Indian Lake Watershed Project

Watershed Action Plan

Prepared and written by:

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In cooperation with:

Indian Lake Watershed Project

Joint Board of Supervisors
Board of Directors
Project team members, and
Numerous Stakeholders, Partners, Volunteers and Members

Funding:

The preparation and publication of this Watershed Action Plan (WAP) was funded locally in part through Indian Lake Watershed Project (ILWP) membership dues and donations to the general fund and from the Logan County Commissioners' Economic Development Grant.

Date:

December 2009

PREFACE

What is a Watershed?

No matter where you live, you live in a watershed. A watershed is the land area that drains to a single area or body of water such as a stream, lake, river or wetland. Hills and ridgelines form watershed boundaries and are often called watershed divides. Precipitation collects into "runoff" if not absorbed into the ground and is collected by these streams, rivers, lakes and wetlands.

These hydrologically defined drainage areas are then used both to coordinate water resource management and to integrate biology, chemistry, economics and social considerations into a policy decision-making process. This process is referred to as a "watershed approach". It uses local stakeholder input as the basis for solving water quality problems that meet local, State and national goals.

Watershed Action Planning Process

The original Indian Lake Watershed Project (ILWP) Long-Range Plan (LRP) was developed in 1995-96 by The Ohio State University Extension (OSUE) in cooperation with the Indian Lake Watershed Project Joint Board (ILWPJB) of Supervisors. The original plan has guided the watershed project's development and growth over the last 10 years. The revisions contained in this document are intended to modify the original plan by incorporating the accomplishments and the growth of ILWP since its inception in 1990 and to reflect the current provisions of Appendix 8, "A Guide to Developing Local Watershed Action Plans in Ohio."

Watershed Action Plan

This Watershed Action Plan (WAP) like the original is "community driven" and reflects public stakeholders' opinions and concerns. This plan identifies the shared vision of watershed property owners and residents, users of the Indian Lake State Park facilities and both local and State agency officials concerning the future of the watershed and lake region.

Public participation was a critical element of this planning process. Formal and informal data gathering methods were used to foster public discussion of watershed and lake issues. Methods included extensive surveys, focus groups, public meetings, questionnaires and individual interviews. Quantitative and qualitative data was used to gain a full perspective of the public stakeholders' perception toward Indian Lake and the watershed's future needs.

Living Document

This WAP is conceived as a "living" document. It provides options and directions for limited personnel and resources to produce the greatest water quality awareness and improvements with the highest degree of public respect while receiving the greatest levels of financial support. This document is aimed to continue obtaining accomplishments in improved water quality of Indian Lake and its 4 major tributaries within the watershed and to build on the growth and respect achieved to date by both the ILWP Board of Directors (ILBD) and the ILJB of Supervisors. This plan is designed to be flexible and to encourage updating or amending as needed to assure goals and objectives are being pursued while producing orderly long-term benefits for Indian Lake and its watershed.

Source of Copies

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Indian Lake Watershed Project Board of Directors
Indian Lake Watershed Project Team
Indian Lake Chamber of Commerce
Indian Lake Water Pollution Control Board
ILDC – Formerly Indian Lake Development Corporation
Ohio Department of Natural Resources
Ohio Environmental Protection Agency
Local Governmental agencies (including Health Departments, Soil and Water Districts, County Engineers' offices and County Commissioners)
The Ohio State University Extension
University of Dayton
Wright State University
Ohio Farm Bureau Federation
Pheasants Forever
Natural Resources Conservation Service
Farm Service Agency

Acknowledgements

Space does not allow for thanking all who have helped in the process of developing this WAP. The input of many was necessary to organize the data and information into one logical format. A "thank you" is extended to all the volunteers and members of the public who went above and beyond the call of duty to assist and participate in the successful development of this WAP.

Special "thanks" are, however, extended to Vicky Boots, Executive Secretary, ILWP, for the many hours of typing, compiling and proofing to ensure the quality and accuracy of this document and to Lorre Culp, Logan Soil and Water Conservation District GIS Specialist, for the hours of time and research that went into compiling the maps for this project.

Indian Lake Watershed Project Joint Board of Supervisors

Frank Phelps, Logan Soil & Water Conservation District (SWCD)
Board of Supervisors
Tom Sprang, Hardin Soil & Water Conservation District (SWCD)
Board of Supervisors
John Schwarck, Auglaize Soil & Water Conservation District (SWCD)
Board of Supervisors

Indian Lake Watershed Project Board of Directors

Glenn Ammons, Agricultural Producer
Kevin Braig, Environmental Law Attorney
Jim Cameron, Condo Resident
Kay Daugherty, Island Resident
Frank Dietz, Investment Representative
Don Eggenschwiller, "The Landing" Restaurant Owner
Robert Erwin, Insurance Agent
Dave Helgeson, Chamber of Commerce
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Dave Leiter, Community Association Representative
Betty Kaser Lyle, Condo Resident
Gordon Neufang, Retired University Professor and Permanent Resident
Frank Phelps, Logan SWCD, Farmer and Landowner
Garis Pugh, Manager, Indian Lake Water Pollution Control Board
Tom Sprang, Hardin SWCD, Farmer and Landowner
John Schwarck, Auglaize SWCD, Farmer and Landowner
Don Walters, Russells Point City Council Representative
Jim Weybright, Retired Fishing Enthusiast
Gabe Wickline, Law Attorney

Indian Lake Watershed Project Team Members

Indian Lake State Park (ILSP)
The Ohio State University Extension (OSUE)
USDA - Natural Resources Conservation Service (NRCS)
USDA-RC & D – Resource, Conservation and Development
Local Soil and Water Conservation District (LSWCD)
ODNR -Divisions of Forestry, Fish and Wildlife and Park and Recreation
Indian Lake Water Pollution Control District (ILWPCD)
Logan County Fish and Wildlife Representative
Local Area Service Forester
Local County Health Departments
Local Farm Service Agencies
Local County Engineer Offices
Local Village Officials

ENDORSEMENT

We, supporters of the Indian Lake Watershed Project, hereby approve and agree to pursue implementation of the Revised ILWP Long-Range Management Plan prepared and concurred in by the ILWP Board of Directors and the ILWP Joint Board of Soil and Water Supervisors.

Ohio Department of Natural Resources	Ohio Environmental Protection Agency	Top of Ohio RC&D
Indian Lake Chamber of Commerce Rep.	ILWPJB Chairman	ILWPBD President
Auglaize SWCD	Hardin SWCD	Logan SWCD
Auglaize NRCS	Hardin NRCS	Logan NRCS
OSU Extension	Auglaize Co. Commissioner	Hardin Co. Commissioner
Logan Co. Commissioner	Indian Lake State Park Mgr.	ILWPCD Rep.
Auglaize Co. Health Dept.	Hardin Co. Health Dept.	Logan Co. Health Dept.
Auglaize County Engineer	Hardin County Engineer	Logan County Engineer
Township Trustee Rep.	Farm Bureau Rep.	ILDC Rep.
Mayor of Belle Center	Mayor of Lakeview	Mayor of Russells Point

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List of Acronyms

BMP	Best Management Practice
CLAM	Citizen Lake Awareness and Monitoring
CLIP	Citizen Lake Improvement Program
CNMP	Certified Nutrient Management Plan
CRP	Conservation Reserve Program
CSP	Conservation Security Program
DMRA	Dredge Material Relocation Area
DRASTIC	Depth to Water, Net Recharge to Aquifer, Soil Media, Topography, Impact of Vadose Zone, Hydraulic Conductivity
EWH	Exceptional Warm Water Habitat
FSA	Farm Service Agency
GIS	Geographic Information System
GPS	Global Positioning System
HEL	Highly Erodible Land
HOA	Honda of America
HUA	Hydrological Unit Area
IBI	Index of Biotic Integrity
ILBD	Indian Lake Board of Directors (non profit)
ILDC	Citizens United for Indian Lake Improvement
ILWPJB	Indian Lake Watershed Project Joint Board of Supervisors
ILPT	Indian Lake Watershed Project Team
ILSP	Indian Lake State Park
ILWP	Indian Lake Watershed Project
ILWPCD	Indian Lake Water Pollution Control District
HOA	Honda of America
LCI	Ohio Lake Condition Index
LRP	Long-Range Plan
LRW	Limited Resource Waters
LTA	Long Term Agreement
MCDTP	Miami Conservancy District Trading Program
MMB	Modified Index of Well Being
MWS	Master Watershed Stewards
N/A	Not Applicable
NEPA	National Environmental Policy Act
NPS	Non Point Source Pollution
NRCS	Natural Resource Conservation Service
NRI	National Resources Inventory
NWI	National Wetlands Inventory
OCAP	Ohio Capability Analysis Program
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OSU	The Ohio State University
OSUE	The Ohio State University Extension
OWEP	Ohio Water Education Program
QAPP	Quality Assurance Project Plan
QHEI	Quantitative Habitat Evaluation Index
RC&D	Top of Ohio Resource, Conservation and Development
SWCD	Soil & Water Conservation District
TMDL	Total Maximum Daily Load
USLE	Universal Soil Loss Equation
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WAP	Watershed Action Plan
WET	Water Education for Teachers
WHIP	Wildlife Habitat Incentive Program
WQEC	Water Quality Education Coalition
WQIP	Water Quality Incentive Program
WWH	Warm Water Habitat
305(b)	OHEPA Water Quality Report
314	Section 314 of the Clean Water Act
319	Section 319 of the Clean Water Act

Section 1
INTRODUCTION

Indian Lake

Located in west central Ohio, Indian Lake is a vacation destination and weekend retreat that is becoming a year around destination, attracting nearly 2.0 million visitors each year, according to the Indian Lake Chamber of Commerce, with a rapidly growing permanent population now exceeding 4,000 residents. While the lake is located in Logan County, the watershed covers portions of Auglaize, Hardin and Logan Counties. There are over 178 miles of tributaries within the watershed which flow to Indian Lake. The lake is at the head waters of the Great Miami River; therefore, the watershed is made up of numerous headwater streams throughout the watershed area.

The Indian Lake Watershed area contains several incorporated towns as well as several unincorporated villages of modest size. The watershed primarily falls under the jurisdiction of the Logan-Union-Champaign Regional Planning Board and Logan Soil and Water Conservation District. Indian Lake State Park is the main park within the watershed. The Watershed does not contain any Phase 2 stormwater communities, nor has it been designated as a wild or scenic river. Several school districts including the following make their home within the watershed: Benjamin Logan Local Schools, Indian Lake Local Schools, Waynesfield Goshen Local Schools, Hardin Northern Local schools, and Kenton City Schools. In addition to these public schools, there are three Amish parochial schools which also reside within the watershed including the following: Northwood Christian School, Richland Christian School, and a third Christian School. The Miami Conservancy District neighbors the watershed area; however, the watershed is not apart of the conservancy.

The watershed is a highly productive agricultural area with nearly 90 percent of the land in agricultural production. Just over seven percent of the watershed is forested while only three percent is urbanized. The watershed region was shaped by continental glaciations and running water. The site of Indian Lake originally was five small natural lakes prior to the construction of a dam in the early 1850s to serve as a feeder lake for the Miami-Erie Canal System.

The Lewistown Reservoir as it was known after construction was abandoned when canals were no longer economical and the area was later designated as a State Park in 1898 with the name changed to Indian Lake.

Demographics

The 2000 United States Census data provided a relatively uniform socio-economic portrait for the three counties that contribute land area to the Indian Lake Watershed. Although the 1985 State of Ohio Population Report predicted a net population loss for the counties within the watershed area, all three have actually shown continued

marginal growth through the 2006 census update. Auglaize County touts the area's largest population by a narrow lead, although it has shown the greatest amount of growth since the 2000 census. Auglaize County also boasts the greatest percentage of college graduates, highest median household income, and shortest commute to work time. Logan County easily outpaces Hardin County for population, population growth, and median household income, although percentage of college graduates and average commute to work are nearly identical. Presence of the interstate interchange in the Auglaize County seat of Wapakoneta has led to much industrial and economic growth for the past decade.

Table 1: Census Data

	Logan County	Hardin County	Auglaize County	State of Ohio
2000 population	46,005	31,945	46,611	11,353,140
Population change 3/1/2000 to 7/1/2006	0.4%	0.1%	1.0%	1.1%
Persons under age 5	6.6%	6.0%	6.3%	6.4%
Persons under age 18	25.0%	22.6%	24.9%	24.1%
Persons 65 years or older	13.9%	13.0%	14.6%	13.3%
High School Graduates	83.6%	80.6%	85.7%	83.0%
Bachelor's degree or higher	11.5%	11.4%	13.4%	21.1%
Mean travel time to work	22.0 minutes	21.8 minutes	18.1 minutes	22.9 minutes
Median Household Income	$43,620	$36,238	$46,070	$43,371

Geographic Locators

Indian Lake Watershed Project
Identification Fact Sheet

Project Area: Indian Lake Hydrologic Code 05080001- 010

Geographic Location: Logan, Hardin & Auglaize Counties, Northwestern Ohio

Project Size:

Total Project	63,122 acres
Land	57,975 acres
Lake	5,147 acres

Land Portion in Each County:

Logan County	37,422 acres	65% of total land
Hardin County	17,848 acres	31% of total land
Auglaize County	2,705 acres	4% of total land

Square Miles in Project:

Total Area	98.63 square miles
Land Portion	90.59 square miles

Sub-watersheds:

South Fork	32,504 acres	52% of total watershed
North Fork	13,455 acres	21% of total watershed
Black Hawk/Van Horn Creek and Indian Lake	17,163 acres	27% of total watershed

Targeted Areas:

Total Area	6987 acres

Highly Erodible Land (HEL):

13,285 acres 26% of total cropland

Current Watershed Land Uses:

Land Use	Acres	% of Total
Agriculture	51,304 acres	88.5%
Forest	4,432 acres	7.6%
Urban/Commercial	1,893acres	3.3%
Other Open Land	307 acres	less than .005%
Water	46 acres	less than .005%

Historic Watershed Information

The first Long-Range Plan for the Indian Lake Watershed Project was published in May of 1996. The original plan was written by Gary W. Graham, Logan County Extension Agent for Water Quality with The Ohio State University Extension. The Indian Lake Watershed Project developed a long-range plan that identified the issues facing the watershed at that time and offered solutions and direction for the future. The original long-range plan as is this plan was specifically written with the residents, the watershed and Indian Lake in mind.

There are many issues impacting water quality in the Indian Lake Watershed. The lake sediment survey completed by the Natural Resource Conservation Service in 1988 found an average lake depth of just over six and a half feet with nearly three and a half feet of sediment. This sediment buildup accounts for the loss of thirty-five percent of the storage capacity of the lake. This buildup was attributed to soil erosion due to intense agricultural production on highly erodible soils. According to the December 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries*, the three subwatersheds of Indian Lake suffer from the following categories of nonpoint source pollution: agriculture, urban runoff, land disposal, and hydromodification. Efforts during the implementation of the first long range watershed plan focused on reducing the amount of sediment entering the lake through increased agricultural conservation practices. The February 2008 *Water Quality Report* prepared by Professor Daniel Klco of the University of Dayton reported the following water quality ratings based on macro invertebrate counts for each of the subwatersheds: South Fork, excellent; North Fork, not applicable due to low water flow; and Van Horn/Black Hawk, good. These ratings have consistently improved since University monitoring began in 2001.

In 1995, two surveys were conducted in collaboration with Gary Graham of The Ohio State University Extension, Logan County. The two groups of survey recipients were landowners within the Indian Lake Watershed and lake users. Each group was asked about issues affecting the lake as well as water quality. Lake users concluded that the top pollution problems affecting Indian Lake were the following: soil erosion from cropland, Canada geese population, littering, increasing algae growth, and watercraft pollution. Lake users also indicated that increased dredging and conservation farming practices were the top two issues needing attention at the lake. In slight contrast, landowners within the Indian Lake Watershed concluded that soil erosion, faulty sewer and septic systems, chemical runoff, littering and watercraft pollution, and Canada geese population were the problems most affecting Indian Lake. Landowners indicated that conservation farming practices, sewer system improvements, educational programs for lake users, increased dredging, and decreased goose population were issues needing attention. As a note, since the time of this survey completion, sewage systems have been installed for many of the villages in the watershed area. Surveys were again conducted in the years of 2002 and 2008.

A landowner survey was sent to 300 Indian Lake Watershed landowners. The survey had three sections covering general areas of water quality perception; knowledge level of the project; main water quality issues and concerns. The stakeholders gave their opinions, ideas, and viewpoints about the project and the main issues in the

watershed. A 47 percent return rate was achieved. The complete survey results and survey questions can be seen in Appendix IV.

Ninety-three percent of landowners indicated the Indian Lake water quality to be "fair" to "good" with sixty-seven percent indicating water quality to be "good" to "very good." They indicated there are environmental problems in the watershed, but nearly half indicated they have seen changes in the watershed in the last ten years.

The respondents indicated the top three water quality problems for the lake are geese, littering, and erosion. Nitrates and pesticides were indicated as the "major threats" of contamination to the lake.

The lake user survey group is an important source of information as this group can see trends in water quality and is often able to see changes made from year to year. Lake User surveys were sent to 600 people. A 38 percent return rate was achieved. The complete survey results and survey questions can be seen in Appendix IV.

Eighty-four percent of the respondents indicated they use the lake greater than ten times a year, and sixty-five percent indicated they use it more than they did five years ago. This is a favorable connection to improved water quality since seventy-eight percent indicated water quality had "some" to a "significant" affect on their decision to use the lake.

Since its inception, the Indian Lake Watershed Project has worked diligently with local landowners to improve water quality. This includes urban homeowners, rural landowners, farmers, and the blossoming Amish communities of the area. Through education and test plot demonstrations, over seventy-five percent of the acres farmed within the watershed have been converted to no-till planting, a BMP with great water quality impacts. This implementation alone is credited for reducing the amount of sediment entering the lake by eighty percent. The watershed coordinator has worked alongside many area farmers to encourage the perusal of government funded incentive programs designed to increase conservation practices. Indian Lake Watershed Project has also administered the Honda of America grant for wetland waters quality education. This program is operated in conjunction with the Indian Lake State Park Naturalist and The Ohio State University Extension of Hardin, Logan, and Auglaize counties and serves fourth and fifth grade students throughout the tri-county area. The Watershed Project also maintained an Intensive Grazing demonstration farm for nine years. This fully operational farm was home to many workshops and agricultural tours during its lifetime. Intensive Rotational Grazing is a BMP which encourages land management water quality in addition to increased animal welfare. This Watershed Project was made possible through a $4,000 Bob Evans Foundation grant and the Ohio Department of Agriculture.

The 92 acre Grazing Site sparked the interest of many local producers.

In 2004, the Project acquired a riparian easement along the North Fork of the Great Miami River, one of the sub watersheds of the lake. This eight acre easement provides wildlife travel lanes and protects Indian Lake State Park from encroaching development. In addition, the Project has solicited four Ohio EPA grants to fund the reconstructing of wetland areas within the watershed. A *Homeowner's Guide to Water Quality* was also developed to educate homeowners on BMPs for their own urban dwellings.

Together these practices are believed to have reduced the sediment entering Indian Lake from 87,000 tons per year in 1988 to less than 15,000 tons per year today. Had ILWP not been created in 1988, Indian Lake would be a vastly different place today. Continued silting would eventually result in a mammoth marsh incapable of retaining the nearly 2 million visitors that recreate in the Indian Lake area annually. The Watershed Project has extended the life of the lake indefinitely.

Local residents, farmers in the watershed, and users of the Indian Lake aquatic resources have witnessed how their investments in water quality improvements have multiplied the benefits for future generations of people who will live, work and vacation in the Indian Lake watershed area. The efforts of the past fifteen years or so have led to significant improvements in both water color and water clarity at Indian Lake. These accomplishments in turn have led to a substantial increase in state park usage, a multitude of new housing projects, many new and expanding businesses, a higher than average increase in county property taxes and a study to plan for community services needed for future generations.

Major Accomplishments (1990-2006)

Cost shared on: 45 no-till planters and 23 no-till drills	$1,385,531.44
Low Interest Loans: 24 no-till planters, no-till drills Compost barn, liquid manure spreader, GPS system, Chopper pump for lagoon	$ 742,874.00
4 Pesticide/Nutrient Containment Facilities:	$ 48,236.00

Filter Strips installed – 264 acres of trees and grass

Grassed waterways – 74.4 acres

South Fork Snag and Clear Project (7 miles) $ 113,250.00

Streambank protection – 1510 feet

Sediment Basin installed – 1.7 acres @ Eagles Annex

6 acres of wetlands installed

Riparian Easement – 8.235 acres

A Great Plains No-till Drill and Pesticide/Nutrient Containment Facility made possible through ILWP grant monies.

Section 2
WATERSHED PLAN DEVELOPMENT

Watershed Group

The Indian Lake Watershed Project began in 1990, shortly after the lake was designated as Ohio's first USDA Hydrological Unit Area. The original goal was to reduce the amount of sediment and nutrients entering Indian Lake and its tributaries from agricultural sources. The project is governed by the Indian Lake Watershed Joint Board of Supervisors, which includes a representative from each of the three counties within the Indian Lake Watershed. Day-to-day water quality activities are led by an Executive Director. Local efforts are assisted by volunteers under the direction of several agencies including: Ohio State University Extension, Natural Resources Conservation Service, Soil & Water Conservation Districts, Indian Lake Water Pollution Control Board, Logan County Health Department. Logan County Litter Prevention and Recycling and the Ohio Department of Natural Resources-Parks and Recreation. Other supporting agencies include the local Farm Service Agencies, Ohio Department of Natural Resources-Division of Wildlife, Ohio Environmental Protection Agency, U. S. Environmental Protection Agency and numerous local government entities in the tri county area.

Over the years there have been many key stakeholder groups which have partnered with the project. The Ohio State University Extension is actively involved in farmer education and early water quality projects. Logan Soil and Water Conservation District continues to provide numerous hours of technical support to the project. The Farm Service Agency and Natural Resource Conservation Service have also helped to mobilize funding through federally funded programs to establish Best Management Practices (BMPs) within the watershed. The Ohio Department of Natural Resources, Division of Parks supports the project by providing their conference room for use to the Watershed's Board of Directors' monthly meetings. Indian Lake State Park also provides its Nature Center free of charge to the project ten days a year for educational presentations to elementary schools in the watershed area.

Monthly board meetings are held at the Indian Lake State Park Headquarters.

The Watershed Project has also established many key partnerships with area organizations. The Wooden Keels and Vintage Wheels annual event held by the Antique Classic Boat Society features antique craftsman wooden boats and restored automobiles. Proceeds from this event are donated to the Watershed endowment fund. The Indian Lake Chamber of Commerce also supports the Project in appreciation for the improvements to water quality which increases the likelihood of repeat tourism, which provided nearly $80 million of revenue in 1999. The Project has also benefited from a local poker run held annually by Spend-A-Day Marina of Indian Lake. Indian Lake Watershed Project has collaborated with over a dozen other non-profit organizations throughout Logan County to form the Logan County Leave a Legacy Foundation. This foundation is sponsored by the Springfield Chapter of Planned Giving. Together these entities make it possible for the Watershed Project to continue the good work.

Presentation of Spend-A-Day Proceeds.

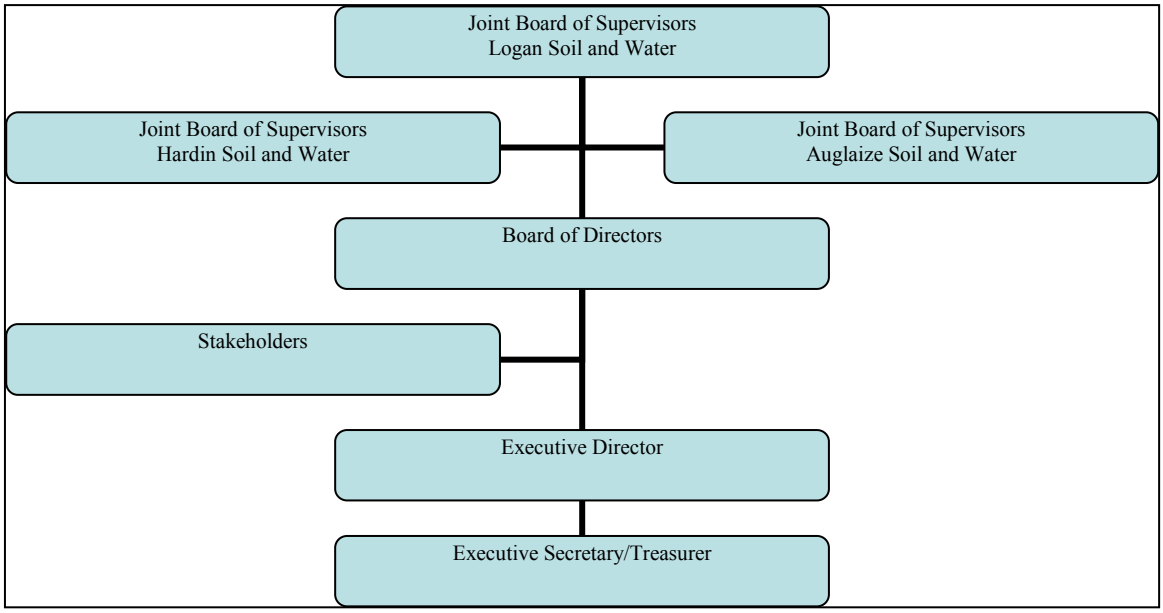
In addition to these partnerships, a collaboration began in March of 2001 when University of Dayton Professor Daniel Klco expressed interest in monitoring water quality for Indian Lake's subwatersheds. Over the past seven years, eighty-four University of Dayton students have volunteered their time to receive water quality training and to collect data and water samples from all four major tributaries to Indian Lake. Results have been utilized to provide guidance and as indicators for improvements achieved through implementation of BMPs.

The Indian Lake Watershed is not only blessed with supportive stakeholders and partners, but also with dedicated leadership **(See Figure 1 for conceptual leadership diagram)**. The Watershed Project is formally managed by a Board of Directors which meet monthly to organize fund-raising events, monitor local events which might affect water quality, and provide guidance to the Watershed Coordinator. The decision making process requires the board to draw on stakeholders for input and direction.

Directors are further organized into committees. There are ten committees including the following: by-laws, budget, new board member search, endowment, legislative,

membership, education/nature center, leave a legacy, memorial, and scholarship. Sub-committees are formed to plan and organize fund-raising events and the annual Appreciation Banquet held to recognize key partners and stakeholders. The Board of Directors operate within the framework established by the Indian Lake Watershed Project By-Laws **(See Appendix II)**.

Figure 1: ILWP Organizational Chart



The Annual Banquet is a great time to socialize and recognize accomplishments.

The Indian Lake Watershed Project, although formally begun in 1990, was a brainchild of the ILDC (formerly known as Indian Lake Development Corporation) in 1988. During the ILDC meetings of this time, it was determined that the best way for this grassroots citizen organization to improve the lake was though improving water quality. With the slogan of "Stop Silt at its Source", five ILDC members began pursuing all viable means of funding through local, state, and federal sources. These

men included the following: State Senator Bob Cupp, State Representative Ed Core, and Logan County Commissioners Jake Jefferies, Don Corwin, and George Clayton. These individuals were motivated by the desire to see the lake returned to its former beauty, to encourage viable economic development through increased tourism, and for personal enjoyment. The majority of their work entailed encouraging farmers to implement conservation practices. Many faces have changed on the Indian Lake Watershed Project (ILWP) Board of Directors with the passing of time, and with it has the project's goals expanded. The new goals are aimed to broaden our impacts to restore and maintain the chemical, physical and biological integrity of each stream, pond, wetland and other water body including Indian Lake within the watershed. At the heart of this goal is the desire to move each body of water into full water quality attainment as set forth by the Clean Water Act and the state of Ohio's Water Quality Standards.

In 1997 the Watershed Project received non-profit status under Section 501(c)(3) of the Internal Revenue Service Code. Since that time, membership was grown from sixty-five members to over eight hundred. Paid dues are utilized to help offset administrative expenses and to grow the endowment fund which is established with Edward Jones Investments to eventually provide funding for the operation of the organization. Today the endowment program boasts a net worth of nearly $200,000. Since state fiscal year 1999, the ILWP has received administrative funding via line item support in the state budget. This source of funding, when combined with EPA funding, totals $2,358,265 since 1990. Membership dues and line item support enabled the Project to seek an executive director who would also serve as the watershed coordinator. Several individuals served in this capacity before the position was filled by Jack Webb in 2000. Jack retired from the project in October of 2008. Vicky Boots, fiscal manager and administrative assistant, has been with the Project since 1990.

Former Executive Director Jack Webb presenting Robert Erwin with the Eagle Award for meritorious service to the Watershed Project.

The mission of the ILWP is *"to facilitate and promote actions that will improve water quality for the benefit of recreation, agriculture, wildlife and other users of the Indian Lake watershed aquatic resources."*

Plan Outline

The Indian Lake Watershed Project is driven by the heartbeat of its members and their desire to improve the water quality of Indian Lake. Seven water quality goals were outlined by the Board of Directors and the Executive Director in response to lake surveys conducted shortly after the Project's inception.

Water Quality Goals

A Restore and maintain the chemical, physical and biological integrity of Indian Lake and its tributaries.

B Promote the reduction of non point source pollution from all potential sources that may include agriculture, commercial, residential and recreational.

C Develop and offer youth and adult educational opportunities regarding water quality and other relevant watershed management topics.

D Foster cooperation among agriculture, commercial, residential and recreational interests in order to enable coordinated actions toward a common goal.

E Assist area decision makers in the development and coordination of sound water quality and watershed management policies.

F Ensure downstream users that the water quality at the headwaters of the Great Miami River meet the OH EPA chemical, physical and biological integrity requirements.

G Protect the underground aquifer's water quality by preventing contaminated recharge to occur.

Endorsement

Without the support of key watershed partners and local units of government, the Indian Lake Watershed Project and its Long-Range Plan would have little if any effect on water quality within the watershed area. For this reason, it has been the expressed purpose of the Board of Directors to include as much public input and support for this document as possible. Please see page seven of the Preface of this publication for the signed endorsements of the plan content by local units of government and other key watershed partners.

Public Education and Understanding

The educational component of the Indian Lake Watershed Project has been the driving force for positive change since its inception. As the updated Watershed Action Plan takes form, the public's understanding and agreement is vital to success. The ILWP's website is configured to allow plan updates to be added for all to view. Comments and suggestions can then be written through the use of a blog. Public meetings are also held during times of peak lake attendance to further educate the public of Non Point Source Pollution management measures that could benefit their area. Watershed displays at local festivals and community events also spark much interest in the work of the watershed. School outreach sessions held at the Indian Lake State Park Nature Center serve to educate future generations about the importance of the Project.

Students visit the wetlands and the Nature Center during School Outreach Sessions.

Section 3
INVENTORY OF WATERSHED (05080001-010)

Introduction

The physical features of Indian Lake play an integral role in the watershed's unique characteristics. The physical features of the watershed create a productive, fertile land for agricultural production operations. These same features cause the area to be fragile and highly susceptible to environmental degradation.

Location

Indian Lake is located in Logan County in west central Ohio. The lake is approximately 5,147 acres while the watershed covers approximately 63,122 acres (57,975 acre drainage basin) in Logan, Auglaize, and Hardin counties. (See Figure 2 for a map of the watershed) The Indian Lake watershed contains 178 miles of tributaries and is headwaters for the Great Miami River. Indian Lake was designated a State Park in 1898. The State Park continues to be a highly used recreational area. The Indian Lake Chamber of Commerce reports that the park attracts an annual 2 million visitors. Belle Center is the only incorporated town within the watershed lying some 8 miles east of the lake. However, Russells Point and Lakeview both adjacent to the lake rely extensively on the recreation and tourism industry that the lake generates. Several of the many islands (69) have been linked by roads and bridges allowing for the expansion of both single family and condominium type home development. Other areas around the lake are becoming very developed as well with either single family homes or overnight camping sites. Over the years a small group of local citizens have looked into the possibility of incorporating both Russells Point and Lakeview with all the other developed areas around the lake into one municipality called "Indian Lake". See Figure 2. **(See Appendix I for a full size map of the Indian Lake Watershed.)**

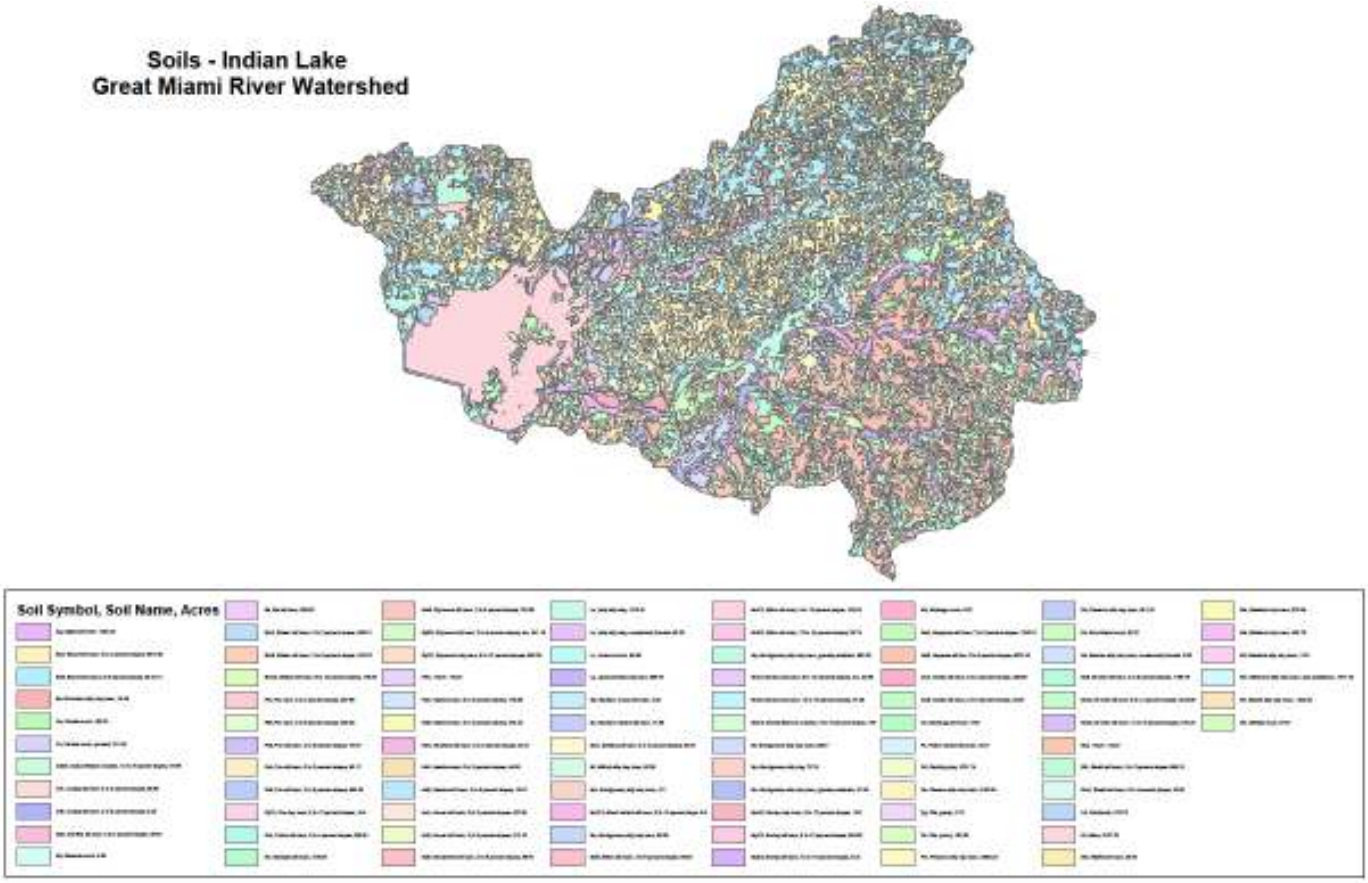
Figure 2: Indian Lake Watershed

Watershed Geology

The topographic features of the Indian Lake Watershed were shaped by continental glaciation and running water. The watershed is located in the till plains of Ohio's central lowlands. The terrain is generally flat to gently rolling in the Van Horn and Black Hawk sub-watersheds (0-6% slopes) with occasional steeper areas in the North Fork of the Great Miami River sub-watershed (6-12% slopes), and somewhat steeper terrain (greater than 12%) in the South Fork of the Great Miami River.

Much of the watershed consists of high lime glacial till of Illinoisan and Wisconsin age (50 to 100 feet of thickness) overlying Devonian dolomite of the lower Monroe formation. Because of the thickness of the glacial till, natural exposures of the bedrock are few in number and small in size. These outcrops are frequently the sites of quarrying operations. There are two active quarries in the watershed.

The soils in the watershed are derived mainly from high lime glacial till **(See Appendix 1 for full size Soils map)**. Eight major soil associates occur in the watershed. The two most extensive associations, the Blount-Morley and the St. Clair-Nappannee (together comprise 47% of the watershed area), have the highest slope and erosion potential in the watershed. These soils are ranked as highly erodible and are moderately productive for row crop and small grain production.



The soil characteristics in the watershed are conducive to growing crops, which are important to the watershed's culture. Most soils in the watershed are not well suited for septic system development due to low permeability, although many areas of the surrounding counties are not well suited for development because of soil conditions (wetlands, prime farmland, etc.). This generalization does not take into consideration the site specific soil conditions.

The sloping terrain and loosely laid glacial till leaves the landscape prone to soil erosion. The Natural Resource Conservation Service (NRCS) has a rating system for determining Highly Erodible Land (HEL) using soil erodibility, rainfall and topographic factors. There are currently 13,285 cropland acres of HEL designated land in the watershed. **(See Appendix I for map)**. The watershed project has been working with producers to enroll HEL acres in order to develop Environmental Quality Incentive Program (EQIP) contracts, Wildlife Habitat Incentive Program (WHIP) enhancements and Conservation Security Program (CSP) agreements to ensure these HEL acres do not eventually again contribute to the sedimentation or water quality problems after the expiration of the CRP contract. All the HEL acres are covered under a conservation compliance plan developed by the land user following U. S. Department of Agriculture (USDA) guidelines. Placing HEL acres into a conservation plan allows implementation of practices which lower soil loss. Erosion is also being reduced by taking this land out of traditional crop production systems and converting to pasture and haying uses.

Row crops are of high economic importance to the watershed area.

Biological Features

Of concern to the Indian Lake Watershed are invasive nonnative species and their potential impacts on the watershed. **Table 2** lists "Ohio's Top Ten" Invasive Non-Native Plants which was compiled by the Ohio Department of Natural Resources, Division of Natural Areas and Preserves. The impact of invasive nonnative species is compounded by their tendency to be highly reproductive in nature. This trait combined with the absence of species desiring to consume the invasive nonnative plant species means the new species can become prolific in a short amount of time. Such establishment leads to competition, and often, the loss of available land area for native species. Land area that is dominated by any one species, especially a nonnative species, is ill-equipped to provide sustenance for native animals. This impacts the overall diversity of the land area.

Table 2: Invasive Non-Native Plants

Plant	Characteristics	Confirmed Presence in Watershed
Japanese Honeysuckle 	Woody, semi-evergreen vine with opposite, oval leaves; yellow , fragrant flowers	Yes
Japanese Knotweed 	Shrub-like herb grows up to 10 feet tall; smooth stems; greenish-white flowers	Yes
Autumn Olive 	Fast growing shrub that may grow to 20 feet tall; small oval dark green leaves with silver bottoms; light yellow flowers	Yes
Buckthorns 	Shrub that may grow to 20 feet tall; smooth gray-brown bark is spotted; glossy leaves; red berry-like fruit	Yes
Purple Loosestrife 	Popular garden flower; linear-shaped leaves grow opposite along square stems	Yes

Plant	Characteristics	Confirmed Presence in Watershed
Reed Canary Grass 	Large, coarse grass that grows to 2-5 feet tall; hairless stems taper to long flat leaf blades; dense, purple flower clusters	Yes
Garlic Mustard 	Biennial herb; rosette of leaves the 1st year; grows a 4 foot stem with triangular leaves the 2nd year	Yes
Multi-flora Rose 	Dense spreading shrub; widely arching canes and stiff, curved thorns; may grow up to 15 feet tall; white flowers that produce small red fruits	Yes
Bush Honeysuckle 	Upright shrub can grow 6-15 feet ; dark green, egg-shaped leaves; white tubular flowers	Yes

Water Resources

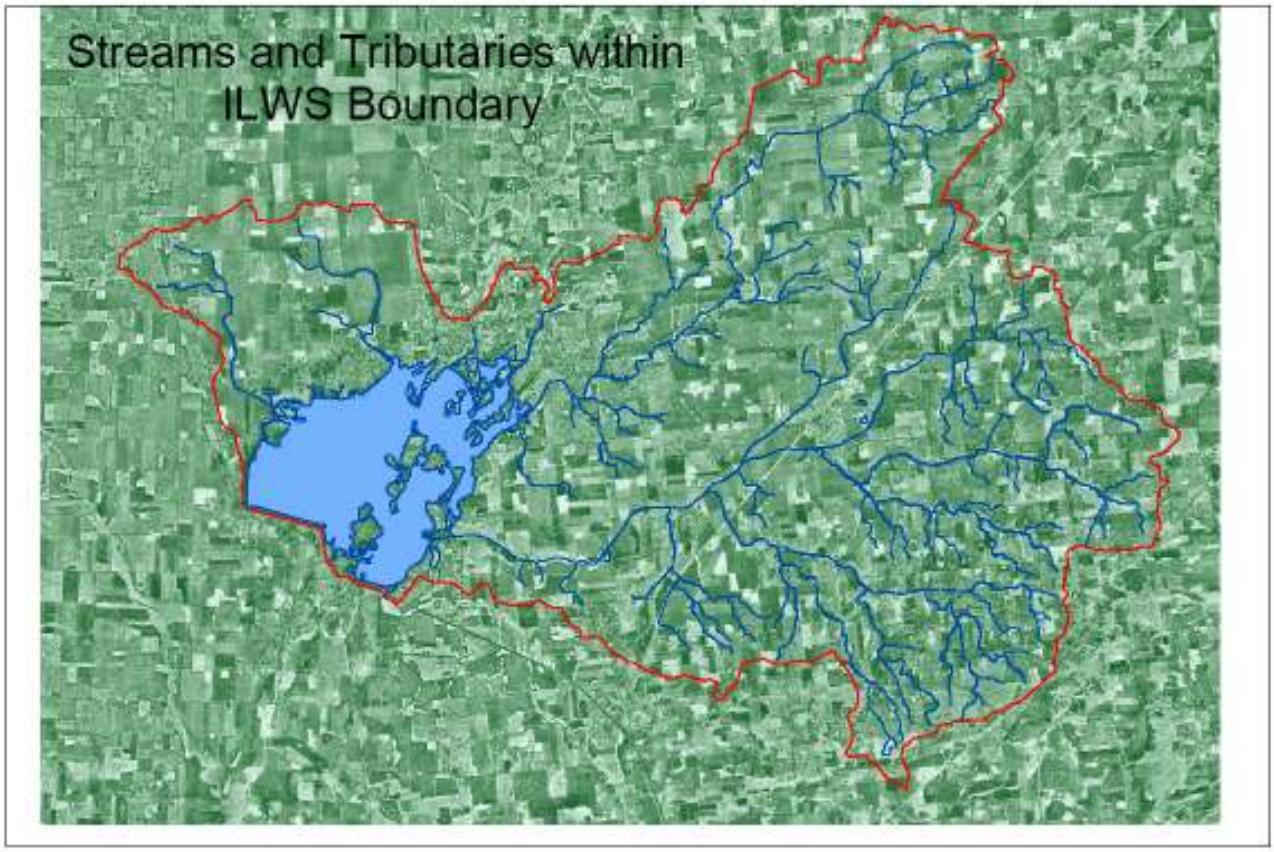
Climate and Precipitation

The total amount of annual precipitation in the watershed is 38-40". Air temperatures very from -10º F to 100º F with four well defined seasons with higher precipitation normally in spring and summer. The average temperature for this area is 58º F. The weather reporting station for Logan County, Ohio, is located on State Route 117 near Huntsville, Ohio. The following data has been collected over the past few years.

Surface Water

Runoff and sediment from residential development, construction sites and agricultural lands may enter streams **(See Appendix 1 for full-size map)**, wetlands and lakes in the watershed. Due to the population area surrounding the perimeter of the lake, runoff (stormwater) may carry other pollutants such as lawn chemicals (pesticides and fertilizers), oil and gas from spills as well as commercial wastes from small businesses.

Surface water hydrology in the Indian Lake Watershed is separated into three sub-watersheds ranging in size from 7,019 acres to 32,563 acres for planning purposes.

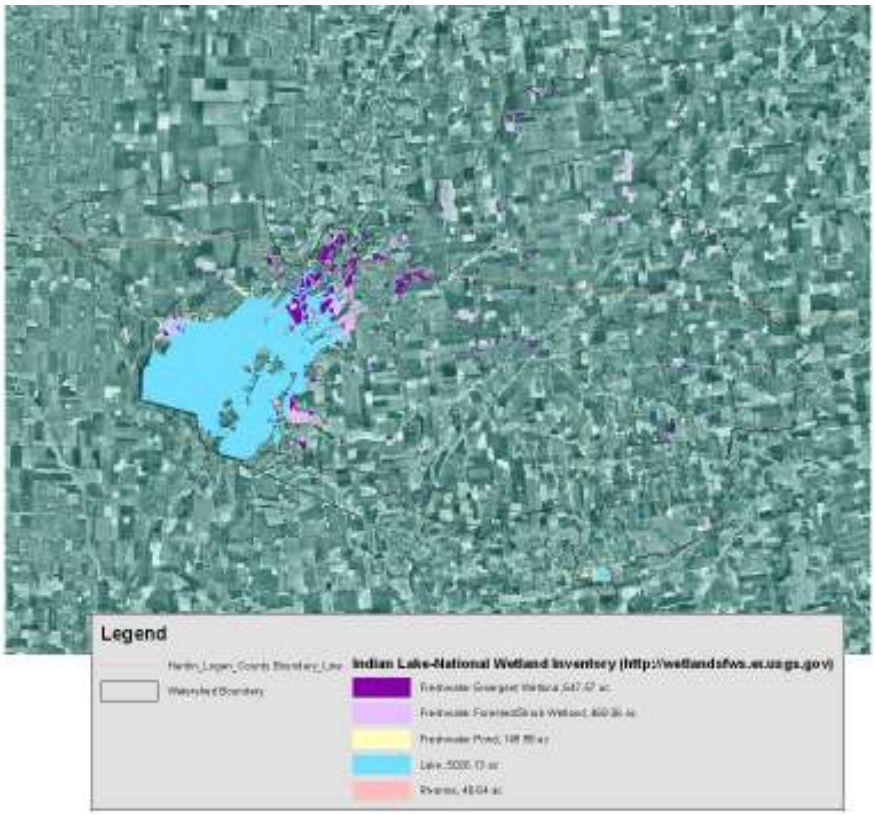


Wetlands

Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The Indian Lake watershed area is thought to be part of the old Lake Erie lake bed, thus originally predominately flat and saturated with wetlands. In the last 100 years or so most of the area has been subjected to artificial drainage (tile both random and systematic) eliminating over 98 percent of the natural wetlands that once existed in the area.

Wetlands have many functions, including storm water storage, wildlife habitat, and water quality improvement. Wetlands are regulated by the U.S. Army Corps of Engineers, as outlined in the Clean Water Act, Section 404. Wetland work requires a Section 401 water quality certification permit which is obtained from OHEPA. Potential wetlands are identified by referencing aerial photographs, soil surveys for the watershed, and the National Wetland Inventory (NWI) maps **(See Appendix I for full-size map of Wetland Locations)**. The most frequent locations of wetlands are along streams, although some potential wetlands may be found near the northern shore of Indian Lake. Wetland delineation is based on three parameters: soil type, vegetation and hydrology.

Wetland locations within the watershed total 1115.93 acres on 783 sites. Freshwater Emergent Wetlands account for 647.57 acres or 58% of the total wetlands. Freshwater Forested/Shrub Wetlands account for 468.36 acres or 42% of the total wetlands.



Streams and Stream banks

The watershed contains 178 miles of perennial and intermittent tributaries. Information collected in the National Resource Inventory (NRI) by NRCS and data from Ohio Capability Analysis Program (OCAP) estimated in 1990 that 45 percent of total soil erosion within the watershed was due to gully erosion, of which a majority was stream bank erosion. Stream bank erosion contributes the greatest impact due to high sedimentation delivery rates. Tributary gradient is lowest in the Van Horn Creek sub-watershed and greatest along the South Fork of the Great Miami River.

The tributaries of Indian Lake were designated by use in 1996 according to Ohio's water quality standards. Biological monitoring in the Indian Lake Watershed by Ohio EPA in 1988 indicated not all tributaries of the lake had fully attained warm water habitat aquatic life use designation based on fish and macroinvertebrate criteria. Non-attainment appeared related to agricultural land use activities resulting in habitat modification (channelization, removal of riparian cover), abnormal flow fluctuation, excessive sedimentation, and nutrient enrichment. Effects of these activities on animal and plant life were most apparent in the North Fork of the Great Miami River, Black Hawk Run, and Van Horn Creek. Some areas on the South Fork of the Great Miami River appeared more stable due to perennial flow, recovered stream channels and established riparian cover. However, some biological impairment was evident in the Belle Center area due to failing domestic wastewater treatment systems which have since been provided with public sewerage. Ohio Environmental Protection Agency (OEPA) continues to retain the warm water habitat aquatic life use designation for streams within the watershed by assuming remediation including restoration of riparian cover and greater erosion control is feasible.

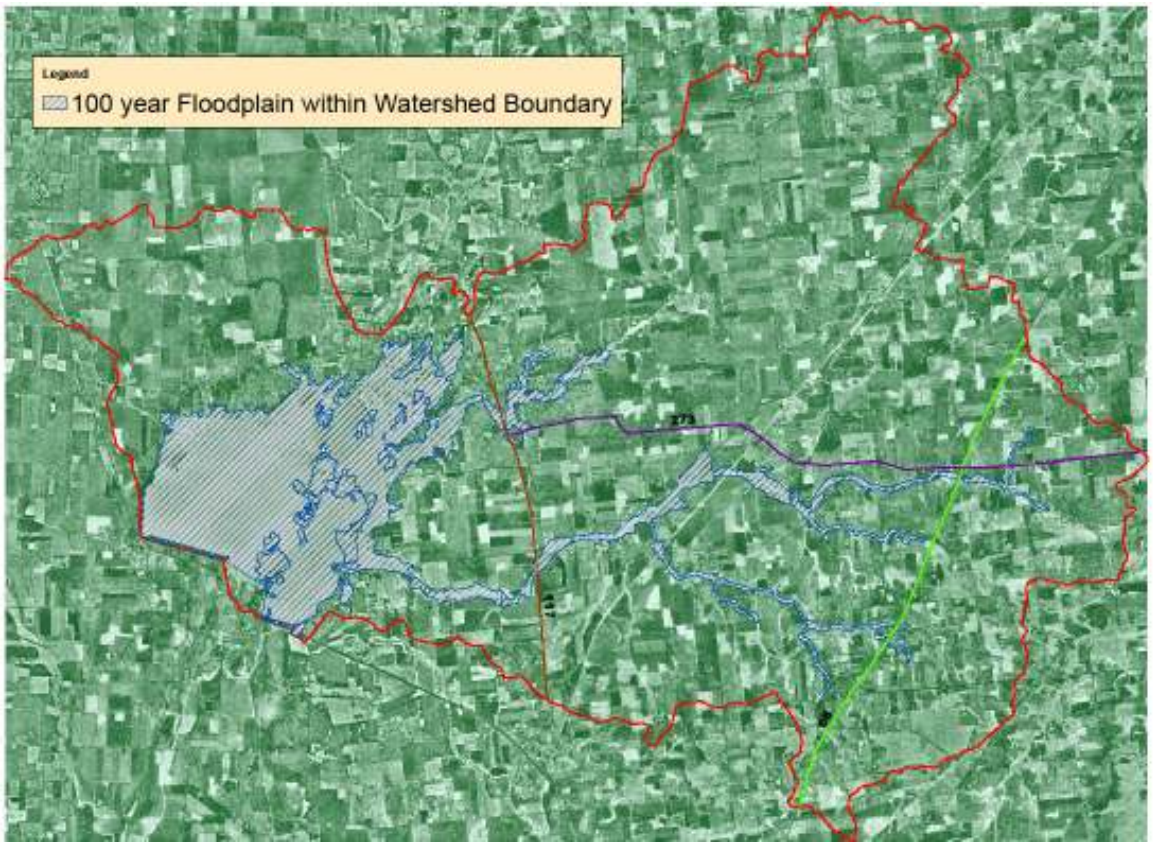
The Water Quality Assessment of 1996 also deigned the tributaries of Indian Lake as worthy of the Primary Contact Recreational use designation. This designation means the tributaries have water depth adequate to support canoeing and pass bacterial indicators for fecal coliforms and e.coli as set by the state of Ohio.

Table 3: Water Quality Assessment of 1996 Aquatic Life Use Attainment

Tributary	IBI	Modified Iwb	ICI	QHEI	Attainment Status
North Fork, Great Miami River Site #1	30	N/A	MGns	25.0	Partial
North Fork Great Miami River Site #2	26	N/A	G	35.5	Non-Attainment
North Fork Great Miami River Site #3	28	6.8	38	56.5	Non-Attainment
Blackhawk Run	40	N/A	34ns	43.5	Full
Van Horn Creek	27	N/A	MGns	46.5	Non-Attainment
South Fork Great Miami River Site #1	41	N/A	54	48.0	Full
South Fork Great Miami River Site #2	39ns	8.3	52	52.5	Full
South Fork Great Miami River Site #3	45	8.0ns	E	52	Full

Floodplains

The floodplain is that portion of a stream or creek valley that is likely to flood. **(See Appendix I for a full size map of the 100 Year Floodplain.)** Tributaries in Indian Lake Watershed used to be frequently flooded. A primary concern with flooding was stream bank and corridor erosion that degraded the water quality. Approximately 15 to 20 miles of streams were in serious need of stabilization practices.



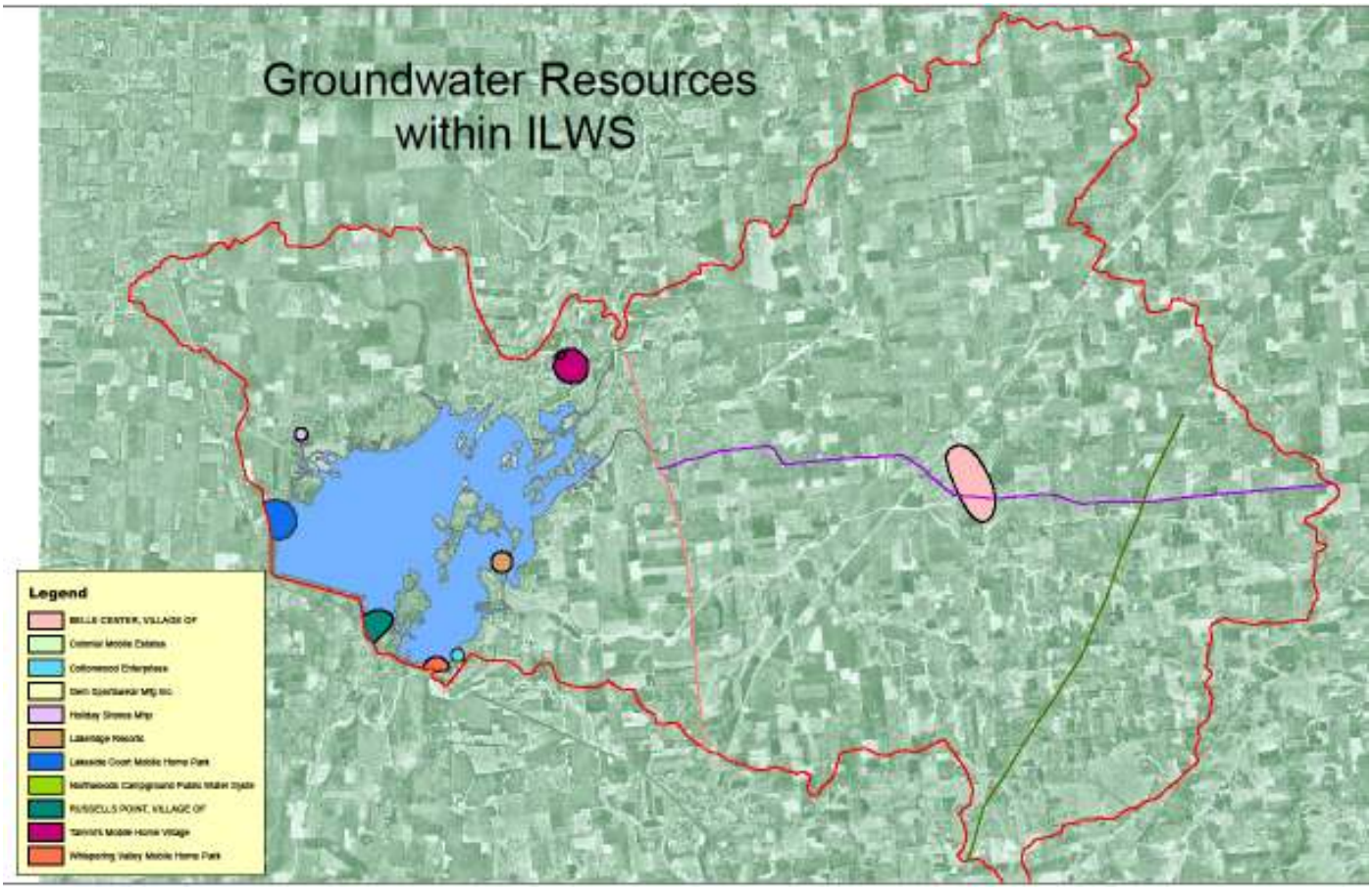
This was not only an environmental concern but also an economical concern from increased sediment needing to be removed from the lake by dredging to higher than normal crop losses. By doing a snag and clear of approximately a 7 mile segment of South Fork in 1999, out of bank flooding has virtually been eliminated along this stream. This portion of the channel is now maintained by the Logan County Engineer's office. In addition, in 2006 the Logan County Solid Waste District removed debris in and along approximately 3 miles of the North Fork located in Logan County. When flooding or ponding of water now occurs, the excess water in the flood plain area is because of the inability of tile to handle the excessive amount of rainfall timely or the soil type does not allow for adequate absorption. These streams' segments no longer overflow the banks each time it rains and the headwater tributaries that flow into these two streams have also had out of bank flow reduced since these two snag and clear projects have been completed.

Groundwater Hydrology

Indian Lake is located on the northern end of the Great Miami Valley aquifer system. The extensive groundwater aquifer system extends south from Indian Lake to Dayton, Ohio, and beyond supplying groundwater needs for hundreds of thousands of people in this region. The buried valley aquifer is one to two-and-a-half miles in width and 70 to 230 feet in depth. The aquifer is sand and gravel with inter-bedded silt and clay and occasional boulders. The source of recharge to the buried valley aquifer system

is infiltration from surface water bodies (including Indian Lake) overlying the aquifer. This suggests Indian Lake and the headwater streams may have a significant recharge function to the aquifer system. According to the groundwater resource maps from ODNR, Division of Water, wells in the watershed area average five to 15 gallon per minute pumping rate. There are no major irrigating systems in the watershed or heavy withdrawals by any manufacturing industry. The main water draw is private wells, municipalities and the state park scattered throughout the watershed. Although there are seven municipalities within the watershed, no municipal community water system Source Water Assessment Plan (SWAP) has been endorsed at this time.

Clean, safe drinking water is essential for human, wildlife, plant and aquatic communities to thrive. The Miami Valley's ground water resource is a great asset. The water supply — both groundwater and surface water — provides an abundant natural resource for industry, business and agriculture leaving ample for future economic growth and development. **Nearly all the residents living throughout the Miami Valley obtain drinking water from a huge underground aquifer that with an abundant supply of high quality water**. This groundwater aquifer is linked to the region's surface waterways, with water flowing between each other during periods of low and high flows. Indian Lake and its tributaries are believed to be a major source of recharge for this large underground aquifer system. Therefore, maintaining good water quality at Indian Lake is very important to the lives of over 1 million residents in the Great Miami River Watershed area. **(See Appendix I for a full size map of Groundwater Resources.)**



Point Source Pollution

There are two (2) mining companies and two (2) trucking companies that operate within the watershed. These industrial operations are constantly monitored by Ohio EPA, Bureau of Mines and other regulatory agencies. They are not a source of known pollution or discharging pollutants into the ILWP surface waters. One trucking company is nearly a mile from North Fork and a grass waterway carries excess runoff from the terminal area.

Septic Systems

Although over 99.9% of the homes immediately around the lake and in Belle Center have been hooked up to the sanitary sewer system **(See Appendix 1 for full-size map of Sanitary Sewer System)**, there are approximately 750 households or nearly 3,000 residents of the watershed that still rely upon on-site septic systems. The Amish community account for approximately 55 homesteads and over 400 residents that still use septic tanks and leach fields. OSU-Extension Hardin County has preformed well water quality testing for most of the Amish households. Their findings have shown that it is a rare occurrence for an analysis to come back positive for any problems with an Amish well in this part of Logan County. The Auglaize, Hardin and Logan County Health Departments have also done a good job of educating homeowners on not only the need to cleanout their septic systems regularly but also providing homeowner guides to potential purchasers of land. According to Logan County Health Department officials, less than one half of one percent of the 3,000 household septic systems could be classified as failing.

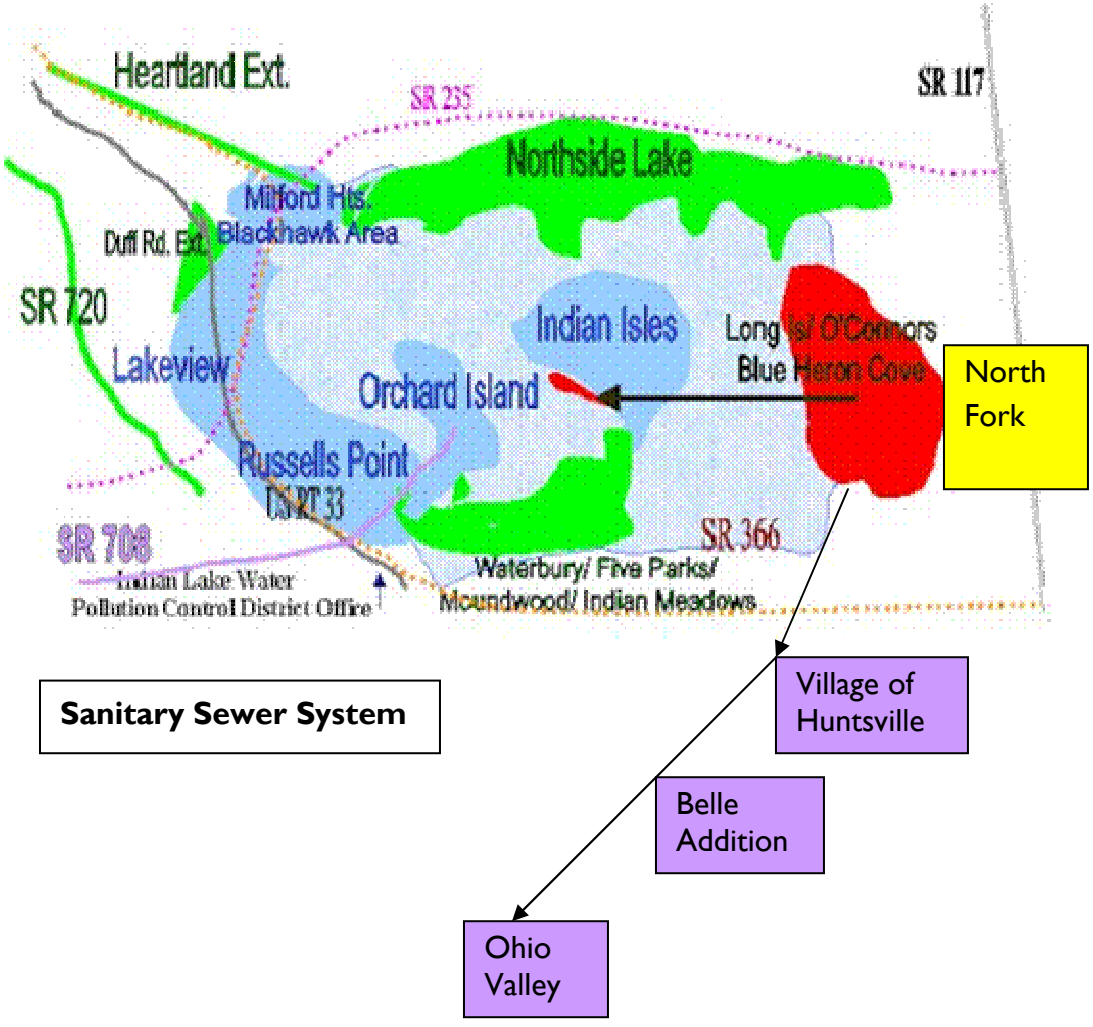
The Indian Lake Water Pollution Control District web page shares the following history of public sanitation in Logan County: "The Indian Lake Water Pollution Control District was formerly known as the Indian Lake Sanitary Sewer District. The original sanitary sewer district which was formed in the late 1930's was comprised of the Russells Point and Orchard Island areas. In the late 40's and early 50's the sanitary sewer district was expanded to include the Village of Lakeview and the chain of islands known as "the Indian Isles" which is comprised of Minnewauken, Tecumseh, Miami, Sunset, Sunrise, Cranetown, Seminole, Shawnee and part of Lake Ridge Islands.

In the early 1980's the sanitary sewer district was expanded yet again to incorporate the northern shores of Indian Lake which includes the Chippewa Park, Island View, Avondale, Sassafras Point, Turkeyfoot and King's Landing areas along with the Five Parks Allotment, Five Parks Addition, Waterbury, Smith Addition, Dunn's Pond, Bergs, and Putterbaugh allotments including the Tracey Farm Addition of Washington Township on the opposite shore.

The early 90's saw the addition of Long Island, O'Connor's Point and the Blue Heron Cove area of Lake Ridge Island. Our latest addition has been the North Fork Area by Long Island Shores on State Route 117. It was during this project that the Village of

Belle Center built their own sanitary sewer collection system and connected their system to the county's sanitary line so as to provide a source for discharging to the Indian Lake Treatment Plant facility. The Village maintains their own collection system.

The Logan County Commissioners in the late 90's acquired the treatment plant facility of the Transportation Research Center (TRC). The treatment plant was renamed the Flat Branch Water Pollution Control District and was so named for the Flat Branch tributary into which the plant effluent water flows. It was at this time the Logan County Commissioners established the LOGAN COUNTY WATER POLLUTION CONTROL DISTRICT. Recently we expanded the District to include the Village of Huntsville, Bell Addition, Shady Knolls Subdivision, Ohio Valley Park, Nash Finch (formerly Super Foods) and the County Road 130 corridor."

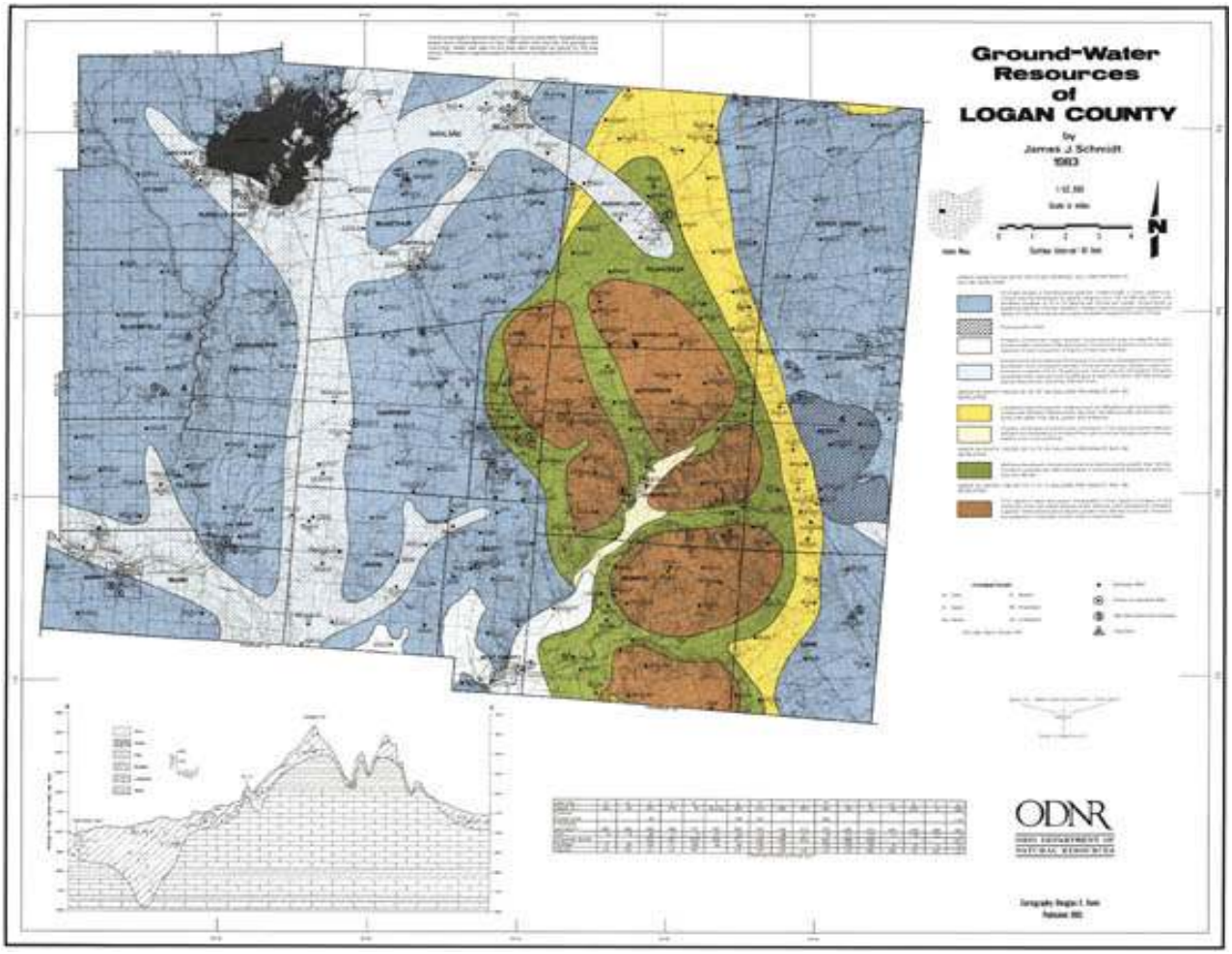


Areas within the sewer district. Image courtesy Logan County Water Pollution Control District.

Storm Water

Due to the relatively flat topography and that all runoff feeds naturally toward Indian Lake, storm water management in urban areas becomes "get excess water to the lake as fast as you can". These waters carry not only soil but pollutants that may be found from lawn treatments, driveways, parking lots, etc. directly to the lake often in specifically designed channels. With both the increasing number of full time residents and the increasing number of visitors annually, the need for storm water management is more apparent than ever. Pollution flowing directly into Indian Lake is rising at an alarming rate with no intervention by either local township zoning or through land use planning efforts by the county. Logan County's erosion regulations lack specificity and ample authority for the County Engineer to enforce construction erosion regulations.

Figure 3: Ground-Water Resources of Logan County



Ground Water Pollution Potential

A ground water pollution potential map and report for Logan County was published in 1995 by the Water Resource Section of ODNR using DRASTIC mapping process. The purpose of the report and map is to provide a tool to assist in ground water protection efforts when making future land use decisions.

This report indicates a high pollution potential index on the areas immediately east and northeast of Indian Lake and along the river corridors of both the North and South Fork Rivers. Most of these areas are devoted to either cropland or pastureland production and encompass our targeted areas of this WAP. The relative pollution potential indicated for these areas ranges from 160-170 primarily over a hydrogeologic setting of 7D for a buried valley. Within this area, the 7D 10 setting is most prevalent for the **DRASTIC** indices.

Table 4: DRASTIC Indices

FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15 feet	5	9 feet	45
Net **R**echarge to Aquifer	4-7 inches/year	4	6 inches	24
Aquifer Media	Sand & Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2% slope	1	10	10
Impact of Vadose Zone	Sand & Gravel w/significant Silt & Clay	5	6	30
Hydraulic **C**onductivity	700-1000 gallons/day/square foot	3	6	18
	Ground **W**ater **P**ollution **P**otential Index			160

Glacial geology of the area indicates lacustrine deposits in the area now occupied by Indian Lake. Ground water in the watershed area is obtained from either the bedrock formations or glacial deposits. The hydrogeology provides the potential for high yielding aquifers as is exemplified by the city of Russells Point with a well that produces over 530 gallons per minute. Properly constructed and developed, large diameter wells in the area are capable of supplying upward of 1000 gallon per minute.

Land Use

These three sub-watersheds are similar in the types and proportions of current land uses (see Table 5). Crop production is the dominant agricultural land use (principally corn, soybeans and wheat), followed by livestock pasturing (dairy and beef operations). These agricultural land uses comprise approximately 89 percent of land use in all three sub-watersheds. Impervious surface area is estimated to be one half of the urban surface area resulting in 0.7 % for the North Fork, 1.3%for the South Fork, and 4.5% for the Van Horn/Black Hawk sub-watershed.

Two quarry operations and a small commercial trucking operation all located in the South Fork sub watershed comprise the limited industrial land use in the Indian Lake Watershed. Indian Lake State Park consists of approximately 968 acres of land and nearly 5800 acres of water. Most of the land is either partially wooded or used as dredge material relocation areas (DMRA).

Table 5: Indian Lake Watershed Land Use by Sub-Watershed

Land Use	North Fork		South Fork		Van Horn, Black Hawk & Indian Lake	
	Acres	%	Acres	%	Acres	%
Cropland	14,600	79.2	25,517	78.5	5,212	74.1
Pasture	1,991	10.0	3,446	10.6	668	9.5
Urban	258	1.4	845	2.6	626	8.9
Forest	1,493	8.1	2,503	7.7	471	6.7
Water	0	0.0	33	0.1	0	0.0
Open/Other	74	0.4	195	0.6	42	0.6
Totals	**18,416**	**---**	**32,539**	**---**	**7,019**	**---**

Agriculture

Soil erosion was identified in the original watershed action plan as a serious problem in the watershed due almost entirely to intensive agricultural practices on erodible soils. The Auglaize, Logan and Hardin SWCD report now that sheet and rill erosion is no longer a major contributor of sediment to the water courses upstream of Indian Lake. The majority of the soils in the watershed are being farmed using approved best management practices that have reduced annual soil loss estimates to at or below the tolerance level for all soil types.

Prior to the beginning of ILWP, agricultural producers had traditionally used conventional tillage practices which involved fall plowing and leaving the soil surface unprotected through the winter and spring months. Because these soils characteristically have high surface water runoff rates, the use of conventional tillage systems on moisture-saturated soils led to large amounts of soil transported off agricultural fields.

In a statewide report on Ohio soils by NRCS (1988) the watershed ranked seventh in the number of soil tons eroded in excess of twice the allowable rate (T), and sixth in

the number of soil tons eroded in excess of twice the allowable rate (2T). Overall, the watershed ranked sixth statewide for combined cropland erosion and erosion from all sources.

There has been no significant change in the acres cropped or the crops raised since the inception of ILWP in 1990. Farmers including the Amish farmers have adopted many of the recommended water quality best management practices that ILWP has demonstrated including conservation tillage, livestock exclusion from streams and intensively grazing livestock to maximize economic benefits.

The economic stability of the majority of the watershed area remains agricultural production operations. The physical features of the watershed are best suited for agricultural production. The economic contribution of agricultural production to the tri-counties is illustrated in Table 6.

Table 6: Economic Importance of Agriculture To the Indian Lake Watershed *

	Auglaize	Hardin	Logan	Indian Lake Watershed Total
Total Acres	211,000	244,000	219,000	--------
I.L. Acres Share **I.L. Acre Share %**	**2,542** **1.20%**	**17,685** **7.25%**	**37,259** **17.01%**	**57,486** **crop acres**
Total Ag Products **I.L. Ag Products Share ****	$105,000,000 **$ 1,260,000**	$116,000,000 **$ 8,410,000**	$ 66,000,000 **$11,227,000**	**$20,897,000/yr.**
Total Crop Products **I.L. Crop Products Share**	$ 60,000,000 **$ 620,000**	$ 61,000,000 **$ 4,423,000**	$ 46,000,000 **$ 7,825,000**	**$7,875,000/yr.**
Total Livestock Products **I.L. Livestock Prod. Share**	$ 45,000,000 **$ 999,000**	$ 55,000,000 **$ 3,987,000**	$ 20,000,000 **$ 3,402,000**	**$8,388,000/yr.**
Average Size Farm in I.L.	**211 acres**	**294 acres**	**213 acres**	**239 acres avg.**

* Data by county from 2005 Ohio Department of Agriculture Annual Report and Statistics
**Used percent of Indian Lake Acres/Share all other dollar amounts

Forest

The number of acres of forested land, although remaining a significant land use, has declined steadily since the 1987 National Resources Inventory (NRI) estimates were made. Forest cover in each of the tri-counties proportions of the watershed are the following: Auglaize-1%, Hardin-3%, Logan-4%. The forest cover for the entire county is as follows: Auglaize-5%, Hardin-7%, Logan-13%.

Most of the forest cover loss in the watershed has occurred mainly because of the increasing number of acres in cultivation. However, some previously forested land

has been cleared for new residential development since 2000 and more development is expected in the next few years. ODNR-Division of Forestry staff reported an increase of forest land during 1990 - 1995. This increase of tree and forest establishment in the watershed was due primarily to either incentive programs offered through the project or CRP.

Residential

The largest area of residential use (approximately 845 acres) occurs in the South Fork sub-watershed containing the towns of Belle Center, Yelverton, New Richland, and Northwood. The villages of Lakeview and Russells Point adjacent to the Van Horn/Black Hawk sub-watershed comprise the next largest area (626 acres) of urban land that lies within the watershed. The village of Russells Point encompasses many residences that are located on islands.

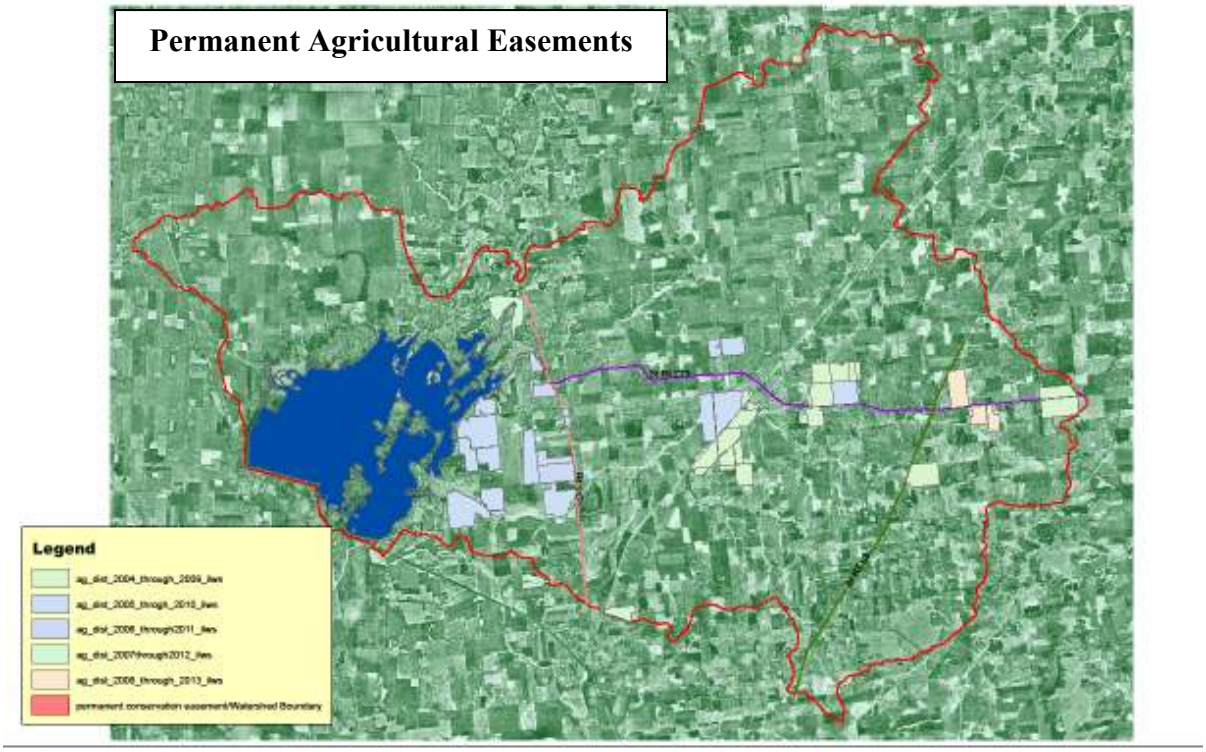
The resident population of the area immediately around Indian Lake, defined as the combined 1980 populations (OHEPA data for 1990 and 2000) of the townships bordering the lake, is 8,944. The villages of Russells Point and Lakeview, although outside the Indian Lake watershed, border the lake and together comprise approximately 25 percent of the lake resident population.

Although a net population loss is projected for Logan County through the year 2015, the resident population of the Indian Lake area is expected to increase. Plans are currently being discussed for a medical treatment facility, resort hotel and other infrastructure that will support the anticipated growth and tourists visiting the area. Additional residential developments are also proposed which would lead to the expansion of current roadways. One development in particular would require reconstruction of an existing bridge in order for boat traffic to reach the development.

Construction on the future site of a Recreational Vehicle Campground.

Protected Lands

The Project has worked with area agricultural producers to obtain permanent protection from land development in the form of easements **(See Appendix 1 for full map of Permanent Agricultural Easements)**. The Carson family has made such a donation on 8.3 acres of farmland. The Project is also working in conjunction with the Logan County Land Trust to promote the preservation of farmland for its benefit to water quality.



Permanent agricultural conservation easements by plan year within the Watershed boundary.

Indian Lake State Park

Indian Lake State Park (ILSP) features the 5800 acre Indian Lake **(See Appendix I for a full map of the lake and state park areas)** but also includes over 950 acres of adjacent acres. Nearly 300 of these acres have been enhanced with camping amenities, hiking trails, parking lots, etc. The other 650 acres are reserved for dredge material relocation areas or remain in a natural state providing water quality protection to Indian Lake. Indian Lake is an important resting stop for migratory birds such as Canada geese, ducks, grebes, swans, egrets and herons. Bald Eagles have been seen in the area in recent years but no confirmed nesting has occurred here.

ODNR has partnered with ILWP on numerous efforts in the past including the construction of three wetlands, educational programming at the Nature Center, native grass establishment plots, wildlife habitat enhancement areas and shoreline protection efforts.

ODNR plans to continue to recreate and reclaim wetlands, acquire adjacent property as the opportunity arises, expand its shoreline protection efforts to include all dredge material reloation areas and those shoreline areas most exposed to wave action from wind and power boating and review existing policies relevant to lake usage and dredging to determine if revised policies in either case could improve water quality.

Each of the tributaries has been monitored by representatives of the University of Dayton, Biology Department, over the past four years. Although the students are not Water Quality Data Collectors as certified by the Ohio Lake Management Society and Ohio EPA, their findings are of significance. Their conclusions to date support that South Fork of the Great Miami River, North Fork of the Great Miami River, Van Horn and Black Hawk creeks each have produced and are capable of supporting numerous and diverse populations under normal circumstances. Unfortunately in 2002 this area of the state experienced well below normal rainfall levels causing 3 of the 4 tributaries to completely dry up during the summer and late fall. The level of the lake was reportedly down 16-18" below normal at times drastically curtailing many summer recreational activities, marooning boaters that chanced unknown shallow waters and prevented many waterfront property owners from being able to access the lake at all.

University of Dayton students prepare to monitor the Black Hawk tributary.

Wildlife

Table 7: Biological Features

Biological Indicators	South Fork Great Miami River	North Fork Great Miami River	Black Hawk and Van Horn Creeks Including Indian Lake
Fish			Over 70 fishing tournaments annually at Indian lake
Invertebrates*	7-27 species	5-19 species	3-19 species
Mammals	deer, raccoon, squirrel, muskrat, beaver, fox, skunk, opossum,	deer, raccoon, squirrel, muskrat, beaver, fox, skunk, opossum,	deer, raccoon, squirrel, muskrat, beaver, fox, skunk, opossum,
Birds**	Surveys resulted in 33 different species being observed over 3 year span	Surveys resulted in26 different species being observed over 3 years	No surveyed sites.
Reptiles/Amphibians	Frogs, toads, snakes, salamanders	Frogs, toads, snakes, salamanders	Frogs, toads, snakes, salamanders
Plants	Bottomland hardwood forests, reeds, marsh grasses	Mostly non saleable trees in narrow riparian corridor, few areas suitable for hydrophytic vegetation.	Marsh grasses, reeds, cattails near the lake. Not much plant life along Van Horn corridor although there are extensive filter strips. Black Hawk has 40+ Ac of wooded area within ½ mile of mouth of river.
Other			

*Surveys completed by University of Dayton, Professor Daniel Klco and his students on each of the 4 tributaries from 2003-2007 and by ILSP Naturalist at Nature Center Wetlands since 2009 using EPA Guidelines following extensive training to ensure both credibility and consistency of data and sampling techniques. Over 60 samples have been observed. Water levels, storm events, time of year, all seemed to contribute to the number of different species present but no consistent numbers can be predicted. Additional testing will be preformed on an as needed/where needed basis if deemed necessary for future programming efforts.
**Surveys Completed at Intensive Grazing Site (South Fork sub watershed) and Restored Wetlands Site (North Fork sub watershed) by J P Haber from 1998 to 2000.

Wildlife Habitat

This part of the state is abundant with a diversity of birds, fish and other wildlife because of our proximity to Indian Lake and the water quality of Indian Lake. The Indian Lake State Park staff has worked diligently to compile an inventory of birds, animals, and plants within the watershed. **(See Appendix III for a full listing of the inventory.)** The following species are rare, threatened, or endangered species known to make their home in the area: American Bittern, Black Tern, Yellow-Bellied Sapsucker, Golden-Winged Warbler, Bald Eagle, Northern Harrier, Peregrine Falcon, and the Spotted Turtle.

Since a significant portion of farmers have adopted no-till, the additional residue and cover, especially over the winter, provides thousands of acres of improved habitat and food sources. In addition, this county has had a strong Conservation Reserve Program (CRP) since its beginning in 1986. Many of these acres are still in CRP. This continuity of increased food and habitat for many different wildlife species has greatly diversified and significantly increased wildlife in the watershed area. Indian Lake is regularly stocked with several species of fish by ODNR. Over 70 fishing tournaments are held here annually, some drawing nationally recognized anglers.

Cultural Resources

The Indian Lake Watershed area is home to numerous sites of historical, cultural, and recreational significance. One member of the Indian Lake Watershed Project set out in January of 2008 to capture the significance of these areas in a book entitled, *Indian Lake-A View from the East Side*. This composition by Chick Heithaus carefully draws together a beautiful picture of the watershed land and history. The Lewistown Reservoir was approved by the state legislature in the 1850s to supply water for the Miami-Erie Canal. This act connected the six existing lakes known as Old Indian Lake, Black Lake, Otter Lake, Sheep Pen Lake, and Buckwheat Lake. Although the era of canal travel would be short-lived, the legacy of the lake would live on. By the turn of the century, Indian Lake had become home to a cultural resort haven. The area was known for fishing, swimming, and boating of all kinds. In 1924 the Sandy Beach Park amusement park opened for business. The park featured roller coasters, beach areas, landscaped gardens, and dancing halls. Numerous big bands played on the stages over the course of many years. The Long Island Golf Course was also home of much recreating during its high season. In 1949 Indian Lake State Park was designated as one of the first state parks under the newly formed Ohio Department of Natural Resources.

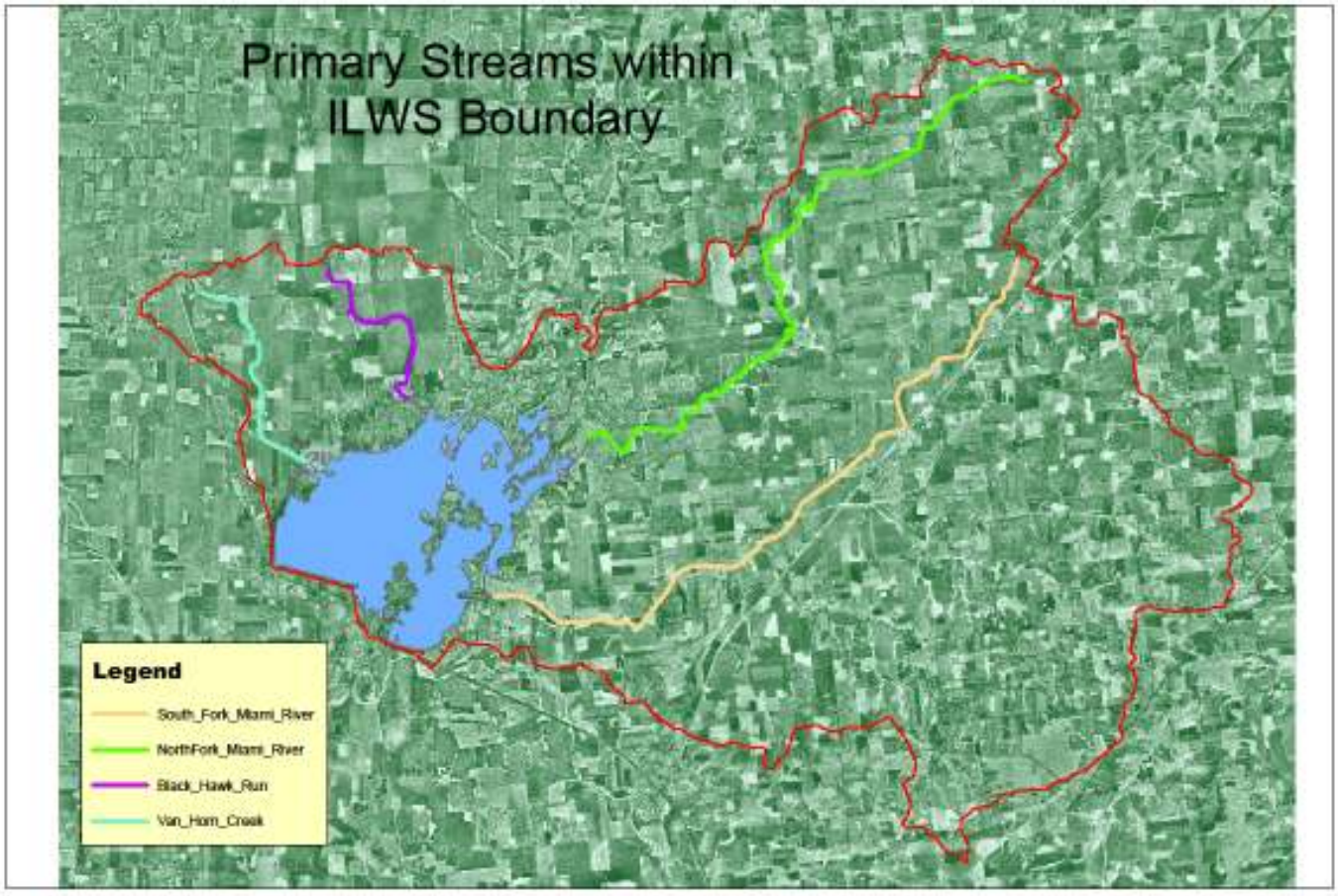
Fishing at Moundwood Channel. Courtesy Greg Freitsig

Today, Indian Lake State Park is one of Ohio's premier state parks. The park boasts marinas, campgrounds, hiking trails, and a paved bicycle path. Fishing has become a keystone for the lake. It has now become the most popular inland bass tournament location in the state, according to the Division of Wildlife's Annual Report. Indian Lake State Park also holds cultural significance for the countless families that make the annual trip to observe the Fourth of July firework celebration over the water.

Fourth of July festivities are enjoyed by thousands of visitors.

Without the Indian Lake State Park and its many amenities, the Indian Lake Watershed Project would not be able to garner such a widespread net of support. The cultural, historical, and recreational value of the lake is priceless.

Habitat Modification Inventory



Channel and Floodplain Conditions

During recent years this area has been subject to several severe storm events with over 3 inches of rain within a 24 hour period. Since most of the areas near the lake are relatively flat, these areas are subject to ponding waters and saturation of the soils. Ditches, streams and tile run full but little out of bank flow is experienced. When out of bank flow has occurred, its duration has usually been for less than 24 hours thus reducing cropland erosion. The lake's high water level is controlled by the height of the dam at the spillway. Although there are flood gates installed, the water level of the lake has remained fairly constant for nearly 20 years.

Although much channelization has occurred throughout the watershed, most stream banks are now stabilized with grass and trees. The riparian corridor width varies from nearly non existent where intensive farming is occurring on both sides to areas nearly 1 mile in width. In some of the intensively cropped areas, many farmers have installed and maintained permanent filter strips. Both grass and tree filter strips are being maintained along many of these corridor areas.

Since most of these areas are no longer subject to frequent flooding, scour erosion caused by out of bank flow is no longer considered to be a major concern or source of lake sedimentation. Stream banks are healing as most livestock has been excluded from the streams including those on the Amish farms.

A streambank exclusion project in action.

Indian Lake Shoreline

Indian Lake has over 29 miles of shoreline plus another approximately 14 miles of shorelines from the 69 islands which contribute directly to both sedimentation and turbidity of the lake. Shoreline erosion is created by wave action from both water craft and the wind. Of the 69 islands, ten are Dredge Material Relocation Areas (DMRAs). Shoreline protection measures are being put into place by the State Park annually on State Park lands and DMRAs to reduce lake sedimentation but many State owned areas remain unprotected.

Approximately seven miles of shoreline are in immediate need of additional erosion control and stabilization practices. Most of these adversely affected areas generally either have a westerly exposure to the lake where wind erosion is more prevalent or are in high boat traffic areas for either launch/dock purposes or productive fishing sites. These areas are both privately and publicly owned.

There are also many areas around the lake which currently have stabilization practices (rip rap, break walls, bulkheads, etc.), both public and privately owned, which are in need of maintenance or repair to reduce future adverse water quality impacts.

Entrenched Shorelines

Nearly all of the entrenched areas have been created by either ODNR to better enable viewing a wildlife preserve area of the state park or by private developers to expand water access to the lake. Recent water quality improvements at Indian Lake have increased interest in permanent home construction and recreational vehicle sites with water access at a premium for both types of new development. Many of these newly entrenched shorelines have concrete bulk heads being installed to reduce erosion. Little consideration is being given to wildlife, fish habitat, etc. in their design and construction. Approved plans often are not being followed allowing for the potential of excessive sedimentation.

Riparian Corridor

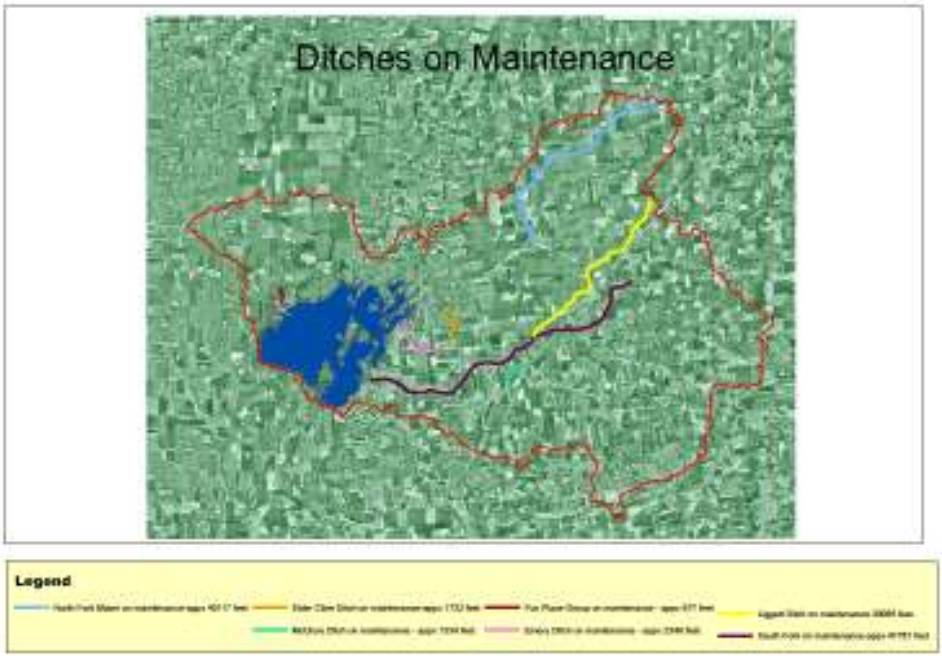
The land directly adjacent to, or surrounding, a waterway, including the rivers and streams, intermittent or ephemeral, ditches and drainage areas where surface water collects, wetlands, and lakes and ponds is the riparian area. These lands extend from the edge of the waterway onto adjacent land area. The width of the riparian area ranges from very narrow to a wide, densely vegetated corridor, with width dependent on location and the adjacent land use.

In the 1995 plan, 10 miles of severely eroding streams were identified in Logan County alone. Since that time most of the Amish farmers have excluded their livestock from the creeks in the South Fork sub watershed. Between the livestock exclusion and the logjam removals, stream bank erosion has been significantly reduced and previously lost riparian area vegetation has naturally regenerated and healed most areas. Only 2 or 3 Amish farmers now graze stream banks and usually it is only intermittently during the year.

In addition to livestock exclusion, most Amish farmers have adopted intensive grazing techniques they learned from an intensive grazing demonstration project that this project conducted for 8 years. Several Amish have installed manure storage facilities that prevent manure from entering the rivers directly and allow for more timely applications. Some of these are covered to better ensure water quality improvements. These measures on Amish farms have all been installed without cost-share assistance as their Church doctrine prohibits them from accepting government subsidies.

Maintained Ditches

There are approximately 124,035 linear feet of ditch on permanent maintenance within the three counties that comprise the watershed. **(See Appendix I for full-size map of ditches on maintenance).** Roughly forty percent of this amount is the Logan County portion of the South Fork tributary which was placed on maintenance after the snag and clear project of 2006.



Sub Watershed Attributes

Attributes	South Fork 05080001- 010-020	North Fork 05080001- 010-010	Black Hawk and Van Horn 05080001- 010-030
Early settlement conditions	Meandering creeks with mostly forested land	Meandering creeks with mostly forested land	Swampy with mostly prairies except on islands
Channel and Floodplain Condition	Over 80 percent channelized with 8 miles under County Engineer's maintenance program. Floodplain has been drained with few natural wetlands remaining.	Nearly 90 percent channelized with all but 1 mile under County Engineer's maintenance Program. Extensive drainage of wetlands.	Totally channelized but no county maintenance. Most wetlands areas have all been drained.
Forested Riparian Corridor assessment	Estimate 25% of banks have no trees.	Estimate 30% of banks have no trees.	Estimate 50 % of banks have no trees.
Number of miles with forested natural riparian buffer	18	6	1
Number of miles with permanent protection	1	1	0
Miles of natural channel	12	4	0
Dams	1(low head)	0	0
Channelization	Yes	yes	yes
Streams with unrestricted Livestock access	<1 mile	<1 mile	none
Eroding banks	6.2 mi.	2.1 mi.	<.5 mi.
Floodplain Connectivity	Yes	yes	yes
Riparian levees	Yes	partially	none
Entrenched miles	<1 mile	<1 mile	7-8 miles
Threatened miles	<1 mile	<1 mile	3-4 miles
Full attainment			
Point sources	Belle Center was linked to the ILWPCD sewer system in 2003. There are no confined feed lots or factories that discharge into this sub watershed. There are 2 large quarries and a small truck terminal located in this sub watershed.	There are no confined feed lots or factories that discharge into this sub watershed. There are no villages or towns in this sub watershed.	There is one confined feed lot of approximately 200 head annually but no factories that discharge into this sub watershed. All of the developed areas both incorporated and unincorporated have been sewered. There are 3 marinas at Indian lake.

Water Resource Quality

Table 8: North Fork of the Great Miami River – 05080001- 010 – 010

ATTRIBUTE	TOTAL UNITS
TOTAL STREAM LENGTH	12.2
TOTAL MILES OF TRIBUTARIES	44.8
CHANNELIZED STREAM MILES	29.8
MILES LEVIED	None
LOW HEAD DAMS	None
MAINTAINED PETITION DITCH	31 miles
RIPARIAN BUFFER PRESENT	Intermittently
LIVESTOCK OPERATIONS NEEDING IMPROVEMENTS	1
AMOUNT OF SUBSURFACE DRAINAGE INSTALLED	Considerable
IRRIGATION USED	Minimal, small-scale vegetable growers
NUMBERS OF BEEF CATTLE	125 a.u.
NUMBERS OF DAIRY	None
NUMBERS OF HOGS	300 a.u.
NUMBERS OF HORSES	17
NUMBERS OF OTHER LIVESTOCK	Approx. 40 sheep, goats, alpacas and other exotics.

Location

North Fork of the Great Miami River enters Indian Lake just south of Long Island. It extends northeast into Hardin County for a distance of 12.2 river miles. There are at least six tributaries to North Fork and numerous grassed waterways with tile mains that outlet into water courses within this sub watershed.

Grassed waterway. Courtesy NRCS photo file

Livestock

There are two farms identified as commercial livestock enterprises. Both have voluntarily excluded or confined their livestock from named and/or blue lined streams to reduce stream bank erosion and improve the water quality of Indian Lake. All other livestock in this sub watershed are randomly scattered 4-H or FFA animals or owned by hobby farmers. A very small number of these livestock producers are known to allow their livestock to regularly frequent the North Fork of the Great Miami River or any of its tributaries.

Grain Farming

Nearly 80 per cent of the sub watershed acreage is devoted to grain crop production, namely corn, soybeans, and wheat. Traditional agricultural practices utilizing chemical application for control of pests, weeds, and fungus are implemented throughout the subwatershed. Our tillage transect information, which estimates the percentage of crop production using various tillage methods, indicates 100 percent of the wheat and soybeans in this sub watershed are planted using no-till planters.

Wildlife Habitat

The habitat though significantly lessened provides adequate diversity along over 80 percent of the stream banks where there is continuous flow. The riparian corridor in these areas varies from 20' to over 200' in width. Few exceptional hardwood stands remain but some secondary growth have canopies 70-90' tall. Other less desirable trees also provide bank stabilization, carbon dioxide sequestration and/or food and habitat for wildlife.

Prior Accomplishments

During the past 15 years a two mile long filter strip was established on one of the two farms with livestock. Although the creek is still used as a source of water, livestock are limited to four areas to cross and obtain water. Each crossing area has been improved to minimize stream bank erosion and prevent livestock from gathering there after they have obtained water. Numerous other farmers installed grassed filter strips utilizing EPA 319 funds. No till farming is prevalent throughout the entire sub watershed regardless of the crop being produced. In recent years most of the larger farmers with on farm storage of fuel and chemicals have installed secondary containment facilities to lessen the chances of an accidental spill.

Grassed filter stip.

Sediment

Sediment delivered from this sub watershed to Indian Lake is believed to have been reduced by nearly 80 per cent based on increases in water clarity, the frequency of dredging the silt traps near the mouth of the rivers where they empty into Indian Lake and the number of additional acres converted from conventional tillage to conservation or no-till.

The 1988 Ohio EPA study, using Ohio Capabilities Analysis Program results, estimated the overall watershed delivery rate o Indian Lake is approximately 19 per cent.

Estimated soil erosion from sheet and rill sources based on the estimated sediment delivery is expressed in Table 9.

Table 9: Estimated Sheet/Rill Erosion and Sediment Delivery Rate

YEAR	Soil Erosion in Tons/Yr*	Percent Reduction
1990 Sheet and Rill Erosion	84,350	--
1990 Sediment Delivery Rate	16,026	--
1994 Sheet and Rill Erosion	43,500	48%
1994 Sediment Delivery Rate	8,265	48%
2000 Sheet and Rill Erosion	32,450	62%
2000 Sediment Delivery Rate	6,090	62%
2006 Sheet and Rill Erosion	30,665	64%
2006 Sediment Delivery Rate	5,769	64%

*The 1990 baseline data was estimated through the National Resource Inventory and Ohio Capability Analysis Program for sheet, rill and gully erosion. Sheet and rill erosion in 1994, 2000 and 2006 were approximated from Indian Lake tillage and crop residue data. All calculations were then made using the Universal Soil Loss Equation (USLE).

Recreational Use

Recent expansion in the number of boat docks and camping facilities near State Route 117 has generated an increased usage of the lower part of this river corridor as an access route by boat to Indian Lake. Otherwise, this non navigable stream upstream of State Route 117 is limited to a few canoes and bank fishing, hunting and rapping.

Wetlands

The North Fork sub-watershed contains 200.8 acres of wetlands. Emergent wetlands comprise 95.4 acres. The remaining105.4 acres are classified as forested or shrub wetlands.

Stream Biology

The University of Dayton, Biology Department, has been contracted to provide essential water qualitysampling data since 2003. The report dated February 2006 indicates the water was too deep in some streams to safely perform the exercise on the date of their visit, but prior macroinvertebrate counts yielded a water quality rating of "poor" primarily because of slow moving water due to a downstream logjam. The logjams in this portion of the stream were removed in July of 2006 by the Logan County Solid Waste District using a Department of Labor grant The upper end of North Fork located in Hardin County is under county maintenance with the Hardin County Engineer's office. This logjam removal project is expected to

reduce the frequency of out of bank flow and the duration of out of bank flows that do occur.

One of many logjams removed in 2006.

Table 10: Water Chemistry of the North Fork

Determination	Dissolved Oxygen Level mg/L	Nitrate Level mg/L	Water Temp.	Ph	Conductivity
April 2002	X	X	X	X	X
Sept. 2002	X	X	X	X	X
Nov. 2002	X	X	X	X	X
April 2003	9.2	0.0	45	6	X
June 2003	8.5	5.0	59	7	X
Sept. 2003	8.4	0.0	63	6	X
April 2004	13.0	2.8	62	N/A	X
July 2004	10.15	1.8	69	8.0	490
Sept. 2004	8.3	0.0	66	7.97	655
April 2005	15.5	2.4	58	8.09	400
July 2005	6.0	4.3	75	7.43	512
Sept. 2005	6.6	0.9	65	7.81	405
April 2006	10.8	0.6	45	7.59	478
June 2006	9.25	2.2	72	7.68	575
Sept. 2006	8.35	0.5	64	7.09	554
April 2007	13.57	0.5	43	7.68	332
May 2007	8.6	0.7	67	7.72	510
June 2007	9.24	0.4	70	7.52	480
Sept. 2007	7.66	0.0	66	7.56	485

Table 11: South Fork of the Great Miami River – 05080001- 010 – 020

ATTRIBUTE	TOTAL UNITS
TOTAL STREAM LENGTH	10.9
TOTAL MILES OF TRIBUTARIES	83.7
CHANNELIZED STREAM MILES	7-8 miles
MILES LEVIED	None
LOW HEAD DAMS	1 (located at Camp Wesley)
MAINTAINED PETITION DITCH	23.4 miles
RIPARIAN BUFFER PRESENT	Partially
LIVESTOCK OPERATIONS NEEDING IMPROVEMENTS	27*
SUBSURFACE DRAINAGE	Considerable
IRRIGATION USED	Minimal, small-scale vegetable growers
NUMBERS OF BEEF CATTLE	140 a. u.
NUMBERS OF DAIRY	565 a. u.
NUMBERS OF HOGS	350 a. u.
NUMBERS OF HORSES	252 a. u.
NUMBERS OF OTHER LIVESTOCK	65 a. u.

*24 of these are small Amish farms where noticeable improvement have already occurred.

Location

South Fork of the Great Miami River enters Indian Lake under a restored covered bridge located approximately one mile upstream of the Moundwood Marina area. This tributary originates in the rolling hills north of Rushsylvania nearly 11 river miles from the lake.

Livestock

Most of the Amish farms and several English farms have been identified having livestock in this sub watershed basin. Most livestock farmers including the Amish farmers have voluntarily excluded domestic livestock from this stream and its tributaries. There are a couple of notable exceptions that involve a few animal units on a periodic basis as there is no other way to obtain any economic use of these acres. Since most of these farms are Amish, the duration of the grazing time is short since most Amish farmers utilize an intensive or rotational grazing system similar to what ILWP demonstrated on the 92 acre CRP farm to minimize bank disturbance, habitat damage and other water quality concerns.

A demonstration Field Day at the Intensive Grazing Site.

Grain Farming

Approximately 78 per cent of the sub watershed acreage is utilized to produce primarily corn, soybeans and wheat. Traditional agricultural practices utilizing chemical application for control of pests, weeds, and fungus are implemented throughout the subwatershed. Some oats and other small grains are grown occasionally by the Amish farmers. Even with the Amish farmers, the annual tillage transect indicates that 100 per cent of the wheat is no-tilled. We know this is not quite true, but since the majority of the Amish farms engage in 5-7 year crop rotation, therefore, the Amish farming technology does not adversely contribute significantly to the long-term sedimentation problem of Indian Lake. A slightly higher percentage (84%) of soybean acreage annually is estimated being planted using no-till. Corn acreage, on the other hand, is slightly below 60 percent no-till in this sub watershed largely because the Amish farmers can not plant no till corn using horse drawn equipment.

Wildlife Habitat

Our Amish community is a strong supporter of wildlife habitat and since many of their farms are adjacent to one or more of the streams or creeks in this sub watershed, the habitat diversity is greatest in this sub watershed of the project area. Another contributing factor to enhanced habitat in this sub watershed is that the terrain is more rolling and not as suitable for cropland conversion for crop production.

Prior Accomplishments

Besides the highly successful conversion of farmers throughout the watershed to no till, more grant funds have been spent per unit over the past 15 years in this sub watershed than in the other two sub watersheds combined. In part, the educational aspects of grant funds were geared toward Amish farmers.

But more importantly, the original long-term plan identified this sub watershed as being the largest contributor of sediment to Indian Lake according to the 1988 SCS report.

Wetlands

The South Fork sub-watershed contains 208.6 acres of wetlands. Emergent etlands comprise 79.5 acres. The remaining 129.1 acres are classified as forested or shrub wetlands.

Sediment

The Indian Lake State Park personnel, that man the dredge daily in the summer, report that silt traps at the mouth of South Fork seldom produce a plume of sediment that stretches into the lake after a rain event. They say this is an indicator that there has been a sizable reduction in the amount of sediment being delivered to the lake annually. A reduction in the frequency of out of bank flow is credited with a significant proportion of this reduction due to the lessening of the amount of sheet erosion that typically occurs during storm events. Since the 2000 river clean out effort, there have only been two out-of-bank flows lasting more than 24 hours at two locations along a seven mile stretch from the covered bridge to Belle Center. One of these followed the ice storm of 2005 which was by all accounts a once in a life time occurrence. The debris from this event was removed before the normal spring rains by the Logan County Engineer's office since this area was under a maintenance agreement.

Watershed board members observe the dredging process close up.

Sediment delivered from this sub watershed to Indian Lake is believed to have been reduced by nearly 80 per cent based on increases in water clarity, the frequency of dredging the silt traps near the mouth of the rivers where they empty into Indian Lake, and the number of additional acres converted from conventional tillage to conservation or no-till.

The 1988 Ohio EPA study, using Ohio Capabilities Analysis Program results, estimated the overall watershed delivery rate to Indian Lake is approximately 19 per cent.

Estimated soil erosion from sheet and rill sources based on the estimated sediment delivery is expressed in Table 12.

Table 12: Estimated Sheet/Rill Erosion and Sediment Delivery Rate

YEAR	Soil Erosion in Tons/Yr*	Percent Reduction
1990 Sheet and Rill Erosion	304,983	--
1990 Sediment Delivery Rate	57,750	--
1994 Sheet and Rill Erosion	141,808	53%
1994 Sediment Delivery Rate	26,943	53%
2000 Sheet and Rill Erosion	111,063	63%
2000 Sediment Delivery Rate	21,102	63%
2006 Sheet and Rill Erosion	89,635	70%
2006 Sediment Delivery Rate	17,030	70%

*The 1990 baseline data was estimated through the National Resource Inventory and Ohio Capability Analysis Program for sheet, rill and gully erosion. Sheet and rill erosion in 1994, 2000 and 2006 were approximated from Indian Lake tillage and crop residue data. All calculations were then made using the Universal Soil Loss Equation (USLE).

Recreational Use

Due to the amount of fall and the shallowness of streams, boat traffic does not venture up the South Fork toward the covered bridge. However, each spring finds he white bass fishing enthusiasts lined up elbow to elbow near the covered bridge. With a number of the land owners adjacent to the stream being Amish, access to the stream is limited. However, the Amish hunt, fish and trap all along the riparian corridor.

Stream Biology

The University of Dayton initially began their Indian Lake water quality work at a site along this stream in the spring of 2002. Since then, the water quality ratings, based on the Master Watershed Stewards Guide, have been "Excellent" to "Fair" depending on their findings during each sampling visit. Although nearly eight miles of this stream is under county maintenance, the branch where this monitoring site is located is not under maintenance.

Table 13: Water Chemistry of the South Fork

Determination	Dissolved oxygen level mg/l	Nitrate level	Water Temp. (o) F	pH	Conductivity
April 2002			46		
Sept. 2002	7.6	3.8	68	7	
Nov. 2002					
April 2003	12.5	0.5	39	6	
June 2003	10.2	1.7	61	7	
Sept. 2003	9.6	0.8	58	7	
April 2004	11.6	1.7	57	7	
July 2004	8.0	1.3	66.2	8.03	699
Sept. 2004	10.1	0.2	59.9	8.09	687
April 2005	13.03	0.5	50.4	8.03	801
July 2005	7.75	0.8	75.9	7.75	811
Sept 2005	7.2	0.0	64	7.74	485
April 2006	13.7	0.1	50.5	8.07	398
July 2006	10.63	0.8	68.9	7.85	756
Sept. 2006	9.32	0	67.8	7.29	749
April 2007	13.85	0	45	7.65	385
May 2007	11.11	0.7	66	7.93	717
June 2007	10.48	0	72	7.91	811
Sept. 2007	9.77	0	68	7.85	785

Table 14: Black Hawk Creek, Van Horn Creek and Indian Lake including the Islands – 05080001- 010 – 030

ATTRIBUTE	TOTAL UNITS
TOTAL STREAM LENGTH	6.4
TOTAL MILES OF TRIBUTARIES	19.9
CHANNELIZED STREAM MILES	< 1 MILE
MILES LEVIED	None
LOW HEAD DAMS	None
MILES OF SHORELINE	29
MAINTAINED PETITION DITCH	8.4 miles
RIPARIAN BUFFER PRESENT	Limited
LIVESTOCK OPERATIONS NEEDING IMPROVEMENTS	None
SUBSURFACE DRAINAGE	Considerable
IRRIGATION USED	Marginal to None
NUMBERS OF BEEF CATTLE	None
NUMBERS OF DAIRY	None
NUMBERS OF HOGS	55 a. u.
NUMBERS OF HORSES	23
NUMBERS OF OTHER LIVESTOCK	None

Location

Known as the Black Hawk Van Horn hydrologic unit, this sub watershed area of 05080001-010-030 includes all the acreage that drains directly into Indian Lake. There are 69 islands in Indian Lake that make up part of this 7,019 acre watershed area. Most land on the north side of the lake is developed with summer homes and seasonal camping areas because it is not zoned. A small part of the incorporated residential area of Russells Point lies within this sub watershed. The balance of the area is intensively cropped.

Livestock

The only livestock farms identified in this sub watershed basin raise horses except for one small confined hog operation. All domestic livestock are excluded from the

streams and lake. Manure applications are not a contributing factor to water degradation in this sub watershed.

Grain Farming

Nearly 80 per cent of this sub watershed acreage is utilized to produce corn, soybeans and wheat. Traditional agricultural practices utilizing chemical application for control of pests, weeds, and fungus are implemented throughout the subwatershed. This subwatershed has the greatest percentage of no-till as there are no Amish farms in this sub watershed area.

Wildlife Habitat

The habitat diversity is least in this sub watershed of the project area. A contributing factor in this sub watershed is that the terrain is less rolling, less fence rows, and fewer miles of headwater streams as much of the acreage is tiled with only a few open ditches serving as a conveyance for excess water.

Prior Accomplishments

More miles of filter strips have been established and maintained since 1990 in this sub watershed than in the other two sub watershed areas. In ddition, a debris basin was constructed in partnership with a local lodge to provide flood protection for a number of homes near the lake.

The Indian Lake Chapter of the Eagles partnered with the Project to build the retention basin.

Sediment

Indian Lake State Park personnel periodically dredge the channels adjacent to Lucy's Pond leading back to Black Hawk Marina. Much of these soil deposits are believed to come from bank and shoreline erosion as there is a high rate of boat traffic and an extensive network of exposed banks in this part of Indian Lake. Again, a reduction in the frequency of out of bank flow has reduced the amount of stream bank erosion occurring.

Sediment delivered from this sub watershed to Indian Lake is believed to have been reduced by nearly 80 per cent based on increases in water clarity, the frequency of dredging the silt traps near the mouth of the rivers where they empty into Indian lake and the number of additional acres converted from conventional tillage to conservation or no-till.

The 1988 Ohio EPA study, using Ohio Capabilities Analysis Program results, estimated the overall watershed delivery rate to Indian Lake is approximately 19 per-cent.

Estimated soil erosion from sheet and rill sources based on the estimated sediment delivery is expressed in Table 15.

Wetlands

The Black Hawk Van Horn including Indian Lake sub-watershed contains 664.0 acres of wetlands. Emergent wetlands comprise 455.2 acres. The remaining 208.8 acres are classified as forested or shrub wetlands.

Table 15: Estimated Sheet/Rill Erosion and Sediment Delivery Rate

YEAR	Soil Erosion in Tons/Yr*	Percent Reduction
1990 Sheet and Rill Erosion	26,713	--
1990 Sediment Delivery Rate	5,075	--
1994 Sheet and Rill Erosion	14,692	45%
1994 Sediment Delivery Rate	2,791	45%
2000 Sheet and Rill Erosion	11,487	57%
2000 Sediment Delivery Rate	2,182	57%
2006 Sheet and Rill Erosion	10,952	59%
2006 Sediment Delivery Rate	2,081	59%

*The 1990 baseline data was estimated through the National Resource Inventory and Ohio Capability Analysis Program for sheet, rill and gully erosion. Sheet and rill erosion in 1994, 2000 and 2006 were approximated from Indian Lake tillage and crop residue data. All calculations were then made using the Universal Soil Loss Equation (USLE).

Recreational Use

Due to the lack of fall and the shallowness of streams in this sub watershed, there is no boat traffic beyond the ILSP boundaries. Bank fishing from private property is seldom observed.

Stream Biology

Table 16: Water Chemistry of Black Hawk Creek

Determination	Dissolved oxygen level mg/l	Nitrate level	Water Temp.	pH	Conductivity
April 2002					
Sept. 2002					
Nov. 2002					
April 2003	11.6	2.6	44	6	
June 2003	8.3	4.7	64	8	
Sept. 2003	6.8	0.0	59	7	
April 2004	9.9	3.2	67	6	
July 2004	8.4	2.3	64.8	7.86	565
Sept. 2004	N/A	N/A	N/A	N/A	N/A
April 2005	13.03	4.1	59.0	7.86	495
July 2005	4.25	0.0	73.6	7.7	715
Sept 2005	7.12	0.3	63.1	7.74	536
April 2006	12.4	2.1	49.1	7.7	320
June 2006	7.44	2.3	69.4	7.6	541
Sept. 2006	7.25	0.1	63.0	7.48	581
April 2007	11.12	0	43	7.32	352
May 2007	7.7	1.0	66	7.43	564
June 2007	4.4	0.1	75	7.44	552
Sept. 2007	6.4	0	73	7.56	460

Table 17: Water Chemistry of Van Horn Creek

Determination	Dissolved oxygen level mg/l	Nitrate level	Water Temp.	pH	Conductivity
April 2002					
Sept. 2002					
Nov. 2002	8.3	1.9	50	6	
April 2003	9.2	2.1	46	6	
June 2003	8.5	7.1	65	7	
Sept. 2003	8.6	1.5	64	6	
April 2004	14.0	0.8	68	7	
July 2004	9.8	0.5	66.7	7.82	581
Sept. 2004	7.45	0.0	71.2	7.64	755
April 2005	15.2	2.8	65.3	8.01	575
July 2005	5.5	0.1	75.7	7.47	800
Sept 2005	7.75	0.2	64.9	7.59	477
April 2006	14.5	1.2	44.6	7.9	340
June 2006	8.73	1.2	76.1	7.66	380
Sept. 2006	7.4	0.1	67.3	7.28	739
April 2007	13.71	1.5	43	7.78	367
May 2007	11.95	0.9	69	7.83	608
June 2007	6.61	0.0	71	7.59	675
Sept. 2007	7.32	0.0	68.9	7.51	764

Table 18: Water Chemistry of Great Miami River at Spillway (Indian Lake)

Determination	Dissolved oxygen level mg/l	Nitrate level	Water Temp.	pH	Conductivity
April 2002					
Sept. 2002					
Nov. 2002					
April 2003					
June 2003					
Sept. 2003	7.6		69	7	
April 2004	10.5	0.0	63.0	7	
July 2004	9.8	0.4	77.2	8.72	357
Sept. 2004	10.68	N/A	71.2	8.66	358
April 2005	11.63	0.9	57.2	8.63	345
July 2005	7.43	0.0	90.8	8.68	410
Sept 2005	8.38	0.0	71.8	8.37	384.2
April 2006	10.5	0.0	51.4	8.28	351.5
June 2006	7.81	0.3	72.2	8.35	469
Sept. 2006	9.05	0	75.2	8.41	378
April 2007	12.14	0	43	8.32	238
May 2007	8.46	0	76	8.23	406
June 2007	5.64	0.1	74	8.06	473
Sept. 2007	8.75	0	77	8.66	349

Non Point Source Pollution

Although considerable improvements have been achieved in water quality by the farmers in the watershed implementing many best management practices since this project's inception in 1988, efforts to continually improve water quality from agricultural non point sources must continue. In addition, new sources of non point pollution have been identified and cost effective measures are proposed.

The desirability of this lake for fishing and other water recreational activities continues to grow as the water quality improves. With nearly two million estimated visitors per year, our information and education program must continue to reach out to as many of these individuals as possible.

The price of waterfront property whether with improvements or not is now being sold by the foot. Everyone wants water access. The State is allowing developers to extend channels to accommodate new housing market demands. In so doing more impermeable surfaces in the way of roads, driveways, rooftops, etc are being installed within the watershed. Not only does water now enter into the lake more quickly due to aggressive development but also many of the natural filtration areas are being destroyed, further impairing the water quality of Indian Lake. Without the eventual installation of a storm water sewer system to route the urban runoff from these newly developed areas, around the lake and prevent it from flowing directly into the lake, there will be a substantial increase in the amount of pollution contributed to the lake waters each year.

Sedimentation

Although cropland sediment is no longer the major source of non point pollution of Indian Lake, additional improvements in farming technology, implementation of additional water quality BMPs and new tillage practices will continue to be explored in order to obtain even greater water quality benefits attributed to agriculture.

Construction sites, whether for single family home construction or multi unit design, normally adhere to required erosion control measures to ensure the continued health of Indian Lake. However, local design requirements need to be expanded to include wetland restoration, rain gardens, etc., to minimize any potentially negative impacts on water quality due to the loss of water percolation at the proposed site for water quality purposes.

Dredging

Dredging of State Park waterways is managed by ODNR, Division of Parks and Recreations, using the guidelines concerning navigable waters. ODNR spends $400,000-$500,000 per year on waterway improvements at the lake. The dredging operation removes approximately 200,000 tons of dredge material per year. The cost of dredging continually increases. Several factors influencing future dredging

operation are dredge material relocation area and equipment replacement issues. Even though the ODNR has acquired additional acreages, the number of economical and suitable dredge relocation areas is disappearing. Some of the dredge machines have been in use for a number of years and obtaining replacement parts is costly and time consuming. There are currently three dredge machines that perform work at Indian Lake. One is a large suction dredge; the second is a smaller suction dredge and the third a clamshell. Dredging is typically an on-going effort, but is necessary to ensure continued usage by both vacationers and residents at Indian Lake. Dredging is merely a band-aid approach to fixing the sedimentation problem, but not the solution, as it can reduce water clarity and temporarily, adversely impact the lake's water quality

The dredger working in the channels.

Indian Lake Watershed Project has been working at keeping the soil on the farm land for over 15 years. Implementation of BMPs is the only economical solution to keeping the soil on the fields and stream banks and out of the water ways. Even though ILWP has been very successful in reducing the annual amounts of sediment being delivered to Indian Lake, there was already 150 years of sediment accumulated in the lake that has: reduced the lake's storage capacity by over 40 per cent, restricted the lake's usage of deep keel boats especially when water levels fall below the top of the spillway, provided the nutrients necessary for accelerated eutrophication and caused water quality degradation. This is important because Indian Lake is believed to be a major recharge area for the underground aquifer that provides water resources to most of the nearly 2 million residents between here and the Ohio River.

As more people establish permanent residency in the Indian Lake area and utilize this lake for recreational purposes, it is believed an increased pressure will be exerted on ODNR to dredge more and more. Dredging is not only costly but unfortunately, initially, adversely impacts water quality for a time because of the manner in which it is accomplished using today's technology. With more dredging will come more relocation sites that, if constructed within the lake, needs to be better protected than in the past and, if located outside the lake, need to be so located as to not destroy areas either currently providing water quality benefits and situated in a manner that the spoils can never return to the lake as sediment in the future.

Fishing and Boating Activities

Users of water craft whether jet skies, bass boats, pontoons or others all present a potential to increase lake turbidity due to their actions or inactions as the case may be. Indian Lake is a shallow lake averaging only approximately 10 feet in depth at the time of construction over 150 years ago. Since then sediment has diminished its storage capacity by over 40 per cent meaning the depth is much less today averaging between 4-5 feet in many places. Near the outlets to the tributaries, some dead end channels and a few other places near prevailing currents, the average depth is less than 3 feet creating a need to dredge periodically. Sediment, in addition to coming from cropland, comes from shorelines when boaters create wakes causing the excessive wave action to wash loose particles into the lake. Often boaters can be seen accelerating rapidly from a stop to nearly top speed causing the prop to dig into the shallow lake bed and churning up the mud.

Eutrophication

Eutrophic lakes are characterized as weedy and subject to frequent algae blooms. Hypereutrophic indicates this process is accelerated. Secchi disc measurements and Chlorophyll-A determinations conducted on the lake from 1990 to 2006 show Indian Lake is hypereutrophic. Hypereutrophic indicates a nutrient rich state that exceeds lake demands and can result in excess algal loading and lake quality degradation. Lily pads and other large aquatic flora have overtaken large areas of shallow water. Duckweed and filamentous algae choke shore areas during the summer and fall months, inhibiting boat travel in numerous areas and prohibiting boat traffic in other areas. Most of the excess nutrient loading is trapped in existing sediment that has reduced the lake's original storage capacity by over 40 percent. These excess nutrients were contributed by livestock, fertilizer application on agricultural and residential property, dumping of organic materials by shoreline residents as well as the lack of properly functioning waste water treatment systems around the lake years ago. These abuses over the past 150 years lie in the nutrient laden sediment approximately 4-10 feet under the lake's surface.

ODNR obtains Secchi Disk measurements in the lake through the Citizen Lake Awareness and Monitoring (CLAM) project. Data is collected by volunteers from April through September **(See Appendix II for CLAM Monitoring Manual)**. Selected sites on Indian Lake are observed and depth readings and water color are recorded. Prior to the onset of ILWP efforts 18 years ago, the water color was brown. Now that much of the sediment that was being delivered to the lake has been eliminated, the water color is clear allowing light to penetrate to the lake's bottom spurring plant growth and algae bloom that was not present in 1988.

Local high school students learn how to take measurements using the Secchi Disk.

The CLAM data gathered from 1989 to 2006 shows a modest improvement in Secchi Disk depth readings. The water clarity has also shown signs of improvement during the same period. Additional water clarity would be recorded if it were not for the recent influx of plant growth.

Future monitoring plans include expanding volunteer programs to include increasing the frequency of stream monitoring and the addition of more sites as well as expanding the number of CLAM volunteers collecting data. Continued work in reducing sediment entering the lake is needed although the problems identified now moves this project into total watershed management unlike the original plan that dealt primarily with non point source pollution reduction. Sediment reduction remains a high priority water quality concern by project leaders. As water clarity in the lake improves, more emphasis will be directed toward nutrient management and the control of algal growth in the lake.

Section 4
WATERSHED IMPAIRMENTS

Pollutant Loading

A Total Maximum Daily Load (TDML) program has not been completed for the Indian Lake Watershed Project. A plan update will take place once data becomes available from the Ohio Environmental Protection Agency. Loading reductions must be calculated for all standard BMPs listed to illustrate the amount of reduction likely to occur if implemented.

Causes and Sources of Impairment

North Fork of the Great Miami River – 05080001- 010 – 010

Causes for impairment along the North Fork of the Great Miami River, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation and secondarily of priority organics (pesticides) and organic enrichment leading to unsatisfactory levels of dissolved oxygen. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* report prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture and hydromodification or channelization. Along with agriculture also comes the nonirrigated crop production source designation which characterizes the majority of the agricultural practices within the subwatershed.

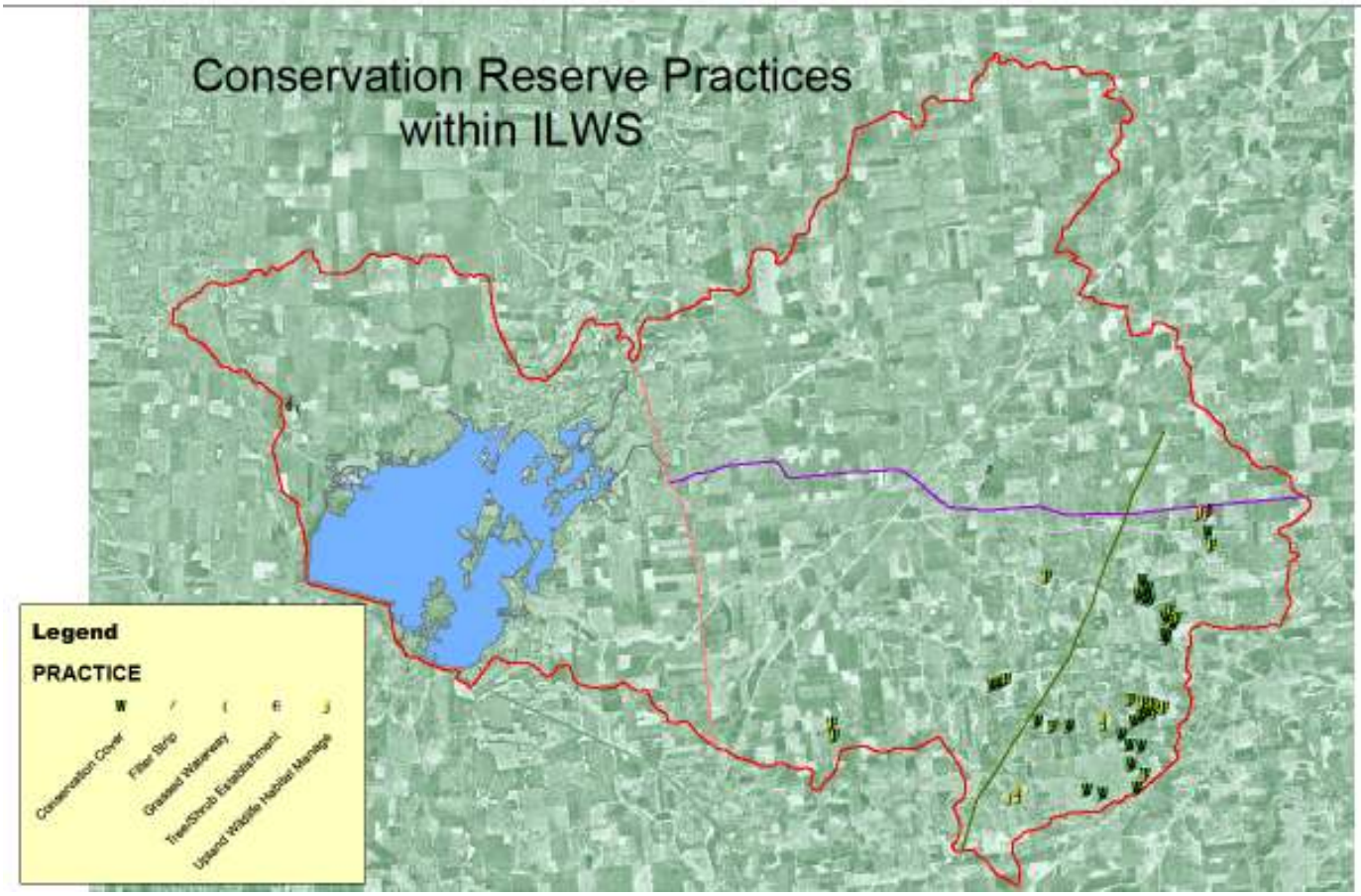
South Fork of the Great Miami River – 05080001- 010 - 020

Causes for impairment along the South Fork of the Great Miami River, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation and organic enrichment leading to unsatisfactory levels of dissolved oxygen. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* reported prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture, urban runoff or lack of storm sewers, and land disposal. Along with agriculture also comes the non-irrigated crop production source designation which characterizes the majority of the agricultural practices within the sub watershed. The source designation of land disposal refers to on-site sewage disposal systems. This source of impairment was remedied in 2004 with the completion of the Belle Center Village Sewer Project.

Black Hawk Creek, Van Horn Creek and Indian Lake including all of the Islands – 05080001- 010 - 030

Causes for impairment along Black Hawk Creek and Van Horn Creek of the Great Miami River, as well as the islands of Indian Lake, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* reported prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture, urban runoff or lack of storm sewers, and hydromodification or channelization. Along with agriculture also comes the non-irrigated crop production source designation which characterizes the majority of the agricultural practices within the sub watershed.

Section 5
WATERSHED RESTORATION AND PROTECTION GOALS



Although there are numerous conservation practices in place within the Indian Lake Watershed **(See Appendix I for a full-size map of Conservation Practices)**, there is much room for improvement and expansion. Problem statements have been compiled for each of the sub watersheds. Input from the board of directors and the community was then sought to establish actions for remedying the situations in each area.

North Fork of the Great Miami River – 05080001- 010 - 010

Background

There are no urban areas within this sub watershed. In this intensively cropped sub watershed, farmers have adopted no-till and conservation tillage on much of their crop production acreage. Many of the larger farmers with on farm fuel and/or fertilizer storage have built state approved secondary containment facilities to prevent accidental spills from reaching field tiles that outlet into water courses that lead to Indian Lake. The two major livestock producers have each enhanced the riparian area with tree plantings, excluded livestock from the water and stabilized ditch banks that were eroding. One of these farmers has created three wetland restoration areas amounting to nearly 15 acres to further improve water quality and enhance wildlife habitat. The other has planted over 800 trees in the riparian corridor area. Another producer Gary Carson has granted an 8.2 acre riparian area easement along one side of the river just prior to where it flows into Indian Lake. The easement area has been enhanced with over 100 tree seedlings with protective shelters being planted in 2006. A grass filter strip abuts the riparian area providing additional water quality benefits.

The Carsons donated 8.2 acres to create a riparian easement area on their farm.

The Logan County portion of the North Fork of the Great Miami River was cleared of logjams in 2006 by the Logan County Solid Waste District utilizing U.S. Department of Labor grant funds thus reducing the number of out of bank flows and duration of flood events when they do occur. This practice also enhances the safety for boaters on Indian Lake by reducing the number of "floaters" in the lake that can cause damage to water craft or endanger human life.

Causes for impairment along the North Fork of the Great Miami River, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation and secondarily of priority organics (pesticides) and organic enrichment leading to unsatisfactory levels of dissolved oxygen. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* report prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture and hydromodification or channelization. Along with agriculture also comes the nonirrigated crop production source designation which characterizes the majority of the agricultural practices within the sub-watershed.

Problem Statement 1

The riparian corridor area has been determined still to be a contributor of lake sedimentation in this sub-watershed area. According to the Universal Soil Loss Equation, 30,665 tons of soil sheet and rill erosion takes place each year within the riparian corridor. Of this soil erosion, 5,769 tons of excess sediment are delivered to the lake each year. There are 2.1 miles of identified unstable stream banks. Local SWCD boards, in cooperation with OSUE, FSA and NRCS, will take the lead in continuing to educate agricultural producers of available program eligibility requirements and encourage participation in soil reduction and water quality improving BMPs.

Goals

1-Reduce field erosion from agriculture by 2,000 tons per year.

Objective 1:

Encourage landowners to: install permanent structures where tile outlets empty into water courses and repair tile blowouts in cropland fields that are contributing to lake sedimentation. Install corrective measures on 300 acres in 2010 and 2011.

Action: Utilize existing local, State and federal voluntary programs to create permanent riparian area protection i.e.: Miami Conservancy District Trading Program, WHIP, CRP, CSP and OHEPA 319 to provide financial incentives ($80/acre) for agricultural producers voluntarily willing to improve riparian corridors for water quality purposes. Expand participation levels of MCDTP to at least five applicants in 2010, seven applicants in 2011 and 10 applicants in subsequent years.

Action: Erect signage for public viewing, periodic field days and tours where installed BMPs are improving water quality before it enters Indian Lake

Objective 2:

Acquire conservation easements on at least 200 acres of land over the next five years and acquire at least one additional riparian area easement.

Action: Partner with Logan County Land Trust to identify potential candidates for riparian area easements.

Action: Continue to encourage the use of no-till application by ILWP agricultural producers through quarterly newsletters

Objective 3:

Install two recreated wetlands (each 1 acre) to be within three years as a tool for improving the water quality of drainage waters.

Action: Seek funding for acreage incentive.

2-Stablize 1 mile of eroding stream banks.

Objective 1:

Exclude all domestic livestock from 3,000 linear feet of headwater streams and grassed waterways by 2012.

Objective 2:

Plant 4 acres of trees within riparian area.
Action: Seek funding for tree establishment.

Problem Statement 2

Agricultural practices for nonirrigated crop production are a source of impairment for the cause of nutrient enrichment within the sub-watershed. Dissolved oxygen levels were found to be below the 4.0 mg/l minimum criterion for Warm Water Habitat designation in the 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* report.

Goals

1-Reduce nutrient enrichment.

Objective 1:

Develop an approved CNMP for livestock producers on 2,000 acres to follow so as to minimize inadvertent applications of manure during inappropriate times and or on inappropriate areas.
Action: Assure an adequate and safe recharge of the underground water aquifer by reminding farmers of their liability if there is an accidental fuel or chemical spill that contaminates either surface water or underlying aquifers.
Action: Increase the number of compost facilities for disposing of livestock remains from two to five within the next five years.
Action: Conduct annual LEAP (Livestock Environmental Assurance Program) certification program in conjunction with Soil and Water Districts.

Objective 2:

Reduce occurrence of lawn chemical usage and garden treatments by occupants of rural homesteads and homes in unincorporated rural developments by 30 %.
Action: Conduct homeowner survey to determine baseline lawn and garden chemical usage.
Action: Distribute information to rural homeowners through 1 informational education session per year. Report observations; make recommendations for more eco-friendly alternatives.

Objectives
North Fork of the Great Miami River – 05080001- 010 – 010

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
Sediment	Establish permanent riparian areas.	Technical application assistance for agricultural producers and financial incentive. $80/acre	Miami Conservancy District Trading Program, WHIP, CRP, CSP, and OHEPA 319	2010 to 2019	Establish 5 applicants for MCDTP in 2010, 10 applicants in 2011
	Install permanent structures where tile empty into water courses and repair tile blowouts in crop fields on 300 acres per year	600 acres @ $2,000 acre (one time assistance) $160,000	EQIP, CSP, CRP, OSUE consultation	2010 to 2011	Provide evidence of corrective measures taken on 600 acres
	Establish 2 wetlands (1 acre each) to demonstrate their usage for improving drainage water quality	2 acres @ $10,000/acre $20,000	EQIP, CSP, WHIP, and OHEPA 319	2010 to 2013	Provide evidence of wetland acres. Calculate sediment reductions at drainage sites.
	Erect signage for public viewing where installed BMPs are improving water quality	10 signs @ $500/sign	OHEPA 319, Logan County Commissioners' Economic Development Grant	2010 to 2012	Erect 10 signs over the next 2 years

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
	Acquire conservation easements on 200 acres; acquire 1 additional riparian area easement	200 acres @ $40/acre for 10 years $80,000	Partner with Logan County Land Trust to identify and assist in acquiring easements; offer incentives through 319 funding	2010 to 2015	Provide legal details as evidence of easements obtained
	Exclude domestic livestock from head water streams and waterways. Install 3,000 linear feet of stream bank fencing	3,000 linear feet of fence @ $3/foot $9,000	EQIP, CSP, WHIP, and OHEPA 319	2010 to 2012	Provide evidence of feet of stream bank fencing. Calculate load reductions from installation.
	Restore riparian area through the planting of 4 acres of trees.	4 acres @ $400/acre $1,600	EQIP, CSP, WHIP, and OHEPA 319, SWCD, NRCS	2010 to 2015	Provide evidence of acreage planted to trees. Calculate sediment reductions
Nutrient Enrichment & Pesticides	Develop CNMP for livestock producers on 2,000 acres	2,000 acres @ $40/acre one time incentive $80,000	SWCD, NRCS, EQIP, CSP, WHIP, and OHEPA 319	2010 to 2015	Obtain copies of approved CNMPs as evidence.

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
	Increase the number of compost facilities from 2 to 5 for disposing of livestock remains	3 facilities at $15,000/facility $45,000	OSUE, SWCD, OHEPA 319	2010 to 2015	3 facilities established in next five years
	Conduct annual LEAP composting certification program for livestock producers	5 training sessions @ $250/session $1250	OSUE, SWCD, OHEPA 319	Yearly 2010 to 2015	1 training session annually 2010 to 2015
	Conduct homeowner survey to establish baseline lawn and garden chemical useage	1 survey with 500 recipients 500 @ $0.15 for printing 500 @ $0.44 for mailing $295	OSUE, OHEPA 319	2010 to 2012	1 survey conducted and results summarized by 2012
	Educate rural homeowners about proper application for lawn and garden chemicals	7 informational meeting @ $200/meeting $1400	OSUE and Master Gardener club members	2012 to 2019	Hold 1 informational meeting a year for rural residents

South Fork of the Great Miami River – 05080001- 010 - 020

Background

Belle Center, the only incorporated urban area within the watershed, was sewered in 2003 with the final hookups to the Indian Lake Water Treatment Plant completed in 2004. In 2000, a snag and clear project along seven miles of South Fork to the Great Miami River from the covered bridge to northeast of Belle Center, reduced the frequency and duration of out-of-bank flows that contributed significant sedimentation and other pollution to Indian Lake. In addition, many "floaters" found on the lake were eliminated thus improving boater safety and reducing expenses for unexpected boat repairs. An Amish community of 40 – 50 families resides in this sub watershed. Many of the farmers, both Amish and English, after participating in the grazing site demonstrational programming offered between 1997 and 2005 adopted variations of the demonstrated BMPs regarding livestock exclusion, intensive grazing, stockpiling of excess forages and the introduction of warm season grasses as their forage crops. The riparian corridor area of this sub watershed area has been determined still to be a likely contributor of lake sedimentation.

Local Amish work horses prepare to spray a crop field.

Causes for impairment along the South Fork of the Great Miami River, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation and organic enrichment leading to unsatisfactory levels of dissolved oxygen. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* reported prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture, urban runoff or lack of storm sewers, and land disposal. Along with agriculture also comes the non-irrigated crop production source designation which characterizes the majority of the agricultural practices within the sub watershed. The source designation of land disposal refers to on-site sewage disposal systems. This source of impairment was remedied in 2004 with the completion of the Belle Center Village Sewer Project.

Problem Statement 1

The riparian corridor area has been determined still to be a contributor of lake sedimentation in this sub-watershed area. According to the Universal Soil Loss Equation, 89,635 tons of soil sheet and rill erosion takes place each year within the riparian corridor. Of this soil erosion, 17,030 tons of excess sediment are delivered to the lake each year. There are 6.2 miles of identified unstable stream banks. Local SWCD boards, in cooperation with OSUE, FSA and NRCS, will take the lead in continuing to educate agricultural producers of available program eligibility requirements and encourage participation in soil reduction and water quality improving BMPs.

Goals

1-Reduce field erosion from agriculture by 2,000 tons per year.

Objective 1:

Encourage landowners to: install permanent structures where tile outlets empty into water courses and repair tile blowouts in cropland fields that are contributing to lake sedimentation. Install corrective measures on at least three farms in 2010, five farms in 2011 and subsequent years.

Action: Utilize existing local, State and federal voluntary programs to create permanent riparian area protection i.e.: Miami Conservancy District Trading Program, WHIP, CRP, CSP and OHEPA 319 to provide financial incentives for agricultural producers voluntarily willing to improve riparian corridors for water quality purposes. Expand participation levels of MCDTP to at least five applicants in 2010, seven applicants in 2011 and 10 applicants in subsequent years.

Action: Erect signage for public viewing, periodic field days and tours where installed BMPs are improving water quality before it enters Indian Lake

Objective 2:

Acquire conservation easements on at least 200 acres of land over the next five years and acquire at least one additional riparian area easement.

Action: Partner with Logan County Land Trust to identify potential candidates for riparian area easements.

Action: Continue to encourage the use of no-till application by ILWP agricultural producers through quarterly newsletters

Objective 3:

Install two recreated wetlands (each 1 acre) to be within three years as a tool for improving the water quality of drainage waters.

Action: Seek funding for acreage incentive.

2-Stablize 4 miles of eroding stream banks.

Objective 1:

Exclude domestic livestock from headwater streams and grassed waterways by installing 3,000 linear feet of fencing by 2012.
Action: Seek EPA 319 funding for development.

Objective 2:

Plant 10 acres of trees within riparian area.
Action: Seek funding for tree establishment.

Problem Statement 2

Excess nutrients stockpiled in the sediment of Indian Lake are causing increasing amounts of algae bloom and eutrophication of Indian Lake. Local SWCD boards, in cooperation with OSUE, FSA and NRCS, will take the lead in continuing to educate agricultural producers of existing program eligibility requirements and encourage voluntary participation in implementation of surface and subsurface water quality best management practices.

Goals

1-Reduce nutrient enrichment.

Objective 1:

Establish five 40 acre nitrogen reduction demonstrational sites to educate farmers on alternative ways to increase net income in lieu of increasing nitrogen applications.
Action: Conduct field day demonstration twice annually.

Objective 2:

Develop an approved CNMP for livestock producers on 3,000 acres so as to minimize inadvertent applications of manure during inappropriate times and on inappropriate areas.
Action: Conduct yearly manure management and composting workshops for Amish farmers, horse owners, 4-H and FFA project participants, users of chicken manure compost and others of proper manure management techniques.

Objective 3:

Increase the number of compost facilities for disposing of livestock remains from three to fifteen within the next five years.
Action: Conduct annual LEAP (Livestock Environmental Assurance Program) certification program in conjunction with Soil and Water Districts.

South Fork of the Great Miami River – 05080001- 010 - 020

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
Nutrient Enrichment & Pesticides	Establish (5) 40 acre nitrogen reduction demonstrational sites	40 acres @ $100/acre incentive payment $4,000	OHEPA 319	2010 to 2012	Obtain Memo of Understanding from 5 cooperating producers as evidence
	Develop CNMP for livestock producers on 3,000 acres	2,000 acres @ $40/acre one time incentive $80,000	SWCD, NRCS, EQIP, CSP, WHIP, and OHEPA 319	2010 to 2015	Obtain copies of approved CNMPs as evidence.
	Conduct annual manure management workshop for small scale producers	5 workshops @ $250/workshop $1250	OSUE, SWCD, OHEPA 319	Yearly 2010 to 2015	1 training session annually 2010 to 2015
	Increase the number of compost facilities from 3 to 15 for disposing of livestock remains	12 facilities at $15,000/facility $180,000	OSUE, SWCD, OHEPA 319	2010 to 2015	12 facilities established in next five years
	Conduct annual LEAP composting certification program	5 training sessions @ $250/session $1250	OSUE, SWCD, OHEPA 319	Yearly 2010 to 2015	1 training session annually 2010 to 2015

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
Sediment	Establish permanent riparian areas.	Miami Conservancy District Trading Program, WHIP, CRP, CSP, and OHEPA 319	Utilize local, state, and federal voluntary programs to create permanent riparian area protection	2010 to 2019	Establish 5 applicants for MCDTP in 2010, 7 applicants in 2011, and 10 applicants in subsequent years
	Install permanent structures where tile empty into water courses and repair tile blowouts in crop fields on 300 acres per year	600 acres @ $2,000 acre (one time assistance) $160,000	EQIP, CSP, CRP, OSUE consultation	2010 to 2011	Provide evidence of corrective measures taken on 600 acres
	Erect signage for public viewing where installed BMPs are improving water quality	10 signs @ $500/sign	OHEPA 319, Logan County Commissioners' Economic Development Grant	2010 to 2012	Erect 10 signs over the next 2 years
	Acquire conservation easements on 200 acres; acquire 1 additional riparian area easement	200 acres @ $40/acre for 10 years $80,000	Partner with Logan County Land Trust to identify and assist in acquiring easements; offer incentives through 319 funding	2010 to 2015	Provide legal details as evidence of easements obtained

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
	Encourage the use of no-till applications through quarterly newsletters.	900 newsletters @ $0.15 for printing and $0.44 for mailing $2120 annually	OHEPA 319	2010 to 2015	20 quarterly newsletters as evidence
	Establish 2 wetlands (1 acre each) to demonstrate their usage for improving drainage water quality	2 acres @ $10,000/acre $20,000	EQIP, CSP, WHIP, and OHEPA 319	2010 to 2013	Provide evidence of wetland acres. Calculate sediment reductions at drainage sites.
	Exclude domestic livestock from head water streams and waterways. Install 3,000 linear feet of stream bank fencing	3,000 linear feet of fence @ $3/foot $9,000	EQIP, CSP, WHIP, and OHEPA 319	2010 to 2012	Provide evidence of feet of stream bank fencing. Calculate load reductions from installation.
	Restore riparian area through the planting of 10 acres of trees.	10 acres @ $400/acre $14,000	EQIP, CSP, WHIP, and OHEPA 319, SWCD, NRCS	2010 to 2015	Provide evidence of acreage planted to trees. Calculate sediment reductions

Black Hawk Creek, Van Horn Creek and Indian Lake including all of the Islands – 05080001- 010 - 030

Background

This sub watershed has the greatest potential for the discharge of contaminants because it includes both Indian Lake and the 69 islands within the lake– the two areas with the greatest populations of both permanent residents and "weekenders". These populated areas in and around the lake lack a storm water management system that bypasses the lake, thus all excess runoff with any contaminants eventually ends up directly into the lake. As the number of new housing starts continues, there are fewer permeable areas causing the water level of the lake to rise faster discharging a greater volume of water over the spillway after storm events. This fact increases both the length and duration of downstream flooding along the Miami River and its tributaries. ODNR has advised the community that a new spillway may be proposed in the near future. Any new spillway design should demonstrate the ability for downstream flood control measures.

There are over 30 miles of shoreline around Indian Lake and the islands. Approximately 30 percent of this shoreline is owned and operated by ODNR. Although the State (ODNR) has protected some fragile areas along islands, some of the very vulnerable sites still exist. On some of the dredge relocation areas, trees have matured and provide habitat for beaver. These trees are now falling into the lake adding an increase in organic matter, blocking channels and causing unsafe boating conditions. ODNR has also installed many new boat docks and bulkheads, although a significant amount of the state owned shoreline remains exposed and susceptible to wave action from boat traffic and wind. In addition, some of the privately owned land, especially those that had seawalls erected thirty years ago or longer are in peril of falling into the lake in some cases as the small soil particles have washed out behind the wall since all storm water goes into the lake and seepage is the only access in some cases. Other private land holdings adjacent to the lake are owned either by farmers or land speculators for development purposes. In the case of adjacent agriculture lands, many of the critical areas have been seeded or planted to trees, tile outlets have been protected, and banks have been stabilized by excluding livestock access, etc. thus providing a natural habitat for both fish and wildlife. Since most of the agricultural land along both of the short tributaries is relatively flat, agricultural commodities are planted using no-till or conservation tillage and most cropland is protected with over 30 percent crop residue.

Causes for impairment along Black Hawk Creek and Van Horn Creek of the Great Miami River, as well as the islands of Indian Lake, as recognized by the Ohio Integrated Water Quality Monitoring and Assessment Report of 2002, are comprised primarily of siltation. The 1996 *Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries* reported prepared by the Ohio Environmental Protection Agency linked this cause of impairment to the following sources: agriculture, urban runoff or lack of storm sewers, and hydromodification or channelization. Along with agriculture also comes the non-irrigated crop production source designation which characterizes the majority of the agricultural practices

within the sub watershed.

Problem Statement

Due to increased development and decreased area of permeable surfaces, urban rainfall has little opportunity to pass through the cleansing nature of the soil. Urban runoff often picks up excess yard chemicals on its steady course towards Indian Lake. This has been determined to be a contributor of lake sedimentation in this sub-watershed area. According to the Universal Soil Loss Equation, 10,952 tons of soil sheet and rill erosion takes place each year. Of this soil erosion, 2,081 tons of excess sediment are delivered to the lake each year. There are 0.5 miles of identified unstable stream banks

.

Residents surrounding the lake do not have any means for composting excess lawn materials at this time. This leads to the dumping of leaves and grass clippings directly, or indirectly, into the lake which exasperates the eutrophication problem.

Goals

1-Reduce siltation from urban runoff sources by 1,000 tons per year.

Objective 1:

Recreate one half-acre urban wetland to enhance water quality, length of time for water retention, reduce downstream flooding and improve wildlife habitat.

Action: Provide recognition incentives for contractors to utilize permeable materials for driveways, sidewalks, etc.

Action: Revise building codes to limit the percent of non permeable area on a lot or pay into a bank for wetland creation.

Objective 2:

Protect 1,000 linear feet of state owned shorelines exposed to wind erosion or intensive boat traffic.

Action: Reduce the speed limit to create a 'no wake' zone on the lake within 200 feet of the shore line to decrease the wake effect on unprotected shoreline areas.

Action: Initiate an ONDR chipping program to remove excess fallen trees from dredge spoil areas and blow material into storage area to keep channels open and improve boater safety.

Objective 3:

Replace 500 linear feet of failing seawalls

Action: Seek funding to provide $500 per linear foot incentive to homeowners for seawall replacement.

Objective 4:

Partner with OSUE Master Gardeners to establish a demonstration rain garden in two locations.

Action: Compile a "Shoreline Guide" for homeowners that encourage individuals to establish their own rain gardens.

An Iowa rain garden initiative project. Courtesy NRCS

Objective 5:

Reduce the amount of foreign materials reaching the lake by 25%.

Action: Conduct foreign material study in conjunction with local FFA chapter to establish baseline amounts.

Action: Collaborate with the Logan County Solid Waste District to establish a composting location similar to the recycling center which has already been established at Moundwood. **(See Appendix II for a pamphlet on the Moundwood Recycling Center.)**

Action: Utilize EPA 319 funding to establish a scrap metal donation program where junk vehicles (untitled and unusable motor vehicles such as cars, motor homes, boats) needing to be removed to prevent gas or oil from leaking into ground water aquifer or storm water runoff can be dropped off. The proceeds will go to the ILWP Endowment Fund.

Action: Work with local Sea Scout Troop #246 to establish a twice a year collection day that would offer curbside lawn waste pick-up for lake residents.

The Logan County Solid Waste District has successfully started recycling programs in the village of Lakeview and at Moundwoood.

Problem Statement 2

Many lake users frequent multiple lakes with their watercraft during the boating season. Potential exists for introduction of an invasive species and disease to the ecosystem of Indian Lake.

Goals

Reduce the likelihood of accidental introduction of invasive species and disease.

Objective:

Erect signage at boat launching sites to educate users of the potential danger of invasive species introduction.

Action: Establish a boat washing bay at the state park marina area to promote clean boat usage, including the "live wells" of bass boats.

Lake users often frequent numerous lakes during a given boating season.

Black Hawk Creek, Van Horn Creek and Indian Lake including all of the Islands – 05080001- 010 - 030

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
Sediment	Establish a 1/2 acre urban wetlands to demonstrate their usage for improving water quality and retention, reduce downstream flooding, and improve wildlife habitat.	1/2 acre @ $10,000/acre $5,000	EQIP, CSP, WHIP, and OHEPA 319	2010 to 2013	Provide evidence of wetland acres. Calculate sediment reductions at drainage sites.
	Create 'no wake' zones within 200 feet of the shoreline	100 buoys @ $25/buoy	OHEPA 319, ODNR	2010	Provide evidence of installed bouys
	Identify and replace 500 linear feet of failing seawalls.	$500 per linear foot incentive $250,000	OHEPA 319, ODNR	2010 to 2015	Identify failing seawalls by 2012, offer cost-share monies to replace 500 feet of failing seawalls by 2015.

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
	Establish a demonstration rain garden in 2 locations around the lake	2 rain gardens @ $4,000/garden $8,000	OSUE Master Gardeners, OHEPA 319	2010 to 2012	Provide evidence of rain garden. Calculated reduced runoff.
	Compile a "Shoreline Guide" manual for homeowners to encourage local rain garden establishment	$5,000 for compilation and printing	OSUE Master Gardeners, OHEPA 319	2010 to 2013	Publish a "Shoreline Guide" and begin distribution by 2011
	Conduct a foreign material study to establish baseline amounts	$2,000 for study	OHEPA 319, local FFA chapters	2010	Establish baseline tons of foreign material reaching the lake.
	Establish a yard waste composting location in conjunction with Logan County Solid Waste District	1 location @ $5,000	OHEPA 319, Logan County Solid Waste District, Sea Scouts #246	2010 to 2012	MOU with LCSWD for composting rules and goals as evidence.
	Establish a scrap metal donation program where proceeds benefit the ILWP Endowment Fund	1 location @ $5,000	OHEPA 319	2010 to 2012	Accept 1st donations by 2012

Pollutant (cause of impairment)	Task	Resources	How	Time Frame	Performance Indicator
	Conduct annual curbside pick-up events for lawn waste	5 events @ $500/ event $2,500	OHEPA 319, Sea Scouts Troup #246	2010 to 2015	5 events. Report tons of waste collected.
	Erect signage at boat launching sites to educate users of the potential danger of invasive species introduction	10 signs @ $500/sign $5,000	OHEPA 319, ODNR	2010 to 2011	Erect 10 signs by 2011
	Establish a boat washing bay at the state park marina	1 boat washing bay @ $25,000	OHEPA 319, ODNR	2010 to 2015	Establish a boat washing bay at the state park marina by 2015

Section 6
IMPLEMENTATION

Education and Marketing Strategy

Reaching the right audience with the right message at the right time to produce a change in behavior is the core concept of a successful education program. To be successful the project needs to move past the awareness and educational informational stages into the action stage. Effective educational projects move an audience from ignorance through awareness, knowledge, understanding, ability and desire to active participation.

A public education program that results in problem-solving actions, whether there are single actions by a limited number of individuals or hundreds of actions by various agencies, groups, businesses and individuals needs to coordinated workgroup members.

Effective communication efforts should include:

- The problems that exist and their significance
- Available pollution prevention controls and their effectiveness
- Number and success of these controls currently in the watershed
- Number and locations where the controls are still needed
- Specific actions needed from the audience to implement practices
- Training or assistance the project can provide to individuals in installing and maintaining BMPs or other pollution controls
- How controls will be evaluated, once installed

The most effective education efforts involve one-on-one interactions with the individuals whose behavior or actions need changing. Communication/educational efforts structured as activities (eg., canoe floats , stream walks, tree planting days) can result in a meaningful or useful product or outcome for the community. News articles and pictures of the public actively doing the work are outstanding ways to express progress accomplished and its importance. By taking the bureaucracy out of the headlines and putting in public participation gives news articles a local importance and a local connection. The public needs to be reconnected to the project so that they will retake a role in taking active steps to continue to make improvements.

Communication and Educational Target Actions for Indian Lake

Newsletters

- Continue and expand Indian Lake Watershed LINK Newsletter
- Include action photos and articles of public involvement

Newspaper Articles

- Provide additional awareness and local citizen success stories
- Photos of citizens in action
- Feature articles can address information about problems and solutions

Demonstration Sites

- Continue to demonstrate new technology to the public
- Target groups to see demonstration sites
- Signs, brochures and assigned staff to answer questions and work to increase awareness and knowledge, but most importantly increase the understanding of why the practice is important

Fact Sheets, Videos, Printed Material

- Explaining current practices, future needs, new technology, evaluation and facts about success are important
- Increase awareness, knowledge and understanding
- Continue distribution of 'Homeowner's Guide'

Signs Promoting the Watershed

- Mark watershed boundaries for project promotion and watershed area identification
- Identify critical areas, promote successful projects, identify cooperators in the project
- Signs increase awareness, understanding, knowledge but they show actions taken and promote successes

Meetings

- Interaction with the public is a crucial part of communication
- Share information, plan actions and public evaluation of program progress
- Working with smaller groups will make the corrective solutions more obtainable on a personal level

Field Trips with On-site Inspections

- Observe resources to be protected and BMPs installed
- Learn how the BMPs operate
- Detail how monitoring will determine project success
- Identify problems with recommended corrective actions
- Evaluate effectiveness of controls
- Educate individuals and implement action steps

Training and Technical Assistance

- Provide new skills to stakeholders
- Empower people to take action
- Promote understanding and the desire to take action and the ability to act
- Trained people become trainers and will become examples to their peers
- As people become educated on the problems and solutions they also become better evaluators of the solution's effectiveness

Fund Raising

- Provide a fundraising event that centers on the wonder and excitement of Lake
- Draw a larger audience of seasonal lake users to the event

Action Steps to be Taken by the Watershed Project

- Provide the Watershed LINK Newsletter to as many landowners and businesses as possible.

- Develop working relationship with non-agricultural businesses that affect Water quality (i.e., lawn care services, landscape services, housing developers and construction companies). Once involved and participating to improve water quality, they receive positive advertisement by being connected in efforts to improve water quality.

- Sponsor events which promote the watershed name and concept (i.e., bike trips, triathalon, road rallies, etc.).

- Develop community service projects where local groups can participate (i.e., litter pickup, tree plantings, storm sewer stenciling, flyer/ brochure distribution).

- Target groups to tour demonstration sites and projects in action (i.e., elected government officials, school district representatives, garden clubs, fishing clubs, 4-H clubs, scout groups).

- Send out an annual funding appeal letter.

The annual Poker Run event benefits the watershed project.

Funding Strategies

Since its inception, the Indian Lake Watershed Project has diligently pursued a wide variety of funding options. Program funding will continue to be requested of Ohio EPA, ODNR, State Department of Agriculture and USDA. Program funds will also be requested through OSU Extension, Solid Wasted Districts and others to meet program objectives. The following list details sources of funding from 1990 through Fiscal Year 2009.

Table 19: Sources of Funding

Year	Source	Amount
1990-1992	"314" EPA Clean Lakes Program	$165,000.00
1990-1992	"319" EPA Clean Water Program	$119,000.00
1992	ODNR- Non Point Source Pollution Book	$ 5,000.00
1993-1995	"314" EPA Clean Lakes Program	$150,450.00
1993-1995	"319" EPA Clean Water Program	$152,500.00
1994	ODNR Filter Strip Program	$ 70,000.00
1994	Bob Evans Foundation-Intensive Grazing Project Demonstration	$ 4,000.00
1994	ODNR-Conservation Tax Incentive Program	$ 20,000.00
1994	ODNR-Eagles Sediment Retention Basin	$ 55,000.00
1995-1996	"319" EPA Clean Water Program- Long Range Management Plan	$ 18,000.00
1995-1998	"319" EPA Clean Water Program	$ 62,000.00
1996-1999	"319" EPA Clean Water Program	$293,705.00
1997-1999	Ohio Environmental Education Fund Nature Center Program	$ 26,604.00
1998-2001	"319" EPA Clean Water Program	$105,880.00
1998	ODNR Nature Works Funding South Fork Snag and Clear Project	$ 41,666.00
1999	Honda of America Grant-Nature Center	$ 9,000.00
2000	State of Ohio Budget Line Item Funds-Administrative	$170,000.00
2000-2003	"319" EPA Clean Water Program	$118,000.00
2002	State of Ohio Budget Line Item Funds-Administrative	$133,960.00
2002	Honda of America Grant-Nature Center	$ 8,000.00
2002	ODNR-Monitoring Grant University of Dayton	$ 8,000.00
2004	State of Ohio Budget Line Item Funds-Administrative	$175,000.00
2004	Honda of America Grant-Nature Center	$ 11,500.00
2006	State of Ohio Budget Line Item Funds-Administrative	$190,000.00
2008	State of Ohio Budget Line Item Funds-Administrative	$250,000.00
2008	Logan County Commissioners' Economic Development Grant – Long Range Plan Development	$ 9,000.00
2009	Logan County Commissioners' Economic Development Grant – Long Range Plan Development	$ 7,000.00

Each year the Indian Lake Watershed Project partakes in several community sponsored fundraising events. Two such events that the Project benefits from are the Wooden Keels and Vintage Wheels annual outing sponsored by the Antique Classic Boat Society and Spend-A-Day Marina's poker run. Additionally, the Project's Board of Directors conducts a biannual 'Night at the Lake' dinner and fundraiser. Proceeds from these events are earmarked for contribution to the Endowment Fund. Deposits to this fund today help to ensure the continued existence of the Watershed Project in the future. With regular deposits to the endowment fund the Project is well on its way to self-sufficiency.

Wooden keel boats meet for the annual Wood Keels and Vintage Wheels Benefit.

Section 7
EVALUATION

Evaluation of the Action Plan goals will take place on an annual basis. The Indian Lake Board of Directors will determine whether practical steps are being taken to achieve the desired outcome. A timeline has been established for each of the goals. Sub-committees assigned to various projects will report progress to the Board of Directors. Achievements will be published on an annual basis in the "Watershed LINK" newsletter which will then be sent to the membership. A one year extension may be provided for projects the Board of Directors deem feasible within the additional timeframe. Projects deemed to be unattainable within the timeframe will then undergo revision of implementation.

The Indian Lake Watershed Project display at the annual banquet.

Section 8
PLAN REVISION AND UPDATES

Distribution

The Watershed Action Plan could not have been developed without the support, critique, and input of numerous stakeholders and public entities. Similarly, the WAP must be in the public forefront to affect change. For this reason, copies of the approved WAP will be available for distribution at the following locations.

Indian Lake Watershed Project
Indian Lake Chamber of Commerce
Indian Lake Water Pollution Control (ILWPCD)
ILDC – Formerly Indian Lake Development Corporation
Ohio Department of Natural Resources
Ohio Environmental Protection Agency
Local Governmental agencies (including Health Districts, Soil and Water Districts, County Engineers' offices, and County Commissioners)
The Ohio State University Extension (OSUE)
University of Dayton
Wright State University
Ohio Farm Bureau Federation
Pheasants Forever
Natural Resources Conservation Service
Farm Service Agency
Indian Lake State Park (ILSP)
USDA - Natural Resources Conservation Service (NRCS)
USDA-RC & D – Resource, Conservation and Development
ODNR -Divisions of Forestry, Fish and Wildlife and Park and Recreation
Local Village Authorities
Regional Planning Offices

Copies of the WAP plan will also be available at the annual meeting which garners attendance from both the general public and local government officials. A PowerPoint presentation will be utilized at the annual meeting to update stakeholders on the accomplishments and future goals of the Project. The quarterly newsletter will continue to serve as a communiqué to those unable to attend the annual meeting. Surveys will also be utilized to monitor success and future areas for improvement.

Plan Updates

The Joint Board of Directors will be responsible for assessing changing conditions within the three county watershed area over time. The Board of Directors and the Watershed Coordinator will make updates to the WAP as deemed necessary by the Joint Board. The Joint Board may also call upon the Board of Directors and Watershed Coordinator to conduct stakeholder information events to better explain research findings, possible funding opportunities, and other issues that may arise.

Updates to the current action plan are anticipated when TMDL data becomes available for the watershed. The Ohio Environmental Protection Agency is also anticipating an update to the 1996 Biological and Water Quality Study of the Upper Great Miami River and Selected Tributaries. The action plan would require maintenance at that point in time to accurately reflect new findings.

Appendices

Appendix I:

Indian Lake State Park Map
Groundwater Resources within ILWP
Ditches on Maintenance
Soils of Indian Lake Watershed
Conservation Reserve Practices within ILWS
Permanent Conservation Easements
100 Year Floodplain Boundary
Primary Streams within ILWS Boundary
Indian Lake Watershed
Highly Erodible Fields
National Wetland Inventory
Sanitary Sewer Systems

Appendix II:

Logan County Homeowner's Guide (also available at www.co.logan.oh.us/ILWP/index.htm)
CLAM Monitoring Manual
Logan County Recycling Centers
Sea Scouts #246 Pamphlet

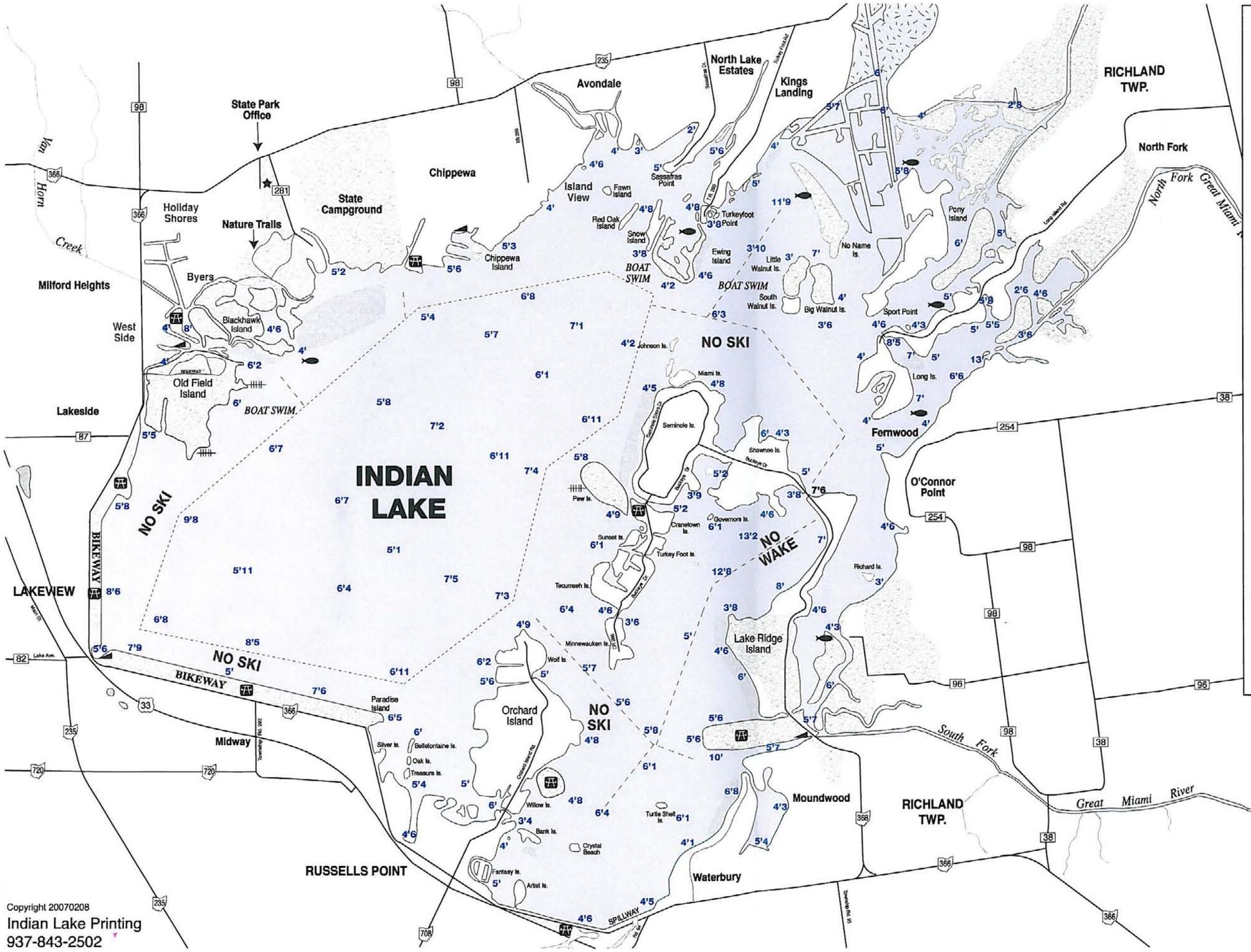
Appendix III:

Bird, Animal, and Plant Inventory
Hydric Soils Inventory
Drainage Soils Inventory
Slope Soils Inventory
Hydrologic Grouping Inventory

Appendix IV:

2008 Landowner Survey Summary
2008 Lake User Survey Summary
"The Landing" Survey Summary

Appendix I



This map is compliments of

ILDC

(Indian Lake Development Corporation)

A group of citizens dedicated to the continuous improvements around the lake, ILDC has been instrumental in working directly with the Department of Natural Resources and local legislators in obtaining funding for large capital items such as dredging equipment, development of the bike paths and Old Field Beach, and land acquisition.

ILDC has monthly meetings on the 3rd Wednesday of every month at the I.L. State Park Office on SR 235 at 7:30 p.m.

If you would be interested in becoming a member of the ILDC or would like more information, please contact us at:

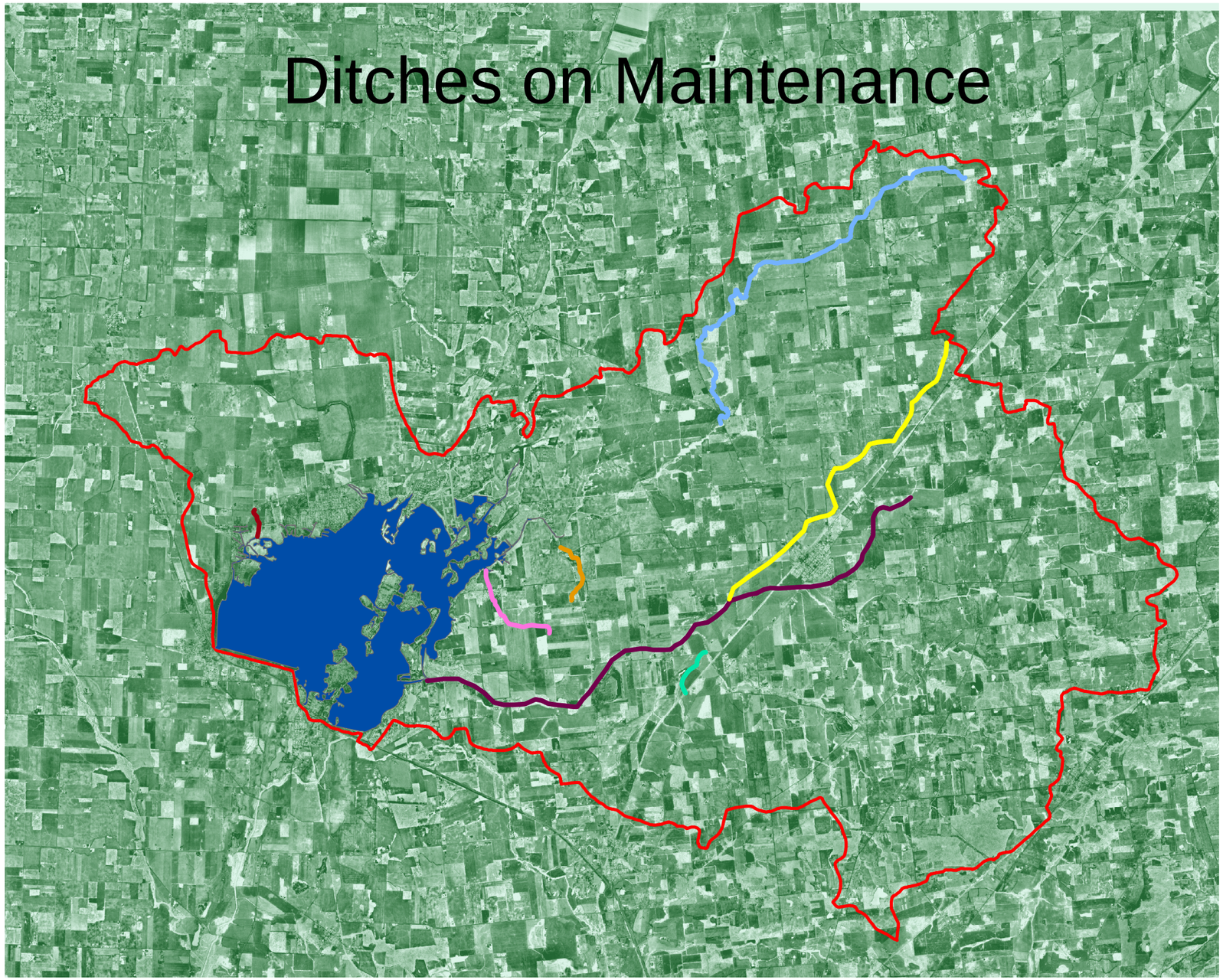
ILDC
P.O. Box 103
Russells Point, Ohio 43348

Groundwater Resources within ILWS

Legend

- BELLE CENTER, VILLAGE OF
- Colonial Mobile Estates
- Cottonwood Enterprises
- Gem Sportswear Mfg Inc.
- Holiday Shores Mhp
- Lakeridge Resorts
- Lakeside Court Mobile Home Park
- Northwoods Campground Public Water Syste
- RUSSELLS POINT, VILLAGE OF
- Tammi's Mobile Home Village
- Whispering Valley Mobile Home Park

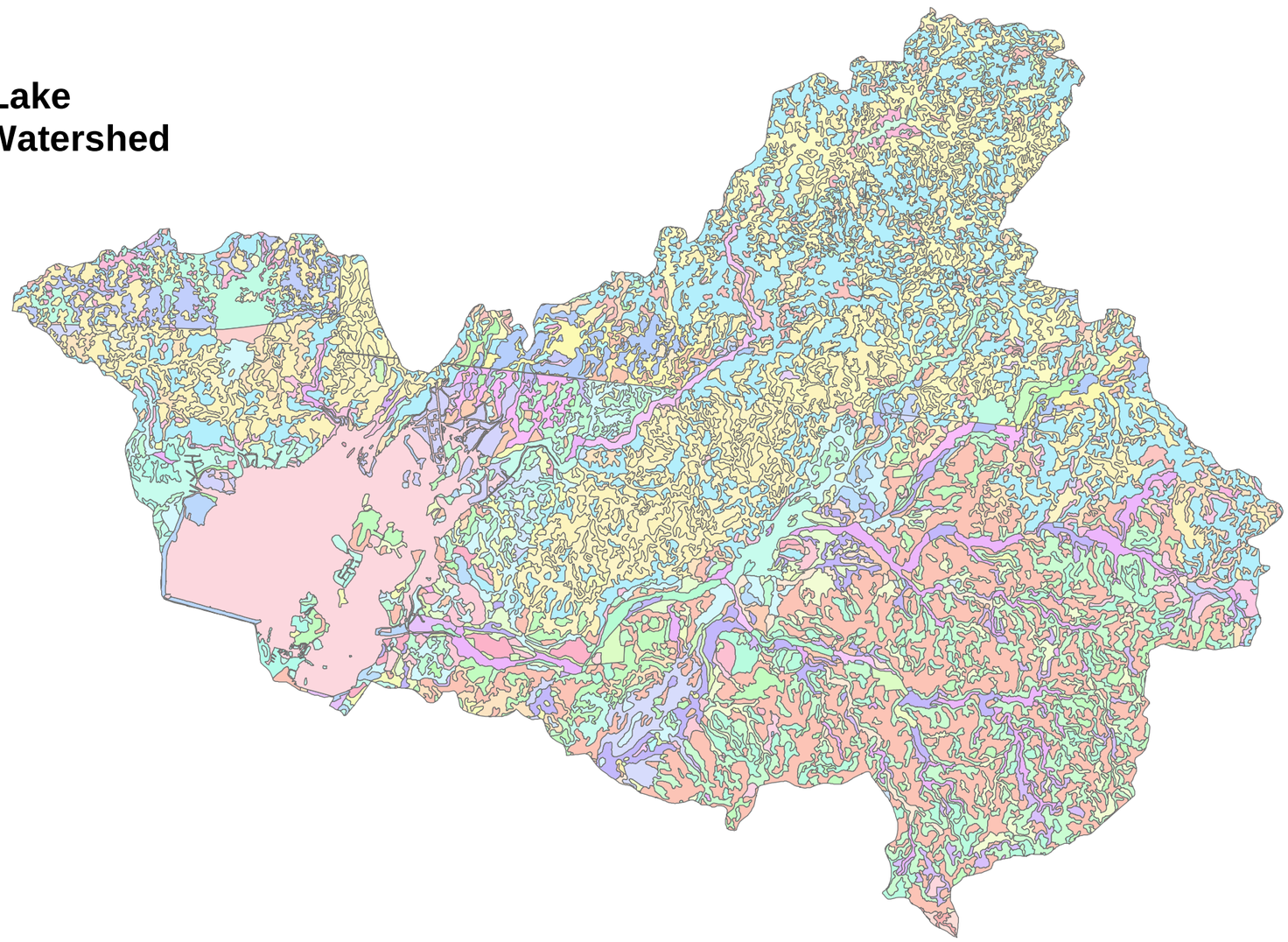
Ditches on Maintenance



Legend

- North Fork Miami on maintenance-appx 40117 feet
- Elder Cline Ditch on maintenance-appx 1732 feet
- Fun Place Group on maintenance - appx 677 feet
- Liggett Ditch on maintenance 30065 feet
- McClure Ditch on maintenance - appx 1334 feet
- Emery Ditch on maintenance - appx 2349 feet
- South Fork on maintenance-appx 47761 feet

Soils - Indian Lake
Great Miami River Watershed



Soil Symbol, Soil Name, Acres

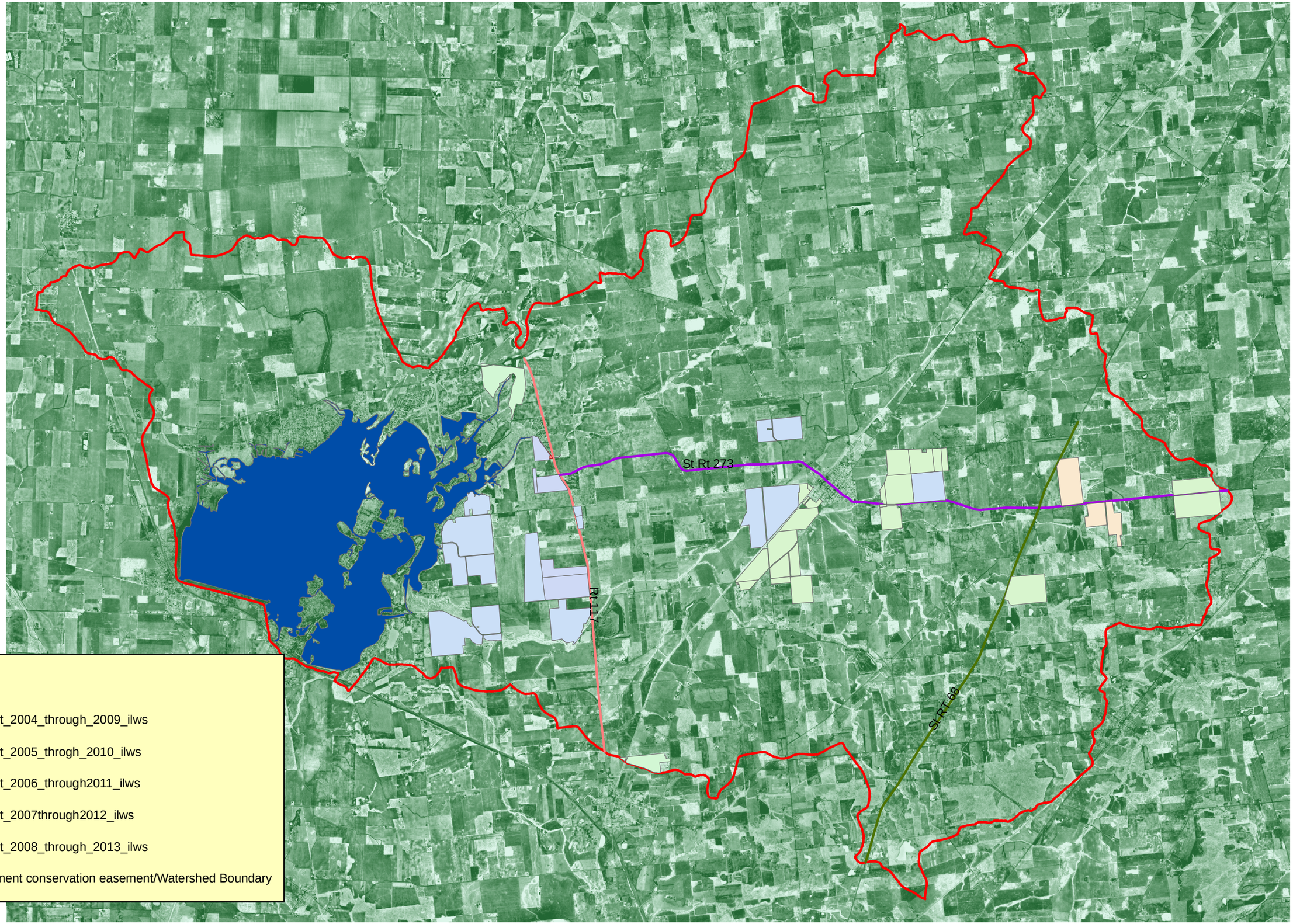
- Ag, Algiers silt loam, 1223.24
- BoA, Blount silt loam, 0 to 2 percent slopes, 6214.54
- BoB, Blount silt loam,2 to 6 percent slopes, 9213.14
- Bs, Brookston silty clay loam, 19.48
- Ca, Carlisle muck, 195.01
- Cc, Carlisle muck, ponded, 511.38
- CdD2, Casco-Eldean complex, 12 to 18 pecent slopes, 47.66
- CrA, Crosby silt loam, 0 to 2 percent slopes, 36.65
- CrB, Crosby silt loam, 2 to 6 percent slopes, 0.23
- DeA, Del Rey silt loam, 0 to 2 percent slopes, 278.8
- Ed, Edwards muck, 4.95
- Ee, Eel silt loam, 298.53
- EmA, Eldean silt loam, 0 to 2 percent slopes, 269.21
- EmB, Eldean silt loam, 2 to 6 percent slopes, 476.76
- EmC2, Eldean silt loam, 6 to 12 percent slopes, 175.97
- FIA, Fox loam, 0 to 2 percent slopes, 287.95
- FIB, Fox loam, 2 to 6 percent slopes, 395.35
- FnB, Fox silt loam, 2 to 6 percent slopes, 74.97
- FoA, Fox silt loam, 0 to 2 percent sloeps, 85.17
- FoB, Fox silt loam, 2 to 6 percent slopes, 685.35
- FpC2, Fox clay loam, 6 to 12 percent slopes, 19.4
- FuA, Fulton silt loam, 0 to 4 percent slopes, 266.91
- Gn, Genesse silt loam, 218.55
- GwB, Glynwood silt loam, 2 to 6 percent slopes, 730.55
- GyB2, Glynwood silt loam, 2 to 6 percent slopes, ero, 341.16
- GyC2, Glynwood clay loam, 6 to 12 percent slopes, 663.28
- HKA, <Null>, <Null>
- HdA, Haskins loam, 0 to 2 percent slopes, 175.69
- HdB, Haskins loam, 0 to 2 percent slopes, 272.42
- HeA, Henshaw silt loam, 0 to 2 percent slopes, 22.41
- HkA, Haskins loam, 0 to 2 percent slopes, 44.93
- HkB, Haskins silt loam, 2 to 6 percent slopes, 15.57
- HoA, Homer silt loam, 0 to 2 percent slopes, 427.93
- HoB, Homer silt loam, 2 to 6 percent slopes, 312.16
- KaB, Kendallville silt loam, 2 to 6 percent slopes, 56.61
- La, Latty silty clay, 1313.81
- Lb, Latty silty clay, occasionally flooded, 80.03
- Ln, Linwood muck, 86.85
- Lp, Lippincott silty clay loam, 956.74
- Ma, Martisco mucky silt loam, 2.28
- Mc, Martisco Variant silt loam, 17.88
- McA, McGary silt loam, 0 to 4 percent slopes, 53.07
- Mf, Milford silty clay loam, 92.39
- Mm, Montgomery silty clay loam, 4.2
- MmC2, Miami Variant silt loam, 6 to 15 percent slope, 5.6
- Mo, Montgomery silty clay loam, 56.55
- MoB, Milton silt loam, 2 to 6 percent slopes, 56.02
- MoC2, Milton silt loam, 6 to 12 percent slopes, 153.03
- MoD2, Milton silt loam, 12 to 18 percent slopes, 25.73
- Mp, Montgomery silty clay loam, gravelly substratu, 882.02
- MrC2, Morley clay loam, 6 to 12 percents slopes, ero, 30.88
- MrD2, Morley clay loam, 12 to 18 percent slopes, 47.26
- MsC2, Morley-Belmore complex, 6 to 15 percent slopes, 7.67
- Mt, Montgomery silty clay loam, 590.7
- Mu, Montgomery silty clay, 72.74
- Mv, Montgomery silty clay loam, gravelly substratu, 37.49
- MwC2, Morley clay loam, 6 to 12 percent slopes, 1.82
- MyC2, Morley silt loam, 6 to 12 percent slopes, 649.52
- MyD2, Morley silt loam, 12 to 18 percent slopes, 42.3
- Mz, Muskego muck, 8.32
- NaA, Nappanee silt loam, 2 to 6 percent slopes, 1243.51
- NaB, Napanee silt loa, 2 to 6 percent slopes, 6972.42
- OcA, Ockley silt loam, 0 to 2 percent slopes, 239.56
- OcB, Ockley silt loam, 2 to 6 percent slopes, 33.87
- Ot, Olentangy silt loam, 7.63
- Pc, Patton Variant silt loam, 40.71
- Pd, Paulding clay, 1021.74
- Pe, Pewamo silty clay loam, 3136.34
- Pg, Pits, gravel, 4.73
- Pk, Pits, quarry, 192.36
- Pm, Pewamo silty clay loam, 4550.22
- Pw, Pewamo silty clay loam, 681.23
- Ro, Roundhead muck, 62.01
- Sa, Saranac silty clay loam, occasionally flooded, 6.35
- ScB, St Clair silt loam, 2 to 6 percent slopes, 1159.75
- ScC2, St Clair silt loam, 6 to 12 percent slopes, 4044.85
- ScD2, St Clair silt loam, 12 to 18 percent slopes, 610.24
- Ska, <Null>, <Null>
- SlA, Sleeth silt loam, 0 to 2 percent slopes, 898.15
- SmA, Sleeth silt loam, 0 to 3 percent slopes, 20.58
- Ud, Odothents, 213.76
- W, Water, 5127.78
- Wa, Wallkill silt loam, 28.64
- We, Westland clay loam, 670.06
- Ws, Westland clay loam, 434.76
- Wt, Westland silty clay loam, 7.45
- Wu, West land silty clay loam, clay substratum, 1571.43
- Wv, Wetzel silty clay loam, 1422.94
- Wx, Willette muck, 37.91

Conservation Reserve Practices within ILWS

Legend

PRACTICE

- Conservation Cover
- Filter Strip
- Grassed Waterway
- Tree/Shrub Establishment
- Upland Wildlife Habitat Manage



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- ag_dist_2004_through_2009_ilws
- ag_dist_2005_throgh_2010_ilws
- ag_dist_2006_through2011_ilws
- ag_dist_2007through2012_ilws
- ag_dist_2008_through_2013_ilws
- permanent conservation easement/Watershed Boundary

Legend

100 year Floodplain within Watershed Boundary

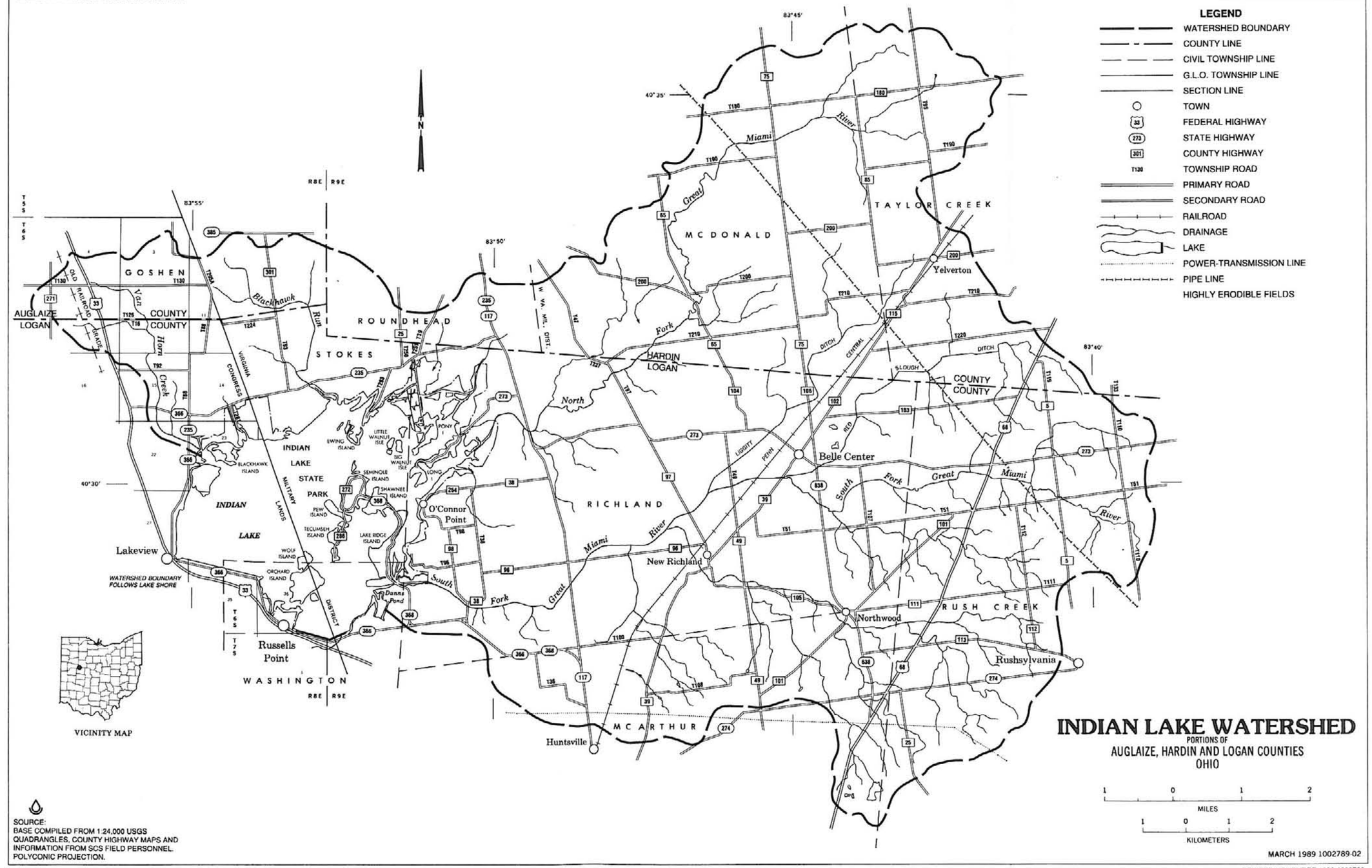
273

117

68

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



INDIAN LAKE WATERSHED

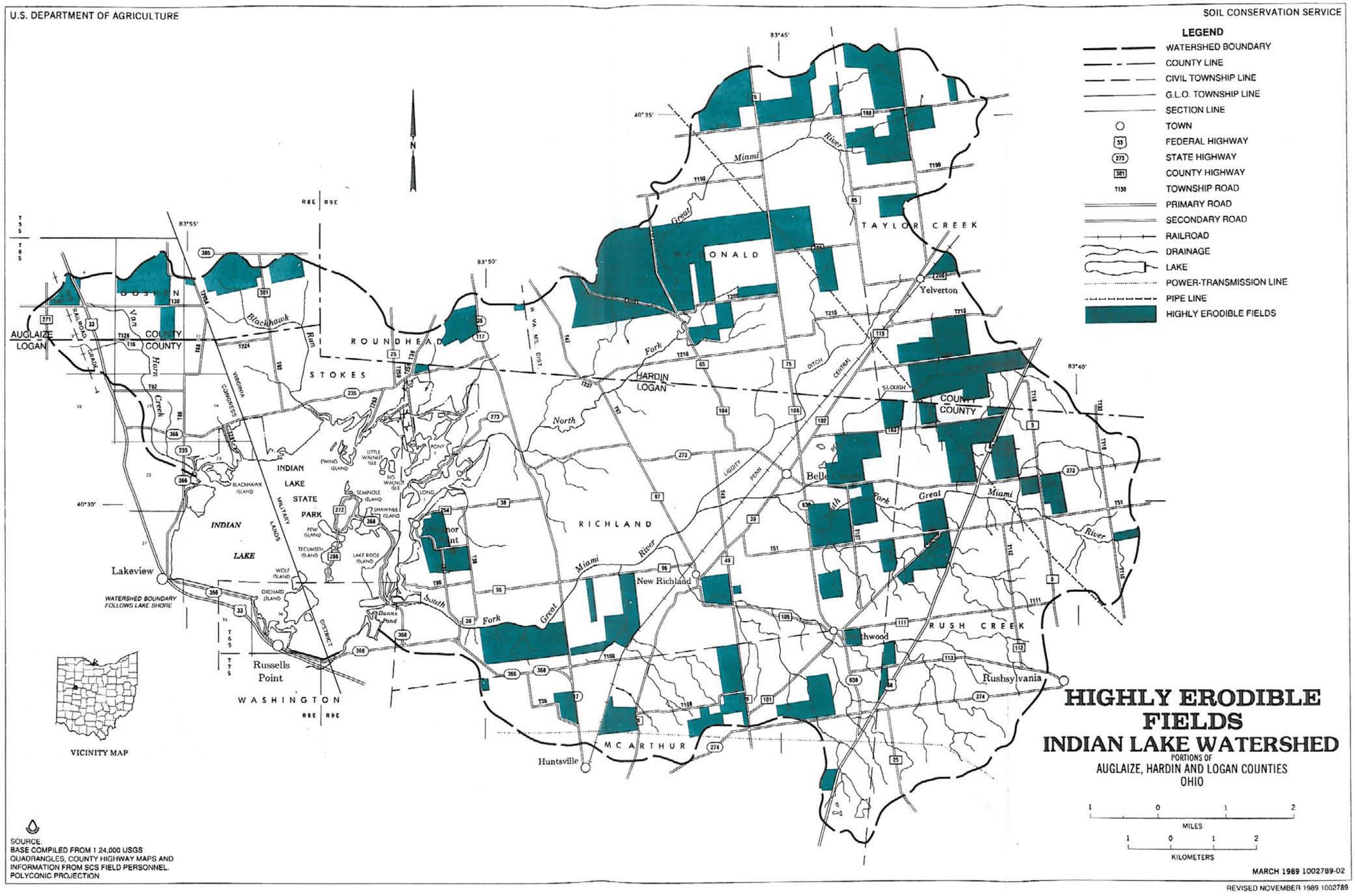
PORTIONS OF
AUGLAIZE, HARDIN AND LOGAN COUNTIES
OHIO

1 0 1 2
MILES
1 0 1 2
KILOMETERS

SOURCE:
BASE COMPILED FROM 1:24,000 USGS QUADRANGLES, COUNTY HIGHWAY MAPS AND INFORMATION FROM SCS FIELD PERSONNEL.
POLYCONIC PROJECTION.

MARCH 1989 1002789-02

REVISED NOVEMBER 1989 1002789


U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LEGEND
WATERSHED BOUNDARY
COUNTY LINE
CIVIL TOWNSHIP LINE
G.L.O. TOWNSHIP LINE
SECTION LINE
TOWN
FEDERAL HIGHWAY
STATE HIGHWAY
COUNTY HIGHWAY
TOWNSHIP ROAD
PRIMARY ROAD
SECONDARY ROAD
RAILROAD
DRAINAGE
LAKE
POWER-TRANSMISSION LINE
PIPE LINE
HIGHLY ERODIBLE FIELDS
N
R8E R9E
T5S
T6S
83°55'
83°50'
83°45'
40°35'
40°30'
AUGLAIZE COUNTY
LOGAN COUNTY
HARDIN COUNTY
LOGAN COUNTY
GOSHEN
ROUNDHEAD
STOKES
TAYLOR CREEK
RICHLAND
RUSH CREEK
MC ARTHUR
WASHINGTON
INDIAN LAKE STATE PARK
INDIAN LAKE
Lakeview
Russells Point
Huntsville
New Richland
Yelverton
Rushsylvania
Miami River
Great
Fork
North
South
Blackhawk Run
Horn Creek
Van Buskirk Ditch
Central Slough
Ligoty Penn Ditch
Dunns Pond
Ewing Island
Little Walnut Isle
Big Walnut Isle
Pony Island
Blackhawk Island
Seminole Island
Shawnee Island
Pew Island
Tecumseh Island
Lake Ridge Island
Wolf Island
Orchard Island
Long Island
Military Lands District
Virginia Congress Line
W. Va. Mil. Dist.
WATERSHED BOUNDARY FOLLOWS LAKE SHORE
VICINITY MAP
SOURCE:
BASE COMPILED FROM 1:24,000 USGS QUADRANGLES, COUNTY HIGHWAY MAPS AND INFORMATION FROM SCS FIELD PERSONNEL.
POLYCONIC PROJECTION
HIGHLY ERODIBLE FIELDS
INDIAN LAKE WATERSHED
PORTIONS OF
AUGLAIZE, HARDIN AND LOGAN COUNTIES
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MILES
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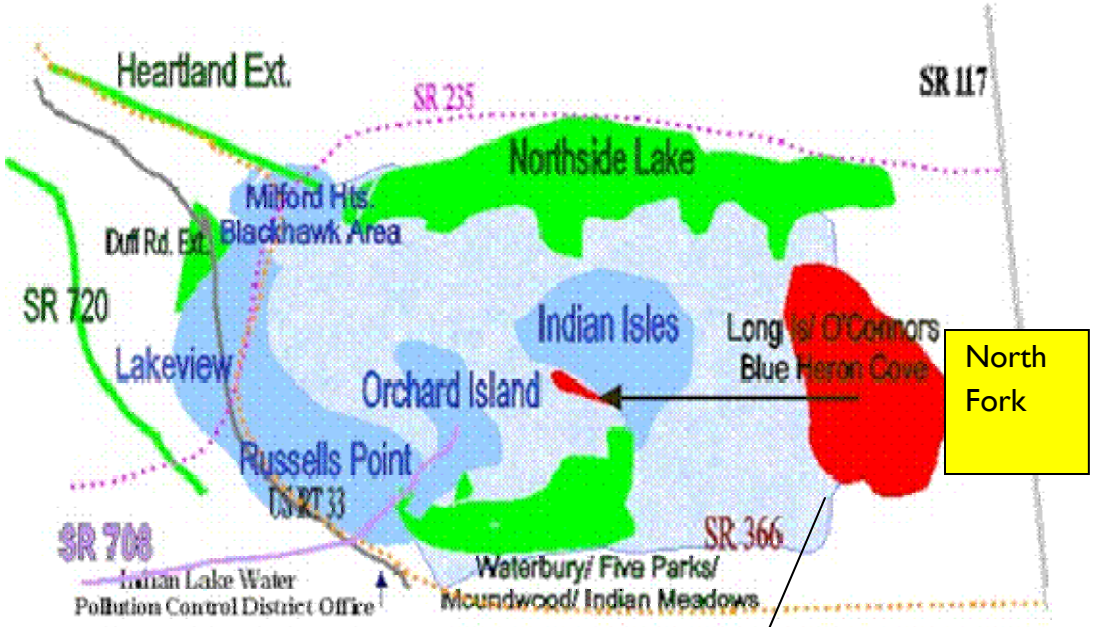
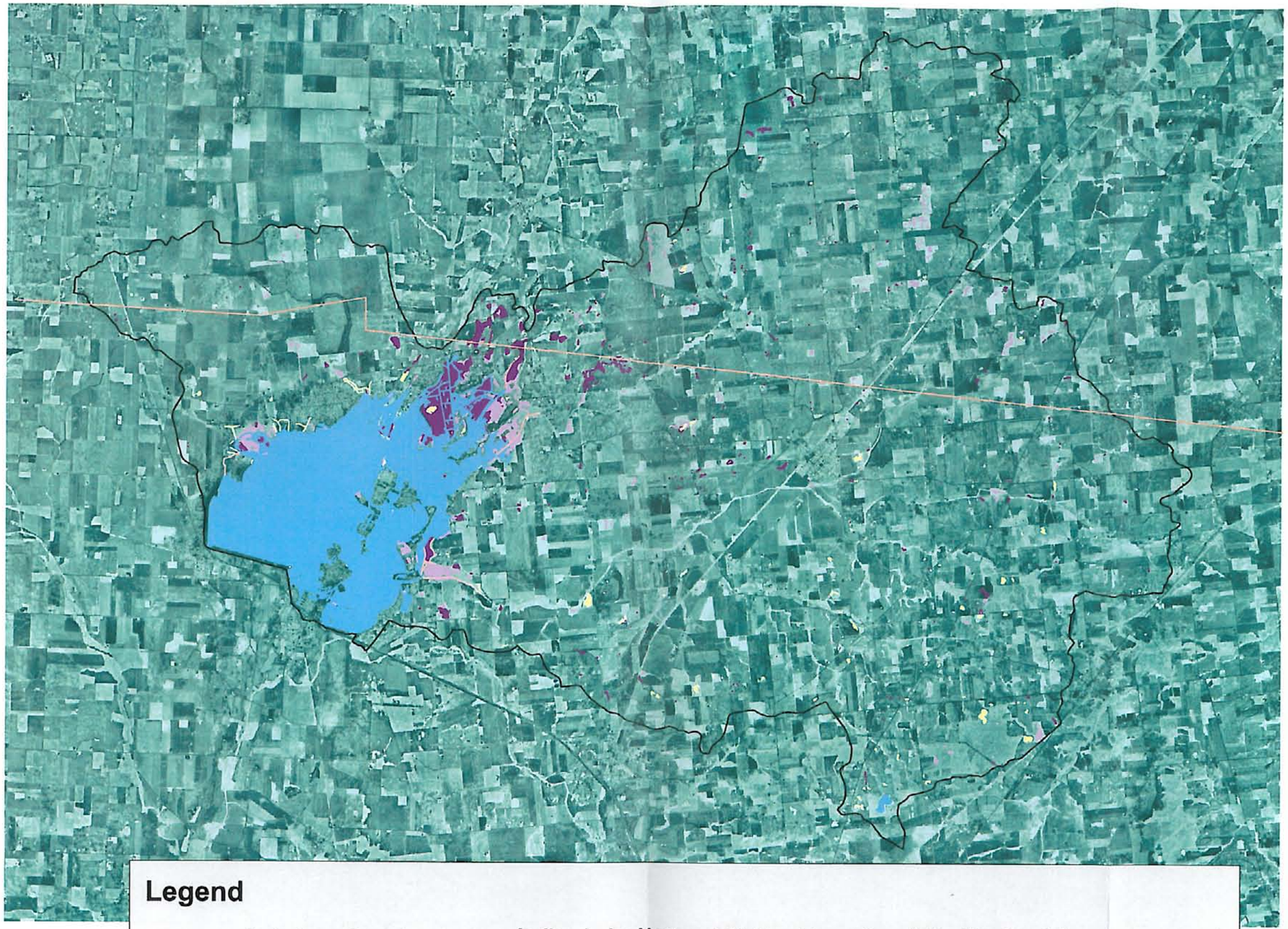
KILOMETERS
MARCH 1989 1002789-02
REVISED NOVEMBER 1989 1002789



Sanitary Sewer System

Areas within the sewer district. Image courtesy Logan County Water Pollution Control District.



Legend

Hardin_Logan_County Boundary_Line

Watershed Boundary

Indian Lake-National Wetland Inventory (http://wetlandsfws.er.usgs.gov)

- Freshwater Emergent Wetland, 647.57 ac
- Freshwater Forested/Shrub Wetland, 468.36 ac
- Freshwater Pond, 149.98 ac
- Lake, 5026.13 ac
- Riverine, 46.64 ac

Appendix II

BY-LAWS

ARTICLE I – NAME, AREA, AND BOARD OF DIRECTORS

Section I - Organizational Name
The name of this corporation shall be the "Indian Lake Watershed Project."

Section II – Program Area
The program area served shall include the entire watershed of Indian Lake within Auglaize, Hardin, and Logan counties as delineated by the USDA, Natural Resource Conservation Service.

Section III – Board of Directors
The Indian Lake Watershed Project shall be managed and represented by a body referred to as the "Indian Lake Watershed Project Board of Directors."

ARTICLE II – MISSION AND OBJECTIVES

Section I – Mission
This corporation is organized exclusively for charitable and educational purposes within the meaning of section 501(c)(3) of the Internal Revenue Code.

The mission of the Indian Lake Watershed Project is to facilitate and promote actions that will improve water quality for the benefit of recreation, agriculture, wildlife, and other users of the Indian Lake Watershed aquatic resources.

Section II – Objectives
A. Promote the reduction of nonpoint source pollution from all potential sources that may include agricultural, commercial, residential, and recreational.

B. Develop and offer youth/adult educational opportunities regarding relevant watershed management topics.

C. Foster cooperation between agriculture, commercial, residential, and recreational interests in order to enable coordinated action toward common goals.

D. Assist area decision makers in the development and coordinated adoption of sound watershed management policies.

E. To have and exercise all rights and powers which are conferred on nonprofit corporations or which may hereafter be conferred by the laws of the State of Ohio, including the power to contract, rent, lease or sell personal or real property; provided, that this corporation shall not, except to an insubstantial degree, if at all, engage in any activities, or exercise any powers, that are not in furtherance of the primary purposes of this corporation.

F. Notwithstanding any other provisions of these Regulations, the corporation shall not conduct or carry on any activities not to be conducted or carried on by:

1. An organization exempt from taxation under Section 501(c)(3) of the Internal Revenue Code and the Regulations promulgated thereunder as they now exist or as they may hereafter be amended, or
2. An organization, contributions to which are deductible pursuant to Section 170(c)2 of the Internal Revenue Code and the Regulations promulgated thereunder as they now exist or as they may hereafter be amended.

ARTICLE III – MEMBERSHIP

Section I – Active Members
Membership is available to individuals with an interest in supporting the mission of the Indian Lake Watershed Project. Membership can be individual, family, or corporate and is available upon receipt of annual dues.

Section II – Ex-Officio Members
The Board of Directors grants ex-Officio membership to individuals, including the Executive Director, who serve in an advisory and supporting capacity to the organization. These individuals are non-voting members of the Board of Directors. The Executive Director shall vote in the event of a tie.

Section III – Dues
Membership in this organization shall be for one year, renewable by the payment of dues. Annual membership shall become delinquent and inactive if not paid by the end of the fiscal year. The Board of Directors shall determine the amount of the dues for membership.

ARTICLE IV – MEETINGS OF MEMBERSHIP

Section I – Annual Meeting
The annual meeting of the Indian Lake Watershed Project shall be held at such time and place as designated by the Board of Directors. A notice regarding such meeting shall be made to each member at least 10 days in advance.

Section II – Special Meetings
Special meetings of the organization may be held at the request of the Board of Directors.

ARTICLE V – BOARD OF DIRECTORS

Section I – Membership

A. This corporation's Board of Directors shall consist of a minimum of 14 to a maximum of 25 representatives from the following positions/organizations:
    - Auglaize SWCD
    - Hardin SWCD
    - Logan SWCD
    - At large – Agriculture
    - Elected Officials (local government)
    - ILDC
    - ILSP Department of Natural Resources
    - Business Owners
    - Wildlife/Environmental Organization
    - Community Civic Organization
    - Coast Guard Auxiliary
    - Chamber of Commerce
    - Education
    - Industry
    - At-large – Residential
    - Other deemed appropriate by Board of Directors

B. Any vacancies may be filled by a majority vote of Board of Director members at a regularly scheduled meeting.

C. Members of the Board of Directors must be Active Members of the Corporation.

Section II – Directors Meetings and Quorum

In order to retain voting authority, directors must attend at least four meetings annually or notify Executive Secretary of an excused absence prior to any missed meetings or the Director will forfeit the position. The presence of 5 Directors of the Board of Directors constitutes quorum.

Section III – Powers of the Board of Directors

A. To establish the rules, objectives and long range plans for the organization;
B. To establish policies to govern the organization;
C. To delegate operation of the organization through the appointing of a competent Executive Director;
D. To evaluate the performance and progress of the organization in meeting its mission and objectives;
E. To authorize any officer or officers to enter in any contract or agreement on behalf of the association; such authority must be in writing; and
F. To designate officers of the Board of Directors to sign checks, drafts and other orders for payment of money.

Section IV – Election

Officers shall be elected at the meeting following the Annual Meeting. Officers shall be installed at the first meeting of the ensuing year.

Section V – Officers

A. The Board of Directors shall annually elect the following officers: President-Elect, Secretary/Treasurer.
B. A Director elected to President-Elect shall serve on the Board of Directors Executive Council for 3 years, which consists of one year as President-Elect, one year as President, and one year as Immediate Past-President.

Section VI – Officer Vacancy

An unfulfilled term may be filled by a majority vote of Board of Director members at a regularly scheduled meeting.

Section VII – Voting Authority
Voting authority for a member of the Board of Directors shall be granted to only those individuals meeting the following criteria:

A. Dues paying member of good standing with the corporation
B. Attended at least four meetings during the previous fiscal year as a voting member unless elected to Board of Directors within the past 6 months or prior notification of Executive Secretary/Treasurer of an excused absence, and
C. Serve, as appointed by the President, to various committee assignments.

Section VIII – Indemnification
The Board of Directors shall be indemnified by the Indian Lake Watershed Project against liabilities imposed upon them and expenses reasonably incurred by them in connection with any claim against them, or any action, suit or proceeding to which they may be a party by reason of their being a director. No director is indemnified (a) with respect to matters for which they shall be adjudged in such action, suit or proceeding to be liable for negligence or misconduct in performance of duty, (b) with respect to any matters which shall be settled by the payment of sums which independent counsel selected by the member(s) shall not deem reasonable payment made primarily with a view to avoiding expense of litigation, or (c) with respect to matters for which such indemnification would be against public policy.

Section IX – Duties of Officers

A. President – to preside at all the Board of Director meetings and to see that the authorized business of the corporation is carried to completion.
B. President-Elect – to assist the President and preside in the President's absence. If both President and President-Elect are absent, the Past President shall preside over the meeting.
C. Secretary/Treasurer – to keep minutes of all meetings, carry on official correspondence, collect all dues, pay authorized bills, present bills for audit prior to the annual meeting each year and conduct such business as shall be delegated him/her.
D. Immediate past President – Serve as a mentor to the President, presides at meetings when the President or President-Elect is not in attendance.

Section X – Executive Director
The duties of the Executive Director shall be determined by the Board of Directors and may include:

A. Supervise and coordinate the business activities of the corporation including human and financial resources;
B. Develop goals and plan to reach objectives of the corporation;
C. Execute policies developed by the Board of Directors;
D. Manage the day-to-day operations of the corporation; and
E. Provide reports for use by the Board of Directors and Executive Council on performance and progress of the corporation.

Section XI – Executive Secretary/Treasurer
The duties of the Executive Secretary/Treasurer shall be determined by the Board of Directors in consultation with the Executive Director and may include:

A. Serves as financial officer of the corporation;
B. Prepares fiscal reports to funding organizations/agencies;
C. Takes minutes and records of all Board of Directors meeting actions; and
D. Maintains Board of Director voting authority record.

ARTICLE VI – EXECUTIVE COUNCIL

Section I – Membership
The Executive Council shall consist of the Executive Director, Immediate Past President, President, President Elect, Secretary/Treasurer of the Board of Directors.

Section II – Responsibilities of Executive Council
A. To develop agendas and action plans for the Board of Directors;
B. Provide guidance between Board of Directors meetings to the Executive Director;
C. Represent the organization on public policy issues; and
D. Provide for an annual audit of all financial transactions.

ARTICLE VII – COMMITTEES AND WORKING GROUPS

Section I – Standing Committees and Working Groups
These committees consist of members of the Board of Directors and include committees such as Nominating, Funding, Public Relations, etc. Committee appointments should be made the first Board of Directors meeting following the Annual Meeting but assume responsibilities at the first meeting of the ensuing year.

Section II – Working Groups
Working Groups shall be determined by the Executive Council as needed to work on specific programs, events, etc. for a specified period of time. Members of the Board of Directors shall chair these Working Groups.

ARTICLE VIII – ORDER OF BUSINESS

Section I – Parliamentary Law
Robert's Rule of Order shall govern all meetings.

Section II – Agenda
The order of business at all meetings shall be as follows:
1. Roll Call / Introductions
2. Report of Minutes of preceding meeting
3. Fiscal Report / Approve Bills
4. Report of Officers and Executive Director
5. Report of Standing Committees
6. Report of Working Groups
7. Old Business
8. New Business
9. Miscellaneous

ARTICLE IX – FINANCIAL PROCEDURES

Section I – Fiscal Year
The fiscal year of the organization for accounting and tax purposes, and membership shall be January 1 to December 31.

Section II – Authority to Solicit and Receive Funds
The Indian Lake Watershed Project may accept, receive, and expend funds, grants, and services from the Federal Government or its agencies; from departments, agencies and instruments of state or local government; civic sources; private individuals; groups; and foundations. It may contract with respect thereto and will provide such information and reports as may be necessary to secure such financial aide.

Section III – Deposits
All funds shall be deposited in a bank or banks selected by the Board of Directors for disbursement.

Section IV – Approvals
The Board of Directors must approve all expenditures of disbursements from the Indian Lake Watershed Project treasury except for those in the amount to be determined by the Board of Directors, which may be approved solely by the Executive Director.

Section V – Audit
The Executive Council shall provide for an annual audit at the end of each fiscal year to confirm the authorized disbursement of and receipt of funds and shall provide for any other audits by law.

ARTICLE X – BOOKS AND RECORDS

There shall be kept at the office of the organization correct books of accounts of the activities and transactions of the association, including a minute book, which shall contain a copy of the articles of incorporation, these by-laws and all minutes of the board meetings.

ARTICLE XI – AMENDMENT PROCEDURES

These by-laws may be amended through the following procedures:

A motion for amendment to the by-laws may be made and seconded at any regular meeting of the Board of Directors. If the motion is approved, the Secretary shall thereafter, but not less than 10 days prior to the next scheduled meeting, forward to each member of the Board a copy of such proposed amendment together with a notice that it will be the subject of action at the next meeting. Such amendment, when presented and considered, shall be deemed adopted upon 2/3 vote of the Board of Directors in attendance at the board meeting.

ARTICLE XII – DISSOLUTION

Under dissolution of the organization, the Board of Directors thereof shall, after paying, or making provision for the payment of all liabilities of the organization, dispose of all the assets of the corporation exclusively for the primary purposes of the organization in such manner, or to such organization of organizations organized and operated exclusively for educational and environmental purposes as shall at that time qualify as an exempt organization or organizations under Section 501(c)(3) of the Internal Revenue Code and the Regulations promulgated thereunder (as they now exist or as they may hereafter be amended), as the Board of Directors shall determine. The Court of Common Please of the county in which the principal office of the organization is then located shall dispose of any such assets not so disposed of, exclusively for such purposes, or to such organization or organizations, as said court shall determine, which are organized or operated exclusively for such purposes.

ARTICLE XIII – BONDING

The corporation shall purchase a security bond for the officers, Executive Director, and Executive Secretary/Treasurer.

These By-Laws of the Indian Lake Watershed Project were reviewed and adopted by 2/3 vote of the Board of Directors present on _September 26, 2007.

In witness whereof, we have hereunto subscribed our names of this _24_ Day of October, 2007.

_____
Frank Phelps, President
Indian Lake Watershed Project
Board of Directors

_____
Dave Leiter, Secretary/Treasurer
Indian Lake Watershed Project
Board of Directors

This Guide jointly prepared by

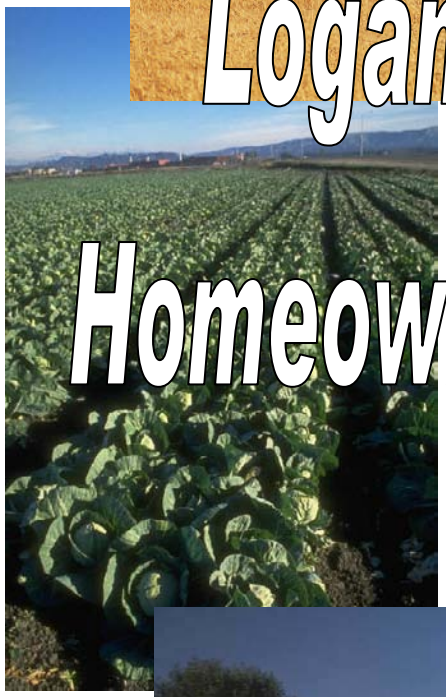
Indian Lake Watershed Project

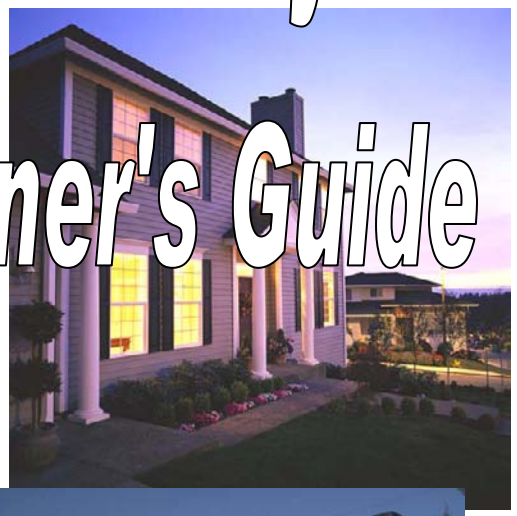
and

Logan Soil and Water

Conservation District

Logan County Homeowner's Guide





NEIGHBOR 2 NEIGHBOR

Through hard work, commitment and dedication, area farmers have made Logan County one of the richest and most diversified agricultural areas of the State. Logan County's diversity, geological setting, history and culture, recreational opportunities and strong employment also make our community ideal for development, expansion and growth.

Being a Good Neighbor

Being a good neighbor means being responsible, courteous and respectful of others. Being respectful of private property and the need for farmers to safeguard their businesses will help preserve the rural landscape so everyone can continue to enjoy it. Take the initiative to get to know your neighbors. Knowing your neighbors and letting them get to know you will speed a new relationship you need to build. Here are some tips to being a good neighbor.

Rural Residents and Country Dwellers:

- Keep your property neat, clean and trim. The vast majority of farmers and rural residents take pride in keeping their homesites presentable. Be a good neighbor and do your share.
- Keep your pets and other domestic animals restricted to your property. The open land may be a temptation to let your animals run loose which may cause crop damage and put livestock under stress.
- Keep your trash in a covered, enclosed receptacle. Refuse that blows onto an active farm can cause serious threats to crops, livestock, farm machinery and equipment.
- If you have a question about a farming or agricultural practice, talk to a farmer. As you discuss your needs with them, you will gain an understanding of the agriculture business. The goal is to find satisfying resolutions to any issues that may arise.
- Don't assume that farmland is open and available for your off-road vehicle or even for walking, anymore than your own backyard is open for others to access without permission.

Livestock Farmers:

- Don't spread manure on Fridays, especially before holiday weekends. Ask neighbors to let you know when a fresh application of manure may infringe on entertainment plans.
- Spread manure in the most environmentally friendly area and method possible.
- Take the time to explain what you do and why. For example, spreading manure on cropland recycles nutrients and puts the manure to productive use. Find out what your neighbor does for a profession as well.
- Explain why, at planting and harvest times, farmers must work late into the night and on weekends. If neighbors know there's an end to the extra noise, traffic, and lights, they may be more understanding.
- Take opportunities to educate. Consider hosting an open house or picnic for this purpose. Invite the neighbors over to see a newborn animal. Explore if there's a way that you can help the neighbors' kids with a class project.
- Be helpful. For example, when it snows, dig out your neighbors if you have a snow plow.
- Share with neighbors that animals require attention and care 24 hours a day, regardless of holidays and weekends.

AGENCY DIRECTORY—con't

McArthur Township
1st and 3rd Monday each month
Township Hall - 7:30 P.M.

Miami Township
3rd Monday each month
Township House - 8:00 P.M.

Monroe Township
2nd and last Monday each month
Township House - 7:00 P.M.

Perry Township
2nd and 4th Monday each month
Township House - 7:30 P.M.

Pleasant Township
2nd Tuesday each month
Township House-7:30 P.M.

Richland Township
2nd and last Friday each month
104 E. Buckeye-Belle Center 1:30 P.M.

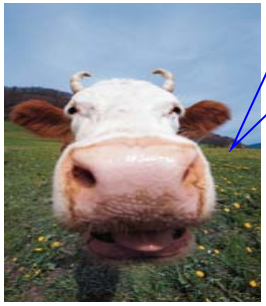
Rushcreek Township
1st Monday each month
Township House-7:00 P.M.

Stokes Township
every 2 weeks-Monday
Township House-8:00 P.M.

Union Township
2nd Friday each month
Township House-5:30 P.M.

Washington Township
2nd Monday each month
Township House-6:00 P.M.

Zane Township
1st Monday each month
Township House-7:00 P.M.



AGENCY DIRECTORY

Logan County Commissioners
117 E. Columbus Ave.
Bellefontaine, Ohio 43311
937-599-7283
www.co.logan.oh.us.commissioners

LUC Reg. Planning Commission
9676 E. Foundry Rd.
East Liberty, Ohio 43319
937-666-3431
www.lucplanning.com

Logan County Engineer
1991 Rd. 13
Bellefontaine, Ohio 43311
937-592-2791
www.co.logan.oh.us/engineer

Logan Co. Health Department
310 S. Main St.
Bellefontaine, Ohio 43311
937-592-9040
www.co.logan.oh.us/healthdepartment

Logan Soil & Water Conservation District
324 Co. Rd. 11
Bellefontaine, Ohio 43311
937-593-2946
www.co.logan.oh.us/soilandwater

Logan Co. Solid Waste Management
1855 W. St. Rt. 47
Bellefontaine, Ohio 43311
937-599-1253
www.logancountyrecycles.com

Refer to latest edition of the local telephone directory for names of township trustees, clerks, and zoning inspector

Bloomfield Township
2nd Monday each month
Township House-Bloom Center-7:30 P.M.

Bokescreek Township
2nd and 4th Wednesday each month
Township House-West Mansfield-7:30 P.M.

Harrison Township
1st and 3rd Monday each month
Township House-W. St.Rt. 47-7:00 P.M.

Jefferson Township
Last Tuesday each month
Trustee Office-4:00 P.M.

Lake Township
2nd and 4th Tuesday each month
Township House-7:30 P.M.

Liberty Township
1st and 3rd Monday each month
Township Hall-7:30 P.M.

.

TABLE OF CONTENTS

SECTION I *Before you Buy . . . .*

ITEMS TO CONSIDER . . .

CONTACT
SWCD, HD

A. SOILS

Important soil characteristics are located in the County Soil Survey. The Survey also contains predictions of soil behavior for selected land uses, limitations and hazards within the soil, improvements needed to overcome limitation, and impacts of selected land uses on the environment. Variations in soils can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Clayey or wet soils are poorly suited for the installation of septic tank absorption fields. A high water table makes a soil poorly suited to basements.

- What soils are found on the property?
- What are the soil limitations for building and sanitary systems?
  - ☼ Seasonal water table
  - ☼ Shrink or swell potential (future cracking due to contracting/expanding)
  - ☼ Standing water on the surface
  - ☼ Slope of the site (percentage of slope)
  - ☼ Sand or gravel subsoils
  - ☼ Depth to bedrock
  - ☼ Permeability (water movement within the soil)
  - ☼ Flooding hazard (See soil survey and FEMA maps)
- Will it be necessary to provide a drainage system or other measures to remove excess water?
- Will the lot meet health department requirements for on-site sewage disposal?
- Does the property have access to an adequate outlet for subsurface drainage?
- Is there enough topsoil to establish a good lawn and a productive garden?
- Does the lot surface seem to be free from rock formation that would adversely affect excavation for basement and foundation walls at 6 feet below the surface?

AGENCY ACRONYMS

SWCD—Logan Co. Soil & Water Conservation District
HD—Logan Co. Health Department
ENG—Logan Co. Engineer
RECY-Logan Co. Litter Prevention & Recycling
ZI—Township Zoning Inspector
TWP—Township Trustees
PLAN-LUC Planning Commission
UT-Public Utilities

GLOSSARY

Covenant - A binding agreement made by two or more persons or parties

Curtain Drain– A subsurface drain (pipe or tubing) installed for the purpose of lowering the perched water table in the vicinity of a leaching field.

Easement - A legal notification of a property right owned by others.

Effluent - The discharge or outflow of fluids from domestic waste collection systems.

EPA - Environmental Protection Agency

FEMA - Federal Emergency Management Agency

Floodplain - Nearly level land situated on either or both sides of a channel that is subject to overflow.

Floodway - Transitional area between the active channel and the floodplain.

Lien - A legal notification that the property is collateral for a loan.

Modified Channel—A water course that has been excavated, reshaped, and/or had the original vegetation removed.

Natural Channel—A water course that is usually characterized by a meandering channel with mature vegetation, usually trees, in and along the channel.

Permeability—Water movement within the soil.

Runoff - Water that flows off land into streams and other waterways.

Watershed - An area of land from which surface water drains into a common outlet, such as a river, lake or wetland.

Water Table - The level below which the ground is saturated with water.

C. SLOW MOVING VEHICLES

They can be large, oversized loads, small ATV's or even lawn mowers. If traveling under 25 MPH, it is required by law to have flashing amber lights and a florescent orange triangle 14 inches in height if on the highway. These slow moving vehicles appear before you realize it. Adjust speed accordingly on country roads allowing ample time for stopping.

Our County is blessed to have many Amish families that add to our diversity and culture. Their horse drawn buggies use our local roads and often are discovered unexpectedly around a corner or over a hill. Remember too, a horse is not a machine. It becomes tired, may be unpredictable and may spook easily if scared. Drivers of horse drawn vehicles have a restricted view of what is behind them. Know your "closure time".

D. TRESPASSING

Always obtain written permission from property owners beforehand. Specify the activity being engaged in on the document as well as the date(s) such activity is being permitted. Always treat other's land, buildings, fences, etc. with respect. Know where property boundaries are. Observe all wildlife and other applicable laws.

E. ESTHETIC VALUE

You are not the first to live here amongst this beauty. Respect the rights of those here before you. Leave the area as clean or cleaner than you found.

B. WATERSHED

CONTACT
SWCD, ENG

This county is divided by several watersheds. Watersheds provide water for drinking, irrigation, and industry. Land use changes above, below, or on your property that may affect your land, and ultimately your watershed include:

- Flooding
- Erosion
- Construction runoff
- Pollution from various source

What can and can't you do?

- Learn where the water comes from above you.
  - ☼ Tile
  - ☼ Open Ditch
  - ☼ County Maintenance
  - ☼ Private
- Learn where water on your property will go.
- Signs of Water Problems
  - ☼ Standing Water
  - ☼ No Grass
  - ☼ Gullies
  - ☼ Deep Road Ditch

C. SEWAGE SYSTEM

CONTACT
HD, ENG, SWCD

There are thousands of residences located in the county that are not served by central sewage treatment systems. At these homesites, sewage treatment becomes a do-it yourself operation. Steep slopes may affect the operation of conventional on-site sewage systems, seasonal high water table, limited depth to bedrock, and low permeability of soils.

- Are public sanitary sewers in place? If not, are any planned in the future?
- Does the lot meet minimum Health Department requirements, including isolation distance from any on-site sewage disposal system for the well?
- Is the lot located out of any flood hazard area?
- Is the lot large enough to permit relocation of the leach field?
- Is a detailed sketch or map available of the septic tank and leaching fields?
- Does the property have any access to an adequate outlet for curtain drain discharge?

D. WATER SUPPLY

CONTACT
HD

Public water systems radiate from cities, towns, and villages within the county, but many homeowners still must rely upon private supplies for water to meet their everyday needs.

It is the homeowner's responsibility to make sure water is safe and clean. If you are purchasing a residence with an existing or proposed well or cistern, here are some key points to remember:

- Before buying, obtain proof of the safety of the water and specific details on the construction and siting of the water supply.
- Have the water supply tested for bacteria, nitrates, etc.
- Continue monitoring your water by testing it at least once a year.

E. NATURAL FEATURES AND DRAINAGE CHARACTERISTICS

CONTACT
ZI, SWCD, ENG

The majority of land located in this county is nearly level and moderately sloping, dissected in some areas with small rivers and streams. Wetness is a major limitation within the county. The hazard of erosion is generally severe on sloping to steep soils and along stream valleys. Drainage problems may occur if a lot is located in a floodplain of a nearby stream, or in a natural drainage way. Even in upland areas, flooding can occur if the proposed building is located on a site that is lower than the surrounding area.

- Are the natural features of the lot acceptable? (drainage, wet areas, trees, streams, etc.)
- Can acceptable natural features be preserved at a reasonable cost?
- Is the property located in a floodway/floodplain/wetland area?
- Could there be runoff problems from adjacent properties?
- Should a natural buffer be maintained for protection of a water body?
- Are trees located on the site that could be saved for shade, wildlife, and protection?
- What is the prevailing wind direction? (a windbreak planting may be beneficial)
- Will you be considering geothermal heating or solar energy?
- Are there any current or proposed drainage improvements covered by a maintenance program?
- Is the property located near a natural stream or a modified channel? That picturesque wooded stream may require extensive modification to accommodate increased runoff resulting from land use changes.

A. WHY DO BURNING LAWS EXIST?

Burning laws exist for the following reasons:

1. Various materials react differently when on fire. Some even release toxic fumes that are harmful to humans and the surrounding environment.
2. Burning leaves and other plant materials release millions of spores. These spores may adversely effect people with allergies, others with breathing problems.
3. Every outdoor open fire emits contaminants directly into the air.

There are specific wastes that may be burned outside restricted areas. These wastes must be burned on the premises where generated.

1. Agricultural wastes except dead animals, garbage, chemicals, etc.
2. Landscape wastes such as trees, branches, brush, leaves and crop residue.
3. Residential wastes such as wood and paper products generated from family residences.

Material Illegal for Burning.

The following shall never be burned: materials containing rubber, grease, asphalt, plastics, waste from food preparation, and dead animals!

Do not burn when conditions are dry. A small spark can start a raging grass fire. Use common sense.

B. DRAINAGE

Each time a raindrop falls to the earth, some of it is absorbed (well water) and some of it runs off (creeks and lakes). Knowing where your "runoff" goes will make you a better neighbor. Keeping our lakes and streams clean is everyone's responsibility. Adding a new building, extending a roof line, paving a driveway are examples of impervious surfaces homeowners construct that can adversely impact water quality if not properly planned.

Wetlands, areas with hydric soils, hydrophytic vegetation and water, are prohibited from being drained. These diverse ecosystems are protected from being destroyed for they provide food and habitat for nearly 1/3 of Ohio's Endangered Species. Exceptions for use may be granted by Ohio EPA or U.S. Army Corps of Engineers.

SECTION II *After you build . . .*

CONTACT
RECY

G. HOUSEHOLD WASTE MANAGEMENT

Every day, more than 570,000 tons of garbage is thrown away. That's about 4.4 pounds of trash per day, per person. At least half of that garbage is recyclable, but once we throw it away its value is lost. Recycling takes just a little more space than traditional garbage disposal.

Litter Prevention is a community affair. Composting is another method. It is the controlled process of biodegradation. It occurs naturally everywhere. By composting, your wastes become a valuable resource.

Newspaper is one of the easiest things to recycle, and it comprises the largest portion of municipal solid waste. Recycled newspaper is made into new boxes, newsprint and tissue paper

Glass containers are 100% recyclable. They are crushed into cullet to produce new containers. Using cullet to produce glass saves energy because it allows for lower temperatures in furnaces, which saves fuel and reduces air emissions.

Aluminum products are recycled into new aluminum products. It takes the same energy to make one new can from raw aluminum ore as 20 new cans from recycled ones.

Plastics are used more each year. Recycled plastics are made into urethane foam, skis, fiberfill, fuel pellets, industrial paint, and more.

Steel containers use tremendous amounts of iron ore, a nonrenewable resource. It takes 2,700 pounds of iron ore to produce 1 ton of steel.

Other items that may be recycled include oil, corrugated cardboard, office paper, scrap metals, paper grocery bags, appliances, and car batteries.

Grass clippings, tree and shrub trimmings and most non-fatty table scraps are examples of what can be composted.

SECTION I *Before you Buy . . . .*

F. REGULATIONS, LEGAL REQUIREMENTS, LOCAL ASSESSMENTS

CONTACT
ZI, ENG, PLAN, TWP

- Have you checked existing township zoning and building regulations for the lot and surrounding area?
- Have you checked specifications for an needed driveway culverts?
- Are there easements on existing drainage ditches?
- Are there existing easements, right-of-ways, or utilities across the property? (Call 1-800-362-2764, before any excavation for underground utility location service.)
- Does the lot have a clear title?
- If the property is in a subdivision, are there restrictive covenants?
- Are the corners of the lot marked clearly with iron pins? Can you find each referenced point mentioned in the deed description?
- What is the tax structure for real estate? Property Tax? Any special assessments?
- Is there a fire company that will respond to a call in the area? How far is the fire station? Does the community have an ambulance and a rescue squad?
- Have you checked on water, sewer, and/or drainage maintenance assessments?
- If you are considering pond construction, have you checked on any requirements or permits necessary?

G. COMMUNITY FEATURES

CONTACT
UT, ENG, SWCD, PLAN,

Be sure to consider the existing neighborhood features and how they might change in the future.

- What utilities are available? Electric, gas, water, sewer, telephone, cable?
- Are sidewalks, curbs and streetlights installed, or will they be added in the future?
- Have you checked surrounding area land use that could be considered an inconvenience or adversely affect the resale value of the property?
- Is there a safe vehicle entrance and exit from the road?
- What school system is the property located in? Is school bus service available?

A. EROSION PROBLEMS?

CONTACT
SWCD

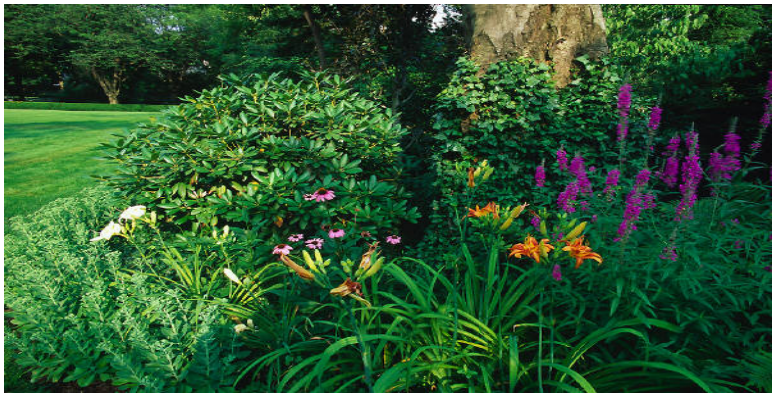
Erosion occurs when wind, rain or running water dislodge soil`particles, organic matter and plant nutrients, then carries them away. The results of erosion cause valuable topsoil to be lost, which will be deposited into rivers, ditches and streams where it plugs culverts and clogs streams. This adversely affects aquatic life, wildlife, and flood control. Because of the harmful effects erosion has on the environment, it is important to reduce erosion in your own yard.

Be alert to these signs of erosion:

- **Bare spots anywhere on your property**
- **Tree roots exposed above ground**
- **Small stones or rocks appearing on the surface**
- **Small rills or gullies starting to form**
- **Silt accumulation in certain areas**
- **Soil splashed on windows and walls**

Some suggestions for getting started include:

- Inventory your property for problem areas. Attack bare spots first by planting the species suited best for the site. Remember to mulch.
- Fertilize thin vegetation to increase plant coverage and soil retention.
- Plant trees, for they increase property values, their leaves reduce rainfall impact, and their roots hold soil.
- Use non-plant materials to reduce erosion in stubborn spots where plants cannot thrive.
- Place stepping stones or gravel where foot traffic is heavy.
- Consult a trained engineer for structural solutions for difficult slopes.
- Where possible, divert surface water flow from newly seeded areas until growth is sufficient to hold against the power of moving water.



F. ATTRACTING BACKYARD WILDLIFE

CONTACT
SWCD

The presence of wildlife can make a backyard or woodlot a better place. Urban development is rapidly displacing many birds, mammals, and butterflies from their natural habitats. By creating a mini-sanctuary on your property, you can attract and hold many species of wildlife. Plan the landscaped area to include three basic elements that all wildlife require: food, water, and shelter. The ideal wildlife management plan provides a year-round succession of nuts and berries to feed a wide variety of animal species. Select plants that will flourish in your yard's unique conditions of soil type, moisture, light, and slope.

FEEDING. . .

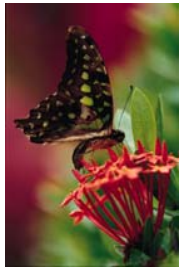
Supplemental feeding will help bridge the gap for your backyard winter residents and provide you with many hours of enjoyment. Remember to keep your feeders well-stocked until spring when natural sources of food become more abundant. Seed-eaters such as sparrows, finches, and cardinals will eat sunflower seeds, cracked corn, millet, and commercial seed mixes. The fruit-eating mockingbirds, catbirds, robins and jays enjoy raisins and chopped fruit. High-energy suet is favored by woodpeckers, chickadees, and nuthatches.

WATER. . .

A simple birdbath or ground watering device can supply wildlife with water for drinking and bathing. Encourage winter activity by keeping part of the pool free of ice.

SHELTER. . .

Your wildlife plan should include both escape cover, to serve as a home base for wildlife, and nesting cover, to provide a safe place for producing and raising young. These areas can be created by planting trees and shrubs with overhanging branches and establishing groundcovers or prairie grasses. Rows of trees and shrubs can provide cover and act as a wildlife corridor while giving you privacy, reducing strong winds, and screening noise. Fore more information on using conservation practices such as tree planting, wildlife habitat, contact the soil and water conservation district. A backyard habitat planning and planting kit is also available from the National Wildlife Federation.



WILDLIFE CONFLICTS. . .

Should human/wildlife conflicts arise, technical assistance is available from the SWCD office.

CONTACT
HD

E. MANAGING YOUR ON-SITE SEPTIC SYSTEM

The most widely used type of on-site system is the septic tank with a soil absorption system. It provides wastewater treatment in two stages. First, wastewater is discharged to a septic tank, a buried watertight tank in which household wastes can settle to the bottom to be decomposed by bacteria into sludge. Lighter materials, such as grease, float to the top and form a scum that is trapped in the tank by baffles. During the second stage of treatment, the septic tank liquid or effluent discharges to a soil absorption system (also called a leach field/drain field). This system is a network of underground perforated pipes. Effluent flows through the pipes, out the holes, and into the soil, which acts as a filter, removing the remaining suspended substances, pollutants, and bacteria. The following guidelines are most applicable to conventional systems:

Managing your on-site system begins with a simple awareness of your household habits. Here are a few "dos" and "don'ts" to practice:

- **<u>Do</u> wash only full loads of laundry and spread out loads to avoid overloading your on-site system.**
- **<u>Do</u> use phosphate-free detergent to prolong your system's life.**
- **<u>Do</u> use good quality toilet paper that breaks up easily when wet.**
- **<u>Don't</u> deposit coffee grounds, cooking fats, wet-strength paper towels, disposable diapers, facial tissues, or similar materials that do not easily decompose.**
- **<u>Don't</u> use a garbage disposal unless you're prepared to have your septic tank pumped out frequently.**

- Know the location of your septic tank and soil absorption field.
- Contact the health department for a list of reputable septage haulers and keep track of when your septage is pumped.
- If you system has a pump or other electrical components, maintain them regularly.
- After a power failure, check that all components are operating properly.
- Practice water conservation to avoid overworking your system and to extend its life. This includes installing flow restrictors in the shower; using low-water-use washing machines, toilets, and dishwashers; repairing leaky faucets and fixtures.
- Divert runoff away from your soil absorption system to avoid saturating the soil. Make sure water from gutters and runoff from driveways are directed away from the drainfield.
- Do not construct anything or pasture animals over your on-site system. Structures can compact the soil and prevent it from absorbing, filtering and evaporating the effluent. This can alter routine maintenance or repair of the system.
- Inspect your system at least once a year. Bright green grass growing over the drainfield, especially during the drier months, often indicates that the system is malfunctioning and effluent is rising toward the surface. The health department can offer advice on how to repair your drainfield.

By understanding and properly managing your on-site system, you will not only enhance your property and immediate neighborhood, but you will also prevent public health hazards and the pollution of groundwater and nearby streams and lakes.

B. IS YOUR LAWN FLOODED?

CONTACT
SWCD

There are two methods to handle excess water, depending on whether the problem is with surface or subsurface water. In some cases, both surface and subsurface drainage systems will be needed in order to solve the problem.

SURFACE DRAINAGE

Every dwelling should have a grading and landscaping plan to provide control of all surface water runoff on the lot. Additions to the landscaping plan, maturity of shrubbery, soil erosion, etc. ten to change drainage. Surface water should never be directed toward the foundation wall.

To keep water away from the building, make sure any surface water traveling across the yard is directed away from the building. Build up the soil at the foundation wall to make it necessary for the water to flow away. Keep gutters and downspouts clean and maintained. Extend downspout drains as far away from the foundation as possible.

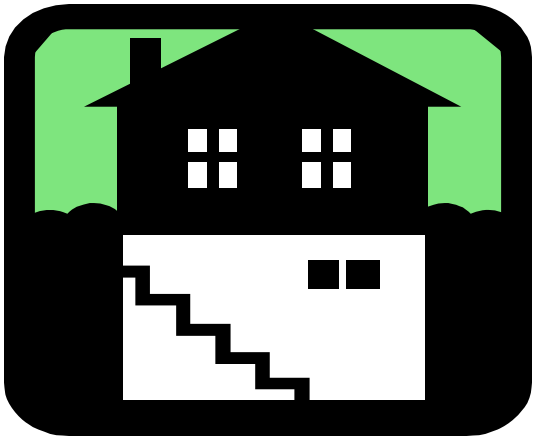
SUBSURFACE DRAINAGE

Subsurface drainage systems are generally constructed of perforated, corrugated plastic tubing. Excess water is drained through pipes, which are placed underground. These pipes are usually at least 4 inches in diameter and surrounded with gravel. The pipes drain excess water from the lawn, footer drains, and downspouts into outlets such as ditches or storm sewers, provided there is an outlet. Never outlet these pipes into the sewage system.

C. DO YOU HAVE A WET BASEMENT?

Water generally enters a basement through the walls, through the joints between the wall and floor, and/or backs in through a floor drain.

- If water is entering through the wall, the waterproof seal is either cracked, to thin, missing, or the footer drains may be inadequate. This can be checked by exposing the exterior wall where the most seer interior leakage is occurring.
- If the waterproof seal is missing and the leakage is widely distributed, you will need a contractor who specializes in such things. In any case, make sure that the exterior surface grading is taking the surface water away from the foundation before you proceed.
- If water is entering through the joint between the wall and the basement floor, or through floor cracks, there may be water pressure under the floor. Foundation drains relieve this pressure.
- If you have water along or under the basement floor, your home either does not have footer drains or they are not functioning properly. In most cases, the exterior wall will require excavation down to the footer and a functioning drain installed.



CONTACT
SWCD

D. PHYSICAL CHANGES TO THE PROPERTY

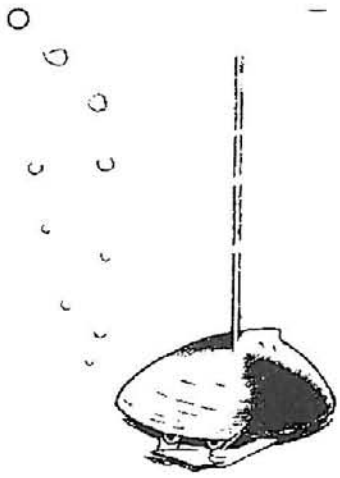
A small stream flowing through your property can be a valuable asset if it is clean, attractive and free of erosion. Unfortunately, streambank erosion has become a major problem, particularly in urban areas where continued development has increased pavement, rooftops, and other impermeable surfaces that prevent water from soaking into the soil. This increases the volume of water, pollutants and sediments in the stream and may cause streambank erosion.

Attractive buffer zones of vegetation near streams can enhance your property and intercept eroded soils and nutrients before they reach the water. Trees are especially important to streambank stability and stream health. They provide shade, which decreases stream temperature and creates a more favorable environment for aquatic life. Vegetation not only stabilizes banks, but may also filter nutrients and sediments harmful to streams.

Most streambank stabilization projects involve working together with other property owners. Some things you can do to clean up your stream and minimize erosion include:

- Remove large obstructions and man-made litter from our stream.
- Never dump leaves or grass clippings near or into a stream.
- Build steps or a ramp into the stream if you need access.
- Control runoff by improving drainage around your home.
- Plan suitable vegetation along the streambank.
- Do not straighten streams or remove gravel bars from the stream bottom, they will reshape themselves again.
- Plan for more water in 10 years than you have now, there will be more impervious surfaces in the future.

Citizen Lake Awareness & Monitoring



Manual for Lake Monitors

Updated

March 2008

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What is CLAM?

The Citizen Lake Awareness and Monitoring program enables the Ohio public to take an active role in learning about aquatic ecology, lake and stream water quality, and pollution prevention. Participants become trained citizens that gather vital water quality data to document the changing conditions of Ohio waterbodies. CLAM then provides this information to concerned individuals, water management groups, and to local, state, and federal agencies to evaluate and improve Ohio lakes and their watersheds. The CLAM program is also an excellent networking opportunity for citizens and environmental organizations.

CLAM's mission is: To care for Ohio lakes and their watersheds.

CLAM's goals are:

1. To promote citizen awareness of the impact of nonpoint source (NPS) pollution on lakes and watersheds.
2. To encourage local watershed-based initiatives to control NPS source pollution.
3. To generate the formation and growth of lake management organizations to ameliorate the impacts of NPS pollution.
4. To provide educational opportunities for citizens to learn about the biological, geological and sociological relationships between lakes and the surrounding watershed.
5. To maintain a database of the water quality information to be used by concerned individuals, environmental organizations, local, state and federal agencies, and the CLAM monitors to evaluate and improve Ohio lakes and their watersheds.

Training:

Ohio Lake Management Society and **Ohio Environmental Protection Agency** are working together to provide training workshops for volunteers to achieve Qualified Data Collector status. Technical Support, Equipment, Data Collection and Quality Control are the responsibility of OLMS.

CLAM is sponsored by the **Ohio Lake Management Society (OLMS),** with funding from the **Ohio Environmental Protection Agency (OEPA) (OEEF Grant) and Cincinnati Foundation**. Additional support is provided by **Kent State University (KSU), Ohio Department of Natural Resources (ODNR), Richland County Soil and Water Conservation District (SWCD), Ohio State University (OSU) Extension**, and the **Muskingum Watershed Conservancy District (MWCD).**

For more information, see our web site at:

www.olms.org

CLAM Contacts

The following people comprise the staff of the CLAM program. If you have any requests or questions regarding CLAM or the monitoring methods, please write or call the Regional Coordinator or Lake Representative in your area or the Program Manager. See map on page 6 for a listing of Ohio CLAM regions.

CLAM Program Manager:

Matthew Smith
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P.O. Box 463 Kent, OH 45424
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CLAM & OEPA Program Trainer:

Carl H Moore
Ohio Lake Management Society
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CLAM **Regional Coordinators:**

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oleskic@olms.org

Not Filled, Muskingum Region

Not Filled, Maumee Region

Not Filled, Scioto Region

Robert Mason, Miami and South Regions
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304 Crescent Ave.
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Mark Swiger, Muskingum and East Regions
Muskingum Watershed Conservancy Dist.
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CLAM **Lake Representatives:**

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Mansfield, OH 44905-1503
419-589-5951

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Willard, OH 44890
419-933-8303

Phil Clem, Indian Lake
US Coast Guard Auxiliary
11306 Oneida Path
Lakeview, OH 43331-9235
937-843-5146

CLAM **Advisory Board Members:**

Dr. Robert Carlson, Co-Chair
Kent State University

Erik Akin
Northeast Ohio Four County Regional Planning & Development Organization

Robert Mason
Hamilton County Park District

Carl Moore
CLAM monitor & OEPA trainer

Dana Oleskiewicz
Ohio State University Extension

John Reinhard
CLAM monitor

Mark Swiger
OLMS Secretary / Muskingum Watershed Conservancy District

CLAM Regions

Safety First

Your personal safety is our (and should be your) primary concern. Be sure to follow all boat safety rules when taking readings. Some definite rules to follow include:

Do not go onto the lake if your safety would be at risk.

Do not go onto the lake if it is raining or if the weather even suggests that it might rain. **Lightning**, of course, is the primary reason for not going out, but also the possibility of **high winds**; **waves** and **limited visibility** are safety considerations. Remember that you should be taking Secchi readings on clear or partly cloudy days only; clouds may produce erroneous readings. Get off the lake immediately if there is thunder or lightning.

Do not take readings if heavy boat traffic or lake users (water skiers or jet skis) could put your safety at risk.

The Coast Guard requests that you wear your life jacket at all times. Even if you can swim, remember that you are required to wear a life jacket. You will be leaning over the edge and there is always the possibility that you will fall overboard.

Always anchor your boat. You need to do so to get good readings. And, if you happen to fall out, your boat won't leave you out there alone.

Be careful about the stability of your boat. If possible, don't use a canoe or flat-bottomed boat because they are unstable and prone to tipping. If you use one of these boat types, keep your center of gravity well within the boat; don't lean too far out to see the Secchi disk.

Take along a friend. Use the buddy system so that if something happens to you, there will be someone else who can help.

Data Collection Method

Introduction

One of the goals of the program is to train the monitors to do basic lake quality monitoring. Two of the most common measurements taken are the Secchi disk depth and water temperature.

With this information, we can start to compile a computerized record of the lake, allowing us to document the condition of the lake over time. This helps us to determine what management plans, if any, should be implemented and if they are working. Even if your lake does not have a pollution problem, it is a good idea to have background information on record to alert you to any changes in the lake condition. Each sampling site must have its own ID number.

Sampling Sites

Site Selection

When you are selecting the location of a sampling site or sites, it is recommended that you have a map available that shows the different depths of the lake. The primary sample site should be at the deepest part of the lake and can be easily located by referring to your map. If you cannot obtain a map of the lake, the deepest part of a reservoir will usually be near the dam or if it is a pond, near the spillway.

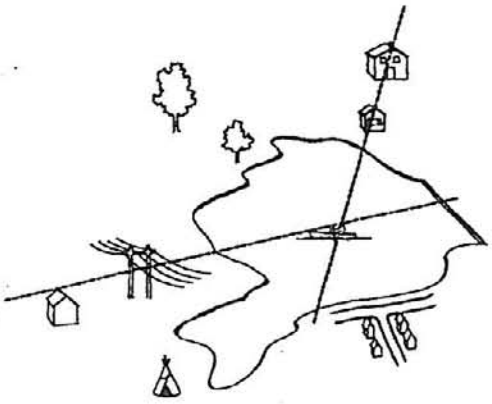
The second and third sites are optional and are not necessary for smaller lakes and ponds. If you would like to collect data at additional sample sites for the larger lakes and reservoirs, you are encouraged to do so. These additional sites could be located near the headwaters, the center of the lake, in large coves, or other branches of the lake. If two people monitor the same lake, each monitor can sample a different site or be an alternate in the event that someone is unable to sample at their site at any given time.

Finding and Marking Your Site

The first time you are out on the lake; use a map to help you locate the sampling site. Once you have located the site, look for several landmarks you can use to help you find the site the next time. It is important that you use the same site on each monitoring trip. Try to locate at least three different landmarks and write them down on the back of the data sheet. Better yet, draw a map that contains the landmarks. This will help you remember the landmarks and, if you are going to miss a sampling date, a QDC-trained alternate can use them to find the site(s).

Make every effort to acquire the Latitude/Longitude using Topozone.com, GPS unit or USGS map, etc; for each sampling site.

This method of using landmarks to locate a position is called **triangulation**. It is important that the Secchi depth readings be taken in the same general area. Using triangulation will aid you in locating the same sampling site each time you collect data.



The lake monitor in this illustration is triangulating his position by lining up the tops of two houses in one direction with the line-up of the house and power poles in the other. When all four objects are in line, the monitor is over the sampling site.

If you are collecting data on ponds or smaller lakes, you may want to use a marker buoy to mark your sampling site so you can always return to the same spot. If you do not have a buoy, you can easily make one using an old plastic milk carton filled with Styrofoam beads anchored to some kind of weight. Buoys are not recommended for public lakes or reservoirs, since the buoy may interfere with boating or other recreational activities.

The Equipment

Secchi Disk

Water transparency is one of the easiest measurements to make and can provide valuable data about the lake. The Secchi disk is a simple scientific instrument used to measure water transparency. The Secchi disk is eight inches in diameter and has alternating black and white quadrants. The disk is attached to a non-stretchable rope so that it can be suspended in the water column. It is named after Pietro Angelo Secchi, a Jesuit astronomer who used a disk to measure the transparency of the Mediterranean in 1865. The operation of a Secchi disk is simple: using the techniques described below on page 13 you achieve the Secchi depth which is an indicator of the transparency of the water. It can provide a rough estimate of light penetration in the water column. For example, the greater the Secchi depth reading, the greater the water clarity is documented.

This is important for a number of reasons. For example, as a general rule, aquatic plants can penetrate to a depth of 2 times the Secchi depth. If the Secchi depth was 5 feet, then sufficient light for algal or rooted plant growth can penetrate to a depth of 10 feet (5 feet x 2 = 10).

The Secchi disk depth can be affected by dissolved color in the water, algae, or suspended sediment. Dissolved water color comes from the decay of plant material in the watershed and the lake itself. Small lakes surrounded by a forested watershed or small bogs may have water deeply stained and have a diminished transparency. Second, the microscopic plants called algae are an important part of the food web in a lake. At high densities, algae will reduce the Secchi depth.

Finally, suspended sediment is the largest water pollutant volume in the United States and the most comman reason for a decreased Secchi disk reading. Sediment can be brought into the lake from a variety of sources and, depending on the type of lake, can easily be re-suspended in the water column. In a shallow lake, winds can mix the water causing the sediment to be re-suspended off the lake bottom. Rough fish such as carp and bullheads will often stir up sediment while searching for food. When sediment is suspended in the water, it gives the water a muddy or cloudy appearance and reduces the water transparency

Water Color Chart

When submitting your Secchi depth data, we know what the water transparency is, but we don't know whether the transparency was affected by dissolved color, algae, or suspended sediment. The color of the water has been found to help us decide what type of substance may be affecting transparency. Record the color chart number that best matches water color at one-half the recorded Secchi depth reading.

If the lake has a small Secchi depth and a green color, we know that algae were reducing the water transparency. If the lake is a muddy brown color, then sediment was reducing the water clarity. Finally, if the lake has a relatively large transparency but has a brown water color, then the lake may be influenced by dissolved color in the water.

Thermometer

The thermometer supplied will be used to take the air temperature and the water temperature. Water is collected one foot below the surface in a container and the thermometer temperature stabilized before taking the temperature reading.

On Shore Preparations

When to Monitor

The Secchi depth data should be collected during the **first and third weeks of each month, May through October,** between the hours of **10:00 a.m. and 4:00 p.m.**.. Try to allow a two-week period (or at least ten days) between sampling dates to get an overall view of conditions during the month. Attempt to monitor on bright, calm days, however, this may not always be possible.

Equipment Check

Before leaving home, check to make sure you have all the equipment and the Data Reporting Forms with you. Go through the checklist in your manual and make sure you have all the equipment needed so that nothing is left behind.

Data Sheet Entries

Some of the data can be recorded before you leave the dock or while you are waiting in line at the boat ramp. Please try to fill in as much as possible before leaving the shore, except for the specific site data (Secchi depth, water temperature, water depth, etc.).

Monitor Name: Put the name and QDC # of the QDC-trained monitor who will verify the Secchi readings. Put the name of the monitor on the form also. You will speed the data entry process if you enter your name and QDC #. Over time your CLAM ID# will be replaced with your QDC#.

Lake Name: Please enter the full name of the lake, pond or reservoir and the assigned ID# for that body of water.

Date: Write the complete date (i.e. May 4, 2007). Do not use only numbers (5/4/07) because of potential confusion as to whether the month or day comes first.

Time of Observations: Please put the time you arrive at your site. Do not forget to mark AM or PM, even though it may seem obvious to you.

Latitude/Longitude: Enter in decimal degrees for each sampling site location.

Cloud Cover: Record an X in the description of clouds present when you reach your first sampling site. The amount of cloud cover can affect your readings, so try to visit your site on clear or partly cloudy days. Under **no circumstances** should you try to get a reading when it is raining. Remember, your safety is more important than a Secchi reading. If you are on the lake and it starts to thunder, get off the lake immediately!

Rainfall: Put an X where appropriate if rain occurred on the monitoring date (today) or one to three days prior. You may want to start recording rainfall the three days before the monitoring day so you do not have to look it up later. We use this data to see if rainfall and subsequent runoff may affect Secchi readings. Also indicate whether the rain or describe another factor that has made the site unusually turbid.

Wind Direction: Mark the direction from which the wind is blowing.

Management Practices: Please note if anything has been done to manage the algae, weeds, sediments, etc. since your last visit. When was it done? Practices might include the application of copper sulfate, weed harvesting, the addition of grass carp, or sediment dredging.

Water Quality: While still on shore, go to the bottom half of the form and mark the description that best describes your opinion today on how suitable the lake water is for each recreation and aesthetic enjoyment.

Excellent, No Problems - beautiful, could not be any nicer
Minor Problems - very minor problems, excellent for this purpose
Slight Use Impairment - use for this purpose is slightly impaired
Substantial Impairment - desire to use the lake for this purpose is reduced
Use Totally Impaired - enjoyment of the lake for this purpose is nearly impossible

The term "overall water quality" should include your general impression of the quality of the lake water today (or in the past two weeks). Do not include factors such as weather.

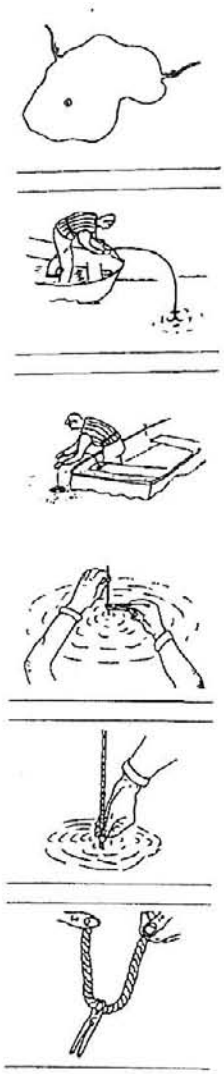
Next mark what you believe to be the biggest problems of your lake (site) today (or in the past two weeks). Please check all that apply. Use the classification above to estimate the degree of impairment caused by any of these factors. If other factors seem to be impairing the use of the lake, please note them as well.

Other Information: Write any other information that you think might be useful in our understanding of your lake (i.e. fish kills, development in the watershed, etc.).

Communications: Need more Data Reporting Forms? Your thermometer broke? Have any suggestions or questions? Please write in your comments or call the QDC trainer for a more prompt response. Do not hesitate to be critical. The QDC program can only improve with your help.

On the Lake

Sampling Sites Using the techniques described above (triangulation or buoy marking). Go to your designated site.



Anchoring at the Site

Anchor the boat to prevent drifting. Be careful not to disturb the sediments on the bottom when anchoring since this could cloud the water and interfere with the Secchi disk reading, especially in shallow lakes.

Taking the Secchi Disk Depth

1. Once you are properly anchored at the sampling site, go to the shady side of the boat and if you are wearing sunglasses, remove them.
2. Lower the Secchi disk straight down into the water until the disk just disappears from sight. Mark the rope at the water level with a clothespin.
3. Lower the disk about another foot. Slowly raise the disk up until it reappears. Mark the rope at the water level with your other clothespin.
4. To find the Secchi depth, grasp both clothespins in one hand and find the center of the loop of rope. Move one clothespin to that point and remove the other. This point is one-half the distance between the point of disappearance of the disk and the point where it reappeared. Measure the distance from this point to the Secchi disk.
5. Record the Secchi depth on your data card to the nearest inch.
6. The OEPA form requires two Secchi readings and the average of the two readings recorded to the nearest half inch.

Diagrams courtesy of the Wisconsin Department of Natural Resources self-help Lake Monitoring Handbook, 1986.

Estimating Water Color

1. Lower the Secchi disk to one-half the Secchi disk depth recorded averaged reading.
2. Describe the color by comparing the water color against the white quadrants of the Secchi disk with the color strip provided by OLMS. Record the number for the best color estimate.

Taking the Water Temperature

1. Lower the container one foot below the water level and fill it with water.
2. Bring the container out of the water and insert the thermometer into the container. Wait about two minutes and read the temperature without removing it from the water.
3. Record the temperature on the data sheet.

Measuring Water Depth

After taking your Secchi depth and color measurement, use the Secchi disk to find the water depth. This depth should be about the same each time you sample. If the depth is different (over one foot), check your landmarks to make sure you have triangulated to the proper location. Remember that heavy rains or drawdown can change the lake level and affect the water depth at the sampling site.

Lower the Secchi disk to the bottom and read the water depth from the marks on the line. Record the depth to the nearest half foot. Please, do not measure the water depth before you take your Secchi reading; the disk will disturb the bottom mud and ruin your reading.

Completing the Data Reporting Form

1. Record the level of the waves at the site. Choose the best fit from the four (1-4) options provided. Do not record in **INCHES or feet**.
2. Some reservoirs have a lake level or staff gauge located at the dam. If there is a gauge at your lake, record the lake level to the nearest hundredth of a foot (two decimal places). Even a small change in water level can mean a large change in the water volume of the lake.
3. Record any miscellaneous information you may consider important.
4. Check over the data form before you leave the site to make sure everything has been completed. Send the forms in at the end of July and October to program manager listed on page 4. Suggest you make a copy of your reports to keep on hand for Quality Control.

Quality assurance/Quality control

The key word is "consistency".

Consistency is making sure equipment is functional and calibrated. Preparations, monitoring schedule and location are consistent. Data collection and methods are consistent.

Keep up-dated with training sessions to stay current with any changes in procedures and QA/QC requirements. Your Qualified Data Collector status must be kept current with OEPA requirements.

Sampling site criteria:

- One primary (deepest part of lake)
- ID number (each site)
- Latitude/Longitude (each site)
- Sampling site constant (year after year)
- New sites must be registered.

Maintaining these procedures allows for the highest data quality and comparability.

Attachments:

Equipment List

QDC Data Report Form (suggest making copies from this copy)

Monitoring Equipment List

Quality Assurance/Quality Control

Make sure equipment is functional and calibrated

Life Vest(s)
Properly Equipped Boat
Anchor
Secchi Disk with calibrated rope
Two Clothes Pins
Color Chart
Ruler
Thermometer
Water Collection Bottle
Watch
Data Report Form(s)
Pencils or pens
Clipboard

Additional Equipment Suggestions

Monitoring Partner
GPS (if available)
Something to drink
Hat
Extra Rope
Monitoring Handbook
Rain Protection Gear
Cell Phone (Full Charged)
Items you want with you

Lake Data Sheet – Division of Surface Water Volunteering Monitoring Program

QDC Name_____ QDC #_____

Monitor Name_____ Phone #_____

Lake Name_____ Date:_____

Site #___ Latitude/Longitude (in decimal degrees):_____°N / _____° W
Site #___ Latitude/Longitude (in decimal degrees):_____°N / _____° W
Site #___ Latitude/Longitude (in decimal degrees):_____°N / _____° W
Site #___ Latitude/Longitude (in decimal degrees):_____°N / _____° W

Lat/Long Source (topozone.com, GPS unit, USGS map, etc.)_____

Please use checkmarks to indicate the following:

Cloud Cover: ( ) Clear ( ) Hazy ( ) Few Clouds ( ) Many Clouds ( ) Overcast
Rainfall Occurred: ( ) Today ( ) Yesterday ( ) 2 days prior ( ) 3 days prior
Wind Direction: ( ) None ( ) N ( ) NE ( ) E ( ) SE ( ) S ( ) SW ( ) W ( ) NW

Lake Data

Lake Level_____ Air Temperature (°F or °C)_____

Please record the following for each site you monitor (and be sure to indicate if the disk is seen on the lake bottom).

Site # *	Time (am/pm)	Secchi #1 (nearest inch)	Secchi #2 (nearest inch)	Secchi Average	Water Depth (nearest ½ ft)	Water Color (or Color #)	Water Temp (°F or °C)	Waves 1-4 **

* When applicable. Some lakes will have multiple sampling locations. Latitude and Longitude for multiple location sites should be recorded with Ohio EPA (by sample site #) prior to submission of data.
** Waves from 1 to 4: 1-calm, 2-ripples, 3-moderate waves, 4-white cap

Has recent rain or other factors made your site unusually turbid today? ( ) Yes ( ) No

Please describe any recent lake or watershed management techniques (i.e., dredging, chemicals, etc.)
Type and Date:_____

Indicate with a checkmark whether the lake is suitable for the following purposes during the last two weeks (Please do not include impairment due to weather):

Overall Water Quality	Excellent, No Problems	Minor Problems	Slight Use Impairment	Substantial Impairment	Total Impair.
Swimming	( )	( )	( )	( )	( )
Boating	( )	( )	( )	( )	( )
Fishing	( )	( )	( )	( )	( )
Aesthetics	( )	( )	( )	( )	( )

Indicate with a checkmark the problems on your lake during the last two weeks. Check all that apply.

Algae	( )	( )	( )	( )	( )
Weeds	( )	( )	( )	( )	( )
Silt Turbidity	( )	( )	( )	( )	( )
Boat Congestion	( )	( )	( )	( )	( )
Jetskis	( )	( )	( )	( )	( )
Trash	( )	( )	( )	( )	( )
Other_____	( )	( )	( )	( )	( )

Note: This section is for people participating in the Ohio Lake Management Society/ Citizen Lake Assessment Monitoring (OLMS/CLAM) Program

CLAM Volunteer ID#_____

CLAM Lake ID#_____

Mail completed data sheets to:

CLAM Program Manager
Matthew Smith
Ohio Lake Management Society
P.O. Box 463 Kent, OH 45424
440-992-5845 smith@olms.org

RECYCLE: FOLLOW NATURE'S LEAD

YOUR RECYCLING CENTER: USE IT, BUT DON'T ABUSE IT.

Full time, never closed, drop-off recycling centers provide an easy recycling option for everyone. With your help these Centers will make a big difference in helping Logan County recycle needed and valued commodities such as cardboard, paper, plastic, glass, and metals. See the inside section to learn which items are accepted at the Centers.

Infrequently someone has an old couch, a bed frame, a torn, plastic swimming pool liner, or florescent light tube to unload. Unfortunately for them they tried to use one of the Recycling Centers as a "dumping ground" for these items. With 24 hour camera surveillance these folks ended up in Municipal Court paying a lot more than it would have cost them to use proper disposal methods for these items. If the signs say we accept it, put it in the correct container; if you don't see it listed, we don't take it.

STATE-OF-THE-ART CENTER: PAYT TRASH DISPOSAL AVAILABLE.

Pay-As-You-Throw (PAYT) trash dumpsters are available at each Center for household trash contained in a PAYT green bag. Only specially made green PAYT bags may be used for trash disposal at these Centers. The Green PAYT bags cost is $1.00 per bag, with packages of five bags available in the vending machine at each Center, or at the Lakeview Village Office and Tinsley's Market. Single bags and packages of five bags are sold through the vending machines at each Center.

REDUCE, REUSE, RECYCLE; ALL THE WAY TO ZERO WASTE

As our economy adjusts to reduce dependence on expensive foreign oil, and to avoid the possibility of climate change, everyone needs to be a wise consumer of our natural resources. Limited resources are becoming apparent throughout the world and we all need to reduce our use of virgin resources by reducing wasteful ways, by reusing items, and by recycling as much as possible. The goal in Logan County is to use resources wisely and to reuse, recycle, or compost everything we use. Logan County has adopted a goal of zero waste to a landfill by 2020. We need everyone to be part of this effort to succeed.

Lakeview Recycling Center

Opened Earth Day, 2007

The Lakeview Center is located behind the Lakeview Village Office, and next to US 33. This Center was built on Village property through agreement with the Lakeview Village Council, Ryan A. Shoffstall, Mayor.

Moundwood Recycling Center

Opened Earth Day, 2008

The Moundwood Center is located a the south end of the Moundwood Boat Ramp parking lot in the Indian Lake State Park. It is a cooperative venture with Indian Lake State Park, Frank Giannola, Manager.

Future Recycling Centers

Full time, drop-off recycling centers in Logan County are state-of-the-art facilities, built as cooperative ventures between the Logan County Solid Waste Management District, local governmental agencies, and the Logan County Commissioners, John Bayliss, David Knight, and Jack Reser.

The importance of recycling as a component of local and national efforts to build a sustainable economy is gaining momentum. Recycling, one of the most important paths to conserving electrical energy, reusing valuable natural resources, and reducing the amount of money you pay to have trash buried in a landfill. You wouldn't bury your money in a landfill ... so why do it indirectly by burying your recyclables?

LOGAN COUNTY RECYCLING CENTERS

LAKEVIEW MOUNDWOOD

Always Open
Convenient Locations
PAYT Trash Service
Video Surveillance

Easy to Use for Household Recycling

Logan County SOLID WASTE MANAGEMENT DISTRICT

Printed on Recycled Paper

Recycling Opportunities at the Lakeview & Moundwood Recycling Centers

PAPER PRODUCTS

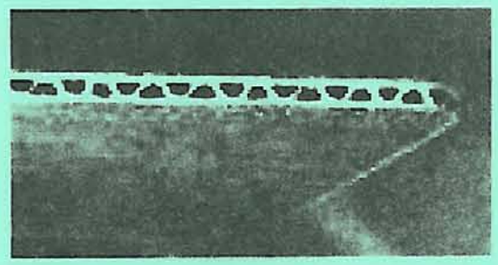
Paper, dry, and not contaminated with food, is accepted. All kinds of paper products are acceptable:

- Newspapers
- Magazines
- Advertising slick inserts
- Junk mail
- Office paper
- Computer paper
- Paper bags
- Telephone books
- Paperback books
- Christmas & Gift wrapping
- Chip board—that is the thin, grey paperboard used to make cereal boxes, cracker & shoe boxes.

Place paper loose in the roll-off container labeled "Paper". Don't tie it up. Don't toss paper into the dumpster in plastic bags. Empty the bags and take the plastic bags with you, or deposit the bag in special, small door in the shed. Plasticized paper used in pet food bags is not recyclable.

CORRUGATED CARDBOARD

Corrugated cardboard is brown and is universally used to package items for shipment to stores:



Cardboard boxes are large and small, from the box your TV came in down to the size of your hand.

Cut or flatten cardboard boxes and insert them into the "Cardboard Only" containers through the slots in the front or sides.

Nothing but cardboard goes into the "Cardboard Only" container.

CALL IF YOU HAVE QUESTIONS
937-599-1253,
or go online to:
logancountyrecycles.com

CO-MINGLE: PLASTIC, GLASS, TIN & ALUMINUM CANS

Plastic containers

Many plastic containers are completely recyclable. Water bottles, milk bottles, etc. Look for the triangle on the bottom with a #1 or #2 inside the triangle.

PETE HDPE

Only #1 and #2 are recyclable at this time.

- Water bottles
- Soft drink bottles
- Water jugs
- Milk bottles
- Detergent bottles
- Bleach bottles
- Fabric softener bottles
- Plastic catsup & mustard
- Motor oil containers
- Many deli containers
- Medicine bottles
- Some ice cream buckets

Rinse container clean before recycling. Double rinse motor oil & peanut butter containers.

Aluminum, tin, glass

Food and drink containers made of aluminum, tin, and glass are all recyclable.

- Aluminum cans
- Tin cans
- Metal cans, (including spray cans that are empty and do not any toxic liquid.)

- Glass bottles, clear, green, or brown. (window glass, and glass wear is not recyclable)

HOUSEHOLD BATTERIES

Flashlight, camera, and other batteries, including 9-volt, Hg, Ni-Cad batteries are collected through a small door in the shed. Batteries D, C, A, AA, AAA, and button batteries are accepted. Place in a zip-lock bag. NO LEAD-ACID BATTERIES, such as car or boat batteries are accepted at drop-off sites.

THIS COULD BE YOU!!!!!!

We give young men and women ages 14 to 20 the opportunity to experience many outdoor water adventures. Here are just some of the things we have done and are planning to do.

SEA SCOUT SHIP 246

Indian Lake Yacht Club
246 Chase Street
Russells Point, OH 43348

Phone: 937-592-8687
E-mail: skippership246@yahoo.com
Web: www.sss246.org

SEA SCOUTS BSA

RUSSELLS POINT, OH

SEA SCOUT SHIP #246 INDIAN LAKE OHIO

246
INDIAN LAKE YACHT CLUB
Russells Point, Ohio

SEA SCOUTS BSA

Sea Scouting in America was founded in 1912. At it's core is the idea that young adults get the chance to experience all that the water has to offer. Initial pursuits included sailing and boating but over the years this has advanced along with technology. Sea Scouts are able to get involved in activities ranging from sailing, power boating, water skiing, wakeboarding, scuba diving, deep sea fishing, the list goes on and on. Sea scouts are also granted the opportunity for advancement in a program that is laid out under the Sea Scout manual. The scouts will learn valuable skills and knowledge that will last a lifetime.

CALENDER OF EVENTS

Winter Orientation Meeting

(All are welcome: Pizza will be served)

January 5th 6:00pm

@ Indian Lake Yacht Club

Cleveland Boat Show

January 24th and 25th

Cleveland, OH

Winter Training Weekend

February 27th to March 1st

@ Son Center

Lewistown,OH

Discover Scuba

March –April

@ Dayton, OH

Lorain Regatta

May 2009

@ Lorain, OH Maumee river

Weekly on-water activities begin

June 1st 6:00pm (Every Monday during the summer)

@ Indian Lake Yacht Club

Thomas Smith Sea Scout Regatta

July 11th and 12th

@ Chicago, IL Yacht Club

Conclusion

If you have always wanted to be a part of something great, look no further. This group is run 100% by the youth members. The adults are merely there to provide guidance and advice. The reason this is important to note is that the scouts learn valuable communication skills, schedule events and coordinate activities that are exciting to them. Sea Scouts is the oldest boating organization in the world for young adults. Backed by the Boy Scouts of America both young men and women can get involved and experience all there is to offer.

Appendix III

Appendix III

Bird, Animal and Plant Inventory

	Common Name	Scientific Name
Birds	Red-Throated Loon	*Gavia Stellata*
	Common Loon	*Gavia Immer*
	Pied Bill Grebe	*Podilymbus Podiceps*
	Horned Grebe	*Podiceps Auritus*
	Red-Necked Grebe	*Podiceps Grisesena*
	Eared Grebe	*Podiceps Nigricollis*
	Double-Crested Cormorant	*Phalacrocorax Auritus*
	American Bittern**	*Botaurus Lentiginogus*
	Least Bittern	*Ixobrychus Exillis*
	Great Blue Heron	*Ardea herodias*
	Great Egret	*Ardea Alba*
	Cattle Egret	*Bubulcus Ibis*
	Green-Backed Heron	*Butorides Virescens*
	Black-Crowned Heron	*Nycticorax Nycticorax*
	Tundra Swan	*Cygnus Columbianus*
	Mute Swan	*Cygnus Olor*
	Greater White-Fronted Goose	*Anser Albifrons*
	Snow Goose	*Chen Caerulescens*
	Canada Goose	*Branta Canadensis*
	Wood Duck	*Aix Sponsa*
	Green-Winged Teal	*Anas Crecca*
	American Black Duck	*Anas Rubripes*
	Mallard	*Anas Platyrhynchos*
	Northern Pintail	*Anas Acuta*
	Blue-Winged Teal	*Anas Discors*
	Northern Shoveler	*Anas Clypeata*
	Gadwall	*Anas Strepera*
	American Widgeon	*Anas Americana*
	Canvasback	*Aythya Valisineria*
	Redhead	*Aythya Americana*
	Ring-Necked Duck	*Aythya Collaris*
	Greater Scaup	*Aythya Marila*
	Lesser Scaup	*Aythya Affinis*
	Oldsquaw	*Clangula Hyemalis*
	Black Scooter	*Melanitta Nigra*
	Surf Scooter	*Melanitta Perspicillata*
	White-Winged Scooter	*Melanitta Fusca*
	Common Goldeneye	*Bucephala Clangula*
	Bufflehead	*Bucephala Albeola*
	Hooded Merganser	*Olphodytus Cucullatus*
	Common Merganser	*Mergus Merganser*
	Red-Breasted Merganser	*Mergus Serrator*
	Ruddy Duck	*Oxyura Jamaicensis*
	Turkey Vulture	*Cathartes aura*
	Osprey	*Pandion Haliaetus*

Birds (cont.)	Ring-Billed Gull	*Larus Delawarensis*
	Herring Gull	*Larus Argentatus*
	Great Black-Backed Gull	*Larus Marinus*
	Black Legged Kittiwake	*Rissa Tridactyla*
	Caspian Tern	*Sterna Caspia*
	Common Tern	*Sterna Hirundo*
	Forster's Tern	*Sterna Forsteri*
	Least Tern	*Sterna Anatillarum*
	Black Tern**	*Chlidonis Niger*
	Rock Dove	*Columbia Livia*
	Mourning Dove	*Zenaida Macroura*
	Black-Billed Cuckoo	*Coccyzus erythropthalmus*
	Yellow-Billed Cuckoo	*Coccyzus americanus*
	Eastern Screech Owl	*Megascops asio*
	Great Horned Owl	*Bubo Virginianus*
	Long-Eared Owl	*Asio Otus*
	Short-Eared Owl	*Asio Flammeus*
	Common Nighthawk	*Chordeiles Minor*
	Chimney Swift	*Chaetura Pelagica*
	Ruby-Throated Hummingbird	*Archilochus Colubris*
	Belted Kingfisher	*Ceryle Alcyon*
	Red-Headed Woodpecker	*Melanerpes Erythrocephalus*
	Red-Bellied Woodpecker	*Melanerpes Carolinus*
	Yellow-Bellied Sapsucker**	*Sphyrapicus Varius*
	Downy Woodpecker	*Picoides Pubescens*
	Hairy Woodpecker	*Picoides Villosus*
	Northern Flicker	*Colaptes Auratus*
	Pileated Woodpecker	*Bryocopus Pileatus*
	Olive-Sided Flycatcher	*Contopus Cooperi*
	Eastern Wood-Pewee	*Contopus Virens*
	Yellow-Bellied Flycatcher	*Empidonax Flaviventris*
	Acadian Flycatcher	*Empidonax Virescens*
	Alder Flycatcher	*Empidonax Alnorum*
	Willow Flycatcher	*Empidonax Traillii*
	Least Flycatcher	*Empidonax Minimus*
	Eastern Phoebe	*Sayornis Phoebe*
	Great Crested Flycatcher	*Myiarchus Crinitus*
	Eastern Kingbird	*Tyrannus Tyrannus*
	Horned Lark	*Erenophila Alpestris*
	Purple Martin	*Progne Subis*
	Tree Swallow	*Tachycineta Bicolor*
	Northern Rough-Winged Swallow	*Stelgidopteryx Serripennis*
	Bank Swallow	*Riparia Riparia*
	Cliff Swallow	*Petrochelidon Pyrrhonota*
	Barn Swallow	*Hirundo Rustica*
	Blue Jay	*Cyanocitta Cristata*
	American Crow	*Crovus Brachyrhynchos*
	Carolina Chickadee	*Poecile Carolinensis*
	Tufted Titmouse	*Baeolophus Bicolor*
	Red-Breasted Nuthatch	*Sitta Canadensis*
	White-Breasted Nuthatch	*Sitta Carolinensis*
	Brown Creeper	*Certhia Americana*

Birds (cont.)	Carolina Wren	*Thryothorus Ludovicianus*
	House Wren	*Troglodytes Aedon*
	Winter Wren	*Troglodytes Troglodytes*
	Sedge Wren	*Cistothorus Platensis*
	March Wren	*Cistothorus Palustris*
	Golden-Crowned Kinglet	*Regulus Satrapa*
	Ruby-Crowned Kinglet	*Regulus Calendula*
	Blue-Gray Gnatcatcher	*Polioptila Caerulea*
	Eastern Bluebird	*Sialia Sialis*
	Veery	*Catharus Fuscescens*
	Gray-Cheeked Thrush	*Catharus Minimus*
	Swainson's Thrush	*Catharus Ustulatus*
	Hermit Thrush	*Catharus Guttatus*
	Wood Thrush	*Hylocichla Mustelina*
	American Robin	*Turdus Migratorius*
	Gray Catbird	*Dumetella Carolinensis*
	Northern Mockingbird	*Mimus Polygiottos*
	Brown Thrasher	*Toxostoma Rufum*
	Water Pipit	*Anthus Spinoletta*
	Cedar Waxwing	*Bombycilla Cedrorum*
	European Starling	*Sturnus Vulgaris*
	White-Eyed Vireo	*Vireo Griseus*
	Bell's Vireo	*Vireo Bellii*
	Solitary Vireo	*Vireo Solitarius*
	Yellow-Throated Vireo	*Vireo Flavifrons*
	Warbling Vireo	*Vireo Gilvus*
	Philadelphia Vireo	*Vireo Philadelphicus*
	Red-Eyed Vireo	*Vireo Olivaceus*
	Blue-Winged Warbler	*Vermivora Pinus*
	Golden-Winged Warbler**	*Vermivora Chrysoptera*
	Tennessee Warbler	*Vermivora Peregrina*
	Orange-Crowned Warbler	*Vermivora Celata*
	Nashville Warbler	*Vermivora Ruficapilla*
	Northern Parula	*Parula Americana*
	Yellow Warbler	*Dendroica Petechia*
	Chestnut-Sided Warbler	*Dendroica Pencylvanica*
	Magnolia Warbler	*Dendroica Magnolia*
	Cape May Warbler	*Dendroica Tigrina*
	Black-Throated Blue Warbler	*Dendroica Caerulescens*
	Yellow-Rumped Warbler	*Dendroica Coronata*
	Black-Throated Green Warbler	*Dendroica Virens*
	Blackburnian Warbler	*Dendroica Fusca*
	Prairie Warbler	*Dendroica Discolor*
	Palm Warbler	*Dendroica Palmarum*
	Bay-Breasted Warbler	*Dendroica Castanea*
	Blackpoll Warbler	*Dendroica Striata*
	Cerulean Warbler	*Dendroica Cerulea*
	Black-And-White Warbler	*Mniotilta Varia*
	American Redstart	*Setophaga Ruticilla*
	Worm-Eating Warbler	*Helmitheros Vermivorum*
	Ovenbird	*Seiurus Aurocapilla*
	Northern Water thrush	*Seiurus Noveboracensis*

Birds (cont.)	Bald Eagle**	*Haliaeetus Leucocephalus*
	Northern Harrier**	*Circus Cyaneus*
	Sharp-Shinned Hawk	*Accipiter Striatus*
	Cooper's Hawk	*Accipiter Cooperii*
	Broad-Winged Hawk	*Buteo Platypterus*
	Northern Cardinal	*Cardinalis cardinalis*
	Red Tailed-Hawk	*Buteo jamaicensis*
	Rough-Legged Hawk	*Butboeo Lagopus*
	American Kestrel	*Falco sparverius*
	Peregrine Falcon**	*Falco Peregrinus*
	Ring-Necked Pheasant	*Phasianus Colchicus*
	Northern Bobwhite	*Colinus Virginianus*
	Virginia Rail	*Rallus Limicola*
	Sora Rail	*Porzana Carolina*
	American Coot	*Fulica Americana*
	Sandhill Crane	*Grus Canadensis*
	Black-Bellied Plover	*Pluvialis Squatarola*
	Lesser Golden Plover	*Pluvialis Dominica*
	Piping Plover	*Charadrius Melodus*
	Semipalmated Plover	*Charadrius Semipalmatus*
	Killdeer	*Charadrius Bociferus*
	American Avocet	*Recurvirostra Americana*
	Greater Yellowlegs	*Tringa Melanoleuca*
	Lesser Yellowlegs	*Tringa Flavipes*
	Solitary Sandpiper	*Tringa Solitaria*
	Willet	*Catoptrophorus Semipalmatus*
	Spotted Sandpiper	*Actitis macularius*
	Upland Sandpiper	*Bartramia Longicauda*
	Hudsonian Godwit	*Limosa Haemastica*
	Ruddy Turnstone	*Arenaria Interpres*
	Red Knot	*Calidris Canutus*
	Sanderling	*Calidris Alba*
	Semipalmated Sandpiper	*Calidris Pusilla*
	Western Sandpiper	*Calidris Mauri*
	Least Sandpiper	*Calidris Minutilla*
	White-Rumped Sandpiper	*Calidris Fusciollis*
	Baird's Sandpiper	*Calidris Eairdii*
	Pectoral Sandpiper	*Calidris Melanotos*
	Dunlin	*Calidris Alpina*
	Stilt Sandpiper	*Calidris Himantopus*
	Buff-Breasted Sandpiper	*Tryngites Subruficollis*
	Short-Billed Dowitcher	*Linnodromus Griseus*
	Long-Billed Dowitcher	*Linnodromus Scolopaceus*
	Common Snipe	*Capella Gallinago*
	American Woodcock	*Scolopax Minor*
	Wilson's Phalarope	*Phalaropus Tricolor*
	Red-Necked Phalarope	*Phalaropus Lobatus*
	Red Phalarope	*Phalaropus Fulicaria*
	Jaeger Species	*Stercorarius*
	Laughing Gull	*Larus Atricilla*
	Franklin's Gull	*Larus Pipixcan*
	Bonaparte's Gull	*Larus Philadelphia*

Birds (cont.)	Louisiana Water thrush	*Seiurus Motacilla*
	Kentucky Warbler	*Oporornis Formosus*
	Common Yellowthroat	*Geothlypis Trichas*
	Wilson's Warbler	*Wilsonia Pusilla*
	Canada Warbler	*Wilsonia Canadensis*
	Yellow-Breasted Chat	*Icteria Virens*
	Scarlet Tanager	*Piranga Olivacea*
	Northern Cardinal	*Cardinalis Cardinalis*
	Rose-Breasted Grosbeak	*Pheucticus Ludovicianus*
	Indigo Bunting	*Passerina Cyanea*
	Dickcissel	*Spiza Americana*
	Rufus-Sided Towhee	*Pipilo Erythrophthalmus*
	American Tree Sparrow	*Spizella Arborea*
	Chipping Sparrow	*Spizella Passerina*
	Field Sparrow	*Spizella Pusills*
	Vesper Sparrow	*Pooecetes Gramineus*
	Savannah Sparrow	*Passerculus Candwichensis*
	Grasshopper Sparrow	*Ammodramus Savannarum*
	Henslow's Sparrow	*Ammodramus Henslowii*
	Fox Sparrow	*Passerella iliaca*
	Song Sparrow	*Melospiza Melodia*
	Lincoln's Sparrow	*Melospiza Lincolnii*
	Swamp Sparrow	*Melospiza Georgiana*
	White-Throated Sparrow	*Zonotrichia Albicollis*
	White-Crowned Sparrow	*Zonotrichia Leucophrys*
	Dark-Eyed Junco	*Junco Hyemalis*
	Lapland Longspur	*Calcarius Lapponicus*
	Snow Bunting	*Plectrophenax Nivalis*
	Bobolink	*Dolichonyx Oryzivorus*
	Red-Winged Blackbird	*Agelaius Phoeniceus*
	Eastern Meadowlark	*Sturnella Magna*
	Rusty Blackbird	*Euphagus Carolinus*
	Brewer's Blackbird	*Euphagus Cyanocephalus*
	Common Grackle	*Quiscalus Quiscula*
	Brown-Headed Cowbird	*Molothrus Ater*
	Orchard Oriole	*Icterus Spurius*
	Northern Oriole	*Icterus Galbula*
	Purple Finch	*Carpodacus Purpureus*
	House Finch	*Carpodacus Mexicanus*
	Common Redpoll	*Carduelis Flammea*
	Pine Siskin	*Carduelis Pinus*
	American Goldfinch	*Carduelis Tristis*
	Evening Grosbeak	*Coccothraustes Vespertinus*
	House Sparrow	*Passer Domesticus*
Butterflies	Acadian Hairstreak	*Satyrium acadia*
	Alfalfa Butterfly	*Colias aurytheme*
	American Copper	*Lycaena phlaeas*
	American Painted Lady	*Venessa Virginiensis*
	Banded Hairstreak	*Satyrium calanus*
	Black Swallowtail	*Papilio polyxenes*
	Bronze Copper	*Lycaena hyllus*

Butterflies Cont.	Checkered Skipper	*Pyrgus communis*
	Clouded Sulphur	*Colias philodice*
	Comma	*Poiygonia comma*
	Common Sooty Wing	Pholisora catullas
	Common Wood Nymph	*Cercyonis pegala*
	Coral Hairstreak	*Harkenclenus titus*
	Delaware Skipper	*Atrytone logan*
	Dreamy Dusky Wing	*Erynnis icelus*
	Dun Skipper	*Euphyes vestris*
	Eastern Snout Butterflies	*Libytheana bachmanii*
	Eastern Tailed Blue	*Everes comyntas*
	European Cabbage White	*Pieris rapae*
	European Skipper	*Thymelicus lineola*
	Giant Swallowtail	*Papilio cnesphontes*
	Gray Hairstreak	*Strymon melinus*
	Great Spangled Fritillary	*Speyeria cybele*
	Hackberry Butterfly	*Asterocompa celtis*
	Juvenal's Dusky Wing	*Erynnis juvenalis*
	Least Skipper	*Anclyoxypha numitor*
	Little Wood Satyr	*Megisto cymela*
	Meadow Fritallary	*Clossiana bellona*
	Milbert's Tortoise Shell	*Nymphalis milberti*
	Monarch	*Danaus plexippus*
	Mourning Cloak	*Nymphalis antiopa*
	Mulberry Wing	*Poanes massasolt*
	Northern Broken Dash	*Wallegrenia egeremet*
	Northern Eyed Brown	*Satyrodes eurydice*
	Northern Golden Skipper	*Poanes hobomok*
	Painted Lady	Vanessa cardui
	Pearl Cresent	*Phyciodes tharos*
	Peck's Skipper	*Polites coras*
	Pipe Vine Swallowtail	*Battus philenor*
	Question Mark	*Poiygonia interrogatlonis*
	Red Admiral	*Venessa altlanta*
	Red-Spotted Purple	*Limenftis arthemis*
	Sachem	*Atalopedes campstris*
	Silver-Spotted Skippers	*Epargyreus clarus*
	Silvery Checkerspot	*Chlosyne Nyctels*
	Southern Golden Skipper	Poanes zabulon
	Spicebush Swallowtail	*Papilio troilus*
	Quaking Aspen	*Populus Tremuloides*
	Black Willow	*Salix Nigra*
	Sandbar Willow	*Salix Exigua*
	Spring Azure	*Celastrina ladon*
	Striped Hairstreak	*Saiyrium liparops*
	Tawny Emperor	*Asterocampa clyton*
	Tawny-Edged Skipper	*Poiltes themistocles*
	Tiger Swallowtail	*Papilio glaucus*
	Viceroy	*Limenitis archippus*
	Wild Indigo Dusky Wing	*Erynnis baptisiae*
Mammals	13-Line Ground squirrel	*Spermophilus tridecemlineatus*

Mammals Cont.	American Beaver	*Castor canadensis*
	Badger	*Taxidea taxus*
	Coyote	*Canis latrans*
	Eastern Chipmunk	*Tamius striatus*
	Eastern Cottontail Rabbit	*Sylvigus floridanus*
	Eastern Gray Squirrel	*Sclurus caollnesls*
	Eastern Mole	*Scalagus aquaticus*
	Fox Squirrel	*Scirus niger*
	Gray Fox	*Urocyon cineneoargentus*
	Masked Shrew	*Sorex cinereus*
	Meadow Jumping Mouse	*Zapus hudsonlus*
	Meadow Vole	*Microtus pennsylvanicus*
	Mink	*Nustela vison*
	Muskrat	*Ondatra zibethicus*
	Northern Short-tailed Shrew	*Balrina brevicauda*
	Pine Vole	*Microtus pinetorum*
	Prairie Vole	*Microtus oohrogaster*
	Raccoon	*Procyon lotor*
	Red Fox	*Vulges vulges*
	Red Squirrel	*Tamiasciurus hudsonlcus*
	Southern Flying Squirrel	*Glacomys volans*
	Star-nosed Mole	*Condylura cristatat*
	Striped Skunk	*Neghltis meghitis*
	Virginia Opossum	*Didlphis virginiana*
	White-Footed Mouse	*Peromyscus leucopus*
	Whitetailed Deer	*Odocoileus virginianus*
	Woodchuck	*Namota monax*
Reptiles	Black Rat Snake	*Elaphe obsolete obsolete*
	Common Map Turtle	*Graptemys geographica*
	Common Musk Turtle	*Stemotherus odoratus*
	Eastern Box Turtle	*Terrapene Carolina Carolina*
	Eastern Garter Snake	*Thamnophis sirtalis sirtalls*
	Eastern Milk Snake	*Sistrurus catenatus catenatus* *Lampropeltis trtangulum triangulum*
	Eastern Spiny Soflshell Turtle	*Apalone spinifera spinifera*
	Midland Painted Turtle	*Chrysemys picta marglnata*
	Northern Brown Snake	*Storia dekayi dekayi*
	Northern Water Snake	*Nerodia sipedon sipedon*
	Queen Snake	*Regina septemvittata*
	Red-eared Slider	*Trachemys scripta elegans*
	Snapping Turtle	*Chelydra serpentine*
	Spotted Turtle**	*Clemmys guttata*
Amphibians	Bullfrog	*Rana catesbeiana*
	Gray Tree Frog	*Hyla versicolor*
	Green Frog	*Rana clamitans melanota*
	Northern Leopard Frog	*Rana pipiens*
	Northern Spring Peeper	*Pseudacaris crucifer crucifer*
Grasslands	American Bumet	*Sanguisiorba canadebsis*

Grasslands Cont.	Angelica	*Angelica atroputpurea*
	Baltic Crush	*Juncus balticus*
	Beaked Sedge	*Garex rostrata*
	Beaked Spikerush	*Eleocharis rostellata*
	Big Bluestem	*Andropogon gerardi*
	Black-eyed Susan	*Rudbeckia hirta*
	Blue-marsh violet	*Viola cucullata*
	Bog Goldenrod	*Solidogo uliginosa*
	Bog Lousewort	*Pedicularis lancelata*
	Bonest	*Eupatorium perfollatum*
	Brown Bog Sedge	*Carex buxbaumii*
	Canadian Bumet	*Sanguisorba canadensis*
	Cowbane	*Oxypolis rigidor*
	False Asphodel	*Tofieldia glutinosa*
	False Cromwell Grass-of-Panassus	*Onosmodium hispidissiurn*
	False Dragonhead	*Physostegia virginiana*
	Fen Grass	*Muhlenbergia mexicana*
	Fen Indian-plantain	*Cacalia tuberosa*
	Fen Sedge	*Carex sterilis*
	Few-flowered Spikerush	*Eleocharis pauciflora*
	Flat-leaved Bladderwort	*Utricularia intemedia*
	Giant Sunflower	*Helianthus giganteus*
	Grass-of-parnassus	*Parnassia glauca*
	Hard-stem Bulrush	*Scirpus acutus*
	Indian Grass	*Sorghastrum nutans*
	Kalm's Lobelia	*Lobeliakalmii*
	Ladies Tresses	*Spiranthes sp.*
	Little Bluestem	*Andropogon scoparius*
	Little Green Sedge	*Carex viridula*
	Low-nut Rush	*Selena verticullata*
	Marsh Fern	*Thelpteris palustris*
	Marsh Timothy	*Muhlenbergia glomerata*
	Mountain-mint	*Pynantheumum virginianum*
	Narrow-leaved Cattail	*Typha angustaifolio*
	Nut rush	*Scterla verticullata*
	Ohio Goldenrod	*Solidago ohionsis*
	Prairie Cord Grass	*Spartina pectinata*
	Prairie Dropseed	*Sporobolus heterlepis*
	Prairie Loosestrife	*Lysimachla quadlflora*
	Prairie rattlesnake-root	*Preneanthes racemosa*
	Purple Gerardia	*Gerardia purpurpea*
	Purple-stemmed Aster	*Aster puniceus*
	Queen-of-the-pralrie	*Filipendula rubra*
	Rattlesnake-root	*Prenanthes racemosa*
	Riddel's Goldenrod	*Solidago riddellii*
	Rough-leaved Goldenrod	*Solidago patula*
	Round-leaved Sundew	*Drosera rotundifolia*
	Seaside Arrow-grass	*Triglochin maritimum*
	Shrubby Cinquefoil	*Potentilla fructicosa*
	Slender Willow	*Salix petiolaris*
	Small Fringed Gentian	*Gentiana procera*
	Sneezewood	*Helenium autumnale*

Grasslands Cont.	Swamp Thistle	*Citsium muticum*
	Tufted beak-rush	*Rhynchospora capillaacea*
	Tufted Hairgrass	*Deschampsia caespitosa*
	Tussock Sedge	*Carex stricta*
	Twig-rush	*Cladium mariscoides*
	Wand-lily	*Zygadenus glaucus*
	Yellow Sedge	*Carex flava*
	Yellow -seeded Spikerush	*Eleocharis elliptica*
Woody Plants	Black Cherry	*Prunus Serotina*
	Honey Locust	*Gleditsia Triacancanthos*
	Hackberry	*Celtis Occidentalis*
	Bulrush	*Genus Scripus*
	Slippery Elm	*Ulmus Rubra*
	American Elm	*Ulmus Americana*
	Black Walnut	*Juglans Nigra*
	Bitternut Hickory	*Carya Cordiformis*
	Red Hickory	*Carya Ovalis*
	Shagbark Hickory	*Carya Ouata*
	White Ash	*Fraxinus Americana*
	Pignut Hickory	*Carya Glabra*
	Red Oak	*Quercus Rubra*
	Black Oak	*Quercus Velutina*
	White Oak	*Quercus Alba*
	Swamp White Oak	*Quercus Bicolor*
	Burr Oak	*Quercus Macrocarpa*
	Shingle Oak	*Quercus Imbricaria*
	Sassafras	*Sassafras Albidum*
	Box Elder	*Acer Megundo*
	Sugar Maple	*Acer Saccharum*
	Black Maple	*Acer Nigrum*
	Silver Maple	*Acer Saccharinum*
	Mulberry	*Morus Rubra*
	Poison Sumac	*Texicodendron Vernix*
	Poison Ivy	*Texicodendron Radicans*
	Blackberry	*Genus Rubus*
	Iron Oak	*Quercus Douglasii*
	Sweet Gum	*Liquidambar Styraciflua*
	Cockspur Hawthorn	*Crataegus Crus-Galli*
	Black Burch	*Betula Lenta*
	Balsam Poplar	*Populus Balsamifera*
	Western White Pine	*Pinus Monticola*
	White Pine	*Pinus Strobus*
	Multi-flora Rose*	*Rosa Multiflora*
	Autumn-Olive*	*Elaeagnus Umbellata*
	Bush Honeysuckles*	*Lonicera tatarica*
	Buckthorns*	*Rhamnus Frangula*
	Japanese Honeysuckle*	*Lonicera Japonica*

Non-Woody Plants	Japanese Knotweed* Purple Loosestrife* Reed Canary Grass* Garlic Mustard* Common Reed Grass*	*Polygonum Cuspidatum* *Lythrum Salicaria* *Phalaris Arundinacea* *Alliaria Petiolata* *Phragmites Australis*

* Invasive species to the area.

** Threatened or endangered species

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
Ag:					
Algiers silt loam	Sloan	4	Oxbows	Yes	2B3, 3
	Brookston	3	Depressions	Yes	2B3, 3
	Pewamo	3	Depressions	Yes	2B3, 3
BoA:					
Blount silt loam, 0 to 2 percent slopes	Pewamo	5	Depressions	Yes	2B3, 3
	Wetzel	5	Depressions	Yes	2B3, 3
BoB:					
Blount silt loam, 2 to 6 percent slopes	Pewamo	5	Depressions	Yes	2B3, 3
	Wetzel	5	Depressions	Yes	2B3, 3
Bs:					
Brookston silty clay loam	Brookston	90	Depressions	Yes	2B3, 3
Ca:					
Carlisle muck	Carlisle	100	Bogs	Yes	1, 3
	Linwood	---	Depressions, End moraines	Yes	1, 3
	Muskego	---	Lake plains	Yes	1, 3, 4
	Wallkill	---	Flood plains	Yes	2B3, 3, 4
	Willette	---	Depressions, Lake plains	Yes	1, 3
Cc:					
Carlisle muck, ponded	Carlisle	100	Bogs	Yes	1, 3
	Willette	---	Depressions, Lake plains	Yes	1, 3
CeA:					
Celina silt loam, 0 to 2 percent slopes	Brookston	5	Depressions	Yes	2B3, 3
CeB:					
Celina silt loam, 2 to 6 percent slopes	Brookston	5	Drainageways	Yes	2B3, 3
CrA:					
Crosby silt loam, 0 to 2 percent slopes	Brookston	5	Depressions	Yes	2B3, 3

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
CrB:					
Crosby silt loam, 2 to 6 percent slopes	Brookston	5	Drainageways	Yes	2B3, 3
CsA:					
Crosby-Urban land complex, nearly level	Brookston	10	Depressions	Yes	2B3, 3
DeA:					
Del Rey silt loam, 0 to 2 percent slopes	Montgomery	10	Drainageways	Yes	2B3, 3
DeB:					
Del Rey silt loam, 2 to 6 percent slopes	Montgomery	5	Drainageways	Yes	2B3, 3
Ed:					
Edwards muck	Edwards	100	Bogs	Yes	1, 3
	Martisco	---	Depressions, Lake plains	Yes	2B3, 3, 4
	Martisco Variant	---	Depressions, Lake plains	Yes	2B3, 3, 4
Ee:					
Eel silt loam	Sloan	5	Oxbows	Yes	2B3, 4
FnA:					
Fox silt loam, 0 to 2 percent slopes	Westland	2	Flats	Yes	2B3, 3
FnB:					
Fox silt loam, 2 to 6 percent slopes	Westland	3	Depressions	Yes	2B3, 3
FuA:					
Fulton silt loam, 0 to 4 percent slopes	Latty	5	Depressions	Yes	2B3, 3
Gn:					
Genesee silt loam	Sloan	5	Oxbows	Yes	2B3, 4
GwB:					
Glynwood silt loam, 2 to 6 percent slopes	Pewamo	5	Drainageways	Yes	2B3, 3
	Wetzel	5	Drainageways	Yes	2B3, 3
GwC2:					
Glynwood silt loam, 6 to 12 percent slopes, eroded	Pewamo	3	Drainageways	Yes	2B3, 3
GyC2:					
Glynwood clay loam, 6 to 12 percent slopes, eroded	Pewamo	4	Drainageways	Yes	2B3, 3

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
HdA:					
Haskins loam, 0 to 2 percent slopes	Pewamo	5	Drainageways	Yes	2B3, 3
HdB:					
Haskins loam, 2 to 6 percent slopes	Pewamo	5	Drainageways	Yes	2B3, 3
HeA:					
Henshaw silt loam, 0 to 2 percent slopes	Patton	5	Depressions	Yes	2B3, 3
HeB:					
Henshaw silt loam, 2 to 6 percent slopes	Patton	5	Drainageways	Yes	2B3, 3
HoA:					
Homer silt loam, 0 to 2 percent slopes	Lippincott	10	Drainageways	Yes	2B3, 3
HoB:					
Homer silt loam, 2 to 6 percent slopes	Lippincott	5	Drainageways	Yes	2B3, 3
La:					
Latty silty clay	Latty	90	Depressions	Yes	2B3, 3
Lb:					
Latty silty clay, occasionally flooded	Latty	100	Depressions	Yes	2B3, 3
Ln:					
Linwood muck	Linwood	100	Depressions	Yes	1, 3
	Carlisle	---	Depressions	Yes	1, 3
Lp:					
Lippincott silty clay loam	Lippincott	95	Depressions	Yes	2B3, 3
Ls:					
Lippincott-Urban land complex	Lippincott	60	Depressions	Yes	2B3, 3
Ma:					
Martisco mucky silt loam	Martisco	100	Depressions	Yes	2B3, 3, 4
	Edwards	---	Depressions, Outwash plains	Yes	1, 3
Mc:					
Martisco Variant silt loam	Martisco Variant	100	Depressions	Yes	2B3, 3, 4

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
MeA:					
McGary silt loam, 0 to 4 percent slopes	Latty	5	Depressions	Yes	2B3, 3
	Montgomery	5	Depressions	Yes	2B3, 3
MhB:					
Miamian silt loam, 2 to 6 percent slopes	Brookston	5	Drainageways	Yes	2B3, 3
MhC2:					
Miamian silt loam, 6 to 12 percent slopes, moderately eroded	Brookston	2	Drainageways	Yes	2B3, 3
MlB:					
Miamian-Urban land complex, undulating	Brookston	2	Depressions	Yes	2B3, 3
MlC:					
Miamian-Urban land complex, rolling	Brookston	2	Drainageways	Yes	2B3, 3
MmC2:					
Miamian Variant silt loam, 6 to 15 percent slopes, moderately eroded	Brookston	5	Drainageways	Yes	2B3, 3
MoB:					
Milton silt loam, 2 to 6 percent slopes	Millsdale	5	Drainageways	Yes	2B3, 3
MoC2:					
Milton silt loam, 6 to 12 percent slopes, moderately eroded	Millsdale	5	Drainageways	Yes	2B3, 3
Mt:					
Montgomery silty clay loam	Montgomery	100	Depressions	Yes	2B3, 3
	silty clay surface layer	---	Depressions	Yes	2B3, 3
Mu:					
Montgomery silty clay	Montgomery	85	Depressions	Yes	2B3, 3
	Areas subject to flooding	5	Depressions	Yes	2B3, 3
	Pewamo	5	Depressions	Yes	2B3, 3
Mv:					
Montgomery silty clay loam, gravelly substratum	Montgomery	90	Depressions	Yes	2B3, 3
	mucky silt loam surface layer	3	Depressions	Yes	2B3, 3
	Westland	3	Outwash plains	Yes	2B3, 3

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
MyC2:					
Morley silt loam, 6 to 12 percent slopes, moderately eroded	Pewamo	5	Depressions	Yes	2B3, 3
Mz:					
Muskego muck	Muskego	100	Depressions	Yes	1, 3, 4
NaA:					
Nappanee silt loam, 0 to 2 percent slopes	Paulding	5	Depressions	Yes	2B3, 3
NaB:					
Nappanee silt loam, 2 to 6 percent slopes	Paulding	5	Depressions	Yes	2B3, 3
PaB:					
Parr silt loam, 1 to 4 percent slopes	Brookston	5	Depressions	Yes	2B3, 3
Pb:					
Patton silt loam	Patton	95	Depressions	Yes	2B3, 3
Pc:					
Patton Variant silt loam	Patton Variant	100	Depressions	Yes	2B3, 3
	Martisco Variant	---	Depressions, Lake plains	Yes	2B3, 3, 4
Pd:					
Paulding clay	Paulding	95	Depressions	Yes	2B3, 3
Pe:					
Pewamo silty clay loam	Pewamo	95	Depressions	Yes	2B3, 3
Pf:					
Paulding silty clay	Paulding	95	Depressions	Yes	2B3, 3
	silty clay loam surface layer	---	Depressions	Yes	2B3, 3
Ph:					
Patton silty clay loam	Patton	100	Depressions	Yes	2B3, 3
ScB:					
St. Clair silt loam, 2 to 6 percent slopes	Paulding	5	Depressions	Yes	2B3, 3
ScC2:					
St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	Paulding	5	Depressions	Yes	2B3, 3

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
SgB:					
Shinrock silt loam, 2 to 6 percent slopes	Montgomery	5	Depressions	Yes	2B3, 3
SgC:					
Shinrock silt loam, 6 to 12 percent slopes	Montgomery	5	Depressions	Yes	2B3, 3
Sh:					
Shoals silt loam	Sloan	10	Oxbows	Yes	2B3, 4
SlA:					
Sleeth silt loam, 0 to 2 percent slopes	Westland	5	Depressions	Yes	2B3, 3
SmA:					
Sleeth silt loam, 0 to 3 percent slopes	Westland	6	Depressions	Yes	2B3, 3
So:					
Sloan silt loam	Sloan	95	Depressions	Yes	2B3, 3, 4
Wa:					
Wallkill silt loam	Wallkill	100	Depressions	Yes	2B3, 3, 4
	Carlisle	---	Depressions	Yes	1, 3
	Muskego	---	Lake plains	Yes	1, 3, 4
Wb:					
Wallkill silty clay loam	Wallkill	90	Stream terraces	Yes	2B3, 3, 4
	Montgomery	3	Depressions	Yes	2B3, 3
	Pewamo	3	Depressions	Yes	2B3, 3
Ws:					
Westland clay loam	Westland	85	Depressions	Yes	2B3, 3
	Linwood	3	Depressions, End moraines	Yes	1, 3
	mucky surface layer	3	Depressions	Yes	2B3, 3
	Pewamo	3	Depressions, Moraines	Yes	2B3, 3
Wt:					
Westland silty clay loam	Westland	95	Depressions	Yes	2B3, 3

Hydric Soils

Logan County, Ohio

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
Wu:					
Westland silty clay loam, clay substratum	Westland	95	Depressions	Yes	2B3, 3
Wv:					
Wetzel silty clay loam	Wetzel	95	Depressions	Yes	2B3, 3
	Pewamo	---	Depressions, Moraines	Yes	2B3, 3
Wx:					
Willette muck	Willette	100	Depressions	Yes	1, 3
	Carlisle	---	Depressions	Yes	1, 3
	Muskego	---	Lake plains	Yes	1, 3, 4

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   B. are poorly drained or very poorly drained and have either:
      1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
      2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
      3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Drainage Class

Drainage Class— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ag	Algiers silt loam	Somewhat poorly drained	10,421.8	3.5%
BeE	Berks silt loam, 18 to 25 percent slopes	Well drained	194.0	0.1%
BeF	Berks silt loam, 25 to 50 percent slopes	Well drained	749.6	0.3%
BoA	Blount silt loam, 0 to 2 percent slopes	Somewhat poorly drained	17,575.2	5.9%
BoB	Blount silt loam, 2 to 6 percent slopes	Somewhat poorly drained	23,172.8	7.8%
Bs	Brookston silty clay loam	Very poorly drained	4,212.0	1.4%
Ca	Carlisle muck	Very poorly drained	2,515.9	0.8%
Cc	Carlisle muck, ponded	Very poorly drained	511.1	0.2%
CdD2	Casco-Eldean complex, 12 to 18 percent slopes, moderately eroded	Somewhat excessively drained	2,373.6	0.8%
CeA	Celina silt loam, 0 to 2 percent slopes	Moderately well drained	611.4	0.2%
CeB	Celina silt loam, 2 to 6 percent slopes	Moderately well drained	4,922.4	1.6%
CrA	Crosby silt loam, 0 to 2 percent slopes	Somewhat poorly drained	5,334.8	1.8%
CrB	Crosby silt loam, 2 to 6 percent slopes	Somewhat poorly drained	9,415.0	3.2%
CsA	Crosby-Urban land complex, nearly level	Somewhat poorly drained	124.7	0.0%
Dc	Defiance silty clay, frequently flooded	Somewhat poorly drained	8.5	0.0%
DeA	Del Rey silt loam, 0 to 2 percent slopes	Somewhat poorly drained	638.3	0.2%
DeB	Del Rey silt loam, 2 to 6 percent slopes	Somewhat poorly drained	392.3	0.1%
Ed	Edwards muck	Very poorly drained	637.4	0.2%
Ee	Eel silt loam	Moderately well drained	1,132.2	0.4%
EmA	Eldean silt loam, 0 to 2 percent slopes	Well drained	4,323.5	1.4%
EmB	Eldean silt loam, 2 to 6 percent slopes	Well drained	7,901.7	2.6%
EmC2	Eldean silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	4,090.2	1.4%
EpB	Eldean-Urban land complex, undulating	Well drained	329.4	0.1%

Drainage Class— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FlA	Fox loam, 0 to 2 percent slopes	Well drained	513.9	0.2%
FlB	Fox loam, 2 to 6 percent slopes	Well drained	862.9	0.3%
FnA	Fox silt loam, 0 to 2 percent slopes	Well drained	1.1	0.0%
FnB	Fox silt loam, 2 to 6 percent slopes	Well drained	82.5	0.0%
FuA	Fulton silt loam, 0 to 4 percent slopes	Somewhat poorly drained	2,414.7	0.8%
GaB	Gallman loam, 1 to 4 percent slopes	Well drained	525.8	0.2%
Gn	Genesee silt loam	Well drained	1,377.5	0.5%
GwB	Glynwood silt loam, 2 to 6 percent slopes	Moderately well drained	6,525.8	2.2%
GwC2	Glynwood silt loam, 6 to 12 percent slopes, eroded	Moderately well drained	2.7	0.0%
GyC2	Glynwood clay loam, 6 to 12 percent slopes, eroded	Moderately well drained	26.5	0.0%
HdA	Haskins loam, 0 to 2 percent slopes	Somewhat poorly drained	1,339.5	0.4%
HdB	Haskins loam, 2 to 6 percent slopes	Somewhat poorly drained	858.5	0.3%
HeA	Henshaw silt loam, 0 to 2 percent slopes	Somewhat poorly drained	670.2	0.2%
HeB	Henshaw silt loam, 2 to 6 percent slopes	Somewhat poorly drained	216.8	0.1%
HoA	Homer silt loam, 0 to 2 percent slopes	Somewhat poorly drained	1,605.1	0.5%
HoB	Homer silt loam, 2 to 6 percent slopes	Somewhat poorly drained	744.7	0.2%
KeB	Kendallville silt loam, 2 to 6 percent slopes	Well drained	0.8	0.0%
La	Latty silty clay	Very poorly drained	9,440.7	3.2%
Lb	Latty silty clay, occasionally flooded	Very poorly drained	793.7	0.3%
Ln	Linwood muck	Very poorly drained	513.9	0.2%
Lp	Lippincott silty clay loam	Very poorly drained	6,591.2	2.2%
Ls	Lippincott-Urban land complex	Very poorly drained	225.4	0.1%
Ma	Martisco mucky silt loam	Very poorly drained	341.5	0.1%
Mc	Martisco Variant silt loam	Very poorly drained	302.0	0.1%
MeA	McGary silt loam, 0 to 4 percent slopes	Somewhat poorly drained	20.9	0.0%
MfE2	Miami-Casco-Rodman complex, 18 to 25 percent slopes, moderately eroded	Well drained	36.8	0.0%
MhB	Miamian silt loam, 2 to 6 percent slopes	Well drained	13,873.5	4.6%

Drainage Class— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MhC2	Miamian silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	21,021.6	7.0%
MhD2	Miamian silt loam, 12 to 18 percent slopes, moderately eroded	Well drained	8,497.0	2.8%
MhE2	Miamian silt loam, 18 to 25 percent slopes, moderately eroded	Well drained	2,860.1	1.0%
MhF	Miamian silt loam, 25 to 50 percent slopes	Well drained	1,436.3	0.5%
MlB	Miamian-Urban land complex, undulating	Well drained	669.7	0.2%
MlC	Miamian-Urban land complex, rolling	Well drained	585.2	0.2%
MmC2	Miamian Variant silt loam, 6 to 15 percent slopes, moderately eroded	Well drained	177.1	0.1%
MoB	Milton silt loam, 2 to 6 percent slopes	Well drained	200.1	0.1%
MoC2	Milton silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	287.1	0.1%
MoD2	Milton silt loam, 12 to 18 percent slopes, moderately eroded	Well drained	228.5	0.1%
Mt	Montgomery silty clay loam	Very poorly drained	6,284.6	2.1%
Mu	Montgomery silty clay	Very poorly drained	72.7	0.0%
Mv	Montgomery silty clay loam, gravelly substratum	Very poorly drained	51.3	0.0%
MwC2	Morley clay loam, 6 to 12 percent slopes, eroded	Well drained	27.5	0.0%
MyC2	Morley silt loam, 6 to 12 percent slopes, moderately eroded	Well drained	5,690.9	1.9%
MyD2	Morley silt loam, 12 to 18 percent slopes, moderately eroded	Well drained	907.3	0.3%
MyE	Morley silt loam, 18 to 25 percent slopes	Well drained	4.5	0.0%
Mz	Muskego muck	Very poorly drained	196.4	0.1%
NaA	Nappanee silt loam, 0 to 2 percent slopes	Somewhat poorly drained	4,614.8	1.5%
NaB	Nappanee silt loam, 2 to 6 percent slopes	Somewhat poorly drained	17,471.6	5.8%
NnA	Nineveh silt loam, 0 to 2 percent slopes	Well drained	246.2	0.1%
OcA	Ockley silt loam, 0 to 2 percent slopes	Well drained	1,817.2	0.6%
OcB	Ockley silt loam, 2 to 6 percent slopes	Well drained	344.0	0.1%
PaB	Parr silt loam, 1 to 4 percent slopes	Well drained	936.9	0.3%
Pb	Patton silt loam	Poorly drained	444.0	0.1%

Drainage Class— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Pc	Patton Variant silt loam	Poorly drained	329.5	0.1%
Pd	Paulding clay	Very poorly drained	3,505.5	1.2%
Pe	Pewamo silty clay loam	Very poorly drained	8,777.5	2.9%
Pf	Paulding silty clay	Very poorly drained	328.0	0.1%
Pg	Pits, gravel		202.6	0.1%
Ph	Patton silty clay loam	Very poorly drained	39.0	0.0%
Pk	Pits, quarries		271.3	0.1%
RoE	Rodman-Casco complex, 18 to 25 percent slopes	Excessively drained	661.0	0.2%
RoF	Rodman-Casco complex, 25 to 50 percent slopes	Excessively drained	1,629.1	0.5%
ScB	St. Clair silt loam, 2 to 6 percent slopes	Moderately well drained	4,055.0	1.4%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	Moderately well drained	9,367.8	3.1%
ScD2	St. Clair silt loam, 12 to 18 percent slopes, moderately eroded	Moderately well drained	2,342.5	0.8%
ScE2	St. Clair silt loam, 18 to 35 percent slopes, moderately eroded	Moderately well drained	771.0	0.3%
SgB	Shinrock silt loam, 2 to 6 percent slopes	Moderately well drained	1,103.1	0.4%
SgC	Shinrock silt loam, 6 to 12 percent slopes	Moderately well drained	819.0	0.3%
Sh	Shoals silt loam	Somewhat poorly drained	2,334.7	0.8%
SlA	Sleeth silt loam, 0 to 2 percent slopes	Somewhat poorly drained	1,738.9	0.6%
SmA	Sleeth silt loam, 0 to 3 percent slopes	Somewhat poorly drained	20.6	0.0%
So	Sloan silt loam	Very poorly drained	603.2	0.2%
Ud	Udorthents		971.6	0.3%
W	Water		5,842.1	2.0%
Wa	Wallkill silt loam	Very poorly drained	1,423.3	0.5%
Wb	Wallkill silty clay loam	Very poorly drained	4.5	0.0%
WeA	Wea Variant silt loam, 0 to 2 percent slopes	Well drained	497.3	0.2%
WkF	Weikert shaly silt loam, 35 to 70 percent slopes	Well drained	354.5	0.1%
Ws	Westland clay loam	Very poorly drained	434.5	0.1%
Wt	Westland silty clay loam	Very poorly drained	1,481.3	0.5%
Wu	Westland silty clay loam, clay substratum	Very poorly drained	2,916.3	1.0%
Wv	Wetzel silty clay loam	Poorly drained	18,867.9	6.3%

Drainage Class— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Wx	Willette muck	Very poorly drained	451.3	0.2%
Totals for Area of Interest			298,702.9	100.0%

Description

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined

Tie-break Rule: Higher

Representative Slope

Representative Slope— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
Ag	Algiers silt loam	1.0	10,421.8	3.5%
BeE	Berks silt loam, 18 to 25 percent slopes	22.0	194.0	0.1%
BeF	Berks silt loam, 25 to 50 percent slopes	38.0	749.6	0.3%
BoA	Blount silt loam, 0 to 2 percent slopes	1.0	17,575.2	5.9%
BoB	Blount silt loam, 2 to 6 percent slopes	4.0	23,172.8	7.8%
Bs	Brookston silty clay loam	0.5	4,212.0	1.4%
Ca	Carlisle muck	1.0	2,515.9	0.8%
Cc	Carlisle muck, ponded	1.0	511.1	0.2%
CdD2	Casco-Eldean complex, 12 to 18 percent slopes, moderately eroded	16.0	2,373.6	0.8%
CeA	Celina silt loam, 0 to 2 percent slopes	1.0	611.4	0.2%
CeB	Celina silt loam, 2 to 6 percent slopes	4.0	4,922.4	1.6%
CrA	Crosby silt loam, 0 to 2 percent slopes	1.0	5,334.8	1.8%
CrB	Crosby silt loam, 2 to 6 percent slopes	4.0	9,415.0	3.2%
CsA	Crosby-Urban land complex, nearly level	1.0	124.7	0.0%
Dc	Defiance silty clay, frequently flooded	1.0	8.5	0.0%
DeA	Del Rey silt loam, 0 to 2 percent slopes	1.0	638.3	0.2%
DeB	Del Rey silt loam, 2 to 6 percent slopes	4.0	392.3	0.1%
Ed	Edwards muck	1.0	637.4	0.2%
Ee	Eel silt loam	1.0	1,132.2	0.4%
EmA	Eldean silt loam, 0 to 2 percent slopes	1.0	4,323.5	1.4%
EmB	Eldean silt loam, 2 to 6 percent slopes	4.0	7,901.7	2.6%
EmC2	Eldean silt loam, 6 to 12 percent slopes, moderately eroded	9.0	4,090.2	1.4%
EpB	Eldean-Urban land complex, undulating	4.0	329.4	0.1%

Representative Slope— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
FlA	Fox loam, 0 to 2 percent slopes	1.0	513.9	0.2%
FlB	Fox loam, 2 to 6 percent slopes	4.0	862.9	0.3%
FnA	Fox silt loam, 0 to 2 percent slopes	1.0	1.1	0.0%
FnB	Fox silt loam, 2 to 6 percent slopes	4.0	82.5	0.0%
FuA	Fulton silt loam, 0 to 4 percent slopes	2.0	2,414.7	0.8%
GaB	Gallman loam, 1 to 4 percent slopes	2.0	525.8	0.2%
Gn	Genesee silt loam	1.0	1,377.5	0.5%
GwB	Glynwood silt loam, 2 to 6 percent slopes	4.0	6,525.8	2.2%
GwC2	Glynwood silt loam, 6 to 12 percent slopes, eroded	8.0	2.7	0.0%
GyC2	Glynwood clay loam, 6 to 12 percent slopes, eroded	9.0	26.5	0.0%
HdA	Haskins loam, 0 to 2 percent slopes	1.0	1,339.5	0.4%
HdB	Haskins loam, 2 to 6 percent slopes	4.0	858.5	0.3%
HeA	Henshaw silt loam, 0 to 2 percent slopes	1.0	670.2	0.2%
HeB	Henshaw silt loam, 2 to 6 percent slopes	4.0	216.8	0.1%
HoA	Homer silt loam, 0 to 2 percent slopes	1.0	1,605.1	0.5%
HoB	Homer silt loam, 2 to 6 percent slopes	4.0	744.7	0.2%
KeB	Kendallville silt loam, 2 to 6 percent slopes	4.0	0.8	0.0%
La	Latty silty clay	1.0	9,440.7	3.2%
Lb	Latty silty clay, occasionally flooded	1.0	793.7	0.3%
Ln	Linwood muck	1.0	513.9	0.2%
Lp	Lippincott silty clay loam	0.5	6,591.2	2.2%
Ls	Lippincott-Urban land complex	0.5	225.4	0.1%
Ma	Martisco mucky silt loam	1.0	341.5	0.1%
Mc	Martisco Variant silt loam	1.0	302.0	0.1%
MeA	McGary silt loam, 0 to 4 percent slopes	3.0	20.9	0.0%
MfE2	Miami-Casco-Rodman complex, 18 to 25 percent slopes, moderately eroded	22.0	36.8	0.0%
MhB	Miamian silt loam, 2 to 6 percent slopes	4.0	13,873.5	4.6%
MhC2	Miamian silt loam, 6 to 12 percent slopes, moderately eroded	9.0	21,021.6	7.0%
MhD2	Miamian silt loam, 12 to 18 percent slopes, moderately eroded	15.0	8,497.0	2.8%

Representative Slope— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
MhE2	Miamian silt loam, 18 to 25 percent slopes, moderately eroded	22.0	2,860.1	1.0%
MhF	Miamian silt loam, 25 to 50 percent slopes	38.0	1,436.3	0.5%
MlB	Miamian-Urban land complex, undulating	4.0	669.7	0.2%
MlC	Miamian-Urban land complex, rolling	10.0	585.2	0.2%
MmC2	Miamian Variant silt loam, 6 to 15 percent slopes, moderately eroded	9.0	177.1	0.1%
MoB	Milton silt loam, 2 to 6 percent slopes	4.0	200.1	0.1%
MoC2	Milton silt loam, 6 to 12 percent slopes, moderately eroded	9.0	287.1	0.1%
MoD2	Milton silt loam, 12 to 18 percent slopes, moderately eroded	15.0	228.5	0.1%
Mt	Montgomery silty clay loam	1.0	6,284.6	2.1%
Mu	Montgomery silty clay	1.0	72.7	0.0%
Mv	Montgomery silty clay loam, gravelly substratum	1.0	51.3	0.0%
MwC2	Morley clay loam, 6 to 12 percent slopes, eroded	6.0	27.5	0.0%
MyC2	Morley silt loam, 6 to 12 percent slopes, moderately eroded	9.0	5,690.9	1.9%
MyD2	Morley silt loam, 12 to 18 percent slopes, moderately eroded	15.0	907.3	0.3%
MyE	Morley silt loam, 18 to 25 percent slopes	20.0	4.5	0.0%
Mz	Muskego muck	1.0	196.4	0.1%
NaA	Nappanee silt loam, 0 to 2 percent slopes	1.0	4,614.8	1.5%
NaB	Nappanee silt loam, 2 to 6 percent slopes	4.0	17,471.6	5.8%
NnA	Nineveh silt loam, 0 to 2 percent slopes	1.0	246.2	0.1%
OcA	Ockley silt loam, 0 to 2 percent slopes	1.0	1,817.2	0.6%
OcB	Ockley silt loam, 2 to 6 percent slopes	4.0	344.0	0.1%
PaB	Parr silt loam, 1 to 4 percent slopes	3.0	936.9	0.3%
Pb	Patton silt loam	0.5	444.0	0.1%
Pc	Patton Variant silt loam	0.5	329.5	0.1%
Pd	Paulding clay	0.5	3,505.5	1.2%
Pe	Pewamo silty clay loam	0.5	8,777.5	2.9%

Representative Slope— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
Pf	Paulding silty clay	1.0	328.0	0.1%
Pg	Pits, gravel		202.6	0.1%
Ph	Patton silty clay loam	1.0	39.0	0.0%
Pk	Pits, quarries		271.3	0.1%
RoE	Rodman-Casco complex, 18 to 25 percent slopes	22.0	661.0	0.2%
RoF	Rodman-Casco complex, 25 to 50 percent slopes	38.0	1,629.1	0.5%
ScB	St. Clair silt loam, 2 to 6 percent slopes	4.0	4,055.0	1.4%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	9.0	9,357.8	3.1%
ScD2	St. Clair silt loam, 12 to 18 percent slopes, moderately eroded	15.0	2,342.5	0.8%
ScE2	St. Clair silt loam, 18 to 35 percent slopes, moderately eroded	27.0	771.0	0.3%
SgB	Shinrock silt loam, 2 to 6 percent slopes	4.0	1,103.1	0.4%
SgC	Shinrock silt loam, 6 to 12 percent slopes	9.0	819.0	0.3%
Sh	Shoals silt loam	1.0	2,334.7	0.8%
SlA	Sleeth silt loam, 0 to 2 percent slopes	1.0	1,738.9	0.6%
SmA	Sleeth silt loam, 0 to 3 percent slopes	1.5	20.6	0.0%
So	Sloan silt loam	1.0	603.2	0.2%
Ud	Udorthents		971.6	0.3%
W	Water		5,842.1	2.0%
Wa	Wallkill silt loam	0.5	1,423.3	0.5%
Wb	Wallkill silty clay loam	0.5	4.5	0.0%
WeA	Wea Variant silt loam, 0 to 2 percent slopes	1.0	497.3	0.2%
WkF	Weikert shaly silt loam, 35 to 70 percent slopes	53.0	354.5	0.1%
Ws	Westland clay loam	1.0	434.5	0.1%
Wt	Westland silty clay loam	0.5	1,481.3	0.5%
Wu	Westland silty clay loam, clay substratum	0.5	2,916.3	1.0%
Wv	Wetzel silty clay loam	0.5	18,867.9	6.3%
Wx	Willette muck	0.5	451.3	0.2%
Totals for Area of Interest			**298,702.9**	**100.0%**

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ag	Algiers silt loam	B/D	10,421.8	3.5%
BeE	Berks silt loam, 18 to 25 percent slopes	B	194.0	0.1%
BeF	Berks silt loam, 25 to 50 percent slopes	B	749.6	0.3%
BoA	Blount silt loam, 0 to 2 percent slopes	C/D	17,575.2	5.9%
BoB	Blount silt loam, 2 to 6 percent slopes	C/D	23,172.8	7.8%
Bs	Brookston silty clay loam	B/D	4,212.0	1.4%
Ca	Carlisle muck	A/D	2,515.9	0.8%
Cc	Carlisle muck, ponded	A/D	511.1	0.2%
CdD2	Casco-Eldean complex, 12 to 18 percent slopes, moderately eroded	B	2,373.6	0.8%
CeA	Celina silt loam, 0 to 2 percent slopes	C	611.4	0.2%
CeB	Celina silt loam, 2 to 6 percent slopes	C	4,922.4	1.6%
CrA	Crosby silt loam, 0 to 2 percent slopes	C/D	5,334.8	1.8%
CrB	Crosby silt loam, 2 to 6 percent slopes	C/D	9,415.0	3.2%
CsA	Crosby-Urban land complex, nearly level	C/D	124.7	0.0%
Dc	Defiance silty clay, frequently flooded	C/D	8.5	0.0%
DeA	Del Rey silt loam, 0 to 2 percent slopes	C/D	638.3	0.2%
DeB	Del Rey silt loam, 2 to 6 percent slopes	C/D	392.3	0.1%
Ed	Edwards muck	C/D	637.4	0.2%
Ee	Eel silt loam	B/D	1,132.2	0.4%
EmA	Eldean silt loam, 0 to 2 percent slopes	B	4,323.5	1.4%
EmB	Eldean silt loam, 2 to 6 percent slopes	B	7,901.7	2.6%
EmC2	Eldean silt loam, 6 to 12 percent slopes, moderately eroded	B	4,090.2	1.4%
EpB	Eldean-Urban land complex, undulating	B	329.4	0.1%
FlA	Fox loam, 0 to 2 percent slopes	B	513.9	0.2%
FlB	Fox loam, 2 to 6 percent slopes	B	862.9	0.3%
FnA	Fox silt loam, 0 to 2 percent slopes	B	1.1	0.0%
FnB	Fox silt loam, 2 to 6 percent slopes	B	82.5	0.0%
FuA	Fulton silt loam, 0 to 4 percent slopes	C/D	2,414.7	0.8%
GaB	Gallman loam, 1 to 4 percent slopes	B	525.8	0.2%
Gn	Genesee silt loam	B	1,377.5	0.5%
GwB	Glynwood silt loam, 2 to 6 percent slopes	D	6,525.8	2.2%

Hydrologic Soil Group— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GwC2	Glynwood silt loam, 6 to 12 percent slopes, eroded	D	2.7	0.0%
GyC2	Glynwood clay loam, 6 to 12 percent slopes, eroded	D	26.5	0.0%
HdA	Haskins loam, 0 to 2 percent slopes	C/D	1,339.5	0.4%
HdB	Haskins loam, 2 to 6 percent slopes	C/D	858.5	0.3%
HeA	Henshaw silt loam, 0 to 2 percent slopes	C/D	670.2	0.2%
HeB	Henshaw silt loam, 2 to 6 percent slopes	C/D	216.8	0.1%
HoA	Homer silt loam, 0 to 2 percent slopes	B/D	1,605.1	0.5%
HoB	Homer silt loam, 2 to 6 percent slopes	B/D	744.7	0.2%
KeB	Kendallville silt loam, 2 to 6 percent slopes	C	0.8	0.0%
La	Latty silty clay	C/D	9,440.7	3.2%
Lb	Latty silty clay, occasionally flooded	C/D	793.7	0.3%
Ln	Linwood muck	B/D	513.9	0.2%
Lp	Lippincott silty clay loam	B/D	6,591.2	2.2%
Ls	Lippincott-Urban land complex	B/D	225.4	0.1%
Ma	Martisco mucky silt loam	B/D	341.5	0.1%
Mc	Martisco Variant silt loam	C/D	302.0	0.1%
MeA	McGary silt loam, 0 to 4 percent slopes	C/D	20.9	0.0%
MfE2	Miami-Casco-Rodman complex, 18 to 25 percent slopes, moderately eroded	C	36.8	0.0%
MhB	Miamian silt loam, 2 to 6 percent slopes	C	13,873.5	4.6%
MhC2	Miamian silt loam, 6 to 12 percent slopes, moderately eroded	C	21,021.6	7.0%
MhD2	Miamian silt loam, 12 to 18 percent slopes, moderately eroded	C	8,497.0	2.8%
MhE2	Miamian silt loam, 18 to 25 percent slopes, moderately eroded	C	2,860.1	1.0%
MhF	Miamian silt loam, 25 to 50 percent slopes	C	1,436.3	0.5%
MIB	Miamian-Urban land complex, undulating	C	669.7	0.2%
MIC	Miamian-Urban land complex, rolling	C	585.2	0.2%
MmC2	Miamian Variant silt loam, 6 to 15 percent slopes, moderately eroded	C	177.1	0.1%
MoB	Milton silt loam, 2 to 6 percent slopes	C	200.1	0.1%
MoC2	Milton silt loam, 6 to 12 percent slopes, moderately eroded	C	287.1	0.1%
MoD2	Milton silt loam, 12 to 18 percent slopes, moderately eroded	C	228.5	0.1%

Hydrologic Soil Group— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Mt	Montgomery silty clay loam	C/D	6,284.6	2.1%
Mu	Montgomery silty clay	C/D	72.7	0.0%
Mv	Montgomery silty clay loam, gravelly substratum	C/D	51.3	0.0%
MwC2	Morley clay loam, 6 to 12 percent slopes, eroded	D	27.5	0.0%
MyC2	Morley silt loam, 6 to 12 percent slopes, moderately eroded	D	5,690.9	1.9%
MyD2	Morley silt loam, 12 to 18 percent slopes, moderately eroded	D	907.3	0.3%
MyE	Morley silt loam, 18 to 25 percent slopes	D	4.5	0.0%
Mz	Muskego muck	C/D	196.4	0.1%
NaA	Nappanee silt loam, 0 to 2 percent slopes	D	4,614.8	1.5%
NaB	Nappanee silt loam, 2 to 6 percent slopes	D	17,471.6	5.8%
NnA	Nineveh silt loam, 0 to 2 percent slopes	B	246.2	0.1%
OcA	Ockley silt loam, 0 to 2 percent slopes	B	1,817.2	0.6%
OcB	Ockley silt loam, 2 to 6 percent slopes	B	344.0	0.1%
PaB	Parr silt loam, 1 to 4 percent slopes	B	936.9	0.3%
Pb	Patton silt loam	B/D	444.0	0.1%
Pc	Patton Variant silt loam	B/D	329.5	0.1%
Pd	Paulding clay	D	3,505.5	1.2%
Pe	Pewamo silty clay loam	C/D	8,777.5	2.9%
Pf	Paulding silty clay	D	328.0	0.1%
Pg	Pits, gravel		202.6	0.1%
Ph	Patton silty clay loam	B/D	39.0	0.0%
Pk	Pits, quarries		271.3	0.1%
RoE	Rodman-Casco complex, 18 to 25 percent slopes	A	661.0	0.2%
RoF	Rodman-Casco complex, 25 to 50 percent slopes	A	1,629.1	0.5%
ScB	St. Clair silt loam, 2 to 6 percent slopes	D	4,055.0	1.4%
ScC2	St. Clair silt loam, 6 to 12 percent slopes, moderately eroded	D	9,357.8	3.1%
ScD2	St. Clair silt loam, 12 to 18 percent slopes, moderately eroded	D	2,342.5	0.8%
ScE2	St. Clair silt loam, 18 to 35 percent slopes, moderately eroded	D	771.0	0.3%
SgB	Shinrock silt loam, 2 to 6 percent slopes	C	1,103.1	0.4%
SgC	Shinrock silt loam, 6 to 12 percent slopes	C	819.0	0.3%

Hydrologic Soil Group— Summary by Map Unit — Logan County, Ohio				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Sh	Shoals silt loam	B/D	2,334.7	0.8%
SlA	Sleeth silt loam, 0 to 2 percent slopes	B/D	1,738.9	0.6%
SmA	Sleeth silt loam, 0 to 3 percent slopes	B/D	20.6	0.0%
So	Sloan silt loam	B/D	603.2	0.2%
Ud	Udorthents		971.6	0.3%
W	Water		5,842.1	2.0%
Wa	Wallkill silt loam	B/D	1,423.3	0.5%
Wb	Wallkill silty clay loam	B/D	4.5	0.0%
WeA	Wea Variant silt loam, 0 to 2 percent slopes	B	497.3	0.2%
WkF	Weikert shaly silt loam, 35 to 70 percent slopes	D	354.5	0.1%
Ws	Westland clay loam	B/D	434.5	0.1%
Wt	Westland silty clay loam	B/D	1,481.3	0.5%
Wu	Westland silty clay loam, clay substratum	B/D	2,916.3	1.0%
Wv	Wetzel silty clay loam	C/D	18,867.9	6.3%
Wx	Willette muck	C/D	451.3	0.2%
Totals for Area of Interest			**298,702.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Appendix IV

105 surveys returned

324 County Road 11, Bellefontaine, Ohio 43311
PHONE: 937-593-2946 FAX: 937-592-3350
www.co.logan.oh.us/ILWP

INDIAN LAKE WATERSHED PROJECT
Landowner Survey Questionnaire

Surveys provide a useful tool for managers to access responses and to gather new ideas on areas of concern. This survey should take no more than 10 minutes to complete. Your views and cooperation are both very important to us. This project is funded in part by the Logan County Economic Grant awarded the Indian Lake Watershed Project by the Logan County Commissioners. Individual responses will be kept confidential and will be released only as summary information where individual answers cannot be identified.

Please complete the attached and return within 5 days in the enclosed prepaid envelope. Thank you in advance for your assistance in our efforts to continue to improve the water quality of Indian Lake.

Jack L. Webb
Executive Director
Indian Lake Watershed Project
324 Co. Rd. 11
Bellefonatine, Ohio 43311
937-593-2946
www.logan.co.oh.us/ILWP

SECTION I

The following questions provide the project insight into the landowner's viewpoint. (Please circle the response that best reflects your opinion or place an "X" between the responses to reflect a response between 2 of those listed.)

1. What is your knowledge of the Indian Lake Watershed Project?

   No Knowledge 3 Some Knowledge 86 Very Knowledgeable 16

2. How would you rate problems in the Indian Lake Watershed?

   Many Problems 9 Some Problems 79 Very Few Problems 12

3. To what extent have you observed changes in the Watershed land uses in the last 10 yrs.?

   No Changes 4 Some Changes 46 Many Great Changes 51

4. How would you rate the water quality in the watershed?

   Very poor 0 Poor 3 Fair 31 Good 67 Very Good 3

5. Please respond to the following statements pertaining to water quality. There are no right or wrong answers to any of the following statements. (Please select the response that best represents your feelings about each statement by placing an "X" in the box)

STATEMENT	STRONGLY DISAGREE (1)	DISAGREE (2)	NEITHER AGREE NOR DISAGREE (3)	AGREE (4)	STRONGLY AGREE (5)
A) Water pollution is an important environmental problem in my area.	0	5	24	57	13
B) Farmers should be forced to adopt conservation practices to protect water resources.	8	14	18	52	10
C) Lake residents should be forced into stronger regulations on the use of chemicals, fertilizers, and nutrients on their yards.	6	13	24	45	14
D) Landowners do not have the right to farm land in a manner that will pollute water resources.	3	12	15	52	20
E) No one has the right to tell farmers what type of practices to use on their farms.	10	44	21	21	4
F) Adoption of new tillage practices that will improve water quality often requires the landowner to purchase new equipment.	1	6	39	50	5
G) Landowners who contribute to water pollution problems should be made to participate in government programs.	6	8	43	38	5
H) Landowners who contribute to water pollution problems should be taxed for the pollution cleanup.	4	18	27	47	7
I) Reducing the rate of chemicals and fertilizer used on my lawn or farm would not reduce the water pollution in this area.	10	55	23	14	0
J) Chemicals and fertilizers do not contribute to the water pollution in this area.	18	55	24	2	2

SECTION II

5.9) Opinions vary about the sources of water pollution. IN YOUR OPINION what is the impact of the following items on the water quality of Indian Lake? (Please place an "X" in the block that best represents your opinion.)

Pollutant	Not a source of pollution	Minor source of pollution	Significant source of pollution	Major source of pollution
A) Cattle in streams	8	61	24	6
B) Construction runoff	4	56	32	5
C) Dredging	36	46	11	2
D) Erosion	5	22	50	13
E) Fertilizer used on lawns	5	54	35	6
F) Geese	11	27	35	28
G) Home sewer septic systems	10	47	32	12
H) Household hazardous waste	5	51	35	5
I) Littering in streams and lake	0	30	53	14
J) Manure/Fertilizer used on fields	4	45	42	9
K) Pesticides used on fields	3	31	56	10
L) Pesticides used on lawns	3	54	38	6
M) Urban Runoff (roads, parking lots, etc.)	5	47	43	7
N) Watercraft on lake (Gas, oil, waves, etc.	5	57	32	7

6. How much of a threat do you feel the following contaminants are to Indian Lake? (Please place an "X" in the box that best represents your opinion.)

Pollutant	Major Threat	Minor Threat	Potential Threat	No Threat at all
A) Pesticides	31	34	25	3
B) Petroleum products	30	40	22	3
C) Nitrates	35	32	23	1
D) Bacteria	31	35	23	1
E) Sediment	38	35	19	2
F) Household hazardous waste	16	24	21	4
G) Metals (lead, copper, iron, etc.)	18	39	28	5
H) Phosphorus	25	33	36	3
I) Algae	27	34	20	5

7. In your opinion, what are the top three (3) pollutants affecting Indian Lake? (Please rank 1, 2, and 3 in the space provided.)

25 A - Algae growth in the lake
34 B - Canada geese population
44 C - Chemical runoff from cropland
14 D - Chemical runoff from lawns
23 E - Faulty sewer & septic systems
39 F - Fertilizer runoff from croplands
13 G - Fertilizer funoff from lawns
4 H - Household hazardous waste
18 I - Littering
10 J - Livestock wastes
44 K - Soil erosion and sediment from cropland
14 L - Soil erosion and sediment from urban development
12 M - Urban runoff (roads, parking lots, etc.)
25 N - Watercraft on the lake (gas, oil, waves, etc.)
1 O - Other (Please Specify) leaves & grass clippings dumped in lake

8. Who, in your opinion, benefits the most from efforts to improve water quality in the watershed? (Please rank 1, 2, and 3 in the space provided.)

15 A - Businesses
16 B - Developers
81 C - Everyone
6 D - Farmers
70 E - Indian Lake Users
41 F - Lake Shore Residents
25 G - Landowners
38 H - Watershed Residents
3 I - Other (Please Specify) All of the above. (2) Wildlife

9. In your opinion, who should be responsible for the Indian Lake Watershed water quality improvements? (Please place an "X" beside your TOP THREE responses.)

9 A - Businesses in the watershed
81 B - Everyone affected by watershed water quality
29 C - Farmers
15 D - Federal government
21 E - Indian Lake developers
15 F - Lake shore owners
39 G - Lake users
23 H - Local government
30 I - State government
33 J - Watershed residents/stakeholders
6 K - Other (Please Specify) All of the above (2), ILWP, Keep dock fees at lake - not at State Gen'l Fund, Government agencies that receive any type revenue from lake.

10. In your opinion, what do you believe Indian Lake should be used for? (Please place an "X" next to your preferred use.)

75 A - Boating (Please indicate preference below)
i) 20 Limited Horsepower
ii) 31 Unlimited Horsepower
3 B - Drinking water source
64 C - Fishing
41 D - Habitat for wildlife
23 E - Retention basin for Miami River
36 F - Swimming
1 G - Other (Please Specify) Recreation(3), The current uses(don't re-regulate
All the above, Place people can enjoy living around water

11. In your opinion, what are the TOP THREE ISSUES listed below that need attention to improve the water quality? (Please mark an "X" by no more than 3.)

49 A - Conservation farming practices in the watershed
11 B - Construction regulations
36 C - Decreasing geese population & swans
20 D - Education programs for agricultural users
24 E - Education programs for lake users
15 F - Education programs for residents and businesses
13 G - Financial incentives to agricultural producers
4 H - Financial incentives to residents and businesses
8 I - Government regulations
24 J - Increase the dredging
4 K - Increase the environmental regulations
3 L - Mandatory shoreline setbacks
26 M - Sewer and septic system improvements
24 N - Shoreline stabilization
13 O - Streambank stabilization
13 P - Zoning regulations

12. With which of the following water quality related issues are you familiar? (Please mark "X" all that apply.)

69 A - Chemical runoff from farming
40 B - Chemical runoff from residential property
26 C - Citizen lake awareness and monitoring
37 D - Composting leaves and grass clippings
51 E - Conservation farming
61 F - Dredging
9 G - Eutrophication
35 H - ILDC
11 I - Macroinvertebrates
30 J - Nutrients
41 K - Pesticides
45 L - Sewer & septic systems
57 M - Soil erosion
16 N - Turbidity
43 O - Water quality monitoring

SECTION III

13. Please indicate your level of agreement of disagreement with the statements below. (Please place an "X" in the block that best represents your opinion.)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
A) The economic stability of my community depends upon good water quality.	0	2	13	60	28
B) Using recommended management practices on farms improves water quality.	1	0	1	67	32
C) It is my personal responsibility to help protect water quality.	0	0	7	58	35
D) It is important to protect water quality even if it slows economic development.	1	2	20	61	15
E) What I do on my land doesn't make much difference in overall water quality.	18	56	18	5	1
F) Investing in water quality protection puts the farmer at an economic disadvantage.	5	46	26	16	5
G) Farm management practices do not have an impact on water quality.	34	59	3	3	0
H) My actions have an impact on water quality.	3	8	12	56	18
I) Taking action to improve water quality is too expensive for me.	8	40	41	8	1
J) It is okay to reduce water quality to promote economic development.	34	55	8	1	1
K) It is important to protect water quality even if it costs me more.	1	4	34	52	9
L) I would be willing to pay more to improve water quality (for example: through local taxes or fees)	14	9	35	37	4
M) I would be willing to change management practices to improve water quality.	0	0	32	64	3
N) The quality of life in my community depends on good water quality in local streams, rivers and lakes.	1	1	8	60	33

SECTION IV

14. I am willing to get involved in improving the water quality in the watershed?

Strongly Disagree 1 Disagree 3 Neither Agree nor Disagree 37 Agree 51 Strongly Agree 4

15. I am willing to voluntarily contribute money periodically to improve the water quality?

Strongly Disagree 1 Disagree 11 Neither Agree nor Disagree 32 Agree 50 Strongly Agree 5

16. I am willing to participate in stream and/or lake monitoring?

Strongly Disagree 1 Disagree 9 Neither Agree nor Disagree 42 Agree 43 Strongly Agree 2

18. I am willing to participate in educational programs that improve the water quality of Indian Lake?

Strongly Disagree 1 Disagree 5 Neither Agree nor Disagree 45 Agree 43 Strongly Agree 1

19. I am willing to voluntarily participate in recommended programs that improve water quality?

Strongly Disagree 1 Disagree 4 Neither Agree nor Disagree 28 Agree 57 Strongly Agree 5

20. To cover the cost of improving Indian Lake and the watershed, what source of revenue do you find most acceptable? (Please check "X" ONLY ONE)

5 A - County wide income tax
8 B - Increase boater and fishing registration fees
5 C - Increase camping fees
18 D - Set up a conservancy district
27 E - Set up a foundation to receive grants an donations
2 F - Special watershed property tax assessment
3 G - Special watershed sales tax assessment
8 H - State wide tax
14 I - Tax on groups responsible for the problems
4 J - None of the above
___ K - Other (Please Specify) Boat Ramp fees (2) – Funds from State & Fed agency Reduce Park Mgr. wages, Responsible use of current taxes, Increase camping fees

21. How long have you owned your property?

8 A - Less than 5 years
9 B - 5-9 years
35 C - 10-19 years
16 D - 20-29 years
25 E - 30+ years

22. Which response best describes your association with Indian Lake?

7 A - Business owner adjacent to Indian Lake
1 B - Business owner not adjacent to Indian Lake
8 C - Farm within 5 miles of Indian Lake
7 D - Farm within 5-10 miles of Indian Lake
6 E - Farm over 10 miles from Indian Lake
22 F - Live on an island at Indian Lake
12 G - Resident within 1 mile of Indian Lake
8 H - Resident within 1-5 miles of Indian Lake
12 I - Resident over 5 miles from Indian Lake but in the watershed
3 J - Seasonal resident only
37 K - Waterfront property owner
3 L - Other (Please Specify) - Visit occassionally, Community supportive, Fishing/Boating

23. Which of the following best describes your occupation?

3 A - Business (agricultural related)
12 B - Business (non agricultural related)
0 C - Clerical or service worker
3 D - Executive/Administrator
8 E - Farmer
1 F - Homemaker
4 G - Middle management
11 H - Professional/Technical
48 I - Retired
6 J - Sales/Marketing
1 K - Student
0 L - Tradesman/Machine Operator/Laborer
2 M - Other (Please Specify) Local government, Rental property owner

SECTION V

24. How do you think the Indian Lake Watershed Project has done in improving the water quality of Indian Lake in the past 15 years of so? (On a scale of 1 - 10 with 10 being the best, please indicate you score on the line below.)

_____ Score

1(1) 2(1) 3(0) 4(2) 5(12) 6(6) 7(15) 8(39) 9(12) 10(13) 10½(1)

25. Do you have any comments that you feel would continue to help improve the water quality of Indian Lake?

Educate Community
Keep doing what is currently being done
Make those with a connection (locals) responsible financially for water quality of lake – not weekenders or absentee landowners
Littering (especially in lake)
More rip rap & dredging
Better water quality of tribs
RV tax
Zoning
Septic Systems improved

Thank you for taking the time to complete this survey. Your input will be of great benefit to our project and to the continuing effort to improve Indian Lake.

ILWP will be holding an Open House August 15, from 5:00 P.M. to 7:00 P.M. at the Indian Lake Community Church Fellowship Hall. Watch for more details in the Shopper's Edge.

324 County Road 11, Bellefontaine, Ohio 43311
PHONE: 937-593-2946 FAX: 937-592-3350
www.co.logan.oh.us/ILWP

226 total returned

INDIAN LAKE WATERSHED PROJECT
Lake User Survey Questionnaire

Surveys provide a useful tool for managers to access responses and to gather new ideas on areas of concern. This survey should take no more than 10 minutes to complete. Your views and cooperation are both very important to us. This project is funded in part by the Logan County Economic Grant awarded the Indian Lake Watershed Project by the Logan County Commissioners. Individual responses will be kept confidential and will be released only as summary information where individual answers cannot be identified.

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Jack L. Webb
Executive Director
Indian Lake Watershed Project
324 Co. Rd. 11
Bellefontaine, Ohio 43311
937-593-2946
www.logan.co.oh.us/ILWP

SECTION I

The following questions provide the project insight into the landowner's viewpoint. (Please circle the response, fill in the blank or place an "X" in the area that best reflects your opinion.)

1. Do you own a residence within 5 miles Indian Lake?

   YES 199 NO 27

   If "NO": How many miles do you travel to come to Indian Lake? _____miles

   If "YES" When do you stay at Indian Lake?
   - 20 A - year around
   - 66 B - mostly summers
   - 130 C - mostly weekends

2. How many years have you been coming to or living at Indian Lake? _____years

0-5	28	20-30	32	50-60	20	70+	3
5-10	39	30-40	23	60-70	13		
10-20	40	40-50	28				

1-5	0
5-10	0
10-20	2
20-30	3
30-40	0
40-50	4
50-60	5
60-70	5
70-80	1
80-90	1
90-100	0
100+	5

SECTION II

3. How many times a year do you use Indian Lake?
   - 15 A - 1-5 times
   - 17 B - 5-10 times
   - 52 C - 10-20 times
   - 58 D - 20-30 times
   - 79 E - greater than 30

4. Do you use Indian Lake more or less than 5 years ago? 146 A - more 50 B – less 21 same

For the next series of questions, place an "X" on the line that best indicates your degree of concurrence.

5. To what extent does water quality affect your decision in coming to Indian Lake?

No affect		Some affect		Significant affect
A 37	B 16	C 60	D 62	E 55

6. From your lake use this year, how would you rate the appearance of Indian Lake?

1 A - Very Poor 11 B - Poor 63 C - Fair 122 D - Good 42 E - Very Good

7. How would you rate the appearance of Indian Lake now compared to:

	Worse				Better
Earlier this year	7	9	116	33	19
Last year	3	12	103	47	21
In the past 5 years	5	8	43	74	69
In the past 10 years	8	5	24	41	104

8. Which of the following activities do you partake in while at Indian Lake?

	Not At All		Sometimes		Often
A) Biking	102	13	66	12	21
B) Boating	4	4	34	28	151
C) Camping	195	8	4	—	—
D) Canoeing	176	8	23	5	8
E) Fishing	48	19	74	18	58
F) Hiking	134	18	41	15	13
G) Nature Walks	112	22	52	11	17
H) Picnicking	119	18	54	10	8
I) Swimming/Beach Use	65	18	78	20	30
J) Visiting Park and Playground	112	23	57	14	7
K) Water skiing	98	19	52	17	25
L) Winter Activities	95	38	59	9	9

9. If you have a boat, what type do you use on Indian Lake? (Mark as many as applicable)

30 A - Pleasure Cruiser
85 B – Jet Ski
65 C – Ski/Speed Boat
41 D – Fishing Boat
129 E – Pontoon
22 F – Sail Boat
1 G – Camouflage
21 H - Other — Kayak - Pedal Boat - John Boat - Canoe - Row Boat

Horsepower 50 – 305
Horsepower 30 – 150
Horsepower 120 – 300
Horsepower 4.9 – 150
Horsepower 10 – 300

SECTION III

10. What do you feel are the TOP THREE POLLUTION PROBLEMS affecting Indian Lake today? Please place an "X" next to your Top three (3) choices.

63 A – Algae Growth in the Lake
109 B – Canada Geese Population
68 C – Chemical Runoff from Cropland
16 D – Chemical Runoff from Lawns
47 E – Faulty Sewer and Septic Systems
69 F – Fertilizer or Nutrient Runoff from Cropland
11 G – Fertilizer or Nutrient Runoff from Lawns
10 H – Household Hazardous Waste
9 I - Livestock Wastes
41 J – Shoreline Erosion from Wind
72 K – Soil Erosion and Sedimentation from Cropland
25 L - Soil Erosion and Sedimentation from Urban Development
11 M – Urban Runoff (roads, parking lots, etc.)
53 N – Watercraft (gas, oil, waves, etc.)
10 O – Others – Noise, Duckweed, Trash (litter)

11. Who do you feel should be responsible for Indian Lake water quality improvement? Please check no more than three (3).

53 A – Local Government
100 B – State Government
25 C – Federal Government
35 D – Farmers
28 E – Residents/Stakeholders
6 F – Businesses
36 G – Developers
25 H – Lake Shore Owners
30 I - Lake Users
104 J - All the Above

_____ Other

12. In your opinion, what do you believe Indian Lake should be used for? (Please place an "X" next to your preferred use.)

197 A – Boating (Please indicate preference below)

43 Limited Horsepower
65 Unlimited Horsepower

5 B – Drinking Water Source
128 C – Fishing
76 D – Habitat for Wildlife
36 E – Retention Basin for Miami River
83 F – Swimming
8 G – Other (Please Specify) Sandy beach area for small sailboats
jet skis in open zone only
all but drinking water
winter use

SECTION IV

13. In your opinion, what are the TOP THREE ISSUES listed below that need attention to improve the water quality? (Please mark an "X" by no more than 3.)

102 A – Conservation Farming Practices in the Watershed
25 B – Construction Regulations
87 C – Decreasing Geese Population
16 D – Educational Programs for Agricultural Users
39 E – Educational Programs for Lake Users
19 F - Educational Programs for Residents and Businesses
7 G – Financial Incentives to Agricultural Producers
7 H - Financial Incentives to Residents and Businesses
6 I – Government Regulations
110 J - Increase the Dredging
25 K – Increase the Environmental Regulations
1 L – Mandatory Shoreline Setbacks
51 M – Sewer and Septic System Improvements
41 N – Shoreline Stabilization
19 O – Streambank Stabilization
32 P – Zoning Regulations

14. To cover the cost of improving Indian Lake and the watershed, what source of revenue do you find most acceptable? (Please check "X" by ONLY ONE.)

11 A – County wide Income Tax
21 B – Increase Boater and Fishing Registration Fees
18 C – Increase Camping Fees
29 D – Set up a Conservancy District
50 E – Set up a Foundation to Receive Grants and Donations
13 F – Special Watershed Property Tax Assessment
22 H – Special Watershed Sales Tax Assessment
25 I – State Wide Tax
39 J – Tax on Groups Responsible for the Problems
4 K – None of the Above
7 L – Other (Please Specify) lake users, State Park's funding, State boat ramp ~~launch~~ launch fees for IL, State or federal grant, State, federal & ODNR, Dock fees

15. What is your knowledge of the Indian Lake Watershed Project?

20 A – No Knowledge 181 B – Some Knowledge 13 C – Very Knowledgeable

16. What do you feel needs to be done in the future to improve Indian Lake water quality?

Dredging (32)

Stricter regs Construction/Development (6)

Sewer/Septic (13)

Control Geese (or Kill all!!) (6)

ILWP continue to do what currently doing (10)

Stump removal (4)

Algae control (8)

Sediment (5)

Control # of RV parks (4)

Agriculture (8)

Control runoff from lake properties (6)

Control water quality of tribs (6)

Education of problems (8)

Law Enforcement in no wake zones, etc (8)

Thank you for taking the time to complete this survey. Your input will be of great benefit to our project and to the continuing effort to improve INDIAN LAKE.

ILWP will be holding an Open House August 15, from 5:00 P.M. to 7:00 P.M. at the Indian Lake Community Church Fellowship Hall. Watch for more details in the Shopper's Edge.

Summary from "The Landing" October-November 2003

NO SIGNATURES REQUIRED

TELL US HOW WE CAN BEST SERVE YOUR NEEDS

Indian Lake Watershed Project developed this document to capture information to be used in updating our long-range management plan. Please take a few minutes this evening to respond so we can serve you better in the future.

Indian Lake Watershed Project membership is growing rapidly. In 2003, we had over 550 members. For 2003-2004 over 300 have already paid! Since our inception in 1990 the amount of soil being delivered to the lake from throughout the watershed has been reduced by over 80% from nearly 79 million tons annually to less than an estimated 12 million tons per year. With demands for dredging to continue to escalate and the cost approaching ¾ million dollars annually, our board is looking for creative and innovative projects that can demonstrate continued improvement of the water quality for Indian Lake.

1. **Should Indian Lake Watershed Project's (ILWP's) emphasis shift from reducing cropland erosion and agriculturally related issues to other contributors to water quality degradation?**

14 YES or 2 NO Please Circle

2(a) **If "YES", to question 1, please rank the following areas of concern from 1-5 with 1 being the area of your greatest concern.**

58	Construction Runoff	5
64	Existing Residential Areas	6
46	Shoreline Stabilization	3
42	State Park Dredging Operations	2
27	Storm Water Management	1
54	Stream Bank Stabilization	4
___	Other (please specify) _____	

2(b) **If you answered "NO" to question 1, please rank the following areas of concern 1-5 with 1 being the area of your greatest concern.**

6	Expand No-till Program	5
5	Confined Livestock Operations	3
2	Livestock exclusion from streams	1
5	Installation of more filter strips	3
2	CRP acres reverting back to crop production	1
10	Chemical and fuel storage facilities	6
___	Other (please specify) _____	

3. Do you believe Ohio Department of Natural Resources (ODNR) has an obligation or responsibility to improve water quality?

15 YES or 0 NO Please Circle

If "YES" to question 3, please indicate using 1-3 with 1 being the area of greatest concern which options ODNR should implement.

45	Algae Growth in the lake	4
31	Place dredge material only in areas where it can not return to the lake.	1
40	Reduce lake turbidity by limiting number of water craft and/or horse power.	3
33	Reduce shoreline erosion using rip rap and/or sea wall	2

4. Indian Lake State park is one of the most frequented parks in the state and visitation is continuing to grow. The ILWP is no longer eligible for Ohio EPA 319 grant funds that provided incentives for landowners to implement many of the Best Management Practices (BMP's) installed in the past 12 years. Thanks to State Representative Tony Core and State Senator Larry Mumper, ILWP was again funded administratively as a line item in the State budget process. To provide incentives to landowners to continue the implementation of water quality improvement BMP's, what source of revenue would you find most acceptable? Please rank 1-5 as the most favorable to the least.

80	State Tax	4
80	Local Tax	4
73	Increase Camping Fees	2
82	Increase Boat and Fishing Registration Fees	7
81	Charge a Launch Fee	6
36	Apply for more private grant funds	1
79	Expand Philanthropic efforts	3

5. Based on the 2 prior year's efforts, our membership is expected to reach 750-800 for 2004 with monetary donations anticipated to exceed $7,500.00. These gifts have varied from $5.00 to $500.00 the past 2 years. How willing are you to make a tax deductible cash donation?

2	I am very willing
7	I am somewhat willing
6	I am not willing

Donations in other forms may also be tax deductible. Have you given any thought to include ILWP in your estate planning process?

1 YES 14 NO

Thanks for taking the time to complete this questionnaire.