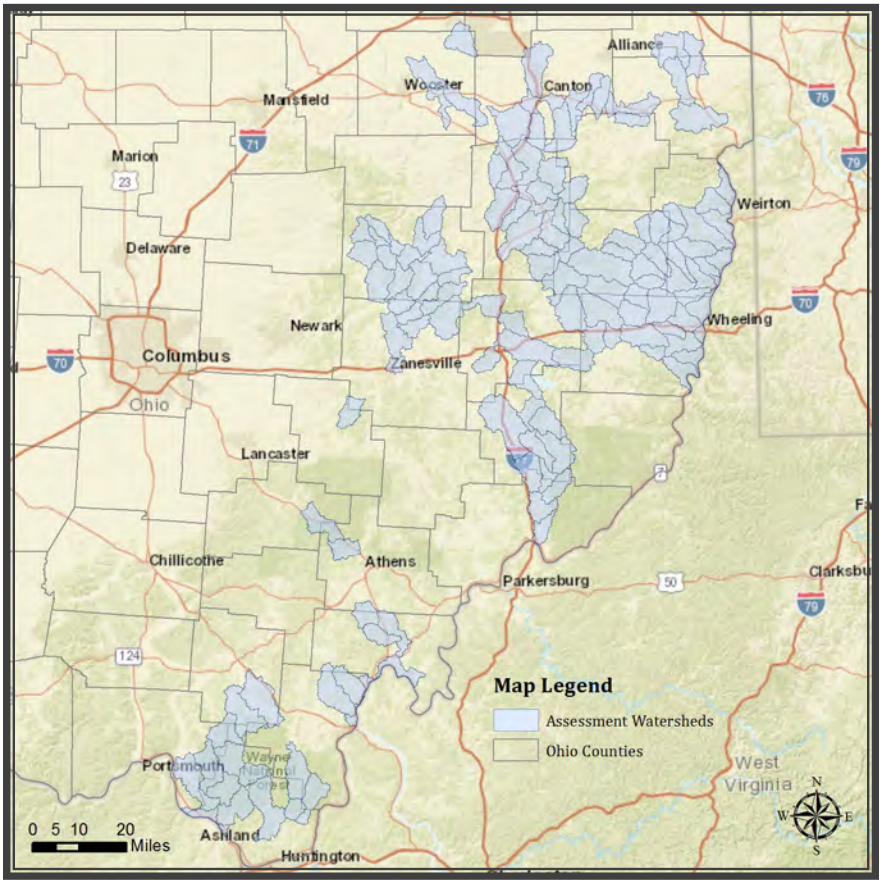
Mine Drainage Impact Assessment of Ohio Watersheds



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Division of Mineral Resources Management

Abandoned Mine Land Program

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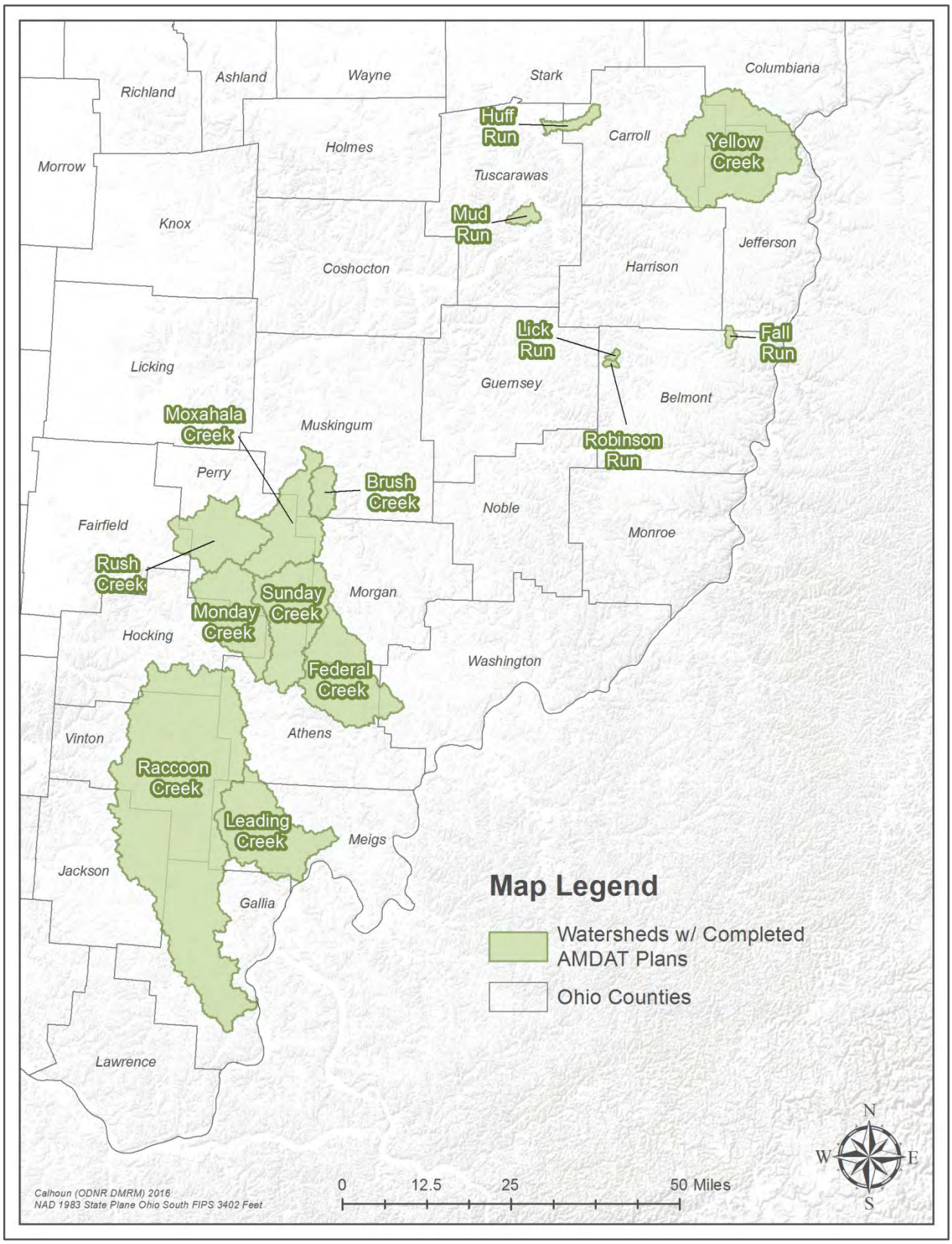
1.0 INTRODUCTION

1.1 Abandoned Mine Land (Acid Mine Drainage Set-Aside) Program

Problems associated with Abandoned Mine Lands (AML) in the coal bearing region of Ohio include watersheds that are impaired by acid mine drainage (AMD). Title IV of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 establishes grants to states to address AML problems. SMCRA allows states to set aside 30% of grants annually to establish the AMD set-aside fund for abatement projects. The Ohio Revised Code (ORC) section 1513.37 (E) provides the authority for the Ohio Department of Natural Resources (ODNR) Division of Mineral Resources Management (DMRM) to implement the AMD set-aside program. The mission of the program is to restore, to the greatest extent possible, Ohio's AMD polluted streams to a healthy condition that will support a normal assemblage of aquatic life (ODNR, 2008). Over the past 15 years, AMD abatement and treatment projects have been completed in 14 watersheds that have completed Acid Mine Drainage Abatement and Treatment (AMDAT) plans (Figure 1). Pursuant to ORC section 1513.37 (E), a watershed must have an AMDAT plan that has been completed, or approved, by ODNR DMRM to become eligible to receive funding for projects from the AMD set-aside program. AMDAT plans are completed to identify and outline AMD abatement and treatment projects, develop a restoration strategy, and determine a cost estimate for implementation.

Figure 1. Completed AMDAT Plans Map



1.1 Purpose

Poorly regulated mining activities that occurred prior to current state and federal mining laws (i.e. the Ohio Strip Mine Law of 1972, the federal SMCRA of 1977) left a legacy of environmental impacts and public health and safety issues. This includes 450,000 acres of abandoned surface mine lands and 600,000 acres of abandoned underground mine lands. ODNR DMRM maintains and updates a comprehensive inventory of AML sites and related problems as they are discovered. AML features that can pose a public health and safety risk include mine openings, impoundments, highwalls, erosion, landslides, and subsidence. AMD is a significant environmental problem associated with AML sites and has led to the impairment of streams. The purpose of this assessment is to identify and prioritize AMD impacted watersheds in order to further assist in the development of Acid Mine Drainage Abatement and Treatment (AMDAT) plans. Watersheds that show the potential to meet state biological water quality standards based on a designated use have been identified as a priority for AMDAT development. With limited funds available for project implementation, prioritization is critical for successfully reducing AMD impacts to water quality.

2.0 WATERSHED ASSESSMENT

2.1 Watershed Assessment Area

Watersheds with a completed AMDAT plan (Figure 1) were not included in this assessment. The Ohio coal region lies within the Western Allegheny Plateau (WAP) and Erie Drift Plain (EDP) eco-regions. The coal region includes 26 counties where more than 3.6 billion tons of coal has been extracted since 1800 (Figure 2).

2.2 Overview

The watershed assessment process included four phases (Figure 3) and was conducted on a 12 digit hydrologic unit code (HUC) scale. A phased approach was used due to the large scale of the assessment area, and allowed for limited resources (staff numbers and time) to be focused on areas with significant environmental issues. The first phase (primary assessment) was to determine if AMD was present in 12 digit HUC watersheds that are potentially impaired by abandoned coal mines. The second phase (secondary assessment) involved a more detailed investigation of mine impacted watersheds to determine the degree and extent of impact on water quality and on the aquatic biology (fish and macroinvertebrates). The third phase (watershed prioritization) consisted of developing and utilizing a ranking mechanism to prioritize watersheds for further investigation. This step involved determining which watersheds/streams were most likely to recover biologically if AMD abatement and treatment was initiated. The fourth and final phase was to develop AMDAT plans for priority watersheds. Each phase is discussed in more detail in the following sections of this report.

Figure 2. Watershed Assessment Area Map

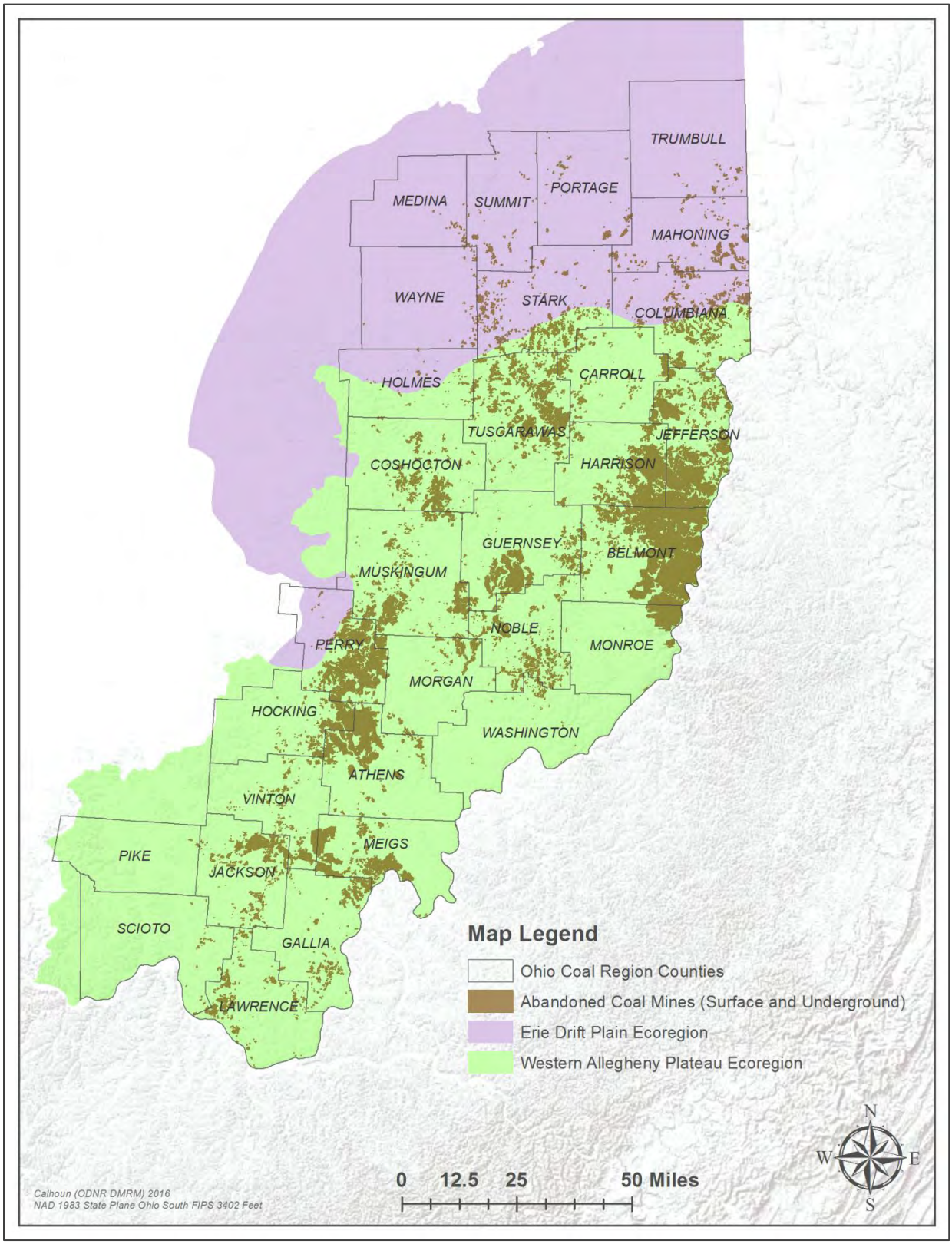
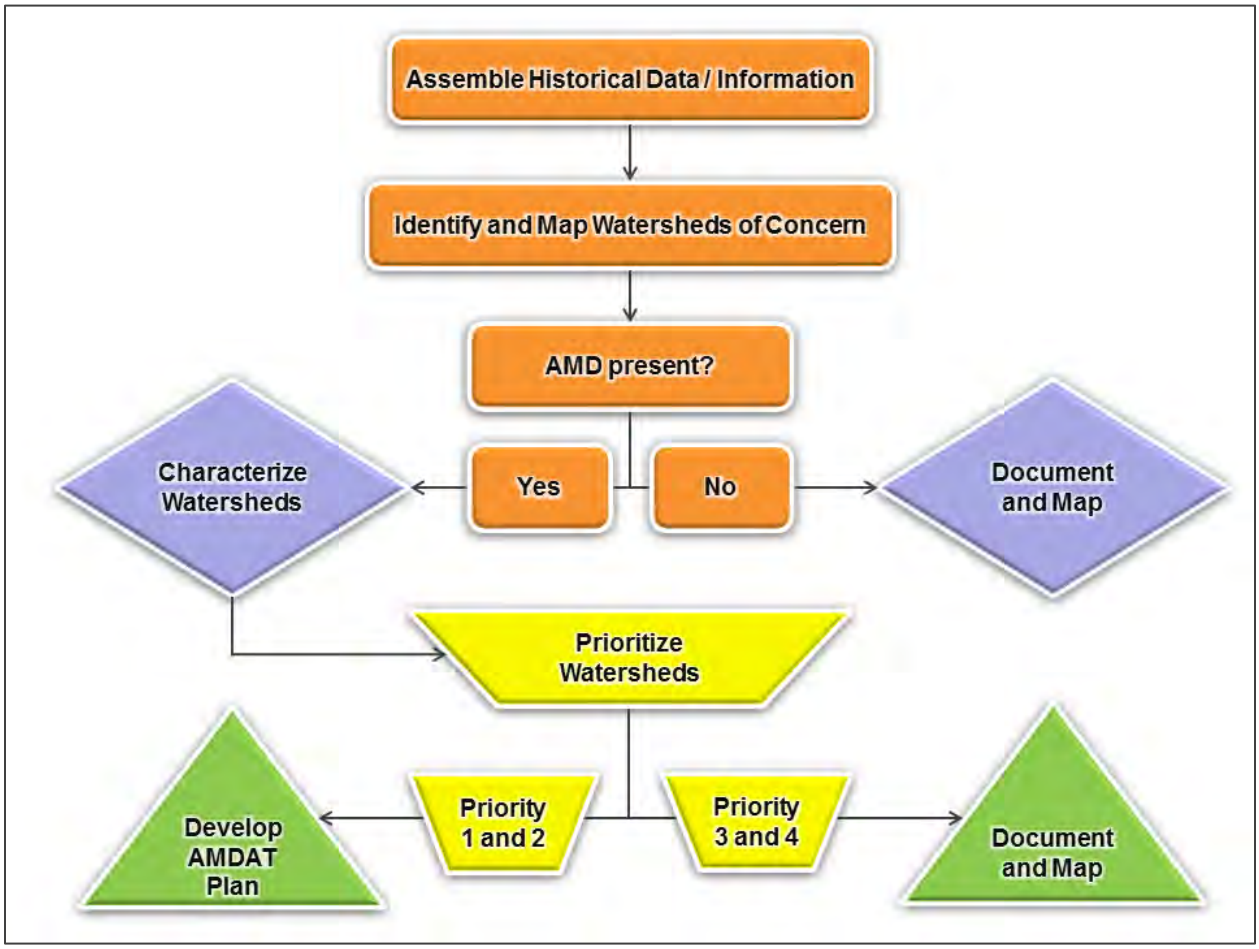


Figure 3. Watershed Assessment Process Flow Chart



2.3 Primary Assessment

2.3.1 Methods

The purpose of the primary watershed assessment was to document the presence or absence of "significant" AMD sources in a watershed. If a stream / watershed had an extremely minor source that was obviously not having an impact on any receiving streams, the stream / watershed was not considered to have AMD "present". Watersheds were chosen for primary assessment based on the review of historic water quality data (i.e. Land Reborn report of 1974, previous OEPA / ODNR / USGS studies)

as well as information provided by DMRM staff. At some point, the watersheds chosen for primary assessment were documented to have had some degree of AMD impact. In watersheds where historical data were not available or were insufficient to determine the presence/absence of AMD, the following field data were collected with a YSI 556 multi-parameter datasonde: pH, specific conductivity, temperature, and dissolved oxygen. Acidity and alkalinity concentrations were collected using a HACH digital titrator (where needed) at various points along the mainstem and at the mouths of potential AMD tributaries. Since AMD can be visible with iron and aluminum precipitates, in some cases visual evidence of AMD was used in the primary assessment process.

A total of 134 watersheds on the 12 digit HUC scale were included in the primary assessment. Watersheds with streams that exhibited any of the chemical characteristics in Table 1 were considered to have mine drainage "present".

Table 1. Water Quality Parameters Used to Identify the Presence of AMD

Parameter[1]	AMD Indicator
pH (S.U)	< 6.0
Specific Conductivity (µs/cm)[2]	> 800.0
Alkalinity (mg/l)	< 20.0
Visual Evidence	iron and/or aluminum precipitants

[1] All parameters are taken from the Federal Water Pollution Control Action of 1968 that suggests AMD impacts, except for visual evidence of AMD - which was added because metals were not always sampled during phase 1 of the watershed assessment.

[2] In some cases regional baseline conductivity is > 800 µs/cm. This may require 1 or 2 field parameter sampling points in reference streams. Conductivity was used in conjunction with all other parameters to determine the presence of AMD.

2.3.2 Results

Of the 134 watersheds surveyed in the primary watershed assessment, 83 (62%) were found to have AMD present, while 51 (38%) did not have AMD present (Figure 4, Table 2). The number of stream reaches within a 12 digit HUC watershed with AMD present varied. However, for the purpose of the primary assessment, if a 12 digit HUC watershed had only one source of mine drainage, then the entire 12 digit HUC watershed was identified as having AMD present.

Table 2. Primary Watershed Assessment Results

Total 12 Digit HUC Watersheds Surveyed	12 Digit HUC Watersheds with AMD Present	12 Digit HUC Watersheds with AMD Absent
134	83	51

Figure 4. Primary Watershed Assessment Results Map (AMD Presence / Absence)

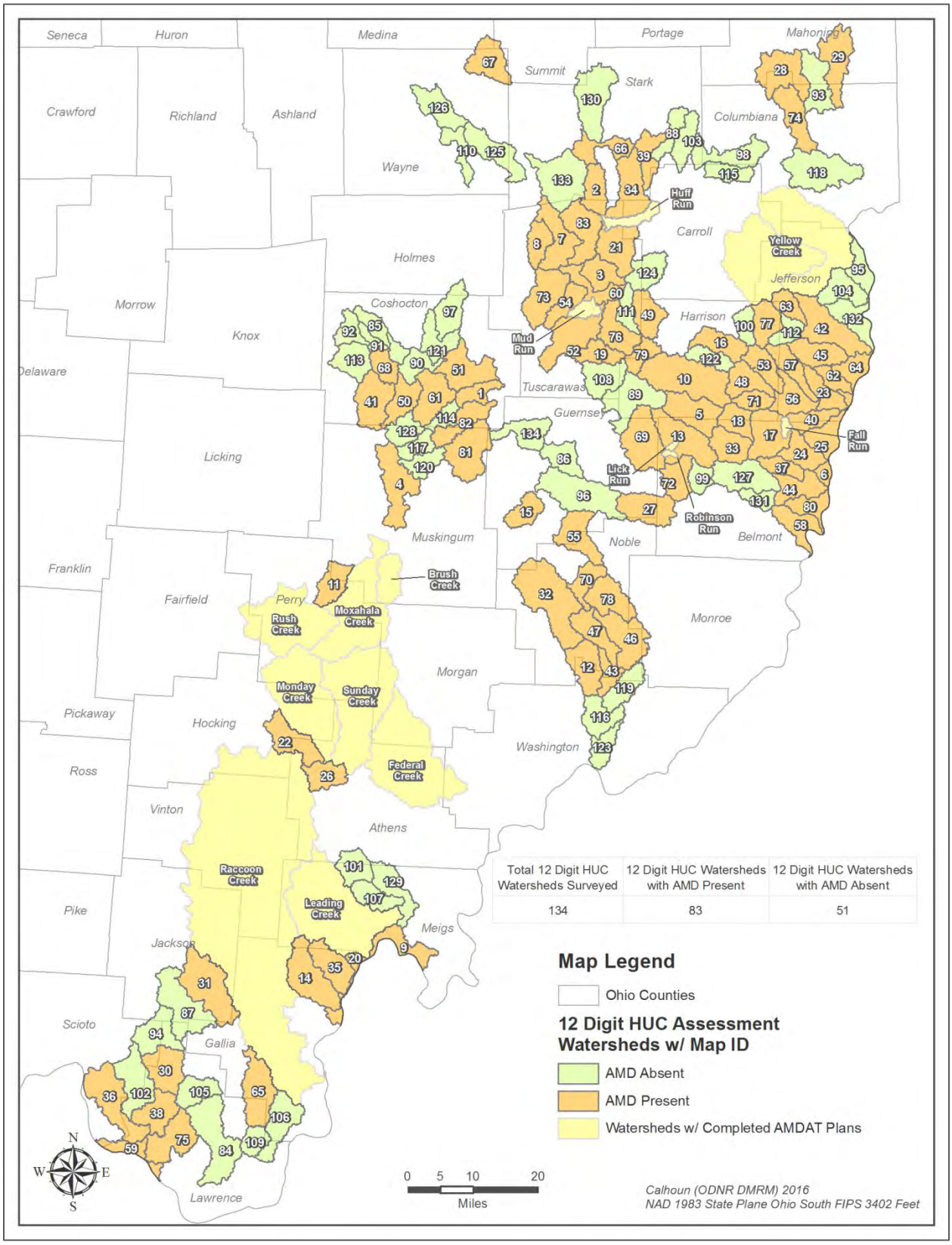


Table 3. Primary Watershed Assessment Results Map Key (AMD Present)

Map Key	12 Digit HUC Watershed Name	12 Digit HUC	Map Key	12 Digit HUC Watershed Name	12 Digit HUC
1	Bacon Run	050400050601	43	Lower East Fork Duck Creek	050302010805
2	Beal Run-Sandy Creek	050400010607	44	Lower McMahon Creek	050301060704
3	Beaverdam Creek	050400011703	45	McIntyre Creek	050301011004
4	Blount Run-Muskingum River	050400040305	46	Middle East Fork Duck Creek	050302010803
5	Boggs Fork	050400011303	47	Middle Fork Duck Creek	050302010802
6	Boggs Run-Ohio River	050301061205	48	Middle Fork Short Creek	050301060202
7	Brandywine Creek-Sugar Creek	050400011105	49	Middle Little Stillwater Creek	050400011504
8	Broad Run	050400011104	50	Mill Fork	050400040202
9	Broad Run-Ohio River	050302020805	51	Morgan Run-Tuscarawas River	050400011904
10	Brushy Fork	050400011402	52	Mud Run-Tuscarawas River	050400011802
11	Buckeye Fork	050400040404	53	North Fork Short Creek	050301060203
12	Buffalo Run-West Fork Duck Creek	050302010902	54	Oldtown Creek	050400011702
13	Buttermilk Creek-Stillwater Creek	050400011304	55	Opossum Run-Seneca Fork	050400050105
14	Campaign Creek	050302020902	56	Perrin Run-Short Creek	050301060205
15	Chapman Run	050400050206	57	Piney Fork	050301060204
16	Clear Fork	050400011501	58	Pipe Creek-Ohio River	050301061207
17	Cox Run-Wheeling Creek	050301060303	59	Pond Run-Ohio River	050901030105
18	Crabapple Creek	050301060301	60	Pone Run-Tuscarawas River	050400011704
19	Crooked Creek	050400011602	61	Robinson Run-Muskingum River	050400040301
20	Crooked Creek-Ohio River	050302020904	62	Rush Run	050301061201
21	Dog Run-Conotton Creek	050400010805	63	Salem Creek	050301011002
22	Dorr Run-Hocking River	050302040606	64	Salt Run-Ohio River	050301061202
23	Dry Fork-Short Creek	050301060207	65	Sand Fork	050901010901
24	Flat Run-Wheeling Creek	050301060304	66	Sherrick Run-Nimishillen Creek	050400010505
25	Glenns Run-Ohio River	050301061204	67	Silver Creek-Chippewa Creek	050400010207
26	Hamley Run-Hocking River	050302040801	68	Simmons Run	050400030904
27	Headwaters Leatherwood Creek	050400050301	69	Skull Fork	050400011401
28	Headwaters Middle Fork Little Beaver Creek	050301010402	70	South Fork Buffalo Creek-Buffalo Creek	050400050203
29	Headwaters Mill Creek	050301030801	71	South Fork Short Creek	050301060201
30	Headwaters Pine Creek	050901030202	72	Spencer Creek	050400011301
31	Headwaters Symmes Creek	050901010803	73	Stone Creek	050400011701
32	Headwaters West Fork Duck Creek	050302010901	74	Stone Mill Run-Middle Fork Little Beaver Creek	050301010403
33	Headwaters Wheeling Creek	050301060302	75	Storms Creek	050901030104
34	Indian Run-Sandy Creek	050400010606	76	Town of Uhrichsville-Stillwater Creek	050400011604
35	Kyger Creek	050302020901	77	Upper Cross Creek	050301011001
36	Lick Run-Pine Creek	050901030205	78	Upper East Fork Duck Creek	050302010801
37	Little McMahon Creek	050301060703	79	Weaver Run-Stillwater Creek	050400011603
38	Little Pine Creek	050901030203	80	Wegee Creek-Ohio River	050301061206
39	Little Sandy Creek	050400010604	81	White Eyes Creek	050400050603
40	Little Short Creek	050301060206	82	Wills Creek Dam-Wills Creek	050400050604
41	Little Wakatomika Creek	050400040203	83	Wolf Run-Tuscarawas River	050400011204
42	Lower Cross Creek	050301011005			

Table 4. Primary Watershed Assessment Results Map Key (AMD Absent)

Map Key	12 Digit HUC Watershed Name	12 Digit HUC	Map Key	12 Digit HUC Watershed Name	12 Digit HUC
84	Aaron Creek-Symmes Creek	050901011004	110	Little Sugar Creek	050400010901
85	Beaver Run	050400030903	111	Lower Little Stillwater Creek	050400011505
86	Beeham Run-Salt Fork	050400050406	112	Middle Cross Creek	050301011003
87	Black Fork	050901010802	113	Mohawk Creek	050400030901
88	Black Run	050400010603	114	Mouth Wills Creek	050400050605
89	Craborchard Creek-Stillwater Creek	050400011403	115	Muddy Fork	050400010404
90	Crooked Creek-Walhonding River	050400030908	116	New Years Creek-Duck Creek	050302010903
91	Darling Run-Walhonding River	050400030905	117	North Branch Symmes Creek	050400040303
92	Dutch Run-Walhonding River	050400030902	118	Patterson Creek-West Fork Little Beaver Creek	050301010504
93	East Branch Middle Fork Little Beaver Creek	050301010401	119	Paw Paw Creek	050302010804
94	Hales Creek	050901030201	120	South Branch Symmes Creek-Symmes Creek	050400040304
95	Hardin Run-Ohio River	050301011106	121	Spoon Creek-Mill Creek	050400030907
96	Hawkins Run-Leatherwood Creek	050400050302	122	Standingstone Fork	050400011502
97	Headwaters Mill Creek	050400030906	123	Sugar Creek-Duck Creek	050302010904
98	Headwaters Sandy Creek	050400010406	124	Thompson Run-Conotton Creek	050400010803
99	Headwaters Stillwater Creek	050400011302	125	Town of Brewster-Sugar Creek	050400010904
100	Headwaters Upper Conotton Creek	050400010701	126	Town of Smithville-Sugar Creek	050400010902
101	Headwaters West Branch Shade River	050302020201	127	Upper McMahon Creek	050301060702
102	Howard Run-Pine Creek	050901030204	128	Village of Adams Mills-Muskingum River	050400040302
103	Hugle Run	050400010601	129	Walker Run-West Branch Shade River	050302020205
104	Island Creek	050301011107	130	West Branch Nimishillen Creek	050400010503
105	Johns Creek	050901011001	131	Williams Creek	050301060701
106	Johns Creek-Indian Guyan Creek	050901010707	132	Wills Creek-Ohio River	050301011109
107	Kingsbury Creek	050302020202	133	Wolf Creek-Tuscarawas River	050400011203
108	Laurel Creek	050400011601	134	Wolf Run-Wills Creek	050400050508
109	Little Indian Guyan Creek	050901010706			

2.4 Secondary Assessment

2.4.1 Methods

The secondary assessment included the collection / compilation of additional chemical, biological, and stream habitat data by DMRM in order to a) estimate the extent of impacts and b) assess biological recovery potential in watersheds where AMD was documented. All data included in this report are stored and managed in the Ohio Watershed Database (www.watersheddata.com).

2.4.1.1 Water Quality Data Collection

Chemical water quality samples collected by DMRM staff included grab samples, field chemistry, and/or flow measurements. OEPA sampling protocols were followed for all chemical water quality monitoring (OEPA, 2012). Specifically, watershed investigations were conducted following the Field Methods for Watershed Characterization manual (Bowman et al., 2006). Additionally, chemical water quality data from OEPA reports that identified watersheds with mine drainage as a cause of impairment were also compiled and used in this assessment.

Data included in this report include pH, specific conductivity (SpC), and concentrations of total iron (Fe), total aluminum (Al), acidity, and alkalinity. For pH and SpC, field data were used. If field data were not available, lab data were used. For data records with both acidity and alkalinity results, net acidity was calculated by subtracting total alkalinity from total acidity.

2.4.1.2 Biological and Physical In-Stream Habitat Data Collection

OEPA sampling protocol was used to conduct biological assessments in the secondary assessment (OEPA, 1987a, 1987b, 1989a, 1989b, 2009a, 2009b). Biological indices include the Index of Biotic Integrity (IBI) / Modified Index of Well Being (MIwb) to assess fish communities, and the Invertebrate Community Index (ICI / QUAL) to assess macro-invertebrate populations (Table 5). ICI /QUAL results are only included in data collected by OEPA. The DMRM utilizes the Macro-invertebrate Aggregated Index for Streams (MAIS) to assess macro-invertebrate communities (Johnson, 2007; Johnson, 2009) since the MAIS is less costly and less time consuming, and a MAIS score of $\geq$12 correlates well with the ICI warmwater habitat (WWH) criteria in AMD impacted streams

(Kinney, 2006; Johnson, 2009). The Qualitative Habitat Evaluation Index (QHEI) was used for the assessment of stream physical habitat (Rankin, 1989; Ohio EPA, 2006). IBI / MIwb and QHEI data were collected by DMRM biologists and sent to OEPA for evaluation and final metric scoring. MAIS samples were collected, processed, and scored by ODNR-DMRM personnel. In addition, biological and habitat data from OEPA reports that identified watersheds with mine drainage as a cause of impairment were also compiled and used in this assessment.

Table 5. Ohio Biological Criteria Descriptions

Metric/Index	Description
IBI - Index of Biotic Integrity	multi metric index that measures fish species richness and diversity
MIwb - Modified Index of Well Being	incorporates fish abundance and diversity to represent assemblage quality
QHEI - Qualitative Habitat Evaluation Index	a measure of the ability of the physical habitat of the stream to support a biotic community
ICI - Invertebrate Community Index	multi metric index representing aquatic macroinvertebrate community integrity
ICI (QUAL) - Invertebrate Community Index (Qualitative)	a narrative evaluation of the qualitative sample based on attributes such as EPT taxa richness, number of sensitive taxa, and community composition
MAIS - Macroinvertebrate Aggregated Index for Streams	an effective "level 2" qualitative bioassessment method to assess macroinvertebrate communities in mine impacted watersheds of the WAP

All of the above are metrics are developed by Ohio EPA, except for MAIS, which has been modified from a method developed by researchers in Virginia (Smith and Voshell, 1997) for use in Ohio's unglaciated Western Allegheny Plateau ecoregion (Johnson, 2009).

2.4.1.3 Chemical, Biological, and Habitat Data Analysis

Table 6 shows different levels of chemical impacts to streams by mine drainage. These guidelines were developed by ODNR-DMRM personnel in regards to mining and post reclamation water quality (ODNR 2008) and were used as a tool to help determine the severity of AMD impacts in each watershed/stream in the secondary assessment.

Table 6. Chemical Water Quality Guidelines Used to Determine Levels of Mine Drainage (AMD) Impact

Parameter	No Detectable Mine Drainage Impact	Mild Mine Drainage Impact	Moderate Mine Drainage Impact	Severe Mine Drainage Impact
pH	> 6.0	5.5 - 6.0	4.5 - 5.4	< 4.5
Total Fe	0.0 - 0.5	0.5 - 1.0	1.0 - 10.0	> 10.0
Total Mn	0.0 - 0.5	0.5 - 2.0	2.1 - 4.0	> 4.0
Total Al	0.0 - 0.5	0.5 - 1.0	1.0 - 5.0	> 5.0
SpC	< 500.0	500.0 - 900.0	900.0 - 2000.0	> 2000.0
Sulfate	< 75.0	76.0 - 250.0	250.0 - 500.0	> 500.0
Alkalinity	> 20.0	< 20.0	0.0	0.0
Acidity	0.0 - 20.0	> 20.0	*	*

Units in mg/L except pH = S.U. and specific conductivity = micromhos/cm

** Net Alkaline water is goal at all times. Any net acid water is severe impact.*

Guidelines for biological criteria associated with various levels of AMD impacts that were developed by DMRM for this assessment were used as a tool help determine the severity of AMD impacts in each watershed/stream in the secondary assessment (Table 8). In general numerical scores for these levels of AMD impacts were derived from biological criteria for the Western Alleghany Plateau (WAP) (Table 7) since most

assessment watersheds fall within this ecoregion. QHEI was not included in determining the level of impacts. However, QHEI scores were analyzed to a) determine if habitat is impaired from AMD or other land uses, and/or b) to determine the potential for biological recovery of a stream if AMD is remediated. The statewide criterion for the QHEI is 60 or greater for habitat suitable for supporting WWH fisheries (Table 9).

Table 7. Ohio Biological Criteria for the Western Alleghany Plateau (WAP) Ecoregion

Aquatic Life Protection Criteria / Use Designations	Biological Indices			
	IBI Headwaters/Wading	Mlwb Wading	ICI	MAIS
Exceptional Warmwater Habitat (EWH)	50	9.4	46	N/A
Warmwater Habitat (WWH)	44	8.4	36	≥ 12
Modified Warmwater Habitat Mine Affected (MWH-MA)	24	5.5	30	N/A

N/A = not applicable

Non-significant departure from biological criteria = < 4 IBI or ICI units, or < 0.5 Mlwb units

Mlwb is not applicable to headwater streams with drainage areas ≤ 20 sq. mi.

Table 8. Ohio Biological Criteria Used to Determine Levels of Mine Drainage (AMD) Impact

Index	No Detectable Mine Drainage Impact	Mild Mine Drainage Impact	Moderate Mine Drainage Impact	Severe Mine Drainage Impact
MAIS	≥ 12	10-11	8-9	0 - 7
ICI	≥ 36	31 - 35	21 - 30	< 20
QUAL	Good (G) - Very Good (VG)	Fair (F)	Poor (P)	Very Poor (VP)
IBI*	≥ 44	39 - 44	25-39	≤ 24

Table modified from AMD Program Guidelines (Kinney and McCament, 2010)

IBI biological criteria for WAP WWH wading sites were used as guidelines to level of AMD impact. The non-significant departure range of 4 units was considered when assigning an impact rating.

Table 9. General Narrative Ranges Assigned to QHEI Scores

Narrative Rating	QHEI Range[1]	
	Headwaters	Larger Streams
Excellent	≥ 70	≥ 75
Good	55 to 69	60 to 64
Fair	43 to 54	45 to 59
Poor	30 to 42	30 to 44
Very Poor	< 30	< 30

Table Reproduced from QHEI Manual (Rankin, 1989)

[1] Ranges vary slightly in headwater streams (≤20 sq mi) vs. larger streams

One sampling event for each sample site was included in the analysis. For sample sites that had multiple sampling events, the event that exhibited the “most severe” AMD impact was included. The “most severe” result typically included the lowest pH results measured at that site and/or the “poorest” biological data results. Once the sampling event was chosen, an AMD impact narrative rating of either “severe”, “moderate”, “mild”, or “none” was assigned to each site/sampling event. At a minimum one parameter for chemical water quality or biology was required to assign a rating. If multiple chemical and/or biological parameters were present, they were analyzed in concert with one another. Professional judgment was used to provide a rating when a site exhibited a combination of chemical and/or biological results that fell within multiple guideline categories. For example, a stream with a pH > 6.0 and Fe concentration > 5.0 was considered to be “minimally” impacted, and a stream with a pH of < 4.5 was typically considered to be severely impacted even if other parameters did not fall within the severe category.

If chemical data results for a sample site showed a different impact rating than biological data results for the same site, then the impact rating for the biological data results was used for that site, since biological data results are more likely to identify the severity of AMD impacts.

2.4.2 Results

A total of 839 sample sites were analyzed and assigned a narrative impact rating. The majority (67%) of the sites did not have an AMD impact. The remaining 33% of the sites analyzed received a narrative impact rating of severe, moderate, or mild (Table 10).

Table 10. Narrative Impact Rating Results for Secondary Assessment Sample Sites

Total Chemical and/or Biological Sample Sites Assessed	AMD Impact Narrative Rating			
	"Severe"	"Moderate"	"Mild"	"None"
839	88	75	115	561
% Total	***10%***	***9%***	***14%***	***67%***

3.0 WATERSHED PRIORITIZATION

The purpose of phase 3 of the watershed assessment was to identify watersheds that are a priority for AMDAT development. This phase also included the development of ranking criteria to prioritize watersheds.

3.1 Criteria

A ranking mechanism was developed by DMRM to be used as a tool to evaluate watersheds/streams for the likelihood of AMD abatement success and biological recovery potential. The mechanism included 11 individual criteria (Table 11). Watersheds were ranked by giving a numerical score for each criterion. The score was then totaled to provide the final ranking score. Once watersheds were ranked, priority categories were developed based on the watershed ranking results (Table 13).

Table 11. Watershed Assessment Ranking Mechanism Criteria

	Criteria	Category	Miles	X	Score	Total Score
1	Stream Miles Impaired	Mild			7	
		Moderate			4	
		Severe			1	
2	Habitat Condition of Impaired Stream Miles	Excellent			7	
		Good			5	
		Fair			3	
		Poor to Very Poor			1	
3	Stream Miles Expected to Recover Specified Designated Use	EWH			7	
		WWH			5	
		MWH			3	
		LRW			1	
4	Cost - Benefit: Cost / Stream Mile Restorable	< $500K			7	
		$500 - < $1 million			5	
		$1 million - < $1.5 million			3	
		> $1.5 million			1	
5	Dominant Treatment Approach	Source Control	NA		7	
		Active	NA		5	
		Mixed	NA		4	
		Passive	NA		3	
6	Likelihood of Restoration Success	High	NA		7	
		Moderate	NA		4	
		Low	NA		1	
7	Availability of Leveraged Funds	>50% Very Likely	NA		5	
		10-50% Possible	NA		3	
		<10% Not Likely	NA		1	
8	Re-mining Potential & Likeliness to Abate AMD Impacts	Abate all AMD	NA		0	
		Mostly Abate AMD	NA		5	
		Partially Abate AMD	NA		3	
		Not Likely	NA		1	
9	Public Support	Motivated Group	NA		5	
		Some Public Interest	NA		3	
		No Resistance	NA		1	
		Resistance	NA		-3	
10	Ownership of AMD Affected Areas	Public	NA		5	
		Private/Public	NA		3	
		Private	NA		1	
11	Obstacles to Restoration Implementation	Permitting Issues	NA		-1	
		Non AMD Water Quality Issues	NA		-3	
		Access Issues	NA		-1	
		Utility Issues	NA		-1	
		Other (describe)	NA		-1	
	Total Score					

Scoring components 1 - 4 requires river miles per category entered in "miles" column. That value is then multiplied by the "weight" column to get "total score".

Scoring components 5 - 10 requires selecting one category only for each and then that value is entered into the "total score" column.

Scoring component 11 requires choosing all that apply and entering each category in the "total score" column.

1. **Stream Miles Impaired**: an estimation of the number of impacted stream miles as well as the degree of impairment of those impacted stream miles. Guidelines used to determine levels of AMD impact (Table 6, Table 8) were used to develop four categories for the degree of impairment including severe, moderate, mild, and none. The estimated number of impacted miles was entered in the appropriate level(s).

2. **Habitat Condition of Impaired Stream Miles**: The stream habitat evaluation criterion was adapted from Ohio EPA "Methods for Assessing Habitat in Flowing Waters using the QHEI" (Rankin 1989, Ohio EPA 2006). Habitat conditions are important in that they provide information on of the potential recovery of the stream should AMD remediation projects be implemented. In particular, the substrate metric of the QHEI can provide critical information about any substrate impacts from AMD (i.e. iron and/or aluminum flocculants). Potential recovery was included as part of the prioritization process. Observations on the quality of habitat in the stream and in surrounding streams also played an important role in determining which streams have biological recovery potential. If QHEI data was not available, habitat analysis was based on the professional judgment of DMRM environmental staff based on visual observations of the watershed.

3. **Stream Miles Expected to Recover to Specified Designated Use**: Ohio biological criteria were used to estimate the number of stream miles that are likely to recover to a specified designated use (Table 7).

4. **Cost/Benefit Analysis**: Standard costs for 4 types of AMD treatment or abatement were used for the cost/benefit analysis. Existing treatment systems or abatement costs over a 20 year period were used to determine standard long term costs for this analysis (Table 12). Once the 20 year cost estimate was determined, a cost per restorable stream mile (derived from criteria # 3) was calculated in the analysis.

5. **Dominant Treatment Approach**: the dominate treatment system was based on which systems are most critical toward meeting restoration goals. Large aerobic wetland for alkaline or slightly acid AMD was considered to be source control. The categories for the treatment approach include source control, active treatment, passive treatment, or a mix of all three of these approaches.

6. **Likelihood of Restoration Success**: determined by or in consultation with DMRM Biologist. Considerations include habitat, surrounding stream ecosystem health, treatment technology used, past project results, land use and other NPS or PS issues.

7. **Availability of Leverage Funds**: Multiple funding sources were considered such as MWCD, EPA 319, Mitigation, etc.

8. **Re-mining Potential & Likeliness to Abate AMD Impacts**: Scores were increased in watersheds where there was potential for re-mining to abate AMD issues since these have the potential to be “no cost” projects.

9. **Public Support**: In most cases it was likely too early in the watershed investigation to tell if there would be public support. Public support may increase if an AMDAT is initiated. A lack of public support was noted based on landowner objections, which could change when landowners have a better understanding of AML program goals.

10. **Ownership of AMD Effected Areas**: Public, private, or a mixture of both were considered.

11. **Obstacles to Restoration Implementation**: Permitting issues, Non AMD water quality issues, access issues, utility issues, or other obstacles were considered.

Table 12. Standard Costs for 4 Types of AMD Treatment Systems

Treatment Type	Standard Cost Used in Watershed Assessment	Calculations and Rationale	Calculation Results
Active Treatment - Lime Doser	$700,000	Annual Chemical Reageent (CaO): Typical use of CaO is 500 lbs/day x 140 ton delivered = $12,775	$13,000
		Annual Time and Labor: Assume $15/hr x 4 hours per week x 52 weeks = $3,120	$3,000
		Annual Maintenance: Estimated cost of materials, etc.	$2,000
		Total Annual Maintenance: The sum of chemical cost, time, and materials	$18,000
		20 Year Maintenance: Annual maintenance cost ($18,000) x 20 years	$360,000
		Capital (Installation): Average cost of doser installed at approximately $340,000 based on 4 dosers in Ohio	$340,000
		Total (capital cost + 20 year maintenance cost)	**$700,000**
Source Control / Reclamation	$25,000 / acre	Average cost of 4 source control projects	$2,550,000
		Average cost / acre (total of 100 acres reclaimed in 4 projects analyzed)	**$25,000**
Passive Treatment - VFP, SSLB, LLB	$825,000	Average cost of 9 passive systems installed in Ohio	$525,000
		20 year operation and maintenance: assume rebuild every 5 years estimated at $100,000 per rebuild = $100K x 3 rebuilds	$300,000
		Total	**$825,000**
Aerobic Wetland	$20,000 / acre	Estimated cost of berm: 4' top, 8' bottom, 1/1 slopes @ $34 per ton of limestone = $272 linear foot (round up to $300) Mulga Run 1,500 linear feet of berm = $450,000 / 22 acres wetland = $20,455 (round down to $20,000 / acre)	$20,000

Table 13. Watershed Priority Categories

Priority	Ranking Score Range	Priority Description
1	80.0 - 150.0	AMDAT development a priority; high potential for abatement success / biological recovery
2	40.0 - 79.9	AMDAT development under consideration, moderate potential for abatement success / biological recovery
3	10.0 - 39.9	AMDAT development likely not feasible, low potential for abatement success / biological recovery
4	0.0 - 9.9	AMDAT development not warranted based on one or more of the following; a) extent of AMD impacts b) biological recovery potential c) likelihood of successful AMD abatement project(s) d) cost/benefit analysis

3.2 Results

A total of 83 watersheds with AMD present were ranked and included in the watershed prioritization process. The results include 36 priority 1 and priority 2 watersheds, and 47 priority 3 and priority 4 watersheds (Table 12, Map 2). Figures 6 through 41 and Tables 17 through 85 include mapping and chemical and/or biological data results for the watersheds that were ranked as priority 1 and 2. Mapping and chemical and/or biological data for the watersheds that were ranked as a priority 3 and 4 are included in Appendix 1.

Table 14. Watershed Prioritization Results Summary

Total Watersheds Prioritized	Priority 1	Priority 2	Priority 3	Priority 4
83	15	21	14	33
% Total	***18%***	***25%***	***17%***	***40%***

Figure 5. Watershed Prioritization Results Overview Map

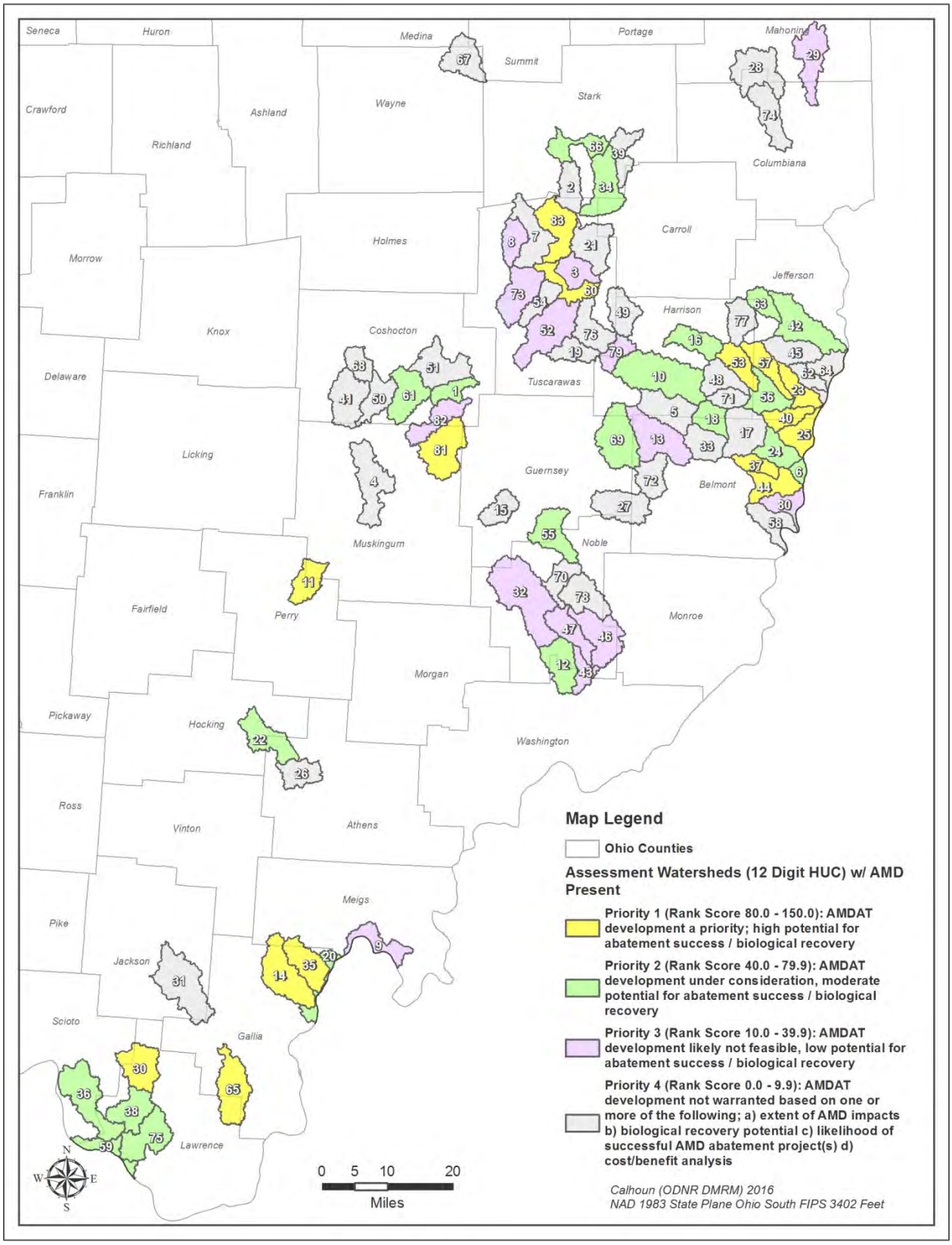


Table 15. Watershed Prioritization Results Overview Map Key (1 of 2)

Map Key	12 Digit HUC Watershed Name	12 Digit HUC	Rank Score	Priority
1	Bacon Run	050400050601	59.0	2
2	Beal Run-Sandy Creek	050400010607	0.0	4
3	Beaverdam Creek	050400011703	34.0	3
4	Blount Run-Muskingum River	050400040305	0.0	4
5	Boggs Fork	050400011303	0.0	4
6	Boggs Run-Ohio River	050301061205	41.0	2
7	Brandywine Creek-Sugar Creek	050400011105	0.0	4
8	Broad Run	050400011104	39.0	3
9	Broad Run-Ohio River	050302020805	34.0	3
10	Brushy Fork	050400011402	49.0	2
11	Buckeye Fork	050400040404	80.0	1
12	Buffalo Run-West Fork Duck Creek	050302010902	53.4	2
13	Buttermilk Creek-Stillwater Creek	050400011304	32.0	3
14	Campaign Creek	050302020902	111.5	1
15	Chapman Run	050400050206	0.0	4
16	Clear Fork	050400011501	56.0	2
17	Cox Run-Wheeling Creek	050301060303	0.0	4
18	Crabapple Creek	050301060301	48.9	2
19	Crooked Creek	050400011602	0.0	4
20	Crooked Creek-Ohio River	050302020904	54.0	2
21	Dog Run-Conotton Creek	050400010805	0.0	4
22	Dorr Run-Hocking River	050302040606	59.0	2
23	Dry Fork-Short Creek	050301060207	127.0	1
24	Flat Run-Wheeling Creek	050301060304	52.0	2
25	Glenns Run-Ohio River	050301061204	80.0	1
26	Hamley Run-Hocking River	050302040801	0.0	4
27	Headwaters Leatherwood Creek	050400050301	0.0	4
28	Headwaters Middle Fork Little Beaver Creek	050301010402	0.0	4
29	Headwaters Mill Creek	050301030801	20.0	3
30	Headwaters Pine Creek	050901030202	85.4	1
31	Headwaters Symmes Creek	050901010803	0.0	4
32	Headwaters West Fork Duck Creek	050302010901	22.2	3
33	Headwaters Wheeling Creek	050301060302	0.0	4
34	Indian Run-Sandy Creek	050400010606	42.0	2
35	Kyger Creek	050302020901	87.2	1
36	Lick Run-Pine Creek	050901030205	70.0	2
37	Little McMahon Creek	050301060703	82.5	1
38	Little Pine Creek	050901030203	64.2	2
39	Little Sandy Creek	050400010604	0.0	4
40	Little Short Creek	050301060206	115.0	1
41	Little Wakatomika Creek	050400040203	0.0	4
42	Lower Cross Creek	050301011005	49.1	2

Table 16. Watershed Prioritization Results Overview Map Key (2 of 2)

Map Key	12 Digit HUC Watershed Name	12 Digit HUC	Rank Score	Priority
43	Lower East Fork Duck Creek	050302010805	27.4	3
44	Lower McMahon Creek	050301060704	116.4	1
45	McIntyre Creek	050301011004	0.0	4
46	Middle East Fork Duck Creek	050302010803	20.0	3
47	Middle Fork Duck Creek	050302010802	18.6	3
48	Middle Fork Short Creek	050301060202	0.0	4
49	Middle Little Stillwater Creek	050400011504	0.0	4
50	Mill Fork	050400040202	0.0	4
51	Morgan Run-Tuscarawas River	050400011904	0.0	4
52	Mud Run-Tuscarawas River	050400011802	29.3	3
53	North Fork Short Creek	050301060203	81.0	1
54	Oldtown Creek	050400011702	0.0	4
55	Opossum Run-Seneca Fork	050400050105	56.0	2
56	Perrin Run-Short Creek	050301060205	65.2	2
57	Piney Fork	050301060204	149.0	1
58	Pipe Creek-Ohio River	050301061207	0.0	4
59	Pond Run-Ohio River	050901030105	65.3	2
60	Pone Run-Tuscarawas River	050400011704	81.3	1
61	Robinson Run-Muskingum River	050400040301	71.0	2
62	Rush Run	050301061201	0.0	4
63	Salem Creek	050301011002	48.7	2
64	Salt Run-Ohio River	050301061202	0.0	4
65	Sand Fork	050901010901	84.4	1
66	Sherrick Run-Nimishillen Creek	050400010505	53.0	2
67	Silver Creek-Chippewa Creek	050400010207	0.0	4
68	Simmons Run	050400030904	0.0	4
69	Skull Fork	050400011401	47.0	2
70	South Fork Buffalo Creek-Buffalo Creek	050400050203	0.0	4
71	South Fork Short Creek	050301060201	0.0	4
72	Spencer Creek	050400011301	0.0	4
73	Stone Creek	050400011701	35.0	3
74	Stone Mill Run-Middle Fork Little Beaver Creek	050301010403	0.0	4
75	Storms Creek	050901030104	75.2	2
76	Town of Uhrichsville-Stillwater Creek	050400011604	0.0	4
77	Upper Cross Creek	050301011001	0.0	4
78	Upper East Fork Duck Creek	050302010801	0.0	4
79	Weaver Run-Stillwater Creek	050400011603	26.3	3
80	Wegee Creek-Ohio River	050301061206	30.0	3
81	White Eyes Creek	050400050603	129.0	1
82	Wills Creek Dam-Wills Creek	050400050604	12.0	3
83	Wolf Run-Tuscarawas River	050400011204	97.0	1

Figure 6. 050400040404 Buckeye Fork Map

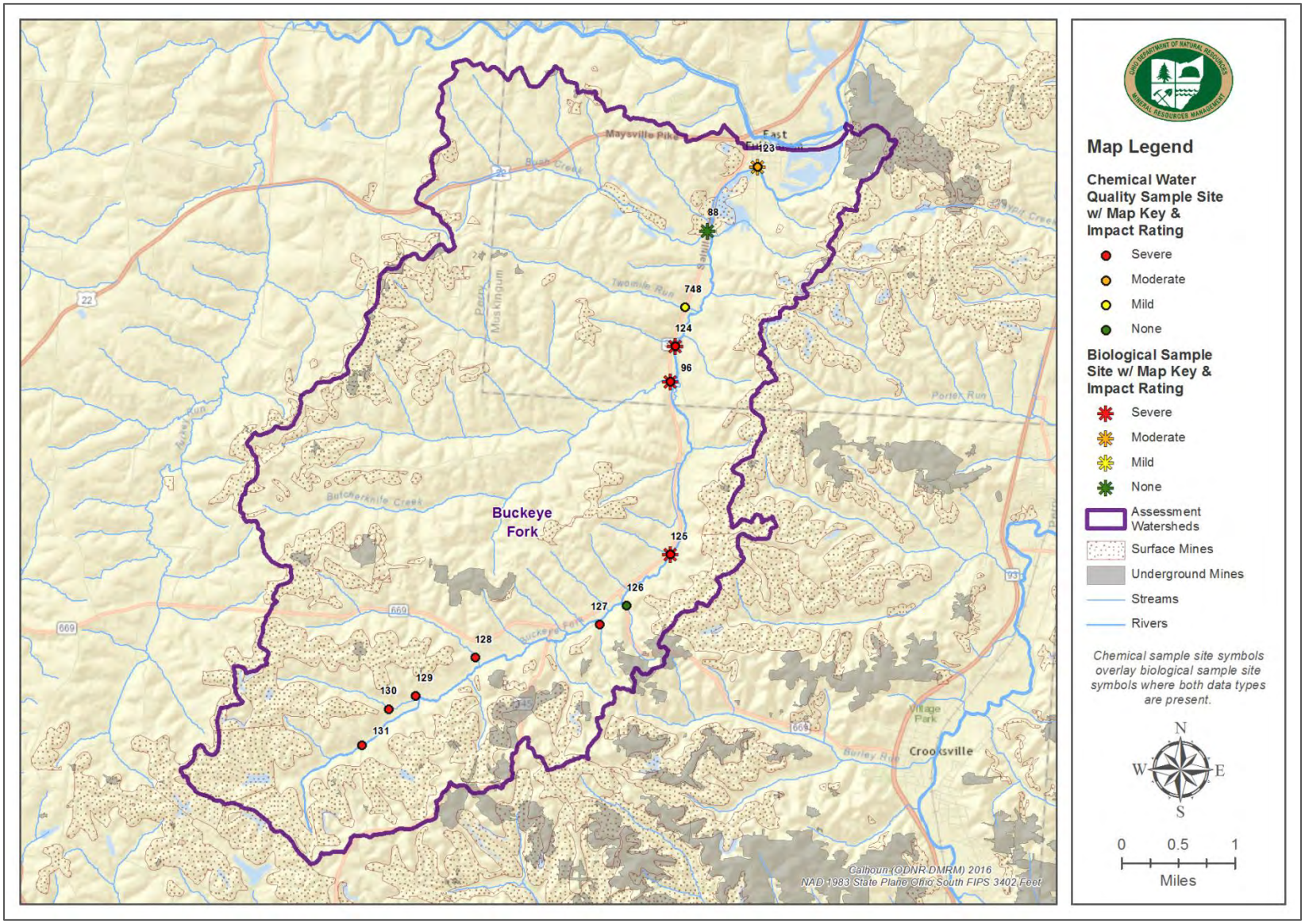


Table 17. 050400040404 Buckeye Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Buckeye Fork	96	BKNF010	Mouth of Butcherknife Creek @ SR345 bridge	04/03/13	ODNR DMRM	6.26	654.00	0.40	1.84	-1.90
Buckeye Fork	123	BUC010	Mouth of Buckeye Fork @ East Fultonham, Hoover Ave. bridge	04/03/13	ODNR DMRM	6.07	896.00	0.57	2.40	-40.26
Buckeye Fork	124	BUC030	Buckeye Fork at Fletcher Road	04/03/13	ODNR DMRM	5.47	837.00	0.57	3.72	18.18
Buckeye Fork	125	BUC060	Buckeye Fork @ Old Ranier Rd	04/03/13	ODNR DMRM	4.42	1031.00	1.72	6.38	47.40
Buckeye Fork	126	BUC071	Unnamed trib to Buckeye Fork adjacent SR 669	04/25/11	ODNR DMRM	6.15	454.00			
Buckeye Fork	127	BUC091	Unnamed trib to Buckeye Fork adjacent Twp Rd 169	04/25/11	ODNR DMRM	4.37	497.00			
Buckeye Fork	128	BUC141	Unnamed tributary to Buckeye Fork @ Twp Rd 154NE near Redfield	04/03/13	ODNR DMRM	3.26	1092.00	4.05	6.53	66.60
Buckeye Fork	129	BUC161	Tributary from west to Buckeye Fork, 2nd dst. from road crossing on Twp Rd 154	04/03/13	ODNR DMRM	2.79	1413.00	5.58	18.80	158.00
Buckeye Fork	130	BUC171	Tributary from west to Buckeye Fork @ culvert, 1st trib downstream from road x-ing at Twp Rd 154	04/03/13	ODNR DMRM	2.86	1188.00	4.74	15.50	128.00
Buckeye Fork	131	BUC190	Headwaters of Buckeye Fork @ culvert under Twp Rd @ Perry State Forest	04/03/13	ODNR DMRM	2.96	1453.00	3.60	9.48	88.40
Buckeye Fork	748	TWML010	Two Mile Run @ SR345 bridge	03/16/10	ODNR DMRM	7.90	312.00			

Table 18. 050400040404 Buckeye Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Buckeye Fork	88	BC46	Bush Creek at SR 345	OEPA SEDO	2009	0.10	40.00				MG	38.50
Buckeye Fork	96	BKNF010	Mouth of Butcherknife Creek @ SR345 bridge	OEPA SEDO	2009	0.10	12.00				LF	61.50
Buckeye Fork	123	BUC010	Mouth of Buckeye Fork @ East Fultonham, Hoover Ave. bridge	OEPA SEDO	2009	1.40	28.00	4.60		22.00		65.00
Buckeye Fork	124	BUC030	Buckeye Fork at Fletcher Road	OEPA SEDO	2009	3.40	12.00				P	58.00
Buckeye Fork	125	BUC060	Buckeye Fork @ Old Ranier Rd	OEPA SEDO	2009	5.50	12.00				VP	72.00

Figure 7. 050302020902 Campaign Creek Map

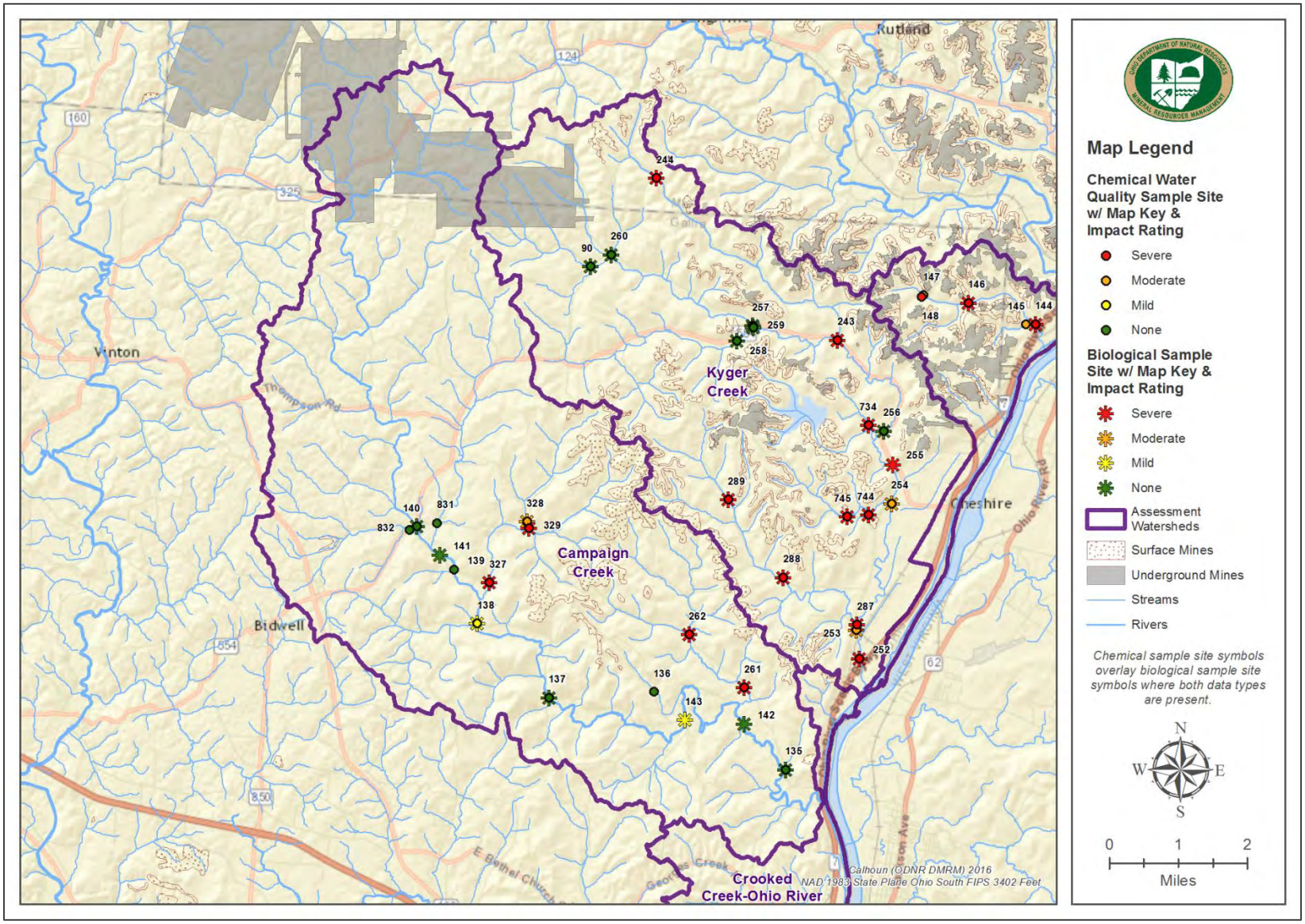


Table 19. 050302020902 Campaign Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Campaign Creek	135	CAMP015	Campaign Creek, adjacent Bulaville-Addison Road at bend in creek close to road	11/04/09	ODNR DMRM	7.40	469.00			
Campaign Creek	136	CAMP040	Unnamed tributary to Campaign Creek @ Bulaville-Addison Road; adjacent Possum Trot Rd	11/04/09	ODNR DMRM	7.52	564.00			
Campaign Creek	137	CAMP060	Campaign Creek at Kemper Hollow Road	11/04/09	ODNR DMRM	7.44	451.00			
Campaign Creek	138	CAMP090	Campaign Creek @ Bulaville-Porter Road, dst. Little White Oak Creek, upst. Blosser Creek	11/04/09	ODNR DMRM	6.78	450.00			
Campaign Creek	139	CAMP110	Campaign Creek, upst. LWOak @ Campaign Rd Bridge	04/02/13	ODNR DMRM	7.36	260.00	0.45	0.22	-81.72
Campaign Creek	140	CAMP120	Campaign Creek at SR 554 bridge	11/04/09	ODNR DMRM	7.39	355.00			
Campaign Creek	261	LCC010	Little Campaign Creek @ Brick School Road	11/04/09	ODNR DMRM	7.12	724.00			
Campaign Creek	262	LCC0100	Little Campaign @ Oil Hollow Rd bridge	03/21/11	ODNR DMRM	5.02	581.00			
Campaign Creek	327	LWOK010	Little White Oak Creek at Campaign Road bridge (near confluence)	04/02/13	ODNR DMRM	6.03	720.00	0.54	1.24	11.54
Campaign Creek	328	LWOK021	un-named trib to Little White Oak dst LWOK045, at WO/Poplar Ridge bridge	11/04/09	ODNR DMRM	4.89	1031.00			
Campaign Creek	329	LWOK045	Little White Oak Creek adjacent Nibert Road, upst. LWOK021 trib	11/04/09	ODNR DMRM	5.00	1371.00			
Campaign Creek	831	WHOK010	White Oak Creek @ White Oak Road	11/04/09	ODNR DMRM	7.56	360.00			
Campaign Creek	832	WLF010	Wolf Run @ Campaign Rd and SR 554	11/04/09	ODNR DMRM	7.30	360.00			

Table 20. 050302020902 Campaign Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Campaign Creek	135	CAMP015	Campaign Creek, adjacent Bulaville-Addison Road at bend in creek close to road	ODNR DMRM	2010		40.00	7.90				59.00
Campaign Creek	137	CAMP060	Campaign Creek at Kemper Hollow Road	ODNR DMRM	2010		42.00	9.00				76.00
Campaign Creek	138	CAMP090	Campaign Creek @ Bulaville-Porter Road, dst. Little White Oak Creek, upst. Blosser Creek	ODNR DMRM	2010				11.00			
Campaign Creek	140	CAMP120	Campaign Creek at SR 554 bridge	ODNR DMRM	2010		44.00					83.50
Campaign Creek	141	CAMPRM11.5	Campaign Creek adj Campaign Rd	ODNR DMRM	2010	11.50			13.00			
Campaign Creek	142	CAMPRM2.85	Campaign Creek @ oil & gas rd, adj. Addison Pike Rd	ODNR DMRM	2010	2.85			12.00			
Campaign Creek	143	CAMPRM5.7	Campaign Creek @ Johnson Ridge Rd (CR 9)., upstream of Little Campaign Creek	ODNR DMRM	2010	37.00	36.00	8.20				70.00
Campaign Creek	261	LCC010	Little Campaign Creek @ Brick School Road	ODNR DMRM	2011				4.00			
Campaign Creek	262	LCC0100	Little Campaign @ Oil Hollow Rd bridge	ODNR DMRM	2011				6.00			
Campaign Creek	327	LWOK010	Little White Oak Creek at Campaign Road bridge (near confluence)	ODNR DMRM	2011				7.00			
Campaign Creek	328	LWOK021	un-named trib to Little White Oak dst LWOK045, at WO/Poplar Ridge bridge	ODNR DMRM	2010		24.00					65.00
Campaign Creek	329	LWOK045	Little White Oak Creek adjacent Nibert Road, upst. LWOK021 trib	ODNR DMRM	2011				3.00			

Figure 8. 050301060207 Dry Fork-Short Creek Map

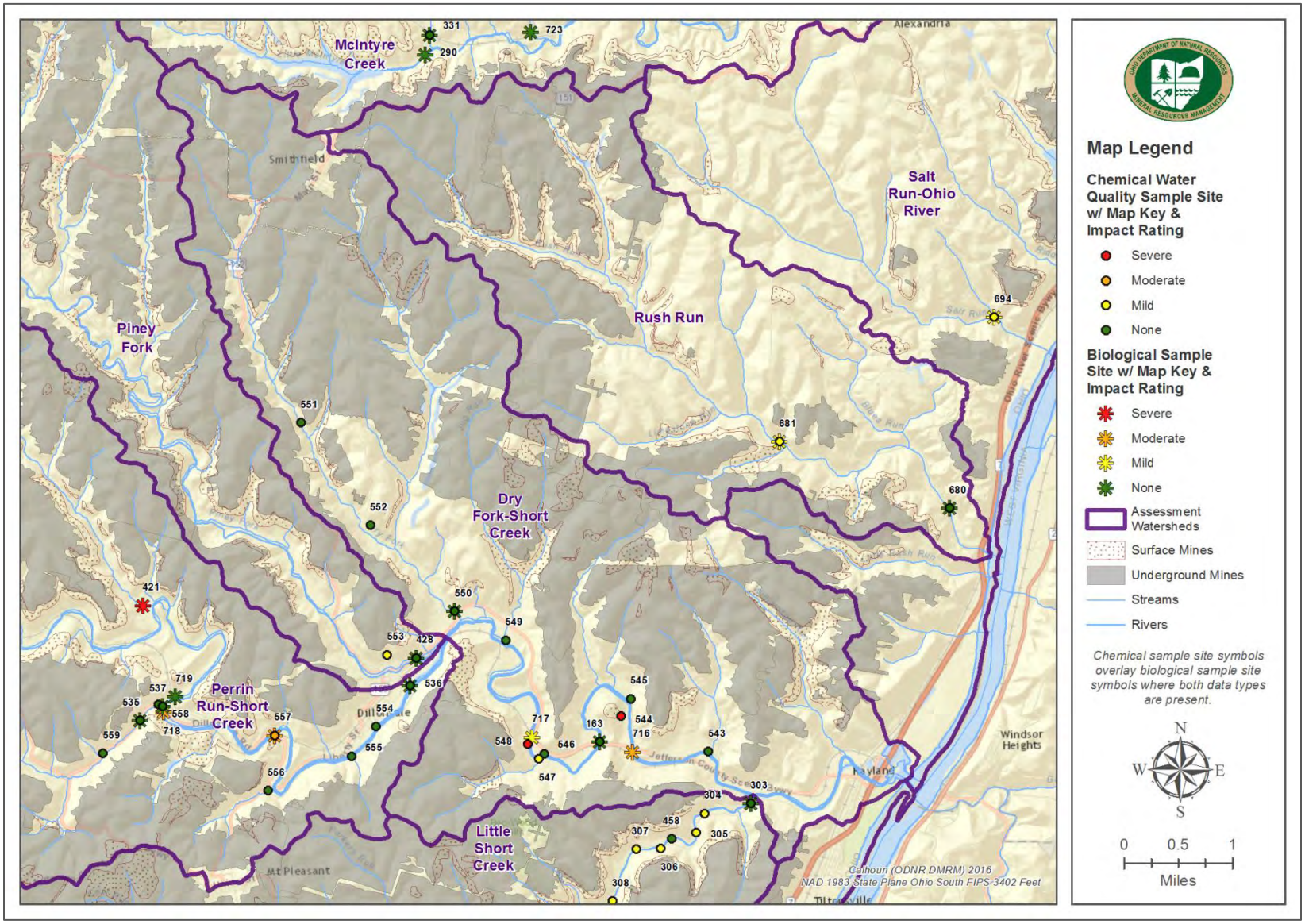


Table 21. 050301060207 Dry Fork-Short Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Dry Fork-Short Creek	163	DFSC040	Short Cr. at SR 150 nr. USGS Gage	08/11/10	OEPA SEDO			0.19	<0.20	-187.10
Dry Fork-Short Creek	543	PSHT001	Short Creek 001	02/02/10	ODNR DMRM	7.73	1079.00			
Dry Fork-Short Creek	544	PSHT002	Short Creek Baumberger source 004 trib on west side of Merkel loop	02/02/10	ODNR DMRM	3.27	3044.00			
Dry Fork-Short Creek	545	PSHT003	Short Creek Markel loop 003 Mine discharge from Markel loop. AMD from impoundment of ridge	02/02/10	ODNR DMRM	7.80	3329.00			
Dry Fork-Short Creek	546	PSHT004	Short Creek Mainstream 006 Dnst. Of 005 in Mainstream	02/02/10	ODNR DMRM	7.61	1368.00			
Dry Fork-Short Creek	547	PSHT005	Short Creek Trib 005 trib from south upst or Merkel	02/02/10	ODNR DMRM	6.08	1240.00			
Dry Fork-Short Creek	548	PSHT006	Lauralton Drainage in HUC (62)	02/03/10	ODNR DMRM	2.21	4889.00			
Dry Fork-Short Creek	549	PSHT007	Short Creek Trib from North 007	02/02/10	ODNR DMRM	8.07	1594.00			
Dry Fork-Short Creek	550	PSHT008	Dry Fork Short Creek - mouth	07/07/10	OEPA SEDO	8.28	1146.70	0.86	0.44	-238.10
Dry Fork-Short Creek	551	PSHT009	Short Creek Dry Fork seep/discharge 009	02/02/10	ODNR DMRM	8.12	1530.00			
Dry Fork-Short Creek	552	PSHT010	Short Creek seep 010 on Bradley Rd coming from high on hill - Artesias	02/02/10	ODNR DMRM	8.02	1093.00			

Table 22. 050301060207 Dry Fork-Short Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Dry Fork-Short Creek	163	DFSC040	Short Cr. at SR 150 nr. USGS Gage	OEPA SEDO	2010	4.96	50.00	8.95		44.00		88.50
Dry Fork-Short Creek	550	PSHT008	Dry Fork Short Creek - mouth	OEPA SEDO	2010	0.15	46.00				MG	67.50
Dry Fork-Short Creek	716	SHT010	Short Creek dnst Merckle loop	ODNR DMRM	2010	125.00			10.00			
Dry Fork-Short Creek	717	SHT020	Short Creek upst Merckle loop	ODNR DMRM	2010	121.00			11.00			

Figure 9. 050301061204 Glenns Run-Ohio River Map

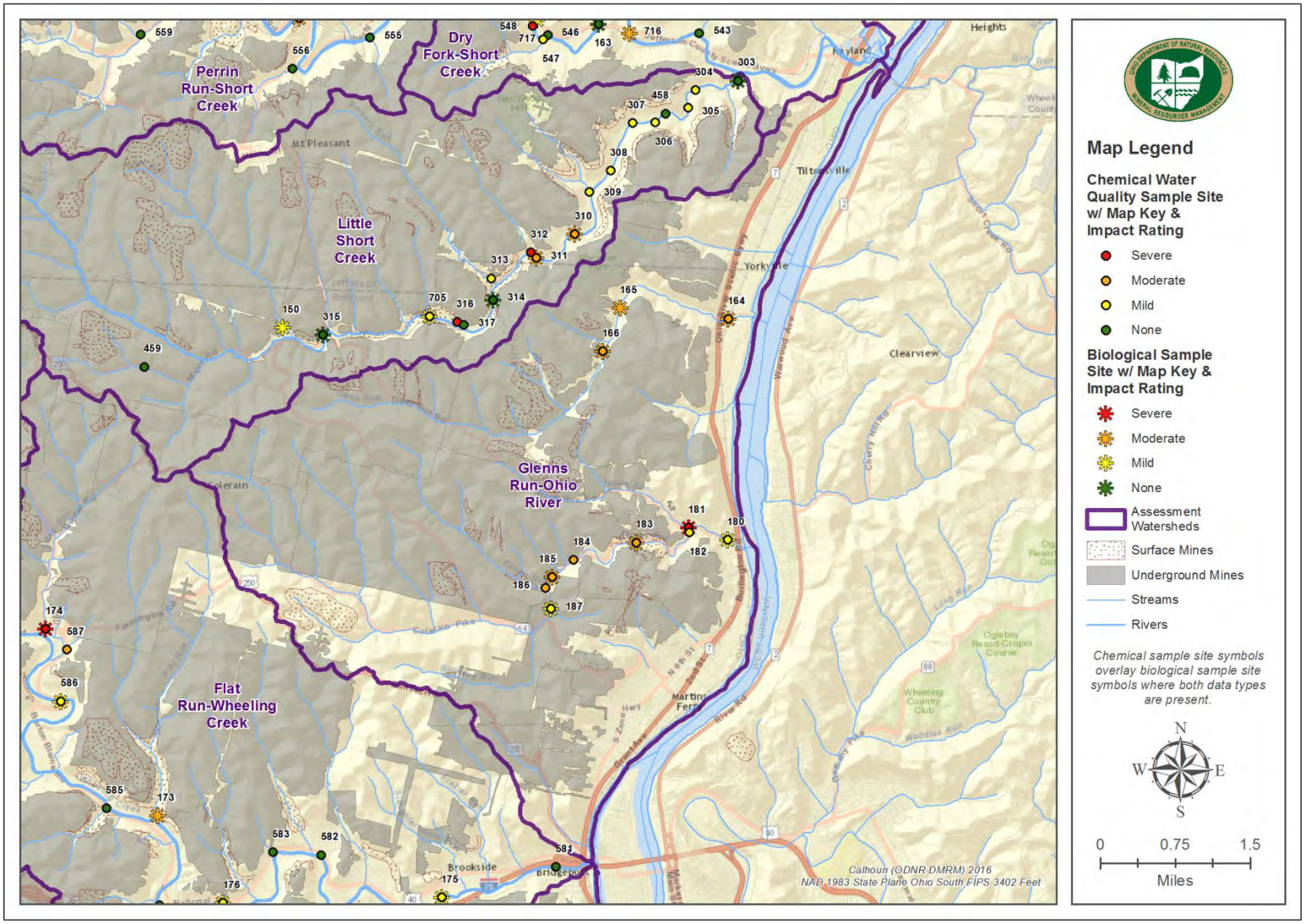


Table 23. 050301061204 Glenns Run-Ohio River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Glenns Run-Ohio River	164	DPR010	Deep Run at the RR tracks	08/11/10	OEPA SEDO			0.71	<0.20	-88.90
Glenns Run-Ohio River	166	DPR040	Deep Run adj Deep Run Rd ust. abandoned mine drainage	07/08/10	OEPA SEDO	7.98	1329.60	0.23	<0.20	
Glenns Run-Ohio River	180	GR010 mouth	Glenns mouth	03/18/14	ODNR DMRM	7.99	940.00	1.63	0.26	-231.18
Glenns Run-Ohio River	181	GR030	Nixon Run	03/18/14	ODNR DMRM	8.10	971.00	0.08	0.11	-237.90
Glenns Run-Ohio River	182	GR040	Glenns upst nixon run	03/18/14	ODNR DMRM	8.12	911.00	1.95	0.29	-231.60
Glenns Run-Ohio River	183	GR060	Glenns Run stripped area	03/18/14	ODNR DMRM	7.94	876.00	2.31	0.29	-226.12
Glenns Run-Ohio River	184	GR080	Glenns Run Beaver pond seep	08/14/13	ODNR DMRM	6.51	9880.00	190.00	0.09	-186.00
Glenns Run-Ohio River	185	GR090	Glenns Run dnst Treadway Hollow	08/15/13	ODNR DMRM	7.51	971.00	2.21	0.36	-230.10
Glenns Run-Ohio River	186	GR100	Treadway Hollow	08/15/13	ODNR DMRM	7.42	860.00	9.46	2.49	-187.32
Glenns Run-Ohio River	187	GR110	Glenns Run Upst AMD	08/09/10	OEPA SEDO	7.50	2448.20	14.80	<0.20	-271.10

Table 24. 050301061204 Glenns Run-Ohio River Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Glenns Run-Ohio River	164	DPR010	Deep Run at the RR tracks	OEPA SEDO	2010	0.25	34.00				P	47.00
Glenns Run-Ohio River	165	DPR020	Deep Run adj Deep Run Rd dst. abandoned mine drainage	OEPA SEDO	2010	1.55					VP	
Glenns Run-Ohio River	166	DPR040	Deep Run adj Deep Run Rd ust. abandoned mine drainage	OEPA SEDO	2010	2.40	22.00				MG	50.80
Glenns Run-Ohio River	180	GR010 mouth	Glenns Run at CR 4 (Glenns Run Rd)	OEPA SEDO	2010	0.10	52.00				F	58.30
Glenns Run-Ohio River	181	GR030	Nixon Run	ODNR DMRM	2011				5			
Glenns Run-Ohio River	183	GR060	Glenns Run stripped area	ODNR DMRM	2010	2.50	24.00		10.00			68.00
Glenns Run-Ohio River	185	GR090	Glenns Run dnst Treadway Hollow	OEPA SEDO	2010	2.15	24.00				F	68.80
Glenns Run-Ohio River	187	GR110	Glenns Run Upst AMD	OEPA SEDO	2010	2.90	30.00				MG	66.50

Figure 10. 050901030202 Headwaters Pine Creek Map

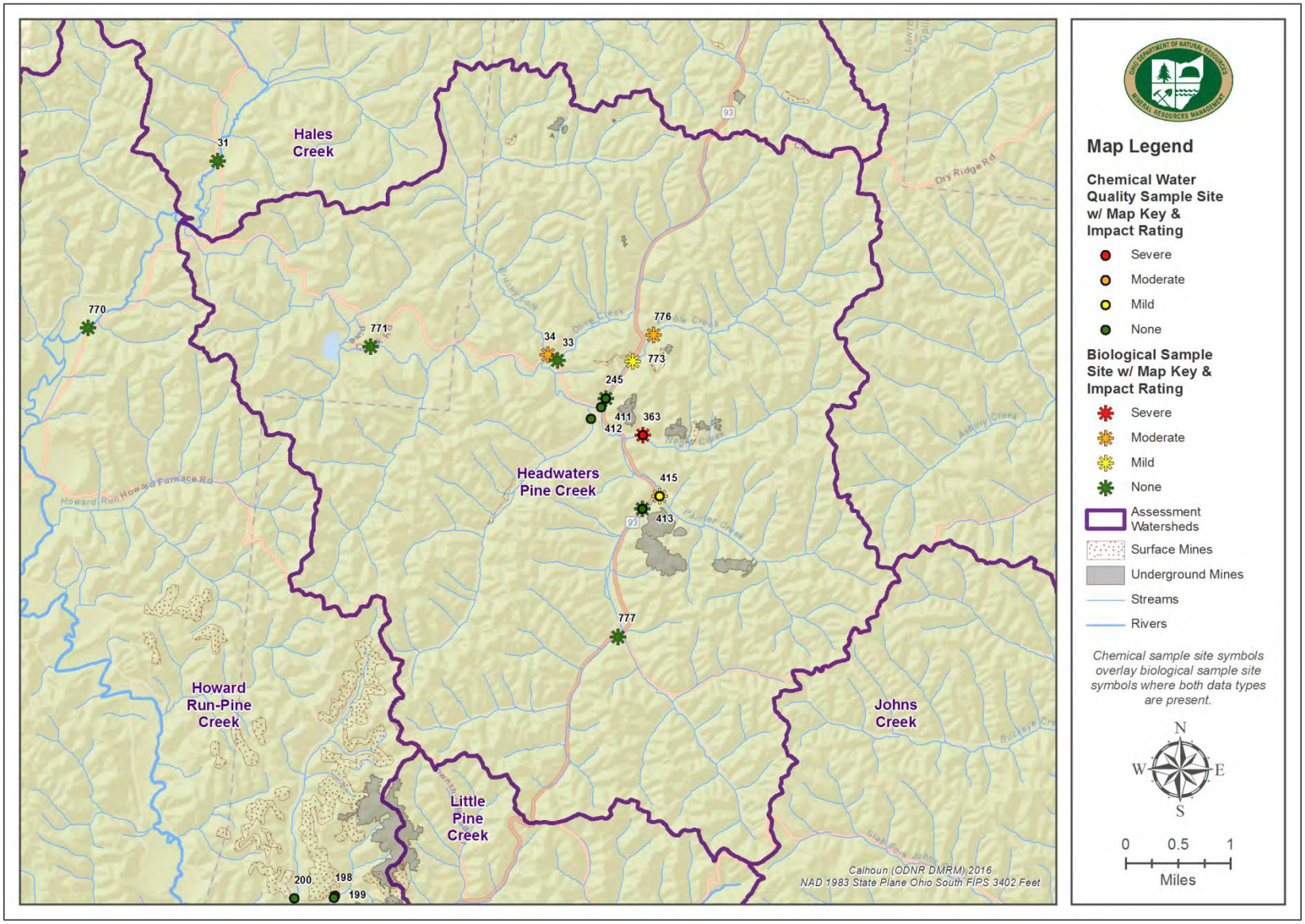


Table 25. 050901030202 Headwaters Pine Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Headwaters Pine Creek	245	KCPCHW001	Kimble Creek @ LC 34 near confluence with Pine Creek	11/24/09	ODNR DMRM	6.84	311.00			
Headwaters Pine Creek	363	NCPCHW004	Negro Creek @ mouth	11/24/09	ODNR DMRM	4.89	634.00			
Headwaters Pine Creek	411	PCHW002	Pine Creek @ LC 34, upstream Kimble Creek	11/24/09	ODNR DMRM	6.76	403.00			
Headwaters Pine Creek	412	PCHW003	Buckhorn Hollow upstream confluence with Pine Creek	11/24/09	ODNR DMRM	7.20	310.00			
Headwaters Pine Creek	413	PCHW006	Pine Creek @ SR 93 adjacent. TR 207, upstream Painters Creek	11/24/09	ODNR DMRM	7.19	377.00			
Headwaters Pine Creek	415	PCPCHW005	PAINTER CREEK SE OF BUCKHORN, @ PAINTER CREEK RD.	11/24/09	ODNR DMRM	6.68	306.00			

Table 26. 050901030202 Headwaters Pine Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Headwaters Pine Creek	33	301132	OLIVE CREEK @ Buckhorn-Pine Creek Rd CR34	OEPA SEDO	2010	0.11					MG	
Headwaters Pine Creek	34	301134	BRUSHY FORK (trib to Pine Creek) @ Buckhorn-Pine Creek Rd CR 34	OEPA SEDO	2010	0.10	26.00				G	66.00
Headwaters Pine Creek	245	KCPCHW001	Kimble Creek RM 0.1 at mouth	OEPA SEDO	2010	0.10					G	
Headwaters Pine Creek	363	NCPCHW004	Negro Creek at mouth adj. TR 166 Negro Creek Rd	OEPA SEDO	2010	0.20					P	
Headwaters Pine Creek	413	PCHW006	PINE CREEK @ ST. RT. 93 just north TR207	OEPA SEDO	2010	45.70	44.00				VG	72.80
Headwaters Pine Creek	415	PCPCHW005	PAINTER CREEK SE OF BUCKHORN, @ PAINTER CREEK RD.	OEPA SEDO	2010	0.10	34.00				MG	81.50
Headwaters Pine Creek	771	W01K13	PINE CREEK DST. YOUNGS BRANCH, ADJ. PINE CREEK RD.	OEPA SEDO	2010	41.30	44.00	7.99		44.00		61.80
Headwaters Pine Creek	773	W01K18	KIMBLE CREEK DST. AMD DISCHARGE, SR 93 south of TR258	OEPA SEDO	2010	0.60	36.00				MG	62.00
Headwaters Pine Creek	776	W01S21	KIMBLE CREEK UPST AMD LEACHATE, Kimble Cr Rd TR258 sign	OEPA SEDO	2010	0.90	24.00				G	75.50
Headwaters Pine Creek	777	W01S24	SAWMILL RUN S OF BUCKHORN @ MOUTH adj SR93 just south CR14	OEPA SEDO	2010	0.10	38.00				MG	60.50

Figure 11. 050302020901 Kyger Creek Map

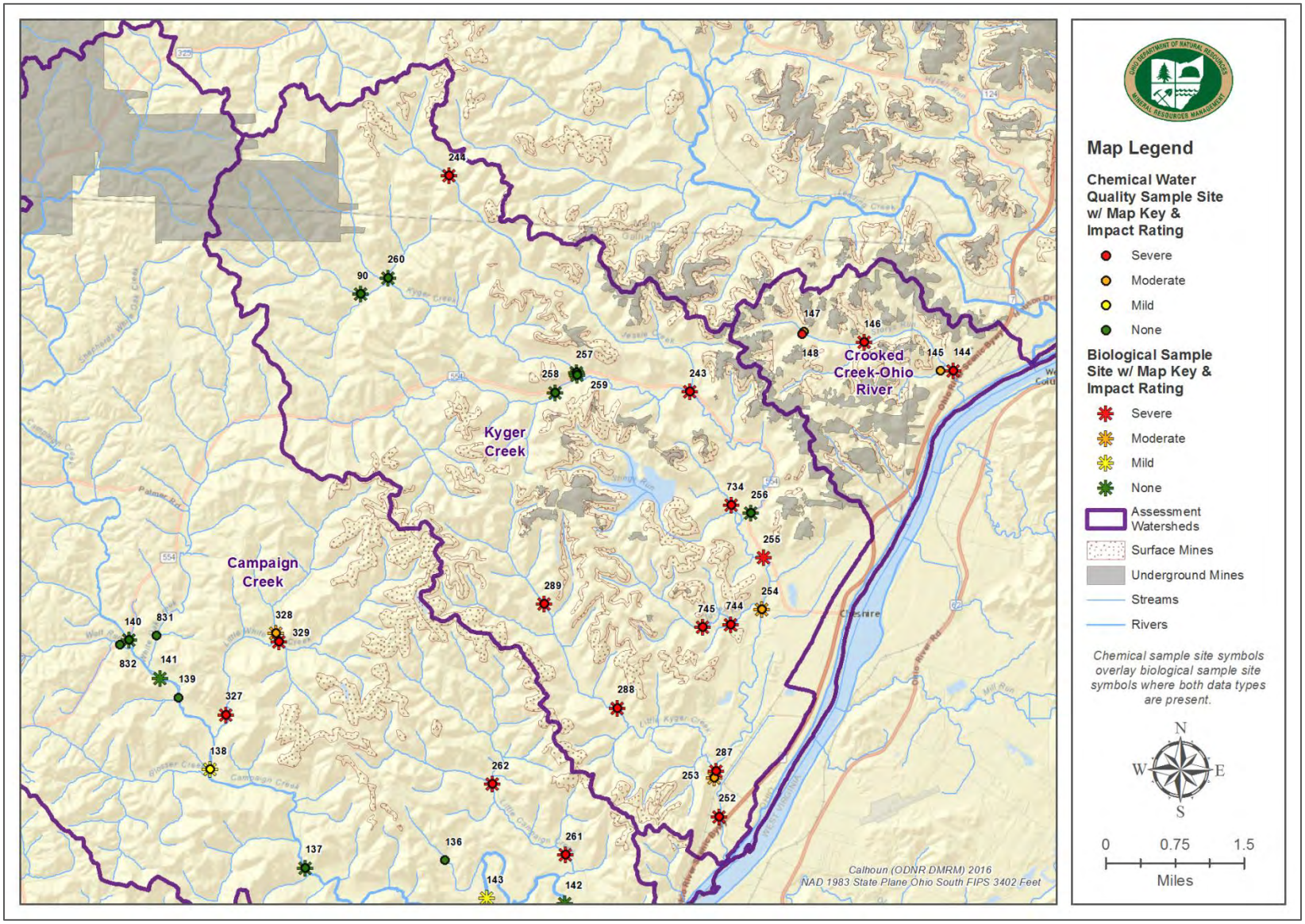


Table 27. 050302020901 Kyger Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Kyger Creek	90	BELLR0010	BELL LICK RUN AT MOUTH @ WARD RD.	10/09/08	OEPA SEDO	6.91	335.60			
Kyger Creek	243	JESSCR0010	JESSIE CREEK 1 MI. E OF KYGER @ MOUTH	10/09/08	OEPA SEDO	5.45	845.70			
Kyger Creek	244	JESSCR0050	JESSIE CREEK 2.3 MI. S OF LANGSVILLE @ WARD RD.	09/03/08	OEPA SEDO	7.12	451.70			
Kyger Creek	252	KYGCR0010	KYGER CREEK AT ADDISON @ ST. RT. 7	08/11/08	OEPA SEDO	8.09	986.90			
Kyger Creek	253	KYGCR0030	KYGER CREEK NEAR ADDISON, UPST. POWER PLANT, DST L KYGER CRK	07/10/08	OEPA SEDO	5.71	716.40			
Kyger Creek	254	KYGCR0050	KYGER CREEK 1 MI W OF CHESHIRE @ GRAVEL HILL RD.	07/10/08	OEPA SEDO	6.92	701.40			
Kyger Creek	256	KYGCR0090	KYGER CREEK NEAR KYGER, UPST. CONFL OF STINGY RUN	10/09/08	OEPA SEDO	6.59	918.20			
Kyger Creek	257	KYGCR0110	KYGER CREEK 1.5 MI. DST BELL LICK RUN, ADJ VAN ZANT RD.	09/22/08	OEPA SEDO	6.37	461.30			
Kyger Creek	258	KYGCR0116	TRIB. TO KYGER CREEK (8.44) ADJ ST. RT. 554 @ ABANDONED ROAD	10/09/08	OEPA SEDO	6.91	692.20			
Kyger Creek	259	KYGCR0130	KYGER CREEK UPST. KYGER @ ST. RT. 554 ACROSS FROM VAN ZANT	08/11/08	OEPA SEDO	6.83	456.10			
Kyger Creek	260	KYGCR0151	TRIB. TO KYGER CREEK (10.98) NEAR KYGER @ VAN ZANT RD.	08/11/08	OEPA SEDO	7.05	352.40			
Kyger Creek	287	LKYGCR0010	L. KYGER CREEK 2 MI. N OF ADDISON @ MOUTH	09/22/08	OEPA SEDO	5.40	1042.20			
Kyger Creek	288	LKYGCR0030	L. KYGER CREEK ADJ. L. KYGER CREEK RD.	10/09/08	OEPA SEDO	4.84	1214.20			
Kyger Creek	289	LKYGCR0050	L. KYGER CREEK @ JERICHO HILL RD. (2ND CROSSING UPSTREAM)	07/10/08	OEPA SEDO	4.33	1191.20			
Kyger Creek	734	STNGYRU0010	STINGY RUN NEAR MOUTH @ STINGY RUN RD.	08/11/08	OEPA SEDO	6.91	768.40			
Kyger Creek	744	TRKYGCR0020	TURKEY RUN NEAR MOUTH @ FOOTBRIDGE NEAR MCCARTY CEMETERY	08/11/08	OEPA SEDO	5.88	2444.20			
Kyger Creek	745	TRKYGCR0040	TURKEY RUN NEAR MOUTH @ TURKEY RUN RD.	09/03/08	OEPA SEDO	4.77	871.60			

Table 28. 050302020901 Kyger Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Kyger Creek	90	BELLR0010	BELL LICK RUN AT MOUTH @ WARD RD.	OEPA SEDO	2008	0.35	20.00				MG	56.00
Kyger Creek	243	JESSCR0010	JESSIE CREEK 1 MI. E OF KYGER @ MOUTH	OEPA SEDO	2008	0.01	18.00				VP	41.00
Kyger Creek	244	JESSCR0050	JESSIE CREEK 2.3 MI. S OF LANGSVILLE @ WARD RD.	OEPA SEDO	2008	4.00	12.00				VP	59.00
Kyger Creek	252	KYGCR0010	KYGER CREEK AT ADDISON @ ST. RT. 7	OEPA SEDO	2008	0.60	17.00	5.20		18.00		66.00
Kyger Creek	253	KYGCR0030	KYGER CREEK NEAR ADDISON, UPST. POWER PLANT, DST L KYGER CRK	OEPA SEDO	2008	1.00	22.00	5.10		14.00		57.00
Kyger Creek	254	KYGCR0050	KYGER CREEK 1 MI W OF CHESHIRE @ GRAVEL HILL RD.	OEPA SEDO	2008	3.40	22.00	3.80		28.00		62.50
Kyger Creek	255	KYGCR0070	Near Cheshire, upstream Roush cemetery, downstream AEP 008	OEPA SEDO	2008	4.00	15.00	4.00		34.00		64.00
Kyger Creek	256	KYGCR0090	KYGER CREEK NEAR KYGER, UPST. CONFL OF STINGY RUN	OEPA SEDO	2008	4.80	30.00				F	52.00
Kyger Creek	257	KYGCR0110	KYGER CREEK 1.5 MI. DST BELL LICK RUN, ADJ VAN ZANT RD.	OEPA SEDO	2008	8.42	19.00				G	53.50
Kyger Creek	258	KYGCR0116	TRIB. TO KYGER CREEK (8.44) ADJ ST. RT. 554 @ ABANDONED ROAD	OEPA SEDO	2008	0.30	12.00				F	54.00
Kyger Creek	259	KYGCR0130	KYGER CREEK UPST. KYGER @ ST. RT. 554 ACROSS FROM VAN ZANT	OEPA SEDO	2008	8.50	22.00				F	66.00
Kyger Creek	260	KYGCR0151	TRIB. TO KYGER CREEK (10.98) NEAR KYGER @ VAN ZANT RD.	OEPA SEDO	2008	0.11					MG	
Kyger Creek	287	LKYGCR0010	L. KYGER CREEK 2 MI. N OF ADDISON @ MOUTH	OEPA SEDO	2008	0.01	12.00				VP	73.00
Kyger Creek	288	LKYGCR0030	L. KYGER CREEK ADJ. L. KYGER CREEK RD.	OEPA SEDO	2008	1.60	12.00				VP	72.00
Kyger Creek	289	LKYGCR0050	L. KYGER CREEK @ JERICHO HILL RD. (2ND CROSSING UPSTREAM)	OEPA SEDO	2008	3.00	12.00				P	56.50
Kyger Creek	734	STNGYRU0010	STINGY RUN NEAR MOUTH @ STINGY RUN RD.	OEPA SEDO	2008	0.20	18.00				P	40.00
Kyger Creek	744	TRKYGCR0020	TURKEY RUN NEAR MOUTH @ FOOTBRIDGE NEAR MCCARTY CEMETERY	OEPA SEDO	2008	0.40	12.00				VP	49.00
Kyger Creek	745	TRKYGCR0040	TURKEY RUN NEAR MOUTH @ TURKEY RUN RD.	OEPA SEDO	2008	0.95	12.00				VP	44.50

Figure 12. 050301060703 Little McMahon Creek Map

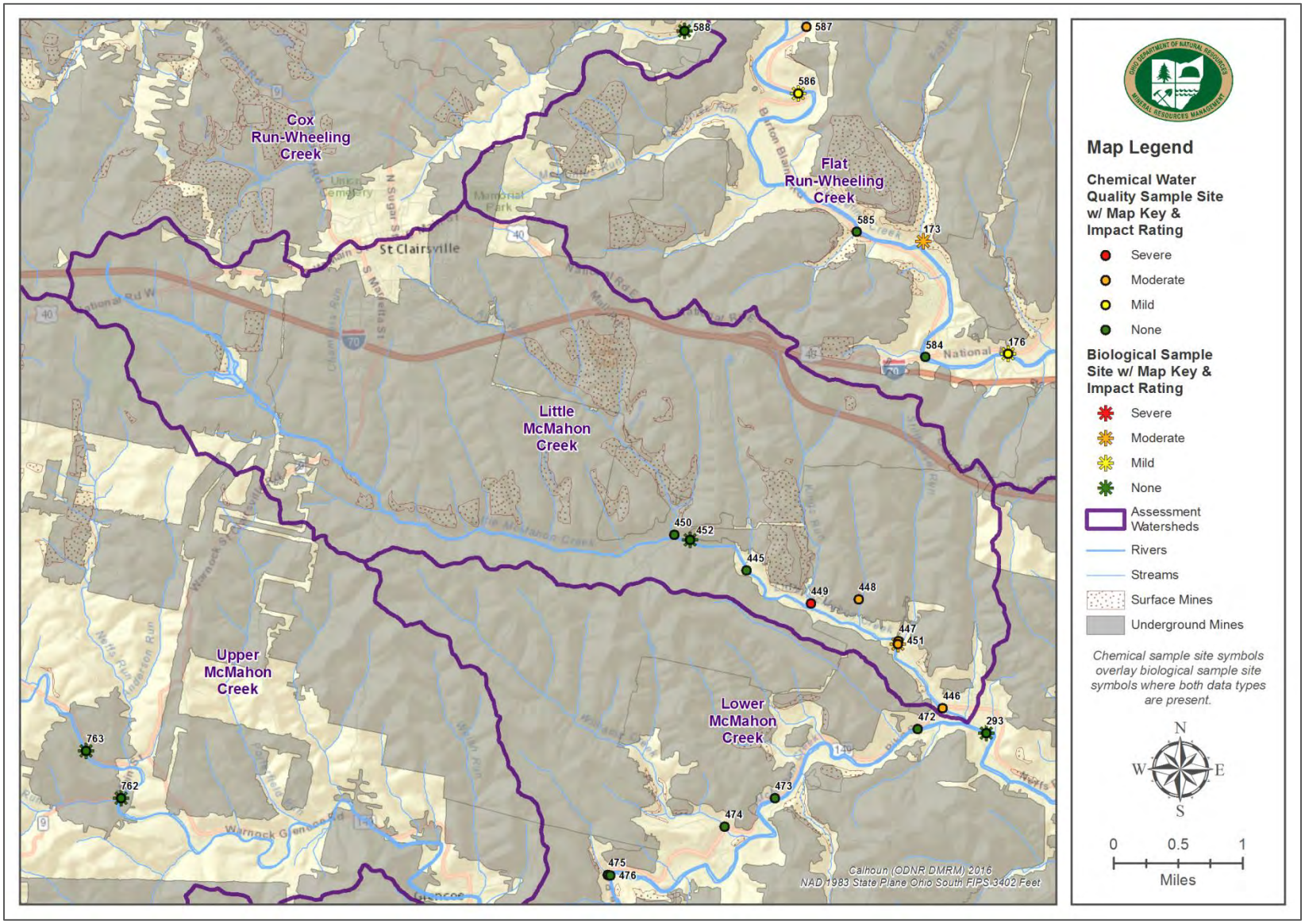


Table 29. 050301060703 Little McMahon Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Little McMahon Creek	445	PLMCMA0005	Little McMahon upstream Kings Run	12/08/09	ODNR DMRM	8.00	1285.00			
Little McMahon Creek	446	PLMCMA001	Little McMahon @ SR 149, at mouth	12/08/09	ODNR DMRM	4.79	2557.00			
Little McMahon Creek	447	PLMCMA002	Stillhouse Run at SR 149	12/08/09	ODNR DMRM	4.79	2557.00			
Little McMahon Creek	448	PLMCMA003	Unnamed trib to Little McMahon Creek at SR 149 and West Echo Rd.	12/08/09	ODNR DMRM	5.27	3748.00			
Little McMahon Creek	449	PLMCMA004	Kings Run @ mouth, at Kings Run Rd	09/16/09	OEPA SEDO	5.56	2401.50	156.00	<0.20	176.10
Little McMahon Creek	450	PLMCMA006	Aults Run at Hurkey Rd	12/08/09	ODNR DMRM	8.05	1396.00			
Little McMahon Creek	451	PLMCMA015	Little McMahon Creek Near Neffs @ Twp. Rd. 316	11/24/09	OEPA SEDO	7.52	1575.90	22.80	2.66	-138.00
Little McMahon Creek	452	PLMCMA020	Downstream Aults Run, Adj. Willow Grove	09/16/09	OEPA SEDO	6.90	1190.30	<0.05	<0.20	-205.00

Table 30. 050301060703 Little McMahon Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Little McMahon Creek	451	PLMCMA015	Little McMahon Creek Near Neffs @ Twp. Rd. 316	OEPA SEDO	2009	0.80	24.00				MG	55.50
Little McMahon Creek	452	PLMCMA020	Downstream Aults Run, Adj. Willow Grove	OEPA SEDO	2009	2.80	44.00				MG	55.50

Figure 13. 050301060206 Little Short Creek Map

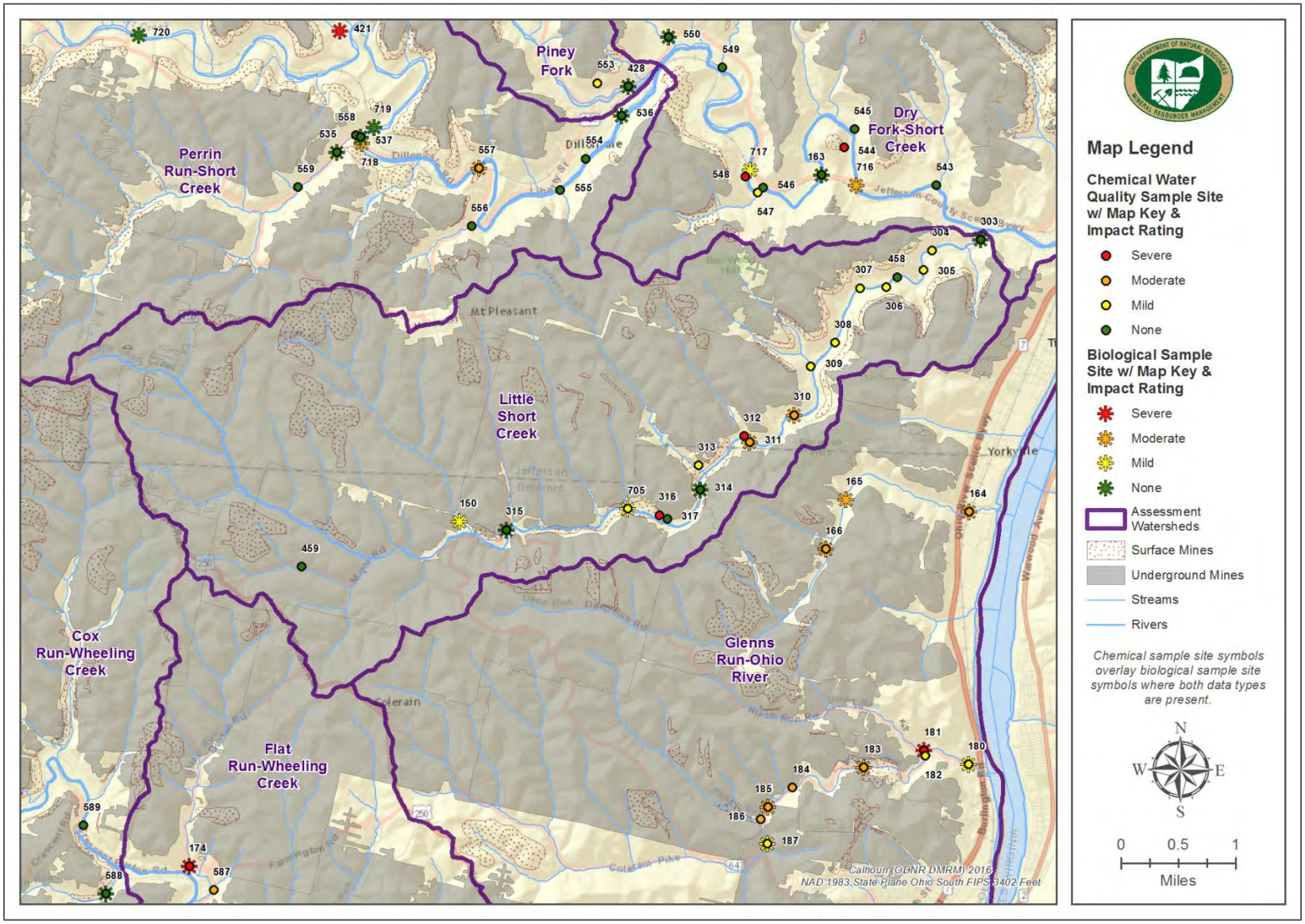


Table 31. 050301060206 Little Short Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Little Short Creek	303	LSC010	Little Short Creek Mouth	03/13/13	ODNR DMRM	7.89	813.00	1.19	0.50	-206.74
Little Short Creek	304	LSC020	Little Short Creek dnst first source	03/13/13	ODNR DMRM	7.98	817.00	1.57	0.61	-209.40
Little Short Creek	305	LSC040	Little Short Creek upstream Source 1	03/13/13	ODNR DMRM	8.10	880.00	1.93	0.72	-212.02
Little Short Creek	306	LSC060	Little Short Creek at waterfall	03/13/13	ODNR DMRM	7.98	888.00	2.14	0.78	-209.68
Little Short Creek	307	LSC070	Little Short Source 3	03/13/13	ODNR DMRM	7.74	1300.00	3.74	0.14	-166.30
Little Short Creek	308	LSC080	Little Short Creek dnst Source 4	03/13/13	ODNR DMRM	7.96	870.00	2.85	1.06	-209.48
Little Short Creek	309	LSC090	Little Short Source 4	03/13/13	ODNR DMRM	7.83	775.00	8.62	1.84	-151.14
Little Short Creek	310	LSC100	Little Short Creek dnst source 5	03/14/13	ODNR DMRM	7.67	924.00	3.38	1.11	-213.60
Little Short Creek	311	LSC120	Little Short Creek @ RM 2.45	03/14/13	ODNR DMRM	7.59	894.00	4.69	1.53	-205.80
Little Short Creek	312	LSC130	Little Short Source 5 (large source upstream glenn robbins)	03/14/13	ODNR DMRM	6.39	1120.00	73.00	16.30	-10.20
Little Short Creek	313	LSC140	Parkers run	03/14/13	ODNR DMRM	7.70	855.00	0.91	0.95	-220.76
Little Short Creek	314	LSC150	Little Short Creek Dnst Hidaway seeps	03/14/13	ODNR DMRM	8.20	794.00	0.10	0.05	-226.12
Little Short Creek	315	LSC170	Mainstem of L. Short 006 at SR 647 bridge	02/03/10	ODNR DMRM	7.92	866.00			
Little Short Creek	316	LSCXXX	Seep 1 dnst of Hidaway	03/14/13	ODNR DMRM	3.33	2660.00	10.60	0.38	74.10
Little Short Creek	317	LSCYYY	Seep 2 dnst hidaway	03/14/13	ODNR DMRM	8.02	991.00	0.52	0.31	-266.46
Little Short Creek	458	PLSHT02	Little Short Creek again 002 Mainstem dust Glen Robins	02/03/10	ODNR DMRM	7.72	1016.00			
Little Short Creek	459	PLSHT06	Headwaters of l. Short 007	02/03/10	ODNR DMRM	7.95	717.00			
Little Short Creek	705	SCLS030	Little Short Cr. at TR 472 ust. Parkers Run	07/27/10	OEPA SEDO			0.27	<0.20	-244.10

Table 32. 050301060206 Little Short Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Little Short Creek	150	COALRUN01	Coal Run at mouth (mine road off SR 647)	OEPA SEDO	2010	0.15	34.00				G	62.80
Little Short Creek	303	LSC010	Little Short Creek Mouth	ODNR DMRM	2011	0.10	52.00		15.00			84.00
Little Short Creek	310	LSC100	Little Short Creek dnst source 5	ODNR DMRM	2011	2.90	28.00		6.00			
Little Short Creek	311	LSC120	Little Short Creek @ RM 2.45	ODNR DMRM	2010	2.45	26.00		6.00			51.00
Little Short Creek	314	LSC150	Little Short Creek Dnst Hidaway seeps	ODNR DMRM	2011	4.20			14.00			
Little Short Creek	315	LSC170	Mainstem of L. Short 006 at SR 647 bridge	ODNR DMRM	2013	6.15			15.00			
Little Short Creek	705	SCLS030	Little Short Cr. at TR 472 ust. Parkers Run	OEPA SEDO	2010	4.99	34.00				G	85.80

Figure 14. 050301060704 Lower McMahon Creek Map

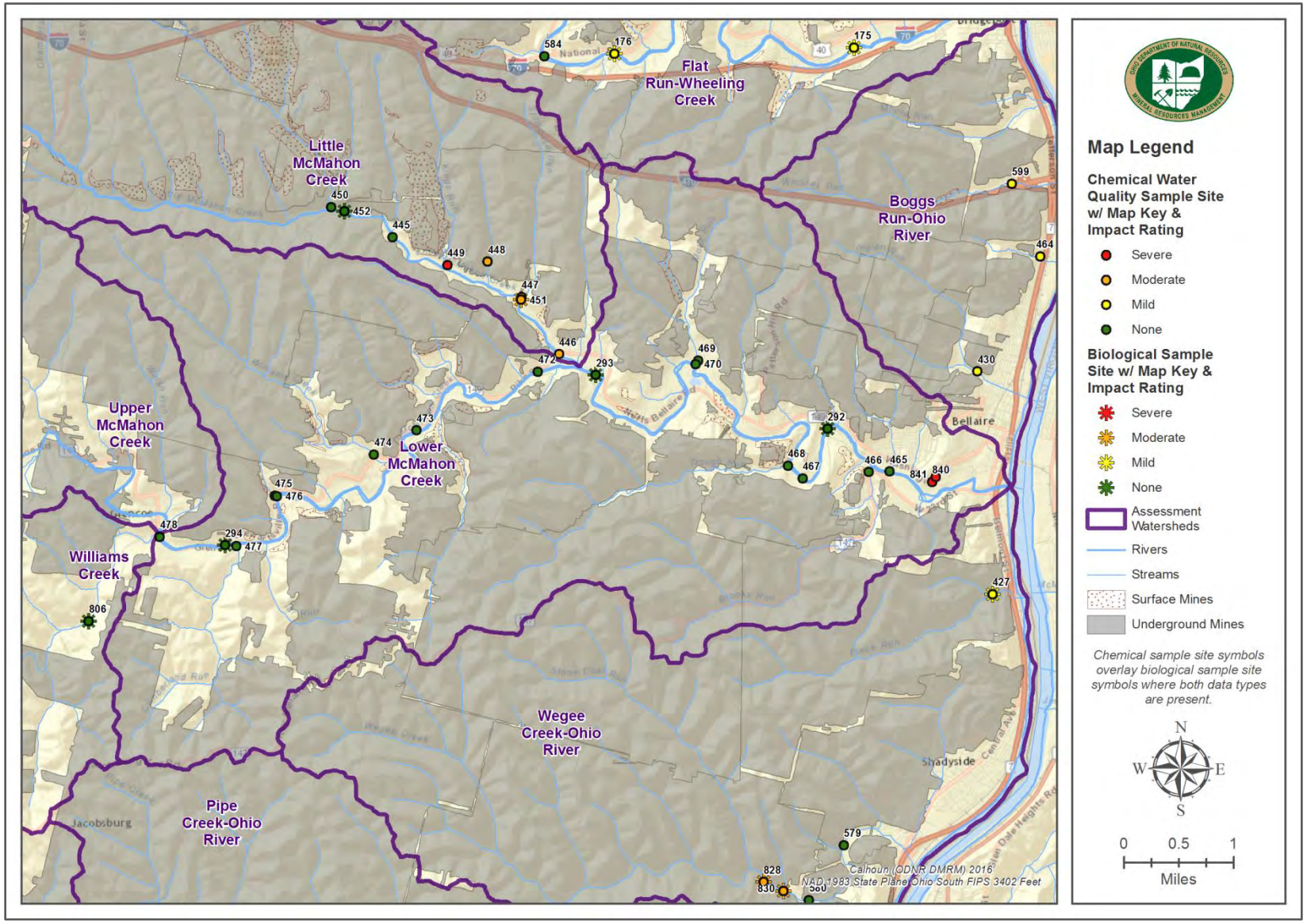


Table 33. 050301060704 Lower McMahon Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Lower McMahon Creek	292	LOMCMA030	Adjacent TR 304 Trough Rd	09/16/09	OEPA SEDO	7.13	1085.30	0.06	<0.20	-153.00
Lower McMahon Creek	293	LOMCMA075	At Neffs, Downstream Little McMahon Creek	09/16/09	OEPA SEDO	7.18	1169.00	0.48	<0.20	-136.00
Lower McMahon Creek	294	LOMCMA100	East of Glencoe @ ST. RT. 149, DST Williams Creek	07/01/09	OEPA SEDO	8.09	651.80	0.11	<0.20	-188.00
Lower McMahon Creek	465	PMCMA001	McMahon Creek at Twp Rd 476, near mouth	12/07/09	ODNR DMRM	7.97	848.00			
Lower McMahon Creek	466	PMCMA002	Brooks Run @ mouth at Fulton Hill (CR 42)	12/07/09	ODNR DMRM	8.07	895.00			
Lower McMahon Creek	467	PMCMA003	McMahon downstream Trough Run. Near active mine(?)	12/07/09	ODNR DMRM	7.98	954.00			
Lower McMahon Creek	468	PMCMA004	Trough Run @ mouth, Trough Run Road	12/07/09	ODNR DMRM	7.32	2104.00			
Lower McMahon Creek	469	PMCMA005	Moss Run @ CR 30 (Moss Run Road)	12/07/09	ODNR DMRM	8.06	1645.00			
Lower McMahon Creek	470	PMCMA006	McMahon Creek upstream Moss Run	12/07/09	ODNR DMRM	7.97	985.00			
Lower McMahon Creek	472	PMCMA008	McMahon Creek upstream Little McMahon Creek, CR 4 bridge	12/07/09	ODNR DMRM	8.00	882.00			
Lower McMahon Creek	473	PMCMA009	McMahon Creek @ Boyd Ridge Road crossing	12/07/09	ODNR DMRM	7.97	841.00			
Lower McMahon Creek	474	PMCMA010	Williams Creek @ Bull Run Rd (284)	12/07/09	ODNR DMRM	8.05	817.00			
Lower McMahon Creek	475	PMCMA011	Unnamed tributary at SR 149 bridge, East of Glencoe	12/07/09	ODNR DMRM	7.68	1135.00			
Lower McMahon Creek	476	PMCMA012	McMahon Creek above unnamed trib; adjacent SR 149 at fjord	12/07/09	ODNR DMRM	7.98	798.00			
Lower McMahon Creek	477	PMCMA013	Cumberland Run at Tar Run Road (723)	12/07/09	ODNR DMRM	8.06	740.00			
Lower McMahon Creek	478	PMCMA014	McMahon below Williams Creek @ Regoli Rd (1109)	12/07/09	ODNR DMRM	8.17	800.00			
Lower McMahon Creek	840	WSMD 4	Washington St. Mine Drain, at the catch basin prior to flowing south under SR 146 in culvert	11/25/14	ODNR DMRM	3.23	3701.00	37.00	0.90	84.30
Lower McMahon Creek	841	WSMD 5E	Washington St. Mine Drain discharge from the eastern drain pipe.	08/28/14	ODNR DMRM	5.10	3961.00	204.00	0.12	-14.00

Table 34. 050301060704 Lower McMahon Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Lower McMahon Creek	292	LOMCMA030	Adjacent TR 304 Trough Rd	OEPA SEDO	2009	2.30	46.00	8.00		50.00		74.50
Lower McMahon Creek	293	LOMCMA075	At Neffs, Downstream Little McMahon Creek	OEPA SEDO	2009	7.00	46.00	8.50		44.00		63.50
Lower McMahon Creek	294	LOMCMA100	East of Glencoe @ ST. RT. 149, DST Williams Creek	OEPA SEDO	2009	12.10	49.00	9.40		48.00		61.50

Figure 15. 050301060203 North Fork Short Creek Map

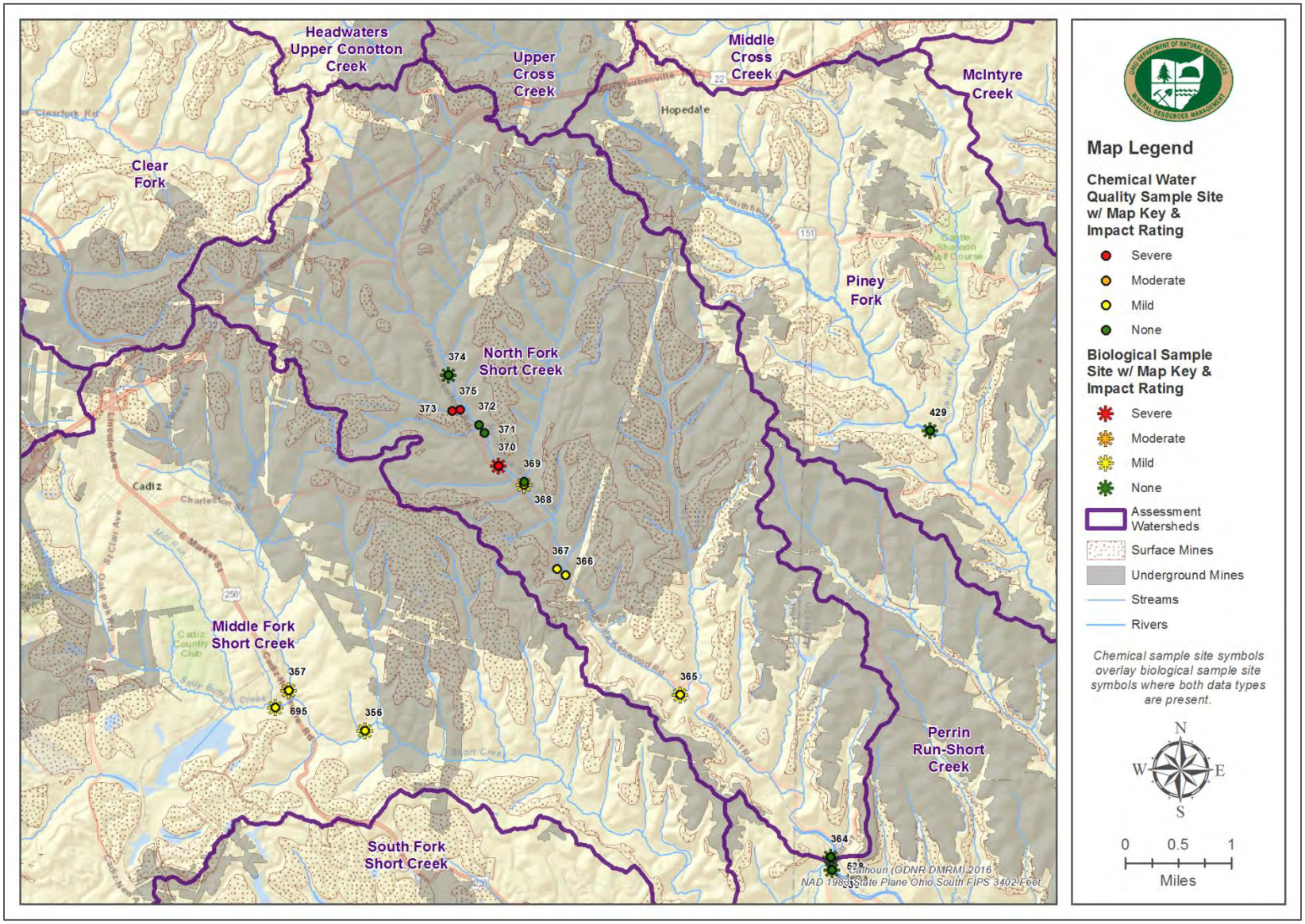


Table 35. 050301060203 North Fork Short Creek Chemical Water Quality

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
North Fork Short Creek	364	NFS010	North Fork Short Creek Mouth	03/12/14	ODNR DMRM	7.92	1380.00	1.32	0.61	-173.82
North Fork Short Creek	365	NFS090	North Fork at Hereford Road	03/11/14	ODNR DMRM	7.68	1300.00	2.84	1.21	-136.64
North Fork Short Creek	366	NFS100	North Fork Short Unionvale-Kennwood Rd	03/11/14	ODNR DMRM	7.55	1290.00	3.27	1.24	-131.08
North Fork Short Creek	367	NFS102	Drainage from pasture field	08/13/13	ODNR DMRM	7.97	2300.00	2.19	0.32	-315.70
North Fork Short Creek	368	NFS110	North Fork Short in Unionvale	08/13/13	ODNR DMRM	7.31	1530.00	3.14	0.41	-99.32
North Fork Short Creek	369	NFS111	Tributary to North Fork in Unionvale	08/13/13	ODNR DMRM	7.97	1670.00	0.12	0.13	-189.84
North Fork Short Creek	370	NFS120	North Fork Short dnst AMD at abandoned house	06/02/11	OEPA SEDO	6.33	1451.00	16.60	4.52	-39.70
North Fork Short Creek	371	NFS130	Drainage from south treatment ponds	08/13/13	ODNR DMRM	7.70	2280.00	0.05	0.26	-38.00
North Fork Short Creek	372	NFS150	Drainage from North treatment ponds	08/13/13	ODNR DMRM	7.83	1830.00	0.05	0.31	-26.00
North Fork Short Creek	373	NFS162	Seep to Trib to N. Fk Short Creek at RM 7.25	06/02/11	OEPA SEDO	2.38	8764.00	2260.00	379.00	9740.00
North Fork Short Creek	374	NFS170	North Fork Short upst AMD	08/13/13	ODNR DMRM	7.89	894.00	0.11	0.07	-180.66
North Fork Short Creek	375	NFSC150	Trib to N. Fk Short Cr. at CR 13 at RM 7.25	06/02/11	OEPA SEDO	4.58	2097.00	76.00	23.00	185.00

Table 36. 050301060203 North Fork Short Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
North Fork Short Creek	364	NFS010	North Fork Short Creek Mouth	ODNR DMRM	2011	0.10	42.00		12.00			87.00
North Fork Short Creek	365	NFS090	North Fork at Hereford Road	ODNR DMRM	2013	3.30	38.00		11.00			79.50
North Fork Short Creek	368	NFS110	North Fork Short in Unionvale	OEPA SEDO	2010	6.21	44.00				F	76.00
North Fork Short Creek	370	NFS120	North Fork Short dnst AMD at abandoned house	ODNR DMRM	2011	6.20	20.00		9.00			72.50
North Fork Short Creek	374	NFS170	North Fork Short upst AMD	ODNR DMRM	2011	7.80	44.00		14.00			82.50

Figure 16. 050301060204 Piney Fork Map

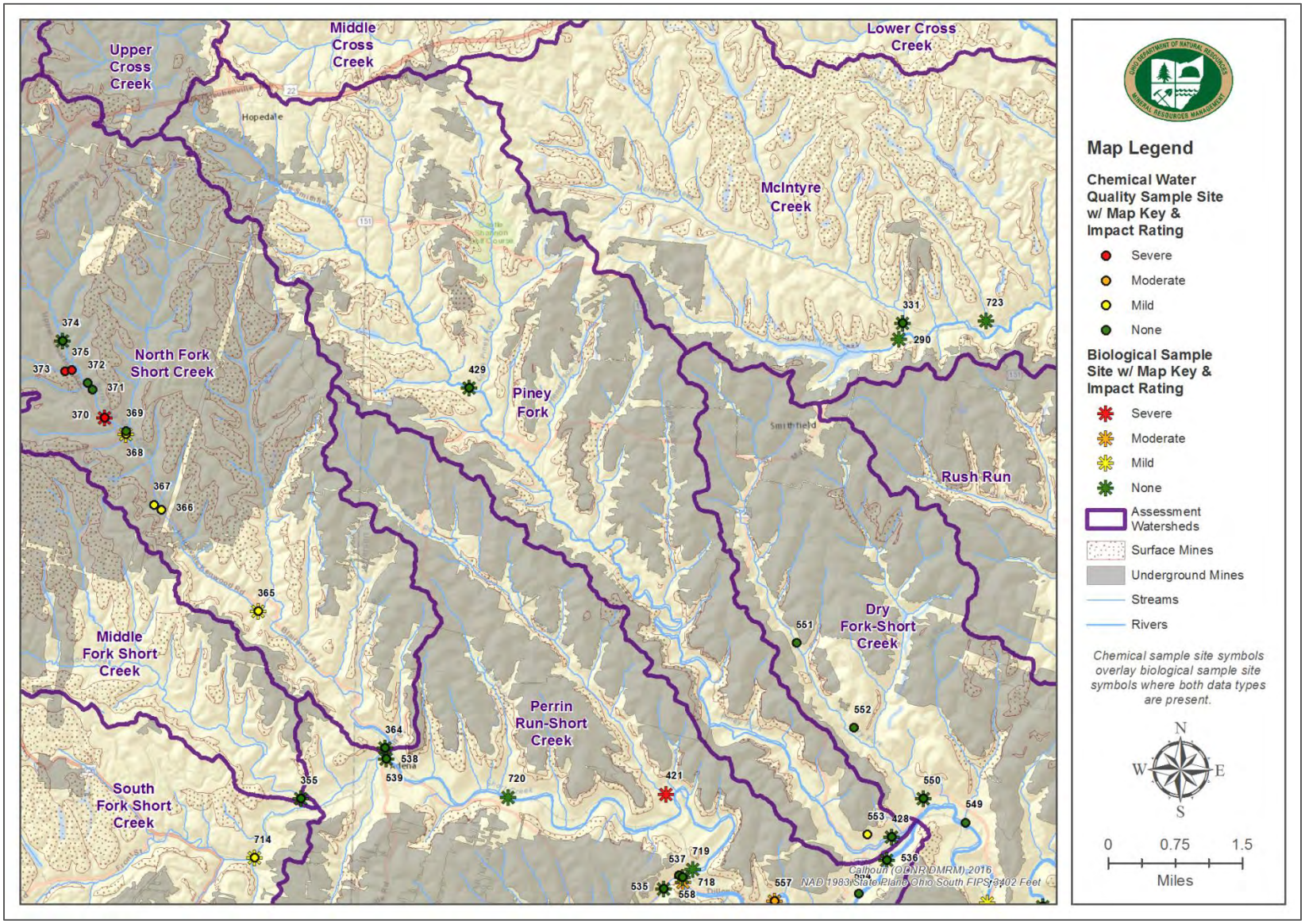


Table 37. 050301060204 Piney Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Piney Fork	428	PINEY01	Piney Fork at SR 150	07/27/10	OEPA SEDO	8.17	1278.30	0.18	<0.20	-195.10
Piney Fork	429	PINEY20	Piney Fork at TR 192 ust L. Piney Fork	10/18/10	OEPA SEDO	7.82		0.08	<0.20	-200.10
Piney Fork	553	PSHT011	Aunt Jenny's Drainage	02/03/10	ODNR DMRM	6.11	1106.00			

Table 38. 050301060204 Piney Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Piney Fork	428	PINEY01	Piney Fork at SR 150	OEPA SEDO	2010	0.35	46.00	8.20		48.00		71.30
Piney Fork	429	PINEY20	Piney Fork at TR 192 ust L. Piney Fork	OEPA SEDO	2010	10.51	44.00				MG	73.00

Figure 17. 050400011704 Pone Run-Tuscarawas River Map

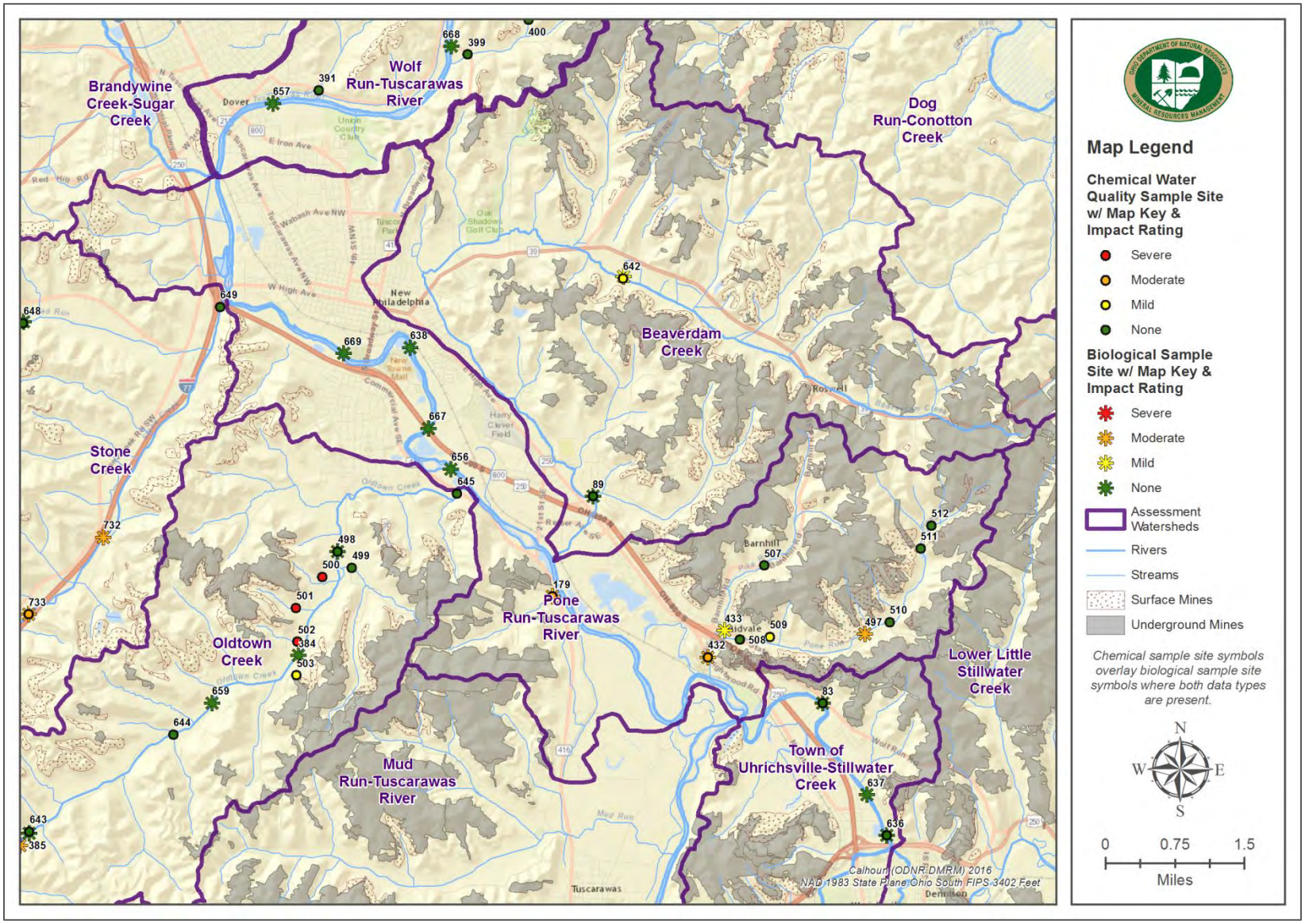


Table 39. 050400011704 Pone Run-Tuscarawas River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Pone Run-Tuscarawas River	179	GOV010	Goshen Valley at bridge	01/04/10	ODNR DMRM	7.39	1119.00			
Pone Run-Tuscarawas River	432	PKR010	Pike Run upstream of Pone Run	01/04/10	ODNR DMRM	6.80	794.00			
Pone Run-Tuscarawas River	507	PPKR002	Pike Run upst of Pone 009 at Barnhill Rd Bridge	01/04/10	ODNR DMRM	6.78	686.00			
Pone Run-Tuscarawas River	508	PPON001	Pone Run - mouth 003	01/04/10	ODNR DMRM	6.51	783.00			
Pone Run-Tuscarawas River	509	PPON002	Trib to Pone Run 008 Midvale Community Park	01/04/10	ODNR DMRM	6.10	1395.00			
Pone Run-Tuscarawas River	510	PPON004	Pone Run 005 At Canary Rd. on the bridge	01/04/10	ODNR DMRM	6.95	481.00			
Pone Run-Tuscarawas River	511	PPON005	Pone Run - mainstream 005 Dst Midvale Mine Rd.	01/04/10	ODNR DMRM	6.93	266.00			
Pone Run-Tuscarawas River	512	PPON006	Tribs to Pone Run 004 Midvale Mine Rd. & True Rd. - off bridge	01/04/10	ODNR DMRM	6.82	273.00			

Table 40. 050400011704 Pone Run-Tuscarawas Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Pone Run-Tuscarawas River	179	GOV010	Goshen Valley at bridge	ODNR DMRM	2010	0.10			8.00			
Pone Run-Tuscarawas River	432	PKR010	Pike Run upstream of Pone Run	ODNR DMRM	2010	0.10	26.00					50.00
Pone Run-Tuscarawas River	433	PKR020	Mouth of Pike Run	ODNR DMRM	2010	0.70	34.00		9.00			66.50
Pone Run-Tuscarawas River	497	PNR010	Pone Run at trail rd	ODNR DMRM	2010	1.60	26.00		14.00			52.00
Pone Run-Tuscarawas River	638	R10G01	TUSCARAWAS R. UPST. NEW PHILADELPHIA WWTP @ GAGE	OEPA SEDO	2003	54.20	45.00	9.79		42.00		85.00
Pone Run-Tuscarawas River	656	R10K12	TUSCARAWAS R. NEAR NEW PHILADELPHIA, 1.0 MI DST U.S. RT. 250	OEPA SEDO	2003	52.30	51.00	9.89		46.00		88.00
Pone Run-Tuscarawas River	667	R10W15	TUSCARAWAS R. NEAR NEW PHILADELPHIA @ U.S. RT. 250	OEPA SEDO	2003	53.28	46.00	9.98				86.50
Pone Run-Tuscarawas River	669	R10W18	TUSCARAWAS R. AT NEW PHILADELPHIA, 0.3 MI. UPST BROADWAY AVE	OEPA SEDO	2003	55.25	49.00	9.35		44.00		86.50

Figure 18. 050901010901 Sand Fork Map

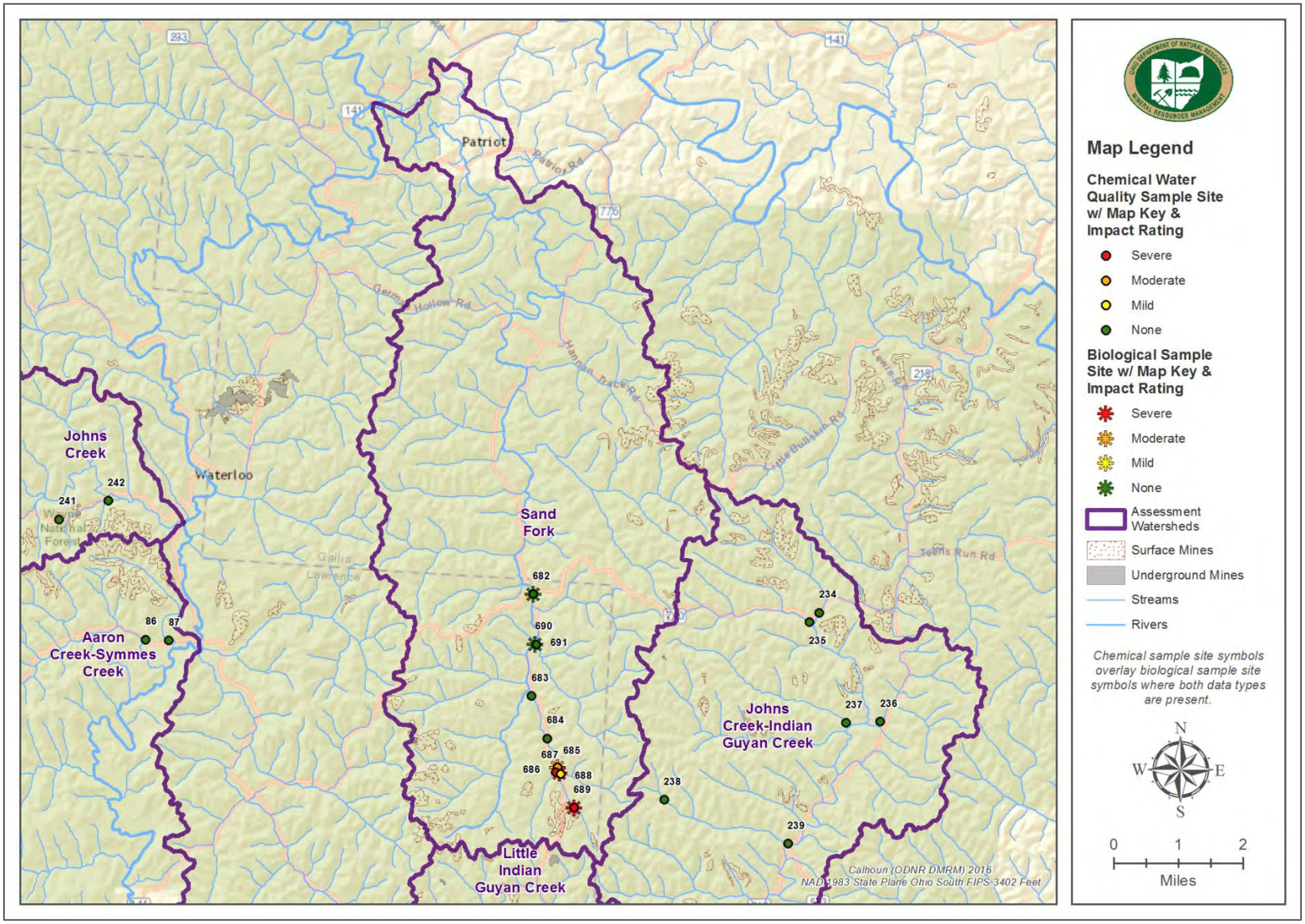


Table 41. 050901010901 Sand Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Sand Fork	682	SAFK150	Sand Fork @ Lecta, at intersection of state routes 790 & 775	05/13/13	ODNR DMRM	5.83	801.00	0.24		-57.84
Sand Fork	683	SAFK175	Sand Fork at TR217, upstream Timber Ridge Lake	11/10/09	ODNR DMRM	7.09	1693.00			
Sand Fork	684	SAFK180	Sand Fork @ Scottown-Lecta Road	11/10/09	ODNR DMRM	6.85	1746.00			
Sand Fork	685	SAFK200	Sand Fork at Scottown-Lecta Rd bridge, dst (north) of Twsp rd 167	05/13/13	ODNR DMRM	5.61	1714.00	1.02	4.49	-45.40
Sand Fork	686	SAFK201	un-named trib to Sand Fork from west	05/13/13	ODNR DMRM	3.00	1459.00	2.63	14.00	115.00
Sand Fork	688	SAFK251	Trib from the east @ bridge	05/13/13	ODNR DMRM	6.39	949.00	0.41	0.12	-113.54
Sand Fork	689	SAFK400	Sand Fork adj. Twp rd 175 at Crown city W.A.	05/13/13	ODNR DMRM	7.00	2415.00			-174.66
Sand Fork	691	SAFKTR010	Turkey Run, at LR37 near mouth	11/10/09	ODNR DMRM	7.50	1170.00			

Table 42. 050901010901 Sand Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Sand Fork	682	SAFK150	Sand Fork @ Lecta, at intersection of state routes 790 & 775	ODNR DMRM	2010	13.40	46.00					72.00
Sand Fork	685	SAFK200	Sand Fork at Scottown-Lecta Rd bridge, dst (north) of Twsp rd 167	ODNR DMRM	2010		30.00					64.50
Sand Fork	687	SAFK250	Sand Fork adjacent CR 37, upst. Timber Lake	ODNR DMRM	2010				6.00			
Sand Fork	689	SAFK400	Sand Fork adj. Twp rd 175 at Crown city W.A.	ODNR DMRM	2010				6.00			
Sand Fork	690	SAFKRM14.25	Sand Fork, dst. Timber Ridge Lake- adj. Co. Rd 37	ODNR DMRM	2010	14.25			12.00			

Figure 19. 050400050603 White Eyes Creek Map

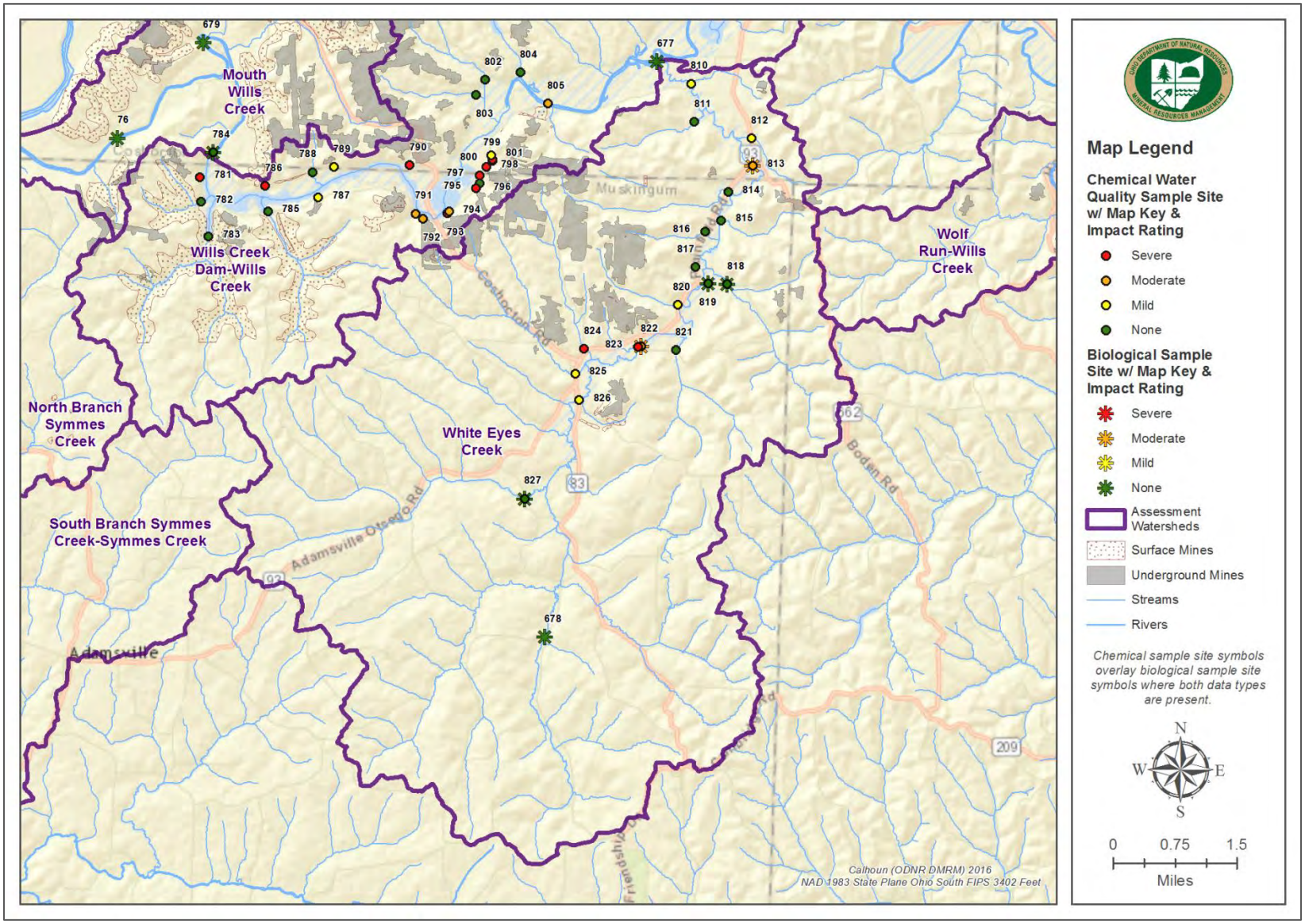


Table 43. 050400050603 White Eyes Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
White Eyes Creek	810	WE0002	Un-named trib to White Eyes from east, adjacent to Twp Rd 145	07/16/14	ODNR DMRM	7.49	713.40	1.92	1.04	-96.76
White Eyes Creek	811	WE0007	Un-named trib to White Eyes from west, access at off-road, (MCWD land)	07/16/14	ODNR DMRM	7.79	2008.00	0.46	0.15	-193.44
White Eyes Creek	812	WE0012	Un-named trib to White Eyes from east, first SR 93 bridge north of SR 662 intersection	07/16/14	ODNR DMRM	7.73	782.40	1.31	1.51	-142.86
White Eyes Creek	813	WE0020	White Eyes Creek at SR 93 bridge near mouth	04/17/12	ODNR DMRM	6.99	549.00	1.19	0.09	-75.08
White Eyes Creek	814	WE0021	Un-named trib to White Eyes from west, at 2nd SR 93 bridge S of SR 662	04/18/12	ODNR DMRM	7.69	1771.00			
White Eyes Creek	815	WE0022	Un-named trib to White Eyes from east	09/16/14	ODNR DMRM	7.52	1500.00	0.22	0.07	-130.74
White Eyes Creek	816	WE0023	Un-named trib to White Eyes from west	04/18/12	ODNR DMRM	7.73	2333.00			
White Eyes Creek	817	WE0024	Drainage from wetland on west side of White Eyes Creek, just north of AEP access Rd./gas well	04/18/12	ODNR DMRM	7.66	1698.00			
White Eyes Creek	818	WE0025	Un-named trib to White Eyes, 2nd Houts Rd. bridge E of SR 93	07/15/14	ODNR DMRM	7.85	534.20	0.84	0.57	-52.38
White Eyes Creek	819	WE0040	White Eyes Creek at Houts Rd.	04/17/12	ODNR DMRM	6.51	433.00	1.66	0.09	-69.92
White Eyes Creek	820	WE0041	Un-named trib to White Eyes from west, upstr (S) Houts Rd. (drains wetland area)	03/13/13	ODNR DMRM	7.09	1067.00	1.06	0.19	-34.00
White Eyes Creek	821	WE0049	Un-named trib to White Eyes from east, at Waters Ln. bridge.	07/15/14	ODNR DMRM	6.90	356.00	0.81	0.16	-76.34
White Eyes Creek	822	WE0050	White Eyes Creek at Waters Ln. bridge	04/17/12	ODNR DMRM	6.64	397.00	4.81	0.23	-72.38
White Eyes Creek	823	WE0052	Gob pile/beaver dam discharge into White Eyes at Waters Ln	04/16/14	ODNR DMRM	3.46	1179.00			
White Eyes Creek	824	WE0061	Un-named trib; first trib north of Otsego	04/17/12	ODNR DMRM	5.72	1328.00	94.00	3.55	161.64
White Eyes Creek	825	WE0081	Un-named trib; first trib south of Otsego	03/26/14	ODNR DMRM	6.91	279.30	2.41	0.16	-34.92
White Eyes Creek	826	WE0090	White Eyes Creek at SR 83 bridge, between Granny's Knob and SR 93, upstr Granny's Know trib	03/13/13	ODNR DMRM	7.08	230.00	0.70	0.96	-59.86
White Eyes Creek	827	WE0120	White Eyes Creek @ Dent Rd.	06/25/14	OEPA SEDO	7.39	215.00	19.90	9.47	-32.50

Table 44. 050400050603 White Eyes Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
White Eyes Creek	677	R18P06	WHITE EYES CREEK @ TR 145 - 3 MI SSW OF PLAINFIELD @ MOUTH	OEPA SEDO	2014	0.01	42.00	8.43		36.00		58.50
White Eyes Creek	678	R18P07	WHITE EYES CREEK S OF OTSEGO @ HIGHLANDS-GRANGE RD.	OEPA SEDO	2014	11.90	50.00				E	61.80
White Eyes Creek	813	WE0020	White Eyes Creek at SR 93 bridge near mouth	ODNR DMRM	2012	2.49	30.00	7.20				58.00
White Eyes Creek	818	WE0025	Un-named trib to White Eyes, 2nd Houts Rd. bridge E of SR 93	OEPA SEDO	2014	0.35	40.00				MG	53.50
White Eyes Creek	819	WE0040	White Eyes Creek at Houts Rd.	OEPA SEDO	2014	4.78	45.00	8.58		42.00		54.00
White Eyes Creek	822	WE0050	White Eyes Creek at Waters Ln. bridge	ODNR DMRM	2011	6.45	28.00					52.00
White Eyes Creek	827	WE0120	White Eyes Creek @ Dent Rd.	OEPA SEDO	2014	10.14	42.00				MG	44.80

Figure 20. 050400011204 Wolf Run-Tuscarawas River Map

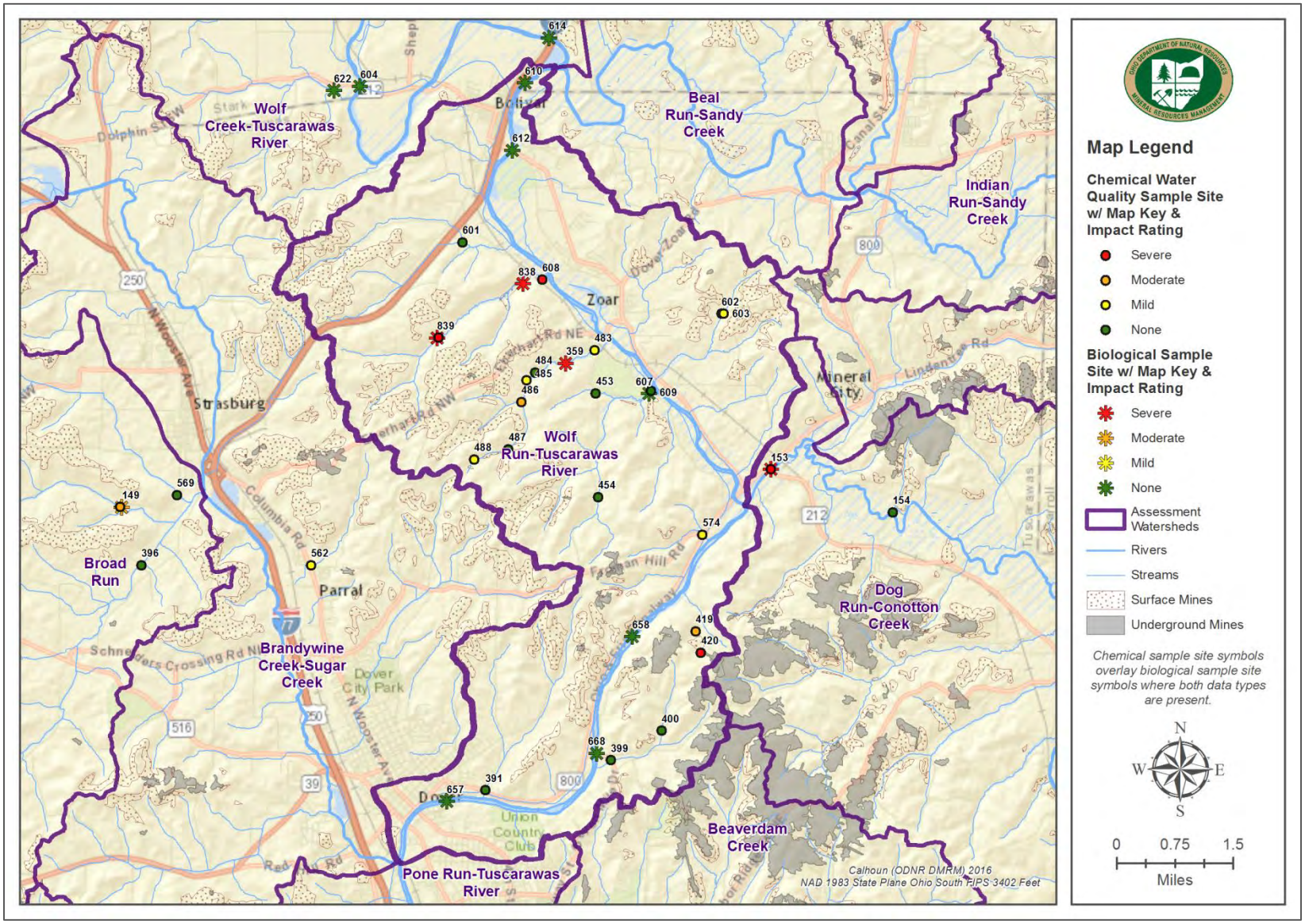


Table 45. 050400011204 Wolf Run-Tuscarawas River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Wolf Run-Tuscarawas River	391	PBEAD005	Tusc. River 003 Off Rt. 800	12/21/09	ODNR DMRM	7.19	709.00			
Wolf Run-Tuscarawas River	399	PBSRT001	Trib at 416 002	12/21/09	ODNR DMRM	6.82	931.00			
Wolf Run-Tuscarawas River	400	PBSRT002	Tusc. River 003 Roemir/Boyscout Rd	12/21/09	ODNR DMRM	7.10	526.00			
Wolf Run-Tuscarawas River	419	PDESK01	Tusc River 004	12/21/09	ODNR DMRM		1092.00			
Wolf Run-Tuscarawas River	420	PDESK02	Dessecker Mine 004 Headwater	12/21/09	ODNR DMRM	3.35	636.00			
Wolf Run-Tuscarawas River	453	PLMD001	Tusc. River 002	01/27/10	ODNR DMRM	6.88	166.00			
Wolf Run-Tuscarawas River	454	PLMD002	Tusc. River 001	01/27/10	ODNR DMRM	7.44	422.00			
Wolf Run-Tuscarawas River	483	PMID001	Tusc. River 003	01/27/10	ODNR DMRM	6.49	590.00			
Wolf Run-Tuscarawas River	484	PMID002	Tusc. River 004	01/27/10	ODNR DMRM	6.88	686.00			
Wolf Run-Tuscarawas River	485	PMID003	Tusc. River 005	01/27/10	ODNR DMRM	6.13	564.00			
Wolf Run-Tuscarawas River	486	PMID004	Tusc. River 008 Trib to North	01/27/10	ODNR DMRM	4.82	753.00			
Wolf Run-Tuscarawas River	487	PMID005	Tusc. River 006	01/27/10	ODNR DMRM	6.17	452.00			
Wolf Run-Tuscarawas River	488	PMID006	Tusc. River 007	01/27/10	ODNR DMRM	6.02	793.00			
Wolf Run-Tuscarawas River	574	PTUS001	Trib at Freshman Hill 001	12/21/09	ODNR DMRM	6.39	647.00			
Wolf Run-Tuscarawas River	601	PWRT002	Wolf Run Tusc. Cty 010	01/27/10	ODNR DMRM	6.90	642.00			
Wolf Run-Tuscarawas River	602	PWRT003	Wolf Run Tusc. Cty 011	01/27/10	ODNR DMRM	6.93	957.00			
Wolf Run-Tuscarawas River	603	PWRT004	Wolf Run Tusc. Cty 012 trib across rd.	01/27/10	ODNR DMRM	6.06	1358.00			
Wolf Run-Tuscarawas River	608	R06G72	TR 111	07/08/03	OEPA SEDO	3.23	1331.00			
Wolf Run-Tuscarawas River	609	R06G73	CR 81 Canal Rd	08/12/03	OEPA SEDO	7.25	659.00			
Wolf Run-Tuscarawas River	839	WRT020	Wolf Run at TWP rd 379	01/27/10	ODNR DMRM	6.05	842.00			

Table 46. 050400011204 Wolf Run-Tuscarawas River Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Wolf Run-Tuscarawas River	359	MIDR010	Middle Run Mouth	ODNR DMRM	2010	2.20			5.00			
Wolf Run-Tuscarawas River	607	R06G70	SMALL MIDDLE RUN S OF ZOAR @ TWP. RD. 411	OEPA SEDO	2003	0.10	30.00					72.50
Wolf Run-Tuscarawas River	610	R06K03	TUSCARAWAS R. NEAR BOLIVAR, DST. SANDY CREEK	OEPA SEDO	2003	72.60	41.00	9.25		42.00		78.50
Wolf Run-Tuscarawas River	612	R06P01	TUSCARAWAS R. AT BOLIVAR @ ST. RT. 212	OEPA SEDO	2003	71.73	48.00	9.58				79.00
Wolf Run-Tuscarawas River	657	R10K15	TUSCARAWAS R. JUST DST. EMPIRE DETROIT STEEL	OEPA SEDO	2003	59.20	26.00	7.27				56.50
Wolf Run-Tuscarawas River	658	R10K18	TUSCARAWAS R. NE OF DOVER @ POWER LINES DST. DOVER DAM	OEPA SEDO	2003	63.20	42.00	10.05				78.00
Wolf Run-Tuscarawas River	668	R10W17	TUSCARAWAS R. UPST. DOVER, UPST. ST. RT. 416	OEPA SEDO	2003	61.52	41.00	9.19		46.00		74.50
Wolf Run-Tuscarawas River	838	WRT010	Wolf Run Mouth	ODNR DMRM	2010	0.40	12.00					53.00
Wolf Run-Tuscarawas River	839	WRT020	Wolf Run at TWP rd 379	ODNR DMRM	2010	1.80	12.00		4.00			69.00

Figure 21. 050400050601 Bacon Run Map

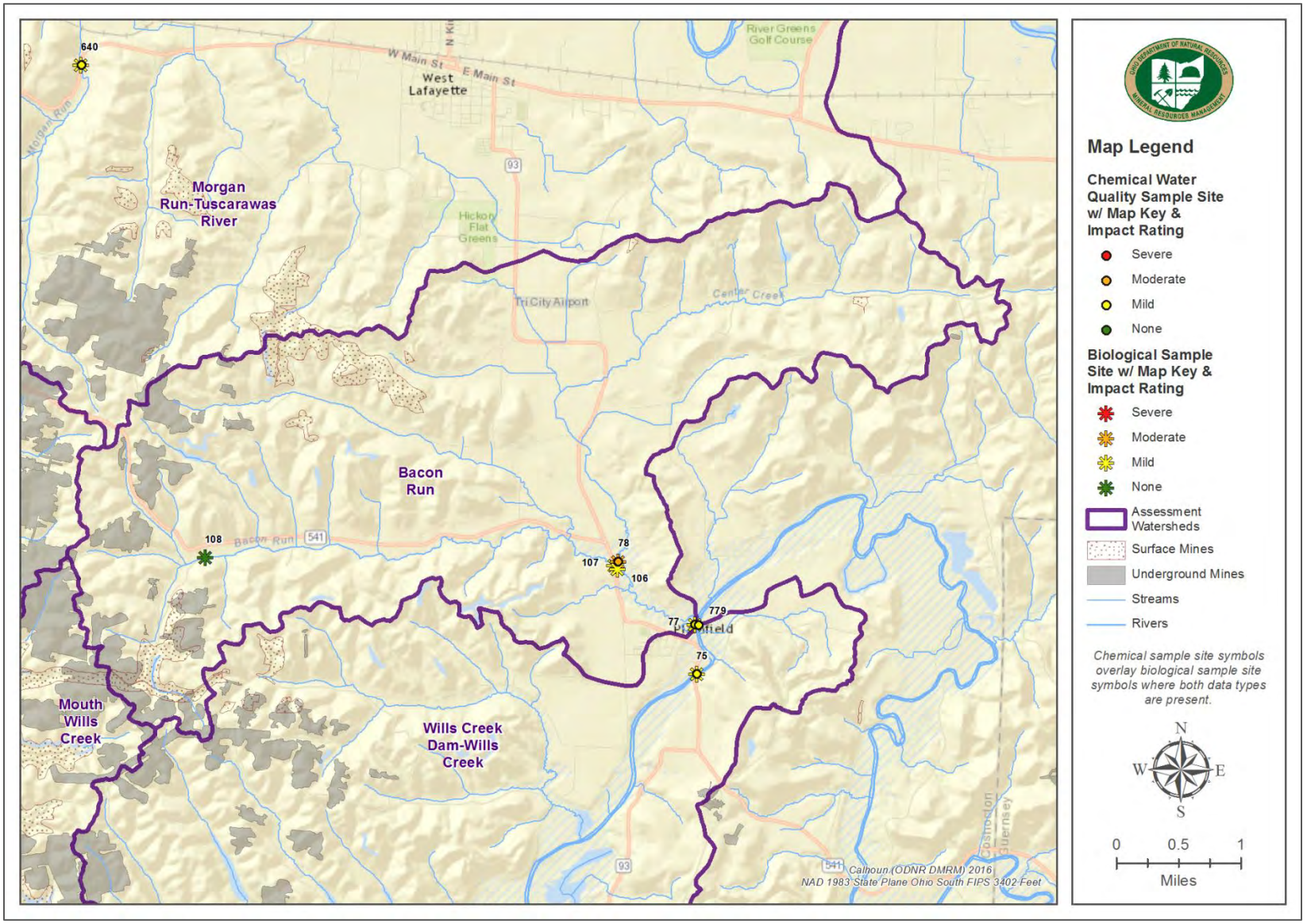


Table 47. 050400050601 Bacon Run Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Bacon Run	77	302634	BACON RUN AT PLAINFIELD, AT MOUTH, NEAR MAIN ST.	06/25/14	OEPA SEDO	7.54	841.00	10.90	4.14	-46.10
Bacon Run	78	302635	CENTER CREEK (BONE RUN) N OF PLAINFIELD @ TWP. RD. 456	06/25/14	OEPA SEDO	7.50	1171.00	10.48	4.55	-104.80

Table 48. 050400050601 Bacon Run Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Bacon Run	77	302634	BACON RUN AT PLAINFIELD, AT MOUTH, NEAR MAIN ST.	OEPA SEDO	2014	0.01	36.00				P	63.30
Bacon Run	78	302635	CENTER CREEK (BONE RUN) N OF PLAINFIELD @ TWP. RD. 456	OEPA SEDO	2014	0.01	26.00				F	55.00
Bacon Run	106	BRWCRM1.0	Bacon Run @ SR 93 and SR 541, dst. Bone Run	OEPA SEDO	2014	14.80	34.00	4.60				
Bacon Run	107	BRWCRM1.1	Bacon Run @ SR 93 and SR 541, upst. Bone Run	ODNR DMRM	2011	7.90			8.00			
Bacon Run	108	BRWCRM4.8	Downstream mine Road near HW, adjacent SR 541	ODNR DMRM	2011	4.80			12.00			

Figure 22. 050301061205 Boggs Run-Ohio River Map

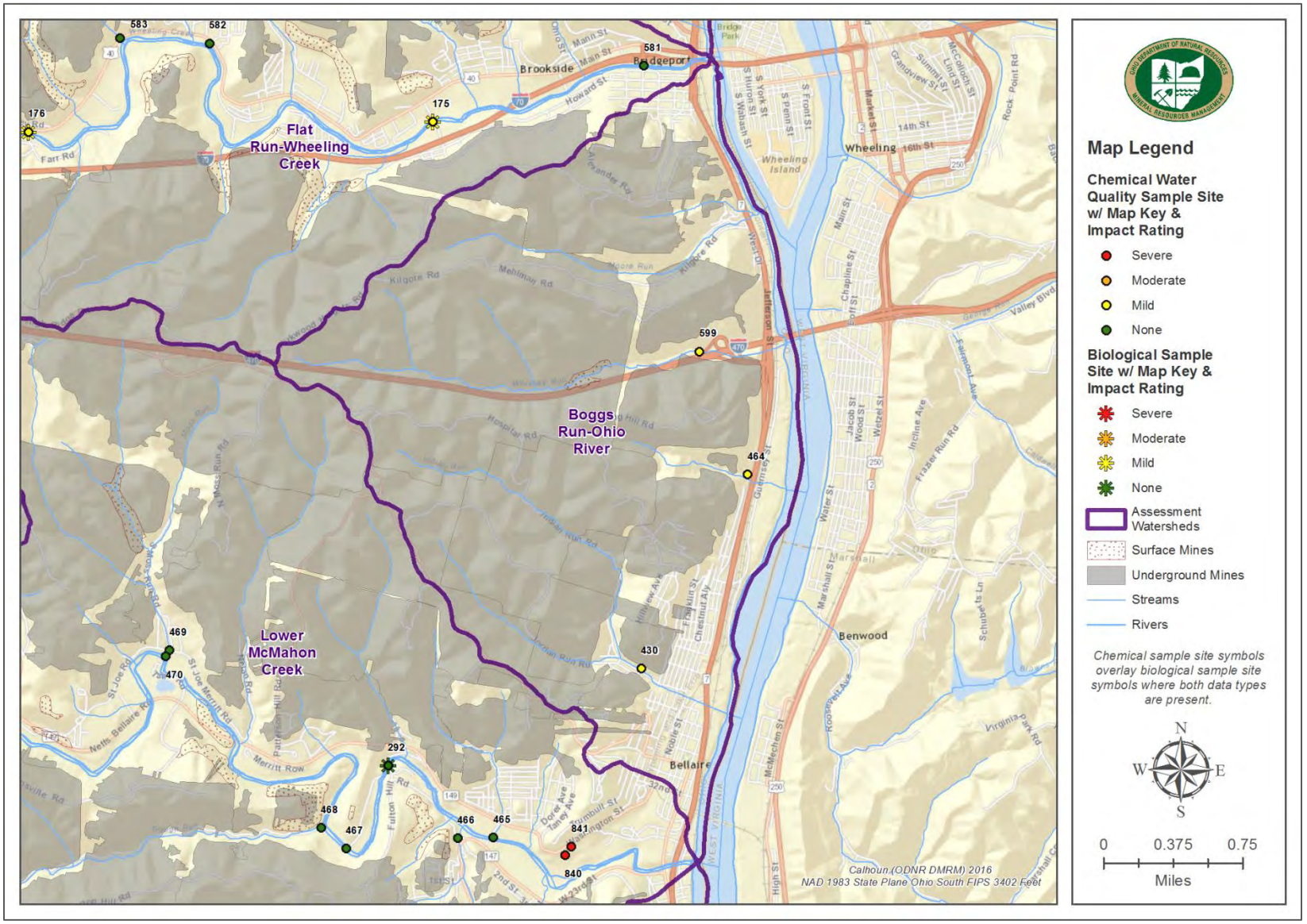


Table 49. 050301061205 Boggs Run-Ohio River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Boggs Run-Ohio River	430	PIR001	Indian Run 013	12/08/09	ODNR DMRM	8.13	966.00			
Boggs Run-Ohio River	464	PMARI01	Site 014 Stream at St. Clair strip mine refuse pile.	12/08/09	ODNR DMRM	7.46	2645.00			
Boggs Run-Ohio River	599	PWISKY01	Whisky Run 015	12/08/09	ODNR DMRM	8.03	1590.00			

Figure 23. 050400011402 Brushy Fork Map

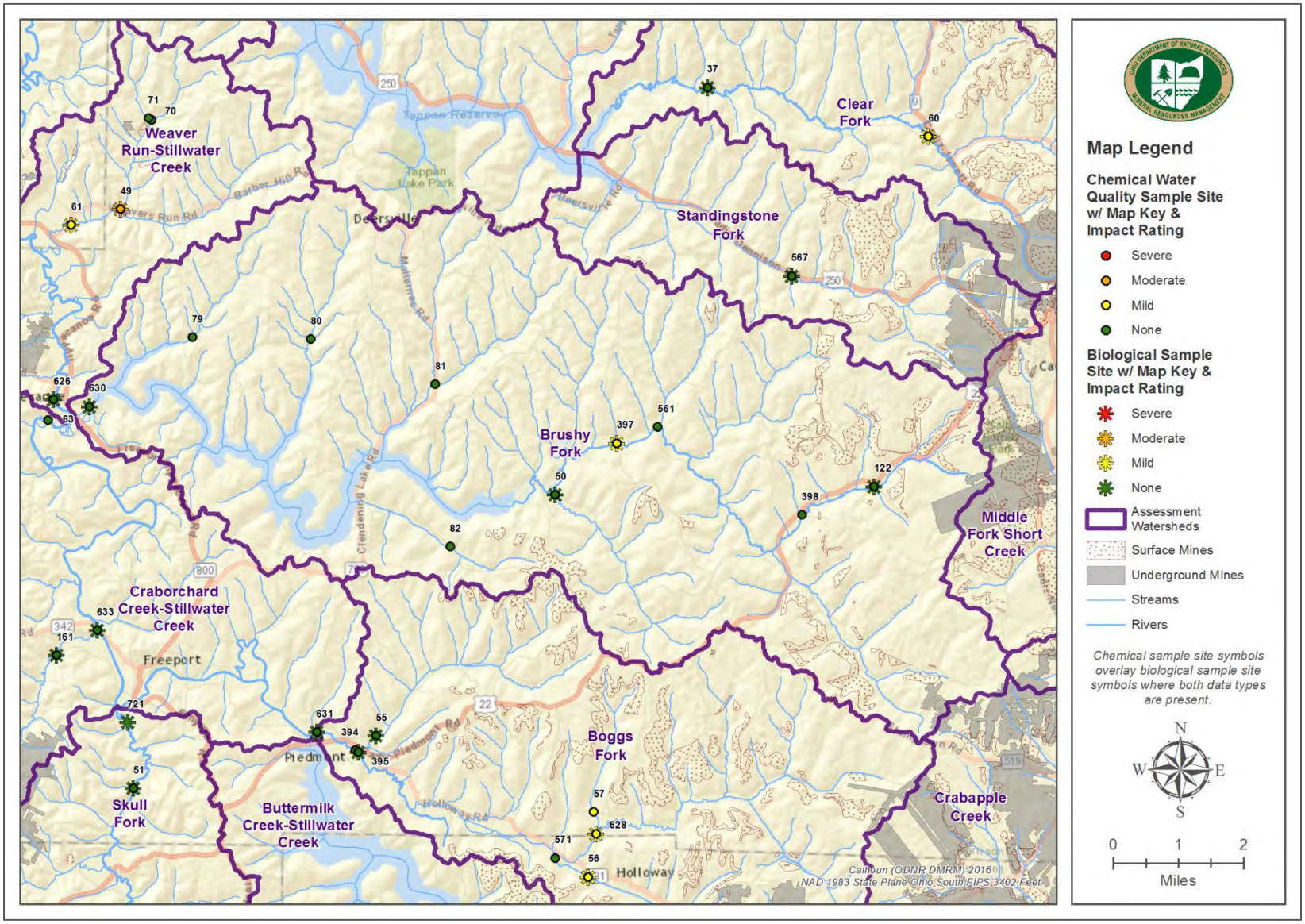


Table 50. 050400011402 Brushy Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Brushy Fork	50	301974	ELK RUN @ ELK RUN RD.	12/10/14	OEPA SEDO	7.41	736.00	0.25	0.10	-115.50
Brushy Fork	79	302811	HELFING RUN AT NORRIS ROAD E OF TIPPECANOE	02/11/15	OEPA SEDO	8.25	170.00	0.27	0.39	-56.10
Brushy Fork	80	302812	COLEMAN RUN AT YMCA RD. SW OF DEERSVILLE	01/14/15	OEPA SEDO	8.54	213.00	0.46	0.10	-78.20
Brushy Fork	81	302813	McFADDEN RUN AT MALLARNEE ROAD S OF DEERSVILLE	02/11/15	OEPA SEDO	8.41	230.00	0.36	0.23	-84.30
Brushy Fork	82	302814	HUFF RUN AT HUFF RUN RD (TRIB TO CLENDENING) WEST OF CADIZ	11/07/14	OEPA SEDO		240.00	0.15	0.10	-87.00
Brushy Fork	122	BSHF010	Brushy Fork at Freeman Rd	06/27/12	OEPA SEDO	7.98	3630.00	0.13	0.10	-322.50
Brushy Fork	397	PBRUSH01	Brushy Fork @ RM 12.55	07/11/11	ODNR DMRM	8.02	3461.00			
Brushy Fork	398	PBRUSH02	Brushy Fork @ RM 17.4	07/11/11	ODNR DMRM	8.05	3005.00			
Brushy Fork	561	PSLAB01	Slab Camp Run	07/11/11	ODNR DMRM	8.18	483.00			
Brushy Fork	630	R09S05	BRUSHY FORK JUST DST. CLENDENING LAKE DAM	01/17/12	OEPA SEDO	7.29	666.50	0.10	0.10	-126.50

Table 51. 050400011402 Brushy Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Brushy Fork	50	301974	ELK RUN @ ELK RUN RD.	OEPA SEDO	2012	0.20	32.00				VG	62.00
Brushy Fork	122	BSHF010	Brushy Fork at Freeman Rd	ODNR DMRM	2011	2.80	44.00					75.50
Brushy Fork	397	PBRUSH01	Brushy Fork @ RM 12.55	OEPA SEDO	2012	12.50	37.00	7.89		30.00		70.50
Brushy Fork	630	R09S05	BRUSHY FORK JUST DST. CLENDENING LAKE DAM	OEPA SEDO	2012	0.29				2.00		

Figure 24. 050302010902 Buffalo Run-West Fork Duck Creek Map

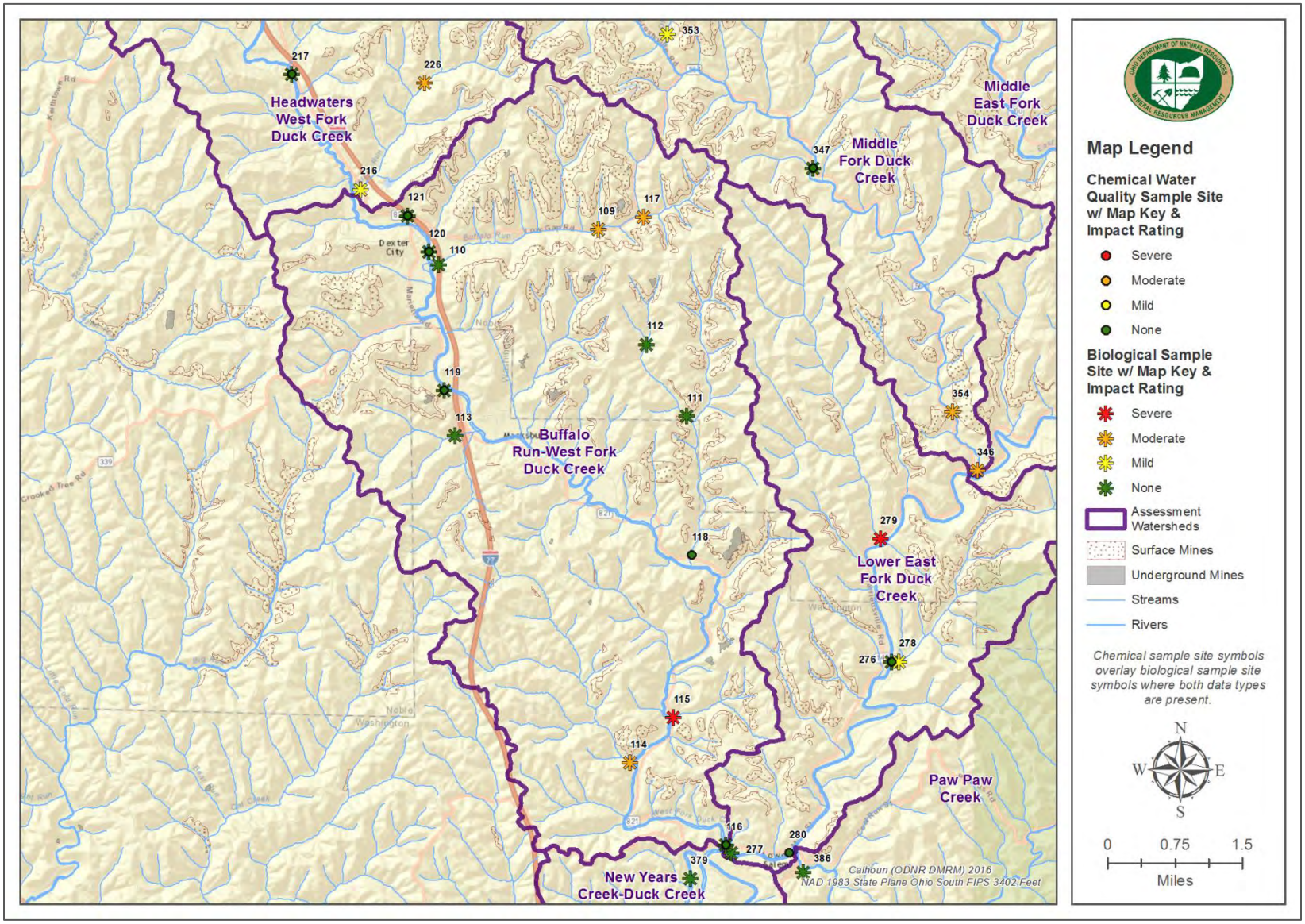


Table 52. 050302010902 Buffalo Run-West Fork Duck Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Buffalo Run-West Fork Duck Creek	116	BRWFDC008	West Fk Duck Ck @ mouth SR 821 E of Warner RM 0.1	08/14/00	OEPA SEDO	6.80				
Buffalo Run-West Fork Duck Creek	118	BRWFDC020	Nelots Creek at SR 821 North of Elba	08/16/00	OEPA SEDO	7.14				
Buffalo Run-West Fork Duck Creek	119	BRWFDC025	West Fork of Duck Creek SR 821 under overpass	08/01/00	OEPA SEDO	7.27				
Buffalo Run-West Fork Duck Creek	120	BRWFDC030	West Fork of Duck Creek Dexter City Park	08/01/00	OEPA SEDO	7.11				
Buffalo Run-West Fork Duck Creek	121	BRWFDC040	West Fork of Duck Creek SR 821 Dexter City	08/01/00	OEPA SEDO	7.17				

Table 53. 050302010902 Buffalo Run-West Fork Duck Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Buffalo Run-West Fork Duck Creek	109	BRWFDC001	BUFFALO RUN E OF DEXTER CITY @ CO. RD. 2 RM 1.97	OEPA SEDO	2000	1.97	28.00					54.00
Buffalo Run-West Fork Duck Creek	110	BRWFDC002	BUFFALO RUN AT DEXTER CITY @ I-77	OEPA SEDO	2000	0.10	44.00				G	42.00
Buffalo Run-West Fork Duck Creek	111	BRWFDC003	Nelots Creek RM 0.2, 0.1	OEPA SEDO	2000		42.00				G	60.50
Buffalo Run-West Fork Duck Creek	112	BRWFDC004	Nelots Creek RM 1.6, 1.1	OEPA SEDO	2000		48.00				VG	61.50
Buffalo Run-West Fork Duck Creek	113	BRWFDC005	Trib to West Fork Duck Creek (confl.@ RM 9.35)	OEPA SEDO	2000	0.30	42.00				E	49.50
Buffalo Run-West Fork Duck Creek	114	BRWFDC006	TRIB. TO W. FK. DUCK CREEK (RM 2.30) NW OF WARNER @ MOUTH	OEPA SEDO	2000	0.20	28.00				E	42.00
Buffalo Run-West Fork Duck Creek	115	BRWFDC007	TRIB. TO W. FK. DUCK CREEK (RM 3.05) NW OF WARNER @ MOUTH	OEPA SEDO	2000	0.10	12.00					50.50
Buffalo Run-West Fork Duck Creek	116	BRWFDC008	West Fk Duck Ck @ mouth SR 821 E of Warner RM 0.1	OEPA SEDO	2000	0.10	49.00	8.60			E	59.00
Buffalo Run-West Fork Duck Creek	117	BRWFDC015	BUFFALO RUN AT GEM @ CO. RD. 42	OEPA SEDO	2000	2.50	24.00					50.50
Buffalo Run-West Fork Duck Creek	119	BRWFDC025	West Fork DC at RM 4.6 at SR 821 at 77 Underpass	OEPA SEDO	2000	4.60	45.00	8.90		48.00		75.00
Buffalo Run-West Fork Duck Creek	120	BRWFDC030	West Fk Duck Ck @ Dexter City Park RM 9.1	OEPA SEDO	2000	9.10	49.00	9.00		42.00		59.00
Buffalo Run-West Fork Duck Creek	121	BRWFDC040	West Fk Duck Ck @ SR 821 Dexter City RM 12.8	OEPA SEDO	2000	12.80	48.00	9.60		48.00		65.50

Figure 25. 050400011501 Clear Fork Map

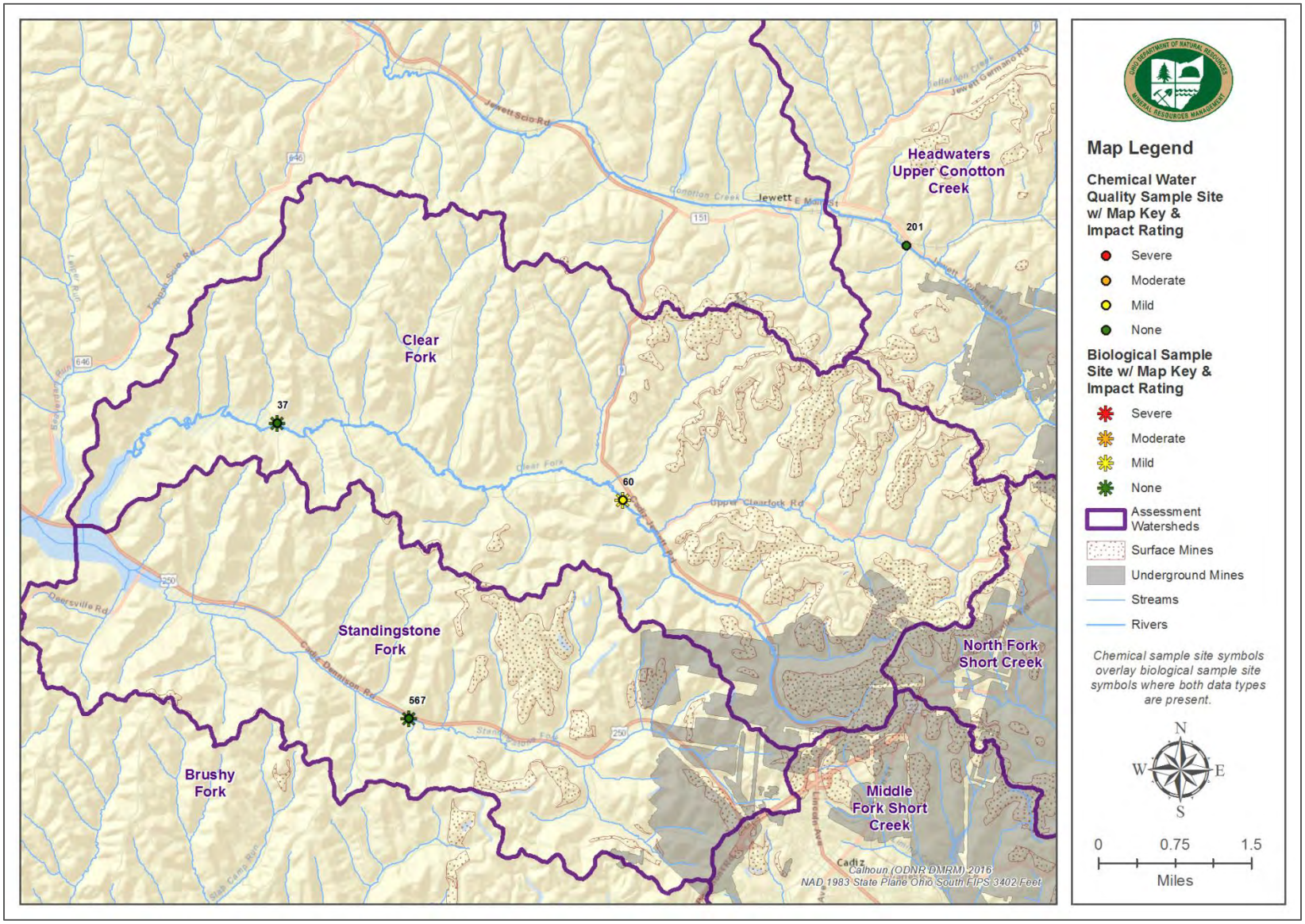


Table 54. 050400011501 Clear Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Clear Fork	37	301720	CLEAR FORK @ MIZER RD. (TWP. RD. 235)	11/16/11	OEPA SEDO	7.39	582.10	0.79	0.37	-106.50
Clear Fork	60	301991	CLEAR FORK NW OF CADIZ @ LOWER CLEAR FORK RD.	07/12/12	OEPA SEDO	8.00	1989.00	0.24	0.10	-144.50

Table 55. 050400011501 Clear Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Clear Fork	37	301720	CLEAR FORK @ MIZER RD. (TWP. RD. 235)	OEPA SEDO	2012	3.50	40.00	8.48		36.00		62.50
Clear Fork	60	301991	CLEAR FORK NW OF CADIZ @ LOWER CLEAR FORK RD.	OEPA SEDO	2012	8.50	52.00				F	65.30

Figure 26. 050301060301 Crabapple Creek Map

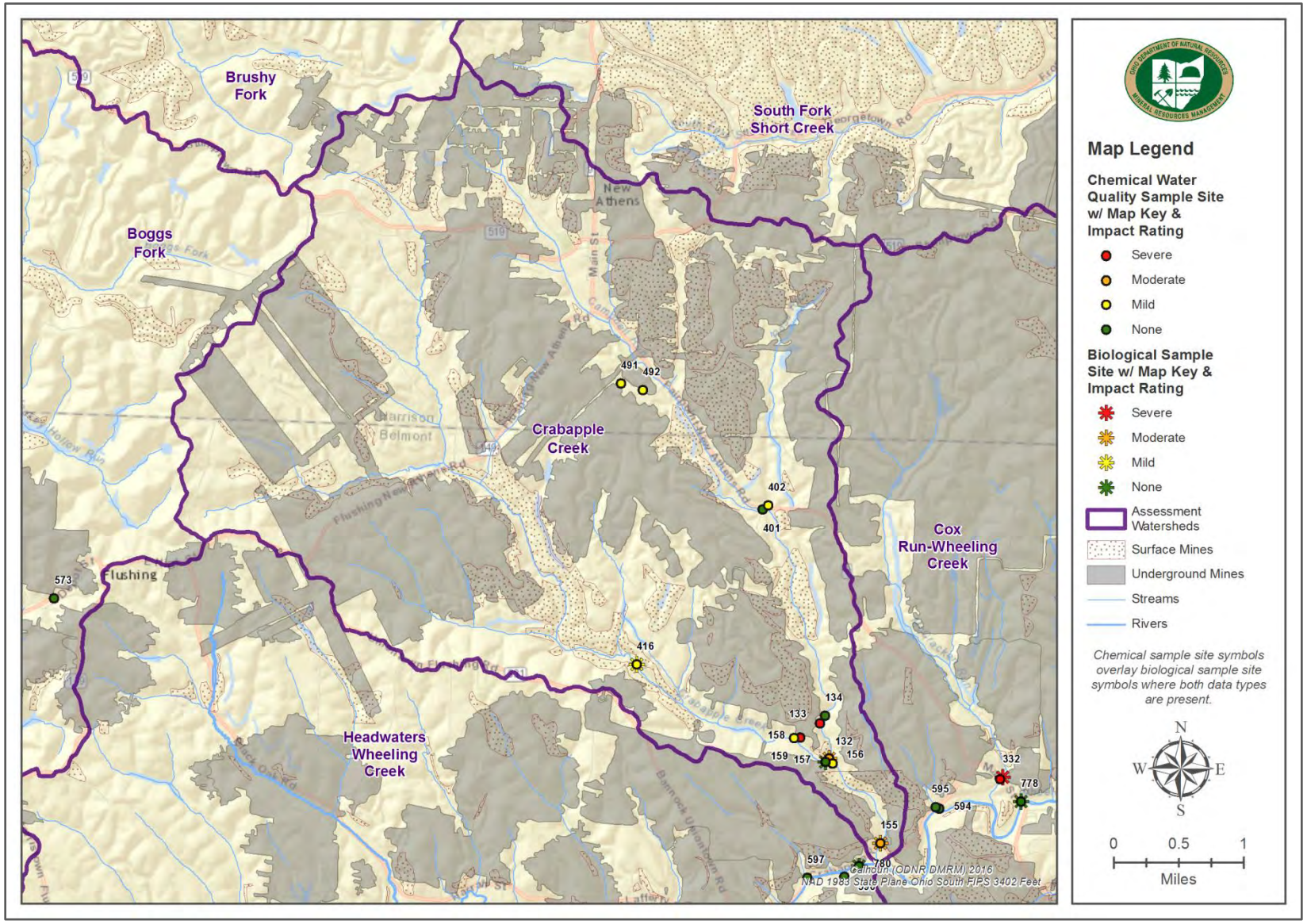


Table 56. 050301060301 Crabapple Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Crabapple Creek	132	CAMP 001	Campbell Run @ mouth from abandoned TR 414	10/28/14	ODNR DMRM	7.68	2910.00	6.42	0.42	-377.00
Crabapple Creek	133	Camp 002A	bottom of slope from camp 002 blow-out just before entering Campbell Run	12/09/14	ODNR DMRM	4.73	7050.00	618.00	24.60	1174.42
Crabapple Creek	134	Camp 003	Campbell Run RM 0.38	10/28/14	ODNR DMRM	7.92	2850.00	0.36	0.13	-411.00
Crabapple Creek	155	CRAB001	Crabapple Creek @ CR 10 (Crabapple Road)	10/28/14	ODNR DMRM	7.88	2780.00	4.42	0.34	-365.00
Crabapple Creek	156	CRAB004	sample site just downstream of confluence of Crabapple & Campbell Run	10/28/14	ODNR DMRM	7.75	2730.00	5.54	0.30	-355.00
Crabapple Creek	157	CRAB005	Crabapple upst Campbell	10/28/14	ODNR DMRM	7.67	2570.00	4.92	0.26	-335.00
Crabapple Creek	158	CRAB006	Upper Pond by highwall (flows into Crabapple)	10/28/14	ODNR DMRM	4.12	7610.00	649.00	20.20	1280.00
Crabapple Creek	159	CRAB008	AMD Seep into Crabapple Creek (upstream of Crab007)	10/28/14	ODNR DMRM	7.69	4730.00	2.93	0.12	-307.00
Crabapple Creek	401	PCAMP01	Wheeling Creek Campbell Run 012	01/28/10	ODNR DMRM	7.64	856.00			
Crabapple Creek	402	PCAMP02	Wheeling Creek Ross Run 013 out of pit impoundment	01/28/10	ODNR DMRM	7.55	2818.00			
Crabapple Creek	416	PCRAB02	Wheeling Creek Crabapple Mainstream 011 off road out of uniontown	10/18/10	OEPA SEDO	7.97	2300.50	0.40	<0.20	-332.10
Crabapple Creek	491	PMSP01	Pond discharge above impoundment	03/15/10	ODNR DMRM	6.33	2916.00			
Crabapple Creek	492	PMSP03	Dam of the Impoundment	03/15/10	ODNR DMRM	6.91	2369.00			

Table 57. 050301060301 Crabapple Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Crabapple Creek	132	CAMP 001	Campbell Run @ mouth from abandoned TR 414	OEPA SEDO	2010	0.03	32.00				VP	70.80
Crabapple Creek	155	CRAB001	Crabapple Creek mouth	ODNR DMRM	2012	0.20	32.00					65.00
Crabapple Creek	157	CRAB005	Crabapple upst Campbell	ODNR DMRM	2012	1.10	40.00					60.00
Crabapple Creek	416	PCRAB02	Wheeling Creek Crabapple Mainstream 011 off road out of uniontown	OEPA SEDO	2010	2.88	38.00				F	59.50

Figure 27. 050302020904 Crooked Creek-Ohio River Map

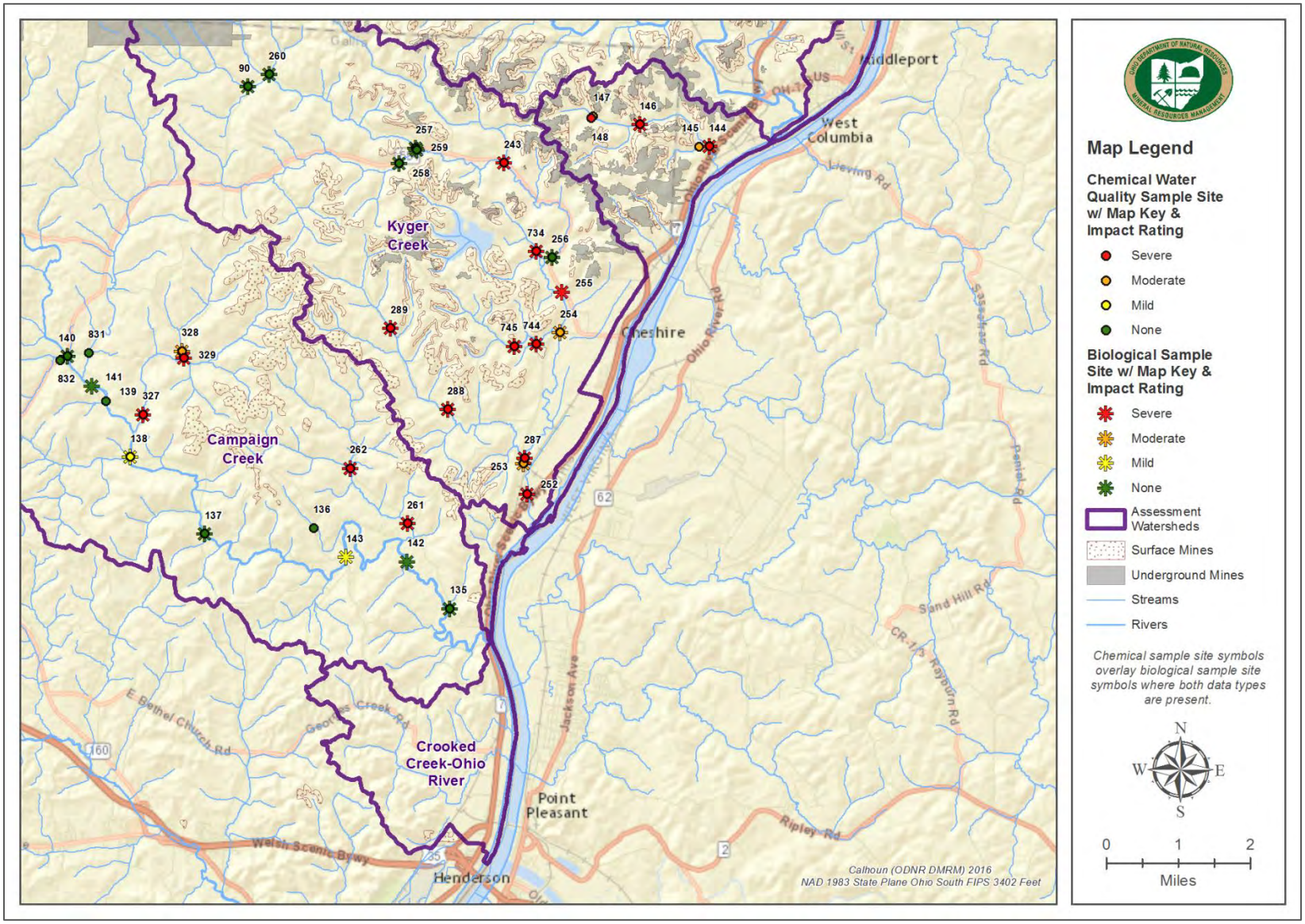


Table 58. 050302020904 Crooked Creek-Ohio River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Crooked Creek-Ohio River	144	CCOR001	Storys Run @ Twp Rd 376 (near mouth - upst. SR 7)	10/29/09	ODNR DMRM	4.72	691.00			
Crooked Creek-Ohio River	145	CCOR002	Silver Run @ culvert on Zuspan Hollow Road (near Confluence with Storys Run)	10/29/09	ODNR DMRM	4.67	780.00			
Crooked Creek-Ohio River	146	CCOR003	Storys Run at cemetery entrance, low water crossing, adj. to Storys Run	10/29/09	ODNR DMRM	4.40	680.00			
Crooked Creek-Ohio River	147	CCOR004	Storys Run adjacent Storys Run Road @ oil well access road (culvert)	10/29/09	ODNR DMRM	5.00	608.00			
Crooked Creek-Ohio River	148	CCOR005	Unnamed tributary to Storys Run, near confluence, at Oil well access (Hood property)	10/29/09	ODNR DMRM	3.14	982.00			

Table 59. 050302020904 Crooked Creek-Ohio River Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Crooked Creek-Ohio River	144	CCOR001	Storys Run @ Twp Rd 376 (near mouth - upst. SR 7)	ODNR DMRM	2014				3.00			
Crooked Creek-Ohio River	146	CCOR003	Storys Run at cemetery entrance, low water crossing, adj. to Storys Run Run	ODNR DMRM	2010		12.00					71.50

Figure 28. 050302040606 Dorr Run-Hocking River Map

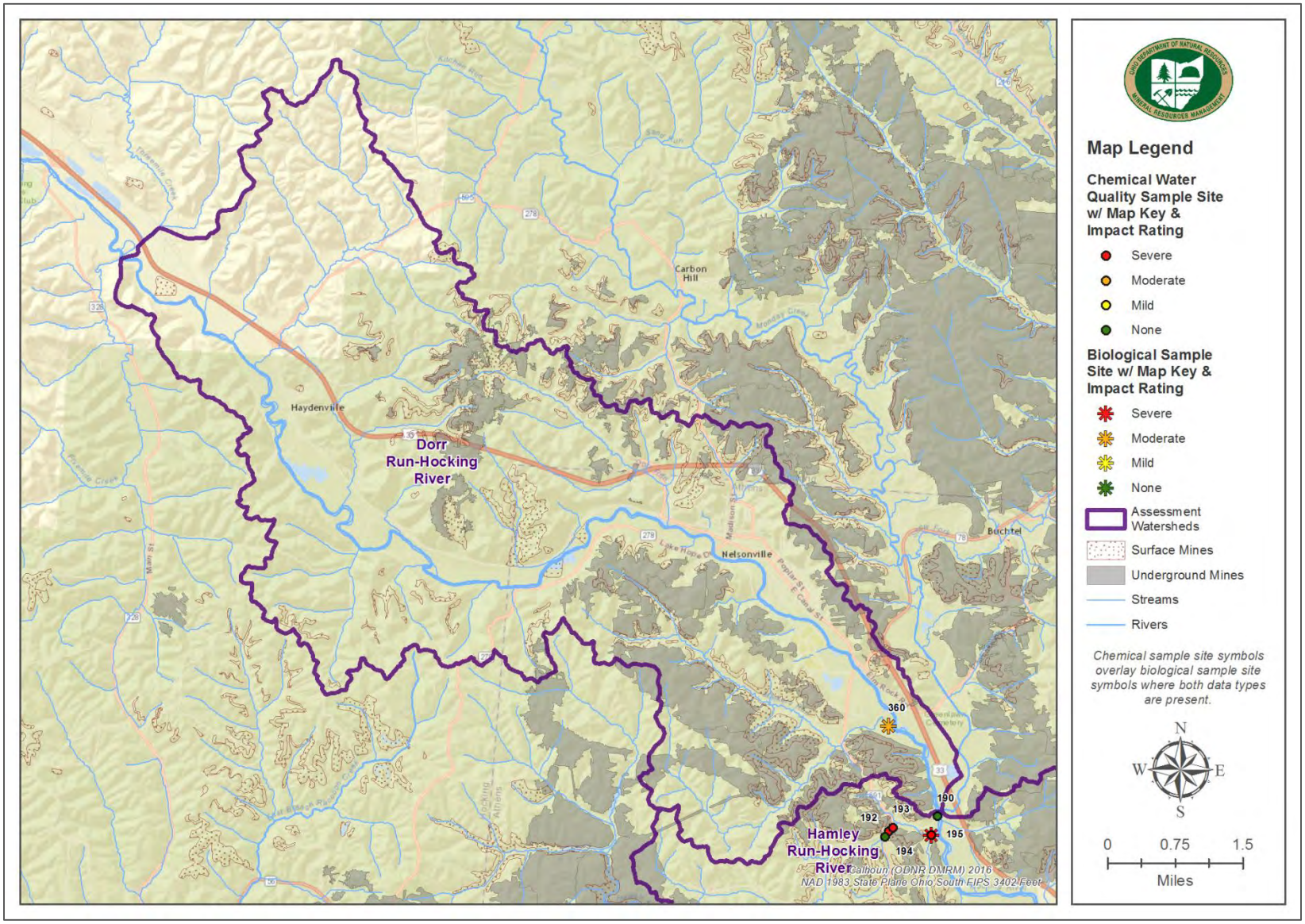


Table 60. 050302040606 Dorr Run-Hocking River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Dorr Run-Hocking River	360	MRHR001	Minkers Run at mouth RM 0.8	OEPA SEDO	2004	0.80	30.00				P	59.50

Figure 29. 050301060304 Flat Run-Wheeling Creek Map

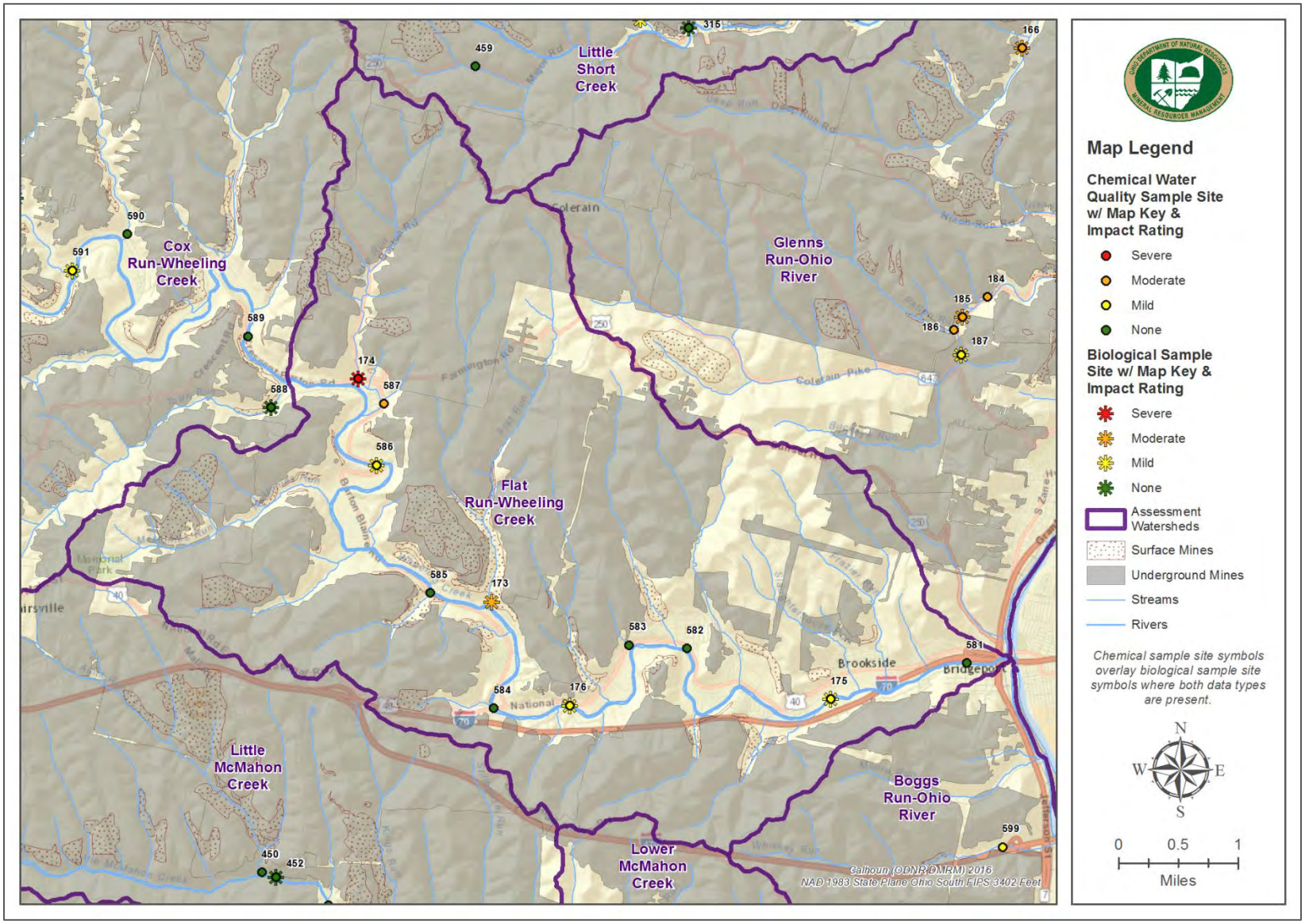


Table 61. 050301060304 Flat Run-Wheeling Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Flat Run-Wheeling Creek	174	FRWC003	Steep Run dst. CR 10 at old Rail Road bridge	08/09/10	OEPA SEDO	7.74	3522.60	24.60	3.69	-120.10
Flat Run-Wheeling Creek	175	FRWC015	Wheeling Creek @ Cr 24 (Boydsville Road)	07/07/10	OEPA SEDO	8.19	2129.60	0.22	<0.20	
Flat Run-Wheeling Creek	176	FRWC040	Wheeling Creek @ Blain (Pease Road)	08/12/10	OEPA SEDO			0.43	0.29	-210.10
Flat Run-Wheeling Creek	581	PWHEC001	Wheeling Creek near mouth @ SR 7 ramp (US 70)	12/08/09	ODNR DMRM	8.16	2014.00			
Flat Run-Wheeling Creek	582	PWHEC002	Wheeling Creek @ Route 40 (Lansing)	12/08/09	ODNR DMRM	8.15	1945.00			
Flat Run-Wheeling Creek	583	PWHEC003	Unnamed tributary upstream Lansing	12/08/09	ODNR DMRM	7.20	3404.00			
Flat Run-Wheeling Creek	584	PWHEC004	Wheeling Creek @ US 40 crossing in town of Blaine	12/08/09	ODNR DMRM	7.86	2077.00			
Flat Run-Wheeling Creek	585	PWHEC005	Unnamed tributary at CR 10, flowing from south	12/08/09	ODNR DMRM	7.80	2582.00			
Flat Run-Wheeling Creek	586	PWHEC006	Wheeling Creek at CR 10, dst Barton	07/07/10	OEPA SEDO	8.22	2062.00	0.21	<0.20	
Flat Run-Wheeling Creek	587	PWHEC007	Steep Run @ East Loretta	12/08/09	ODNR DMRM	5.18	6815.00			

Table 62. 050301060304 Flat Run-Wheeling Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Flat Run-Wheeling Creek	173	FLAT010	Flat Run at mouth	ODNR DMRM	2013	0.05			10.00			
Flat Run-Wheeling Creek	174	FRWC003	Steep Run dst. CR 10 at old Rail Road bridge	OEPA SEDO	2010	0.03	26.00				P	30.50
Flat Run-Wheeling Creek	175	FRWC015	Wheeling Creek @ Cr 24 (Boydsville Road)	OEPA SEDO	2010	1.64	44.00	9.00		26.00		67.00
Flat Run-Wheeling Creek	176	FRWC040	Wheeling Creek @ Blain (Pease Road)	OEPA SEDO	2010	5.05	42.00	8.10		30.00		84.00
Flat Run-Wheeling Creek	586	PWHEC006	Wheeling Creek at CR 10, dst Barton	OEPA SEDO	2010	9.40	41.00	7.80		40.00		70.50

Figure 30. 050400010606 Indian Run-Sandy Creek Map

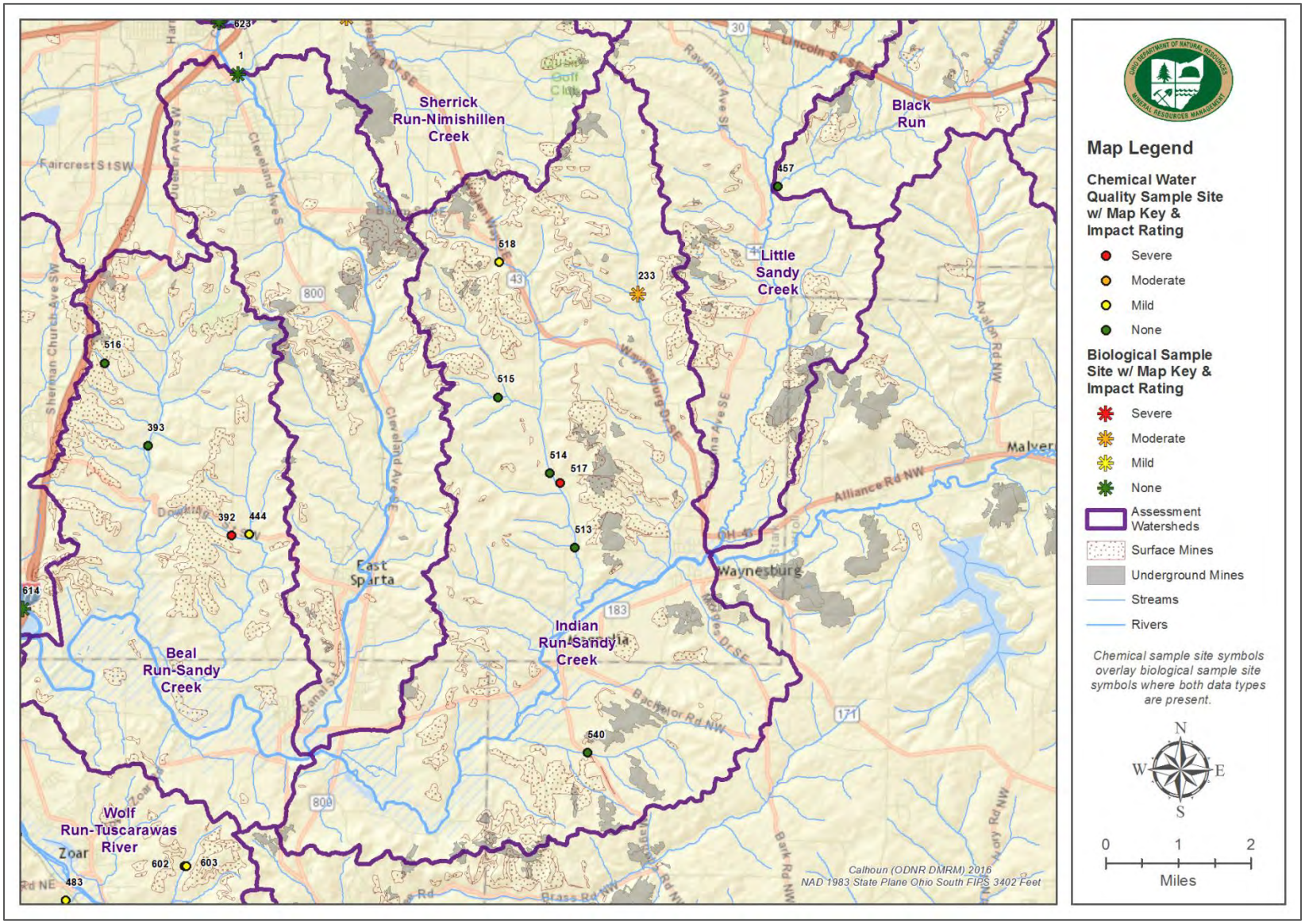


Table 63. 050400010606 Indian Run-Sandy Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Indian Run-Sandy Creek	513	PPV001	Pleasant Valley Trib 002	03/19/10	ODNR DMRM	7.47	779.00			
Indian Run-Sandy Creek	514	PPV002	Pleasant Valley mainstem 003	03/19/10	ODNR DMRM	7.42	839.00			
Indian Run-Sandy Creek	515	PPV003	Trib to Pleasant Valley 004	03/25/10	ODNR DMRM	6.97	1147.00			
Indian Run-Sandy Creek	517	PPV005	Pond on Sandy Valley 005 near mine openings	03/25/10	ODNR DMRM	3.69	579.00			
Indian Run-Sandy Creek	518	PPV006	AMD trib to Pleasant Valley 006	03/25/10	ODNR DMRM	5.94	962.00			
Indian Run-Sandy Creek	540	PSAND001	Sandy Creek 001 on Rt. 542 south	03/16/10	ODNR DMRM	6.67	662.00			

Table 64. 050400010606 Indian Run-Sandy Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Indian Run-Sandy Creek	233	IR0010	Indian Run at Fairhill st	ODNR DMRM	2011	3.50	26.00					45.50

Figure 31. 050901030205 Lick Run-Pine Creek Map

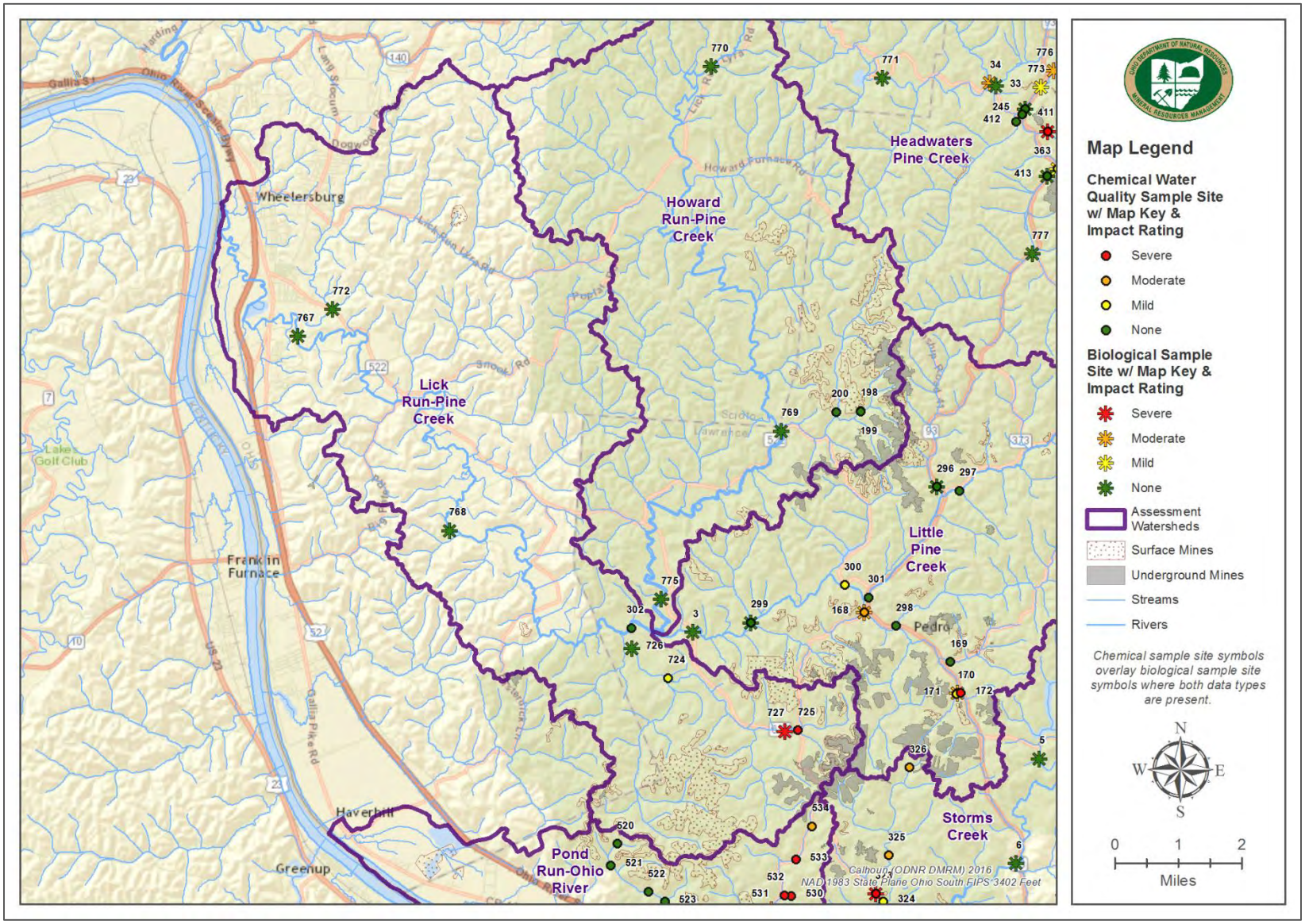


Table 65. 050901030205 Lick Run-Pine Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Lick Run-Pine Creek	302	LRPC019	Pine Creek @ Kellys Mill Rd, upstream Sperry Fork	11/25/09	ODNR DMRM	6.97	363.00			
Lick Run-Pine Creek	724	SPFK030	Sperry Fork @ Ironton Country Club	11/25/09	ODNR DMRM	6.43	607.00			
Lick Run-Pine Creek	725	SPFK070	Sperry Fork @ Pine Grove (downstream CR 26 bridge)	11/25/09	ODNR DMRM	4.37	700.00			

Table 66. 050901030205 Lick Run-Pine Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Lick Run-Pine Creek	726	SPFKRM0.4	Sperry Fork at Dark Lick Rd (Twp Rd 128W)	ODNR DMRM	2010	9.80	40.00					53.00
Lick Run-Pine Creek	727	SPFKRM3.56	Sperry Fork @ SR 650, dst. Pine Grove	ODNR DMRM	2010	3.56			5.00			
Lick Run-Pine Creek	767	W01K08	PINE CREEK AT SAND HILL, UPST. MILL RD.	OEPA SEDO	2010	5.10	49.00	9.12		48.00		80.50
Lick Run-Pine Creek	768	W01K09	PINE CREEK SW OF POWELLSVILLE @ POWELLSVILLE RD.	OEPA SEDO	2010	13.40	46.00	8.45		52.00		79.00
Lick Run-Pine Creek	772	W01K15	LICK RUN NEAR GARDEN CITY @ ST. RT. 522	OEPA SEDO	2010	0.90	46.00				F	81.50

Figure 32. 050901030203 Little Pine Creek Map

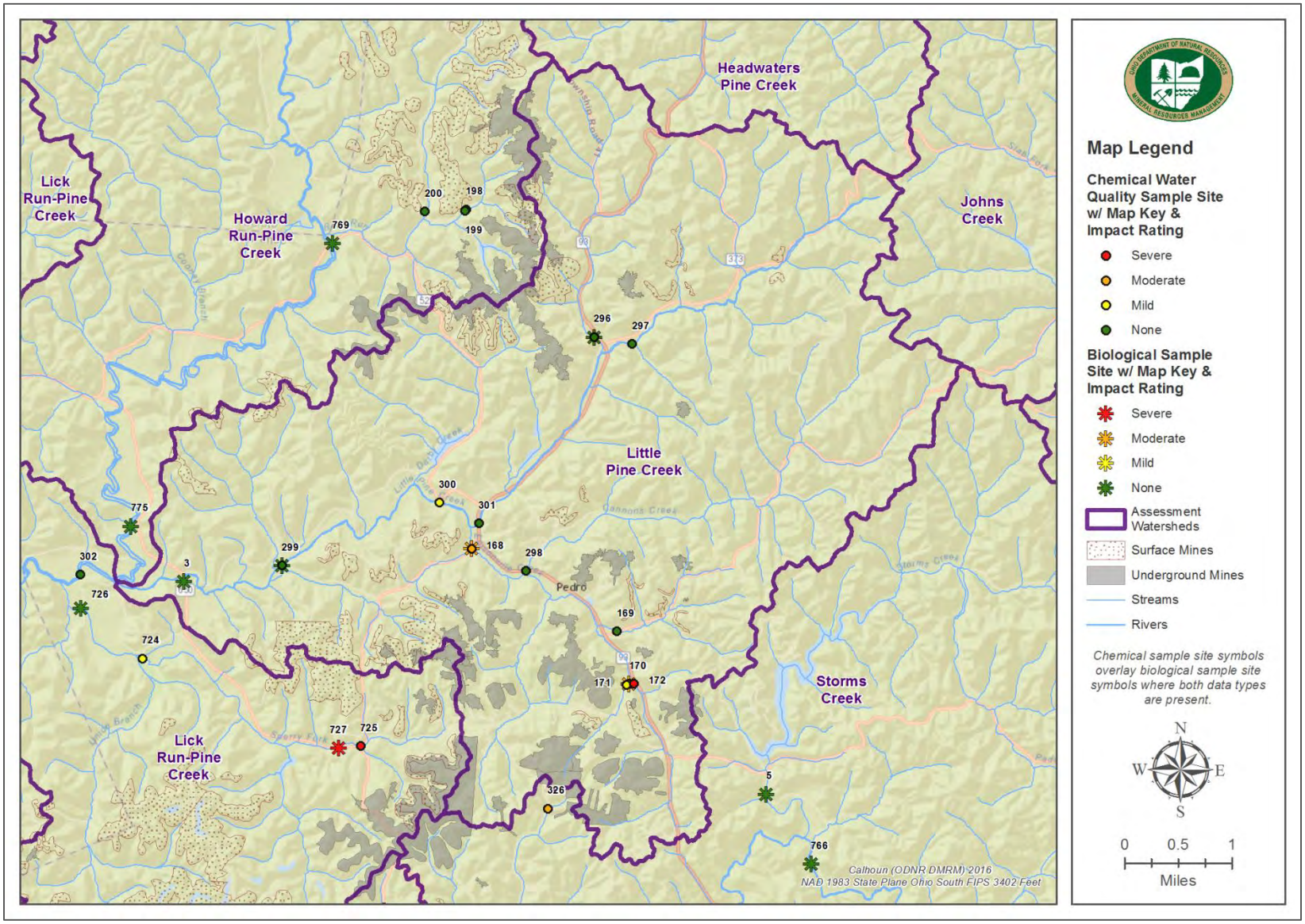


Table 67. 050901030203 Little Pine Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Little Pine Creek	168	ELC010	Ellisonville Creek @ White Oak Rd	04/08/13	ODNR DMRM	6.90	471.00	1.53	4.13	-2.40
Little Pine Creek	169	ELC081	Mouth of un-named trib to Ellisonville Creek, at Etna Waterloo Rd bridge	04/08/13	ODNR DMRM	6.83	364.00	0.13	0.10	-43.34
Little Pine Creek	170	ELC100	Ellisonville Creek @ Rock Hill H.S. road (TR 169)	11/25/09	ODNR DMRM	4.98	775.00			
Little Pine Creek	171	ELC101	Mouth of un-named trib to Ellisonville Creek at mouth, '"Slope Hollow"	04/08/13	ODNR DMRM	6.68	516.00	1.48	1.91	-11.88
Little Pine Creek	172	ELC130	Ellisonville Creek, upst. ELC101 trib ("Slope Hollow")	04/08/13	ODNR DMRM	3.52	857.00	7.77	11.30	92.00
Little Pine Creek	296	LPC012	Little Pine Creek @ WNF road (former Kosmos Mine road) adjacent SR 93	11/25/09	ODNR DMRM	7.63	629.00			
Little Pine Creek	297	LPC013	Texas Hollow @ TR 324, downstream Peter Cave Hollow	11/25/09	ODNR DMRM	7.84	383.00			
Little Pine Creek	298	LPC016	Cannon Creek @ confluence with Ellisonville Creek @ SR 93	11/25/09	ODNR DMRM	7.01	437.00			
Little Pine Creek	299	LPC020	Little Pine Creek @ TR 155E	11/25/09	ODNR DMRM	7.20	558.00			
Little Pine Creek	300	LPC085	Little Pine Creek, dst Ellisonville Creek, adjacent state route 522	04/08/13	ODNR DMRM	5.60	448.00	0.70	1.28	-45.08
Little Pine Creek	301	LPC090	Little Pine Creek, upst Ellisonville Creek at state route 93 bridge	04/08/13	ODNR DMRM	7.15	407.00	0.30		-90.04

Table 68. 050901030203 Little Pine Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Little Pine Creek	3	300826	LITTLE PINE CREEK @ SR 650	OEPA SEDO	2010	0.80	48.00	8.31		52.00		81.00
Little Pine Creek	168	ELC010	ELLISONVILLE CREEK @ CR25 White Oak Road	OEPA SEDO	2010	0.20	26.00				MG	68.00
Little Pine Creek	170	ELC100	Ellisonville Creek @ Rock Hill HS road	ODNR DMRM	2010	2.35			9.00			
Little Pine Creek	296	LPC012	Little Pine Creek @ WNF road (former Kosmos Mine road) adjacent SR 93	ODNR DMRM	2010				14.00			
Little Pine Creek	299	LPC020	Little Pine Creek @ TR 155E	ODNR DMRM	2010				16.00			

Figure 33. 050301011005 Lower Cross Creek Map

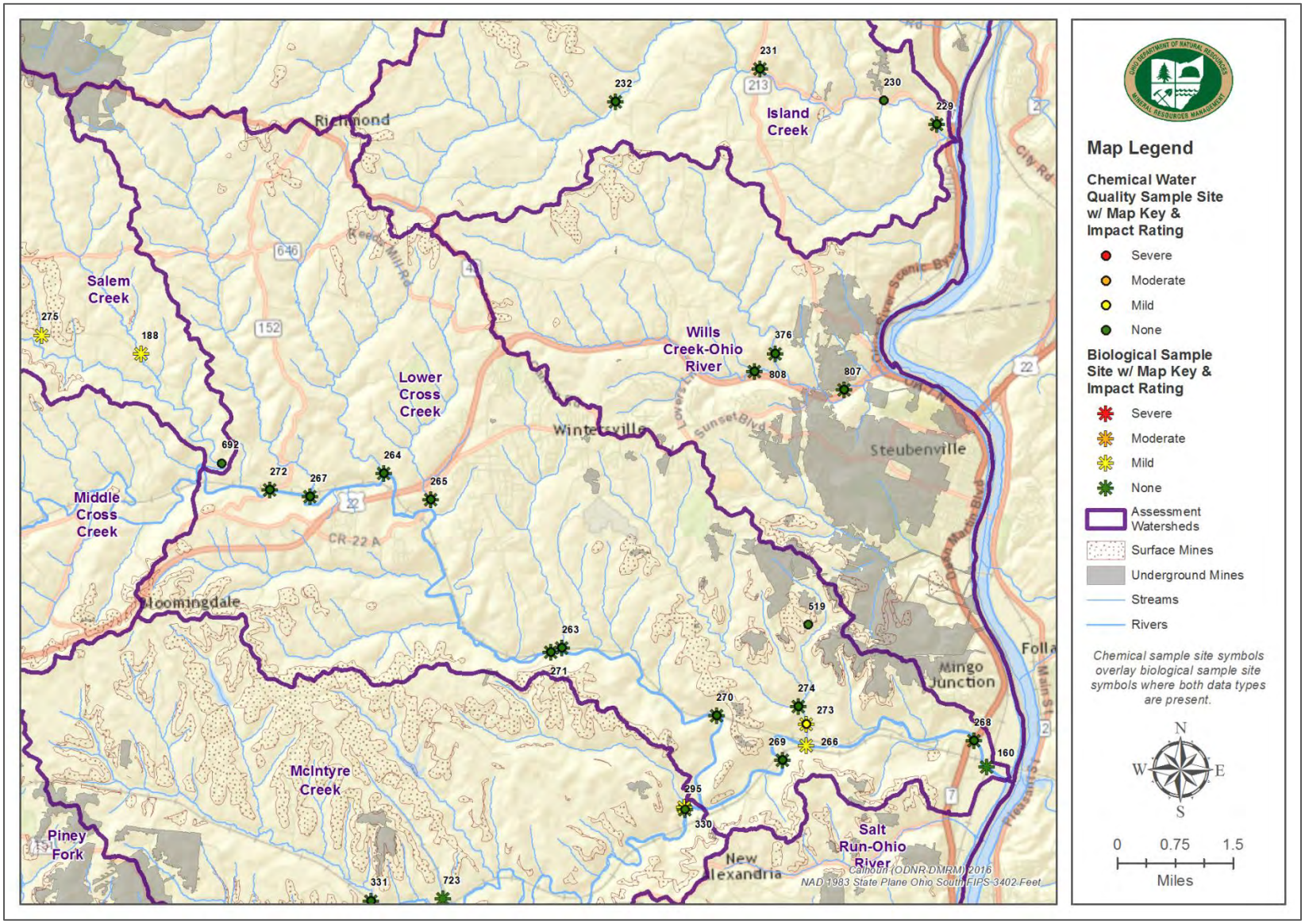


Table 69. 050301011005 Lower Cross Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Lower Cross Creek	263	LCCBH01	Barbers Hollow @ TR 166 dst. WWTP plants	09/22/10	OEPA SEDO			0.07	<0.20	-100.10
Lower Cross Creek	264	LCCCL01	Cedar Lick Ck @ TR 166	07/27/10	OEPA SEDO	7.83	715.10	0.08	<0.20	-137.10
Lower Cross Creek	265	LCCCL02	Cedar Lick Run @ CR 22A	07/27/10	OEPA SEDO	7.61	966.90	0.11	<0.20	-161.10
Lower Cross Creek	267	LCLAY01	Clay Lick Creek @ TR 166	07/27/10	OEPA SEDO	7.78	371.90	0.25	<0.20	-116.10
Lower Cross Creek	268	LCROSS01	Cross Ck @ South Commercial Ave.	10/18/10	OEPA SEDO	7.92		0.16	<0.20	-153.10
Lower Cross Creek	269	LCROSS10	Cross Ck @ CR 74 (Mingo Junction - Goulds Rd)	09/22/10	OEPA SEDO			0.22	<0.20	-144.10
Lower Cross Creek	270	LCROSS20	Cross Ck @ TR 166 ford Dst Landfills	10/18/10	OEPA SEDO	8.23		0.24	<0.20	-147.10
Lower Cross Creek	271	LCROSS40	Cross Ck @ CR 26 (Bloomingdale - Fernwood Rd)	07/27/10	OEPA SEDO	7.84	1015.10	0.16	<0.20	-158.10
Lower Cross Creek	272	LCROSS75	Cross Ck @ Broadacre (SR 152)	09/22/10	OEPA SEDO			0.08	<0.20	-163.10
Lower Cross Creek	273	LDRFK01	Dry Fork @ Gould (Driveway Bridge)	10/18/10	OEPA SEDO	7.83		<0.05	<0.20	-98.10
Lower Cross Creek	274	LDRFK05	Dry Fork ust. Mine affected tributary to Dry Fork.	07/27/10	OEPA SEDO	8.09	1876.60	0.25	0.21	-138.10
Lower Cross Creek	519	PRHW01	Reparation Highwall dst 001	03/15/10	ODNR DMRM	7.55	1158.00			

Table 70. 050301011005 Lower Cross Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Lower Cross Creek	160	CROSS01	Cross Creek RM 0.35	OEPA SEDO	2010	0.35	40.00	9.40				52.00
Lower Cross Creek	263	LCCBH01	Barbers Hollow @ TR 166 dst. WWTP plants	OEPA SEDO	2010	0.06	40.00				F	79.00
Lower Cross Creek	264	LCCCL01	Cedar Lick Ck @ TR 166	OEPA SEDO	2010	0.05	48.00			48.00		74.00
Lower Cross Creek	265	LCCCL02	Cedar Lick Run @ CR 22A	OEPA SEDO	2010	0.10	56.00				VG	71.00
Lower Cross Creek	266	LCCK010	Cross Creek mainstem dst Dry Fork	ODNR DMRM	2010	3.30			11.00			
Lower Cross Creek	267	LCLAY01	Clay Lick Creek @ TR 166	OEPA SEDO	2010	0.03	50.00				E	70.50
Lower Cross Creek	268	LCROSS01	Cross Ck @ South Commercial Ave.	OEPA SEDO	2010	0.78				32.00		
Lower Cross Creek	269	LCROSS10	Cross Ck @ CR 74 (Mingo Junction - Goulds Rd)	OEPA SEDO	2010	4.15	44.00	10.00		40.00		78.50
Lower Cross Creek	270	LCROSS20	Cross Ck @ TR 166 ford Dst Landfills	OEPA SEDO	2010	6.95	49.00	10.90		36.00		73.00
Lower Cross Creek	271	LCROSS40	Cross Ck @ CR 26 (Bloomingdale - Fernwood Rd)	OEPA SEDO	2010	9.72	49.00	10.20		42.00		83.50
Lower Cross Creek	272	LCROSS75	Cross Ck @ Broadacre (SR 152)	OEPA SEDO	2010	16.20	54.00	10.60		44.00		86.00
Lower Cross Creek	273	LDRFK01	Dry Fork @ Gould (Driveway Bridge)	OEPA SEDO	2010	0.28	58.00				F	66.50
Lower Cross Creek	274	LDRFK05	Dry Fork ust. Mine affected tributary to Dry Fork.	OEPA SEDO	2010	0.56	56.00				MG	68.50

Figure 34. 050400050105 Opossum Run-Seneca Fork Map

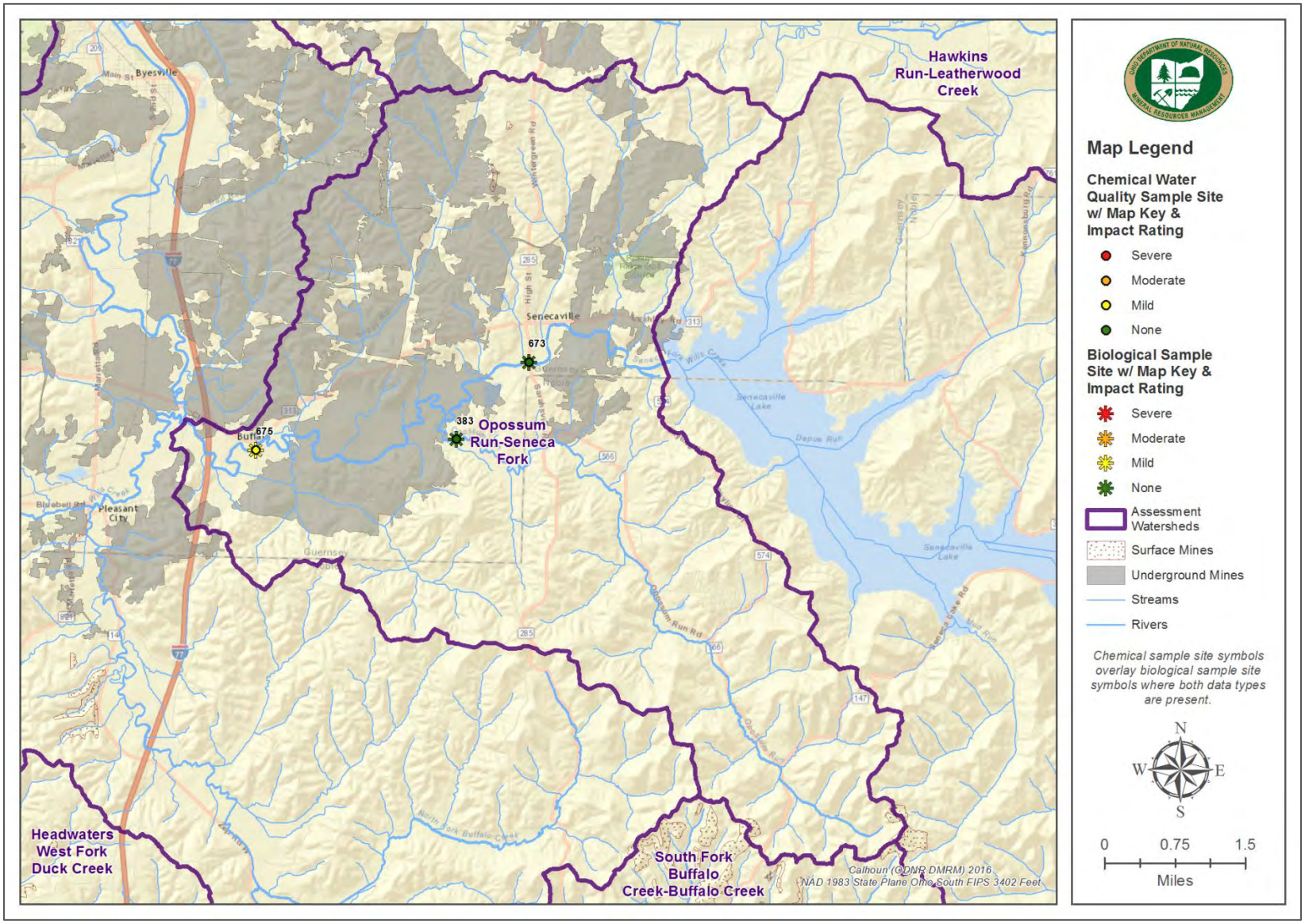


Table 71. 050400050105 Opossum Run-Seneca Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Opossum Run-Seneca Fork	383	ORSF01	Opossum Run-Seneca Fork	08/04/15	ODNR DMRM	8.00	451.00			
Opossum Run-Seneca Fork	673	R17K16	SENECA FORK NEAR SENECAVILLE @ ST. RT. 285	09/16/14	OEPA SEDO	7.85	676.00	0.48	0.32	-120.50
Opossum Run-Seneca Fork	675	R17P03	SENECA FORK AT BUFFALO @ CO. RD. 25	08/13/14	OEPA SEDO	7.40	543.00	2.34	1.54	-139.50

Table 72. 050400050105 Opossum Run-Seneca Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Opossum Run-Seneca Fork	383	ORSF01	Opossum Run-Seneca Fork	OEPA SEDO	2014	0.55	22.00				MG	44.00
Opossum Run-Seneca Fork	673	R17K16	SENECA FORK NEAR SENECAVILLE @ ST. RT. 285	OEPA SEDO	2014	7.43	32.00	8.94		50.00		51.30
Opossum Run-Seneca Fork	675	R17P03	SENECA FORK AT BUFFALO @ CO. RD. 25	OEPA SEDO	2014	2.07	35.00	7.91		44.00		49.00

Figure 35. 050301060205 Perrin Run-Short Creek Map

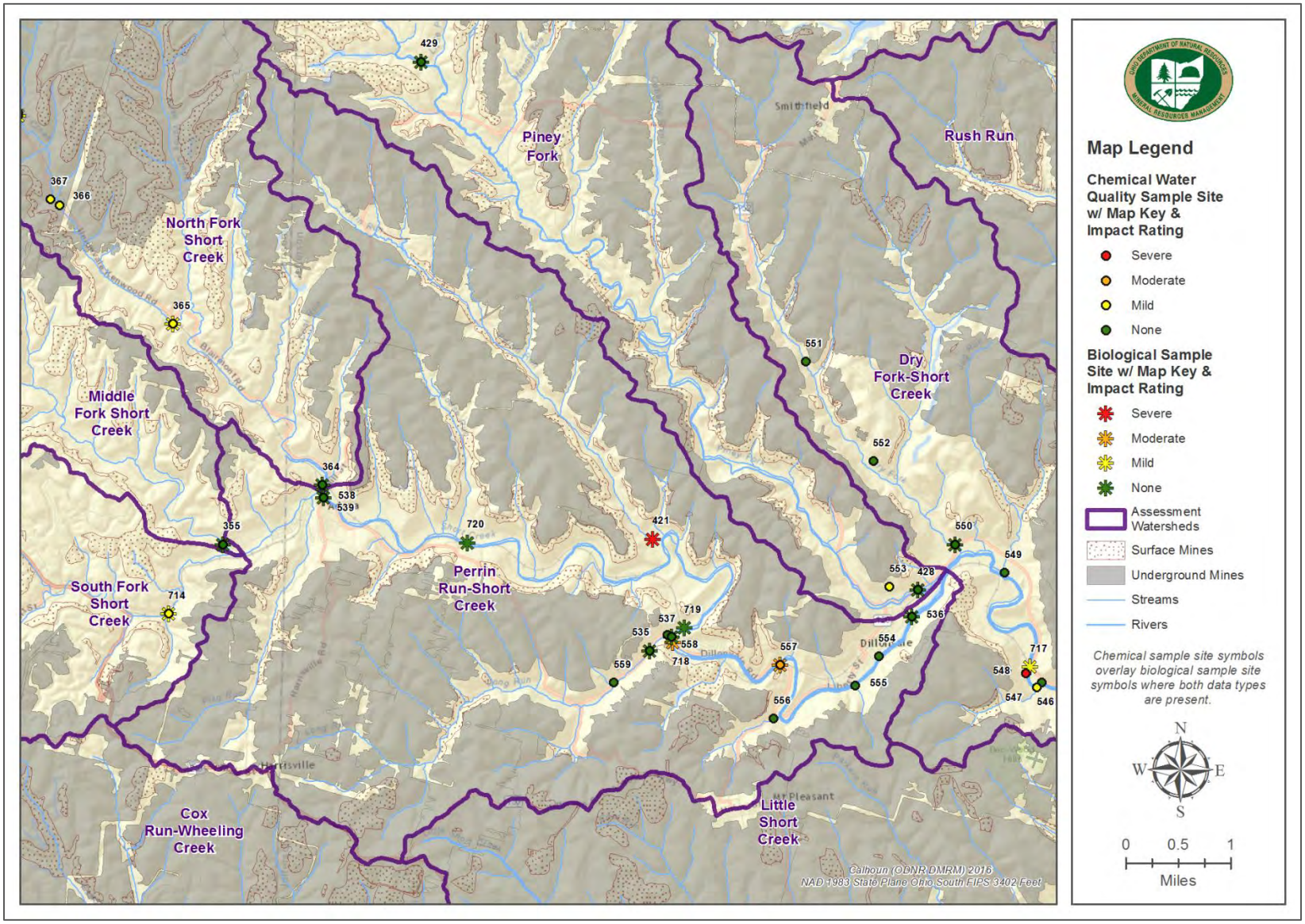


Table 73. 050301060205 Perrin Run-Short Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Perrin Run-Short Creek	535	PRSC010	Long Run at CR 7 (Dillonvale-Long Run Rd)	10/18/10	OEPA SEDO	8.05		0.09	<0.20	-188.10
Perrin Run-Short Creek	536	PRSC020	Short Cr. dst. Dillonvale WWTP ust. Piney Fk.	08/11/10	OEPA SEDO			0.24	<0.20	-165.10
Perrin Run-Short Creek	537	PRSC030	Short Cr. at CR 7 ust. Long Run	10/18/10	OEPA SEDO	8.13		0.08	<0.20	-203.10
Perrin Run-Short Creek	538	PRSC040	Short Cr. at CR 10 (Mill St) dst. North Fork	08/12/10	OEPA SEDO			0.13	<0.20	-187.10
Perrin Run-Short Creek	554	PSHT012	Short Creek dst 001 in mainstream 002 at bridge in Dillonvale	02/02/10	ODNR DMRM	7.75	1474.00			
Perrin Run-Short Creek	555	PSHT013	Short Creek HUC 63 001 trib south just west of Dillonvale	02/02/10	ODNR DMRM	7.43	1128.00			
Perrin Run-Short Creek	556	PSHT014	Short Creek Trib 003 trib from mt. Pleasant	02/03/10	ODNR DMRM	8.08	2266.00			
Perrin Run-Short Creek	557	PSHT015	Short Creek Dnst Dunglen Gob	02/03/10	ODNR DMRM	3.15	2469.00			
Perrin Run-Short Creek	558	PSHT016	Short Creek Long Run - mouth 006	02/03/10	ODNR DMRM	7.47	938.00			
Perrin Run-Short Creek	559	PSHT017	Short Creek seep into Long Run 008	02/03/10	ODNR DMRM	7.02	1598.00			

Table 74. 050301060205 Perrin Run-Short Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Perrin Run-Short Creek	421	PER010	Perrins Run mouth	ODNR DMRM	2012				6.00			
Perrin Run-Short Creek	535	PRSC010	Long Run at CR 7 (Dillonvale-Long Run Rd)	OEPA SEDO	2010	0.26	42.00				MG	61.50
Perrin Run-Short Creek	536	PRSC020	Short Cr. dst. Dillonvale WWTP ust. Piney Fk.	OEPA SEDO	2010	8.84	49.00	9.30		42.00		54.00
Perrin Run-Short Creek	537	PRSC030	Short Cr. at CR 7 ust. Long Run	OEPA SEDO	2010	12.68	50.00	9.10		32.00		77.50
Perrin Run-Short Creek	538	PRSC040	Short Cr. at CR 10 (Mill St) dst. North Fork	OEPA SEDO	2010	18.90	46.00	9.20		42.00		75.00
Perrin Run-Short Creek	557	PSHT015	Short Creek Dnst Dunglen Gob	ODNR DMRM	2010	84.00	32.00	5.30				76.00
Perrin Run-Short Creek	718	SHT040	Short Creek dnst long run	ODNR DMRM	2011	12.60			8.00			
Perrin Run-Short Creek	719	SHT050	Short Creek dnst Perrins Run at RR tressel	ODNR DMRM	2011				12.00			
Perrin Run-Short Creek	720	SHT060	Short Creek upst perrins run at TWP rd 126	ODNR DMRM	2011				13.00			

Figure 36. 050901030105 Pond Run-Ohio River Map

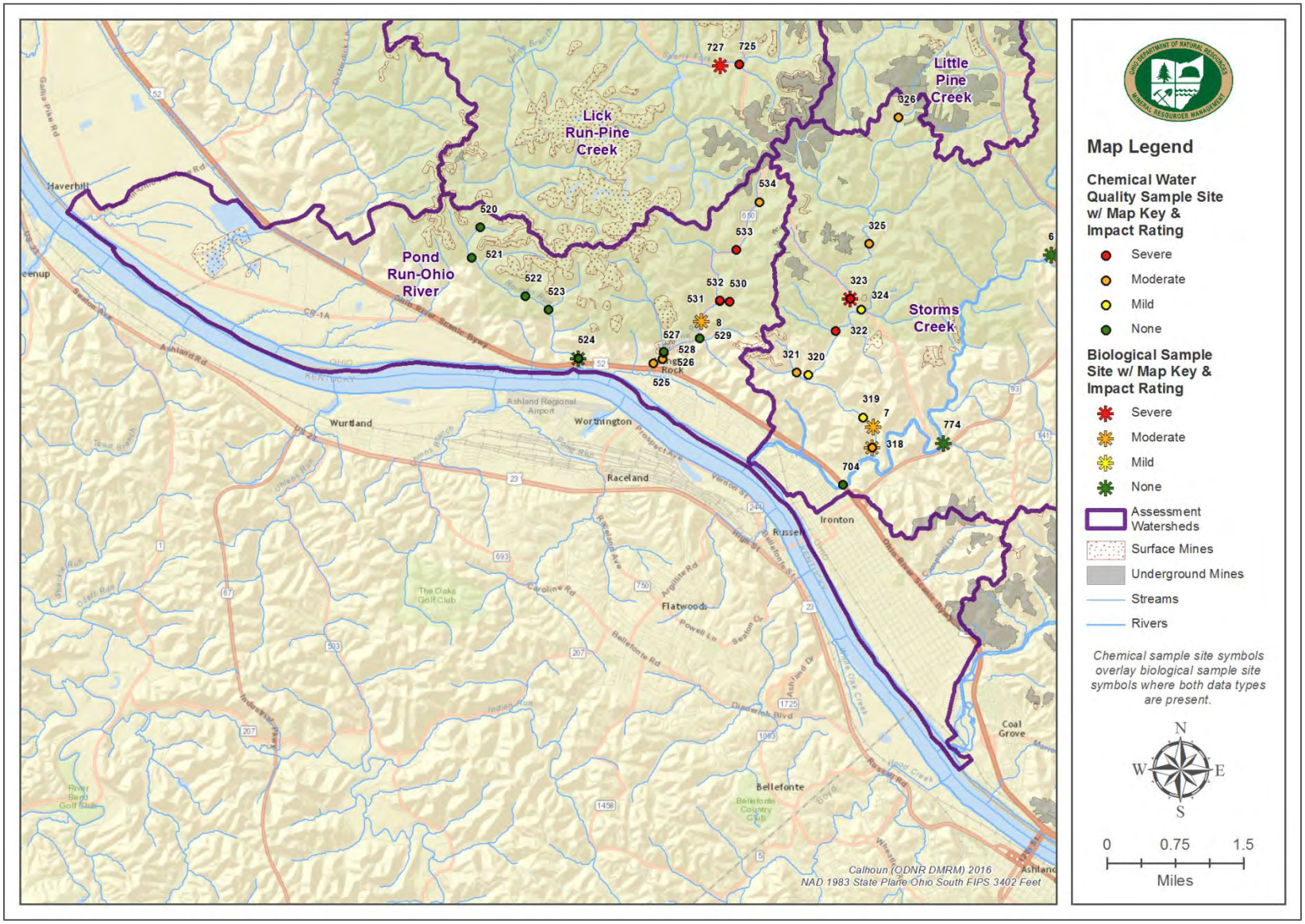


Table 75. 050901030105 Pond Run-Ohio River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Pond Run-Ohio River	520	PROR001	Norman Run adjacent Rock Hollow Rd dst culvert in HW area	02/17/10	ODNR DMRM	7.75	325.00			
Pond Run-Ohio River	521	PROR002	Norman Run @ Winkler Hollow Rd	02/17/10	ODNR DMRM	6.81	313.00			
Pond Run-Ohio River	522	PROR003	Norman Run adjacent Rock Hollow Rd, Kern driveway	02/17/10	ODNR DMRM	7.02	258.00			
Pond Run-Ohio River	523	PROR004	tributary to Norman Run from east	02/17/10	ODNR DMRM	7.16	256.00			
Pond Run-Ohio River	524	PROR005	Norman Run just upstream of SR 52	02/17/10	ODNR DMRM	7.24	256.00			
Pond Run-Ohio River	525	PROR006	Osborne Run near mouth, upst of SR 52 @ Hanging Rock	02/17/10	ODNR DMRM	5.44	471.00			
Pond Run-Ohio River	526	PROR007	Long Bridge Hollow, trib to Osborne Run, culver under cemetery Rd	02/17/10	ODNR DMRM	5.39	307.00			
Pond Run-Ohio River	527	PROR008	Osborne Run upstream Long Bridge Hollow	02/17/10	ODNR DMRM	5.28	507.00			
Pond Run-Ohio River	528	PROR009	Seep to Osborne Run; culvert upst Long Bridge Hollow	02/17/10	ODNR DMRM	6.60	423.00			
Pond Run-Ohio River	529	PROR010	Pigeon Hollow	02/17/10	ODNR DMRM	6.75	338.00			
Pond Run-Ohio River	530	PROR011	Unnamed trib to Osborne Run, Lagrange Rd @ private drive 183 (Twp Rd 151)	02/17/10	ODNR DMRM	3.68	436.00			
Pond Run-Ohio River	531	PROR012	Osborne Run dst. Unnamed trib @ Lagrange Rd	02/17/10	ODNR DMRM	3.86	580.00			
Pond Run-Ohio River	532	PROR013	Osborne Run upstream unnamed trib @ Lagrange Rd	02/17/10	ODNR DMRM	3.95	580.00			
Pond Run-Ohio River	533	PROR014	Osborne Run @ SR 650 x-ing, mile marker 2 (box culvert)	02/17/10	ODNR DMRM	3.56	686.00			
Pond Run-Ohio River	534	PROR015	Osborne Run @ private drive 2566 and SR 650	02/17/10	ODNR DMRM	4.80	616.00			

Table 76. 050901030105 Pond Run-Ohio River Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Pond Run-Ohio River	8	300957	OSBORNE RUN (AKA OSBURN RUN) @ SR 650	OEPA SEDO	2010	1.30					P	
Pond Run-Ohio River	524	PROR005	Norman Run just upstream of SR 52	ODNR DMRM	2010				13.00			

Figure 37. 050400040301 Robinson Run-Muskingum River Map

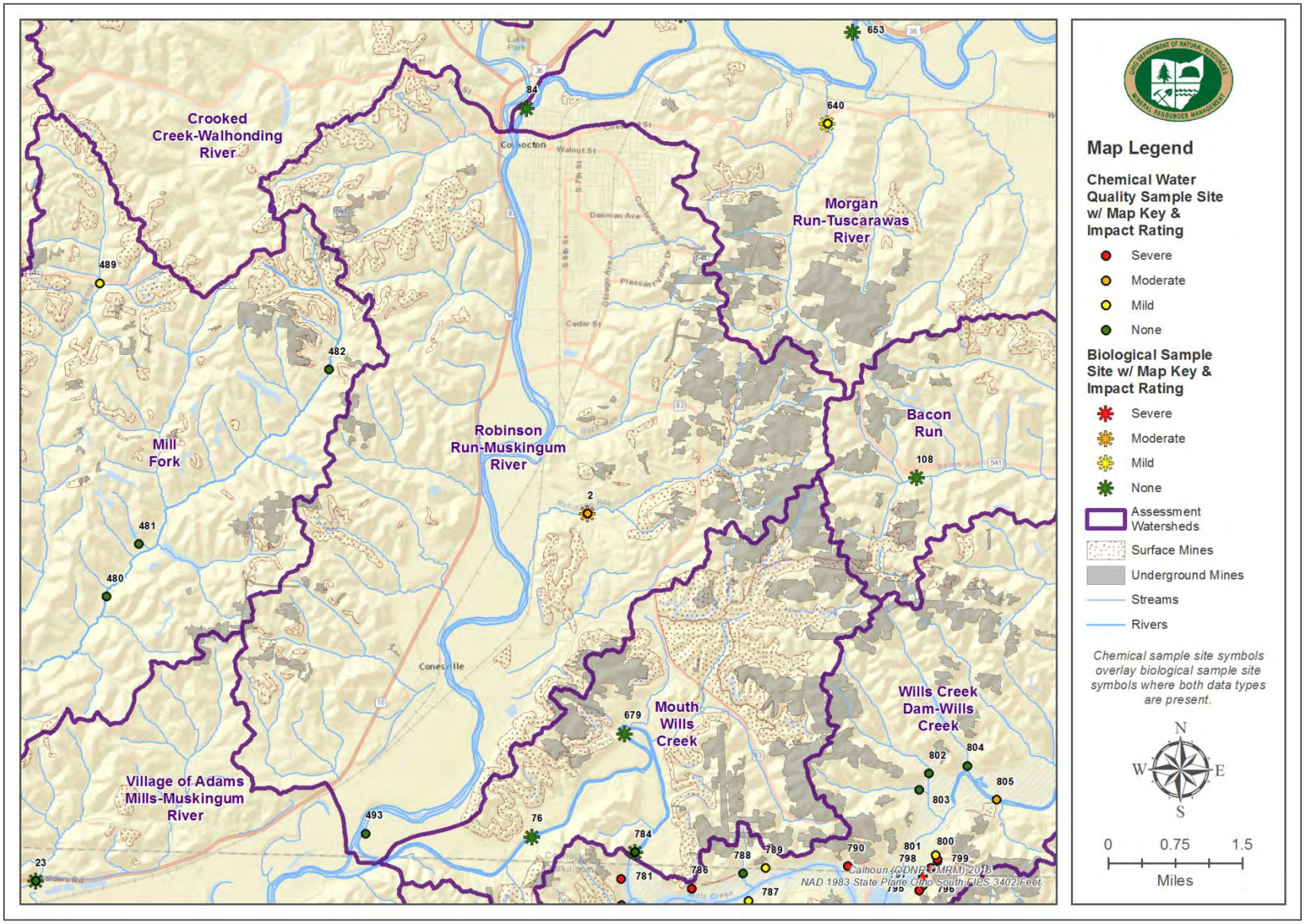


Table 77. 050400040301 Robinson Run-Muskingum River Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Robinson Run-Muskingum River	2	300289	ROBINSON RUN UPST. COSHOCTON ETHANOL @ CO. RD. 271	07/01/10	OEPA SEDO	7.27	990.00	3.59	0.10	-35.80
Robinson Run-Muskingum River	493	PMUSK01	Trib to Musk 004	03/12/10	ODNR DMRM	7.47	360.00			

Table 78. 050400040301 Robinson Run-Muskingum River Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	Mlwb	MAIS	ICI	QUAL	QHEI
Robinson Run-Muskingum River	2	300289	ROBINSON RUN UPST. COSHOCTON ETHANOL @ CO. RD. 271	OEPA SEDO	2010	1.35	20.00				VP	79.50

Figure 38. 050301011002 Salem Creek Map

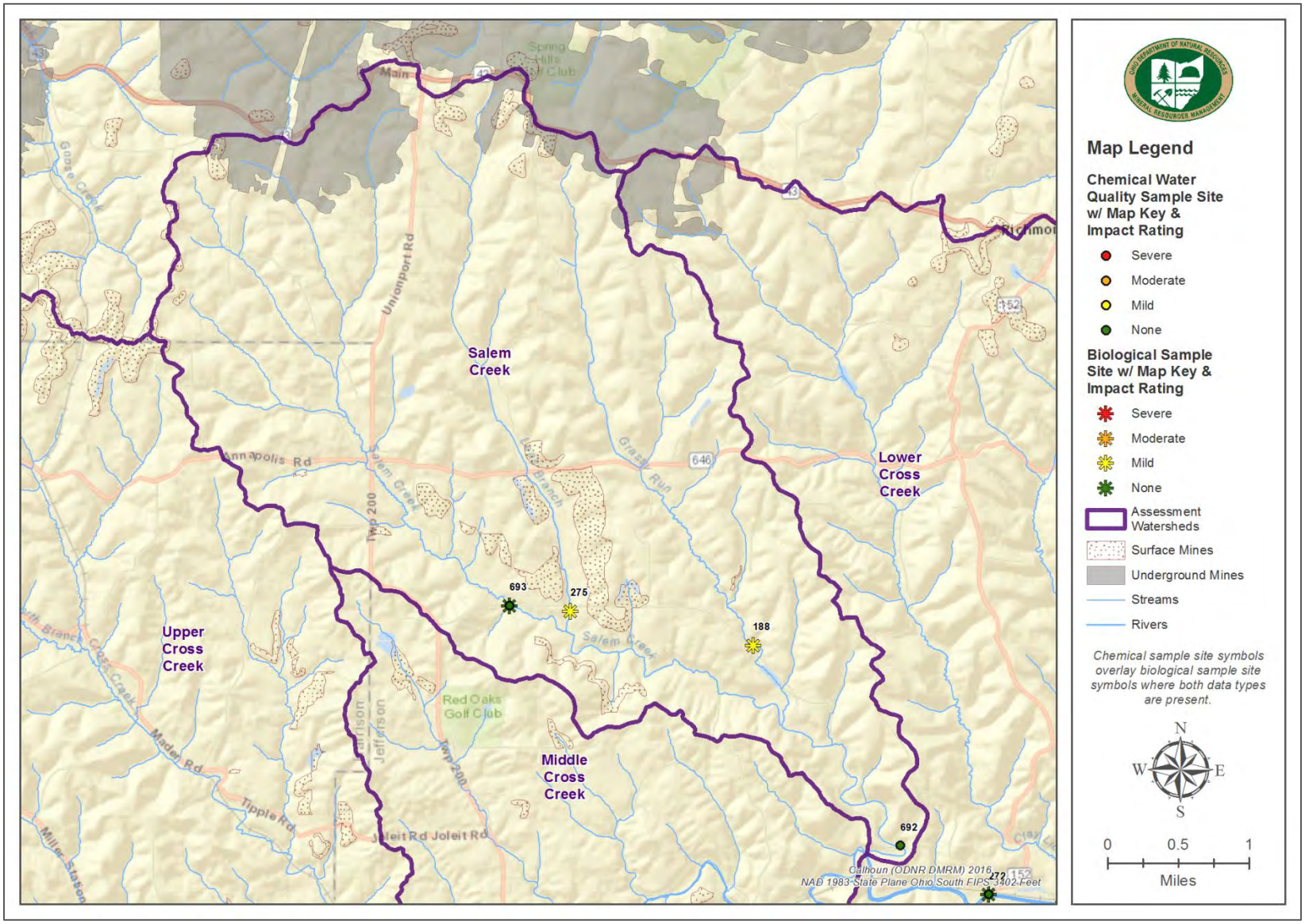


Table 79. 050301011002 Salem Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Salem Creek	692	SALCR01	Salem Ck @ Northeast of Fairplay TR 208	10/18/10	OEPA SEDO	7.66				-178.10
Salem Creek	693	SALCR15	Salem Ck @ TR 136	07/27/10	OEPA SEDO	7.84	782.40	0.52	<0.20	-200.10

Table 80. 050301011002 Salem Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Salem Creek	188	GRARU01	Grassy Run @ T-205, ust. Seminary pond	OEPA SEDO	2010	0.68	34.00				VG	52.50
Salem Creek	275	LEABR01	Leas Branch @ T-136	OEPA SEDO	2010	0.15	46.00				F	59.00
Salem Creek	693	SALCR15	Salem Ck @ TR 136	OEPA SEDO	2010	4.57	56.00				VG	65.00

Figure 39. 050400010505 Sherrick Run-Nimishillen Creek Map

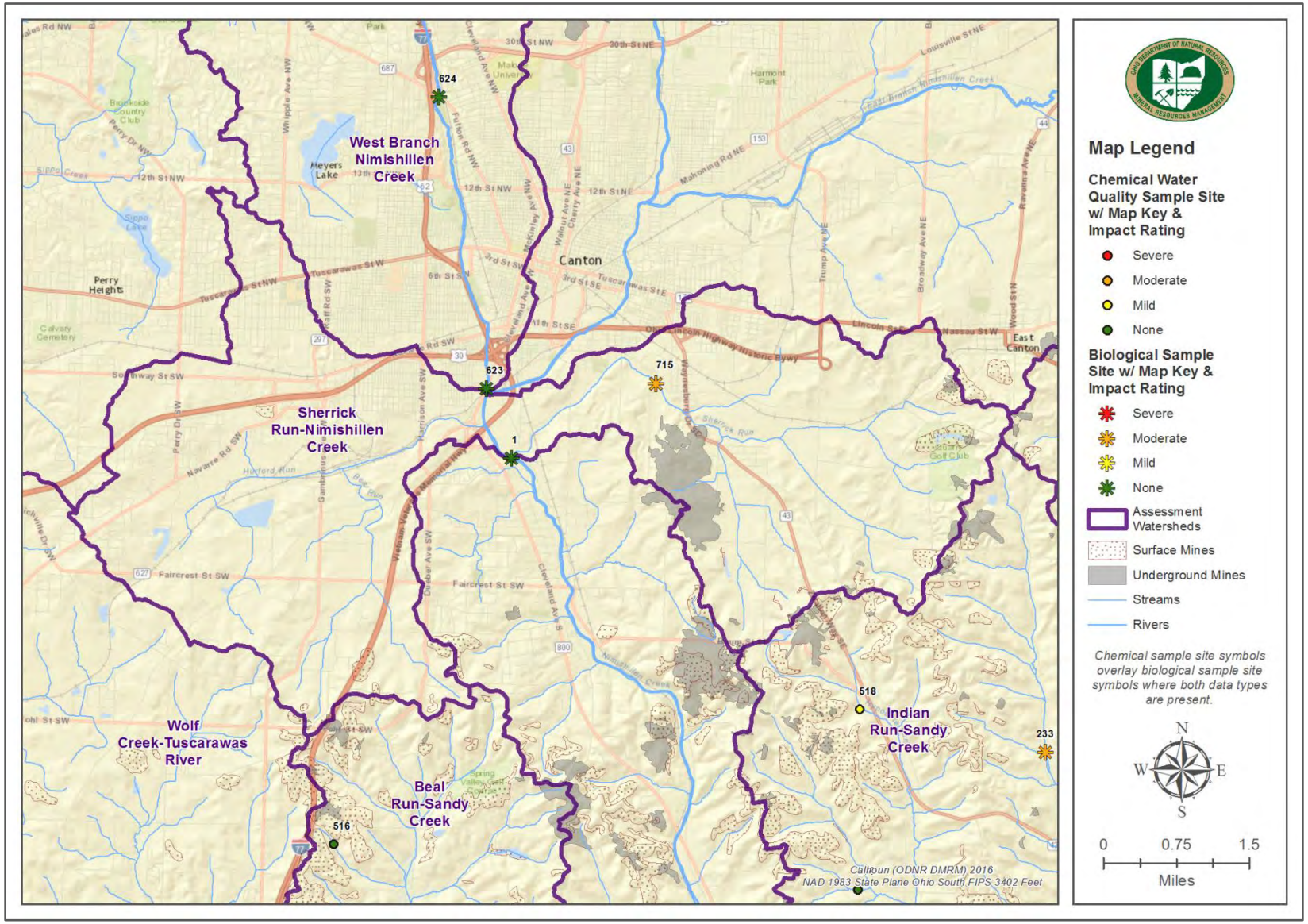


Table 81. 050400010505 Sherrick Run-Nimishillen Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Sherrick Run-Nimishillen Creek	1	300080	NIMISHILLEN CREEK UPST. SHERRICK RUN @ BAUHOF PARK	OEPA SEDO	2003	11.10	31.00	6.13		38.00		68.50
Sherrick Run-Nimishillen Creek	715	SHK010	Sherrick Run at Moore Ave.	ODNR DMRM	2011	8.53			8.00			

Figure 40. 050400011401 Skull Fork Map

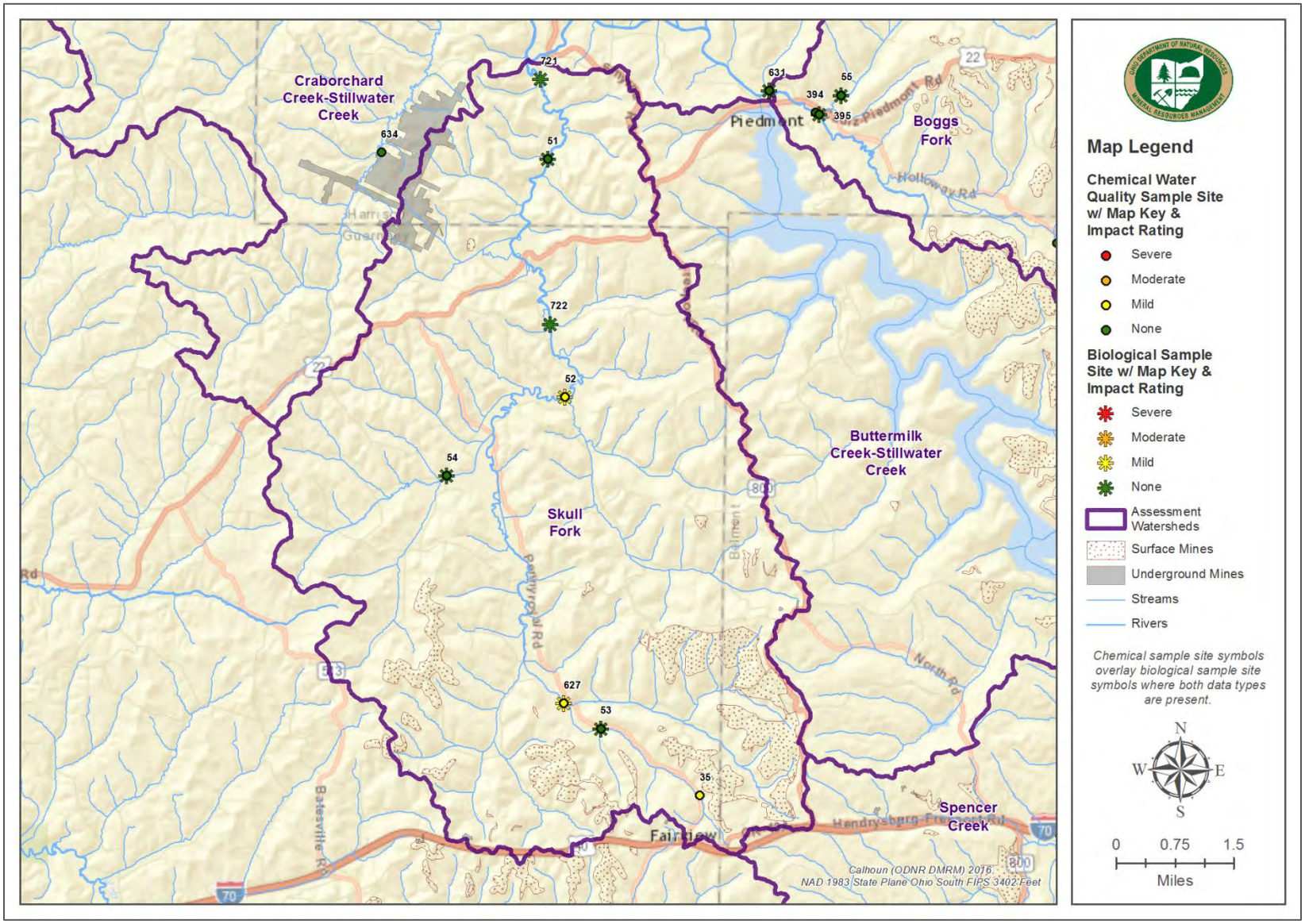


Table 82. 050400011401 Skull Fork Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Skull Fork	35	301666	TRIB. TO SKULL FORK N OF FAIRVIEW @ PENNY ROYAL RD.	09/01/11	OEPA SEDO	7.44	1160.00	1.39	11.30	-71.70
Skull Fork	51	301975	SKULL FORK @ COVERED BRIDGE RD.	08/23/12	OEPA SEDO	7.78	920.00	0.29	0.10	-59.60
Skull Fork	52	301976	SKULL FORK @ SKULL FORK RD.	08/06/12	OEPA SEDO	7.05	894.00	0.71	0.44	-47.20
Skull Fork	53	301977	TRIB. TO SKULL FORK (13.87) @ MCBRIDE LANE (TWP. RD. 9667)	08/06/12	OEPA SEDO	7.77	850.00	0.22	0.21	-84.90
Skull Fork	54	301978	MILLER FORK @ TYSON MILL RD.	08/06/12	OEPA SEDO	7.50	310.00	0.82	0.48	-77.20
Skull Fork	627	R09K31	SKULL FORK 5.4 MI. SE OF LONDONDERRY, DST. PENNY-ROYAL RD.	08/06/12	OEPA SEDO	7.69	1258.00	2.06	0.89	-72.30

Table 83. 050400011401 Skull Fork Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Skull Fork	51	301975	SKULL FORK @ COVERED BRIDGE RD.	OEPA SEDO	2012	2.20	41.00	8.23		34.00		70.30
Skull Fork	52	301976	SKULL FORK @ SKULL FORK RD.	OEPA SEDO	2012	6.80	48.00	7.37			F	53.00
Skull Fork	53	301977	TRIB. TO SKULL FORK (13.87) @ MCBRIDE LANE (TWP. RD. 9667)	OEPA SEDO	2012	0.62	22.00				MG	44.30
Skull Fork	54	301978	MILLER FORK @ TYSON MILL RD.	OEPA SEDO	2012	0.90	44.00				MG	42.00
Skull Fork	627	R09K31	SKULL FORK 5.4 MI. SE OF LONDONDERRY, DST. PENNY-ROYAL RD.	OEPA SEDO	2012	13.80	36.00				F	54.50
Skull Fork	721	SKF010	Skull Fork Mouth	ODNR DMRM	2011				15.00			
Skull Fork	722	SKF020	Skull Fork at bridge on Skull Fork Rd	ODNR DMRM	2012	36.00	44.00	7.30				59.00

Figure 41. 050901030104 Storms Creek Map

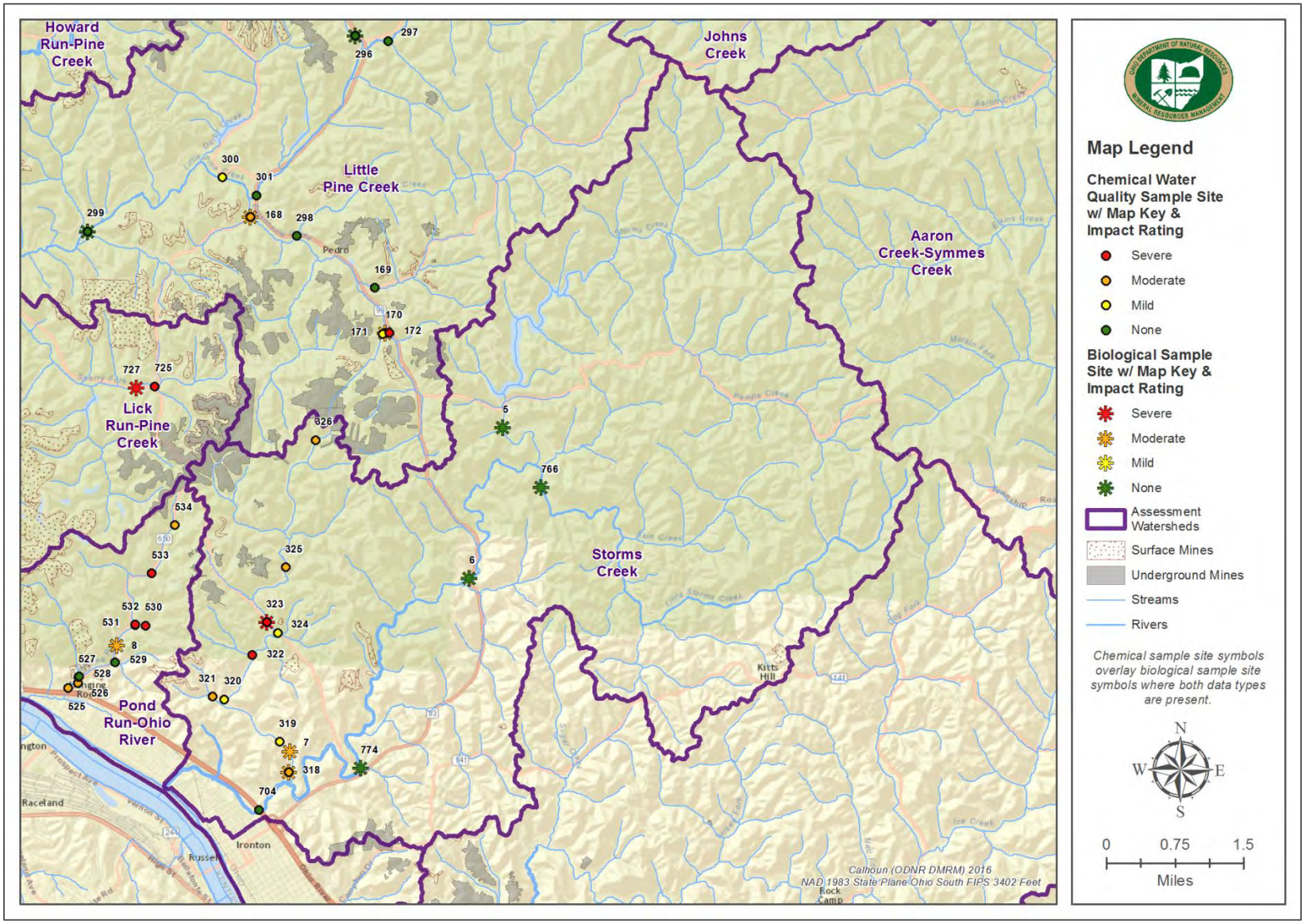


Table 84. 050901030104 Storms Creek Chemical Water Quality Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Sample Date	Data Source	pH s.u.	SpC µs/cm	Fe (Total) mg/l	Al (Total) mg/l	Net Acidity mg/l
Storms Creek	318	LSIC002	Little Storms Creek upst. Confluence with Storms Creek @ private drive (concrete bridge)	03/08/10	ODNR DMRM	6.22	337.00			
Storms Creek	319	LSIC003	Little Storms Creek @ Little Storms Creek Rd, 1st bridge upst. Mouth	03/08/10	ODNR DMRM	5.92	351.00			
Storms Creek	320	LSIC004	Little Storms Creek @ Little Storms Creek Rd, 2nd bridge upstream from mouth	03/08/10	ODNR DMRM	5.63	362.00			
Storms Creek	321	LSIC005	Unnamed tributary to Little Storms Creek @ Upper Twp Rd 203 - dst. 2 forks	03/08/10	ODNR DMRM	5.24	498.00			
Storms Creek	322	LSIC006	Unnamed tributary to Little Storms Creek @ Upper Twp Rd 151E, upstream culvert	03/08/10	ODNR DMRM	4.15	455.00			
Storms Creek	323	LSIC007	Little Storms Creek @ CR 21 (Porter Gap Rd) bridge	03/08/10	ODNR DMRM	4.86	359.00			
Storms Creek	324	LSIC008	Unnamed tributary to Little Storms Creek @ culvert under CR 21 -at abandoned iron furnace site	03/08/10	ODNR DMRM	5.64	300.00			
Storms Creek	325	LSIC009	Little Storms Creek adjacent Twp Rd 179 (LaGrange-Boyersville Rd).	03/08/10	ODNR DMRM	4.66	347.00			
Storms Creek	326	LSIC010	headwaters of Little Storms Creek adjacent Twp Rd 179, ditch next to road at private drive	03/08/10	ODNR DMRM	5.22	301.00			
Storms Creek	704	SCIC001	Storms Creek @ Little Storms Creek Road, under SR 52 overpass	03/08/10	ODNR DMRM	7.30	286.00			

Table 85. 050901030104 Storms Creek Biological Data

12 Digit HUC Watershed Name	Map Key	OWD* Site ID	Site Description	Data Source	Sample Year	River Mile	IBI	MIwb	MAIS	ICI	QUAL	QHEI
Storms Creek	5	300954	STORMS CREEK, ACCESS RD DST. LAKE VESUVIUS	OEPA SEDO	2010	10.10	52.00				G	81.50
Storms Creek	6	300955	Storms Creek @ SR 93	OEPA SEDO	2010	6.80	53.00				E	80.00
Storms Creek	7	300956	Little Storms Creek (lower trib at RM 1.8) at private drive	ODNR DMRM	2010	5.40	28.00					67.30
Storms Creek	318	LSIC002	Little Storms Creek upst. Confluence with Storms Creek @ private drive (concrete bridge)	ODNR DMRM	2010				8.00			
Storms Creek	323	LSIC007	Little Storms Creek @ CR 21 (Porter Gap Rd) bridge	ODNR DMRM	2010				4.00			
Storms Creek	766	W01K01	L. STORMS CREEK (UPPER trib at RM 9.23) UPST. GRAVEL LANE NEAR MOUTH	OEPA SEDO	2010	0.10	42.00				G	69.50
Storms Creek	774	W01P02	Storms Creek at Porter Gap Road	OEPA SEDO	2010		44.00	7.70			G	59.50

4.0 AMDAT DEVELOPMENT

A total of 36 priority 1 and priority 2 watersheds are considered a priority for AMDAT development based on the results of this assessment (Figure 5). Once an AMDAT is completed for a particular watershed, it will become eligible for AMD set-aside program funds to implement the plan. However, development of an AMDAT does not guarantee funding for implementation projects.

5.0 CAVEATS

AMD watershed identification, ranking, prioritization, and AMDAT development is an on-going process, and will likely continue to change as more data is collected and analyzed and/or conditions in the watershed change. The number of 12 digit HUC watersheds with AMD present could increase if new information about unknown mine drainage sources is obtained, or new sources develop from AML areas (i.e. mine blowouts). Watershed prioritization will likely change as well as more information is obtained. Watershed evaluations in this assessment were based on limited water quality information. Therefore, in many cases this analysis relied on the professional judgment of DMRM staff. Priority rankings could change as more water quality data are collected in these watersheds. Because of this, low priority watersheds are not completely “ruled out”, and should be still be considered for remediation if new information leads to a higher priority ranking. A shapefile of 12 digit HUC assessment watersheds will be managed by ODNR DMRM AMD program staff. Information regarding the presence / absence of AMD, ranking scores, and prioritization will be updated as needed.

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