Ohio Environmental Protection Agency

Study Plan for Fiscal Years 2012 and 2013 Supplemental 106 Funding

Field Year 2016 State Resource Water Assessment Monitoring

Division of Surface Water
May 9, 2016

Study Plan for

Fiscal Years 2012 and 2013 Supplemental 106 Funding

Field Year 2016 State Resource Water Assessment Monitoring

May 9, 2016

Grant # I01E00992
(State Grant # EPAFSUPP12)

EA^3 Project Name:
LWH/SRW Assessments (FFY12/13 106 Supplemental Gr.) 2013-15

Monitoring Objective

Sampling will be conducted to determine the appropriate tiered antidegradation category for named but very small streams (generally < 5.0 mi^2 drainages) currently assigned to the State Resource Water (SRW) category within several small watersheds in southern Ohio. These watersheds include (1) Sunfish Creek (Scioto), (2) Beaver Creek (Scioto), (3) Rocky Fork Paint Creek (Scioto), (4) Symmes Creek (Ohio), and (5) Raccoon Creek (Ohio). The selected small streams in the latter two watersheds will be included as part of the more intensive sampling of larger streams planned for 2016. The SRW category has been replaced by a tiered system of antidegradation categories which includes: 1) outstanding national resource waters, 2) outstanding state waters, 3) superior high quality waters, 4) general high quality waters, and 5) limited quality waters. By rule, all stream and river segments assigned to the SRW category are considered general high quality waters. SRW streams sampled as part of this initiative will focus on those for which there is some information or evidence suggesting that a category other than general high quality water may be warranted and which are clustered in watersheds for efficiency of sampling. Most of the streams selected also have unverified Warmwater Habitat (WWH) or Exceptional Warmwater Habitat (EWH) aquatic life uses, so an additional benefit will be the verification of the appropriate aquatic life use. A map of Ohio streams currently assigned to the SRW category is attached (Figure 1) and Table 1 lists all the 2016 streams to be sampled and provides relevant details for each. Figures 2-6 depict stream sampling sites in each of the five watersheds. Also included in Table 1 are two sites partially assessed in earlier years and for which some additional monitoring or follow-up is needed to reassess the designated Limited Warmwater Habitat (LWH) aquatic life use with the goal of recommending one of the suite of aquatic life uses available in the Ohio WQS.

Sampling Activities

Biological Community Assessment
The fish communities will be assessed once at each sampling site using headwater electrofishing methods. Macroinvertebrate communities will be assessed once at each sampling site with a qualitative multihabitat composite sample.

Physical Habitat Assessment
Physical habitat will be evaluated at each biological sampling site and pertinent attributes will be used in the overall assessment of the each streams' antidegradation category and aquatic life use.

Water Quality Field Parameters
Periodic site visits (1-3) to measure site water temperature, dissolved oxygen, pH, and conductivity will be conducted and results will be used in the overall assessment of the each streams' antidegradation category and aquatic life use. Biological field sampling crews should coordinate with CDO and SEDO staff to determine if they need to assist in this effort.

Results

- Results will be used to look at key biological community and physical habitat parameters used by Ohio EPA to determine the appropriate antidegradation category including: 1) presence of federal or state endangered, threatened, or special concern fish and invertebrate species, 2) number and prevalence of pollution sensitive fish species, 3) quality of the physical habitat as documented by Qualitative Habitat Evaluation Index (QHEI) scores, and 4) quality of fish and macroinvertebrate communities as reflected with biological index scores (Index of Biotic Integrity - IBI) and macroinvertebrate narrative evaluations.

- Results will be used to conduct aquatic life use attainability analyses supported by the data collected including IBI scores, macroinvertebrate narrative evaluations, and QHEI scores.

- Results of the above assessments will be used to recommend the appropriate tiered antidegradation category and verify the existing or recommend an appropriate tiered aquatic life use based on those currently defined in the Ohio Water Quality Standards.

Quality Assurance/Sampling Methods

Ohio EPA Manuals
All biological, physical habitat, field water quality, data processing, and data analysis methods and procedures adhere to those specified in the Surface Water Field Sampling Manual for water column chemisty, bacteria and flows (Ohio EPA 2015a) for field parameter measurement, Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio EPA 1987, 1989a, 2015b, 2015c) for biological assemblage assessment, and The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Ohio EPA 1989b, 2006) for physical habitat assessment.

Aquatic Life Use Attainment
Attainment/non-attainment of aquatic life uses will be determined by using biological criteria codified in Ohio Administrative Code (OAC) 3745-1-07, Table 7-15. Numerical biological criteria are based on multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community.

Performance expectations for the basic aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH] were developed using the regional reference site approach (Hughes et al. 1986; Omernik 1988). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance. Biological sampling results will be compared to WWH or EWH biocriteria for applicable ecoregions in Ohio.

Biological Community Assessment
The macroinvertebrates from each waterbody sampling location will be sampled qualitatively by collecting a multihabitat composite sample. This sampling effort consists of an inventory of all observed macroinvertebrate taxa from the natural habitats at each site with no attempt to quantify populations other than notations on the predominance of specific taxa or taxa groups within major macrohabitat types (e.g., riffle, run, pool, margin). Fish will be sampled once at each sampling location with pulsed DC headwater electrofishing gear. Detailed biological field and laboratory sampling protocols are

documented in the Ohio EPA manual *Biological Criteria for the Protection of Aquatic Life, Volume III* (2015c).

Stream Physical Habitat Evaluation

Physical habitat is evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Ohio EPA 1989b, 2006). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic faunas. Evaluations of type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle development and quality, and stream gradient are among the metrics used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values higher than 60 were generally conducive to the establishment of warmwater faunas while those which scored in excess of 75-80 often typify habitat conditions which have the ability to support exceptional faunas.

Water Quality Field Parameters

Water quality field parameters (temperature, dissolved oxygen, pH, and conductivity) will be measured 1-3 times at each location using field meters calibrated and maintained according to procedures specified in the Surface Water Field Sampling Manual for water column chemisty, bacteria and flows (Ohio EPA 2015a).

Table 1. Streams and sampling locations to be assessed in 2016 to resolve unverified but designated LWH and SRW (EWH or WWH) streams as part of the FFY12/13 106 Supplemental Grant project.

Name	HUC12	Basin	Stream Code	Station	Latitude	Longitude	Unverified ALU	River Mile	Drainage Area	Location
Sunfish Creek Basin SRW Sites										
Loys Run	05060002 12 06	Sunfish	02-801-000		39.009340	-83.062404	WWH	0.10	1.4	adj. Sunfish Creek Rd. (Rd. 21)
Bull Run	05060002 12 05	Sunfish	02-803-000	203364	39.045009	-83.147013	WWH	0.10	1.6	west of Tennyson dst. St. Rt. 32
Camp Run	05060002 12 05	Sunfish	02-805-000		39.032544	-83.181007	WWH	0.15	1.2	adj. Laurel Ridge Rd. (Rd. 27)
Georges Run	05060002 12 05	Sunfish	02-806-000		39.050870	-83.192021	WWH	0.10	0.9	upst. St. Rt. 32
Long Run	05060002 12 05	Sunfish	02-807-000		39.038386	-83.241029	WWH	0.10	2.0	upst. St. Rt. 32
Lick Run	05060002 12 04	Sunfish	02-812-000		39.086194	-83.188307	WWH	0.40	1.1	at McCoy Rd. (Rd. 235)
Sparcy (Spicy) Run	05060002 12 04	Sunfish	02-813-000		39.090633	-83.214125	WWH	0.15	2.2	end of Spicy Run Rd. (Rd. 233)
Dry Bone Creek	05060002 12 01	Sunfish	02-816-000		39.105522	-83.298224	WWH	1.60	4.4	dst. Drybone Rd. (Rd. 8)
Beaver Creek Basin SRW Sites										
Millers Run	05060002 13 03	Beaver	02-024-000		39.031313	-82.932398	WWH	0.10	1.2	at old RR crossing adj. Bobo Rd. (Rd. 65)
Fourmile Creek	05060002 13 03	Beaver	02-025-000		39.034802	-82.920662	WWH	0.35	5.1	upst. Germany Rd. (Rd. 66)-Coal Dock Rd. (Rd. 75) intersection
Fivemile Creek	05060002 13 03	Beaver	02-026-000		39.045257	-82.911553	WWH	0.25	1.6	end of Bumgardner Rd.
Millstone Run	05060002 13 02	Beaver	02-028-000		39.017091	-82.919136	WWH	0.15	0.9	dst. Millstone Rd. (Rd. 623)
Dutch Run	05060002 13 02	Beaver	02-029-000		39.003207	-82.917437	WWH	0.30	2.7	at Dutch Run Rd. (Rd. 68)
Swift Creek	05060002 13 02	Beaver	02-030-000		39.044281	-82.813272	WWH	2.00*	5.4	upst. Dutch Hollow Rd. (Rd. 528)
							*PEMSO map is Big Beaver RM 21.8; Swift Creek RM 2.0 if Swift Creek's confluence with Big Beaver is at RM 19.8.			
Rocky Fork Paint Creek Basin SRW Sites										
Factory Branch	05060003 05 05	Rocky Fork	02-531-000		39.200958	-83.386372	EWH	0.10	1.3	dst. Barrett Mill Rd. (Rd. 1) nr. Ferneau Rd. (Rd. 259)
Heads Branch	05060003 05 05	Rocky Fork	02-533-000		39.172316	-83.390101	EWH	1.60	3.3	at Cynthiana Rd. (Rd. 17) upst. Hickory Hills Lake
Puncheon Run	05060003 05 05	Rocky Fork	02-534-000	V10K33	39.198871	-83.413548	EWH	0.50	3.6	nr. end of W Rd. (Rd. 386)
Franklin Branch	05060003 05 05	Rocky Fork	02-535-000	V10K35	39.160027	-83.431913	EWH	1.90	5.6	at St. Rt. 506
Plum Run	05060003 05 04	Rocky Fork	02-536-000		39.173544	-83.458297	EWH	1.65	2.9	at Spruance Rd. (Rd. 195)
Blinco Branch	05060003 05 04	Rocky Fork	02-537-000		39.216253	-83.473118	EWH	1.85	3.1	dst. U.S. Rt. 50
Churn Creek	05060003 05 04	Rocky Fork	02-538-000		39.198036	-83.487318	EWH	1.10	1.9	upst. N. Shore Rd. (Rd. 27)
Smith Branch	05060003 05 04	Rocky Fork	02-539-000		39.166997	-83.487318	EWH	1.20	2.6	at Chestnut Rd. (Rd. 195)
Symmes Creek Basin SRW Sites										
Elkins Creek	5090101 10 04	Symmes	09-709-000		38.632700	-82.531000	WWH	1.73	3.4	adj. Elkins Creek Rd. (Rd. 5)
Brushy Buckeye Cr.	5090101 10 01	Symmes	09-716-000		38.710910	-82.552800	WWH	0.60	1.6	adj. Big Buckeye Rd. E
Slab Fork	5090101 10 01	Symmes	09-717-000		38.679500	-82.564800	WWH	0.45	2.5	adj. Slab Fork Rd. (Rd. 51)
Buffalo Creek	5090101 09 02	Symmes	09-719-000	200752	38.750800	-82.557500	WWH	5.00	3.1	at ford off Buffalo-Olive Rd. (Rd. 129)
Caulley Creek	5090101 09 02	Symmes	09-720-000	W02S01	38.737800	-82.519700	WWH	0.15	4.9	at Waterloo-Mount Vernon Rd. (Rd. 46)
Miller Creek	5090101 09 02	Symmes	09-721-000		38.754754	-82.524567	WWH	0.05	1.0	at Caulley Creek Rd. (Rd. 46)
Indian Creek	5090101 09 02	Symmes	09-723-000		38.756605	-82.562361	WWH	0.05	0.8	at mouth from Buffalo Creek at RM 5.6 off Buffalo-Olive Rd.
Little Buffalo Creek	5090101 09 03	Symmes	09-724-000		38.750560	-82.495900	WWH	1.20	2.6	at Carpenter Creek Rd. (Rd. 189)
Camp Creek	5090101 09 03	Symmes	09-725-000		38.763130	-82.459900	WWH	0.25	5.0	at Cadmus Rd. (Rd. 134)
Trace Creek	5090101 09 03	Symmes	09-726-000		38.771370	-82.434700	WWH	0.20	2.8	at St. Rt. 141
Wolf Creek	5090101 09 03	Symmes	09-729-000		38.814860	-82.435435	WWH	0.05	0.9	at Symmes Creek Rd. (Rd. 56)
Dirtyface Creek	5090101 08 01	Symmes	09-731-000		38.805580	-82.546100	WWH	4.70	3.0	adj. C, H, & D Rd. (Rd. 76)
Clear Fork	5090101 08 02	Symmes	09-732-000		38.845170	-82.538600	WWH	0.70	3.1	at Shaffer Rd. (Rd. 78)
Hewitt Run	5090101 08 02	Symmes	09-738-000		38.911600	-82.614400	WWH	0.75	4.6	at Franklin Valley Rd. (Rd. 13)
Cherry Fork	5090101 08 03	Symmes	09-739-000		38.896090	-82.486900	WWH	0.40	2.5	at Tom Parry Rd. (Rd. 68)
Sugar Run	5090101 08 03	Symmes	09-741-000	200756	38.933200	-82.519400	WWH	0.05	4.7	at mouth from Symmes Creek at RM 69.48 off C, H, & D Rd.

Raccoon Creek Basin SRW Sites										
Deer Creek	05090101 04 04	Raccoon	09-511-000	W03P15	38.951900	-82.368900	WWH	0.20	5.9	at St. Rt. 325 nr. mouth at Vinton
McConnel Run	05090101 04 01	Raccoon	09-528-000		39.221381	-82.516539	EWH	1.98	0.8	at Lake Rd. (Rd. 15)
Williams Run	05090101 05 02	Raccoon	09-547-000	203956	39.058196	-82.306958	EWH	0.10	3.8	at mouth SE of Wilkesville
Sandy Run	05090101 02 05	Raccoon	09-568-000	203966	39.333708	-82.331951	WWH	2.70	5.0	at King Hollow Rd. (Rd. 4)
Little Sandy Run	05090101 02 05	Raccoon	09-569-000		39.312796	-82.360733	WWH	0.40	1.5	at St. Rt. 278
LWH Sites										
Rush Run	05040001 13 03	Stillwater	17-376-000	301983	40.176390	-81.135404	LWH	0.30	1.9	at Rush Run Rd. (Rd. 360)
Beards Run	05040003 09 06	Walhonding	17-614-000	301021	40.394910	-81.845820	LWH	0.03	2.7	at Co. Rd. 12

Figure 1. Ohio streams assigned State Resource Water designations with locations of watersheds where verification of antidegradation category and aquatic life use will be determined in 2016.

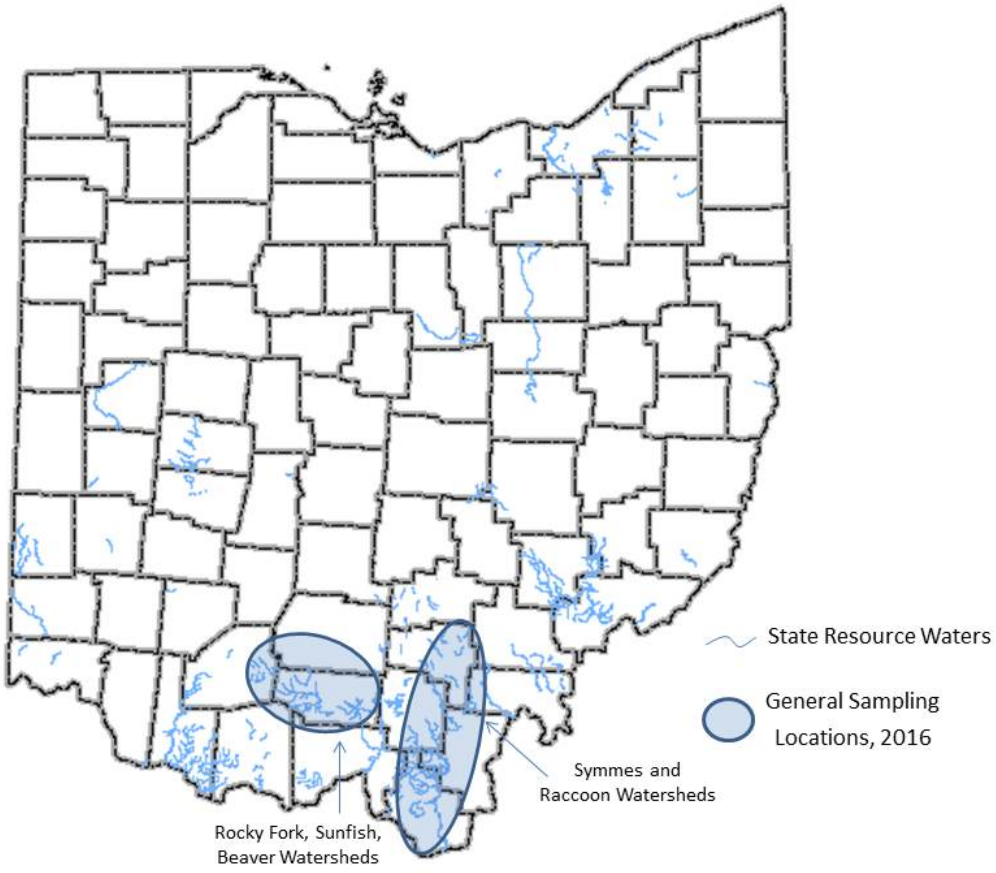


Figure 2. Sunfish Creek watershed sampling locations, 2016.

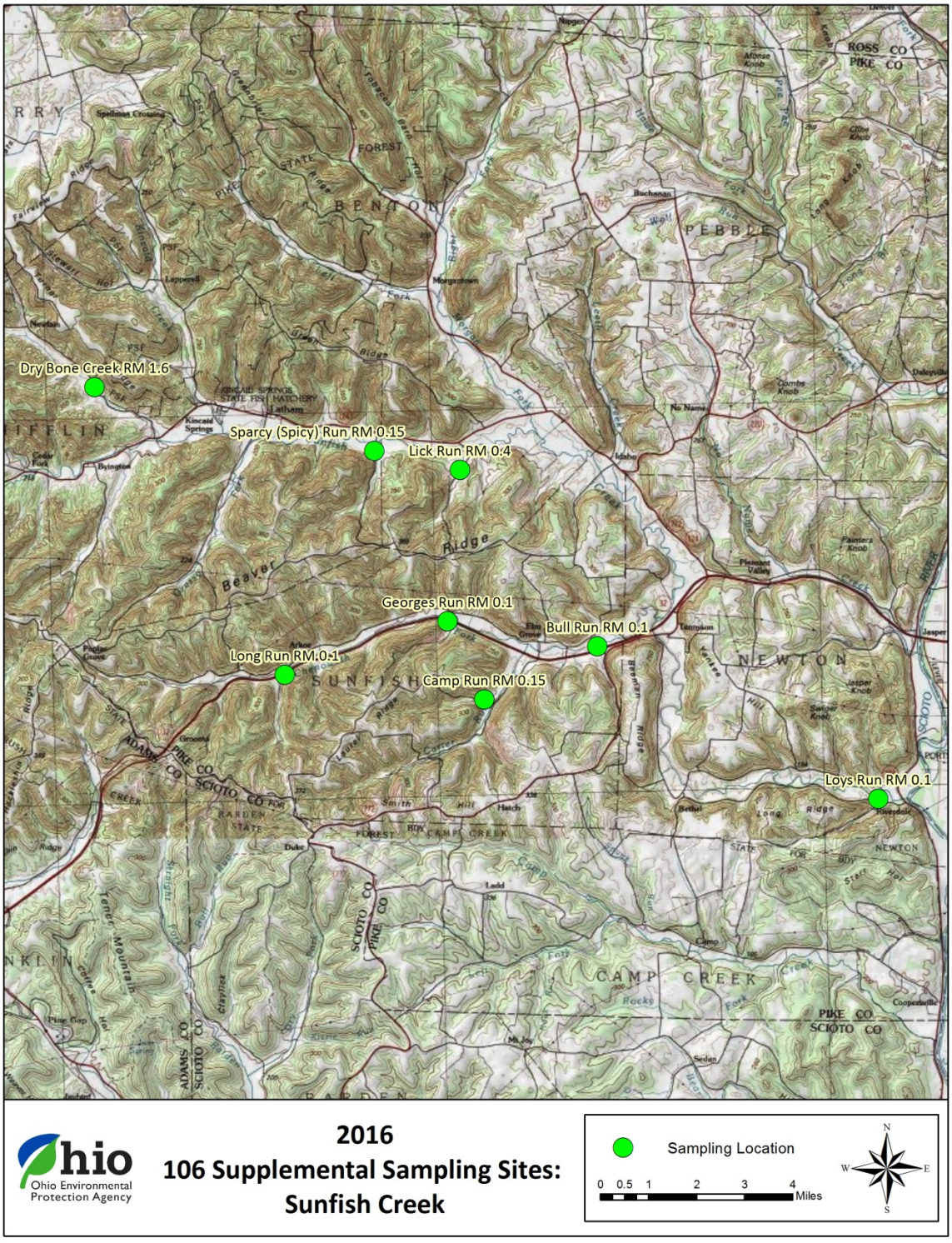


Figure 3. Beaver Creek watershed sampling locations, 2016.

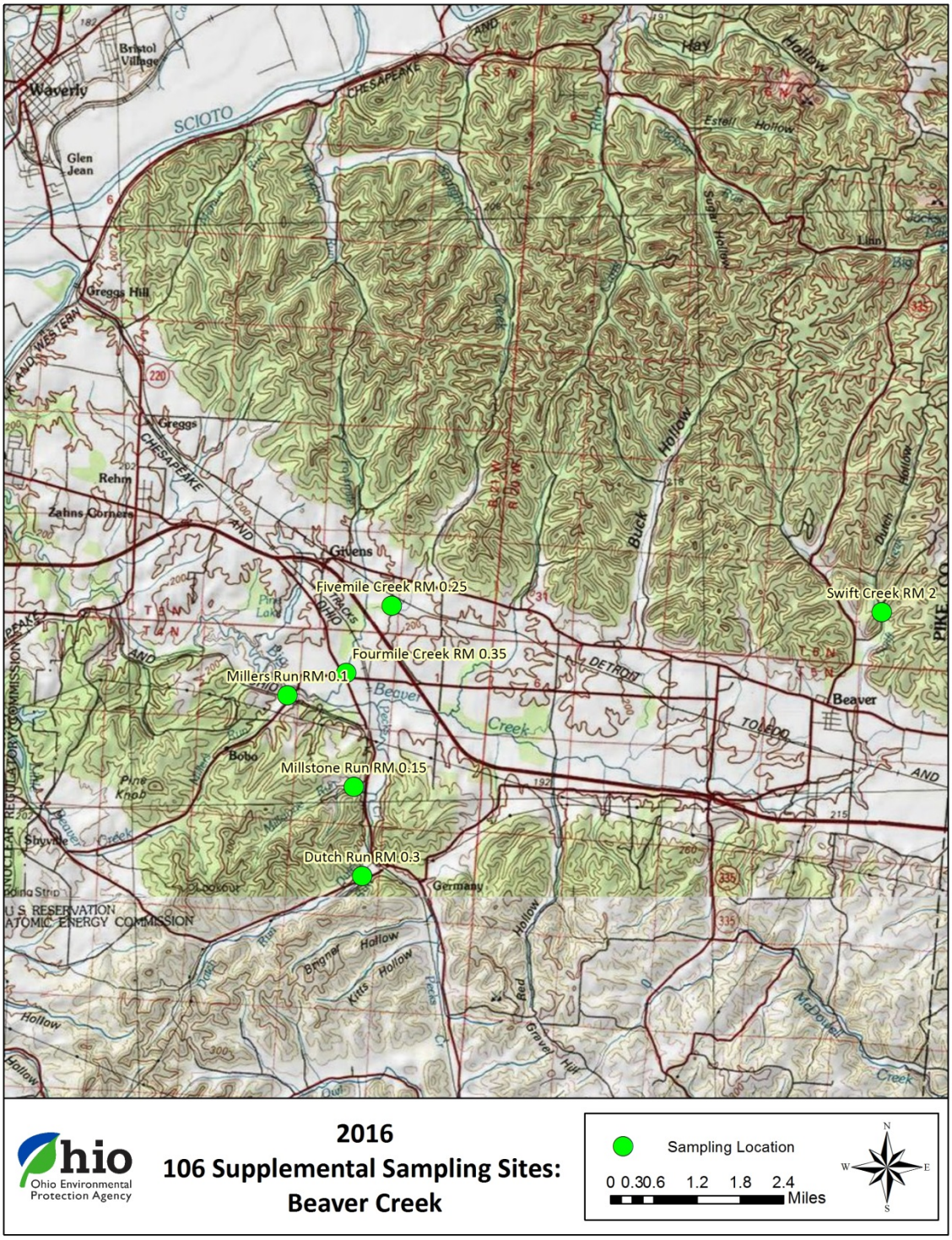


Figure 4. Rocky Fork Paint Creek watershed sampling locations, 2016.

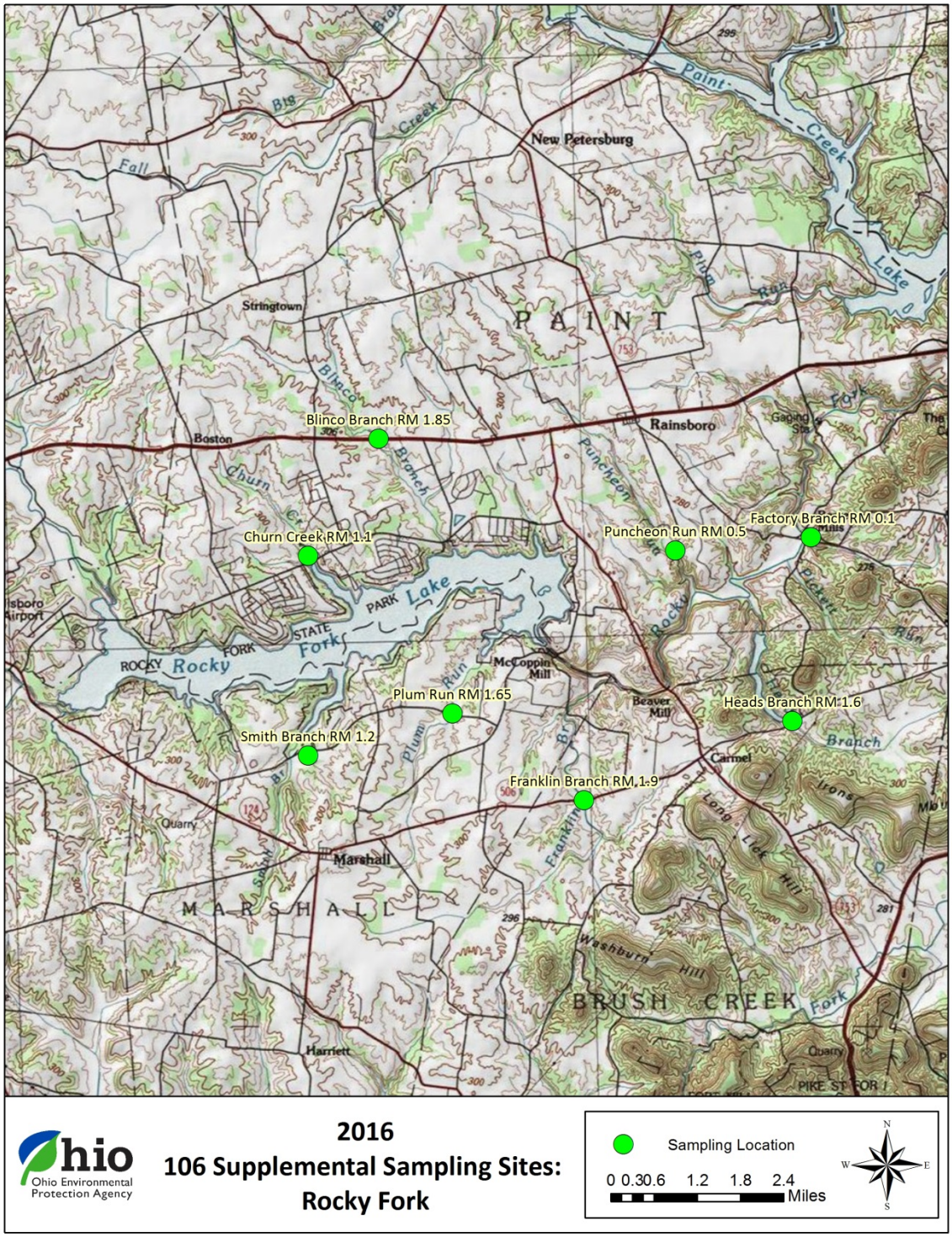


Figure 5. Symmes Creek watershed sampling locations, 2016.

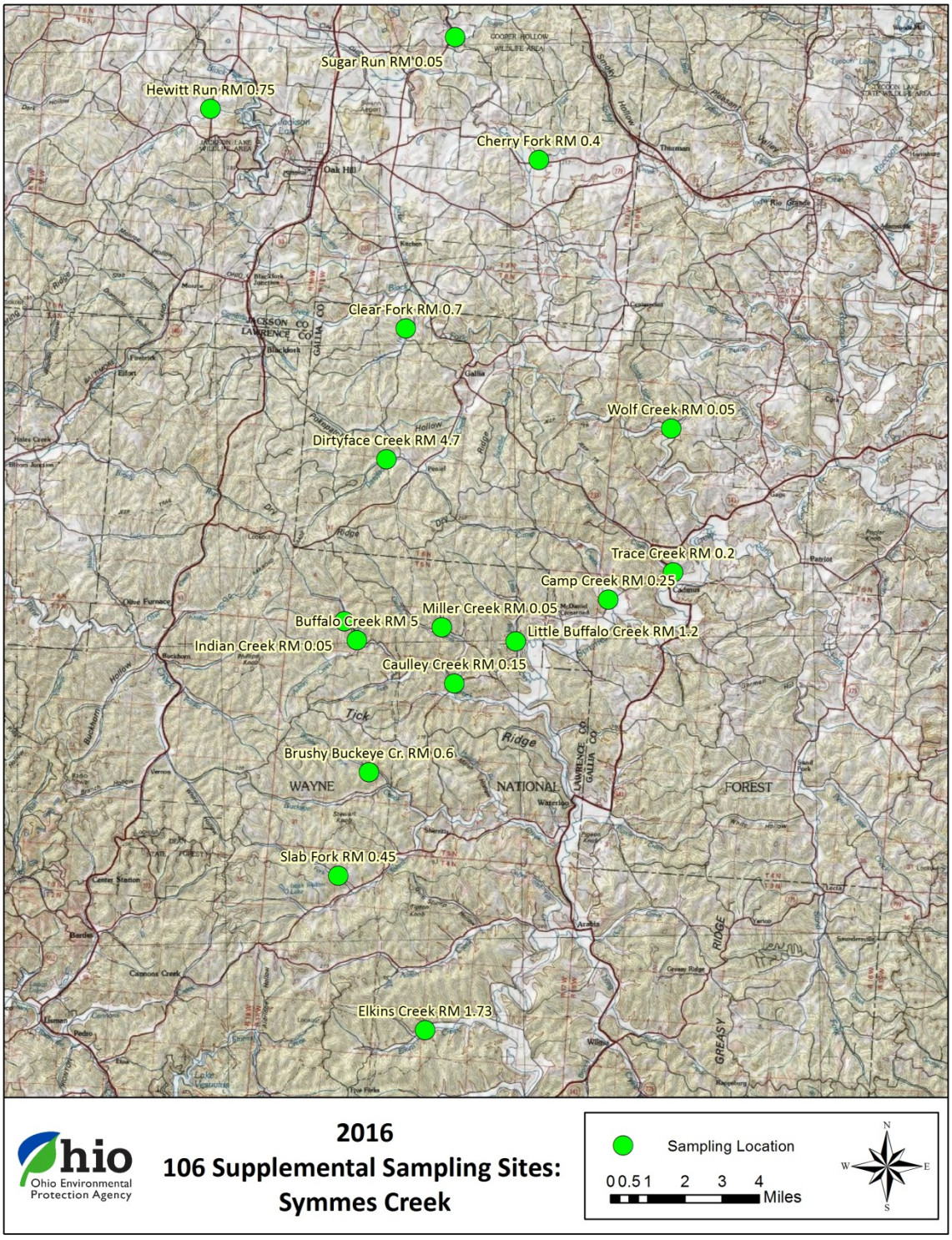
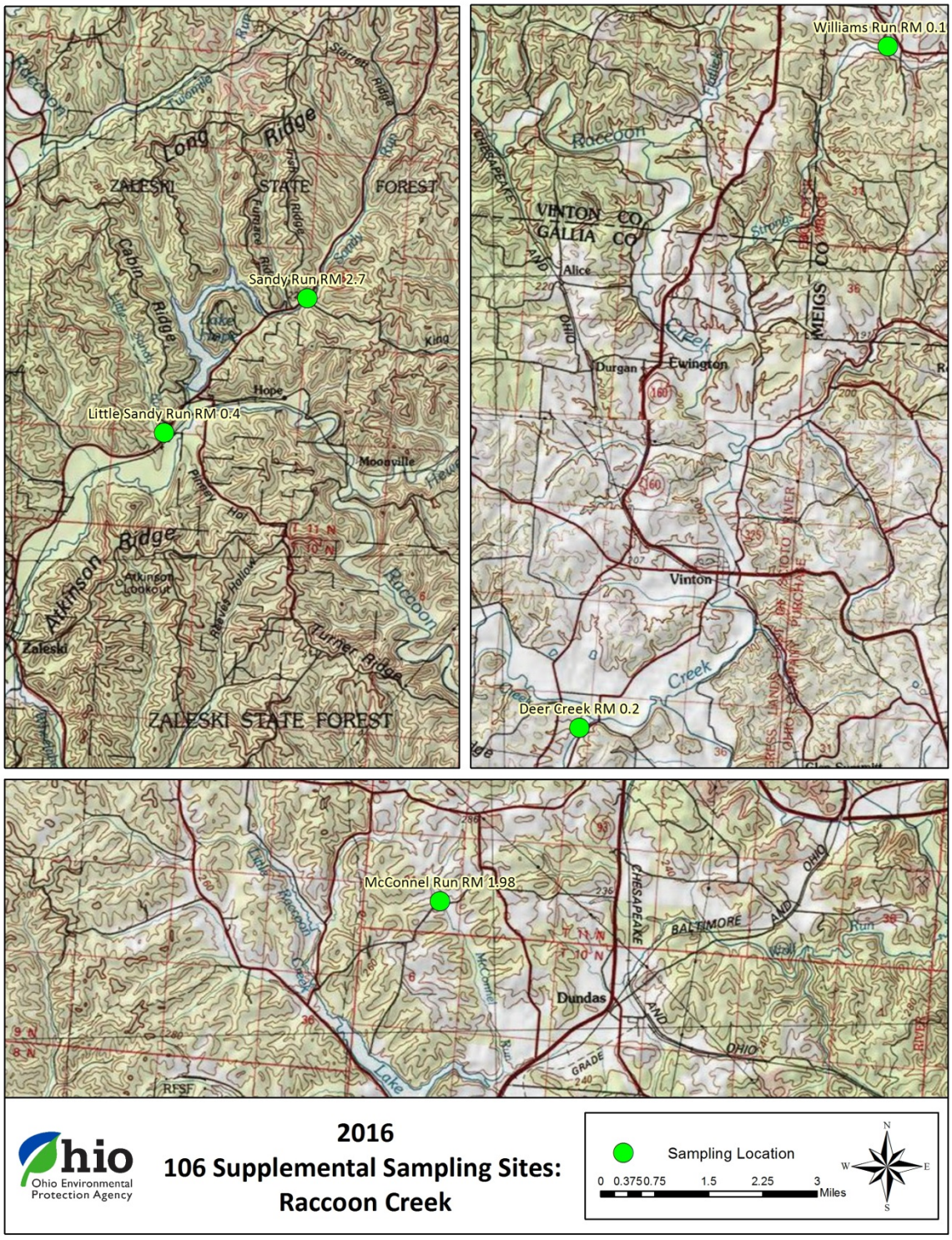


Figure 6. Raccoon Creek watershed sampling locations, 2016.



References

Hughes, R.M., D.P. Larsen, and J.M. Omernik. 1986. Regional reference sites: a method for assessing stream pollution. Env. Mgmt. 10(5): 629-635

Karr, J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. Env. Mgmt. 5(1): 55-68.

Ohio Environmental Protection Agency. 2015a. Surface water field sampling manual for water column chemistry, bacteria and flows. Div. of Surface Water, Columbus, Ohio. Version 5.0, July 31, 2015.

___. 2015b. 2015 Updates to Biological criteria for the protection of aquatic life: Volume II and Volume II Addendum. Users manual for biological field assessment of Ohio surface waters. Div. of Surface Water, Ecol.Assess. Sect., Columbus, Ohio. May 8, 2015.

___. 2015c. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Tech. Rept. EAS/2015-06-01. Div.of Surface Water, Ecol. Assess. Sect., Columbus, Ohio. September 23, 2015.

___. 2006. Methods for assessing habitat in flowing waters: Using the Qualitative Habitat Evaluation Index (QHEI). Ohio EPA Tech. Bull. EAS/2006-06-1. Div. of Surface Water, Ecol. Assess. Sect., Columbus, Ohio.

___. 1989a. Addendum to Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.

___. 1989b. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Division of Water Quality Planning and Assessment, Columbus, Ohio.

___. 1987. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.

Omernik, J.M. 1988. Ecoregions of the coterminous United States. Ann. Assoc. Amer. Geogr. 77(1): 118-125.