

**WATER QUALITY NETWORK
REFERENCE CANDIDATE STREAMS**

**WATER QUALITY STANDARDS REVIEW
STREAM REDESIGNATION EVALUATION**

Study Basins:

East Branch Dyberry Creek	(06016)	B	UNT Tunkhannock Creek	(29200)	I
Muncy Creek	(19402)	L	Young Womans Ck	(23509)	L
Spruce Run	(18964)	L	Blue Eye Run	(56058)	Q
East Hickory Creek	(55629)	Q			

**WATER QUALITY MONITORING SECTION (DSB)
DIVISION OF WATER QUALITY STANDARDS
BUREAU OF WATER STANDARDS AND FACILITY REGULATION
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

May 2006

INTRODUCTION

The Department operates the Surface Water Quality Monitoring Network (WQN) - a long-term, fixed station network of monitoring stations on rivers and streams throughout the state. This network was initially designed to monitor water quality conditions on a broad scale. Most stations are located on major streams with large drainage areas. However, recent water quality monitoring trends emphasize the importance of identifying and defining biological reference conditions characteristic of no or minimal disturbance. As part of the process to establish biological reference conditions, smaller watersheds with minimal land disturbance were added to the water quality network to collect data representative of reference water quality conditions and support biological metric protocol development. WQN reference streams are selected from various areas across the state and monitored for five years. Following the close of the 5-year inventory period, the studied sites are replaced with a new set of reference stations.

After reviewing the WQN reference monitoring data, several of the stations displayed existing use stream conditions indicative of Exceptional Value (EV) waters. Based on these data, the Department put together this package of stream redesignation evaluations from a list of streams that were part of the WQN Reference Network. The streams included in this report are listed below with more detailed station information presented in Table 1.

Stream	Stream Code	WQN Number	County	Township	Ch 93 Designated Use
Muncy Creek	19402	446	Sullivan	Davidson, Laporte	CWF (main stem) HQ-CWF (tribs)
Blue Eye Run	56058	862	Warren	Spring Creek, Columbus, Pittsfield	CWF
East Hickory Creek	55629	877	Warren	Limestone, Watson	HQ-CWF
Young Womans Creek	23509	443	Clinton	Chapman	HQ-CWF
			Potter	Stewardson	
			Lycoming	Brown	
East Branch Dyberry Creek	06016	183	Wayne	Dyberry, Lebanon	HQ-CWF, MF
Spruce Run	18964	447	Union	Buffalo, West Buffalo, Hartley, Lewis, White Deer	HQ-CWF
UNT Tunkhannock Creek	29200	340	Susquehanna	Ararat, Gibson, Jackson, Thompson	CWF

GENERAL WATERSHED DESCRIPTIONS

The upper portion of Muncy Creek is located in SGL 13. This basin is also mostly forested except for a narrow corridor that runs along the main stem. This area contains a paved road and low-density residential development. All the tributaries to Muncy Creek within the study area are designated HQ-CWF except for ElkLick Run (19753) which is designated EV. The main stem has a CWF designation. Most of the Blue Eye Run watershed is located in State Game Land (SGL) 143. East Hickory Creek is located in the Allegheny National Forest. East Hickory Creek basin from the source to Middle Hickory Creek has a designated use of EV. The section from and including Middle Hickory Creek to the mouth is HQ-CWF as reflected in the above table.

Both of these basins are mostly forested with very little human disturbance except for hiking trails. All but the lower 0.8 miles of the Young Womans Creek watershed is located within the Sproul State Forest and nearly the entire watershed of Spruce Run is located in Bald Eagle State Forest. Land use in both of these basins is almost entirely forested with several roads and seasonal camps. The majority of the East Branch Dyberry Creek basin is located in SGL 159. Land use in the floodplain is mostly deciduous forest with a dirt road. There is some agriculture and low-density residential development on the surrounding hillsides. Land use in the UNT Tunkhannock Creek basin is a mixture of deciduous forest along with agriculture, low-density residential development, and several roads. A small portion of the headwaters of one of the tributaries is located in SGL 236.

WATER QUALITY AND USES

Surface Water

The candidate streams are cold-water, freestone streams with a moderate gradient. Since all of these streams have had or currently do have WQN stations, there is chemical data available to help characterize ambient water quality conditions. Table 2 is a compilation of a recent set of 24 monthly samples collected as part of the Water Quality Network, including the range of dates of these samples. The maximum and minimum concentrations of 12 different parameters are listed for each station. Unnamed Tributary to Tunkhannock Creek, Young Womans Creek, Muncy Creek, Spruce Run, and East Hickory Creek, which contain WQN Stations 340, 443, 446, 447, and 877 respectively, all displayed excellent water quality conditions over these 24 month periods except for brief periods when the pH dropped below the minimum criterion of 6.0 at stations 447 and 877. These lower pH observations may have been the result of acid precipitation as these streams are naturally poorly buffered with alkalinity concentrations that rarely exceeded 10 mg/l. East Branch Dyberry Creek (WQN 183) and Blue Eye Run (WQN 862) exceeded the criteria for dissolved copper twice and three times respectively, during the two-year period. This is probably the result of natural conditions as there are no known discharge sources of copper in either watershed. Blue Eye Run exceeded the criteria for dissolved cadmium twice during the two-year period, also probably the result of natural conditions.

There are no surface water withdrawals for a public water supply or NPDES permitted discharges located in any of the candidate basins.

Aquatic Biota

Depending on the size of the watershed, one to three stations were sampled in each candidate basin along with a reference station of comparable drainage area. An assessment of the physical habitat was conducted at each station (Table 3). Total habitat scores ranged from a low of 198 to a high of 218. All of the candidate stations, along with the reference stations, scored in the Optimal range (186-240) for instream and riparian habitat. Benthic macroinvertebrate samples were also collected at all stations. These samples consisted of six 0.3 square meter D-net samples collected in riffle habitat over a 100-meter reach of stream. All candidate stations showed a high diversity of macroinvertebrates with the presence of many taxa that are intolerant of organic pollution, such as Ephemeroptera, Plecoptera, and Trichoptera (Table 4). Survey dates are listed in Tables 3 - 5.

The UNT Tunkhannock Creek mainstem from its source to the mouth is classified by the Pennsylvania Fish and Boat Commission (PFBC) as Class A wild trout waters.

BIOLOGICAL USE QUALIFICATIONS

The biological use qualifying criteria applied to the candidate streams were the integrated benthic macroinvertebrate score tests described at Title 25, §93.4b(a)(2)(i)(A) and §93.4b(b)(1)(v) of the Pennsylvania Code. Selected benthic macroinvertebrate community metrics were calculated from 200-count subsamples that were randomly selected from the total samples and enumerated following the Department's Pa RBP III protocol modified from Plafkin et. al. (1989) and Barbour et. al. (1999)(Table 4). Biological Condition Scores (BCS) generated from the subsamples were compared to reference stations with comparable drainage areas (Table 5). These BCS comparisons were done using the following metrics which were selected as being indicative of community health: taxa richness; modified EPT index (total number of intolerant Ephemeroptera, Plecoptera, and Trichoptera taxa); modified Hilsenhoff Biotic Index; percent dominant taxon; and percent modified mayflies. All reference streams were selected because they were representative of excellent EV conditions based on the macroinvertebrate community and were of similar stream types, comparable geologic settings, and reasonable proximity with respect to their compared candidate stream. Both the candidate streams and the reference streams were sampled within a similar time frame to minimize the effects of seasonal variation.

Muncy Creek (Station MC) was compared to Little Fishing Creek (R1) and scored 100% of the reference station. Blue Eye Run (BER) and East Hickory Creek (3MH and 4EH) were compared to West Branch Caldwell Creek (R2 and R3). Both of these reference samples were collected at the same location but on different dates that corresponded to the timing of the candidate station samples. Blue Eye Run scored 95%, and the two stations in the East Hickory Creek basin scored 95 and 100% of the reference station score. Young Womans Creek (1YW and 2YW) was compared to Cross Fork Kettle Creek (R4) and scored 93 and 100% of the reference station. East Branch Dyberry Creek (1EB, 2EB, and 3EB) was compared to Little Bush Kill (R5) and all three stations scored 100% of the reference station. Spruce Run (SR) and UNT Tunkhannock Creek (UTC) were compared to Wild Creek (R6). Spruce Run and UNT Tunkhannock Creek scored 100 and 93% respectively of the reference station score.

According to the Department's regulatory criteria, a BCS greater than or equal to 92% of the reference station score support an EV designation (Title 25, § 93.4b(b)(1)(v)), scores greater than or equal to 83% but less than 92% qualify for High Quality (HQ), and scores less than 83% do not meet the threshold for an HQ designation (Title 25, § 93.4b(a)(2)(i)(A)). Based on these regulations Muncy Creek, Blue Eye Run, East Hickory Creek, Young Womans Creek, East Branch Dyberry Creek, Spruce Run, and UNT Tunkhannock Creek all qualify for an EV use designation.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of these evaluations and requested any technical data from the general public through publication in the Pennsylvania Bulletin on April 27, 2002 (32 Pa.B 2162). A similar notice was published on April 26, 2002 in the following newspapers: the Scranton Times, Times Observer, Towanda Daily Review, The Daily Item, and the Lock Haven Express. In addition, Pittsfield, Spring Creek, Columbus, and Watson Townships, Warren

County; Dyberry and Lebanon Townships, Wayne County; Davidson and Laporte Townships and Laporte Borough, Sullivan County; Hartley, Lewis, and West Buffalo Townships, Union County; Ararat, Gibson, Jackson, and Thompson Townships, Susquehanna County; Chapman Township, Clinton County; Stewardson Township, Potter County; and Brown Township, Lycoming County were notified of the evaluations in a letter dated March 12, 2002. No data were received in response to these notices.

RECOMMENDATION

The Department recommends the designated use of the following streams be changed based on Title 25, § 93.4b(a)(2)(i)(A) and § 93.4b(b)(1)(v) of the Pennsylvania Code:

Muncy Creek: Drainage List (DL) L; Basin, Source to second SR2002 Bridge upstream of Sonestown at RMI 26.4. Change current HQ-CWF and CWF to EV. Affects 29.6 stream miles.

Blue Eye Run: DL Q; Basin, Source to SR0027 Bridge. Change CWF to EV. Affects 19.6 stream miles.

Middle Hickory Creek: DL Q; Basin. Change HQ-CWF to EV

East Hickory Creek: DL Q; Basin, Middle Hickory Creek to Forest Highway 119. Change HQ-CWF to EV. Affects 20.4 stream miles.

Young Womans Creek: DL L; Basin, Source to and including Left Branch Young Womans Creek. Change HQ-CWF to EV. Affects 122.9 stream miles

East Branch Dyberry Creek: DL B; Basin. Change HQ-CWF, MF to EV, MF. Affects 27.2 stream miles

Spruce Run: DL L; Basin, Source to eastern boundary of Bald Eagle State Forest at RMI 5.09. Change HQ-CWF to EV. Affects 18.3 stream miles.

UNT Tunkhannock Creek: DL I; Basin. Change CWF to EV. Affects 17.5 stream miles.

The above recommendation affects a total of 264.2 stream miles.

REFERENCES

Plafkin, JL, MT Barbour, KD Porter, SK Gross, & RM Hughes. 1989. Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001

Barbour, MT, J. Gerritsen, BT Snyder, and JB Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition. United States Environmental Protection Agency. EPA/841/B-99-002.

TABLE 1
STATION LOCATIONS
WQN REFERENCE CANDIDATE STREAMS

<u>STATION</u>	<u>LOCATION</u>
MC	Muncy Creek (19402) approximately 50 meters downstream of the third bridge upstream of Sonestown on SR2002. Davidson Township, Sullivan County. WQN 446 Lat: 41 22 00 Long: 76 30 51 RMI: 27.3
BER	Blue Eye Run (56058) approximately 15 meters upstream of the SR0027 Bridge. Pittsfield Township, Warren County. WQN 862 Lat: 41 49 07 Long: 79 25 45 RMI: 0.50
3MH	Middle Hickory Creek (55695) approximately 30 meters upstream of the mouth. Limestone Township, Warren County. Lat: 41 39 39 Long: 79 18 51 RMI: 0.10
4EH	East Hickory Creek (55629) approximately 15 meters upstream of the crossing of Forest Road 119. Limestone Township, Warren County. WQN 877 Lat: 41 38 31 Long: 79 20 16 RMI: 6.91
1YW	Young Womans Creek (23509) approximately 0.7 miles upstream from Bull Run. Chapman Township, Clinton County. WQN 443 Lat: 41 26 28 Long: 77 39 10 RMI: 8.76
2YW	Left Branch Young Womans Creek (23513) approximately 150 meters upstream of the T320 Bridge. Chapman Township, Clinton County. Lat: 41 22 23 Long: 77 42 01 RMI: 0.16
1EB	East Branch Dyberry Creek (06016) approximately 0.21 miles downstream of SR371. Dyberry Township, Wayne County. Lat: 41 43 26 Long: 75 15 56 RMI: 5.32
2EB	Rose Pond Branch (06019) approximately 0.20 miles downstream of the SR371 bridge. Dyberry Township, Wayne County. Lat: 41 43 25 Long: 75 15 52 RMI: 0.05
3EB	East Branch Dyberry Creek approximately 0.15 stream miles downstream of the Lebanon/Dyberry Township line Dyberry Township, Wayne County. WQN 183 Lat: 41 40 19 Long: 75 17 28 RMI: 0.94
SR	Spruce Run (18964) approximately 15 meters downstream of the SR1001 bridge.

West Union Township, Union County. WQN 447
Lat: 41 01 26 Long: 77 03 55 RMI: 8.4

- UTC UNT Tunkhannock Creek (29200) approximately 5 meters upstream of SR2046 bridge.
Gibson Township, Susquehanna County. WQN 340
Lat: 41 48 30 Long: 75 34 52 RMI: 0.26
- R1 Little Fishing Creek (27657) approximately 5 meters downstream of road SR4033.
Pine Township, Columbia County. WQN 339
Lat: 41 09 52 Long: 76 30 13 RMI: 13.2
- R2 West Branch Caldwell Creek (54257) approximately 10 meters upstream of road T304.
Southwest Township, Warren County. WQN 873
Lat: 41 41 44 Long: 79 34 18 RMI: 0.16
- R3 West Branch Caldwell Creek approximately 10 meters upstream of road T304.
Southwest Township, Warren County.
Lat: 41 41 44 Long: 79 34 18 RMI: 0.16
- R4 Cross Fork (23765) approximately 1.18 km kilometers upstream of the mouth.
Stewardson Township, Potter County.
Lat: 41 29 42 Long: 77 49 14 RMI: 0.72
- R5 Little Bush Kill (05056) approximately 15 meters upstream of road SR2003.
Lehman Township, Pike County. WQN 181
Lat: 41 05 51 Long: 75 00 15 RMI: 0.6
- R6 Wild Creek (03959) approximately 15 meters upstream of the SR27 bridge.
Penn Forest Township, Carbon County. WQN 191
Lat: 41 56 24 Long: 75 35 11 RMI: 5.8

FIGURE 1

WQN REFERENCE CANDIDATE STREAMS

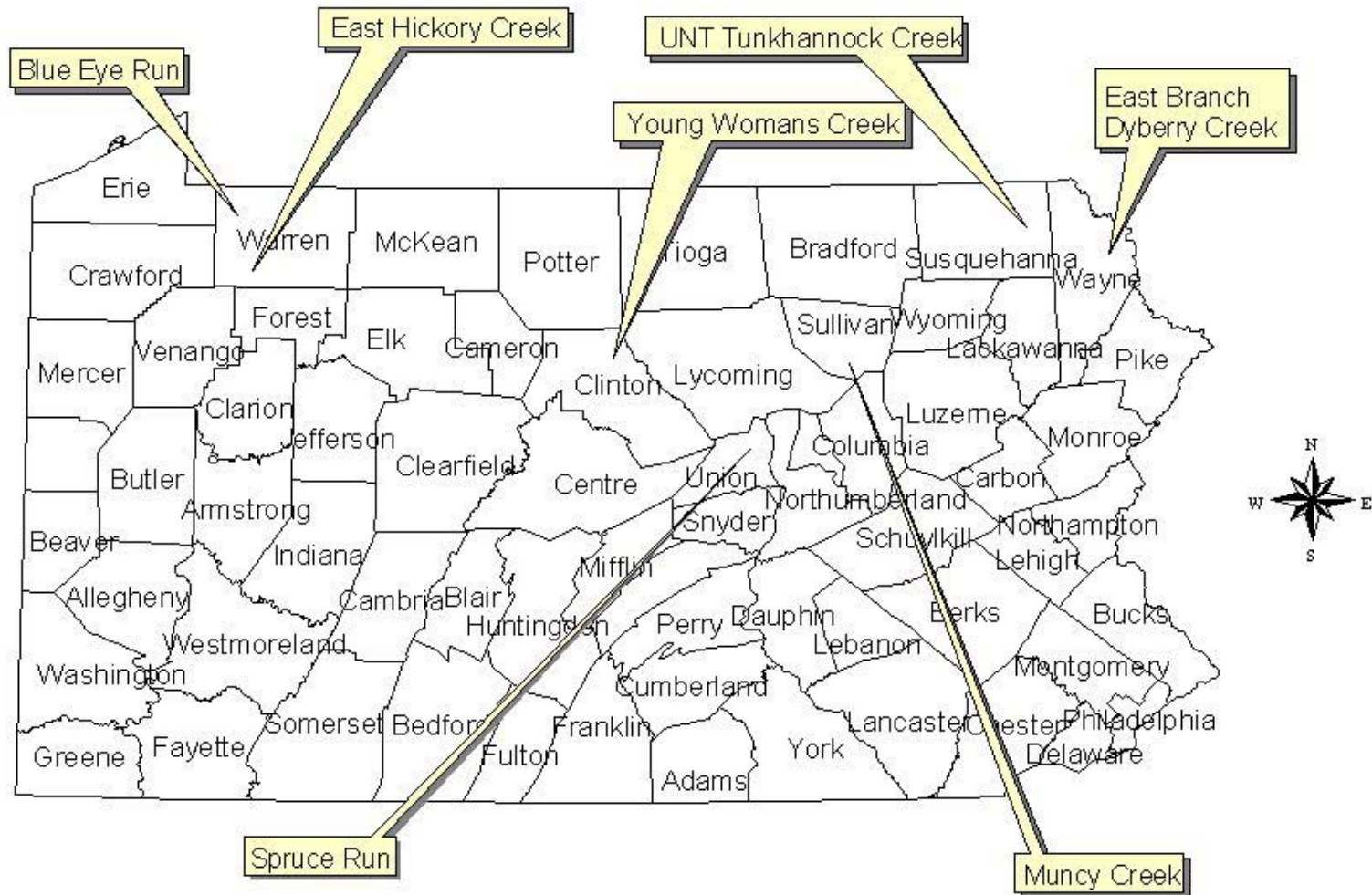


TABLE 2
WATER CHEMISTRY¹
WQN REFERENCE CANDIDATE STREAMS

STATIONS	WQN183		WQN340		WQN443		WQN446		WQN447		WQN862		WQN877	
STREAMS	E. BR. Dyberry Ck		UNT Tunkhannock		Young Womans Ck		Muncy Creek		Spruce Run		Blue Eye Run		East Hickory Ck	
DATE RANGE	8/96 - 7/98		10/02 - 1/05		9/96 - 8/98		9/02 - 1/05		2/03 - 1/05		8/96 - 7/98		2/05 - 10/06 ³	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Field Parameters														
pH	7.7	6.5	8.3	6.5	9.0	6.0	7.8	6.9	6.9	5.0	7.7	5.9	7.0	5.6
Diss. O ₂ (mg/l)	14.4	9.2	14.5	8.9	13.4	8.0	15.0	9.5	12.5	8.8	14.8	8.4	14.4	8.0
Lab Parameters														
Alkalinity (mg/l)	26	11	34	15	12	5.4	23	8.2	10	3.0	46	13	24	2.8
Hardness (mg/l)	44	10	41	23	19	10	26	16	9	6	45	15	19	10
NH ₃ -N (mg/l)	0.03	<.02 ²	0.03	<.02	<.02	<.02	0.04	<.02	<.02	<.02	0.03	<.02	0.03	<.02
diss As (ug/l)	<4.0*	<4.0*	<4.0	<4.0	<4.0*	<4.0*	<4.0	<4.0	<4.0	<4.0	<4.0*	<4.0*	<4.0	<4.0
diss Cd (ug/l)	<0.2*	<0.2*	<0.2	<0.2	<0.2*	<0.2*	<0.2	<0.2	<0.2	<0.2	0.66*	<0.2*	<0.2	<0.2
diss Cu (ug/l)	8.5	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	9.0	<4.0	<4.0	<4.0
total Fe (ug/l)	135	39	430	<20	148	23	<20	81	99	<20	729	120	1390	93
diss Pb (ug/l)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0
diss Ni (ug/l)	9.7	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
diss Zn (ug/l)	11.4	<5.0	<5.0	<5.0	<5.0	<5.0	5.16	<5.0	6.9	<5.0	25	<5.0	7.5	<5.0
total Al (ug/l)	78	16	204	<10	54	14	76	<10	147	<10	210	33	470	49

¹ - Based on the 24 most recent monthly samples.

² - < indicates a concentration below the detection limit

³ - Recently added to WQN Reference Network

* - Total concentrations not dissolved

**TABLE 3
HABITAT ASSESSMENT SUMMARY
WQN REFERENCE CANDIDATE STREAMS**

HABITAT PARAMETER	STATIONS ¹																
	MC	R1	BER	R2	3MH	4EH	R3	1YW	2YW	R4	1EB	2EB	3EB	R5	SR	UTC	R6
DATE OF SURVEY	12/01	12/01	6/01	6/01	12/01	12/01	12/01	12/01	12/01	12/01	4/02	4/02	4/02	4/02	11/03	12/03	11/03
1. instream cover	16	17	17	17	16	18	17	18	18	16	18	18	17	18	17	18	19
2. epifaunal substrate	19	18	16	18	17	17	18	19	19	19	18	18	19	17	14	17	18
3. embeddedness	16	18	14	16	16	17	16	17	17	17	17	16	17	16	16	17	19
4. velocity/depth	13	14	16	16	18	18	16	13	14	13	16	18	16	18	18	16	17
5. channel alterations	16	17	17	19	20	19	19	16	17	18	18	19	17	19	18	17	15
6. sediment deposition	18	19	15	18	18	18	18	19	18	18	18	18	18	18	19	18	18
7. riffle frequency	19	16	18	15	14	15	15	19	19	16	19	18	17	19	19	19	19
8. channel flow status	16	16	17	13	16	14	13	17	17	18	12	18	13	18	18	12	19
9. bank condition	16	17	15	16	16	16	16	16	16	12	16	17	17	17	19	18	17
10. bank vegetation protection	17	18	18	17	18	17	17	17	17	14	17	16	18	18	19	19	19
11. grazing/disruptive pressures	18	19	19	19	19	19	19	19	19	18	19	18	18	19	19	18	19
12. riparian vegetation zone width	14	15	18	20	20	20	20	14	18	19	14	16	17	19	19	18	19
Total Score	198	204	200	204	208	208	204	204	209	198	202	210	204	216	215	207	218
Rating ²	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT

¹ Refer to Figure 1 and Table 1 for stations locations.

² OPT - Optimal; SUB - Suboptimal

R1=Little Fishing Creek; R2=West Branch Caldwell Creek; R3=West Branch Caldwell Creek; R4=Cross Fork; R5=Little Bush Kill; R6=Wild Cree

TABLE 4
SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA
WQN REFERENCE CANDIDATE STREAMS

TAXA	STATION																
	MC	R1	BER	R2	3MH	4EH	R3	1YW	2YW	R4	1EB	2EB	3EB	R5	SR	UTC	R6
DATE OF SURVEY	12/01	12/01	6/01	6/01	12/01	12/01	12/01	12/01	12/01	12/01	4/02	4/02	4/02	4/02	11/03	12/03	11/03
Ephemeroptera (mayflies)																	
Baetiscidae; <i>Baetisca</i>								1									
Baetidae; <i>Acentrella</i>			15	15							5	3	2				
<i>Baetis</i>			2						1		3		1		11	31	2
Caenidae; <i>Caenis</i>					4												
Ephemerellidae; <i>Drunella</i>			59	18							21	38	29	10		1	
<i>Ephemerella</i>	19	12	3	10		6	42	30	86	61	5	12	42	68	21	31	14
<i>Eurylophella</i>		1			2			2	3	1					1		
<i>Serratella</i>				29		1					16	4	11	7	1	4	3
Ephemeridae; <i>Ephemera</i>		2			5	2	1	3		4		1	1				
Heptageniidae; <i>Cinygmula</i>													1				
<i>Epeorus</i>	28	4	2	12		17	8	8	18	9	23	22	21	2	12	68	5
<i>Leucrocuta</i>									1				1	1			
<i>Rhithrogena</i>	14							1								4	
<i>Stenacron</i>					3	1	3		5	1							
<i>Stenonema</i>	10	11	2	3	69	27	12	4	11	9	17	14	4	4	7		5
Isonychiidae; <i>Isonychia</i>	4	13		2		10		25	13	14	7	3	3	3			
Leptophlebiidae; <i>Paraleptophlebia</i>	25	38	13	11	5	9	9	11	16	16	2	2	6		9	10	6
<i>Habrophlebiodes</i>			2				3										
Plecoptera (stoneflies)																	
Capniidae; <i>Paracapnia</i>					4	3	1	1		2					2	6	1
Chloroperlidae; <i>Alloperla</i>																3	
<i>Sweltsa</i>	2											1			1		2
Leuctridae; <i>Leuctra</i>	1	2	33	11	1	3	2	1			13	6	3	2	1	1	3
Nemouridae; <i>Amphinemura</i>			2								5				4	2	1
<i>Prostoia</i>							1									3	
Peltoperlidae; <i>Tallaperla</i>															2	1	8
Perlidae; <i>Acroneuria</i>	3	10	2		5	10	4	3	5	5	4	5	2	9	3	1	
<i>Agnatina</i>	3			1		2	3		1				5				
<i>Paragnetina</i>	1			1				1			3	3					
Perlodidae; <i>Diploperla</i>					2			1									
<i>Isogenoides</i>					1			3	1								
<i>Isoperla</i>	21				1		3	8	10	6		5	1		1	10	9
<i>Malirekus</i>															1		1
Pteronarcyidae; <i>Pteronarcys</i>		1												1	2		
Taeniopterygidae; <i>Taeniopteryx</i>	2	3			3	2	19	9		4							1
<i>Taenionema</i>	16					2									5	11	2

TAXA	STATION																
	MC	R1	BER	R2	3MH	4EH	R3	1YW	2YW	R4	1EB	2EB	3EB	R5	SR	UTC	R6
Elmidae; <i>Optioservus</i>		2	3	2	15	7	6	17	6	9	3	1	16			2	2
<i>Oulimnius</i>					1			1							15		3
<i>Promoresia</i>						2						2		4	7		22
<i>Stenelmis</i>					6						2						
Psephenidae; <i>Psephenus</i>	1	5	15		3		2	1	4	13	3	9	4	15			
<i>Ectopria</i>					2			3			1						
Ptilodactylidae; <i>Anchytarsus</i>					1												
Non-Insect Taxa																	
Collembola															2		
Hydracarina															3		2
Oligochaeta	1		4					3	3	11	1			1	8		6
Nematoda															1		
Decapoda (crayfish)																	
Cambaridae												1					
Gastropoda (univalves, snails)																	
Ancylidae; <i>Ferrissia</i>							2	9			3	1					
Valvatidae														1			
Pelecypoda (bivalve clams)																	
Sphaeriidae											1			27	1		2
Total Number in Subsample	203	212	200	211	210	212	221	220	223	206	209	210	216	217	240	225	218

TABLE 5
RBP BIOLOGICAL CONDITION SCORE COMPARISON
WQN REFERENCE CANDIDATE STREAMS

METRIC	STATIONS																
	MC	R1	BER	R2	3MH	4EH	R3	1YW	2YW	R4	1EB	2EB	3EB	R5	SR	UTC	R6
DATE OF SURVEY	12/01	12/01	6/01	6/01	12/01	12/01	12/01	12/01	12/01	12/01	4/02	4/02	4/02	4/02	11/03	12/03	11/03
1. TAXA RICHNESS	28	31	24	22	38	31	32	34	28	23	35	33	29	31	40	26	35
Cand/Ref (%)	90		109		119	97		148	122		113	106	94		114	74	
Biol. Cond. Score	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	5	8
2. MOD. EPT INDEX	20	17	14	14	15	19	20	21	19	15	17	19	18	17	23	20	20
Cand/Ref (%)	118		100		75	95		140	127		100	112	106		115	100	
Biol. Cond. Score	8	8	8	8	6	8	8	8	8	8	8	8	8	8	8	8	8
3. MOD. HBI	1.68	2.54	2.26	2.71	3.34	2.76	2.70	2.82	2.01	2.11	2.53	2.46	2.32	2.54	3.08	1.88	3.05
Cand-Ref	-0.86		-0.45		0.64	0.06		0.71	-0.10		-0.01	-0.08	-0.22		0.03	-1.17	
Biol. Cond. Score	8	8	8	8	8	8	8	7	8	8	8	8	8	8	8	8	8
4. % DOMINANT TAXON	14	18	29	16	33	16	19	14	37	30	13	18	19	18	19	30	25
Cand-Ref	-4		13		14	-3		-16	7		-5	0	1		-6	5	
Biol. Cond. Score	8	8	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
5. % MOD. MAYFLIES	49	38	47	45	40	34	35	37	69	56	46	47	56	38	21	52	15
Ref-Cand	-11		-2		-5	1		19	-13		-8	-9	-18		-6	-37	
Biol. Cond. Score	8	8	8	8	8	8	8	6	8	8	8	8	8	8	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40	38	40	38	40	40	37	40	40	40	40	40	40	40	37	40
% COMPARABILITY TO REFERENCE	100		95		95	100		93	100		100	100	100		100	93	

R1=Little Fishing Creek
R2=West Branch Caldwell Creek
R3=West Branch Caldwell Creek
R4=Cross Fork
R5=Little Bush Kill
R6=Wild Creek

FIGURE 2 MUNCY CREEK

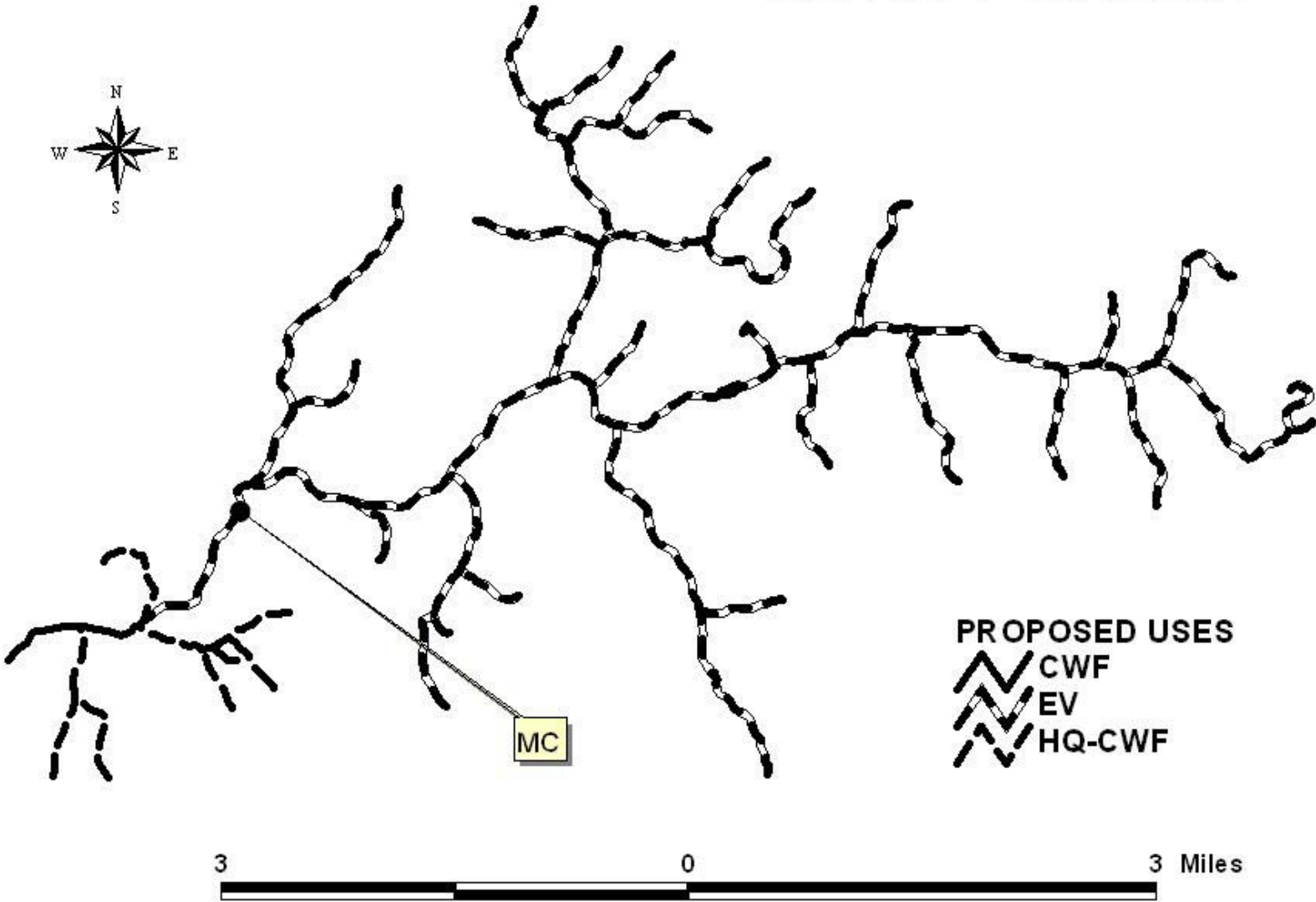


FIGURE 3 BLUE EYE RUN

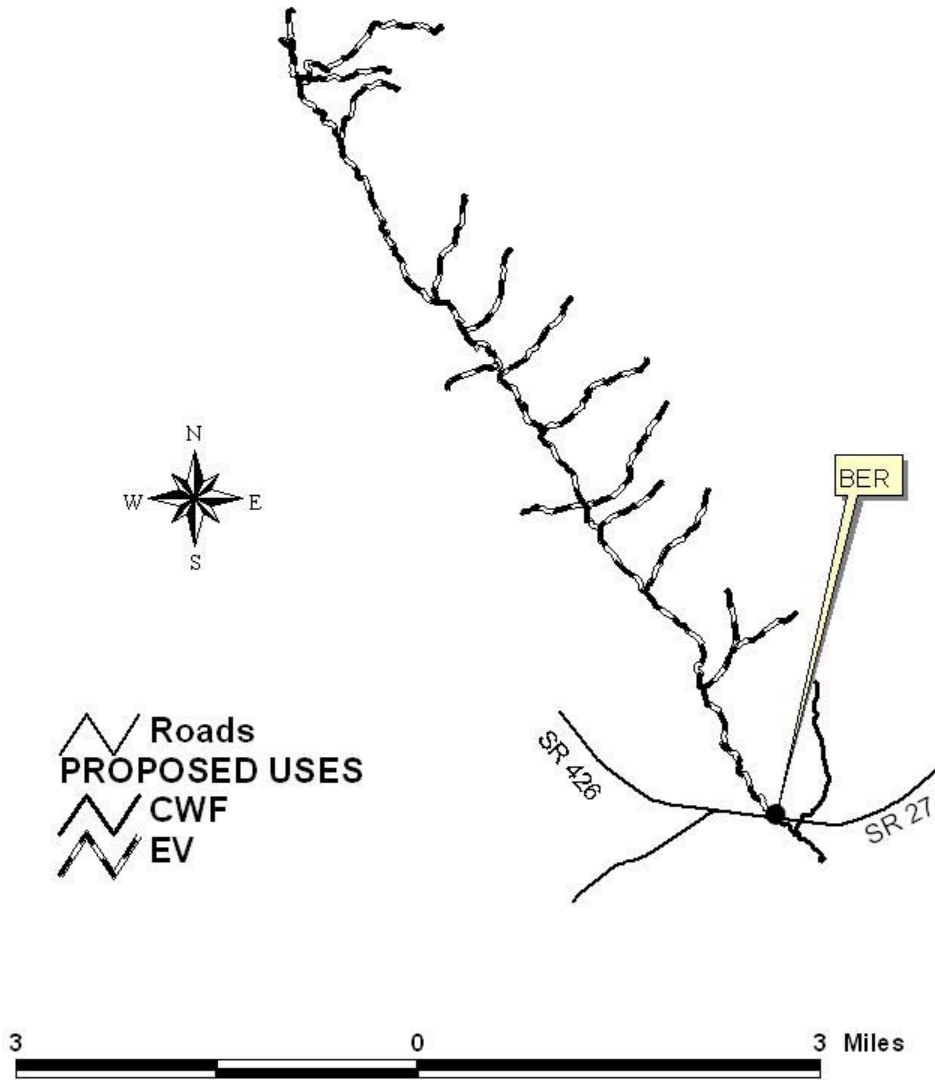


FIGURE 4
EAST HICKORY CREEK

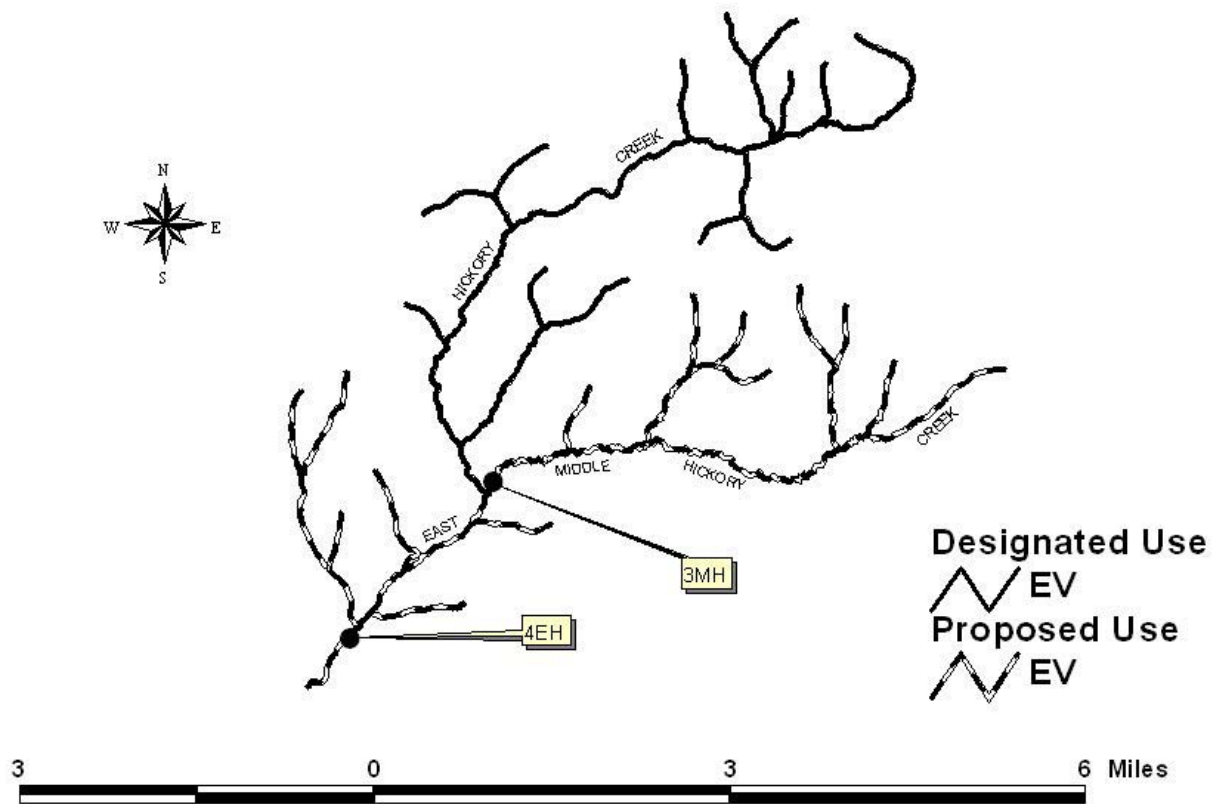


FIGURE 5 YOUNG WOMANS CREEK

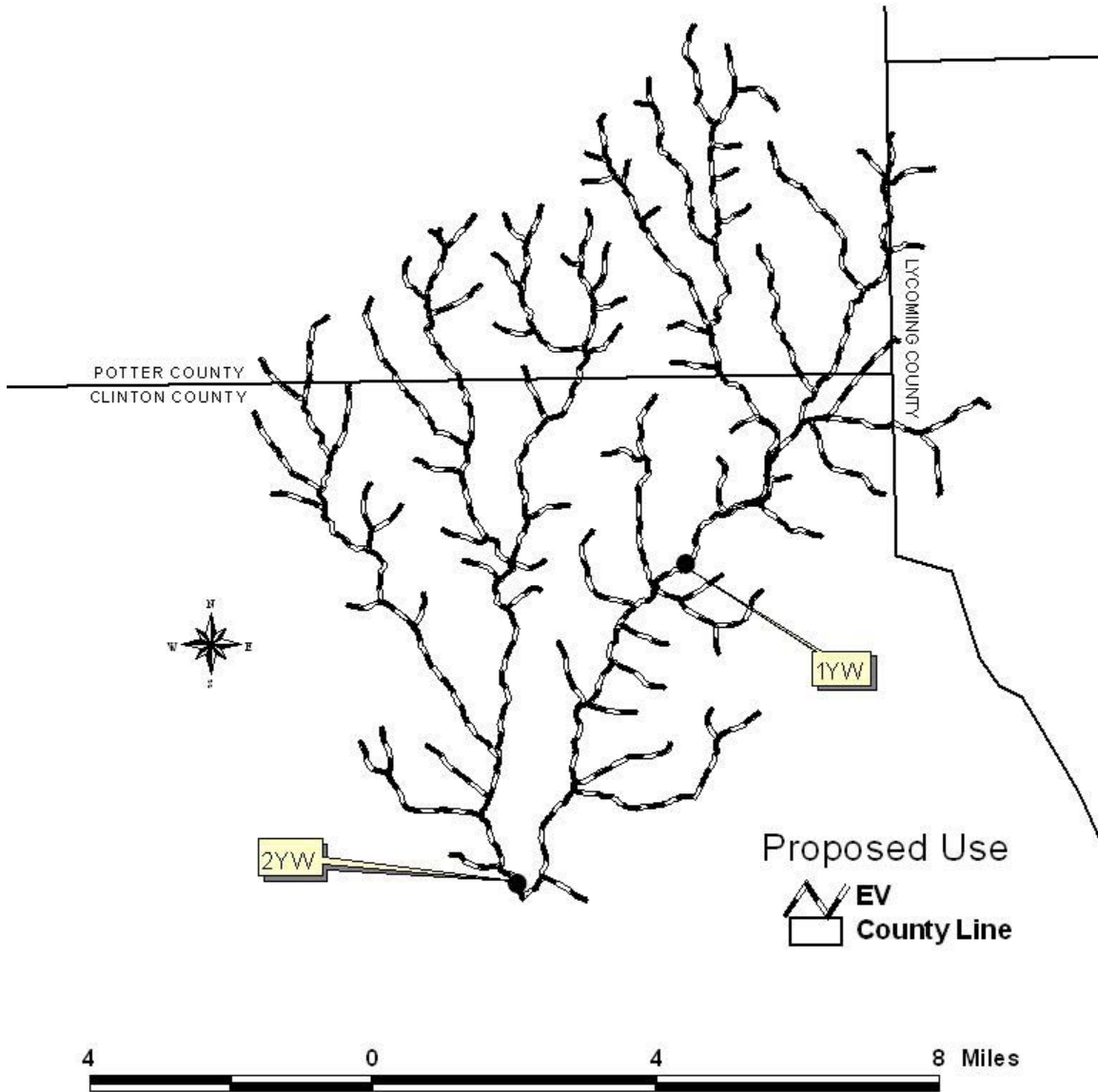


FIGURE 6 EAST BRANCH DYBERRY CREEK

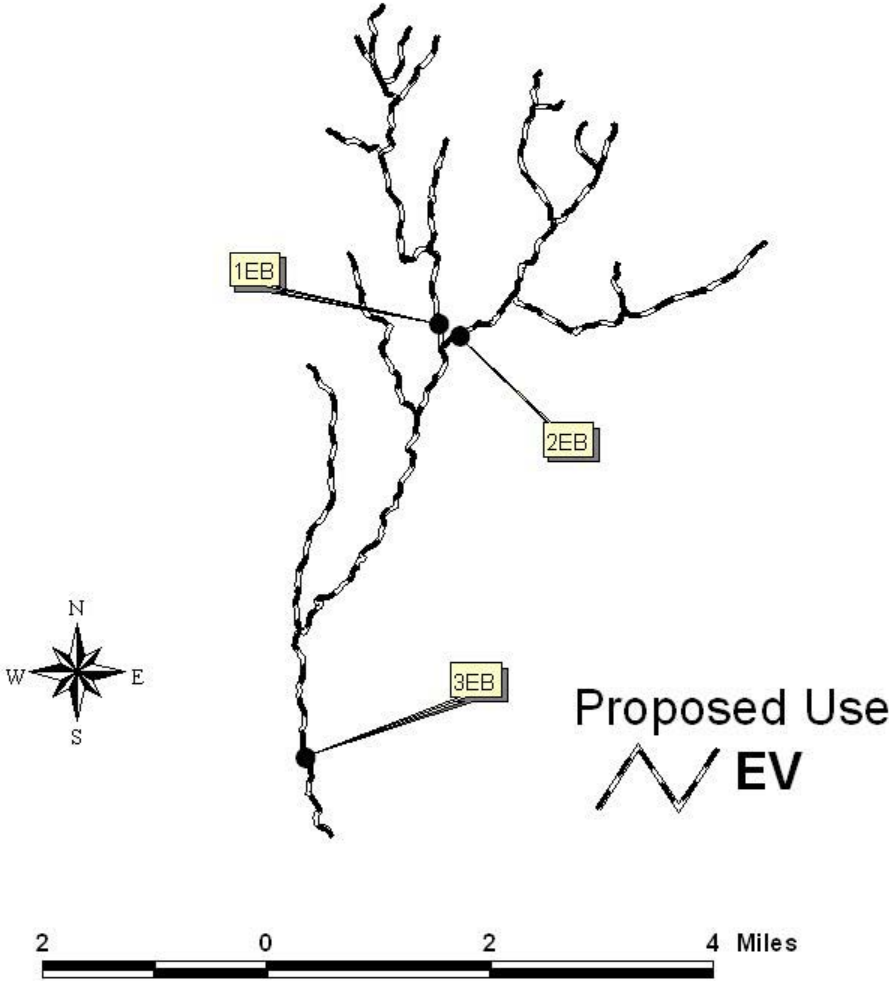
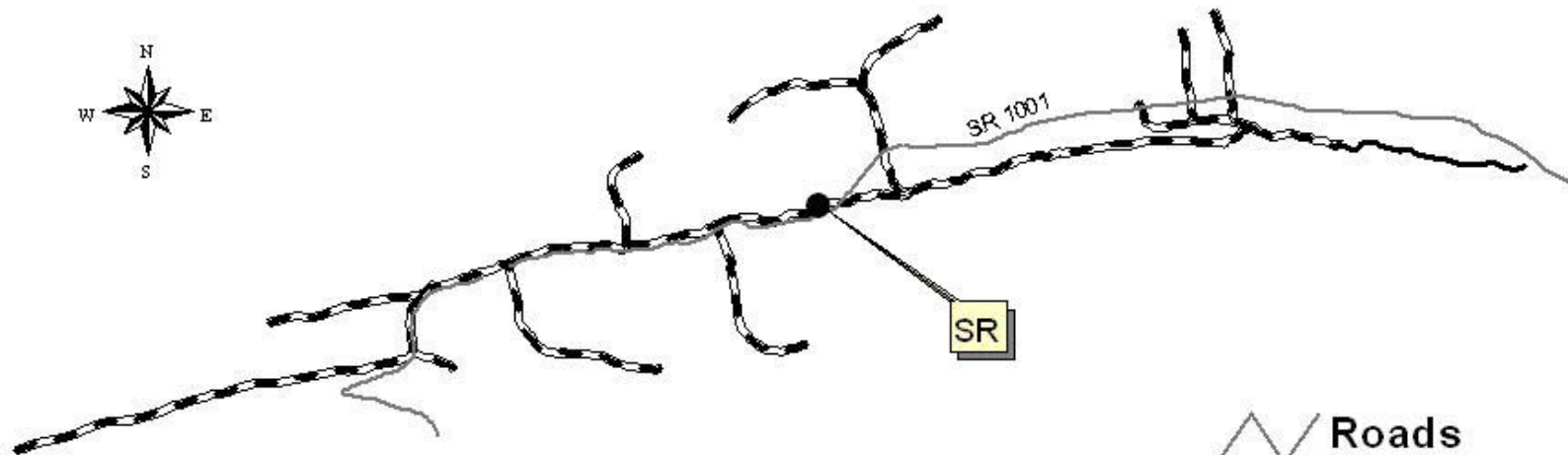
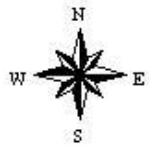


FIGURE 7 SPRUCE RUN



-  Roads
-  Proposed Use
-  EV
-  HQ-CWF



FIGURE 8 UNT TUNKHANNOCK CREEK

