

**Comparison of Stream Habitat Conditions on the Pedlar Ranger District
George Washington-Jefferson National Forest
1995 vs. 2005**



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June 2005**



Table of Contents

Background.....	3
Methods	3
Results.....	5
Discussion.....	5
Literature Cited.....	8
Appendix A: Stream Habitat 1995 vs. 2005	17
Index of Stream Summaries.....	18
Appendix B: Habitat Inventory Categories.....	129

List of Figures

Figure 1. USGS 1:24000 quadrangle maps within the Pedlar Ranger District.....	13
Figure 2. Range of pool habitat attributes.....	14
Figure 3. Range of riffle habitat attributes.....	15
Figure 4. Range of total LWD per km and LWD per km by size class	16

List of Tables

Table 1. Streams selected for BVET habitat inventories on the Pedlar Ranger District.....	9
Table 2. Attributes recorded during 1995 and 2005 BVET stream habitat inventories.....	9
Table 3. Pool attributes, by stream.....	10
Table 4. Riffle attributes, by stream.....	10
Table 5. Maximum riffle depths, by stream.....	11
Table 6. Total large woody debris per km, by stream.....	12
Table 7. Large woody debris per km in each size class, by stream	12

Background

In summer 1995, at the request of the George Washington-Jefferson National Forest (GWJNF), the USDA Forest Service, Southern Research Station, Center for Aquatic Technology Transfer (CATT) completed stream habitat inventories on several Pedlar Ranger District stream reaches (Underwood et al. 1995). The inventories were intended to provide baseline stream habitat data on attributes such as large woody debris (LWD) abundance and pool:riffle ratio. In summer 2005, the GWJNF requested that the CATT re-inventory 15 of the stream reaches initially inventoried in summer 1995. The data collected in summer 2005 were intended to provide information on changes in stream habitat on the Pedlar Ranger District between 1995 and 2005.

Methods

Inventories in both 1995 and 2005 were based on visual estimation of stream habitat attributes (Hankin and Reeves 1998), however in 2005 several of the original attributes were either modified or eliminated and new attributes were added to the inventory (Table 2). Here, we describe data collection methods used in 2005.

Two-stage visual estimation techniques were used to quantify habitat and DFCs¹ in selected Dry River Ranger District streams. During the first stage, habitat was stratified into similar groups based on naturally occurring habitat units including pools (areas in the stream with concave bottom profile, gradient equal to zero, greater than average depth, and smooth water surface), and riffles (areas in the stream with convex bottom profile, greater than average gradient, less than average depth, and turbulent water surface). Glides (areas in the stream similar to pools, but with average depth and flat bottom profile) were identified during the inventory but were grouped with pools for data analysis. Runs (areas in the stream similar to riffles but with average depth, less turbulent flow, and flat bottom profile) and cascades (areas in the stream with gradient greater than 2%, high velocity, and exposed bedrock or boulders) were grouped with riffles for data analysis.

¹the George Washington portion of the GWJNF has a separate Forest plan and different DFCs than the Jefferson portion of the GWJNF

Habitat in each stream was classified and inventoried by a two-person crew. One crew member identified each habitat unit by type (as described above), estimated average wetted width, average and maximum depth, riffle crest depth (RCD), substrate composition, and percent fines. The length (0.1 m) of each habitat unit was measured with a hip chain. Average wetted width was visually estimated. Average and maximum depth of each habitat unit were estimated by taking depth measurements at various places across the channel profile with a graduated staff marked in 5 cm increments. The RCD was estimated by measuring water depth at the deepest point in the hydraulic control between riffles and pools. The RCD was subtracted from average pool depth to obtain an estimate of residual pool depth. Substrates were assigned to one of nine size classes (Appendix A). The dominant substrate (covered greatest amount of surface area in habitat unit) and subdominant substrate (covered 2nd greatest amount of surface area in habitat unit) within the wetted channel were visually estimated. Percent fines was the percent of surface

area of the stream bed that consisted of sand, silt, or clay substrate particles (particles less than 2 mm diameter). In addition, several attributes of road-stream crossings (location, type, size, etc.) were recorded, where encountered.

The second crew member classified and inventoried large woody debris (LWD) within the bankfull stream channel, determined the Rosgen's channel type (Appendix A) associated with each habitat unit, and recorded data on a Husky fex21 data logger. LWD was assigned to one of four size classes (Appendix A). All woody debris less than 1.0 m long and less than 10 cm in diameter were omitted from the inventory. Rosgen's channel type was visually estimated using criteria found in Rosgen (1996).

The first unit of each habitat type selected for intensive (second stage) sampling (i.e. accurate measurement of wetted width) was determined randomly. Additional units were selected systematically (every 10th habitat unit type for streams over 1000 m and every 5th habitat unit type for streams under 1 km). The wetted width of each systematically selected habitat unit was measured with a meter tape across at least three transects and averaged. In each of the systematically selected (second stage) riffles we also estimated the bankfull stream channel width and riparian width, measured channel gradient and water temperature, and took a digital photograph. We estimated bankfull channel width by measuring the width of the bankfull channel perpendicular to flow. We estimated riparian width by measuring from the edge of the bankfull channel to the intersection with the nearest landform at an elevation equal to two-times maximum bankfull depth as described by Rosgen (1996). Gradient was estimated by using a clinometer to site from the downstream to the upstream end of the selected riffle. Water temperature was measured with a thermometer in flowing water out of direct sunlight.

We used the ratio of measured to estimated area to develop a calibration ratio, which allowed us to correct visual estimates and estimate stream area with confidence intervals (Hankin and Reeves 1988). BVET calculations were computed with a Microsoft Excel spreadsheet using formulas found in Dolloff et al. (1993). Data were summarized using Excel spreadsheets and SigmaPlot graphics software.

Results

We were able to compare attributes between 1995 and 2005 for 13 of 15 stream reaches. Dancing Creek and Maple Creek were excluded from comparisons due to differences in inventory locations between 1995 and 2005. Results for the 2005 inventories on Dancing Creek and Maple Creek are presented in Appendix A.

For the remaining 13 reaches we were able to compare total area covered in pools (i.e. pool:riffle ratio), number of pools and riffles per km, average pool and riffle surface area, and LWD loading between years. Between 1995 and 2005 the median surface area covered by pools, median number of pools per km, median number of riffles per km, and median total LWD decreased, while median surface area of individual pools and riffles increased (Tables 2 – 6; Figures 2 – 4). The largest decreases in LWD were in the smallest size class (size 1: 1-5 m long, 10-50 cm diameter).

Discussion

There are several possible explanations for the differences in results between the 1995 and 2005 stream inventories on the Pedlar Ranger District. Differences in water levels between years can affect BVET habitat inventory results. In past studies increased stream discharge resulted in decreased number of habitat units and increased average surface area of individual units (Herger et al. 1996, Hilderbrand et al. 1999). However, we found little difference in the average depth of riffles between inventories in 1995 and 2005, suggesting that there was not a difference in discharge between inventories (Table 3). Analysis of discharge data from local stream gauges could be used to confirm that discharges were similar between time periods.

A second possible explanation for the differences in results may be differences in inventory technique between years. For example, crews in 1995 may have identified small pools within long riffles as separate habitat units more frequently than crews in 2005. If crews in 1995 tended to ‘split’ habitat units and crews in 2005 tended to ‘lump’ them, we would expect the types of changes we observed here; fewer and larger habitat units in 2005. However, if the 2005 crews were ‘lumping’ habitat units we would also expect an increase the maximum depth in riffles, which we did not find (Table 5), suggesting that crews were using similar techniques between inventories. This is expected given that crews received similar training prior to each group of inventories.

Given that the differences in results between years were not caused by water level fluctuations or changes in inventory technique, then we are left to assume that the changes were the result of actual changes in stream habitat. We found large decreases in size 1 LWD (1-5 m long, 10-50 cm diameter), resulting in an overall decrease in the total LWD. In 1995, 50% of stream reaches were below the DFC of 78 pieces per km, whereas in 2005, 75% of reaches did not meet the minimum (Tables 5 & 6, Figure 4). Changes in LWD loading can result in the changes in physical habitat characteristics we observed here (Dolloff and Warren 2003, Flebbe and Dolloff 1995, Naiman et al. 2002, Sweka and Hartman 2006).

The largest decrease was in the smallest size class of LWD (size 1: 1-5 m long, 10-50 cm diameter). These pieces most often form pool habitat by combining with other small pieces of woody debris to form debris jams (Naiman et al. 2002). Size of wood relative to the size of the stream channel is the primary factor in determining wood stability and in general the smallest size classes are the most easily dislodged and transported downstream or out of the active stream channel during high flows (Hilderbrand et al. 1998, Montgomery et al. 2003). Loss of debris jams from long riffle areas following flood events could result in the changes in stream habitat we observed here.

The largest size classes (size 3: > 5 m long, 10-50 cm diameter; size 4: >5 m long, >50 cm diameter) are most stable and can easily have residence times of greater than 10 years in Appalachian streams with relatively little movement (Andy Dolloff, unpublished data). The median amount of these size classes either remained the same (size 4) or increased (size 3) in the reaches between 1995 and 2005. Continued supply of these size classes to the stream may result in increases in total pool habitat in the future.

Several streams experienced notably large decreases in total LWD, including Belle Cove Creek, North Fork Bennetts Run, and Little Cove Creek, while others such as Loves Run and Big Marys Creek showed increases. All stream reaches had decreases in the smallest size class of LWD (size 1) while streams such as Little Cove Creek and Enchanted Creek had increases in the largest size classes. Such differences highlight the fact that LWD dynamics are governed by a wide array of chronic and acute events, both natural and anthropogenic, including flooding, fires, stand maturation, riparian composition, and timber harvest to name a few (Dolloff and Warren 2003, Benda et al. 2003). For example, insect infestations such as gypsy moth or hemlock wooly adelgid can result in the relatively rapid death of many trees. Smaller size classes of LWD are added to the stream as dead trees standing in the riparian area begin to shed branches, and larger size classes are added as these trees continue to decompose and eventually fall across the stream channel. Additions of LWD can come thru slow attrition or in large pulses if stands are impacted by events such as hurricanes.

The current management goal of the GWJNF is a LWD load of 78 – 186 total pieces per km for individual streams. Given the variable nature of LWD loading in individual streams it may also be useful to also examine the range of LWD loading within larger management areas such as watersheds or Ranger Districts. For example within a watershed one would expect to find some streams with relatively low amounts of LWD and others with higher amounts, but if a certain percentage of streams falls within the DFC the Forest may conclude that overall it is meeting its management goal. The GWJNF has baseline stream habitat data collected by the CATT between 1995 and 2005 for over 300 stream reaches covering all Ranger Districts except the James River. With a relatively simple GIS exercise the GWJNF could describe the current range of LWD loading with watersheds or Districts and use the information to guide the development of future LWD management goals.

In addition, repeating BVET habitat inventories on stream reaches in other Ranger Districts would provide valuable information on trends in stream habitat across the Forest. The present report suggests that in 1995 only 25% of streams met the DFC for stream area in pools and less than half of streams met the DFC for total LWD. By 2005 no streams met the DFC for pool area and 75% of streams did not meet the DFC for total LWD. Additional inventories are needed to determine if these trends are present on other Ranger Districts on the GWJNF.

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Table 1. Streams selected for BVET habitat inventories on the Pedlar Ranger District in 1995 and 2005.

Stream	Quad	Survey Length (km)	
		1995	2005
Dancing Creek	Big Island	2.6	2.6 – different section
Love Lady Creek	Big Island	2.0	2.4
Maple Creek	Big Island	0.8	0.6 – different section
Kennedy Creek	Big Levels	4.4	4.5
Loves Run	Big Levels	2.5	2.3
Enchanted Creek	Buena Vista	4.0	3.8
Pedlar Gap Run	Buena Vista	2.7	1.9
Little Cove Creek*	Forks Of Buffalo	1.7	1.2
Rocky Branch*	Forks Of Buffalo	1.0	1.0
Belle Cove Creek	Glasgow	5.9	4.0
North Fork (N. F.) Bennetts Run	Glasgow	1.8	2.4
Coxs Creek	Massies Mill	1.6	1.2
Greasy Springs	Montebello	1.8	1.9
King Creek	Montebello	1.7	1.7
Big Marys Creek	Vesuvius	7.2	7.9

*Little Cove Creek and Rocky Branch were surveyed in 1989.

Table 2. Attributes recorded during 1995 and 2005 BVET stream habitat inventories on the Pedlar Ranger District.

Attribute	1995	2005
Unit type	X	X
Unit number	X	X
Distance	X	X
Estimated width	X	X
Maximum depth	X	X
Average depth	X	X
Riffle crest depth		X
Substrate		X
Rosgen channel type		X
Percent fines		X
Large woody debris	X	X
Actual width	X	X
Bankfull width	X	X
Riparian width	X	X
Gradient		X
Water temperature		X
Photo		X
Features		X

Table 3. Percent of total stream surface area covered by pools, average pool depth, number of pools per km, and average surface area of individual pools for BVET stream inventories performed on the Pedlar Ranger District in 1995 and 2005. The DFC for pool surface area is 35% - 65% of total stream area.

	Pool Surface Area			Ave. Pool Depth			Pools per km			Ave. Pool Area		
	(%)			(cm)			(n)			(m ²)		
	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁
Love Lady Creek	55	29	-26	28	21	-7	33	25	-8	39	34	-5
Kennedy Creek	27	23	-4	35	38	3	49	26	-23	18	30	12
Loves Run	25	19	-6	26	27	1	53	21	-32	11	22	11
Enchanted Creek	36	16	-20	23	32	9	60	22	-38	28	28	0
Pedlar Gap Run	31	10	-21	25	32	7	65	21	-44	11	15	4
Little Cove Creek*	26	24	-2	36	34	-2	69	42	-27	19	21	2
Rocky Branch*	33	21	-12	36	31	-5	72	39	-33	14	14	0
Belle Cove Creek	31	15	-16	35	28	-7	32	18	-14	22	21	-1
N. F. Bennetts Run	36	17	-19	30	36	6	64	21	-43	14	21	7
Coxs Creek	45	21	-24	35	34	-1	85	35	-50	18	24	6
Greasy Springs	18	13	-5	38	31	-7	43	36	-7	10	14	4
King Creek	27	21	-6	33	32	-1	68	33	-35	10	22	12
Big Marys Creek	25	15	-10	36	30	-6	37	14	-23	24	39	15
median	31	19	-12	35	32	-1	60	25	-32	18	22	+4

*Little Cove Creek and Rocky Branch were surveyed in 1989.

Table 4. Percent of total stream surface area covered by riffles, average riffle depth, number of riffles per km, and average surface area of individual riffles for BVET stream inventories performed on the Pedlar Ranger District in 1995 and 2005.

	Riffle Surface Area			Ave. Riffle Depth			Riffles per km			Ave. Riffle Area		
	(%)			(cm)			(n)			(m ²)		
	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁
Love Lady Creek	45	71	26	10	9	-1	27	24	-3	37	87	50
Kennedy Creek	73	77	4	16	15	-1	43	25	-18	55	100	45
Loves Run	75	81	6	12	14	2	44	19	-25	38	102	64
Enchanted Creek	64	84	20	13	12	-1	60	23	-37	35	144	109
Pedlar Gap Run	69	90	21	12	13	1	56	29	-27	29	98	69
Little Cove Creek*	74	76	2	19	12	-7	72	42	-30	50	64	14
Rocky Branch*	67	79	12	15	11	-4	67	47	-20	31	44	13
Belle Cove Creek	69	85	16	12	14	2	25	18	-7	63	122	59
N. F. Bennetts Run	64	83	19	11	12	1	56	24	-32	28	88	60
Coxs Creek	55	79	24	15	21	6	58	34	-24	32	94	62
Greasy Springs	82	87	5	18	19	1	40	41	1	51	86	35
King Creek	73	79	6	15	15	0	55	28	-27	31	94	63
Big Marys Creek	75	85	10	14	14	0	33	14	-19	83	214	131
median	69	81	+12	14	14	+0	55	25	-24	37	94	+60

*Little Cove Creek and Rocky Branch were surveyed in 1989.

Table 5. Change in average maximum depth in riffles for BVET stream inventories performed on the Pedlar Ranger District in 1995 and 2005.

	Riffle Average Maximum Depth		
	1995	(cm) 2005	t ₂ -t ₁
Love Lady Creek	19	21	2
Kennedy Creek	33	29	-4
Loves Run	21	26	5
Enchanted Creek	22	26	4
Pedlar Gap Run	21	24	3
Little Cove Creek*	32	25	-7
Rocky Branch*	23	24	1
Belle Cove Creek	23	29	6
N. F. Bennetts Run	21	30	9
Coxs Creek	29	43	14
Greasy Springs	34	34	0
King Creek	26	25	-1
Big Marys Creek	25	29	4
median	23	26	+3

*Little Cove Creek and Rocky Branch were surveyed in 1989.

Table 6. Total large woody debris (LWD) per km from BVET habitat inventories performed on the Pedlar Ranger District in 1995 and 2005. The GWJNF DFC for total LWD is 78- 186 total pieces per km.

	Total Large Woody Debris (n/km)		
	1995	2005	t ₂ -t ₁
Love Lady Creek	49	43	-6
Kennedy Creek	37	18	-19
Loves Run	32	62	30
Enchanted Creek	152	92	-60
Pedlar Gap Run	63	32	-31
Little Cove Creek*	142	72	-70
Rocky Branch*	78	82	4
Belle Cove Creek	287	52	-235
N. F. Bennetts Run	320	58	-262
Coxs Creek	91	45	-46
Greasy Springs	183	178	-5
King Creek	72	56	-16
Big Marys Creek	20	43	23
median	78	56	-19

*Little Cove Creek and Rocky Branch were surveyed in 1989.

Table 7. Large woody debris (LWD) per km by size class from BVET habitat inventories performed on the Pedlar Ranger District in 1995 and 2005. Size 1: 1-5 m long, 10-50 cm diameter; Size 2: 1-5 m long, >50 cm diameter; Size 3: >5 m long, 10-50 cm diameter; Size 4: >5 m long, >50 cm diameter.

	Size 1			Size 2			Size 3			Size 4		
	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁	1995	2005	t ₂ -t ₁
Love Lady Creek	24	16	-8	2	0	-2	20	19	-1	4	8	4
Kennedy Creek	15	5	-10	2	0	-2	15	12	-3	5	1	-4
Loves Run	21	13	-8	1	0	-1	19	44	25	0	5	5
Enchanted Creek	83	29	-54	14	0	-14	47	45	-2	8	17	9
Pedlar Gap Run	31	21	-10	1	0	-1	26	10	-16	5	1	-4
Little Cove Creek*	102	10	-92	8	2	-6	26	43	17	5	16	11
Rocky Branch*	33	15	-18	11	9	-2	20	49	29	14	9	-5
Belle Cove Creek	70	16	-54	15	0	-15	182	35	-147	21	1	-20
N. F. Bennetts Run	122	7	-115	13	10	-3	144	36	-108	42	5	-37
Coxs Creek	71	4	-67	4	0	-4	13	41	28	2	0	-2
Greasy Springs	41	25	-16	14	20	6	94	108	14	34	25	-9
King Creek	26	14	-12	2	0	-2	41	41	0	2	1	-1
Big Marys Creek	10	5	-5	3	0	-3	4	35	31	2	2	0
median	33	14	-16	4	0	-2	26	41	+0	5	5	-2

*Little Cove Creek and Rocky Branch were surveyed in 1989.

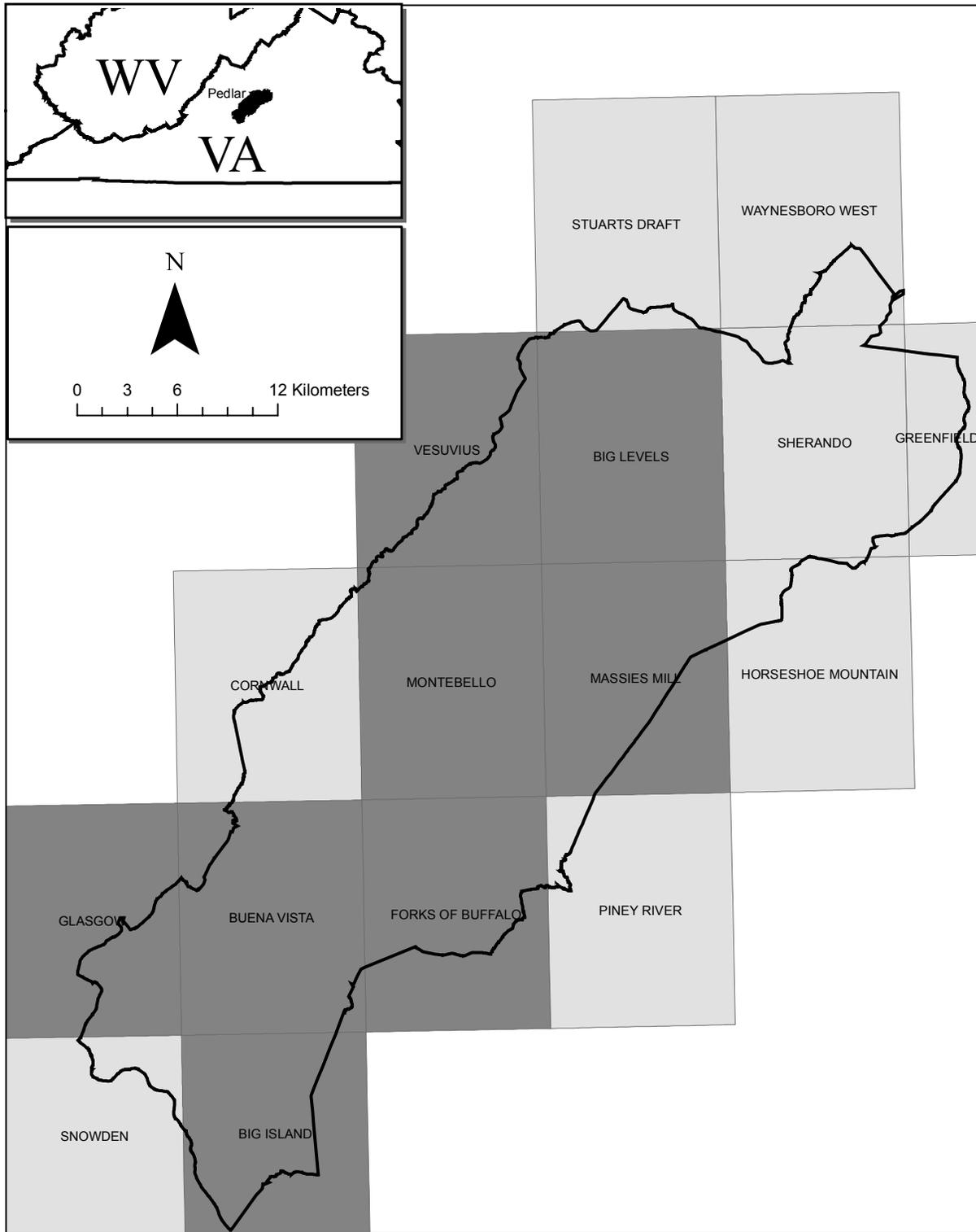


Figure 1. USGS 1:24000 quadrangle maps within the Pedlar Ranger District, GWJNF, VA. Dark shading indicates maps where inventories were completed in 1995 and 2005.

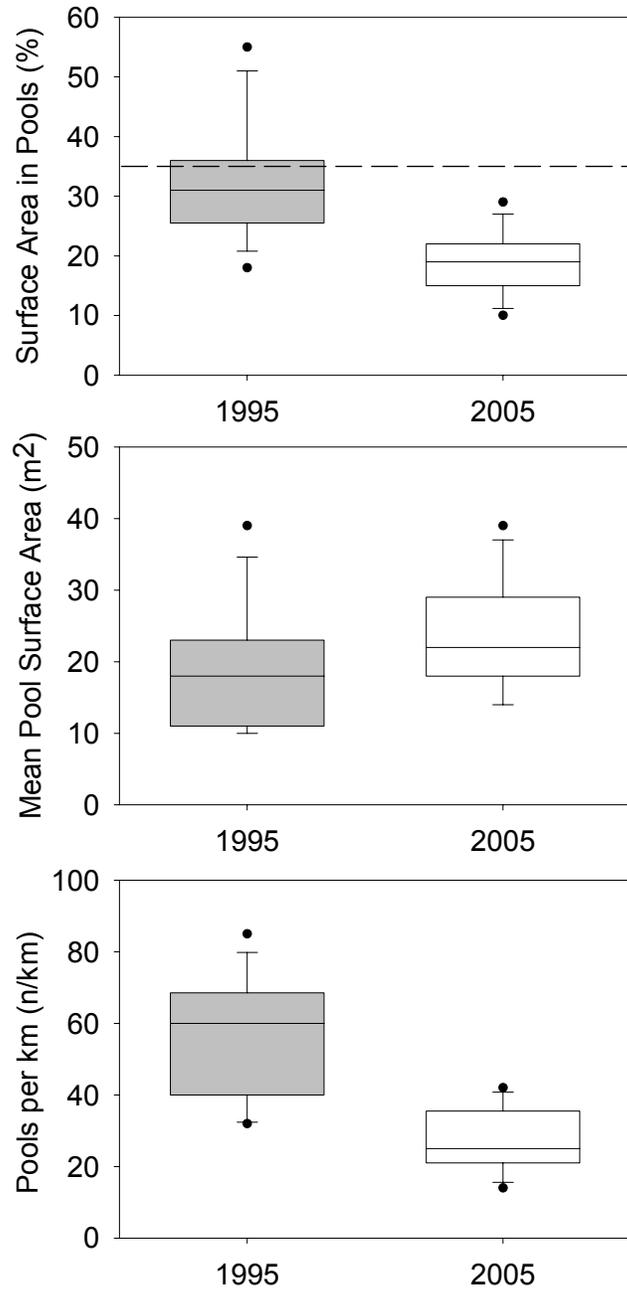


Figure 2. Range of pool habitat attributes in Pedlar Ranger District stream reaches ($n = 13$) in 1995 and 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data. The DFC for total surface area in pools is 35% - 65%.

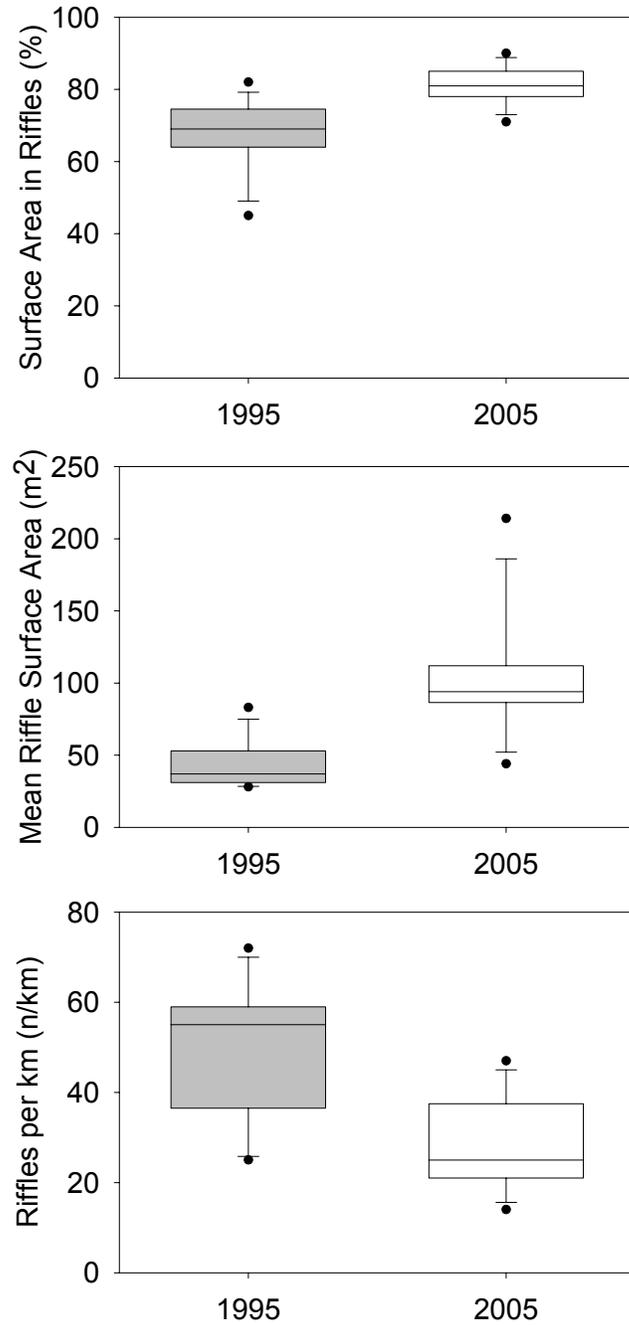


Figure 3. Range of riffle habitat attributes in Pedlar Ranger District stream reaches (n = 13) in 1995 and 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

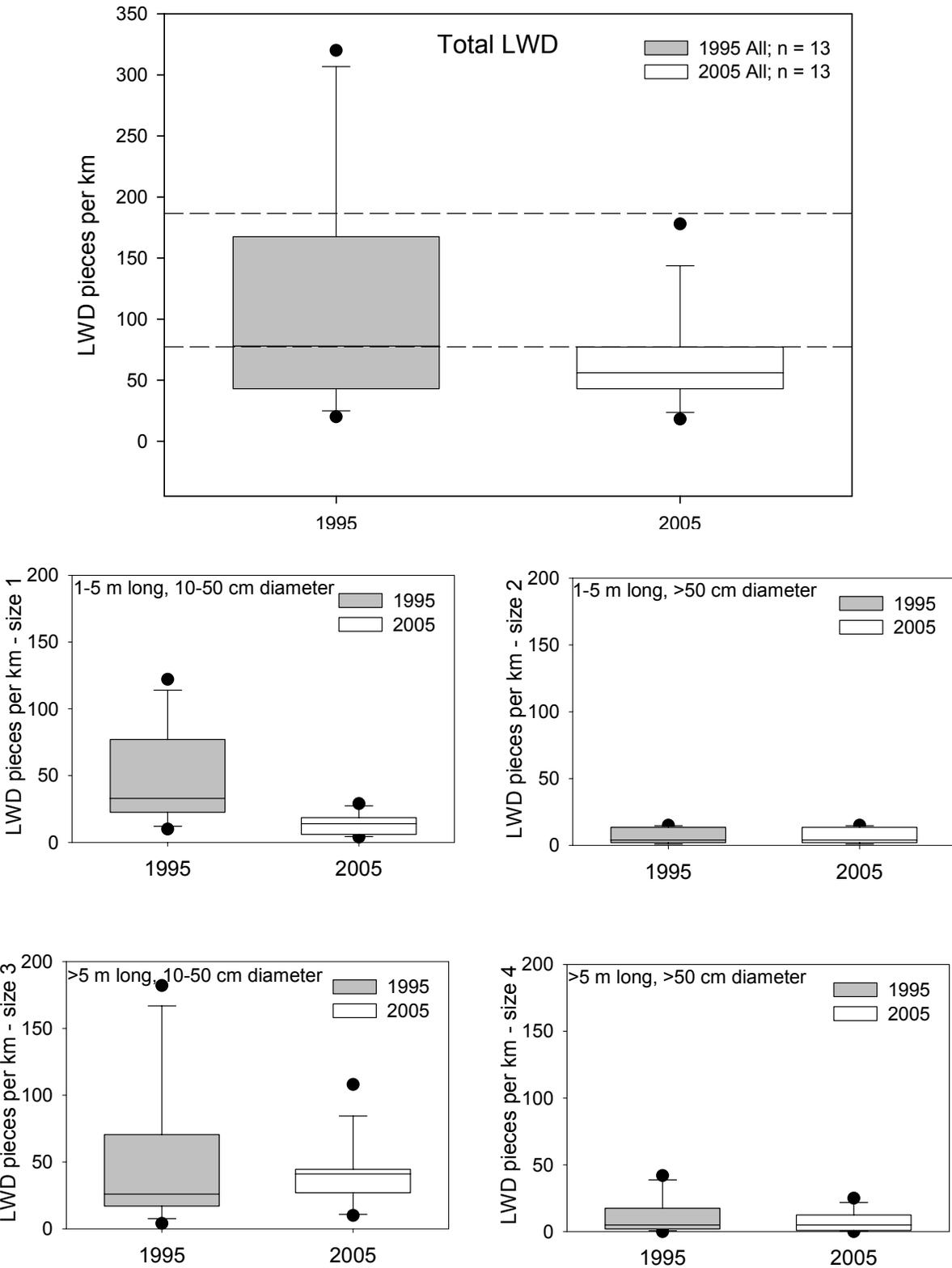
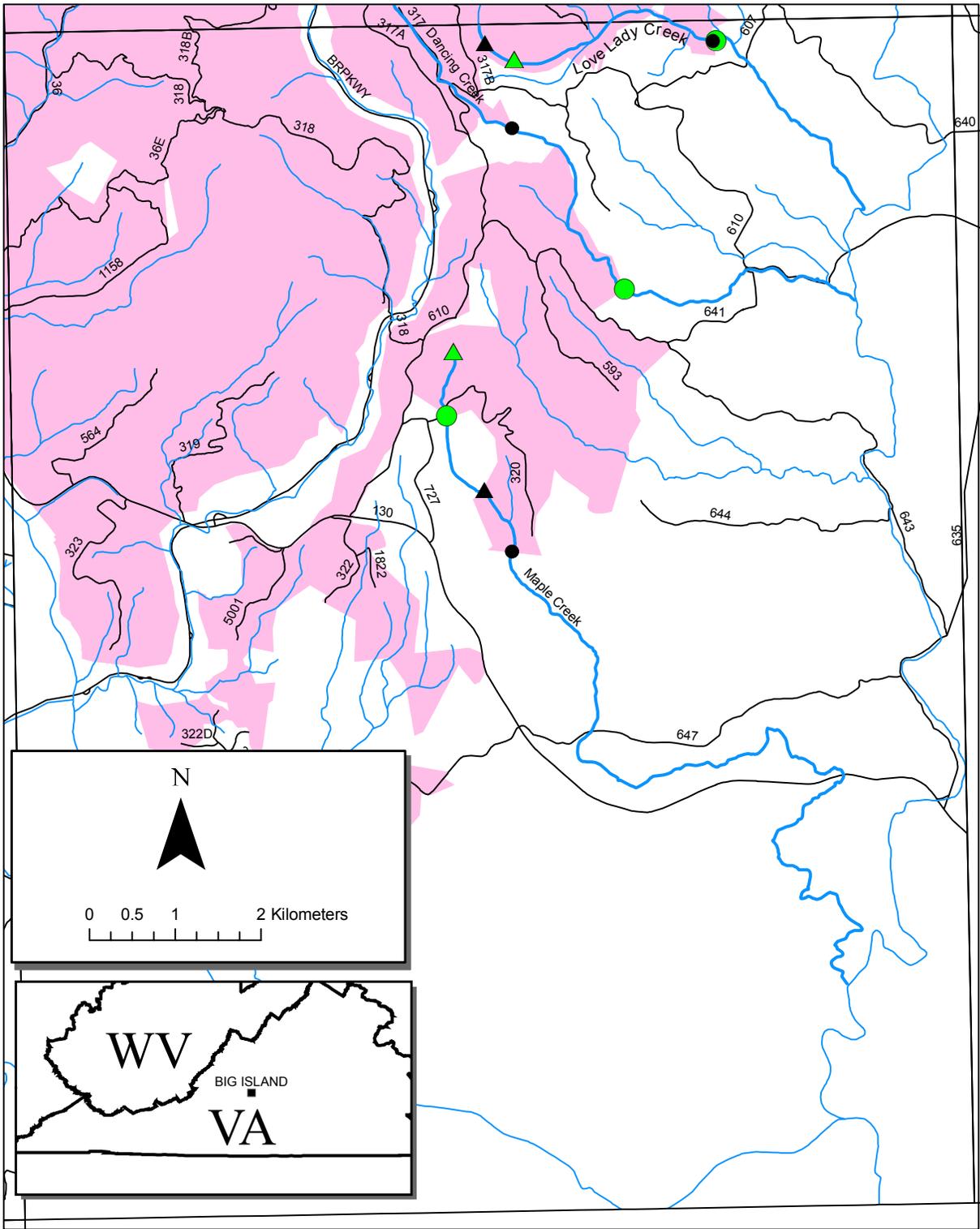


Figure 4. Range of total LWD per km (top) and LWD per km by size class (bottom) in Pedlar Ranger District stream reaches (n = 13) recorded during BVET habitat inventories in 1995 and 2005. Total LWD DFC = 78 – 186 pieces per km. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Appendix A: Stream Habitat 1995 vs. 2005

Index of Stream Summaries

Big Island	19
Dancing Creek	20
Love Lady Creek.....	26
Maple Creek.....	32
Big Levels	38
Kennedy Creek.....	39
Loves Run	45
Buena Vista.....	51
Enchanted Creek	52
Pedlar Run.....	59
Forks Buffalo	65
Little Cove Creek.....	66
Rocky Branch.....	72
Glasgow	78
Belle Cove Creek	79
North Fork Bennetts Run	86
Massies Mill.....	92
Coxs Creek.....	93
Montebello	99
Greasy Springs	100
King Creek	106
Vesuvius.....	112
Big Marys Creek.....	113



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Big Island quadrangle in 1995 (green) and 2005 (black).

Stream:	Dancing Creek		
District:	Pedlar		
USGS Quadrangle:	Big Island, Buena Vista		
	1995		2005
Survey Date:	8/16/2005		6/2/2005
Total Distance Surveyed (km):	2.6*		2.6

*Surveyed 4.3 km total in 1995; used last 2.6 km for comparison to 2005 data.

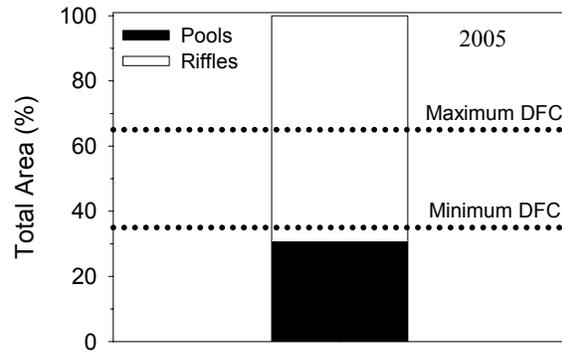
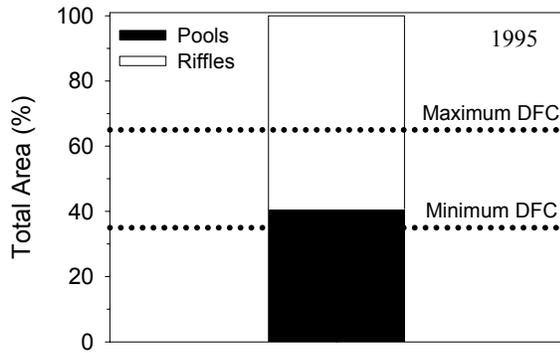
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	52	31	48	69
Total Area (m ²):	8782 ± 2360	2433 ± 650	7985 ± 740	5417 ± 598
Correction Factor Applied:	1.23	0.88	1.10	1.04
Number of Paired Samples:	8	9	7	7
Total Count:	165	87	141	68
Number per km:	38	33	32	26
Mean Area (m ²):	53	28	57	80
Mean Maximum Depth (cm):	42	43	16	23
Mean Average Depth (cm):	26	34	8	12
Mean Residual Depth (cm):	NA	17	--	--
Percent Surveyed as Glides:	NA	39	--	--
Percent Surveyed as Runs:	--	--	NA	0
Percent Surveyed as Cascades:	--	--	NA	1
Percent with > 35% Fines:	0	11	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	50	19
1 - 5 m long, > 55 cm diameter:	5	1
> 5 m long, 10 cm – 55 cm diameter:	32	44
> 5 m long, > 55 cm diameter:	13	8
Total:	100	72

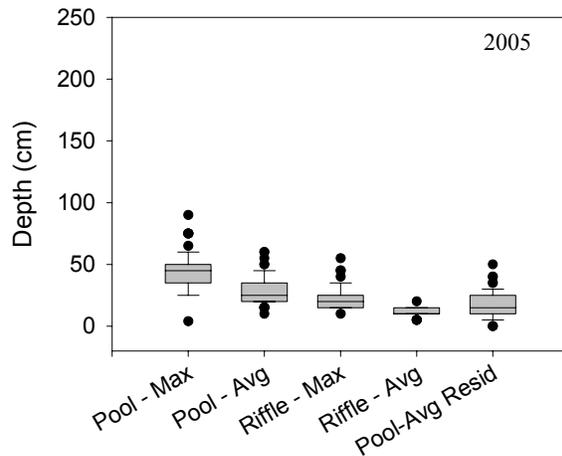
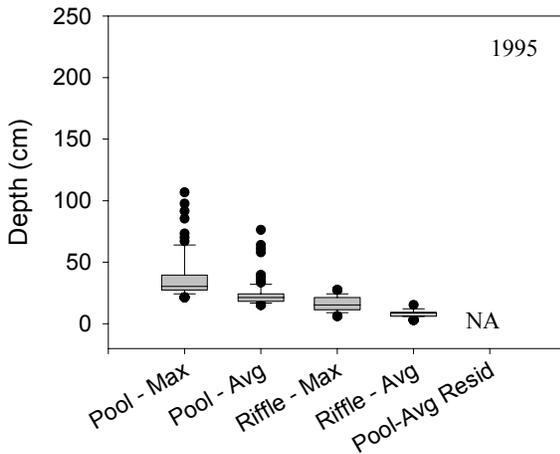
Rosgen's Channel Type*	Frequency (%)
A:	63
B:	37
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	8	6
Mean Channel Gradient (%):	NA	5
Median Water Temperature (C):	NA	15

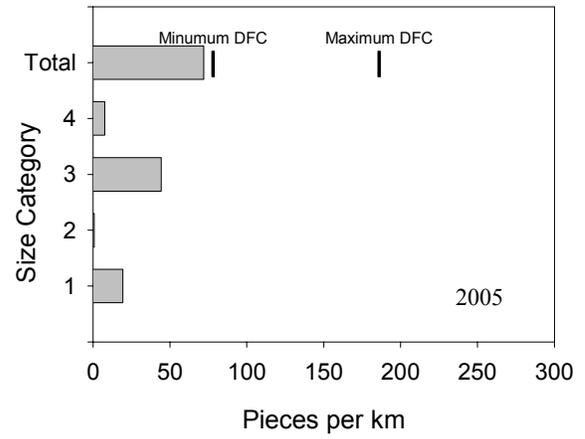
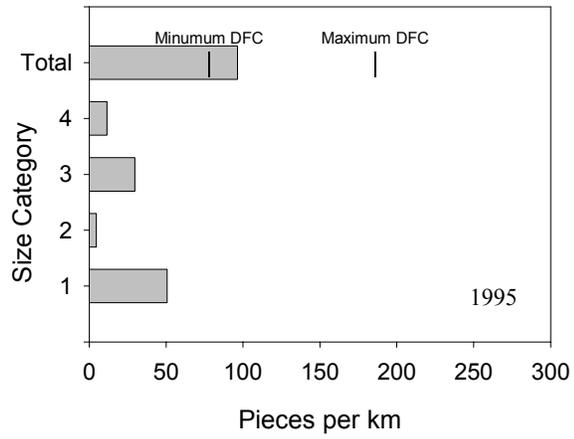
*recorded in 2005 only



Estimated area of Dancing Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Dancing Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



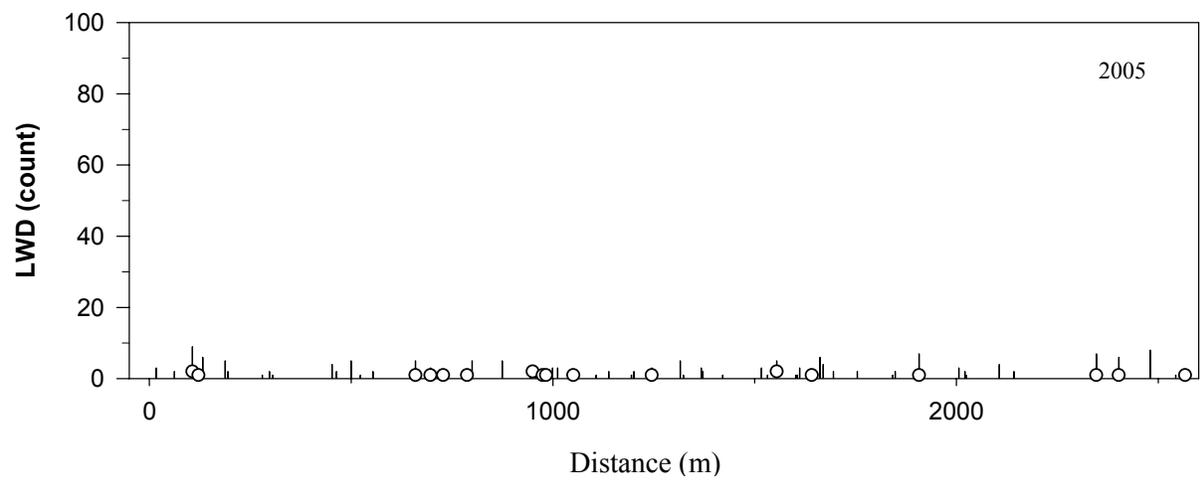
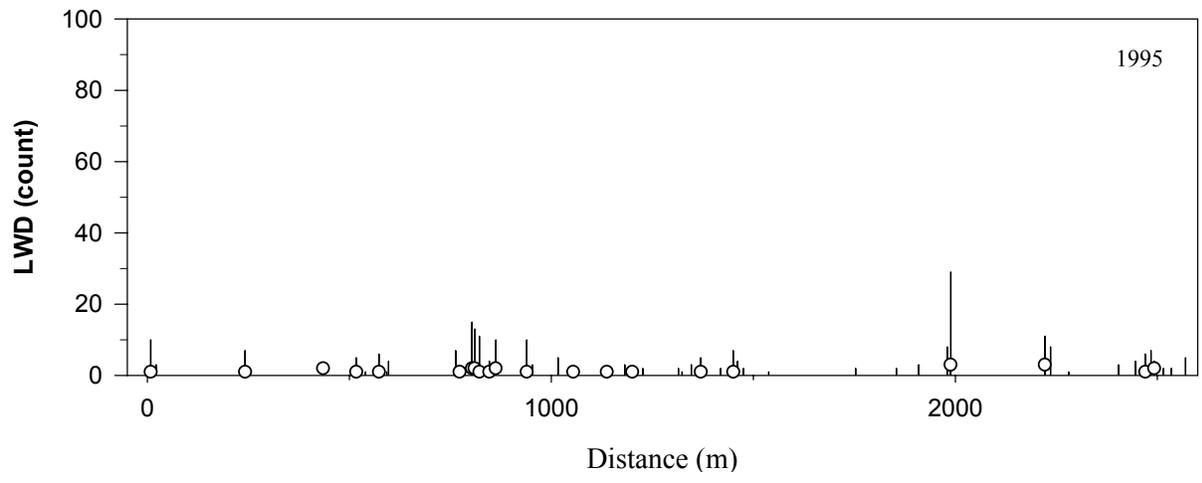
LWD per kilometer in Dancing Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Dancing Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

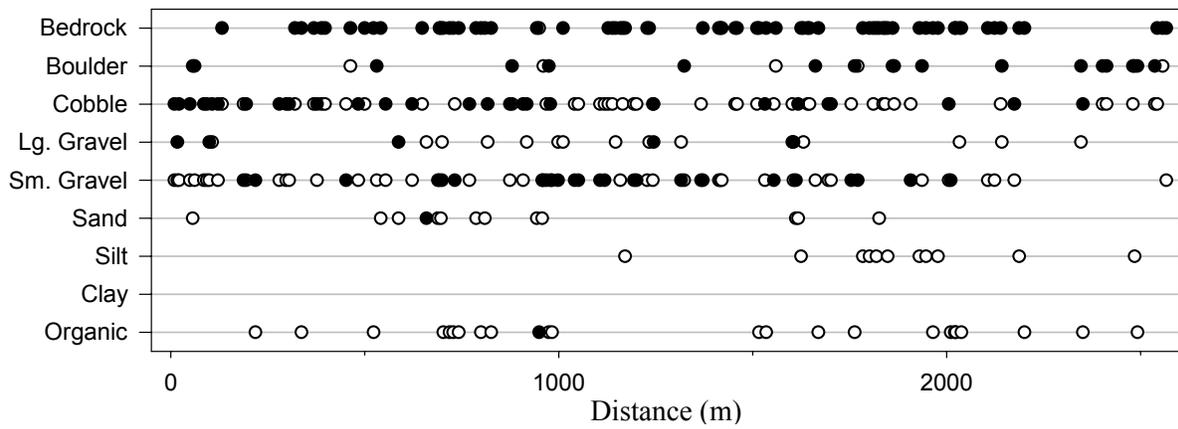
Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	353.4	6.1	
FORD	559.5		
FORD	779.9		
TRIBUTARY	1288.3		RIGHT
TRIBUTARY	1429.7		LEFT
TRIBUTARY	1575.4		RIGHT
TRIBUTARY	1696.1		RIGHT
TRIBUTARY	1885.1		RIGHT, DRY
SEEP	2132.0		
FORD	2147.8		
FORD	2409.3		
FORD	2448.0		TRAIL CROSSING; PIPELINE

Stream features recorded for Dancing Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	36.9	0.7	RIGHT
SIDE CHANNEL	126.9	1.5	ON RIGHT
TRIBUTARY	161.8	1.0	ON LEFT
SIDE CHANNEL	187.4		COMES OUT RT. 610. 23M LONG. 2.5M TALL. 6M WIDE. NATURAL SUBSTRATE
CULVERT	590.4		
FORD	756.7		
FORD	908.1		LEFT VERY BIG LOG CREATES A DAM AND A POOL BEHIND IT
OTHER	945.0		
SIDE CHANNEL	960.1	0.5	LEFT
TRIBUTARY	1252.0	0.5	RIGHT
TRIBUTARY	1505.1	1.0	RIGHT
SIDE CHANNEL	1592.7	0.5	RIGHT
SIDE CHANNEL	1611.0		OUT
FORD	1786.0		
FORD	1990.0		
SIDE CHANNEL	2053.0	1.5	LEFT
OTHER	2265.2		PIPELINE
SIDE CHANNEL	2273.5	1.5	RIGHT



Distribution and abundance of LWD in Dancing Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Dancing Creek 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Love Lady Creek	
District:	Pedlar	
USGS Quadrangle:	Big Island, Buena Vista	
	1995	2005
Survey Date:	8/14/1995	5/31/2005
Total Distance Surveyed (km):	2.0	2.4

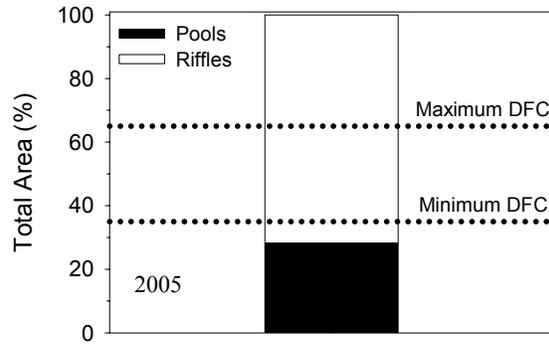
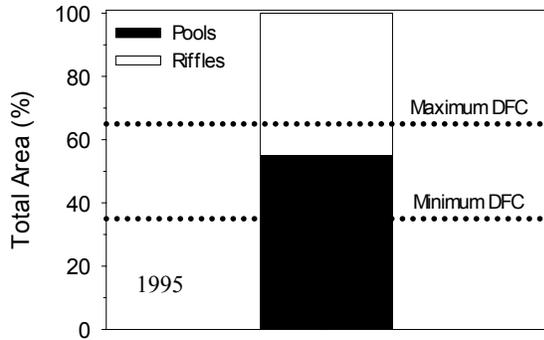
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	55	29	45	71
Total Area (m ²):	2529 ± 18376	1981 ± 141	2062 ± 1975	4935 ± 1524
Correction Factor Applied:	1.03	1.08	0.93	1.22
Number of Paired Samples:	2	6	2	5
Total Count:	65	58	54	57
Number per km:	33	25	27	24
Mean Area (m ²):	39	34	37	87
Mean Maximum Depth (cm):	41	39	19	21
Mean Average Depth (cm):	28	21	10	9
Mean Residual Depth (cm):	NA	12	--	--
Percent Surveyed as Glides:	NA	0	--	--
Percent Surveyed as Runs:	--	--	NA	0
Percent Surveyed as Cascades:	--	--	NA	0
Percent with > 35% Fines:	0	10	0	2

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	24	16
1 - 5 m long, > 55 cm diameter:	2	0
> 5 m long, 10 cm – 55 cm diameter:	20	19
> 5 m long, > 55 cm diameter:	4	8
Total:	49	43

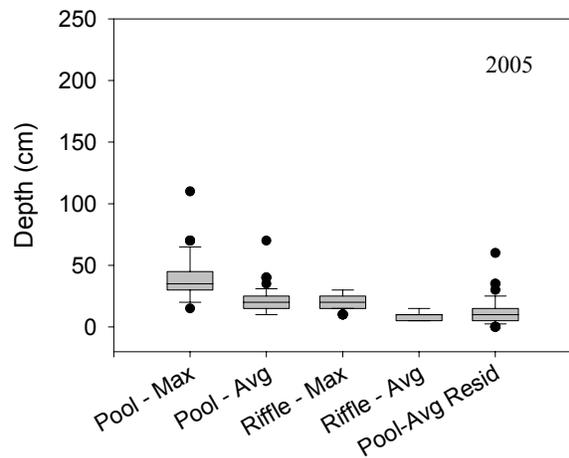
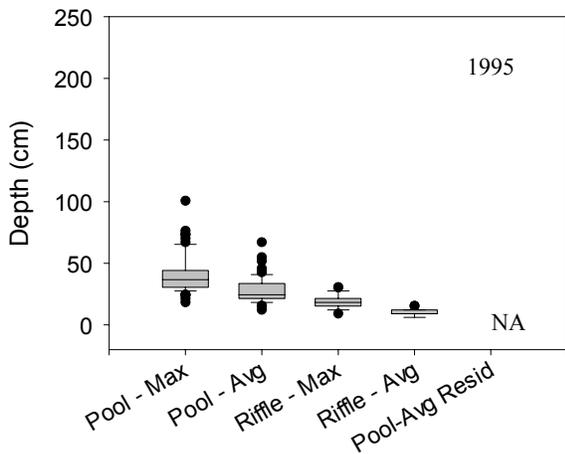
Rosgen's Channel Type*	Frequency (%)
A:	30
B:	70
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	6	6
Mean Channel Gradient (%):	NA	4
Median Water Temperature (C):	NA	15

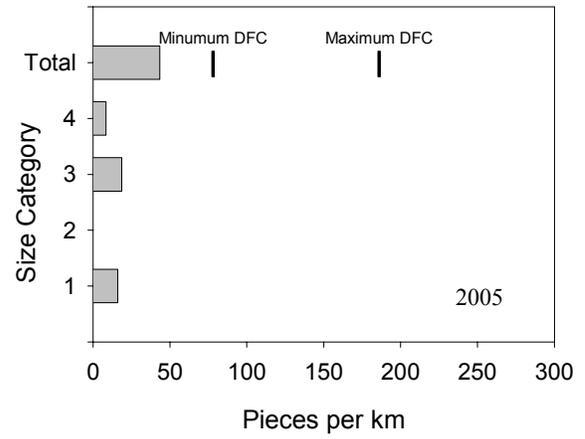
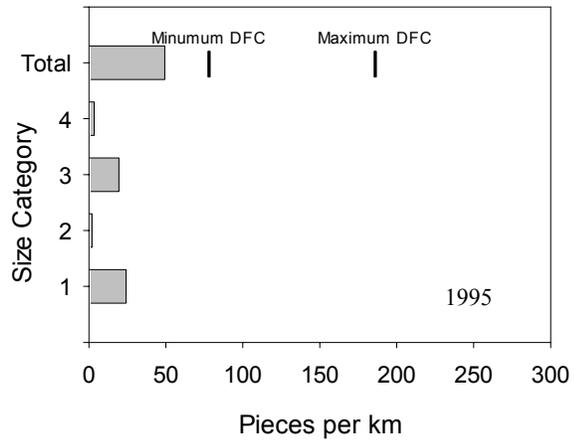
*recorded in 2005 only



Estimated area of Love Lady Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Love Lady Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



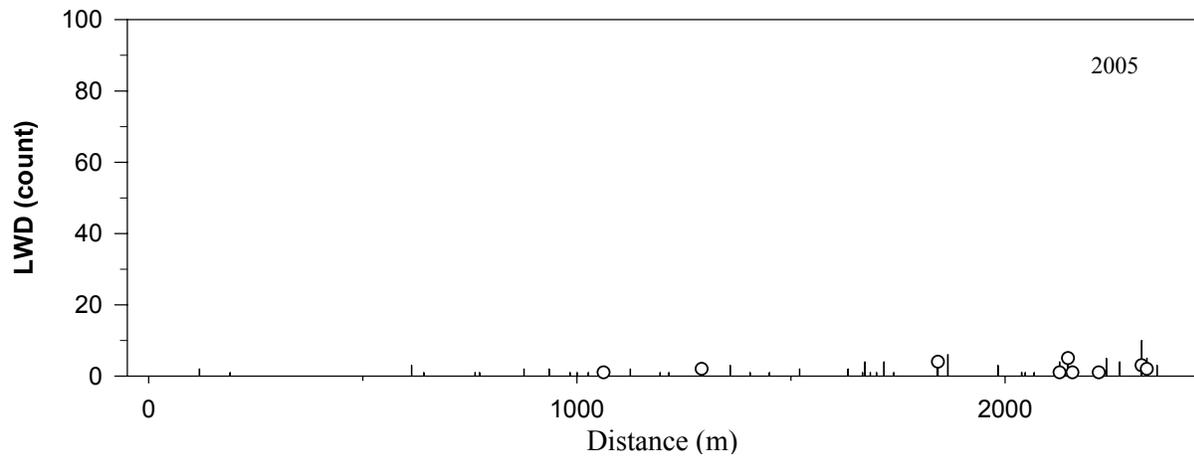
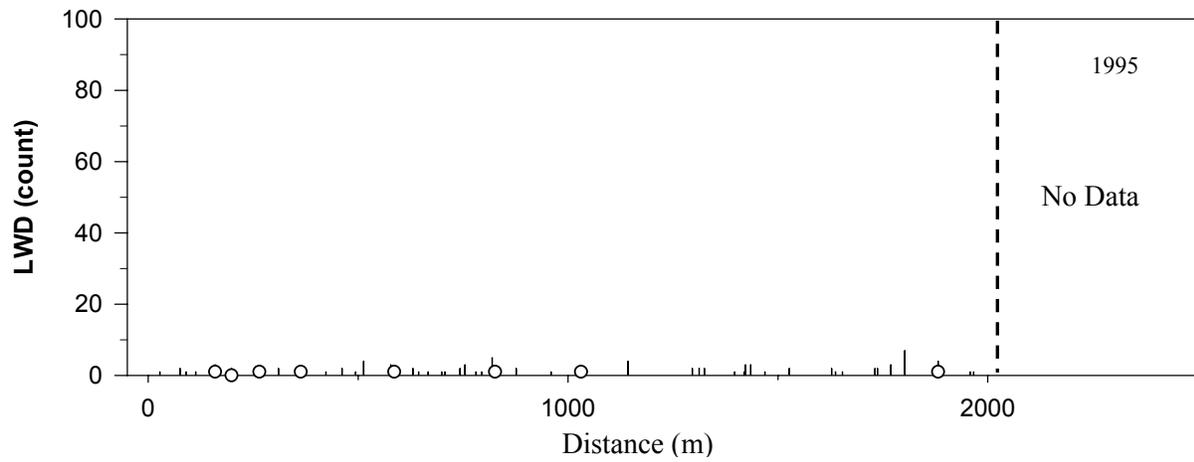
LWD per kilometer in Love Lady Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: < 5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Love Lady Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

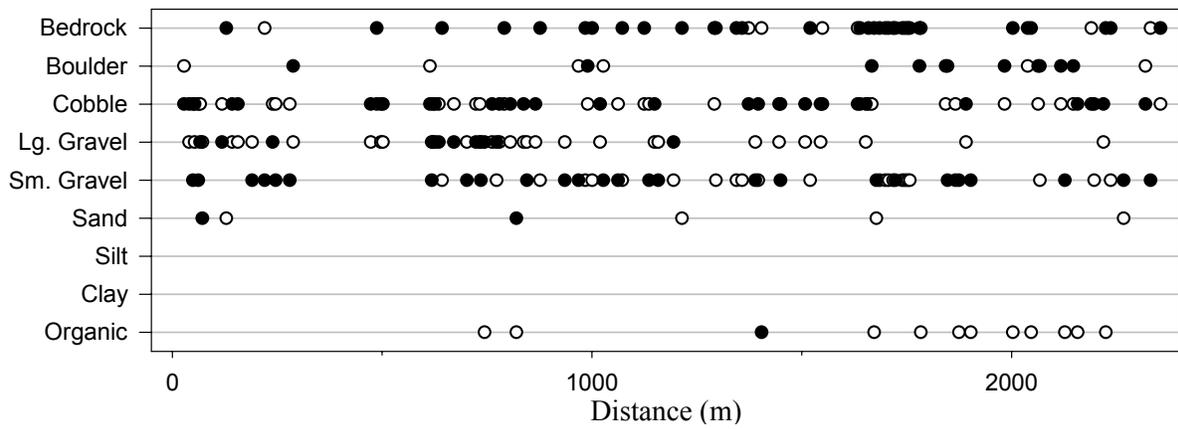
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	145.6		ON LEFT
TRIBUTARY	322.7		ON RIGHT
SIDE CHANNEL	593.7		ON RIGHT
TRIBUTARY	1043.6		ON RIGHT
TRIBUTARY	1526.7		ON LEFT
TRIBUTARY	1576.4		ON RIGHT

Stream features recorded for Love Lady Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	743.4	1.0	RIGHT
SIDE CHANNEL	876.2		RIGHT
SIDE CHANNEL	922.9		RIGHT
TRIBUTARY	1133.9		RIGHT
TRIBUTARY	1428.9	1.0	RIGHT
SEEP	1487		RIGHT
TRIBUTARY	1614.6	1.5	LEFT
TRIBUTARY	1666.7	1.0	RIGHT
SIDE CHANNEL	1852.5	0.5	RIGHT
SIDE CHANNEL	2182.2	0.5	RIGHT
UNDERGROUND	2236.2		BEGIN
UNDERGROUND	2254		END UNDERGROUND
TRIBUTARY	2354.8	0.5	RIGHT



Distribution and abundance of LWD in Love Lady Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Love Lady Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Maple Creek	
District:	Pedlar	
USGS Quadrangle:	Big Island	
	1995	2005
Survey Date:	8/17/1995	6/2/2005
Total Distance Surveyed (km):	0.8	0.6*

* Different reach inventoried in 2005

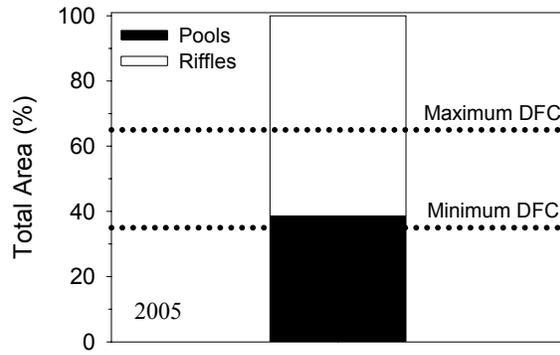
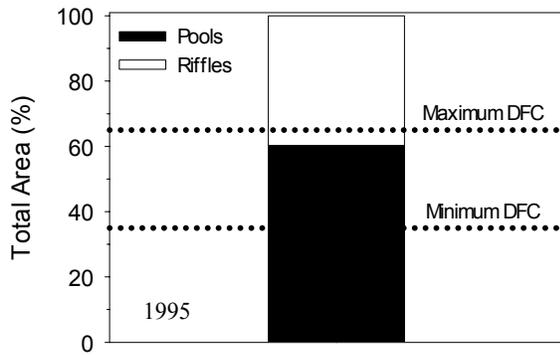
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	60	39	40	61
Total Area (m ²):	770 ± 223	427	504 ± 1094	672
Correction Factor Applied:	1.03	1.00	1.02	1.20
Number of Paired Samples:	3	1	2	1
Total Count:	54	4	43	7
Number per km:	70	7	56	12
Mean Area (m ²):	14	107	12	96
Mean Maximum Depth (cm):	28	39	9	28
Mean Average Depth (cm):	17	25	4	9
Mean Residual Depth (cm):	NA	28	--	--
Percent Surveyed as Glides:	NA	50	--	--
Percent Surveyed as Runs:	--	--	NA	71
Percent Surveyed as Cascades:	--	--	NA	0
Percent with > 35% Fines:	0	75	0	100

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	125	8
1 - 5 m long, > 55 cm diameter:	0	0
> 5 m long, 10 cm – 55 cm diameter:	5	18
> 5 m long, > 55 cm diameter:	18	0
Total:	148	27

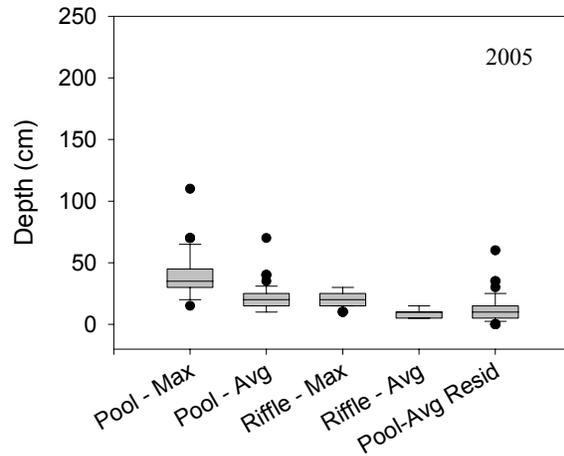
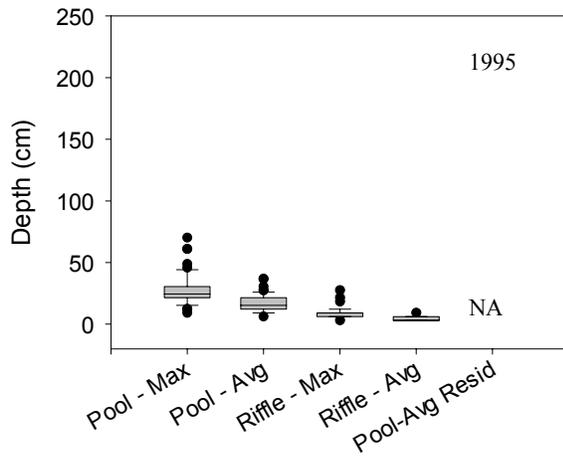
Rosgen's Channel Type*	Frequency (%)
A:	0
B:	0
C:	0
D:	0
E:	0
F:	0
G:	100

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	1	4
Mean Channel Gradient (%):	NA	1
Median Water Temperature (C):	NA	18

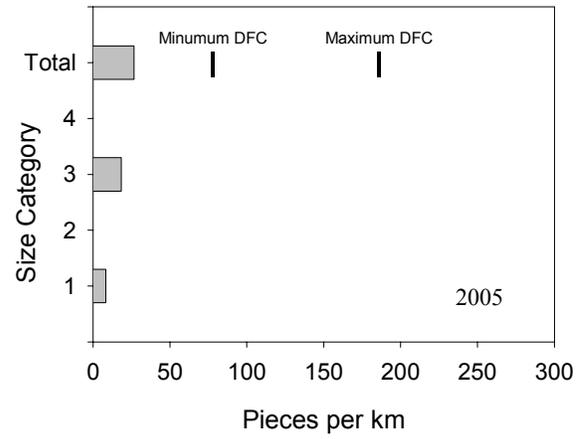
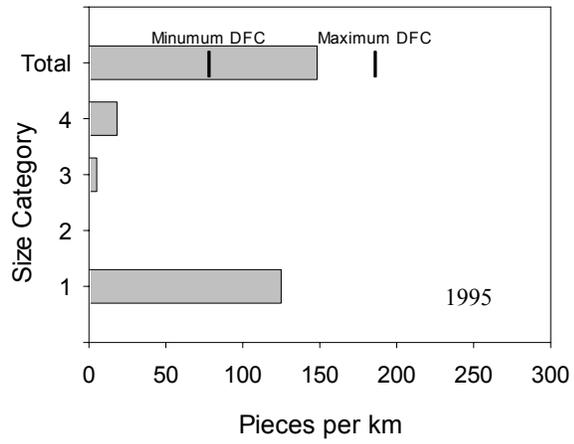
*recorded in 2005 only



Estimated area of Maple Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Maple Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



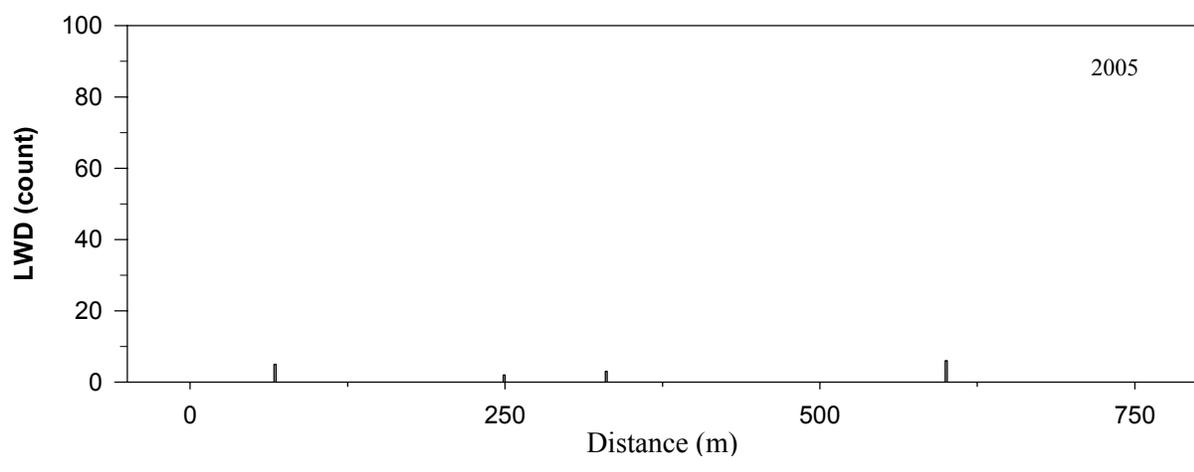
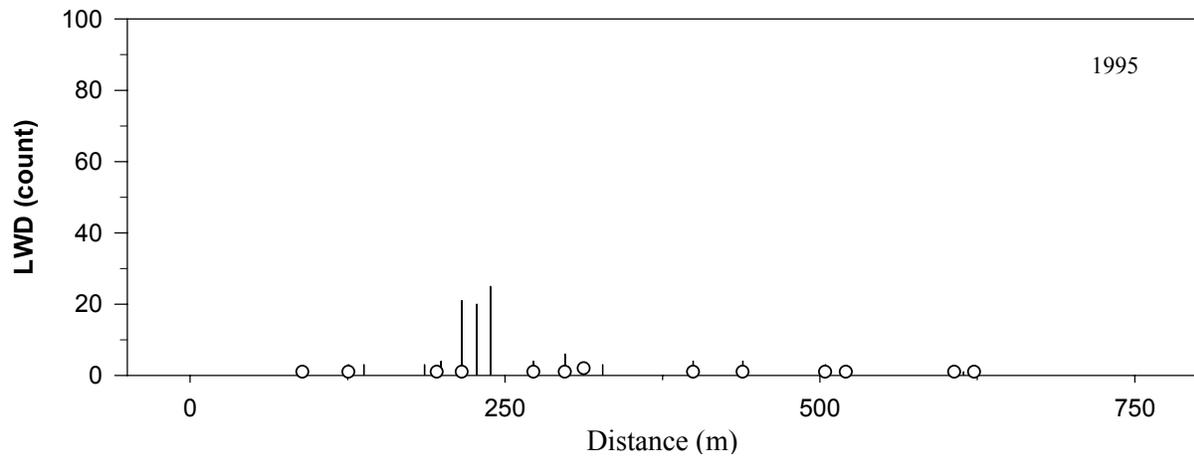
LWD per kilometer in Maple Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Maple Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

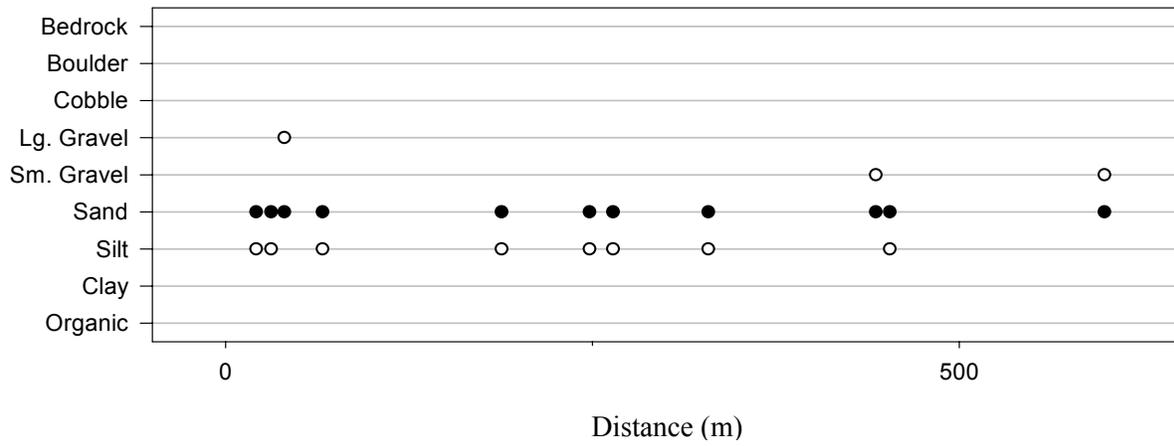
Stream Feature	Distance (m)	Width (m)	Comments
FORD	3.6		TRAIL CROSSING
TRIBUTARY	317.6		RIGHT

Stream features recorded for Maple Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	53.0		DRY IN ON RIGHT
TRIBUTARY	152.0		IN ON RIGHT
TRIBUTARY	452.7	0.5	IN ON RIGHT
END	599.0		END AT BLAZES 17:00



Distribution and abundance of LWD in Maple Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Maple Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Kennedy Creek		
District:	Pedlar		
USGS Quadrangle:	Big Levels		
	1995		2005
Survey Date:	5/30/1995		6/2/2005
Total Distance Surveyed (km):	4.4		4.5

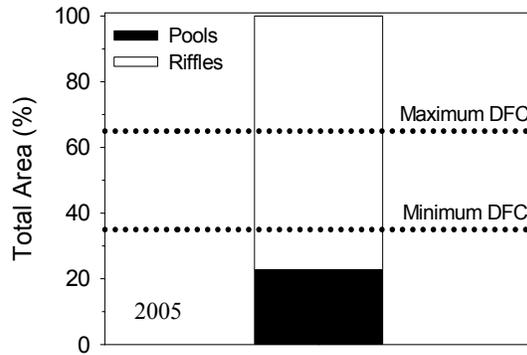
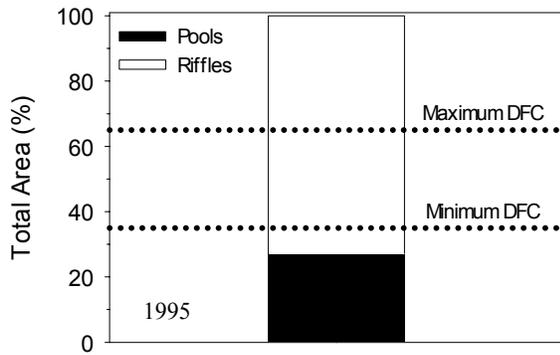
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	27	23	73	77
Total Area (m ²):	3869 ± 372	3410 ± 324	10354 ± 1792	11365 ± 666
Correction Factor Applied:	1.09	1.00	0.93	1.14
Number of Paired Samples:	12	11	10	11
Total Count:	213	115	189	114
Number per km:	49	26	43	25
Mean Area (m ²):	18	30	55	100
Mean Maximum Depth (cm):	55	62	33	29
Mean Average Depth (cm):	35	38	16	15
Mean Residual Depth (cm):	NA	25	--	--
Percent Surveyed as Glides:	NA	0	--	--
Percent Surveyed as Runs:	--	--	NA	3
Percent Surveyed as Cascades:	--	--	NA	6
Percent with > 35% Fines:	0	0	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	15	5
1 - 5 m long, > 55 cm diameter:	2	0
> 5 m long, 10 cm – 55 cm diameter:	15	12
> 5 m long, > 55 cm diameter:	5	1
Total:	37	18

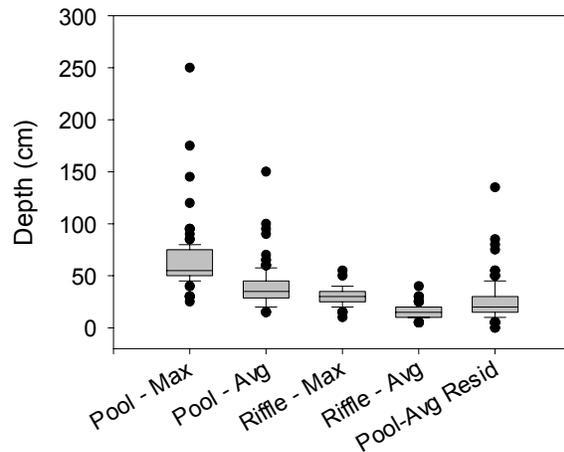
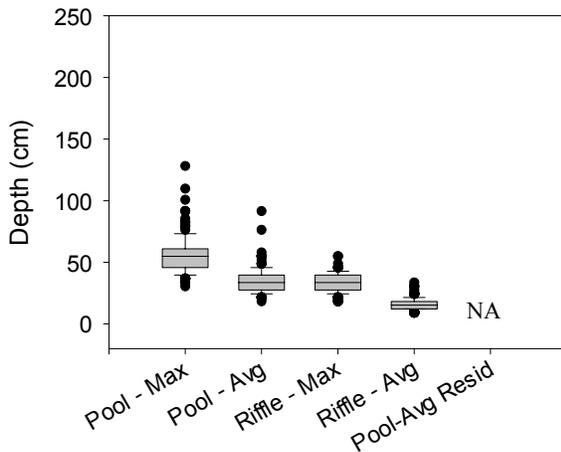
Rosgen's Channel Type*	Frequency (%)
A:	16
B:	84
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	6	6
Mean Channel Gradient (%):	NA	4
Median Water Temperature (C):	NA	14

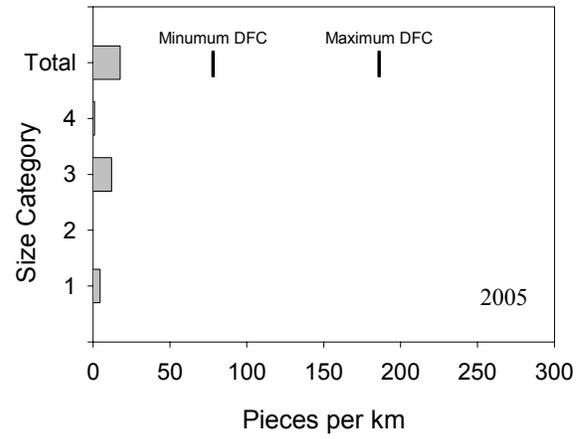
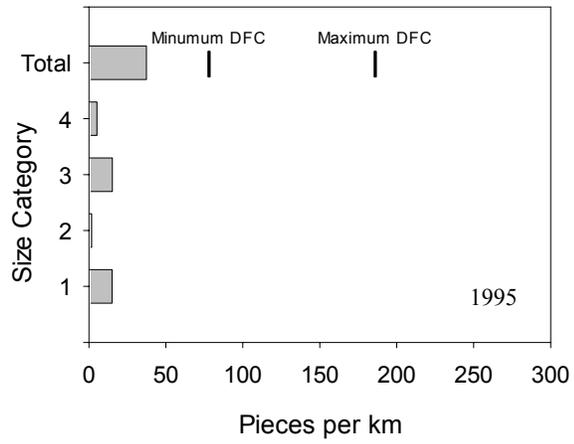
*recorded in 2005 only



Estimated area of Kennedy Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Kennedy Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



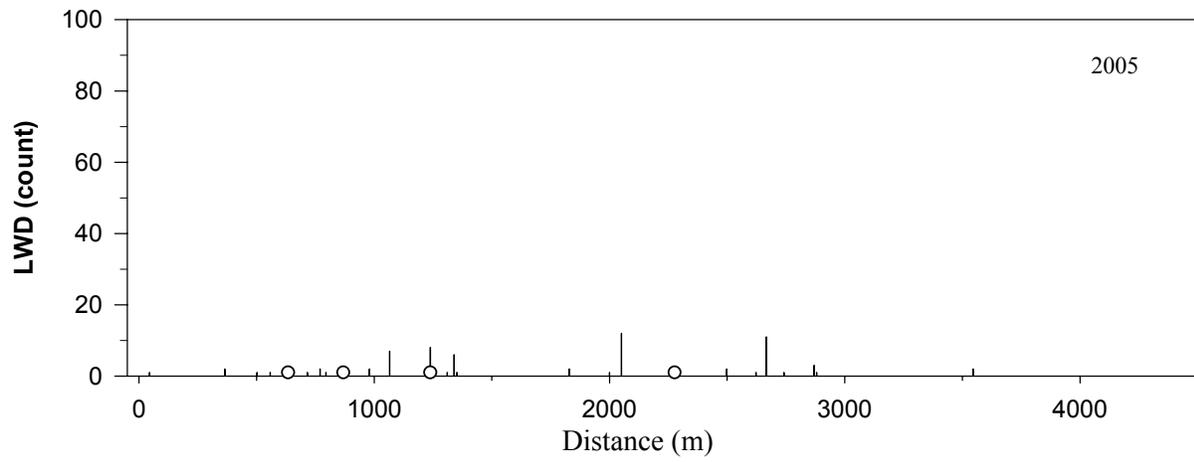
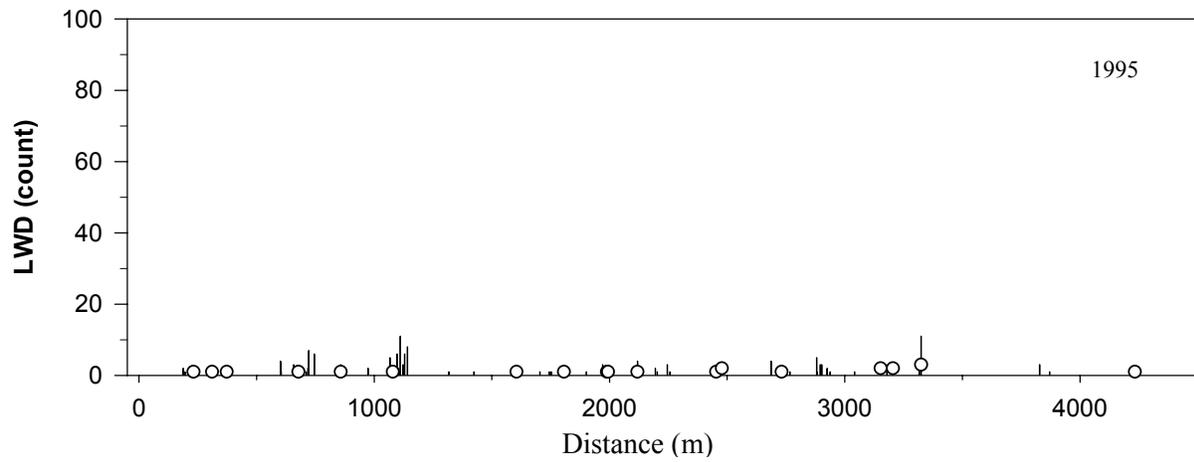
LWD per kilometer in Kennedy Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Kennedy Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

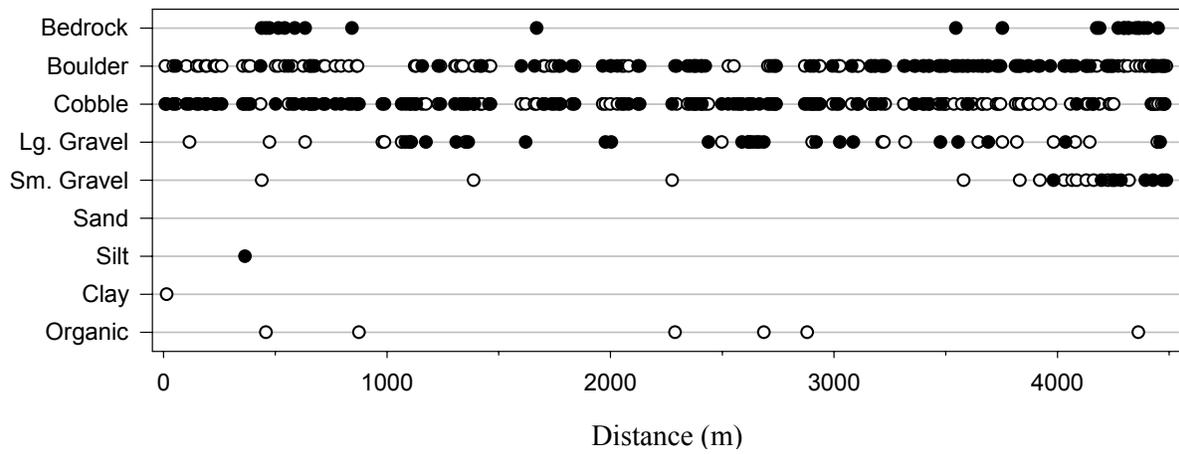
Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	85.7		
SIDE CHANNEL	664.5		
SIDE CHANNEL	745.2		
SIDE CHANNEL	992.7		
SIDE CHANNEL	1147.3		
TRIBUTARY	1160.1		
FORD	1261.9		TRAIL CROSSING
TRIBUTARY	1827.6		
TRIBUTARY	1892.5		
SIDE CHANNEL	1947.4		
TRIBUTARY	2159.2		
FORD	2223.2		TRAIL CROSSING
SIDE CHANNEL	2654.2		
SIDE CHANNEL	2881.9		
SIDE CHANNEL	2895.3		
SIDE CHANNEL	2912.4		
TRIBUTARY	3301.9		
SIDE CHANNEL	3510.7		
SIDE CHANNEL	3555.8		
TRIBUTARY	3996.8		

Stream features recorded for Kennedy Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	71.5		2.5 M TALL, ANGULAR CMP, CONCRETE ON BOTTOM, 40 CM PERCH
TRIBUTARY	893.8		1 M ON RIGHT
OTHER	1043.5		STREAM CHANNEL BLOWNOUT-LARGE PILE OF ROCKS
OTHER	1052.6		LARGE POOL ON RIGHT OFF MAIN CHANNEL
FORD	1157.1		TRAIL CROSSING NO NAME
OTHER	1935.0		DRY CHANNEL ON LEFT
SIDE CHANNEL	1960.0		SIDE CHANNEL OUT
SIDE CHANNEL	2314.7		SIDECHANNEL ON RIGHT
OTHER	2479.9		CHANNEL BLOWN OUT
SIDE CHANNEL	2602.0		SIDECHANNEL ON RIGHT
OTHER	2972.0		STREAM CHANNEL BLOWN OUT
SLIDE	3544.6		
TRIBUTARY	3613.7		
FALL	4450.0	6	
FALL	4480.0	2	



Distribution and abundance of LWD in Kennedy Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in Kennedy Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Loves Run	
District:	Pedlar	
USGS Quadrangle:	Big Levels	
	1995	2005
Survey Date:	8/14/1995	6/3/2005
Total Distance Surveyed (km):	2.5	2.3

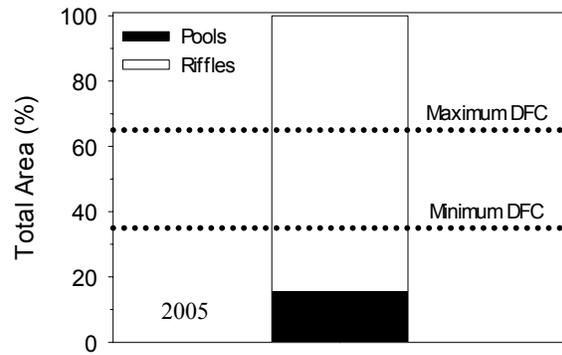
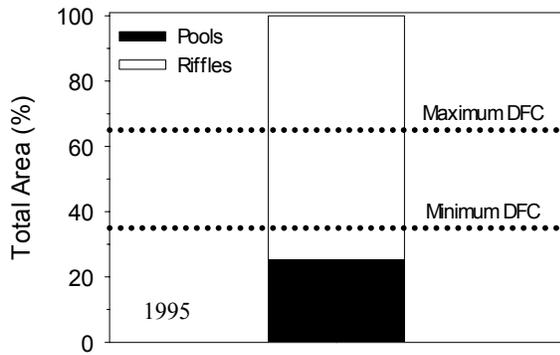
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	25	19	75	81
Total Area (m ²):	1429 ± 2391	1056 ± 197	4203 ± 1040	4368 ± 2258
Correction Factor Applied:	0.91	1.07	0.94	0.97
Number of Paired Samples:	9	5	4	4
Total Count:	133	48	110	43
Number per km:	53	21	44	19
Mean Area (m ²):	11	22	38	102
Mean Maximum Depth (cm):	36	45	21	26
Mean Average Depth (cm):	26	27	12	14
Mean Residual Depth (cm):	NA	14	--	--
Percent Surveyed as Glides:	NA	31	--	--
Percent Surveyed as Runs:	--	--	NA	0
Percent Surveyed as Cascades:	--	--	NA	0
Percent with > 35% Fines:	0	2	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	21	13
1 - 5 m long, > 55 cm diameter:	1	0
> 5 m long, 10 cm – 55 cm diameter:	9	44
> 5 m long, > 55 cm diameter:	0	5
Total:	32	62

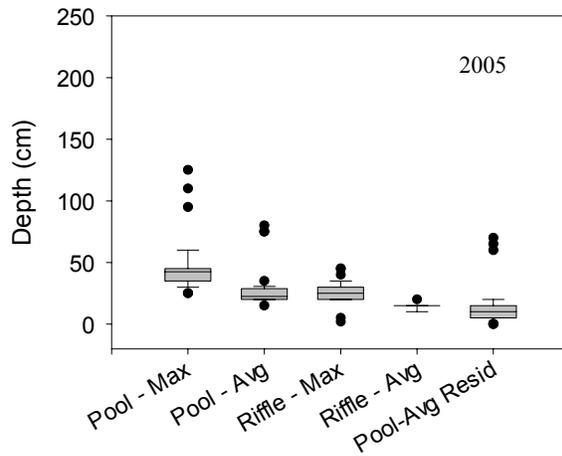
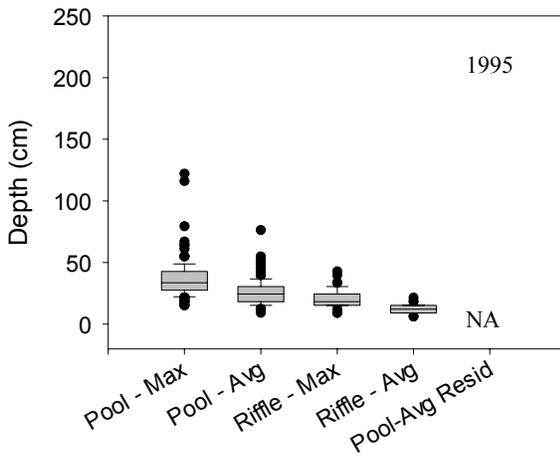
Rosgen's Channel Type*	Frequency (%)
A:	67
B:	0
C:	0
D:	0
E:	0
F:	0
G:	33

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	4	4
Mean Channel Gradient (%):	NA	4
Median Water Temperature (C):	NA	12.5

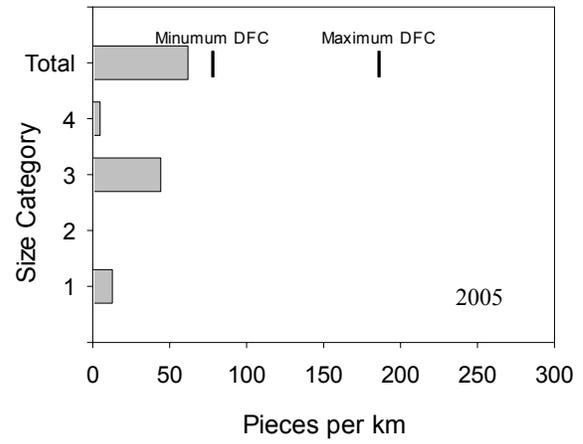
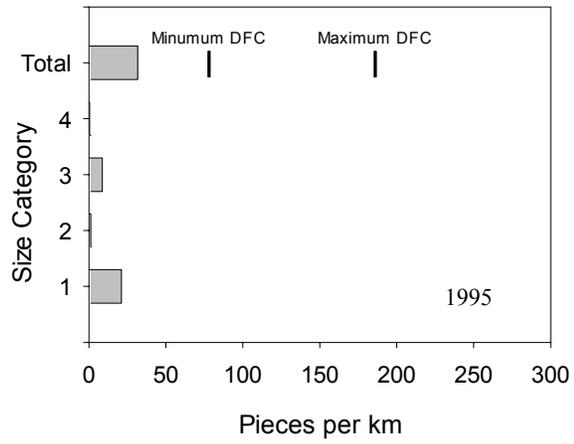
*recorded in 2005 only



Estimated area of Loves Run in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Loves Run. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



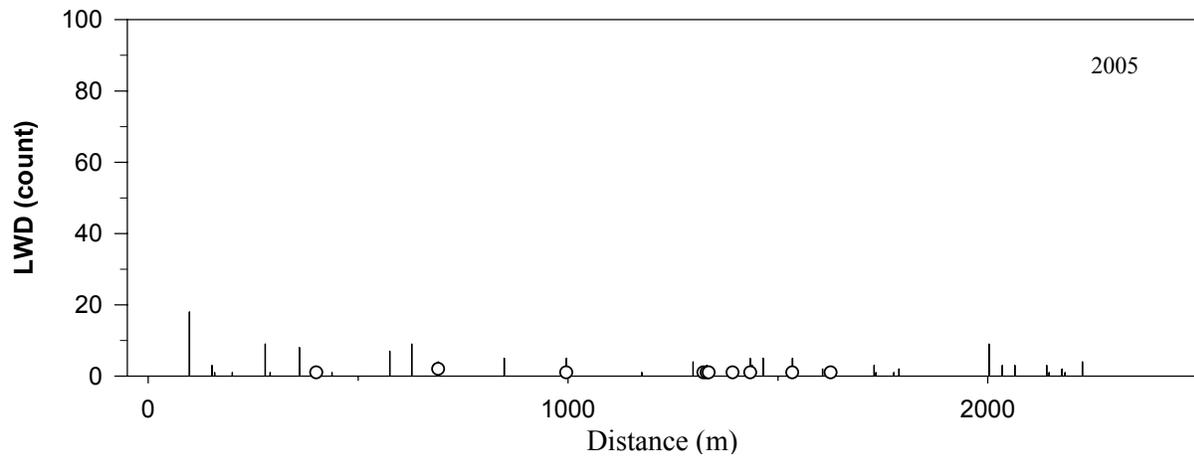
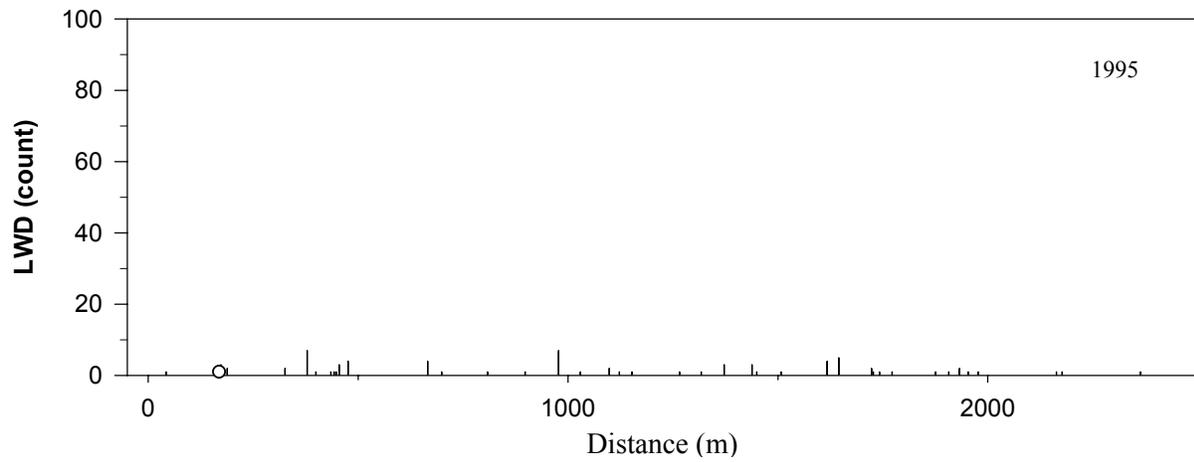
LWD per kilometer in Loves Run. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Loves Run during BVET habitat survey, 1995. Distance is meters from start of survey.

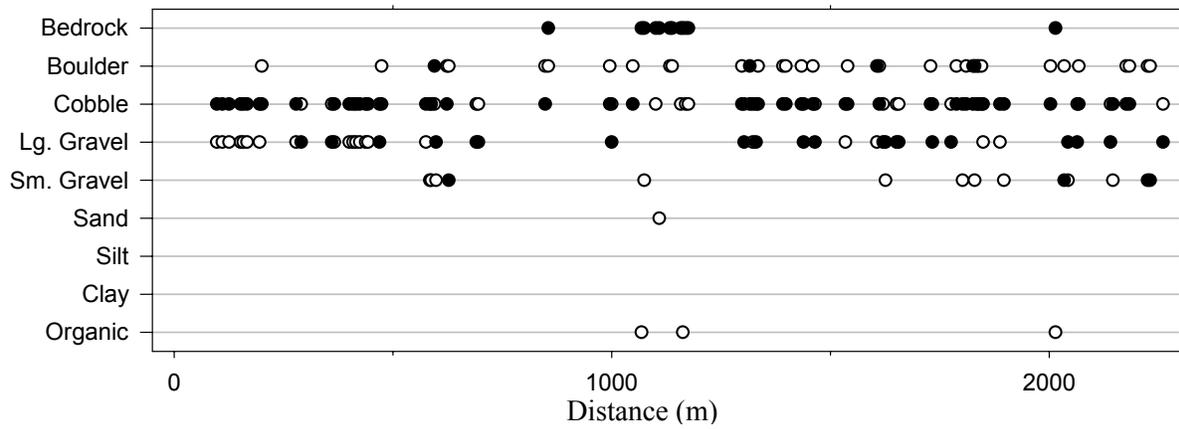
Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	12.5		
TRIBUTARY	271.3		LEFT
SIDE CHANNEL	961.3		LEFT
SIDE CHANNEL	1554.8		IN
SIDE CHANNEL	1674.6		OUT

Stream features recorded for Loves Run during BVET habitat survey, 2005. Distance is meters from start of survey.

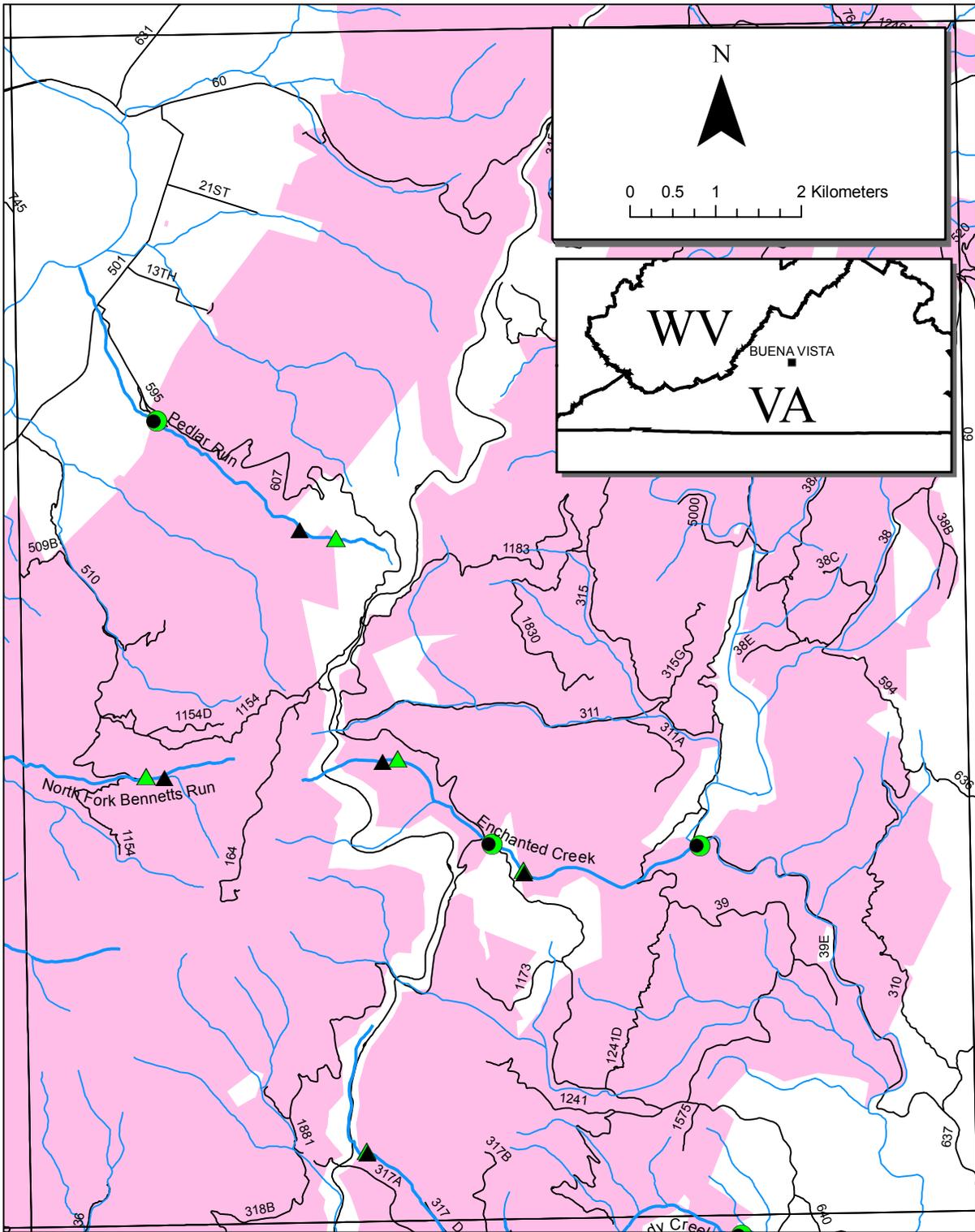
Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	85.4	1.0	ON RIGHT
SIDE CHANNEL	138.2	0.5	RIGHT
SIDE CHANNEL	151.0		BOTH OF THE PREVIOUS TWO
TRIBUTARY	232.2	2	LEFT
SIDE CHANNEL	250.1	1.5	LEFT
SIDE CHANNEL	261.7	0.5	RIGHT
SIDE CHANNEL	278.1		
SIDE CHANNEL	331.4	1.0	RIGHT
SIDE CHANNEL	357.2		
SIDE CHANNEL	390.0	0.5	RIGHT
SIDE CHANNEL	400.4		RIGHT
TRIBUTARY	577.8	0.5	LEFT
OTHER	623.0	1.0	LOG JAM
SIDE CHANNEL	708.2	0.5	LEFT
TRIBUTARY	711.3	1.0	RIGHT
SIDE CHANNEL	723.7		LEFT
SIDE CHANNEL	752.0	0.5	LEFT
SIDE CHANNEL	771.5		LEFT
SIDE CHANNEL	788.1	0.5	RIGHT
SIDE CHANNEL	802.9		RIGHT
SIDE CHANNEL	803.0	0.5	RIGHT
SIDE CHANNEL	920.9	1.5	LEFT
SIDE CHANNEL	1000.0		LEFT
TRIBUTARY	1394.3		
SIDE CHANNEL	1657.4	0.5	RIGHT
SIDE CHANNEL	1670.8		RIGHT
SIDE CHANNEL	1718.0		
SIDE CHANNEL	1744.7	0.5	LEFT
END SURVEY	2260.0		14:08 CONFLUENCE OF TWO SMALLER STREAMS WHICH FORM INTO LOVES RUN ENDED DUE TO INTERMITTANCE



Distribution and abundance of LWD in Loves Run in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in Loves Run in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Buena Vista quadrangle in 1995 (green) and 2005 (black).

Stream:	Enchanted Creek	
District:	Pedlar	
USGS Quadrangle:	Buena Vista	
	1995	2005
Survey Date:	5/22/1995	6/30/2005
Total Distance Surveyed (km):	3.8	3.8

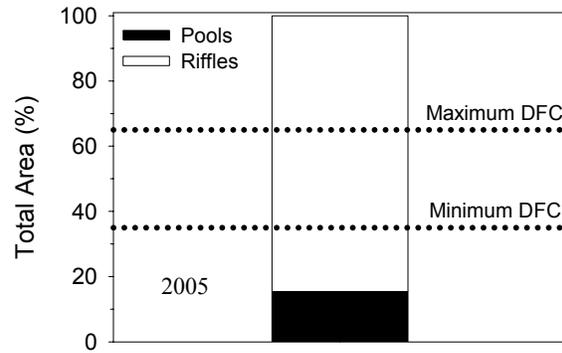
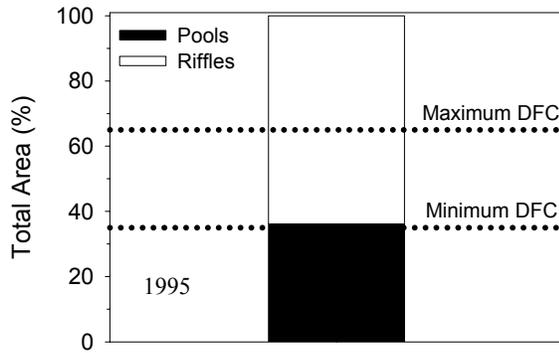
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	36	16	64	84
Total Area (m ²):	4574 ± 325	2346 ± 293	7967 ± 764	12704 ± 1990
Correction Factor Applied:	1.09	0.98	0.99	1.17
Number of Paired Samples:	14	10	11	8
Total Count:	273	85	227	88
Number per km:	72	22	60	23
Mean Area (m ²):	17	28	35	144
Mean Maximum Depth (cm):	36	54	22	26
Mean Average Depth (cm):	23	32	12	12
Mean Residual Depth (cm):	NA	18	--	--
Percent Surveyed as Glides:	NA	1	--	--
Percent Surveyed as Runs:	--	--	NA	2
Percent Surveyed as Cascades:	--	--	NA	10
Percent with > 35% Fines:	0	22	0	2

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	84	29
1 - 5 m long, > 55 cm diameter:	14	0
> 5 m long, 10 cm – 55 cm diameter:	46	45
> 5 m long, > 55 cm diameter:	8	17
Total:	152	92

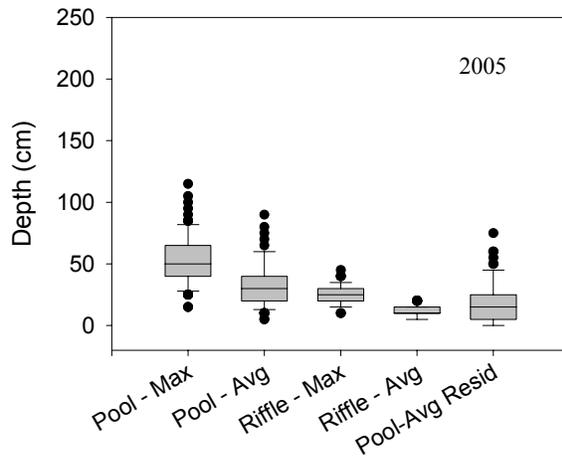
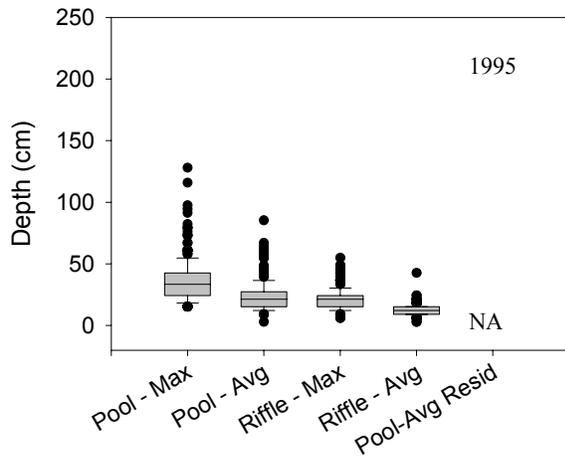
Rosgen's Channel Type*	Frequency (%)
A:	5
B:	92
C:	3
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	6	6
Mean Channel Gradient (%):	NA	8
Median Water Temperature (C):	NA	15

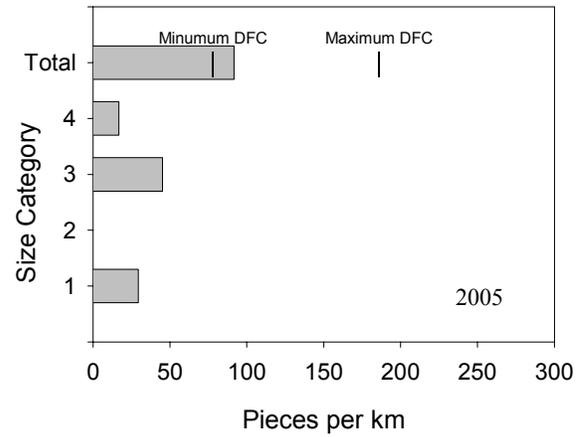
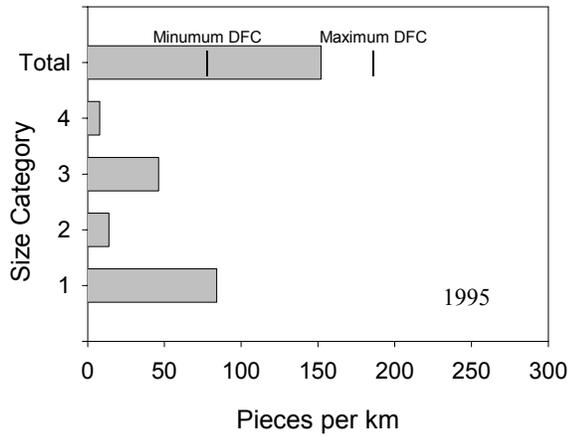
*recorded in 2005 only



Estimated area of Enchanted Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Enchanted Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



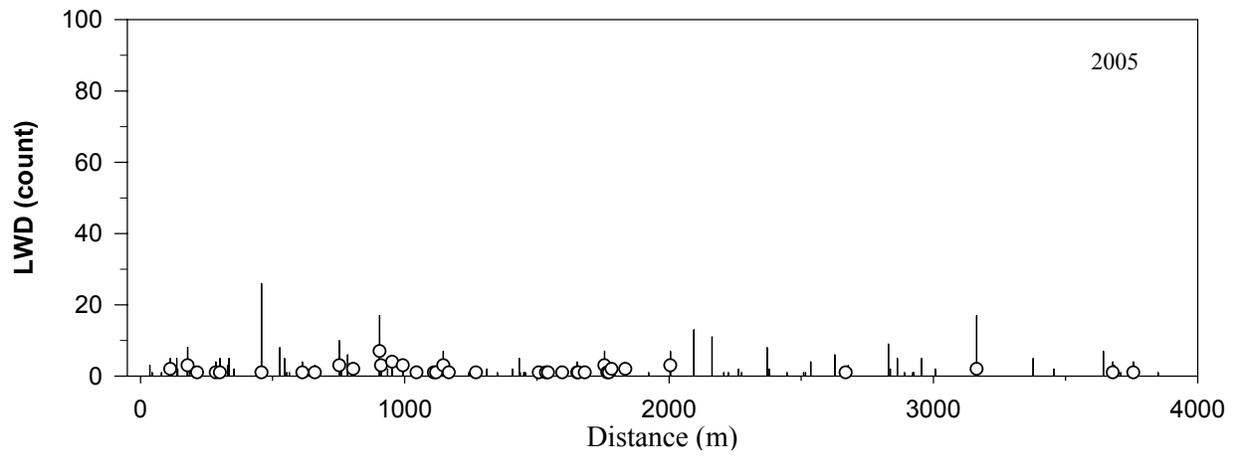
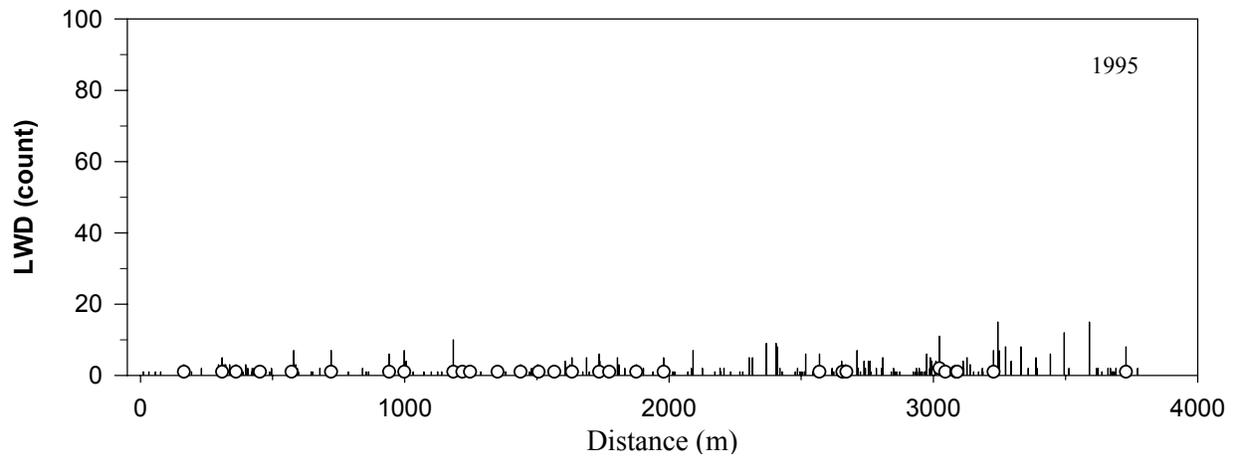
LWD per kilometer in Enchanted Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Enchanted Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

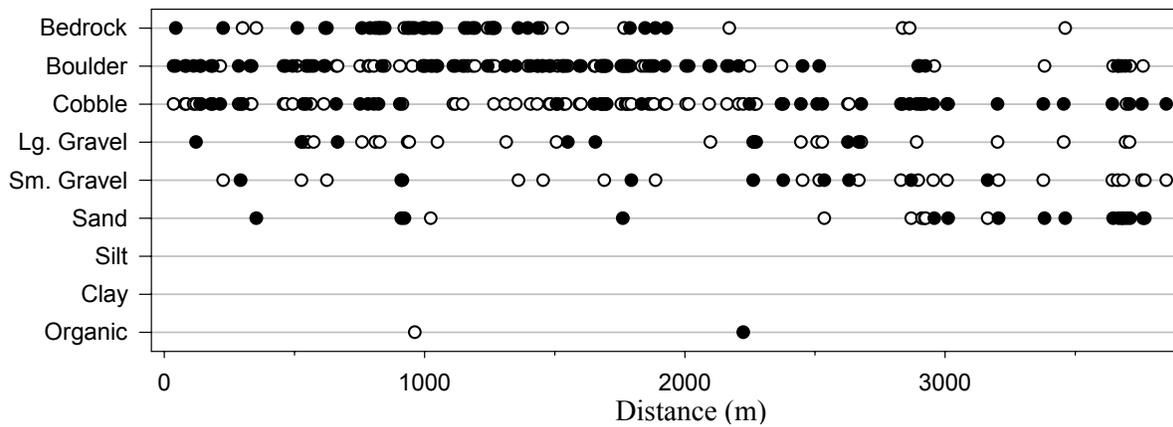
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	227.7		
SIDE CHANNEL	302.1		
SIDE CHANNEL	311.2		
SEEP	373.7		
TRIBUTARY	1258.8		
TRIBUTARY	1702.9		
TRIBUTARY	1876.3		
OTHER	2031.8		FOREST BOUNDARY
OTHER	2031.8		RESUMED SURVEY
FORD	2031.8		TRAIL CROSSING
TRIBUTARY	2119.9		
TRIBUTARY	2301.5		
TRIBUTARY	2352.8		
FORD	2370.7		ROAD CROSSING
TRIBUTARY	2424.7		
FORD	2728.0		ROAD CROSSING
FORD	2922.4		ROAD CROSSING
TRIBUTARY	3053.5		
FORD	3059.0		ROAD CROSSING
TRIBUTARY	3205.6		
FORD	3378.4		ROAD CROSSING
SEEP	3849.9		
TRIBUTARY	227.7		

Stream features recorded for Enchanted Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	214.0		ON LEFT
OTHER	665.6		CHUB MOUND
			ACROSS FS 39 RESERVOIR ROAD 2 1/2 M
CULVERT	857.3		HIGH 3 M WIDE PERCH IS 40 CM
OTHER	904.9		LOG JAM
OTHER	1014.6		LOG JAM
SIDE CHANNEL	1388.4		RIGHT
BRAID	1731.7		
TRIBUTARY	1945.5		LEFT
TRIBUTARY	2103.0		LEFT
FORD	2152.0		ROAD CROSSING
OTHER	2169.9		MANMADE ROCK DAM, HOUSE ON LEFT
			FOREST BOUNDARY, MOVED BY TRUCK TO
OTHER	2206.5		UPPER SECTION
			CONTINUED SURVEY AT FORD OF FS 1881
FORD			OF OFF ROUTE 607
TRIBUTARY	2264.0	0.5	ON LEFT
FORD	2541.5		
FORD	2761.3		
TRIBUTARY	2771.2	0.5	ON RIGHT
TRIBUTARY	2885.6	1.5	LEFT, BLUFF CREEK
FORD	2890.5		
SIDE CHANNEL	3017.9		LEFT
SIDE CHANNEL	3038.9		LEFT
SEEP	3504.0		LEFT
SIDE CHANNEL	3552.0		RIGHT
SEEP	3731.6		LEFT
			END SURVEY, STREAM SPLITS INTO 2
END	3849.5		SMALL TRIBS AT 1654.3



Distribution and abundance of LWD in Enchanted Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in Enchanted Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Pedlar Run	
District:	Pedlar	
USGS Quadrangle:	Buena Vista	
	1995	2005
Survey Date:	8/14/1995	5/31/2005
Total Distance Surveyed (km):	2.7	1.9

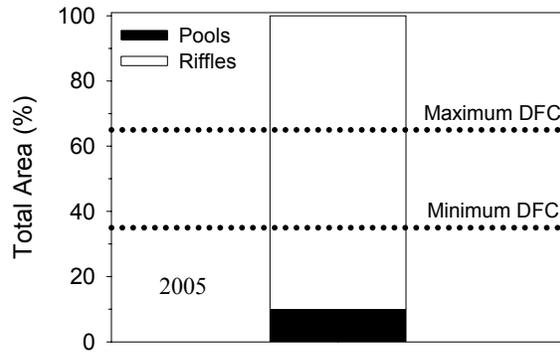
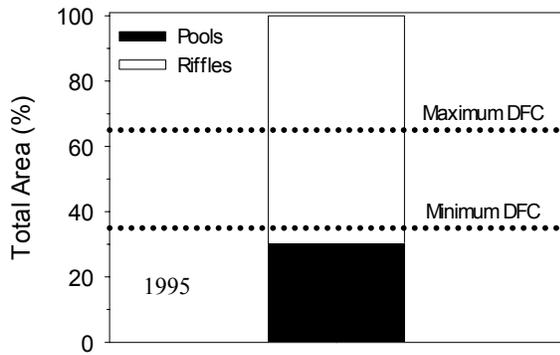
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	31	10	69	90
Total Area (m ²):	1949 ± 77	602 ± 257	4436 ± 253	5273 ± 1218
Correction Factor Applied:	1.05	0.79	1.08	1.12
Number of Paired Samples:	9	4	8	7
Total Count:	176	39	153	54
Number per km:	65	21	56	29
Mean Area (m ²):	11	15	29	98
Mean Maximum Depth (cm):	38	41	21	24
Mean Average Depth (cm):	25	32	12	13
Mean Residual Depth (cm):	NA	18	--	--
Percent Surveyed as Glides:	NA	15	--	--
Percent Surveyed as Runs:	--	--	NA	20
Percent Surveyed as Cascades:	--	--	NA	7
Percent with > 35% Fines:	0	74	0	7

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	31	21
1 - 5 m long, > 55 cm diameter:	1	0
> 5 m long, 10 cm – 55 cm diameter:	26	10
> 5 m long, > 55 cm diameter:	5	1
Total:	63	32

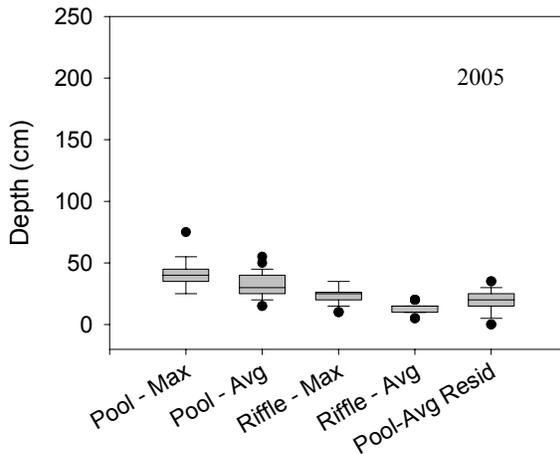
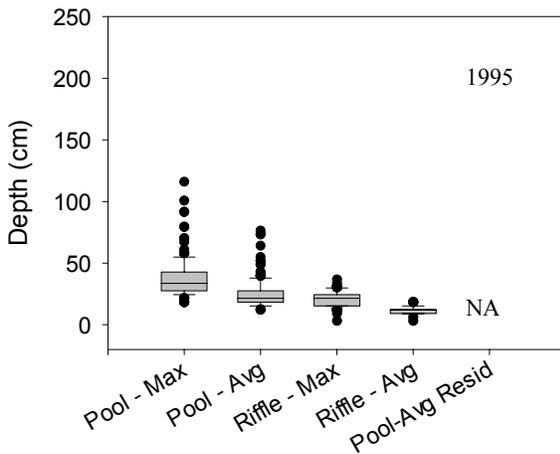
Rosgen's Channel Type*	Frequency (%)
A:	35
B:	44
C:	0
D:	0
E:	20
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	5	5
Mean Channel Gradient (%):	NA	7
Median Water Temperature (C):	NA	16.5

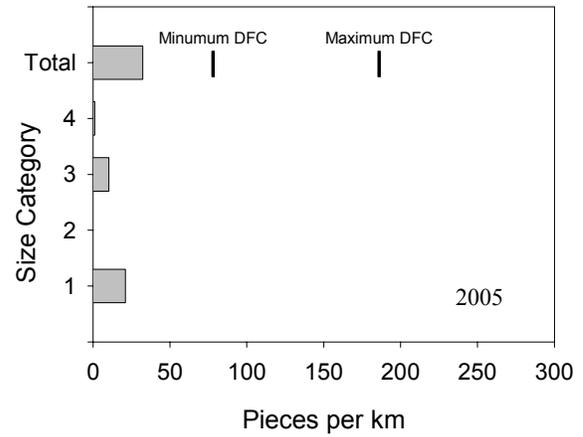
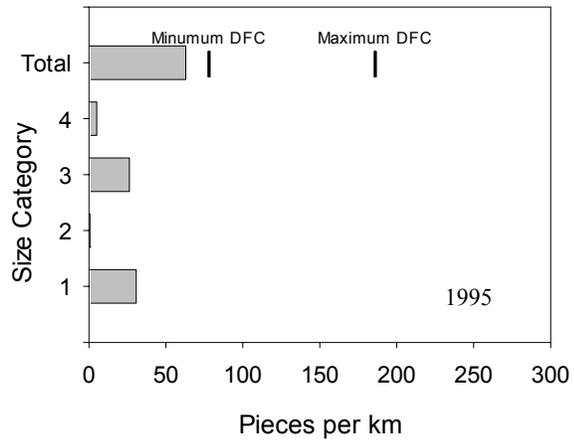
*recorded in 2005 only



Estimated area of Pedlar Run in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Pedlar Run. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



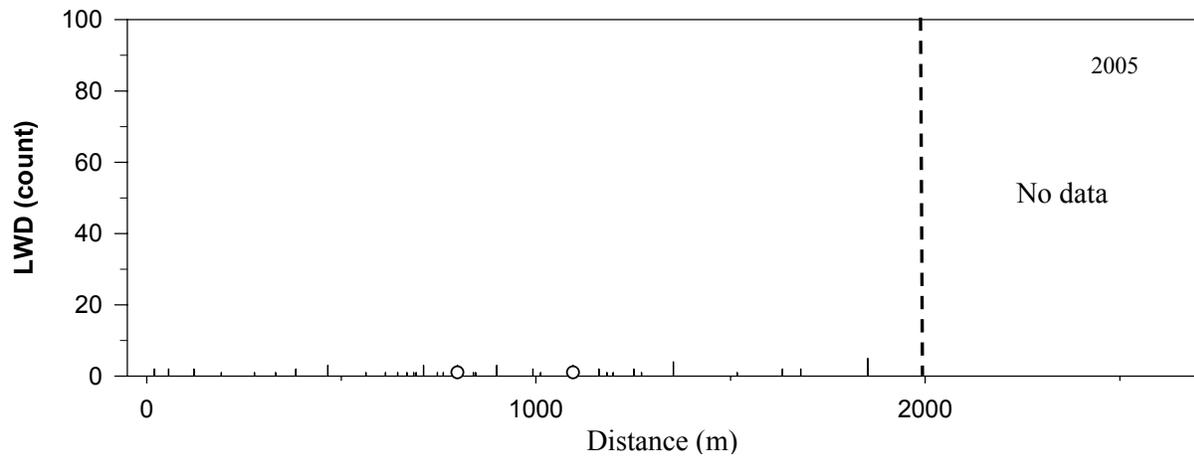
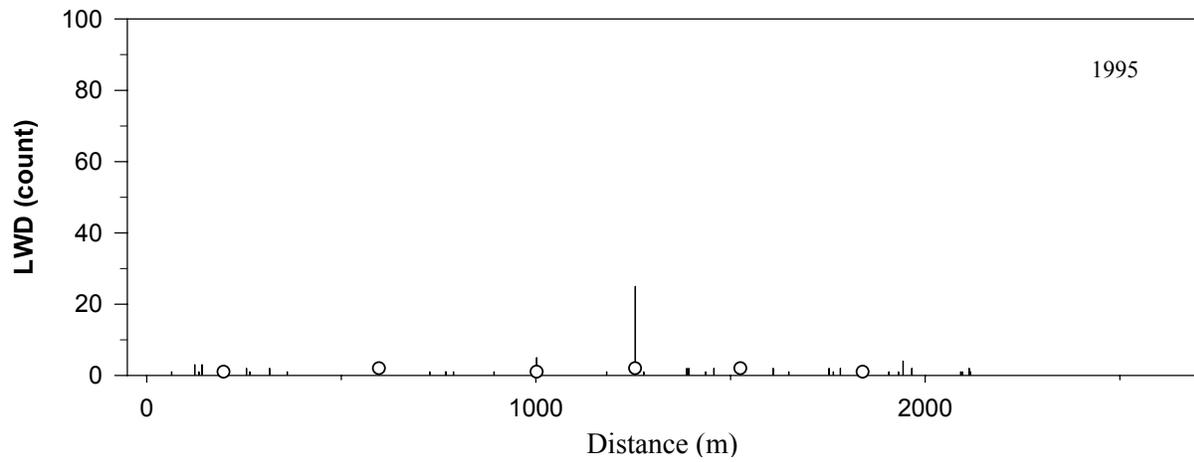
LWD per kilometer in Pedlar Run. LWD size classes: Size 1: <5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Pedlar Run during BVET habitat survey, 1995. Distance is meters from start of survey.

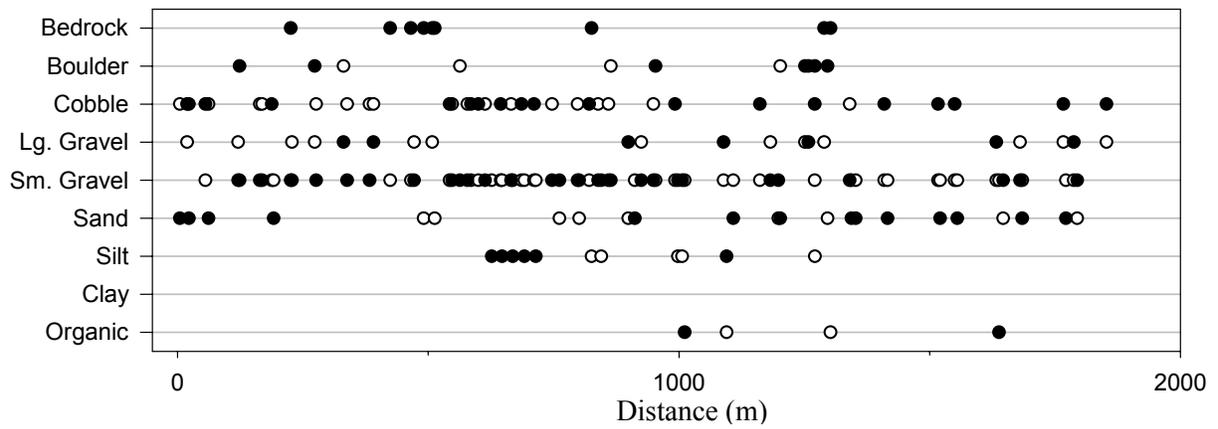
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	426.4		LEFT
TRIBUTARY	1141.5		LEFT
FORD	1176.		TRAIL CROSSING
TRIBUTARY	1506.3		LEFT
TRIBUTARY	2429.6		LEFT
SEEP	2484.1		RIGHT

Stream features recorded for Pedlar Run during BVET habitat survey, 2005. Distance is meters from start of survey.

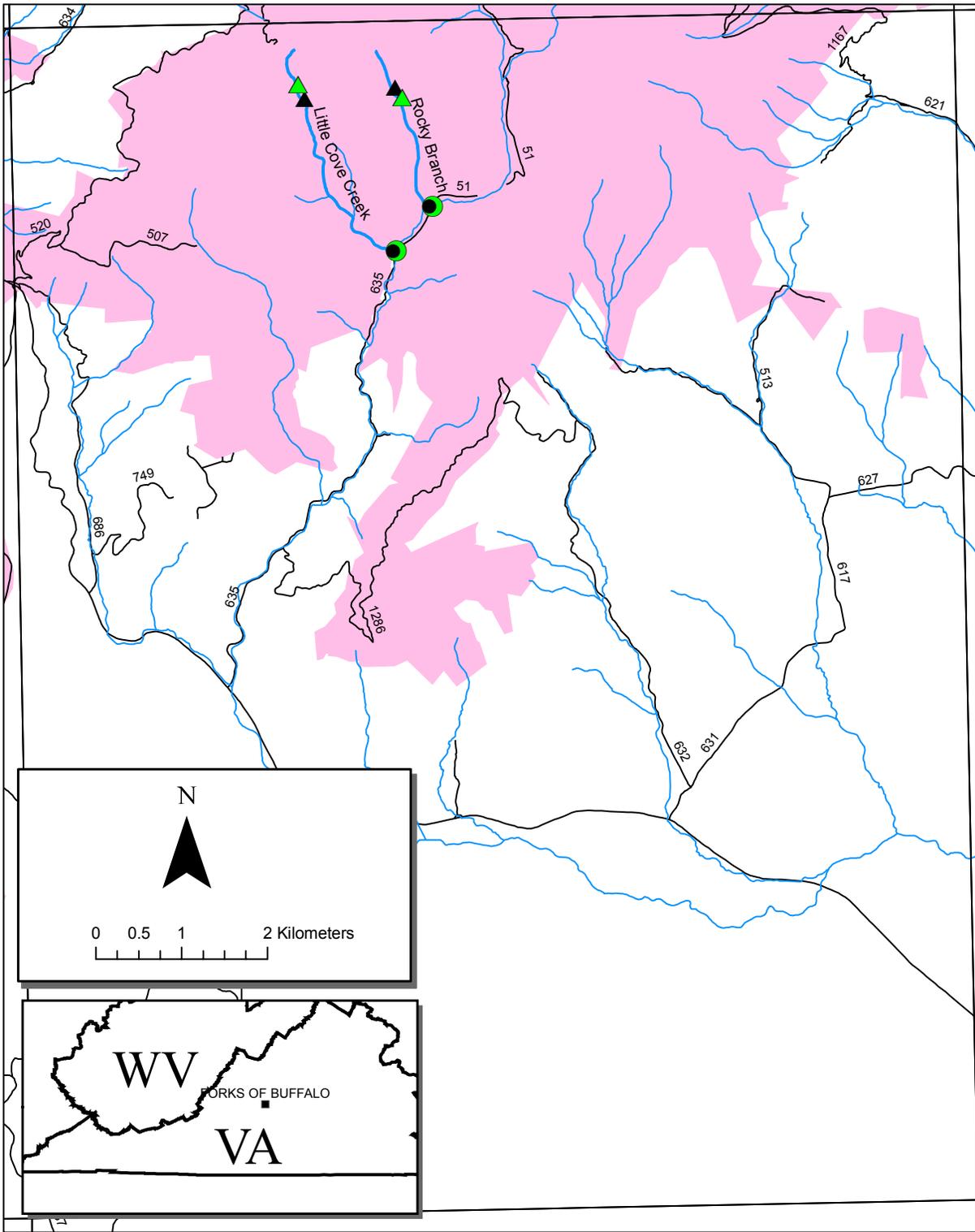
Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	1.0	0.6	IN ON RIGHT
SIDE CHANNEL	8.9		OUT ON RIGHT
			WHITE BUILDING TO LEFT OF STREAM.
			POWERLINE AND TRAIL END AT THIS
OTHER	254.0		BUILDING.
SEEP	473.0		ON LEFT
SLIDEE	473.0		ON LEFT
TRIBUTARY	546.0	1.2	IN ON RIGHT
TRIBUTARY	880.0	1.0	
TRIBUTARY	965.3	1.5	IN ON LEFT
SIDE CHANNEL	1024.0	1.0	IN ON RIGHT
SIDE CHANNEL	1032.0		OUT ON RIGHT
TRIBUTARY	1139.0	0.6	IN ON RIGHT
SIDE CHANNEL	1154.9	0.8	IN ON LEFT
SIDE CHANNEL	1161.3	0.8	OUT ON LEFT
TRIBUTARY	1221.0		IN ON LEFT. DRY.
FORD	1602.0		
FALL	1794.0		HEIGHT 1.5 M
END	1852.0		END SURVEY.NATIONAL FOREST
			BOUNDARY.



Distribution and abundance of LWD in Pedlar Run in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Pedlar Run in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Forks of Buffalo quadrangle in 1995 (green) and 2005 (black).

Stream:	Little Cove Creek	
District:	Pedlar	
USGS Quadrangle:	Forks of Buffalo	
	1989	2005
Survey Date:	7/21/1989	6/2/2005
Total Distance Surveyed (km):	1.7	1.2

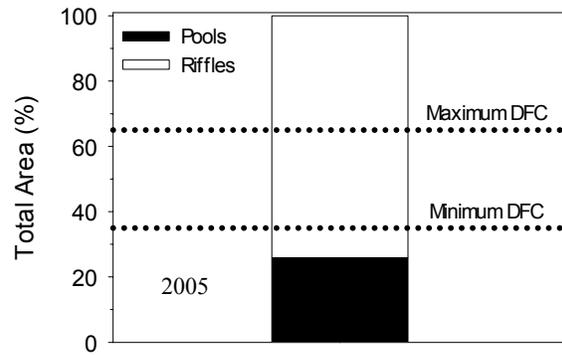
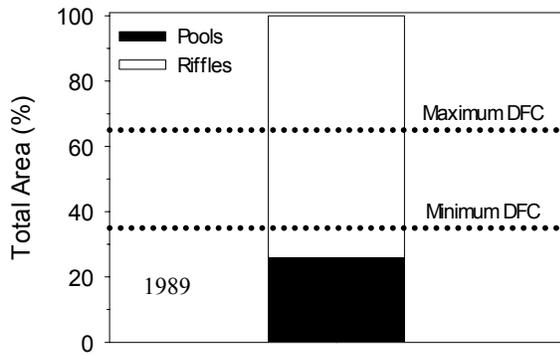
	<u>Pools</u>		<u>Riffles</u>	
	1989	2005	1989	2005
Percent of Total Stream Area:	26	24	74	76
Total Area (m ²):	2163 ± 285	1034 ± 161	6148 ± 454	3205 ± 389
Correction Factor Applied:	1.05	0.95	0.98	0.98
Number of Paired Samples:	21	5	11	5
Total Count:	116	50	122	50
Number per km:	69	42	72	42
Mean Area (m ²):	19	21	50	64
Mean Maximum Depth (cm):	56	60	32	25
Mean Average Depth (cm):	36	34	19	12
Mean Residual Depth (cm):	NA	20	--	--
Percent Surveyed as Glides:	38	0	--	--
Percent Surveyed as Runs:	--	--	0	0
Percent Surveyed as Cascades:	--	--	61	52
Percent with > 35% Fines:	0	0	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1989	2005
1 - 5 m long, 10 cm – 55 cm diameter:	102	10
1 - 5 m long, > 55 cm diameter:	8	2
> 5 m long, 10 cm – 55 cm diameter:	26	43
> 5 m long, > 55 cm diameter:	5	16
Total:	142	71

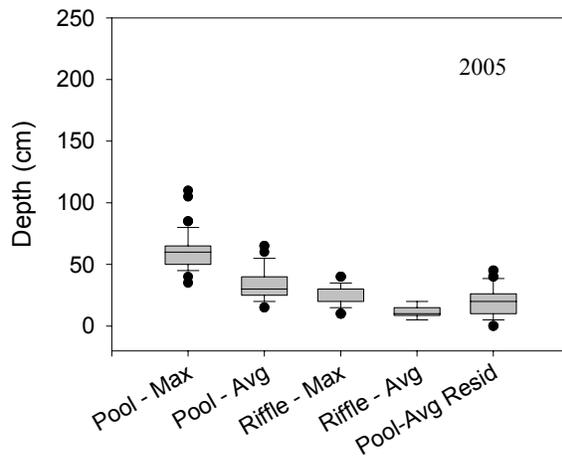
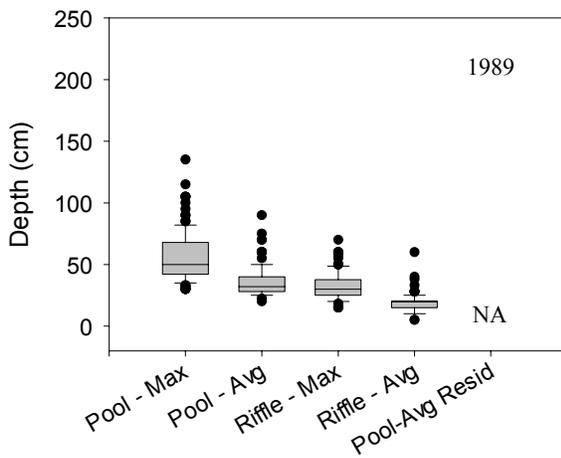
Rosgen's Channel Type*	Frequency (%)
A:	100
B:	0
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1989	2005
Mean Bankfull Channel Width (m):	NA	7
Mean Channel Gradient (%):	NA	14
Median Water Temperature (C):	NA	14

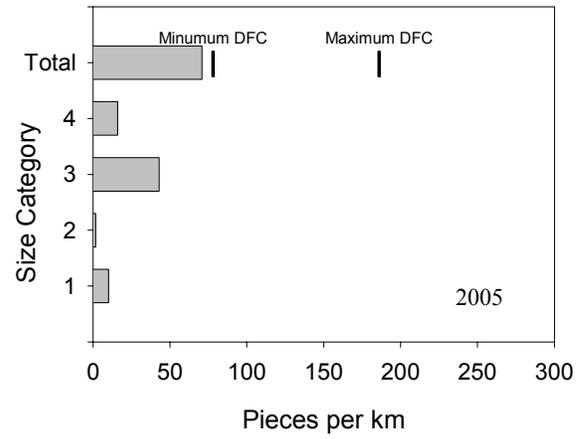
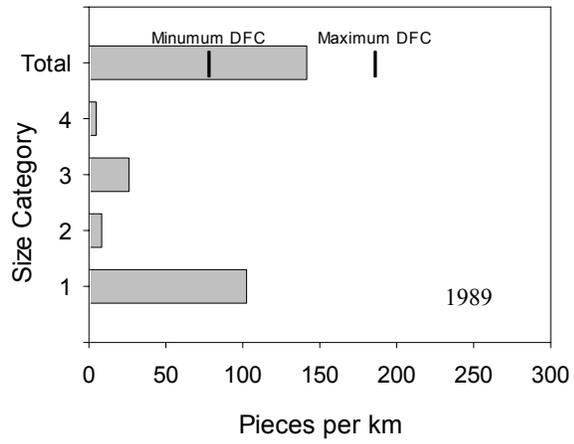
*recorded in 2005 only



Estimated area of Little Cove Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Little Cove Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



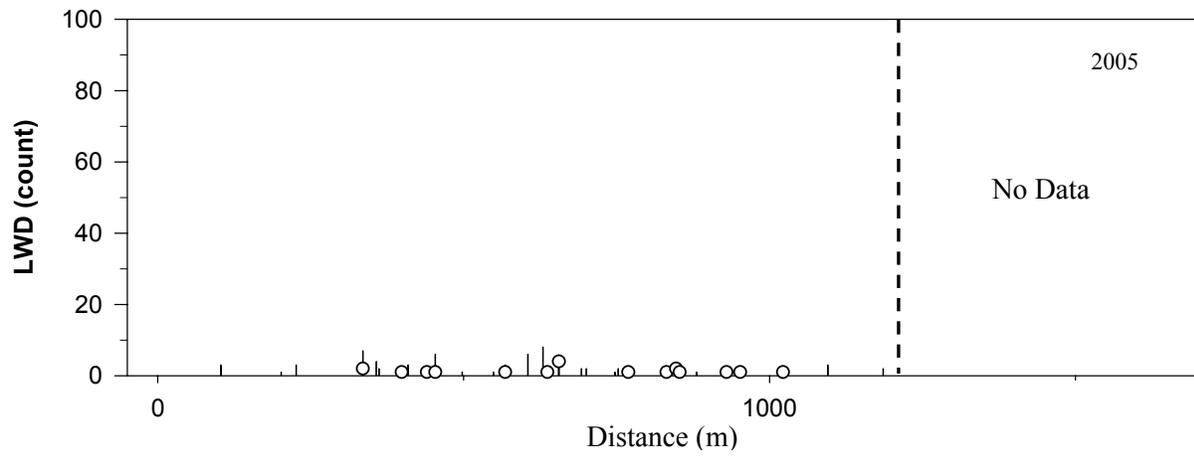
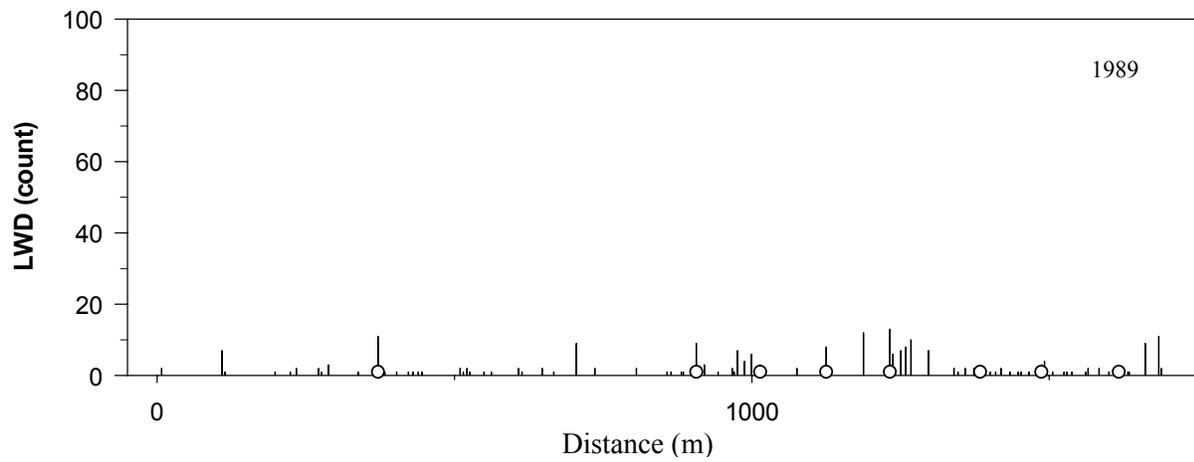
LWD per kilometer in Little Cove Creek in 1989 and 2005. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Little Cove Creek during BVET habitat survey, 1989. Distance is meters from start of survey.

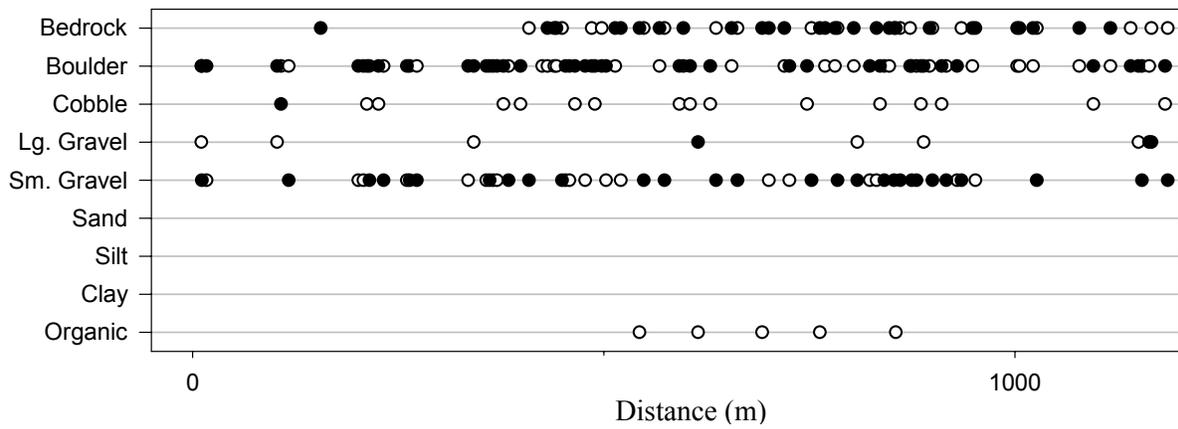
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	762.8		TRIBUTARY
TRIBUTARY	1161.2		TRIBUTARY

Stream features recorded for Little Cove Creek during BVET habitat survey, 2005. Distance is meters from start of survey. Similar data were not collected in 1989.

Stream Feature	Distance (m)	Width (m)	Comments
FALL	107.7		1 M
FALL	596.8		2 M
TRIBUTARY	685.0	2.0	CASCADES UP THE SIDE OF MOUNTAIN
FALL	841.1		2 M
FALL	874.4		2 M
FALL	1140.7		1.5 M



Distribution and abundance of LWD in Little Cove Creek in 1989 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Little Cove Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1989 inventory.

Stream:	Rocky Branch	
District:	Pedlar	
USGS Quadrangle:	Forks of Buffalo	
	1989	2005
Survey Date:	7/21/1989	6/2/2005
Total Distance Surveyed (km):	1.0	1.0

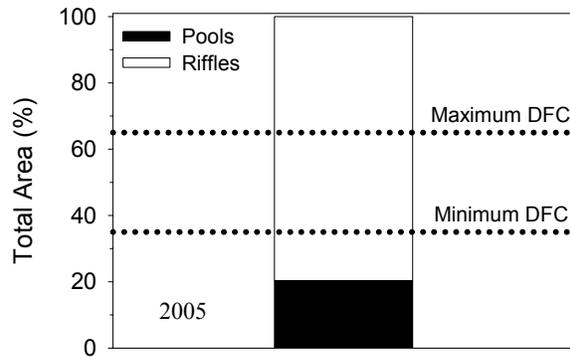
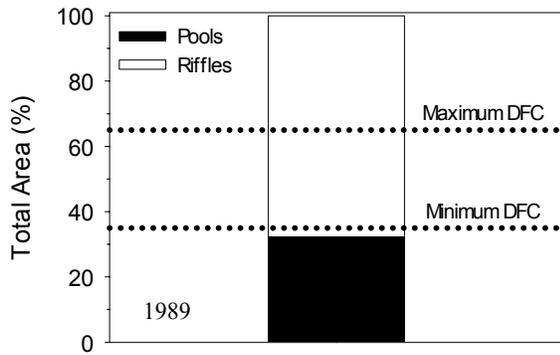
	<u>Pools</u>		<u>Riffles</u>	
	1989	2005	1989	2005
Percent of Total Stream Area:	33	21	67	79
Total Area (m ²):	1046 ± 85	539 ± 63	2161 ± 176	2090 ± 694
Correction Factor Applied:	0.93	0.99	0.99	0.90
Number of Paired Samples:	12	3	5	4
Total Count:	74	39	69	47
Number per km:	72	39	67	47
Mean Area (m ²):	14	14	31	44
Mean Maximum Depth (cm):	53	54	23	24
Mean Average Depth (cm):	36	31	15	11
Mean Residual Depth (cm):	NA	20	--	--
Percent Surveyed as Glides:	39	0	--	--
Percent Surveyed as Runs:	--	--	0	0
Percent Surveyed as Cascades:	--	--	49	38
Percent with > 35% Fines:	0	8	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1989	2005
1 - 5 m long, 10 cm – 55 cm diameter:	33	15
1 - 5 m long, > 55 cm diameter:	11	9
> 5 m long, 10 cm – 55 cm diameter:	20	49
> 5 m long, > 55 cm diameter:	14	9
Total:	78	82

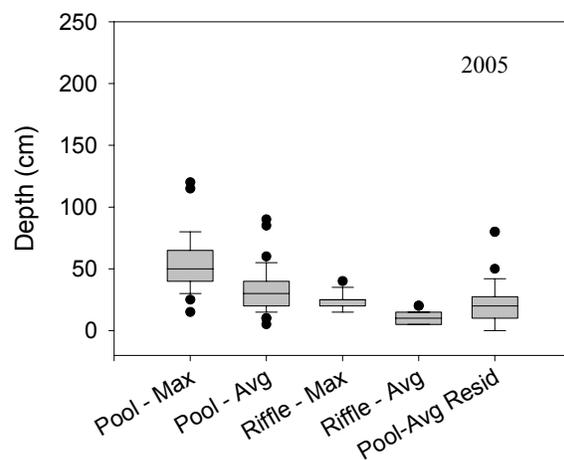
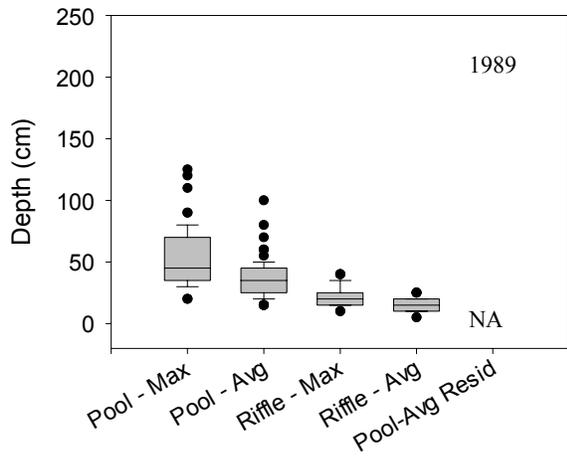
Rosgen's Channel Type*	Frequency (%)
A:	100
B:	0
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1989	2005
Mean Bankfull Channel Width (m):	NA	4
Mean Channel Gradient (%):	NA	10
Median Water Temperature (C):	NA	12

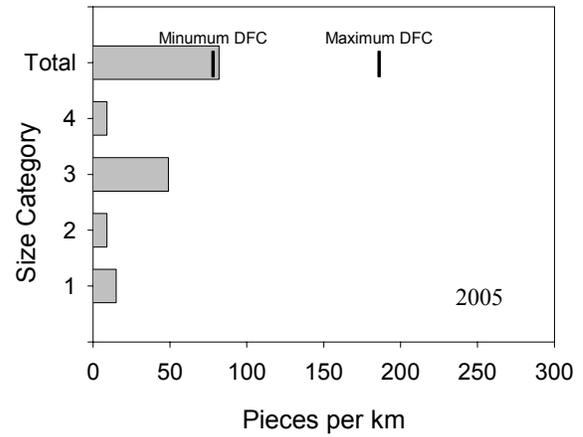
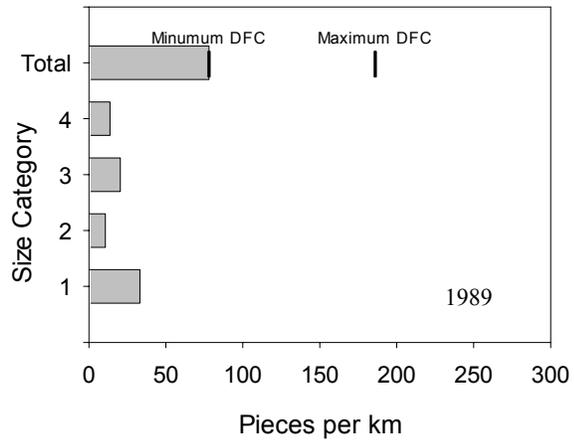
*recorded in 2005 only



Estimated area of Rocky Branch in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Rocky Branch. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



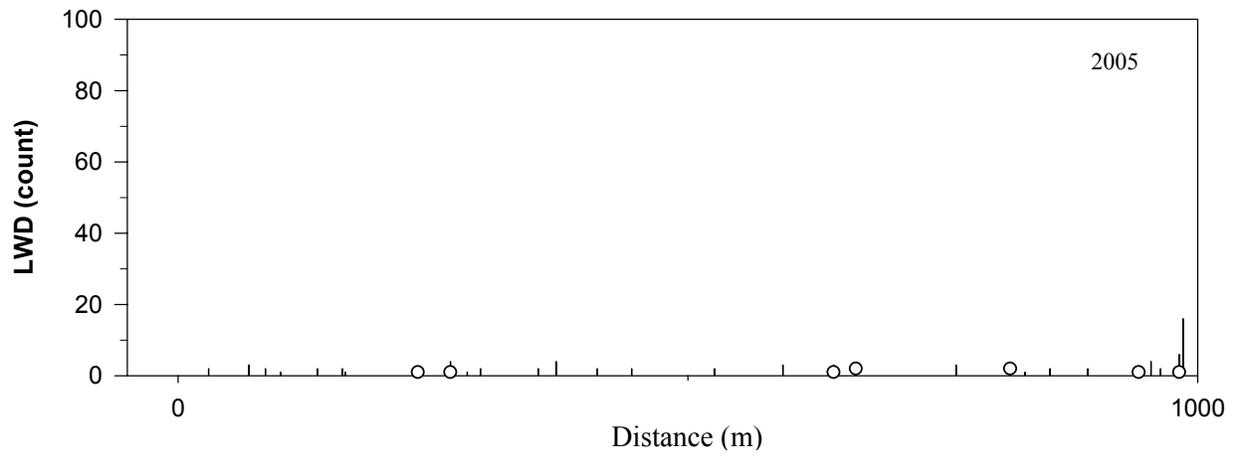
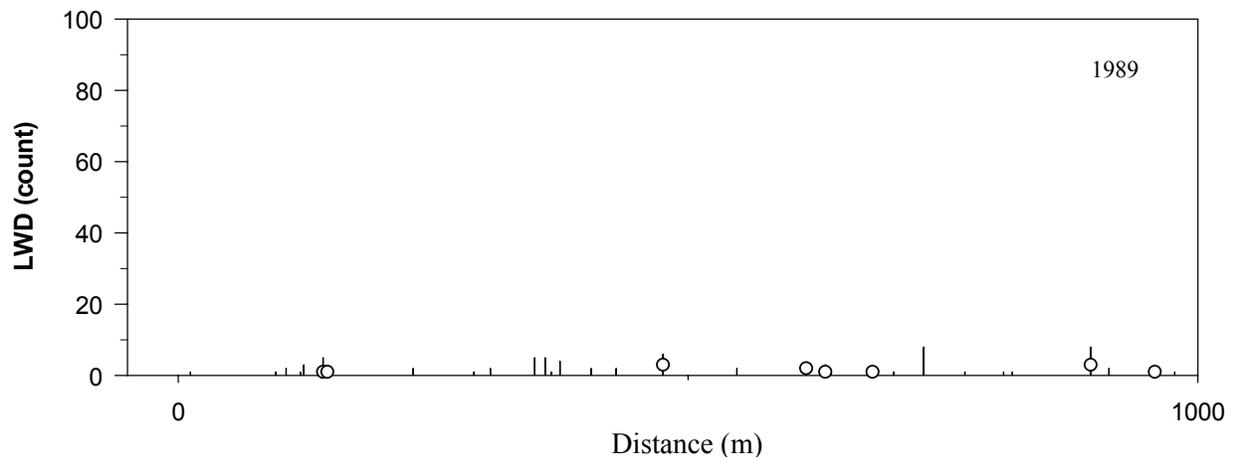
LWD per kilometer in Rocky Branch. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: < 5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Rocky Branch during BVET habitat survey, 1989. Distance is meters from start of survey.

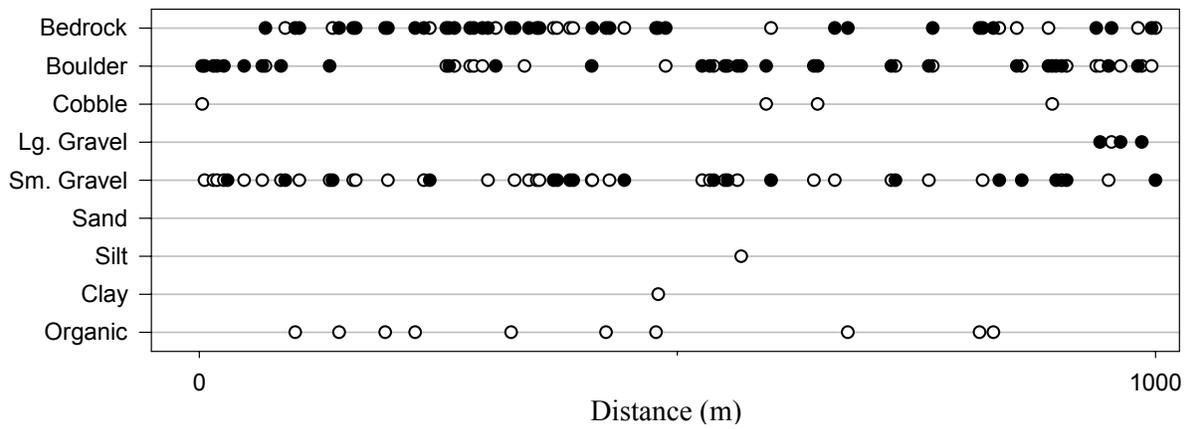
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	645.9		

Stream features recorded for Rocky Branch during BVET habitat survey, 2005. Distance is meters from start of survey. Similar data were not collected in 1989.

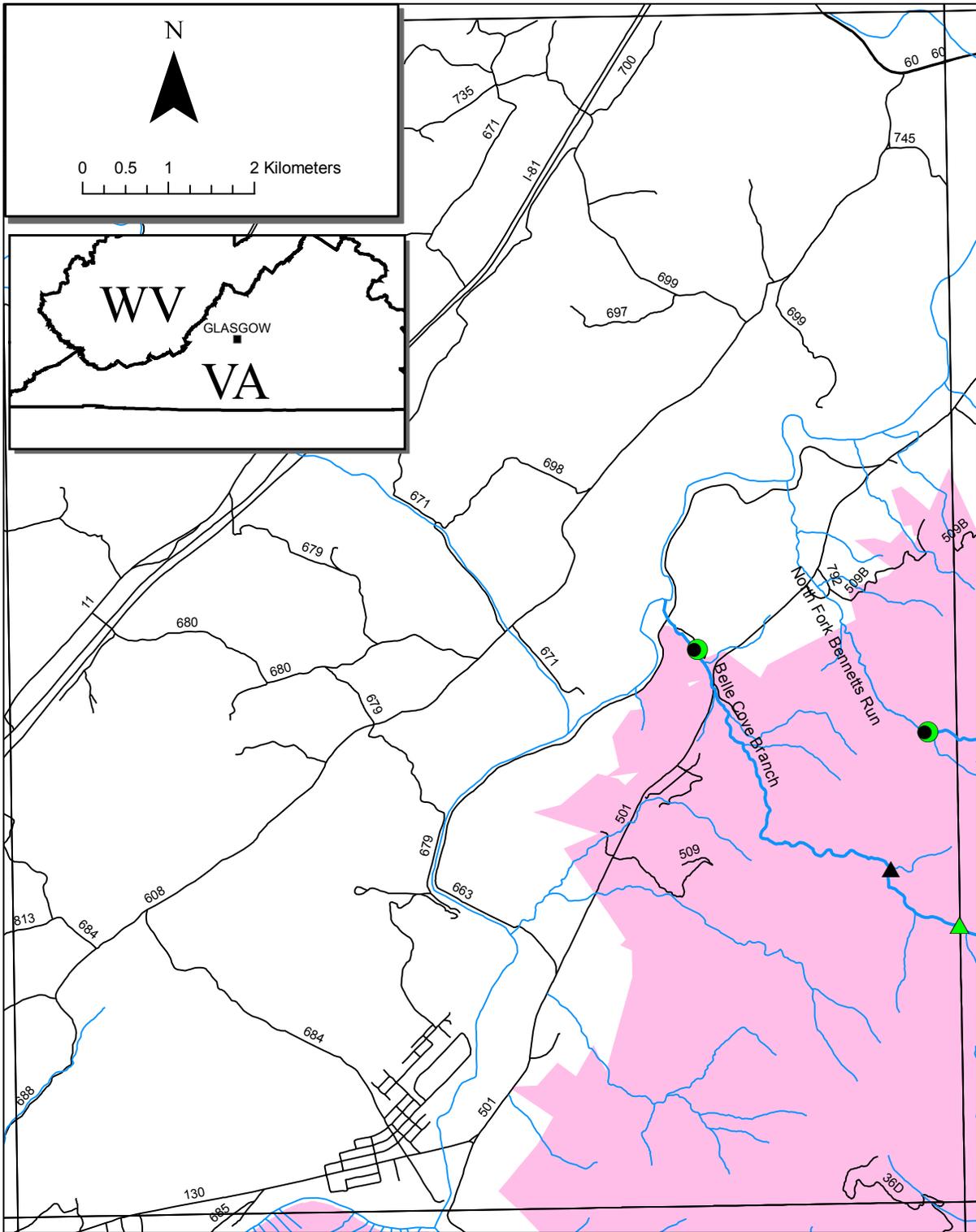
Stream Feature	Distance (m)	Width (m)	Comments
FALL	47.1	2.5	2 M HIGH
FALL	104.7		10 M HIGH
FALL	146.2		7.5 M FALL
FALL	197.4		4 M HIGH
FALL	429.0		10 M HIGH
FALL	480.1		1.5 M HIGH
FALL	556.7		2 M HIGH
FALL	598.0		2.5 M HIGH
FALL	664.6		2 FALLS ABOUT 3 M HIGH
SEEP	870.9		RIGHT SIDE
FALL	1051.2		3 M HIGH
TRIBUTARY	1097.4	1.0	ON RIGHT
END	1202.0		END SURVEY CONTINUOUS CASCADE FOR GREATER THAN 150 M TREACHEROUS



Distribution and abundance of LWD in Rocky Branch in 1989 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in Rocky Branch in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Glasgow quadrangle in 1995 (green) and 2005 (black).

Stream:	Belle Cove Creek		
District:	Pedlar		
USGS Quadrangle:	Glasgow		
	1995		2005
Survey Date:	8/9/1995		6/1/2005
Total Distance Surveyed (km):	5.9		4.0

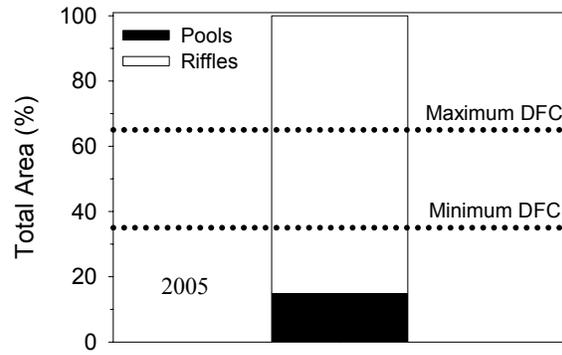
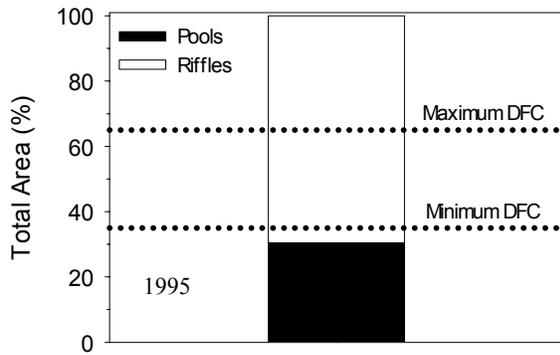
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	31	15	69	85
Total Area (m ²):	4201 ± 180	1550 ± 220	9537 ± 792	8774 ± 1258
Correction Factor Applied:	1.06	0.79	1.02	0.74
Number of Paired Samples:	10	8	8	7
Total Count:	190	74	151	72
Number per km:	32	18	25	18
Mean Area (m ²):	22	21	63	122
Mean Maximum Depth (cm):	52	41	23	29
Mean Average Depth (cm):	35	28	12	14
Mean Residual Depth (cm):	NA	18	--	--
Percent Surveyed as Glides:	NA	24	--	--
Percent Surveyed as Runs:	--	--	NA	6
Percent Surveyed as Cascades:	--	--	NA	10
Percent with > 35% Fines:	0	0	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	70	16
1 - 5 m long, > 55 cm diameter:	15	0
> 5 m long, 10 cm – 55 cm diameter:	182	35
> 5 m long, > 55 cm diameter:	21	1
Total:	287	52

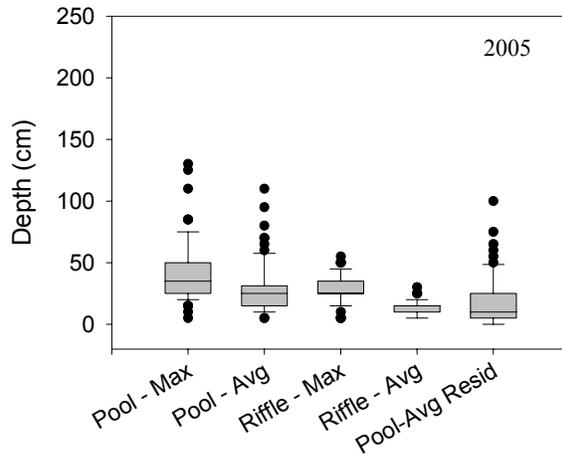
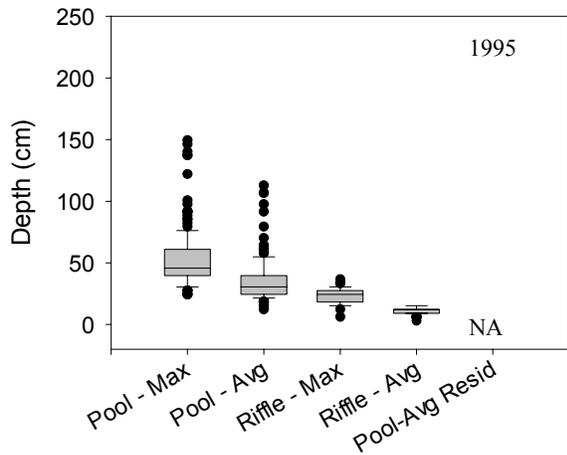
Rosgen's Channel Type*	Frequency (%)
A:	0
B:	100
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	9	5
Mean Channel Gradient (%):	NA	6
Median Water Temperature (C):	NA	19

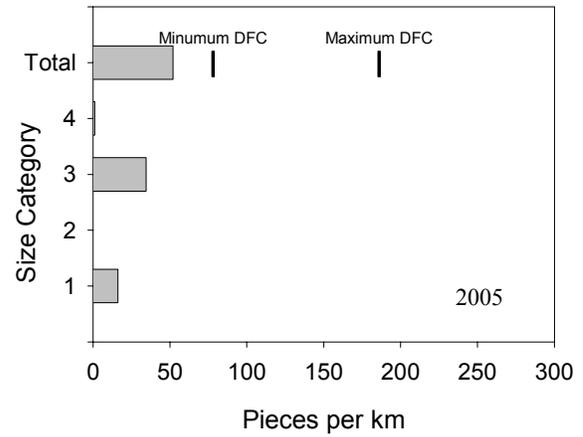
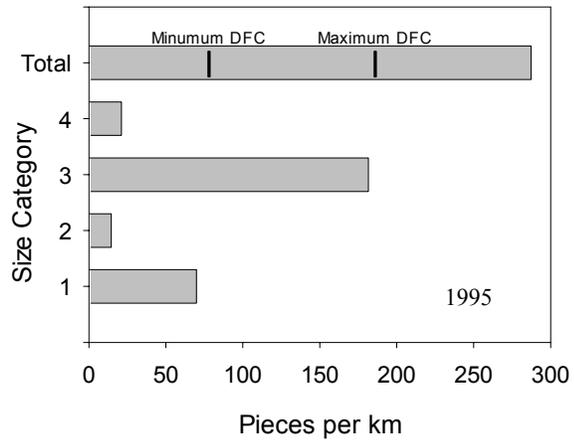
*recorded in 2005 only



Estimated area of Belle Cove Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Belle Cove Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



LWD per kilometer in Belle Cove Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: < 5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Belle Cove Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

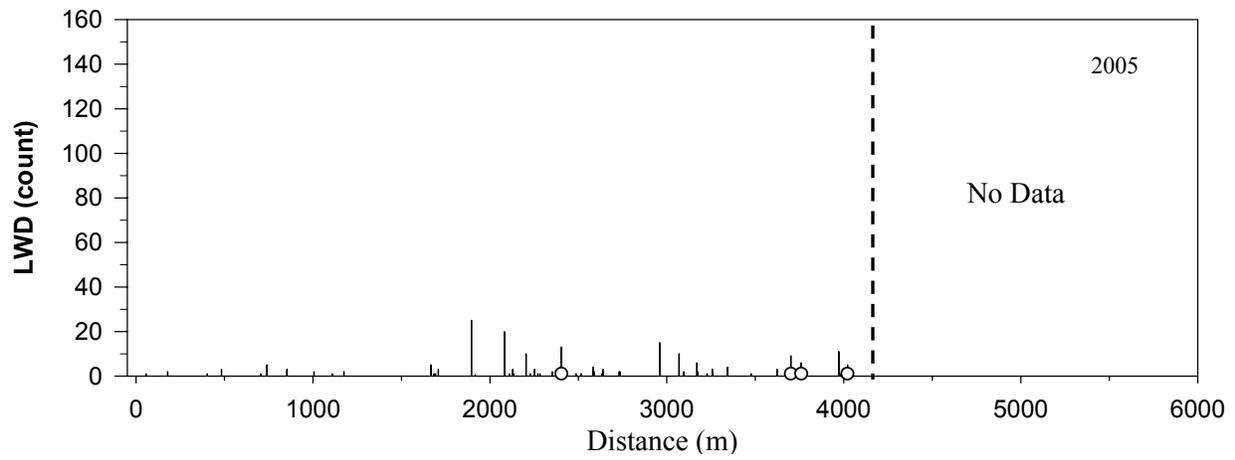
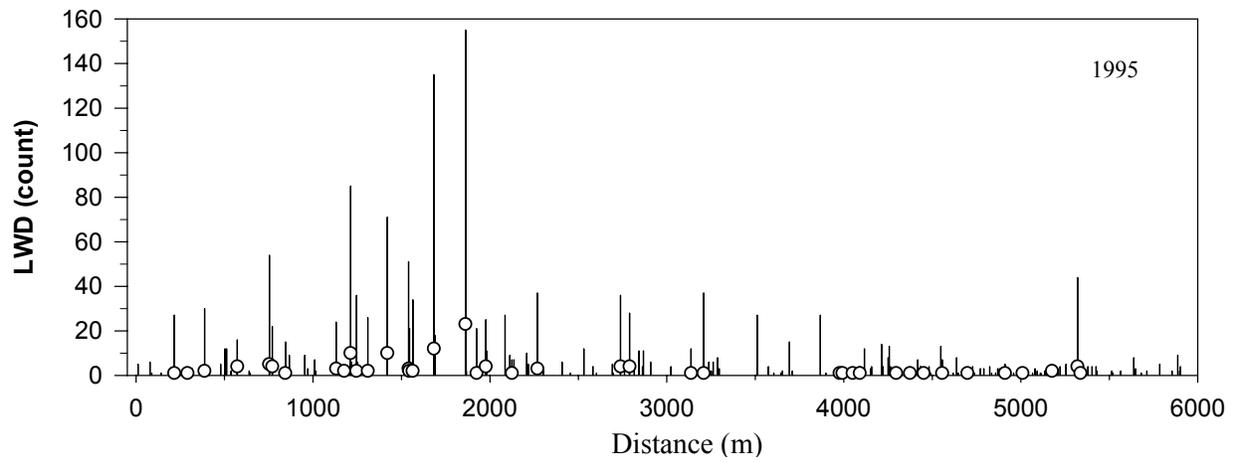
Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	381.3		CONCRETE
OTHER	1113.4		EXPOSED PIPE
TRIBUTARY	1893.4		MUDSLIDE DEVASTATED
TRIBUTARY	2074.2		MUDSLIDE NOW BEDROCK
OTHER	2997.1		MUDSLIDE
TRIBUTARY	3244.0		RIGHT SIDE DRY
TRIBUTARY	3260.8		RIGHT SIDE DRY
TRIBUTARY	3381.1		LEFT SIDE DRY
TRIBUTARY	3579.9		RIGHT SIDE.INTERMITANT
TRIBUTARY	3882.2		1ST FORK LEFT SIDE
TRIBUTARY	4173.9		LEFT SIDE TRIBUTARY FORK?
TRIBUTARY	4269.3		FORK
TRIBUTARY	5025.8		RIGHT SIDE. 2ND FORK
OTHER	5324.9		LARGE MUD SLIDE
FORD	5638.5		TRAIL CROSSING
TRIBUTARY	5735.4		RIGHT SIDE. FORK
SEEP	5806.4		RIGHT SIDE.
TRIBUTARY	5897.3		RIGHT SIDE. SMALL
TRIBUTARY	5925.3		FORK LEFT SIDE SMALLER;RIGHT SIDE. NOT MUCH BIGGER
END	5925.3		END SURVEY

See next page for 2005 features

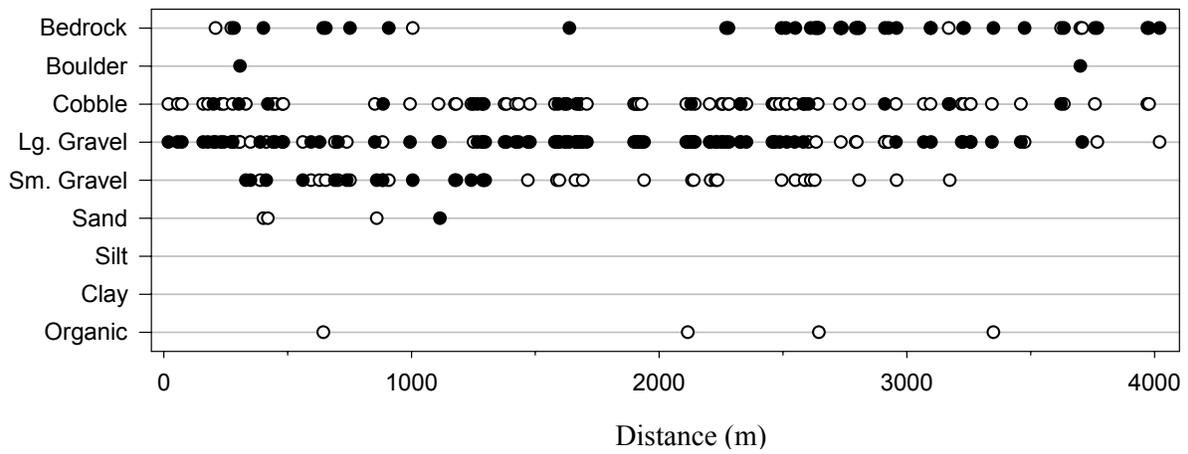
See previous page for 1995 features

Stream features recorded for Belle Cove Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	48.3	1.5	IN ON RIGHT
SIDE CHANNEL	204.0		OUT ON RIGHT
SIDE CHANNEL	288.0	1.0	IN ON LEFT
SIDE CHANNEL	384.0		OUT ON LEFT
TRIBUTARY	465.0	0.5	IN ON LEFT
SIDE CHANNEL	519.0	1.5	IN ON RIGHT
SIDE CHANNEL	567.0		OUT ON RIGHT
SIDE CHANNEL	596.0	1.5	IN ON RIGHT
SIDE CHANNEL	640.0		OUT ON RIGHT
SIDE CHANNEL	815.0	1.0	
CULVERT			BRIDGE, NATURAL SUBSTRATE' CEMENT, HEIGHT:3.5M, WIDTH:5.5, NO PERCH , RT 501, ENDS AT 879M
	860.0		
TRIBUTARY	1175.0	0.5	
TRIBUTARY	1670.0	1.0	
SIDE CHANNEL	1702.0		IN ON RIGHT
SIDE CHANNEL	1740.0		OUT ON RIGHT, DRY
TRIBUTARY	1761.4		IN ON LEFT, DRY
SIDE CHANNEL	1947.6		IN ON RIGHT
SLIDE	2203.8		
SLIDE	2453.0		
SLIDE	3244.0		
SIDE CHANNEL	3320.0		IN ON RIGHT
SIDE CHANNEL	3340.0		OUT ON RIGHT
OTHER	3652.0		CLIFF IN STREAM
FALL	4020.0		1.5M HEIGH
END			CONFLUENCE OF TWO UNKNOWN STREAMS, 5:30
	4021.0		



Distribution and abundance of LWD in Belle Cove Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Belle Cove Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	North Fork Bennetts Run		
District:	Pedlar		
USGS Quadrangle:	Glasgow, Buena Vista		
	1995		2005
Survey Date:	08/09/1995		6/02/2005
Total Distance Surveyed (km):	1.8		2.4

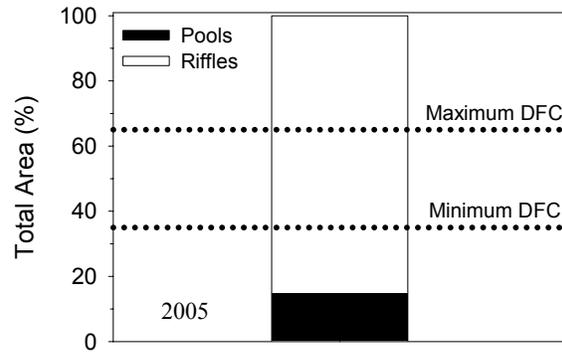
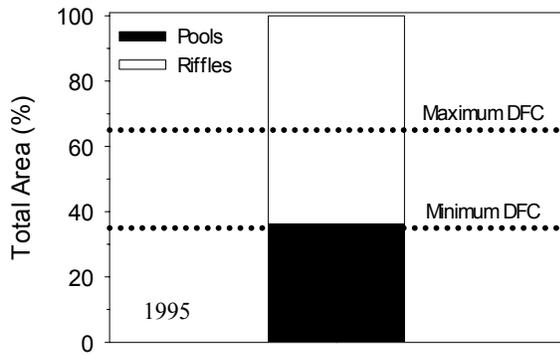
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	36	17	64	83
Total Area (m ²):	1641 ± 186	1012 ± 433	2871 ± 226	4925 ± 929
Correction Factor Applied:	1.03	0.81	1.01	1.05
Number of Paired Samples:	6	4	5	5
Total Count:	117	49	103	56
Number per km:	64	21	56	24
Mean Area (m ²):	14	21	28	88
Mean Maximum Depth (cm):	46	52	21	30
Mean Average Depth (cm):	30	36	11	12
Mean Residual Depth (cm):	NA	25	--	--
Percent Surveyed as Glides:	NA	4	--	--
Percent Surveyed as Runs:	--	--	NA	0
Percent Surveyed as Cascades:	--	--	NA	36
Percent with > 35% Fines:	0	45	0	7

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	122	7
1 - 5 m long, > 55 cm diameter:	13	10
> 5 m long, 10 cm – 55 cm diameter:	144	36
> 5 m long, > 55 cm diameter:	42	5
Total:	320	58

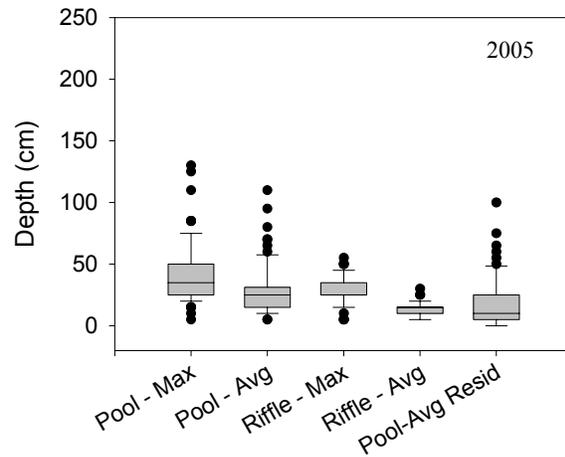
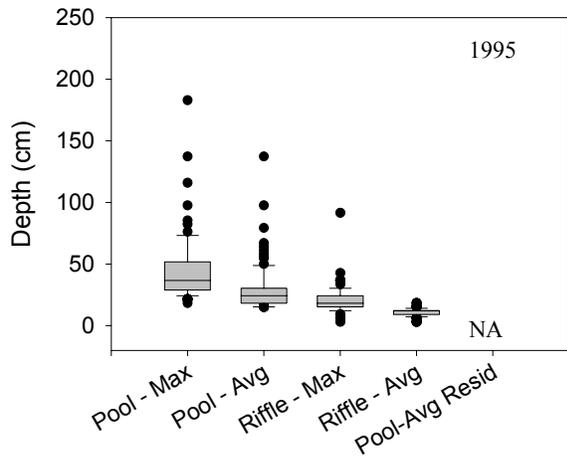
Rosgen's Channel Type*	Frequency (%)
A:	90
B:	10
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	7	10
Mean Channel Gradient (%):	NA	10
Median Water Temperature (C):	NA	14

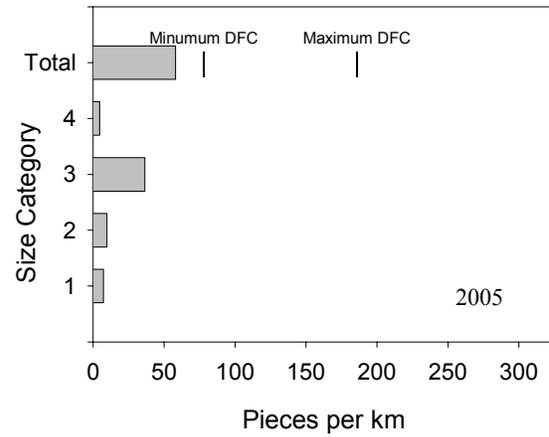
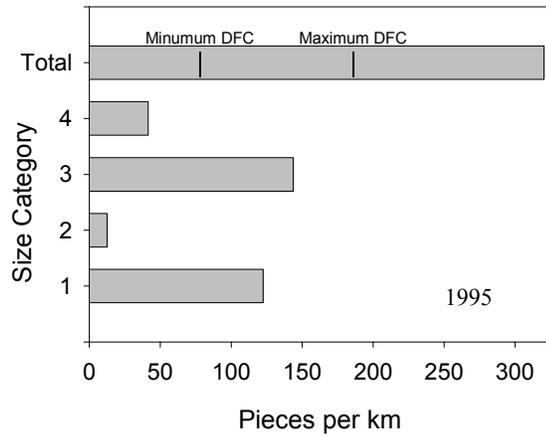
*recorded in 2005 only



Estimated area of North Fork Bennetts Run in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in North Fork Bennetts Run. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



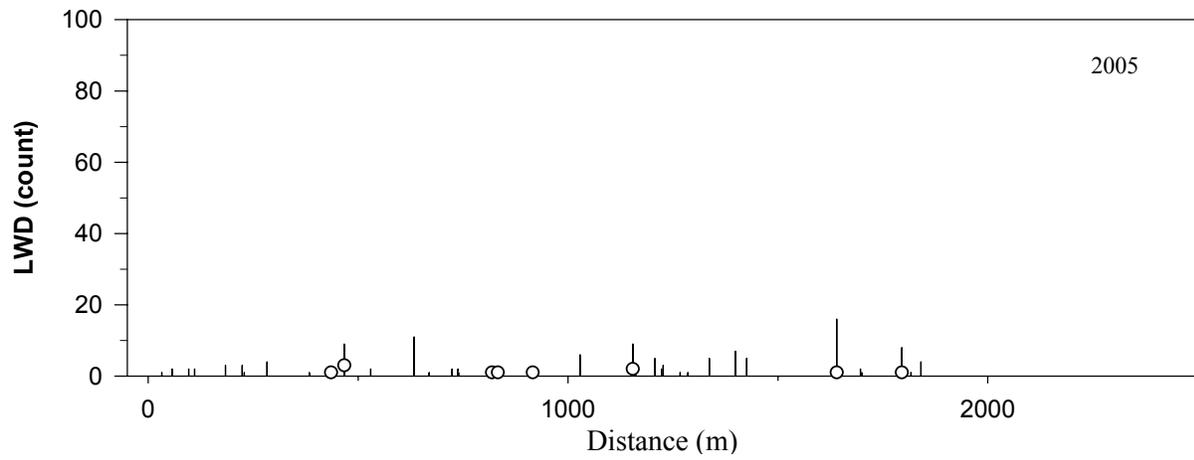
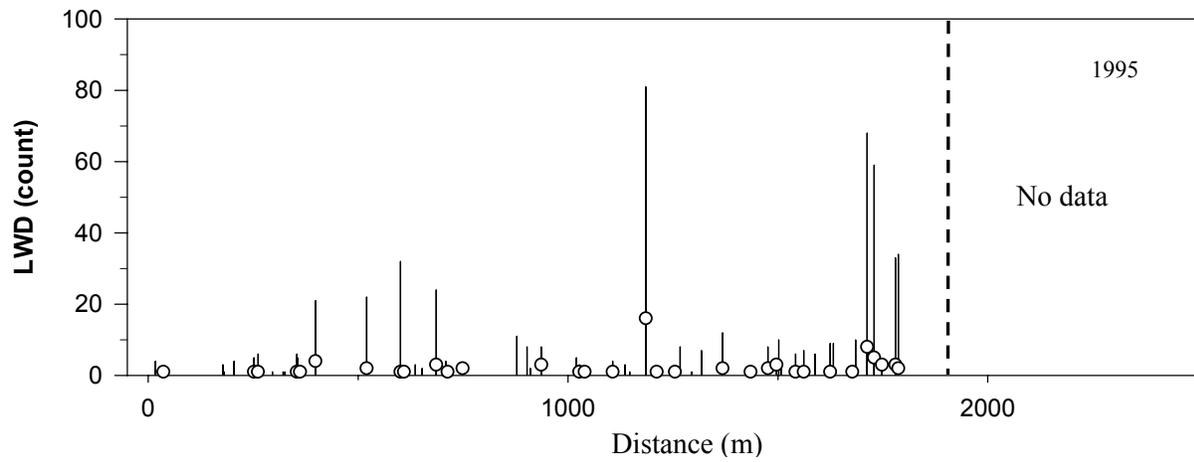
LWD per kilometer in North Fork Bennetts Run. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for North Fork Bennetts Run during BVET habitat survey, 1995. Distance is meters from start of survey.

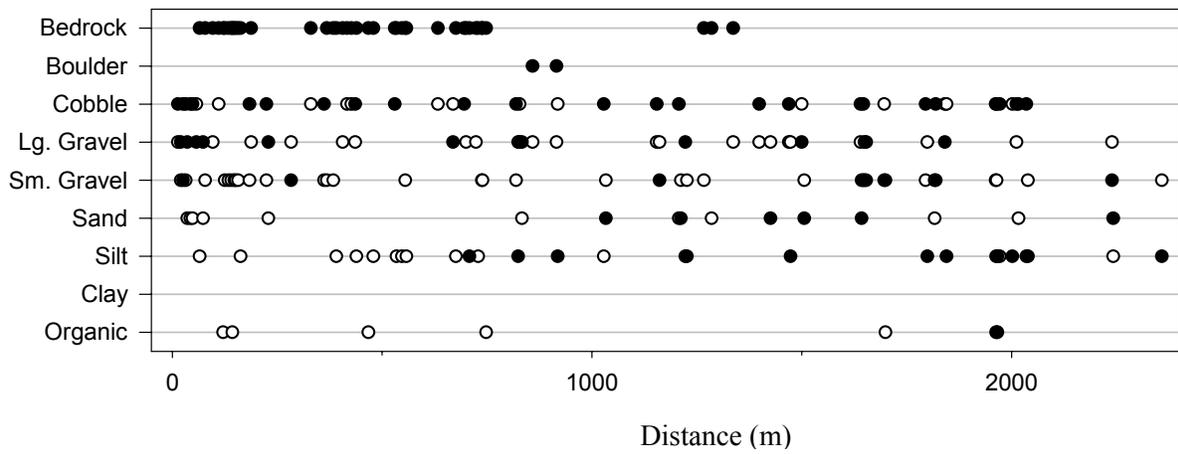
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	412.4		LEFT-20' WIDE-STRIPPED TO BEDROCK
TRIBUTARY	1280.2		LEFT

Stream features recorded for North Fork Bennetts Run during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
OTHER	13.1		PIPELINE
SIDE CHANNEL	214.0		IN ON LEFT
SIDE CHANNEL	224.0		OUT ON LEFT
TRIBUTARY	374.8		IN ON LEFT
OTHER	450.0		LOG JAM
SIDE CHANNEL	494.0		IN ON LEFT
SIDE CHANNEL	519.0		OUT ON LEFT
SIDE CHANNEL	780.0		IN ON RIGHT
SIDE CHANNEL	799.0		OUT ON RIGHT
SIDE CHANNEL	930.0		IN ON RIGHT
SIDE CHANNEL	939.0		OUT ON RIGHT
TRIBUTARY	1149.0	0.3	IN ON LEFT
TRIBUTARY	1625.0	0.5	
CULVERT			ROAD 510, ROUND METAL, 2 PIPES, WIDTH 1.7M, NO NATURAL SUBSTRATE, CORRUGATED. 13M LONG.
	1653.4		
SIDE CHANNEL	1699.4		IN ON RIGHT
SIDE CHANNEL	1717.0		OUT ON RIGHT
FORD	1805.6		
SIDE CHANNEL	1951.0		IN ON RIGHT
SIDE CHANNEL	1985.8		OUT ON RIGHT
TRIBUTARY	2026.0	1.0	IN ON RIGHT
END			CHANNEL IMPASSIBLE NO EVIDENCE OF COMING BACK
	23582.9		



Distribution and abundance of LWD in North Fork Bennetts Run in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in North Fork Bennetts Run in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	Coxs Creek	
District:	Pedlar	
USGS Quadrangle:	Massies Mill	
	1995	2005
Survey Date:	7/17/1995	6/3/2005
Total Distance Surveyed (km):	1.6	1.2

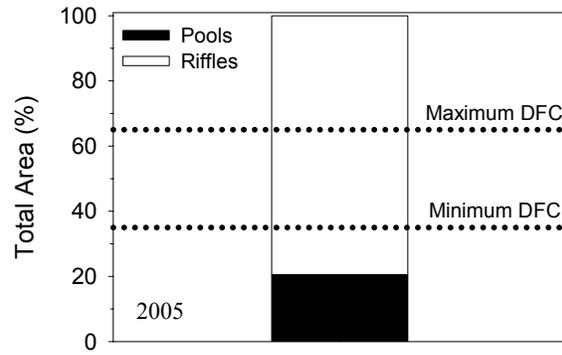
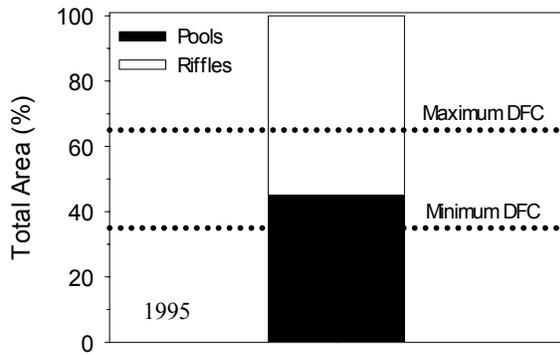
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	45	21	55	79
Total Area (m ²):	2531 ± 121	1031 ± 658	3041 ± 606	3957 ± 825
Correction Factor Applied:	1.03	1.06	1.02	0.94
Number of Paired Samples:	7	4	5	4
Total Count:	137	43	94	42
Number per km:	85	35	58	34
Mean Area (m ²):	18	24	32	94
Mean Maximum Depth (cm):	58	53	29	43
Mean Average Depth (cm):	35	34	15	21
Mean Residual Depth (cm):	NA	16	--	--
Percent Surveyed as Glides:	NA	7	--	--
Percent Surveyed as Runs:	--	--	NA	5
Percent Surveyed as Cascades:	--	--	NA	0
Percent with > 35% Fines:	0	0	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	71	4
1 - 5 m long, > 55 cm diameter:	4	0
> 5 m long, 10 cm – 55 cm diameter:	13	41
> 5 m long, > 55 cm diameter:	2	0
Total:	91	45

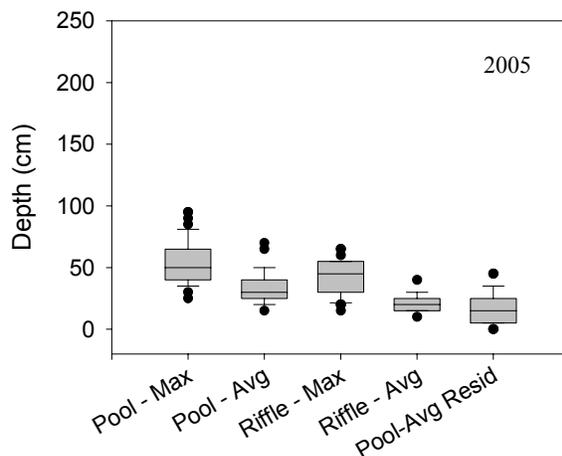
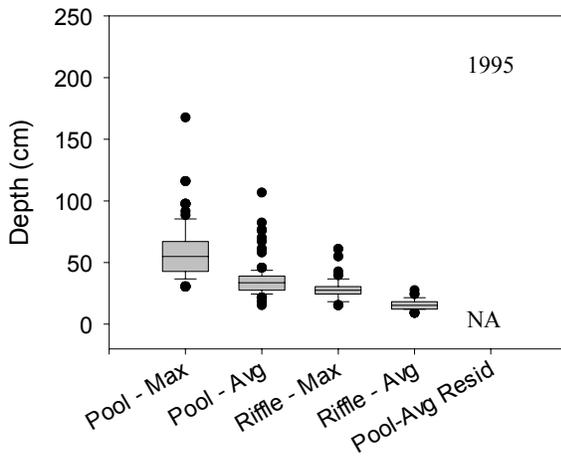
Rosgen's Channel Type*	Frequency (%)
A:	0
B:	100
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	10	8
Mean Channel Gradient (%):	NA	7
Median Water Temperature (C):	NA	13.5

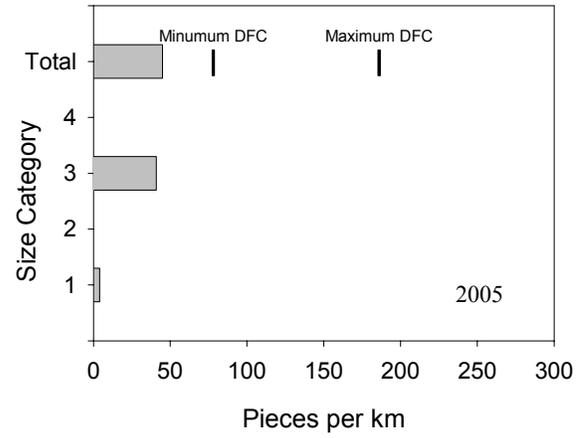
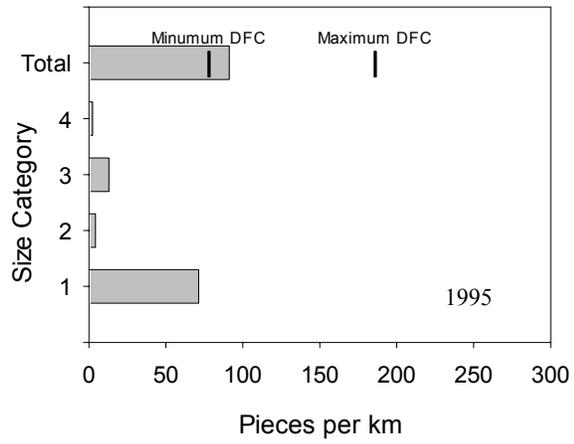
*recorded in 2005 only



Estimated area of Coxs Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Coxs Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



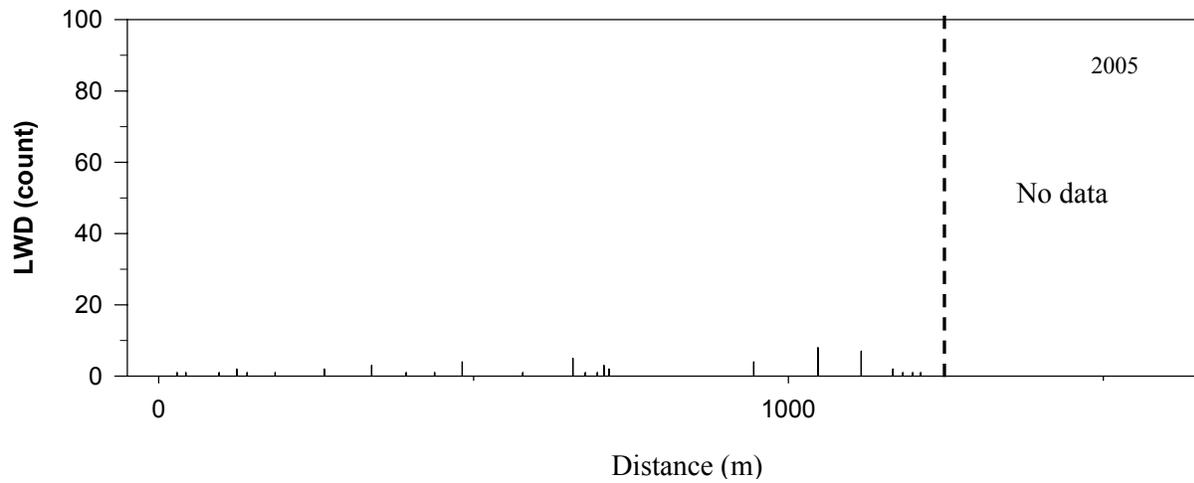
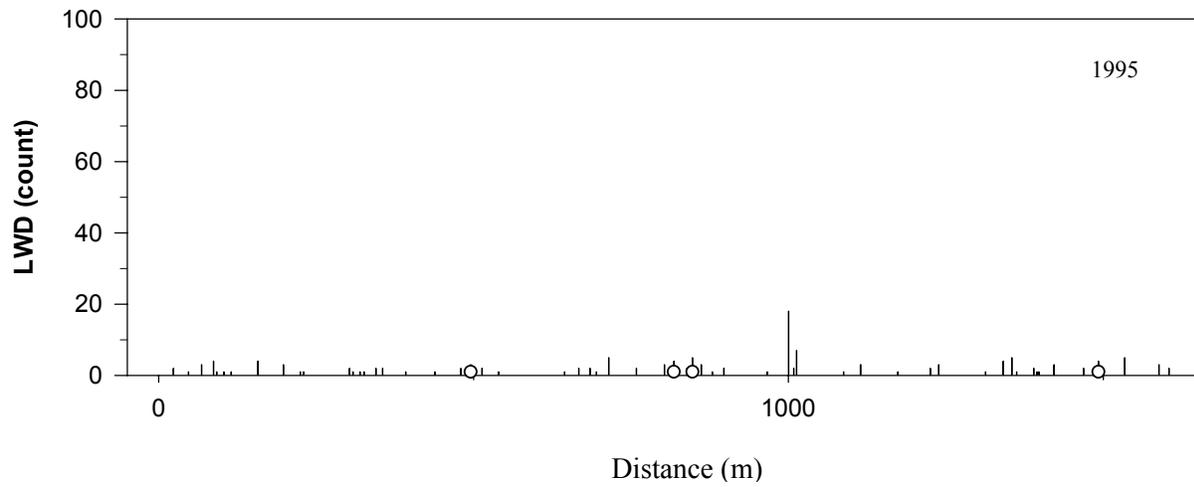
LWD per kilometer in Coxs Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Coxs Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

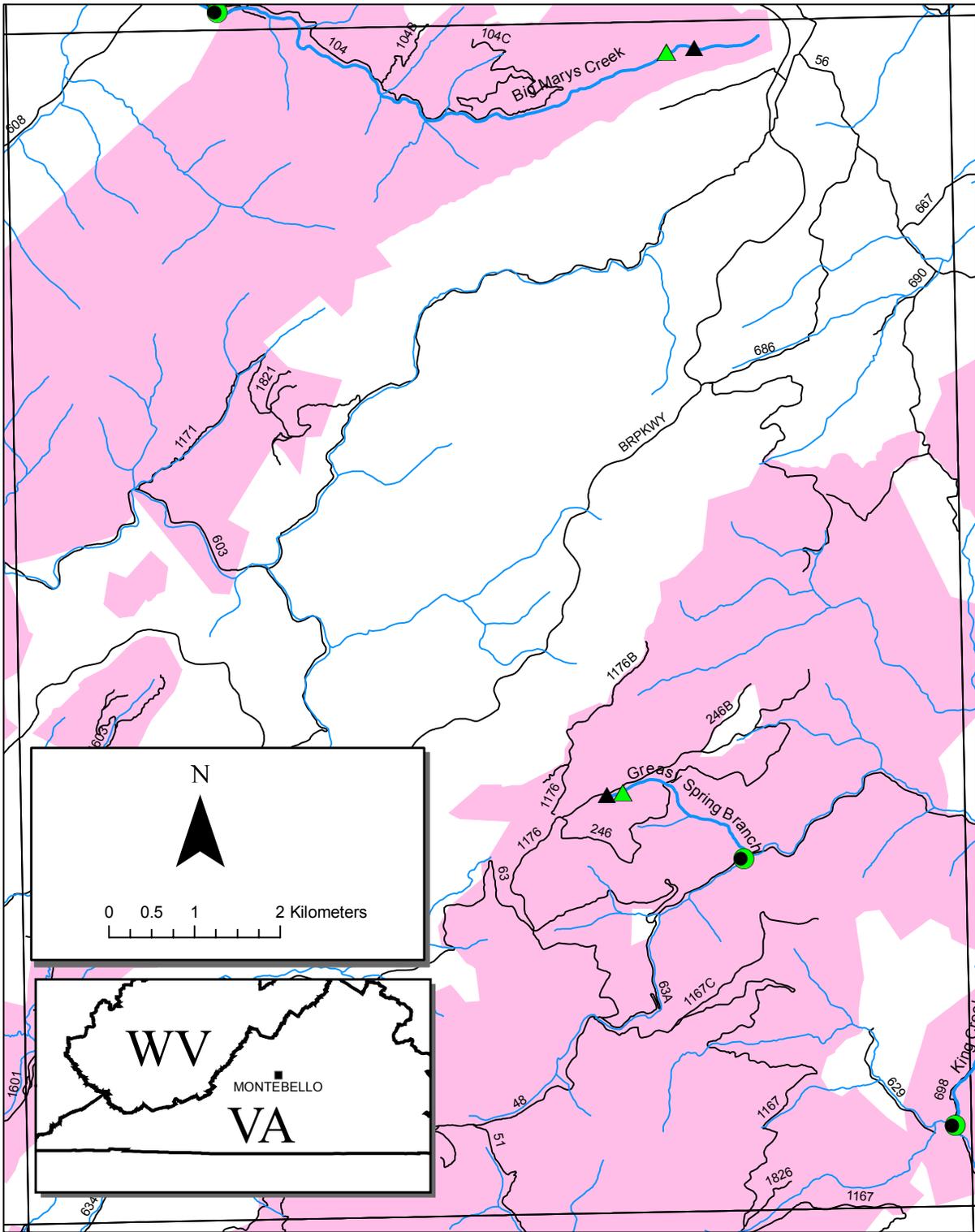
Stream Feature	Distance (m)	Width (m)	Comments
FALL	721.8	1.2	
FALL	941.2	1.2	
FALL	961.6	1.5	
FALL	967.7	1.0	
FALL	1308.8	2.1	
FALL	1342.6	1.5	

Stream features recorded for Coxs Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	317.2		IN ON RIGHT
SIDE CHANNEL	326.9		OUT ON RIGHT
SIDE CHANNEL	350.0		IN ON LEFT
SIDE CHANNEL	373.0		OUT ON LEFT
SIDE CHANNEL	510.5		IN ON RIGHT
SIDE CHANNEL	526.0		OUT ON RIGHT
TRIBUTARY	815.0		IN ON LEFT
SIDE CHANNEL	968.0		IN ON LEFT
SIDE CHANNEL	995.0		OUT ON LEFT
SIDE CHANNEL	1017.0		IN ON RIGHT
SIDE CHANNEL	1045.0		OUT ON RIGHT
END	1222.0		12:30 CONFLUENCE OF 2 TRIBUTARIES



Distribution and abundance of LWD in Coxs Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Montebello quadrangle in 1995 (green) and 2005 (black).

Stream:	Greasy Springs	
District:	Pedlar	
USGS Quadrangle:	Montebello	
	1995	2005
Survey Date:	7/36/1995	5/31/2005
Total Distance Surveyed (km):	1.8	1.9

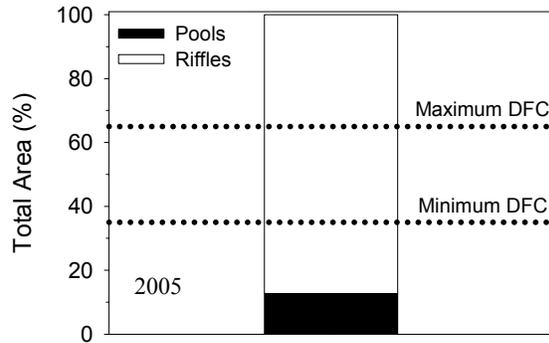
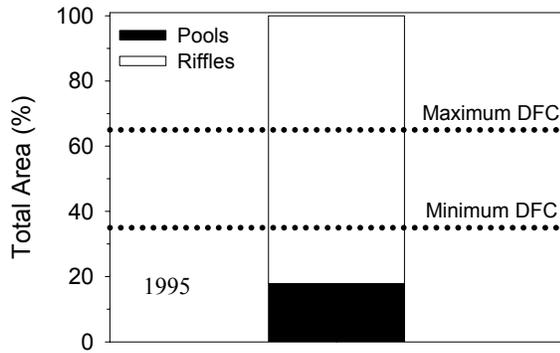
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	18	13	82	87
Total Area (m ²):	824 ± 575	1008 ± 66	3753 ± 307	6757 +/- 1641
Correction Factor Applied:	0.85	1.00	0.91	1.19
Number of Paired Samples:	5	7	4	7
Total Count:	80	70	74	79
Number per km:	43	36	40	41
Mean Area (m ²):	10	14	51	86
Mean Maximum Depth (cm):	54	46	34	34
Mean Average Depth (cm):	38	31	18	19
Mean Residual Depth (cm):	NA	15	--	--
Percent Surveyed as Glides:	NA	9	--	--
Percent Surveyed as Runs:	--	--	NA	1
Percent Surveyed as Cascades:	--	--	NA	22
Percent with > 35% Fines:	0	60	0	1

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	41	25
1 - 5 m long, > 55 cm diameter:	14	20
> 5 m long, 10 cm – 55 cm diameter:	94	108
> 5 m long, > 55 cm diameter:	34	25
Total:	183	178

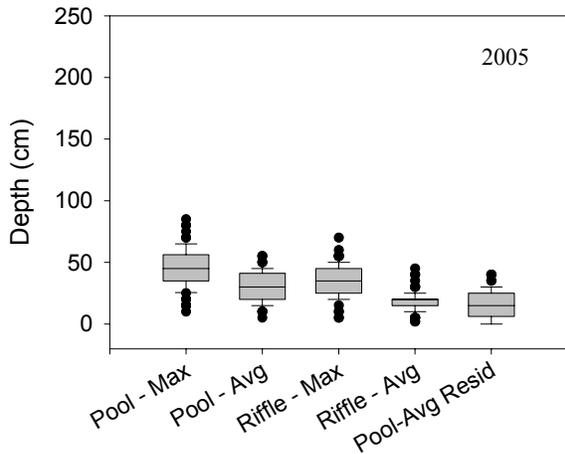
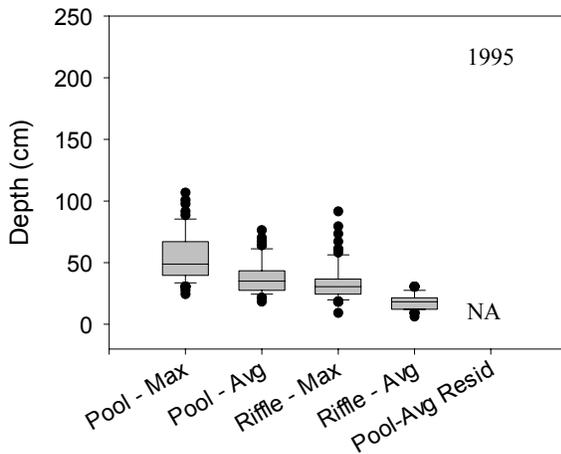
Rosgen's Channel Type*	Frequency (%)
A:	72
B:	28
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	6	6
Mean Channel Gradient (%):	NA	12
Median Water Temperature (C):	NA	12

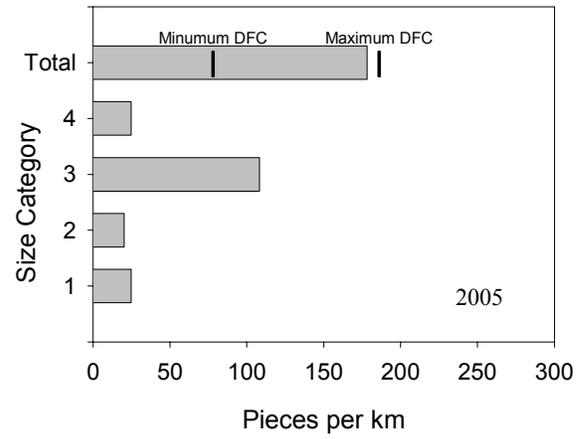
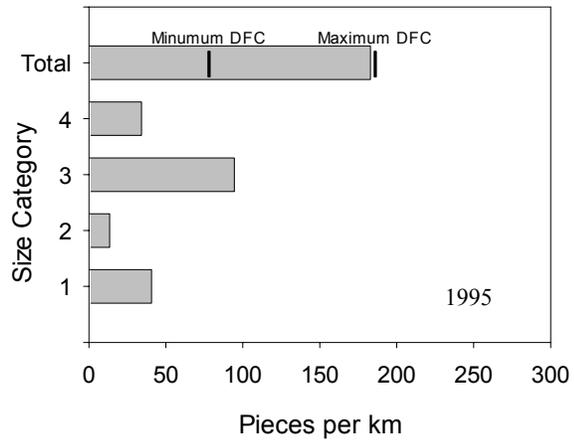
*recorded in 2005 only



Estimated area of Greasy Springs in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Greasy Springs. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



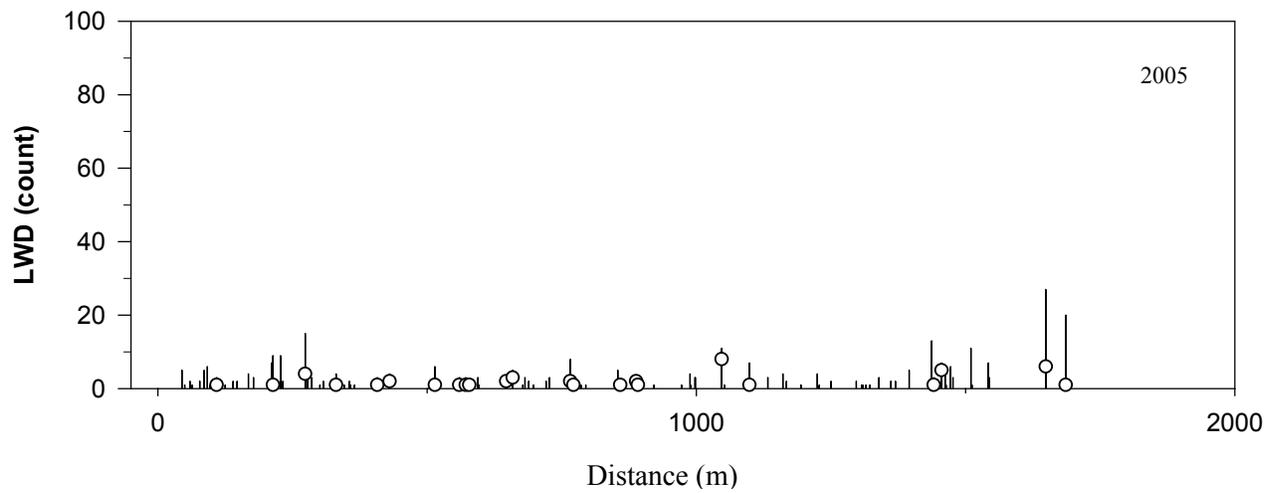
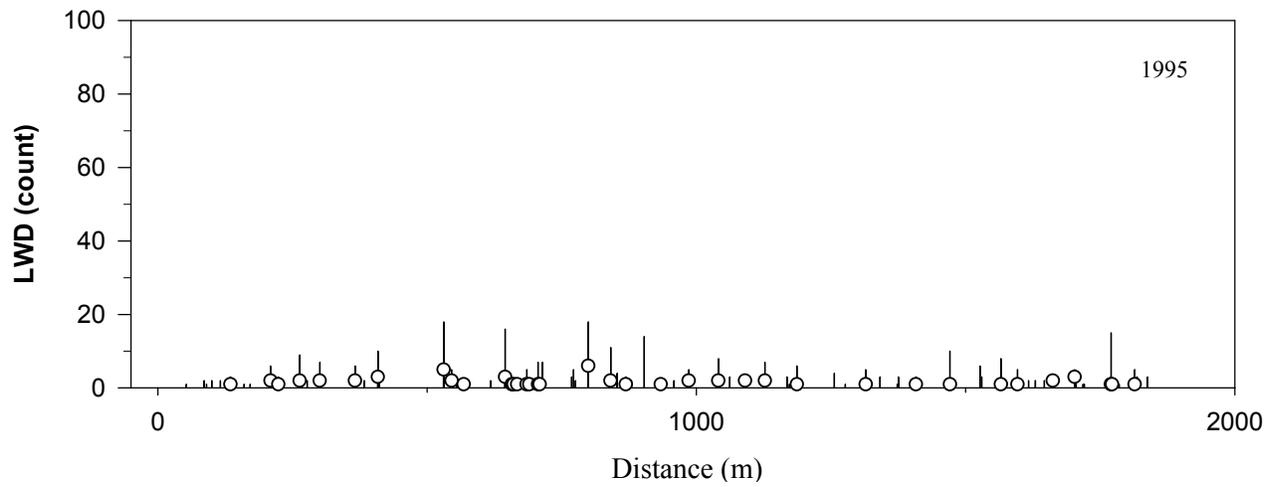
LWD per kilometer in Greasy Springs. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Greasy Springs during BVET habitat survey, 1995. Distance is meters from start of survey.

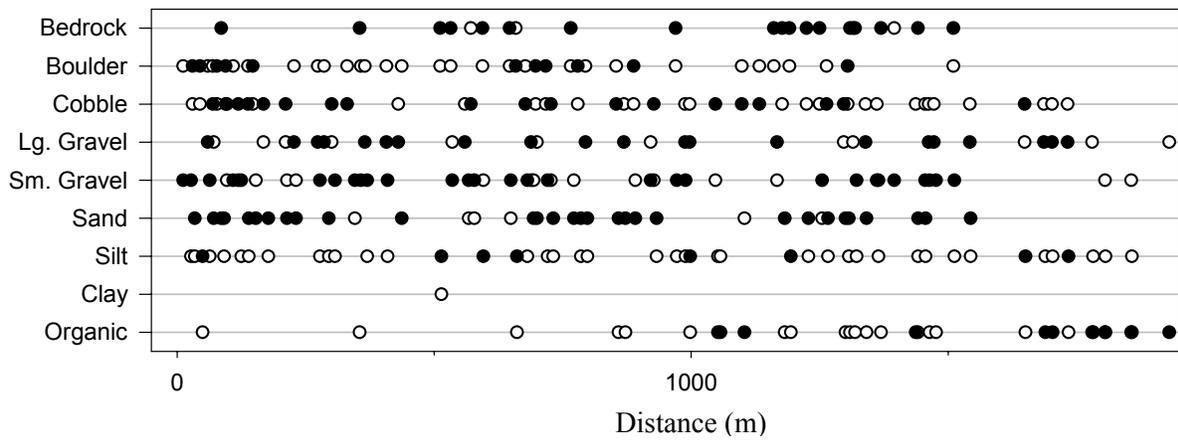
Stream Feature	Distance (m)	Width (m)	Comments
BRIDGE	13.1		
TRIBUTARY	907.7		LEFT
TRIBUTARY	1300.3		RIGHT
CULVERT	1481.9	1.4	
TRIBUTARY	1674.9		RIGHT

Stream features recorded for Greasy Springs during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	24.1	4.5	FOREST RT. 63, PERCH: 60CM TYPE: PIPE, MATERIAL: METAL
CULVERT	1409.0	3.0	PIPE/METAL



Distribution and abundance of LWD in Greasy Springs in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in Greasy Springs in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Stream:	King Creek	
District:	Pedlar	
USGS Quadrangle:	Montebello, Massies Mill	
	1995	2005
Survey Date:	7/27/1995	6/30/2005
Total Distance Surveyed (km):	1.7	1.7

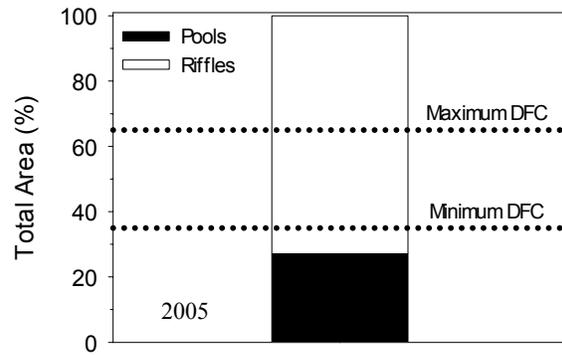
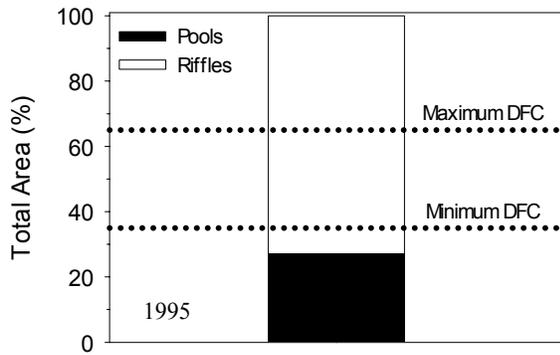
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	27	21	73	79
Total Area (m ²):	1138 ± 276	1179 ± 317	3023 ± 584	4440 ± 1416
Correction Factor Applied:	0.96	0.99	1.05	1.00
Number of Paired Samples:	6	5	5	5
Total Count:	118	54	96	47
Number per km:	68	33	55	28
Mean Area (m ²):	10	22	31	94
Mean Maximum Depth (cm):	44	48	26	25
Mean Average Depth (cm):	33	32	15	15
Mean Residual Depth (cm):	NA	18	--	--
Percent Surveyed as Glides:	NA	0	--	--
Percent Surveyed as Runs:	--	--	NA	0
Percent Surveyed as Cascades:	--	--	NA	0
Percent with > 35% Fines:	0	37	0	0

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	26	14
1 - 5 m long, > 55 cm diameter:	2	0
> 5 m long, 10 cm – 55 cm diameter:	41	41
> 5 m long, > 55 cm diameter:	2	1
Total:	72	56

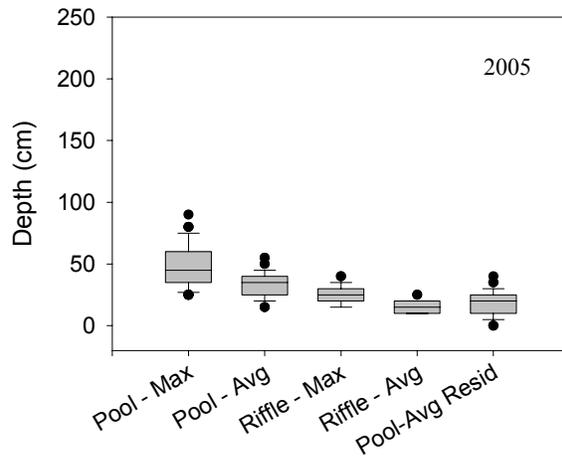
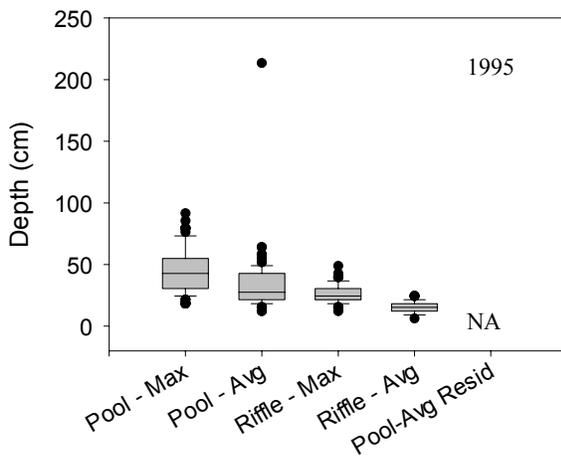
Rosgen's Channel Type*	Frequency (%)
A:	33
B:	67
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	5	13
Mean Channel Gradient (%):	NA	5
Median Water Temperature (C):	NA	16

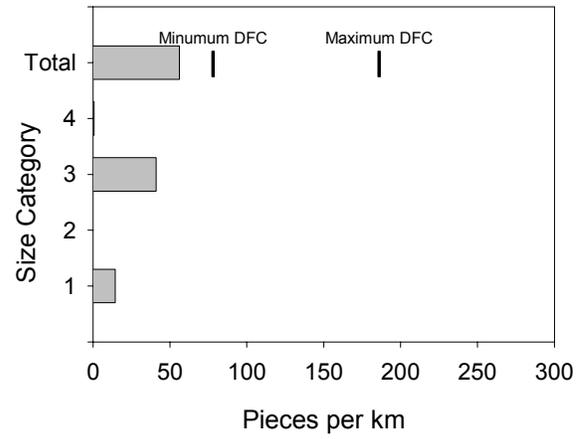
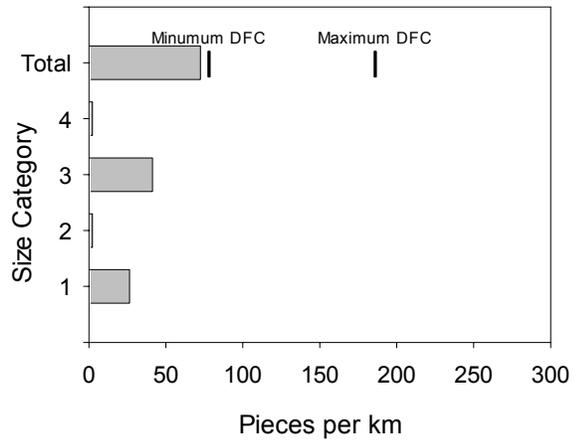
*recorded in 2005 only



Estimated area of King Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in King Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



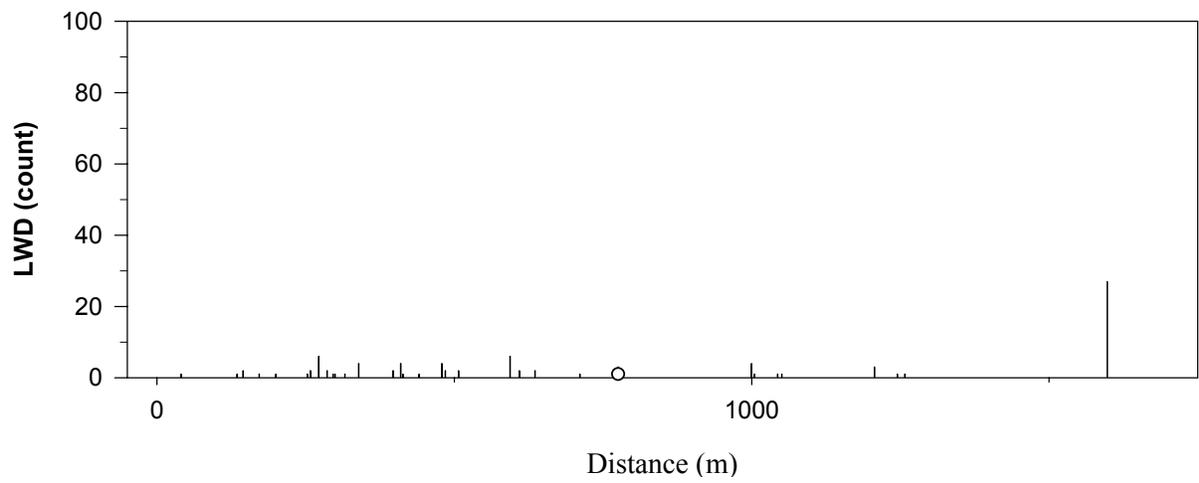
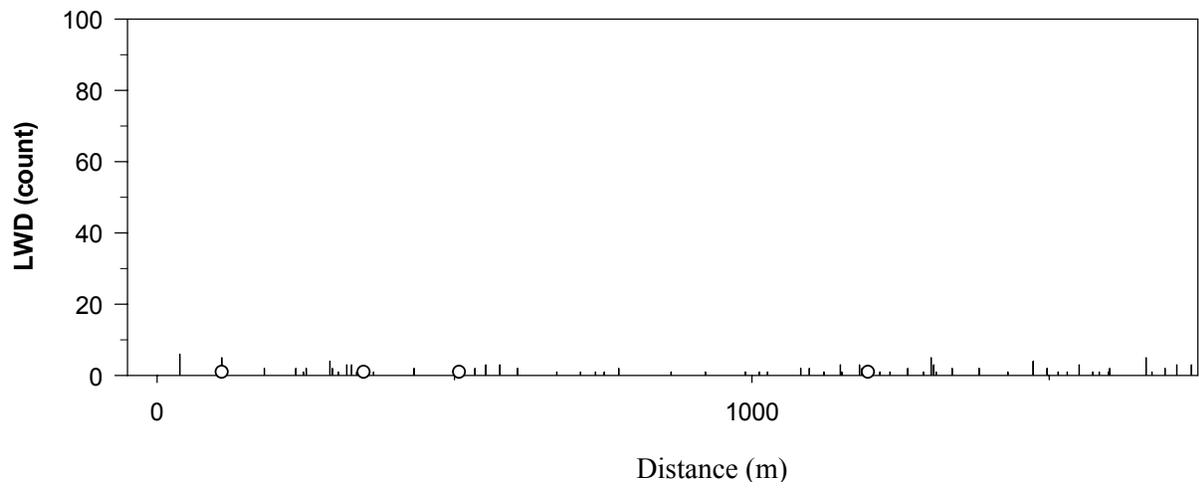
LWD per kilometer in King Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for King Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

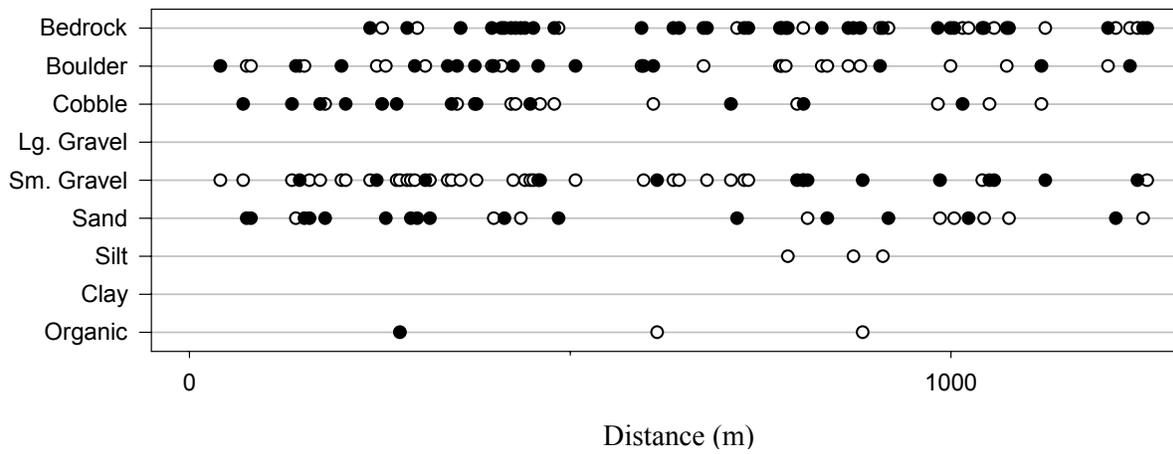
Stream Feature	Distance (m)	Width (m)	Comments
FORD	45.1		TRAIL CROSSING
TRIBUTARY	837.6		RIGHT
FORD	870.2		TRAIL CROSSING
TRIBUTARY	952.2		RIGHT
TRIBUTARY	1345.7		LEFT
TRIBUTARY	1457.9	1.4	
TRIBUTARY	1470.4		RIGHT

Stream features recorded for King Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

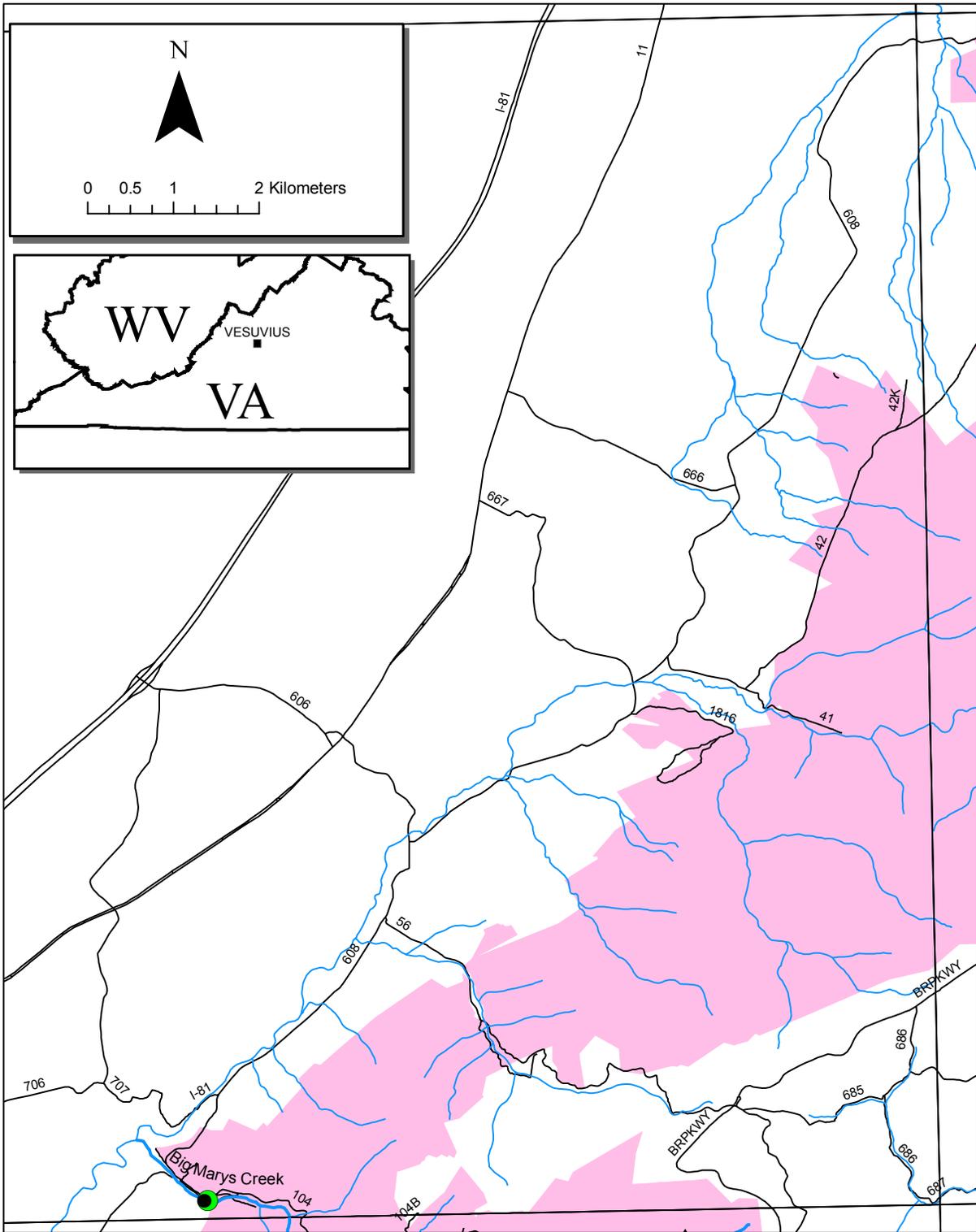
Stream Feature	Distance (m)	Width (m)	Comments
FORD	40.5		ROAD 698
SIDE CHANNEL	748.6		IN ON LEFT
FORD	830.4		ROAD 698
SIDE CHANNEL	1159.7		IN ON LEFT
SIDE CHANNEL	1194.8		OUT ON LEFT
TRIBUTARY	1297.4		IN ON LEFT
TRIBUTARY	1402.7		IN ON RIGHT
END	1656.0		END SURVEY AT RED BOUNDARY BLAZES 17:30.



Distribution and abundance of LWD in King Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary.



Distribution of substrates in King Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.



Start (circle) and end (triangle) points for BVET stream habitat inventories performed on stream reaches on the Vesuvius quadrangle in 1995 (green) and 2005 (black).

Stream:	Big Marys Creek	
District:	Pedlar	
USGS Quadrangle:	Vesuvius, Montebello	
	1995	2005
Survey Date:	7/19/1995	7/05/2005
Total Distance Surveyed (km):	7.2	7.9

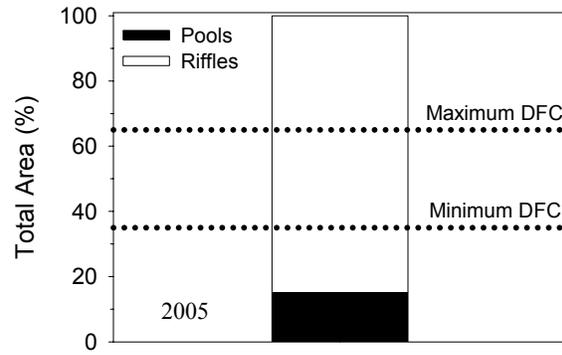
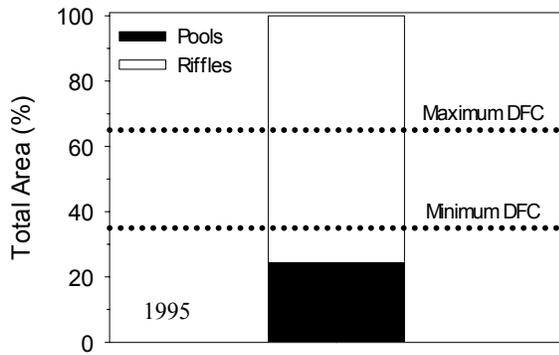
	<u>Pools</u>		<u>Riffles</u>	
	1995	2005	1995	2005
Percent of Total Stream Area:	25	15	75	85
Total Area (m ²):	6452 ± 1096	4403 ± 441	19673 ± 2412	24420 ± 4516
Correction Factor Applied:	0.96	1.04	1.02	1.26
Number of Paired Samples:	14	11	12	11
Total Count:	265	114	236	114
Number per km:	37	14	33	14
Mean Area (m ²):	24	39	83	214
Mean Maximum Depth (cm):	53	48	25	29
Mean Average Depth (cm):	36	30	14	14
Mean Residual Depth (cm):	NA	22	--	--
Percent Surveyed as Glides:	NA	15	--	--
Percent Surveyed as Runs:	--	--	NA	3
Percent Surveyed as Cascades:	--	--	NA	12
Percent with > 35% Fines:	0	17	0	1

Large Woody Debris Size Classes	<u>Pieces per km</u>	
	1995	2005
1 - 5 m long, 10 cm – 55 cm diameter:	10	5
1 - 5 m long, > 55 cm diameter:	3	0
> 5 m long, 10 cm – 55 cm diameter:	4	35
> 5 m long, > 55 cm diameter:	2	2
Total:	20	43

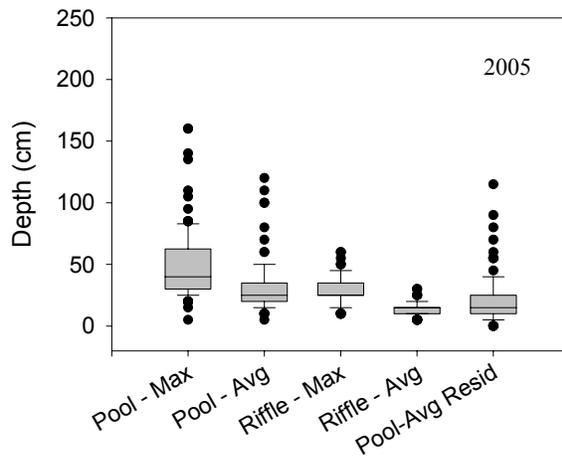
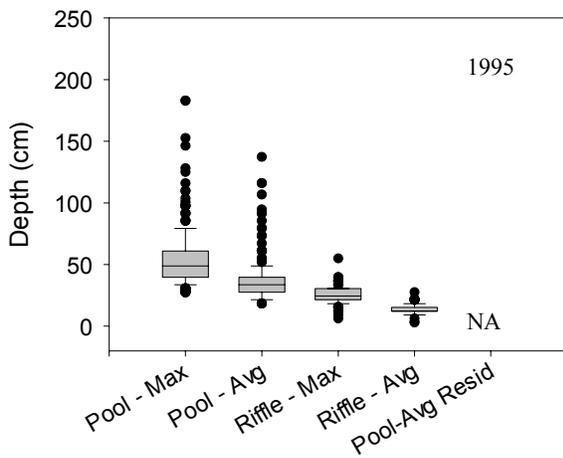
Rosgen's Channel Type*	Frequency (%)
A:	15
B:	85
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	1995	2005
Mean Bankfull Channel Width (m):	8	7
Mean Channel Gradient (%):	NA	5
Median Water Temperature (C):	NA	21

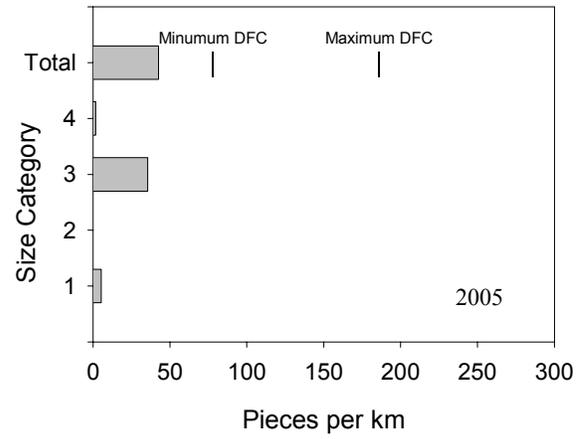
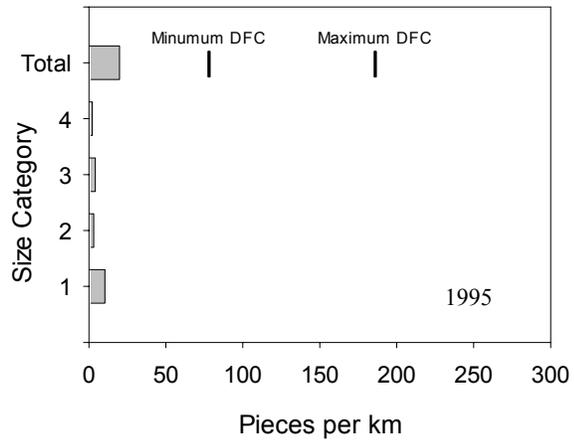
*recorded in 2005 only



Estimated area of Big Marys Creek in pools and riffles as calculated using BVET techniques. The GWJNF DFC for pool area is 35%-65% of total stream area.



Maximum and average depths for pools and riffles and residual depths in Big Marys Creek. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.



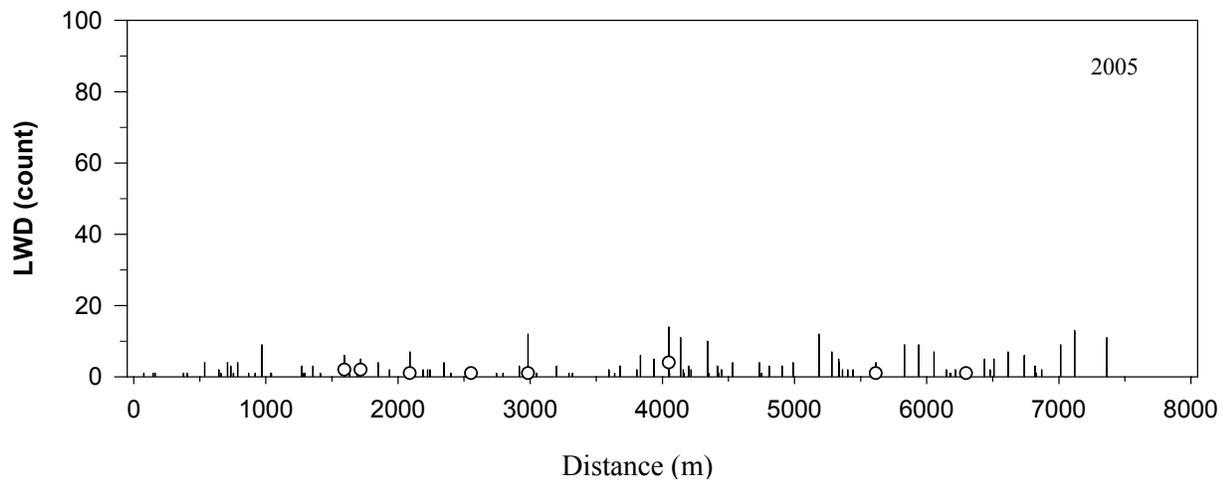
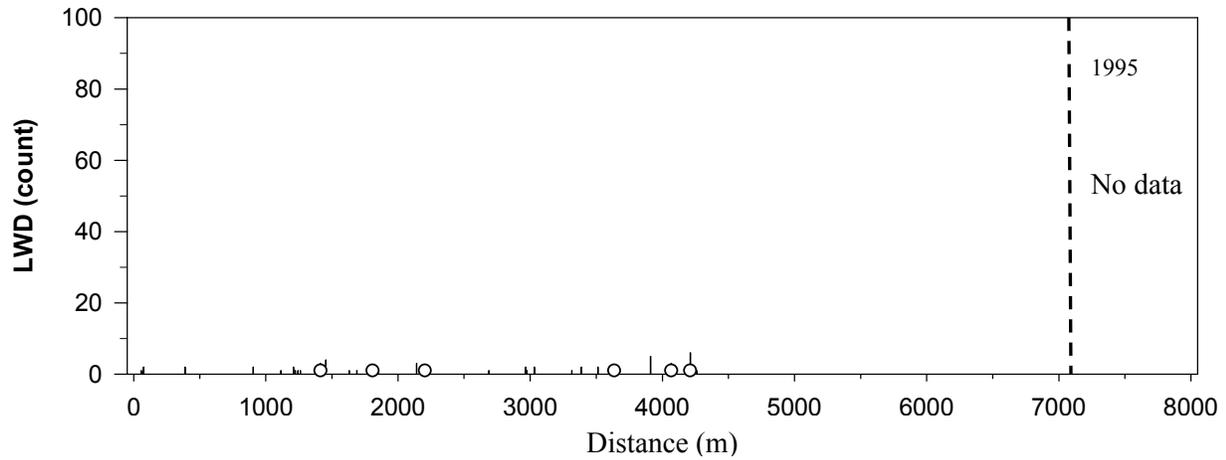
LWD per kilometer in Big Marys Creek. LWD size classes: Size 1: < 5 m long, 10-55 cm diameter; Size 2: <5 m long, > 55 cm diameter; Size 3: > 5 m long, 10-55 cm diameter; Size 4: > 5 m long, > 55 cm diameter. The GWJNF DFC for LWD is 78-186 Total pieces per km.

Stream features recorded for Big Marys Creek during BVET habitat survey, 1995. Distance is meters from start of survey.

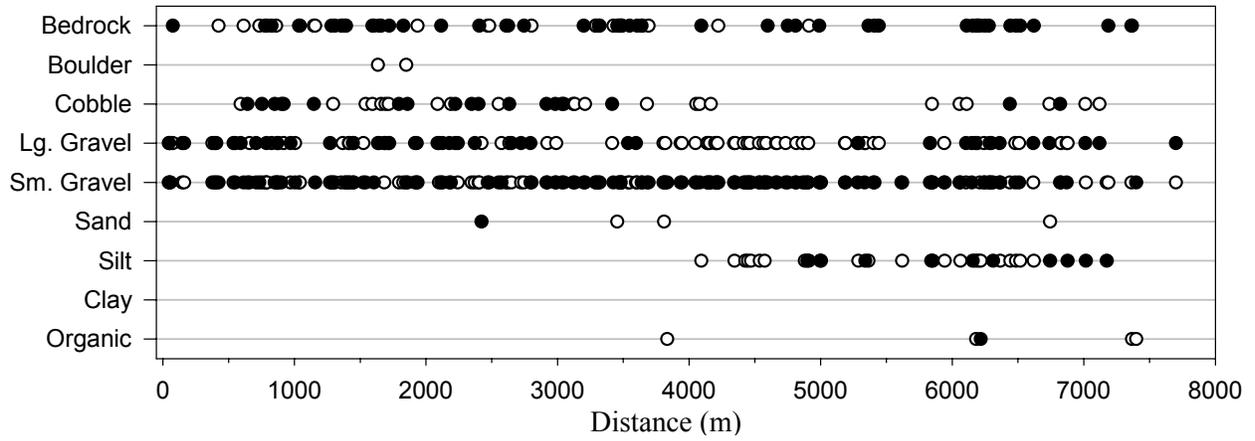
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	652.3		RIGHT, DRY
FORD	766.6		TRAIL CROSSING
TRIBUTARY	1037.5		LEFT
TRIBUTARY	2552.4		LEFT
TRIBUTARY	2764.2		RIGHT
FORD	3512.2		TRAIL CROSSING
TRIBUTARY	3517.4		RIGHT
TRIBUTARY	3838.7		LEFT
FORD	6938.5		TRAIL CROSSING

Stream features recorded for Big Marys Creek during BVET habitat survey, 2005. Distance is meters from start of survey.

Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	156.0	1.0	IN ON RIGHT
CULVERT	385.4		OPEN BOTTOM PIPE, HAS WING WALLS, 6M WIDE, HAS NATURAL SUBSTRATE
OTHER	462.0		CAMP ON RIGHT BANK
TRIBUTARY	1090.0	1.5	IN ON LEFT
SIDE CHANNEL	1400.0		IN ON RIGHT
SIDE CHANNEL	1444.0		OUT ON RIGHT
OTHER	1470.0		UNDERCUT BANK
FALL	1659.0	1.0	
TRIBUTARY	1935.3		DRY, IN ON RIGHT
TRIBUTARY	2654.2	1.0	IN ON LEFT
SIDE CHANNEL	2907.0		IN ON RIGHT
FORD	3393.4		
TRIBUTARY	3398.0		DRY IN ON RIGHT
SIDE CHANNEL	4077.7		IN ON RIGHT
SIDE CHANNEL	4117.0		OUT ON RIGHT
FORD	4290.0		TRAIL FORDS STREAM
FORD	4461.0		ROAD ENDS
TRIBUTARY	4461.0	0.5	IN ON LEFT
TRIBUTARY	4560.0		DRY IN ON RIGHT
FORD	5830.6		
SIDE CHANNEL	5860.0		IN ON LEFT
SIDE CHANNEL	5882.0		OUT ON LEFT
FORD	6170.0		TRAIL
SEEP	6478.8		IN ON RIGHT
FORD	6794.2		
OTHER	6888.0		LARGE BOULDER
SIDE CHANNEL	7025.0		IN ON LEFT
SIDE CHANNEL	7033.0		OUT ON LEFT
SIDE CHANNEL	7115.0		IN ON LEFT
SIDE CHANNEL	7167.1		OUT ON LEFT
END	7916.0		STREAM CHANNEL WAS LOST



Distribution and abundance of LWD in Big Marys Creek in 1995 and 2005. LWD were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Dashed line indicates end of shorter survey.



Distribution of substrates in Big Marys Creek in 2005. X-axis indicates distance upstream from National Forest boundary. Similar data are not available for the 1995 inventory.

Appendix B: Habitat Inventory Categories

Table A1. Size classes used to categorize large woody debris during BVET habitat inventories on the Pedlar Ranger District, summer 1995 and 2005. Woody debris < 1.0 m in length or < 10 cm in diameter were omitted.

Size Class	Length (m)	Diameter (cm)
1	< 5	10-55
2	< 5	> 55
3	> 5	10-55
4	> 5	> 55

Table A2. Size classes used to categorize substrate particles during BVET habitat inventories on the Pedlar Ranger District, summer 2005. Size was visually estimated on the intermediate axis (b-axis).

Size Class	Name	Size (mm)	Description
1	Organic	--	Dead organic matter, leaves, detritus, etc.
2	Clay	< 0.00024	Sticky
3	Silt	0.00024-0.0039	Slippery
4	Sand	0.0039-2	Gritty
5	Small Gravel	3-16	Sand to thumbnail
6	Large Gravel	17-64	Thumbnail to fist
7	Cobble	65-256	Fist to head
8	Boulder	>256	Larger than head
9	Bedrock	--	Solid parent material

Table A3. Bankfull channel characteristics used to determine Rosgen channel types in the field during BVET habitat inventories on the Pedlar Ranger District, summer 2005.

Channel Type	A	B	C	D	E	F	G
Entrenchment	< 1.4	1.4 – 2.2	> 2.2	n/a	> 2.2	< 1.4	< 1.4
W/D Ratio	< 12	> 12	> 12	> 40	< 12	> 12	< 12
Slope (%)	4 – 9.9	2 – 3.9	< 2	< 4	< 2	< 2	2 – 3.9