June 12, 2006

Final Study Plan

for the

2006 Biological and Water Quality Survey

of the

Paint Creek Basin

Clark, Clinton, Greene, Highland, Fayette, Madison, Ross and Pickaway Counties, Ohio

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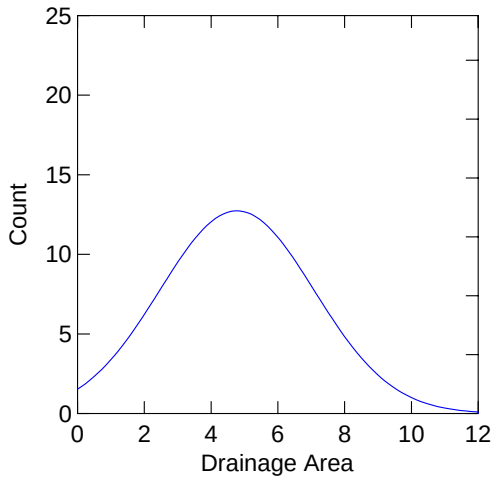
Broad Issues

Geographic Scope and Study Objectives
The biological, habitat and water quality of the Paint Creek basin will be surveyed in 2006. The geographic scope and sampling locations within the basin are shown the Figure 1, and detailed in Table 1. The number of samples by sample type is given in Table 2. Results of the survey will be used to determine the status of aquatic life uses, status of recreational uses, assign causes and sources of impairment where appropriate, assess performance of Nation Pollution Discharge Elimination System (NPDES) permitted dischargers, and support development of Total Maximum Daily Loads for stream segments identified as impaired or threatened.

Probability Sample of Small Streams Stratified by Glacial Moraine Deposit Type and Landuse
Catchments of 87 small streams (defined *ad hoc* as those whose catchment drainage areas are less than 10 mi^2, but average about 5 mi^2) within the Paint Creek watershed were categorized by glacial moraine type and land use. Moraine type was stratified as Wisconsin ground moraine, Wisconsin end moraine, and Illinoisan. Land use within moraine strata was classified as either being primarily agricultural, or as having a significant amount of forested land cover within the catchment. Here, a significant amount was defined *ad hoc* as more than ten percent. Ten streams were then selected randomly within strata. All sites classified as Illinoisan were also in the forested category. No Wisconsin ground moraine sites were forested. Of the Wisconsin end moraine sites, seven were forested, so all were included in the sample. The net result is that thirty-seven sites were randomly selected: 10 Wisconsin-end moraine agricultural, 7 Wisconsin-end moraine forested, 10 Wisconsin ground moraine agricultural, and 10 Illinoisan forested. The distribution of drainage areas and summary statistics for the randomly selected sites are give in the accompanying graphics below. The objective of the small stream probability sample is to help quantify factors limiting to, or facilitating, aquatic life use attainment in small streams within the Paint Creek basin.



	Drainage Area
Minimum	1.7000
Maximum	11.0000
Median	4.0000
Mean	4.7730
Standard Dev	2.3176
Skewness(G1)	0.6484
SE Skewness	0.3876
Kurtosis(G2)	-0.2593
SE Kurtosis	0.7587

Samples to Support Nutrient Study
Periphyton and water column samples for determination of chlorophyll a concentrations are planned for n sites. These sites require at least one water column or periphyton sample collected between late July and early September following a minimum of two weeks of stable, low-flow. For a given sampling event (either periphyton or water column), one composite sample per site will be split among three filters for later analysis. Attention district staff: on the day you collect the water column chlorophyll sample, please also collect a dissolved P sample. Datasondes are requested for each nutrient site.

Sentinel Sites
To aid in the development of a TMDL model(s), sentinel sites have been established at thirteen designated locations (Table 1). At each sentinel site, samples are collected monthly beginning prior to the routine field season that starts on June 15th to test for routine water chemistry parameters, pesticides (methods 525.2, 531.1, and 547), and stream stage is measured to the nearest hundredth of a foot, as the water line against a designated bridge piling or abutment. Sampling events at sentinel sites should cover the range of stream flow from the 10th to 90th percentiles.

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

The components of the TMDL process supported by this survey are primarily the identification of impaired waters, verification (and redesignating if necessary) of beneficial use designations, gathering ambient information that will factor into the wasteload allocation, and ascribing causes and sources of use impairment. These data are necessary precursors to the development of effective control or abatement strategies.

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Aquatic Life Use Designations
Previously unassessed streams (named and unnamed) within the study area have aquatic life use designations made prior to standardized approaches to the collection of physical habitat and

biological samples. Consequently their aquatic life use designations are unverified. Furthermore, many water bodies within the study area are entirely unclassified (no existing beneficial use designations). The Ohio EPA is obligated to review, evaluate, or recommend (where appropriate) beneficial uses prior to basing any permitting actions on existing, unverified designations, or wholly unclassified water bodies.

Specific Issues

Table 1 lists the location, Ohio EPA river-code and river-mile, STORET station, USGS 7.5' topographic map, the samples to be collected, and a brief description of the rationale for each site. Table 1 was excerpted from an electronic file (sent with this distribution as an attached Excel spread sheet) containing geo-location information. The survey sites are grouped by 11-digit Hydrologic Unit (HUC_11), and listed in river-code and river-mile order.

The following publicly owned wastewater treatment plants are being evaluated:

Facility	**Receiving Stream**
Bloomingburg WWTP	East Fork Paint Creek
Jeffersonville WWTP	Sugar Creek
New Holland WWTP	North Fork Paint Creek
South Solon WWTP	Rattlesnake Creek
Washington Court House WWTP	Paint Creek
Pleasant Valley Reg Sewer District	North Fork Paint Creek
Frankfort WWTP	North Fork Paint Creek
Greenfield WWTP	Paint Creek
Hillsboro WWTP	Clear Creek
Leesburg WWTP	Lees Creek
Rocky Fork Regional WWTP	Rocky Fork (Lake)

Other NPDES dischargers being evaluated include:

Facility	**Receiving Stream**
Mead Paper Company	Paint Creek

Public Water Supply

Two communities in the study area rely on surface waters as their source for public water supply: Washington Court House and Hillsboro. A full suite of samples (biological, habitat, sediment, datasondes and water quality+organics are requested upstream from the source intake.

Unsewered Communities

Potential contamination of surface waters from poorly or untreated sewage emanating from the unsewered communities of New Petersburg, East Monroe, New Martinsburg, Octa, Milledgeville, and Rainsboro will be screened with water quality grab samples.

AFOs

The following small streams in the study either have animal feeding operations (AFOs) within or in close proximity to the their catchments and likely receive land applied manure.

Thompson Creek - Natural Pork Production II LLC - Midway facility
Trib to Rattlesnake Creek - Meerland Dairy
Vallery Ditch - Twin Oak Dairy
William Cathcart Ditch - Stardust Dairy
Mud Run - Proposed Swine farm, near New Holland

Biological, habitat and water quality samples are planned for each of these streams.

Sampling Effort

Water Chemistry

Water column chemistry and bacteria samples will be collected from 135 stations, 11 WWTP effluents and 1 industrial effluent within the study areas. Water column grab samples will be collected 6 times from all locations greater than or equal to 20 square miles in drainage area and all reference sites. Water column organic samples will be collected from 28 locations

In addition to the conventional grab samples, there are eight sites from which district staff are requested to provide one filtered water column samples for chlorophyll and dissolved phosphorus between late July and mid-September, following at least two weeks of stable, low flows.

Effluent samples will be collected during each sampling run from the Bloomburg, Jeffersonville, New Holland, South Solon, Washington Court House, Pleasant Valley Reg Sewer District, Greenfield, Hillsboro, Leesburg, and the Rocky Fork Regional WWTPs, and the Mead Paper Co. 001 outfall to Paint Creek.

Datasonde deployment is requested for eleven stations within the study area to characterize diel water quality. If possible, the deployment of continuous monitors should coincide with typical low summer/fall flows (i.e., approaching $Q_7 10$). The OEPA DSW modeling section will be responsible for deployment of the datasonde units. A list summarizing field and laboratory load (stations, number of samples, and parameters for analysis etc.) can be found in Table 2.

Sediment Chemistry

Sediment samples will be collected at 20 stations within the study area. Analysis will include an organic scan (BNAs, PCBs, TOC, and Pesticides), a full metals scan, ammonia-nitrogen, total phosphorus, total organic carbon, and sediment particle size at all sites except for four small stream sites as noted in Table 1. At those four sites, only ammonia-nitrogen, total phosphorus, total organic carbon, and sediment particle size will be measured. Given the limited laboratory allocation, sediment and metal-organic sampling stations are located at reference sites and upstream from public water supply treatment plants in Hillsboro and Washington Court House.

Locations of all sediment sampling stations are listed in Table 1.

Benthic Macroinvertebrate Assessment

The condition of the macrobenthos will be evaluated at 123 locations. Artificial substrate samples (quantitative) will be collected by at 62 stations within the study area. Qualitative benthic macroinvertebrate samples (natural substrates) will be collected at 61 locations. Locations of benthic macroinvertebrate sampling stations and type of sample required are listed in Table 1.

Fish Community Assessment

The condition of the fish assemblages within the study area will be evaluated at 123 locations. Multiple pass fish community samples will be collected at 62 sites. Single pass fish community samples will be collected at 61 stations. Single pass evaluations will be limited to headwaters, baring reference sites or significant permit issues.

Table 1. Streams, locations and samples to be collected during the 2006 Biological and Water Quality Survey of the Paint Creek basin.

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 010							
02-581-000		**Big Run**					
V10K83	1.80	Lewis Road	Washington Court House	Random Small Stream	Bq, F, C	CDO	3.7
02-580-000		**East Fork Paint Creek**					
V10W23	8.60	Lewis Rd.	Washington Court House	Prior Sample	B, F, C	CDO	28.0
V10K84	6.30	Bloomburg WWTP	Washington Court House	Effluent	E	CDO	0.0
V10W24	5.10	Matthews Rd.	Washington Court House	Prior Sample	B, F, C	CDO	33.0
V10W25	0.70	U.S. Rt. 22	Washington Court House	Sentinel	B, F, Co, D	CDO	50.0
02-500-000		**Paint Creek**					
V10W18	96.00	Charleston-Chillicothe Road	Jeffersonville	Prior Sample	Bq, F, C	CDO	15.0
V10W20	80.00 R	adj. Wildwood Rd.	Washington Court House	Prior Sample	B, F, Co, S	CDO	39.0
V10S36	75.30 R	Bloomingburg Road	Washington Court House	Prior Sample	B, F, Co, S	CDO	58.0
V10S35	73.30	ust/adj SR 41, ust Washington CH PWS	Washington Court House	Prior Sample	B, F, Cbo, D, S, ch	CDO	60.0
V10K87	71.40	Washington Court House PWS	Washington Court House	PWS	Cbo	CDO	0.0
V10W21	70.90	at park, at Washington	Washington Court House	Prior Sample	B, F, C	CDO	65.0
V10S34	69.70	upst. Washington Court House	Washington Court House	Sentinel	B, F, Co, D	CDO	67.0
V10S26	69.45	Washington Court House WWTP	Washington Court House	Effluent	E	CDO	0.0
V10W02	69.40	Washington Court House	Washington Court House	Mix Zone	B, F, C	CDO	67.0
V10W03	69.20	Dst Washington C. H. WWTP	Washington Court House	Prior Sample	B, F, C	CDO	67.0
02-580-002		**Vallery Ditch**					

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 010							
02-580-002		**Vallery Ditch**					
V10K86	2.30	Prairie Road - AFO	Midway	AFO	Bq, F, Cb	CDO	5.5
02-580-001		**William Cathcart Ditch**					
V10K85	0.20	SR 38 - AFO	Midway	Random Small Stream/AFO	Bq, F, C	CDO	3.8

STORET	RM		LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 020								
02-579-001			**Missouri Ditch**					
V10K80	1.60		Harmony	Milledgeville	Random Small Stream	Bq, F, C	CDO	6.4
02-579-000			**Sugar Creek**					
V10K82	36.90		Selsor Moon Road	Florence	Unsampled Stream/Reach	Bq, F, C	CDO	5.3
V10W26	29.20		McKillip Road	Jeffersonville	Prior Sample	B, F, C	CDO	24.0
V10K81	25.90		Jeffersonville WWTP	Jeffersonville	Effluent	E	CDO	0.0
V10W27	24.80	R	Creamer Road	Jeffersonville	Prior Sample	B, F, Co, S	CDO	32.0
V10W28	18.60		Ford Road	Milledgeville	Prior Sample	B, F, C	CDO	47.0
V10W29	12.00		US 22	Milledgeville	Prior Sample	B, F, C	CDO	62.0
V10W30	5.40		Mark Road	New Martinsburg	Prior Sample	B, F, C	CDO	71.0
300050	4.20		Armbrust Rd	New Martinsburg	Sentinel	B, F, Co, D	CDO	75.0

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 030							
02-561-000		**Grassy Branch**					
V10K68	8.70	Marchant-Luttrell Road	Bowersville	Random Small Stream	Bq, F, C, Q, S	CDO	5.2
02-550-002		**Maple Grove Creek**					
V10K73	1.60	Pleasant View Road	Jamestown	Random Small Stream	Bq, F, C, Q	CDO	2.3
02-550-000		**Rattlesnake Creek**					
V10W32	40.40	SR 734	Jeffersonville	Prior Sample	Bq, F, C	CDO	15.5
V10W33	38.10	Ust US 35	Milledgeville	Prior Sample	B, F, C	CDO	25.0
V10S37	35.20	Milledgville-Octa Rd	Milledgeville	Prior Sample	B, F, C	CDO	34.0
V10W37	31.40	SR 729	Milledgeville	Prior Sample	B, F, Cb	CDO	40.0
V10W38	24.00	Snow Hill Road	Memphis	Prior Sample	B, F, C	CDO	110.0
	15.00 R	Zimmerman Road (near jct w/ Penn Rd)	New Martinsburg	Prior Sample	B, F, Co, D, S	CDO	123.0
V10S05	13.30 R	Fishback Rd.	New Martinsburg	Prior Sample	B, F, Co, D, S, ch	CDO	137.0
02-550-003		**Trib to Rattlesnake Creek**					
V10K75	0.20	South Solon WWTP	Jeffersonville	Effluent	E	CDO	0.0
02-550-003		**U.T. to Rattlesnake Creek**					
V10K74	1.10	Pleasantview Road & SR 734	Jamestown	AFO	Bq, F, Cb	CDO	4.6
02-563-001		**UT to Wilson Creek**					
V10K71	0.40	US 22	Sabina	Random Small Stream	Bq, F, C	CDO	5.5

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 030							
02-562-000		**West Branch Rattlesnake Creek**					
V10K72	11.40	Hargrave	Bowersville	Random Small Stream	Bq, F, C, Q, S, ch, D	CDO	6.3
V10S03	4.30 R	Ust SR 729	Milledgeville	Prior Sample	B, F, Co, S	CDO	19.0
V10K69	2.80	dst confluence w/ Wilson Creek	Milledgeville	Prior Sample	B, F, C	CDO	41.6
02-563-000		**Wilson Creek**					
V10K70	2.80	dst Sabina WWTP (access at WWTP)	Sabina	Prior Sample	Bq, F, C	CDO	19.5

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 040							
02-553-000		**Big Branch**					
V10K49	1.60	Hardins Creek Road	Greenfield	Random Small Stream	Bq, F, C	SWDO	3.7
02-556-000		**Bridgewater Creek**					
V10K56	0.20	Monroe Rd	Leesburg	Chemical	C	SWDO	0.0
02-552-000		**Fall Creek**					
V10K48	7.20	Dst SR 138	Leesburg	Unsampled Stream/Reach	Bq, F, C	SWDO	3.9
V10K47	1.60	Bectal Road	Greenfield	Unsampled Stream/Reach	Bq, F, C	SWDO	13.3
02-554-000		**Hardin Creek**					
V10K57	5.80	Black Rabbit Road	Leesburg	Random Small Stream	Bq, F, C	SWDO	2.8
V10K50	1.10	ust Big Oak Road	Greenfield	Prior Sample	B, F, C	SWDO	20.8
02-558-000		**Lees Creek**					
V10K67	10.40	Redbud Road	Memphis	Unsampled Stream/Reach	Bq, F, C	SWDO	14.3
V10W44	4.50	US 62	Leesburg	Prior Sample	B, F, C	SWDO	27.5
V10S27	3.55	Leesburg WWTP	Leesburg	Effluent	E	SWDO	0.0
V10W45	1.20	Monroe Road	Leesburg	Sentinel	B, F, Co, D	SWDO	71.0
02-559-000		**Middle Fork Lees Creek**					
V10K65	5.10	Stowe Road	Memphis	Unsampled Stream/Reach	Bq, F, C	SWDO	12.4
V10W46	1.10	US 62	Leesburg	Prior Sample	B, F, C	SWDO	35.0

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 040							
02-550-000		**Rattlesnake Creek**					
300049	7.90	Centerfield Road	Greenfield	Sentinel	B, F, Cbo, D	SWDO	209.0
02-560-000		**South Fork Lees Creek**					
V10K63	1.60	Hixon Road	Leesburg	Unsampled Stream/Reach	Bq, F, C	SWDO	15.9
02-558-001		**Trib to Lees Creek**					
V10K61	1.30	Thomas Road	Leesburg	Random Small Stream	Bq, F, C	SWDO	3.1
02-550-001		**Trib to Paint Creek Lake**					
V10K46	1.00	New Petersberg area unsewered	Greenfield	Unsewered Community	C	SWDO	0.0
02-560-001		**Trib to South Fork**					
V10K64	0.50	Careytown Road (South of SR 28)	New Vienna	Random Small Stream	Bq, F, C	SWDO	1.7
02-558-002		**U.T. to Lees Creek**					
V10K66	0.30	Sabina Road	Leesburg	Random Small Stream	Bq, F, C	SWDO	2.2
02-557-000		**Walnut Creek**					
V10K59	4.20	Walnut Creek Road	New Martinsburg	Random Small Stream	Bq, F, C	SWDO	5.7
V10K58	0.60	Centerfield Road	Greenfield	Prior Sample	Bq, F, C	SWDO	13.8

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 050							
02-576-000		**Buck Run**					
V10K77	0.82	SR 41	New Martinsburg	Chemical	C	SWDO	0.0
02-577-000		**Indian Creek**					
V10K78	1.60	Miami Trace	Good Hope	Random Small Stream	Bq, F, C	SWDO	5.8
02-500-000		**Paint Creek**					
V10S32	67.20	dst. U.S. Rt. 35	Washington Court House	Prior Sample	B, F, C	SWDO	120.0
V10W22	63.30	adj Flakes Ford Road	New Martinsburg	Prior Sample	B, F, C	SWDO	130.0
V10S31	58.80	Miami Trace Rd.	New Martinsburg	Prior Sample	B, F, C, D, ch	SWDO	224.0
V10S30	52.50	SR 753	New Martinsburg	Sentinel	B, F, Co, D	SWDO	249.0
V10S06	49.60	Greenfield WWTP	Greenfield	Effluent	E	SWDO	0.0
V10S29	48.90	0.4 miles dst. Greenfield	Greenfield	Prior Sample	B, F, C	SWDO	260.0
300053	39.00	below Paint Ck Dam USGS	South Salem	Sentinel	B, F, Co, D	SWDO	570.3
02-500-003		**Plum Run**					
V10K45	2.00	Beaver Road	Rainsboro	Chemical	C	SWDO	0.0
02-578-000		**Wabash Creek**					
V10K79	0.80	New Martinsburg	New Martinsburg	Unsampled Stream/Reach	Bq, F, C	SWDO	4.6

STORET	RM		LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 060								
02-540-000			**Clear Creek**					
V10K41	11.30		Roundhead Road	New Vienna	Random Small Stream	Bq, F, C, S	SWDO	7.4
V10P18	8.30	R	adj. Evans Rd.	Hillsboro	Prior Sample	B, F, Cbo, D, S, ch	SWDO	20.7
V10K38	7.40		Ust Hillboro PWS intake, Dst culvert RR	Hillsboro	PWS	Cbo	SWDO	0.0
V10S13	6.80	R	ust Hillsboro WWTP dst Moberly Br	Hillsboro	Prior Sample	B, F, Co, S	SWDO	24.5
V10S07	6.70		Hillsboro WWTP	Hillsboro	Effluent	E	SWDO	0.0
V10S12	6.60		dst. Hillsboro WWTP	Hillsboro	Prior Sample	B, F, C	SWDO	25.0
V10S11	5.20		dst. Selph Rd.	Hillsboro	Prior Sample	B, F, C, D, S, ch	SWDO	32.0
V10P15	3.00		U.S. Rt. 50	Hillsboro	Prior Sample	B, F, C	SWDO	35.0
02-540-001			**Coon Creek**					
V10P14	0.20		Off Clear Creek Road	Hillsboro	Random Small Stream	Bq, F, C	SWDO	4.0
02-535-000			**Franklin Branch**					
V10K35	1.90		SR 506	Rainsboro	Chemical	C	SWDO	0.0
02-540-007			**Hussey Run**					
V10K40	0.80		Off Careytown Rd, Fallsville WA south unit	Leesburg	Random Small Stream	Bq, F, C	SWDO	3.0
02-540-002			**Little Rock Creek**					
V10K37	1.40		Lewis Road (off Selph Road)	Hillsboro	Random Small Stream	Bq, F, C	SWDO	2.2
02-540-004			**Moberly Branch Clear**					

STORET	RM		LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 060								
02-540-004			**Moberly Branch Clear**					
V10S15	0.90	R	U.S. Rt. 62	Hillsboro	Prior Sample	B, F, Co, S	SWDO	2.5
02-532-000			**Pickett Run**					
V10K32	0.10		Ferneau	Rainsboro	Random Small Stream	Bq, F, C	SWDO	1.8
02-530-000			**Rocky Fork**					
V10S16	23.27	R	U.S. Rt. 62	Hillsboro	Prior Sample	B, F, Co, D, S	SWDO	17.0
V10P16	18.05	R	Fettro Rd.	Hillsboro	Prior Sample	B, F, Co, D, S	SWDO	34.0
300091	17.80		Rocky Fork Regional WWTP	Hillsboro	Effluent	E	SWDO	0.0
V10Q05	17.53		SR 124 Dst Rocky Fork Regional WWTP	Hillsboro	Chemical	C	SWDO	39.0
610800	3.10		Browning Rd.	Rainsboro	Sentinel	B, F, Co, D	SWDO	140.0
02-542-000			**South Fork Rocky Fork**					
V10K43	3.30		Dst SR 247	Hillsboro	Random Small Stream	Bq, F, C	SWDO	7.2
02-540-005			**Trib to Clear Creek (Fenner Trib)**					
V10K39	0.40		Careytown Road (South of Evans Road)	New Market	Random Small Stream	Bq, F, C	SWDO	2.7
02-530-001			**Trib to Rocky Fork @ RM 17.55**					
V10K42	1.00		Pigeon Roost Road	Hillsboro	Random Small Stream	Bq, F, C	SWDO	2.3
02-530-002			**Trib to Rocky Fork @ RM 24.27**					

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 060							
02-530-002		**Trib to Rocky Fork @ RM 24.27**					
V10K44	0.80	SR 138	New Market	Chemical	C	SWDO	0.0

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 070							
02-564-000		**Buckskin Creek**					
V10K21	3.10	Black Lane	Good Hope	Random Small Stream	Bq, F, C	SEDO	4.3
V10K05	0.40	ust Falls Road	Bainbridge	Prior Sample	B, F, C	SEDO	39.7
02-545-000		**Lower Twin Creek**					
V10K07	2.20	farm off Lower Twin Rd.	Bourneville	Prior Sample	Bq, F, C	SEDO	15.0
02-568-000		**Massie Run**					
V10K08	0.10	US 50	Bainbridge	Random Small Stream	Bq, F, C	SEDO	3.5
02-500-000		**Paint Creek**					
300053	31.50	adjacent to U.S. Rt. 50	Bainbridge	Prior Sample	B, F, C	SEDO	723.0
V10K09	27.50	Dills Road	Morgantown	Prior Sample	B, F, C	SEDO	779.0
601320	21.60	Bourneville @ Jones Levee Road	Bourneville	Sentinel	B, F, Co, D	SEDO	807.0
02-548-000		**Sulpher Lick**					
V10K10	1.50	Spargersville Road	Morgantown	Random Small Stream	Bq, F, C, S	SEDO	7.6
02-500-001		**Taylor Run**					
V10K11	1.30	Potts Hill Road	Morgantown	Random Small Stream	Bq, F, C	SEDO	3.4
		Trib to Buckskin Creek					
V10K54	0.20	McCann	South Salem	Random Small Stream	Bq, F, C	SEDO	2.4

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 070							
02-546-000		**Upper Twin Creek**					
V10K20	5.80	Tong Hollow Road	Bourneville	Unsampled Stream/Reach	Bq, F, C	SEDO	6.2
V10K12	2.00	Upper Twin Cr Rd (1.4 m W of Bourneville)	Bourneville	Unsampled Stream/Reach	Bq, F, C	SEDO	12.2

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 080							
02-522-000		**Compton Creek**					
V10K27	17.60	Meyers Road	Midway	Random Small Stream	Bq, F, C, Q	CDO	6.1
V10K26	11.20	Washington Waterloo Road	New Holland	Unsampled Stream/Reach	Bq, F, C	CDO	19.9
300048	3.40	Good Hope - New Holland	New Holland	Sentinel	B, F, Co, D	CDO	50.2
V10S02	1.10 R	Dogtown Road	Good Hope	Prior Sample	B, F, Co, S	CDO	59.0
02-523-000		**Crooked Creek**					
V10K31	3.00	Camp Grove	New Holland	Random Small Stream	Bq, F, C	CDO	7.2
02-524-000		**Mud Run**					
V10K24	0.40	Lane off Good Hope - New Holland Road	New Holland	AFO	Bq, F, C	CDO	7.3
02-510-000		**North Fork Paint Creek**					
V10K52	42.00	Yankeetown Chenoweth	Mount Sterling	Random Small Stream	Bq, F, C, Q, S, ch, D	CDO	11.0
V10W16	31.00	Glaze Road	New Holland	Prior Sample	B, F, C	CDO	44.0
V10E01	26.71	New Holland WWTP	New Holland	Effluent	E	CDO	0.0
300046	26.70	Good Hope - New Holland	New Holland	Sentinel	B, F, Co, D	CDO	51.1
02-525-000		**Thompson Creek**					
V10K51	3.30	Wissler Road - AFO	Midway	Random Small Stream/AFO	Bq, F, C, Q	CDO	8.0
02-510-002		**Wolf Run**					
V10K25	0.30	Rockwell Road	Mount Sterling	Random Small Stream	Bq, F, C, Q	CDO	3.6

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 090							
02-511-000		**Biers Run**					
V10K06	1.50	Co. Rd 550	Andersonville	Unsampled Stream/Reach	Bq, F, C	SEDO	7.1
02-516-000		**Little Creek**					
V10K02	6.00	Clipps Bridge Road	Bourneville	Random Small Stream	Bq, F, C	SEDO	8.4
V10K13	1.00	Little Creek Road (Near Jct w/ Rodgers Rd)	Frankfort	Unsampled Stream/Reach	B, F, C	SEDO	22.7
02-510-000		**North Fork Paint Creek**					
V10S01	22.30 R	Dexter Rd.	Frankfort	Prior Sample	B, F, Co, S	SEDO	160.0
V10K14	17.60	Asbury Road	Frankfort	Prior Sample	B, F, C	SEDO	122.0
V10S19	14.20	Frankfort WWTP 001 outfall	Frankfort	Effluent	E	SEDO	0.0
V10S20	14.10	Dst Frankfort WWTP (access at WWTP)	Frankfort	Prior Sample	B, F, C	SEDO	171.0
V10S18	10.50	Musselman Hill Rd.	Bourneville	Prior Sample	B, F, C	SEDO	205.0
V10K01	3.90	U.S. Rt. 50	Chillicothe West	Prior Sample	B, F, C	SEDO	231.0
300047	2.30	Polk Hollow Road	Chillicothe West	Sentinel	B, F, Co, D	SEDO	231.3
V10K30	0.10	Pleasant Valley Reg Sewer 001 Outfall	Chillicothe West	Effluent	E	SEDO	0.0
02-518-000		**Oldtown Run**					
V10K15	1.30	Ust Frankfort Clarksburg Pike	Frankfort	Random Small Stream	Bq, F, C	SEDO	8.5
02-510-001		**Trib to North Fork Paint @ RM 6.56**					
V10K29	0.30	Maple Grove Road	Chillicothe West	Random Small Stream	Bq, F, C	SEDO	6.3

STORET	RM	LOCATION	TOPO	Site Type	Samples	District	Drain Area
HUC_11: 100							
02-543-000		**Black Run**					
V10K21	3.96	Baum Hill Road	Bourneville	Unsampled Stream/Reach	Bq, F, C	SEDO	5.0
V10K16	1.00	Spruce Hill Road	Bourneville	Unsampled Stream/Reach	Bq, F, C	SEDO	8.6
02-527-000		**Cattail Run**					
V10K53	1.20	Owl Creek Road	Chillicothe West	Unsampled Stream/Reach	Bq, F, C	SEDO	2.9
02-528-000		**Owl Creek**					
V10K22	0.10	Ust US 50	Chillicothe West	Unsampled Stream/Reach	Bq, F, C	SEDO	6.5
02-500-000		**Paint Creek**					
V10K17	8.90	0.8 miles upst. North Fork	Chillicothe West	Prior Sample	B, F, C	SEDO	896.0
V10P06	3.80 R	adjacent to St. Rt. 772	Chillicothe East	Sentinel	B, F, Co, D, S, ch	SEDO	1137.
V10S17	3.40	Mead Paper Co. 001 outfall to Paint Creek	Chillicothe East	Effluent	E	SEDO	0.0
V10K18	0.70	U.S. Rt. 23	Chillicothe East	Prior Sample	B, F, C	SEDO	1143.
02-529-000		**Plug Run**					
V10K03	0.40	Mingo Road	Bourneville	Unsampled Stream/Reach	Bq, F, C	SEDO	5.4
02-526-000		**Ralston Run**					
V10K19	2.80	Turner Road	Chillicothe West	Random Small Stream	Bq, F, C	SEDO	5.2

Table 2. Sample Tallies.

Chemistry 718 conventional (61 sites x 4 runs; 79 sites x 6 runs) 56 organics (28 sites x 2 runs) 718 metals **Sondes** 23 **Fish** **Macroinvertebrates** 61 one-pass 61 quals 59 two-pass 59 quants	**Sediment** 15 Metals 15 Organics 6 Nutrient 6 TOC 6 Particle Size **Chlorophyll** water column 8 sites x 1 runs = 24 filters periphyton 8 sites x 1 runs = 24 filters Field Blanks = 4 Total = 40 filters

QUALITY ASSURANCE/SAMPLING METHODS

Ohio EPA Manuals

All biological, chemical, EPA laboratory, data processing, and data analysis methods and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio Environmental Protection Agency 2006), Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio Environmental Protection Agency 1987, 1989a, 1989b), The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Rankin 1989) for habitat assessment, and Ohio EPA Sediment Sampling Guide and Methodologies (Ohio EPA 2001).

Use Attainment

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

Performance expectations for the 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. The results will be compared to WWH biocriteria for the Western Allegheny Plateau ecoregion.

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

Stream Habitat Evaluation

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

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

Biological Community Assessment

The macroinvertebrates will be sampled quantitatively. Macroinvertebrates will be collected from artificial substrates and from the natural habitats. The artificial substrate collection provides quantitative data and consists of a composite sample of 5 modified Hester-Dendy (HD) multiple-plate samplers colonized for six weeks. At the time of the artificial substrate collection, a qualitative multihabitat composite sample is also collected. 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 twice at each sampling location with pulsed DC current. Night electrofishing will occur at all sampling locations downstream from Ellis Dam. Detailed biological sampling protocols are documented in the Ohio EPA manual Biological Criteria for the Protection of Aquatic Life, Volume III (1989).

Sediment

Fine grained multi-incremental sediment samples will be collected in the upper 4 inches of bottom material using either decontaminated stainless steel scoops or Ekman dredges. Collected sediment will be placed into glass jars with teflon lined lids, placed on ice (to maintain 4^{o}C) and delivered to the Ohio EPA lab. Sampling and decontamination protocols will follow those listed in the Ohio EPA Sediment Sampling Guide and Methodologies, November, 2001.

Surface Water

Surface water grab samples will be collected from the upper 12 inches of river water and sampled directly into appropriate containers. Collected water will be preserved using appropriate methods, as outlined in Parts II and III of the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio EPA 2006) and delivered to the Ohio EPA lab for analysis. Datasonde© continuous recorders will be placed at select locations to evaluate diurnal measurements of dissolve oxygen, pH, temperature, and conductivity.

Bacteria

When practicle, water samples will be collected directly from the river, otherwise from a rinsed bucket into sterilized polyethylene containers, cooled to 4˚C, and transported to the Ohio EPA lab in Columbus for analysis within 6 hours of sample collection. All samples will be analyzed for fecal coliform and *E. coli* bacteria using U.S.EPA approved methods (STORET Parameter Codes 31611 and 31633). Samples may be processed in the field using standard incubation methods before delivery to the Ohio EPA lab.

Quality Control Samples

Ten percent of the sediment, water, and bacteria samples will be submitted to the lab as field duplicates. One Datasonde© recorder site will have two instruments placed in the river as field duplicates.

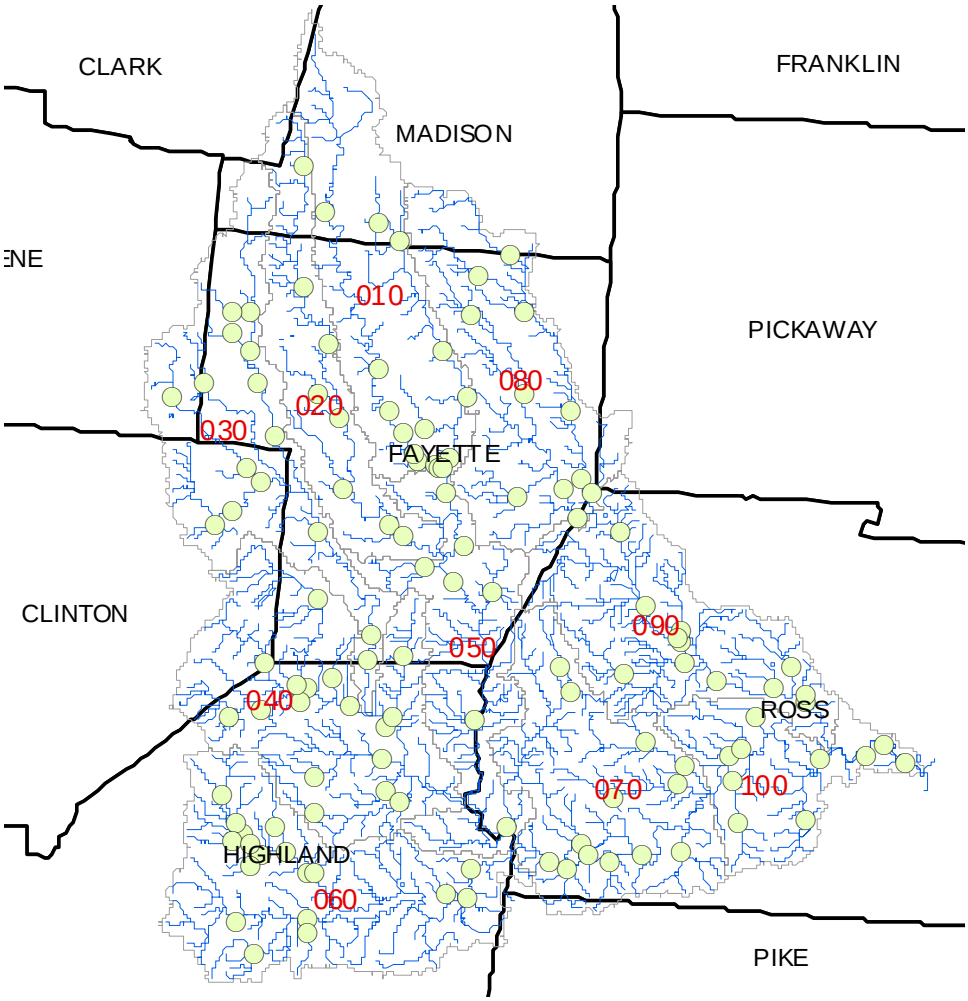
Table 3. List of chemical/physical water quality parameters to be analyzed/ measured in surface and sediment from the Paint Creek Basin, 2006. Water samples will be collected 4 to 6 times (organics twice), sediment once. Bacterial samples will be collected 5 times in a thirty-day period to determine the recreational use. Select sampling locations will be monitored for dissolved oxygen, pH, temperature, and conductivity using Datasonde© continuous recorders (Table 1).

Parameters	Test Method	Water	Sediment
BOD, 5-DAY	SM 5210B	X	
SOLIDS, DISSOLVED (TDS)	USEPA 160.1	X	
SOLIDS, SUSPENDED (TSS)	USEPA 160.2	X	
AMMONIA	USEPA 350.1/ SM 4500	X	X
TKN	USEPA 351.2	X	
NITRATE-NITRITE	USEPA 353.1	X	
TOTAL PHOSPHORUS	USEPA 365.4/ USEPA 365.4	X	X
Dissolved Phosphorus	USEPA 365.4	X	
ICP 1 (Al,Ba,Ca,Cr,Cu,Fe, Mg, Mn, Na, Ni, K, Sr, Zn, Hardness)	USEPA 200.7	X	
ICP 3 (Al,Ba,Ca,Cr,Cu,Fe,Mg,Mn,Na,Ni,K,Sr,Zn,Pb)	USEPA 200.7		X
GFAA 1 (As,Cd,Pb,Se)	USEPA 200.9, SM 3113B	X	
GFAA 2 (As, Cd, Se)	USEPA 200.9, SM 3113B		X
MERCURY, TOTAL	USEPA 245.1,7470A,7471A	X	X
pH - grab	Hanna HI9811 meter	X - field	
Conductivity - grab	Hanna HI9811 meter/ USEPA 120.1	X - field / lab	
Dissolved Oxygen - grab	YSI 55 meter	X - field	
Temperature - grab	YSI 55 meter	X - field	
VOCs	-	NOT RECOMMENDED	NOT RECOMMENDED
SVOCs	USEPA 625/ USEPA 8270C	X	X
Pesticides/PCBs/ Chlordane	USEPA 608/ USEPA 8081A, 8082	X	X
E.coli	USEPA 1103.1/ 640.1	X	
Fecal coliform	SM 9222 D/ 610.1	X	
Percent Solids	SM 2540G		X
Total Organic Carbon	OEPA 335.2		X
Particle Size	OEPA 160.1		X

Wildlife Officers
Fayette Roy Rucker (614) 644-3929 x1204
Madison Roger Niese (614) 644-3929 x1209
Ross Bob Nelson (740) 589-9995
Highland Jim Carnes (937) 372-5639 x5214
Greene Dave Warner (937) 372-5639 x5204
Clinton Matthew Roberts (937) 372-5639 x5206

County Sheriff's Offices (24 hour non-emergency numbers)
Fayette County (740)335-6170
Highland County (937) 393-1421
Madison County (740) 852-1332
Ross County (704) 773-1186

Hospitals - see attached maps
Washington Court House 1430 Columbus Ave; (740) 335-1210
Hillsboro 1275 North High St; 937.393.6100
Chillicothe Adena Urgent Care Center - Western Avenue 55 Centennial Blvd., Chillicothe, OH 45601 (740) 779-4000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PIKE

Washington Court House

Hillsboro


Southern State
Highland District Hospital
138
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124
Highland County
Court House
Hillsboro
50
124
247
62
138
73

Chillicothe