology accepted and approved by Ohio EPA as Ohio EPA Category 3 Wetlands.

1157.03 DELINEATIONS REQUIRED

The following procedures and standards shall apply to the delineation of riparian areas, riparian setbacks, wetland areas, and wetland setbacks:

(a) Upon receipt of an application for:

(1) Minor subdivision;

(2) Major subdivision;

(3) Site plan for any use or structure; or

(4) Application for a building permit. The Director of Planning and Zoning and the Director of Engineering, Utilities and Inspections, hereafter the City Engineer, shall determine if there is potential that the property which is the subject of the application includes part of a riparian area, riparian setback, wetland area, or wetland setback. The determination shall be made based upon available information regarding the location, extent, and characteristics of riparian areas, riparian setbacks, wetland, or wetland setbacks in proximity to the subject property.

(b) The Director of Planning and Zoning and the City Engineer may waive the requirement for delineation if they determine:

(1) That it is unlikely that the property includes part of a riparian area, riparian setback, wetland area, or wetland setback; or

(2) That the proposed construction is unlikely to be located in or have any impact upon any riparian area, riparian setbacks, wetland area, or wetland setbacks; or

(3) That the potential for impact of the proposed construction upon any riparian area, riparian setback, wetland area, or wetland setback has already been reviewed and approved by the Planning Commission in a subdivision plan, site plan, or other approval by the City.

(c) If the Director of Planning and Zoning and the City Engineer determine that there is potential that the subject property includes part of a riparian area, riparian setback, wetland area, or wetland setback, and that the delineation requirement should not be waived, then they shall direct the applicant to prepare and submit a delineation of such areas according to the provisions of this Chapter.

(d) The applicant shall be responsible for engaging the services of a qualified professional to delineate the riparian areas, riparian setbacks, wetland areas, or wetland setbacks consistent with the provisions of this Chapter, and shall identify the areas on plats or site plans for any proposed minor subdivision, major subdivision, site development, or other construction subject to a building permit. This delineation shall be conducted prior to any further action by the City in review or approval of any plats or site plans for any proposed minor subdivision, major subdivision, site development, or other construction subject to a building permit. This delineation shall be done through a metes and bounds survey and shall be subject to review and approval by the Director of Planning and Zoning and by the City Engineer. As the result of this review, the Director of Planning and Zoning may require further studies from the developer, applicant, or designated representative.

Wetlands shall be delineated and categorized by a site survey approved by the City Engineer using delineation protocols accepted and approved by the U.S. Army Corps of Engineers. All wetland categorizations shall be based on appropriate wetland evaluation methodologies that have been accepted and approved by the Ohio Environmental Protection Agency.

(e) Prior to any land clearing, grading, or grubbing, the applicant shall mark the site by properly staked orange construction fencing or other methods approved by the Director of Planning and Zoning to indicate the boundaries of the riparian setback, wetland area, or wetland setback. The markings shall be maintained throughout construction.

(f) No approvals or permits for uses, subdivisions, building construction, or other site improvements shall be issued by the Director of Planning and Zoning or by the Building Department or by the City Engineer prior to delineation and prior to determination that such approval or permits comply with these regulations.

(g) All watercourses, riparian setbacks, wetland areas, and wetland setbacks shall be drawn on the recorded plat of any approved subdivision of land. The watercourses, riparian setbacks, wetland, and wetland setbacks shall be shown on any approved site plan.

1157.04 ACTIVITIES IN RIPARIAN AND WETLAND SETBACKS.

(a) Except as otherwise provided in this Code, lands within riparian setbacks and wetland setbacks shall be preserved in their natural state. The following activities as set forth in paragraphs (1) through (6) of this section shall be permitted in riparian setbacks and wetland setbacks provided they are otherwise permitted in this zoning code. No use permitted under this ordinance shall be construed as allowing or encouraging trespass on privately held lands.

(1) Recreational Activity. Passive recreational uses such as hiking, picnicking, and related uses.

(2) Removal of Damaged or Diseased Trees. Damaged or diseased trees may be removed.

(3) Revegetation and/or Reforestation. The revegetation and/or reforestation of the riparian setback and the wetland setback shall be allowed.

(4) Other activities similar to those listed in Section 1157.04 (a)(1-3), as approved by the Planning Commission.

(5) Streambank Stabilization/Erosion Control Measures. Streambank stabilization/erosion control measures may be allowed provided that such measures are ecologically compatible and substantially utilize natural materials and native plant species where practical and available. Such streambank stabilization/erosion control measures shall only be undertaken upon approval of an Erosion Control Plan by the Director of Planning and Zoning and the City Engineer.

If streambank stabilization work is proposed below the ordinary high water mark of the watercourse, proof of compliance with the applicable conditions of a U.S. Army Corps of Engineers Section 404 Permit (either a applicable Nationwide Permit, including the Ohio State Certification Special Conditions and Limitations, or an Individual Permit, including Ohio 401 water quality certification, as presently enacted, amended, or superceded in the future) shall be provided to the City. Proof of compliance shall be the following:

A. A site plan showing that any proposed streambank stabilization conforms to the general and special conditions of the applicable Nationwide Permit, or

B. A copy of the authorization letter from the U.S. Army Corps of Engineers approving activities under the applicable Nationwide Permit, or,

C. A copy of the authorization letter from the U.S. Army Corps of Engineers approving activities under an Individual Permit and Ohio EPA water quality certification.

(6) Crossings. Crossings through riparian setbacks or wetland setbacks by bridges, culverts, or other construction for pedestrians, vehicles, sewer and/or water lines, and public utility transmission lines may only be allowed upon approval of a Crossing Plan by the Director of Planning and Zoning and the City Engineer. Such crossings shall minimize disturbance to the land within riparian and wetland setbacks, shall not disturb the bed of the watercourse, and shall mitigate any approved disturbances. The Director of Engineering may require additional hydraulic analysis to ensure no increase in the water surface elevation of adjoining properties as the result of an approved crossing.

(b) Prohibited Activities. Any activity not expressly authorized by this section shall be prohibited in the respective riparian setback and wetland setback. By way of example, the following activities are specifically prohibited; however, prohibited activities are not limited to those examples listed here:

(1) Construction. No structures shall be constructed.

(2) Dredging or dumping. Except as otherwise provided in this Chapter, there shall be no drilling, filling, dredging, or dumping of soil, spoils, liquid or solid materials, except for noncommercial composting of uncontaminated natural materials.

(3) Motorized vehicles. There shall be no use of motorized vehicles of any kind, except as approved in the conduct of a permitted activity.

(4) Disturbance of natural vegetation. There shall be no disturbance of the natural vegetation, except for such conservation maintenance that the landowner deems necessary to control noxious weeds; for such plantings as are consistent with activities permitted by this Chapter; and for the passive enjoyment, access, and maintenance of landscaping or lawns existing at the time of passage of this ordinance. Nothing in this section shall be construed as requiring a landowner to plant or undertake any other activities in the riparian or wetland setback provided the landowner allows for natural succession.

(5) Parking lots and driveways. There shall be no parking lots, driveways, or other human-made impervious surfaces, except as permitted under Crossings, above.

(6) New surface and/or subsurface sewage disposal or treatment areas. The riparian setback and the wetland setback shall not be used for the disposal or treatment of sewage except in accordance with Portage District Board of Health regulations at the time of application of this chapter.

1157.05 REVIEW OF PLANS

In reviewing plans required by this Chapter, the Director of Planning and Zoning and the City Engineer may consult with representatives of the Ohio Department of Natural Resources, Division of Forestry; Ohio Department of Natural Resources, Division of Natural Areas and Preserves; Ohio Environmental Protection Agency, Division of Surface Water; Portage Soil and Water Conservation District; or other technical experts as necessary.

1157.06 INSPECTIONS

The riparian setback, wetland, or wetland setback shall be inspected by the Director of Planning and Zoning when:

(a) A preliminary subdivision plat or site plan is submitted to the City.

(b) A building permit is requested.

(c) Prior to any land clearing or grading to inspect the delineation of the riparian setback, wetland, or wetland setback.

1157.06 INSPECTIONS

The riparian setback, wetland, or wetland setback shall be inspected by the Director of Planning and Zoning when:

(a) A preliminary subdivision plat or site plan is submitted to the City.

(b) A building permit is requested.

(c) Prior to any land clearing or grading to inspect the delineation of the riparian setback, wetland, or wetland setback.

1157.07 VARIANCES WITHIN RIPARIAN AND WETLAND SETBACKS.

(a) The Planning Commission may grant a variance to this regulation as provided herein. In granting a variance, the following conditions shall apply:

(1) In determining whether there is unnecessary hardship with respect to maintaining the riparian or wetland setback as established in this regulation such as to justify the granting of a variance, the Planning Commission shall consider:

A. The potential harm or reduction in riparian or wetland functions that may be caused by a proposed activity.

B. If the applicant has demonstrated a hardship beyond economic considerations and not created by his or her prior activities on the property such as lot splits.

C. If the variance requested is the minimum that would alleviate the hardship.

(2) The Planning Commission may not authorize any activity in a Zoning District other than those authorized in the Zoning Code.

(3) Variances shall be void if not implemented within one (1) year of the date of issuance.

(b) In making a determination under Section 1157.07 (a) of this regulation, the Planning Commission may consider the following:

(1) The natural vegetation of the property.

(2) The percentage of the parcel that is in the 100-year floodplain. When granting a variance in the 100-year floodplain, the Planning Commission shall require the applicant to demonstrate that the proposed activity will cause no increase in the water surface elevation. The Director of Engineering may also require proposals from the applicant for on-site compensatory flood storage mitigation to compensate for impacts to the 100-year floodplain.

(3) The extent to which the requested variance impairs the flood control, erosion control, water quality protection, or other functions of the riparian or wetland setback, watercourse, or wetland.

(4) The extent to which the applicant has demonstrated the use of stream and/or wetland mitigation within the City of Aurora to compensate for the loss of non-structural flood control, erosion control, and water quality protection functions as a result of the proposed impacts requested with the variance.

(5) Any mitigation approved by this variance procedure shall first be in compliance with applicable Ohio EPA and U.S. Army Corps requirements.

(6) The degree of hardship with respect to maintaining the riparian or wetland setback as established in this regulation, and the availability of alternatives to the proposed activity.

(7) The extent to which soil-disturbing activities are proposed in such a fashion as to minimize clearing and erosion and to control sediment.

(c) In granting a variance under this regulation, the Planning Commission, for good cause, may impose such conditions that it deems appropriate to maintain the purposes of this regulation.

(d) The Planning Commission is prohibited from granting a variance under this section if the applicant is able to obtain compliance with this Chapter through one or more variances from other provisions of the Zoning Code pursuant to Section 1139.03 of the Code, unless the applicant has applied to the Board of Zoning Appeals for variances and such variance requests have been denied.

1157.08 PROCEDURES FOR VARIANCES AND APPEALS

(a) Any applicant seeking a variance from the conditions imposed under this regulation or an appeal of an administrative decision made under this regulation, other than a decision by the Planning Commission, may apply to or appeal to the Planning Commission. The following procedures shall apply:

(1) When filing an appeal from an administrative decision or an application for a variance, the applicant shall file a notice of appeal or request for variance specifying the grounds, therefore, with the Planning and Zoning Director within 20 days of the administrative official's decision. Upon determining that the application is complete and upon receipt of the required fee of one hundred dollars ($100.00) plus a deposit of one hundred dollars ($100.00) towards mailing costs, the Director of Planning and Zoning shall transmit to the Planning Commission the application and a transcript or other documents that constitute the record from which the administrative decision subject to appeal was based. This transmission shall occur no less than fourteen (14) days prior to a regularly scheduled meeting of the Planning Commission in order to be placed on the agenda for that meeting.

(2) The applicant shall pay all mailing costs.

(3) Applications for appeals or variances made under this regulation shall contain the following information:

A. The name, address, and telephone number of the applicant and relationship to the property owner.

B. Proof of ownership or authorization to represent the property owner.

C. The location of the property, including street address and permanent parcel number.

D. The current zoning of the property.

E. A description of the project for which the appeal or variance is sought.

F. A description of the administrative decision being appealed or the conditions of the regulation from which a variance is sought.

G. Applications for variances or appeals of administrative decisions shall not be resubmitted to the Planning Commission within one (1) year of the date of a final decision by the Planning Commission on the original application, unless the applicant shows the Planning Commission either of the following:

1. Newly discovered evidence that could not have been presented with the original submission, or

2. Evidence of a change in circumstances since the time of the original submission.

(b) A decision by the Planning Commission in response to an application for a variance request or an appeal of an administrative decision filed pursuant to this regulation shall be final.

(c) Any variance granted under this Chapter 1157 shall only be valid for twelve (12) months from the date of such grant unless a building permit or zoning approval is obtained within such period, and unless the erection or alteration of a building is started or the use is commenced within such period in compliance with the approvals and permits. When a variance has been stated as a condition of approval of a site plan, the granting of the variance shall be contingent on conformance with the site plan.

1157.09 NONCONFORMING SETBACKS

(a) Nonconforming Setback of Building and Structures Not Affected By This Chapter: The setback of any dwelling, building, or structure, as existing and lawful at the time of enactment of this Chapter 1157 or amendment thereto, may be continued, although such use does not conform with this Chapter, but if any such nonconforming setback is voluntarily discontinued for two (2) years or more, any future setback of said dwelling, building, or structure shall be in conformity with this Chapter 1157 or amendment thereto.

(b) Completion of Buildings or Structures: The completion of any dwelling, building, or structure which commenced prior to enactment of this Chapter 1157 or amendment thereto, and for which a zoning certificate has been lawfully obtained, may be continued and completed, although the location of such building or structure does not conform with the setback requirements of this Chapter 1157 or amendment thereto. To qualify for nonconforming status under this section, construction must be completed within two (2) years of enactment of this Chapter 1157 or amendment thereto.

(c) Nonconforming Subdivisions: In any zoning district, the setbacks as set forth herein shall not be required on any sublot as shown on a final plat of a subdivision recorded in conformity with sections 1105.05 (a) or (b) of this code, if either the plat or the application to build on the sublot satisfies (1) through (5) below. All five criteria must be met.

(1) The sublot is shown on a final plat of a subdivision which was approved by the Aurora City Council for record purposes (not for acceptance of streets and/or utilities for dedication to the city) prior to the enactment of Chapter 1157 or amendment thereto which resulted in its nonconformity; and

(2) The sublot is shown on a plat which was filed for record (not for acceptance of streets and/or utilities for dedication to the city) in the office of the county recorder prior to or within two (2) years after the enactment of Chapter 1157 or amendment thereto which resulted in its nonconformity; and

(3) The application to use the sublot is filed with either the Zoning Department or the Building Department within two years of the date the plat is filed for record purposes (not for acceptance of streets and/or utilities for dedication to the city); and

(4) The sublot upon which an application is filed is in conformity with all of the regulations of the zoning code which were in effect immediately prior to the enactment of Chapter 1157 or amendment; and

(5) The amount of nonconformity created under this chapter has not increased since the nonconformity began.

Summary of Riparian and Wetland Setback Regulations in Ohio

COUNTY GOVERNMENTS

Knox County

Where a subdivision is traversed by a water course, acceptable drainage way, channel, or stream, there shall be provided a storm water easement or drainage right of way not less than 20 feet in width, conforming substantially with the lines of such water course.
Adopted: January 2005, Subdivision Code Chapter 5.
Contact: Knox County Regional Planning Commission, (740) 393-6718.

Lake County

Riparian setbacks ranging from 25 feet to 120 feet, depending on watercourse drainage area. Implemented to influence the design of new subdivisions to ensure better management of watercourses and on-site drainage. Applies to all new subdivisions in unincorporated areas.
Adopted: December 17, 2002, Subdivision Regulations Article IV, Section 8.
Contact: Lake County Planning Commission, 1-800-899-5253, ext. 2739.

Madison County

The sections of the Big Darby and Little Darby Creeks which flow through the unincorporated area of Madison County have been designated State Scenic Rivers. Minimum riparian setback of 120 feet shall be maintained along both sides of stream channels which are designated as components of the State Scenic River system.
Adopted: May 1991, Madison County Zoning Regulations.
Contact: Madison County, (740) 852-2833.

Summit County

Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 100 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than 0.5 square mile (320 acres) and up to 20 square miles.
Minimum of 50 feet on each side of all streams draining an area greater than 0.05 square mile (32 acres) and up to 0.5 square mile (320 acres).
Minimum of 30 feet on each side of all streams draining an area less than 0.05 square mile (32 acres).
Extended to outer edge of 100-year floodplain where 100-year floodplain is wider than riparian setback.
50 feet setback extending beyond the outer boundary of a Category 3 wetlands
30 feet setback extending beyond the outer boundary of a Category 2 wetlands
No additional setback will be required adjacent to Category 1 wetlands
Adopted: April 29, 2002, Summit County Ohio Riparian and Wetland Setbacks, Revised March 2008 Summit County Subdivision Regulations, Appendix N, Summit County Riparian Ordinance.

Summary of Riparian and Wetland Setback Regulations in Ohio

Contact: Summit County Soil & Water Conservation District, (330) 929-2871.

MUNICIPAL GOVERNMENTS

City of Aurora

Minimum 75 feet riparian setback from the Aurora Branch of the Chagrin River and any other watercourses draining more than ½ square mile.
Minimum 25 feet riparian setback from all watercourses, regardless of drainage area.
Extended to outer edge of 100-year floodplain where 100-year floodplain is wider than riparian setback.120 feet setback extending beyond the outer boundary of a Category 3 Wetlands.
Minimum 75 feet setback extending beyond the outer boundary of a Category 2 Wetlands.
Adopted: June 2000, revised June 2006, Zoning Ordinances Chapter 1157.
Contact: Director of Planning and Zoning, (330) 995-5334.

City of Broadview Heights

Minimum of 300 feet on both sides of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on both sides of all watercourses draining an area greater than 20 square miles and up to and including 300 square miles.
Minimum of 75 feet on both sides of all watercourses draining an area greater than one-half square mile and up to and including 20 square miles.
Minimum of 50 feet on both sides of all watercourses draining an area less than one-half square mile and having a defined bed and bank
Extended to the outer edge of the 100-year floodplain.
120 feet setback extending beyond the outer boundary of a Category 3 wetlands
75 feet setback extending beyond the outer boundary of a Category 2 wetlands
No additional setback will be required adjacent to Category 1 wetlands
Adopted: April 2004, Revised June 2007 Storm Water Pollution Prevention Plan Chapter 1334.
Contact: City Engineer, (440) 838-4705.

City of Euclid

Minimum of 25 feet on each side of watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum of 75 feet on each side of watercourses draining an area greater than or equal to ½ square mile and up to 20 square miles.
Minimum of 120 feet on each side of watercourses draining an area greater than or equal to 20 square miles.
120 feet setback extending beyond the outer boundary of a Category 3 wetlands
75 feet setback extending beyond the outer boundary of a Category 2 wetlands
No additional setback will be required adjacent to Category 1 wetlands
Adopted: June 2007, Chapter 150-2007 Codified Ordinances

Summary of Riparian and Wetland Setback Regulations in Ohio

Contact: Public Service Department, (216) 289-2701.

City of Green

Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 100 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than 0.5 square mile and up to 20 square miles.
Minimum of 50 feet on each side of all streams draining an area greater than 0.05 square mile (32 acres) and up to 0.5 square mile.
Minimum of 30 feet on each side of all streams draining an area less than 0.05 square mile.
Extended to the outer edge of the 100-year floodplain.
Additional setback width of 25 feet to 100 feet for steep slopes.
50 feet setback extending beyond the outer boundary of a Category 3 wetlands.
30 feet setback extending beyond the outer boundary of a Category 2 wetlands.
Adopted: November 2003, Building & Housing Code Chapter 1468
Contact: City of Green, (330) 896-6602

City of Hudson

Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 100 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than 0.5 square mile (320 acres) and up to 20 square miles.
Minimum of 50 feet on each side of all streams draining an area greater than 0.05 square mile (32 acres) and up to 0.5 square mile (320 acres).
Minimum of 30 feet on each side of all streams draining an area less than 0.05 square mile (32 acres).
50 feet setback extending beyond the outer boundary of a Category 3 wetlands.
30 feet setback extending beyond the outer boundary of a Category 2 wetlands.
No additional setback will be required adjacent to Category 1 wetlands.
Adopted: April 29, 2002, Summit County Ohio Riparian and Wetland Setbacks
Contact: Planning Director, (330) 650-1799.

City of Independence

Minimum of 300 feet on both sides of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on both sides of all watercourses draining an area greater than 20 square miles and up to and including 300 square miles.
Minimum of 75 feet on both sides of all watercourses draining an area greater than one half square mile and up to and including 20 square miles.

Summary of Riparian and Wetland Setback Regulations in Ohio

Minimum of 25 feet on both sides of all watercourses draining an area less than one half square mile and having a defined bed and bank as determined above.
Extended to the outer edge of the 100-year flood plain.
Wetlands setback of 120 feet for Category 3 and 75 feet for Category 2 wetlands.
Adopted: December 2003, Building Code Chapter 1354
Contact: Law Director, (216) 706-3870

City of Kirtland
Minimum of 120 feet on either side of all watercourses draining an area greater than 20 square miles.
Minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank as determined in 1294.05(A)(2) of this regulation.
Minimum setbacks expanded to 100-year floodplain and riparian wetlands.
Adopted: July 2002.
Contact: City Engineer, (440) 951-9000.

City of Middleburg Heights
Minimum of 25 feet on each side of watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum of 75 feet on each side of watercourses draining an area greater than or equal to ½ square mile and up to 20 square miles.
Minimum of 120 feet on each side of watercourses draining an area greater than or equal to 20 square miles.
120 feet setback extending beyond the outer boundary of a Category 3 wetland.
75 feet setback extending beyond the outer boundary of a Category 2 wetlands.
No additional setback will be required adjacent to Category 1 wetlands.
Adopted: 2007
Contact: Building Department, (440) 234-2218.

City of Mentor-on-the-Lake
Minimum of 120 feet on each side of all watercourses draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all watercourses draining an area greater than one-half square mile and up to 20 square miles.
Minimum of 25 feet on each side of all watercourses draining an area less than one-half square mile and having a defined bed and bank.
Extended to include the outermost boundary of the 100-year floodplain and riparian wetlands.
Setbacks are to be preserved in their natural state. **Adopted:** November 2004, Planning and Zoning Code Chapter 1286.
Contact: Service Director, (440) 257-7216.

Summary of Riparian and Wetland Setback Regulations in Ohio

City of North Royalton
Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 120 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than 0.5 square miles and up to 20 square miles.
Minimum of 25 feet on each side of all streams draining an area less than 0.5 square miles.
Extended to the outer edge of the 100-year floodplain.
Wetlands setback of 120 feet for Category 3 and 75 feet for Category 2 wetlands.
Adopted: Amended December 2005, Building and Housing Code Chapter 1492.
Contact: City Engineer, (440) 582-3001.

City of Norton
Includes streams shown on USGS topographical map, Summit County Riparian Setback map, USDA, NRCS Soils Survey map, or City of Norton Riparian Setback map.
Minimum riparian setbacks of 25 feet to 120 feet on either side of watercourses depending on drainage area.
Additional setback width of 25 feet to 100 feet for steep slopes.
Wetlands setback of 50 feet for Category 3 and 30 feet for Category 2 wetlands.
Adopted: June 2004**.**
Contact: City of Norton, (330) 825-7815 ext. 49

City of Olmsted Falls
Minimum of 300 feet on both sides of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on both sides of all watercourses draining an area greater than 20 square miles and up to and including 300 square miles.
Minimum of 75 feet on both sides of all watercourses draining an area greater than ½ square mile and up to and including 20 square miles.
Minimum of 25 feet on both sides of all watercourses draining an area less than ½ square mile and having a defined bed and bank as determined above.
Adopted: Adopted May 2007, Chapter 1470 of the Codified Ordinances.
Contact: City Engineer, (440) 885-8030.

City of Parma
Includes all watercourses draining an area greater than ½ square mile or all watercourses draining less than ½ square mile and having a defined bed and bank. Also use USDA, NRCS Soil Survey for stream identification.
Minimum riparian setback of 25 feet on both sides of all watercourses draining less than ½ square mile and having a defined bed and bank.
Minimum riparian setback of 75 feet on both sides of Big Creek, West Creek and water

Summary of Riparian and Wetland Setback Regulations in Ohio

courses draining an area greater than ½ square mile and up to 20 square miles.
Wetlands found within a riparian setback shall consist of the full extent of the riparian setback plus a 75 feet minimum setback extending beyond the outer boundary of the wetland.
Adopted: December 2003, Chapter 1111 Riparian Setbacks.
Contact: City Engineer, (440) 885-8030.

City of Pepper Pike
Minimum of 300 feet on either side of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on either side of all watercourses draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.
Where the 100-year floodplain is wider than a minimum riparian setback on either or both sides of a designated watercourse, the minimum riparian setback shall be extended to the outer edge of the 100-year floodplain. Where a wetland is identified within a minimum riparian setback, the minimum riparian setback width shall be extended to the outermost boundary of the wetland.
Adopted: May 2008, Chapter 1540 **Contact:** City Engineer, (440) 439-1999

Plain City
Includes streams shown on USGS topographical map, Madison County Riparian Setback map, USDA, NRCS Soils Survey map, or Parks City Riparian Setback map.
Minimum riparian setbacks of 50 feet on Agricultural and Roadside ditches, 100 feet on all Ephemeral and Intermittent Stream and 300 feet on Perennial Streams on either side of watercourses.
Wetlands setback of 100 feet for Category 3 and Category 2 wetlands.
Adopted: January 2008**.**
Contact: Zoning Department, (614) 873-1945.

City of Richmond Heights
Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 120 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than ½ square mile (320 acres) and up to 20 square miles.
Minimum of 25 feet on each side of all streams draining an area greater than 0.05 square mile (32 acres) and up to 0.5 square mile (320 acres).
120 feet setback extending beyond the outer boundary of a Category 3 wetlands.
75 feet setback extending beyond the outer boundary of a Category 2 wetlands.

Summary of Riparian and Wetland Setback Regulations in Ohio

No additional setback will be required adjacent to Category 1 wetlands.
Adopted: May 7, 2007, Chapter 1197 Codified Ordinances
Contact: Building Department, (216) 383-6312.

City of Stow
Mud Brook Watershed.
Minimum of 300 feet on each side of all streams draining an area greater than 300 square miles.
Minimum of 100 feet on each side of all streams draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on each side of all streams draining an area greater than 0.5 square mile (320 acres) and up to 20 square miles.
Minimum of 50 feet on each side of all streams draining an area greater than 0.05 square mile (32 acres) and up to 0.5 square mile (320 acres).
Minimum of 30 feet on each side of all streams draining an area less than 0.05 square mile (32 acres).
50 feet setback extending beyond the outer boundary of a Category 3 wetlands
30 feet setback extending beyond the outer boundary of a Category 2 wetlands and no additional setback will be required adjacent to Category 1 wetlands.
Adopted: September 2003, Chapter 1155, Mud Brook Watershed Stream and Wetland Setback Overlay District Regulations.
Contact: City of Stow, (330) 689-2819.

City of Twinsburg
Minimum riparian setback of 120 feet on either side of Tinkers Creek and 50 feet on either side of other watercourses and wetlands.
Contact: City Planner, (216) 752-4475

City of Willoughby Hills
Minimum of 120 feet on either side of a watercourse draining greater than 20 square miles.
Minimum of 75 feet on either side of a watercourse draining greater than ½ square miles and up to 20 square miles.
Minimum of 25 feet on either side of a watercourse draining an area less than ½ square mile and having a defined bed and bank.
120 feet extending beyond the outer boundary of a Category 3 wetlands.
75 feet extending beyond the outer boundary of a Category 2 wetlands.
Adopted: June 2008 in Protected Areas Code, which includes steep slopes
Contact: Building Commissioner, (440) 975-3550

Village of Bentleyville
Minimum of 300 feet on either side of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on either side of all watercourses draining an area greater than 20

square miles and up to 300 square miles.
Minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.
Adopted: Fall 2007
Contact: Village Engineer (440) 439-1999

Village of Chagrin Falls
Minimum 120 feet riparian setback from either side of designated watercourses and may be extended to include floodplains, wetlands, steep slopes and wooded areas.
Adopted: 1997, Revised January 2002, Chapter 1353
Contact: Village Administrator, (440) 247-6106.

Orange Village
Minimum of 25 feet on each side of watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum of 75 feet on each side of watercourses draining an area greater than or equal to ½ square mile and up to 20 square miles.
Minimum of 120 feet on each side of watercourses draining an area greater than or equal to 20 square miles.
Extended to 100 year floodplain.
Extended to the outermost boundary of wetlands within a minimum riparian setback.
Adopted: March 2006, Chapter 1176
Contact: Village Engineer, (216) 731-6255.

Village of Hunting Valley
Regulation of Construction of Structures and Other Activities within 300 feet of the Chagrin River or 100 feet of the 100-year flood plain, whichever distance is greater. Regulation of Construction of Structures and Other Activities within 75 or 25 feet of protected watercourses as identified on the protected watercourses map.
Adopted: October 2000, initially on Chagrin River and large tributaries, Revised January 2009, Chapter 1155.
Contact: Building Commissioner, (440) 247-6464.

Village of Moreland Hills
Minimum of 300 feet on either side of all watercourses draining an area greater than 300 square miles.
Minimum of 120 feet on either side of all watercourses draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.

Summary of Riparian and Wetland Setback Regulations in Ohio

Extended to 100-year floodplain
Extended to the outermost boundary of wetlands within a minimum riparian setback

Adopted: October 2006, Chapter 1131.
Contact: Village Engineer (440) 439-1999

Village of Waite Hill
Regulation of disturbing, building on, grading, clear cutting, or developing property in an ecologically sensitive area as defined in the Ecologically Sensitive Areas Map of Waite Hill Village and Ecologically Sensitive Areas Map Narrative.
Adopted: June 1995, Chapter 1329
Contact: Planning and Zoning Commission (440) 942-1612

Village of Woodmere
Riparian setback of 25 feet or 75 feet from the ordinary high water mark depending on drainage area.
Adopted: December 2005, Chapter 1187
Contact: Village Engineer (440) 439-1999

TOWNSHIP GOVERNMENTS

Auburn Township, Geauga County
Minimum of 25 feet on each side of watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum of 75 feet on each side of watercourses draining an area greater than or equal to ½ square mile and up to 20 square miles.
Minimum of 120 feet on each side of watercourses draining an area greater than or equal to 20 square miles.
Minimum setbacks expanded to 100-year floodplain and riparian wetlands with additional setback from jurisdictional wetland boundary.
Adopted: January 2005 Zoning Resolution Article 3.06.
Contact: Zoning Inspector, (440) 543-1660.

Bainbridge Township, Geauga County
Minimum of 25 feet on each side of watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum of 75 feet on each side of watercourses draining an area greater than or equal to ½ square mile and up to 20 square miles.
Minimum of 120 feet on each side of watercourses draining an area greater than or equal to 20 square miles.
Minimum setbacks expanded to 100-year floodplain and riparian wetlands.
Adopted: February 2004, Zoning Resolution Chapter 160.
Contact: Zoning Inspector, (440) 543-9871.

Summary of Riparian and Wetland Setback Regulations in Ohio

Bath Township, Summit County
Minimum riparian setback of 75 feet on either side of named streams and 40 feet on either side of unnamed streams.
Adopted: Bath Township Zoning Resolution.
Contact: Engineering Department (330) 666-4007.

Brimfield Township, Portage County
Minimum riparian buffer of twenty-five (25) feet on either side of a river or perennial channel, measured from the river or stream bank. Small streams without clearly defined high water marks can be measured from the centerline. This buffer may be required to be increased based upon the type of stream, slope of the stream banks, surrounding soils, vegetation, land uses, and the function of the stream, but in general shall not exceed three-hundred (300) feet.
Minimum wetland buffer of twenty-five (25) feet, measured from the edge of the designated wetland. The area within this buffer shall not be disturbed and shall be retained in its natural state; and a minimum building and pavement setback of forty (40) feet, measured from the edge of the designated wetland.
Adopted: October 2007, Zoning Code Chapter 5 Section 506.06
Contact: Zoning Commission (330) 678-0739

Canfield Township, Mahoning County
Minimum of 120 feet on either side of all watercourses draining an area greater than 20 square miles and up to 300 square miles.
Minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum riparian setback width shall be extended to the outermost boundary of the wetland.
Adopted: May 2005, Zoning Code Section 619
Contact: Zoning Commission (330) 678-0739

Hinckley Township, Medina County
Minimum of 120 feet on each side of all designated watercourses draining an area equal to or greater than 20 square miles.
Minimum of 75 feet on each side of all designated watercourses draining an area equal to or greater than one-half (0.5) square mile and up to 20 square miles.
Minimum of 25 feet on each side of all designated watercourses draining an area less than one-half (0.5) square mile and having a defined bed and bank as determined in these regulations. Extended to 100-year floodplain.
Additional minimum setback of 50 feet extending beyond the outermost boundary of Category 3 wetlands, and minimum of 30 feet extending beyond the outermost boundary of Category 2 wetlands.
Adopted: November 2007, Zoning Code Section 18
Contact: Zoning Commission (330) 278-4181

Summary of Riparian and Wetland Setback Regulations in Ohio

Perry Township, Lake County
Minimum of 150 feet on each side of the Grand River.
Minimum of 30 feet on each side of Red Mill Creek, Red Creek, and Arcola Creek.
Extended to 100-year floodplain.
Adopted: June 2006, Zoning Code Section 405
Contact: Zoning Inspector (440) 259-5140

Russell Township, Geauga County
Minimum of 120 feet on either side of all watercourses draining an area equal or greater than 20 square miles.
Minimum of 75 feet on either side of all watercourses draining an area equal or greater than ½ square mile and up to 20 square miles.
Minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.
Minimum setbacks extended to the outer edge of the 100-year floodplain.
Minimum riparian setback is extended to include the outermost boundary of a wetland plus an additional minimum setback of 50 feet beyond the outermost boundary a category 3 wetland, and 30 feet beyond the outermost boundary of a category 2 wetland. **Adopted:** November 1967 (minimum riparian setback of 30 feet on either side of all watercourses), revised February 2008, Zoning Resolution Section 4.16
Contact: Russell Township Trustees (440) 388-1718.

Thompson Township, Geauga County
Minimum of 75 feet on each side of all designated watercourses draining an area equal to or greater than 0.5 square mile and up to 20 square miles.
2. A minimum of 25 feet on each side of all designated watercourses draining an area less than 0.5 square mile and having a defined bed and bank.
Extended to 100-year floodplain.
Additional minimum setback of 50 feet extending beyond the outermost boundary of a category 3 wetland, and (30) feet extending beyond the outermost boundary of a category 2 wetland.
Adopted: February 2008, Zoning Code Article XV
Contact: Zoning Inspector (440) 298-1445

Prepared by:
Chagrin River Watershed Partners, Inc.
P.O. Box 229
Willoughby, Ohio 44096-0229
(440) 975-3870
www.crwp.org

Appendix G
Indiana Model Wetlands Ordinance

A MODEL WETLANDS ORDINANCE FOR INDIANA COMMUNITIES

Section 1.

BE IT ORDAINED that the Comprehensive Plan of the City/Town/County of _____ be amended to add the following findings of fact and policy statement:

(A) FINDINGS

The wetlands of the City/Town/County of _____ are a valuable natural resource requiring careful management to maintain their usefulness to public health, safety, and welfare.

In their natural state, wetlands serve to control flooding and water pollution, buffer shorelines and stream banks against erosion, and maintain supplies of potable ground water.

Wetlands also provide high-quality wildlife habitat and offer opportunities for recreation, scientific study, and natural resource education.

Wetlands are subject to significant development constraints because of poorly drained subsoils and the need for constructed drainage and storm water management systems to compensate for loss of natural wetlands functions.

In a well-planned community, wetlands offer the benefits of open space and natural separation of land uses.

(B) POLICY

It is the policy of the City/Town/County of _____ to avoid or minimize damage to wetlands; to permit reasonable economic use of wetlands in ways that are compatible with sound wetlands conservation practices; to encourage development not dependent on a water-related location to be sited in upland areas; to allow wetlands losses only when unavoidable; to promote development at adjacent upland sites that will have minimal or no adverse impact on wetlands; and to coordinate the planning and zoning process with federal and state programs designed to preserve, protect or enhance wetlands values.

Section 2.

BE IT FURTHER ORDAINED that the Zoning Ordinance of the City/Town/County of _____ be amended to add the following subchapter:

000.000 WETLANDS CONSERVATION

000.010 GENERAL PROVISIONS

(A) PURPOSE

The purpose of this subchapter is to prevent harm to the human and natural environment from water pollution, increased flooding and loss of ground water supply that may result when natural wetlands are drained, filled or otherwise subjected to uses incompatible with public health, safety and welfare. This purpose is consistent with the Comprehensive Plan of the City/Town/County of _____. This subchapter is intended to achieve this purpose by:

(1) Providing a method of identifying wetlands within the planning and zoning jurisdiction of the City/Town/County of _____;

(2) Establishing regulations that permit reasonable economic use of wetlands consistent with sound wetlands conservation practices;

(3) Guiding development adjacent to wetlands to prevent harm to wetlands and protect property from potential flood damage; and

(4) Establishing procedures to assure compliance with the Federal Clean Water Act (33 U.S.C. Sec. 1251 et seq.) and with state regulations that may affect wetlands.

(B) AUTHORITY

This subchapter is adopted under the authority of Indiana Code 36-1-3-1 et seq. (Home Rule), Indiana Code 36-7-4-600 et seq. (Local Planning and Zoning - 600 Series - Zoning Ordinance) and Indiana Code 36-9-2-10 through 36-9-2-12 (General Powers Concerning Transportation and Public Works) which relate to the powers of a local unit of government to regulate watercourses as defined in Indiana Code 36-9-1-10.

(C) DEFINITIONS

Words used in this subchapter are intended to have their common-sense meanings unless defined otherwise. The definitions and rules of construction that apply to the rest of the Zoning Ordinance are intended to apply to this subchapter unless a different definition or rule is provided for.

(1) Adverse Impact. Anything that would destroy, harm, impair, diminish, or degrade the value or utility of a wetland for pollution control, flood prevention, ground water recharge, or habitat for fish and wildlife.

(2) Development. Any improvement or change to property brought about by human activity, including, but not limited to, the construction of buildings and other structures, mining, dredging, filling, grading, paving, excavation, or drilling. Development does not include preparing land for the cultivation of agricultural crops.

(3) Fill Material. Any solid material that displaces water or reduces water holding capacity.

(4) Hydrophytic Vegetation. Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Plant species of this type are listed in: P.B. Reed, Jr., "National List of Plant Species that Occur in Wetlands" (North Central - Region 3), Biological Report 88(24), (Washington, D.C.: U.S. Fish & Wildlife Service, 1988).

(5) National Wetlands Inventory (NWI). A series of maps produced by the U.S. Fish and Wildlife Service showing the location and classification of wetlands in standard topographical areas.

(6) Natural Water Storage Capacity. The maximum volume of water that a wetland can contain up to its ordinary high watermark without alterations to its natural grade or contour.

(7) Ordinary High Watermark. A mark delineating permanent or periodic inundation or prolonged soil saturation sufficient to support hydrophytic vegetation. In general terms, it indicates the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape.

(8) Overlay District. A zoning district that is overlaid upon other zoning districts. Land in an overlay district may be used in a manner permitted in the underlying district only if and to the extent that such use is also permitted in the overlay district.

(9) Periodic Maintenance. Ordinary inspection and repair of facilities accesory to use of a wetland. This includes erosion control and removal of silt and non-hydrophytic vegetation in ways that do not substantially disturb hydrophytic plant and animal life. Periodic maintenance does not include any modification of a wetland's contour or natural water storage capacity.

(10) Practicable Alternative. An alternative in terms of the size or location of a proposed development that would accomplish the development's basic purpose and would avoid or reduce adverse impact on a wetland.

(11) Wetland. An area that is inundated or saturated by surface or ground water at a frequency and duration that under normal circumstances supports a prevalence of hydrophytic vegetation.

(D) WETLANDS OVERLAY DISTRICTS

(1) The Wetlands (W) Districts established by this subchapter are overlay districts.

(2) No development may take place in a Wetlands (W) District without an improvement location permit.

(3) Only uses that are permitted by right or by special use permit [special exception] may be placed in a Wetlands (W) District. All other uses are prohibited.

(4) Property located in a Wetlands (W) District is exempt from the provisions of any local ordinance requiring the control or cutting of weeds or the control or cutting of other vegetation over a certain height.

(E) APPLICATION

(1) This subchapter does not apply to:

(a) artificially-constructed ponds, drainage ditches, storm water collection basins, gravel pits, stone quarries, or waste treatment lagoons, except to the extent that such uses are restricted or prohibited in a Wetlands (W) District;

(b) wetlands or portions thereof for which federal permits for fill were issued prior to the adoption of this subchapter or prior to the extension of the planning and zoning jurisdiction of the City/Town/County of _____over the areas for which the permits were issued; or to

(c) any area or use excluded from local planning and zoning jurisdiction by federal or state law.

(2) Subparagraph (1)(b) of this section notwithstanding, if a wetland has been divided by the discharge or placement of fill material, the separated parts shall be considered a single wetland.

(3) Wetlands of different National Wetlands Inventory (NWI) classifications that are hydrologically linked shall be considered a single wetland.

(4) In the event of a conflict between the provisions of this subchapter and those of any other part of the Zoning Ordinance that governs the management of flood hazard areas, the more restrictive provision shall take precedence.

(F) COORDINATION WITH FEDERAL AND STATE AGENCIES

No application made under this subchapter for an improvement location permit, special use permit [special exception], or variance shall be accepted unless the applicant first obtains all necessary federal and state permits, approvals, waivers, or letters of non-applicability. This includes Water Quality Certification from the Indiana Department of Environmental Management (IDEM) under Section 401 of the Federal Clean Water Act.

000.020 WETLANDS (W) DISTRICT

(A) DESIGNATION

(1) A Wetlands (W) District is any wetland area other than those exempted in subsection 010(E)(1) at least one (1) acre in size that appears on the most current National Wetlands Inventory (NWI) map or maps published by the U.S. Fish and Wildlife Service for areas subject to the planning and zoning jurisdiction of the City/Town/County of _____. The most current edition of the applicable NWI map or maps and any subsequent revisions thereto are hereby adopted by reference and declared to be part of this subchapter. A Wetlands (W) District must also meet the standards of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1, January 1987) applied according to the procedures set forth below.

(2) The National Wetlands Inventory (NWI) shows only the general location of wetlands. Precise delineation shall be made by the applicant for an improvement location permit or approval of a development plan through the performance of a full field survey applying the standards of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual. All permit applications for development in a Wetlands (W) District or on a tract containing or abutting a Wetlands (W) District shall be accompanied by a scaled drawing showing the wetland boundary. The applicant shall submit evidence documenting the results of the delineation survey to the Zoning Administrator. The Zoning Administrator shall verify the accuracy of the delineation and may make adjustments to it.

(3) The Zoning Administrator may waive the delineation requirement if he/she determines that a development will have no adverse impact on a Wetlands (W) District.

(4) In determining the accuracy of the boundary delineation or whether a development will have an adverse impact on a Wetlands (W) District, the Zoning Administrator may seek the advice and assistance of appropriate federal and state agencies and qualified private experts.

(5) Because the Zoning Administrator may incur extraordinary costs in verifying the accuracy of an applicant's boundary delineation, the Plan Commission may set reasonable fees for verification over and above the basic fee for an improvement location permit or application for approval of a development plan.

(6) When requested by the applicant, the Zoning Administrator shall perform the delineation, employing such experts as needed. The applicant shall be charged for the costs incurred.

(7) Anyone aggrieved by the Zoning Administrator's determination of the Wetlands (W) District boundary may appeal the determination to the Board of Zoning Appeals.

(8) In applying for an improvement location permit or approval of a development plan, the applicant consents to allow the Zoning Administrator and agents and employees of the Zoning Administrator's office to enter upon the applicant's land for the purpose of performing their duties under this subsection.

(B) PERMITTED USES

The following uses are permitted by right, provided they do not involve erecting a building or structure, opening an excavation, depositing or discharging fill material, dredging, earth moving, extending existing drainage systems, or creating new drainage systems:

(1) Agricultural uses, except animal feed lots, but including general farming, grazing, gardening, sustained-yield forestry in accordance with a management plan approved by the State Forester, nurseries, and the erection and maintenance of wire agricultural fences;

(2) Hunting, trapping, and fishing, where not otherwise prohibited by law;

(3) Parks, when left in a natural state, wildlife and nature preserves, recreational uses, including swimming, boating, natural-surface hiking and bridle paths, and educational and scientific uses;

(4) Uses incidental to the enjoyment of residential property; and

(5) Maintenance and repair of existing streets, roads, highways, and public utilities, provided that such uses are not enlarged and that such maintenance or repair is done in such a way that avoids or minimizes adverse impacts on wetlands.

(C) SPECIAL USES [Note: Some communities use the term "Special Exceptions."]

The following special uses may be permitted by special use permit [special exception] in accordance with subchapter _____ of the Zoning Ordinance, provided that all required federal and state permits have been obtained prior to filing the application for the special use permit:

(1) Structures accessory to permitted uses, provided that they do not obstruct water circulation, threaten water quality, create erosion hazards, or disrupt significant wildlife habitat. Such structures include, but are not limited to:

(a) temporary structures not intended for human habitation or sheltering livestock;

(b) boat anchorages, moorings, and piers;

(c) walkways, benches, informational displays, directional signs, foot bridges, and observation decks; and

(d) residential wells.

(2) Enhancement of wetlands to improve wildlife habitat in accordance with a plan approved by the Indiana Department of Natural Resources.

(3) Public infrastructure, other than buildings and electrical substations, but including public utilities, streets, roads and bridges, provided that:

(a) there is no practicable alternative route outside the wetland;

(b) the public need cannot be met by existing facilities or the modification thereof;

(c) the proposed facility is designed to allow the unimpeded circulation of water in the wetland, control runoff from paved surfaces in accordance with Paragraph 4, below, and otherwise minimize adverse impacts on the wetland;

(d) any filling, excavating, or draining must be necessary for the construction and maintenance of the proposed facility and done in a way that minimizes adverse impacts on the wetland;

(e) erosion control measures are taken in accordance with the U.S. Department of Agriculture Natural Resource Conservation Service Field Office Technical Guide; and

(f) underground utilities are installed in watertight conduits.

[NOTE: THE FOLLOWING PARAGRAPH IS BEING REVIEWED FOR POSSIBLE REVISION.]

(4) Storm water collection, provided that there is no practicable alternative site outside the Wetlands (W) District and that a wetland utilization plan is prepared by the applicant and approved by the Board of Zoning Appeals listing steps for monitoring surface and subsurface water quality and a schedule of periodic maintenance of the wetland while in use as a storm water collection facility; and further provided that net flow does not exceed the wetland's natural water storage capacity and that the storm water undergoes pretreatment as described in subparagraph (b) below to prevent silt, debris, and chemical pollutants from entering the wetland.

(a) No special use permit [special exception] for storm water collection use of a wetland shall involve decreasing the wetland's natural water storage capacity or placing more than 25 percent of the surface area of a constructed collection basin in the Wetlands (W) District. No constructed collection basin shall occupy more than ten percent of the area of a Wetlands(W) District. The natural outflow from a Wetlands (W) District shall not be changed so as to increase or decrease the normal pool elevation. Minor alteration of a wetland's contour may be permitted for the installation of facilities accessory to storm water inflow and outflow.

(b) Pre-treatment measures may include sedimentation basins, vegetated swales, and buffer strips. Riprap made of natural rock may be used only where vegetation cannot control erosion. Storm drains may not discharge directly into a wetland. Lining of swales with paving materials shall not be permitted.

(c) No storm water collection facility shall be constructed within a forested wetland, but overflow into a forested wetland may be permitted.

(d) No more than one (1) constructed collection basin may be placed within a single Wetlands (W) District.

(e) Any portion of a Wetlands (W) District used for storm water collection shall remain part of the Wetlands (W) District.

(f) No special use permit [special exception] shall be granted for storm water collection use of a wetland subject to divided ownership unless the applicant first obtains and records an easement of use from the owners of all other affected properties.

(g) A contructed outflow to a regulated county drain requires approval of the county drainage board or appropriate joint drainage board and/or the county surveyor.

[THE FOLLOWING PROVISION IS OPTIONAL. IT IS INTENDED FOR COMMUNITIES WITH PLANNING AND ZONING JURISDICTION OVER DEVELOPED LAKEFRONT AREAS.]

(5) Maintenance of existing boat channels, provided that the applicant has received a permit from the Indiana Department of Natural Resources under Indiana Code 13-2-11-1 et seq. (Lakes Preservation) and that dredging will be limited as follows:

(a) dredging shall be located so as to minimize adverse impacts on vegetation;

(b) dredging shall not adversely change water circulation;

(c) the size of the dredged area shall be limited to the minimum required for boat ingress and egress; and

(d) dredged material shall not be disposed of within any lake, wetland or flood hazard area or in any manner that is unlawful or would constitute a public or private nuisance.

000.030 GENERAL DEVELOPMENT STANDARDS

In order to guide development outside a Wetlands (W) District to prevent harm to wetlands inside the district, the following standards are established:

(A) No building, structure, street, road, alley, driveway, parking area, or paved surface shall be placed within 25 feet of the boundary of a Wetlands (W) District.

(B) No septic system shall be installed within 150 feet of the boundary of a Wetlands (W) District.

(C) The lowest ground floor elevation of all new buildings and extensions of existing buildings within 50 feet of the boundary of a Wetlands (W) District shall be at least two (2) feet above the ordinary high water mark.

(D) No soil storage pile shall be placed within 25 feet of the boundary of a Wetlands (W) District. Erosion from all soil storage piles placed within 200 feet of the boundary of a Wetlands (W) District shall be prevented by the placement of effective containment barriers around the piles. Soil loss from any construction site within 200 feet of the boundary of a Wetlands (W) District shall be controlled by measures described in the U.S. Department of Agricultural Natural Resource Conservation Service Field Office Technical Guide. Erosion control blankets, if required, shall be made entirely of biodegradable materials in order to avoid hazards to wildlife.

(E) No storm water runoff from a development shall be directed into a Wetlands (W) District except as provided in section 020(C)(4).

000.040 NON-CONFORMING USES

Any building, structure, or other use that does not conform to this subchapter is a non-conforming use and is subject to the following restrictions:

(A) A non-conforming use may be altered, enlarged, or extended on a one-time only basis, provided that:

(1) The lowest ground floor elevation of any addition to an existing building or structure is at least two (2) feet above the ordinary high watermark;

(2) The proposed alterations, enlargements, or extensions, excluding improvements made solely to comply with the Americans With Disabilities Act and with state or local health, sanitary, or safety codes or to assure safe living conditions, do not increase the value of the use by more than 40 percent of its pre-improvement market value, excluding the value of the land; and

(3) No extension of a non-conforming use that does not conform to the setback requirements of section 030(A) shall be constructed in the direction of a Wetlands (W) District.

(B) A non-conforming use that is damaged by accident, flood, fire, explosion, natural disaster, or the public enemy may be restored to its original dimensions and condition provided that the damage does not reduce the value of the use, excluding the value of the land, by more than 40 percent of its pre-damage value.

000.050 BOARD OF ZONING APPEALS

(A) The Board of Zoning Appeals may grant variances from the provisions of this subchapter, provided the applicant establishes that:

(1) The grant of the proposed variance complies with Indiana Code 36-7-4-918.4 (Variances of use from terms of zoning ordinance) and subsequent amendments thereto; and that

(2) The grant of the proposed variance will not adversely affect the water quality, volume of ground water supply, or flood storage capacity of the Wetlands (W) District.

(B) Variances shall give the minimum relief necessary to alleviate the applicant's hardship.

(C) No variance shall permit storm water runoff from a street, parking area, or roof of an industrial or commercial building to be directed into a Wetlands (W) District.

(D) Variances and special use permits [special exceptions] may be granted only if the applicant demonstrates that all required federal and state permits have been obtained.

(E) No variance or special use permit [special exception] shall allow construction or dredging to disturb waterfowl breeding areas during breeding season or fish spawning areas during spawning season.

(F) Whenever a variance or special use permit [special exception] is granted for a use that may alter the grade or contour of land in a Wetlands (W) District, the Board of Zoning Appeals shall require that, upon completion of the proposed construction, the applicant will restore the land as closely as possible to its original grade and contour.

(G) No variance or special use permit shall allow a net loss of wetland area. Where all or part of a wetland in a Wetlands (W) District would be destroyed or substantially altered by a proposed development, the Board of Zoning Appeals shall require mitigation by the applicant and his/her successors in interest according to the following standards:

(1) Acre-for-acre replacement of lost wetlands with constructed wetlands providing the same or superior environmental benefits.

(2) Replacement wetlands shall be located adjacent to the Wetlands (W) District in which the losses are sustained and shall become part of the Wetlands (W) District.

(3) Periodic maintenance of replacement wetlands shall be carried out by the applicant or by his/her successors in interest for a minimum of three (3) years to control erosion, remove nuisance vegetation, and assure the establishment and survival of predominantly hydrophytic vegetation. Before applicant is released from monitoring:

(a) greater than fifty percent of the vegetation species of the replacement site must be hydrophytic;

(b) the hydrology of the replacement site must meet the wetland hydrology criteria contained in the U.S. Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January 1987);

(c) the combined surface area coverage of reed canary grass (*Phalaris arundinacea*) and cattail (*Typha* spp.) must not be more than 15 percent; and

(d) the mitigation site must be free of the following exotic species: purple loosestrife (*Lythrum salicaria*); common reed (*Phragmites australis*); and water milfoil (*Myriophyllum spicatum*).

(4) The Board of Zoning Appeals may require the applicant to post a bond or other performance guarantee sufficient to assure the City/Town/County of _____ the satisfactory completion of replacement wetlands.

(5) If constructing replacement wetlands that will provide the same or superior environmental benefits is not feasible at a site adjacent to the Wetlands (W) District in which the projected losses would be sustained, the Board of Zoning Appeals may permit replacement at a ratio of no less than 2:1 in as close proximity as possible to the Wetlands (W) District.

(6) The Board of Zoning appeals shall require replacement of wetland losses even when the applicant has received federal or state approval for the proposed construction without mitigative conditions.

(7) The authorization of replacement wetlands shall not be used as a means of permitting avoidable losses of natural wetlands.

000.060 ENFORCEMENT

(A) The Zoning Administrator shall enforce the provisions of this subchapter in the manner and form and with the powers provided by the Zoning Ordinance and by the laws of the State of Indiana.

(B) In addition to the enforcement powers and penalties for violation described in Section_____ of the Zoning Ordinance, the Zoning Administrator, Plan Commission or Board of Zoning Appeals, pursuant to Indiana Code 36-7-4-1000 et seq. (Local Planning and Zoning - 1000 Series - Remedies and Enforcement) may institute civil proceedings in a court of competent jurisdiction to compel restoration of wetlands damaged in violation of this subchapter. Such action may also be instituted by anyone who is especially damaged by the violation of any provision of this subchapter.

000.070 SEVERABILITY

If any part of this subchapter is found by the courts to be unconstitutional or invalid, that finding shall not affect the validity of this subchapter as a whole or of any part of the subchapter other than the part specifically declared to be unconstitutional or invalid.

Section 3. BE IT FURTHER ORDAINED that this ordinance shall be in full force and effect from and after the date of its passage and approval by the proper legal authorities of the City/Town/County of _____ and all necessary publication.

TEXT LAST REVISED ON SEPTEMBER 14, 2002. LAST PREVIOUS REVISION WAS ON OCTOBER 11, 2001.