



Study Plan for the Lye Creek (Blanchard River) Study Area 2013

**Hydrologic Unit Code (HUC)
04100008 02 04**

Hancock County



Division of Surface Water
April 10, 2013

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Hancock County, Ohio

In support of:
Upper Blanchard Phosphorus Reduction Initiative
GLRI Grant GL-00E01020-0
State Grant EPAFBLAN12

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April 10, 2013

CONTACTS

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Ohio DNR – Wildlife Officers

District 2 – 419-424-5000

- Hancock County – Scott Sharpe 419-429-8384

Sheriffs (emergencies dial 911)

- Hancock County – 419-424-7097

Police Department (emergencies dial 911)

- City of Findlay Police – 419-422-3141

Hospital (emergencies dial 911 and map attached)

- Blanchard Valley Hospital – 419-423-4500
1900 South Main St., Findlay, OH, 45840

INTRODUCTION

Dissolved phosphorus inputs into the western basin of Lake Erie from the Maumee watershed are at historic levels and are believed to be a significant cause for harmful algae blooms (cyanobacteria) that have reappeared in recent years. Multiple local, state and federal agencies as well as nongovernmental partners are mobilizing to implement a variety of nutrient reduction projects within the basin. For example, USDA-NRCS is working with several parties within the Upper Blanchard for a special EQIP project that will enhance the benefits derived from the phosphorus reduction demonstration project funded by the GLRI Upper Blanchard Phosphorus Reduction Initiative grant. This project is designed to demonstrate the effectiveness of targeting agricultural nutrient reduction (and other) practices at a focused scale in which measurable reductions in nitrogen and phosphorus may be achieved. The project also proposes a more holistic approach that includes not only robust source reduction efforts, but also will implement additional practices that are designed to reduce sediment loadings and improve flow and habitat conditions within the Lye Creek watershed (HUC 0410008 02 04) in Hancock County, Ohio. The project will be a collaborative partnership among Ohio EPA, the Hancock County SWCD, Hancock County Health Department, Environmental Defense Fund (EDF), the Ohio Department of Natural Resources and the USDA-NRCS.

During the 2013 field season (July through October) chemical, physical, and biological sampling will be conducted in the Lye Creek watershed (HUC 0410008 02 04) to assess and characterize baseline water quality conditions prior to full implementation of the Upper Blanchard Phosphorus Reduction Initiative. The watershed lies within the Blanchard River basin, a tributary of the Auglaize River and, ultimately the Maumee River. The Lye Creek watershed is located in northwest Ohio in Hancock County and is comprised of approximately 17920 acres (28 mi²) - of which 82.6% is in agricultural row crop production. Other land uses within the Lye Creek watershed include developed land (9.5%), forest (5.0%) and grass/pasture (2.9%) (Source: National Land Data Set, 2006).

The current aquatic life use designation of Lye Creek and its primary tributary, Silver Creek, is unverified Warmwater Habitat (WWH). Based on limited sampling in 2005, Lye Creek was recommended for the Modified Warmwater Habitat (MWH) use due to extensive channel modifications. However, preliminary biological and habitat sampling in 2012 at five Lye Creek and Silver Creek sites indicated that WWH is the appropriate aquatic life use based on fish community assemblages (Table 1). Based on the 2005 sampling and updated with the 2012 survey results, principal causes of impairment in the Lye Creek watershed are direct habitat alterations, nutrient/eutrophication biological indicators, organic enrichment (sewage) biological indicators, phosphorus, excessive algal growth, and particle distribution (embeddedness). Primary impairment sources identified are crop production with subsurface drainage and channelization.

Specific objectives of the survey are:

- Establish the present biological conditions in the Lye Creek watershed by evaluating fish and macroinvertebrate communities;
- Identify the relative concentrations and loadings of nutrients and other selected parameters in surface water;
- Assess physical habitat influences on stream biotic integrity;
- Determine beneficial use attainment status and recommend changes if appropriate; and
- Confirm or revise causes and sources of beneficial use impairment as determined by earlier studies.

The entire watershed is located within the Eastern Corn Belt Plains (ECBP) ecoregion and there are no permitted point source dischargers present. Stream samples, including sample type, drainage area and location information are listed in Table 2 and represented graphically in Figure 1.

SAMPLING ACTIVITIES

Macroinvertebrate and Fish Assemblages

Macroinvertebrate assemblages using artificial substrates (quantitative sampling) and/or natural substrates (qualitative sampling) will be collected as listed in Table 2. Fish assemblages will be sampled using pulsed DC electrofishing protocols as listed in Table 2. Habitat will be scored using the Qualitative Habitat Evaluation Index (QHEI) at all fish sampling locations.

Chemical/Physical Water Sampling

Chemical sampling locations within the study area are listed in Table 2. Conventional chemical/physical water quality grab samples will be collected 3-5 times at each designated location during the survey. Samples will be collected between April and October. Datasondes© will be deployed at one location for two 48-hour periods as detailed in Table 2. Chemical/physical parameters to be tested are listed in Table 3. An attempt will be made to sample surface waters across a variety of flow conditions, from lower flows to moderate and higher flows.

Chlorophyll Sampling

Benthic chlorophyll a samples are to be collected at designated wadeable and headwater sites noted in Table 2. Benthic chlorophyll samples are to be collected at least once, and should be timed to coincide with deployment of Datasonde© automated data loggers during stable, baseflow conditions (i.e., typically the second sonde deployment).

QUALITY ASSURANCE/SAMPLING METHODS

Ohio EPA Manuals

All biological, chemical, data processing, and data analysis methods and procedures adhere to those specified in the Surface Water Field Sampling Manual for water column chemistry, bacteria and flows (Ohio EPA 2013a), Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio EPA 1987, 1989a, 1989b, 2013b, 2013c), and The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Ohio EPA 1989c, 2006) for habitat assessment.

Use Attainment

Attainment/non-attainment of aquatic life uses will be determined by using biological criteria codified in Ohio Administrative Code (OAC) 3745-1-07, Table 7-17. Numerical biological criteria are based on multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community.

Performance expectations for the tiered aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH]) were developed using the regional reference site approach (Hughes et al. 1986; Omernik 1987). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance. The Powell Creek watershed results will be compared to biocriteria for the Huron-Erie Lake Plain ecoregion.

Stream Habitat Evaluation

Physical habitat is evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Ohio EPA 1989c, Ohio EPA 2006). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic faunas. Evaluations of type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle development and quality, and stream gradient are among the metrics used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with

better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values higher than 60 were generally conducive to the establishment of warmwater faunas while those which scored in excess of 75-80 often typify habitat conditions which have the ability to support exceptional faunas.

Biological Community Assessment

Macroinvertebrates will be collected from artificial substrates and/or natural stream habitats. Artificial substrate collections will be collected at all sites with greater than 20 mi² drainage areas or at reference site locations. This sample provides quantitative data and consists of a composite sample of five modified Hester-Dendy multiple-plate artificial substrate samplers colonized for six weeks. Qualitative sampling will be conducted at all sampling locations. This sampling effort consists of an inventory of all observed macroinvertebrate taxa from the natural stream habitats at each site with no attempt to quantify populations other than notations on the predominance of specific taxa or taxa groups within major macrohabitat types (e.g., riffle, run, pool, margin). Detailed macroinvertebrate assemblage sampling protocols are documented in Biological Criteria for the Protection of Aquatic Life, Volume III (1989b, 2013c).

Fish will be sampled at each sampling location using pulsed DC headwater, wading, or boat electrofishing methods depending on watershed size at each sampling zone. Sites with drainage areas greater than 20 mi² or at reference site locations will be sampled twice during the sampling index period. Fish are processed in the field which includes identifying each individual to species, counting individuals at all sites, weighing individuals at wading and boat sites, and recording any external abnormalities. Detailed fish assemblage sampling protocols are documented in Biological Criteria for the Protection of Aquatic Life, Volume III (1989b, 2013c).

Surface Water

Surface water grab samples will be collected and preserved using appropriate methods, as outlined in Surface Water Field Sampling Manual for water column chemistry, bacteria and flows (Ohio EPA 2013a) and delivered to the Ohio EPA Division of Environmental Services lab for analyses. Datasonde© automated data loggers will be deployed at select locations to evaluate diel measurements of dissolved oxygen, pH, temperature, and conductivity.

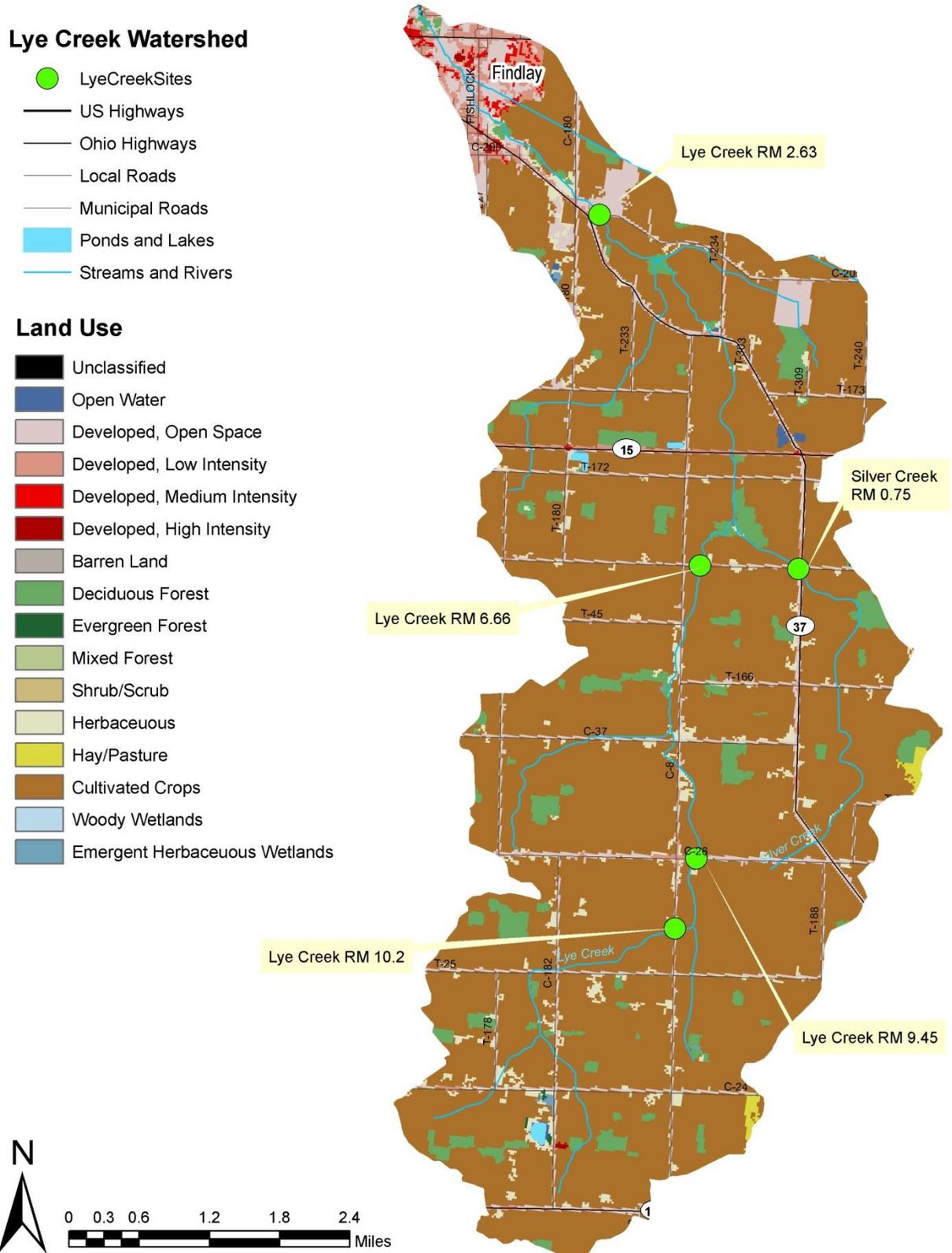
Chlorophyll

Benthic chlorophyll a samples will be collected and preserved using appropriate methods, as outlined in Appendix II of Surface Water Field Sampling Manual for water column chemistry, bacteria and flows (Ohio EPA 2013a) and delivered to the Ohio EPA Division of Environmental Services lab for analyses. Alkalinity must be requested as a routine water quality parameter at all study sites along with the routine field parameters, especially temperature and pH.

Field Quality Control Samples

Ten percent of the water samples will be submitted to the lab as field duplicates. Field blanks will occur at a minimum of 5 percent of the water samples. Field instruments will be calibrated daily using manufacturer guidelines and requirements as noted in Surface Water Field Sampling Manual for water column chemistry, bacteria and flows (Ohio EPA 2013a).

Figure 1. Sampling locations (biological, physical habitat, and stream chemistry) and current land uses in the Lye Creek (Blanchard River) watershed study area, 2013.



RM	Stream Name	Station ID	Eco-Region	Current Aquatic Life Use	Rec.	IBI	MIwb	ICI	Macro Narrative	QHEI	Attainment Status
Basin & Stream Code:		Lye Creek 04-190-000									
10.20	LYE CREEK S OF HOUCKTOWN @ CO. RD. 8	302113	ECBP	WWH	-	44			Very Poor	28.00	Non
9.45	LYE CREEK AT HOUCKTOWN @ HANCOCK CO. RD. 26	P05K40	ECBP	WWH	-	44			Poor	32.50	Non
6.66	LYE CREEK SE OF FINDLAY @ JACKSON TWP. RD. 168	P05K41	ECBP	WWH	-	40			Poor	46.30	Non
2.63	LYE CREEK @ HANCOCK CO. RD. 205	P05K42	ECBP	WWH	-	40	7.85		Poor	45.50	Non
Basin & Stream Code:		Silver Creek 04-191-									
0.75	SILVER CREEK SE OF FINDLAY @ TWP. RD. 168	302115	ECBP	WWH	-	22				34.50	Non

<u>HUC12</u>	<u>Stream Code</u>	<u>Station</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Sample Type</u>	<u>River Mile</u>	<u>Drainage Area</u>	<u>Location</u>
04100008 02 04 Lye Creek								
Lye Creek	04-190-000	302113	40.9267	-83.5946	F1x, Mql, C	10.20	4.9	Hancock Co. Rd. 8
		P05K40	40.9354	-83.5912	F1x, Mql, C	9.45	7.8	Hancock Co. Rd. 26
		P05K41	40.9717	-83.5912	F1x, Mql, C	6.66	12.8	Jackson Twp. Rd. 168
		P05K42	41.0150	-83.6083	F2x, Mqt, C, CI, D	2.63	25.7	Hancock Co. Rd. 205
Silver Creek	04-191-000	302115	40.9714	-83.5751	F1x, Mql, C	0.75	4.1	Jackson Twp. Rd. 168

F1x - Fish one-pass site; F2x – Fish two-pass site.
 Mqt - Macroinvertebrate quantitative site; Mql – Macroinvertebrate qualitative site.
 C - Chemical water quality site.
 CI - Chlorophyll analysis site.
 D - Datasonde® automated data logger monitoring site.

Table 3. List of chemical/physical water quality parameters to be analyzed/ measured in surface water from the Lye Creek watershed. Water samples will be collected 3-5 times. Select sampling locations will be monitored for dissolved oxygen, pH, temperature, and conductivity using Datasonde© automated data loggers (Table 1).

Parameter	Units	Method	MDL
Temperature	°C	YSI 556 or Pro Plus Meter	
Dissolved Oxygen	mg/L	YSI 556 or Pro Plus Meter	
Dissolved Oxygen	%	YSI 556 or Pro Plus Meter	
pH	SU	YSI 556 or Pro Plus Meter	
Conductivity	µS/cm	YSI 556 or Pro Plus Meter	
Specific Conductivity	µS/cm	YSI 556 or Pro Plus Meter	
Dissolved Solids	mg/L	SM 2540 C	10
Suspended Solids	mg/L	SM 2540 D	5
Alkalinity	mg/L	USEPA 310.1	5
Ammonia	mg/L	USEPA 350.1	0.05
Chemical Oxygen Demand	mg/L	SM 5220 D	20
Chloride	mg/L	USEPA 325.1	5
Specific Conductivity (lab)	µS/cm	SM 2510 B	2
Nitrate-Nitrite	mg/L	USEPA 350.1	0.5
Nitrite	mg/L	USEPA 353.2	0.02
Sulfate	mg/L	USEPA 375.2	10
Kjeldahl Nitrogen	mg/L	USEPA 351.2	0.2
Orthophosphate	mg/L	USEPA 365.1	0.01
Phosphorus	mg/L	USEPA 365.4	0.01
Chlorophyll a	µg/L	USEPA 445.0	

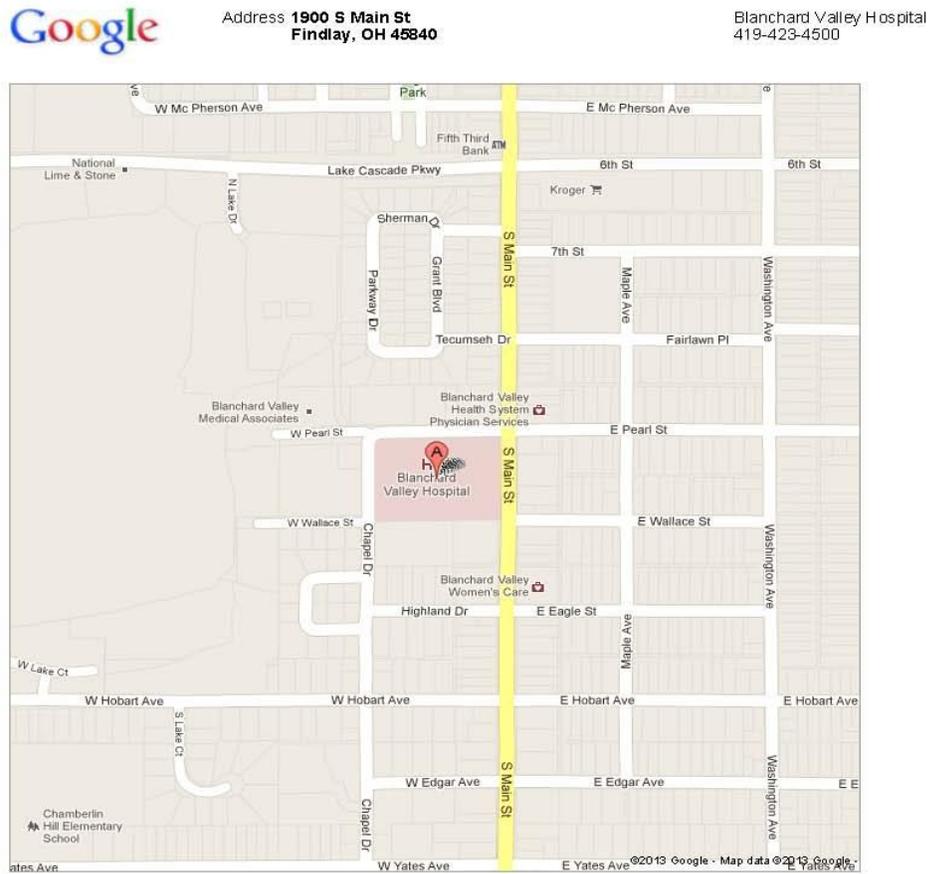
REFERENCES

- Hughes, R. M., D. P. Larsen, and J. M. Omernik. 1986. Regional reference sites: a method for assessing stream pollution. *Env. Mgmt.* 10(5): 629-635.
- Karr, J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. *Env. Mgmt.* 5(1): 55-68.
- National Land Cover Data (NLCD 2006).
- Ohio Environmental Protection Agency. 2013a. Surface water field sampling manual for water column chemistry, bacteria and flows. Version 4.0, January 31, 2013. Div. of Surface Water, Columbus, Ohio.
- _____. 2013b. 2013 Updates to Biological criteria for the protection of aquatic life: Volume II and Volume II Addendum. Users manual for biological field assessment of Ohio surface waters. Div. of Surface Water, Ecol.Assess. Sect., Columbus, Ohio.
- _____. 2013c. 2013 Updates to Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div.of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.
- _____. 2006. Methods for assessing habitat in flowing waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Tech. Bull. EAS/2006-06-1. Div. of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.
- _____. 1989a. Addendum to Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.
- _____. 1989b. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Division of Water Quality Planning and Assessment, Columbus, Ohio.
- _____. 1989c. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Division of Water Quality Planning and Assessment, Columbus, Ohio.
- _____. 1987a. Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.
- _____. 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.
- Omernik, J.M. 1987. Ecoregions of the conterminous United States. *Ann. Assoc. Amer. Geogr.* 77(1): 118-125.

Blanchard Valley Hospital
419-423-4500

1900 South Main Street, Findlay, OH - Google Maps

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