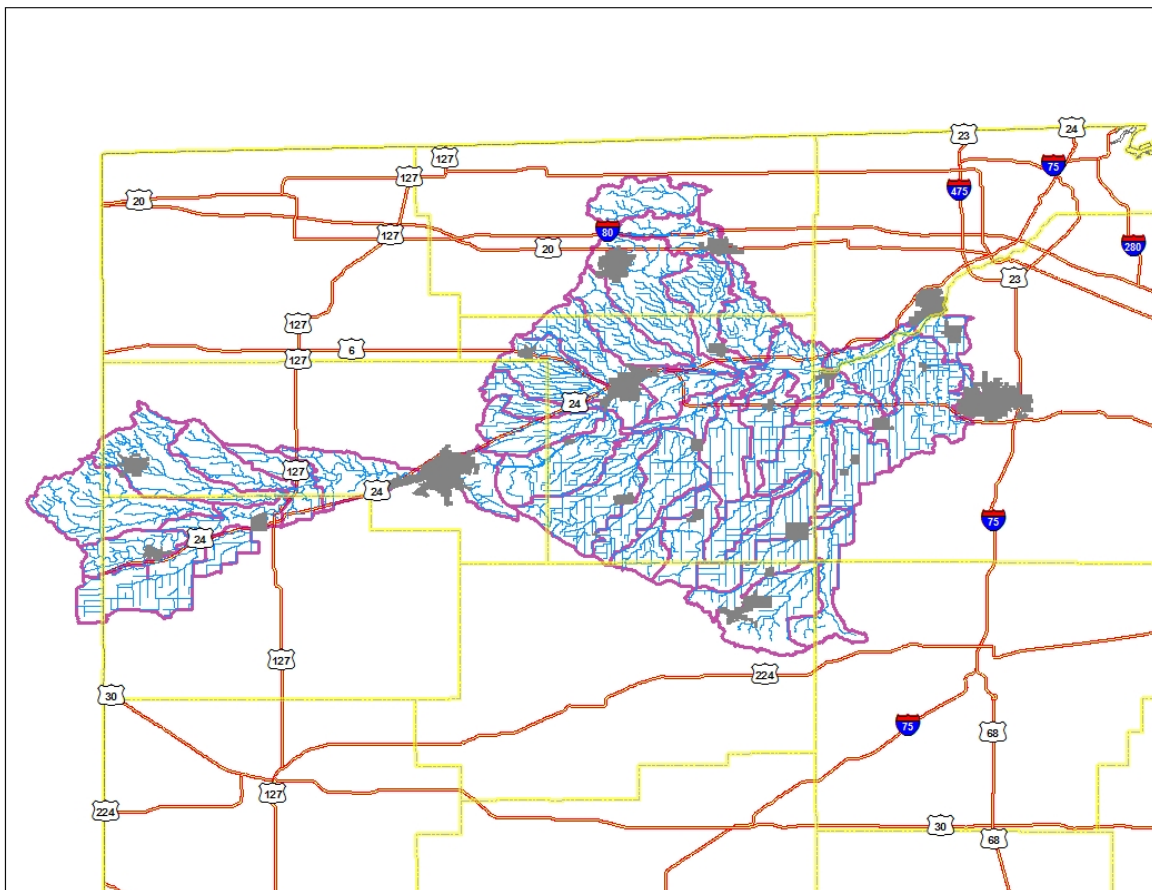




2015 Study Plan for the *Maumee River Basin Select Tributaries*

Defiance, Fulton, Hancock, Henry, Paulding,
Putnam, and Wood Counties, Ohio



Division of Surface Water
Ecological Assessment Section
June 5th 2015

Maumee River Basin Select Tributaries Study Plan, 2015

2015 Study Plan for the Maumee River Basin Select Tributaries

(Defiance, Fulton, Hancock, Henry, Paulding, Putnam, and Wood counties, OH)

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Introduction

As part of the Total Maximum Daily Load (TMDL) process and in support of the basin approach for National Pollution Discharge Elimination System (NPDES) permitting, an intensive ambient assessment will be conducted during the 2015 field sampling season within selected Maumee River tributaries (Table 3). The study area is composed of all or portions of 37 HUC12 watershed assessment units (WAUs). Data from a total of 102 sampling stations will be collected in the selected Maumee River tributaries study area. Ambient biology, macrohabitat quality, water column chemistry, and bacteriological data will be collected concurrently from most of these sites. Diel water quality (DO, pH, conductivity, and temperature), sediment chemistry (metals, organics, and particle size), nutrients, and fish tissue will be evaluated at selected sampling locations (Table 3).

Sampling Objectives

- 1 Systematically sample and assess the principal drainage networks of selected Maumee River tributaries in support of the TMDL process,
- 2 Gather ambient environmental information (biological, chemical, and physical) from designated water bodies, to assess current beneficial uses (e.g., aquatic life, recreational, water supply), Table 3,
- 3 Verify the appropriateness of existing, unverified, beneficial use designations,
- 4 Establish baseline ambient biological conditions at selected reference stations to evaluate the effectiveness of future pollution abatement efforts, and
- 5 Document any changes in biological, chemical, and physical conditions of the study areas where historical information exists, thus expanding the Ohio EPA data base for statewide trends analysis (e.g., 305[b]),
- 6 Collect fish tissue samples at selected stations as listed under sample types in Table 3.

Total Maximum Daily Load

Information collected as part of this survey will support TMDL development for this study area. The objectives of the TMDL process are to estimate pollutant loads from the various sources within the basin, define or characterize allowable loads to support the various beneficial uses, and to allocate pollutant loads among different pollutant sources through appropriate controls (e.g., NPDES permitting (Tables 1 & 2), storm water management, 319 proposals, NPS controls or other abatement strategies).

The components of the TMDL process supported by this survey are primarily the identification of impaired waters, verification (and re-designating if necessary) of beneficial use designations, and sources of use impairment. These data are necessary precursors to the development of effective control or abatement strategies.

Aquatic Life Use Designations (ALU)

The majority of streams contained within the study area are designated WWH (Warmwater Habitat), while a few are designated MWH-C (modified warmwater habitat – channelized) and LRW (limited resource water). For some of the streams, this will be the first time that they will be sampled and assessed. The Ohio EPA is obligated to review, evaluate, or recommend (where appropriate) beneficial uses prior to basing any permitting actions on existing, unverified designations, or entirely unclassified water bodies. A large portion of the sampling effort for this survey is allocated to fulfill this obligation.

SAMPLING ACTIVITIES

Chemical/Physical Water and Sediment

Chemical sampling locations within the study area are listed in Table 3. Conventional chemical/physical water quality samples will be collected 5 times at each designated location. Sediment samples will be collected at 14 locations. A total of 30 sondes will be deployed at designated locations, eight of which will overlap with sentinel sites. Chemical parameters to be tested are listed in Table 4. Surface water sampling will occur across a variety of flow conditions, from lower flows to moderate and higher flows.

Bacteriological Sampling

Water samples will be collected at 60 chemistry sites for bacteriological analyses to determine the attainment status of the Primary Contact recreational use of the streams within the study area. Testing will include *Escherichia coli* (E. coli) bacteria. Each site will be sampled at least 5 times, while sentinel sites may have 5-10 bacteriological samples.

Chlorophyll

Benthic and sestonic chlorophyll a samples are to be collected at 15 designated wadeable and headwater sites noted in Table 3. Benthic chlorophyll samples are to be collected at least once, and should be timed to coincide with deployment of automated data logger sondes during stable, baseflow conditions (i.e., typically the second deployment).

Biological Assemblage and Habitat

Fish and macroinvertebrate assemblage samples will be collected as listed in Table 3. Qualitative Habitat Evaluation Index (QHEI) scores will be calculated by evaluating habitat at all fish sampling locations.

Fish Tissue

Fish tissue samples will be collected from 12 potential locations as part of the Ohio Fish Tissue Consumption Monitoring Program. Sampling locations may vary based on the availability of sport fish collected at each location. Fillet samples of edible size sport fish will be tested for organochlorinated pesticides, PCBs, mercury, lead, cadmium, arsenic, and selenium. Results will be used in the Ohio Sport Fish Consumption Advisory Program.

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 2015a), Biological Criteria for the Protection of Aquatic Life,

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Volumes II - III (Ohio EPA 1987, 1989a, 2015b), 2015 Updates to the Biological Criteria for the Protection of Aquatic Life, Volume II (Ohio EPA 2015c), the Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Ohio EPA 1989c, 2006) for habitat assessment, Surface Water Field Sampling Manual – Appendix III for sediment sampling (Ohio EPA 2015a), and Ohio EPA Fish Tissue Collection Guidance Manual (Ohio EPA 2012) for fish tissue sampling.

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 multi-metric 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 basic 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 results will be compared to WWH biocriteria for the Huron-Erie Lake Plain (HELP) ecoregion.

Recreational use attainment will be determined using *E. coli* bacteria. Both types of organisms are indicator organisms for the potential presence of pathogens in surface water resulting from the presence of untreated human or animal wastes, and they are the basis for recreational use water quality criteria in Rule 3745-1-07 of the (OAC).

Stream Habitat Evaluation

Physical habitat is evaluated using the (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Ohio EPA 1989b). 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, and margin). Detailed macroinvertebrate assemblage sampling protocols are documented in Ohio EPA (2015b).

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. The number of passes can be adjusted as necessary based on best professional judgment. 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 Ohio EPA (2015b).

Sediment

Fine grained multi-incremental sediment samples will be collected in the upper 4 inches of bottom material using either decontaminated stainless steel scoops or Ekman dredges. Collected sediment will be placed into appropriate containers, placed on ice (to maintain 4°C) and shipped to the Ohio EPA Division of Environmental Services (DES) lab. Sampling and decontamination protocols will follow those listed in Ohio EPA (2015a Appendix III).

Chlorophyll

Benthic and sestonic chlorophyll a samples will be collected and preserved using appropriate methods, as outlined in Ohio EPA (2015a Appendix II) and delivered to the Ohio EPA DES 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.

Surface Water

Surface water grab samples will be collected and preserved using appropriate methods, as outlined in Ohio EPA (2015a) and delivered to the Ohio EPA Division of Environmental Services lab for analyses. Field measurements of dissolved oxygen, pH, temperature, and conductivity will be made using YSI Professional Plus meters along with all grab samples for surface water chemistry. Datasonde® continuous recorders will be placed at select locations to evaluate diel measurements of dissolved oxygen, pH, temperature, and conductivity.

Bacteria

Water samples will be collected into appropriate containers, cooled to 4°C, and transported to the Jones & Henry Laboratories Inc. laboratory in Northwood, Ohio within 6 hours of sample collection. All samples will be analyzed for *E. coli* bacteria using U.S.EPA approved methods (STORET Parameter Code 31648).

Fish Tissue

Tissue fillet samples will be collected from fish of edible size, and species preferred for analysis may include spotted bass, largemouth bass, smallmouth bass, flathead catfish, walleye, saugeye, white bass, common carp, freshwater drum, buffalo, and channel catfish. When possible, composite samples (by species) will be collected using a minimum of three fish and a minimum

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of 150 grams of material. At each sampling location, an attempt will be made to collect five fish species for fillet tissue analysis. Fish will be sampled using electrofishing boat methods at the reservoir and wading method at the remainder sites. Sampling locations are listed in Table 3. Fish used for tissue analysis will be filleted in the field using decontaminated stainless steel fillet knives. Filleted samples will be wrapped in aluminum foil, placed in a sealed plastic bag, and placed on dry ice. Sampling and decontamination protocols will follow those listed in the Ohio EPA Fish Collection Guidance Manual (2012). Fish tissue samples will be stored in chest freezers at the Ohio EPA Groveport Field Facility prior to delivery to DES.

Lake Sampling

Sampling will be done over two field seasons at lakes listed in Table 3. A total of five sampling events will be done per season at a frequency of roughly once per month May – September. At a minimum, grab samples for chemical analysis will be collected at 0.5 m below the surface and 0.5 m above the bottom from the deepest portion of the lake. Additional sites will be added if the lake is >20 km long, clearly divided into sub-basins, has major inflows or has a beach. Field reading profiles (temperature, dissolved oxygen, pH and conductivity) will be done in the water column at the location of chemistry grab samples and at roughly 1m depths in-between. Lakes used to store public drinking water will have samples analyzed for atrazine. Samples for identification of phytoplankton species, cell counts and bio-volume estimates will be submitted and analysis of cyanotoxins will also be done. Other pollutants outside the standard assessment (i.e. glyphosate, carbomates) will be done if they are known or suspected to be a problem. A sediment sample will be collected if none has been done within the last 10 years. Fish tissue specimens will be collected in lakes selected by a multi-agency committee with a priority given to those commonly used for sport fishing.

All field practices will follow guidelines in Ohio EPA (2015a) and the *Inland Lakes Sampling Procedure Manual* (Ohio EPA 2015d). Data will be used to assess use designations previewed in the *Ohio 2012 Integrated Water Quality Monitoring and Assessment Report*. The uses, criteria and assessment methods described are considered draft until they are adopted into the Ohio Water Quality Standards. The strategy generally focuses on water quality conditions in the epilimnion of lakes, although the entire water column is examined when the lake is un-stratified.

Field Quality Control Samples

Ten percent of the sediment, water, and bacteria samples will be submitted to the lab as field duplicates and field blanks; approximately 5% will be duplicates and 5 % will be blanks. One sonde recorder site will have two instruments placed in the river 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 noted in Ohio EPA(2015a). Matrix spike duplicates will be collected for organic water samples at a minimum of 5 percent.

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Please contact Andrew Phillips for any updates to this study plan

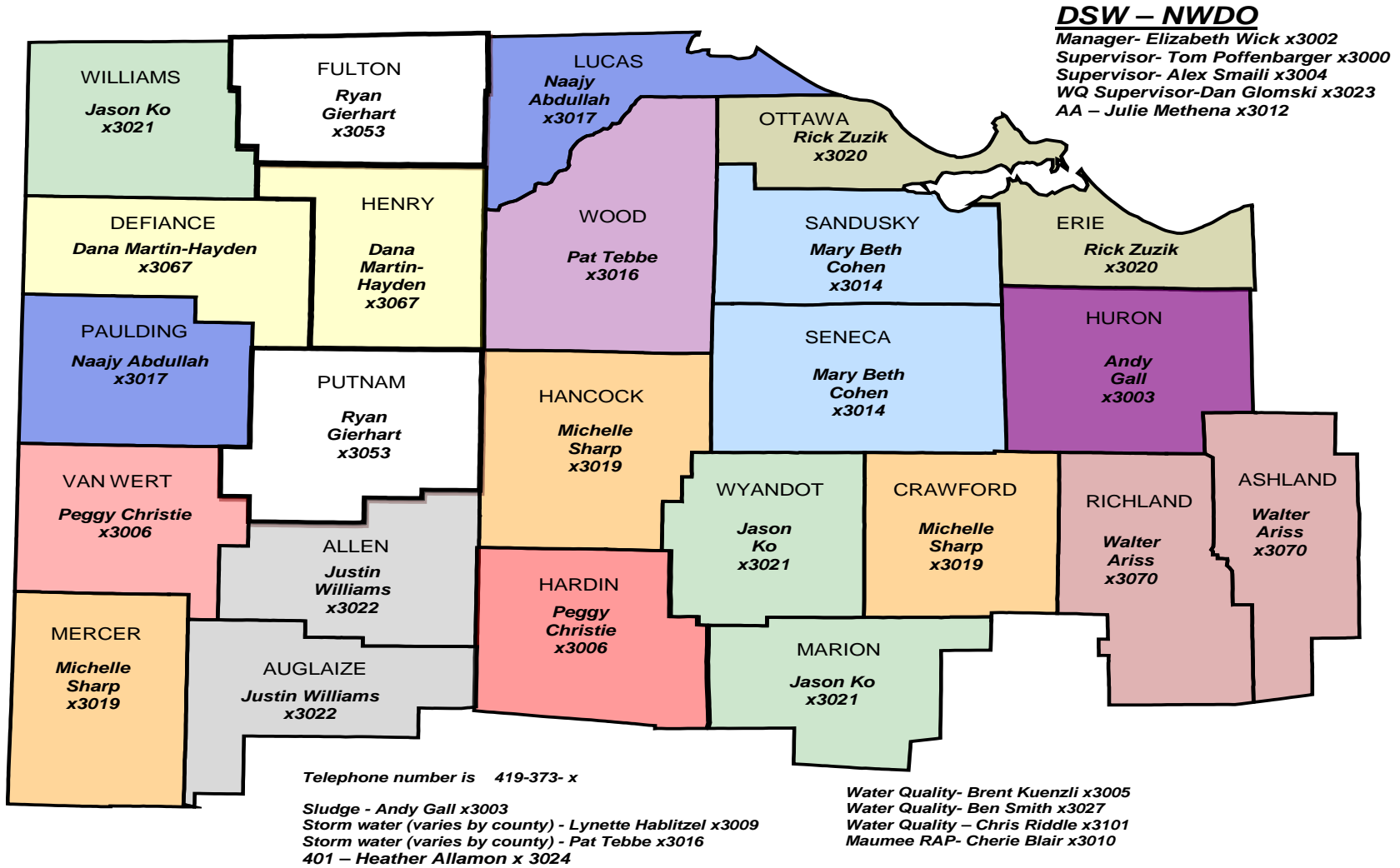
Sheriff's Offices by County:

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Table 1 Facilities regulated by an individual NPDES permit for the Lower Maumee River Watershed Assessment Unit (04100009).

Facility Name	Ohio EPA Permit No.	Receiving Stream	River Mile	Description
Airport Industrial Park	2PG00110	S. Branch Bad Creek	5.58	0.005 MGD Package Plant
Delta WTP	2IW00070	Bad Creek	17.55	Backwash water to lagoon – controlled discharge
Delta WWTP	2PB00003	Bad Creek	13.87	0.725 MGD Sequencing Batch Reactor
Pleasant View Subdivision	2PG00109	Bad Creek	9.5	0.020 MGD Package Plant
Wauseon WWTP	2PD00016	N. Turkeyfoot Creek	18.61	1.5 MGD Trickling filter, extended aeration
Camelot South Estates MHP	2PY00038	Dry Creek	10.5	0.0125 MGD Package Plant
Peters Dairy LLC (Napoleon Dairy LLC)	2IK00022	UT Konzen Ditch		Storm water, manure discharge to fields
Country View Haven	2PG00111	UT Van Hying Creek		0.01 MGD Package plant, aeration and sand filter
Campbells Soup Supply Co.	2IH00021	Maumee River	45.8	10 MGD Trickling filter for process water, 7 spray irrigation discharges from RM 44.65 to 43.38
Napoleon WWTP	2PD00000	Maumee River	46.05	2.5 MGD Trickling Filter with Alum addition and post aeration
Napoleon WTP	2IW00190	Maumee River	47.2	Filtrate to sludge lagoon discharge
Universal Cooperatives, Inc	2IF00019	Ditch 1518 to Maumee River		0.4 MGD Carbon filter, stabilization pond for storm water
Northstar Steel	2ID00015	Maumee River	42.48	0.29 MGD Metal removal, clarification, pH adjustment of process water
Worthington Steel	2ID00014	Maumee River	42.48	0.129 MGD Clarification, pH adjustment of process water
Liberty Center WWTP	2PB00039	Maumee River	40	0.25 MGD Oxidation Ditch
UMC Widewater Retreat	2PR00067	UT Maumee River	0.45	Lagoon System – controlled discharge

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River Bend MHP	2PY00026	Maumee River	34.8	0.005 MGD Package Plant
Grand Rapids WWTP	2PA00029	Beaver Creek	0.38	0.180 MGD Oxidation Ditch
Hanson Aggregates MW-Waterville Quarry	2IJ00047	UT Maumee River		Sedimentation Pond
Haskins WWTP	2PA00026	Liberty High Road Ditch	0.86	0.300 MGD Sequencing Batch Reactor
McDowell WTP	2IW00010	Maumee River	23.04	Lime sludge lagoon, backwash water
Tontogany Area WWTP	2PB00024	Tontogany Creek	3.6	0.10 MGD Lagoon System
Wood County landfill	2IN00120	Norris Euler Ditch		Storm water sedimentation pond
Weston WWTP	2PB00011	West Branch Tontogany Creek	8.1	0.280 MGD Activated Sludge
Country Side MHP	2PY00071	Wingston Road Ditch	2.4	0.008 MGD Package Plant
Drost Land Co. LLC (Manders Dairy LLC)	2IK00023	UT West Branch Tontogany Creek		Storm water, manure discharge to fields
Custar WWTP	2PA00090	Jackson Cutoff	5.9	0.050 MGD Lagoon System
Custar Stone Co. – Custar Plant	2IJ00034	Beaver Creek	10.5	2.016 MGD storm water sedimentation pond discharge
McClure WWTP	2PA00056	Big Creek	3.4	0.1 MGD Lagoon System - Controlled Discharge
The Ridge Project (Previously Hope School)	2PT00019	UT Big Creek		0.0033 MGD Package Plant
Holgate WWTP	2PB00041	Brinkman Ditch	2.55	0.247 MGD Lagoon System - Controlled Discharge
Malinta WWTP	2PA00098	S Turkeyfoot Creek	11.24	0.052 MGD Lagoon System - Controlled Discharge
Florida WWTP	2PA00091	Brubaker Creek		0.48 MGD Lagoon System – controlled discharge
Camp Libbey	2PR00166	Maumee River	59.8	Lagoon for Sanitary and food wastes
Diehl Food Ind. Inc.	2IH00057	Maumee River	64.32	Non-contact cooling water

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Metal Management of Ohio	2IS00026	Maumee River	60.91	1.0 MGD Slow sand filtration and storm water
Defiance WWTP	2PD00013	Maumee River	62.04	6.0 MGD Trickling Filter, Activated Sludge
GM Defiance NPA Systems	2IN00004	Maumee River	61.95	2.0 MGD Sand Filtration for process water, stormwater and landfill sed basin discharges
General Motors Powertrain	2IN00202	Maumee River	61.95	0.1008 MGD Granular Activated Carbon for landfill leachate treatment
Hamler WWTP	2PB00043	S Turkeyfoot Creek	20.62	0.113 MGD Lagoon System - Continuous Discharge
Bavarian Club	2PR00163	Hammer Creek		0.007 MGD Package Plant
BP Amoco Oil – West Leipsic	2IN00171	UT Little Yellow Creek		Oil water separator to pond
Deshler WWTP	2PC00002	Brush Creek	9.8	0.57 MGD Lagoon System - Controlled Discharge
Leipsic WWTP	2PB00040	Little Yellow Creek	6.38	1.5 MGD Trickling Filter, Sequencing Batch Reactor
Summit Ethanol LLC	2IF00023	Hickey Ditch	0.52	0.305 MGD Non-contact cooling water, RO reject water – currently 100% recycled
Industrial Corridor Sewer System	2PH00020	Maumee River	44.75	0.300 MGD Activated Sludge – Extended Aeration
Riverview MHP	2PY00061	UT Maumee River		0.0035 MGD Package Plant
NWS Williamsburg on the River	2PG00097	Maumee River	26.74	0.05 MGD Package Plant

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Table 2 Facilities regulated by an individual NPDES permit for the Upper Maumee River Watershed Assessment Unit (04100005).

Facility Name	Ohio EPA Permit No.	Receiving Stream	River Mile	Description
Sherwood WWTP	2PA00017	Sulphur Creek	0.7	0.160 MGD Stabilization Pond
Hicksville WWTP	2PB00042	Mill Creek	2.0	2.25 MGD Activated Sludge
Middle Gordon Creek Subdivision	2PG00049	Middle Fork Gordon Creek	5.57	0.008 MGD Activated Sludge, Sand Filter
Brentwood MHP	2PY00044	Maumee River	82.98	0.010 MGD Package Plant – Sand Filters
Cecil WWTP	2PA00033	UT Maumee River		0.025 MGD Activated Sludge
Zylstra Dairy LLC	2IK00013	UT South Creek		Storm Water, Manure discharge to fields
Antwerp WWTP	2PA00037	North Creek	2.7	0.330 MGD Lagoon System – controlled discharge
Boston Weatherhead Div. Dana Corp.	2IC00004	Maumee Cemetery Ditch		0.003 MGD Carbon Adsorption Ground Water treatment
Lafarge North America	2IJ00015	Bowie Ditch & Bull Creek		0.715 MGD Sedimentation pond discharge

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Table 3 Maumee River basin tributary sampling stations, 2015.

STATION	NAME	River Mile	Drainage Area	RIVERCODE	HUC12	LATITUDE	LONGITUDE	SAMPLING
P06W17	NORTH CREEK UPST. ANTWERP WWTP @ BARKER RD.	2.95	4.30	04-061-000	041000050201	41.17110	-84.72720	F,Mq,C
P06W16	NORTH CREEK DST. ANTWERP WWTP @ MURPHY RD.	1.60	5.40	04-061-000	041000050201	41.17560	-84.70810	F,Mq,C,B,M
302971	SOUTH CREEK @ CO. RD. 144 (GASSER RD)	5.42	11.35	04-062-000	041000050201	41.14528	-84.74659	F,Mq,C,B
302970	SOUTH CREEK @ VICTORY RD.	2.08	23.10	04-062-000	041000050201	41.17923	-84.68376	F2,MQ,C,B,D
P06K24	MARIE DELARME CREEK NEAR MOUTH @ TWP. RD. 192	0.50	27.60	04-056-000	041000050203	41.22860	-84.65440	F2,MQ,C,B,M,Sn,N
P06K26	S. BR. MARIE DELARME CREEK N OF ANTWERP @ CO. RD. 45 (TREMBLY RD.)	1.30	7.50	04-060-000	041000050203	41.22750	-84.72780	F,Mq,C
P06K25	N. BR. MARIE DELARME CREEK N OF ANTWERP @ CO. RD. 45 (TREMBLY RD.)	1.60	8.40	04-057-000	041000050203	41.23810	-84.72780	F,Mq,C
303046	U.T. to Marie Delarme Creek (1.4)	.2	0.1	04-056-001	041000050203	41.234363	-84.671348	Q, Mq –GLRI Pre-project Monitoring
303047	U.T. to Marie Delarme Creek (1.4)	.1	0.1	04-056-001	041000050203	41.233855	-84.667884	Q, Mq–GLRI Pre-project Monitoring

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302845	SIX MILE CUTOFF AT TR 224 (HARGRAVE RD.)	1.24	10.80	04-001-011	041000071208	41.22317	-84.61045	F,Mq,C,B
P06S15	GORDON CREEK SW OF MARK CENTER @ WONDERLY RD.	6.67	37.00	04-052-000	041000050204	41.26220	-84.65000	F2,MQ,C
P06S04	GORDON CREEK SW OF SHERWOOD @ COUNTY LINE RD. (LOWER CROSSING)	1.12	43.40	04-052-000	041000050204	41.25310	-84.58140	F2,MQ,C,B,M,Sn,N
302972	N. FORK GORDON CREEK @ ROSEDALE RD.	9.62	11.09	04-054-000	041000050204	41.28083	-84.68957	F,Mq,C
P06S16	M. FK. GORDON CREEK SE OF HICKSVILLE @ ROSEDALE RD.	0.76	13.00	04-055-000	041000050204	41.27390	-84.69220	F,Mq,C
P06W07	MILL CREEK NEAR MOUTH, ADJ. FOUNTAIN STREET RD.	0.10	3.60	04-055-001	041000050204	41.28120	-84.72580	C,B,M, Sd
302973	S. FORK GORDON CREEK @ BREININGER RD.	0.23	10.91	04-053-000	041000050204	41.26352	-84.66926	F,Mq,C
303014	PLATTER CREEK @ WONDERLY RD.	7.95	4.5	04-051-000	041000050206	41.303427	-84.650037	F,Mq,C
302975	PLATTER CREEK @ FARMER MARK	6.41	11.91	04-051-000	041000050206	41.29321	-84.63092	F,Mq,C
302974	PLATTER CREEK @ FOUNTAIN RD	5.40	12.84	04-051-000	041000050206	41.28163	-84.62390	B,C
303010	PLATTER CREEK @ JERICHO RD (W CROSSING)	1.70	19.96	04-051-000	041000050206	41.26730	-84.58142	F,Mq,C,B,M,D

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303015	U.T. TO PLATTER CREEK (7.66) @ WONDERLY RD.	0.78	5.0	04-051-001	041000050206	41.310023	-84.649978	F,Mq,C
302976	SULPHUR CREEK UPST. SHERWOOD WWTP @ COY RD	1.20	7.10	04-050-000	041000050207	41.28390	-84.54580	F,Mq,C
P06W19	SULPHUR CREEK DST. SHERWOOD @ ROLAND RD.	0.13	9.90	04-050-000	041000050207	41.28080	-84.55250	F,Mq,C+BNA,B,M,Sd
P06K17	SNOOKS RUN AT THE BEND @ SLOUGH RD.	0.50	5.70	04-049-000	041000050208	41.28530	-84.51500	F,Mq,C,B
302977	PRESTON RUN @ STANDLEY RD	2.45	7.71	04-047-000	041000090201	41.26802	-84.33659	F,Mq,C,B
P09K22	WADE CREEK SE OF FLORIDA @ CO. RD. K	1.80	9.80	04-045-000	041000090203	41.31140	-84.15060	F,Mq,C,B
302978	BENIEN CREEK @ CR 17-C	4.00	10.27	04-042-000	041000090202	41.35151	-84.19864	C,B
P09K18	BENIEN CREEK SW OF NAPOLEON @ TWP. RD. N	2.30	21.60	04-042-000	041000090202	41.35580	-84.17390	F2,MQ,C,M,D
302979	BRUBAKER Creek @ CO. RD. 17-D	2.40	8.45	04-043-000	041000090202	41.33664	-84.20982	F,Mq,C
P09K19	BRUBAKER CREEK NE OF FLORIDA @ TWP. RD. M-2	0.50	10.60	04-043-000	041000090202	41.34810	-84.18670	F,Mq,C,B
302980	UT to Maumee River (48.7) @ TWP. RD. 16	1.34	12.61	04-001-012	041000090206	41.37057	-84.17022	F,Mq,C,B
302981	GARRETT CREEK @ TWP. RD. R	4.00	8.13	04-041-000	041000090204	41.41352	-84.18086	C,B,M,Sd
302982	GARRETT CREEK @ TWP. RD. 16	2.49	17.24	04-041-000	041000090204	41.39776	-84.17059	F,Mq,C

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P09K17	GARRETT CREEK NEAR NAPOLEON @ CO. RD. P	0.70	27.80	04-041-000	041000090204	41.3847	-84.15360	F2,MQ,C,B,M,Sn,N
P09K15	OBERHAUS CREEK NEAR NAPOLEON @ CO. RD. 15	2.50	8.30	04-039-000	041000090205	41.40060	-84.15110	F,Mq,C,B
302985	OBERHAUS CREEK IN NAPOLEON @ OAKWOOD AVE	0.40	10.06	04-039-000	041000090205	41.39919	-84.12370	F,Mq,C,B,M,Sd
302984	VAN HYNING CREEK AT TWP. RD. 15	4.31	7.95	04-040-000	041000090205	41.43066	-84.15368	F,Mq,C
302983	VAN HYNING CREEK IN NAPOLEON @ OAKWOOD AVE	0.75	13.76	04-040-000	041000090205	41.40452	-84.12176	F,Mq,C,B,M,Sd,D,N
302986	U.T. TO MAUMEE RIVER (42.2) @ ST. RT. 110	0.40	7.03	04-001-013	041000090207	41.40617	-84.04580	F,Mq,C,B,M
302995	S. TURKEYFOOT CREEK @ TWP. RD. D	23.65	15.81	04-029-000	041000090102	41.21018	-84.05886	C
P09S27	S. TURKEYFOOT CREEK AT HAMLER @ CO. RD. F	20.94	18.90	04-029-000	041000090102	41.23970	-84.02470	F,Mq,C,M
P09S26	S. TURKEYFOOT CREEK NW OF HAMLER @ CO. RD. G	19.75	20.20	04-029-000	041000090102	41.25420	-84.02780	F2,MQ,C,B,M,D,N
P09W13	S. TURKEYFOOT CREEK AT MALINTA @ CO. RD. L	13.18	65.00	04-029-000	041000090104	41.32670	-84.04110	F2,MQ,C,FT
P09W12	S. TURKEYFOOT CREEK NW OF MALINTA @ C.R. 11 (UPPER CROSSING)	10.80	73.00	04-029-000	041000090104	41.33890	-84.07670	F2,MQ,C,B,M,FT

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302836	S TURKEYFOOT CK NEAR SHUNK @ CO. RD. N	7.900	116.00	04-029-000	041000090106	41.3562556	-84.050397	F2,MQ,C,B,M,Sn,N,FT
P09W11	S. TURKEYFOOT CREEK @ TWP. RD. P-3	1.97	148.00	04-029-000	041000090106	41.39310	-83.98000	F2,MQ,C,B,M,FT
P10K07	WEST CREEK N OF HAMLER @ ST. RT. 109	1.00	15.40	04-033-000	041000090101	41.26190	-84.03670	F,Mq,C,B,M,D,N
302996	LOST CREEK @ CO. RD. 12	6.39	7.90	04-031-000	041000090104	41.26142	-84.09444	C
P09S09	LOST CREEK SW OF MALINTA @ CO. RD. 10	1.30	20.70	04-031-000	041000090104	41.30222	-84.05666	F2,MQ,C,B,M,D,N
302992	SCHOOL CK UST HOLGATE @ CO. RD. F	9.82	7.09	04-035-000	041000090103	41.23891	-84.14697	C
302993	SCHOOL CK DST HOLGATE @ CO. RD. H	7.00	9.84	04-035-000	041000090103	41.26812	-84.12264	F,Mq,C,M,Sd
302994	SCHOOL CREEK @ CO. RD. 12	0.90	32.70	04-035-000	041000090103	41.33299	-84.09575	F2,MQ,C,B,D
P09K11	BRINKMAN DITCH UPST. HOLGATE WWTP @ CO. RD. 15	2.80	8.00	04-036-000	041000090103	41.26440	-84.15220	F,Mq,C
P09W17	BRINKMAN DITCH DST. HOLGATE WWTP @ CO. RD. H	2.35	8.30	04-036-000	041000090103	41.26780	-84.14560	F,Mq,C,B,M
302843	LITTLE TURKEYFOOT @ TWP. RD. O4	0.48	22.60	04-030-000	041000090105	41.37849	-83.99806	F2,MQ,C,B,D

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302997	UT TO LITTLE TURKEYFOOT CK (2.45) @ CO. RD.	2.65	10.46	04-030-001	041000090105	41.35048	-83.99974	C
P09S19	N. TURKEYFOOT CREEK UPST. WAUSEION WWTP @ REIGHARD PARK	19.06	4.5	04-037-000	041000090402	41.5522	-84.1308	F,Mq,C
P09S04	N. TURKEYFOOT CREEK DST. WAUSEON WWTP @ CO. RD. 13	17.85	5.80	04-037-000	041000090402	41.54440	-84.11530	F,Mq,C+BNA,B,M,Sd,D
P09S03	N. TURKEYFOOT CREEK SE OF WAUSEON @ CO. RD. C (ARCHBOLD- WEST RD)	13.79	19.60	04-037-000	041000090402	41.51530	-84.07970	F,Mq,C
P09K12	N. TURKEYFOOT CREEK NW OF LIBERTY CENTER @ CO. RD. V	9.67	31.0	04-037-000	041000090402	41.47220	-84.04860	F2,MQ,C
302988	N. TURKEYFOOT CREEK @ CO. RD. S	5.5	46.27	04-037-000	041000090402	41.42834	-84.03028	C,B
P09S01	N. TURKEYFOOT CREEK S OF LIBERTY CENTER @ CO. RD. 8	3.40	73.00	04-037-000	041000090402	41.41750	-84.01830	F2,MQ,C,B,M,Sn,N,FT
302989	U.T. TO N. TURKEYFOOT CREEK (6.68) @ CO. RD. 10	1.02	9.94	04-037-001	041000090402	41.44578	-84.05721	F,Mq,C+BNA,Sd
302987	KONZEN DITCH @ CO. RD. 12	4.2	15.56	04-038-000	041000090401	41.43151	-84.09587	F,Mq,C
P09K14	KONZEN DITCH NEAR MOUTH AT CO. RD. S	0.65	24.7	04-038-000	041000090401	41.428364	-84.045671	F2,MQ,C,B,M,D
203751	WAUSEON RESERVOIR L-1	-	-	04-038-000	041000090402	41.51188	-84.14957	DW

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302848	DRY CREEK @ CO. RD. B (STRYKER- NEAPOLIS RD)	8.80	11.30	04-028-000	041000090403	41.50122	-84.01396	F,Mq,C
302990	DRY CREEK DST LIBERTY CENTER @ CO. RD. S	1.60	23.94	04-028-000	041000090403	41.42860	-83.99100	F2,MQ,C,B,M,N
P11K48	BAD CREEK UPST. SOUTH BRANCH @ CO. RD. K	22.45	12.00	04-026-000	041000090301	41.61830	-84.04780	F,Mq,C
P11W22	BAD CREEK UPST DELTA @ CO. RD. H	17.51	36.00	04-026-000	041000090302	41.58830	-84.01420	F2,MQ,C,M,DW,D
P11S05	BAD CREEK SE OF DELTA @ CO. RD. D	10.46	44.00	04-026-000	041000090302	41.53060	-83.98170	F2,MQ,C+BNA,B,M,Sd,D
P11K38	BAD CREEK SE OF DELTA @ CO. RD. 5	8.07	46.00	04-026-000	041000090302	41.50720	-83.96110	C
P11S04	BAD CREEK S OF COLTON @ CO. RD. T	2.47	58.00	04-026-000	041000090302	41.44330	-83.96060	F2,MQ,C,B,M,Sn,N,FT
302849	S BR BAD CREEK @ CO. RD. 10 (HELLER- LYONS RD.)	0.44	10.15	04-027-000	041000090301	41.62016	-84.05381	F,Mq,C,B
302991	U.T. TO BAD CK (20.85) @ NASH RD.	0.15	8.17	04-026-002	041000090302	41.60093	-84.04804	C
203749	DELTA RESERVIOR #2, L-1	17.53	36	04-026-000	041000090302	41.5922	-84.0144	DW,C,FT,Sd
P09S28	BIG CREEK AT MCCLURE @ WOODLAWN AVE.	3.51	17.80	04-024-000	041000090501	41.37860	-83.93610	F,Mq,C,B
P09K06	BIG CREEK N OF MCCLURE @ TWP. RD. Q	1.30	20.70	04-024-000	041000090501	41.40080	-83.92330	F2,MQ,C,B,M,D

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302999	BEAVER CREEK @ TWP. RD. 5	20.15	10.20	04-015-000	041000090503	41.24801	-83.95948	C,B
302998	BEAVER CREEK W OF CUSTAR @ CO. RD. 2	16.16	19.39	04-015-000	041000090503	41.27743	-83.90203	F,Mq,C,B
P10K03	BEAVER CREEK UPST. CUTOFF DITCH @ WAPAKONETA RD.	8.30	65.00	04-015-000	041000090508	41.34560	-83.86920	F2,MQ,C,B,D,FT
P10P09	BEAVER CREEK W OF WESTON, DST CUTOFF DITCH @ EULER RD.	6.80	169.00	04-015-000	041000090509	41.35720	-83.86000	C,M
P10K02	BEAVER CREEK SE OF GRAND RAPIDS @ WINTERGREEN RD.	2.73	184.000	04-015-000	041000090509	41.39360	-83.84500	F2,MQ,C,B,M,Sd,Sn,N,FT
303001	HAMMER CREEK (A.K.A. E. BEAVER CK.) @ CO. RD. E	5.20	13.08	04-022-000	041000090502	41.22542	-83.93681	C
303000	HAMMER CREEK (A.K.A. E. BEAVER CK.) @ CO. RD. H	1.34	24.26	04-022-000	041000090502	41.26950	-83.89436	F2,MQ,C,B,M,D
303003	JACKSON CUTOFF DITCH DST YELLOW CREEK @ BAYS RD.	6.60	86.29	04-017-000	041000090507	41.26976	-83.83415	F2,MQ,C,B,FT
510040	JACKSON CUTOFF DITCH NEAR WESTON @ SAND RIDGE RD.	1.15	101.00	04-017-000	041000090507	41.34280	-83.84610	F2,MQ,C,B,M,D,FT
500760	YELLOW CREEK S OF DESHLER @ CO. RD. B	8.02	18.30	04-019-000	041000090504	41.15310	-83.89220	F,Mq,C,B,M

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500780	YELLOW CREEK E OF DESHLER @ ROUNDHEAD RD.	3.18	51.00	04-019-000	041000090506	41.19890	-83.86140	F2,MQ,C,B,M,FT
500700	L. YELLOW CREEK NE OF LEIPSIC @ CO. RD. 2	0.90	7.70	04-021-000	041000090504	41.15580	-83.90000	F,Mq,C+BNA,B,M,Sd,D,N
302840	WEST CREEK (TRIB TO YELLOW CK) @ HANCOCK WOOD CO. LINE RD.	0.10	13.30	04-020-000	041000090506	41.16784	-83.86988	F,Mq,C,D
302002	BRUSH CREEK N OF BELMORE @ TR-A	8.99	10.02	04-018-000	041000090505	41.16730	-83.95260	F,Mq,C,B,M
P10P07	BRUSH CREEK E OF DESHLER @ HENRY/WOOD CO. LINE	3.47	22.40	04-018-000	041000090505	41.21478	-83.88192	C+BNA,B,M,Sd
P10P06	BRUSH CREEK E OF DESHLER @ CUSTAR RD.	0.58	24.60	04-018-000	041000090505	41.23514	-83.84249	F2,MQ,C,D,N
303004	U.T. TO BEAVER CREEK UPST. HERTZFELD FARM @ POE RD	1.50	10.85	04-015-002	041000090509	41.38323	-83.82194	C,B
303007	SUGAR CREEK @ SUGAR CREEK RD	1.06	5.40	04-001-014	041000090602	41.43382	-83.77708	F,Mq,C,B
303006	TONTOGANY CK UST TONTOGANY @ TONTOGANY RD	4.15	11.21	04-013-000	041000090601	41.42372	-83.73782	F,Mq,C
P10K01	TONTOGANY CREEK N OF TONTAGONY @ ROBINSON RD.	1.60	42.00	04-013-000	041000090601	41.45190	-83.74860	F2,MQ,C,B,M,Sd,Sn,N

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303005	UT TO W BR TONTOGANY CREEK @ LONG-JUDSON RD	0.72	13.05	04-013-002	041000090601	41.40140	-83.76730	F,Mq,C,B
P10P13	W. BR. TONTOGANY CREEK SW OF TONTAGONY @ TULLER RD.	3.42	6.60	04-013-001	041000090601	41.40830	-83.77280	F,Mq,C,M,B,D
303009	LIBERTY HIGH ROAD DITCH UPST. HASKINS @ ST. RT. 582	0.30	9.55	04-001-015	041000090603	41.45918	-83.70364	F,Mq,C,
303008	LIBERTY HIGH ROAD DITCH DST HASKINS @ ST. RT. 65	0.05	14.	04-001-015	041000090603	41.48680	-83.71648	F,Mq,C,M,B,D

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Sample Type Key		# Sites
Water Chemistry	C	98
Macroinvertebrate quantitative	MQ	30
Macroinvertebrate qualitative	Mq	54
Fish 2 pass	F2	30
Fish single pass	F	52
Nutrient Site*	N	15
Drinking Water	DW	3
Fish Tissue (possible sites)	FT	12
E.coli	B	60
Water Chemistry Metals	M	41
Sentinel (includes sonde deployment)	Sn	8
Sonde only	D	22
Sediment	Sd	14
QHEI only	Q	2

Denotes the collection of only surface water chemistry, bacteriological, surface water metals, and/or sediment data. Data from these locations will be used to support ALU decisions, including the assignment of causes/sources if ALU impairment is identified.

Denotes the collection of drinking water samples.

* Follow procedures outlined in the Chlorophyll a, BOD5, and site selection

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Table 4 List of chemical/physical water quality parameters to be analyzed/measured in surface water, sediment, and fish tissue samples from the Upper and Lower Maumee River tributary sampling locations. The reporting limit or an “X” is placed in the column where samples may be collected. Not all sites will be sampled for all parameters

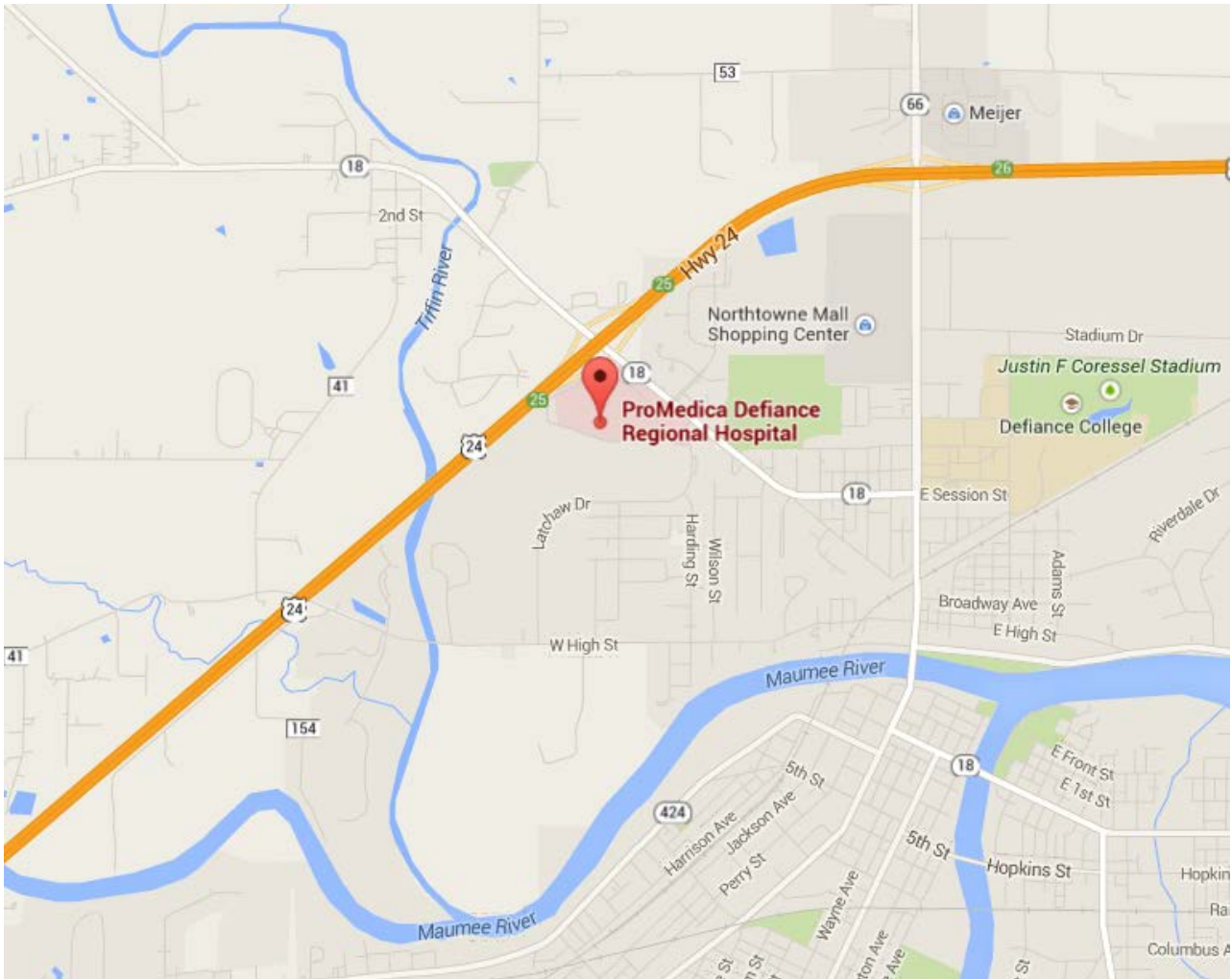
Parameters	Test Method	Stream	Sediment	Fish Tissue	Lake
cBOD, 5 day	SM 5210B	2 mg/L			
cBOD, 20 day	OEPA 310.2	2 mg/L			
BOD, 5 day	SM 5210B	2 mg/L			
Solids Dissolved (TDS)	USEPA 160.1	10 mg/L			10 mg/L
Solids Suspended (TSS)	USEPA 160.2	5 mg/L			5 mg/L
Total Organic Carbon (TOC)	SM 5310B / OEPA 335.2	2 mg/L	0.1 %		
Alkalinity	USEPA 305.1	5 mg/L			5 mg/L
Chemical Oxygen Demand (COD)	USEPA 410.4	20 mg/L			
Ammonia	USEPA 350.1	0.05 mg/L			0.05 mg/L
Total Kjeldahl Nitrogen (TKN)	USEPA 351.2	0.2 mg/L			0.2 mg/L
Nitrate + Nitrite	USEPA 353.1	0.5 mg/L			0.5 mg/L
Nitrite	USEPA 353.2	0.02 mg/L			0.02 mg/L
Chloride	USEPA 325.1	5 mg/L			5 mg/L
Phosphorus, Total	USEPA 365.4	0.01 mg/L	X		0.01 mg/L
Orthophosphate (as P)	USEPA 365.4	0.01 mg/L			0.01 mg/L
Aluminum	USEPA 200.7	200 µg/L			200 µg/L
Barium	USEPA 200.7	15 µg/L			15 µg/L
Calcium	USEPA 200.7	2 mg/L			2 mg/L
Iron	USEPA 200.7	50 µg/L			50 µg/L
Magnesium	USEPA 200.7	1 mg/L			1 mg/L
Manganese	USEPA 200.7	10 µg/L			10 µg/L
Sodium	USEPA 200.7	5 mg/L			5 mg/L
Potassium	USEPA 200.7	2 mg/L			2 mg/L
Strontium	USEPA 200.7	300 µg/L			300 µg/L
Zinc	USEPA 200.7	10 µg/L	X		10 µg/L
Hardness	USEPA 200.7	10 mg/L			10 mg/L
Arsenic	USEPA 200.8 / SM 3113B	2.0 µg/L	X	X	2.0 µg/L
Cadmium	USEPA 200.8 / SM 3113B	0.2 µg/L	X	X	0.2 µg/L
Chromium	USEPA 200.8	2.0 µg/L	X		2.0 µg/L
Copper	USEPA 200.8	2.0 µg/L	X		2.0 µg/L
Nickel	USEPA 200.8	2.0 µg/L	X		2.0 µg/L
Lead	USEPA 200.8 / SM 3113B	2.0 µg/L	X	X	2.0 µg/L
Selenium	USEPA 200.8 / SM 3113B	2.0 µg/L	X	X	2.0 µg/L
Silver	USEPA 200.8		X		
Percent Solids	SM 2540G		X		
pH	Field Meter	X			X
Conductivity	Field Meter / USEPA 120.1	X (2 µs/cm)			X
Dissolved Oxygen (mg/L and % sat)	Field Meter	X			X
Temperature	Field Meter	X			X

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Mercury	USEPA 245.1, 7470A, 7471A		X	X	
Herbicides	USEPA 525.2	X			X
SVOCs (BNA)	USEPA 625 / USEPA 8270C	X	X		
PCBs / Pesticides / Chlordane	USEPA 8082 / OEPA 590.1		X	X	
<i>E. coli</i>	USEPA 1603	2 CFU			2 CFU
chlorophyll-a	USEPA 445.0	X			X
microcystins	OEPA 701.0				0.3 µg/L
Turbidity	OEPA 180.1				2 NTU
Volitile Suspended Solids	SM 2540 D/E				5 mg/L
Carbonate / Bicarbonate	SM 2320 B				5 mg/L
Sulfate	USEPA 375.2	10 mg/L			10 mg/L
Organic Carbon	SM 5310B			X	
Percent Lipids	OEPA 581.5			X	

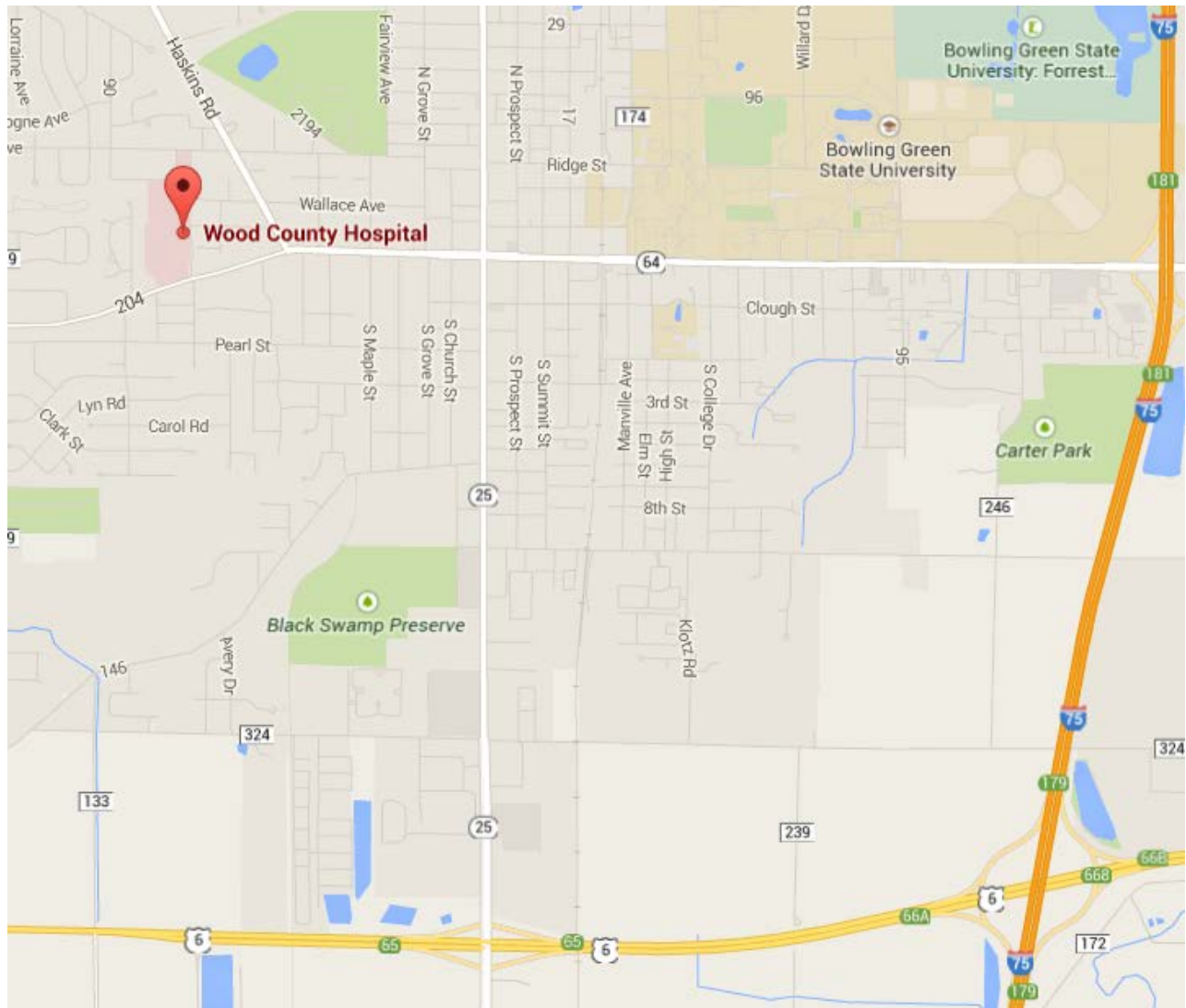
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Local Hospitals: [Defiance Regional Medical Center](#) 1200 Ralston Ave, Defiance, OH 43512 (419) 783-6955.



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Wood Co. Hospital - West Wooster Street, Bowling Green, OH 43402 - (419) 354-8900



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