

**Condition of Selected Streams in the Warm Springs Ranger District,
George Washington-Jefferson National Forest, VA
2005**



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Table of Contents

Introduction.....	3
Methods	3
Literature Cited.....	5
Acknowledgements.....	6
User's Guide	7
Summary Tables	8

Introduction

Throughout summer 2005 we conducted stream habitat inventories on selected streams within the Warm Springs Ranger District, George Washington-Jefferson National Forest (GWJNF), Virginia, to quantify stream habitat conditions. Habitat conditions in 10 streams (29 km) were classified and inventoried between May and August 2005 using basinwide visual estimation technique (BVET) habitat inventories (Dolloff et. al 1993). Streams were selected for inventory by Dawn Kirk, GWJNF Fisheries Biologist to provide baseline stream habitat information.

We modified standard BVET methods to measure stream habitat parameters identified in the George Washington Forest plan (Roghair and Nuckols 2005). Included in the Forest plan is an outline of the desired-future-condition (DFC) for all the streams within the Forest¹. The pertinent DFCs for the Forest include: woody debris loading - 78 to 186 pieces per kilometer, and percent pool habitat - 35 to 65 percent of the total stream habitat.

Methods

Inventories began at confluences for streams contained within National Forest boundaries and at the downstream USFS boundary for all other streams. Inventories were terminated when we encountered an upstream USFS boundary, or when the wetted channel was less than 1 m average wetted width or dry for over 500 m.

Two-stage visual estimation techniques were used to quantify habitat and DFCs 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 from 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.

Literature Cited

- Dolloff, C. A., D. G. Hankin, and G. H. Reeves. 1993. Basinwide estimation of habitat and fish populations in streams. General Technical Report SE-83. Asheville, North Carolina: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experimental Station.
- Hankin, D. G., and G. H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. *Canadian Journal of Fisheries and Aquatic Sciences* 45:834-844.
- Roghair, C. N., and D. R. Nuckols. 2005. Guide to stream habitat characterization using the BVET methodology in the George Washington-Jefferson National Forest, VA. Unpublished File Report. Blacksburg, VA: U.S. Department of Agriculture, Forest Service, Southern Research Station.
- Rosgen, D.L. 1996. *Applied River Morphology*. Wildland Hydrology Books, Pagosa Springs, Colorado.

Acknowledgements

We would like to thank the CATT summer field crew for collecting the data presented in this report. The field crew included Jill Christoferson, David Ferguson, Tomas Ivasauskas, Chastine Kyger, Ernie Stanley, and Sarah Whisman. In addition, we thank Dawn Kirk, the Warm Springs Ranger District, and the GWJNF for providing assistance and funding for the inventories.

User's Guide

Results from stream inventories are presented in two sections. The 'Summary Tables' section presents summarized data analyses in a table format that allows for quick comparison of results between streams. The 'Stream Summaries' section presents a detailed summary for each stream or stream reach. As shown in the 'Index of Stream Summaries,' summaries are organized in alphabetical order by US Geological Survey (USGS) 1:24,000 topographic quadrangle, then by stream name. The upper righthand corner of each page contains the USGS quadrangle name for the selected stream. A map of the quadrangle, which shows inventoried streams, is presented at the start of each quadrangle section. George Washington Forest DFCs are indicated on all pertinent tables and graphs. Digital photographs were taken during the stream inventories, copied to CD-ROMs, and provided to the GWJNF.

Each stream or reach summary contains:

1. several tables summarizing stream characteristics;
2. figures showing frequency of substrate types, area in pools and riffles, average, maximum, and residual depths, and LWD per kilometer;
3. table describing features encountered on the stream;
4. figures showing the distribution of LWD, substrate types, and Rosgen's channel types;
5. table documenting photographs taken during inventories.

Summary Tables

Summary of general stream habitat attributes for streams inventoried using BVET techniques on the Warm Springs Ranger District in summer 2005. NA = data was not recorded. 'Length' is total inventory length, 'Width' is mean bankfull channel width, 'Gradient' is mean channel gradient, and 'Temperature' is mean water temperature.

Stream	Quad	Date	Length (km)	Width (m)	Gradient (%)	Temperature (C)
Cub Run	Bath Alum	8/11/2005	1.5	4	8	18
Mare Run	Bath Alum and Warm Springs	8/9/2005	4.1	6	8	16
Rocky Run	Burnsville	8/8/2005	0.9	7	6	NA
Left Prong	Healing Springs	7/7/2005	2.2	8	5	NA
Ruckman Draft	Mustoe and Paddy Knob	8/9/2005	4.5	7	4	NA
South Fork of Pads Creek	Nimrod Hall	8/8/2005	8.1	7	4	20
Townsend Draft	Paddy Knob	7/7/2005	1.8	6	5	NA
Castle Run	Sunrise	8/8/2005	0.8	5	9	12
Kelly Run	Sunrise	7/5/2005	1.8	7	3	13

Summary of pool attributes for streams inventoried using BVET techniques on the Warm Springs Ranger District in summer 2005. The George Washington National Forest DFC is between 35% and 65% of total stream area in pools. ‘Total Area (%)’ is percent of total stream surface area in pools (includes glides), ‘Total Area (m²)’ is surface area of stream in pools, ‘Mean Area’ is mean surface area of individual pools, ‘Mean Max Depth’ is the mean maximum depth of all pools, ‘Mean Ave Depth’ is mean average depth of all pools, ‘Mean Resid Depth’ is mean residual depth of all pools, ‘Glides’ is percent of pool habitat units inventoried as glides, ‘>35% Fines’ is percent of pools with greater than 35% of substrate materials < 2 mm in diameter.

Stream	Total Area (%)	Total Area (m²)	Total Count (n)	# per km	Mean Area (m²)	Mean Max Depth (cm)	Mean Ave Depth (cm)	Mean Resid Depth (cm)	Glides (%)	>35% Fines (%)
Cub Run	9	291 ± 41	28	19	10	31	21	15	0	89
Mare Run	16	2762 ± 168	76	18	36	67	37	24	0	1
Rocky Run	6	292 ± 192	18	19	16	38	23	8	17	94
Left Prong	5	1326 ± 97	36	16	37	53	39	25	0	3
Porters Mill Creek	9	712 ± 91	54	16	13	46	25	9	2	22
Ruckman Draft	7	1541 ± 182	72	16	21	40	22	9	10	3
South Fork of Pads Creek	23	8926 ± 702	89	11	100	40	25	16	27	2
Townsend Draft	7	285 ± 87	21	12	14	48	26	18	0	0
Castle Run	14	185 ± 53	16	21	12	50	28	21	0	25
Kelly Run	28	1782 ± 183	28	15	64	45	25	14	0	43

Summary of riffle attributes for streams inventoried using BVET techniques on the Warm Springs Ranger District in summer 2005. ‘Total Area (%)’ is percent of total stream surface area in riffles (includes runs and cascades), ‘Total Area (m²)’ is surface area of stream in riffles, ‘Mean Area’ is mean surface area of individual riffles, ‘Mean Max Depth’ is the mean maximum depth of all riffles, ‘Mean Ave Depth’ is mean average depth of all riffles, ‘Runs’ is percent of riffle habitat units inventoried as runs, ‘Cascades’ is percent of riffle habitat units inventoried as cascades.

Stream	Total Area (%)	Total Area (m²)	Total Count (n)	# per km	Mean Area (m²)	Mean Max Depth (cm)	Mean Ave Depth (cm)	Runs (%)	Cascades (%)
Cub Run	91	3050 ± 733	25	17	122	23	9	0	12
Mare Run	84	14545 ± 784	79	19	184	27	15	1	13
Rocky Run	94	4336 ± 184	19	20	228	21	14	0	0
Left Prong	95	25900 ± 1988	34	15	762	37	21	0	0
Porters Mill Creek	91	7659 ± 2410	44	13	174	23	15	0	0
Ruckman Draft	93	20030 ± 5103	74	17	271	19	14	0	1
South Fork of Pads Creek	77	29214 ± 1699	87	11	336	29	13	3	6
Townsend Draft	93	4071 ± 986	22	13	185	20	7	0	5
Castle Run	86	1153 ± 95	17	22	68	15	8	0	24
Kelly Run	72	4499 ± 10030	29	16	155	25	12	0	0

Summary of LWD per km and Rosgen's channel types for streams inventoried using BVET techniques on the Warm Springs Ranger District in summer 2005. The GWJNF DFC for total LWD is 78 to 186 pieces per km. LWD sizes: 1) <5 m long, <55 cm diameter, 2) < 5 m long, >55 cm diameter, 3) >5 m long, <55 cm diameter, 4) >5 m long, >55 cm diameter. See Appendix A for description of Rosgen channel types.

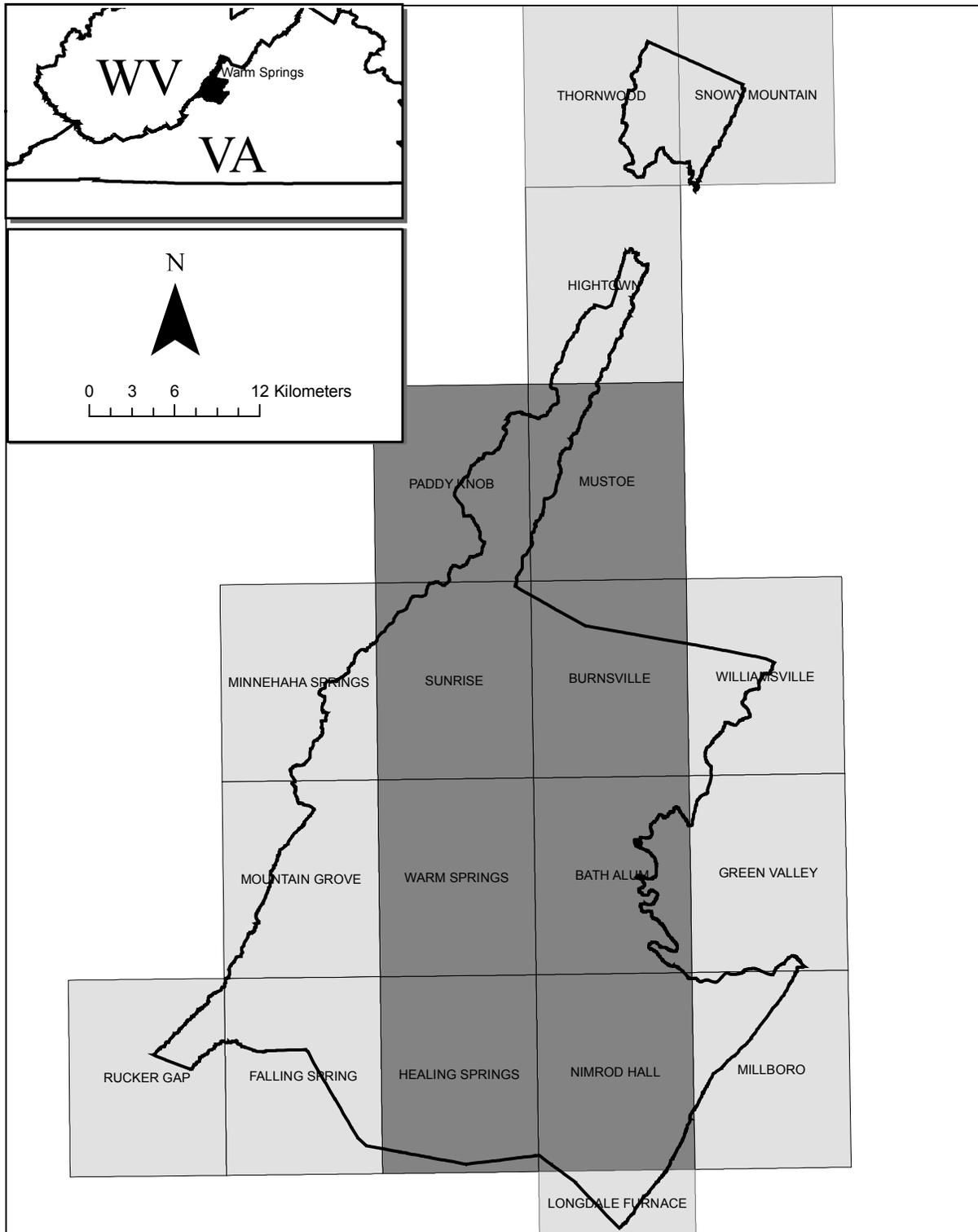
Stream	Large Woody Debris per km					Rosgen's Channel Type						
	1	2	3	4	Total	A	B	C	D	E	F	G
Cub Run	60	3	22	3	88	100	0	0	0	0	0	0
Mare Run	5	1	7	2	15	27	73	0	0	0	0	0
Rocky Run	20	1	13	4	39	57	27	0	0	0	0	16
Left Prong	2	0	32	4	38	0	14	0	0	0	86	0
Porters Mill Creek	0	0	8	2	11	89	0	11	0	0	0	0
Ruckman Draft	10	1	30	8	49	100	0	0	0	0	0	0
South Fork of Pads Creek	4	0	13	0	17	0	100	0	0	0	0	0
Townsend Draft	25	1	26	2	54	0	100	0	0	0	0	0
Castle Run	13	3	8	1	25	100	0	0	0	0	0	0
Kelly Run	17	0	4	1	21	0	52	48	0	0	0	0

Summary of riparian width calculations for streams inventoried using BVET techniques on the Warm Springs Ranger District in summer 2005. NA = data not recorded. The left riparian width, right riparian width, and bankfull channel widths were added together before values for 'Riparian Width Total' were calculated. Left and right riparian widths were pooled together before values for 'Riparian Left & Right Width' were calculated.

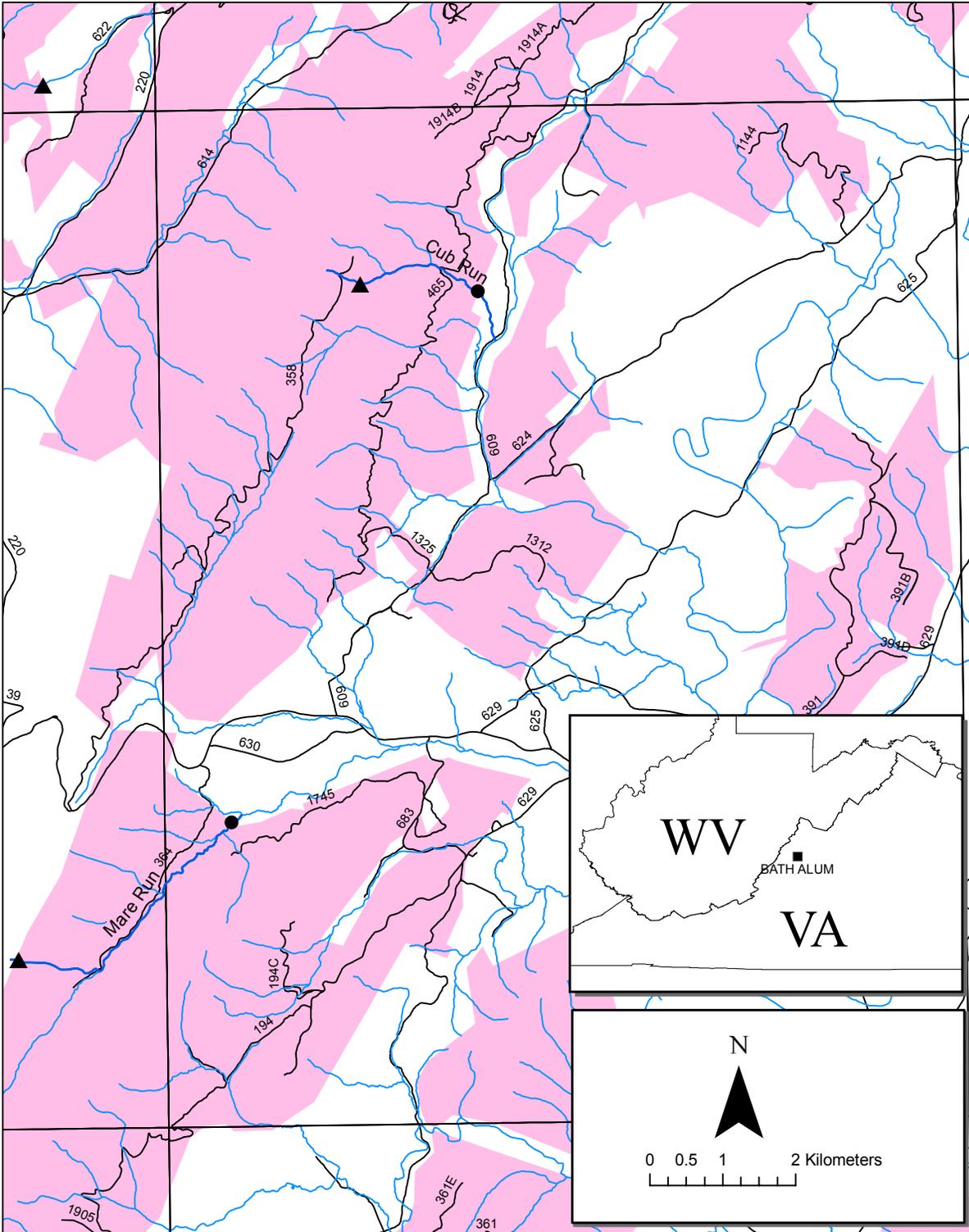
Stream	Riparian Width Total (m)					Riparian Left & Right Width (m)				
	Mean	Max	75 th	25 th	Min	Mean	Max	75 th	25 th	Min
Cub Run	5	7	6	5	4	1	1	1	1	0
Mare Run	13	20	17	8	5	3	10	5	1	1
Rocky Run	10	13	11	8	7	2	5	1	1	1
Left Prong	13	18	14	11	10	2	8	2	1	1
Porters Mill Creek	9	14	9	7	7	2	6	2	1	1
Ruckman Draft	18	35	26	11	9	6	15	10	1	1
South Fork of Pads Creek	11	16	12	9	6	2	5	2	1	0
Townsend Draft	9	13	11	8	6	2	3	2	1	1
Castle Run	6	8	7	5	4	1	3	1	1	1
Kelly Run	11	15	13	9	7	3	5	4	2	1

Index of Stream Summaries

Bath Alum	16
Cub Run.....	17
Mare Run.....	22
Burnsville	27
Rocky Run.....	28
Healing Springs	33
Left Prong.....	34
Porters Mill Creek.....	39
Mustoe	44
Ruckman Draft.....	45
Nimrod Hall	50
South Fork of Pads Creek.....	51
Paddy Knob	56
Townsend Draft.....	57
Sunrise	62
Castle Run.....	63
Kelly Run.....	68



USGS Quadrangles within the Warm Springs Ranger District. Quadrangles that contain streams inventoried in 2005 are shaded in dark grey.



Streams inventoried on the Bath Alum Quadrangle using BVET habitat inventories during summer 2005. A small section of the Warm Springs Quadrangle, to the west, is also included to show the complete Mare Run inventory. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Cub Run
District:	Warm Springs
USGS Quadrangle:	Bath Alum
Inventory Date:	08/11/05
Downstream Starting Point:	Forest Boundary about 1 km downstream of Forest Road 465
Total Distance Inventoried (km):	1.5

	Pools	Riffles
Percent of Total Stream Area:	9	91
Total Area (m ²):	291 ± 41	3050 ± 733
Correction Factor Applied:	0.97	1.03
Number of Paired Samples:	6	5
Total Count:	28	25
Number per km:	19	17
Mean Area (m ²):	10	122
Mean Maximum Depth (cm):	31	23
Mean Average Depth (cm):	21	9
Mean Residual Depth (cm):	15	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	12
Percent with >35% Fines:	89	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	60
< 5 m long, > 55 cm diameter:	3
> 5 m long, 10 cm – 55 cm diameter:	22
> 5 m long, > 55 cm diameter:	3
Total:	88

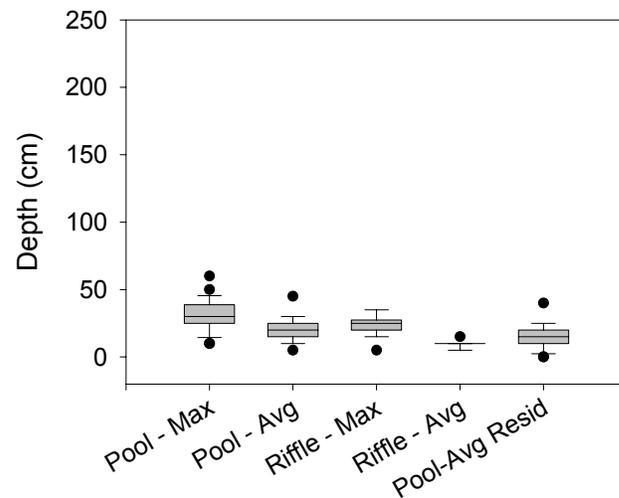
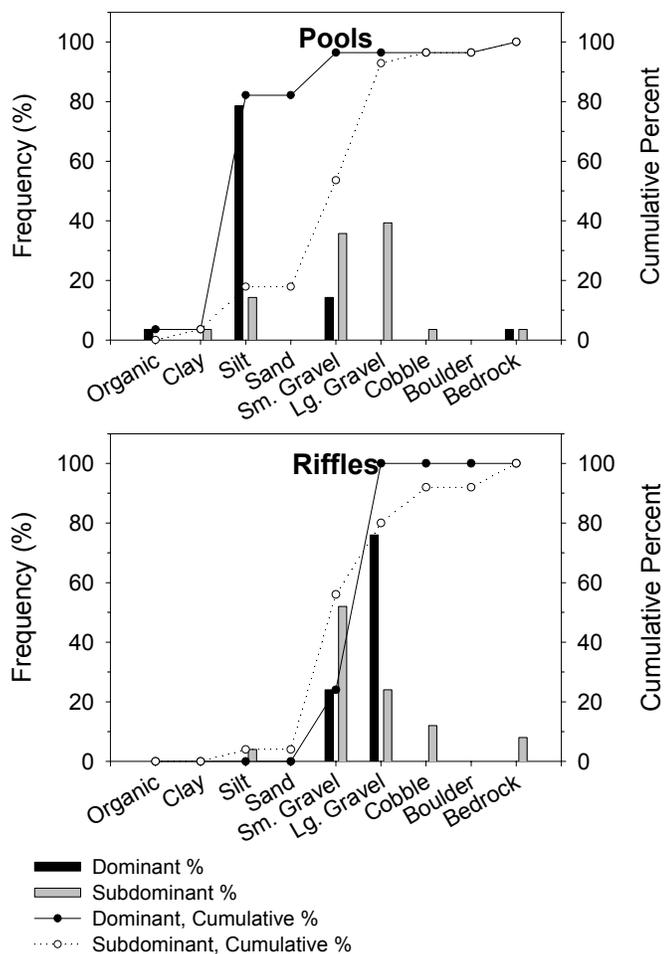
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	5	1
Maximum	7	1
75 th Percentile	6	1
25 th Percentile	5	1
Minimum	4	0

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

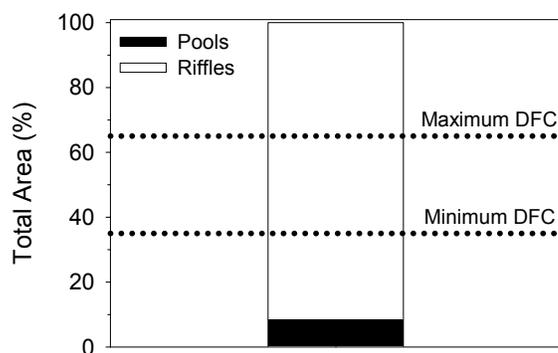
Rosgen's Channel Type	Frequency (%)
A:	100
B:	0
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	4
Mean Channel Gradient (%):	8
Median Water Temperature (C):	18

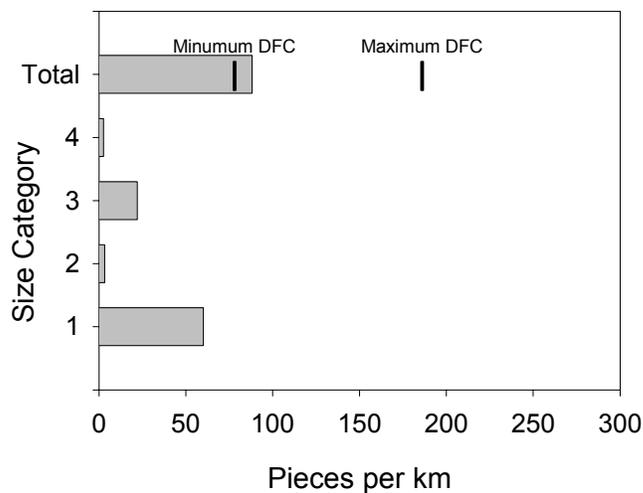


Maximum and average depths and residual pool depths for pools and riffles in Cub Run, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Cub Run, summer 2005.



Estimated area of Cub Run in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

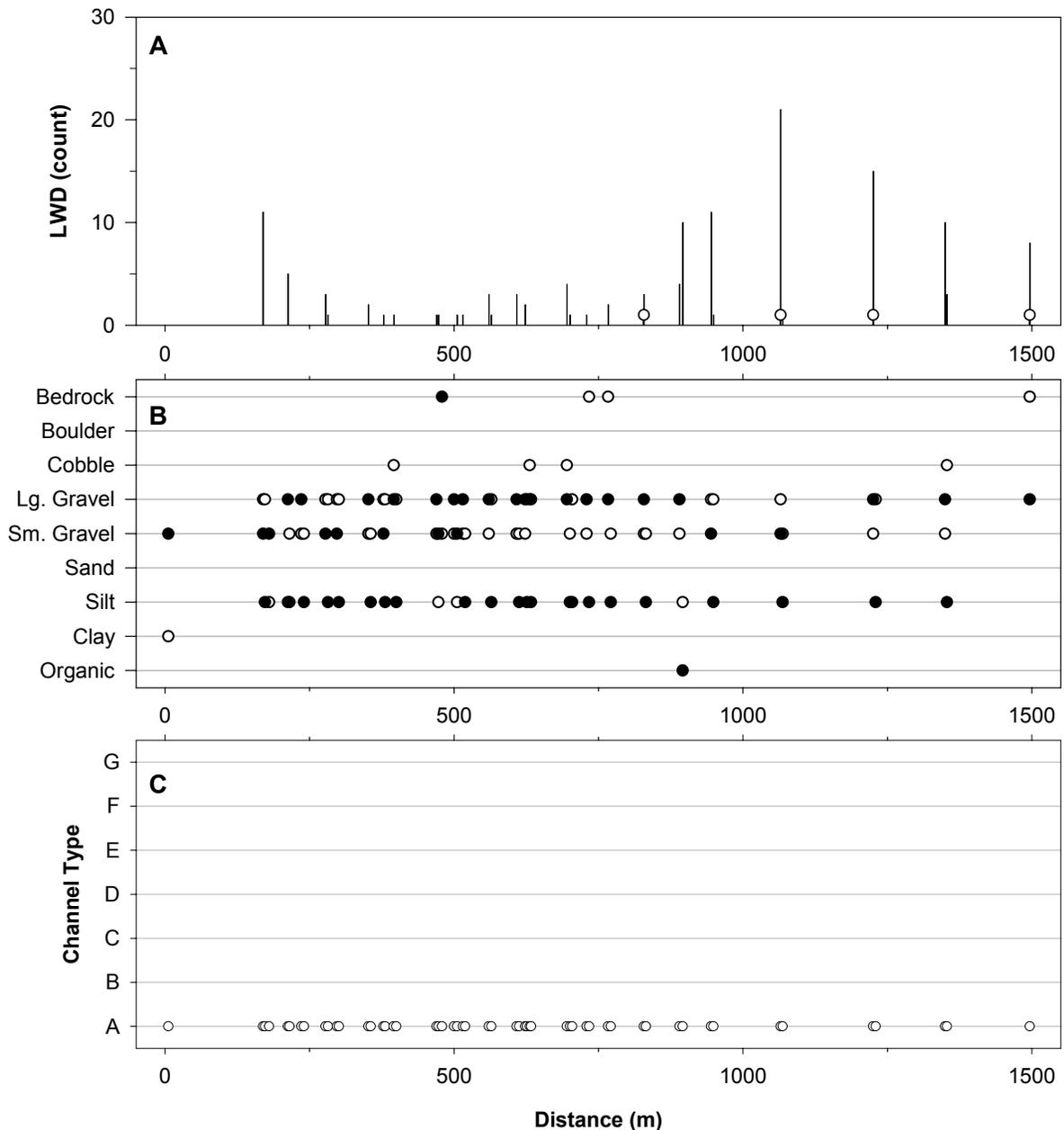


LWD per kilometer in Cub Run, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Cub Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
LANDSLIDE	133		2 PHOTOS
SIDE CHANNEL	365		IN ON RIGHT
CULVERT	706		OVAL CORRUGATED METAL PIPE. WIDTH = 250 CM. HEIGHT = 170 CM. PERCH = 25 CM. 11 METERS LONG.
TRIBUTARY	792	0.5	IN ON RIGHT
TRIBUTARY	1501		STREAM SPLITS INTO 2 UNNAMED TRIBUTARIES; EACH 1 M WIDE. FOLLOWED TRIBUTARY ON LEFT FOR 83 METERS TO FALL AND RECORDED DATA. 1.5 M HIGH
FALL	1584		



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Cub Run, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Cub Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
LANDSLIDE		133	2 PHOTOS
RIFFLE	1	170	AVG BANKFULL DEPTH (BFD) = 15 CM. MAX = 20 CM.
RIFFLE	6	352	AVG BFD = 20 CM. MAX = 30 CM.
RIFFLE	11	515	AVG BFD = 20 CM. MAX = 40 CM.
CASCADE	16	695	AVG BFD = 30 CM. MAX = 40 CM.
CULVERT		706	OVAL CORRUGATED METAL PIPE. WIDTH = 250 CM. HEIGHT = 170 CM. PERCH = 25 CM. 11 M LONG.
TRIBUTARY		792	IN ON RIGHT. .5 M WIDE
RIFFLE	21	945	AVG BFD = 55 CM. MAX = 65 CM.
WATERFALL		1584	1.5 M HIGH

Stream:	Mare Run
District:	Warm Springs
USGS Quadrangle:	Bath Alum and Warm Springs
Inventory Date:	08/09/05
Downstream Starting Point:	Forest Service boundary, northeast of Little Porter Hollow
Total Distance Inventoried (km):	4.1

	Pools	Riffles
Percent of Total Stream Area:	16	84
Total Area (m ²):	2762 ± 168	14545 ± 784
Correction Factor Applied:	0.88	1.04
Number of Paired Samples:	8	8
Total Count:	76	79
Number per km:	18	19
Mean Area (m ²):	36	184
Mean Maximum Depth (cm):	67	27
Mean Average Depth (cm):	37	15
Mean Residual Depth (cm):	24	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	1
Percent Inventoried as Cascades:	--	13
Percent with >35% Fines:	1	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	5
< 5 m long, > 55 cm diameter:	1
> 5 m long, 10 cm – 55 cm diameter:	7
> 5 m long, > 55 cm diameter:	2
Total:	15

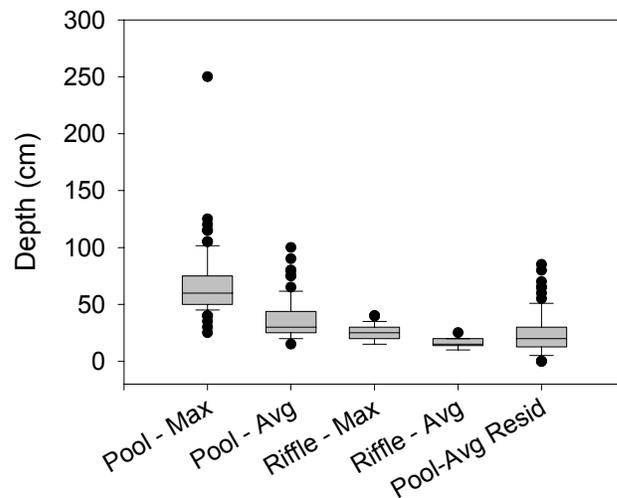
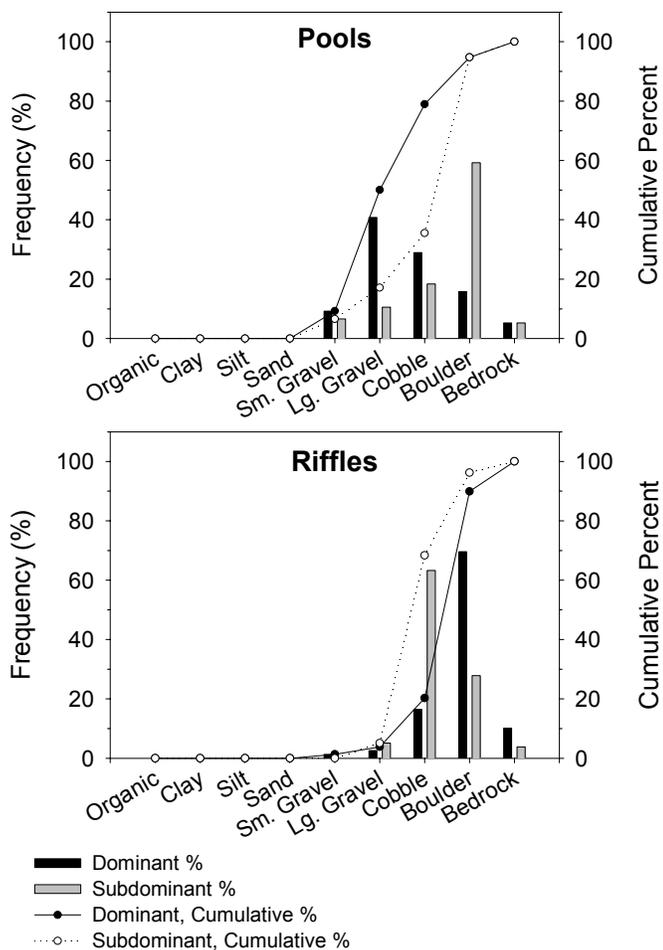
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	13	3
Maximum	20	10
75 th Percentile	17	5
25 th Percentile	8	1
Minimum	5	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

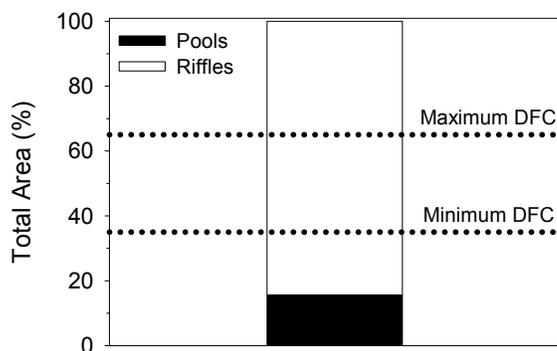
Rosgen's Channel Type	Frequency (%)
A:	27
B:	73
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	6
Mean Channel Gradient (%):	8
Median Water Temperature (C):	16

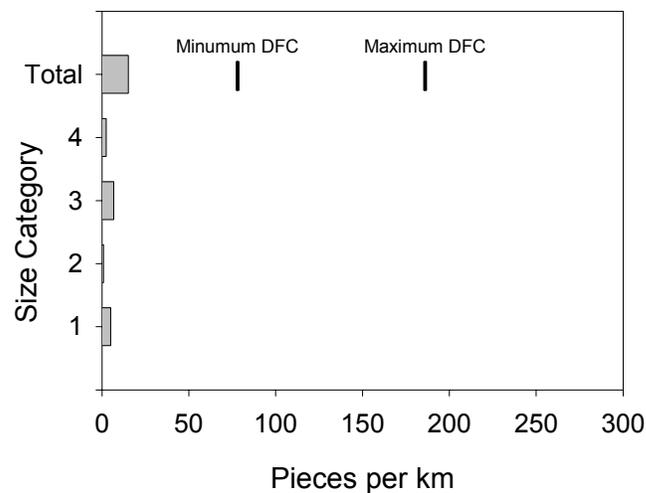


Maximum and average depths and residual pool depths for pools and riffles in Mare Run, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Mare Run, summer 2005.



Estimated area of Mare Run in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

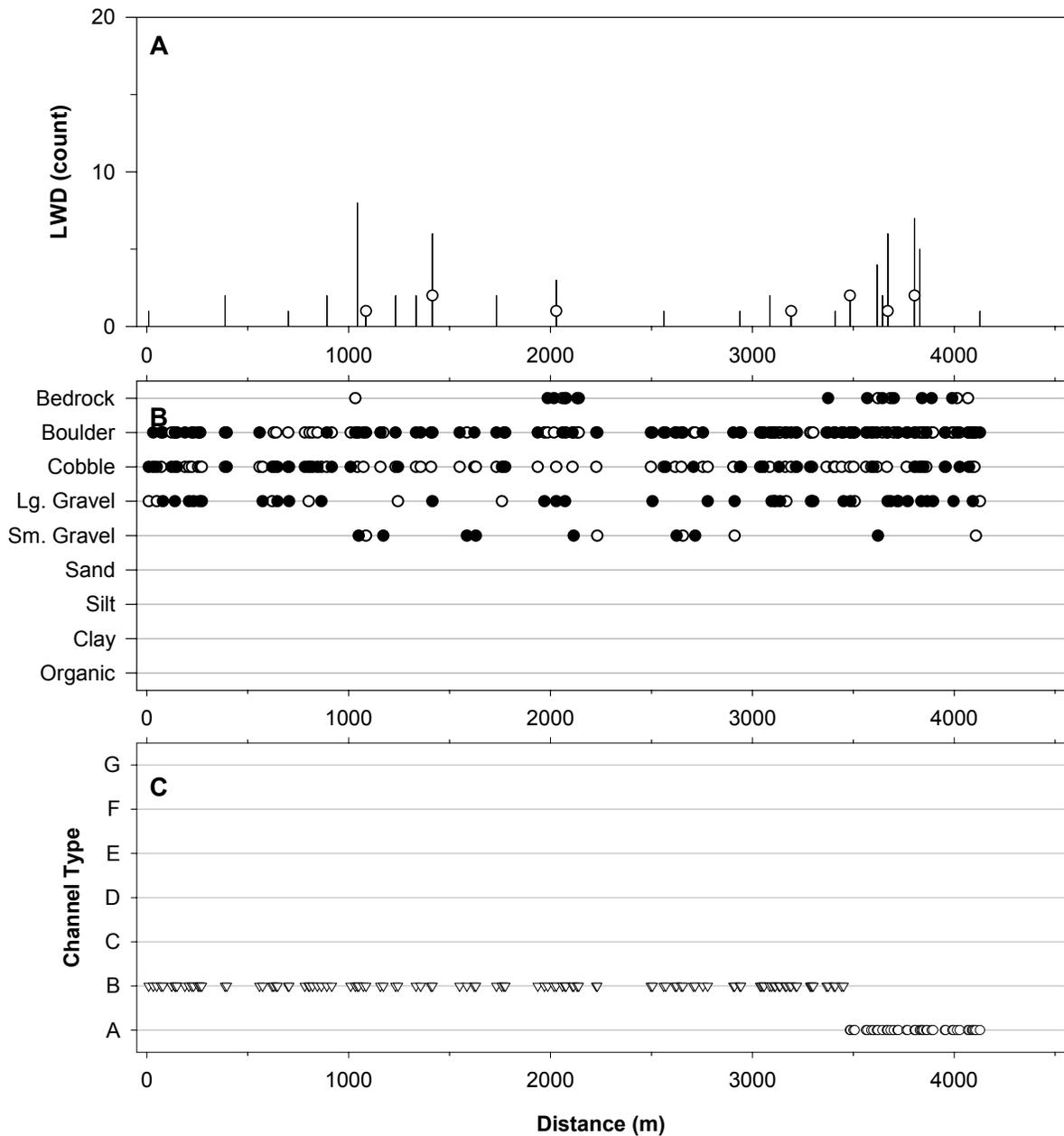


LWD per kilometer in Mare Run, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Mare Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

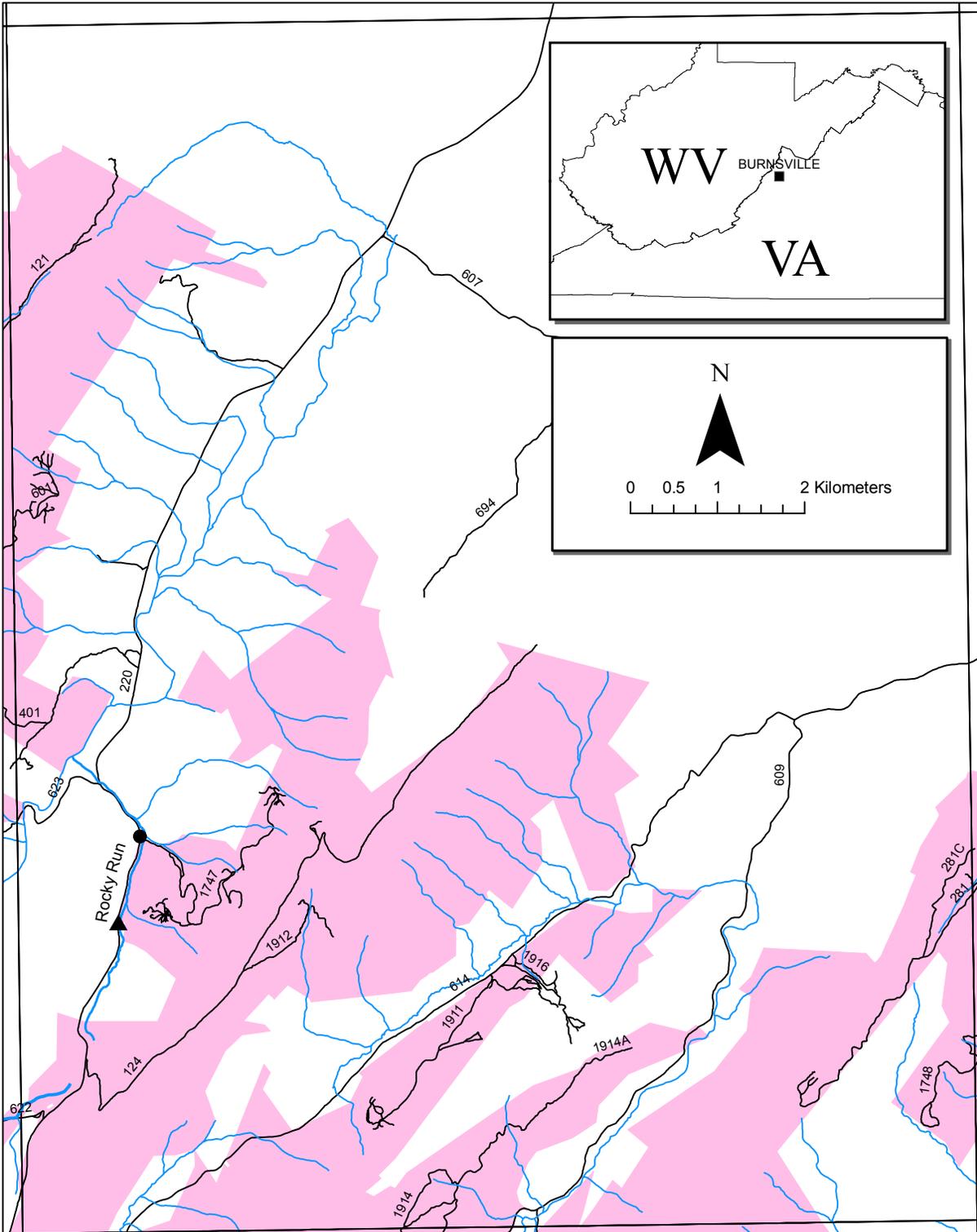
Stream Feature	Distance (m)	Width (m)	Comments
TRIBUTARY	228		TRAIL 714A
SIDE CHANNEL	450		
SIDE CHANNEL	559		
SIDE CHANNEL	580		
SIDE CHANNEL	641		ON RIGHT
TRIBUTARY	656	1	
TRIBUTARY	756		PANTHER RUN
SIDE CHANNEL	916		ON RIGHT
SIDE CHANNEL	977		DRY
SIDE CHANNEL	1033		OUT
SIDE CHANNEL	1063		
TRIBUTARY	1365	1.5	ON RIGHT, FLOWING WELL.
SEEP	1480		
SEEP	1506		ON LEFT
SIDE CHANNEL	1636		OUT
SIDE CHANNEL	2779		ON RIGHT
LANDSLIDE	2779		SLIDE ON LEFT
SIDE CHANNEL	2854		ON RIGHT
TRIBUTARY	2860	2	UNNAMED
FORD	2906		
SEEP	3171		ON LEFT
SIDE CHANNEL	3220		
SIDE CHANNEL	3245		
FALL	3673	3	
FALL	3686	3	
SIDE CHANNEL	3700		
FALL	4026	1.5	



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Mare Run, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Mare Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	5	189	
RIFFLE	15	806	
RIFFLE	25	1550	
RIFFLE	35	2109	
FORD		2906	TRAIL 714A
RIFFLE	45	2938	
RIFFLE	55	3296	
RIFFLE	65	3666	
FALL		3672	
CASCADE	75	4014	



Streams inventoried on the Burnsville Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Rocky Run
District:	Warm Springs
USGS Quadrangle:	Burnsville
Inventory Date:	08/08/05
Downstream Starting Point:	Culvert over stream on Forest Road 1747
Total Distance Inventoried (km):	0.9

	Pools	Riffles
Percent of Total Stream Area:	6	94
Total Area (m ²):	292 ± 192	4336 ± 184
Correction Factor Applied:	0.70	1.13
Number of Paired Samples:	3	3
Total Count:	18	19
Number per km:	19	20
Mean Area (m ²):	16	228
Mean Maximum Depth (cm):	38	21
Mean Average Depth (cm):	23	14
Mean Residual Depth (cm):	8	--
Percent Inventoried as Glides:	17	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	0
Percent with >35% Fines:	94	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	20
< 5 m long, > 55 cm diameter:	1
> 5 m long, 10 cm – 55 cm diameter:	13
> 5 m long, > 55 cm diameter:	4
Total:	39

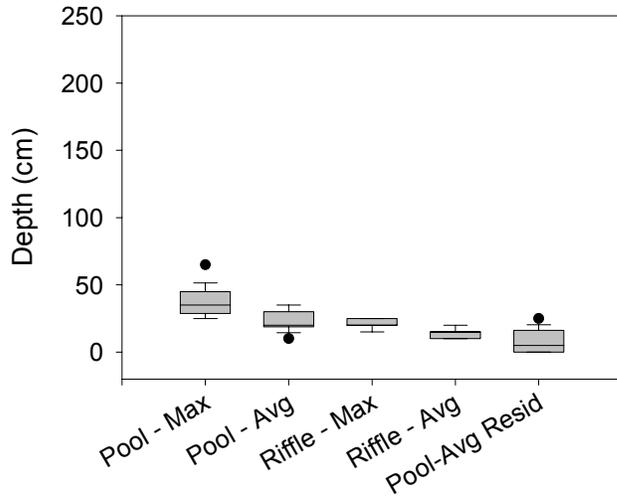
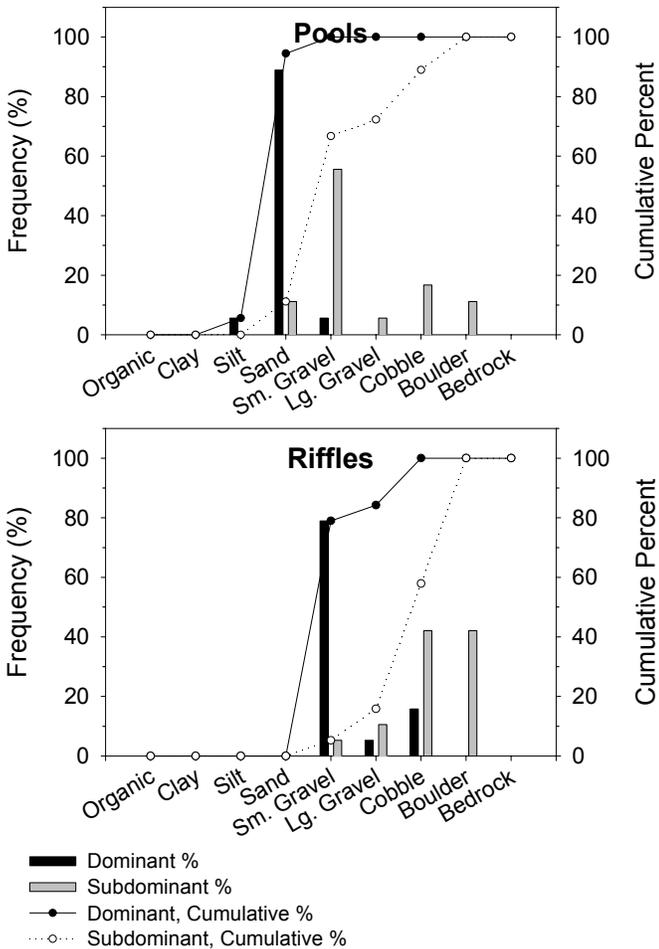
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	10	2
Maximum	13	5
75 th Percentile	11	1
25 th Percentile	8	1
Minimum	7	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

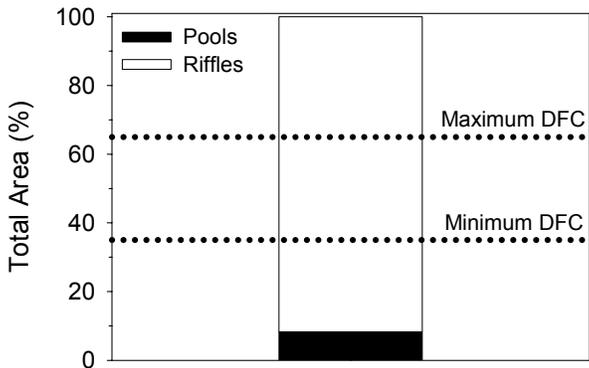
Rosgen's Channel Type	Frequency (%)
A:	57
B:	27
C:	0
D:	0
E:	0
F:	0
G:	16

Other Stream Attributes	
Mean Bankfull Channel Width (m):	7
Mean Channel Gradient (%):	6
Median Water Temperature (C):	NA

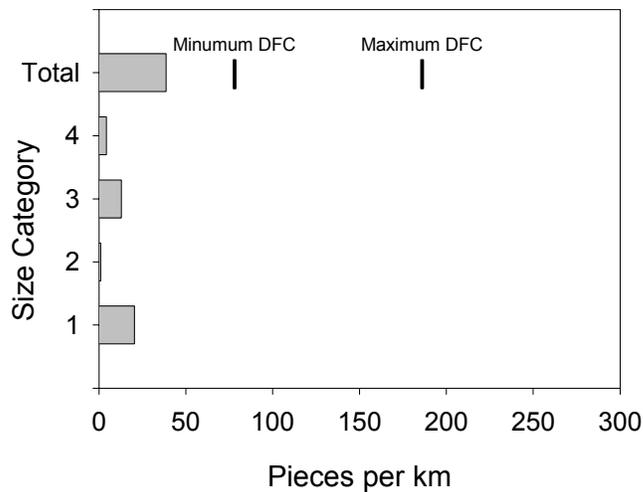


Maximum and average depths and residual pool depths for pools and riffles in Rocky Run, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Rocky Run, summer 2005.



Estimated area of Rocky Run in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

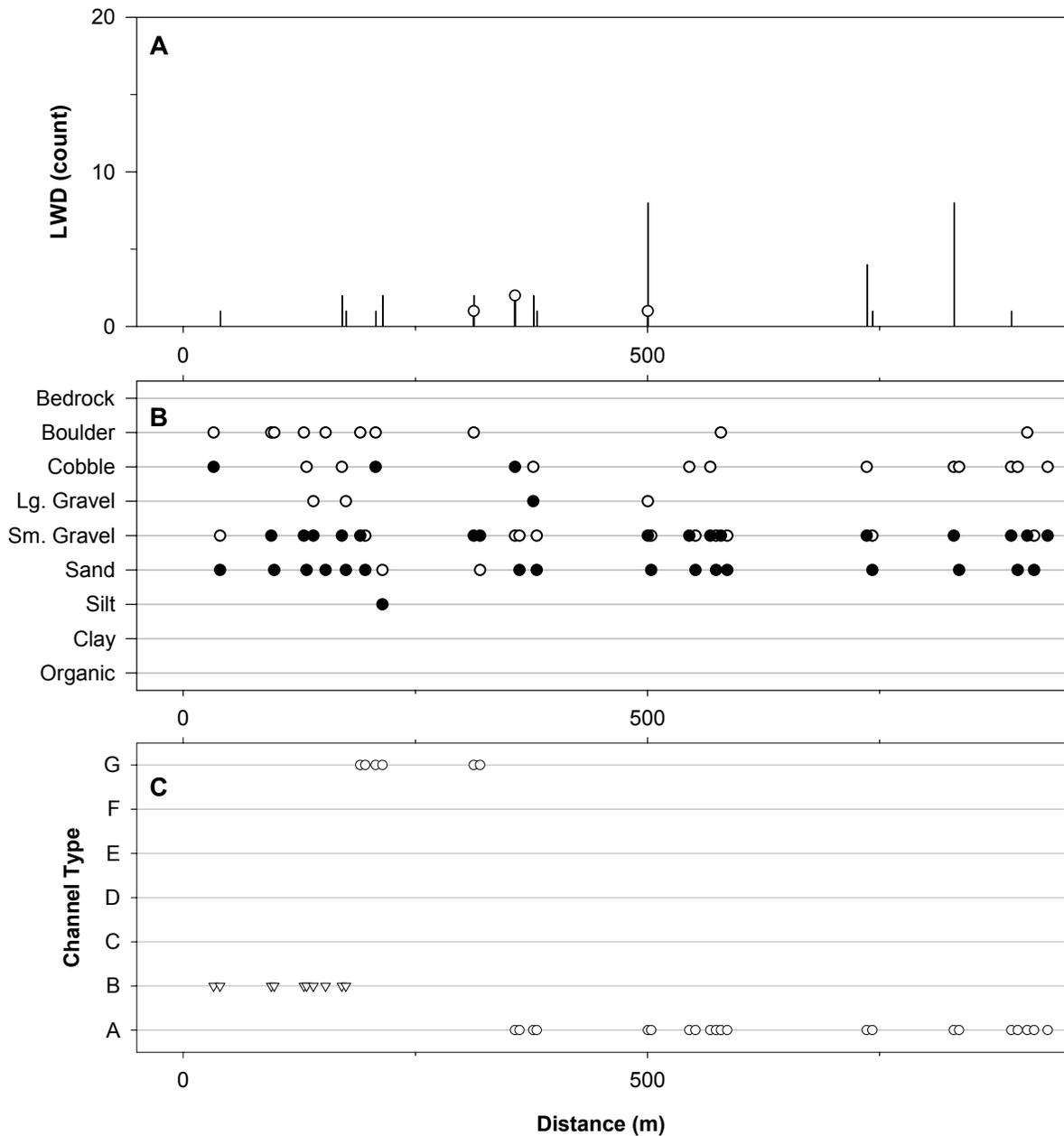


LWD per kilometer in Rocky Run, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Rocky Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

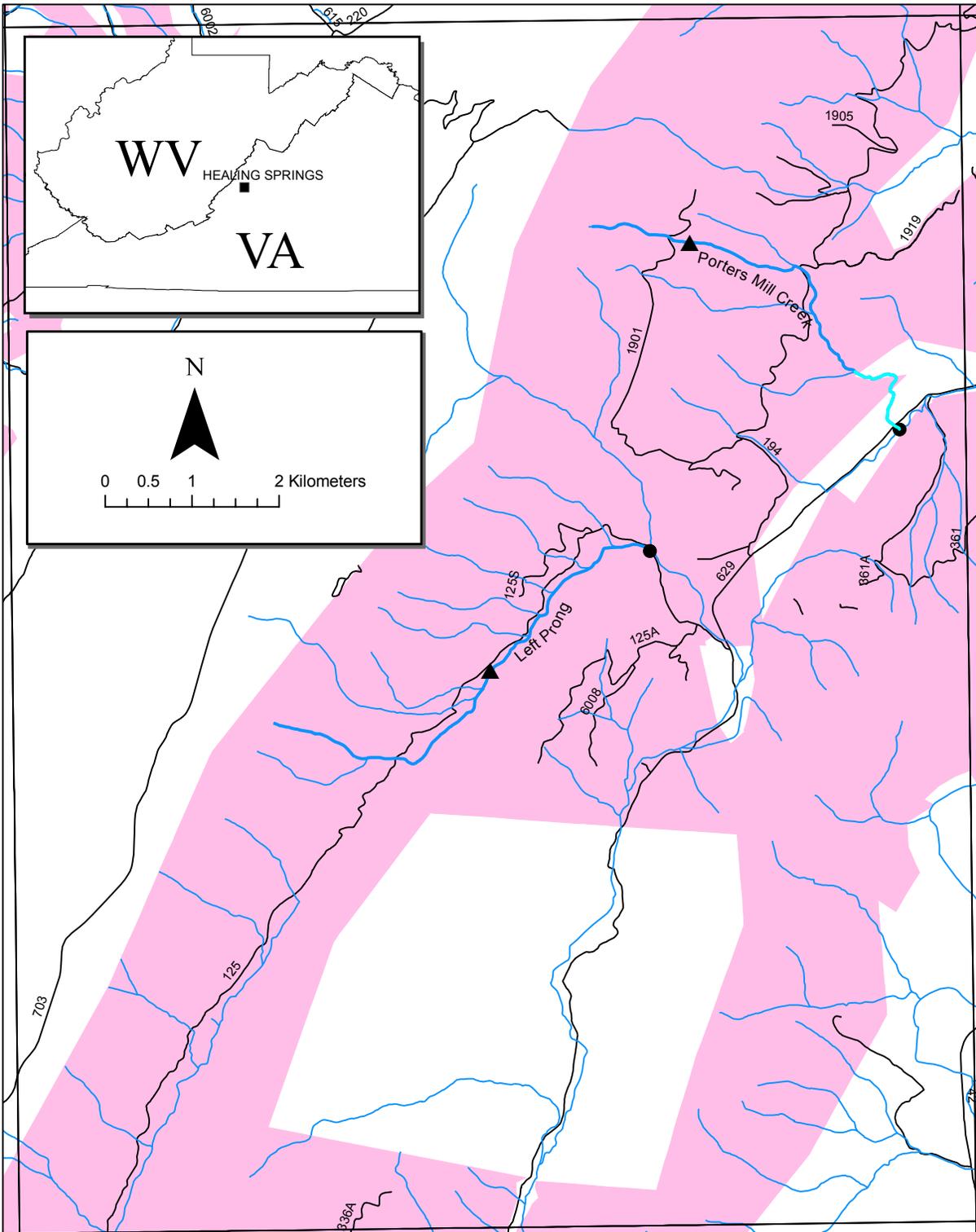
Stream Feature	Distance (m)	Width (m)	Comments
OTHER	87		
SIDE CHANNEL	112	1	
OTHER	178		
TRIBUTARY	442	1	
TRIBUTARY	872	1	
END	931		END INVENTORY AT FOREST BOUNDARY AT 4:18 PM. 08/08/2005.



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Rocky Run, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Rocky Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
Photos			
Unavailable			



Streams inventoried on the Healing Springs Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Left Prong (INVENTORY INCOMPLETE)
District:	Warm Springs
USGS Quadrangle:	Healing Springs
Inventory Date:	07/07/05
Downstream Starting Point:	Confluence of Left Prong and Bear Loop Branch
Total Distance Inventoried (km):	2.2

	Pools	Riffles
Percent of Total Stream Area:	5	95
Total Area (m ²):	1326 ± 97	25900 ± 1988
Correction Factor Applied:	0.91	1.23
Number of Paired Samples:	3	3
Total Count:	36	34
Number per km:	16	15
Mean Area (m ²):	37	762
Mean Maximum Depth (cm):	53	37
Mean Average Depth (cm):	39	21
Mean Residual Depth (cm):	25	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	0
Percent with >35% Fines:	3	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	2
< 5 m long, > 55 cm diameter:	0
> 5 m long, 10 cm – 55 cm diameter:	32
> 5 m long, > 55 cm diameter:	4
Total:	38

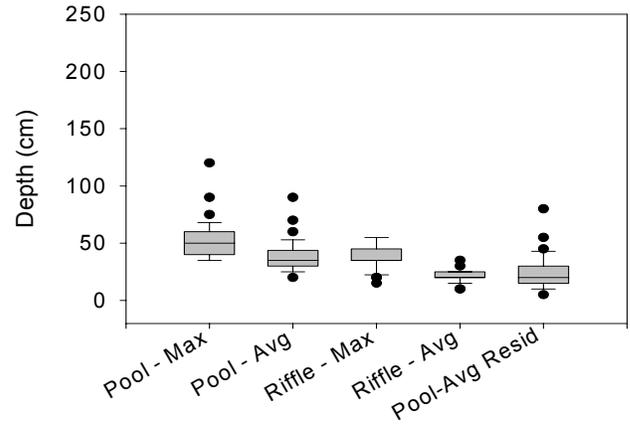
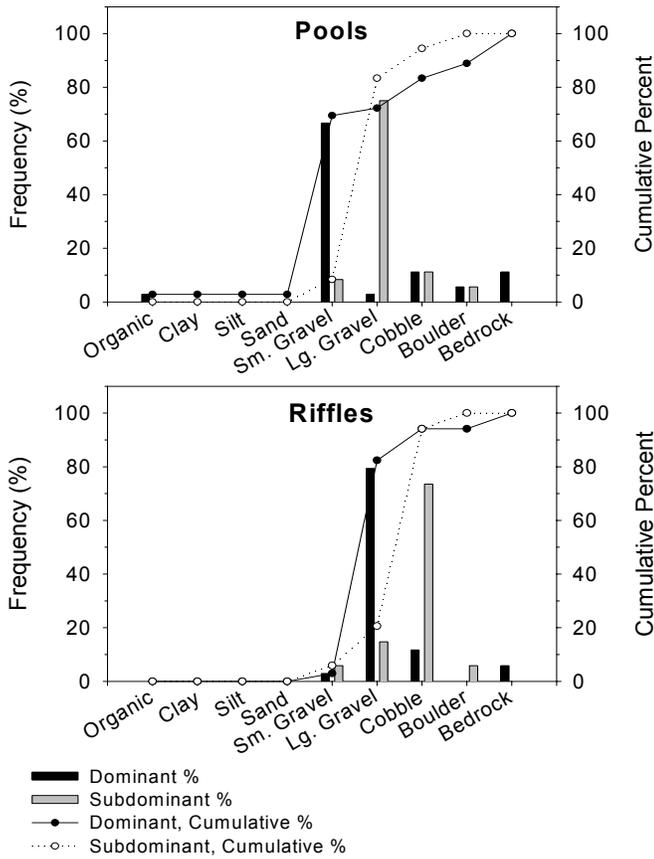
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	13	2
Maximum	18	8
75 th Percentile	14	2
25 th Percentile	11	1
Minimum	10	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

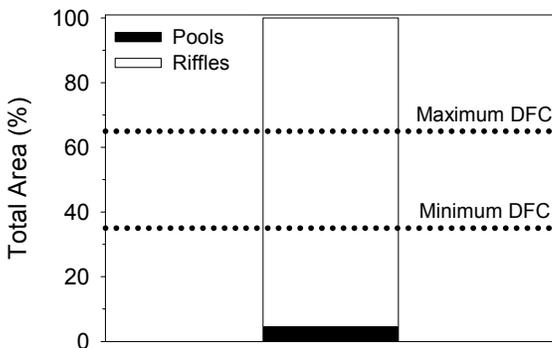
Rosgen's Channel Type	Frequency (%)
A:	0
B:	14
C:	0
D:	0
E:	0
F:	86
G:	0

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

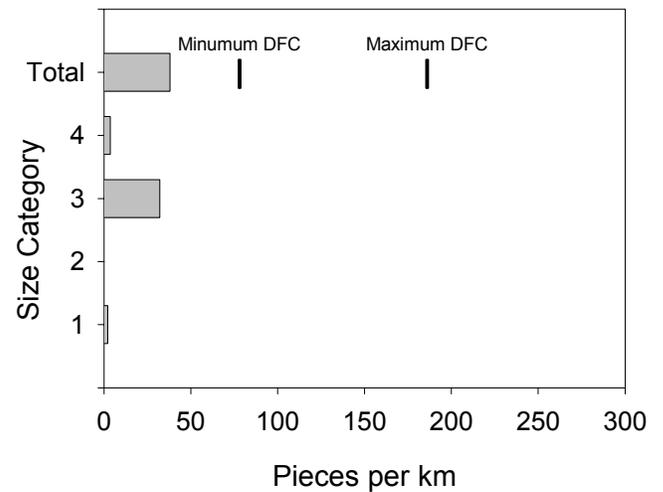


Maximum and average depths and residual pool depths for pools and riffles in Left Prong, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Left Prong, summer 2005.



Estimated area of Left Prong in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.



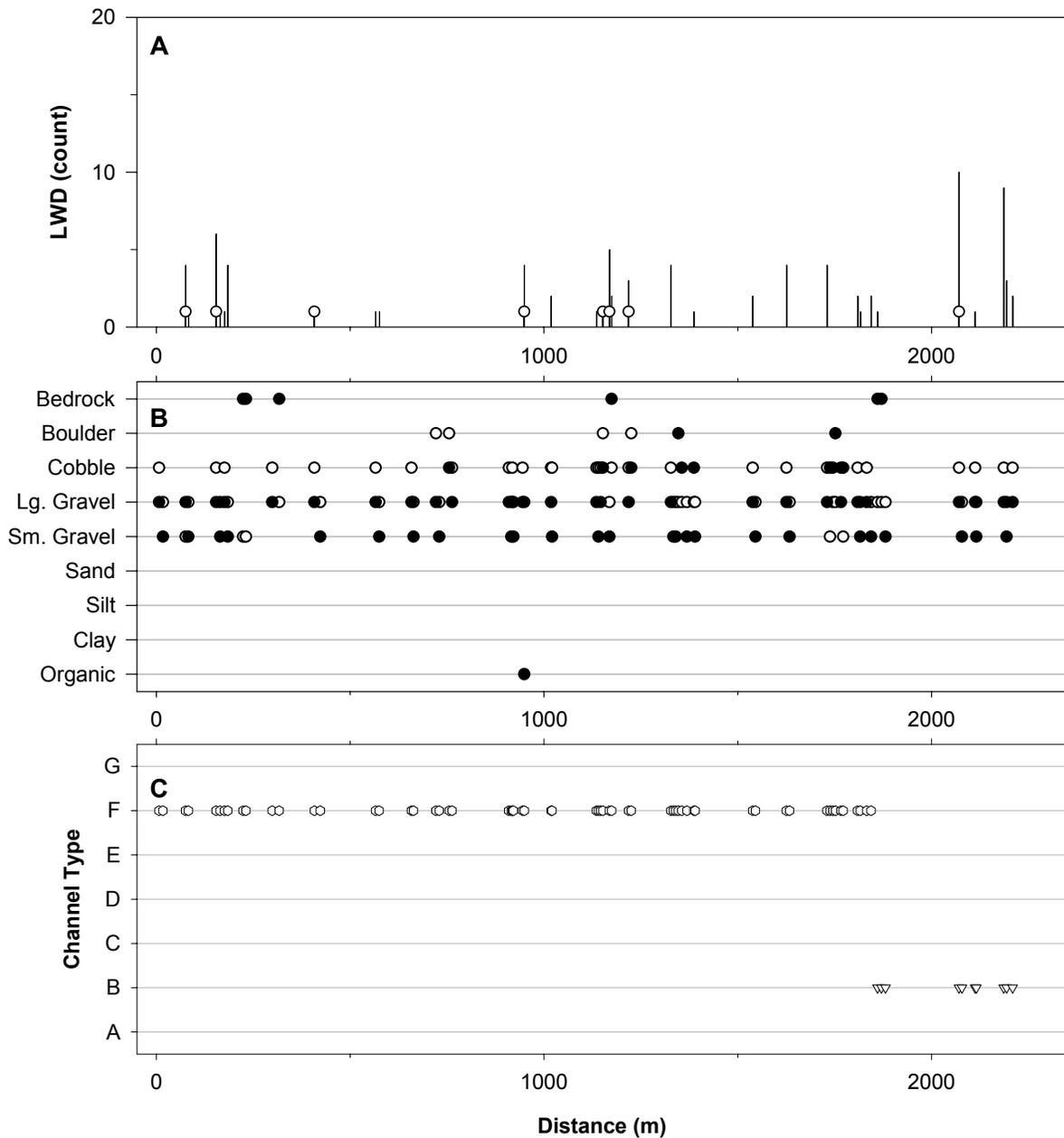
LWD per kilometer in Left Prong, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Healing Springs

Stream features found on Left Prong during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
CULVERT	26	3.9	ALUMINUM HALF PIPE
TRIBUTARY	383	1	IN ON RIGHT
SIDE CHANNEL	681	3	IN ON LEFT
SIDE CHANNEL	716	3	OUT ON LEFT
TRIBUTARY	1479	0.5	ON RIGHT
OTHER	1581	2	SIDEPOOL ON RIGHT
OTHER	1669	2	SIDEPOOL ON RIGHT
TRIBUTARY	1771	1	ON RIGHT
TRIBUTARY	1793	0.5	ON LEFT, SMELLS LIKE CHERRIES.
SIDE CHANNEL	1875	1	ON RIGHT
OTHER	1889	2.5	SIDEPOOL ON RIGHT
SIDE CHANNEL	1895	1	OUT ON LEFT
SIDE CHANNEL	1908		
END			END INVENTORY AT 4:30 PM, 07/07/2005. DUE TO HEAVY RAINFALL AND RISING TRIBS. SURVEY NOT COMPLETED.



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Left Prong, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Healing Springs

Photos taken on Left Prong during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	10	721	AVG BANKFULL DEPTH (BFD) = 35 CM. MAX = 65 CM.
RIFFLE	20	1328	AVG BFD = 45 CM. MAX = 65 CM.
RIFFLE	30	1861	AVG BFD = 65 CM. MAX = 85 CM.

Stream:	Porters Mill Creek
District:	Warm Springs
USGS Quadrangle:	Healing Springs
Inventory Date:	08/10/05
Downstream Starting Point:	Forest Boundary northeast of Chestnut Ridge. About 1.5 miles downstream of Forest Road 194.
Total Distance Inventoried (km):	3.4

	Pools	Riffles
Percent of Total Stream Area:	9	91
Total Area (m ²):	712 ± 91	7659 ± 2410
Correction Factor Applied:	0.91	1.14
Number of Paired Samples:	6	4
Total Count:	54	44
Number per km:	16	13
Mean Area (m ²):	13	174
Mean Maximum Depth (cm):	46	23
Mean Average Depth (cm):	25	15
Mean Residual Depth (cm):	9	--
Percent Inventoried as Glides:	2	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	0
Percent with >35% Fines:	22	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	0
< 5 m long, > 55 cm diameter:	0
> 5 m long, 10 cm – 55 cm diameter:	8
> 5 m long, > 55 cm diameter:	2
Total:	11

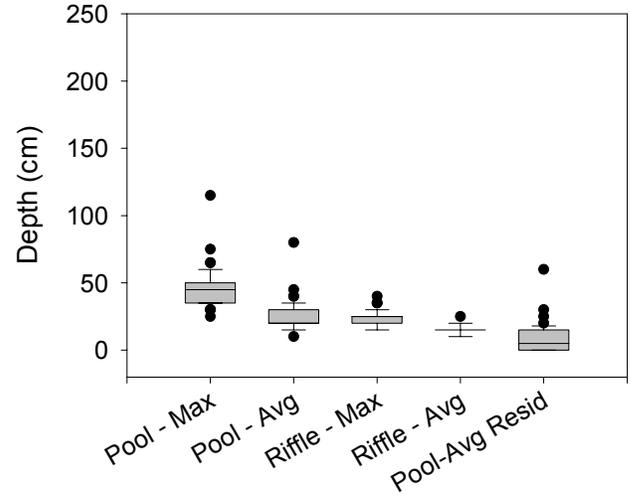
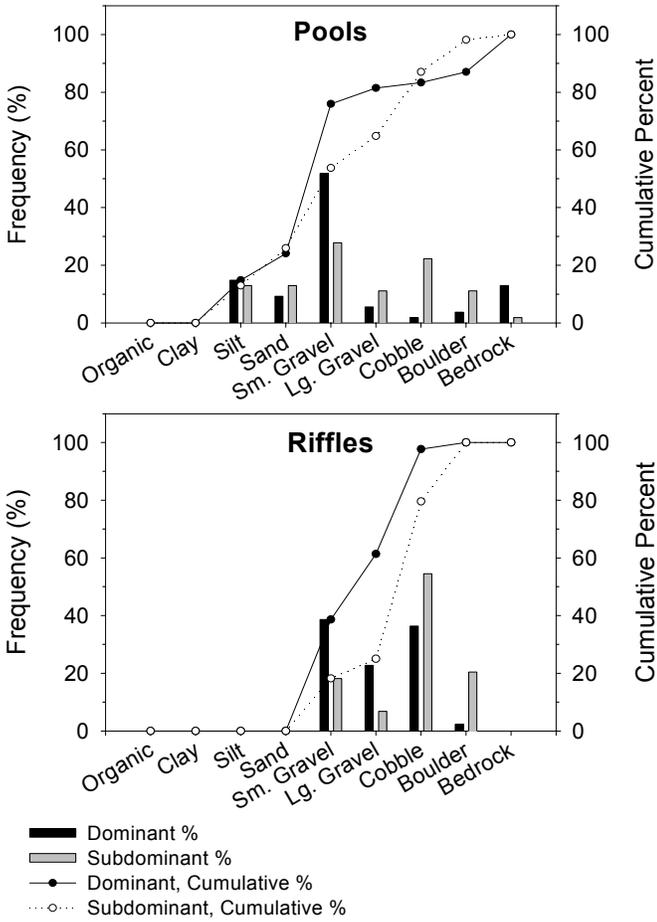
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	9	2
Maximum	14	6
75 th Percentile	9	2
25 th Percentile	7	1
Minimum	7	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

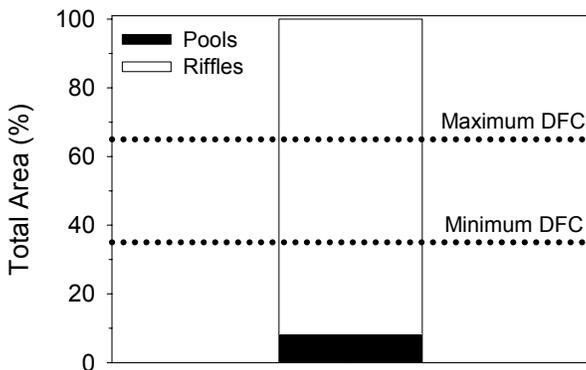
Rosgen's Channel Type	Frequency (%)
A:	89
B:	0
C:	11
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	5
Mean Channel Gradient (%):	4
Median Water Temperature (C):	NA

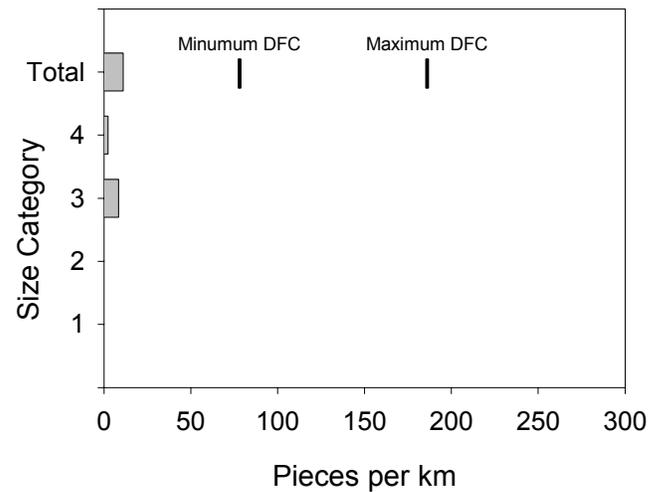


Maximum and average depths and residual pool depths for pools and riffles in Porters Mill Creek, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Porters Mill Creek, summer 2005.



Estimated area of Porters Mill Creek in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.



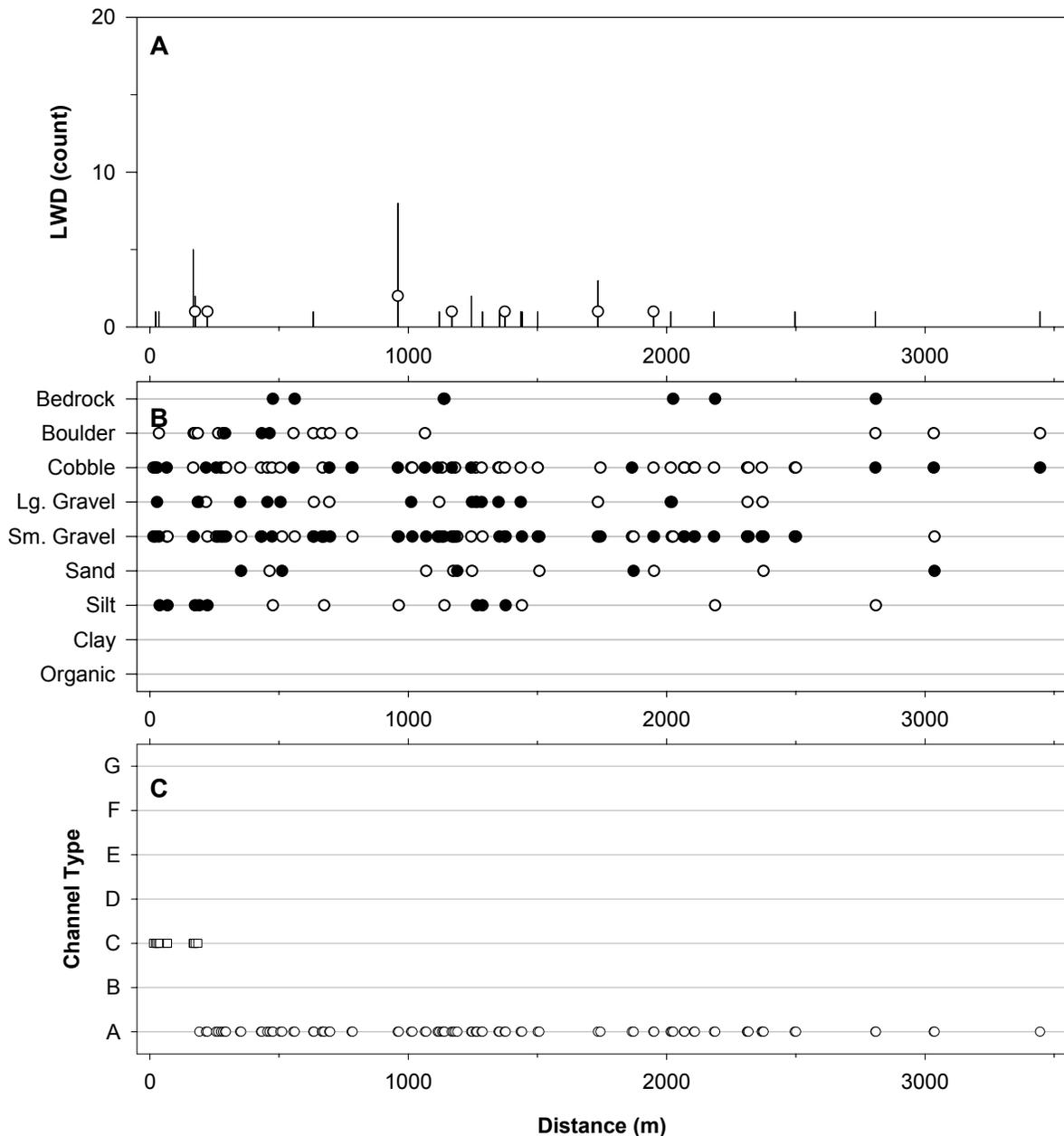
LWD per kilometer in Porters Mill Creek, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Healing Springs

Stream features found on Porters Mill Creek during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	38		OUT
TRIBUTARY	195	1	IN ON LEFT
FORD	254		ABANDONED TRAIL
SIDE CHANNEL	353		IN ON RIGHT
FORD	567		SALT POND TRAIL
TRIBUTARY	1225	1.5	IN ON LEFT
SIDE CHANNEL	1475	1	IN ON LEFT
CULVERT	1887	1.5	ALUMINUM, ROUND, PERCH = 45 CM, HEIGHT = 1.5 M.
TRIBUTARY	1895	1	ON RIGHT
FORD	1951		ABANDONED
SIDE CHANNEL	2415	1	IN ON LEFT
SIDE CHANNEL	2568		IN ON RIGHT
CULVERT	3458	1.5	PERCH = 40 CM. HEIGHT = 1.5 M.
END			END INVENTORY; SMALL RIFFLE OVER 500M LONG. END AT 3:38 PM, 08/10/2005.

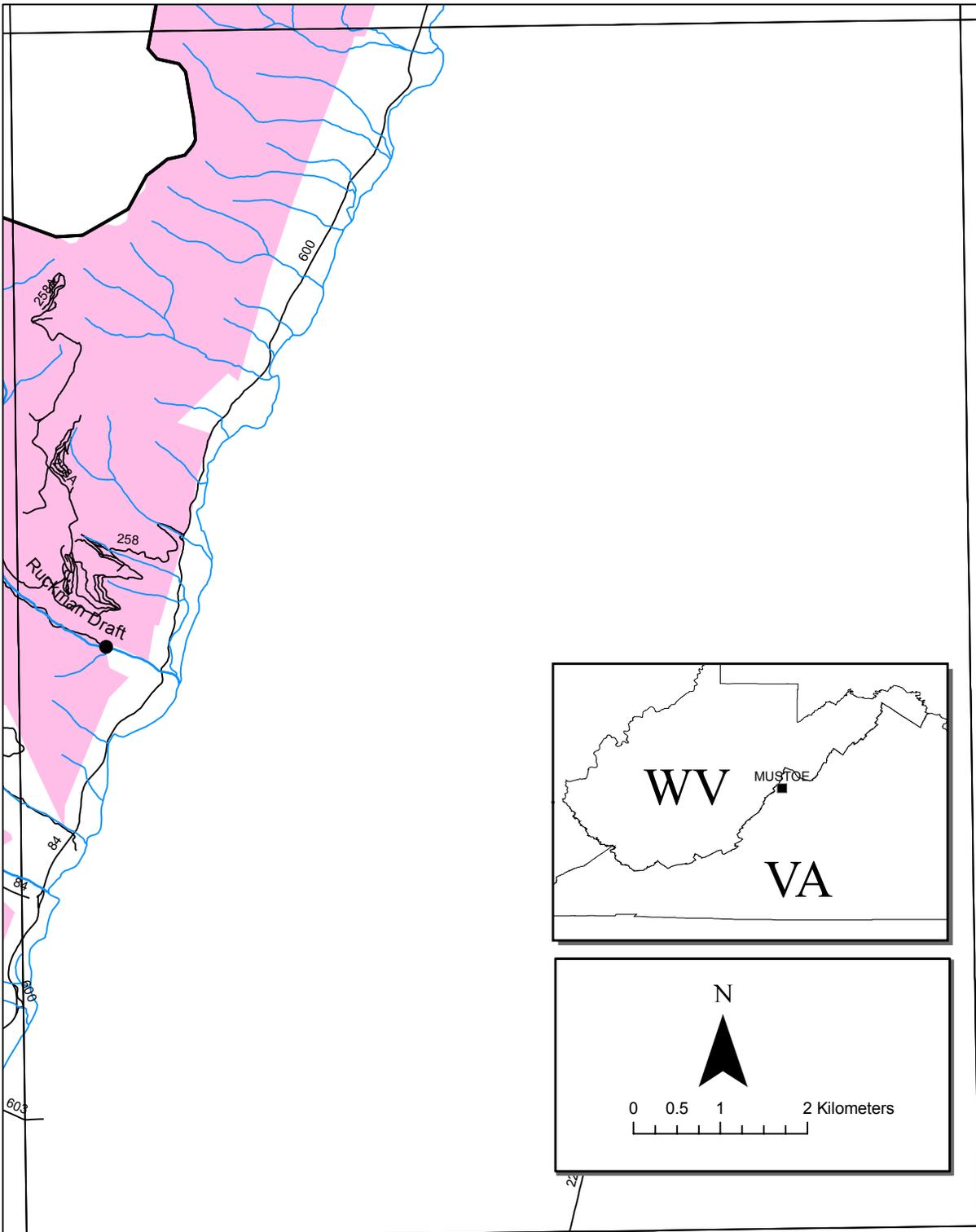


Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Porters Mill Creek, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Healing Springs

Photos taken on Porters Mill Creek during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	4	185	AVG BANKFULL DEPTH (BFD) = 50 CM. MAX = 70 CM. BORDERLINE B CHANNEL. LARGE WOODY DEBRI JAM.
OTHER			
RIFFLE	14	556	AVG BFD = 45 CM. MAX = 60 CM.
RIFFLE	24	1168	AVG BFD = 45 CM. MAX = 55 CM.
RIFFLE	34	1949	AVG BFD = 45 CM. MAX = 55 CM.



Streams inventoried on the Mustoe Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Ruckman Draft
District:	Warm Springs
USGS Quadrangle:	Mustoe and Paddy Knob
Inventory Date:	08/09/05
Downstream Starting Point:	Forest Service Boundary off of Route 600
Total Distance Inventoried (km):	4.5

	Pools	Riffles
Percent of Total Stream Area:	7	93
Total Area (m ²):	1541 ± 182	20030 ± 5103
Correction Factor Applied:	0.97	1.63
Number of Paired Samples:	7	7
Total Count:	72	74
Number per km:	16	17
Mean Area (m ²):	21	271
Mean Maximum Depth (cm):	40	19
Mean Average Depth (cm):	22	14
Mean Residual Depth (cm):	9	--
Percent Inventoried as Glides:	10	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	1
Percent with >35% Fines:	3	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	10
< 5 m long, > 55 cm diameter:	1
> 5 m long, 10 cm – 55 cm diameter:	30
> 5 m long, > 55 cm diameter:	8
Total:	49

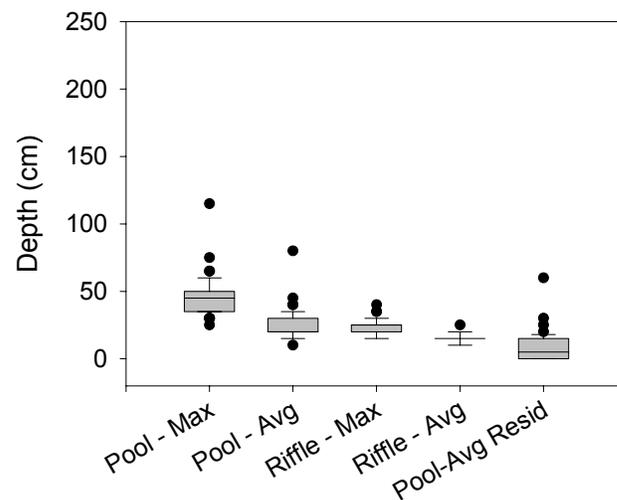
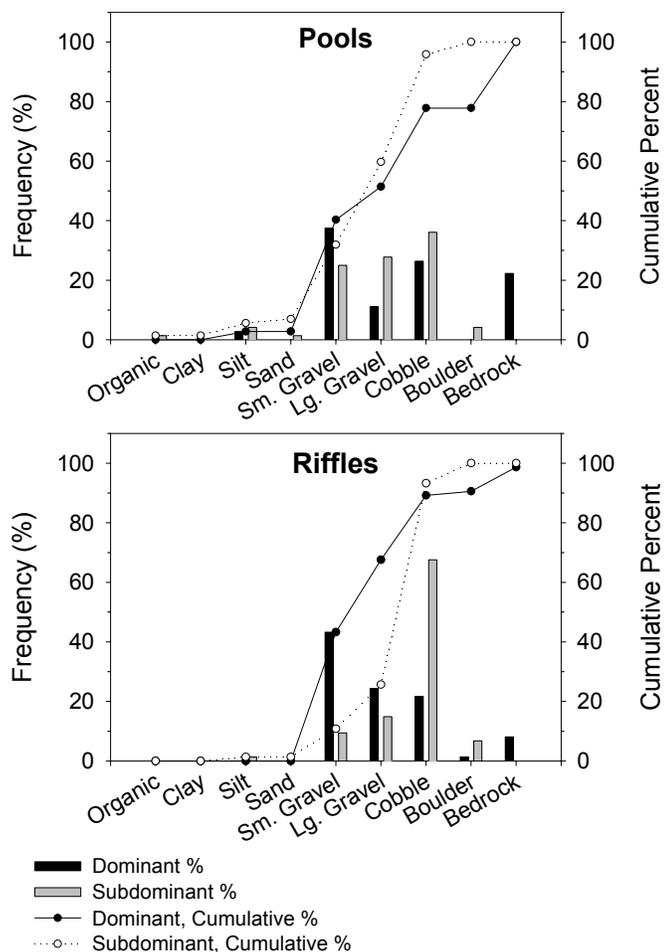
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	18	6
Maximum	35	15
75 th Percentile	26	10
25 th Percentile	11	1
Minimum	9	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

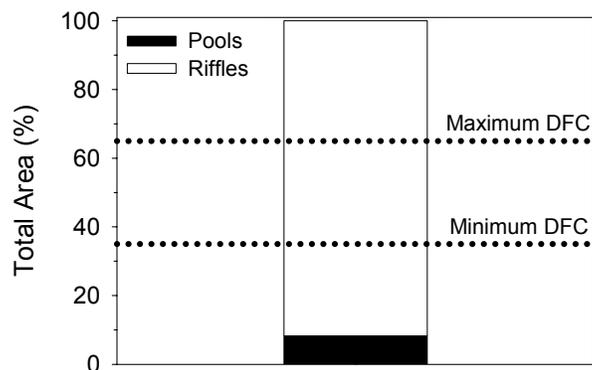
Rosgen's Channel Type	Frequency (%)
A:	100
B:	0
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	7
Mean Channel Gradient (%):	4
Median Water Temperature (C):	NA

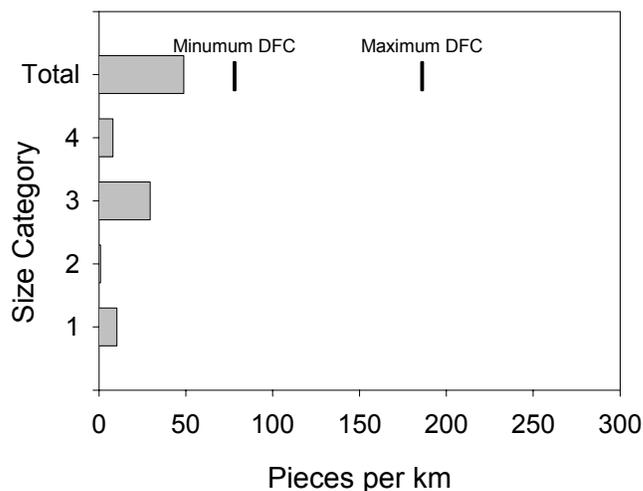


Maximum and average depths and residual pool depths for pools and riffles in Ruckman Draft, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Ruckman Draft, summer 2005.



Estimated area of Ruckman Draft in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

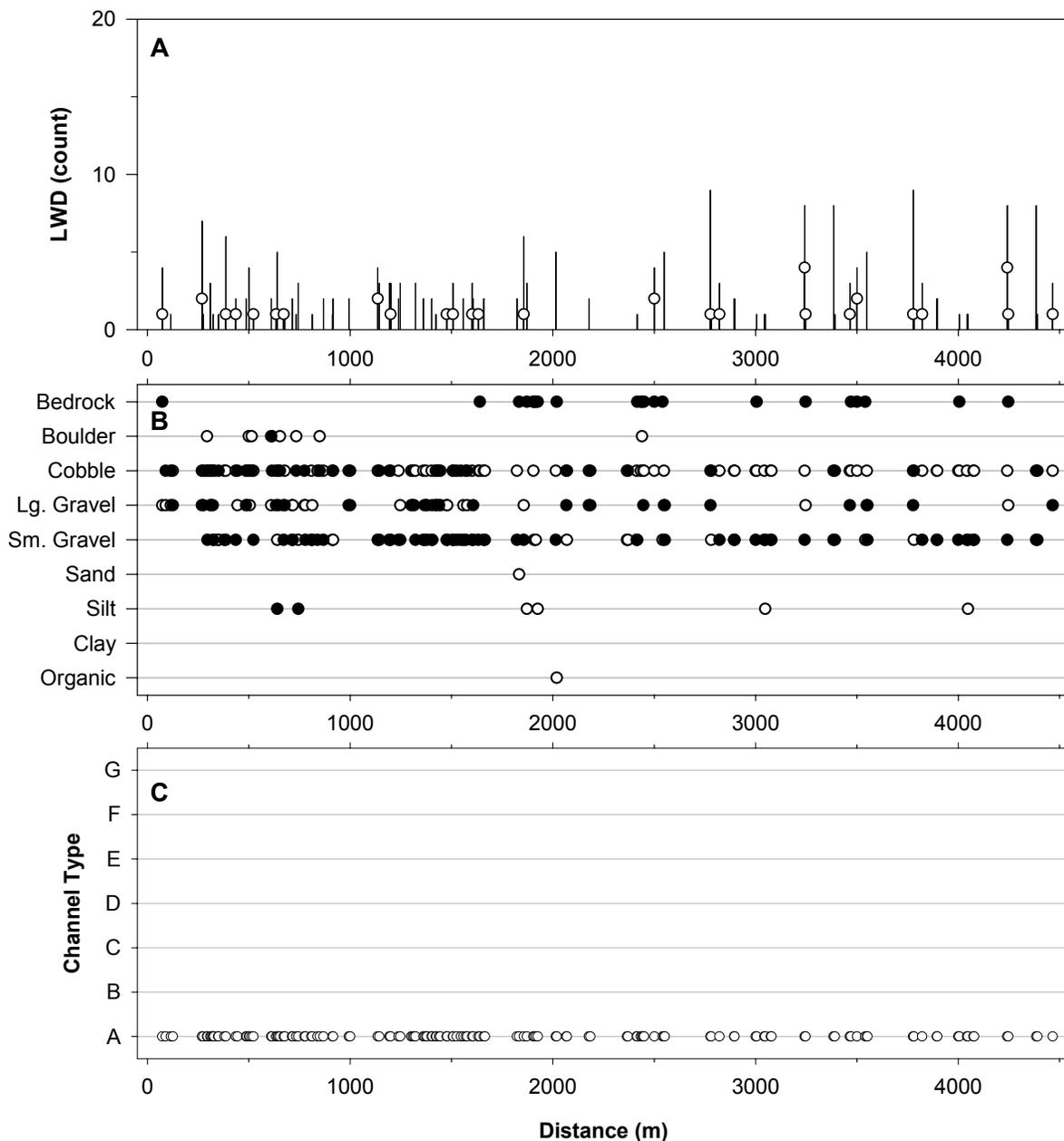


LWD per kilometer in Ruckman Draft, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Ruckman Draft during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

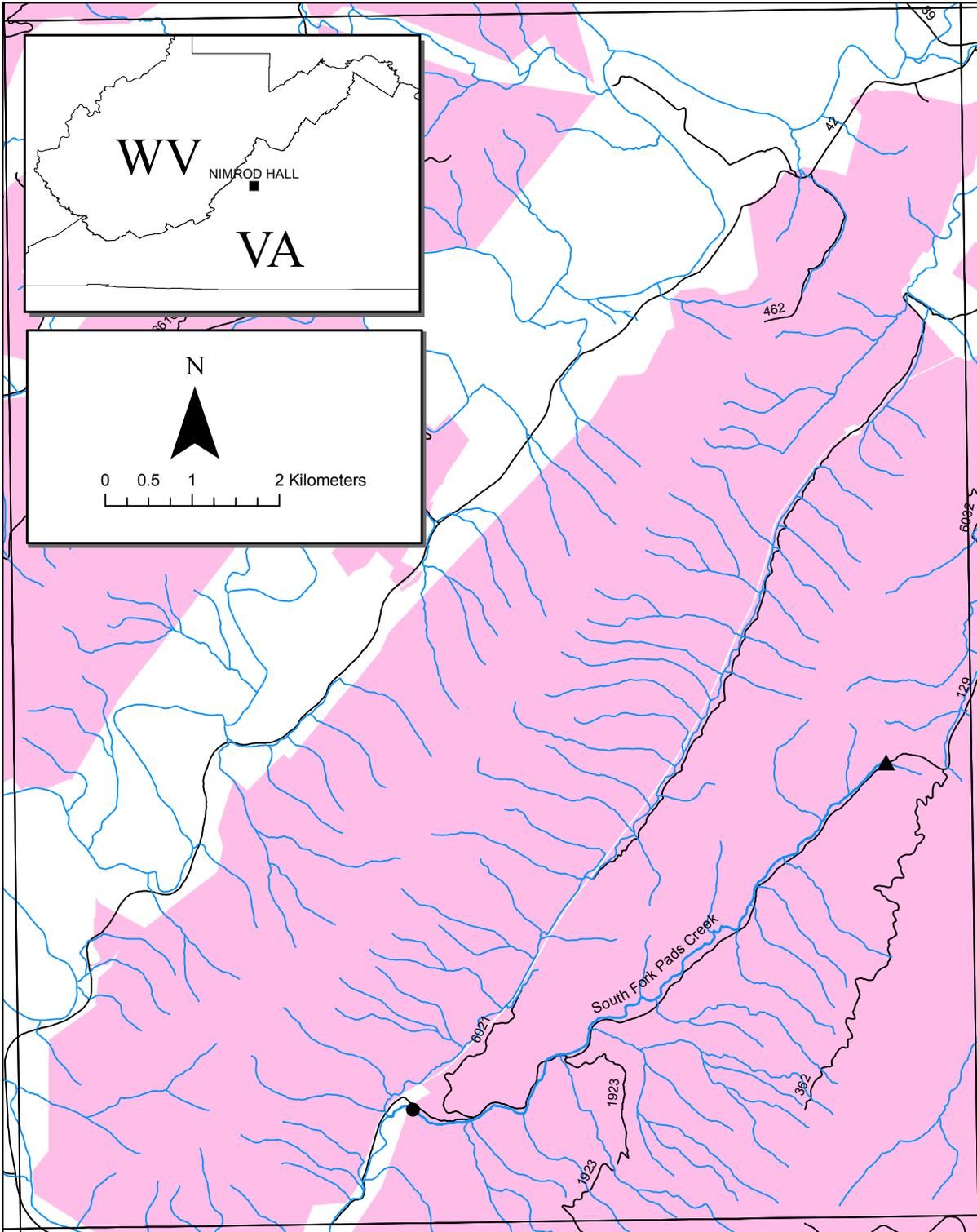
Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	2		OUT ON LEFT
FORD	44		ABANDONED
TRIBUTARY	125	2	ON LEFT
SIDE CHANNEL	155		IN ON LEFT
TRIBUTARY	234	1	ON RIGHT
SEEP	278		SPRING ON RIGHT
TRIBUTARY	294	1.5	ON RIGHT
SIDE CHANNEL	435	1.5	IN ON LEFT
SIDE CHANNEL	449		IN ON RIGHT
TRIBUTARY	522	1	ON LEFT
TRIBUTARY	671	1	ON LEFT
SIDE CHANNEL	820	1	IN ON RIGHT
SIDE CHANNEL	1401		IN ON LEFT
TRIBUTARY	1696	1	ON LEFT
TRIBUTARY	1848	1	ON RIGHT
CULVERT	2028		TWO ROUND ALUMINUM PIPES. PERCH = 55 CM. WIDTH = 2.5 CM. HEIGHT = 2 CM.
SIDE CHANNEL	2053		IN ON RIGHT
SEEP	2117		ON RIGHT
SIDE CHANNEL	2193		IN ON LEFT
SIDE CHANNEL	2212		OUT ON LEFT
SEEP	2352		ON RIGHT
SEEP	2521		ON LEFT
SIDE CHANNEL	2594		IN ON LEFT
TRIBUTARY	3192	1.5	ON LEFT
LANDSLIDE	3223		



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Ruckman Draft, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Ruckman Draft during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	6	322	AVG BANKFULL DEPTH (BFD) = 80 CM. MAX = 115 CM.
RIFFLE	15	647	AVG BFD = 70 CM. MAX = 80 CM.
RIFFLE	25	1136	AVG BFD = 45 CM. MAX = 60 CM.
RIFFLE	35	1476	AVG BFD = 55 CM. MAX = 65 CM.
CASCADE	45	1926	AVG BFD = 60 CM. MAX = 95 CM.
CULVERT		2028	TWO ROUND ALUMINUM PIPES. PERCH = 55 CM. WIDTH = 2.5 CM. HEIGHT = 2 CM.
RIFFLE	55	2777	AVG BFD = 45 CM. MAX = 60 CM.



Streams inventoried on the Nimrod Hall Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	South Fork of Pads Creek
District:	Warm Springs
USGS Quadrangle:	Nimrod Hall
Inventory Date:	08/08/05
Downstream Starting Point:	National Forest Boundary off of Rd 129
Total Distance Inventoried (km):	8.1

	Pools	Riffles
Percent of Total Stream Area:	23	77
Total Area (m ²):	8926 ± 702	29214 ± 1699
Correction Factor Applied:	0.93	1.01
Number of Paired Samples:	9	8
Total Count:	89	87
Number per km:	11	11
Mean Area (m ²):	100	336
Mean Maximum Depth (cm):	40	29
Mean Average Depth (cm):	25	13
Mean Residual Depth (cm):	16	--
Percent Inventoried as Glides:	27	--
Percent Inventoried as Runs:	--	3
Percent Inventoried as Cascades:	--	6
Percent with >35% Fines:	2	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	4
< 5 m long, > 55 cm diameter:	0
> 5 m long, 10 cm – 55 cm diameter:	13
> 5 m long, > 55 cm diameter:	0
Total:	17

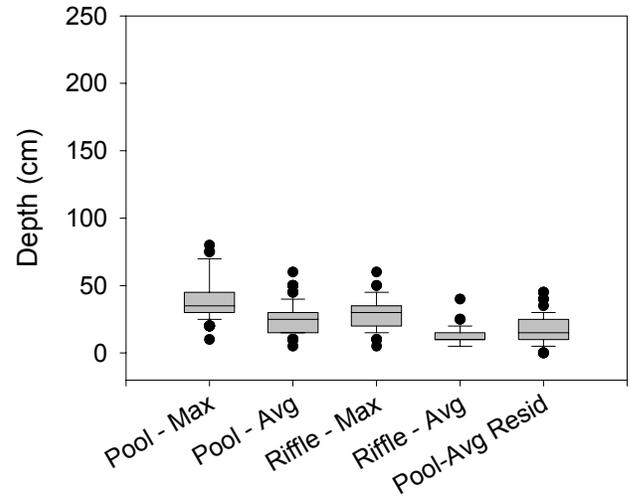
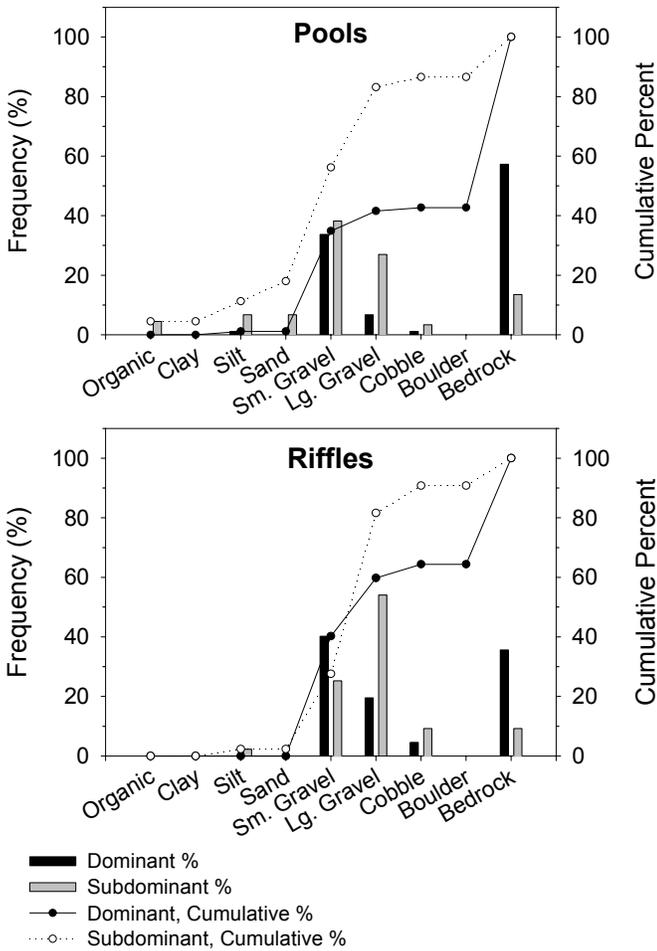
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	11	2
Maximum	16	5
75 th Percentile	12	2
25 th Percentile	9	1
Minimum	6	0

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

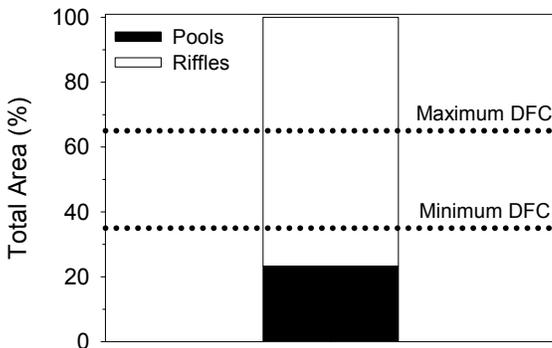
Rosgen's Channel Type	Frequency (%)
A:	0
B:	100
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	7
Mean Channel Gradient (%):	4
Median Water Temperature (C):	20

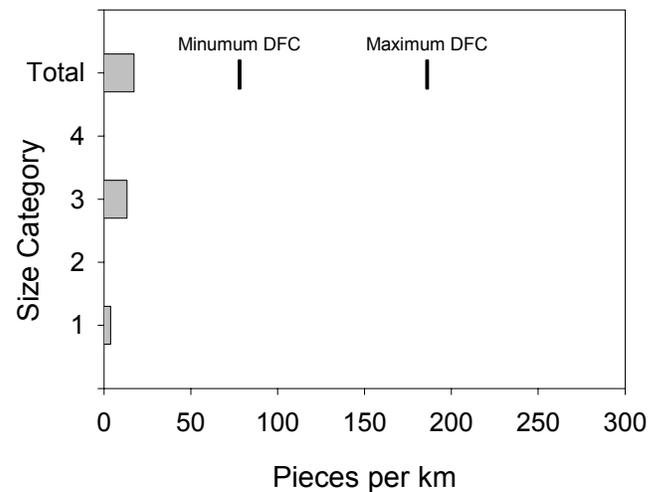


Maximum and average depths and residual pool depths for pools and riffles in South Fork of Pads Creek, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in South Fork of Pads Creek, summer 2005.



Estimated area of South Fork of Pads Creek in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

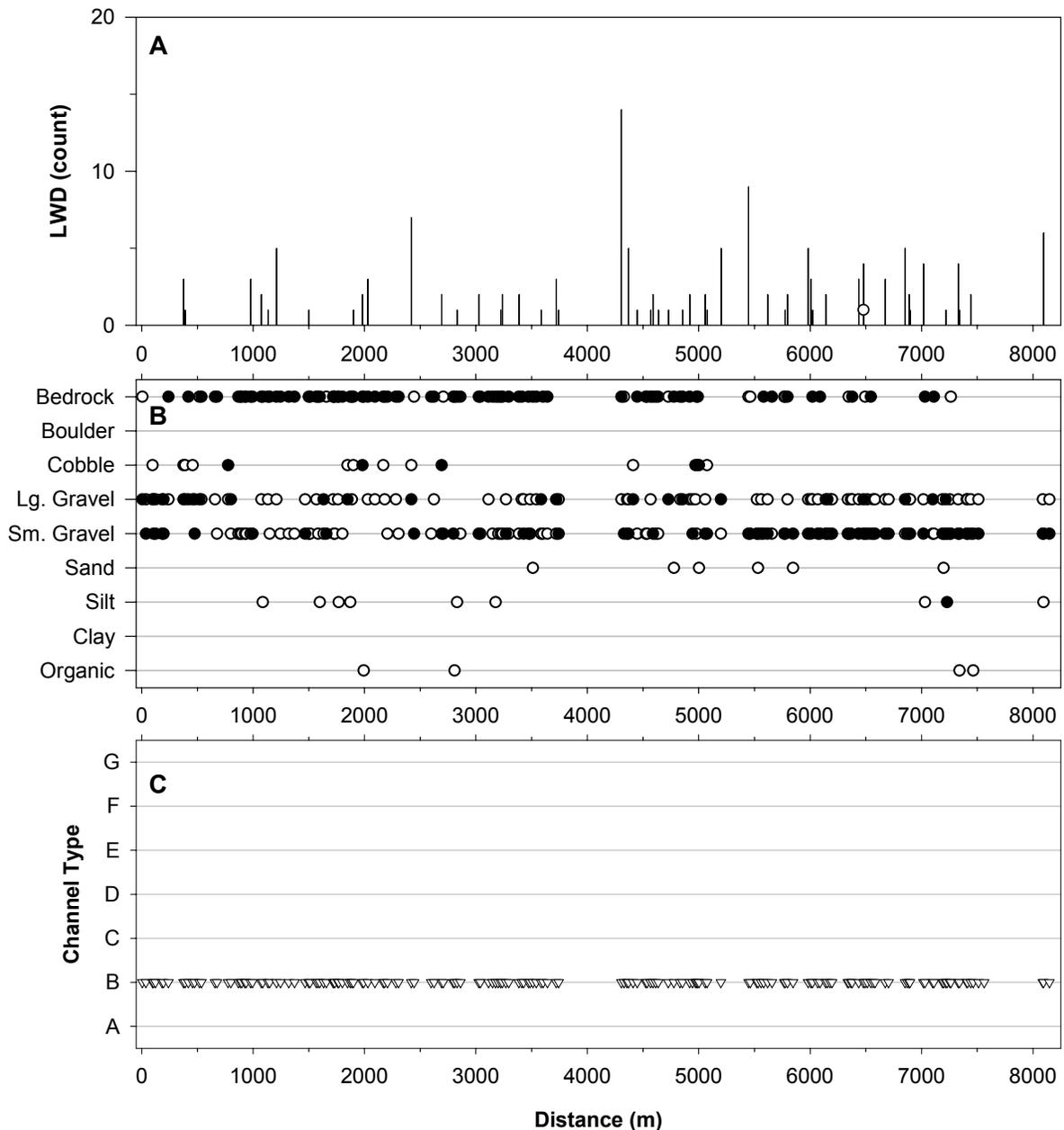


LWD per kilometer in South Fork of Pads Creek, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on South Fork of Pads Creek during BVET habitat inventory, summer 2005.
Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	123		OUT ON RIGHT, 7 M WIDE, LOG JAM
TRIBUTARY	673	1	IN ON LEFT
TRIBUTARY	1369	3	IN ON RIGHT
FALL	1394		HEIGHT 1.2 M
FORD	1841		2 PHOTOS, ONE FROM EACH SIDE
FORD	2030		2 PHOTOS ONE FORM EACH SIDE; ROAD 129
END	2030		END INVENTORY ON 8/8/2005 AT 5:19 PM
RESUME	2030		RESUME INVENTORY ON 8/9 AT 9:30 AM. RAINED OVERNIGHT AND DURING THE MORNING.
OTHER	2282		ROCK WALL ON RIGHT
TRIBUTARY	2716	6.5	IN ON RIGHT
OTHER	3330		BIG ROCK WALL ON LEFT SIDE
TRIBUTARY	3742	1.5	IN ON RIGHT
TRIBUTARY	4216		IN ON RIGHT
END	4216		END INVENTORY AT 11:30 AM DUE TO RAIN
RESUME	4216		RESUME INVENTORY 10:00 AM ON 8/10/05
TRIBUTARY	4782	0.5	IN ON LEFT
SIDE CHANNEL	4981		IN ON RIGHT
TRIBUTARY	5219	1	IN ON RIGHT
TRIBUTARY	5755	1.5	IN ON RIGHT
TRIBUTARY	6242		IN ON RIGHT, DRY
SEEP	6441		
FALL	6641		1.2M TALL
TRIBUTARY	6897	2	IN ON LEFT
TRIBUTARY	7229		IN ON RIGHT
TRIBUTARY	7373		IN ON LEFT, DRY
TRIBUTARY	7447	0.5	IN ON RIGHT
TRIBUTARY	7655		IN ON RIGHT, DRY
TRIBUTARY	7977	0.5	IN ON RIGHT
TRIBUTARY	8094	0.25	IN ON LEFT
OTHER	8148		STREAM ENDS IN SPRING.
END	8148		END INVENTORY 2:18 PM ON 8/10/2005.

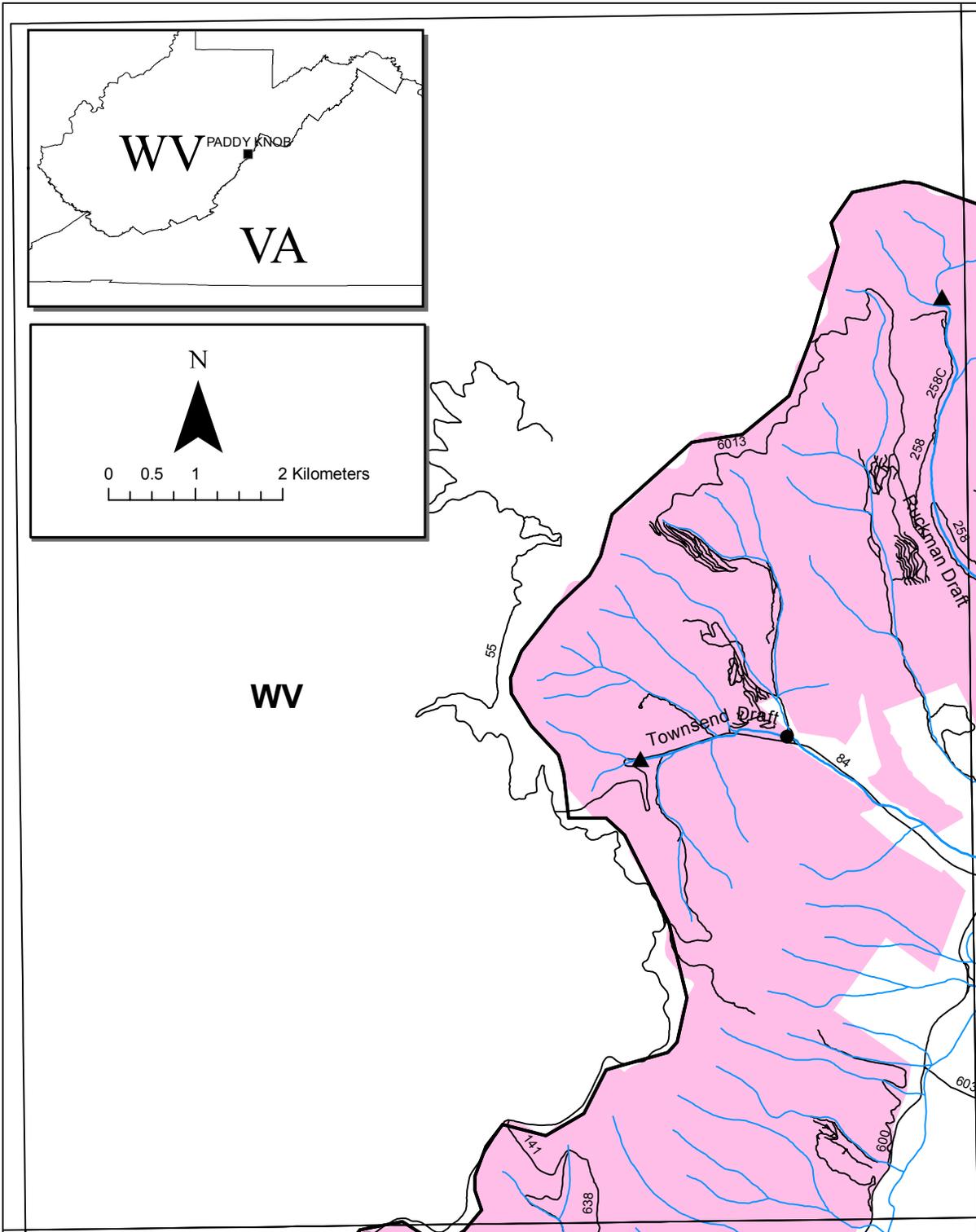


Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in South Fork of Pads Creek, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on South Fork Pads Creek* during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
TRIBUTARY		2	IN ON RIGHT
CASCADE	9	897	AVG BANKFULL DEPTH (BFD) = 30 CM. MAX = 40 CM.
TRIBUTARY		1369	IN ON RIGHT
FALL		1394	HEIGHT 1.2 M.
RIFFLE	19	1633	ROAD ON LEFT; AVG BFD = 35 CM. MAX = 45 CM.
FORD		1841	2 PHOTOS, ONE FROM EACH SIDE.
FORD		2030	2 PHOTOS ONE FORM EACH SIDE; ROAD 129.
RN	29	2445	AVG BFD = 30 CM. MAX = 45 CM.
TRIBUTARY		2716	IN ON RIGHT
OTHER		3330	BIG ROCK WALL ON LEFT SIDE
RIFFLE	39	3386	AVG BFD = 35 CM. MAX = 40 CM.
TRIBUTARY		3742	IN ON RIGHT
TRIBUTARY		4216	IN ON RIGHT
RIFFLE	49	4569	AVG BFD = 45 CM. MAX BFD = 55 CM.
TRIBUTARY		4782	IN ON LEFT
TRIBUTARY		5219	IN ON RIGHT
RIFFLE	59	5522	AVG BFD = 35 CM. MAX = 55 CM.
TRIBUTARY		5755	IN ON RIGHT
TRIBUTARY		6242	IN ON RIGHT, DRY
RIFFLE	69	6366	AVG BFD = 35 CM. MAX = 50 CM.
FALL		6641	1.2M TALL
TRIBUTARY		6897	IN ON LEFT
RIFFLE	79	7189	AVG BFD = 30 CM. MAX = 35 CM.
TRIBUTARY		7229	IN ON RIGHT
TRIBUTARY		7373	IN ON LEFT, DRY
TRIBUTARY		7447	IN ON RIGHT
TRIBUTARY		7655	IN ON RIGHT, DRY
TRIBUTARY		7977	IN ON RIGHT
TRIBUTARY		8094	IN ON LEFT
OTHER		8148	STREAM ENDS IN SPRING.

*Two photos are not included on CD-ROM



Streams inventoried on the Paddy Knob Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Townsend Draft
District:	Warm Springs
USGS Quadrangle:	Paddy Knob
Inventory Date:	07/07/05
Downstream Starting Point:	National Forest Boundary. 100 meters above ford off Rt. 804.
Total Distance Inventoried (km):	1.8

	Pools	Riffles
Percent of Total Stream Area:	7	93
Total Area (m ²):	285 ± 87	4071 ± 986
Correction Factor Applied:	0.79	1.00
Number of Paired Samples:	4	4
Total Count:	21	22
Number per km:	12	13
Mean Area (m ²):	14	185
Mean Maximum Depth (cm):	48	20
Mean Average Depth (cm):	26	7
Mean Residual Depth (cm):	18	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	5
Percent with >35% Fines:	0	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	25
< 5 m long, > 55 cm diameter:	1
> 5 m long, 10 cm – 55 cm diameter:	26
> 5 m long, > 55 cm diameter:	2
Total:	54

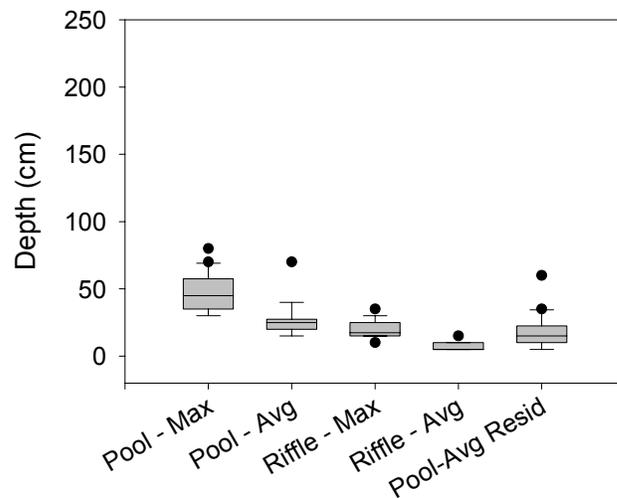
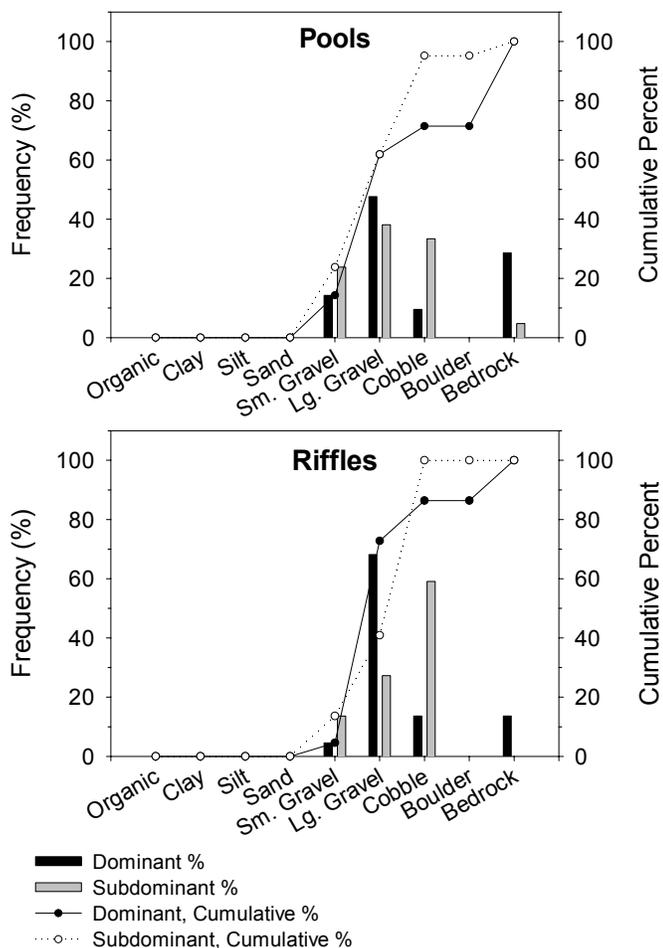
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	9	2
Maximum	13	3
75 th Percentile	11	2
25 th Percentile	8	1
Minimum	6	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

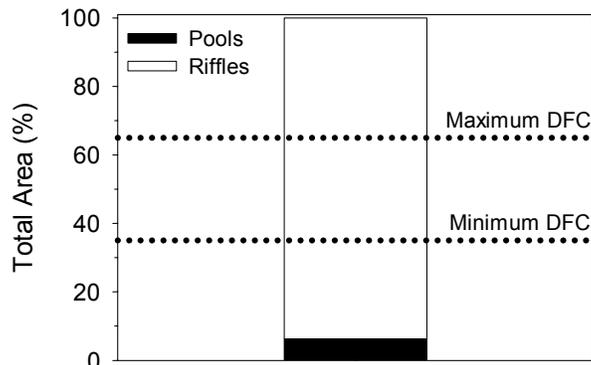
Rosgen's Channel Type	Frequency (%)
A:	0
B:	100
C:	0
D:	0
E:	0
F:	0
G:	0

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

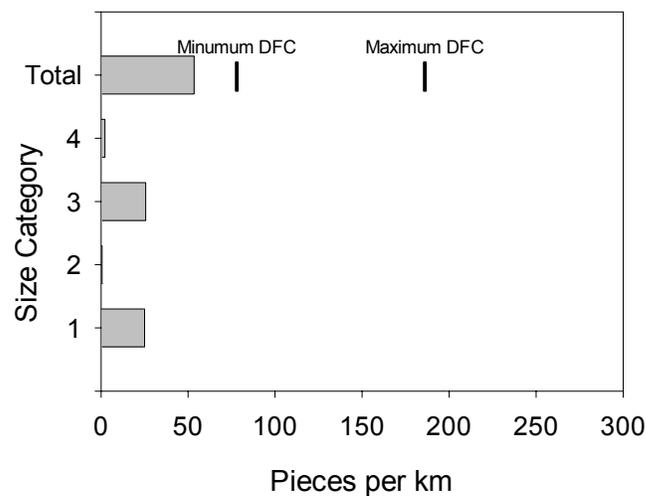


Maximum and average depths and residual pool depths for pools and riffles in Townsend Draft, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Townsend Draft, summer 2005.



Estimated area of Townsend Draft in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

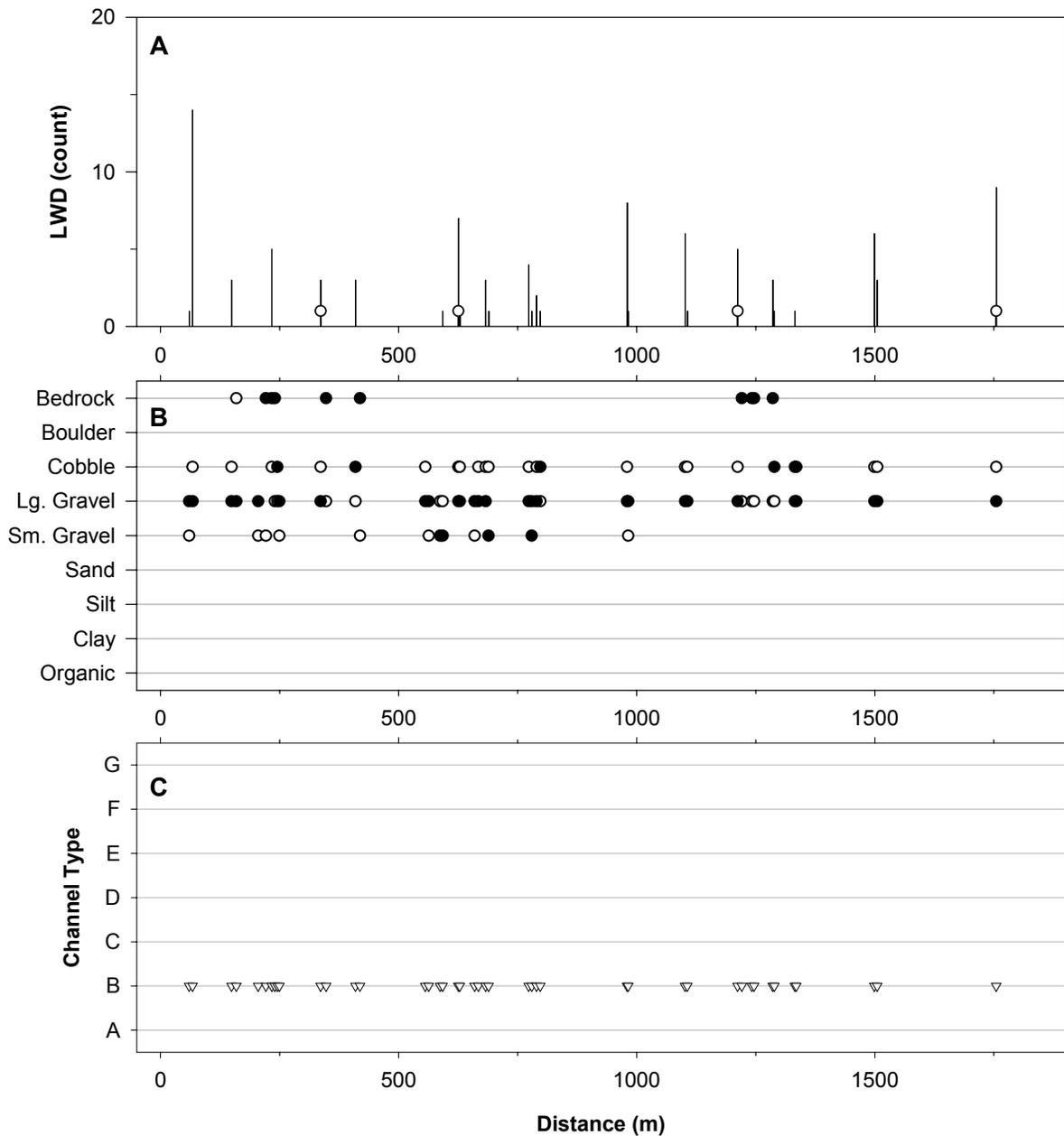


LWD per kilometer in Townsend Draft, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Townsend Draft during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

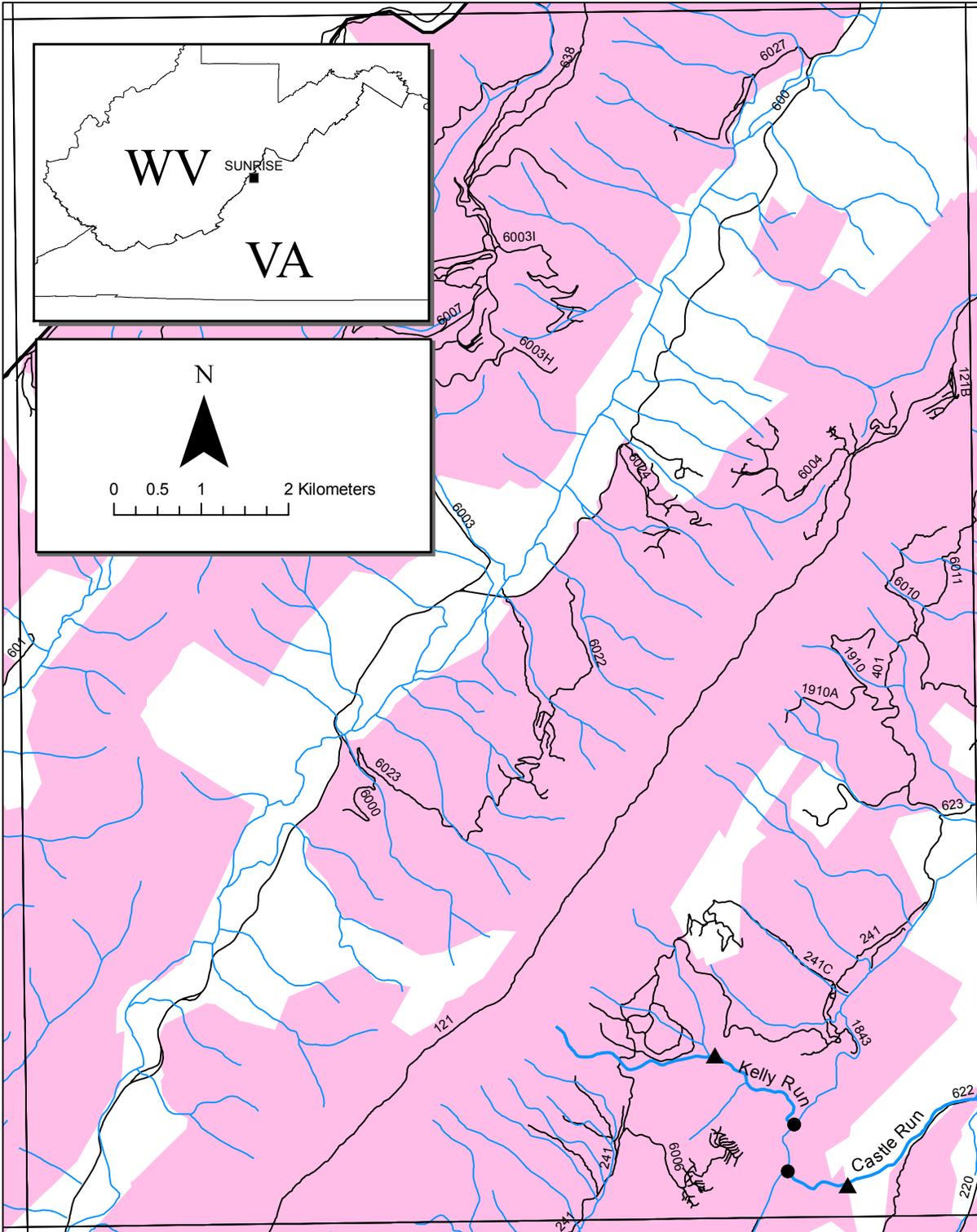
Stream Feature	Distance (m)	Width (m)	Comments
SIDE CHANNEL	27		IN ON LEFT
SIDE CHANNEL	109		OUT ON LEFT
TRIBUTARY	458		IN ON RIGHT
BRIDGE	478		RT 84
TRIBUTARY	705	0.5	IN ON RIGHT
TRIBUTARY	773	1	
SEEP	817		ON LEFT
TRIBUTARY	843		IN ON RIGHT
TRIBUTARY	901		IN ON RIGHT
TRIBUTARY	1257		IN ON RIGHT
SEEP	1316		ON LEFT
TRIBUTARY	1755		CONFLUENCE OF 2 UNNAMED TRIBS (ONE COMES FROM BEAR HOLLOW)



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Townsend Draft, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Townsend Draft during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	3	205	AVG BANKFULL DEPTH (BFD) = 65 CM. MAX BFD = 75 CM.
TRIBUTARY		458	IN ON RIGHT
BRIDGE		478	RT 84
TRIBUTARY		705	IN ON RIGHT
RIFFLE	13	773	AVG BFD = 60 CM. MAX BFD = 75 CM.
TRIBUTARY		773	
TRIBUTARY		843	IN ON RIGHT
TRIBUTARY		901	IN ON RIGHT
CASCADE	18	1242	AVG BFD = 105 CM. MAX BFD = 115 CM.
TRIBUTARY		1257	IN ON RIGHT



Streams inventoried on the Sunrise Quadrangle using BVET habitat inventories during summer 2005. Closed circles represent the downstream starting position of inventories and closed triangles represent upstream endpoints. See quadrangle map (pg. 15) for names of adjacent quadrangles.

Stream:	Castle Run
District:	Warm Springs
USGS Quadrangle:	Sunrise
Inventory Date:	08/08/05
Downstream Starting Point:	Confluence with Jackson River
Total Distance Inventoried (km):	0.8

	Pools	Riffles
Percent of Total Stream Area:	14	86
Total Area (m ²):	185 ± 53	1153 ± 95
Correction Factor Applied:	0.93	0.90
Number of Paired Samples:	3	3
Total Count:	16	17
Number per km:	21	22
Mean Area (m ²):	12	68
Mean Maximum Depth (cm):	50	15
Mean Average Depth (cm):	28	8
Mean Residual Depth (cm):	21	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	24
Percent with >35% Fines:	25	0

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	13
< 5 m long, > 55 cm diameter:	3
> 5 m long, 10 cm – 55 cm diameter:	8
> 5 m long, > 55 cm diameter:	1
Total:	25

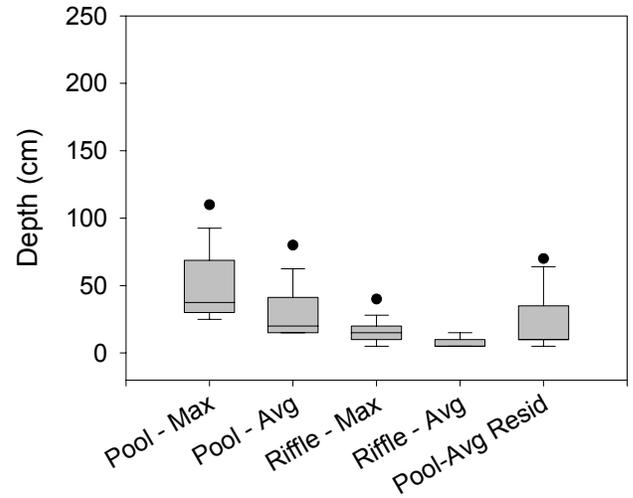
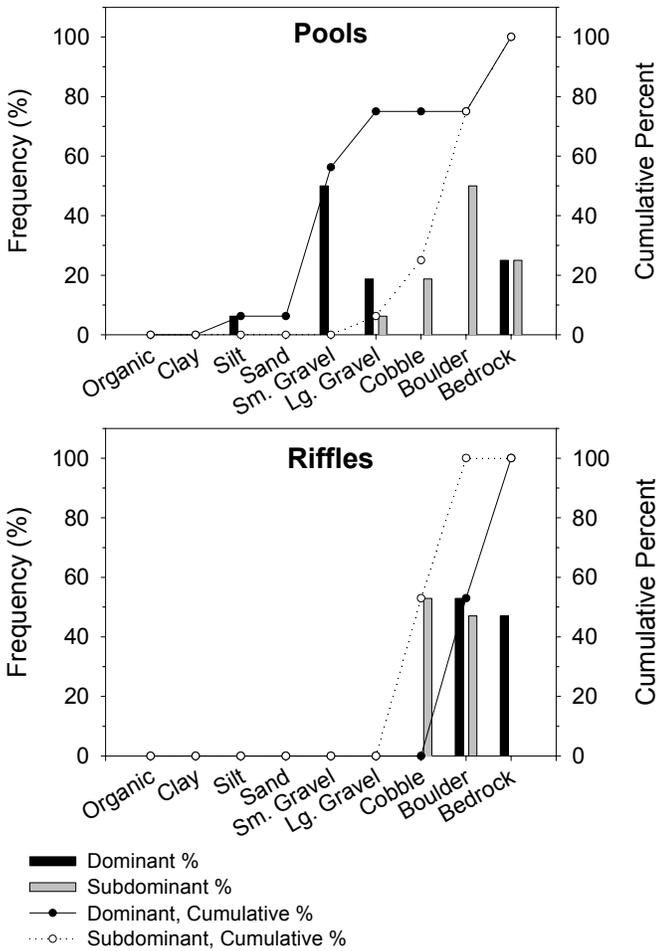
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	6	1
Maximum	8	3
75 th Percentile	7	1
25 th Percentile	5	1
Minimum	4	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

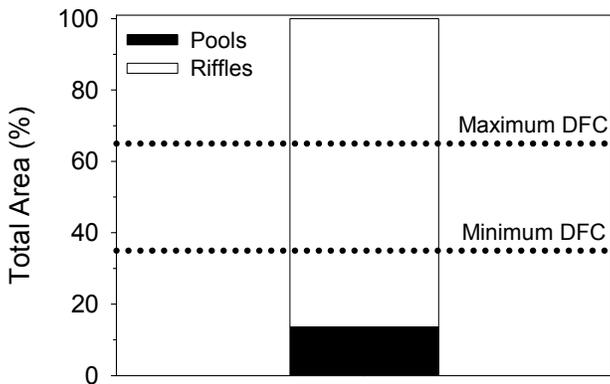
Rosgen's Channel Type	Frequency (%)
A:	100
B:	0
C:	0
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	5
Mean Channel Gradient (%):	9
Median Water Temperature (C):	12

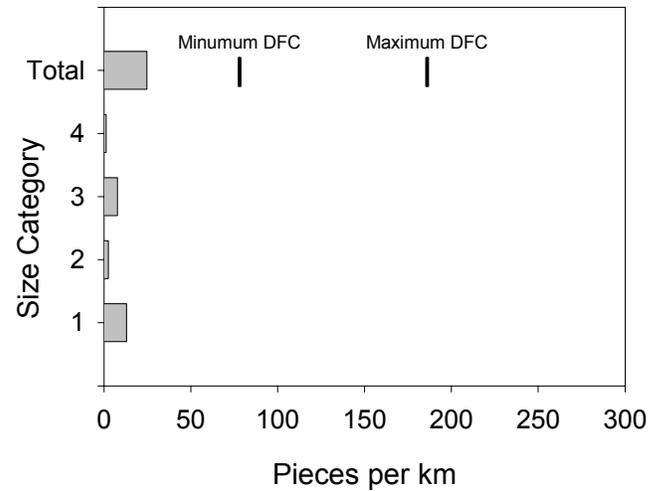


Maximum and average depths and residual pool depths for pools and riffles in Castle Run, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Castle Run, summer 2005.



Estimated area of Castle Run in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

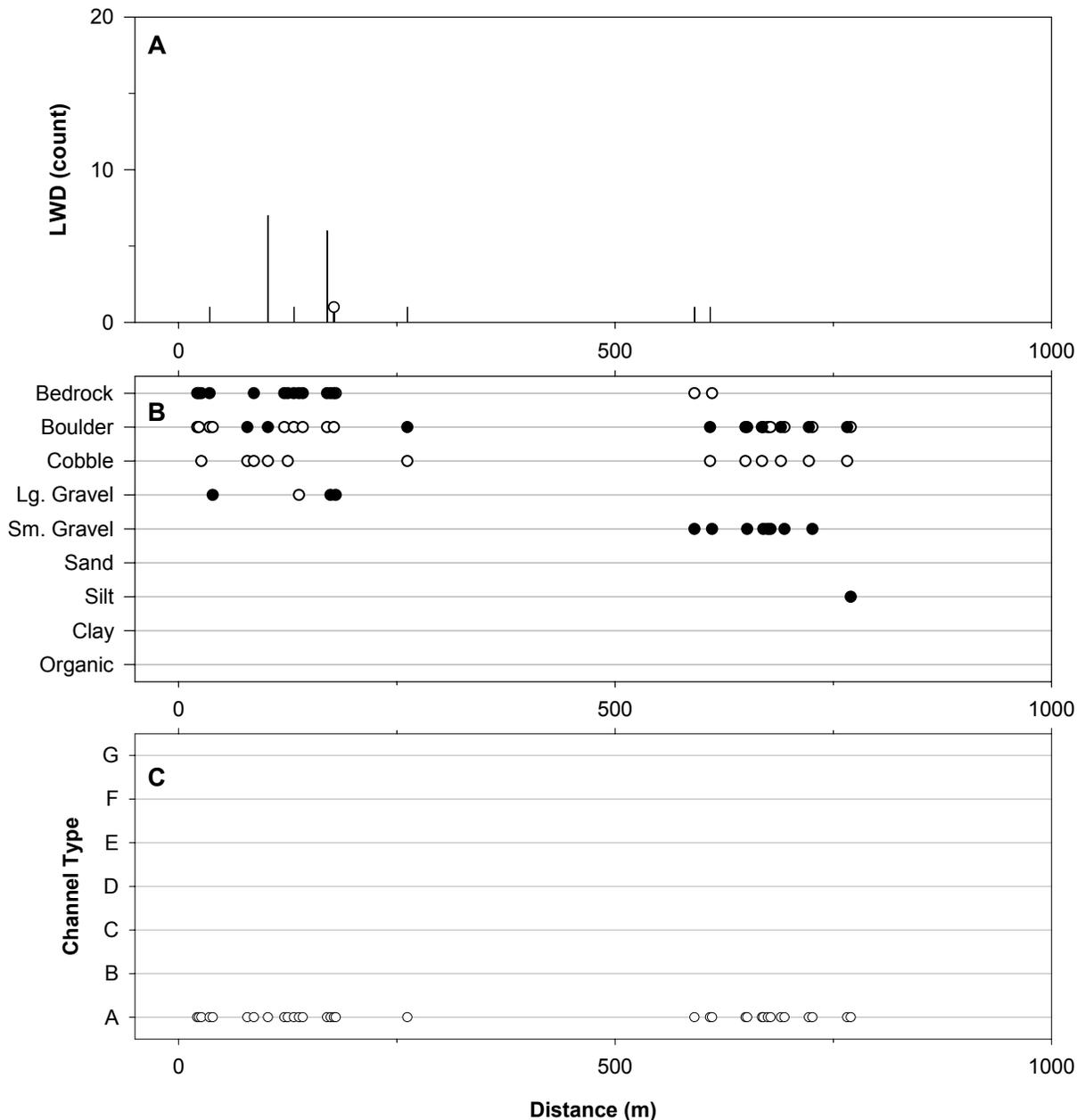


LWD per kilometer in Castle Run, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Castle Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
UNDERGROUND	587		



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Castle Run, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Castle Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	3	35	
CASCADE	8	142	
RIFFLE	14	668	

*Additional undocumented photos are included on CD-ROM.

Stream:	Kelly Run
District:	Warm Springs
USGS Quadrangle:	Sunrise
Inventory Date:	07/05/05
Downstream Starting Point:	Confluence with the Jackson River
Total Distance Inventoried (km):	1.8

	Pools	Riffles
Percent of Total Stream Area:	28	72
Total Area (m ²):	1782 ± 183	4499 ± 10030
Correction Factor Applied:	1.11	0.98
Number of Paired Samples:	3	3
Total Count:	28	29
Number per km:	15	16
Mean Area (m ²):	64	155
Mean Maximum Depth (cm):	45	25
Mean Average Depth (cm):	25	12
Mean Residual Depth (cm):	14	--
Percent Inventoried as Glides:	0	--
Percent Inventoried as Runs:	--	0
Percent Inventoried as Cascades:	--	0
Percent with >35% Fines:	43	7

Large Woody Debris Size	Pieces per km
< 5 m long, 10 cm – 55 cm diameter:	17
< 5 m long, > 55 cm diameter:	0
> 5 m long, 10 cm – 55 cm diameter:	4
> 5 m long, > 55 cm diameter:	1
Total:	21

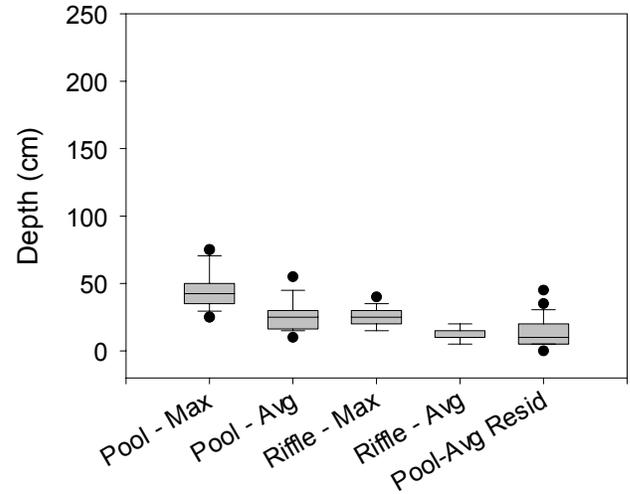
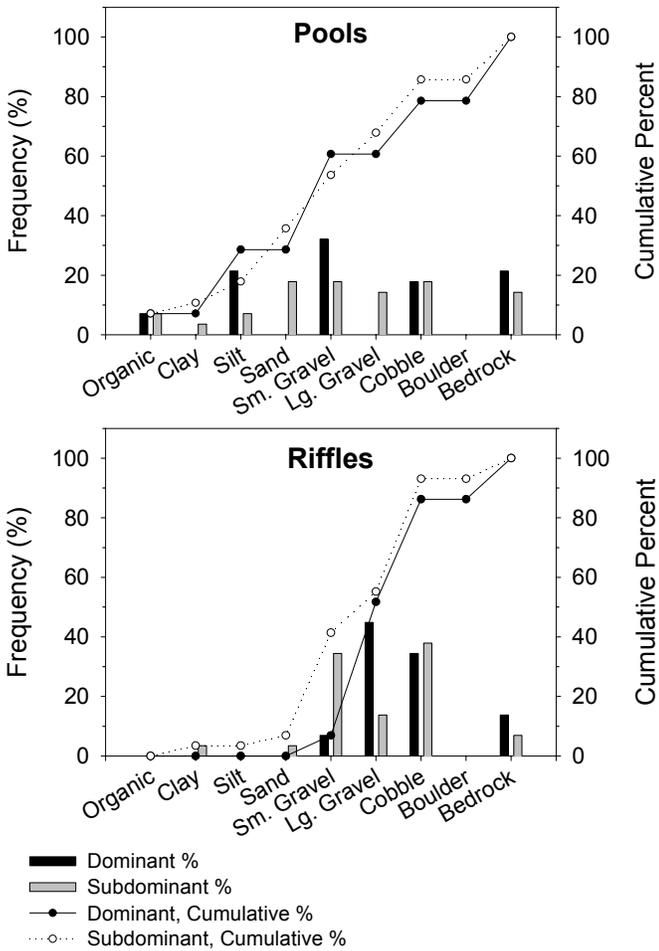
Riparian Width	Total Width* (m)	Left & Right Width** (m)
Mean	11	3
Maximum	15	5
75 th Percentile	13	4
25 th Percentile	9	2
Minimum	7	1

*Left riparian, right riparian, and bankfull channel widths were added together for calculations

**Left and right riparian widths were grouped (not added) together for calculations

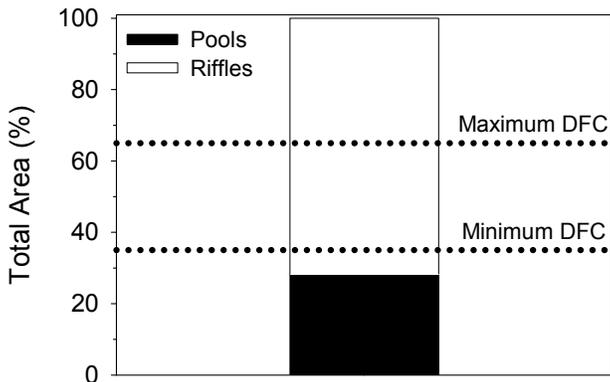
Rosgen's Channel Type	Frequency (%)
A:	0
B:	52
C:	48
D:	0
E:	0
F:	0
G:	0

Other Stream Attributes	
Mean Bankfull Channel Width (m):	7
Mean Channel Gradient (%):	3
Median Water Temperature (C):	13

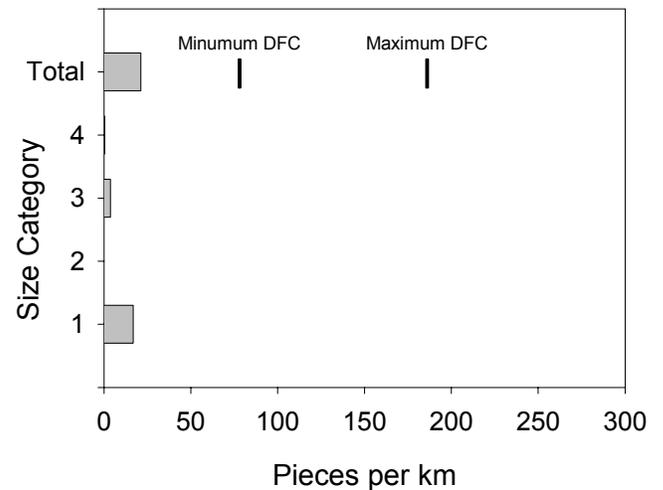


Maximum and average depths and residual pool depths for pools and riffles in Kelly Run, summer 2005. The top and bottom of the boxes represent the 25th and 75th percentiles, the bar in the center of the box represents the median, whiskers represent the 10th and 90th percentiles, and closed circles represent the entire range of the data.

Frequency (percent) and cumulative percent of dominant and subdominant substrate occurrence for pools and riffles in Kelly Run, summer 2005.



Estimated area of Kelly Run in pools and riffles as calculated using BVET techniques, summer 2005. The GWJNF DFC is between 35 and 65 percent of total stream area in pools.

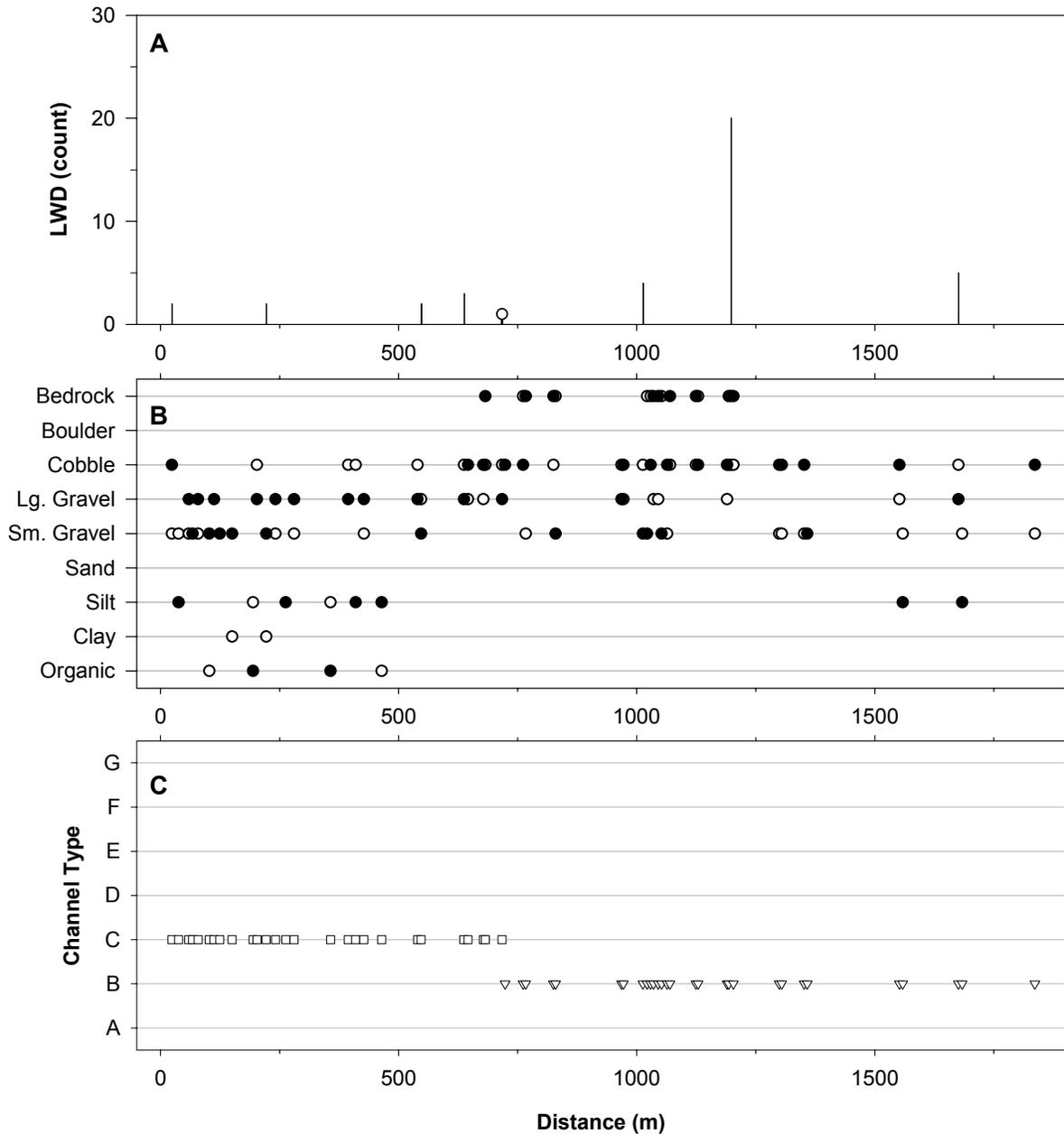


LWD per kilometer in Kelly Run, summer 2005. Y-axis labels are LWD size classes described below. The GWJNF DFC for total LWD is between 78 and 186 pieces per km.

- 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

Stream features found on Kelly Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Stream Feature	Distance (m)	Width (m)	Comments
OTHER	370		HIDDEN VALLEY TRAIL
OTHER	618		HIDDEN VALLEY TRAIL
SIDE CHANNEL	882		ON RIGHT
SIDE CHANNEL	932		IN ON RIGHT
SIDE CHANNEL	1631		ON LEFT
SIDE CHANNEL	1654		IN ON LEFT
SEEP	1080		ON LEFT
SEEP	1129		ON LEFT
TRIBUTARY	1168	0.5	DRY. IN ON LEFT.
TRIBUTARY	1280	0.5	ON RIGHT
TRIBUTARY	1704	1	ON LEFT



Distribution and abundance of LWD, distribution of substrates, and distribution of Rosgen's channel types (Rosgen 1996) in Kelly Run, summer 2005. LWD, substrate, and channel type were recorded for each habitat unit in the stream. X-axis indicates distance upstream from National Forest boundary. Vertical bars on (A) indicate total count of LWD; open circles represent the amount of the total LWD that was >5 m in length, >55 cm in diameter (size 4). Closed circles on (B) are dominant substrates, open circles are subdominant substrates. See Appendix A for substrate sizes. See Appendix A for channel type descriptions from (C).

Photos taken on Kelly Run during BVET habitat inventory, summer 2005. Distance is meters from start of inventory.

Unit Type	Unit Number	Distance (m)	Comments
RIFFLE	8	280	AVG BANKFULL DEPTH (BFD) = 75 CM. MAX BFD = 85 CM.
RIFFLE	17	968	AVG BFD = 65 CM. MAX BFD = 90 CM.
RIFFLE	27	1552	AVG BFD = 50 CM. MAX BFD = 70 CM.

Appendix A:

Size classes used to categorize large woody debris during BVET habitat inventories on the Warm Springs Ranger District, summer 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

Size classes used to categorize substrate particles during BVET habitat inventories on the Warm Springs 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

Bankfull channel characteristics used to determine Rosgen channel types in the field during BVET habitat inventories on the Warm Springs 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