

**COLD WATER HABITAT EVALUATION PROJECT  
BLUE MOUNDS BRANCH WATERSHED**

FY 2001-03 Progress Report  
MWBC = 1251100

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Project Objectives: Cooperate with the Military Ridge Prairie Heritage Work Group to improve cold water streams by managing grassland habitat on a landscape scale. Conduct fisheries and water quality surveys to evaluate how cold water streams respond to landowner assistance programs including Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Targeted Runoff Management (TRM), and Trout Stamp projects.

**SUMMARY**

Monitoring data collected from 2001 through 2002 indicate improved water quality in streams of the Blue Mounds Branch Watershed. Compared with data collected in the 1970's and early 1990's, three Dane County streams in the watershed now support greater numbers of cold water fish including brown trout.

Blue Mounds Branch (Big Spring or Gordon) has completely recovered from a major manure spill that occurred in 1995. Significantly greater numbers of brown trout and trout stream indicator species are found in the stream compared to surveys performed before the spill. Blue Mounds Branch is currently classified as a Class II trout stream and designated Exceptional Resource Water. Stream temperature data suggest potential for establishing brook trout in the headwaters.

German Valley Creek is currently on the USEPA 303d list of impaired streams, but recent data indicates good water quality and healthy cold water fisheries in the lower reach. Survey results indicate that the lower reach has potential to support a very productive trout fishery if steps are taken to improve habitat. The stream corridor is currently shrouded with box elder trees while the substrate is mostly soft sediment. German Valley Creek is an important tributary to Blue Mounds Branch and improving the habitat could expand trout fisheries on a watershed scale. Poor habitat due to siltation was the basis for the 303d designation but habitat restoration would likely promote de-listing.

Syftestad Creek is a small cold water tributary to Kittleson Valley Creek, a Class II trout stream. Water quality and electrofishing data collected in 2002 suggest that Syftestad

Creek displays trout stream potential based on cold water temperatures and other cold water indicators. The stream historically supported Wisconsin Special Concern listed redbreast dace (*Clinostomus elongatus*), but no specimens have been collected since 1974.

Improved fisheries and water quality in the streams of the Blue Mounds Branch Watershed reflect improved land use practices, particularly the extensive CRP grasslands. The area has high potential for continued water quality improvement since it is located within the special CREP grassland management area and The Nature Conservancy grassland bird project area.

## INTRODUCTION

Once overlooked as a small remote watershed overlapping political and management boundaries, the Blue Mounds Branch Watershed has become a major focus of land use improvement efforts on a landscape scale. Since the mid-1980's, the number of landowners in the watershed participating in CRP has been considered to be very high compared to state and national participation rates. Anglers and riparian property owners were the first to notice the water quality benefits as large tracts of grassland became established under the CRP program. In recent years, Blue Mounds Branch has become a favorite among anglers seeking to enjoy a productive trout stream as an alternative to some of the other popular trout streams in the area.

Within the last three years, public and private support for grassland and trout stream management in the watershed have gained considerable momentum. The Military Ridge Prairie Heritage Work Group (a coalition of landowners, conservation groups and government agencies) is supporting efforts to improve these habitats on a landscape scale. The group endorses CRP, CREP, TRM and other management tools available to assist landowners and improve habitats within the watershed. For instance, landowners along German Valley Creek have expressed their support for improving the trout fishery and Dane County Land Conservation Department will be submitting a TRM grant proposal to remove box elder trees and improve trout habitat in the stream. In addition to the substantial support of conservation groups and private landowners, the area has also been identified in the WDNR Land Legacy Report (draft) as 5 star for conservation significance and 5 star for recreational potential.

Compared to several popular trout streams in Dane County, streams within the Blue Mounds Branch watershed are currently exposed to minimal urban stormwater and construction site runoff. Since the watershed is relatively undeveloped, streams can be easily protected without the expensive technical restorations required in more developed watersheds.

Building on the momentum of the Military Ridge Prairie Heritage Work Group, and their goal of linking upland and riparian land use management with water resources, WDNR South Central Region conducted an assessment of three cold water streams in the watershed. This report summarizes water quality monitoring and fish survey results from the 2001-02 sampling seasons.

## Resource Descriptions of the Three Monitored Streams

**Blue Mounds Branch** is a spring-fed stream that flows along the western edge of Dane County and is joined by German Valley Creek. The Dane County portion is approximately 5.5 miles long. With the exception of a major manure spill in 1995, water quality is very good and the entire reach in Dane and Iowa County is a Class II trout stream and designated Exceptional Resource Water (ERW). These classifications continue into Iowa County for another 7 miles. The stream has a variable gradient and contains numerous riffle and pool habitats in the upper sections. Over-grazing and excessive box elder trees in some areas currently limit full use potential as a Class I trout fishery.

**German Valley Creek** is an important tributary to Blue Mounds Branch in the overall goal of managing trout habitat and for protecting water quality of the ERW stream. At this time, German Valley Creek has not been formally classified so the default “warm water fish and aquatic life” classification under Wisconsin Department of Natural Resources Administrative Code NR 102 applies. The stream is currently listed as 303d impaired due to excessive sediment deposition. While sediment deposits and lack of pools in the lower reach continue to limit full use potential, recent findings support classification changes to Class II trout stream and “cold water” stream under WDNR Administrative Code NR 104. The lower reach below Mayflower Road has the best cold water habitat potential based on flow and temperature. A small section of stream below CTH Z is already managed for brown trout. The lower reach has an overall gradient of 11 feet per mile, typical of low gradient trout streams (Wang et. al 1998).

**Syftestad Creek** originates south of Daleyville area and flows southerly for 5 miles before the confluence with Kittleson Valley Creek, a Class II trout stream. The average gradient is 28.2 feet/mile. Current use classification is default “warm water fish and aquatic life” under WDNR Administrative Code NR 102 but cold water classifications have been proposed in both WDNR and Dane County planning documents. The stream historically supported a rare “cool water” species known as redbside dace. This State Special Concern species has not been found in the stream since 1974 and is probably extirpated from the watershed.

## Methods

Water chemical information was collected from both German Valley Creek and Blue Mounds Branch using Yellow Springs Instruments® Model 600XLM data loggers. The units continuously record dissolved oxygen, temperature, pH, conductivity, total dissolved solids, and salinity. The units were deployed during both 2001 and 2002 sampling seasons. The units also contain depth sensors that were useful for identifying peak storm events. The data loggers were deployed for intervals of less than two weeks to prevent probe fouling and calibration drift. Manual dissolved oxygen meters were also used for quality assurance and calibration.

Continuous Onset® temperature recorders were deployed to evaluate cold water habitat in all three streams. The units were deployed at a single station on Syftestad Creek, two sites on German Valley Creek and two sites on Blue Mounds Branch.

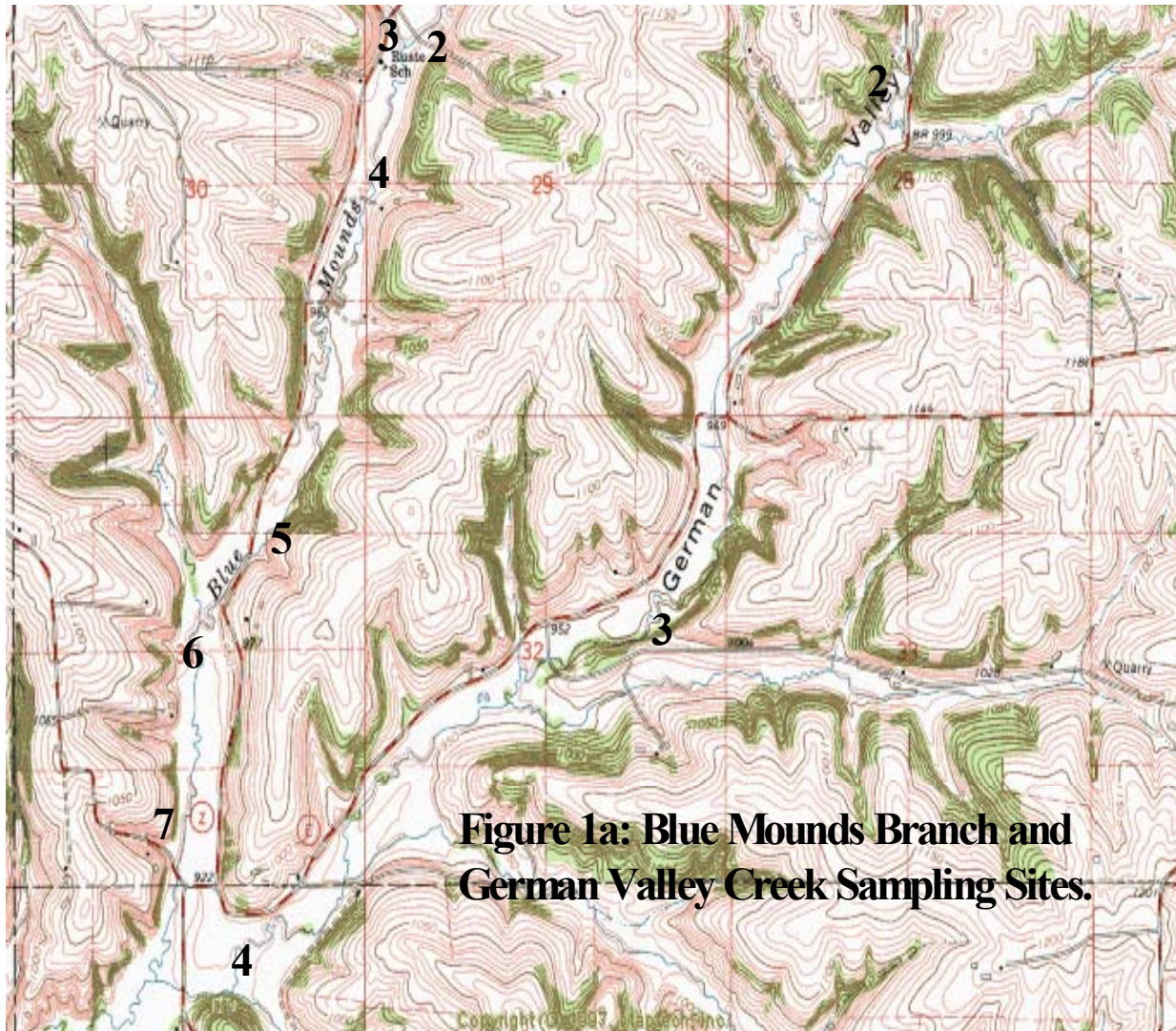
Macroinvertebrates were collected from the three streams using a d-frame kick net. Samples were submitted to UW-Stevens Point for enumeration and identification. Hilsenhoff Biotic Index - HBI (Hilsenhoff, 1987) values were determined for each sample as a measure of water quality. The HBI is based on varying tolerances of aquatic insects and crustaceans to organic pollution. HBI water quality values range from 0 (best) to 10 (worst).

Fish populations were sampled with a pulse DC towed shocker barge in larger sections of the streams and a battery powered backpack shocker in small headwater areas. Fish community data were used primarily to determine the cold water Index of Biotic Integrity - IBI (Lyons and Wang 1996), a measure of cold water fish community health. IBI environmental quality values range from 0 (worst) to 100 (best).

Stream habitat quality was assessed at four stations on German Valley Creek and three stations on Blue Mounds Branch. Essential habitat characteristics including width, depth and riparian cover were determined using “Wadeable Stream Habitat Evaluation” form 3600-228 and protocol from “Development and Evaluation of a Habitat Rating System for Low-Gradient Wisconsin Streams (Wang et al 1998). Swiffer Model 2100 flow meters were used for velocity measurements and flow calculations.

### Results – Blue Mounds Branch

YSI 600XLM: A multiple-parameter data logger was deployed near County Highway Z (Station 5) during the summers of 2001 and 2002. The data logger was deployed for a total of 59 days during the biennium, 31 days in July and August of 2001 and 28 days during July and August of 2002. Table 1 lists minimum, maximum and mean results combined for both years. The lowest or minimum measurements for dissolved oxygen, pH, total dissolved solids (TDS), salinity and specific conductivity coincided with a storm event on August 1, 2001. Total rainfall reported in Madison for that date was 3.4 inches. Low levels of pH, TDS, salinity and specific conductivity reflected soft water inputs from the rain. The low dissolved oxygen measurement likely reflected nutrient runoff. The amount of polluted runoff was modest since the level did not fall below water quality standards limit of 6 mg/l. Higher levels of TDS-salinity-specific conductivity and pH during lowflow reflect calcium and other minerals dissolved in the groundwater that sustains the stream. Figure 1 displays a graph encompassing the sampling period from July 30 to August 3, 2001. The graph illustrates a storm event as well as daily pH and dissolved oxygen fluctuations due to photosynthesis and respiration of aquatic plants. The daily fluctuations were not severe and therefore suggest that nutrient enrichment to the stream is moderate.

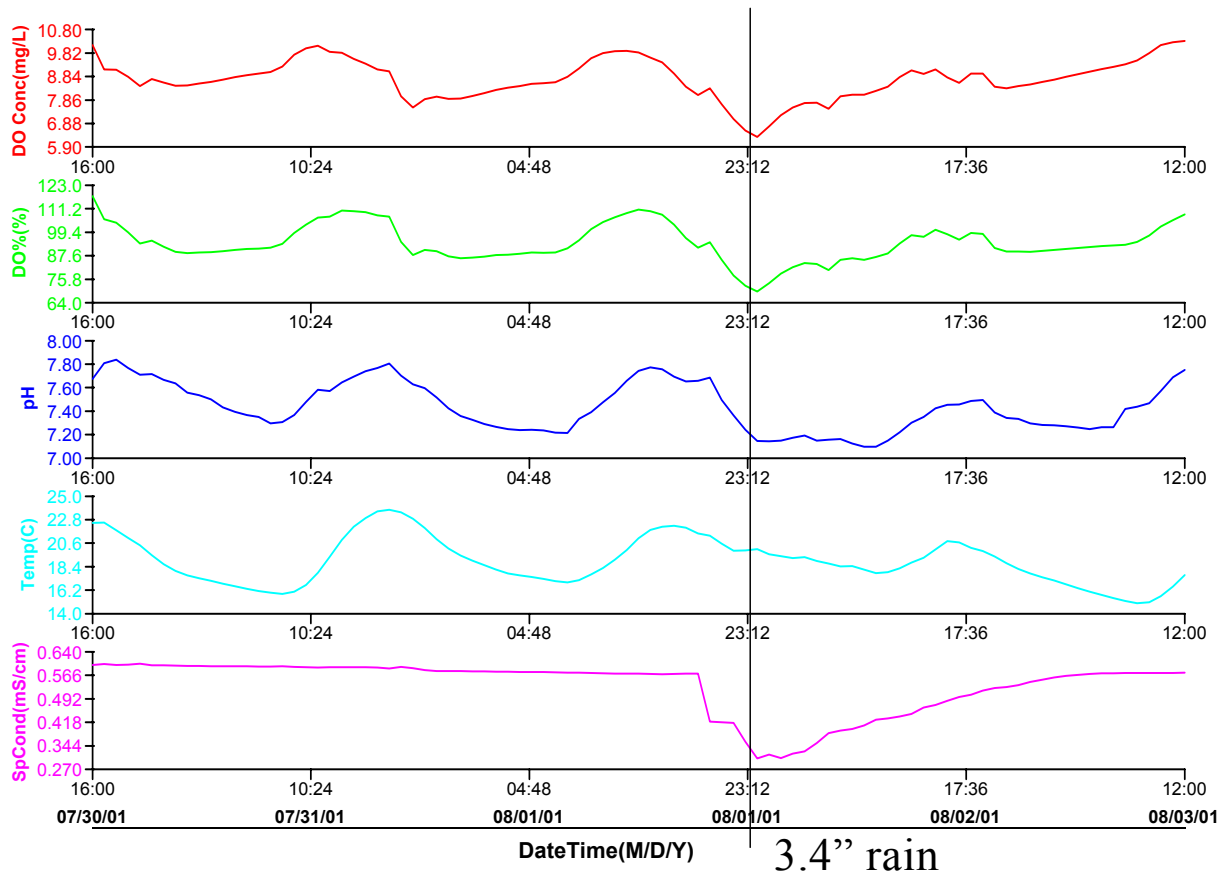


**Figure 1a: Blue Mounds Branch and German Valley Creek Sampling Sites.**

**Table 1: Blue Mounds Branch YSI 600XLM Summary 2001-02**

Parameter	Minimum	Maximum	Mean
Sp Cond uS/cm	300	630	588
TDS mg/l	180	390	280
Salinity ppt	.14	.31	.29
D. O. mg/l	6.3	11.3	9.1
pH su	7.1	8.8	8.0
Temp C	12.1	23.7	16.9

Fig. 1: Blue Mounds Branch YSI 600XLM



Onset temperature data: Onset Tidbits were deployed at two locations in Blue Mounds Branch, at County Highway Z (Station 5) and upstream approximately 2500 feet below the confluence of two forks (Station 4). The data loggers were deployed from early fall of 2001 to the middle of September 2002. During the summer of 2002, cold water temperatures were sustained at both locations. At the site below the tributaries (Figure 2), colder temperatures were sustained, maximum 68 F or 20 C, while the maximum temperature at CTH Z was 72 F or 22 C. Higher temperatures at Station 5 (Figure 3) probably indicated effects of an overgrazed stretch, exposing the stream to extra solar radiation. Cold temperatures sustained farther upstream indicate potential to support native brook trout populations.

Fig 2: Blue Mounds Branch at farm drive below tributaries. Onset temperature logger results

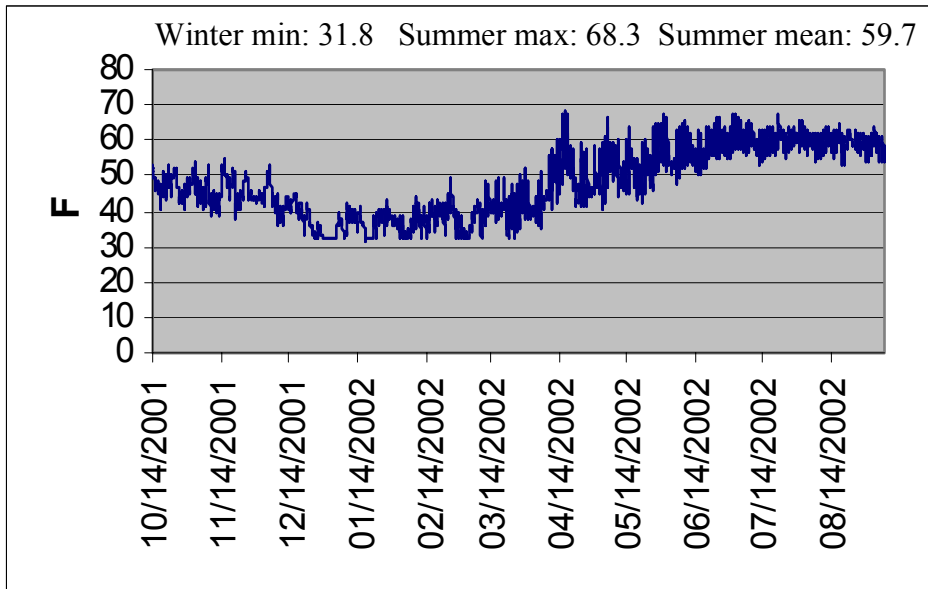
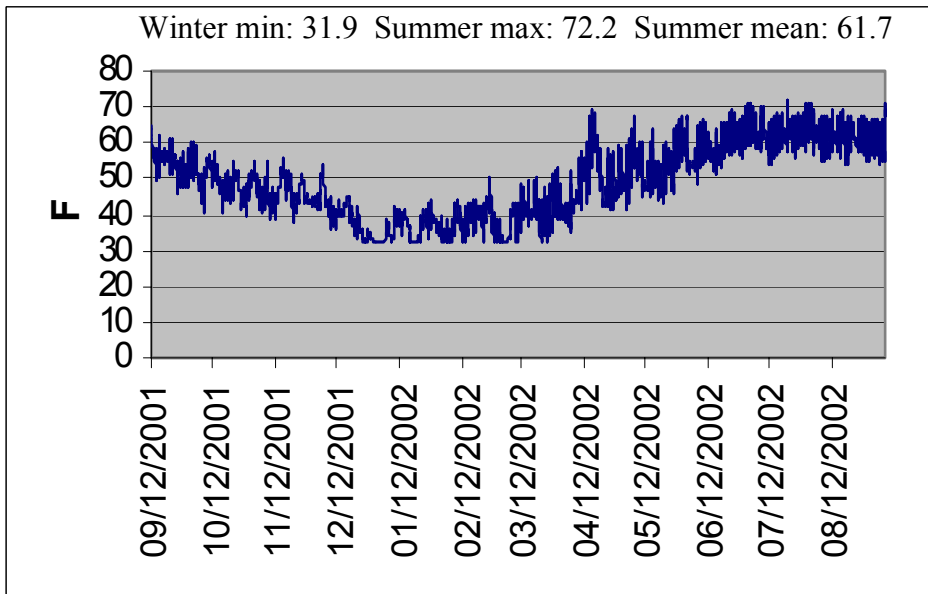


Fig. 3: Gordon Creek at CTH Z. Onset temperature logger results.





Macroinvertebrate results: Ten kick net samples were collected from Blue Mounds Branch during the 2001-02 sampling seasons. Since 1994, a total of 18 samples have been collected from various locations in the stream. HBI values ranged from 2.39 (excellent) to 4.96 (good), and a mean score of 3.62. The highest or worst HBI value (4.96) coincided with the manure spill in 1995.

Pollution sensitive stoneflies (*Isoperla signata*) were found in 13 of 18 samples. Stoneflies are uncommon in southern Wisconsin streams due to their sensitivity to polluted runoff. The combination of frequent stonefly occurrences and good to excellent HBI scores indicate better than average water quality compared to other local trout streams. For example, Black Earth Creek HBI values at the least impacted reference site (CTH P) are significantly higher ( $P=.05$ ), ranging from 3.5 to 5.8, and a mean score of 4.8. Stoneflies are considered very rare in Black Earth Creek and were not found in over 100 samples collected from 1985 through 1996. Table 2 summarizes HBI scores from Blue Mounds Branch. Table 3 lists species of Ephemeroptera-Plecoptera-Tricoptera (EPT), the Orders of mayflies-stoneflies-caddisflies. Blue Mounds Branch supports a rich diversity of these aquatic insect orders, and is another indication of a healthy trout stream.

Table 2: Blue Mounds Branch HBI scores.

Site	Year	4-94	5-95	4-01	11-01	4-02
2. East Fork					2.86*	
4. Below Forks					3.09*	
5. CTH Z		3.75	4.96!	3.71*	3.07	4.31*
8. Spring Creek Road					4.55*	
9. Clay Hill Road		3.65*	3.83*	3.21*		4.21*
10. Sand Rock Road		2.39*	2.39*			
11. CTH A		2.58*				
12. Hwy 39		4.36			3.71*	

- \* *Isoperla signata* “light brown stonefly” found in these samples.
- ! Manure spill several miles upstream resulted in worst HBI score.

Fish survey results: Healthy trout streams typically support low diversity of species adapted to the sustained cold water conditions. Disturbances that alter thermal, chemical and physical habitat create conditions more favorable for tolerant species such as white sucker and creekchub. Tolerant and other eurythermal species thrive while cold water species decline or disappear from the degraded conditions. In degraded cold water streams species diversity increases and is reflected by a low Index of Biotic Integrity (IBI) score (Lyons and Wang 1996).



Table 3: EPT species and frequency in 18 Blue Mounds Branch samples.

EPT Orders and species	% Frequency
Plecoptera (stoneflies)	
<i>Amphinemura delosa</i>	6
<i>Isoperla signata</i>	72
<i>Taeniopteryx</i>	6
Ephemeroptera (mayflies)	
<i>Acentrella carolina</i>	6
<i>Baetis brunneicolor</i>	44
<i>Baetis dubius</i>	6
<i>Baetis flavistriga</i>	33
<i>Baetis tricaudatus</i>	72
<i>Ephemerella catawba</i>	6
<i>Ephemerella inermis</i>	72
<i>Ephemerella needhami</i>	6
<i>Serratella frisoni</i>	6
<i>Heptagenia diabasias</i>	6
<i>Stenocron interpunctatum</i>	17
Tricoptera (caddisflies)	
<i>Ceratopsyche alhedra</i>	11
<i>Ceratopsyche bronta</i>	6
<i>Ceratopsyche slossonae</i>	94
<i>Ceratopsyche sparna</i>	22
<i>Cheumatopsyche</i>	78
<i>Hydropsyche betteni</i>	61
<i>Hydroptila</i>	17
<i>Lype diversa</i>	6
<i>Neophylax</i>	6
<i>Oecetis</i>	6
<i>Pycnopsyche</i>	11

Fish survey data collected from 1975-76 and 1994 indicated that Blue Mounds Branch was an unbalanced trout stream, supporting unnaturally high species diversity and high numbers of tolerant white sucker and creekchub. IBI scores from those earlier surveys revealed “poor to fair” conditions based on the low values. In 2001-2002, twelve of thirteen IBI scores ranked within the “good” range. Lower diversity and greater percentage of cold water species now characterize the fish community. Mottled sculpin and brown trout were most abundant along with modest numbers of American brook lamprey. Mottled sculpin and American brook lamprey require good water quality to thrive. Table 4 contains the cold water IBI scores from 1975 through 2002 at various locations along the stream. In the recent surveys, cold water habitat and “good” IBI scores were also revealed in both head water forks of Blue Mounds Branch.

Table 4: Blue Mounds Branch Cold Water IBI Results

Site	1975-76	1994	2001	2002
1. East Fork - upstream			50	
2. East Fork - downstream			60	60
3. West Fork			60	60
4. Below Forks	20	50	60	70
5. Above 'Z'			60	
6. Below 'Z'	40	20	60	60
7. Barber Road		20*	80	60
10. Sand Rock Rd				70

\*Estimate based on the relatively diverse species composition for cold water streams and qualitative abundance.

Comparing sampling stations 4 and 6 over time, species diversity decreased, along with the percentage of warm water indicators, while the percentage and abundance of cold water species increased. The fish community change reflected improved land use practices, including CRP, and the resultant increased spring-flow to the stream. Gebert and Krug (1996) demonstrated increased low flows and decreased peak flows in the Driftless Area, a response to farmland conservation practices. Increased low flow due to greater surface infiltration and groundwater discharge ultimately enhanced cold water fisheries. The pattern of improved cold water fisheries has apparently coincided with the flow changes that Gebert and Krug documented, particularly in this grassland watershed. Table 5 lists fish community representatives along with recent changes, including lower species diversity and cold water species composition in 2001 and 2002.

The gradual decline of “warm” water species reflects a shift toward a more healthy trout stream. At Station 6 in 1994, only 9 brown trout were sampled while 189 were collected in 2001 and 197 in 2002. The sampling effort was the same each time. Based on current data, brown trout and mottled sculpin are now very abundant in the stream. Tables 6 and 7 list species numbers for each site surveyed in 2001 and 2002.

Habitat: Sampling protocols for assessing habitat of low gradient streams (Wang et al 1998) were used for this appraisal. Low gradient stations are defined as reaches with gradients less than of 15.8 feet per mile. Stream gradients actually range for high to low but the method was used at all stations for consistent comparisons among sites. Three surveys were conducted during low flow season of September 2001.

At Station 7 near Barber Road, the stream displayed low gradient habitat characteristics with an elevation change of only 6.7 feet per mile. Fine deposits of sand and silt were the prevalent substrate and no riffles were detected. Riparian vegetation provided good overhead cover however box elder trees appear to be expanding in some locations. Flow was measured at 4.6 cubic feet per second and the stream had a mean stream width of 8.5 feet.

At Station 5 above CTH Z, the stream gradient increased to 14.5 feet/mile. Riffle and pool habitats were measured in this segment and are more typical of headwater Driftless Area streams. However, farther upstream from this site is an area of over-pasturing and severe bank erosion. The effect of the over-grazed section on stream temperatures could not be assessed during the habitat survey. Separate flow measurements taken in September 2001 and July 2002 resulted in the same rate each time (4.1 cfs). The mean stream width was 8.9 feet.

At Station 4, below the east and west forks, Blue Mounds Branch displayed relatively high gradient of 20.2 feet/mile. Riffles and pools were common features while fine sediment deposits were not substantial. A narrow riparian corridor and excessive box elder growth were the greatest habitat limitations at that site. Flow was measured at 3 cfs and the mean stream width was 7.5 feet.

In general, the surveys did not reveal any substantial habitat limitations to the cold water fisheries. Enhancements could include box elder removal, lunger structures in the lower reaches, reduced grazing impacts above and below County Z and expanded riparian corridor at various locations upstream of County Z.

Table 5: Blue Mounds Branch Fish Community Composition at sta. 4 and 6.

Species	Indicator	1975	1976	1994	2001	2002
American brook lamprey	I – C		X	X	X	X
Brown trout	C	X	X	X	X	X
Common shiner	W	X				
Central stoneroller	W		X	X		
Bluntnose minnow	T – W	X				
Southern redbelly dace	W	X	X	X		
Creekchub	T – W	X	X	X	X	X
White sucker	T – W	X	X	X	X	X
Brook stickleback	C				X	X
Johnny darter	W	X	X			
Fantail darter	W	X	X	X		
Mottled sculpin	I - C	X	X	X	X	X
Total number of species		9	9	8	6	6
% cold species		22	33	50	67	67
% warm species		78	67	50	33	33
% intolerant species		11	22	25	33	33

I = intolerant of environmental degradation. T= tolerant of environmental degradation. C = stenothermal cool-cold. W = eurythermal. Survey lengths per year: 1975 (330'), 1976 (330'), 1994 (1550'), 2001 (2500'), 2002 (1600')

Table 6: Blue Mounds Branch Fish Community Data for 2001.

Sites →	1	2	3	4	5	6	7
American brook lamprey				4	3	4	2
Brown trout	8	40	21	76	66	189	120
Creekchub						7	1
White sucker				4	11	35	9
Brook stickleback						2	
Mottled sculpin	123	51	2	213	235	265	93
Distance shocked (ft.)	620	720	1150	1300	1000	1200	1400
1 = towed barge, 2 = backpack	2	2	2	1	1	1	1

Table 7: Blue Mounds Branch Fish Community Data for 2002.

Sites →	1	2	3	4	5	6	7
American brook lamprey						3	
Brown trout		31	15	18		197	51
Creekchub						13	
White sucker				1		20	3
Brook stickleback						4	1
Mottled sculpin		72	22	7		198	51
Distance shocked (ft.)		500	400	400		1200	500
1 = towed barge, 2 = backpack		2	2	1		1	1

Figure 4: West Tributary to Blue Mounds Branch  
Brown Trout Length Frequency

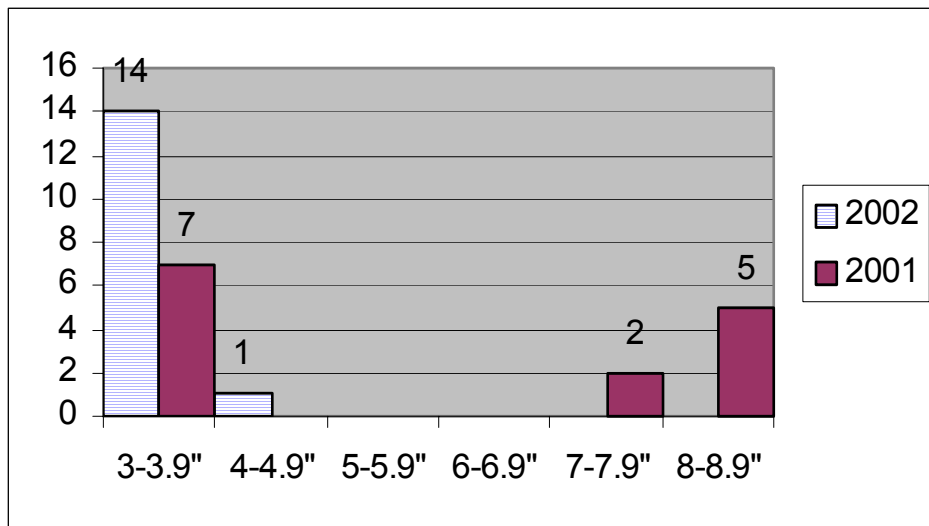
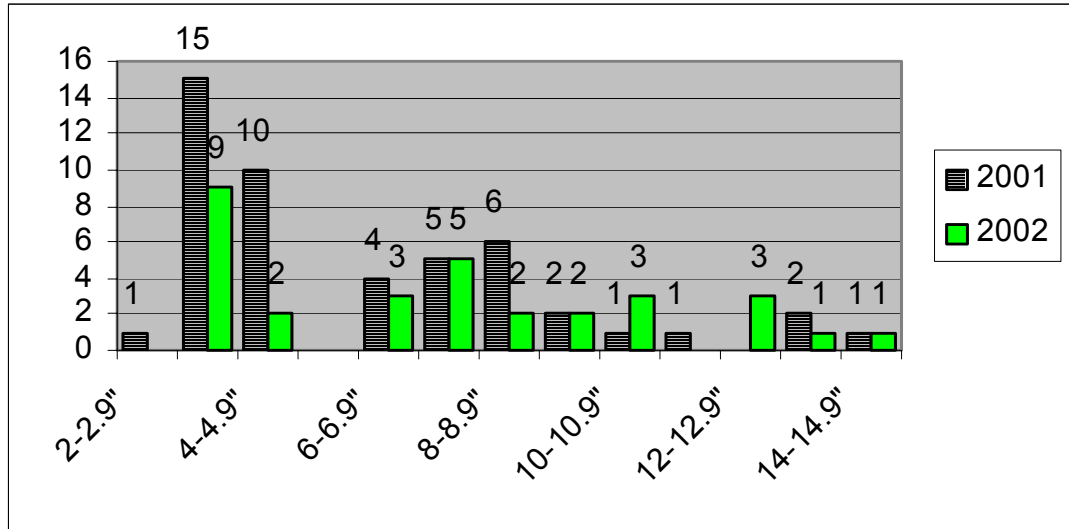
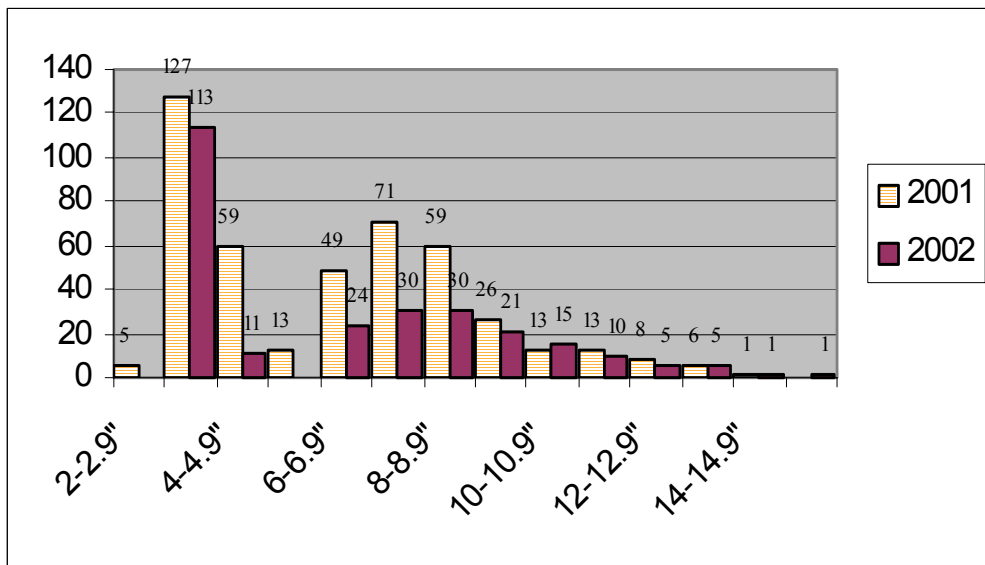


Figure 5: East Tributary to Blue Mounds Branch  
Brown Trout Length Frequency



2001 - Sites 1 and 2. 2002 - Site 2.

Figure 6: Blue Mounds Branch Brown Trout  
Length Frequency  
2001 - Sites 4, 5, 6, 7. 2002 - Sites 4, 6, half of 7.



## Results – German Valley Creek

YSI600XLM: The continuous water quality monitoring unit was deployed near Mayflower Road (Site 3) during the summers of 2001 and 2002. The data logger was deployed for a total of 59 days, but power failure during one of the deployment periods reduced the information recorded to 54 days. On another occasion, the dissolved oxygen probe malfunctioned and no data was recorded for that parameter from July 25 through August 3, 2002. Other data logger sensors functioned during the entire period. Regardless of the brief technical difficulties encountered, enough data was generated to characterize the stream water quality. Table 7 displays the July and August descriptive statistics for both years. Consistent with data collected from Blue Mounds Branch, the lowest measurements for dissolved oxygen, specific conductance, total dissolved solids and salinity occurred during a storm event. A ~1 inch rainfall during August 12-13, 2002 (Madison climatology data) coincided with the lowest dissolved oxygen level measured in German Valley Creek. A brief period of low conductivity and a dissolved oxygen level of only 3.3 mg/l likely suggested a flush of manure or other nutrient source. Since other stream indicators suggest good water quality in the stream, frequency of low dissolved oxygen in the stream is probably low, and in this case not significant enough to degrade the stream. Figure 7 demonstrates the daily pulse of German Valley Creek along with the blip of low conductivity and dissolved oxygen. Modest dissolved oxygen and pH fluctuations indicate only modest eutrophication and nutrient loading.

Fig. 7: German Valley Creek YSI 600XLM

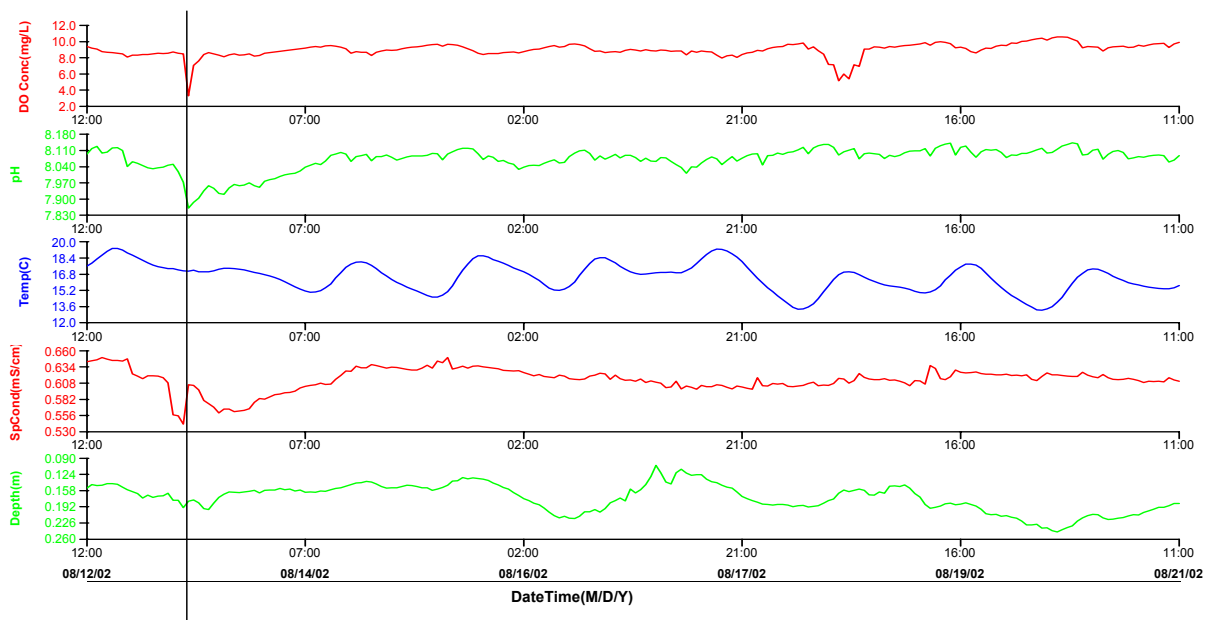


Table 7: German Valley Creek YSI 600XLM Summary 2001-02

Parameter	Minimum	Maximum	Mean
Sp. Cond. uS/cm	540	690	630
TDS mg/l	300	410	350
Salinity ppt	.26	.34	.31
D. O. mg/l	3.3	10.6	8.45
pH su	7.7	8.5	8
Temp C	13.1	21.4	17.3

Onset temperature data: Onset tidbits were deployed at two locations in German Valley Creek to measure water temperature continuously. One unit was deployed at Station 3 near Mayflower Road and another at Station 2 approximately 2.5 miles upstream. Based on a number of indicators including temperature, Station 3 probably represents the northern limit of the best trout habitat while Station 2 indicates “cool” water habitat. Figures 8 and 9 display the water temperature trends from September-October 2001 through September 2002. Comparing German Valley Creek with Blue Mounds Branch, the temperature regimes of the two streams are spatially reversed. The coldest temperatures are found in the lower reaches of German Valley and in the upper reaches of Blue Mounds Branch. Maximum and mean water temperatures at Station 3 (Mayflower Road) were actually colder than temperatures at (CTHZ) Station 5 on Blue Mounds Branch, a Class II trout stream.

Fig. 8: German Valley Creek at CTH E.  
Onset temperature logger results.

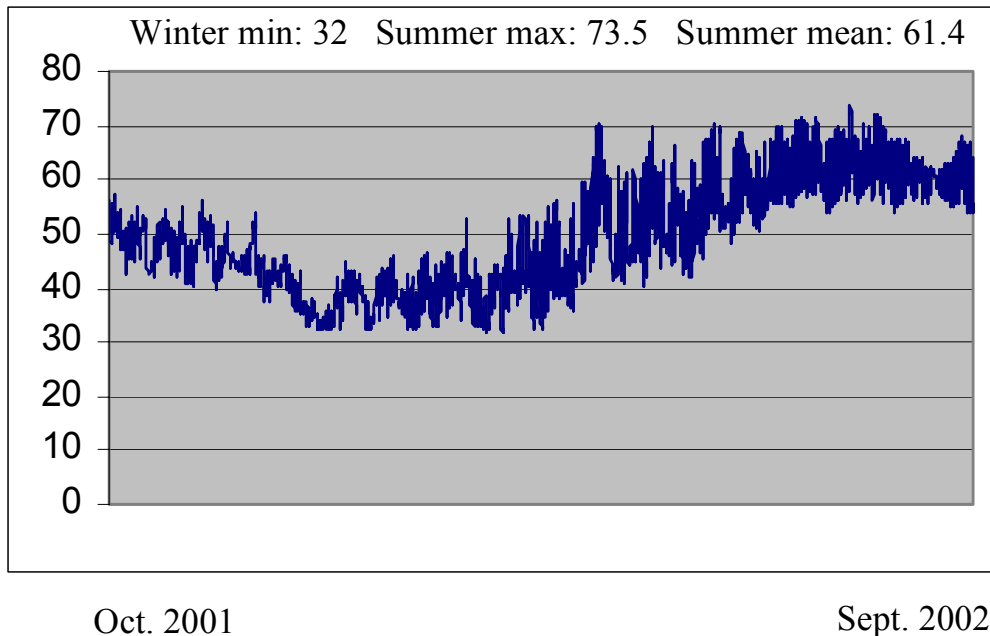
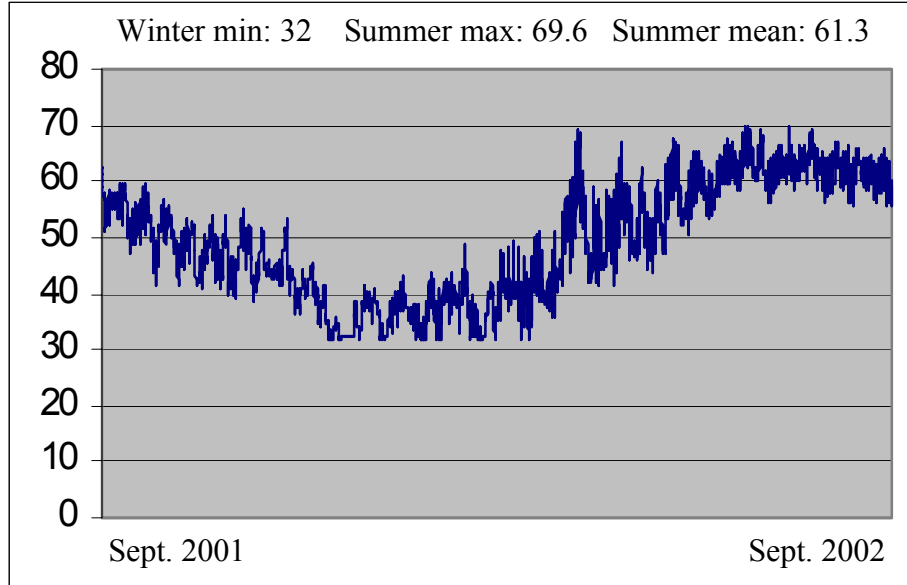




Fig. 9: German Valley Creek at Mayflower Rd.  
Onset temperature logger results.



Macroinvertebrates: Four d-frame kick net samples were collected during the 2001-02 sampling seasons. HBI values ranged from 2.91 (excellent) to 5.15 (good) and these results suggest that water quality is not a limiting factor for trout management. Three samples were also collected in 1994 and 1995 and the results were within this range as well. Five of the six samples were collected near Station 3. While the results indicate “good” to “excellent” water quality, none of the environmentally sensitive stoneflies have been found in German Valley Creek so far. Tables 8 and 9 present the macroinvertebrate monitoring results.

Table 8: German Valley Creek HBI Scores

	Site 2 (CTH E)	Site 3 (near Mayflower Rd)
5-94		4.29
5-95		4.41
4-01		5.07
11-01	2.91	3.01
4-02		5.15

Table 9: German Valley EPT species and frequency in 6 samples.

EPT Orders and Species	% Frequency
Ephemeroptera (mayflies)	
<i>Baetis brunneicolor</i>	50
<i>Baetis flavistriga</i>	17
<i>Baetis tricaudatus</i>	50
<i>Ephemerella inermis</i>	17
<i>Stenocron interpunctatum</i>	50
Trichoptera (caddisflies)	
<i>Brachycentrus occidentalis</i>	50
<i>Ceratopsyche slossonae</i>	50
<i>Chematopsyche</i>	50
<i>Hydropsyche betteni</i>	100
<i>Neophylax</i>	17

- No Plecoptera (stoneflies) found in six samples collected from 1994 – 2002.

Fish survey results: German Valley Creek supports a healthy cold water fish community in the lower reach that is typical of good quality trout streams. Cold water IBI scores represented “fair” conditions (IBI = 50) in 2001 and “good” conditions (IBI = 60) in 2002. Mottled sculpin was the dominant species both years while brown trout were common and American brook lamprey were present. Upstream, the fish community shifts to a more diverse forage fishery and appears to mirror the temperature data. As a result, the “cool” water conditions score poorly based on the cold water IBI, but low numbers of brown trout are found upstream at Station 2.

Table 10: German Valley Creek IBI results from current and previous surveys.

	1976	1994	2001	2002
Station 1	0	0	0	0
Station 2		0	0	0
Station 3		0	20	
Station 4	10		50	60

Comparing current and previous IBI results, the environmental quality in German Valley Creek appears to be improving along with trout management potential (Table 10). Species compositions in Table 11 suggest a shift from “warm” eurythermal to cool-cold stenothermal at Stations 3 and 4, while eurythermal species continue to dominate at Stations 1 and 2. Based on the collections so far, the upper reaches of the stream support a low-density brown trout fishery. Abundance may vary seasonally. Brown trout were common in the lower reaches both years. Since water quality is not the limiting factor, improved habitat could improve brown trout densities. Figures 10 and 11 display community data and brown trout length frequencies for 2001 and 2002 at Station 4.

Table 11: Fish species occurrences in German Valley Creek at both headwaters and lower reaches in different years. Stations 1 & 2 = headwaters. Stations 3 & 4 = lower reaches. Cold species in bold.

Species	Sampling Stations → Year →	1 & 2	1 & 2	3 & 4	3 & 4
		'76-94	'01-02	'76-94	'01-02
<b>American brook lamprey</b>	I, C			<b>X</b>	<b>X</b>
<b>Brown trout</b>	C		<b>X</b>		<b>X</b>
Common shiner				X	
Blacknose dace	T			X	
Central stoneroller		X	X	X	X
Creekchub	T	X	X	X	X
White sucker	T	X	X	X	X
Yellow bullhead	T			X	
Black bullhead					X
<b>Brook stickleback</b>	C	<b>X</b>	<b>X</b>		<b>X</b>
Bluegill			X		
Johnny darter		X	X	X	
Fantail darter		X	X		
<b>Mottled sculpin</b>	I, C				<b>X</b>

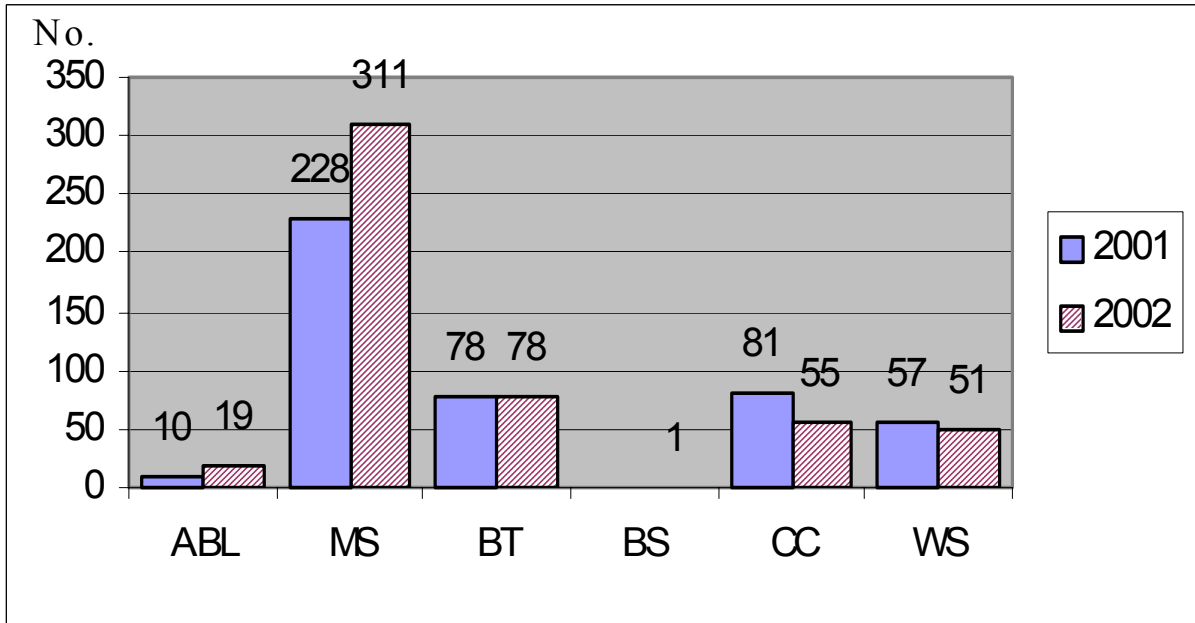
I = intolerant, T = tolerant, C = stenothermal cool-cold, W = eurythermal.

Table 12: Species and numbers collected from German Valley Cr. in 2001 and 2002.

Species	Year → Stations →	2001				2002		
		1	2	3	4	1	2	4
American brook lamprey					10		2	19
Brown trout			3	22	78			78
Central stoneroller			2	2				
Creekchub		13	27	196	81	19	9	55
White sucker		27	53	151	57	27	9	51
Black bullhead				1				
Brook stickleback		103	75			21	1	1
Bluegill		1		2				
Johnny darter		5	24			1		
Fantail darter		111	14			22	2	
Mottled sculpin				331	228			311

Survey lengths: (1) 780', (2) 640', (3) 4000', (4) 4100'.

Figure 10: German Valley Creek Fish Community Structure  
CTH Z to N. Perry Road



ABL=American brook lamprey, MS=mottled sculpin, BT=brown trout, BS=brook stickleback, CC=creekchub, WS=white sucker. IBI scores: 50 (2001), 60 (2002)

Figure 11: German Valley Creek: Brown trout length frequency. CTH Z to N. Perry Road.

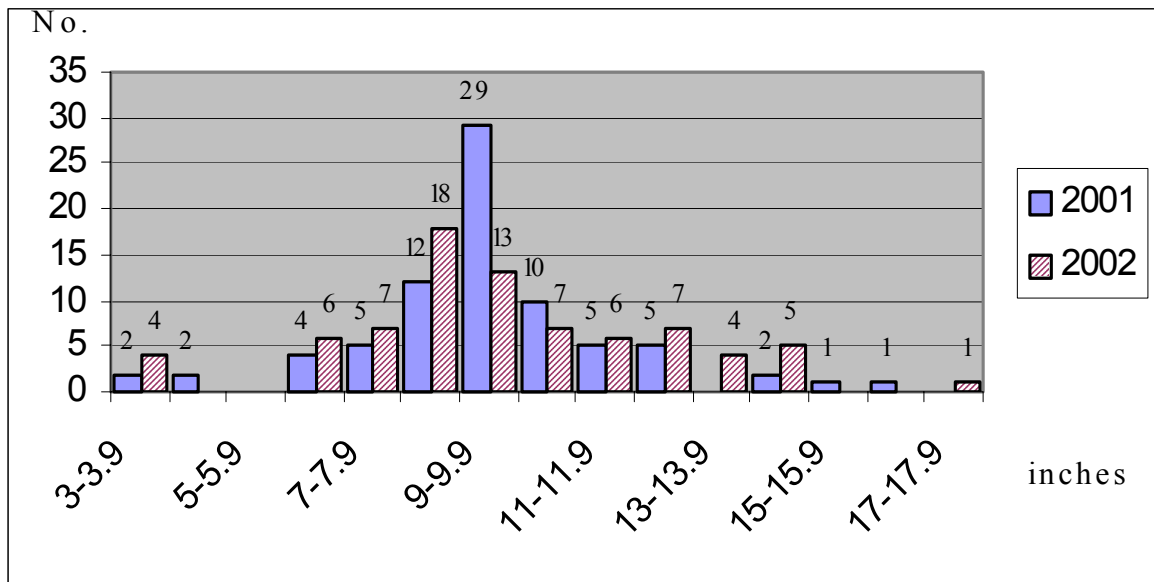
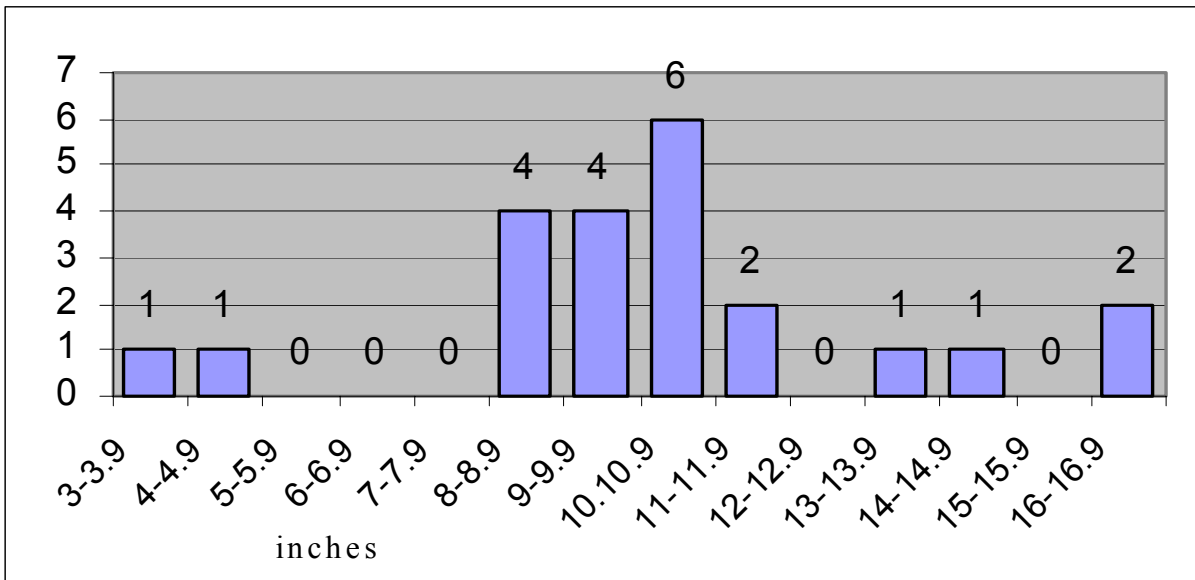


Figure 12: Brown trout length frequency distribution.  
N. Perry to Mayflower Rd. Aug. 15, 2001



Habitat: Protocols for conducting habitat surveys are described in “Development and Evaluation of a Habitat Rating System for Low-Gradient Wisconsin Streams” (Wang et al 1998). Low gradient stations are defined as reaches with gradients less than 15.8 feet per mile. The gradient of German Valley Creek declines significantly along the lower reach and almost mirrors the elevation change along Blue Mounds Branch. The gradient at Site 4 above CTH Z is 6.2 feet per mile compared to 6.7 feet per mile along the lower reach of Blue Mounds Branch in Dane County. While the two streams display similar flow and gradient characteristics, excessive box elder growths retard favorable habitat for trout along German Valley. Few riffles were found but the most significant limiting habitat factor is the lack of pool habitat and bank cover. Dense box elder growths completely shade the stream channel and prevent grass cover. Unstable raw banks and shallow runs dominate the channel. Comparing the low gradient sections of both streams, bank erosion rates along Blue Mounds Branch were only 8.5% compared to 73% along German Valley Creek. The mean width of Blue Mounds Branch was 8.5’ compared to a wider and shallower German Valley Creek (11.5’). The maximum and mean maximum depths in Blue Mounds Branch were 2.6’ and 1.7’ compared with 1.4’ and 1’ in German Valley Creek. The only available cover for adult trout in German Valley Creek is under the abundant snags. As flow energies are deflected around the box elder snags, naked banks erode, creating an artificially wide shallow channel. Other findings at Station 4 included a lowflow rate of 4.2 cfs and fine sediment is the dominant substrate.

Station 3 was located near Mayflower Road. Gradient at that location was 12.9’/mile. Riffles and pools were scarce but were slightly more abundant than at Station 4.

Excessive box elder growths were also a problem here. The stream is approximately 25% smaller at this location based on a lowflow rate of 3.1 cfs, however the stream is still relatively wide with a mean width of 10.8'. Maximum and mean maximum depths were 1.7' and 1' respectively.

Station 2 was located approximately 1.7 miles upstream of Station 3 and within the described "cool" water section of the creek. Flow was again measured at 3.1 cfs, suggesting that spring-flow did not change significantly between Stations 2 and 3. The gradient is much higher at this location along with the frequency of riffles. Mean stream width was 7.5' and maximum and mean maximum depths were 2' and 1.4'. Depth to width ratio is a little more favorable compared to Station 3, however riparian buffer appears to be the primary limiting factor and may be affecting the stream temperature.

Station 1 represented the farthest upstream reach. The mean channel width was 6.6' and the flow was 0.7 cfs. This small stream segment is good habitat supporting an abundant forage fish community.

In general, the lower reach of German Valley Creek has potential to support abundant brown trout based on favorable flow, cold temperatures and good water quality. Excessive box elder growth is the primary factor limiting trout numbers in the stream. The instream biological indicators reflect good cold water habitat. The habitat at the upstream locations (Stations 1 and 2) may have potential to support a population of redds dace.

### Syftestad Creek – Results

Onset temperature data: Syftestad Creek was sampled only in year-two of the project. The stream was not monitored with a YSI 600XLM, but a temperature recorder was installed near Hwy 78 from late March to mid September 2002. The minimum, maximum and mean values from June 15 through September 9, 2002 were 49.5, 68.5 and 58 degrees F respectively. Results from this survey clearly suggest trout stream habitat. Figure 13 displays the temperature trend.

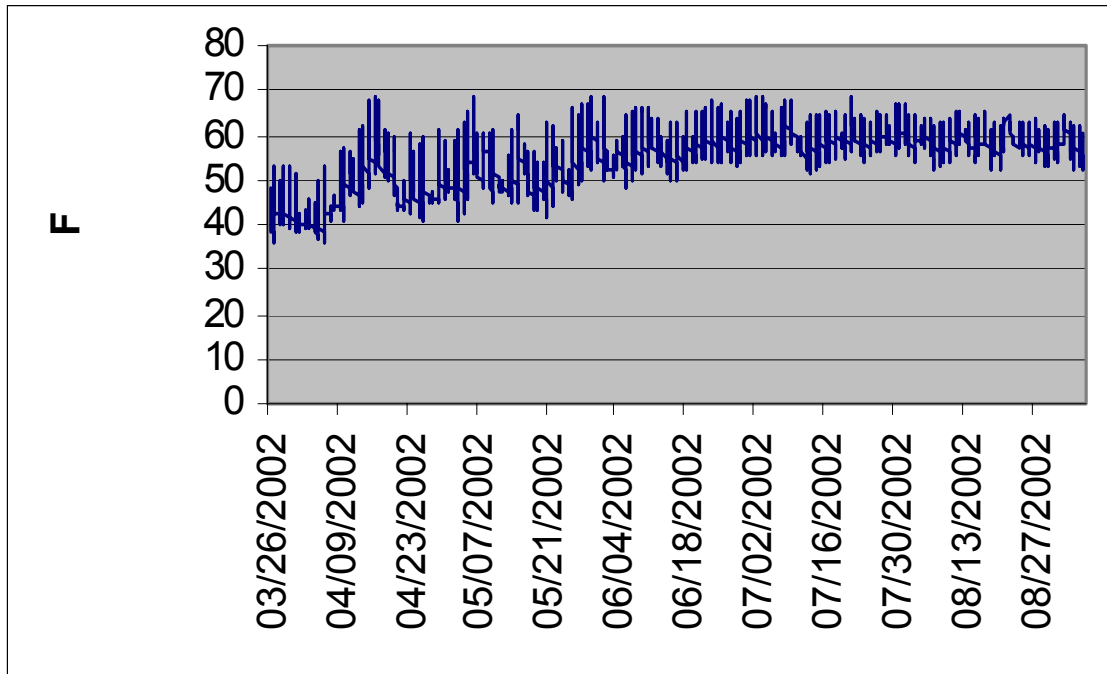
Macroinvertebrate results: A single sample collected near Highway 78 (Station 3) contained a benthic community with an HBI score of 4.69 or "good" water quality. There were no stoneflies in the sample, but mayflies included *Baetis tricaudatus* and *Ephemerella inermis* and caddisflies included *Brachycentrus*, *Ceratopsyche slossonae*, *Cheumatopsyche*, and *Neophylax*.

Fish survey results: Four stations were electrofished in 2002 using a backpack shocker in the upper reaches (Stations 1 and 2) and towed stream shocker in the middle section of the stream above and below Hwy 78 (Stations 3 and 4). Mottled sculpin was the dominant species at all locations. Considered a trout good stream indicator, the significant sculpin numbers we found suggest trout management potential. At Stations 3 and 4, abundant mottled sculpin and low numbers of tolerant individuals resulted in a

cold water IBI score of 50 at both sites. The score was based on a single intolerant species, very low numbers of tolerant individuals, and community dominated by stenothermal cool water individuals. Since only a single brown trout was collected, the top carnivore metric did not contribute points.

Figure 13: Syftestad Creek at STH 78

Summer min: 49.5 Summer max: 68.8 Summer mean: 59



Compared with a survey conducted in 1976 at Station 3, the fish community has shifted from a mixed forage fish community to a cold water community. Mottled sculpin numbers greatly increased while species diversity declined. Two reddsides were found in 1976, but none were found at the four locations in 2002 and are likely extirpated from the stream.

The species shift in Syftestad Creek is similar to the trends we found in both German Valley Creek and Blue Mounds Branch. The recent temperature data from Syftestad, combined with historic and recent fish community data, suggest that spring-flow to the stream has probably increased and now favors stenothermal species. The cold water IBI score in 1976 was 20 (poor) compared to 50 (fair) in 2002. Table 13 compares fish community composition at Station 3 in 1976 and 2002. Table 14 lists the numbers of species found at the four sampling sites. The headwater section (Station 1) and tributary (Station 2) were very narrow and produced few individuals. An IBI score could not be determined at those two sites because of low fish numbers.



Table 13: Syftestad Creek fish community composition

Species	Indicator	1976	2002
Redside dace	I, C, SC	X	
Brassy minnow	C	X	
Common shiner	W	X	
Fathead minnow	T	X	
Bluntnose minnow	T, W	X	
Central stoneroller	W	X	
Southern redbelly dace	W	X	
Creekchub	W, T	X	X
White sucker	W, T	X	X
Brook stickleback	C	X	X
Johnny darter	W	X	
Fantail darter	W	X	
Mottled sculpin	I, C	X	X

I = intolerant, T = tolerant, C = cool-cold stenothermal, W = eurythermal, SC = Special Concern.

Table 14: Syftestad Creek fish survey results from 2002

Species	Station →	1	2	3	4
Brown trout					1
Creekchub				4	
White sucker				4	
Brook stickleback		3		9	2
Mottled sculpin		5	2	280	285
Distance shocked (feet)		500	400	1600	900
Cold IBI score				50	50

Military Ridge Prairie Heritage Work Group: Blue Mound Area Project, Dane County Land Conservation Department, Dane County Chapter Pheasants Forever, Harry and Laura Nohr Chapter Trout Unlimited, Iowa County Land Conservation Department, Natural Heritage Land Trust, Natural Resources Conservation Service, Perry Lutheran Church, River Alliance, Southern Wisconsin Chapter Trout Unlimited, The Nature Conservancy, The Prairie Enthusiasts, Upper Sugar River Watershed Association, U. S. Fish and Wildlife Service.

Survey participants: Jim Amrhein, Erin Decker, Steve Fabos, Eric Forward, Jason Himebauch, Dave Marshall, Adam Ray, Coreen Ripp, Ron Schwerdtfeger, Bradd Sims, Mike Sorge, Kurt Welke.

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Figure 14: Syftestad Creek sampling sites

