

**Current Condition of Streams on the Blacksburg Ranger District,  
George Washington - Jefferson National Forest, Virginia**



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134 Cheatham Hall  
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United States Department of Agriculture  
Forest Service  
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**Introduction** - In Spring 1999 we began stream habitat surveys on the Blacksburg Ranger District (BRD), George Washington - Jefferson National Forest (GW - JNF) to quantify current stream conditions. Habitat in over 60 miles of stream (23 streams) was classified and inventoried between 26 May and 13 August 1999 using Basinwide Visual Estimation Techniques (BVET [Dolloff et. al 1993]).

We modified standard BVET methods to measure stream habitat parameters identified in the George Washington (GW) forest plan. Included in the forest plan is an outline of the desired-future-condition (DFC) for all the streams within the GW based on physical habitat. The pertinent DFCs for the GW include woody debris loading of 78 to 186 pieces per kilometer and 30 to 70 percent of the total stream habitat in pools. The use of BVET allowed us to estimate woody debris loading, percentage of pool and riffle area, and the width of the riparian area of streams in the BRD. Further, we were able to map the distribution of woody debris, and Rosgen's channel type in all streams surveyed.

The purpose of this report is to describe the current conditions of BRD streams in a format useful to the BRD and the GW-JNF. The enclosed information is intended as a baseline for BRD managers involved in habitat improvement projects or land use decisions.

**Methods** - Two-stage visual estimation techniques were used to quantify habitat and DFCs in selected BRD streams. During the first stage, all habitat units were classified and the surface area and depth were estimated. Sampling strata were based on naturally occurring habitat units such as pools (an area in the stream with low water velocity, streambed gradient less than zero, and a smooth water surface), riffles (an area in the stream with moderately steep gradient, shallow water, relatively high velocity, and turbulent surface), glides (an area in the stream with moderate to low water velocity, gradient at or near zero, and uniform depth), cascades (an area in the stream with very high velocity, turbulent surface, and steep gradient), and braids (an area in the stream where multiple channels occur regardless of habitat type). Surveys began at confluences for streams confined to the BRD and at the downstream USFS boundary for all other streams. Surveys were terminated when we encountered an upstream USFS property boundary or determined the stream to be intermittent.

Habitat in each stream was classified and inventoried by a two-person crew. One crew member identified each habitat unit by type, estimated surface area, estimated the average and maximum depth, and substrate composition for each habitat unit. This crew member also determined whether or not embeddedness (an area on the stream bottom where larger substratum was embedded by at least 35% or more of smaller substratum) was present in pools. Average depth of each habitat unit was estimated by taking depth measurements at various places across the channel profile with a graduated staff marked in 5cm increments. The length (0.1m) of each habitat unit was measured with a hip chain.

Another crew member classified and inventoried large woody debris (LWD) within the stream channel, and Rosgen's channel type associated with each habitat unit. This crew member also recorded the data on a Husky Hunter field computer. LWD was divided into four classes: 1) less than 5m long, less than 55 cm in diameter,

2) less than 5m long, greater than 55cm in diameter, 3) greater than 5m long, less than 55cm in diameter, and 4) greater than 5m long, greater than 55cm in diameter. All LWD less than 1m long and less than 10cm in diameter were omitted from the survey. Rosgen's channel types were restricted to A, B, C, D, and F (pers. comm. Gary Kappesser, GW-JNF Hydrologist). This was performed following the guidelines found in Rosgen, 1996.

The first unit of each habitat type selected for intensive sampling (accurate measurement of surface area - second stage sampling) was determined randomly. Additional units were selected systematically (one unit out of 10 for each habitat type). The width of these systematically selected habitat units was measured with a 30-m measuring tape at intervals ranging from about 1 m to 15 m. Interval size was determined by the length and the morphology of the unit (e.g., intervals of measured widths increased with increasing unit length).

The relationship between the estimated surface area and the measured surface area typically is strongly and positively correlated when the estimates are made by experienced personnel; thus, visual estimates were corrected by multiplying all estimates by a calibration ratio (Hankin and Reeves 1988). The calibration ratio ( $\hat{Q}$ ), the estimated true total area ( $\hat{M}$ ) and the variance of the area estimator  $\hat{V}(\hat{M})$  were calculated separately for each habitat type and each stream.

In each of the systematically selected riffles we also estimated the stream channel width (m) at bankfull and riparian width (m) as described by Harrelson et. al 1994. We used this information to describe the channel and flood plain associated with each stream. Temperature (Celsius) and channel gradient (%) were also measured at different intervals in each stream.

The corrected estimates of habitat area were computed using a Microsoft Excel spreadsheet macro created by Craig Roghair (140 Cheatham Hall, VA Tech, Blacksburg, VA 24061-0321) based on BVET calculations found in Dolloff et. al 1993. Data were summarized using Quattro Pro and Excel spreadsheets.

**User's Guide** - Stream Summaries are organized by U. S. Geological Survey Topographic Quadrangle. Data for each stream section were collected, analyzed, and presented separately. Glides and cascades were included with pools and riffles summaries respectively, unless otherwise specified (i.e. percent of pool habitat called as glide). Each stream or stream section summary contains: 1) synopsis of stream characteristics; 2) boxplots of maximum and average depth for pools and riffles, and average residual pool depth; 3) LWD size graph; 4) LWD distribution graph; 5) substrate composition for pools and riffles; 6) boxplot of riparian measurements; 7) percent pools and riffles graph; and 8) distribution of Rosgen's channel type. GW-JNF DFCs are indicated on all pertinent graphs.

We also included references tables of all streams surveyed which will allow managers to quickly assess the present condition of BRD streams in relation to pertinent DFCs. Streams are arranged by DFC parameters (percent pool habitat and LWD pieces per kilometer) in descending order. DFCs are indicated within each table.

## 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. 25 pp.
- 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.
- Harrelson, Cheryl C.; Rawlins, C. L.; Potyondy, John P. 1994. Stream channel reference sites: an illustrated guide to field technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61p.
- Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology Books, Pagosa Springs, Colorado. 390pp.

## Acknowledgments

We would like to thank the following people for their contributions to this report: George Annis, Dave Baxter, Mike Mabe, Kristen MacQuarrie, Jesse Overcash, Matt Stengel, and Jeff Strottman.

## Reference Tables

**Table 1.** Large woody debris (LWD) pieces per kilometer in streams on the Blacksburg Ranger District. Streams above the double line meet GW-JNF DFCs.

<b>Stream</b>	<b>LWD per kilometer</b>	<b>Kilometers Surveyed</b>
Dismal Creek	559.9	8.5
Little Stony Creek	483.7	6.2
Nobusiness Creek	437.4	9.3
Laurel Creek	411.1	2.4
Pearis Thompson Branch	387.8	2.4
Standrock Branch	366.3	1.8
Laurel Branch	363.0	1.9
Mill Creek	343.4	4.4
Unnamed Tributary of White Rock Branch	304.4	1.0
Nettle Hollow	278.5	1.2
White Rock Branch	254.5	4.5
Poverty Creek	202.4	8.7
South Fork of Potts Creek	201.7	2.9
War Spur Branch	200.8	3.5
Pineswamp Branch	194.3	0.6
Big Stony Creek	120.0	13.7
Straley Branch	113.4	1.3
North Fork of Stony Creek	104.2	8.4
Craig Creek	96.4	10.2
Johns Creek	85.7	3.1
*****		
<b>LWD <math>\geq</math> 78 pieces per kilometer</b>		
*****		
Lee Hollow	77.1	2.5
Dixon Branch	69.5	3.4
Whitewash Hollow	63.6	3.4

**Table 2.** Percent pool habitat of streams surveyed on the Blacksburg Ranger District. Streams above the double line meets GW-JNF DFCs.

<b>Stream</b>	<b>Percent Pool Habitat</b>	<b>Kilometers Surveyed</b>
Dismal Creek	83.2	8.5
Craig Creek	73.6	10.2
North Fork of Stony Creek	71.5	8.4
Poverty Creek	70.5	8.7
Little Stony Creek	60.5	6.2
Nobusiness Creek	58.7	9.3
Pearis Thompson Branch	52.4	2.4
White Rock Branch	49.9	4.5
South Fork of Potts Creek	49.6	2.9
Big Stony Creek	48.7	13.7
Whitewash Hollow	47.0	0.7
Straley Branch	46.8	1.3
Mill Creek	44.3	4.4
Laurel Creek	44.0	2.4
Standrock Branch	42.8	1.8
Dixon Branch	41.9	1.2
Nettle Hollow	39.6	1.2
Lee Hollow	38.3	1.5
Unnamed Tributary of White Rock Branch	30.5	1.0
*****		
<b>Pool Habitat <math>\geq</math> 30%</b>		
*****		
Johns Creek	27.3	3.1
War Spur Branch	27.0	3.5
Laurel Branch	24.5	1.9
Pineswamp Branch	15.9	0.6

## Stream Summaries

## **Craig Springs and McDonalds Mill Quadrangles**

**Stream:** Craig Creek

**District:** Blacksburg

**Quadrangle:** Looney

**Sample Date:** 07/11/1999

**Downstream Starting Point:** Forest Service boundary

**Total Distance Surveyed:** 10.2 kilometers

**Percent of Total Area - Pools:** 73.6%

Number of Pools: 367

Number of Pools per kilometer: 36.0

Total Pool Area: 44069.0 sq. meters  $\pm$  2026.8

Mean Pool Area: 120.1 sq. meters

Correction Factor: 0.99

Mean Maximum Depth: 50.8 cm

Mean Average Depth: 35.8 cm

Mean Average Residual Pool Depth: 11.0 cm

**Percent of Total Area - Riffles:** 26.4%

Number of Riffles: 209

Number of Riffles per kilometer: 20.5

Total Riffle Area: 15836.4 sq. meters  $\pm$  2257.6

Mean Riffle Area: 75.8 sq. meters

Correction Factor: 0.99

Mean Maximum Depth: 22.0 cm

Mean Average Depth: 12.8 cm

**Number of Large Woody Debris Pieces per kilometer:** 96.4

Wood < 5 m and < 55 cm: 43.7

Wood < 5 m and > 55 cm: 3.6

Wood > 5 m and < 55 cm: 35.1

Wood > 5 m and > 55 cm: 14.0

**Mean Channel Width:** 8.8 m

**Mean Riparian Width:** 79.5 m

Mean Maximum Riparian Distance (either side): 59.4 m

Mean Minimum Riparian Distance (either side): 11.3 m

Maximum Riparian Width (Total): 199.3 m

Minimum Riparian Width (Total): 17.0 m

Craig Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 38.2%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 10.6%

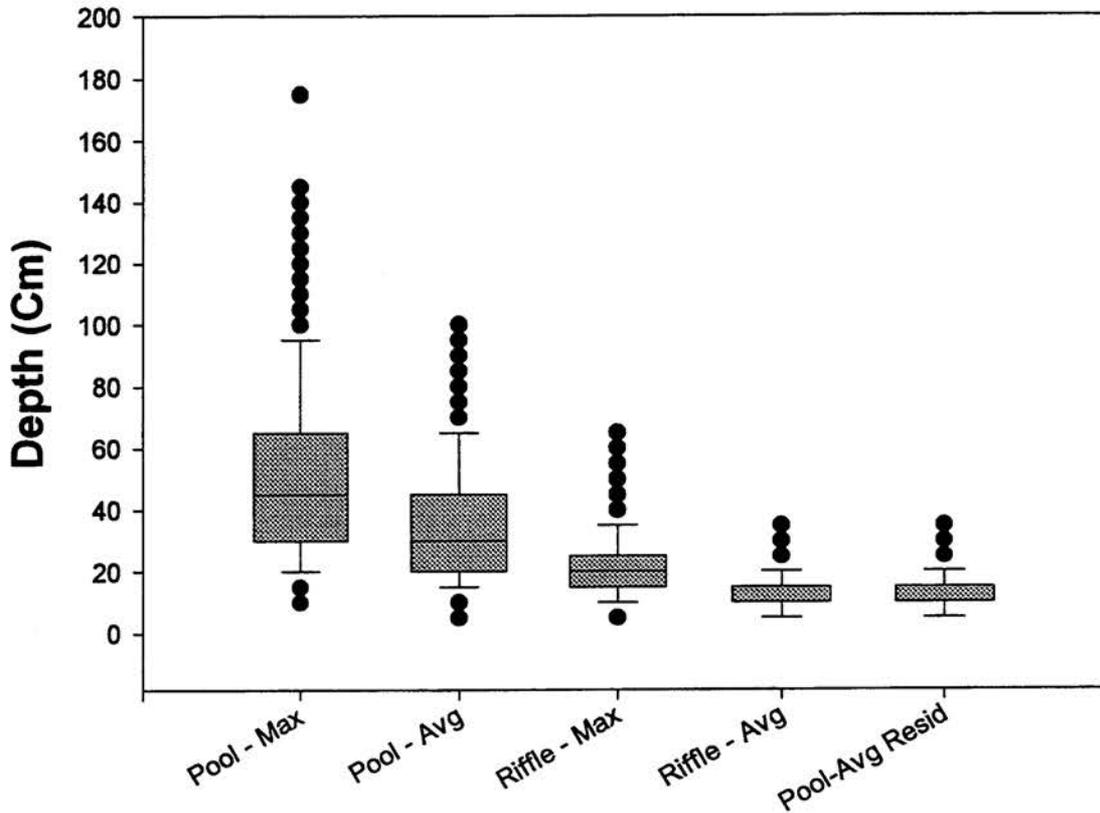
Channel Type C: 89.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 18.8%**

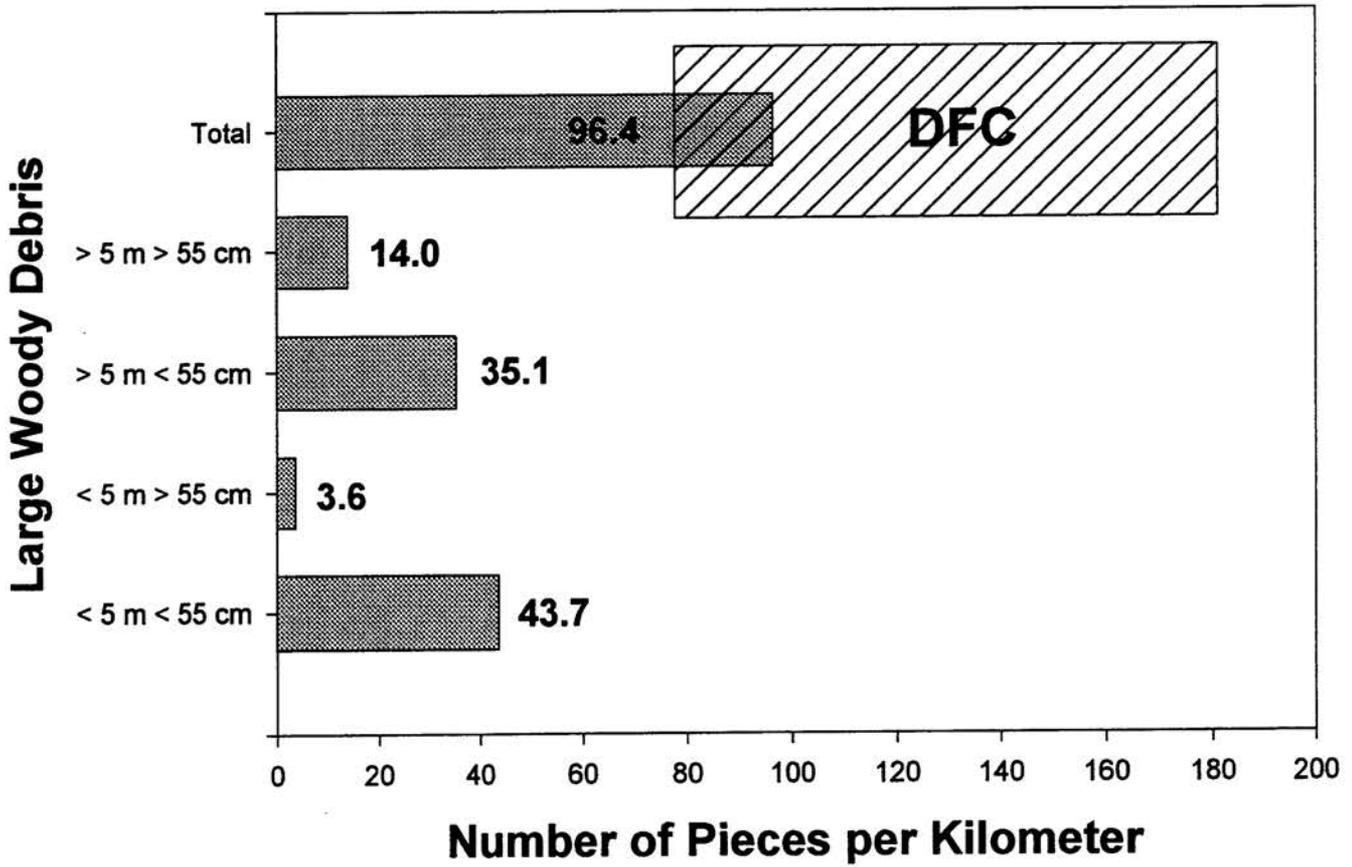
**Average Channel Gradient: 3.9**

## Craig Creek

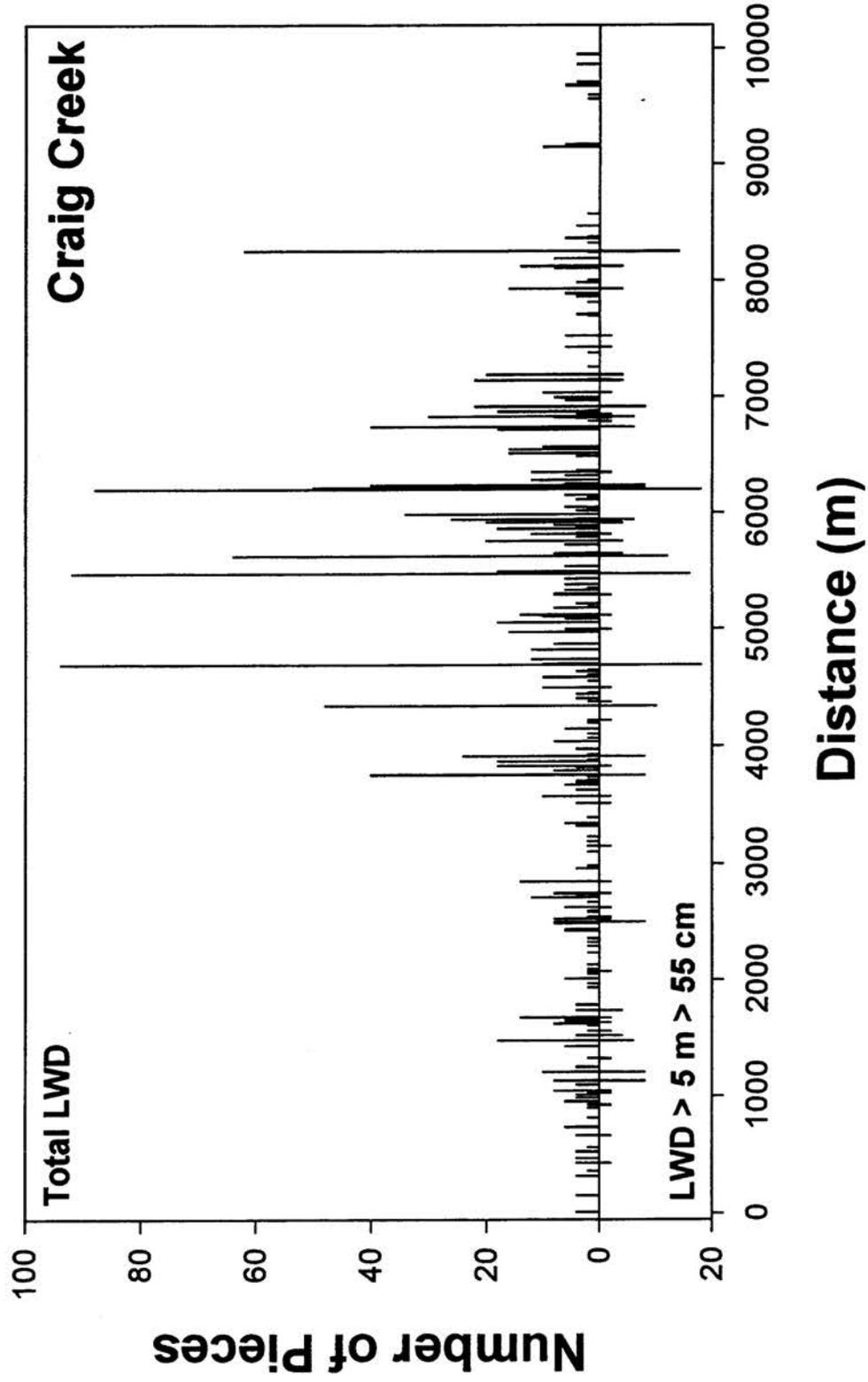


Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.

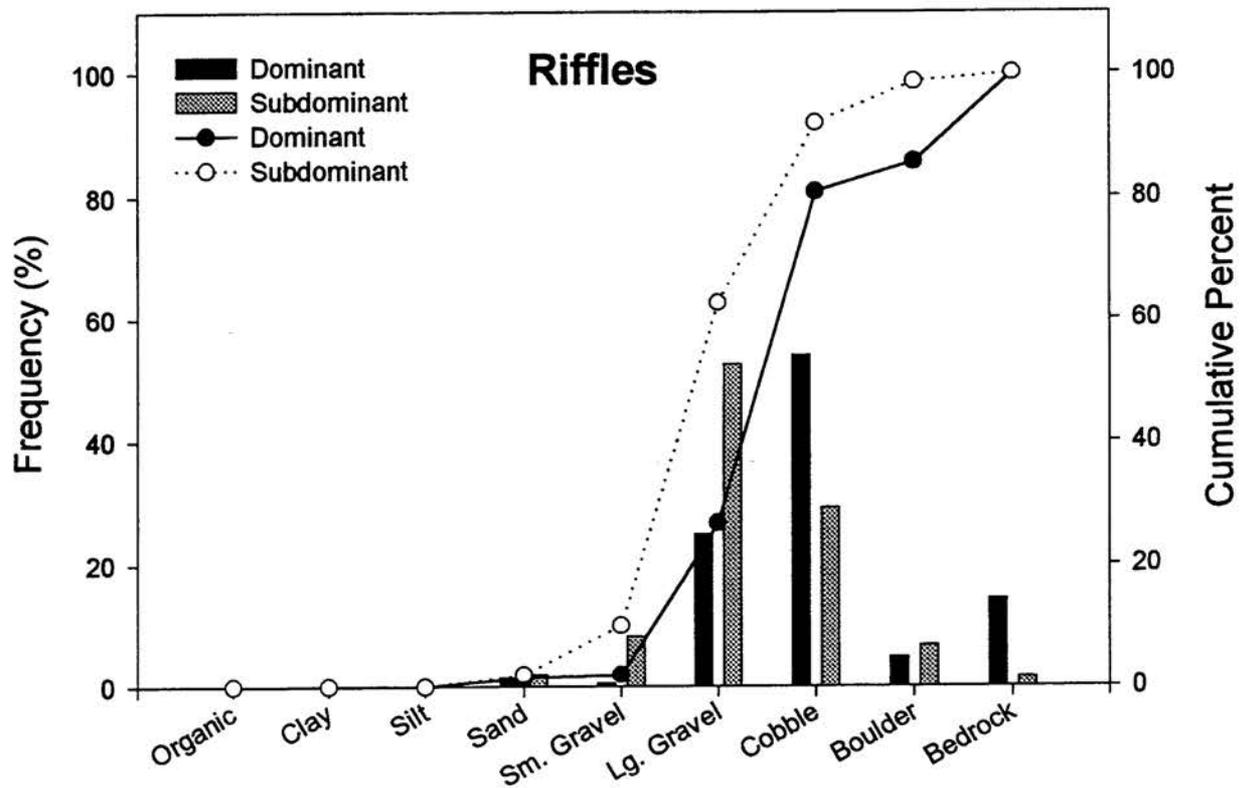
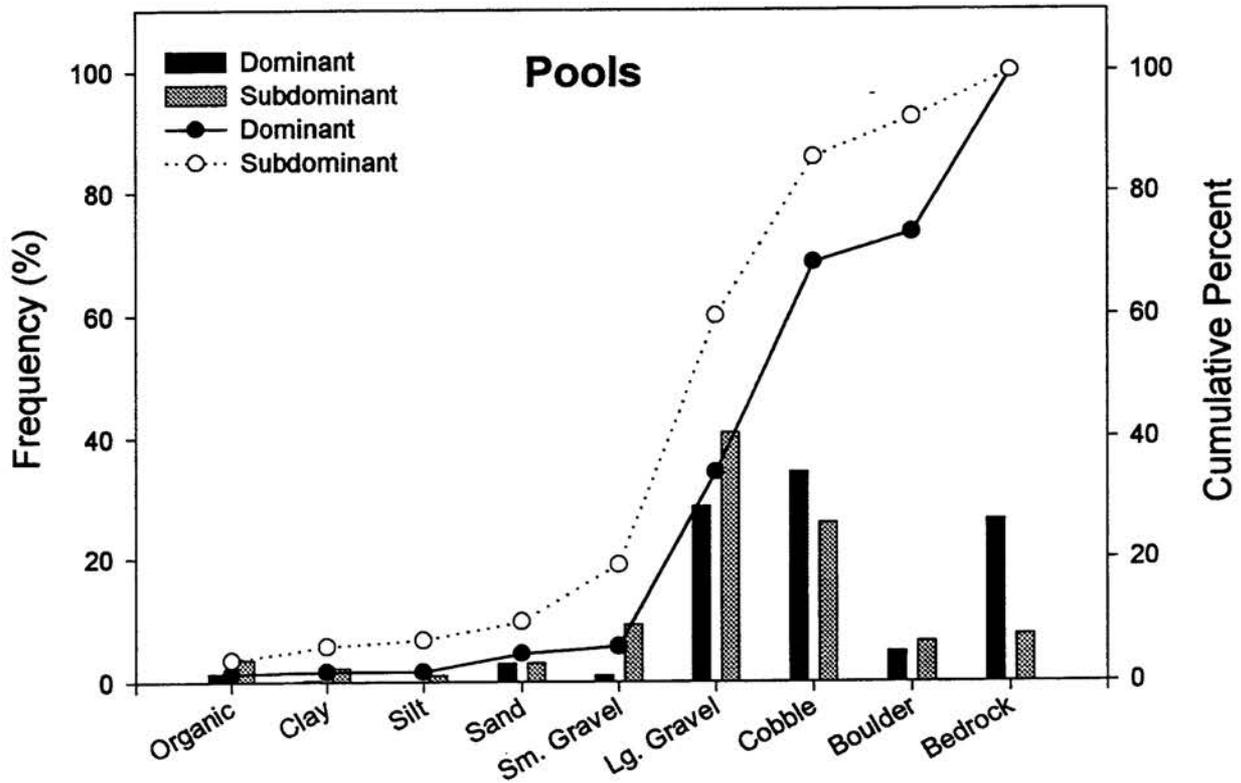
## Craig Creek

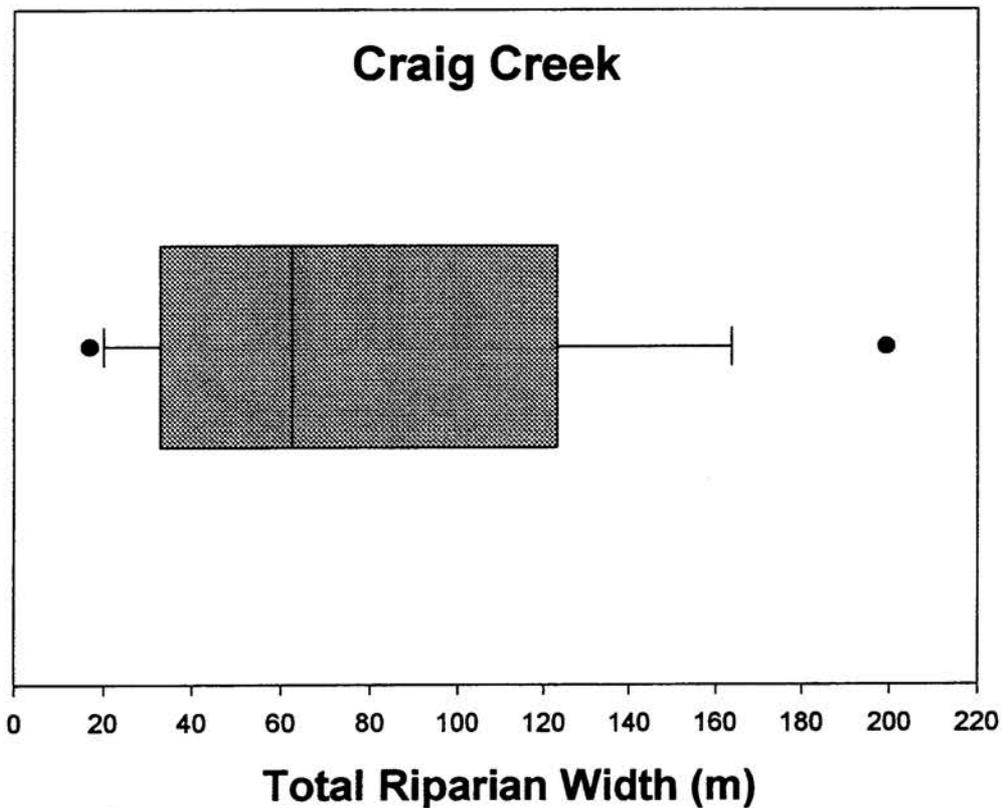


# Distribution and Abundance of Large Woody Debris



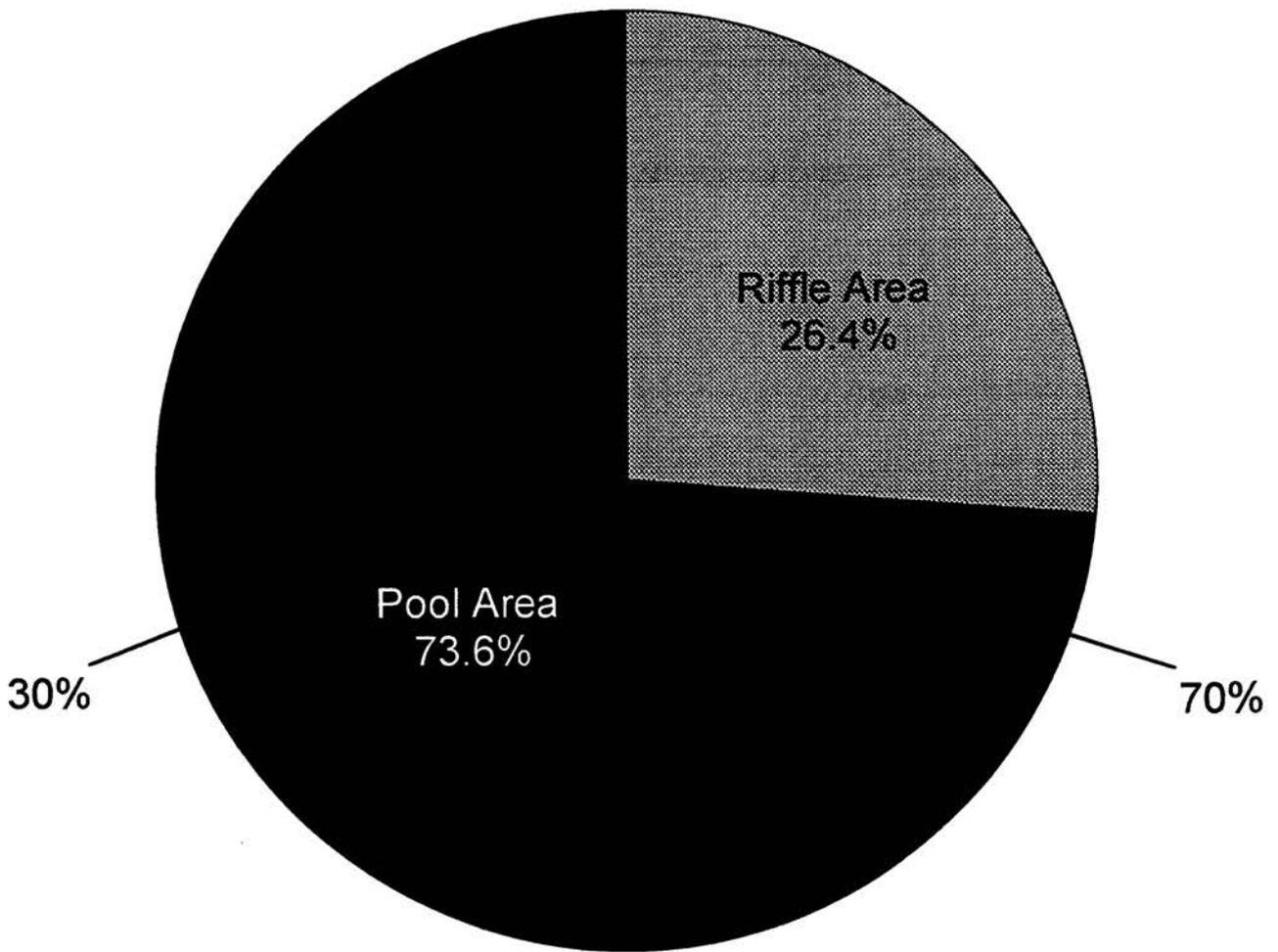
## Craig Creek Substrate Composition



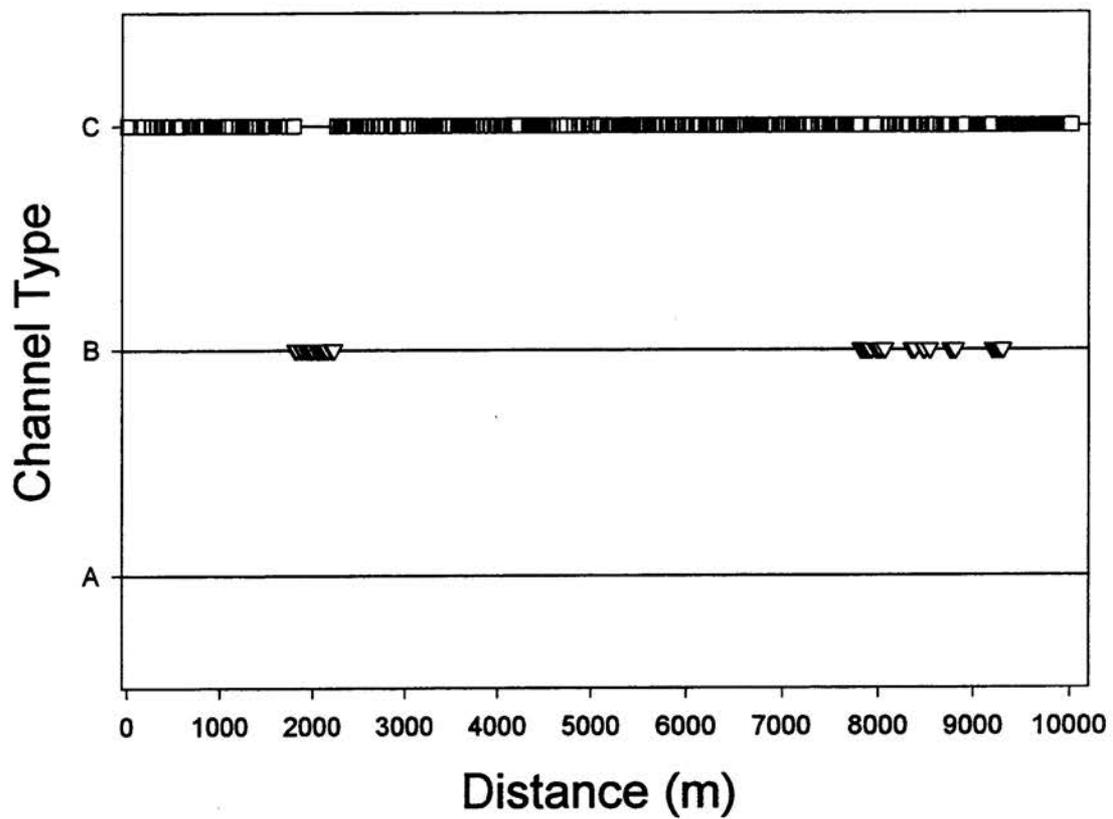
**Riparian Width****Stream: Craig Creek****Number of Measurements: 15****Mean Width: 79.5m Std Dev: 56.9****Max: 199.3m Min: 17.0m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Craig Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Craig Creek Rosgen's Channel Type Distribution



**Stream:** Lee Hollow

**District:** Blacksburg

**Quadrangle:** Craig Springs

**Sample Date:** 07/09/1999

**Downstream Starting Point:** Confluence with Craig Creek

**Total Distance Surveyed:** 1.5 kilometers

**Percent of Total Area - Pools:** 38.3%

Number of Pools: 124

Number of Pools per kilometer: 82.7

Total Pool Area: 1168.1 sq. meters  $\pm$  200.4

Mean Pool Area: 9.4 sq. meters

Correction Factor: 1.01

Mean Maximum Depth: 30.6 cm

Mean Average Depth: 15.8 cm

Mean Average Residual Pool Depth: 10.0 cm

**Percent of Total Area - Riffles:** 61.7%

Number of Riffles: 101

Number of Riffles per kilometer: 67.3

Total Riffle Area: 1880.1 sq. meters  $\pm$  293.4

Mean Riffle Area: 18.6 sq. meters

Correction Factor: 1.14

Mean Maximum Depth: 16.7 cm

Mean Average Depth: 6.6 cm

**Number of Large Woody Debris Pieces per kilometer:** 75.9

Wood < 5 m and < 55 cm: 59.6

Wood < 5 m and > 55 cm: 1.4

Wood > 5 m and < 55 cm: 12.2

Wood > 5 m and > 55 cm: 2.7

**Mean Channel Width:** 3.6 m

**Mean Riparian Width:** 16.3 m

Mean Maximum Riparian Distance (either side): 10.6 m

Mean Minimum Riparian Distance (either side): 2.1 m

Maximum Riparian Width (Total): 33.5 m

Minimum Riparian Width (Total): 6.2 m

Lee Hollow Continued.

**Percent of Pool Habitat Surveyed as Glides: 2.4%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 54.1%

Channel Type B: 45.9%

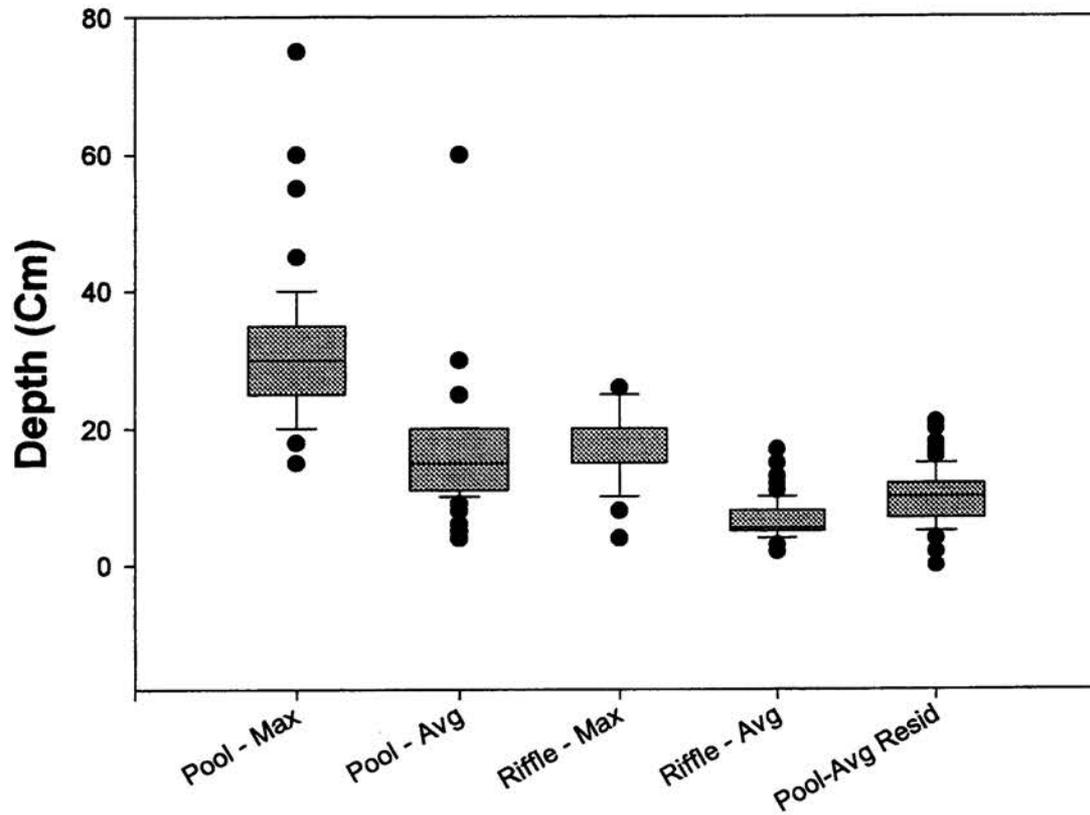
Channel Type C: 0.0%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 7.3%**

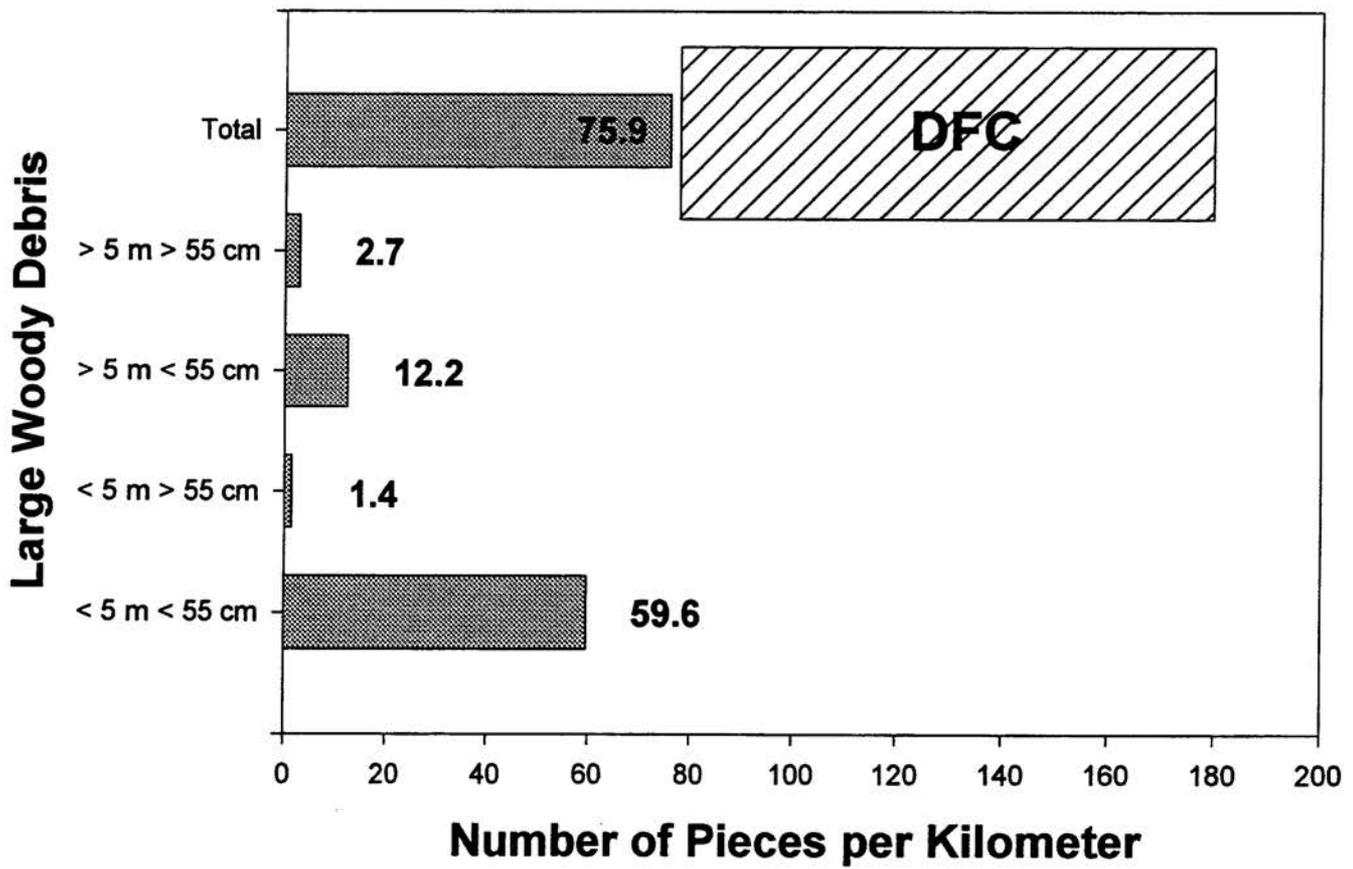
**Average Channel Gradient: 7.3**

## Lee Hollow

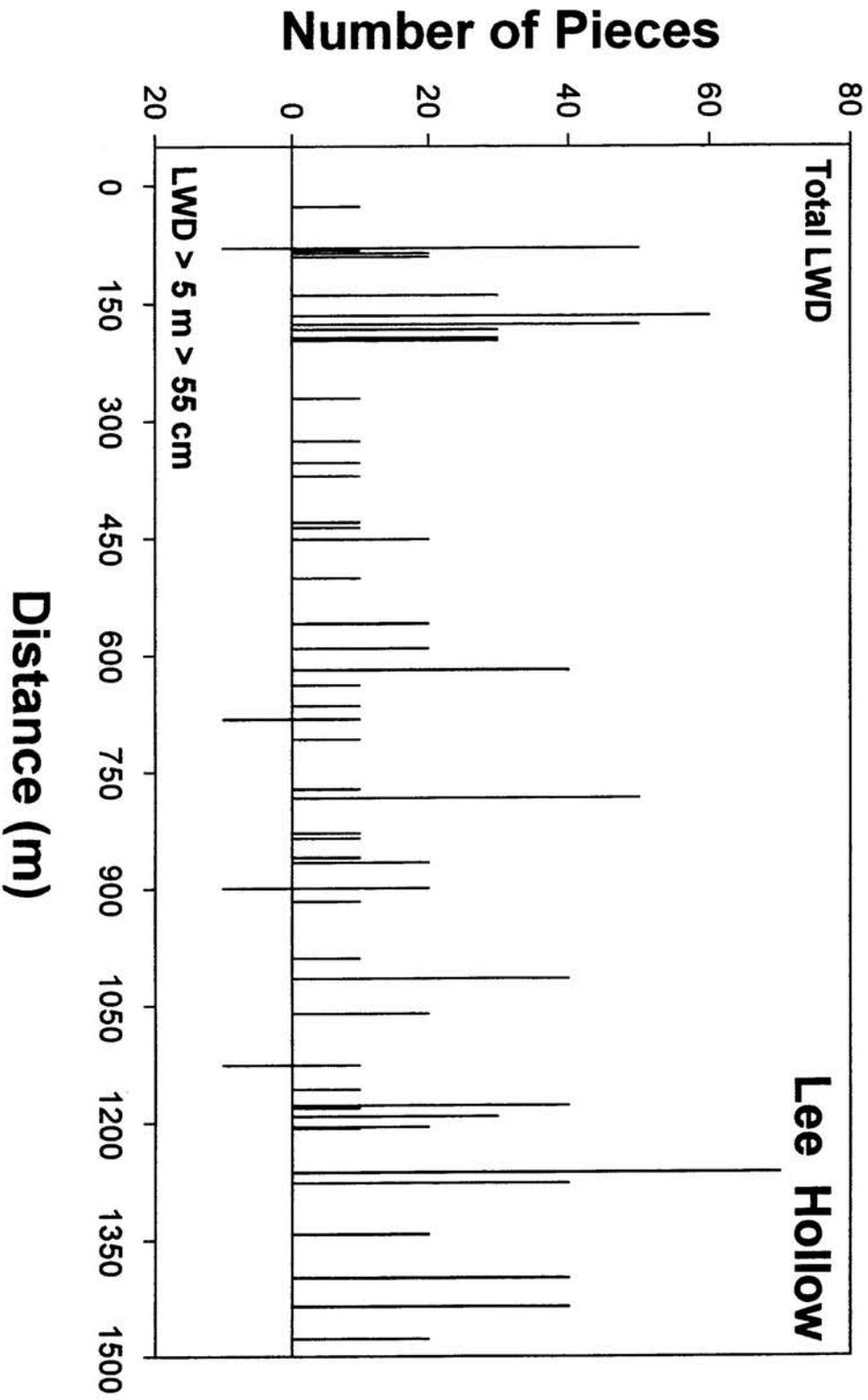


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

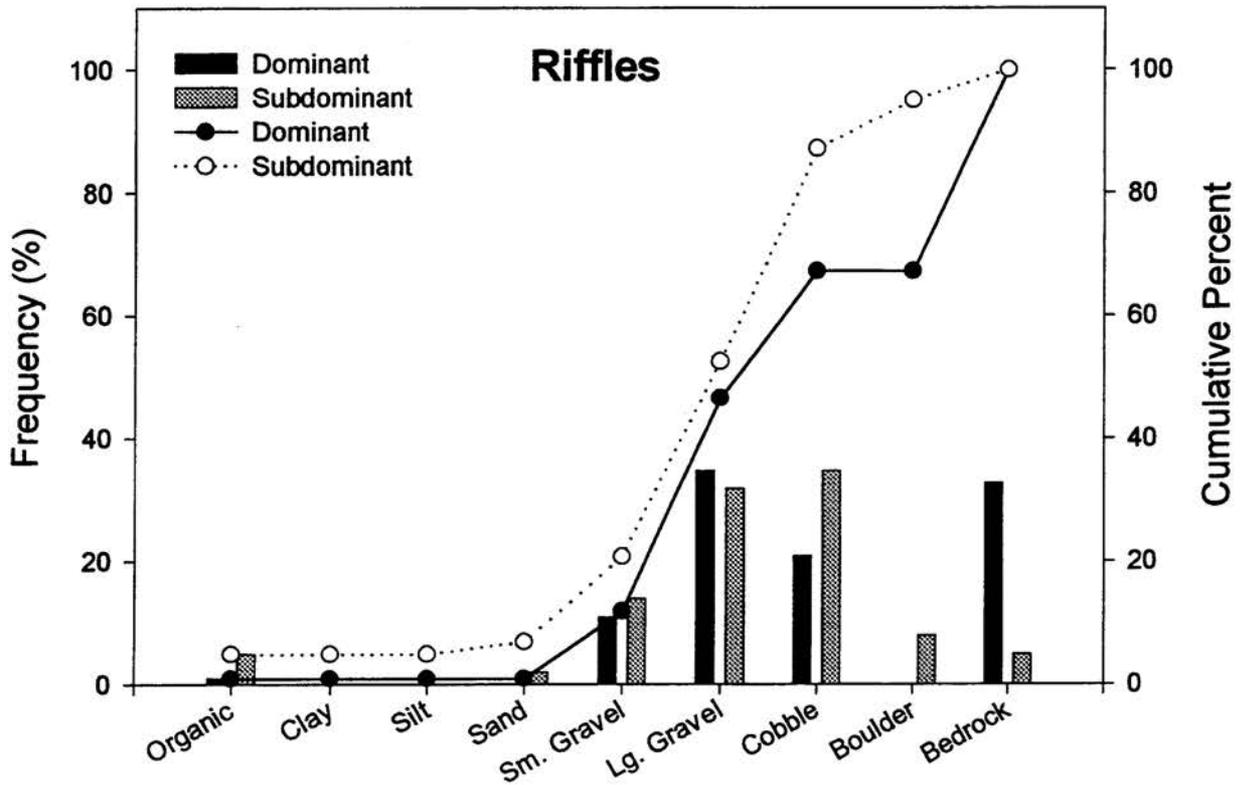
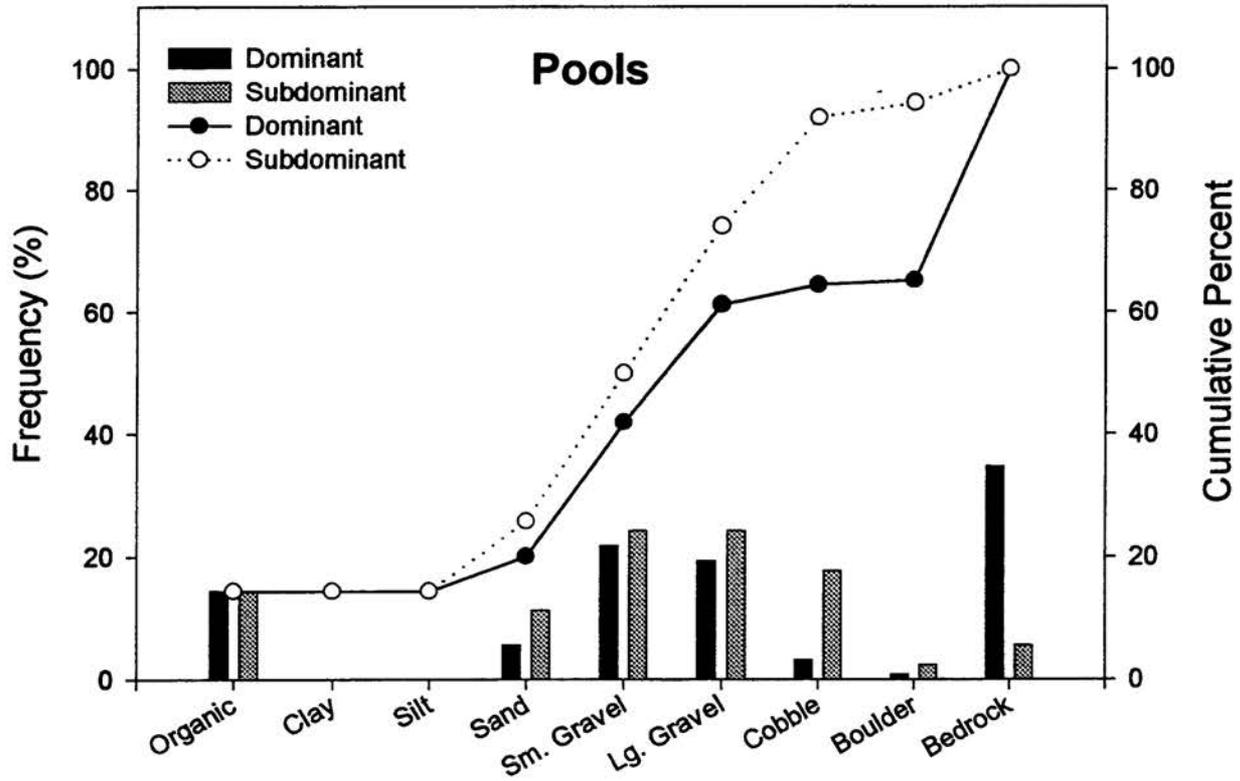
## Lee Hollow

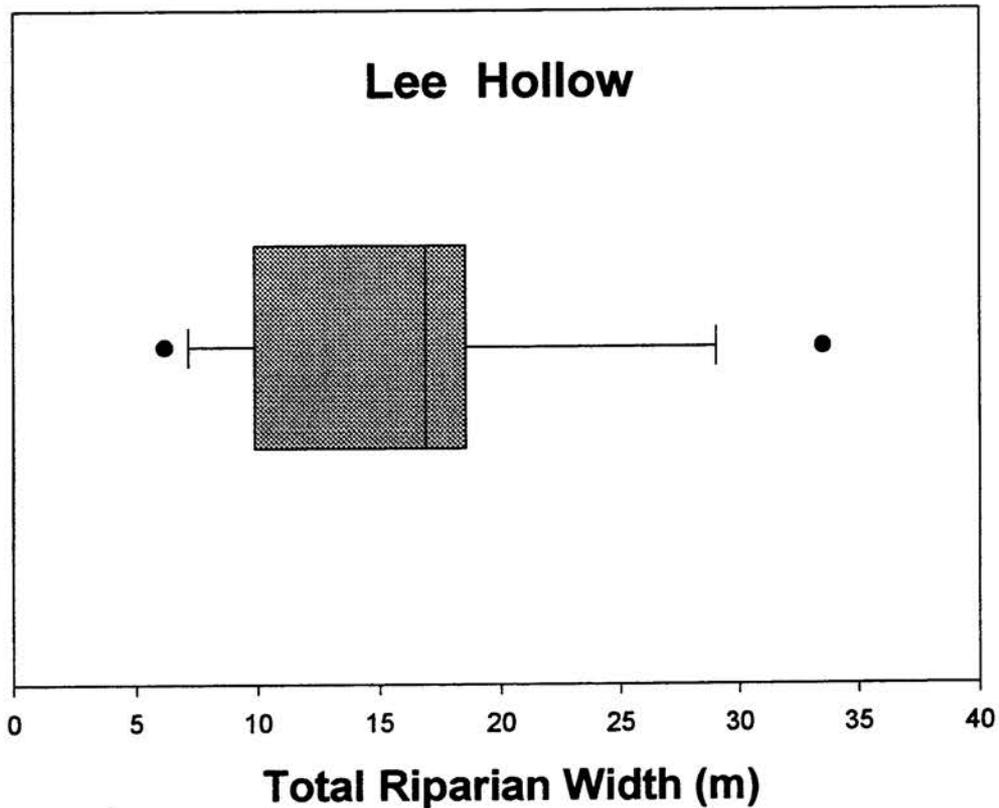


# Distribution and Abundance of Large Woody Debris



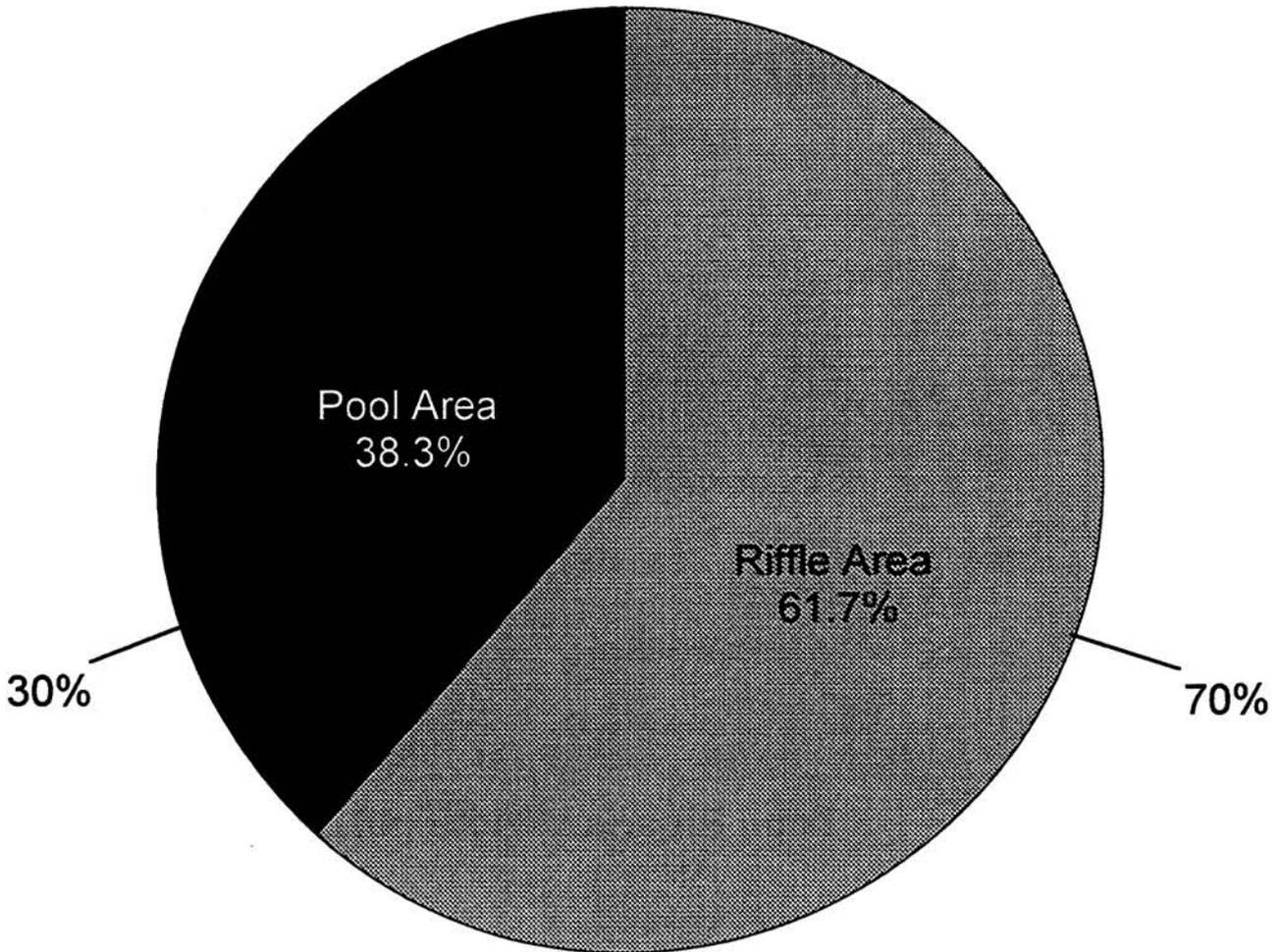
## Lee Hollow Substrate Composition



**Riparian Width****Stream: Lee Hollow****Number of Measurements: 8****Mean Width: 16.3m Std Dev: 8.4****Max: 33.5m Min: 6.2m**

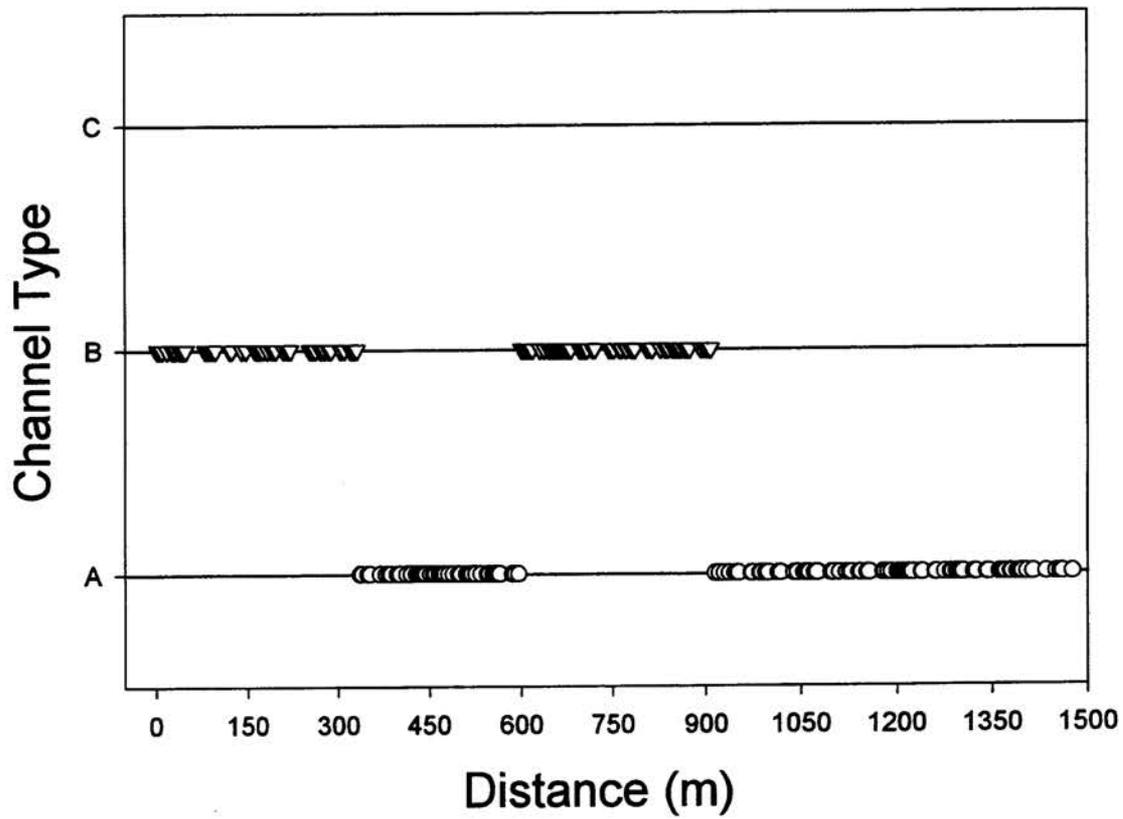
Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Lee Hollow  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Lee Hollow

## Rosgen's Channel Type Distribution



**Stream:** Whitewash Hollow

**District:** Blacksburg

**Quadrangle:** McDonalds Mill

**Sample Date:** 05/27/99

**Downstream Starting Point:** Confluence with Craig Creek

**Total Distance Surveyed:** 0.7 kilometers

**Percent of Total Area - Pools:** 47.0%

Number of Pools: 82

Number of Pools per kilometer: 117.1

Total Pool Area: 605.2 sq. meters  $\pm$  140.3

Mean Pool Area: 7.4 sq. meters

Correction Factor: 1.08

Mean Maximum Depth: 26.1 cm

Mean Average Depth: 14.1 cm

Mean Average Residual Pool Depth: 10.2 cm

**Percent of Total Area - Riffles:** 53.0%

Number of Riffles: 57

Number of Riffles per kilometer: 81.4

Total Riffle Area: 683.9 sq. meters  $\pm$  157.1

Mean Riffle Area: 12.0 sq. meters

Correction Factor: 1.15

Mean Maximum Depth: 11.2 cm

Mean Average Depth: 5.3 cm

**Number of Large Woody Debris Pieces per kilometer:** 59.9

Wood < 5 m and < 55 cm: 21.3

Wood < 5 m and > 55 cm: 9.3

Wood > 5 m and < 55 cm: 21.3

Wood > 5 m and > 55 cm: 8.0

**Mean Channel Width:** 3.4 m

**Mean Riparian Width:** 19.1 m

Mean Maximum Riparian Distance (either side): 12.3 m

Mean Minimum Riparian Distance (either side): 3.4 m

Maximum Riparian Width (Total): 30.4 m

Minimum Riparian Width (Total): 10.8 m

Whitewash Hollow Continued.

**Percent of Pool Habitat Surveyed as Glides: 17.0%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 28.9%

Channel Type B: 63.4%

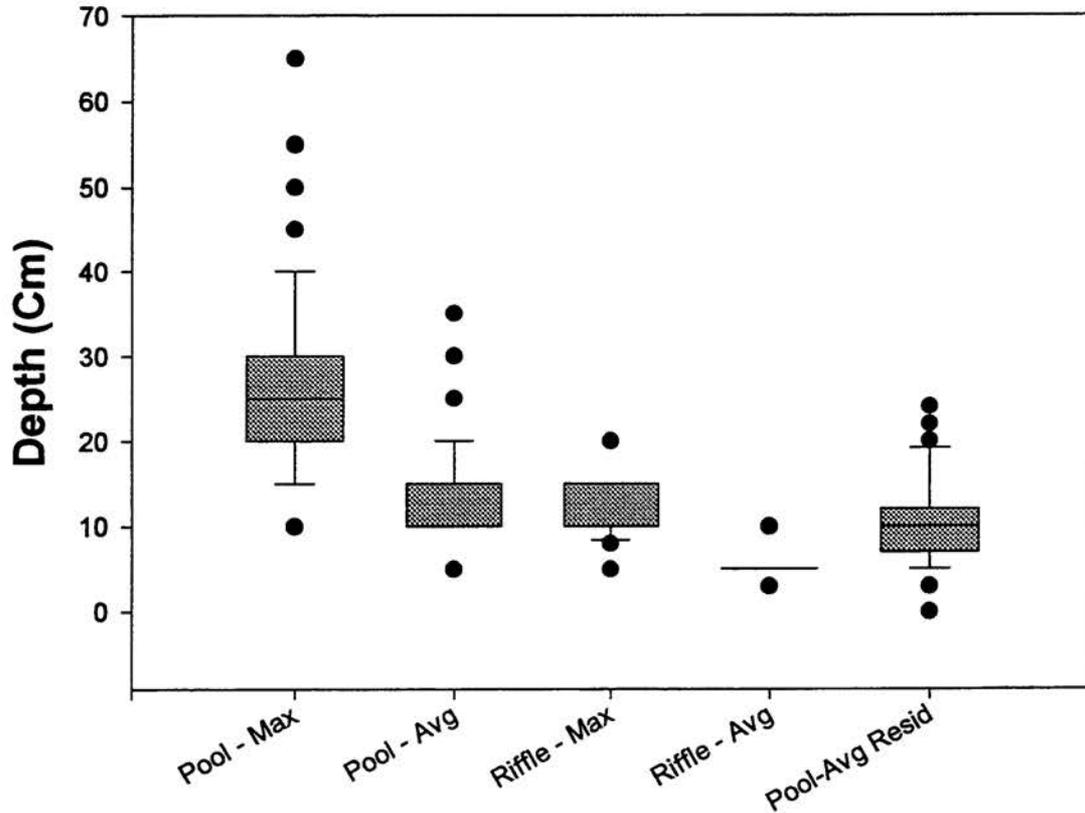
Channel Type C: 7.7%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 22.0%**

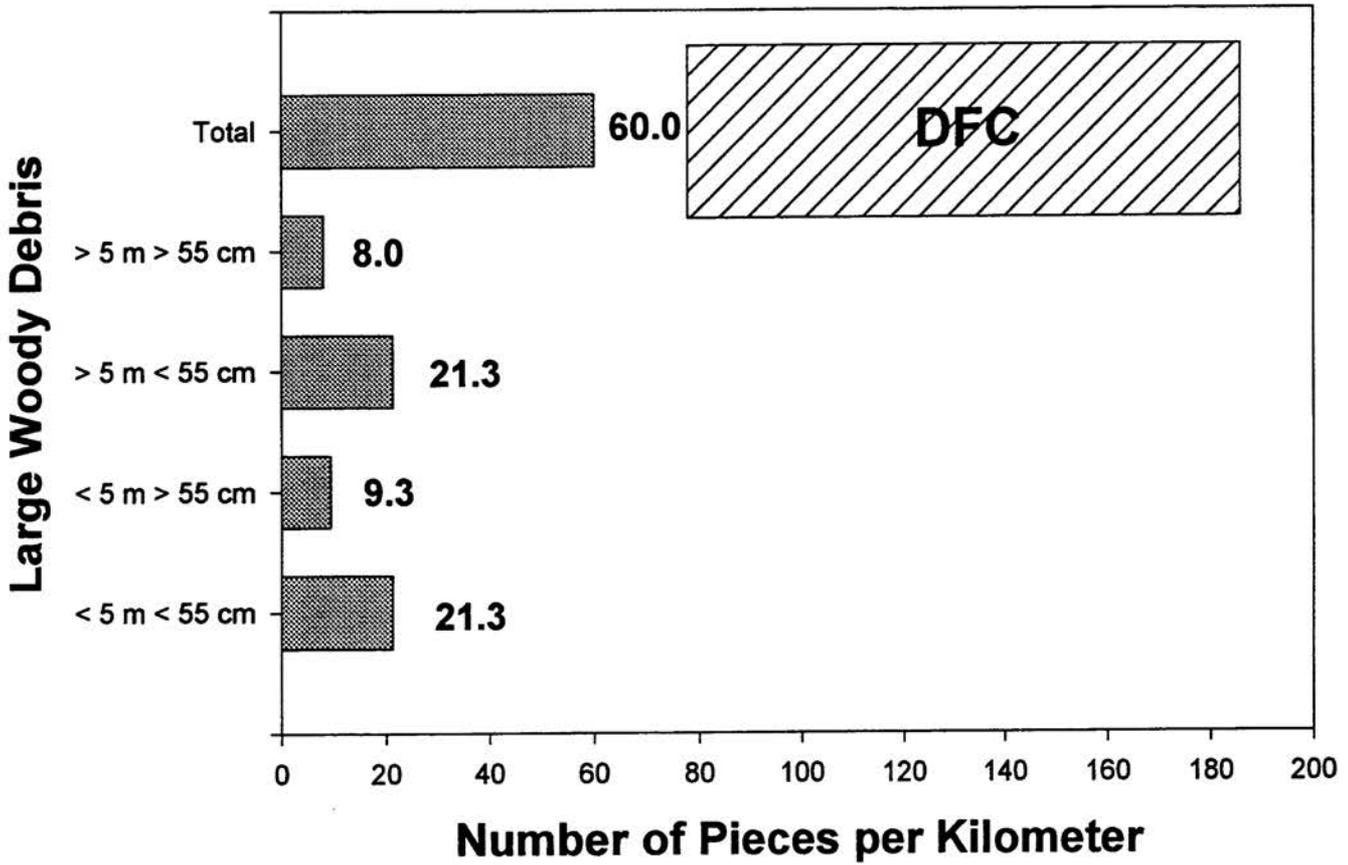
**Average Channel Gradient: 8.0**

## Whitewash Hollow

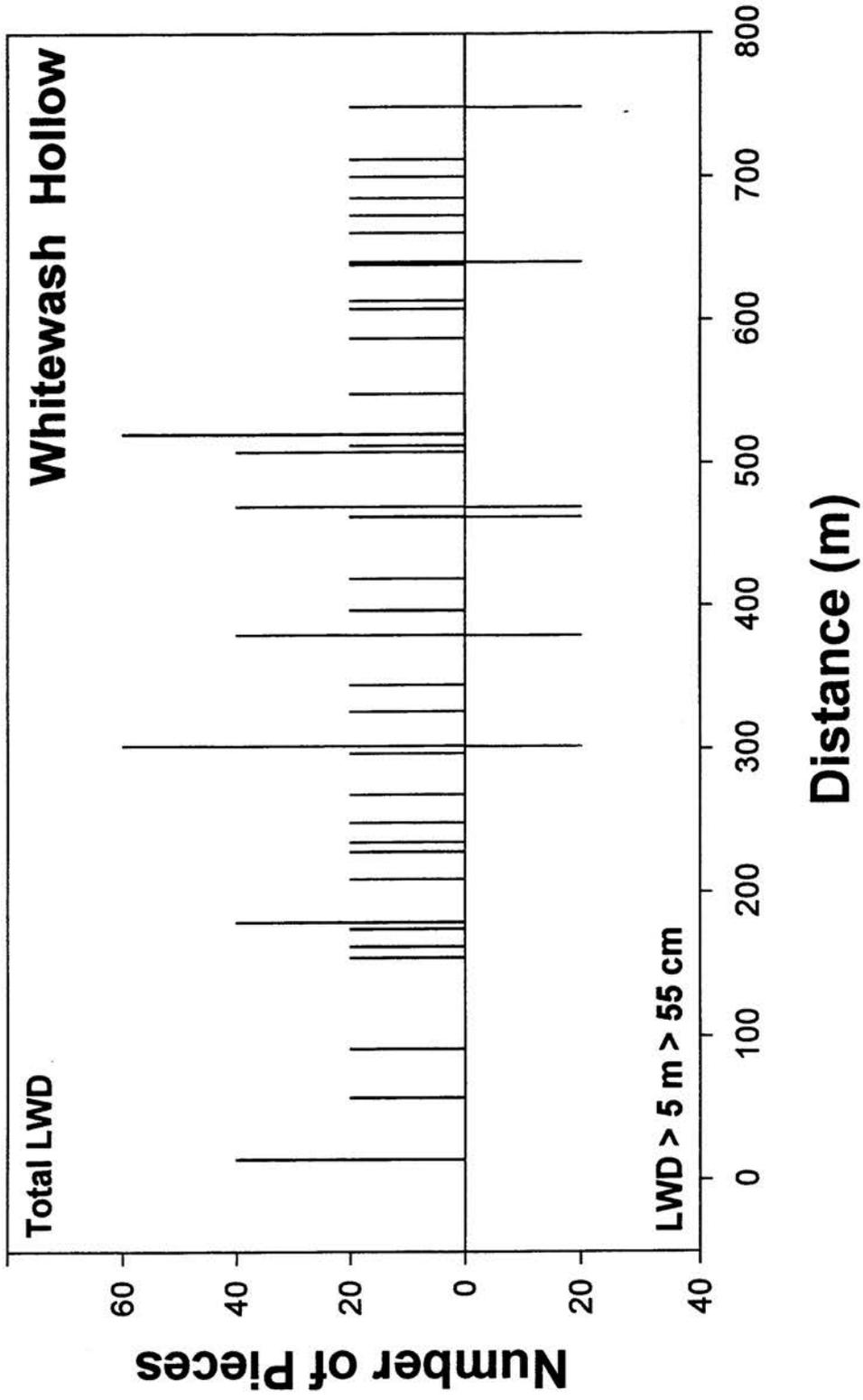


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

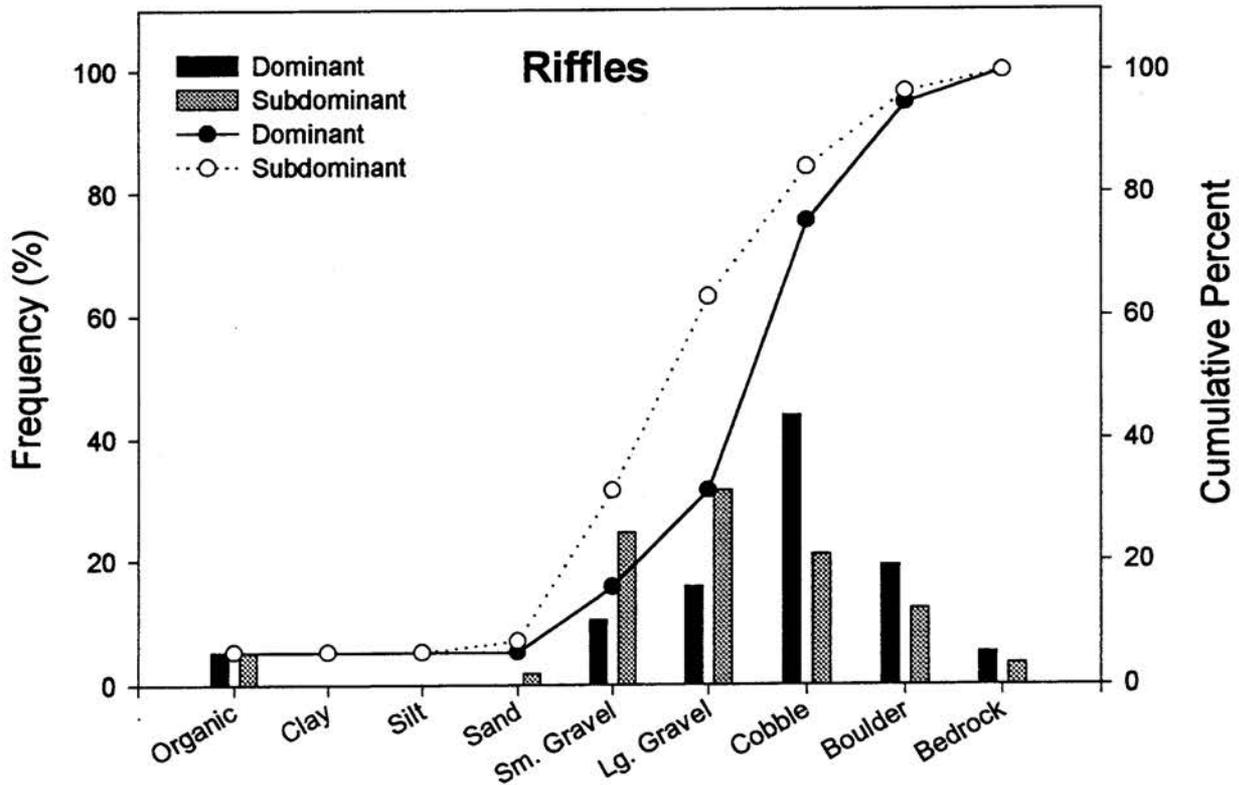
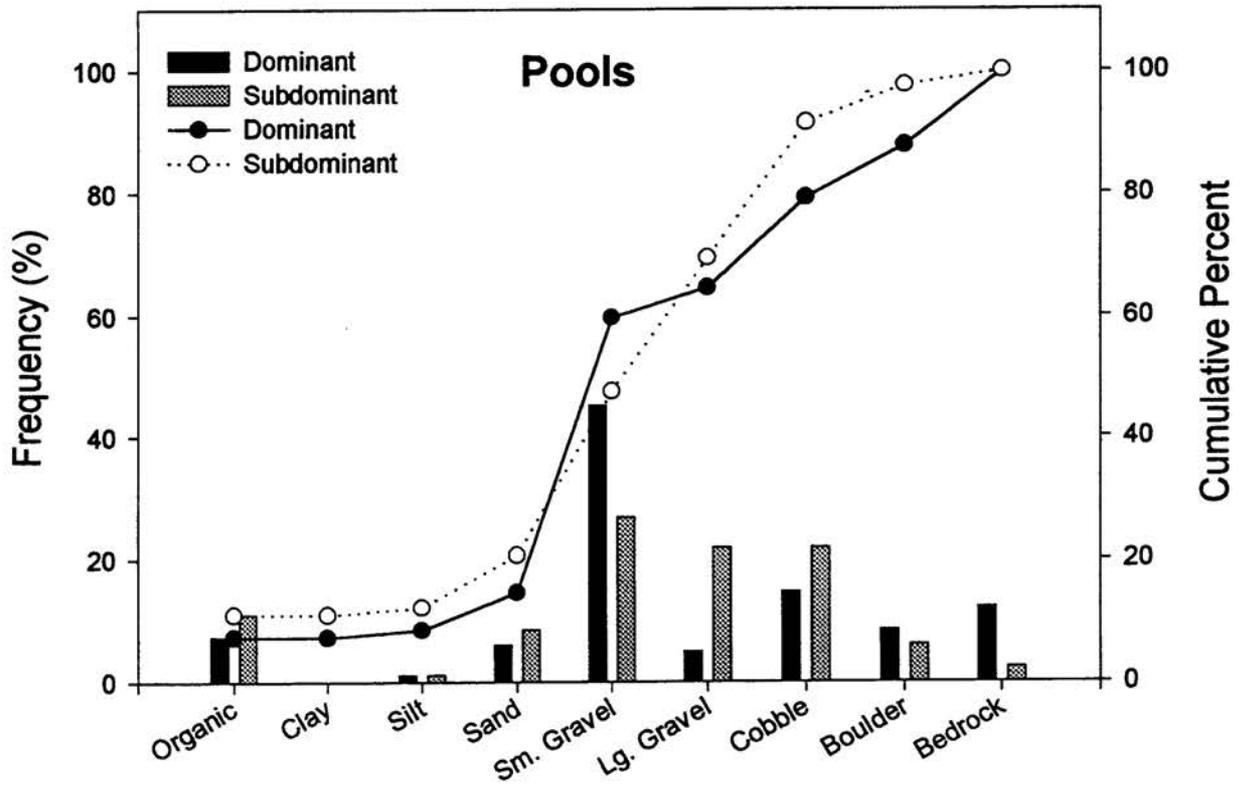
## Whitewash Hollow

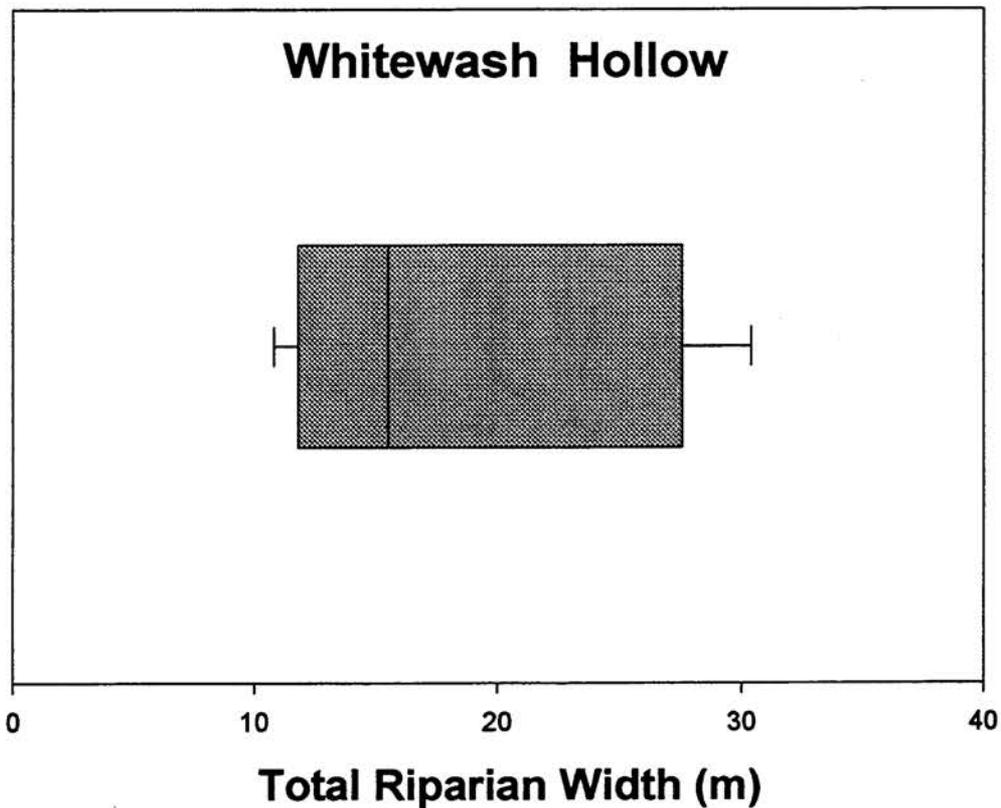


# Distribution and Abundance of Large Woody Debris



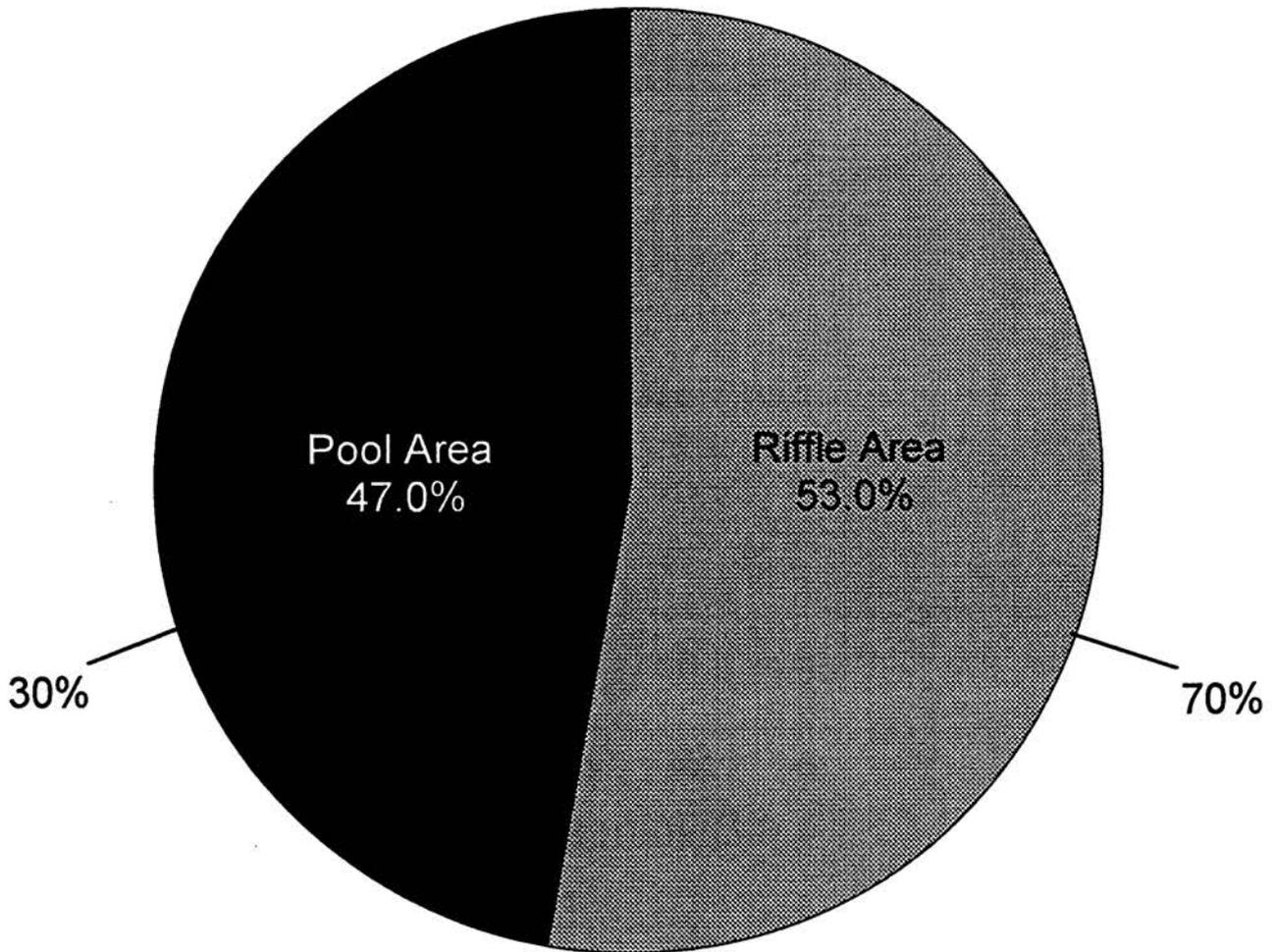
## Whitewash Hollow Substrate Composition



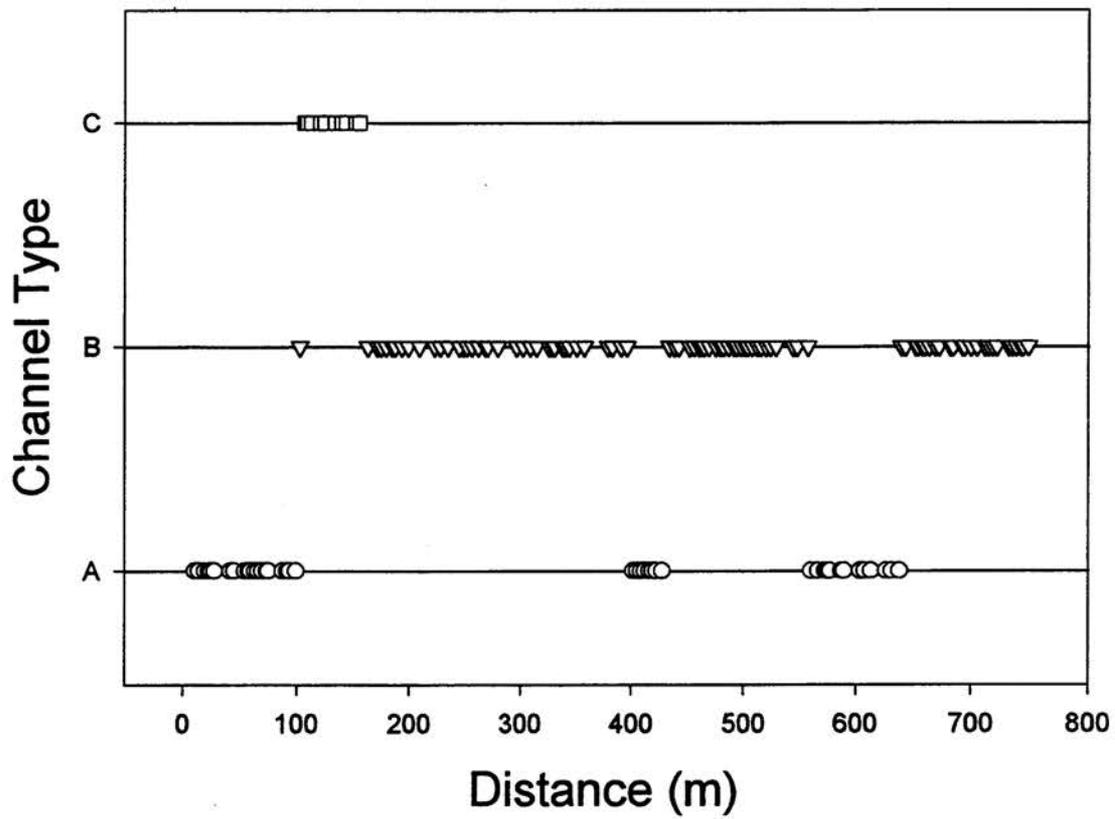
**Riparian Width****Stream: Whitewash Hollow****Number of Measurements: 5****Mean Width: 19.1m Std Dev: 8.9****Max: 30.4m Min: 10.8m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Whitewash Hollow  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Whitewash Hollow Rosgen's Channel Type Distribution



## **Eggleston Quadrangle**

**Stream:** Little Stony Creek

**District:** Blacksburg

**Quadrangle:** Eggleston

**Sample Date:** 06/03/99

**Downstream Starting Point:** Forest Service Boundary below parking lot

**Total Distance Surveyed:** 6.2 kilometers

**Percent of Total Area - Pools:** 60.5%

Number of Pools: 335

Number of Pools per kilometer: 54.0

Total Pool Area: 24404.0 sq. meters  $\pm$  1578.3

Mean Pool Area: 72.8 sq. meters

Correction Factor: 1.03

Mean Maximum Depth: 74.8 cm

Mean Average Depth: 58.6 cm

Mean Average Residual Pool Depth: 42.1 cm

**Percent of Total Area - Riffles:** 39.5%

Number of Riffles: 220

Number of Riffles per kilometer: 35.5

Total Riffle Area: 15922.9 sq. meters  $\pm$  848.1

Mean Riffle Area: 72.4 sq. meters

Correction Factor: 0.99

Mean Maximum Depth: 31.7 cm

Mean Average Depth: 19.2 cm

**Number of Large Woody Debris Pieces per kilometer:** 483.6

Wood < 5 m and < 55 cm: 235.3

Wood < 5 m and > 55 cm: 24.3

Wood > 5 m and < 55 cm: 164.5

Wood > 5 m and > 55 cm: 59.5

**Mean Channel Width:** 14.3 m

**Mean Riparian Width:** 43.0 m

Mean Maximum Riparian Distance (either side): 23.5 m

Mean Minimum Riparian Distance (either side): 5.2 m

Maximum Riparian Width (Total): 105.3 m

Minimum Riparian Width (Total): 25.5 m

Little Stony Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 22.6%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 91.9%

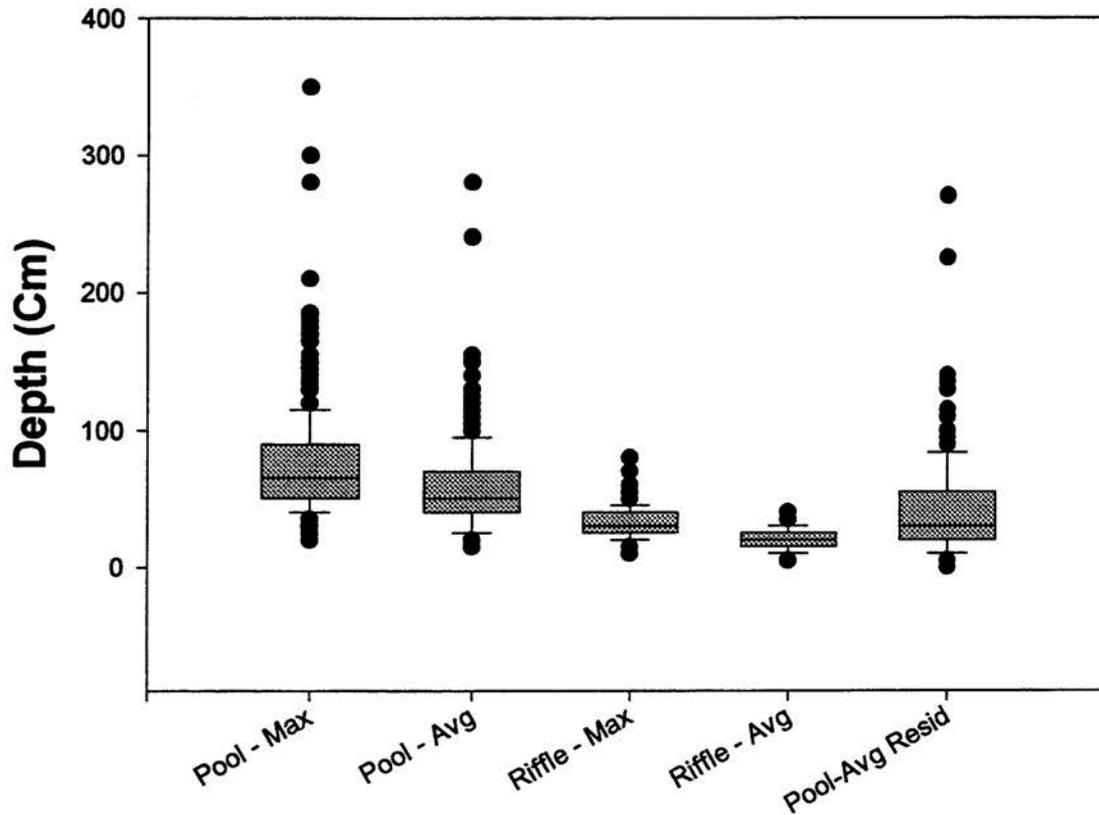
Channel Type C: 8.1%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 9.0%**

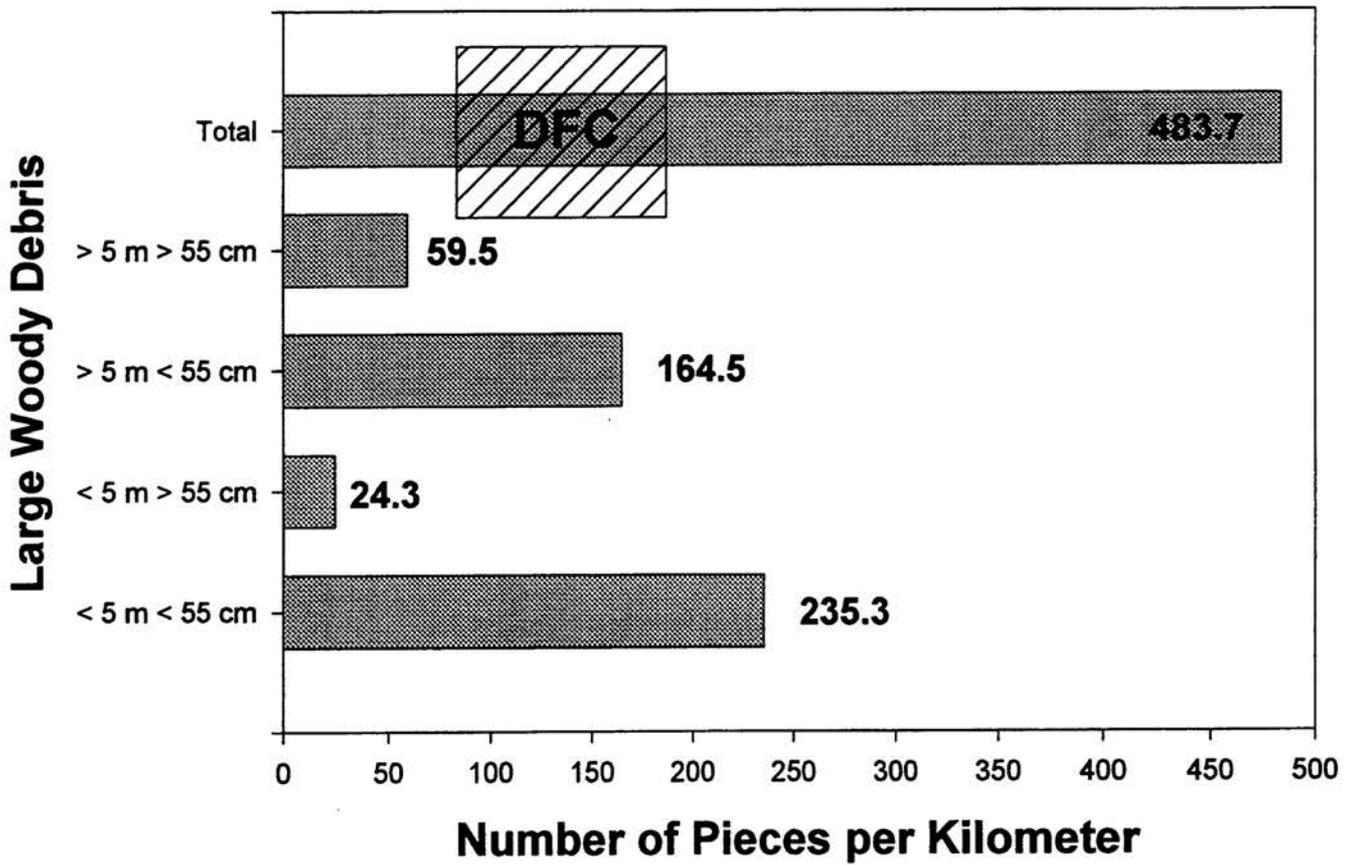
**Average Channel Gradient: 10.9**

## Little Stony Creek

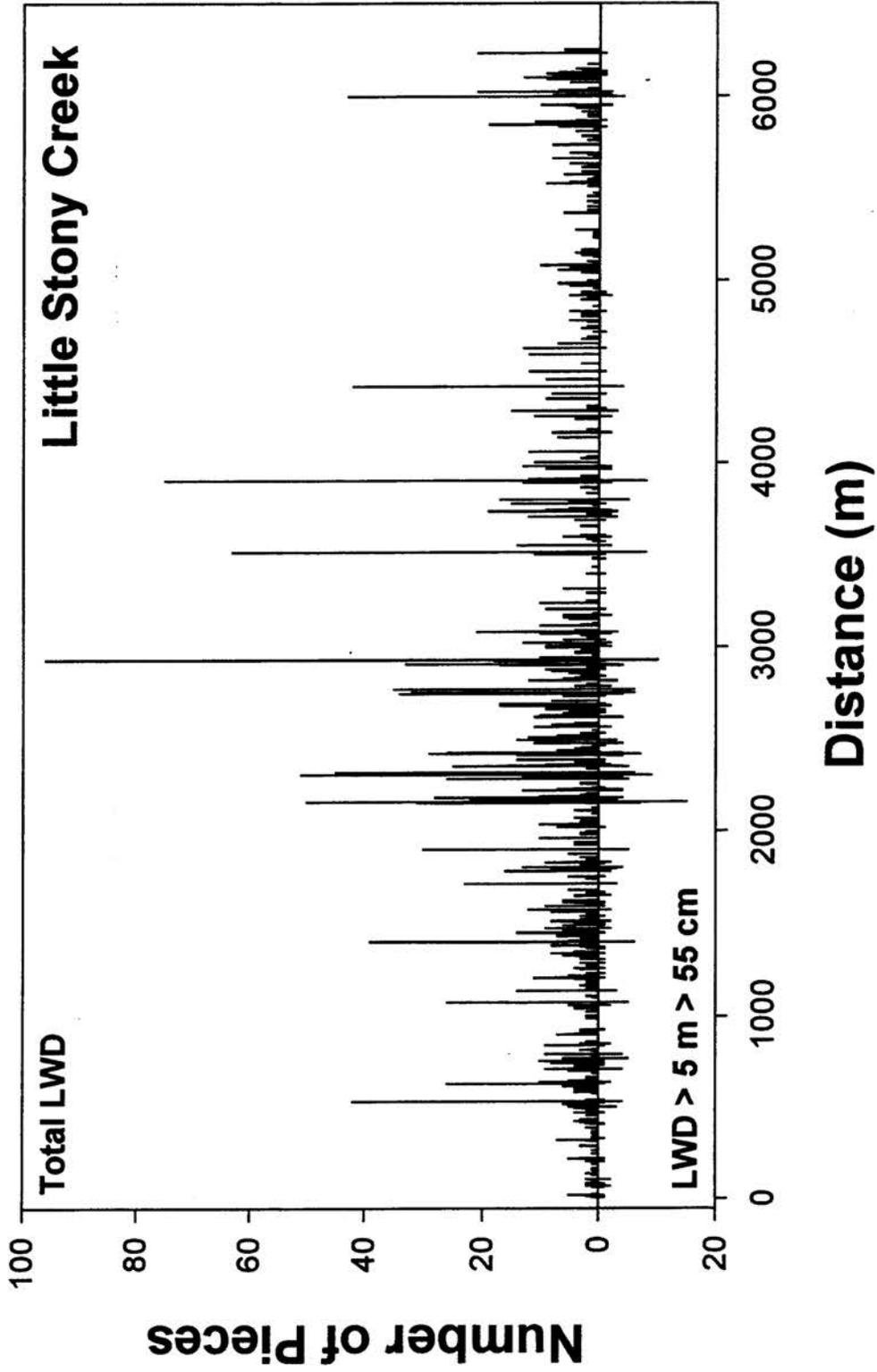


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

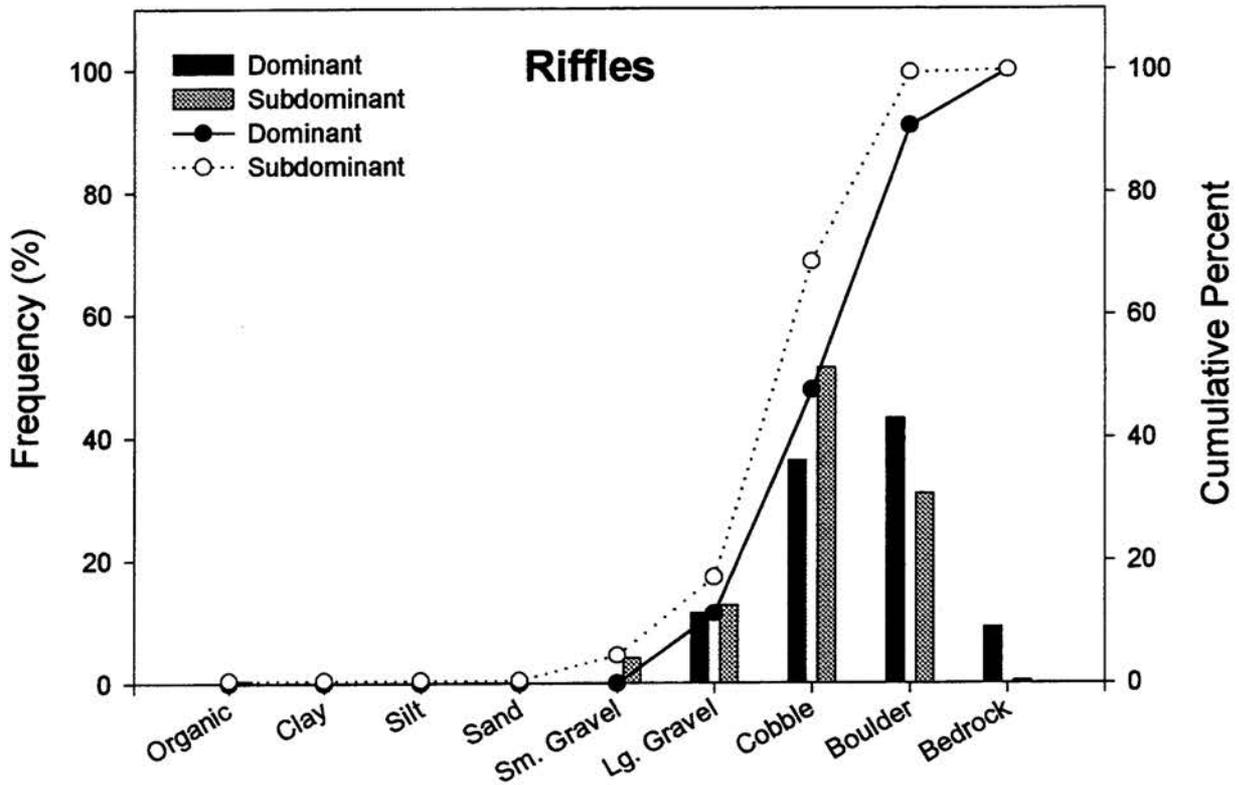
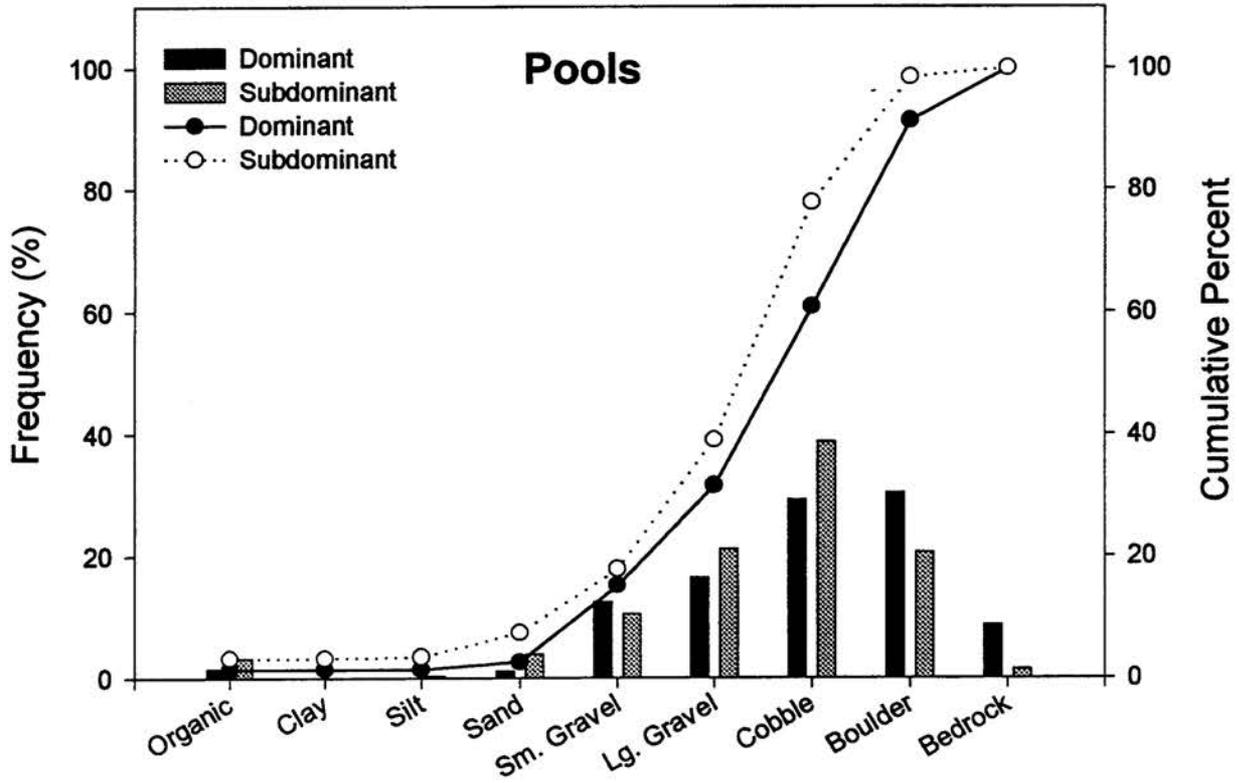
## Little Stony Creek

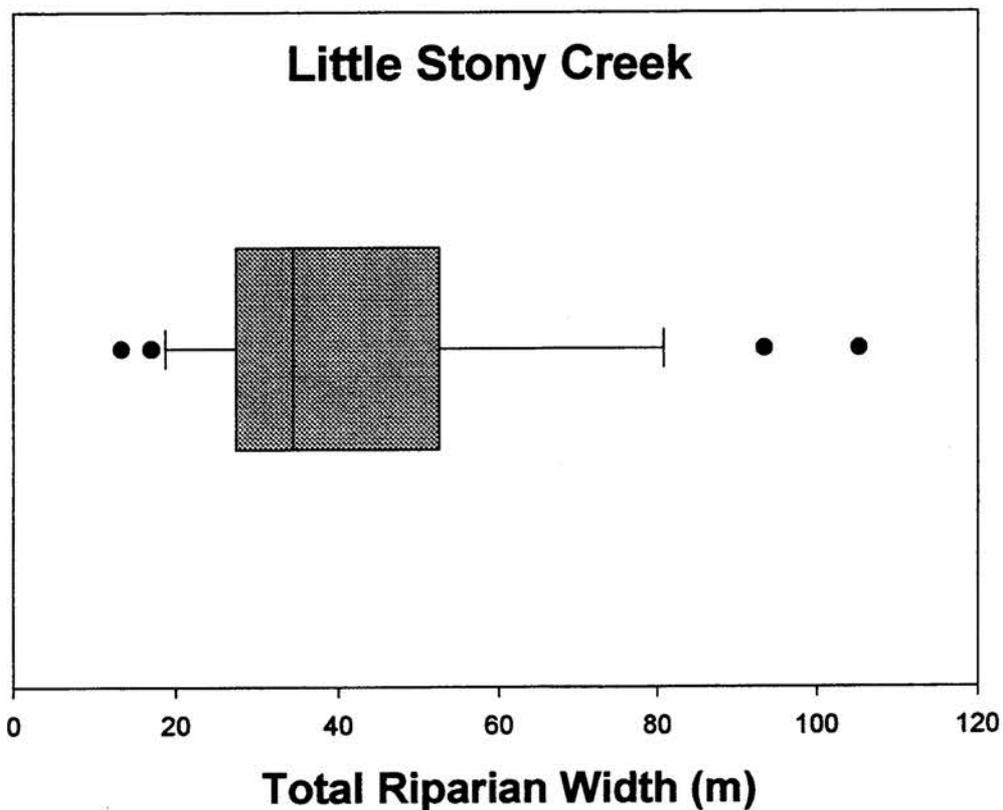


# Distribution and Abundance of Large Woody Debris



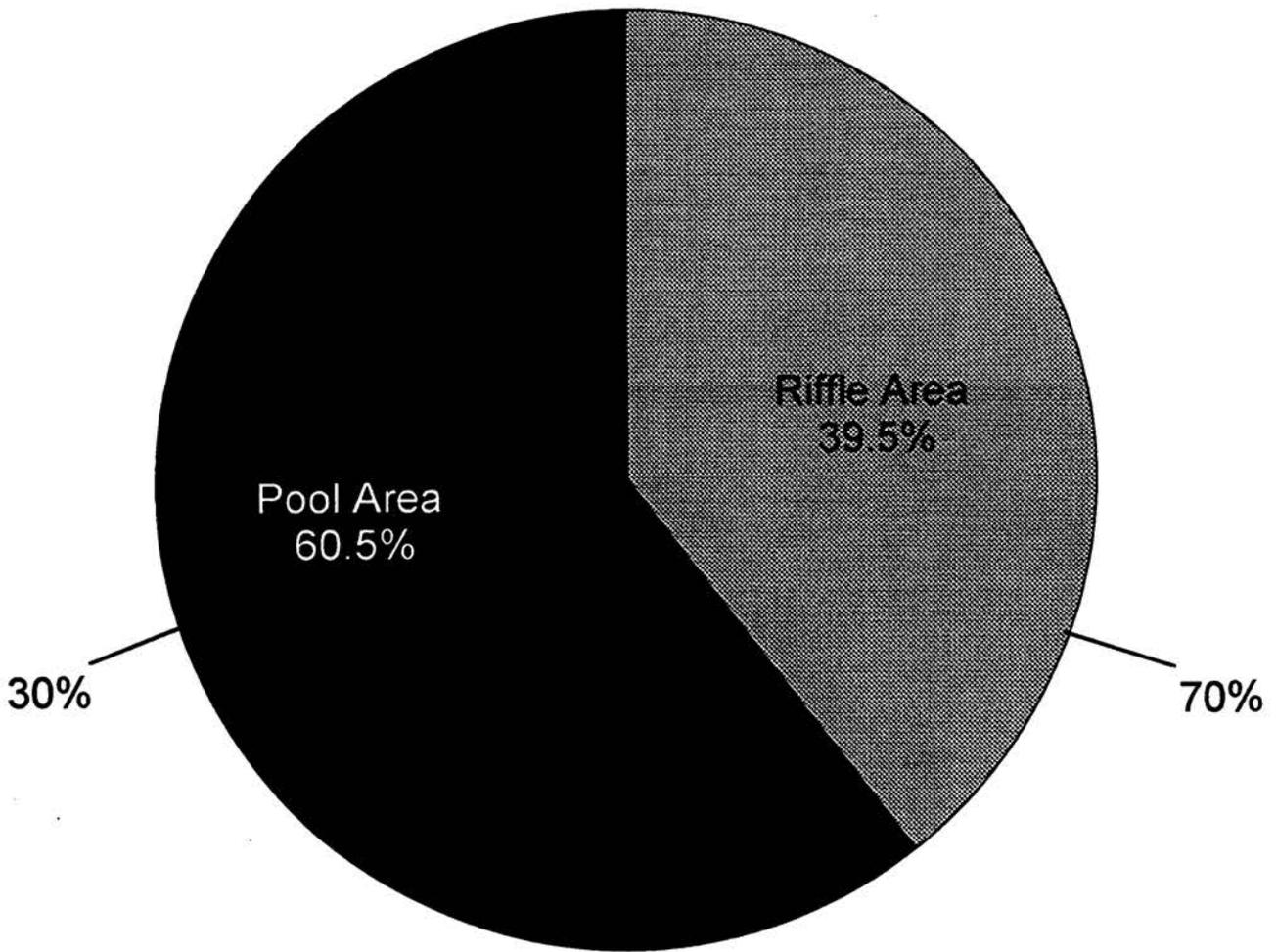
## Little Stony Creek Substrate Composition



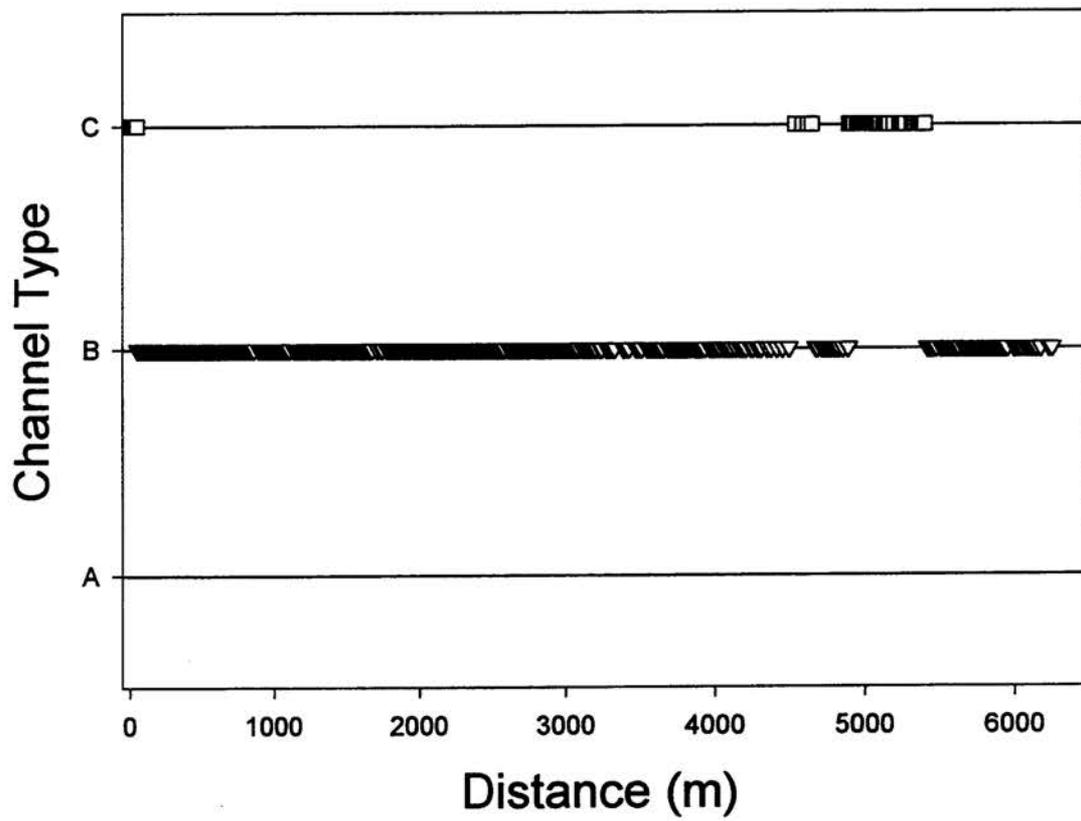
**Riparian Width****Stream: Little Stony Creek****Number of Measurements: 21****Mean Width: 43.1m Std Dev: 24.2****Max: 105.3m Min: 13.3m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Little Stony Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Little Stony Creek Rosgen's Channel Type Distribution



**Stream:** Poverty Creek

**District:** Blacksburg

**Quadrangle:** Eggleston/Newport

**Sample Date:** 05/26/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 8.7 kilometers

**Percent of Total Area - Pools:** 70.5%

Number of Pools: 289

Number of Pools per kilometer: 33.2

Total Pool Area: 31568.5 sq. meters  $\pm$  2881.5

Mean Pool Area: 109.2 sq. meters

Correction Factor: 1.02

Mean Maximum Depth: 46.1 cm

Mean Average Depth: 24.7 cm

Mean Average Residual Pool Depth: 15.7 cm

**Percent of Total Area - Riffles:** 29.5%

Number of Riffles: 216

Number of Riffles per kilometer: 24.8

Total Riffle Area: 13181.8 sq. meters  $\pm$  1796.8

Mean Riffle Area: 61.0 sq. meters

Correction Factor: 1.05

Mean Maximum Depth: 16.1 cm

Mean Average Depth: 8.5 cm

**Number of Large Woody Debris Pieces per kilometer:** 202.4

Wood < 5 m and < 55 cm: 109.4

Wood < 5 m and > 55 cm: 24.7

Wood > 5 m and < 55 cm: 47.2

Wood > 5 m and > 55 cm: 21.1

**Mean Channel Width:** 7.2 m

**Mean Riparian Width:** 71.5 m

Mean Maximum Riparian Distance (either side): 48.3 m

Mean Minimum Riparian Distance (either side): 16.0 m

Maximum Riparian Width (Total): 107.7 m

Minimum Riparian Width (Total): 26.1 m

Poverty Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 6.9%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 2.8%

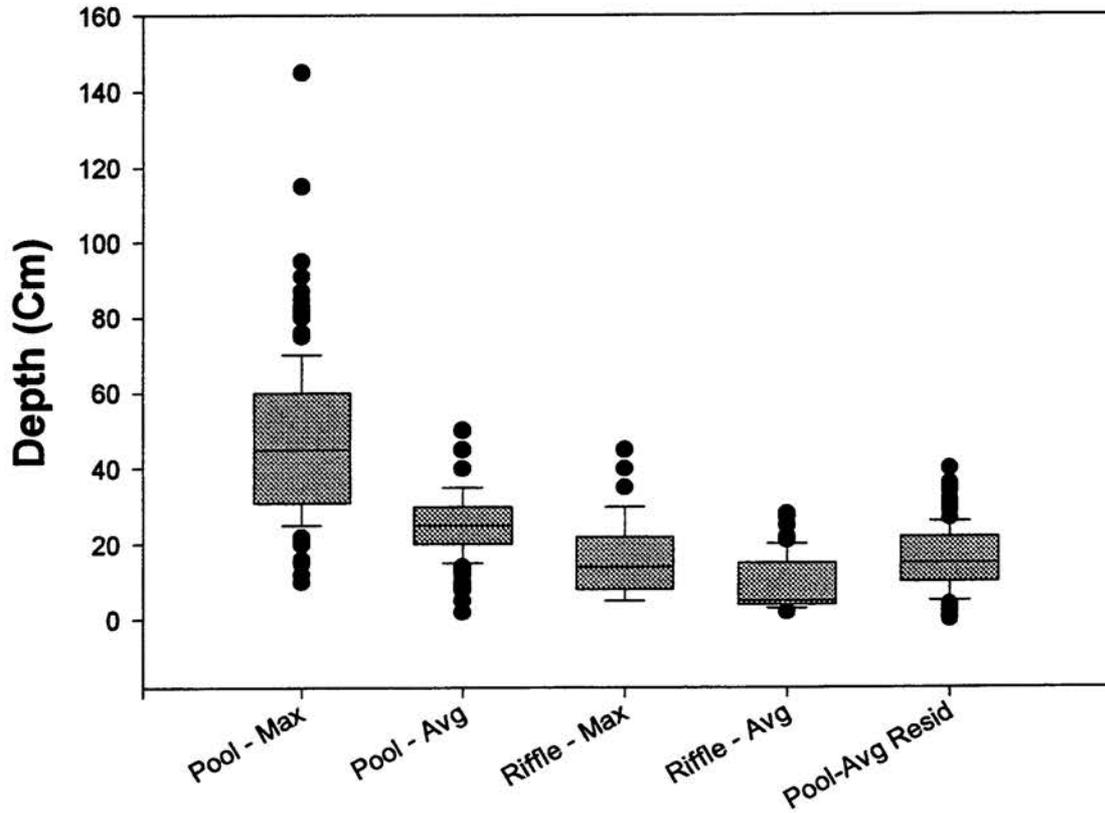
Channel Type C: 97.2%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 14.9%**

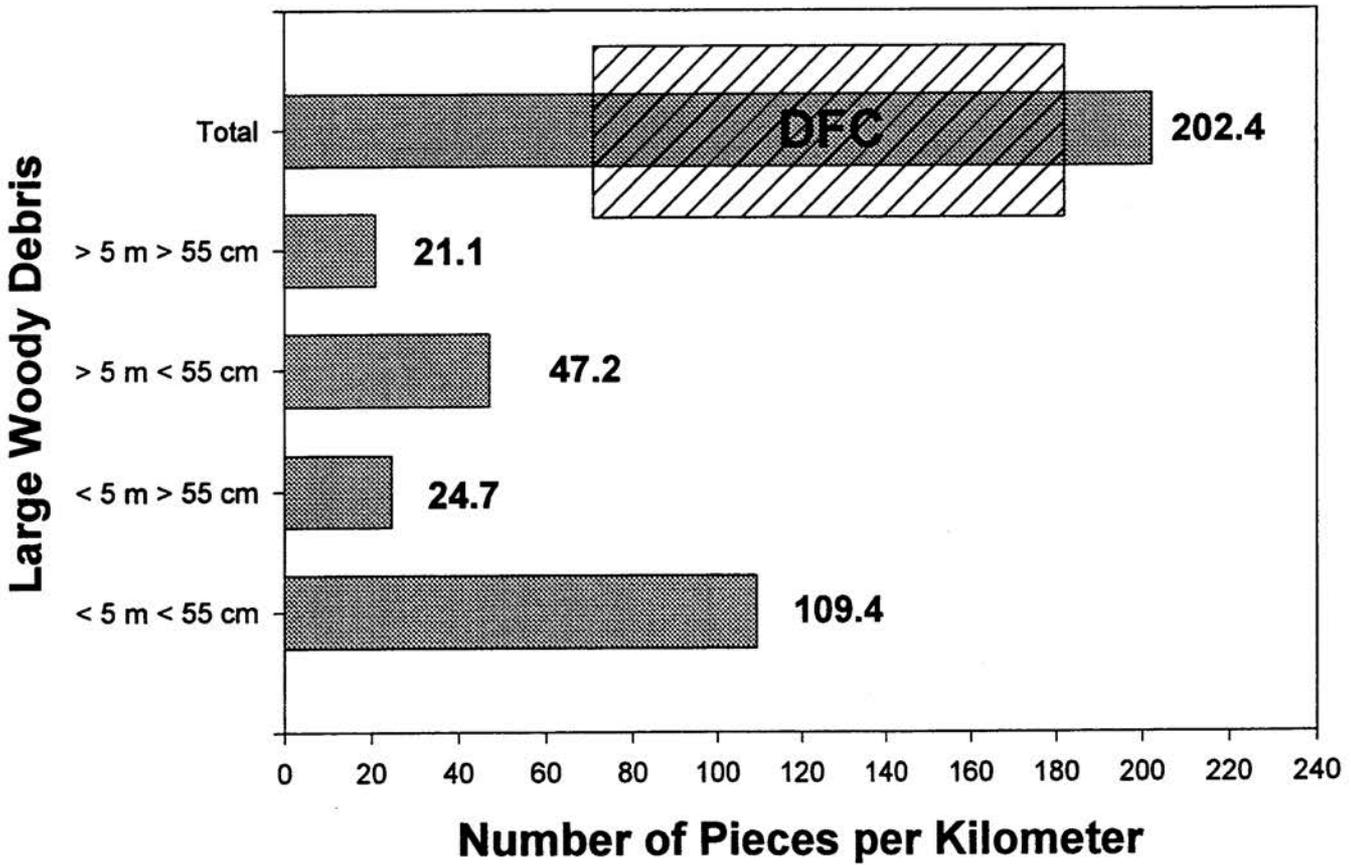
**Average Channel Gradient: 3.4**

## Poverty Creek

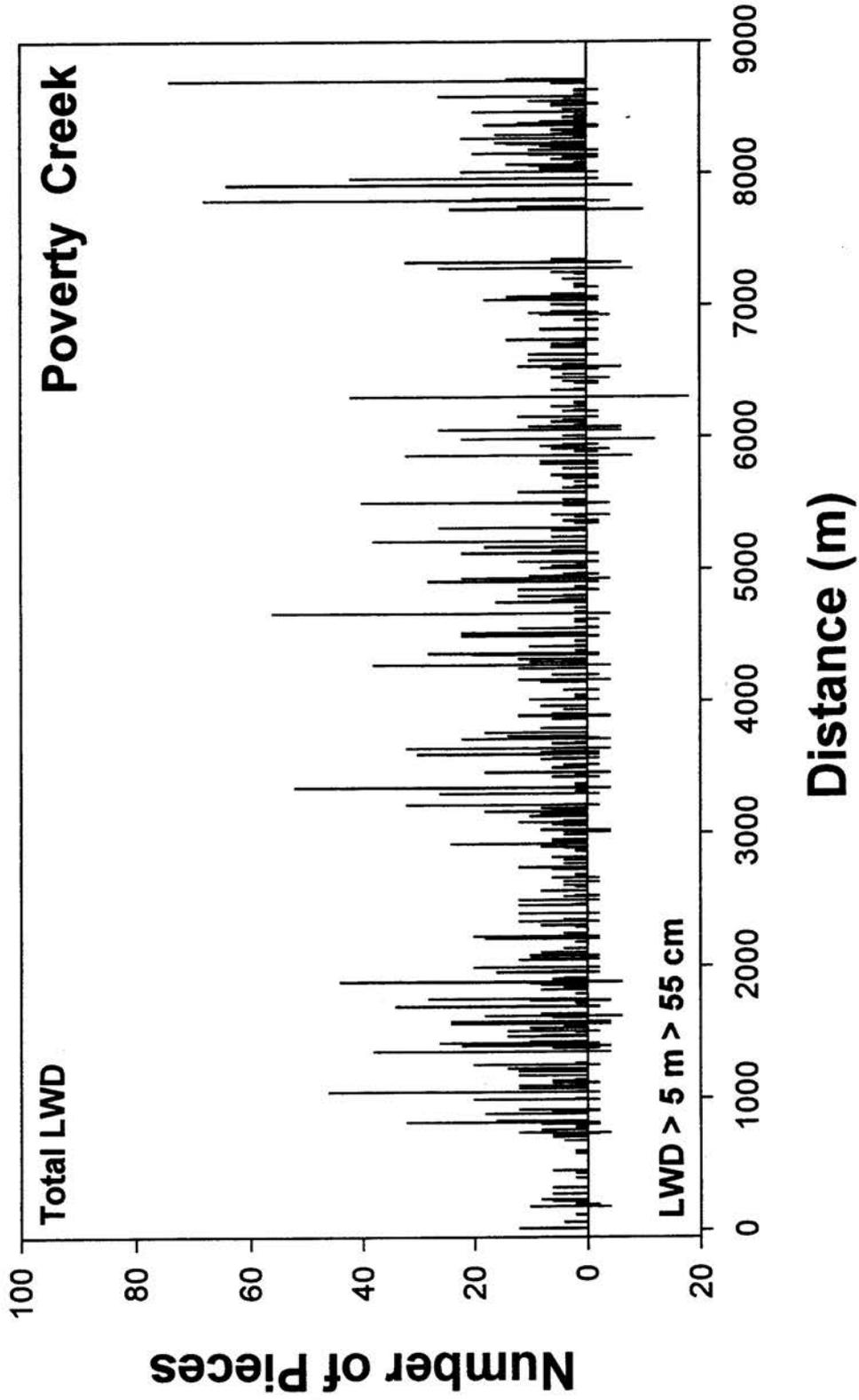


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

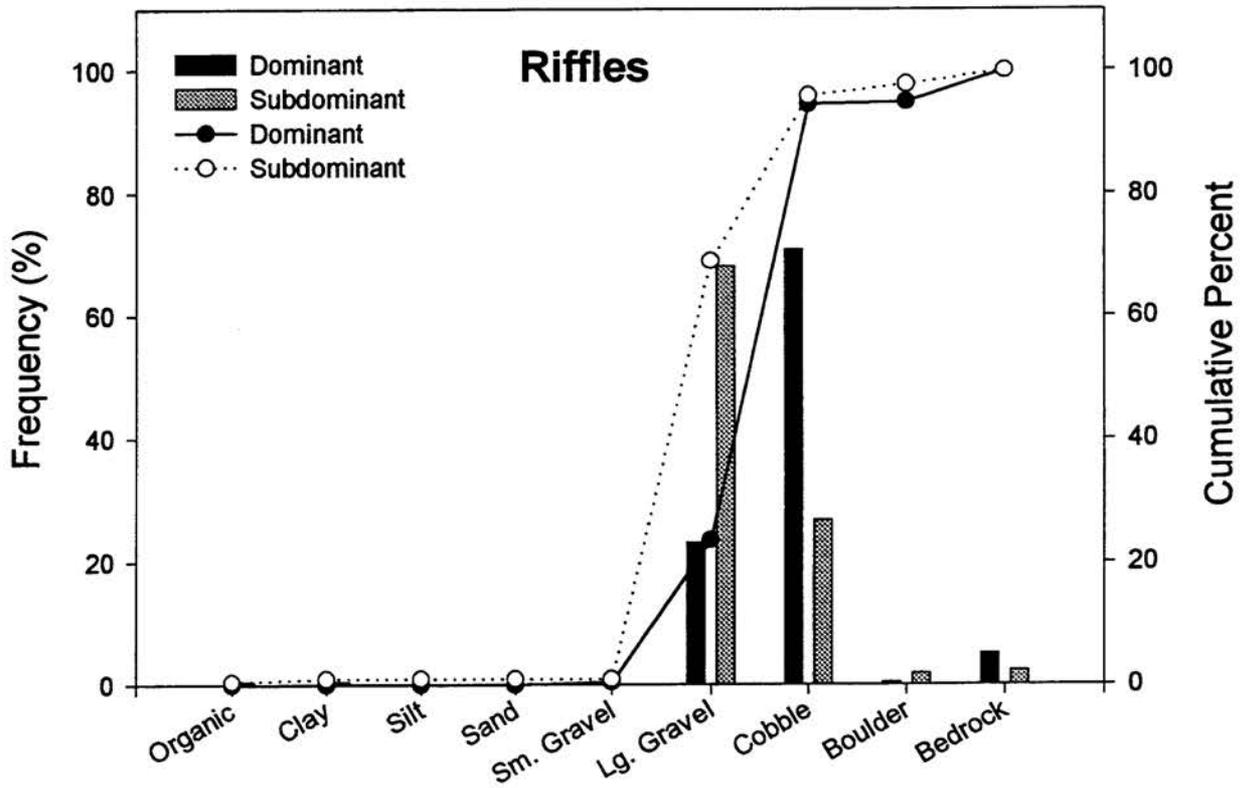
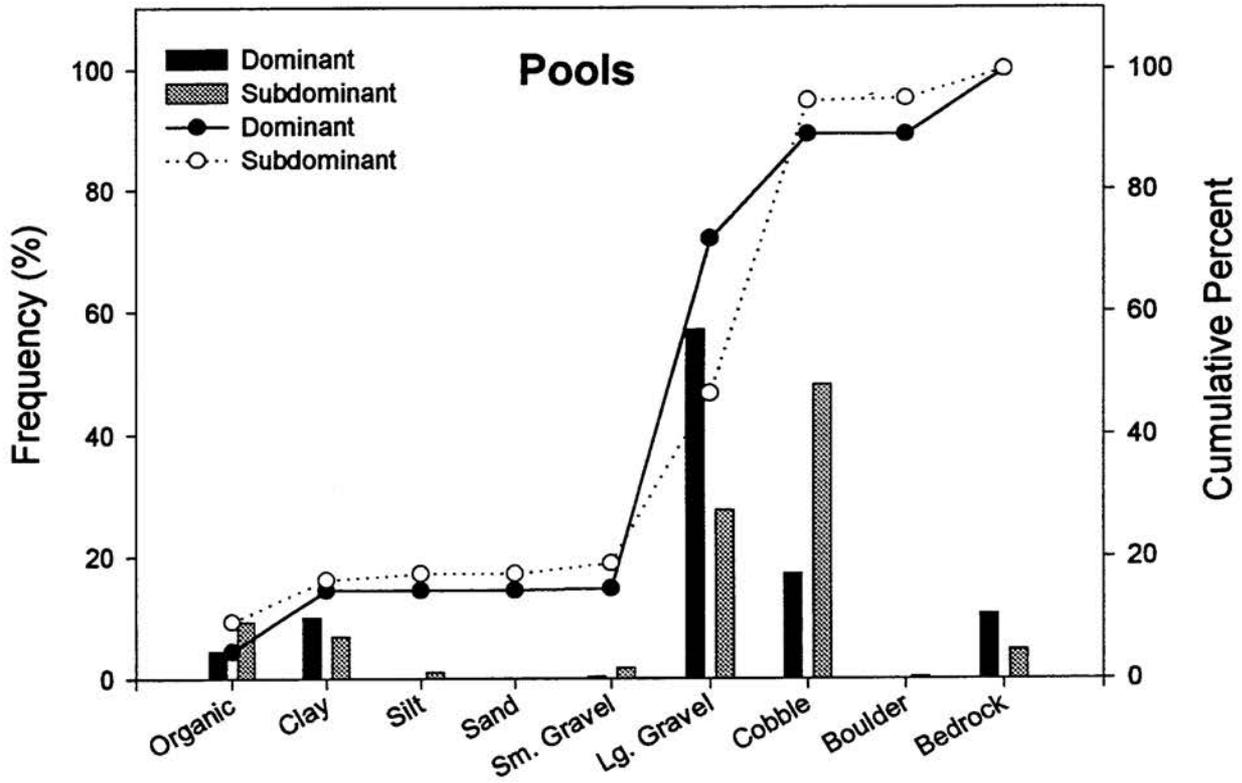
## Poverty Creek

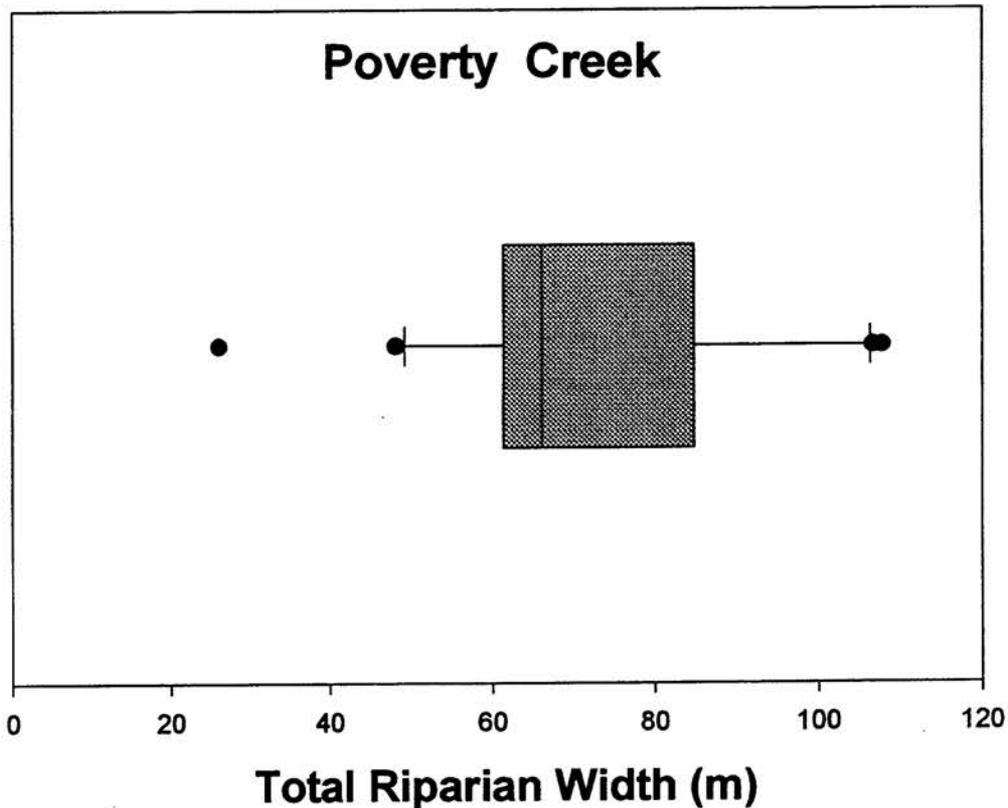


# Distribution and Abundance of Large Woody Debris



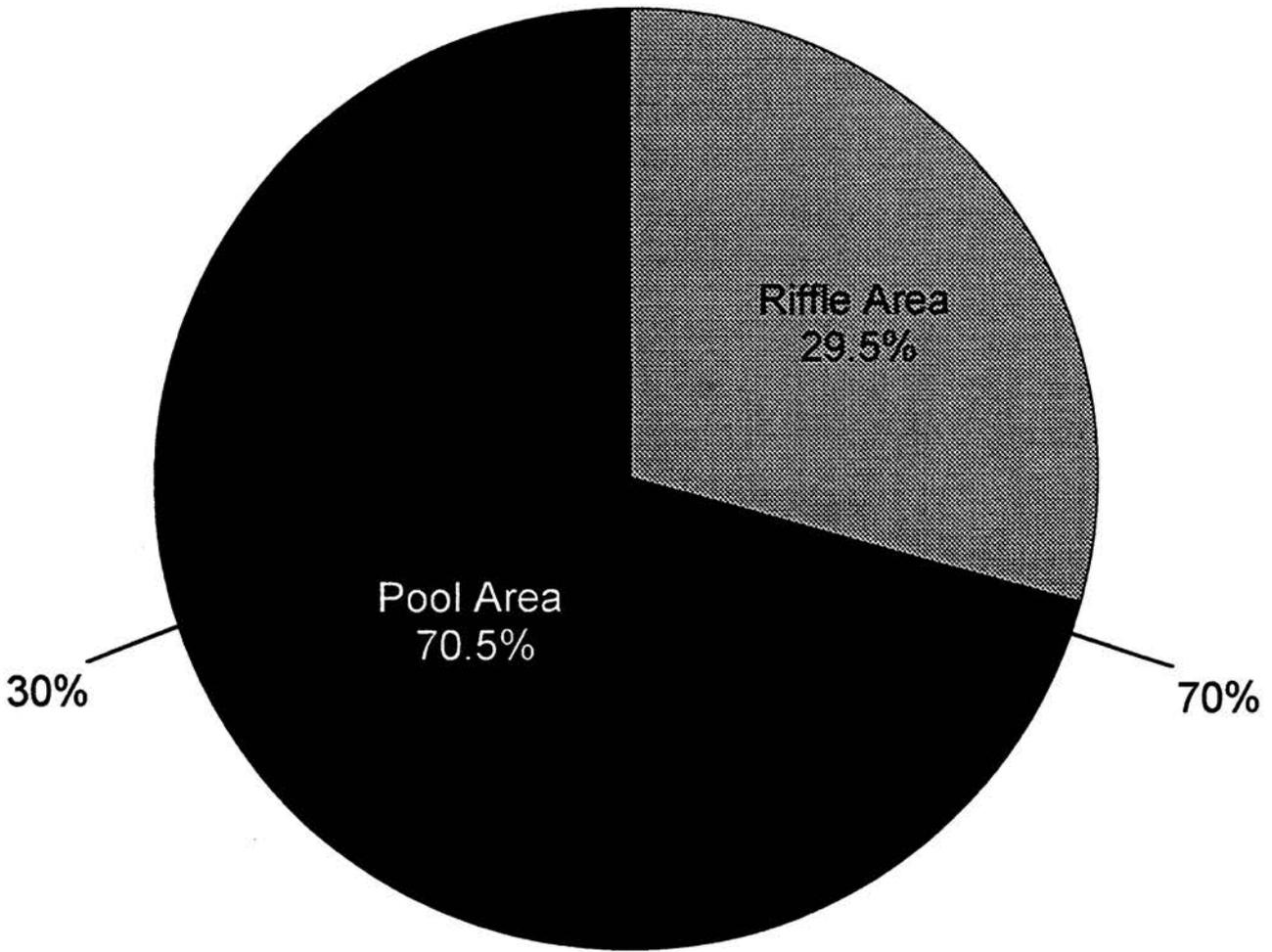
# Poverty Creek Substrate Composition



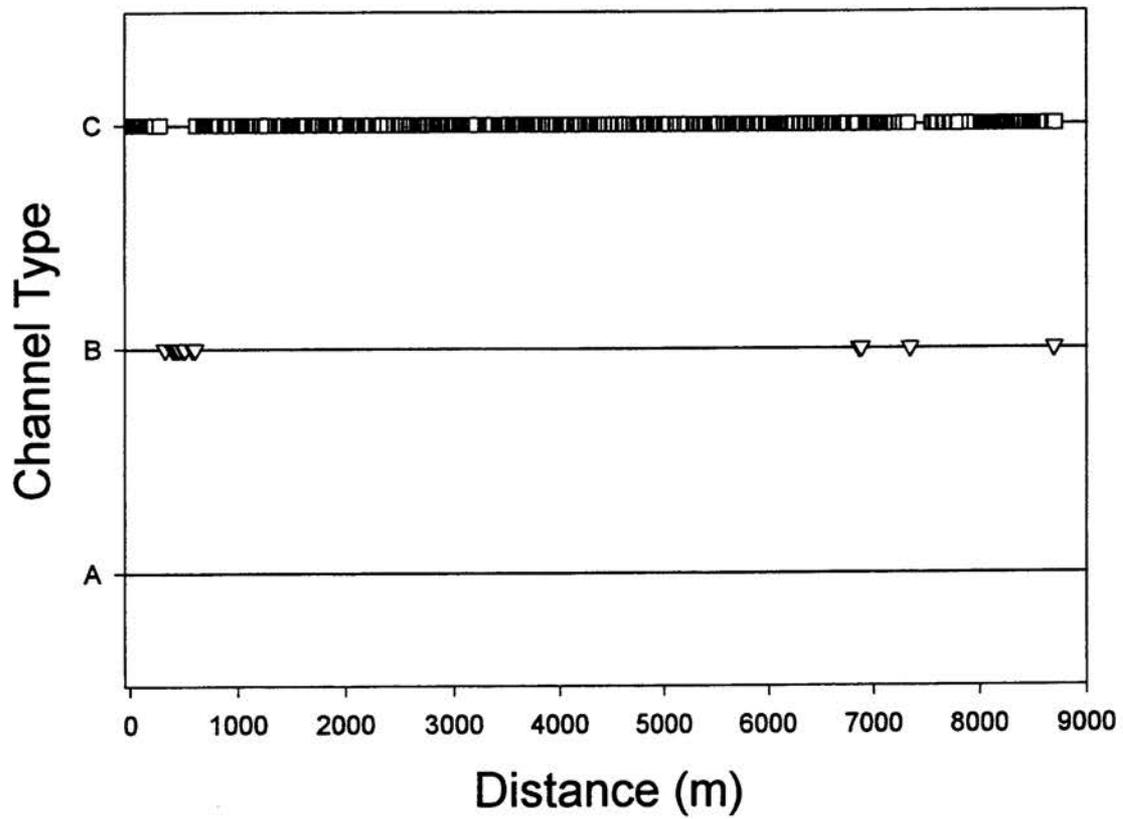
**Riparian Width****Stream: Poverty Creek****Number of Measurements: 17****Mean Width: 71.5m Std Dev: 22.5****Max: 107.7m Min: 26.1m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Poverty Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Poverty Creek Rosgen's Channel Type Distribution



**Stream:** Straley Branch

**District:** Blacksburg

**Quadrangle:** Eggleston

**Sample Date:** 06/02/99

**Downstream Starting Point:** Confluence with Poverty Creek

**Total Distance Surveyed:** 1.3 kilometers

**Percent of Total Area - Pools:** 46.8%

Number of Pools: 82

Number of Pools per kilometer: 63.1

Total Pool Area: 1243.6 sq. meters  $\pm$  110.6

Mean Pool Area: 15.2 sq. meters

Correction Factor: 1.02

Mean Maximum Depth: 28.0 cm

Mean Average Depth: 15.8 cm

Mean Average Residual Pool Depth: 12.2 cm

**Percent of Total Area - Riffles:** 53.2%

Number of Riffles: 64

Number of Riffles per kilometer: 49.2

Total Riffle Area: 1415.6 sq. meters  $\pm$  135.9

Mean Riffle Area: 22.1 sq. meters

Correction Factor: 1.06

Mean Maximum Depth: 15.4 cm

Mean Average Depth: 7.8 cm

**Number of Large Woody Debris Pieces per kilometer:** 113.5

Wood < 5 m and < 55 cm: 72.3

Wood < 5 m and > 55 cm: 10.1

Wood > 5 m and < 55 cm: 26.4

Wood > 5 m and > 55 cm: 4.7

**Mean Channel Width:** 5.6 m

**Mean Riparian Width:** 22.4 m

Mean Maximum Riparian Distance (either side): 15.4 m

Mean Minimum Riparian Distance (either side): 1.4 m

Maximum Riparian Width (Total): 36.7 m

Minimum Riparian Width (Total): 7.1 m

**Straley Branch Continued.****Percent of Pool Habitat Surveyed as Glides: 12.3%****Rosgen's Channel Type Frequency:**

Channel Type A: 37.2%

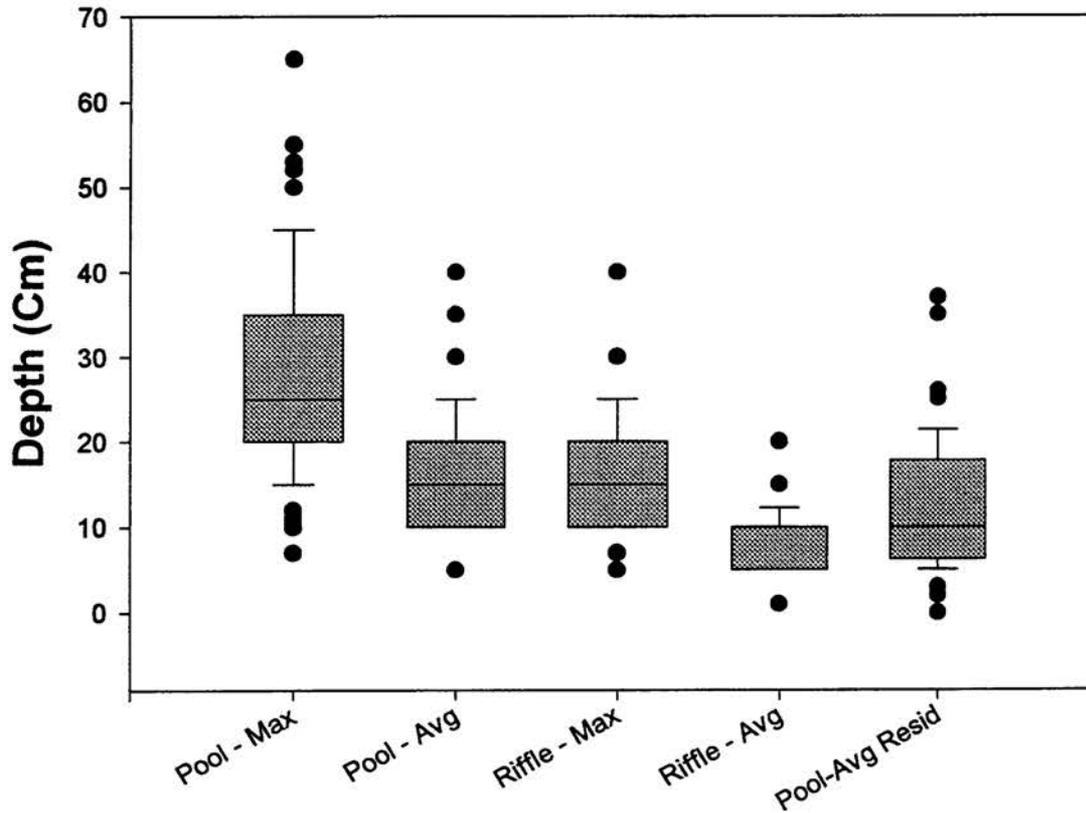
Channel Type B: 45.5%

Channel Type C: 17.3%

Channel Type D: 0.0%

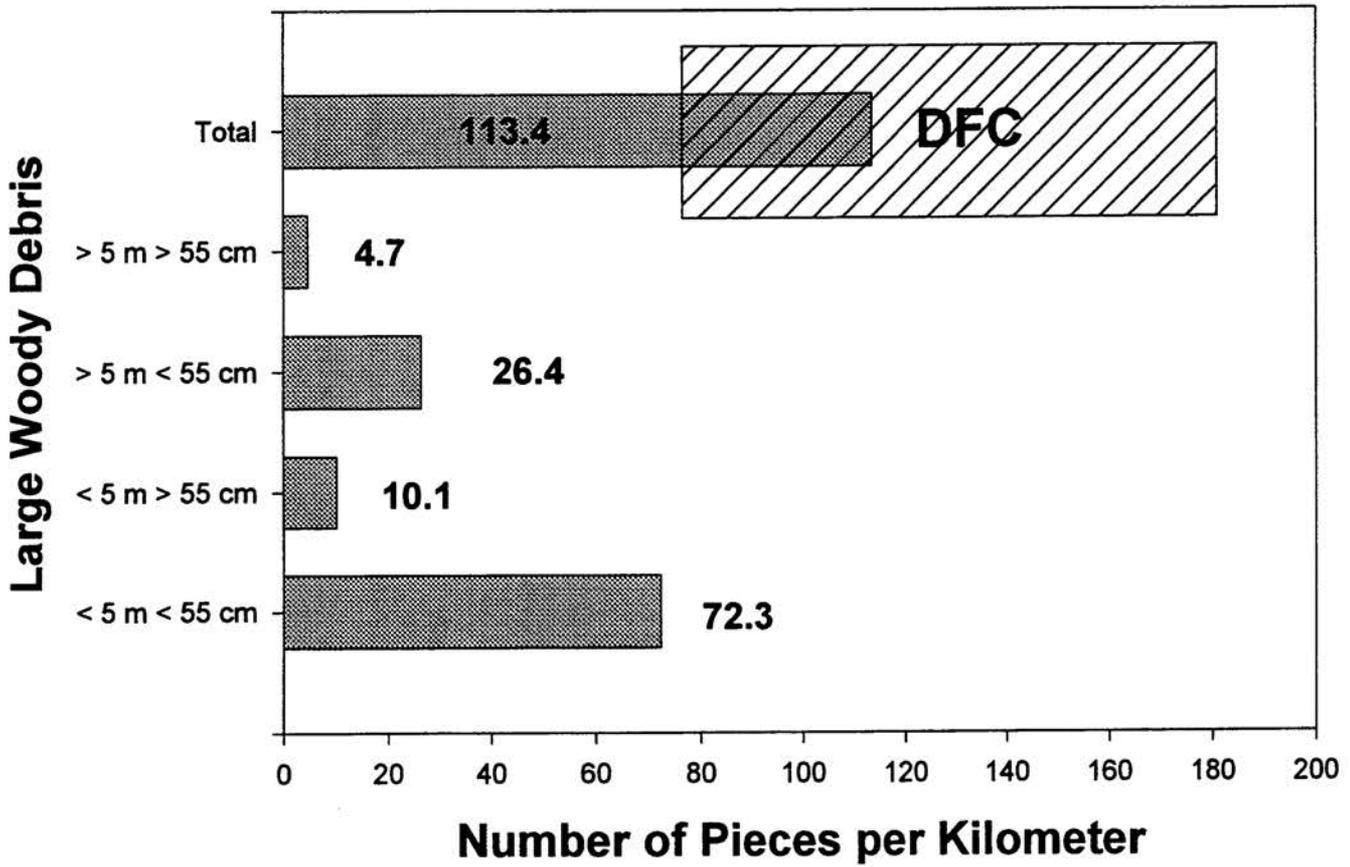
**Percent Pools with  $\geq$  35% Embeddedness: 7.3%****Average Channel Gradient: 8.2**

## Straley Branch

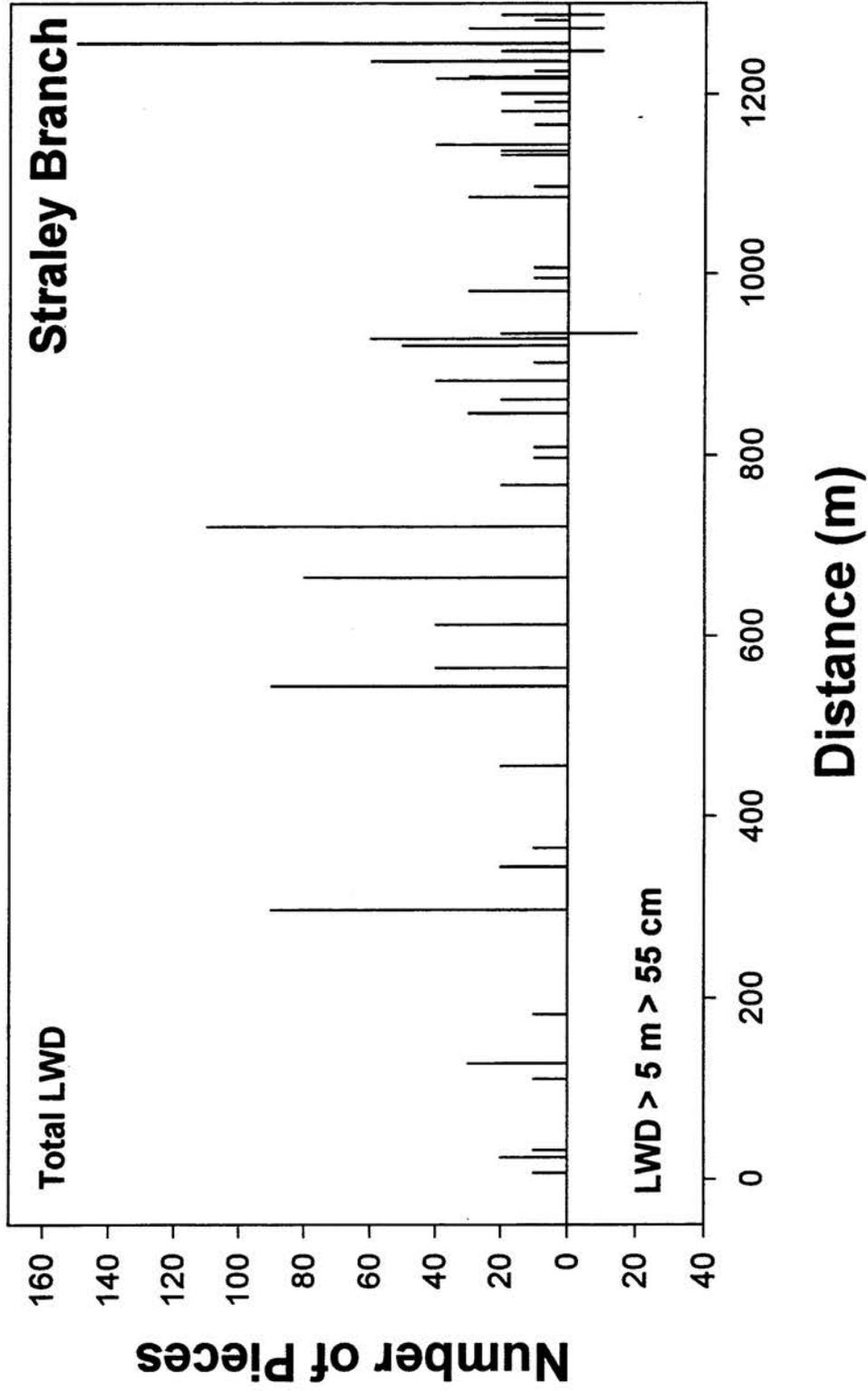


Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.

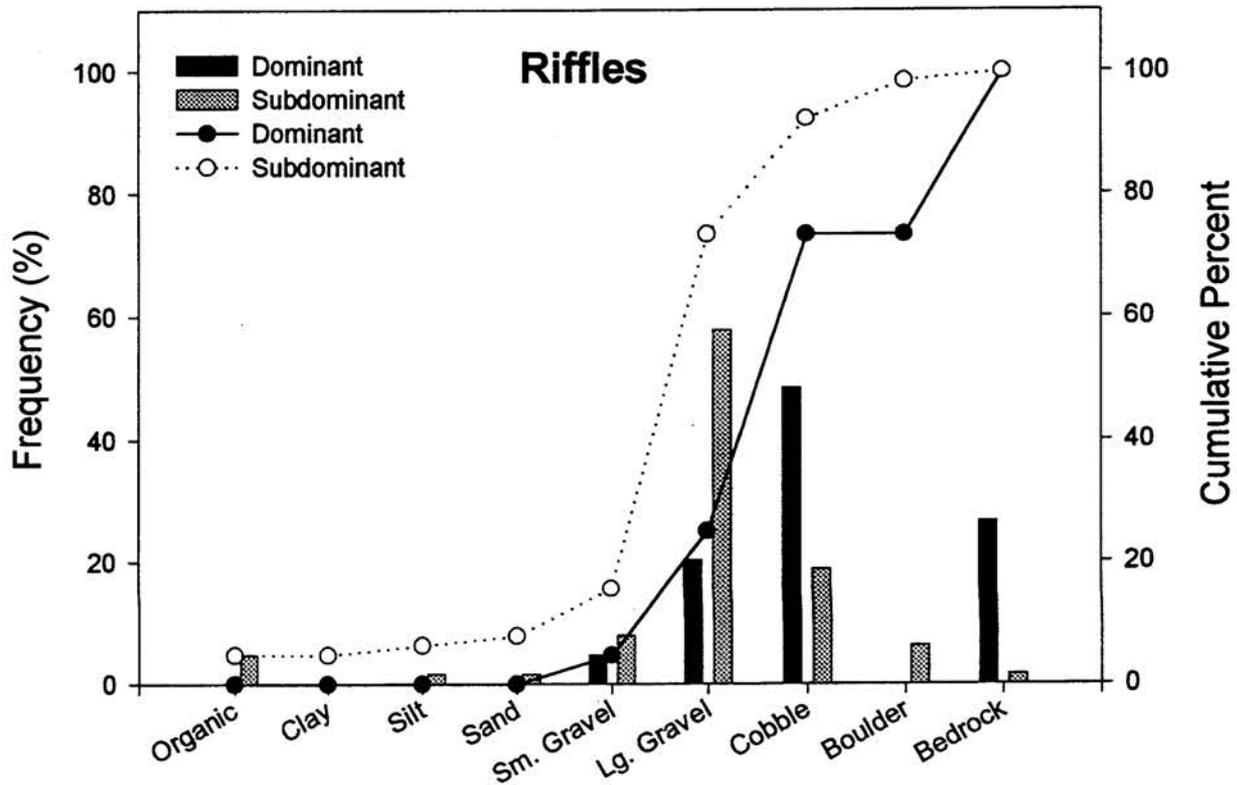
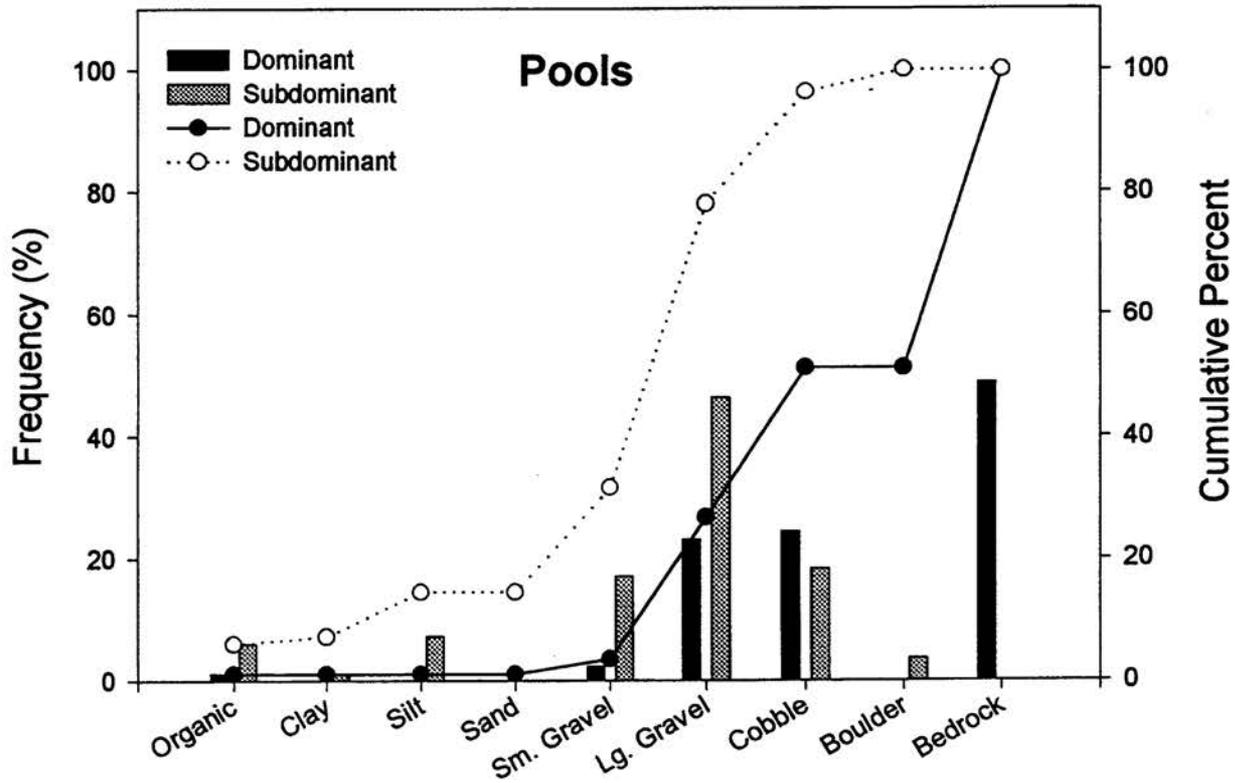
## Straley Branch

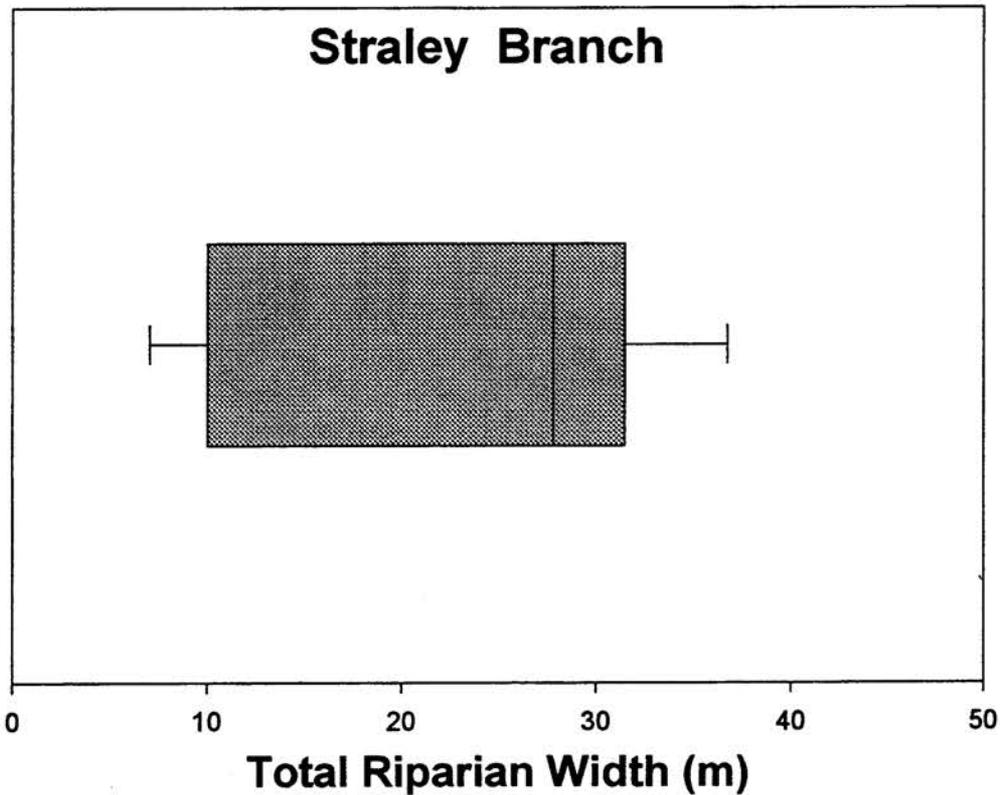


# Distribution and Abundance of Large Woody Debris



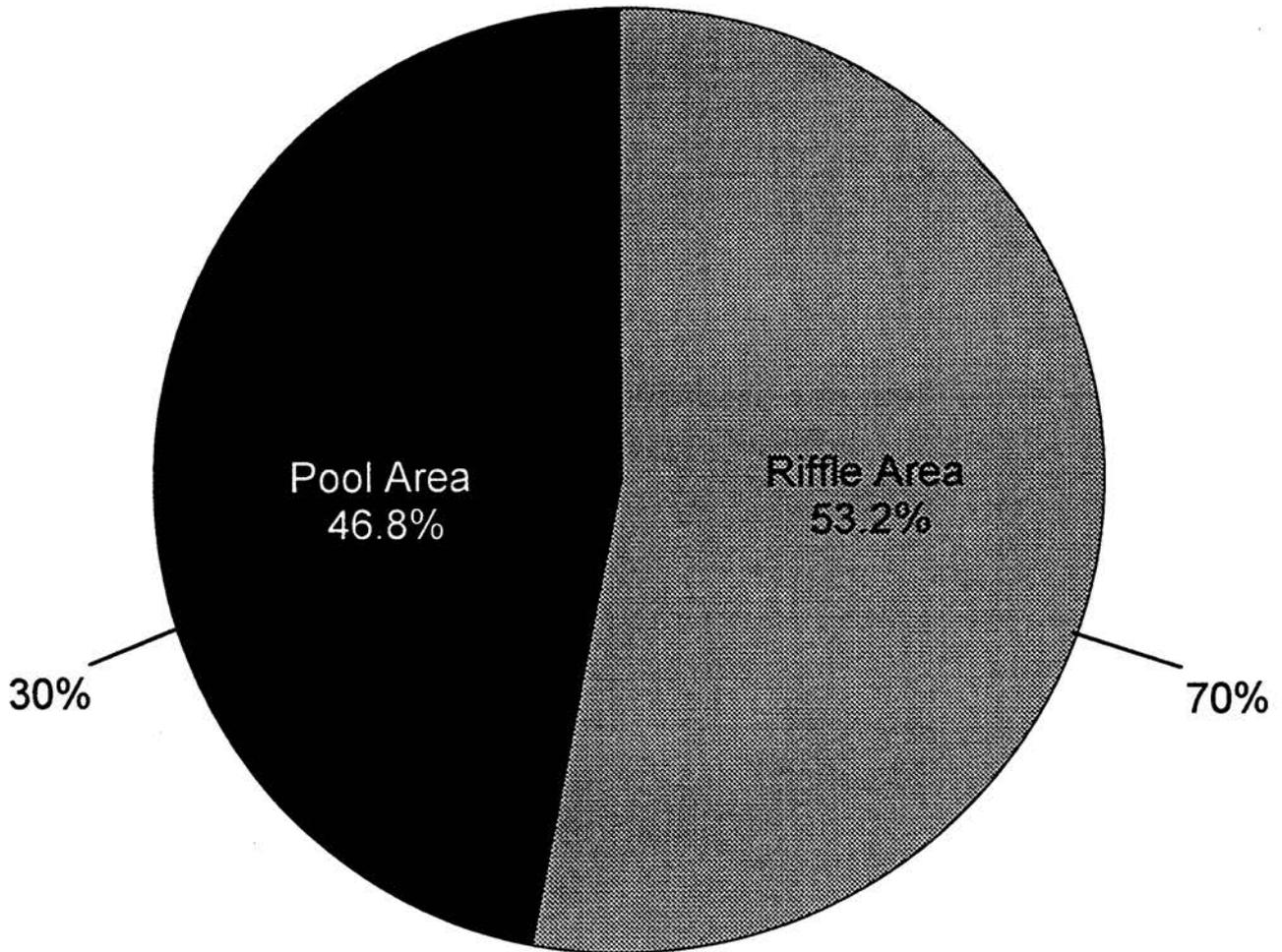
## Straley Branch Substrate Composition



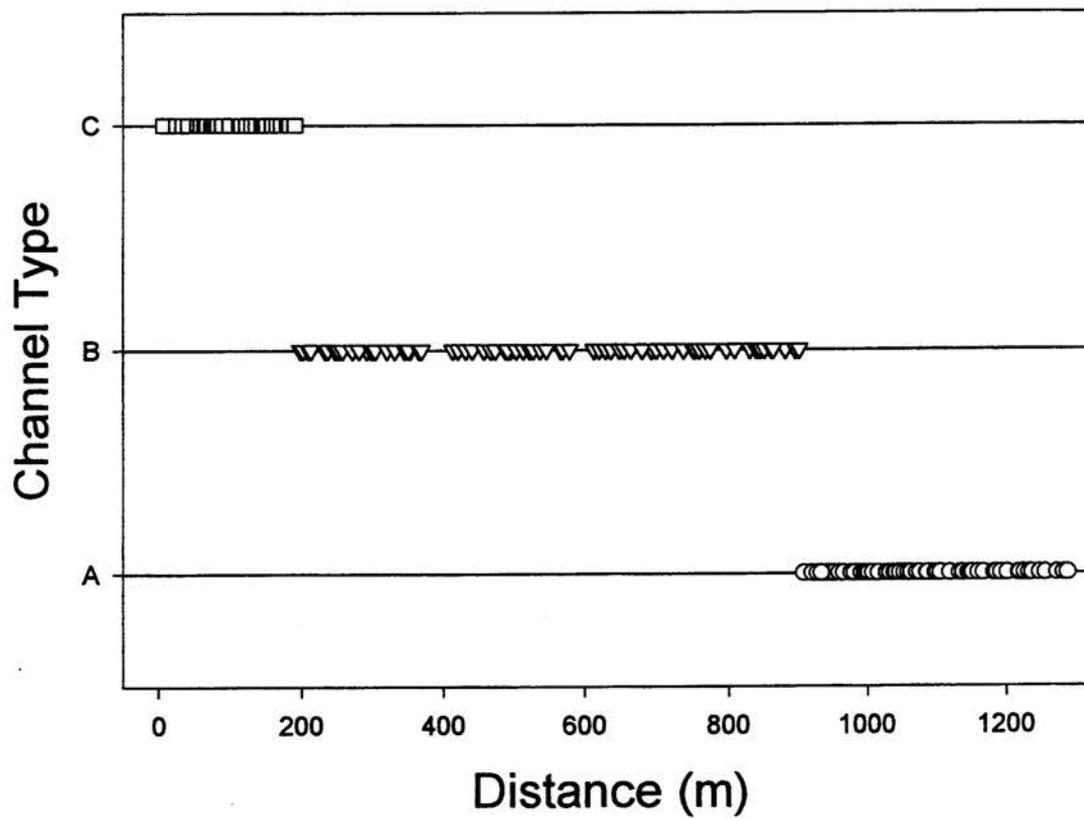
**Riparian Width****Stream: Straley Branch****Number of Measurements: 5****Mean Width: 22.5m Std Dev: 12.8****Max: 36.7m Min: 7.1m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Straley Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Straley Branch Rosgen's Channel Type Distribution



## **Mechanicsburg and Narrows Quadrangles**

**Stream:** Dismal Creek

**District:** Blacksburg

**Quadrangle:** Mechanicsburg/White Gate

**Sample Date:** 06/30/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 8.5 kilometers

**Percent of Total Area - Pools:** 83.2%

Number of Pools: 343

Number of Pools per kilometer: 40.4

Total Pool Area: 38072.9 sq. meters  $\pm$  4293.4

Mean Pool Area: 111.0 sq. meters

Correction Factor: 1.03

Mean Maximum Depth: 38.7 cm

Mean Average Depth: 28.6 cm

Mean Average Residual Pool Depth: 30.6 cm

**Percent of Total Area - Riffles:** 16.8%

Number of Riffles: 144

Number of Riffles per kilometer: 16.9

Total Riffle Area: 7684.3 sq. meters  $\pm$  626.9

Mean Riffle Area: 53.4 sq. meters

Correction Factor: 1.03

Mean Maximum Depth: 16.2 cm

Mean Average Depth: 8.7 cm

**Number of Large Woody Debris Pieces per kilometer:** 559.9

Wood < 5 m and < 55 cm: 298.2

Wood < 5 m and > 55 cm: 33.0

Wood > 5 m and < 55 cm: 162.4

Wood > 5 m and > 55 cm: 66.3

**Mean Channel Width:** 9.4 m

**Mean Riparian Width:** 31.1 m

Mean Maximum Riparian Distance (either side): 18.3 m

Mean Minimum Riparian Distance (either side): 3.4 m

Maximum Riparian Width (Total): 59.0 m

Minimum Riparian Width (Total): 16.4 m

Dismal Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 80.3%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 0.0%

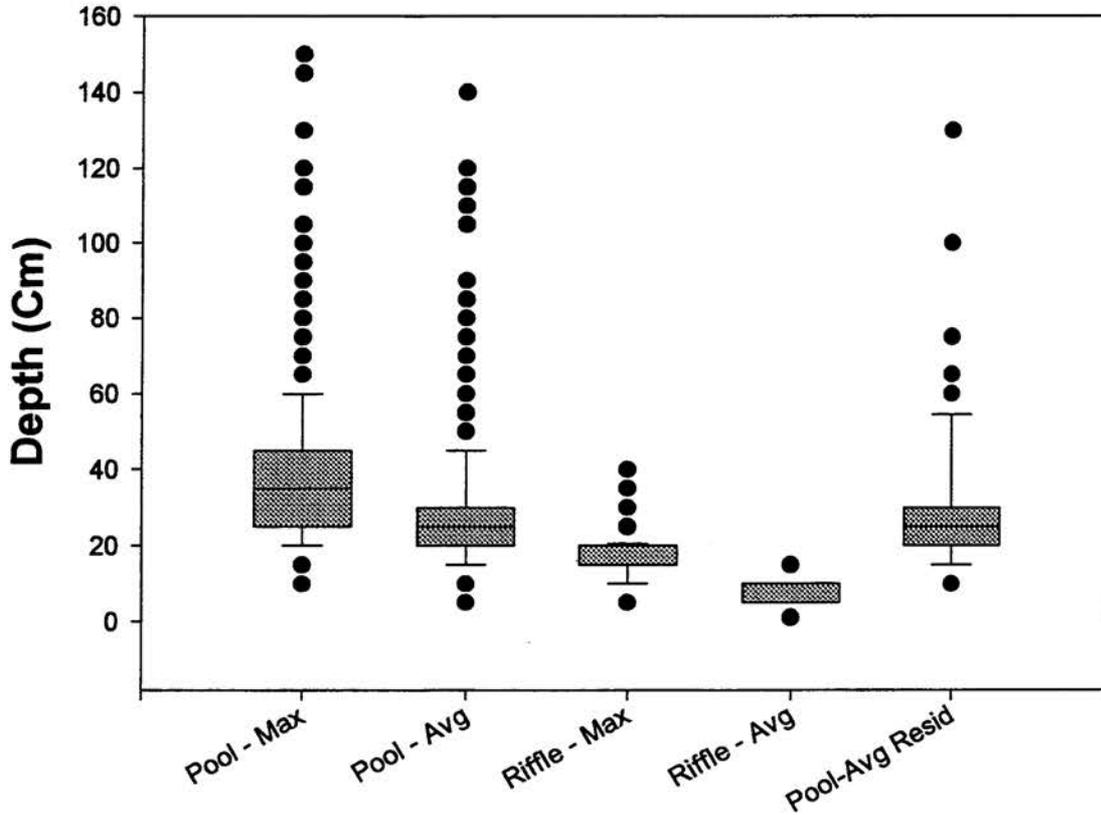
Channel Type C: 100%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 19.2%**

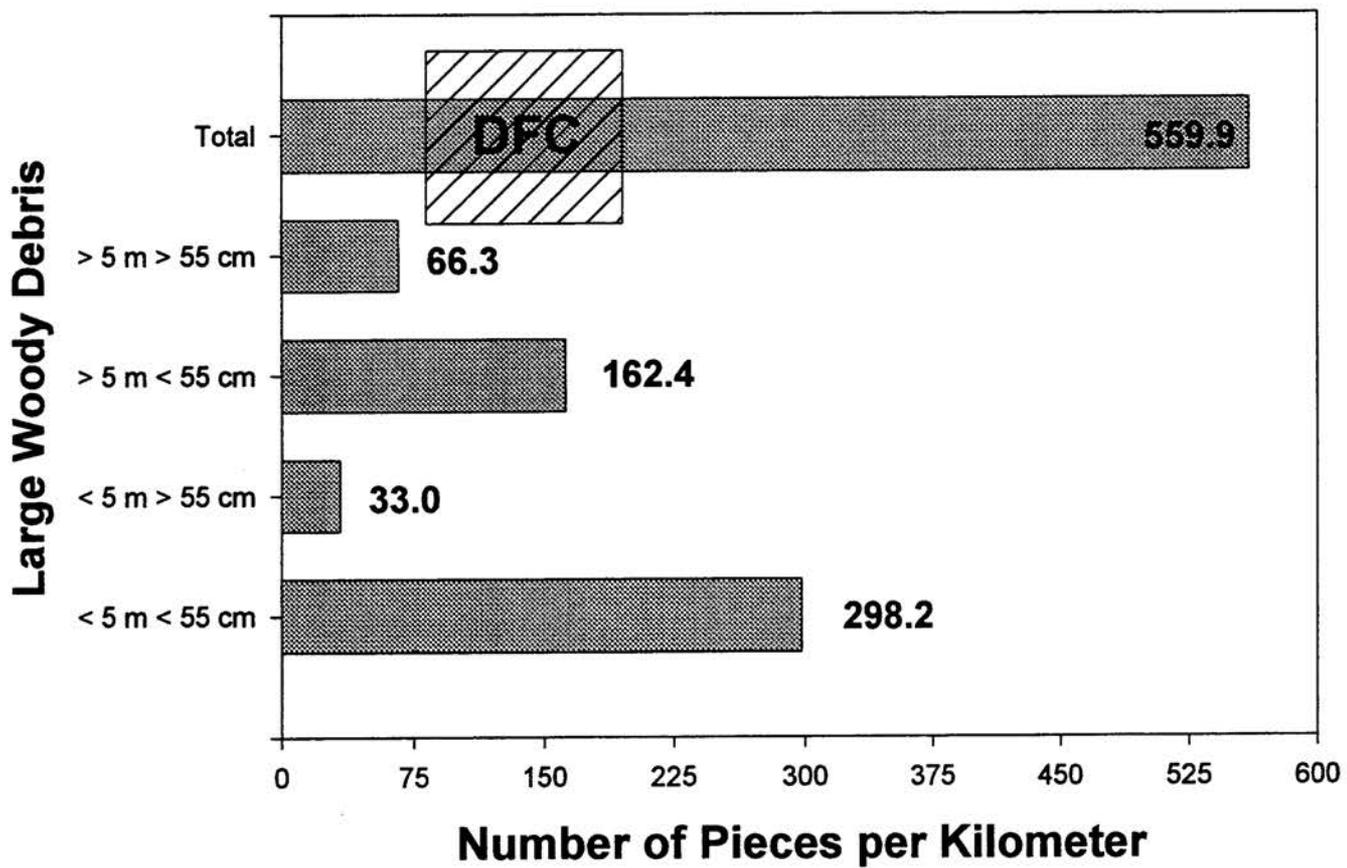
**Average Channel Gradient: 7.7**

## Dismal Creek

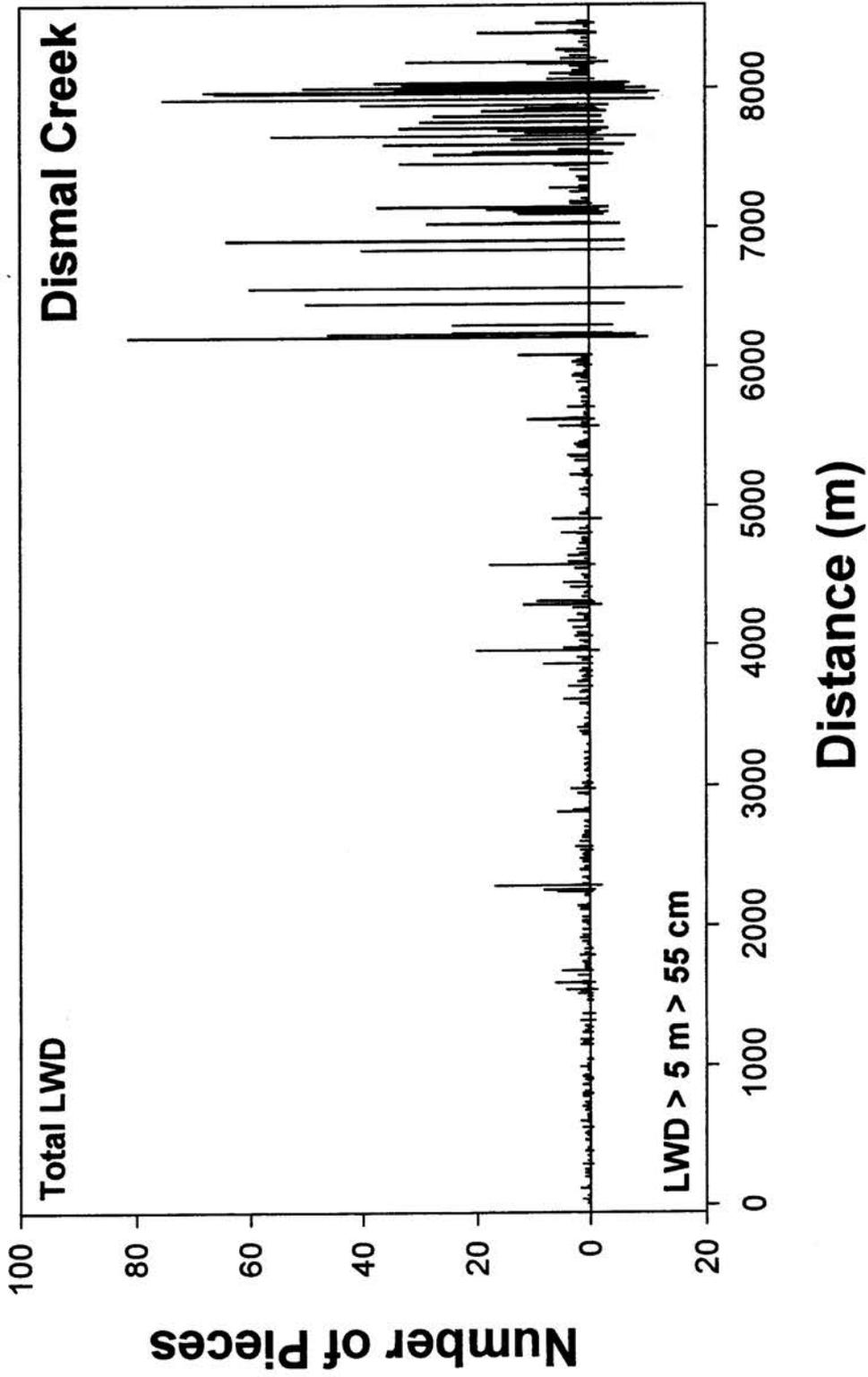


Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.

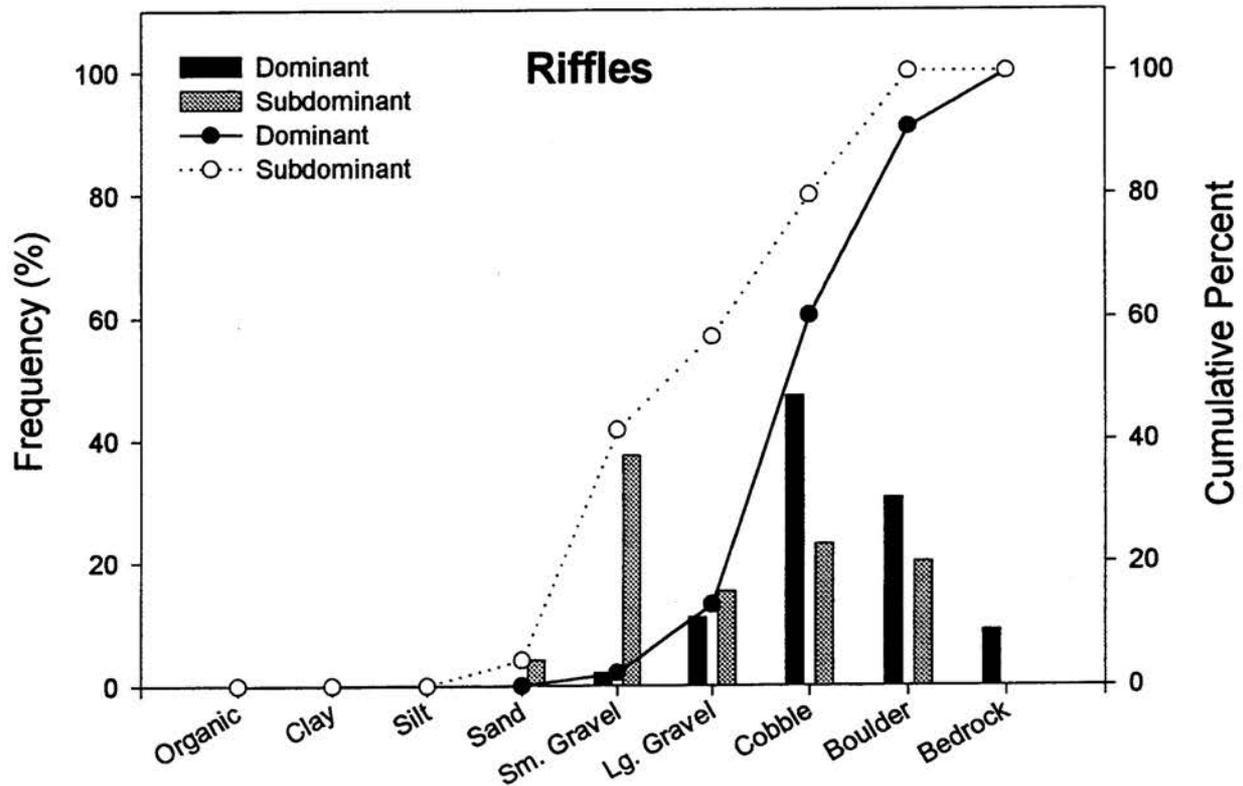
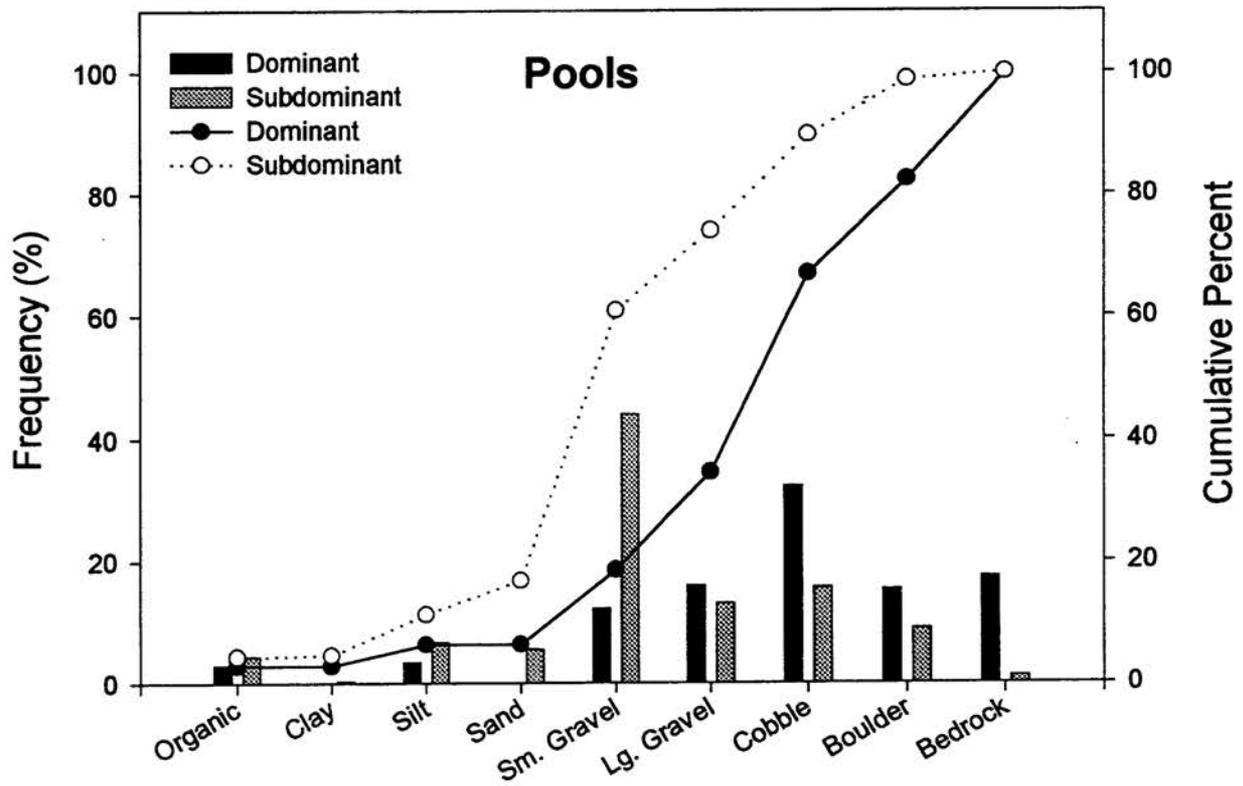
## Dismal Creek

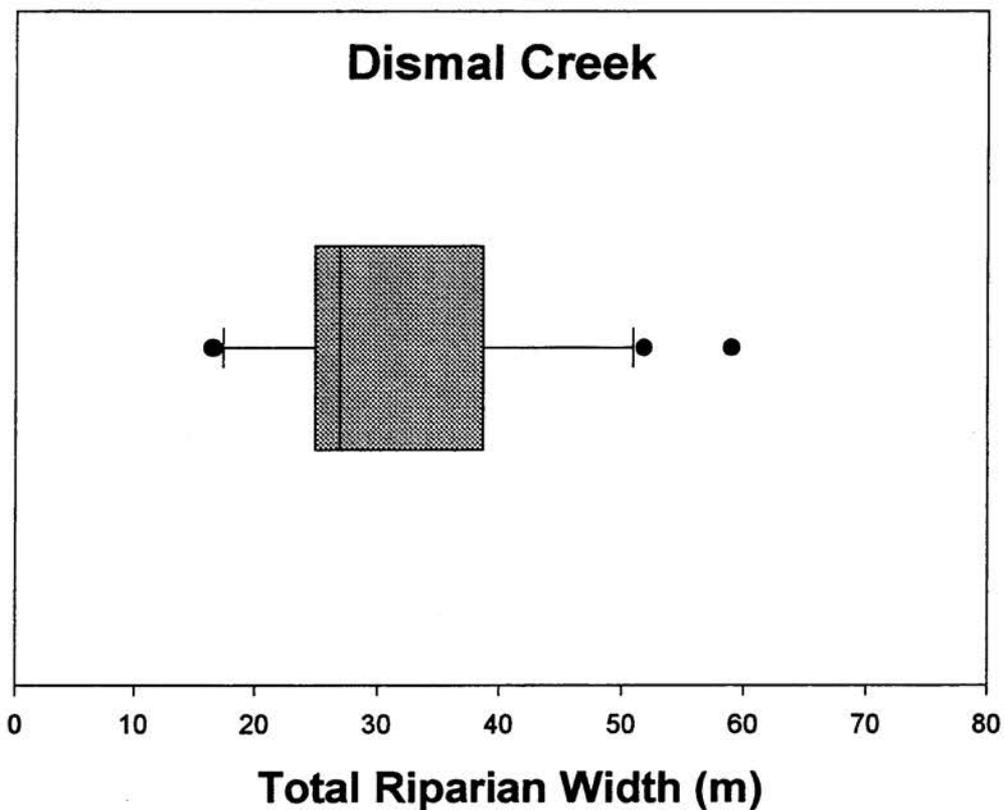


# Distribution and Abundance of Large Woody Debris



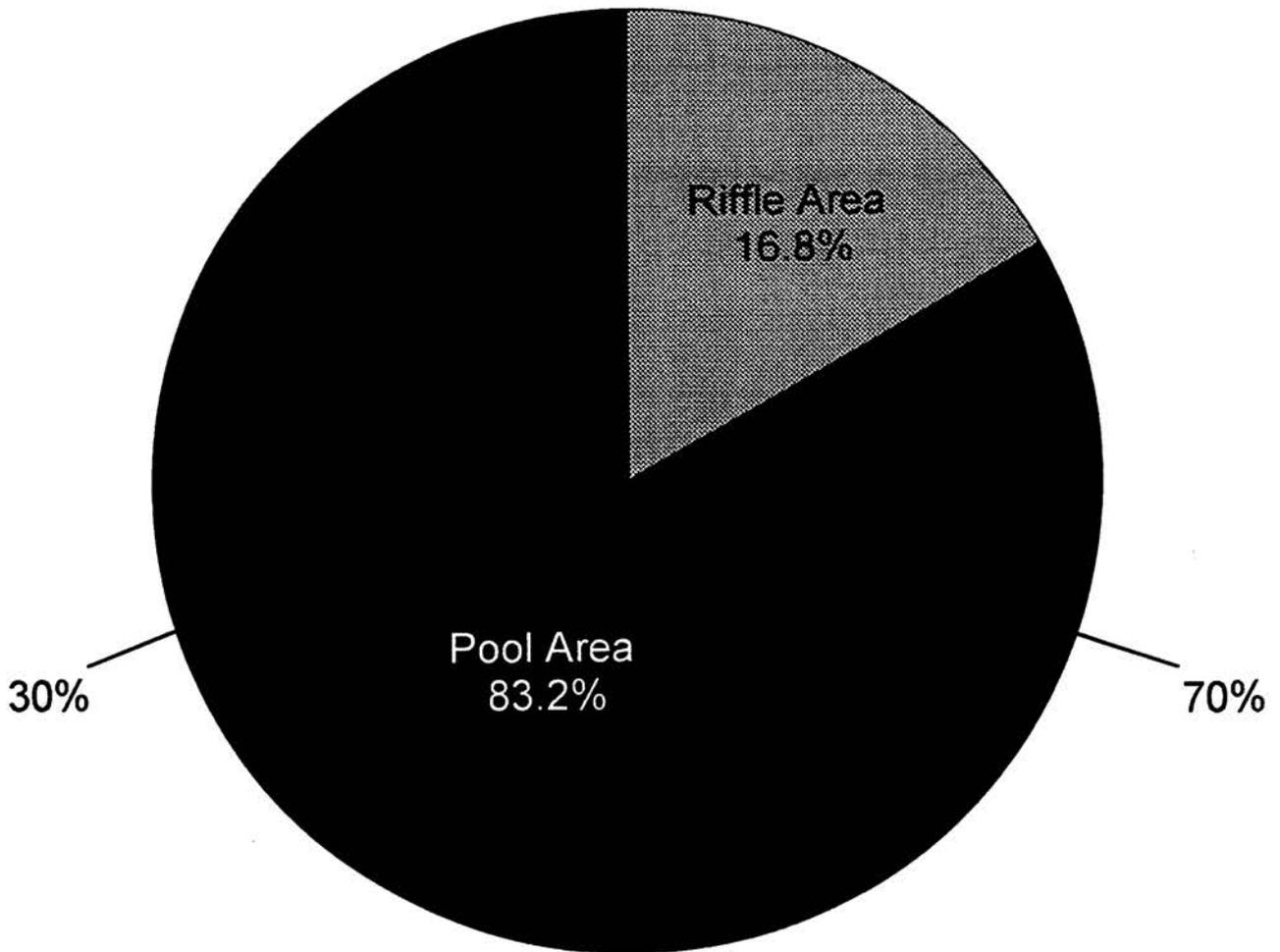
## Dismal Creek Substrate Composition



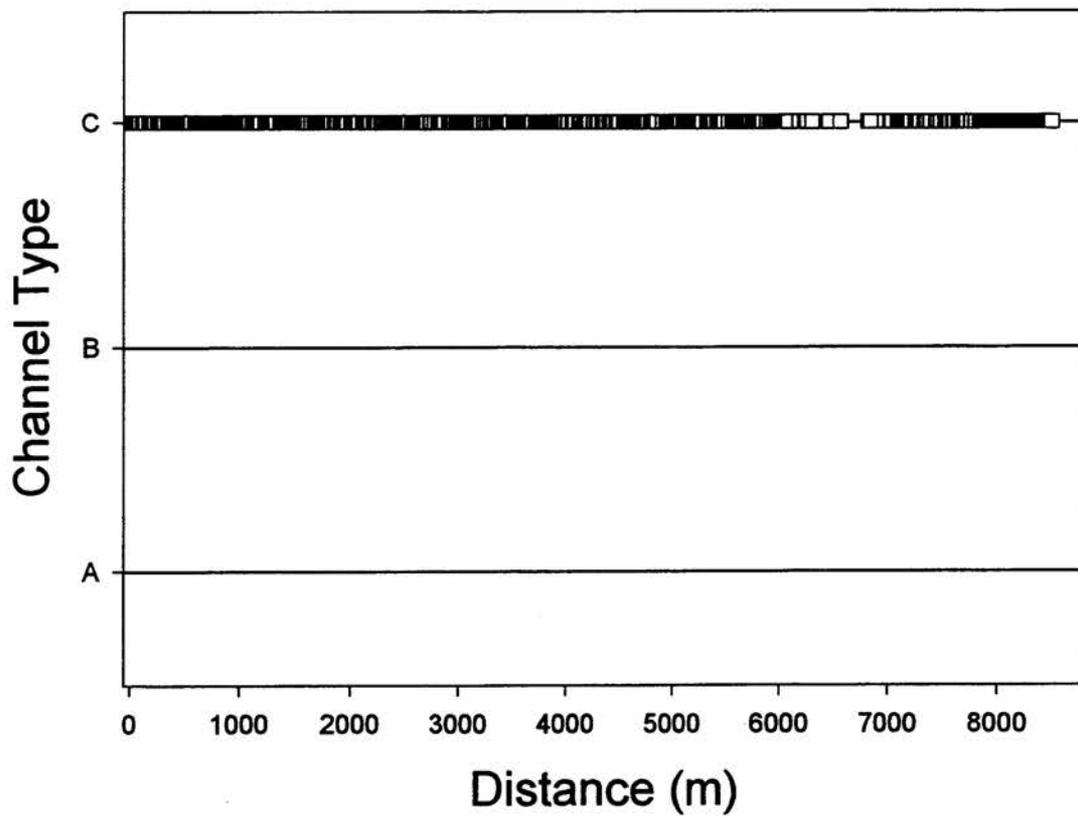
**Riparian Width****Stream: Dismal Creek****Number of Measurements: 16****Mean Width: 31.2 m Std Dev: 11.8****Max: 59.0m Min: 16.4m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Dismal Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Dismal Creek Rosgen's Channel Type Distribution



**Stream:** Mill Creek

**District:** Blacksburg

**Quadrangle:** Narrows

**Sample Date:** 08/09/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 4.4 kilometers

**Percent of Total Area - Pools:** 44.3%

**Number of Pools:** 151

**Number of Pools per kilometer:** 34.3

**Total Pool Area:** 4779.2 sq. meters  $\pm$  339.5

**Mean Pool Area:** 31.7 sq. meters

**Correction Factor:** 0.93

**Mean Maximum Depth:** 51.6 cm

**Mean Average Depth:** 37.5 cm

**Mean Average Residual Pool Depth:** 10.0 cm

**Percent of Total Area - Riffles:** 55.7%

**Number of Riffles:** 125

**Number of Riffles per kilometer:** 28.4

**Total Riffle Area:** 5999.8 sq. meters  $\pm$  945.9

**Mean Riffle Area:** 48.0 sq. meters

**Correction Factor:** 1.03

**Mean Maximum Depth:** 20.4 cm

**Mean Average Depth:** 10.6 cm

**Number of Large Woody Debris Pieces per kilometer:** 343.4

**Wood < 5 m and < 55 cm:** 206.6

**Wood < 5 m and > 55 cm:** 31.2

**Wood > 5 m and < 55 cm:** 74.4

**Wood > 5 m and > 55 cm:** 31.2

**Mean Channel Width:** 7.9 m

**Mean Riparian Width:** 16.7 m

**Mean Maximum Riparian Distance (either side):** 6.7 m

**Mean Minimum Riparian Distance (either side):** 2.1 m

**Maximum Riparian Width (Total):** 20.9 m

**Minimum Riparian Width (Total):** 11.6 m

Mill Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 17.5%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 62.7%

Channel Type B: 37.3%

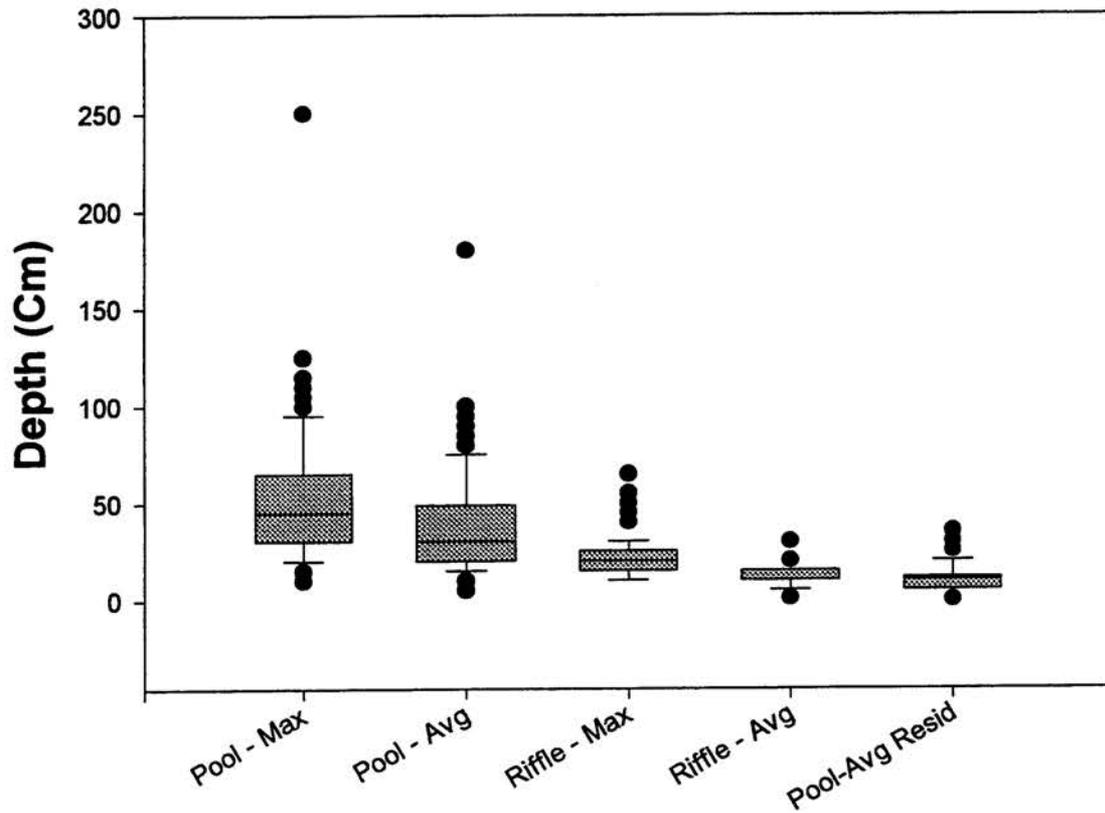
Channel Type C: 0.0%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 13.2%**

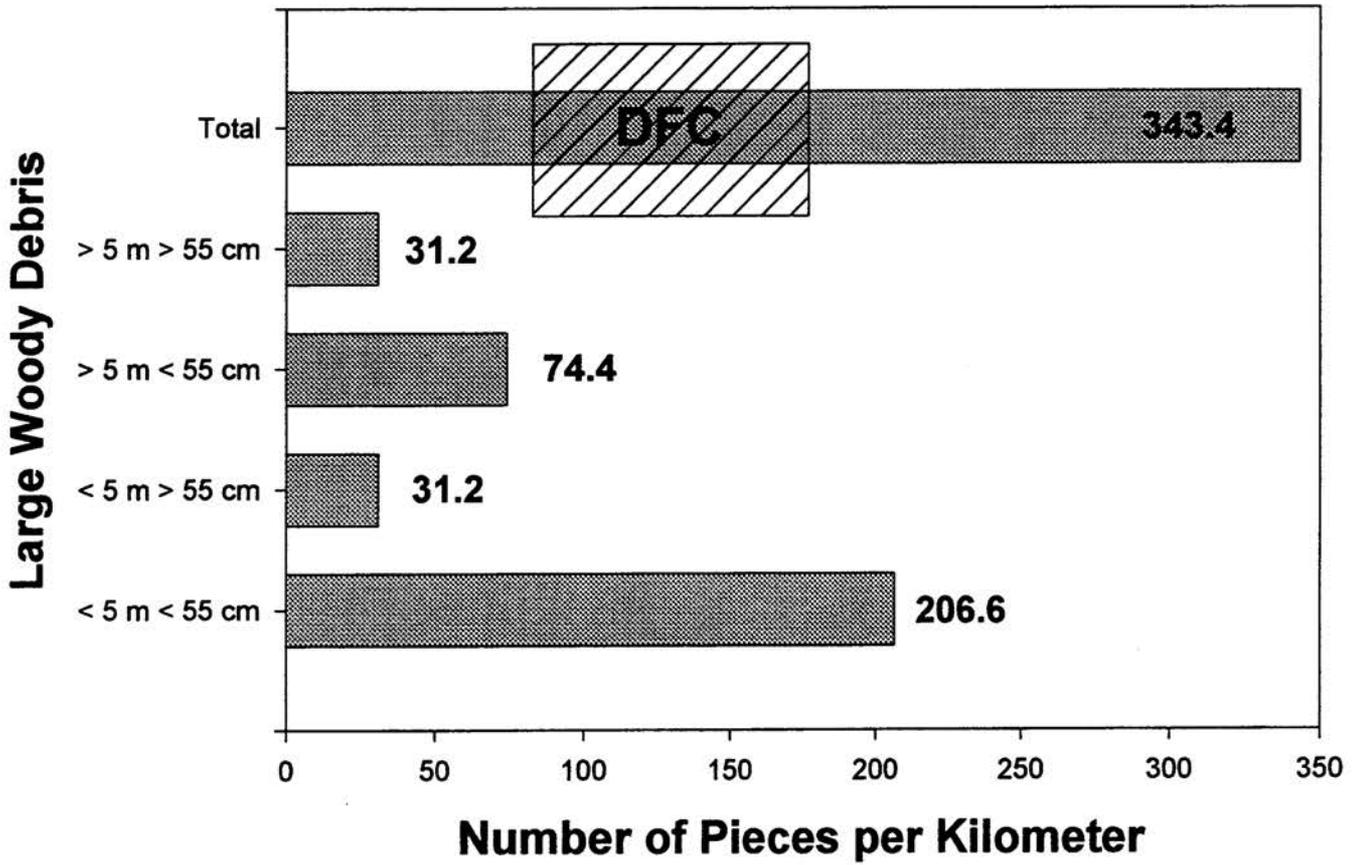
**Average Channel Gradient: 14.5**

## Mill Creek

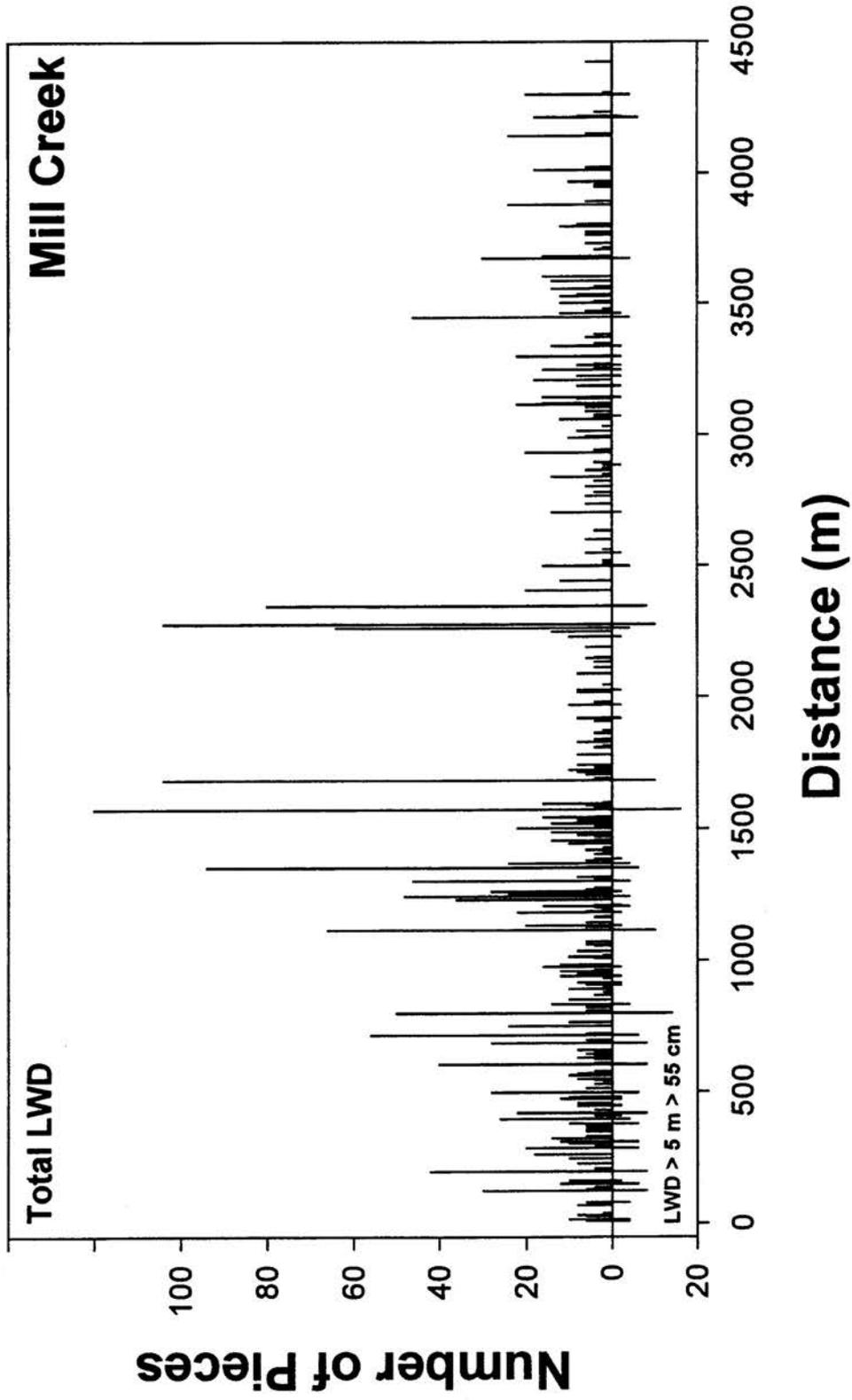


Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.

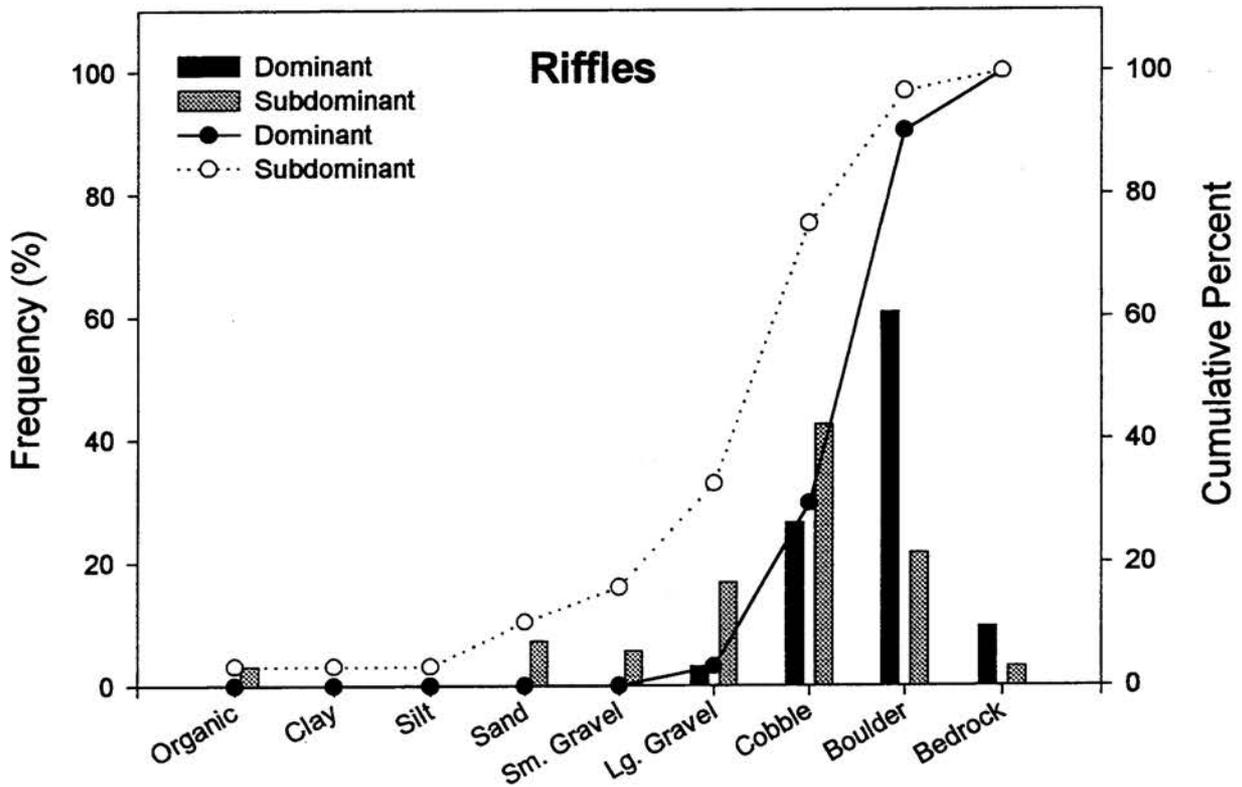
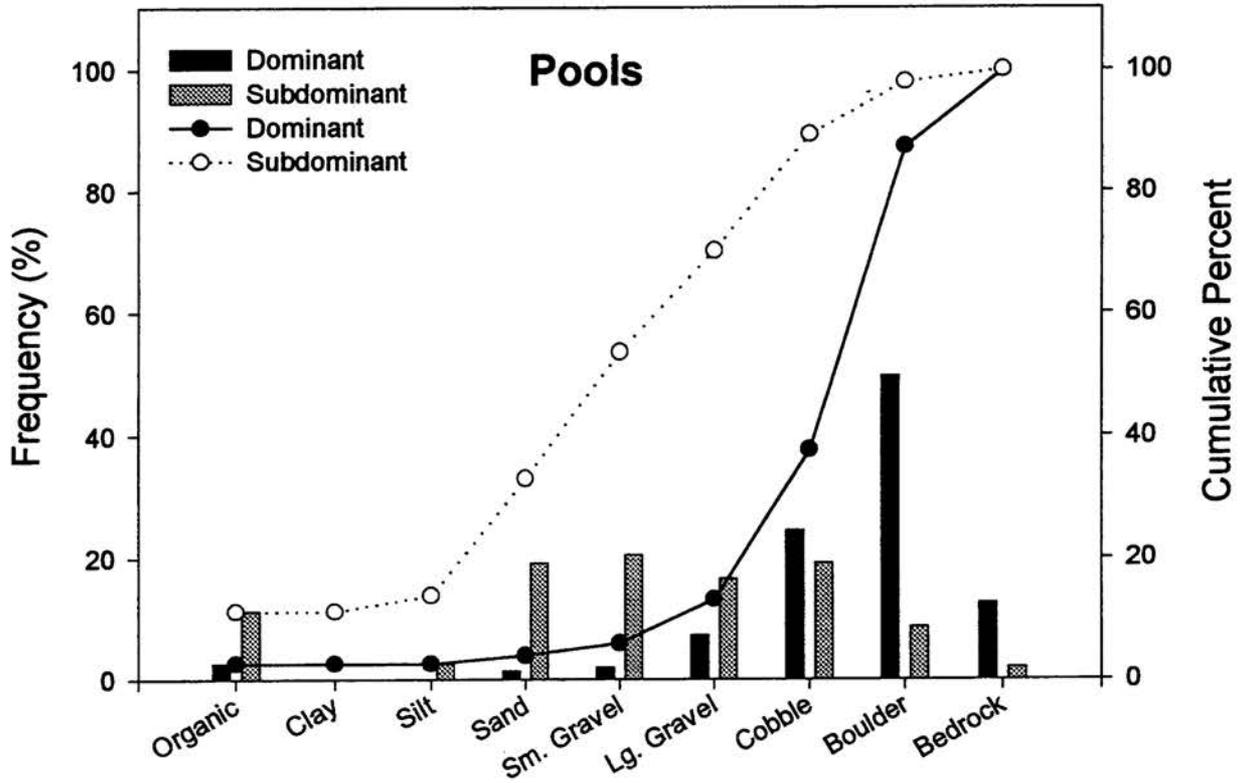
## Mill Creek



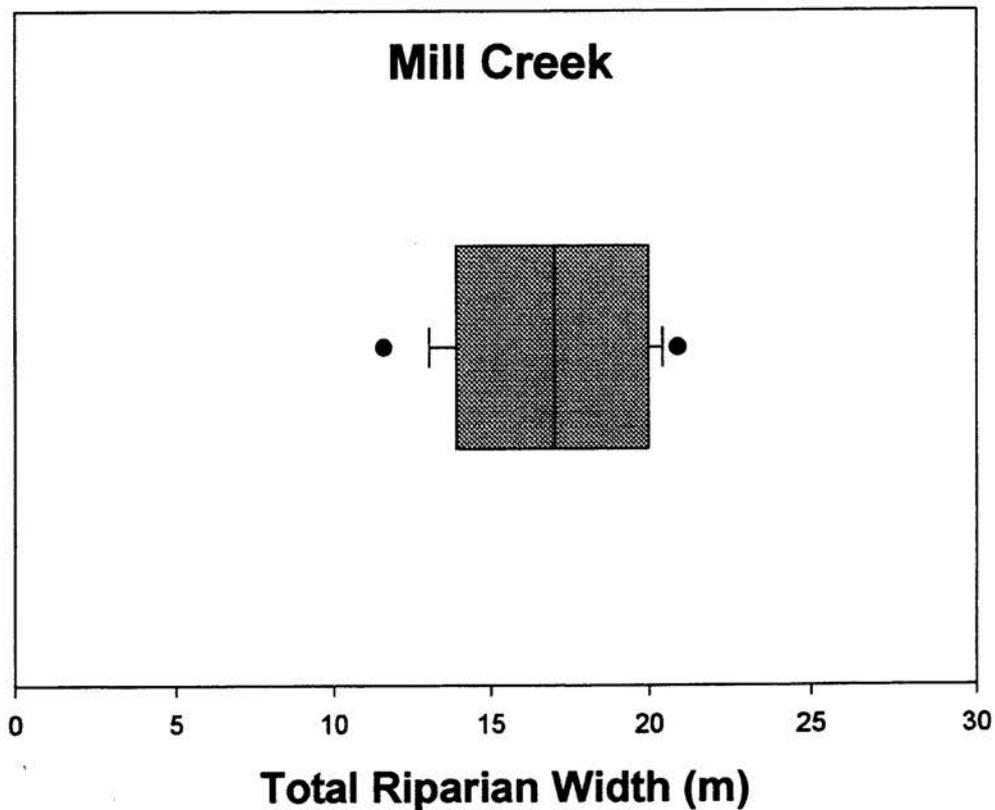
# Distribution and Abundance of Large Woody Debris



## Mill Creek Substrate Composition

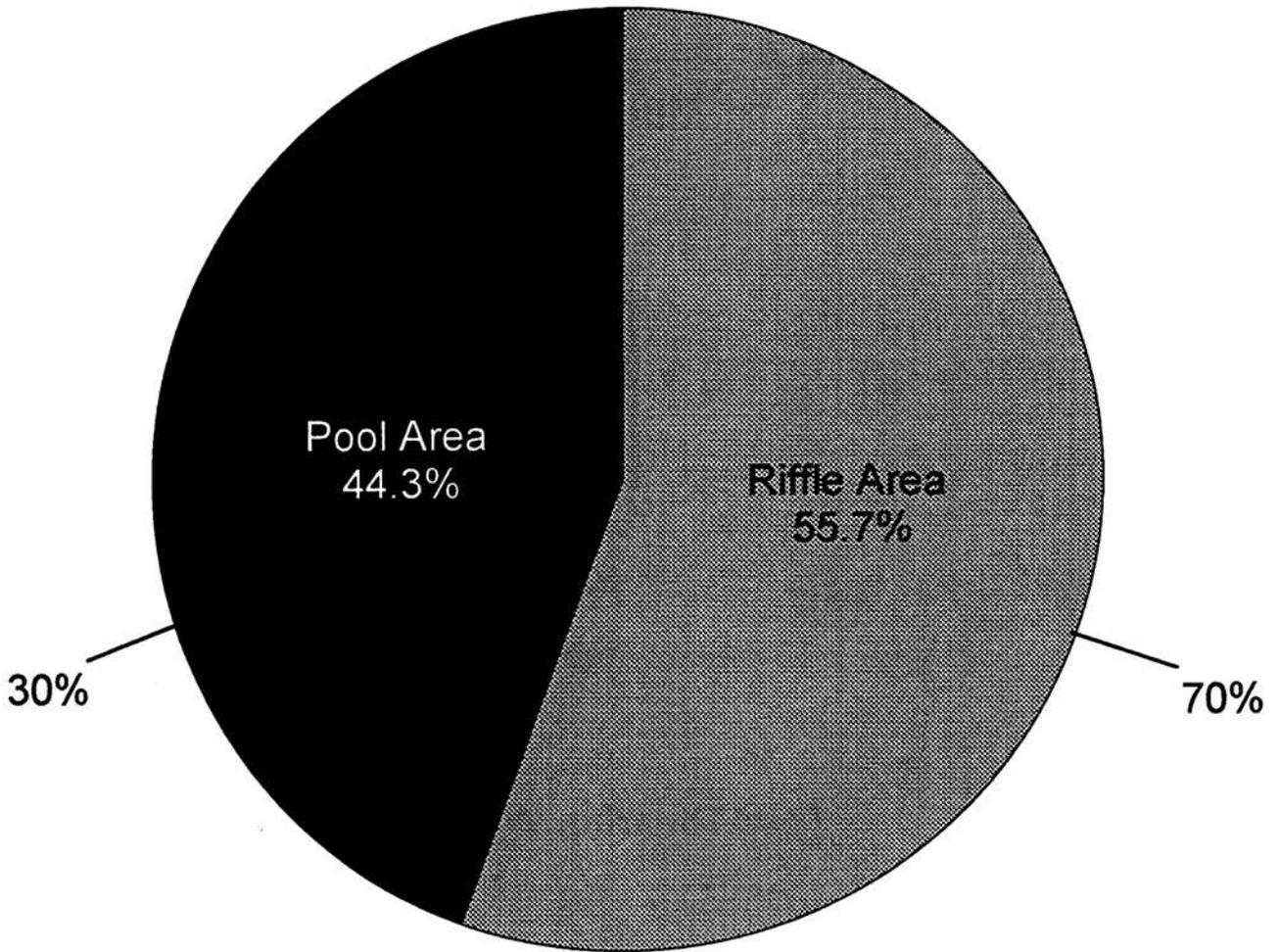


**Riparian Width**  
**Stream: Mill Creek**  
**Number of Measurements: 13**  
**Mean Width: 16.6m Std Dev: 3.1**  
**Max: 20.9m Min: 11.6m**

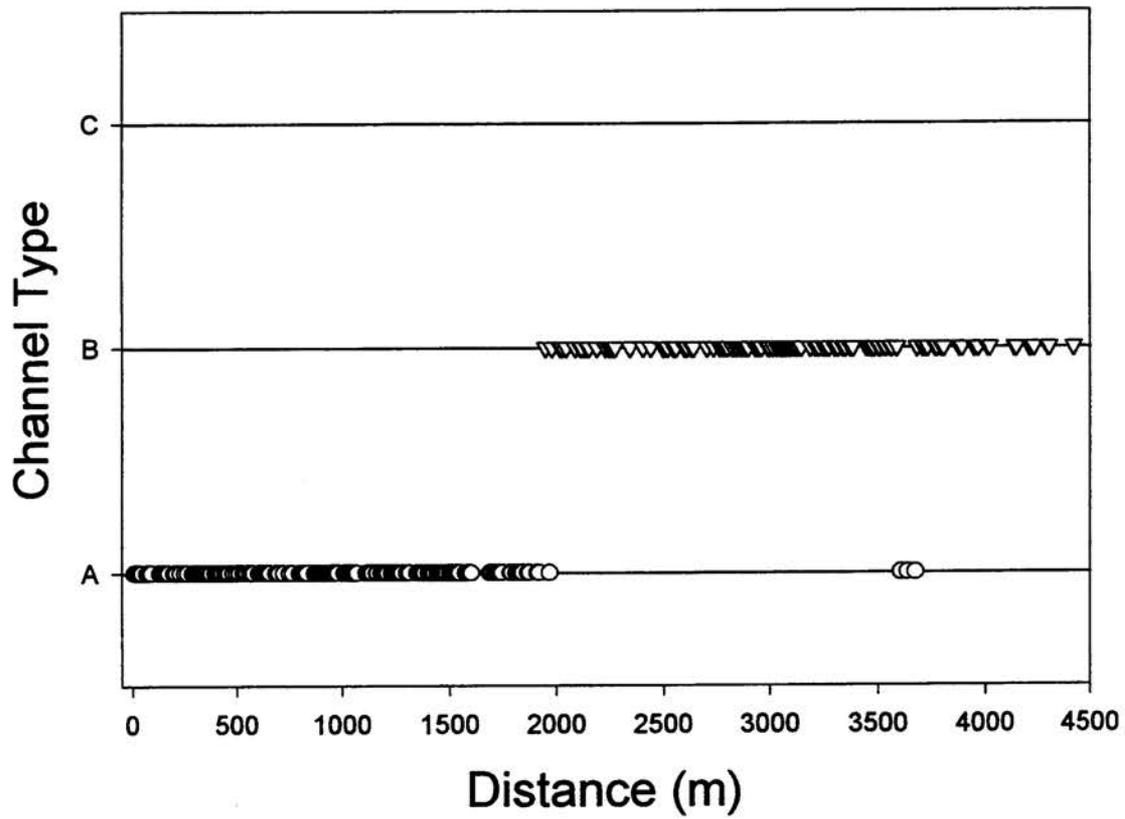


Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Mill Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Mill Creek Rosgen's Channel Type Distribution



**Stream:** Nobusiness Creek

**District:** Blacksburg

**Quadrangle:** Narrows

**Sample Date:** 08/23/1999

**Downstream Starting Point:** Forest Service boundary

**Total Distance Surveyed:** 9.3 kilometers

**Percent of Total Area - Pools:** 58.7%

Number of Pools: 470

Number of Pools per kilometer: 50.5

Total Pool Area: 18244.8 sq. meters  $\pm$  619.7

Mean Pool Area: 38.8 sq. meters

Correction Factor: 0.94

Mean Maximum Depth: 39.3 cm

Mean Average Depth: 28.3 cm

Mean Average Residual Pool Depth: 21.9 cm

**Percent of Total Area - Riffles:** 41.3%

Number of Riffles: 323

Number of Riffles per kilometer: 34.7

Total Riffle Area: 12822.1 sq. meters  $\pm$  856.7

Mean Riffle Area: 39.7 sq. meters

Correction Factor: 0.93

Mean Maximum Depth: 19.4 cm

Mean Average Depth: 10.7 cm

**Number of Large Woody Debris Pieces per kilometer:** 437.2

Wood < 5 m and < 55 cm: 311.6

Wood < 5 m and > 55 cm: 10.8

Wood > 5 m and < 55 cm: 90.7

Wood > 5 m and > 55 cm: 24.1

**Mean Channel Width:** 5.4 m

**Mean Riparian Width:** 17.2 m

Mean Maximum Riparian Distance (either side): 8.7 m

Mean Minimum Riparian Distance (either side): 3.1 m

Maximum Riparian Width (Total): 47.4 m

Minimum Riparian Width (Total): 9.7 m

**Nobusiness Creek Continued.**

**Percent of Pool Habitat Surveyed as Glides: 29.3%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 12.6%

Channel Type B: 83.2%

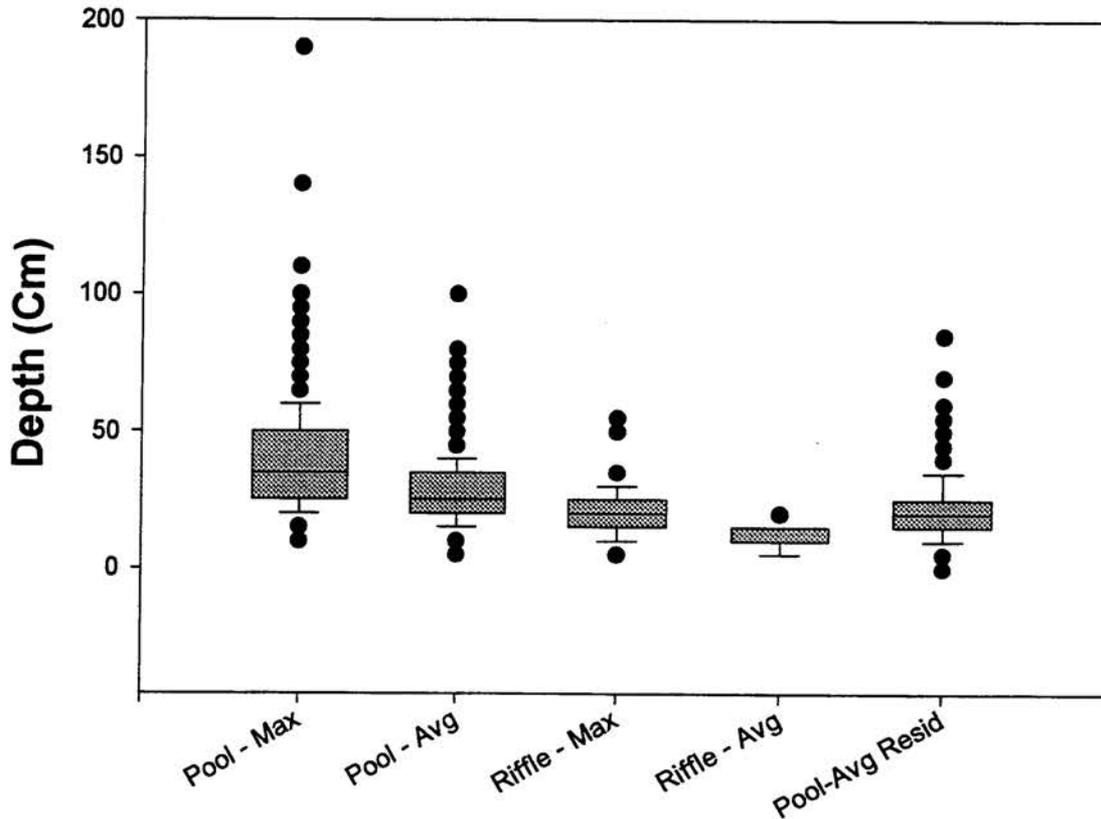
Channel Type C: 4.2%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 2.6%**

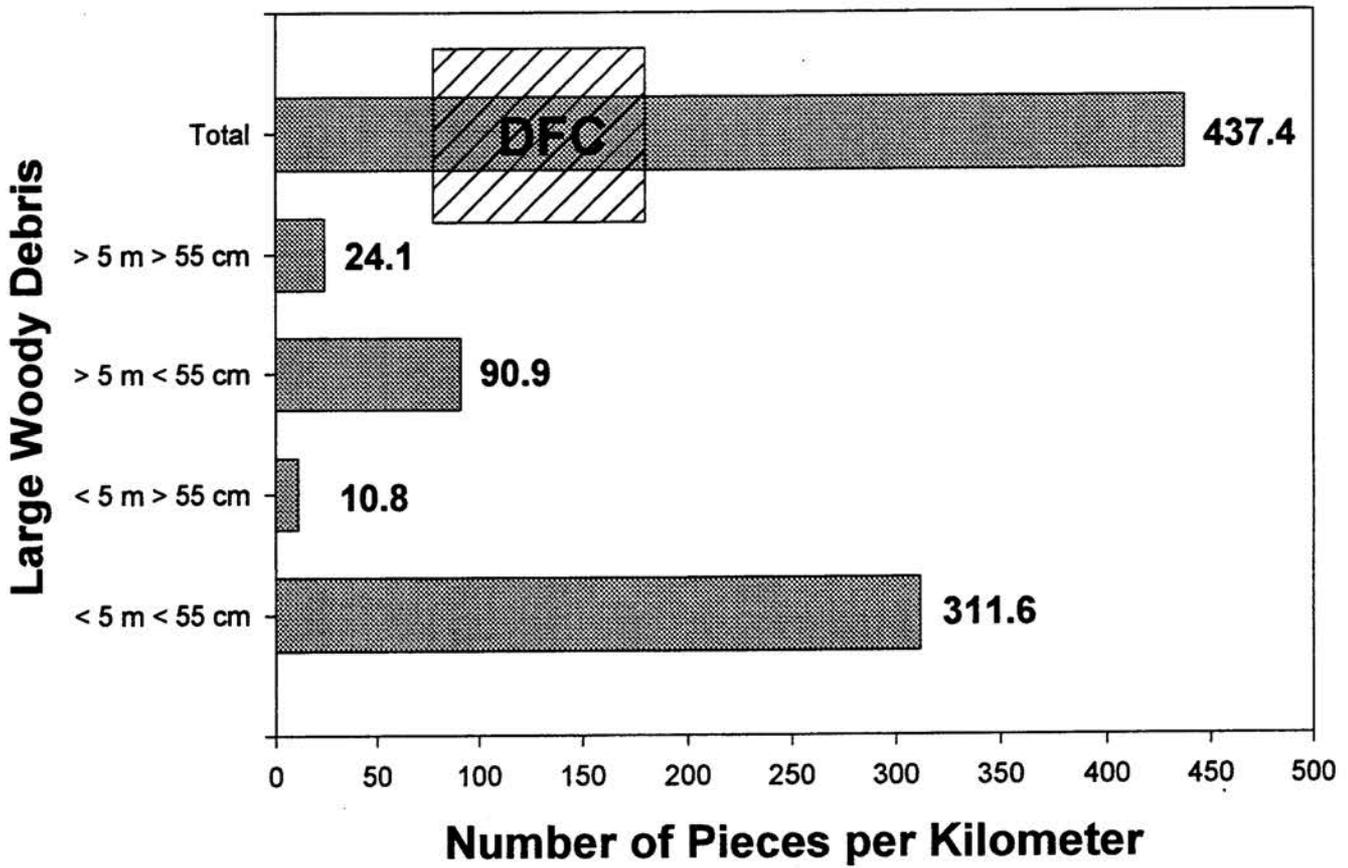
**Average Channel Gradient: 5.3**

## Nobusiness Creek

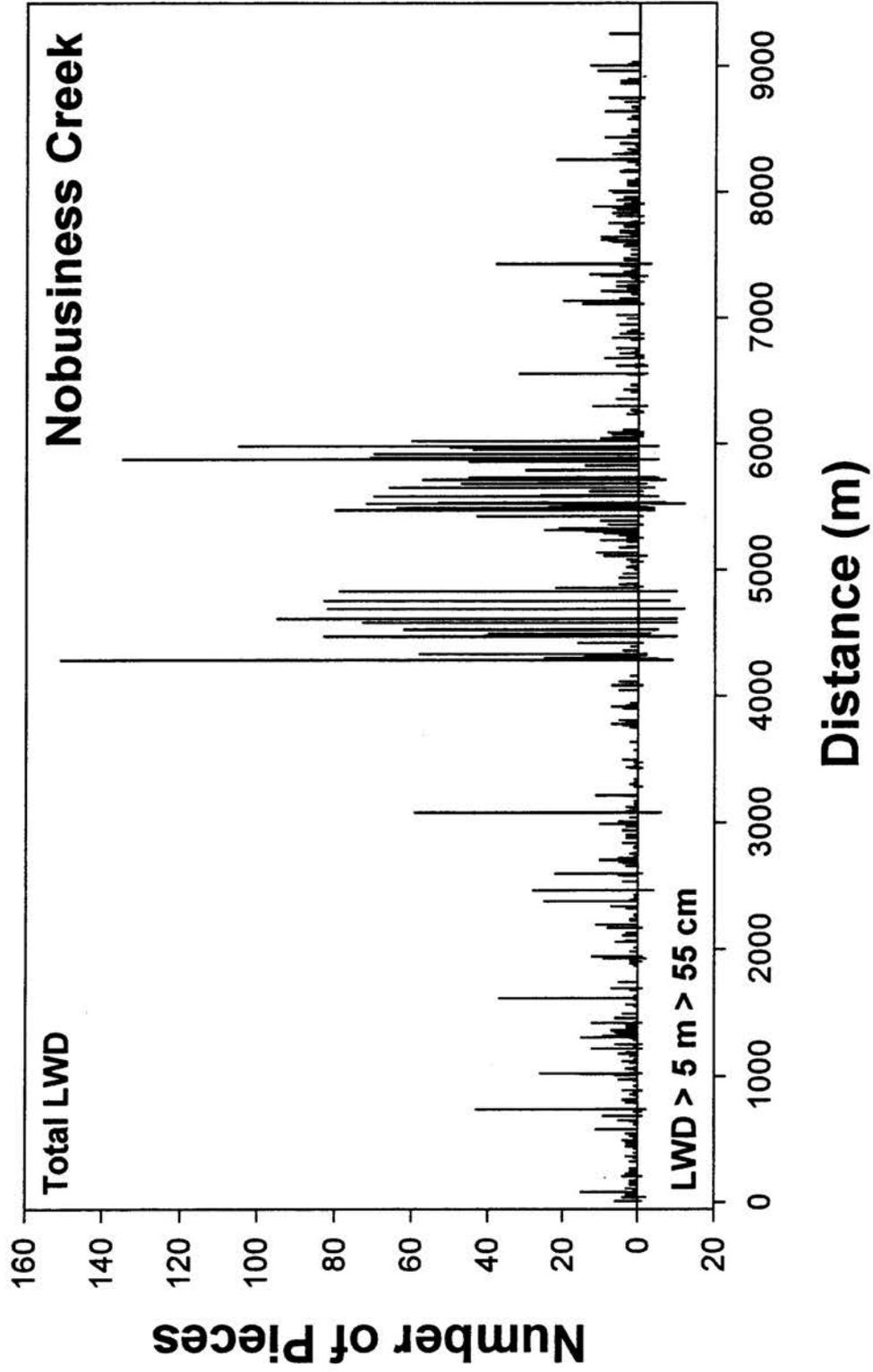


Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.

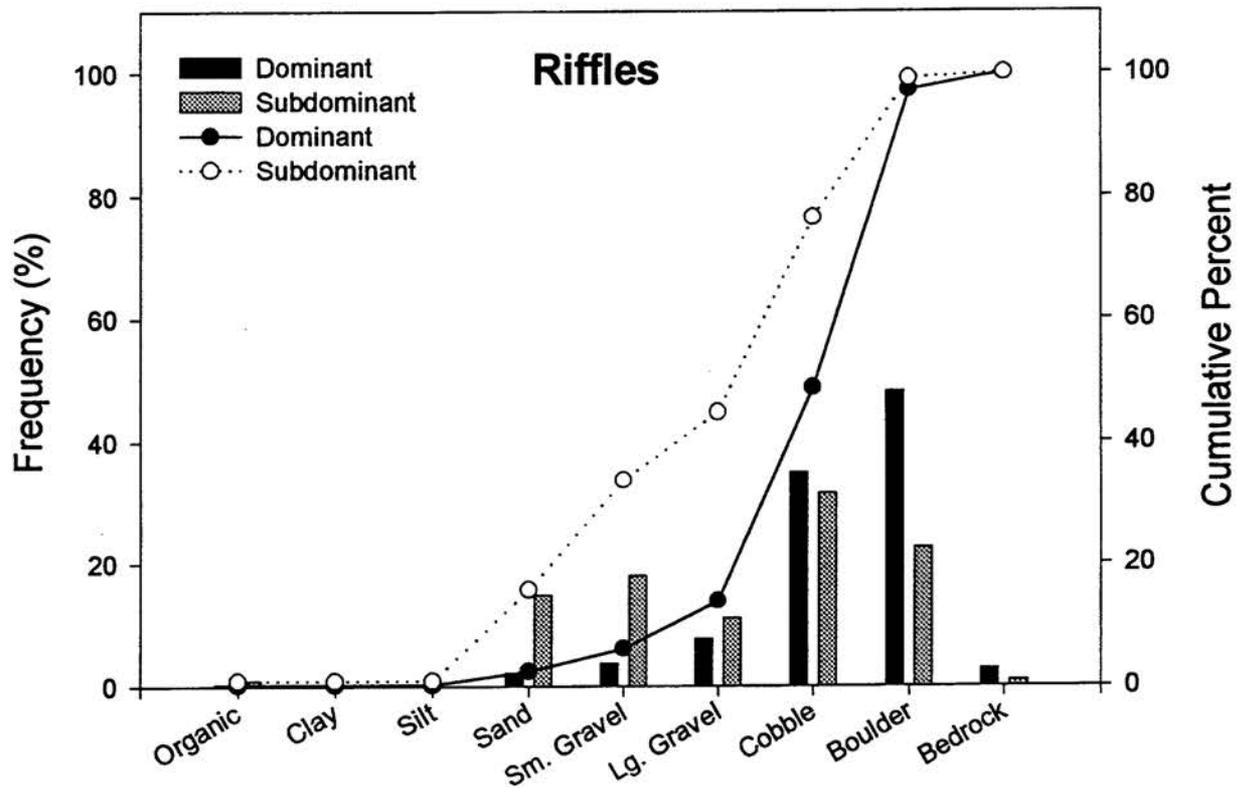
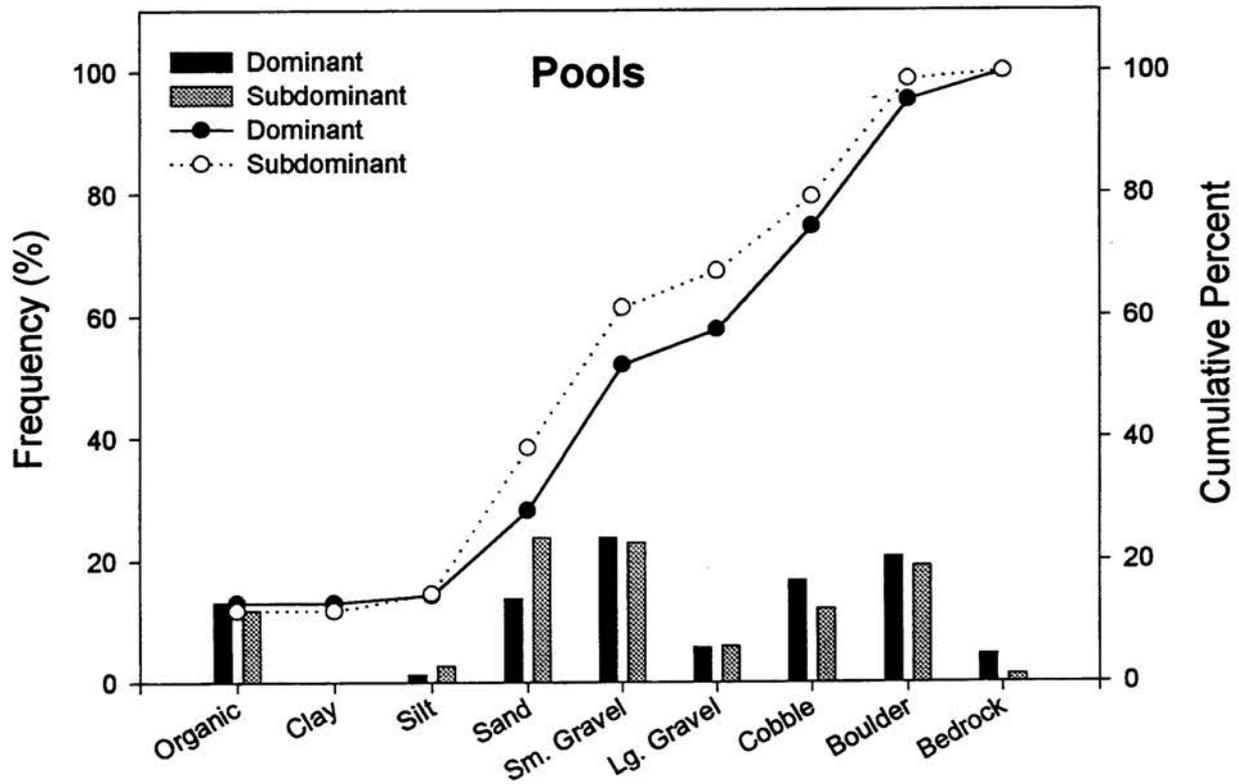
## Nobusiness Creek

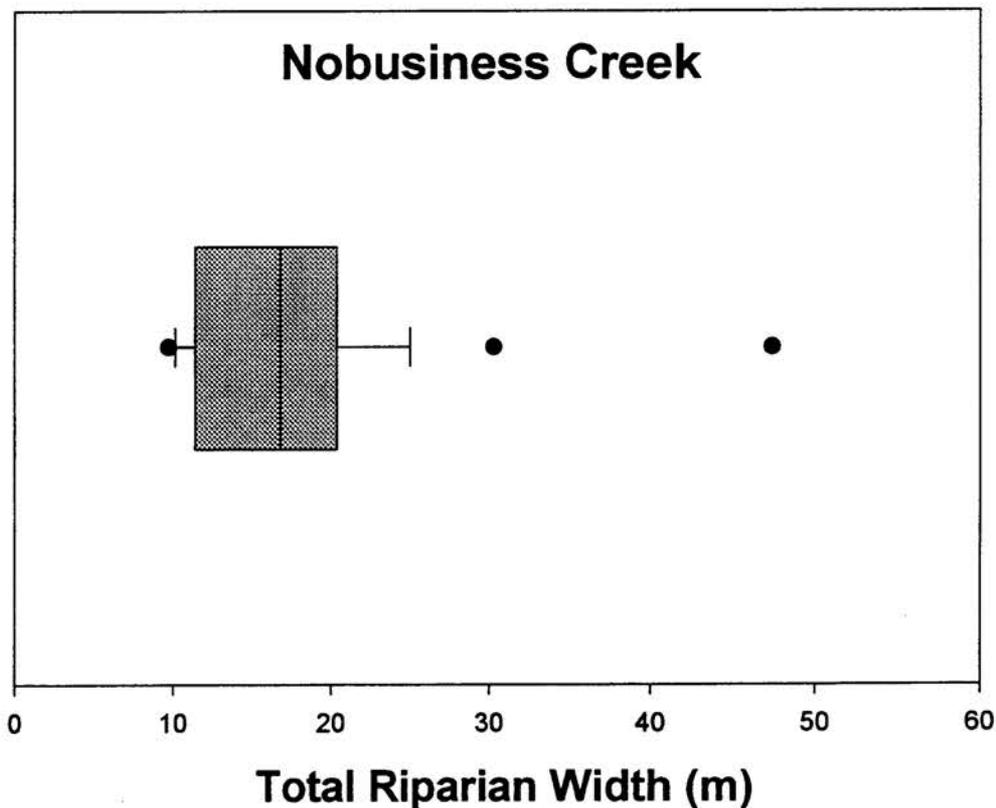


# Distribution and Abundance of Large Woody Debris



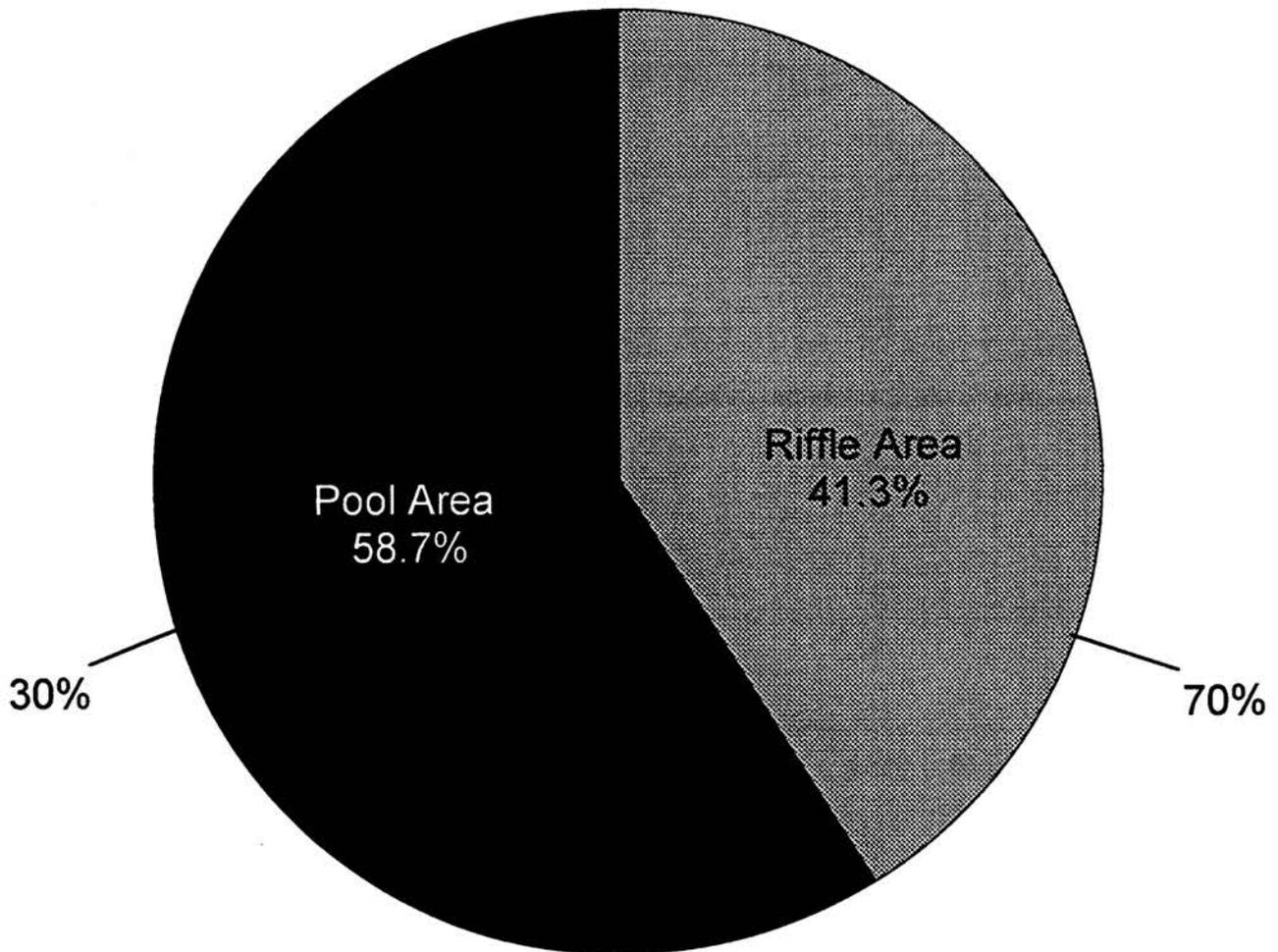
## Nobusiness Creek Substrate Composition



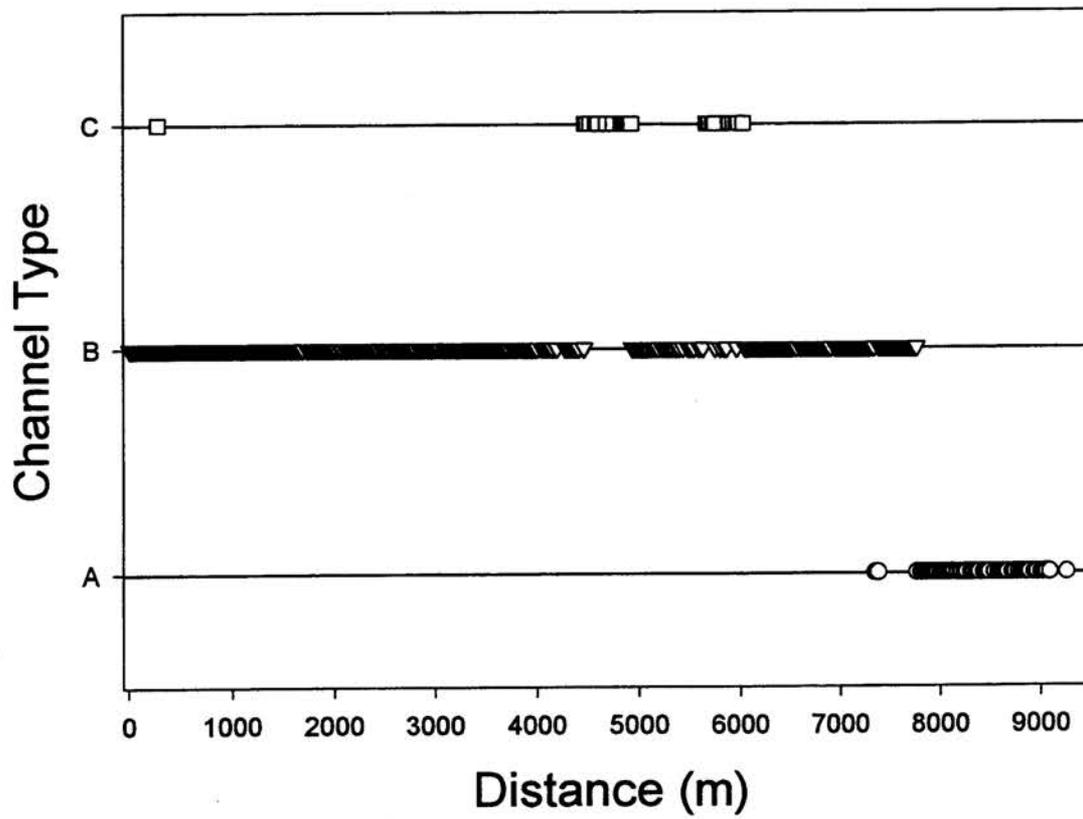
**Riparian Width****Stream: Nobusiness Creek****Number of Measurements: 25****Mean Width: 17.6m Std Dev: 8.3****Max: 47.4m Min: 9.7m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Nobusiness Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Nobusiness Creek Rosgen's Channel Type Distribution



**Stream:** Pearis Thompson Branch

**District:** Blacksburg

**Quadrangle:** Mechanicsburg

**Sample Date:** 06/28/99

**Downstream Starting Point:** Confluence with Dismal Creek

**Total Distance Surveyed:** 2.4 kilometers

**Percent of Total Area - Pools:** 52.4%

Number of Pools: 140

Number of Pools per kilometer: 58.3

Total Pool Area: 1896.2 sq. meters  $\pm$  186.7

Mean Pool Area: 13.5 sq. meters

Correction Factor: 0.97

Mean Maximum Depth: 20.3 cm

Mean Average Depth: 13.9 cm

Mean Average Residual Pool Depth: 12.8 cm

**Percent of Total Area - Riffles:** 47.6%

Number of Riffles: 93

Number of Riffles per kilometer: 38.8

Total Riffle Area: 1719.8 sq. meters  $\pm$  152.2

Mean Riffle Area: 18.5 sq. meters

Correction Factor: 1.13

Mean Maximum Depth: 10.3 cm

Mean Average Depth: 5.4 cm

**Number of Large Woody Debris Pieces per kilometer:** 387.7

Wood < 5 m and < 55 cm: 211.6

Wood < 5 m and > 55 cm: 19.4

Wood > 5 m and < 55 cm: 129.5

Wood > 5 m and > 55 cm: 27.2

**Mean Channel Width:** 3.1 m

**Mean Riparian Width:** 23.4 m

Mean Maximum Riparian Distance (either side): 14.5 m

Mean Minimum Riparian Distance (either side): 5.8 m

Maximum Riparian Width (Total): 37.7 m

Minimum Riparian Width (Total): 11.8 m

Pearis Thompson Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 74.4%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 100%

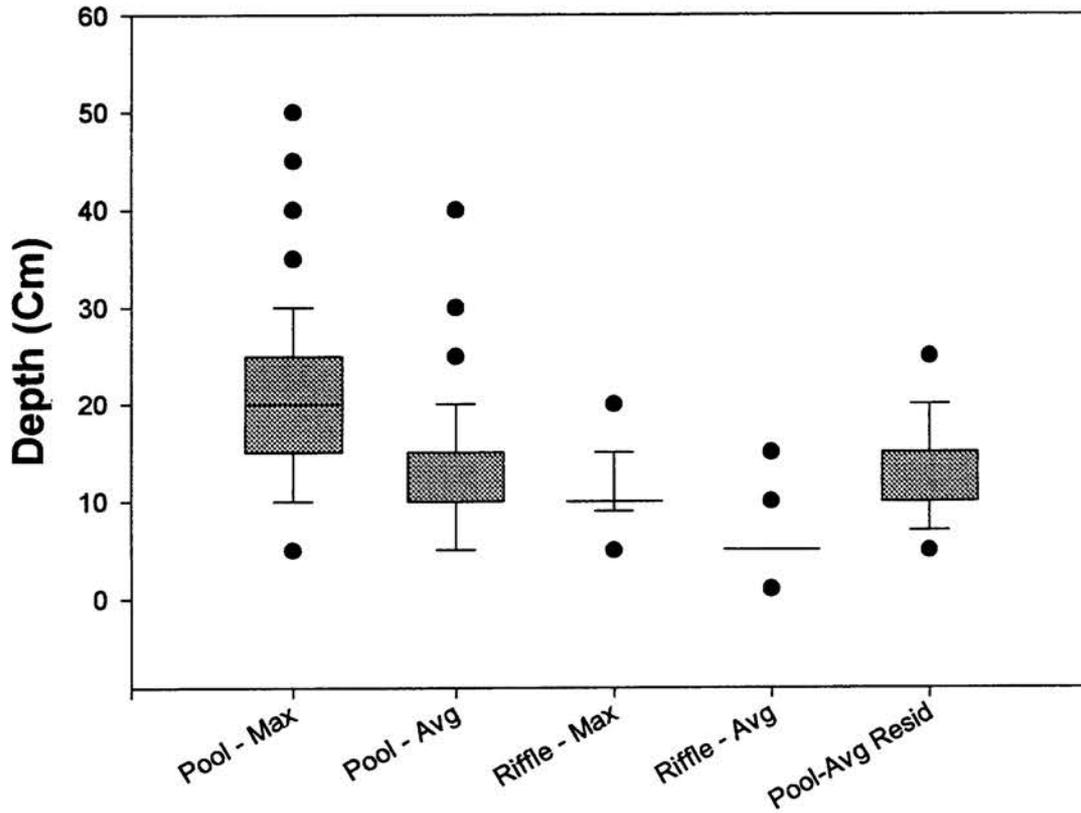
Channel Type C: 0.0%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 9.3%**

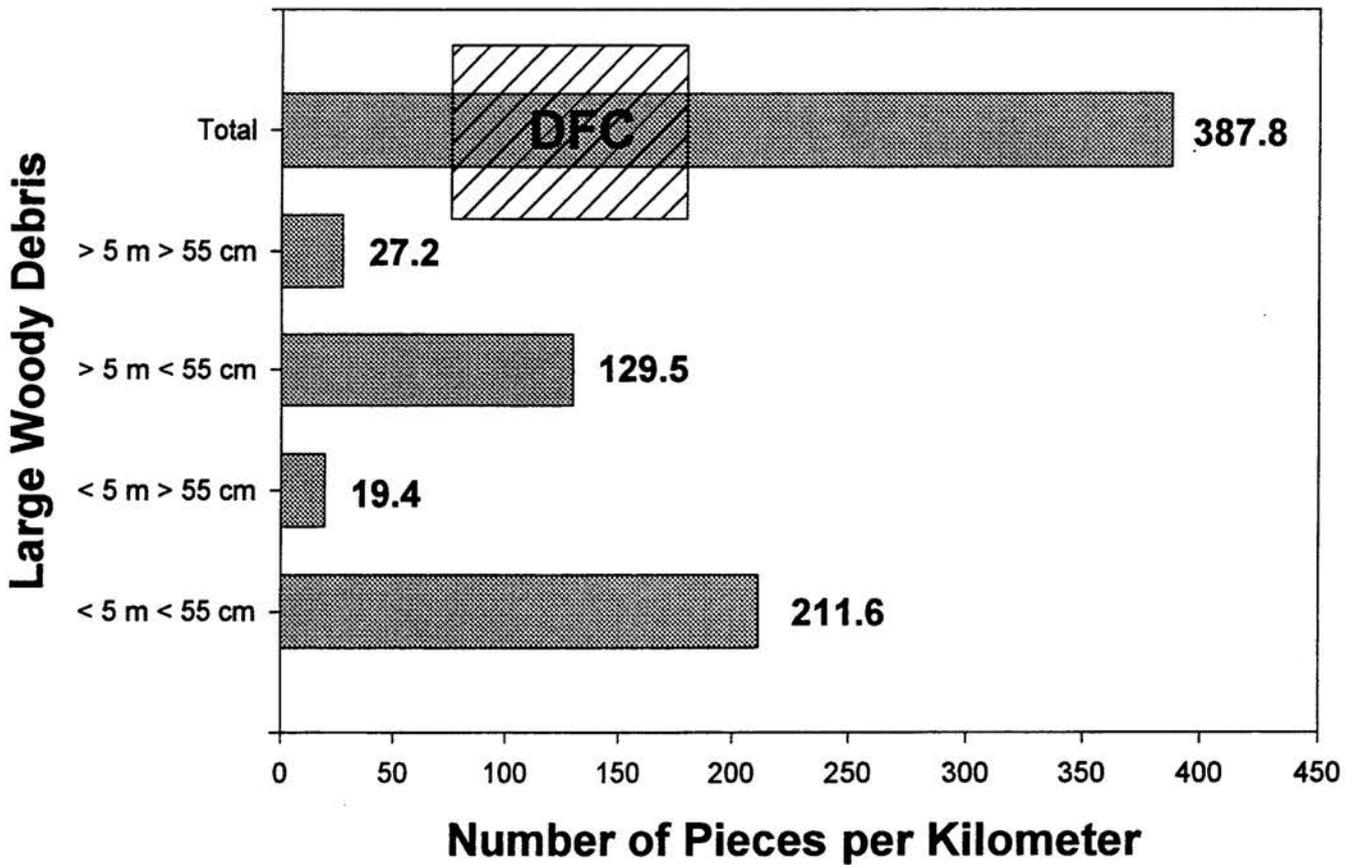
**Average Channel Gradient: 9.4**

## Pearis Thompson Branch

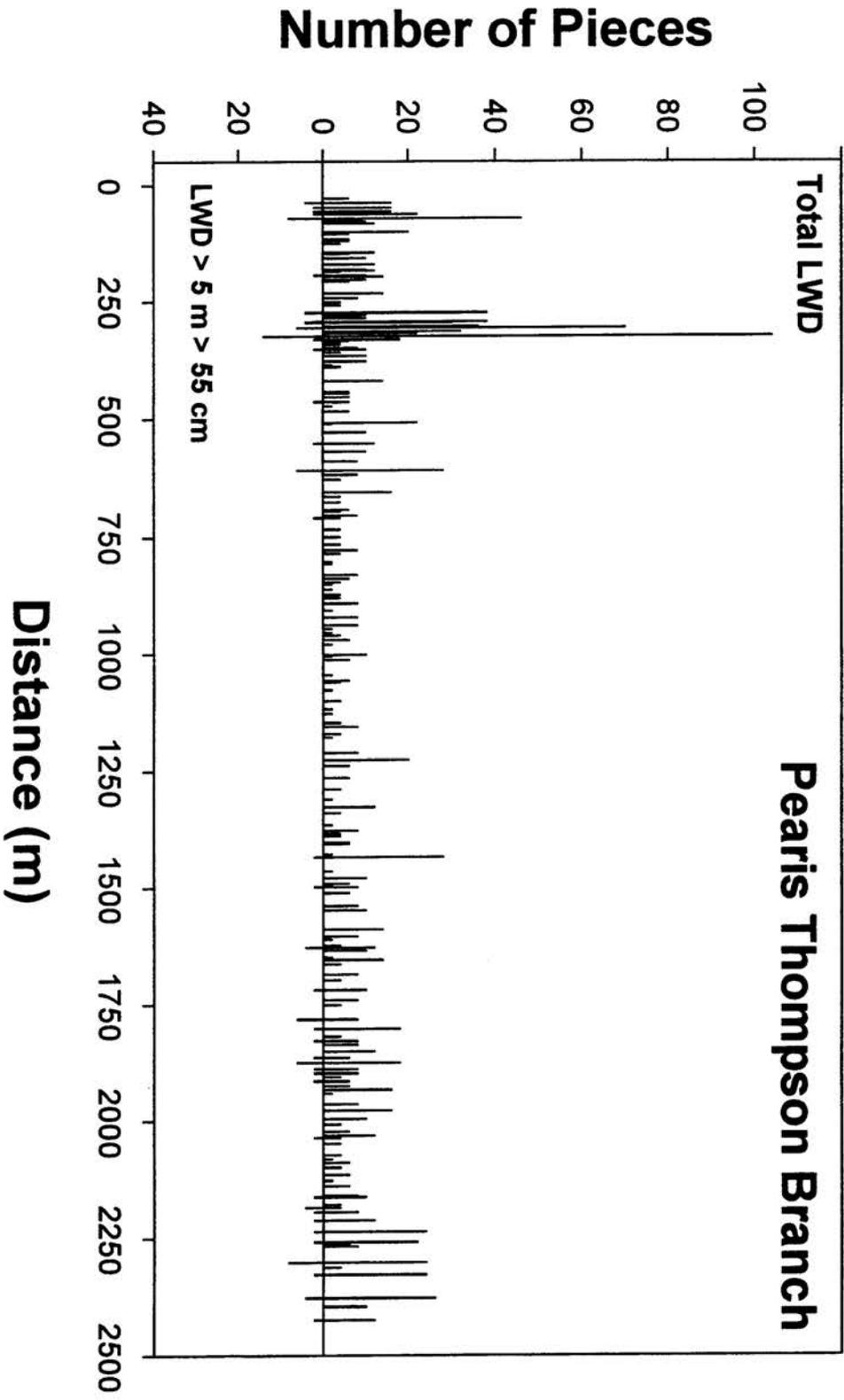


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

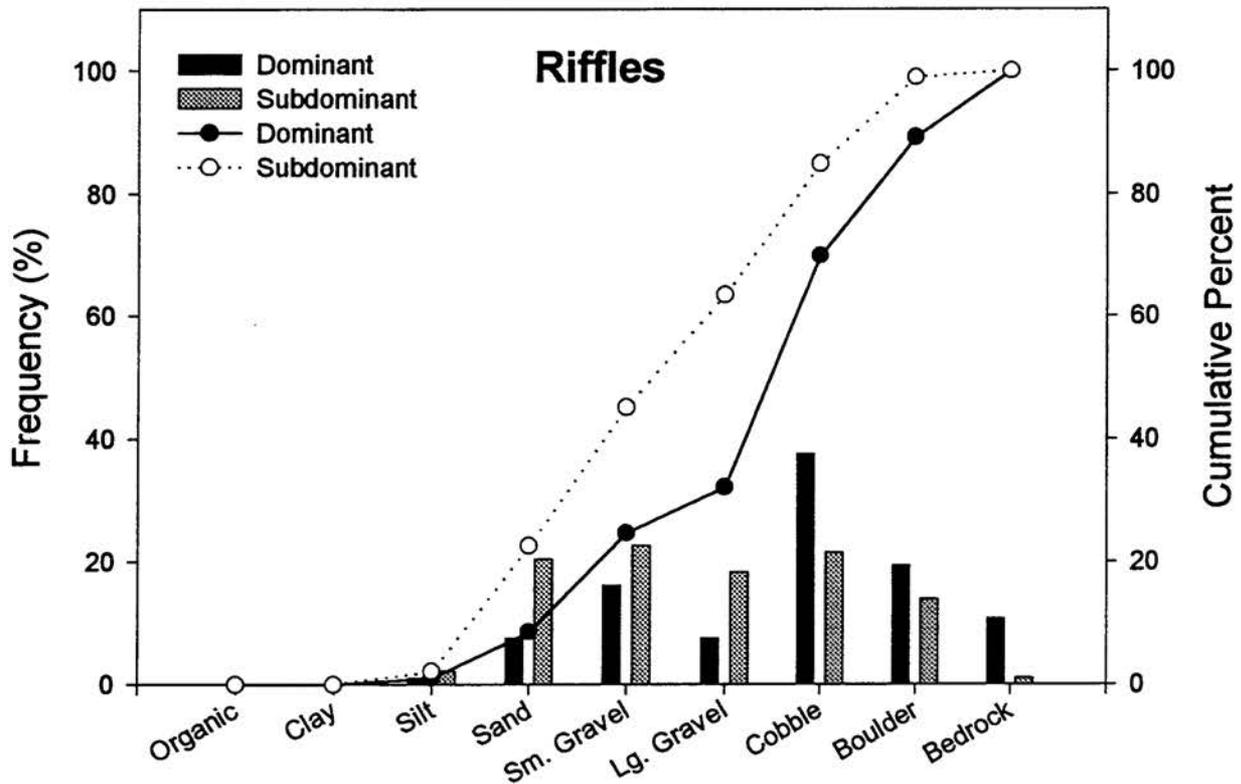
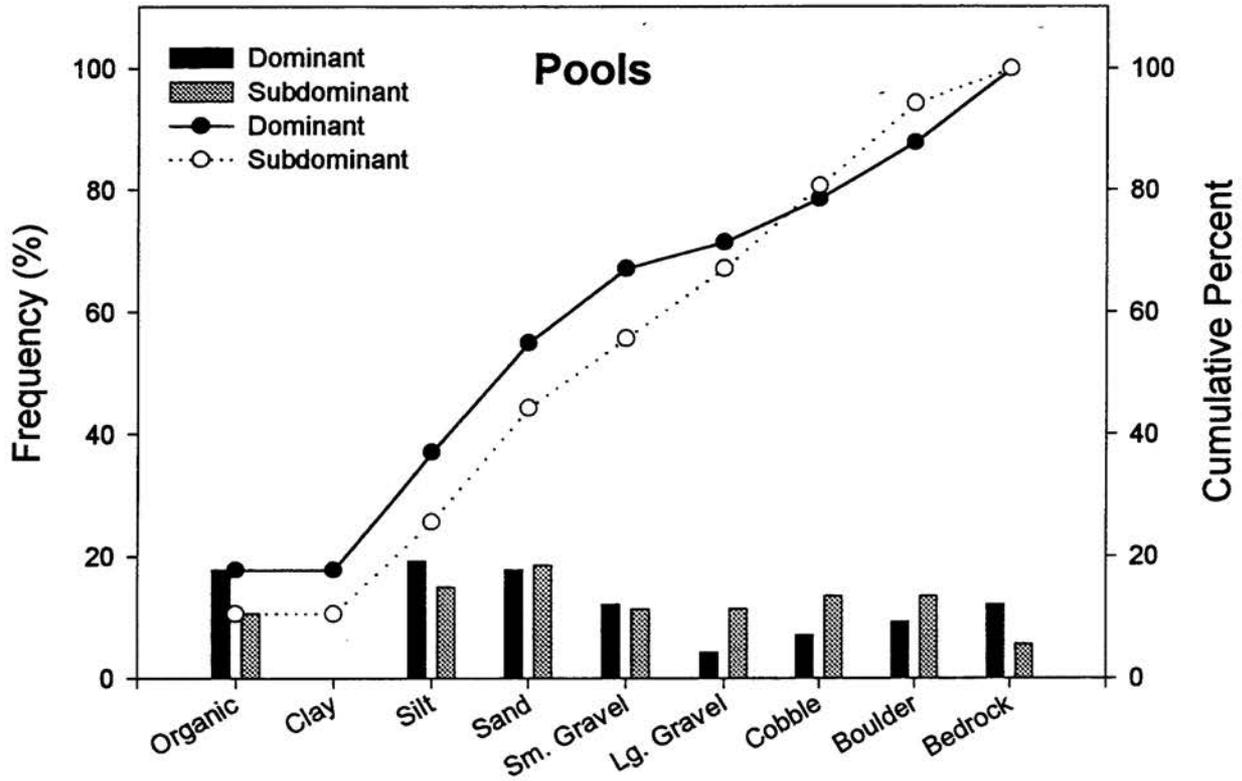
## Pearis Thompson Branch

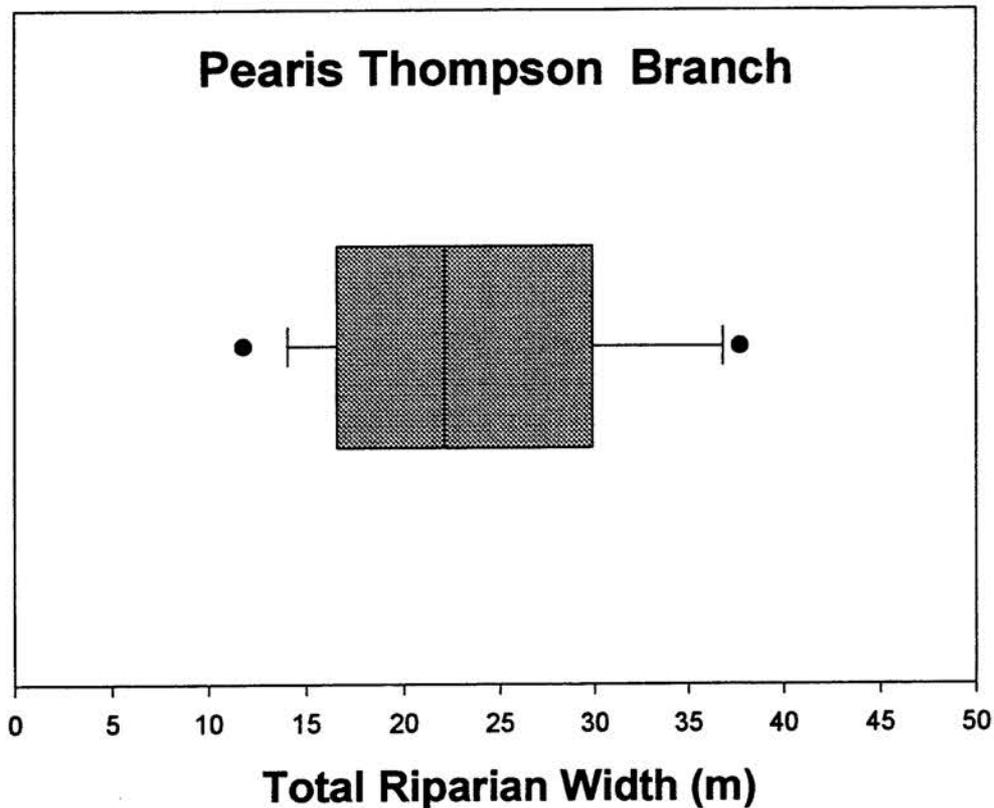


# Distribution and Abundance of Large Woody Debris



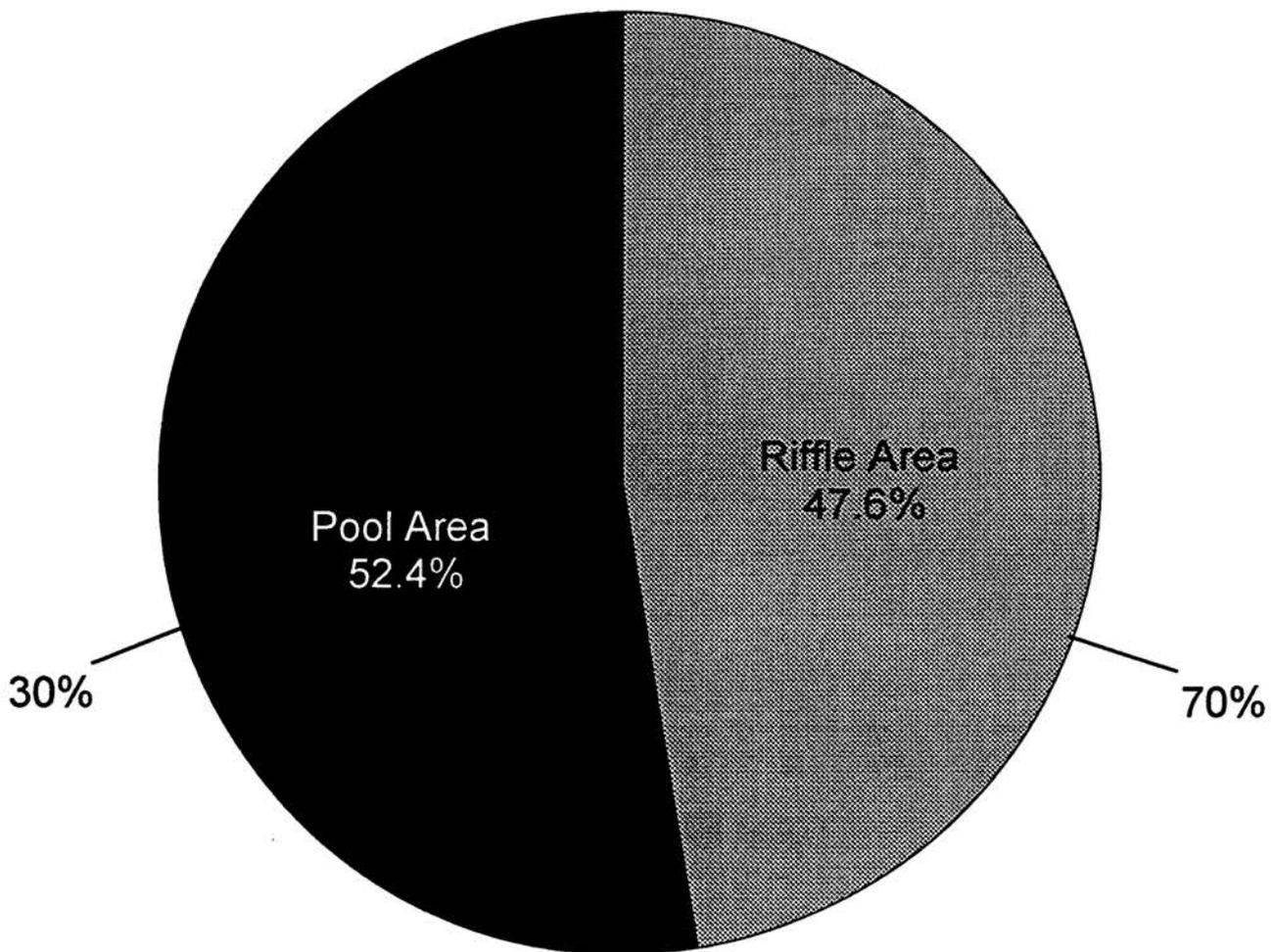
## Pearis Thompson Branch Substrate Composition



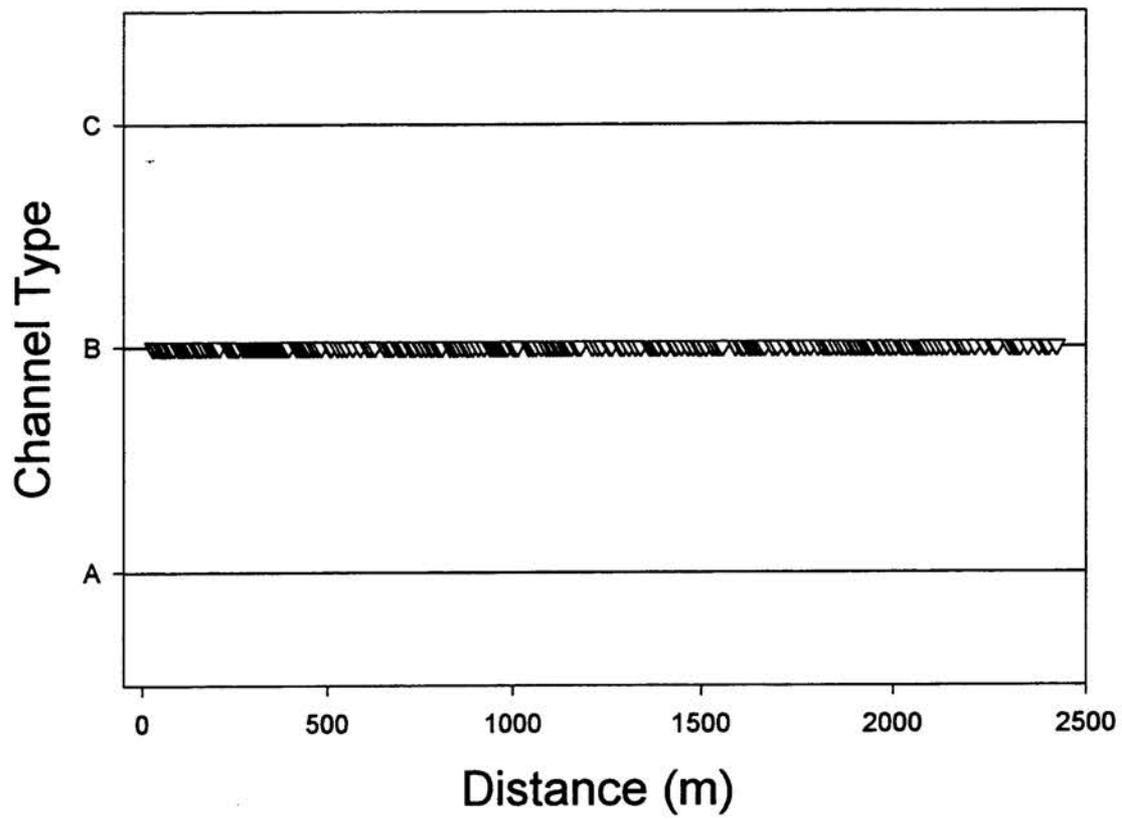
**Riparian Width****Stream: Pearis Thompson Branch****Number of Measurements: 11****Mean Width: 23.4m Std Dev: 8.6****Max: 37.7m Min: 11.8m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Pearis Thompson Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Pearis Thompson Branch Rosgen's Channel Type Distribution



**Stream:** Standrock Branch

**District:** Blacksburg

**Quadrangle:** Mechanicsburg

**Sample Date:** 08/14/99

**Downstream Starting Point:** Confluence with Dismal Creek

**Total Distance Surveyed:** 1.8 kilometers

**Percent of Total Area - Pools:** 42.8%

Number of Pools: 83

Number of Pools per kilometer: 46.1

Total Pool Area: 1488.8 sq. meters  $\pm$  143.9

Mean Pool Area: 17.9 sq. meters

Correction Factor: 0.94

Mean Maximum Depth: 23.2 cm

Mean Average Depth: 16.5 cm

Mean Average Residual Pool Depth: 15.3 cm

**Percent of Total Area - Riffles:** 57.2%

Number of Riffles: 70

Number of Riffles per kilometer: 38.9

Total Riffle Area: 1987.2 sq. meters  $\pm$  103.4

Mean Riffle Area: 28.4 sq. meters

Correction Factor: 1.04

Mean Maximum Depth: 11.9 cm

Mean Average Depth: 6.8 cm

**Number of Large Woody Debris Pieces per kilometer:** 366.3

Wood < 5 m and < 55 cm: 227.5

Wood < 5 m and > 55 cm: 16.3

Wood > 5 m and < 55 cm: 105.1

Wood > 5 m and > 55 cm: 17.4

**Mean Channel Width:** 3.9 m

**Mean Riparian Width:** 24.9 m

Mean Maximum Riparian Distance (either side): 18.8 m

Mean Minimum Riparian Distance (either side): 2.2 m

Maximum Riparian Width (Total): 65.6 m

Minimum Riparian Width (Total): 8.7 m

Standrock Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 59.6%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 9.2%

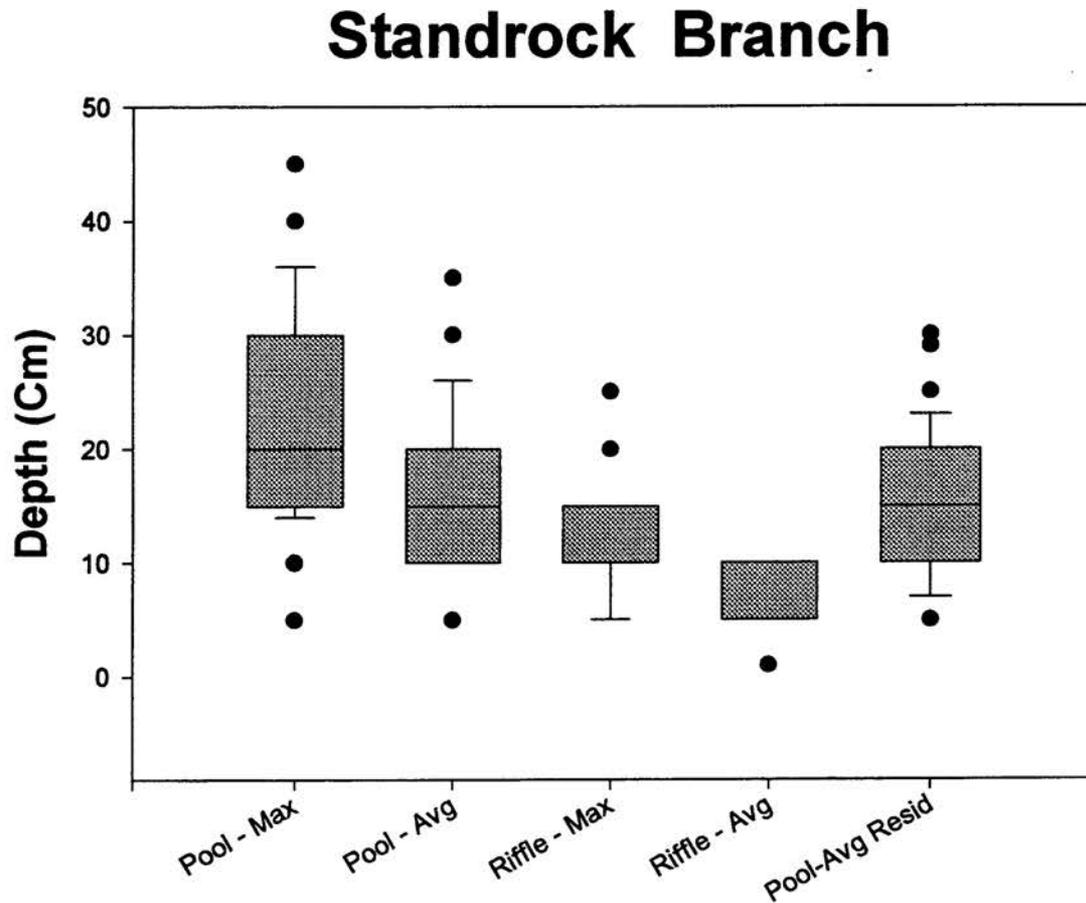
Channel Type B: 87.7%

Channel Type C: 3.1%

Channel Type D: 0.0%

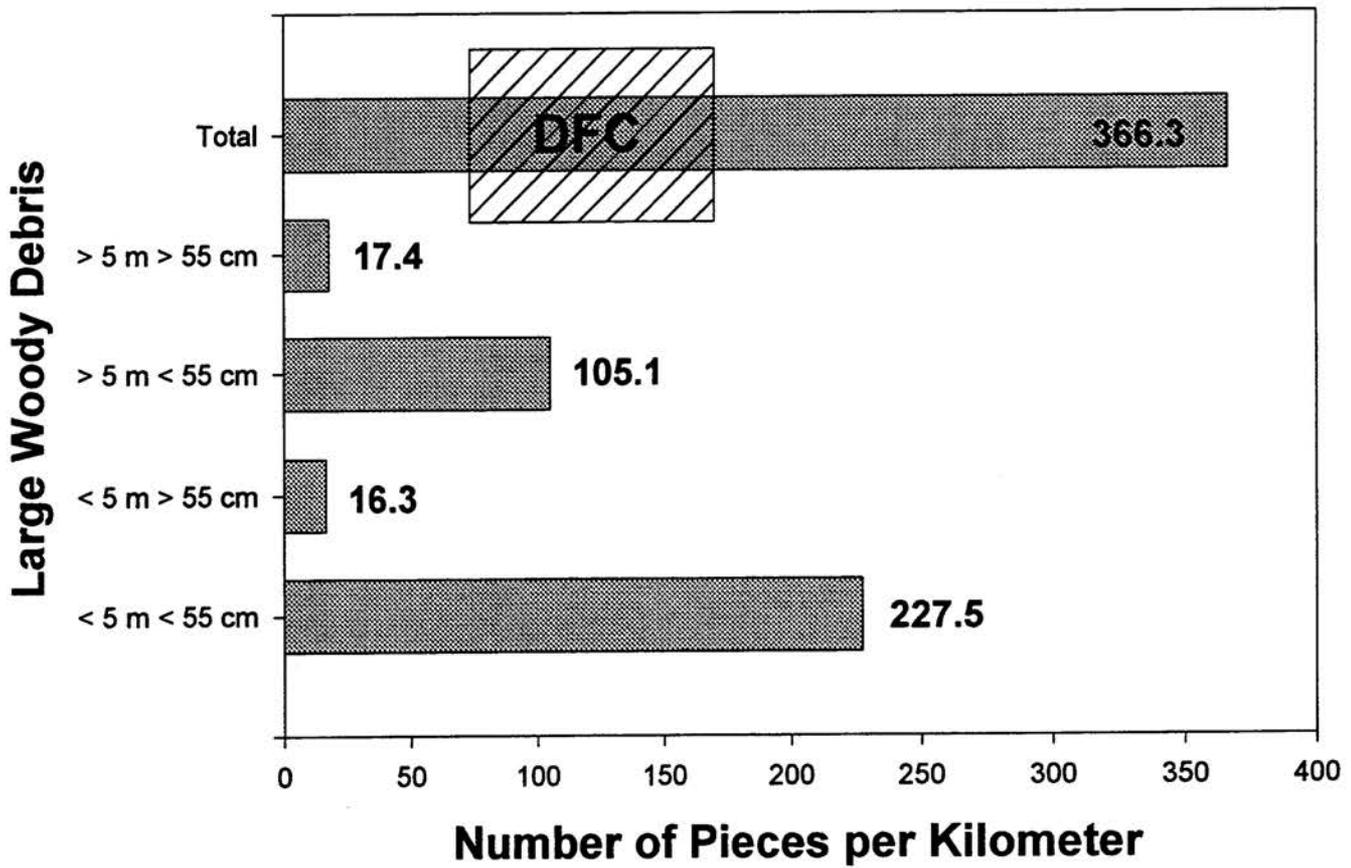
**Percent Pools with  $\geq$  35% Embeddedness: 4.8%**

**Average Channel Gradient: 10.0**

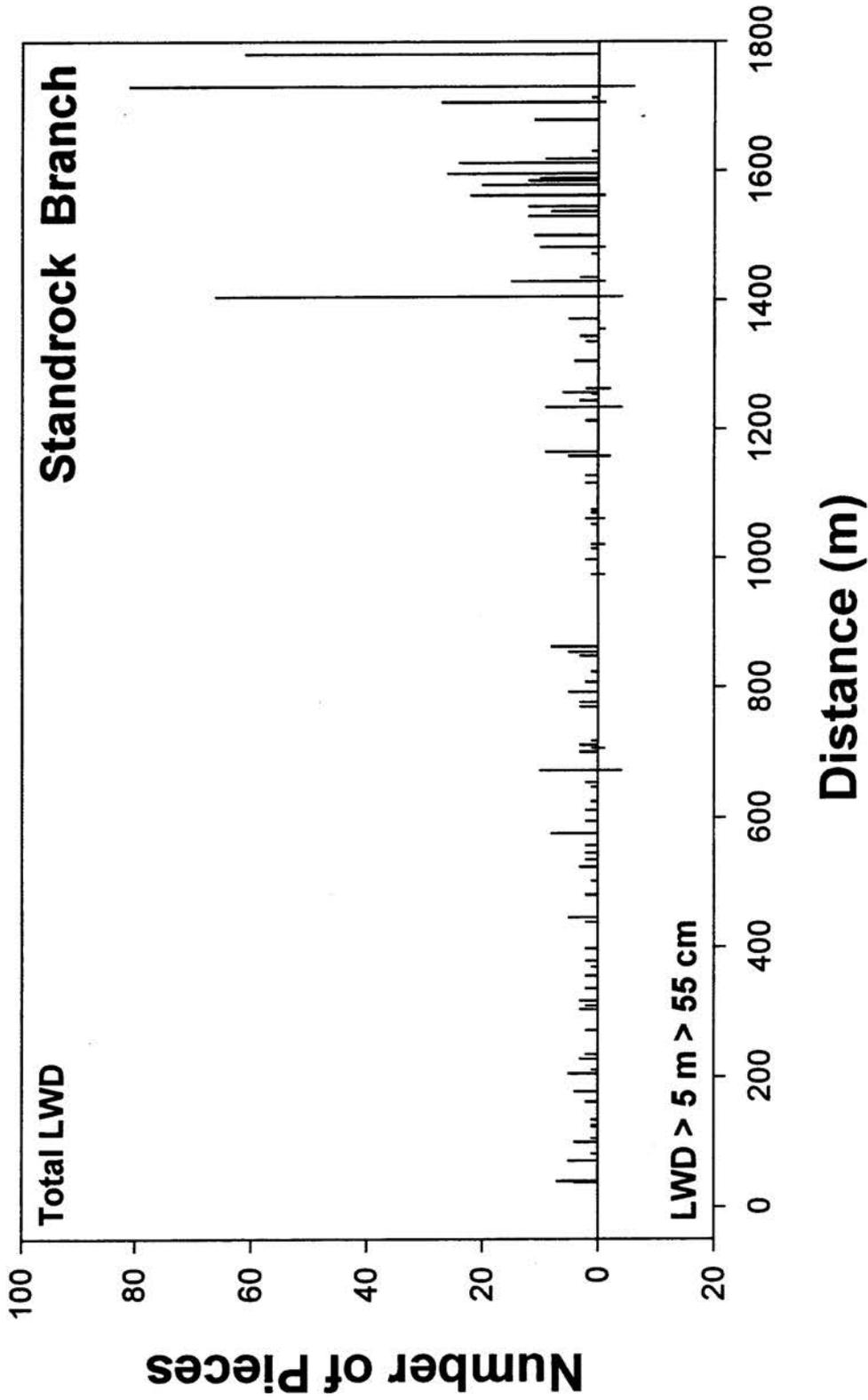


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

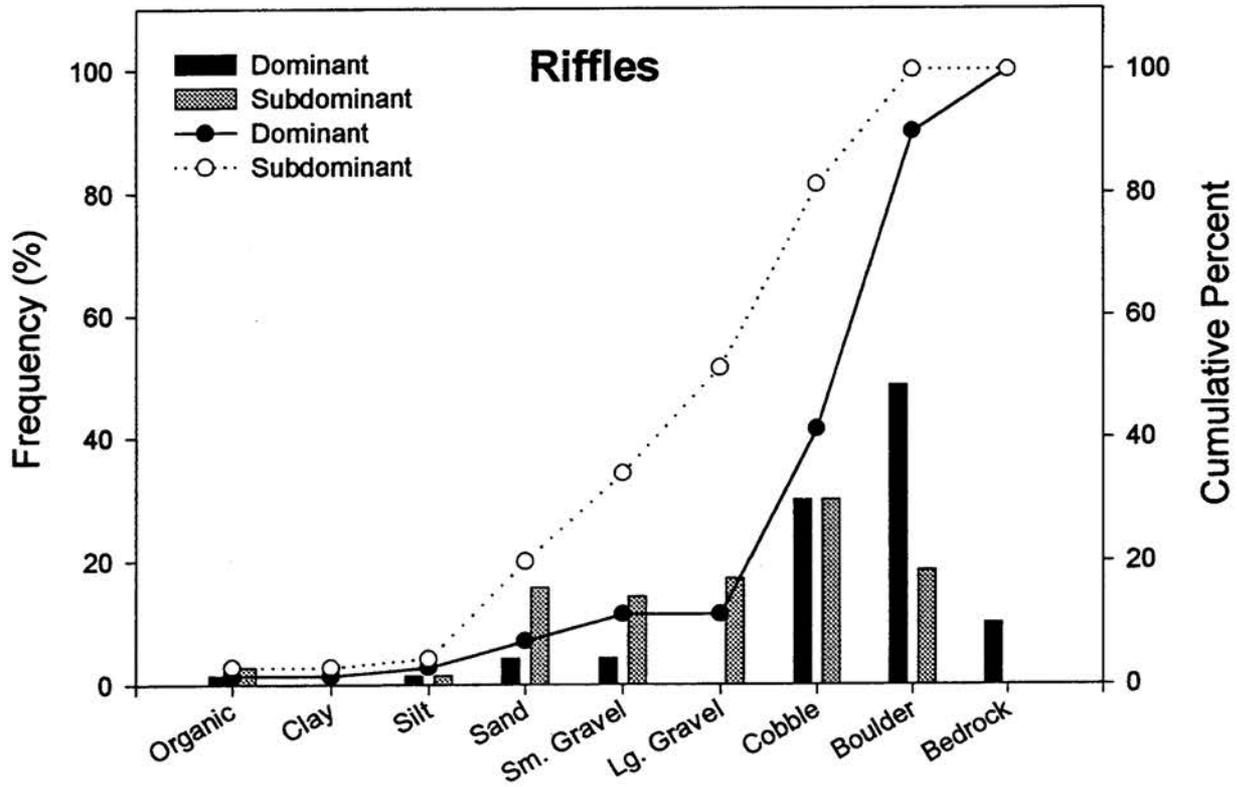
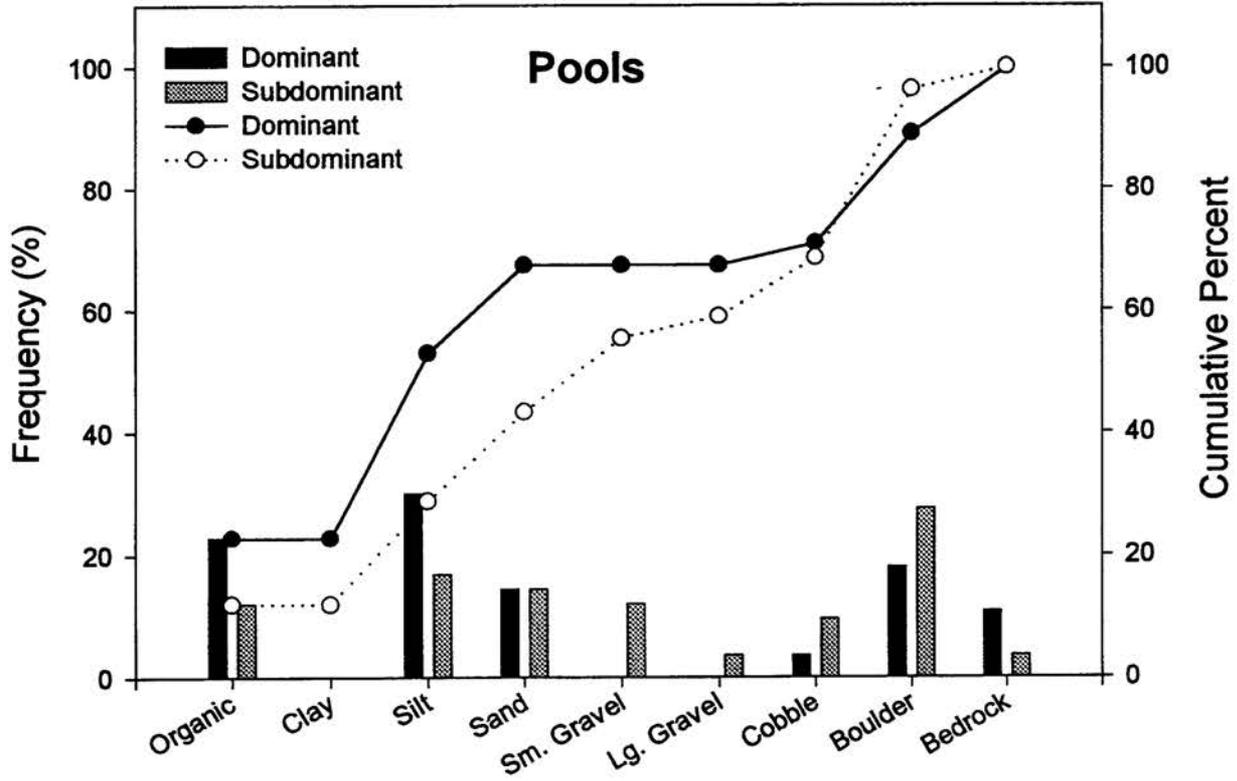
## Standrock Branch

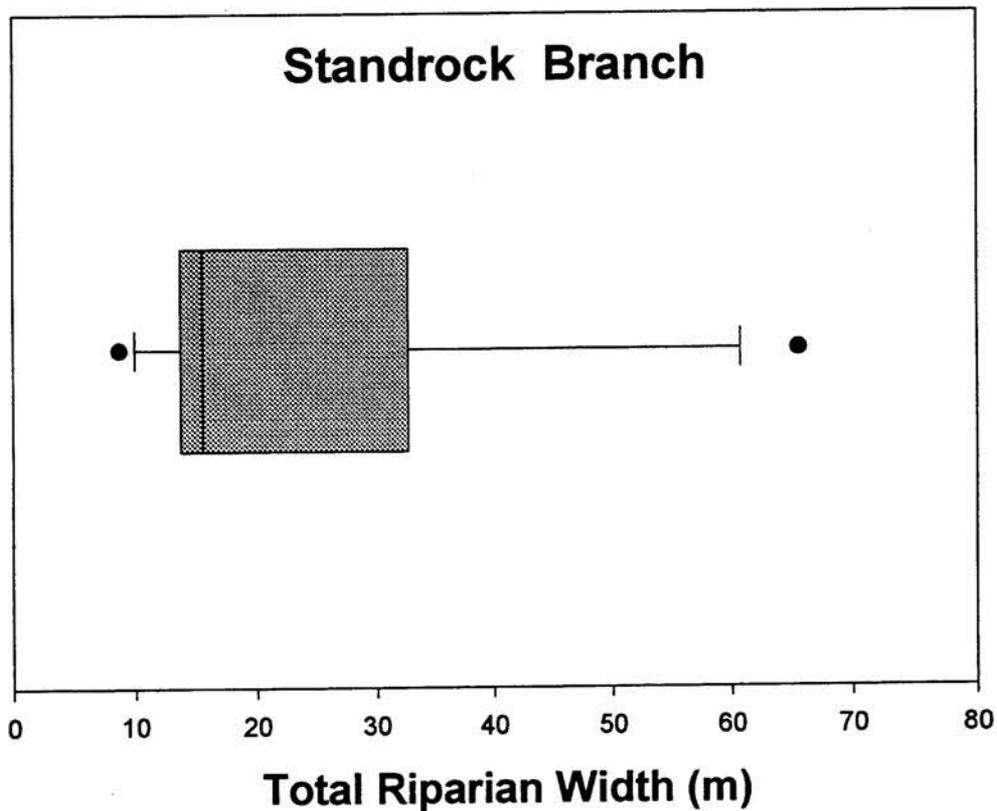


# Distribution and Abundance of Large Woody Debris



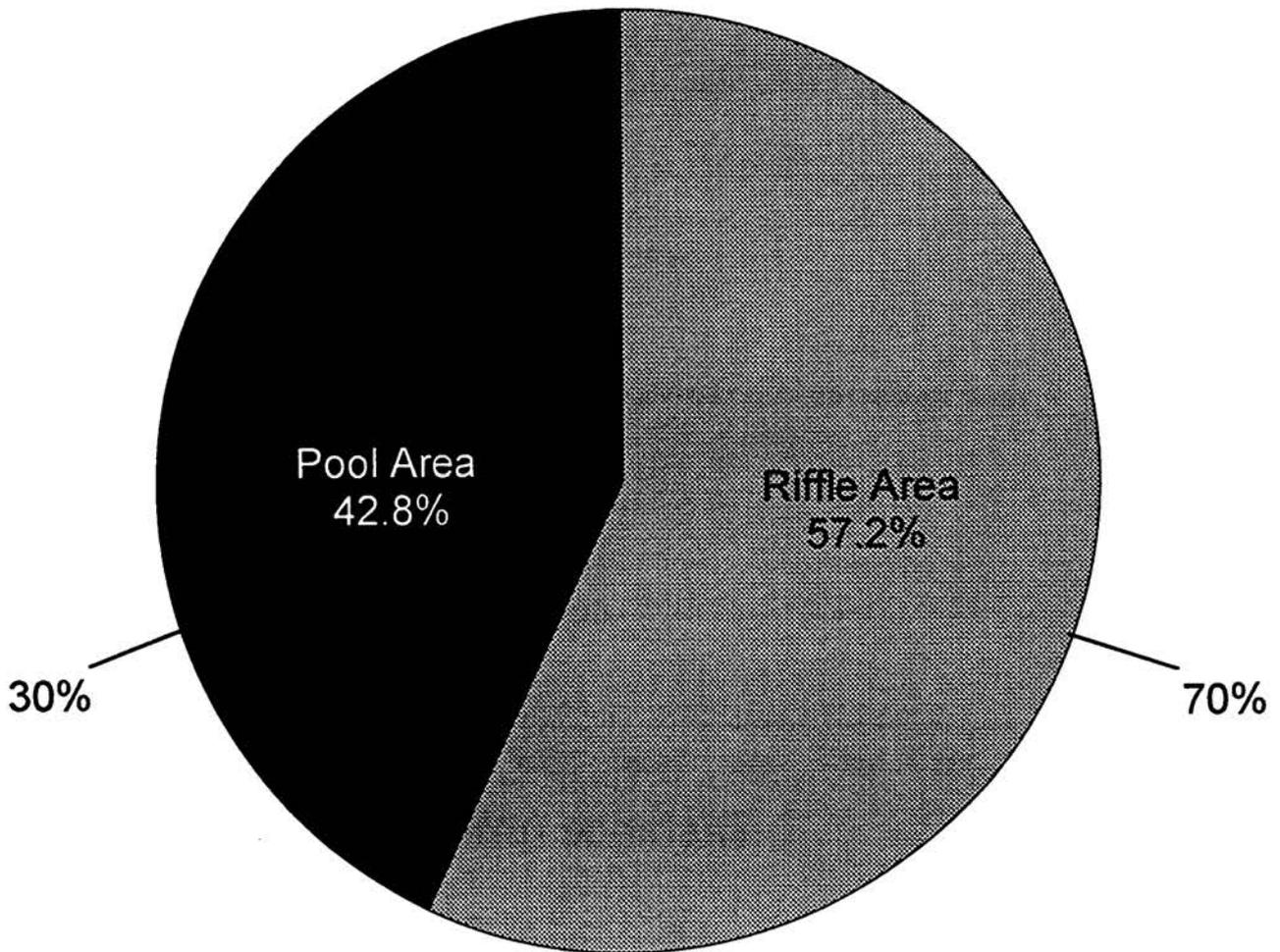
# Standrock Branch Substrate Composition



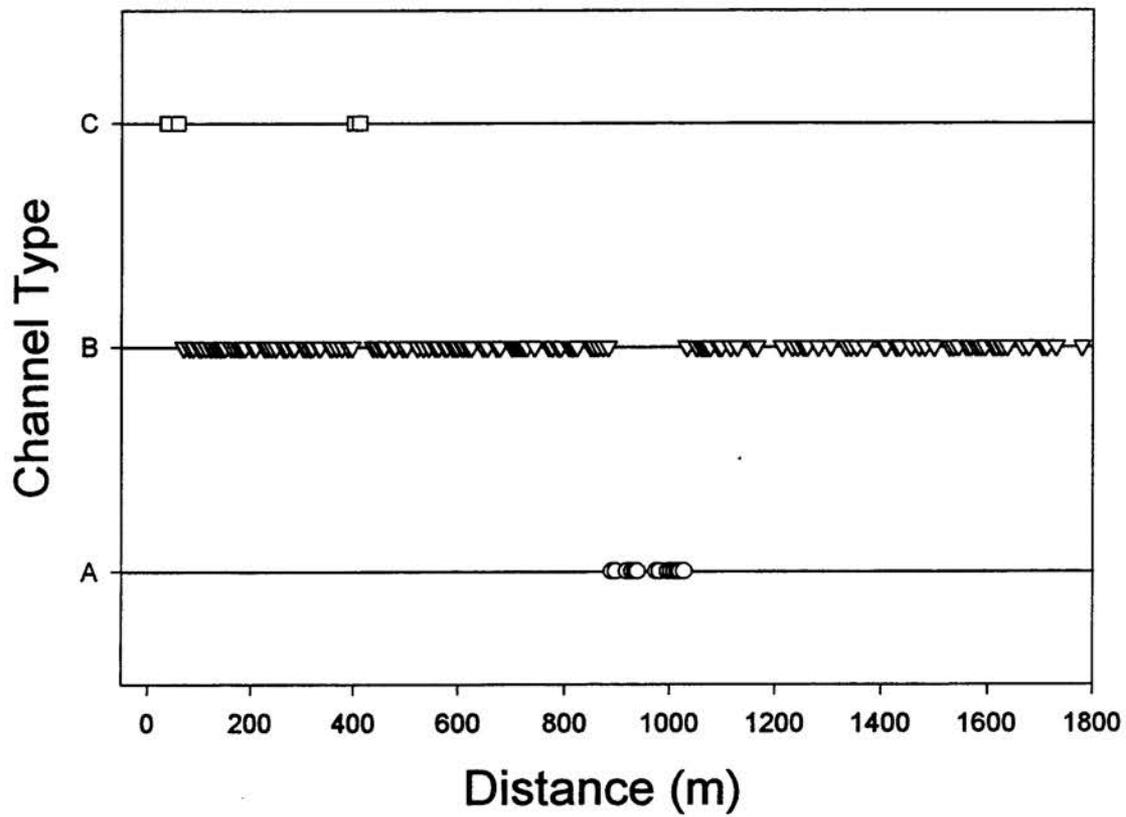
**Riparian Width****Stream: Standrock Branch****Number of Measurements: 8****Mean Width: 24.8m Std Dev: 20.8****Max: 65.6m Min: 8.7m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Standrock Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Standrock Branch Rosgen's Channel Type Distribution



## **Interior and Linside Quadrangles**

**Stream:** Big Stony Creek

**District:** Blacksburg

**Quadrangle:** Linside/Interior

**Sample Date:** 06/30/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 13.7 kilometers

**Percent of Total Area - Pools:** 48.7%

Number of Pools: 307

Number of Pools per kilometer: 22.4

Total Pool Area: 62919.5 sq. meters  $\pm$  4894.3

Mean Pool Area: 204.9 sq. meters

Correction Factor: 0.91

Mean Maximum Depth: 66.2 cm

Mean Average Depth: 48.4 cm

Mean Average Residual Pool Depth: 28.4 cm

**Percent of Total Area - Riffles:** 51.3%

Number of Riffles: 199

Number of Riffles per kilometer: 14.5

Total Riffle Area: 66249.1 sq. meters  $\pm$  8731.4

Mean Riffle Area: 332.9 sq. meters

Correction Factor: 1.06

Mean Maximum Depth: 35.4 cm

Mean Average Depth: 21.0 cm

**Number of Large Woody Debris Pieces per kilometer:** 120.0

Wood < 5 m and < 55 cm: 57.6

Wood < 5 m and > 55 cm: 7.9

Wood > 5 m and < 55 cm: 39.1

Wood > 5 m and > 55 cm: 15.4

**Mean Channel Width:** 16.0 m

**Mean Riparian Width:** 67.2 m

Mean Maximum Riparian Distance (either side): 47.0 m

Mean Minimum Riparian Distance (either side): 4.2 m

Maximum Riparian Width (Total): 186.1 m

Minimum Riparian Width (Total): 20.9 m

Big Stony Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 5.2%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 25.5%

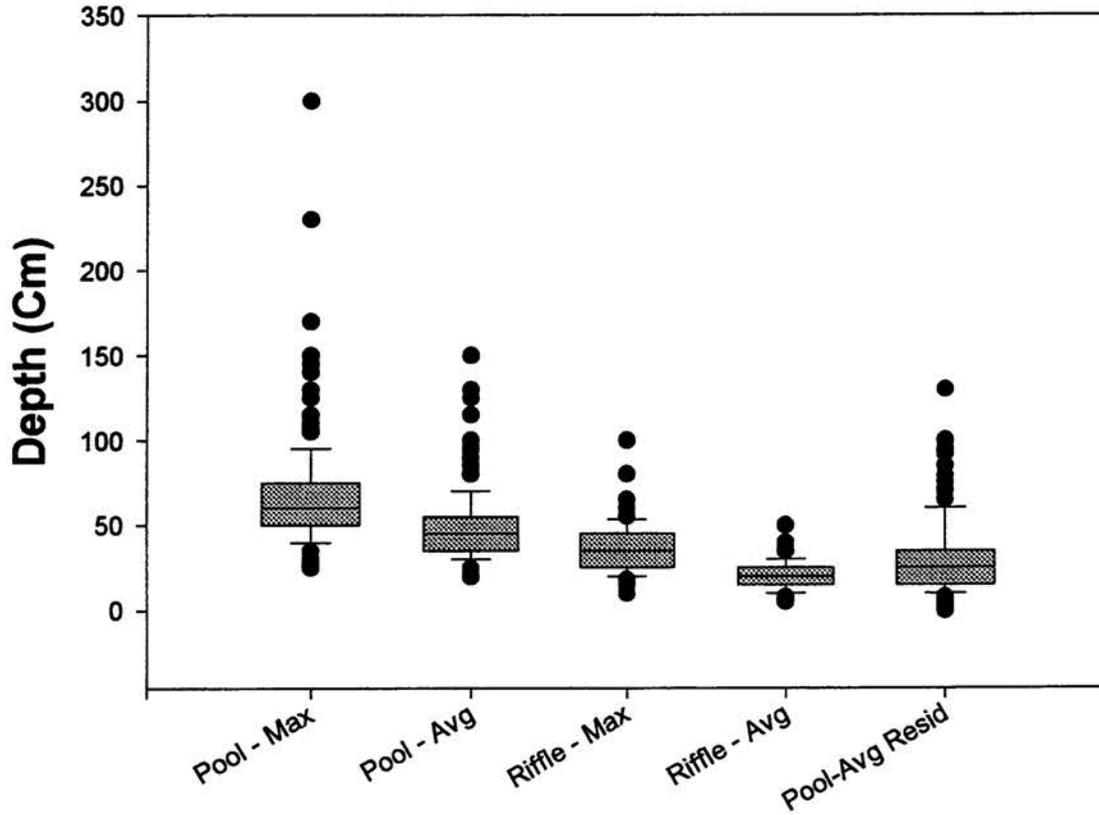
Channel Type C: 74.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 0.0%**

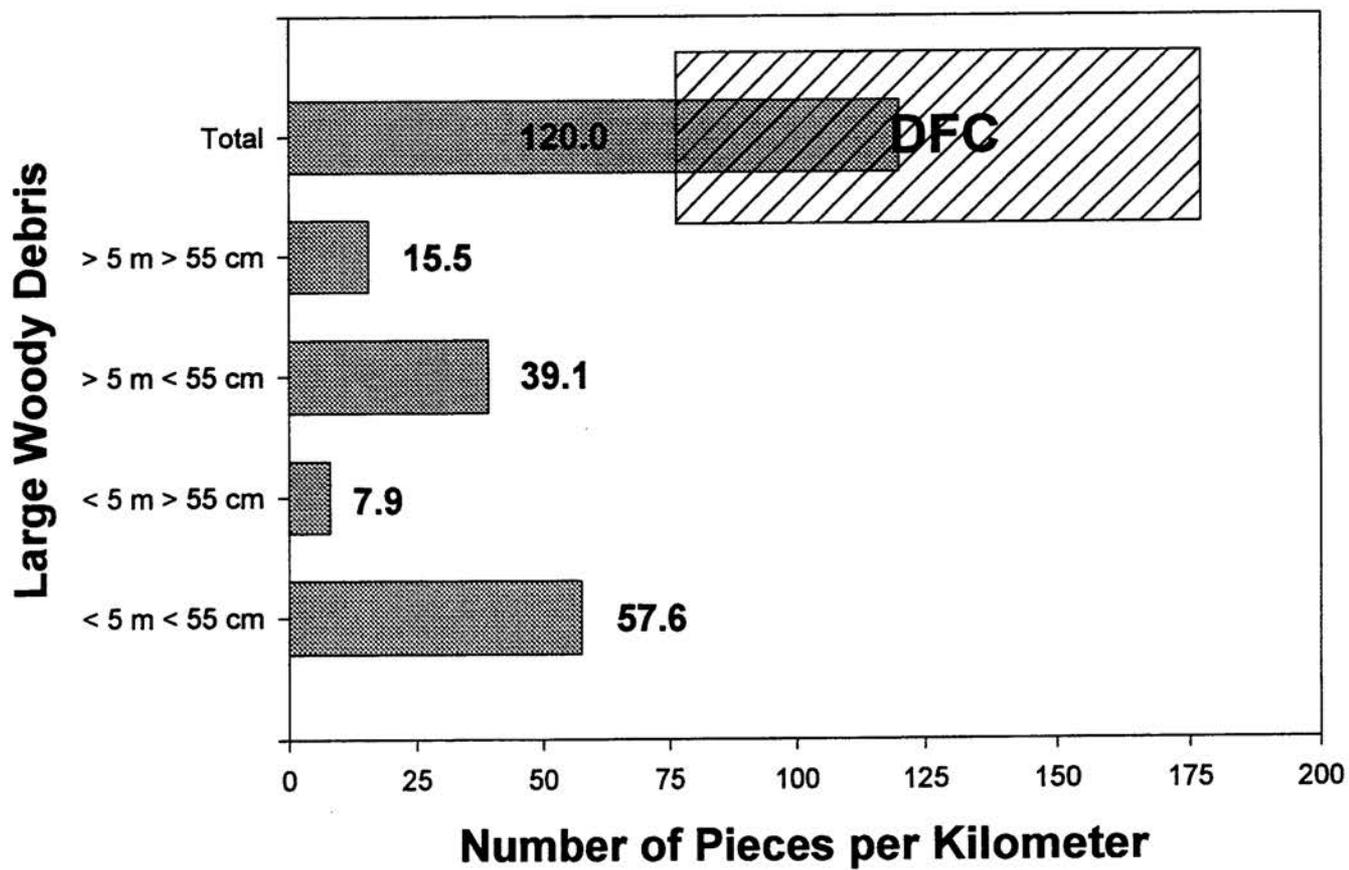
**Average Channel Gradient: 5.4**

## Big Stony Creek

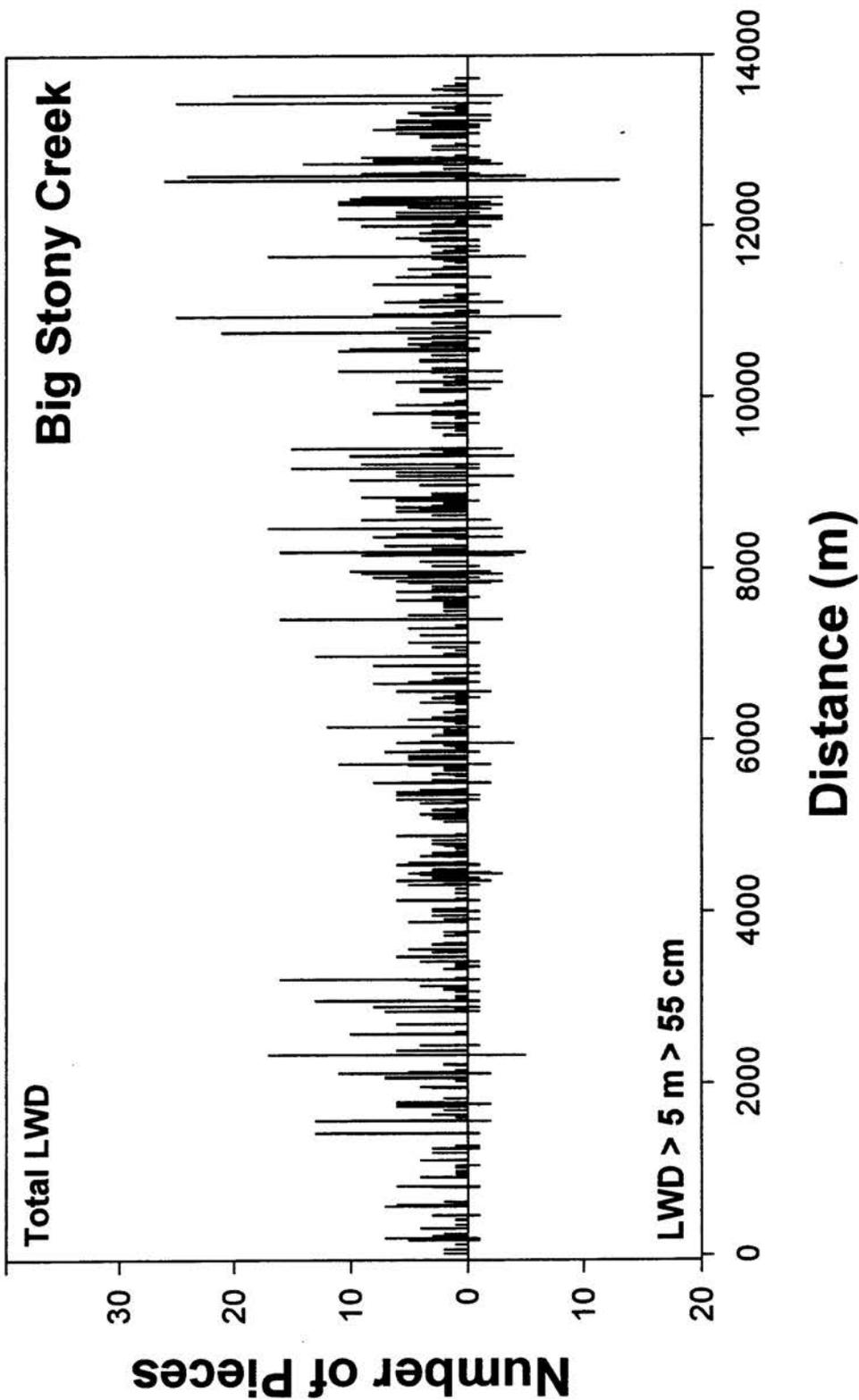


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

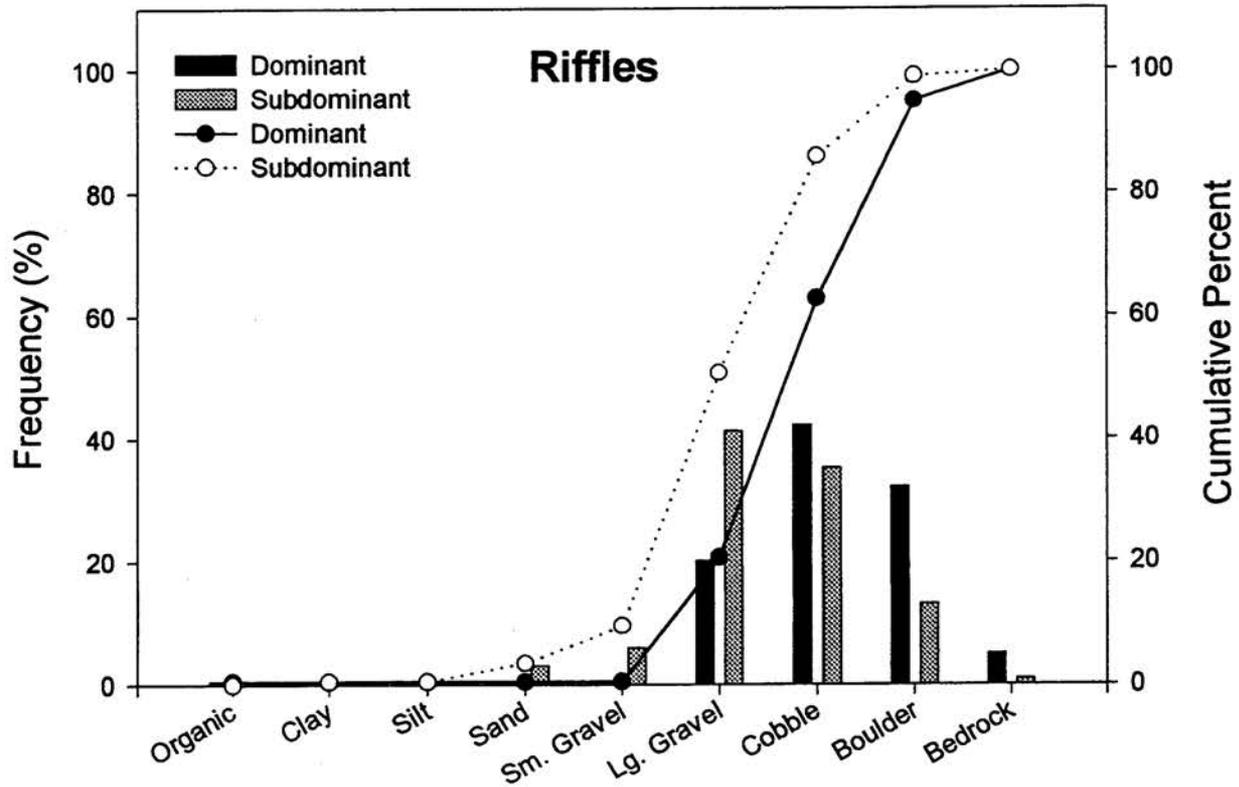
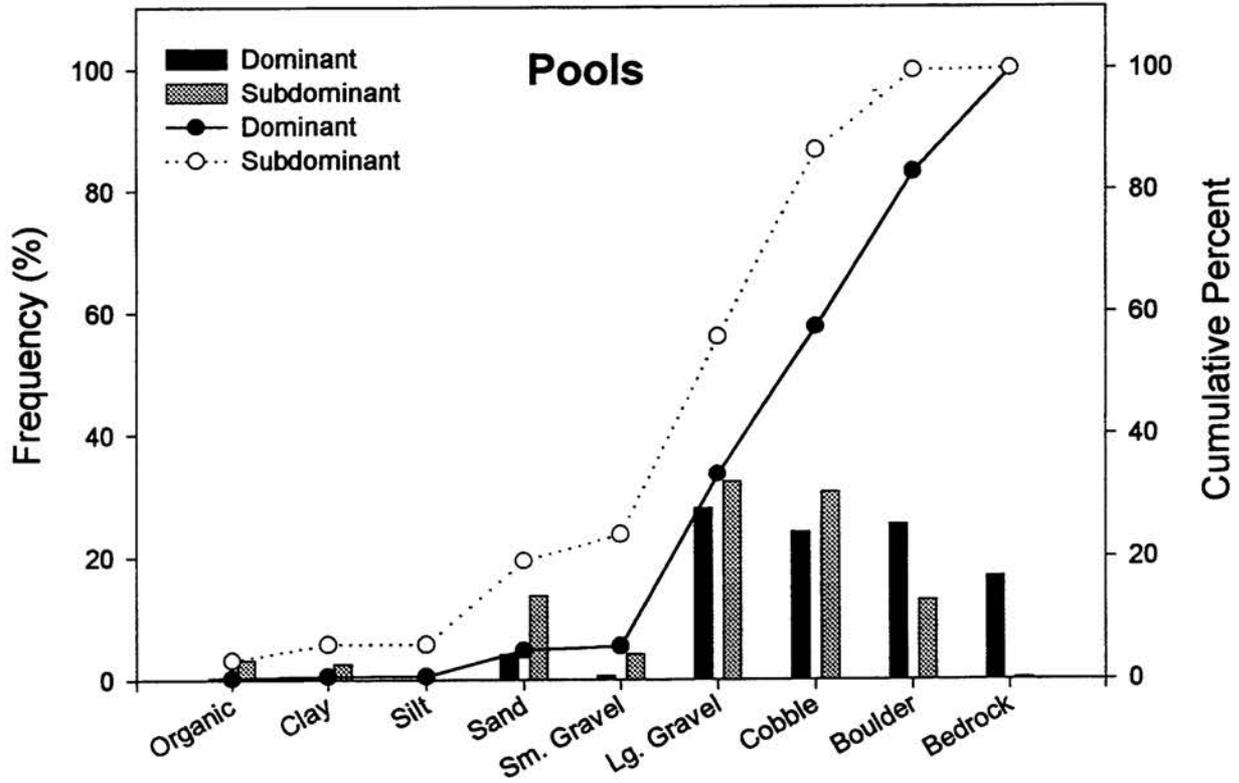
## Big Stony Creek

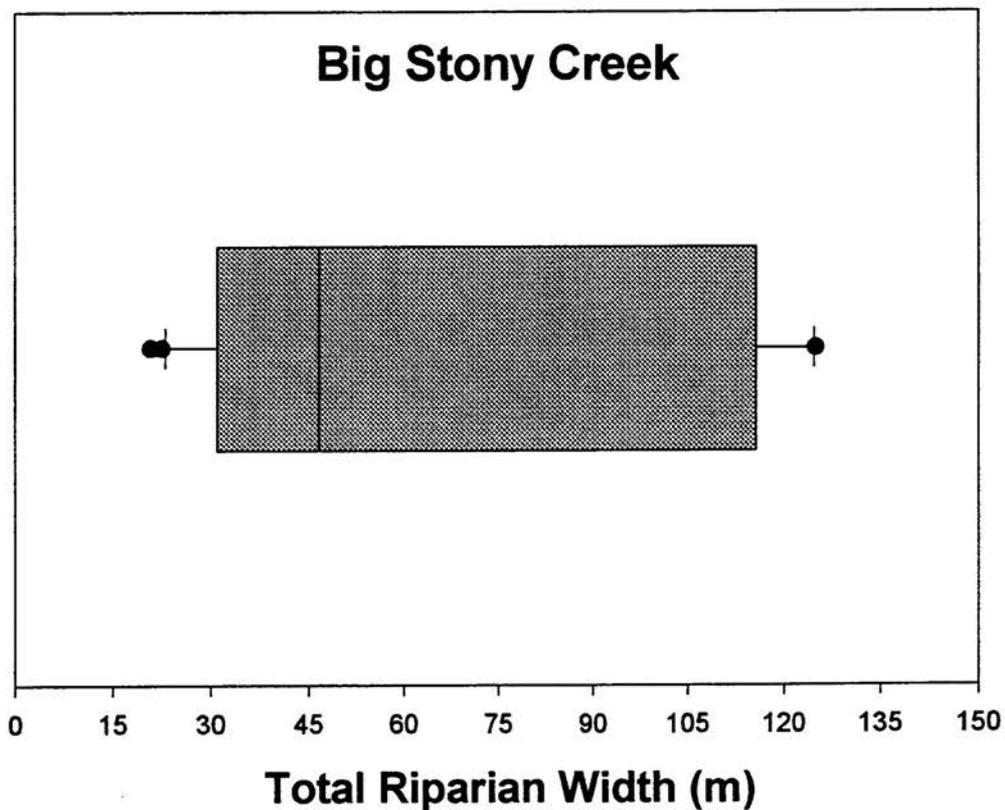


# Distribution and Abundance of Large Woody Debris



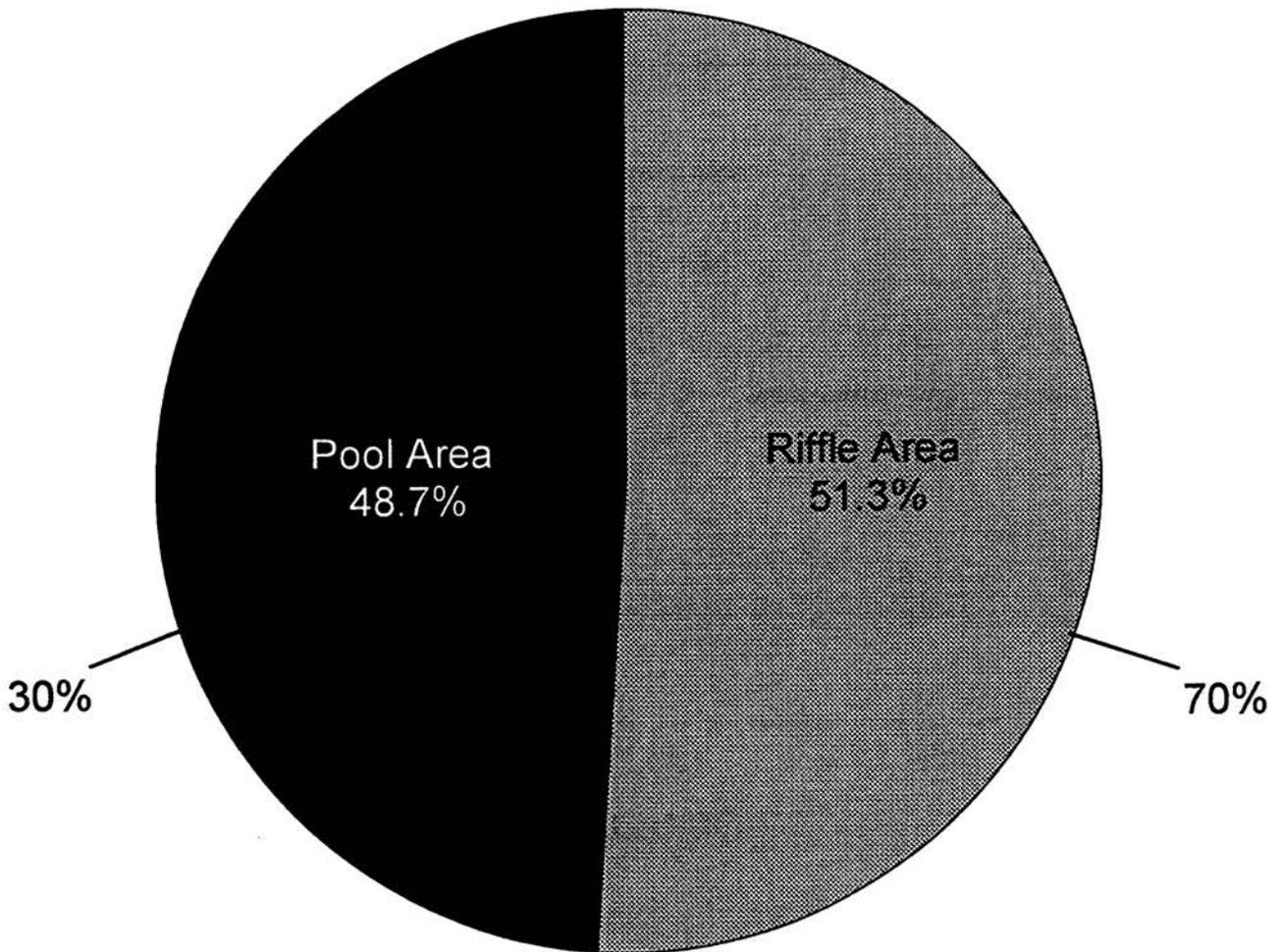
# Big Stony Creek Substrate Composition



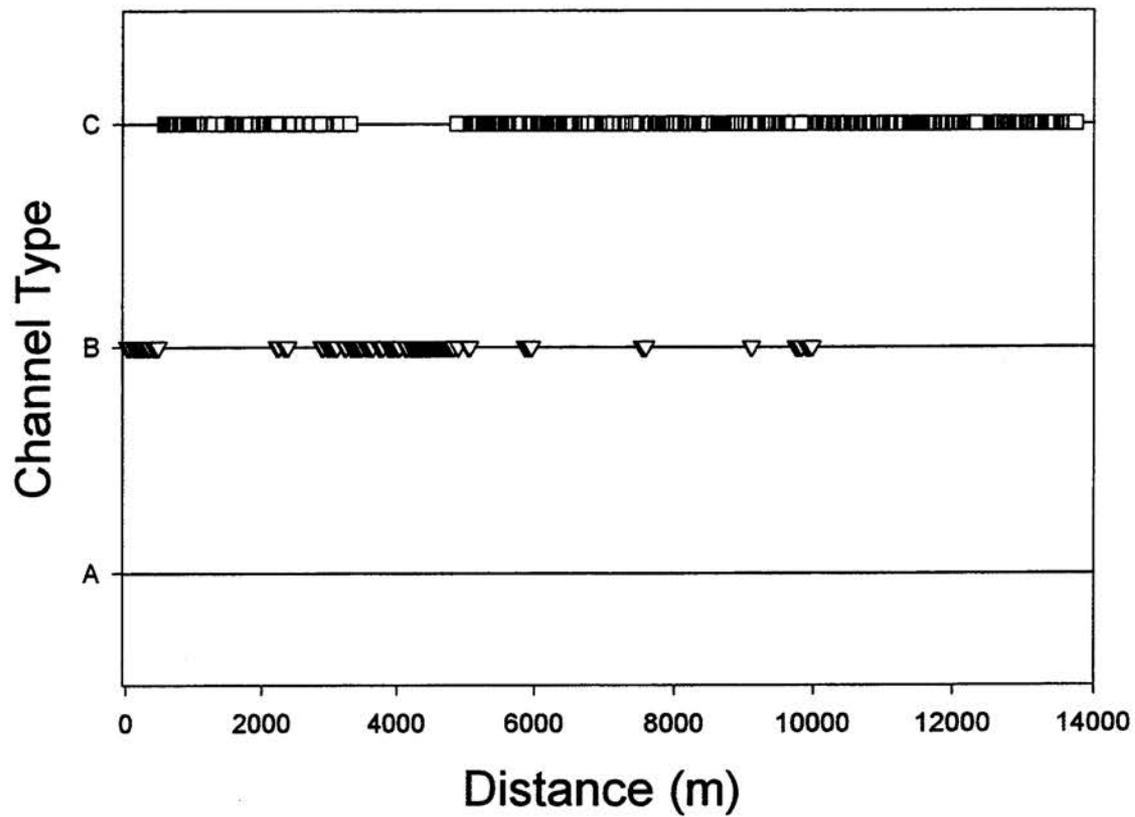
**Riparian Width****Stream: Big Stony Creek****Number of Measurements: 16****Mean Width: 67.2m Std Dev: 49.6****Max: 186.1m Min: 20.9m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Big Stony Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Big Stony Creek Rosgen's Channel Type Distribution



**Stream:** Dixon Branch

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 06/30/99

**Downstream Starting Point:** Confluence with North Fork of Stony Creek

**Total Distance Surveyed:** 1.2 kilometers

**Percent of Total Area - Pools:** 41.9%

Number of Pools: 111

Number of Pools per kilometer: 92.5

Total Pool Area: 1145.0 sq. meters  $\pm$  83.5

Mean Pool Area: 10.3 sq. meters

Correction Factor: 0.99

Mean Maximum Depth: 30.2 cm

Mean Average Depth: 15.3 cm

Mean Average Residual Pool Depth: 10.1 cm

**Percent of Total Area - Riffles:** 58.1%

Number of Riffles: 75

Number of Riffles per kilometer: 62.5

Total Riffle Area: 1585.2 sq. meters  $\pm$  109.6

Mean Riffle Area: 21.1 sq. meters

Correction Factor: 1.06

Mean Maximum Depth: 15.3 cm

Mean Average Depth: 6.0 cm

**Number of Large Woody Debris Pieces per kilometer:** 63.5

Wood < 5 m and < 55 cm: 40.7

Wood < 5 m and > 55 cm: 0.8

Wood > 5 m and < 55 cm: 16.1

Wood > 5 m and > 55 cm: 5.9

**Mean Channel Width:** 3.7 m

**Mean Riparian Width:** 34.8 m

Mean Maximum Riparian Distance (either side): 24.3 m

Mean Minimum Riparian Distance (either side): 6.8 m

Maximum Riparian Width (Total): 49.1 m

Minimum Riparian Width (Total): 23.4 m

Dixon Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 11.5%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 1.6%

Channel Type B: 92.0%

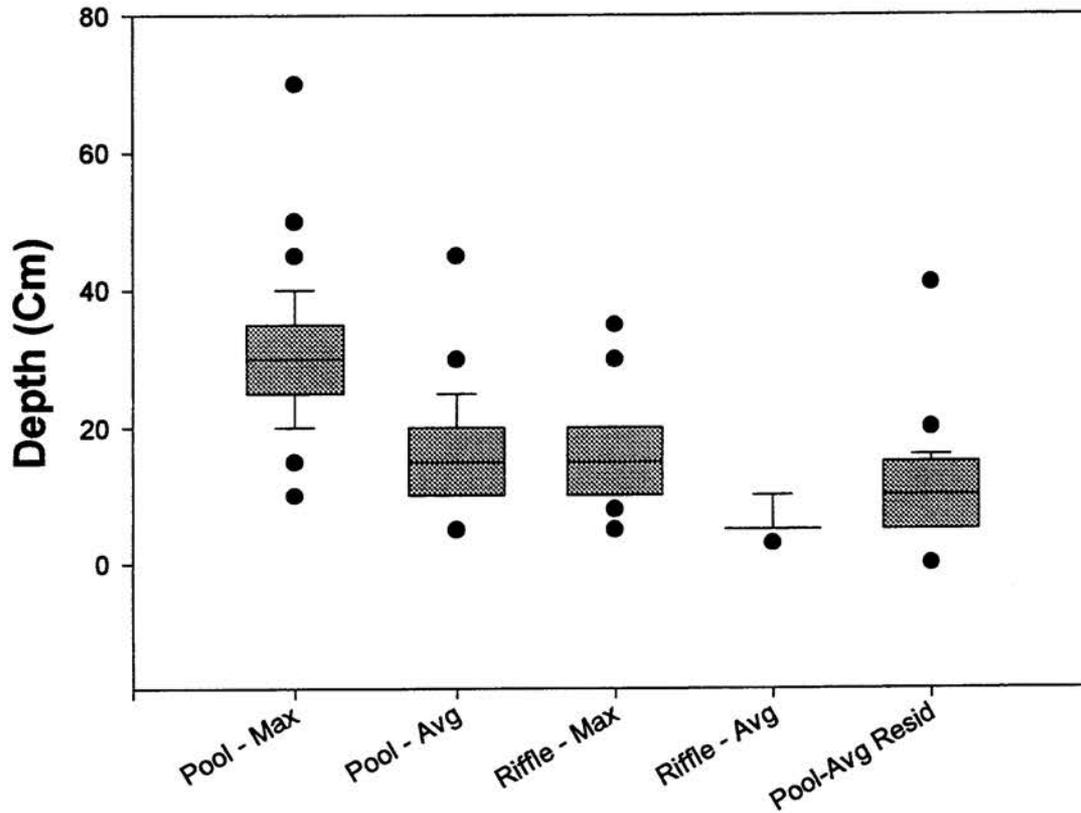
Channel Type C: 6.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 5.4%**

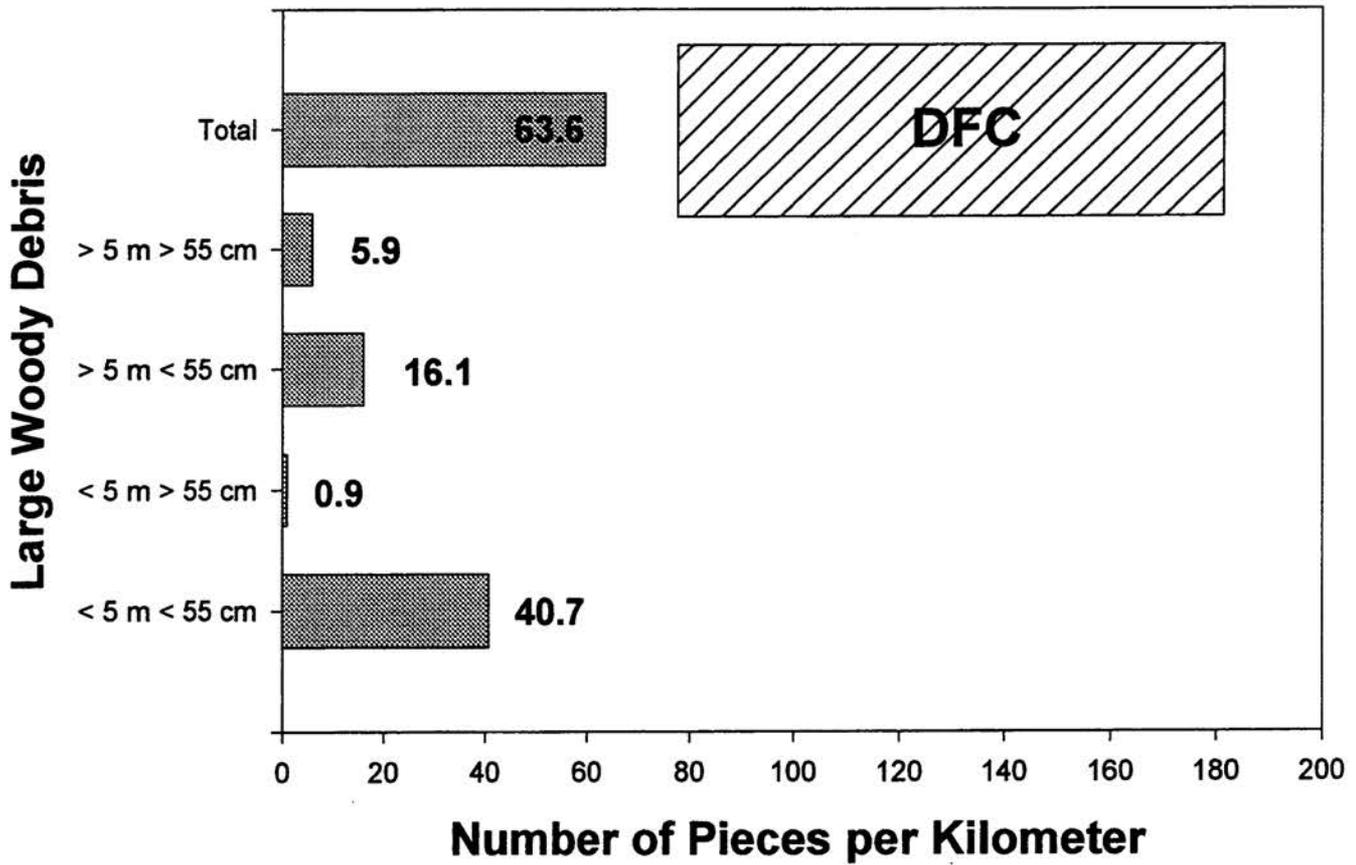
**Average Channel Gradient: 9.8**

## Dixon Branch

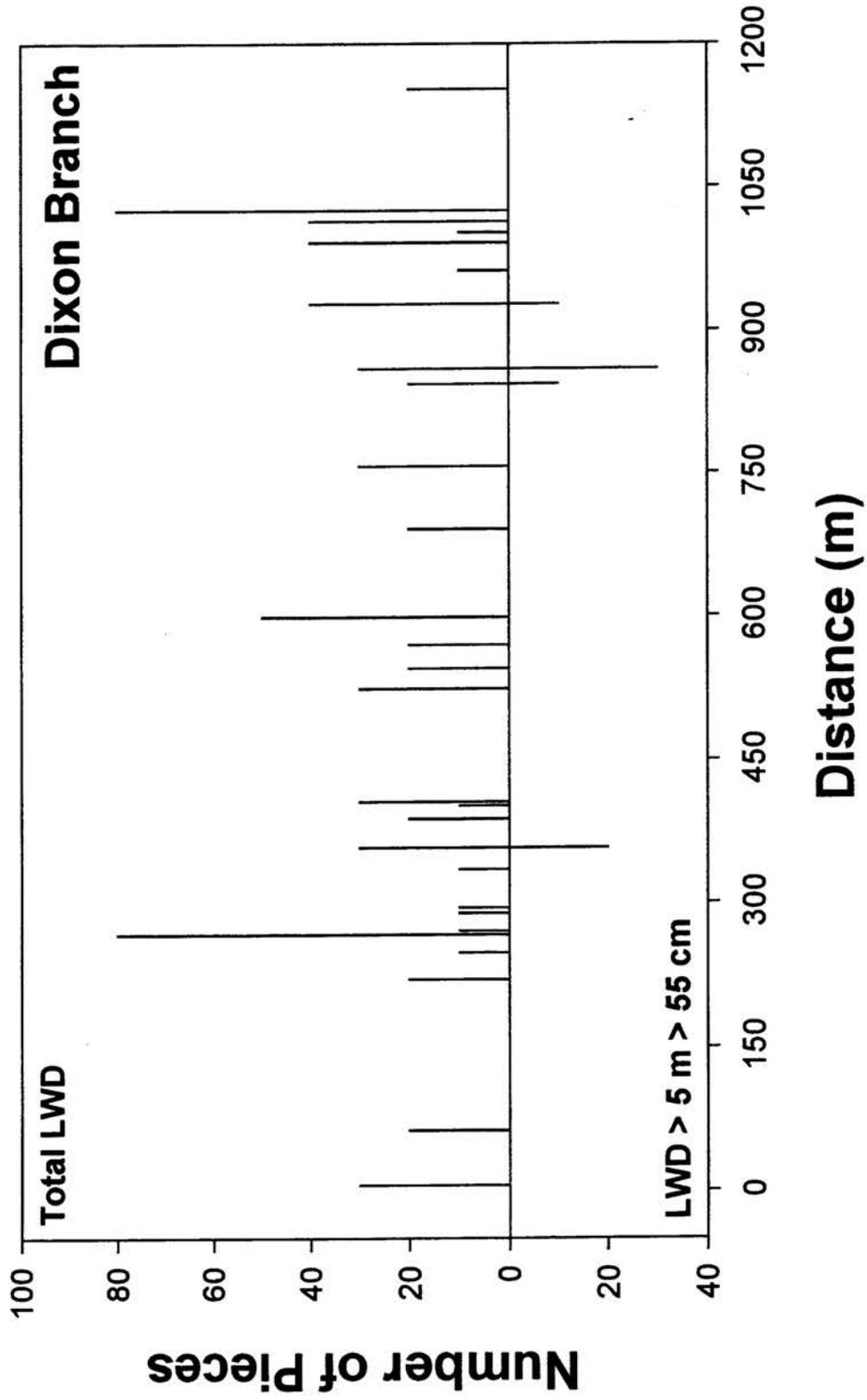


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

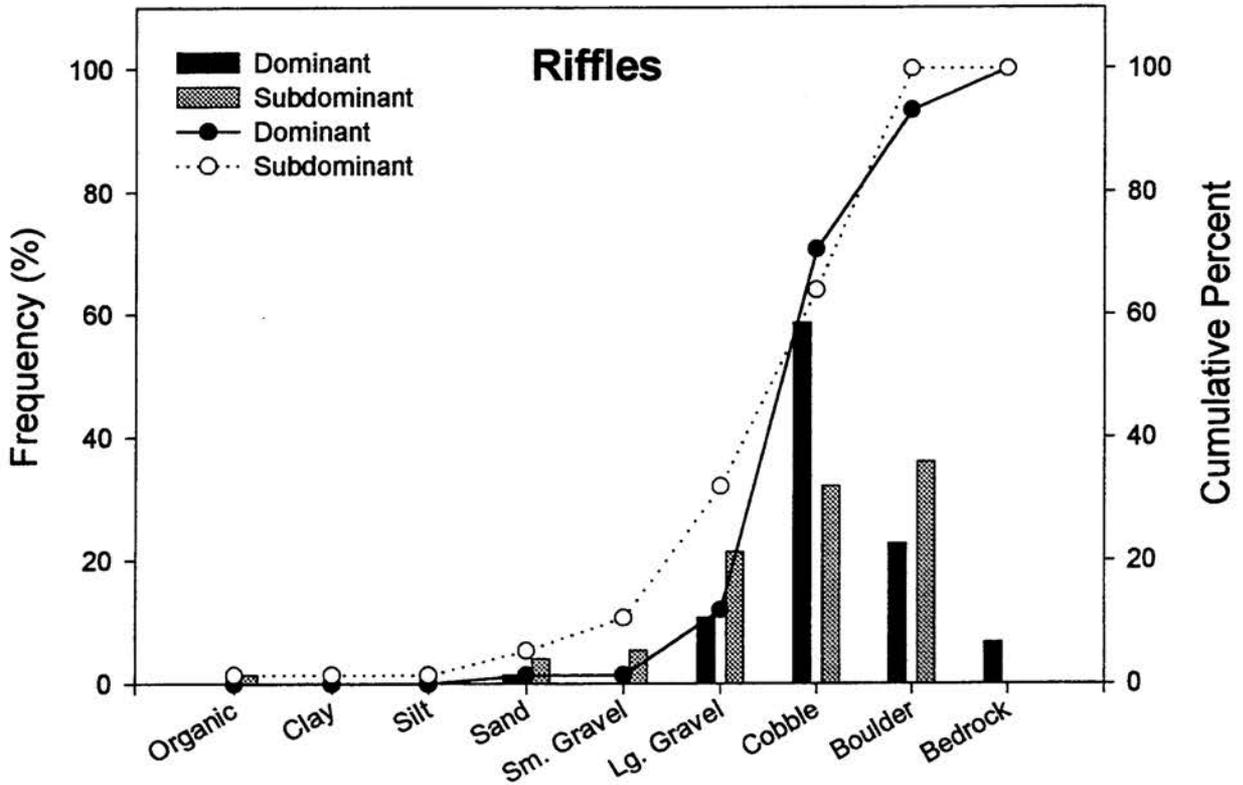
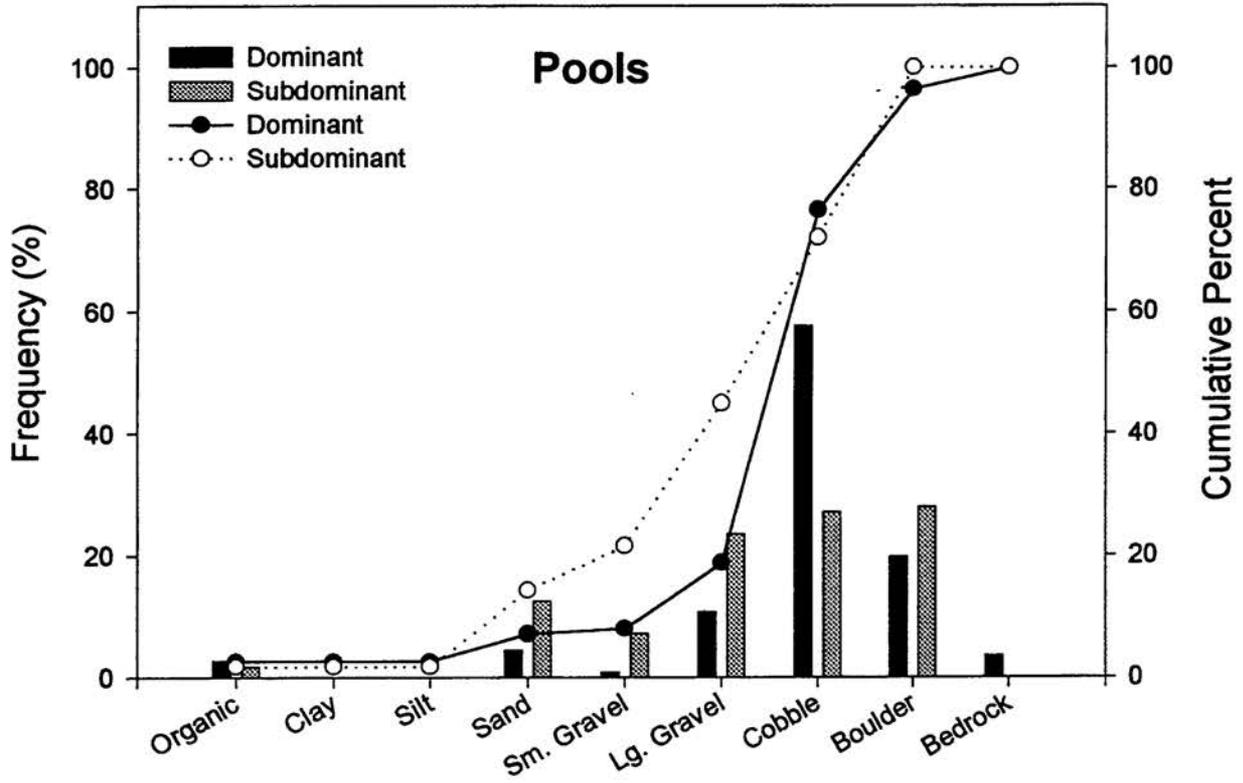
## Dixon Branch

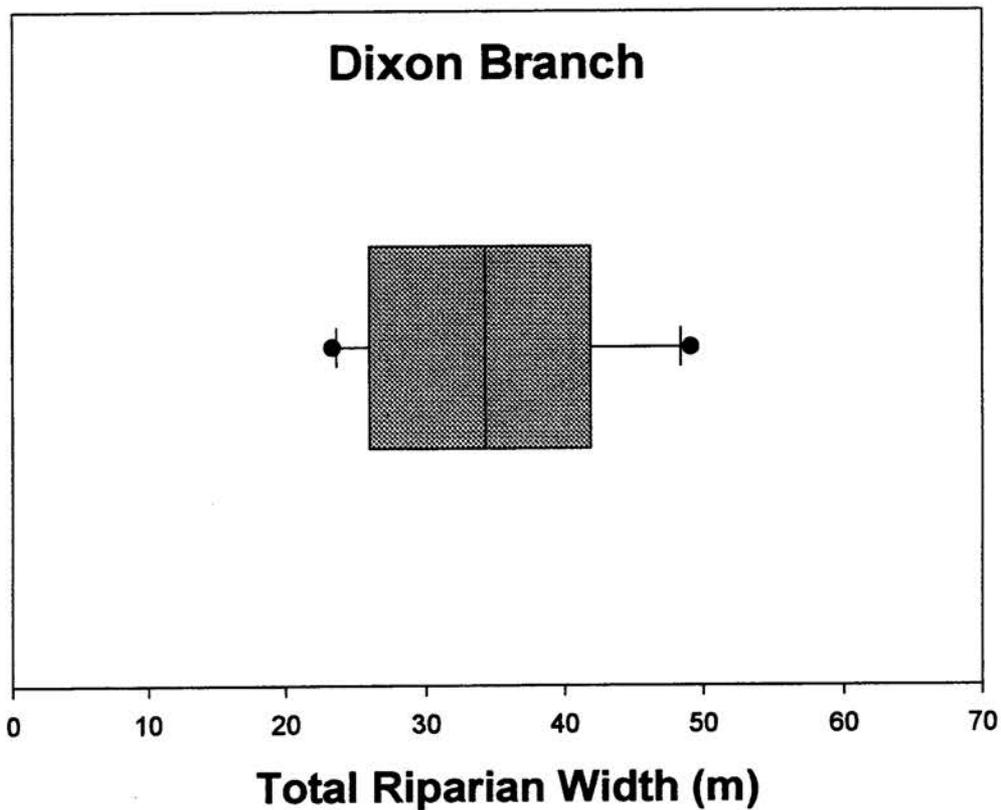


# Distribution and Abundance of Large Woody Debris



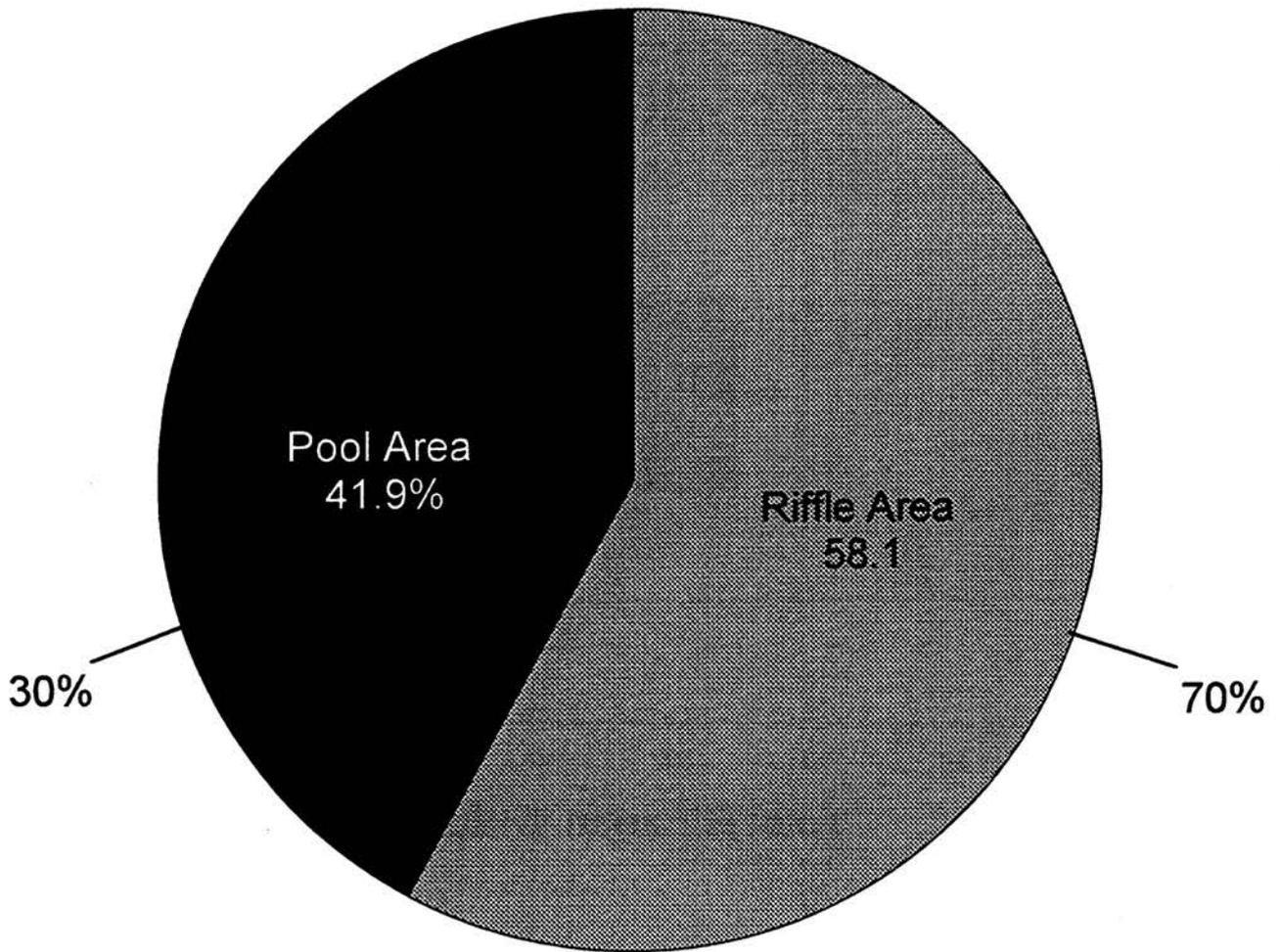
## Dixon Branch Substrate Composition



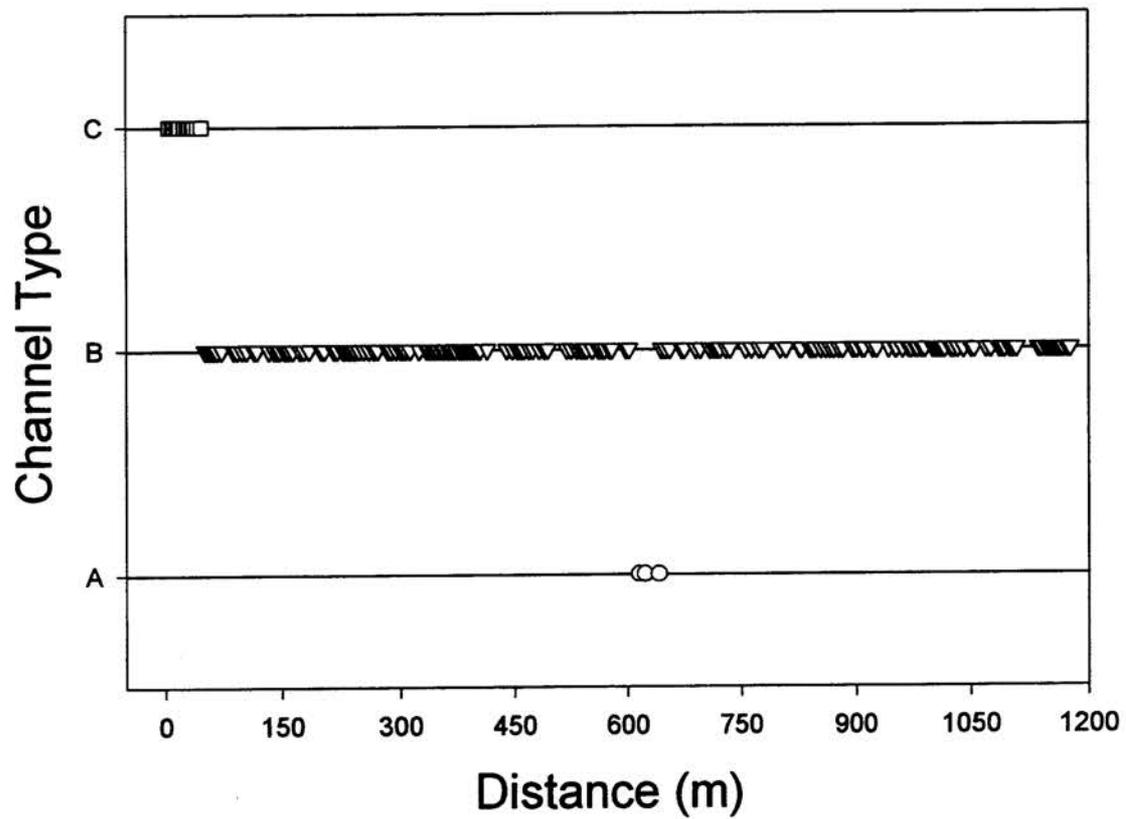
**Riparian Width****Stream: Dixon Branch****Number of Measurements: 6****Mean Width: 34.8m Std Dev: 10.6****Max: 49.1m Min: 23.4m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Dixon Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Dixon Branch Rosgen's Channel Type Distribution



**Stream:** Laurel Branch

**District:** Blacksburg

**Quadrangle:** Interior/Linside

**Sample Date:** 06/28/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 1.9 kilometers

**Percent of Total Area - Pools:** 24.5%

Number of Pools: 120

Number of Pools per kilometer: 63.2

Total Pool Area: 1219.3 sq. meters  $\pm$  299.4

Mean Pool Area: 10.2 sq. meters

Correction Factor: 1.09

Mean Maximum Depth: 26.5 cm

Mean Average Depth: 16.8 cm

Mean Average Residual Pool Depth: 10.1 cm

**Percent of Total Area - Riffles:** 75.5%

Number of Riffles: 106

Number of Riffles per kilometer: 55.8

Total Riffle Area: 3751.8 sq. meters  $\pm$  368.6

Mean Riffle Area: 35.4 sq. meters

Correction Factor: 1.05

Mean Maximum Depth: 14.8 cm

Mean Average Depth: 5.8 cm

**Number of Large Woody Debris Pieces per kilometer:** 363.0

Wood < 5 m and < 55 cm: 260.4

Wood < 5 m and > 55 cm: 22.4

Wood > 5 m and < 55 cm: 67.2

Wood > 5 m and > 55 cm: 13.0

**Mean Channel Width:** 4.8 m

**Mean Riparian Width:** 15.2 m

Mean Maximum Riparian Distance (either side): 7.7 m

Mean Minimum Riparian Distance (either side): 2.7 m

Maximum Riparian Width (Total): 20.3 m

Minimum Riparian Width (Total): 8.8 m

Laurel Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 0.0%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 59.3%

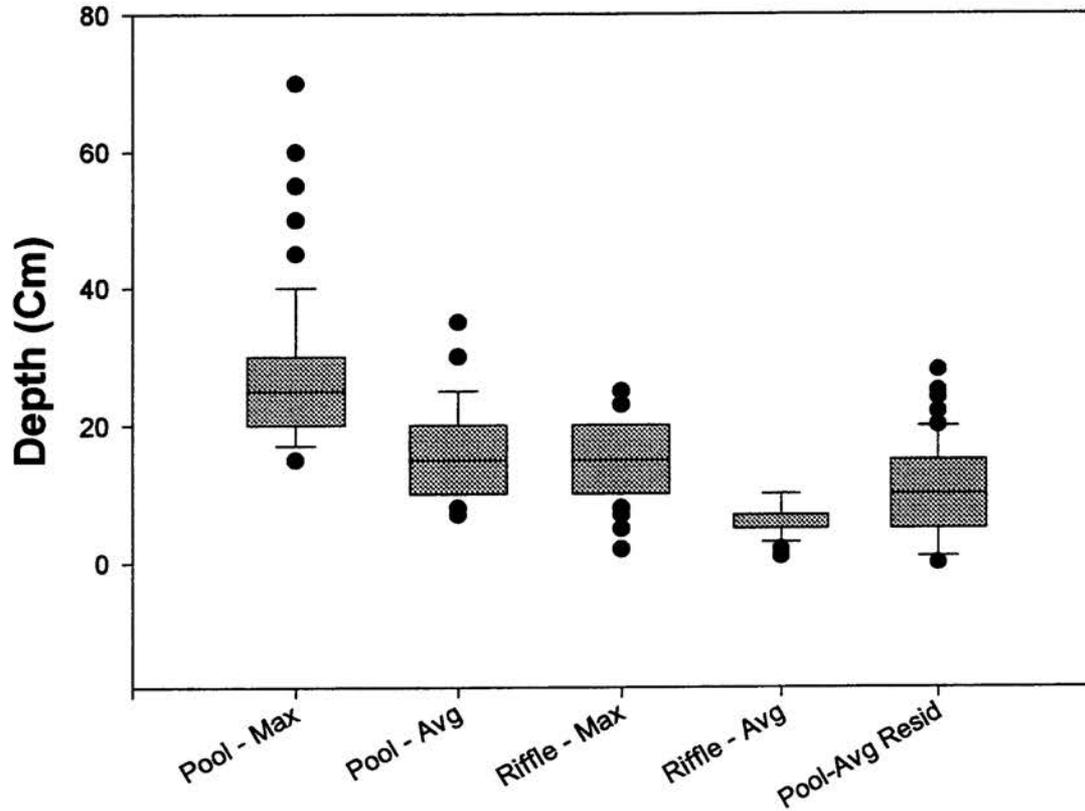
Channel Type C: 40.7%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 85.8%**

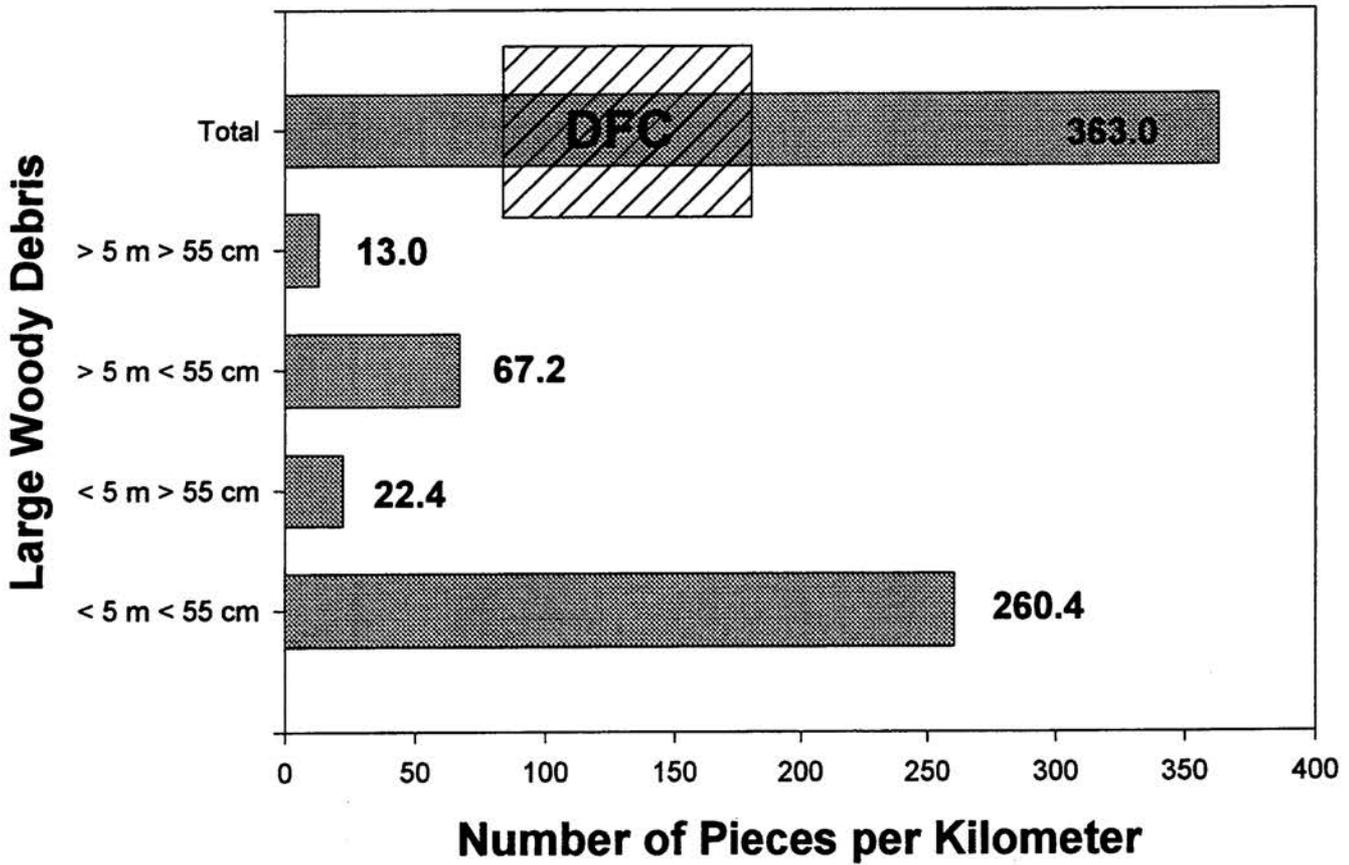
**Average Channel Gradient: 10.3**

## Laurel Branch

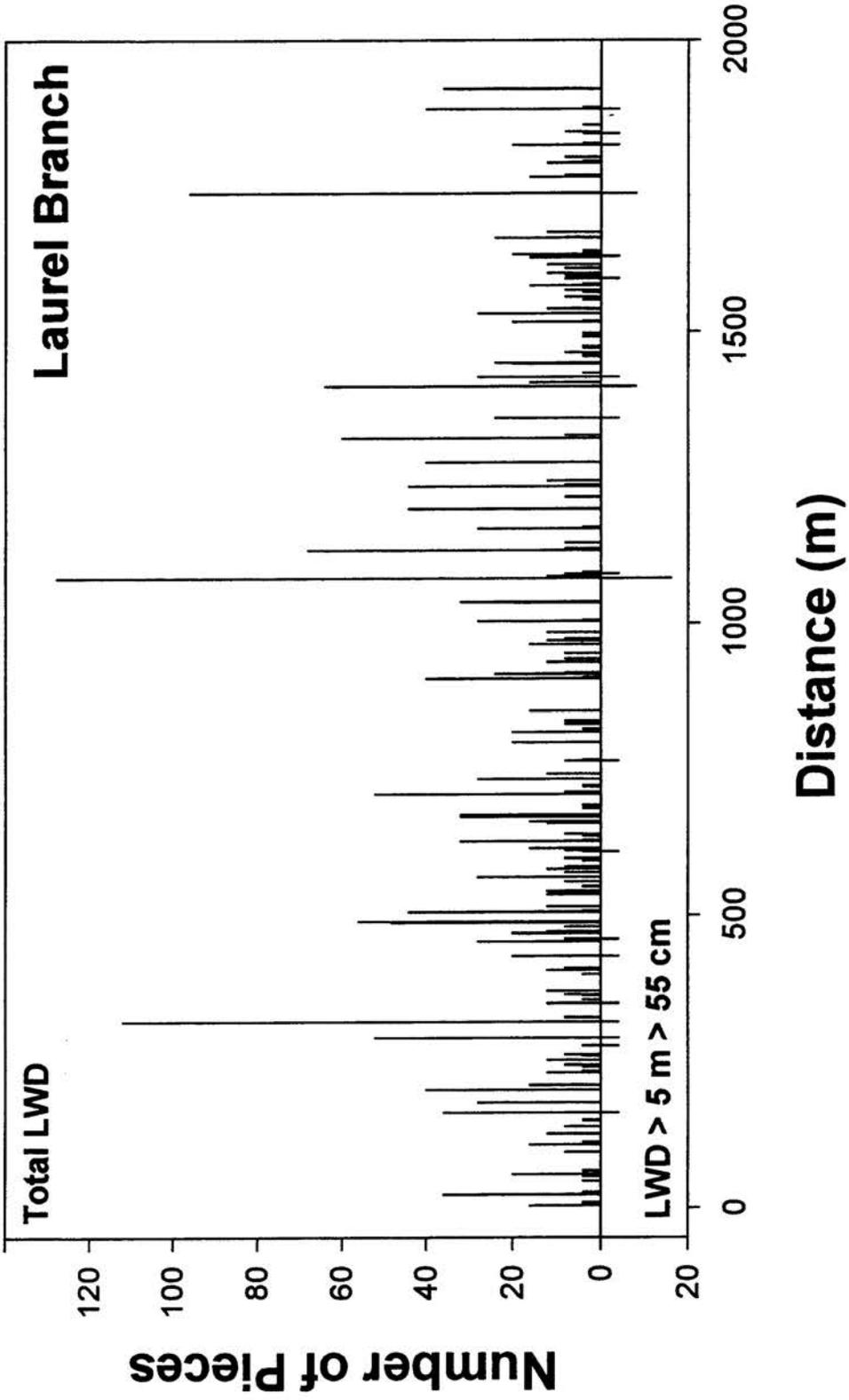


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

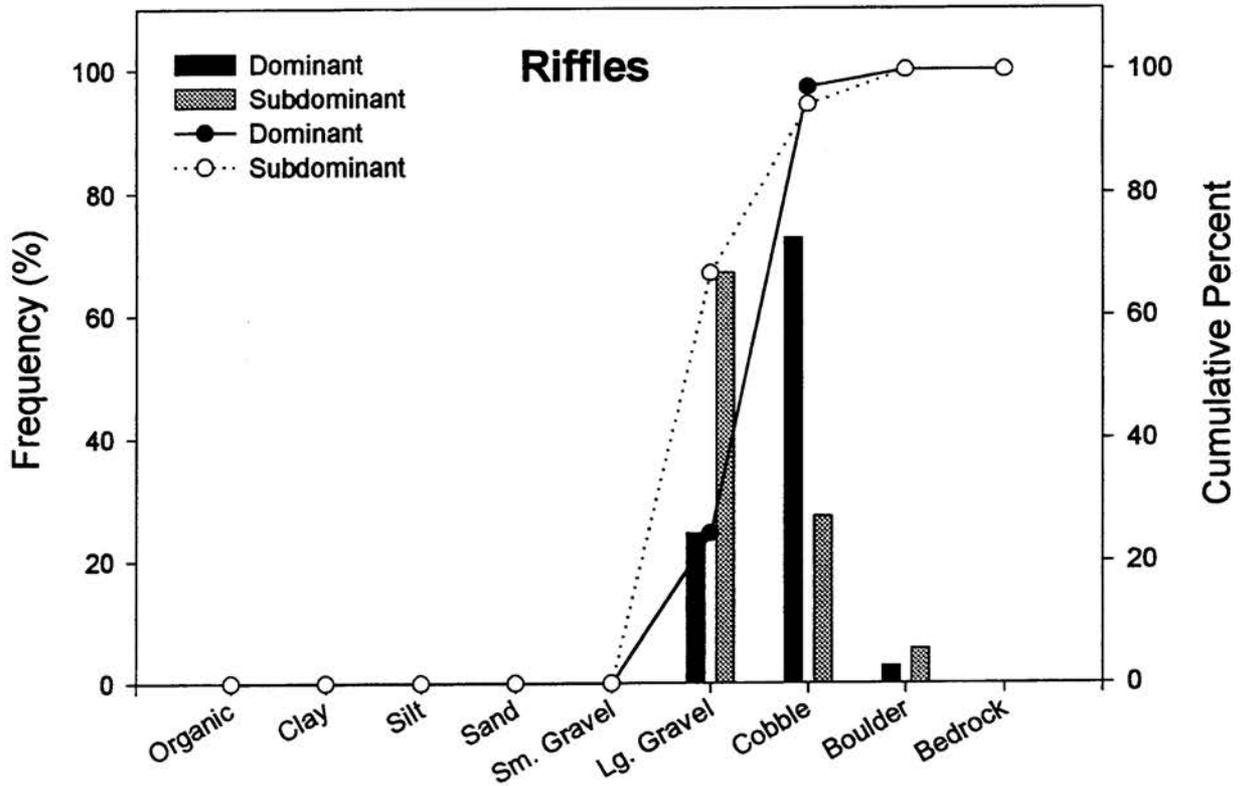
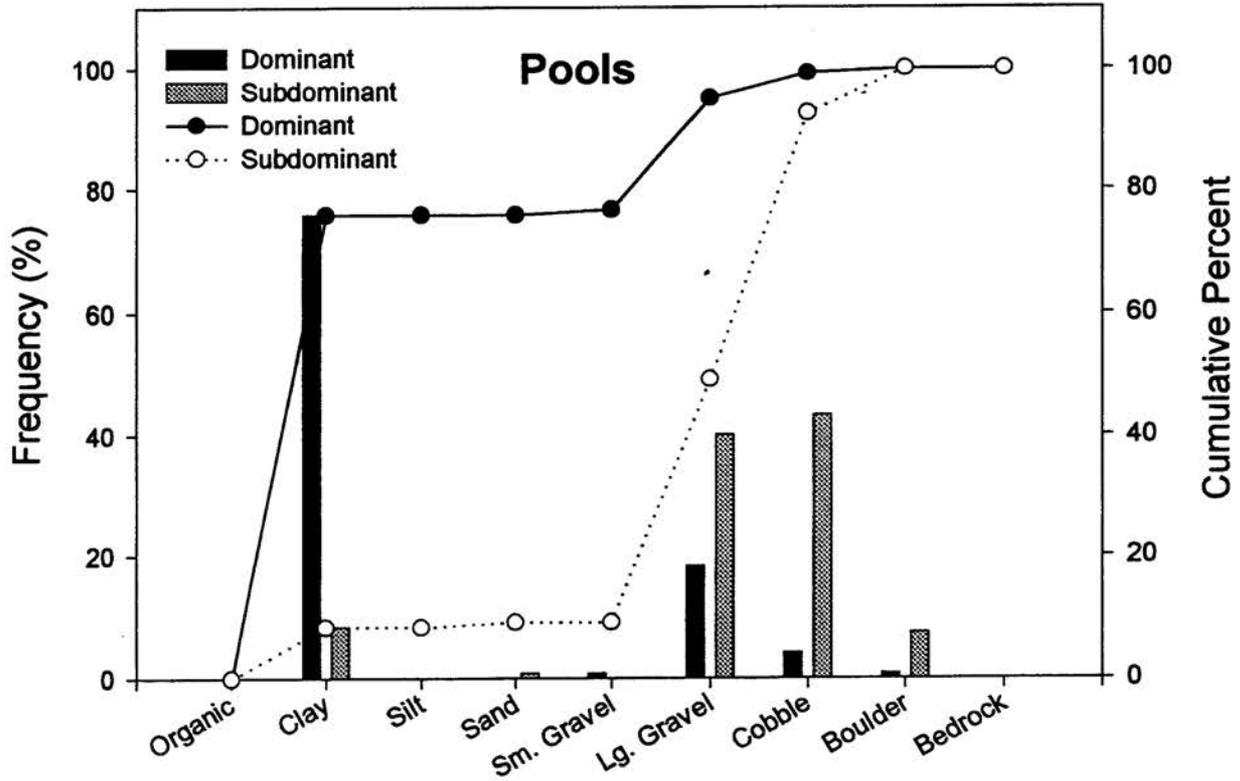
## Laurel Branch

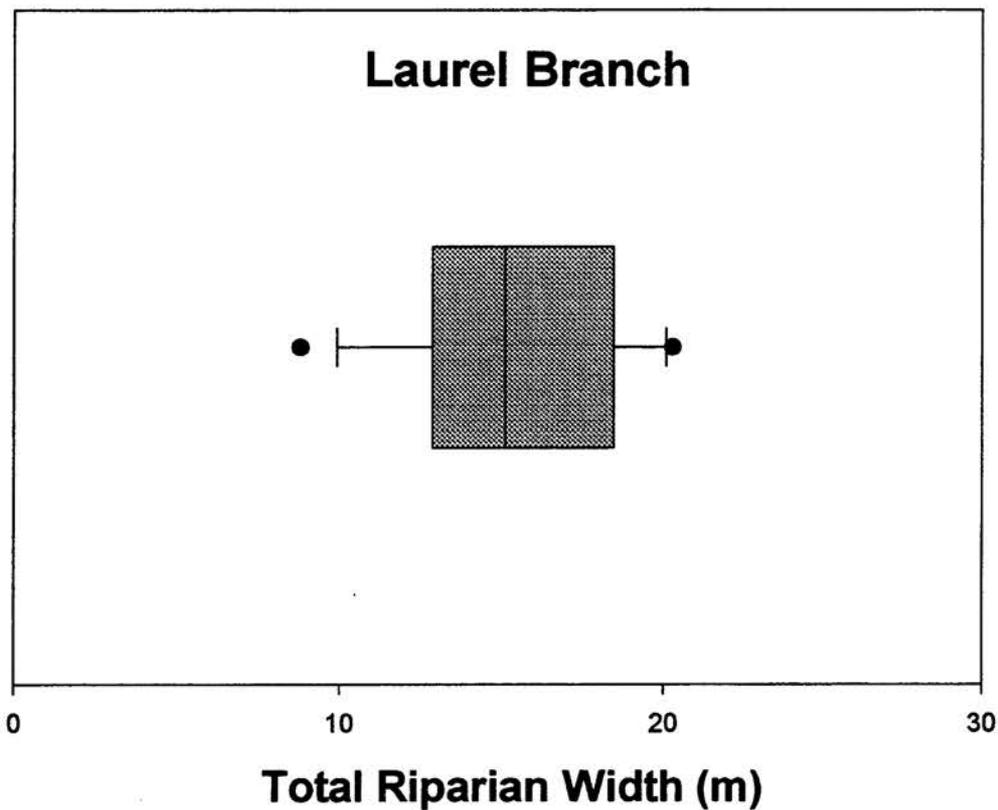


# Distribution and Abundance of Large Woody Debris



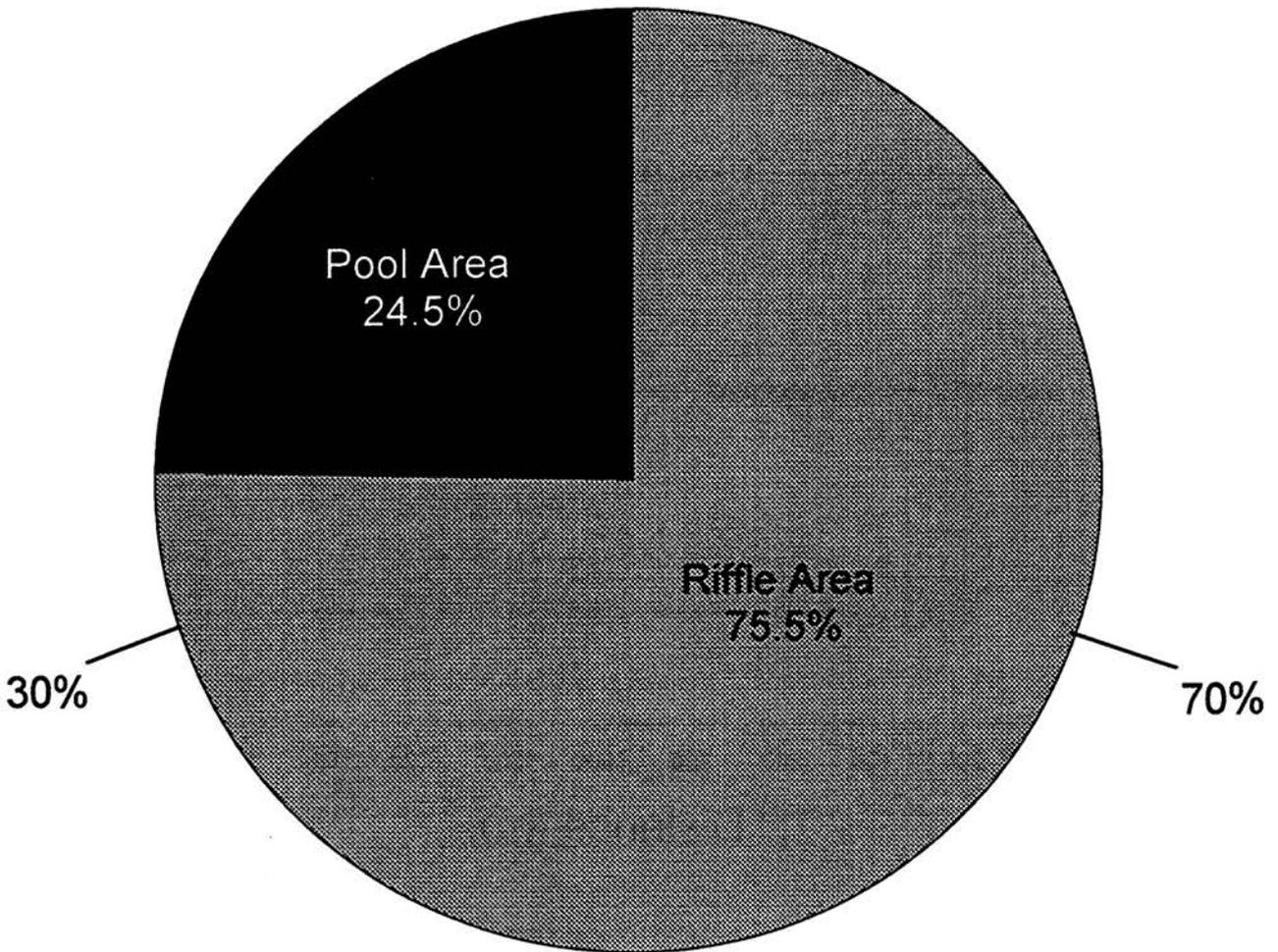
# Laurel Branch Substrate Composition



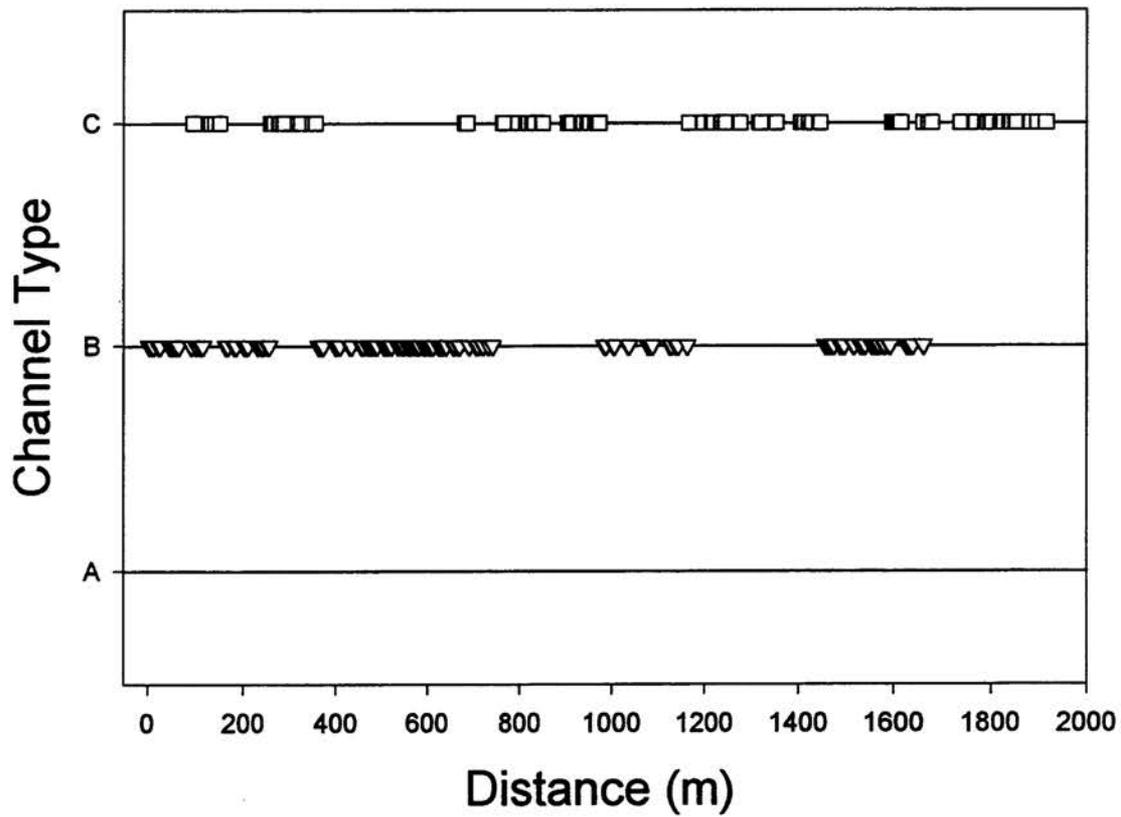
**Riparian Width****Stream: Laurel Branch****Number of Measurements: 8****Mean Width: 15.3m Std Dev: 3.9****Max: 20.3m Min: 8.8m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Laurel Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Laurel Branch Rosgen's Channel Type Distribution



**Stream:** Laurel Creek

**District:** Blacksburg

**Quadrangle:** Eggleston/Interior

**Sample Date:** 06/03/99

**Downstream Starting Point:** Confluence with Little Stony Creek

**Total Distance Surveyed:** 2.4 kilometers

**Percent of Total Area - Pools:** 44.0%

Number of Pools: 135

Number of Pools per kilometer: 56.3

Total Pool Area: 3563.9 sq. meters  $\pm$  222.2

Mean Pool Area: 26.4 sq. meters

Correction Factor: 1.07

Mean Maximum Depth: 41.0 cm

Mean Average Depth: 27.1 cm

Mean Average Residual Pool Depth: 18.8 cm

**Percent of Total Area - Riffles:** 56.0%

Number of Riffles: 104

Number of Riffles per kilometer: 43.3

Total Riffle Area: 4530.9 sq. meters  $\pm$  517.6

Mean Riffle Area: 43.6 sq. meters

Correction Factor: 1.07

Mean Maximum Depth: 20.1 cm

Mean Average Depth: 11.9 cm

**Number of Large Woody Debris Pieces per kilometer:** 411.1

Wood < 5 m and < 55 cm: 219.2

Wood < 5 m and > 55 cm: 101.2

Wood > 5 m and < 55 cm: 73.1

Wood > 5 m and > 55 cm: 17.6

**Mean Channel Width:** 4.6 m

**Mean Riparian Width:** 23.6 m

Mean Maximum Riparian Distance (either side): 15.9 m

Mean Minimum Riparian Distance (either side): 3.1 m

Maximum Riparian Width (Total): 65.4 m

Minimum Riparian Width (Total): 8.8 m

Laurel Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 6.1%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 23.6%

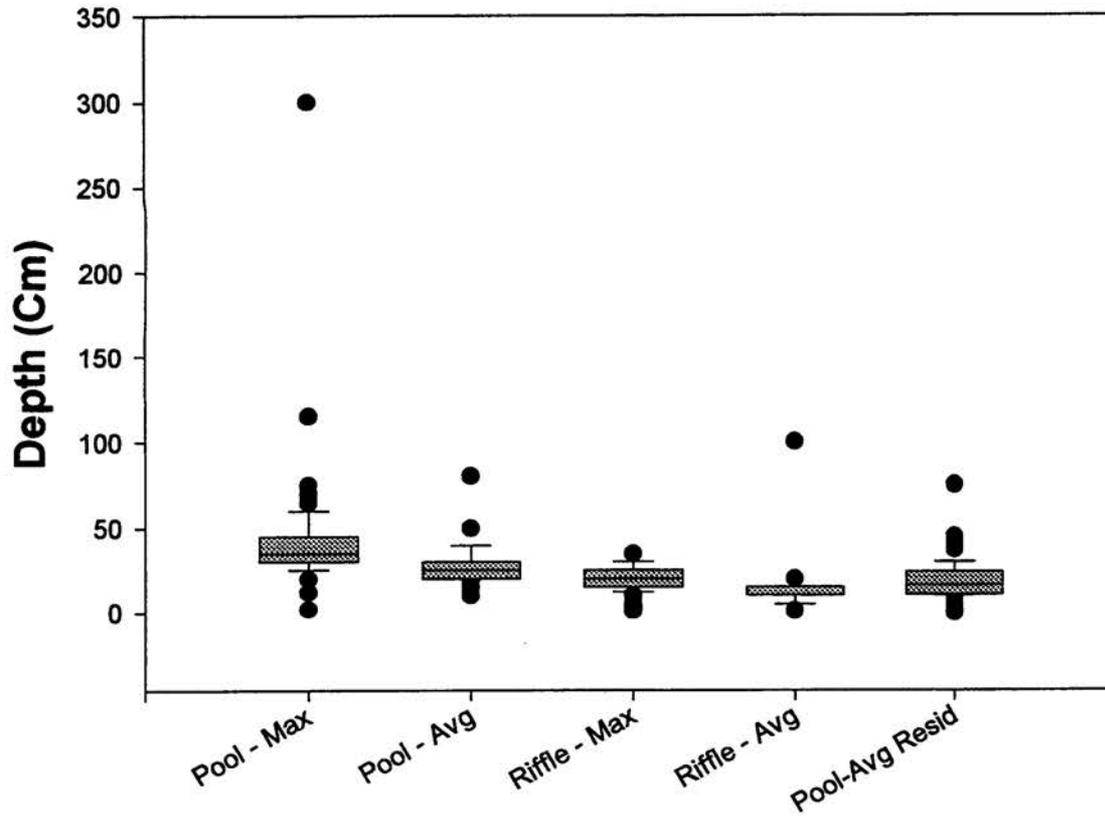
Channel Type C: 76.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 11.9%**

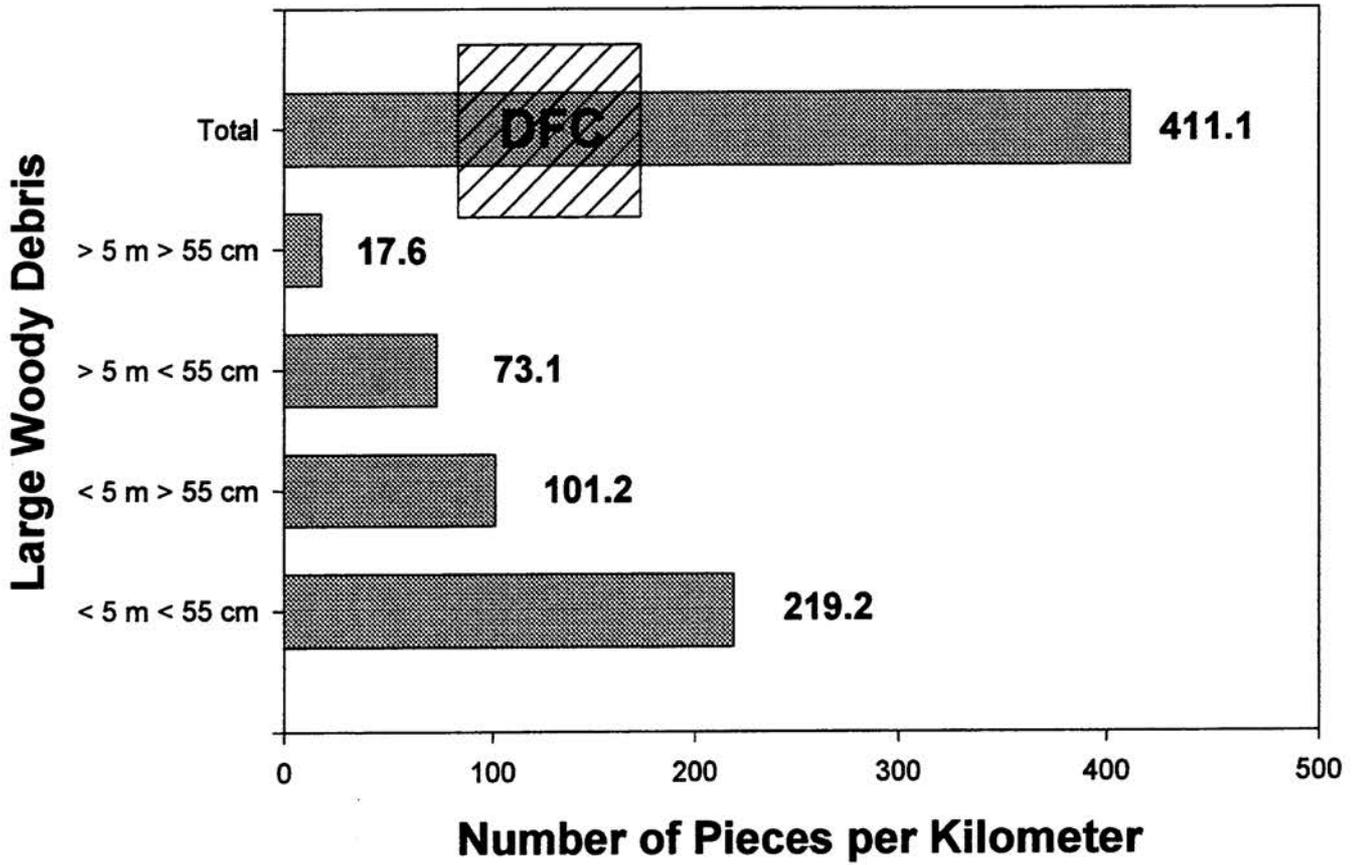
**Average Channel Gradient: 6.5**

## Laurel Creek

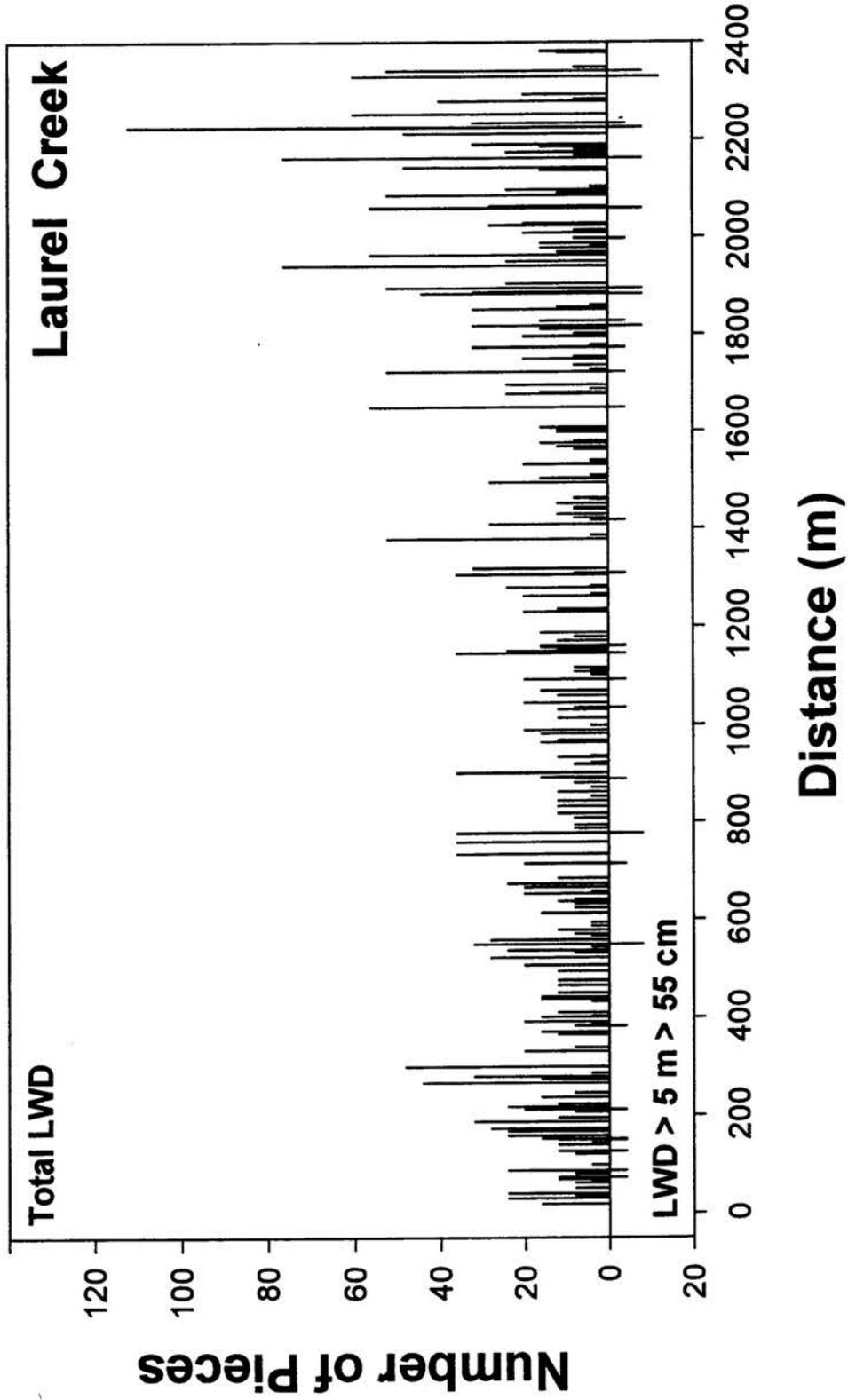


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

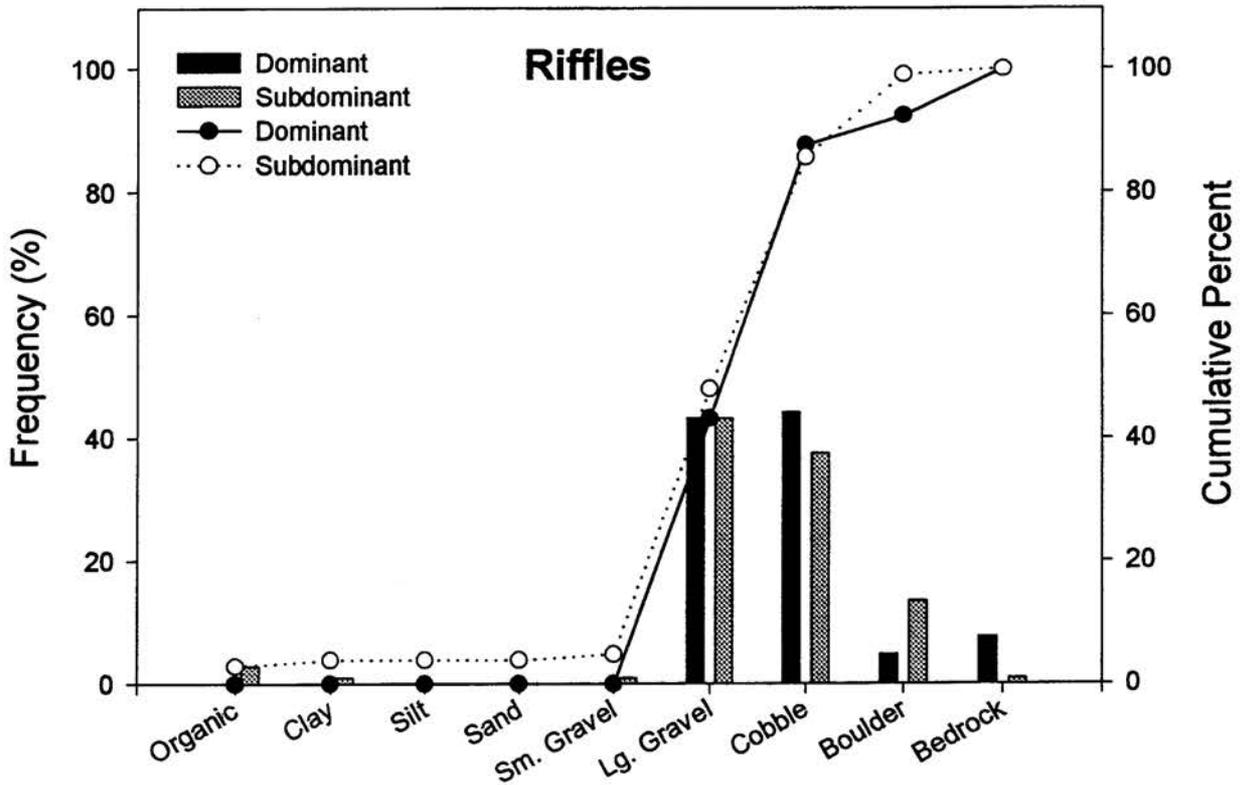
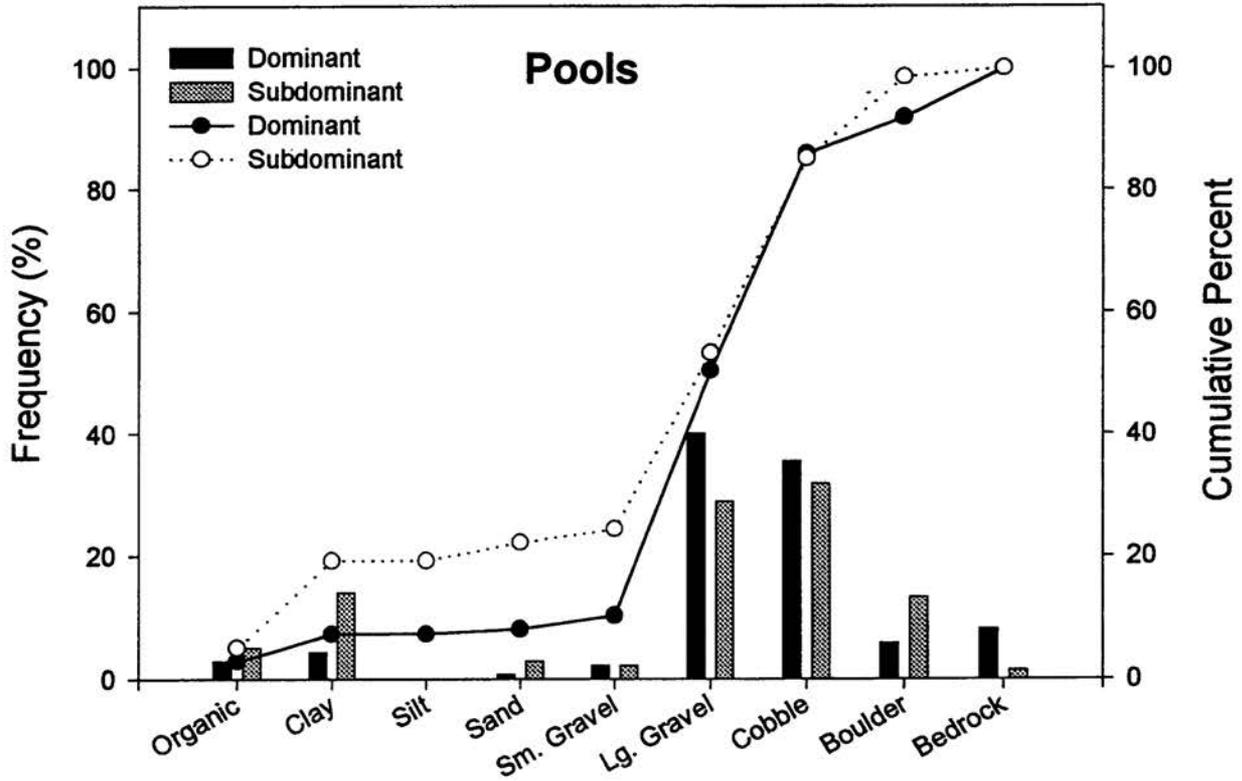
## Laurel Creek

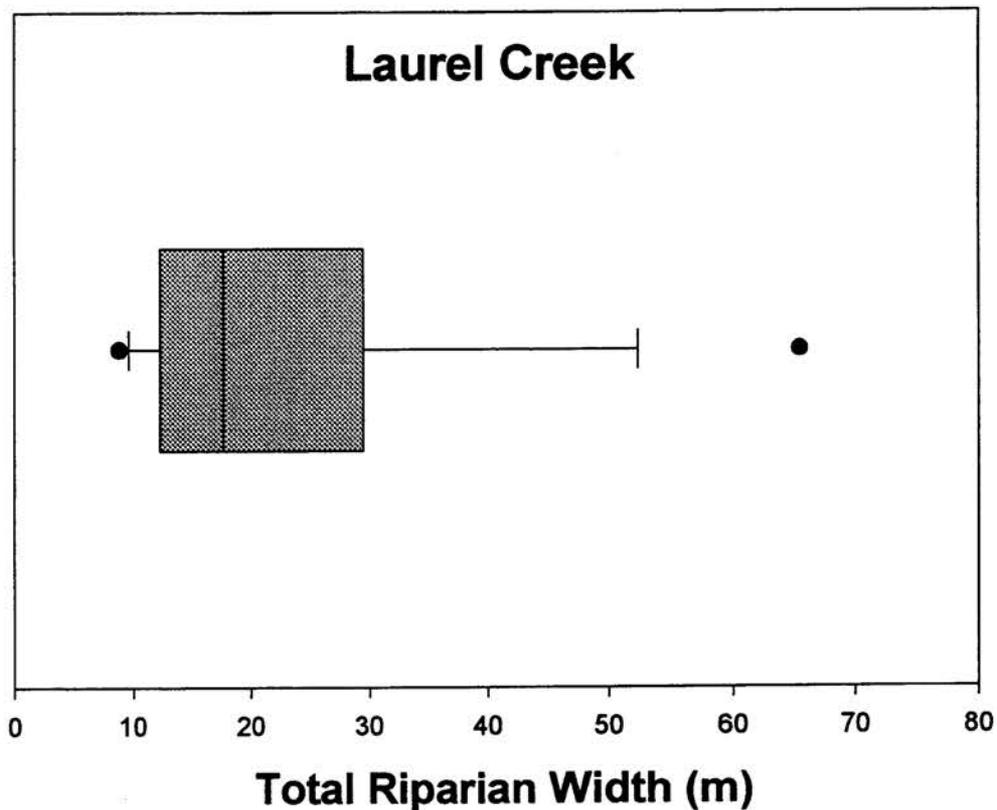


# Distribution and Abundance of Large Woody Debris



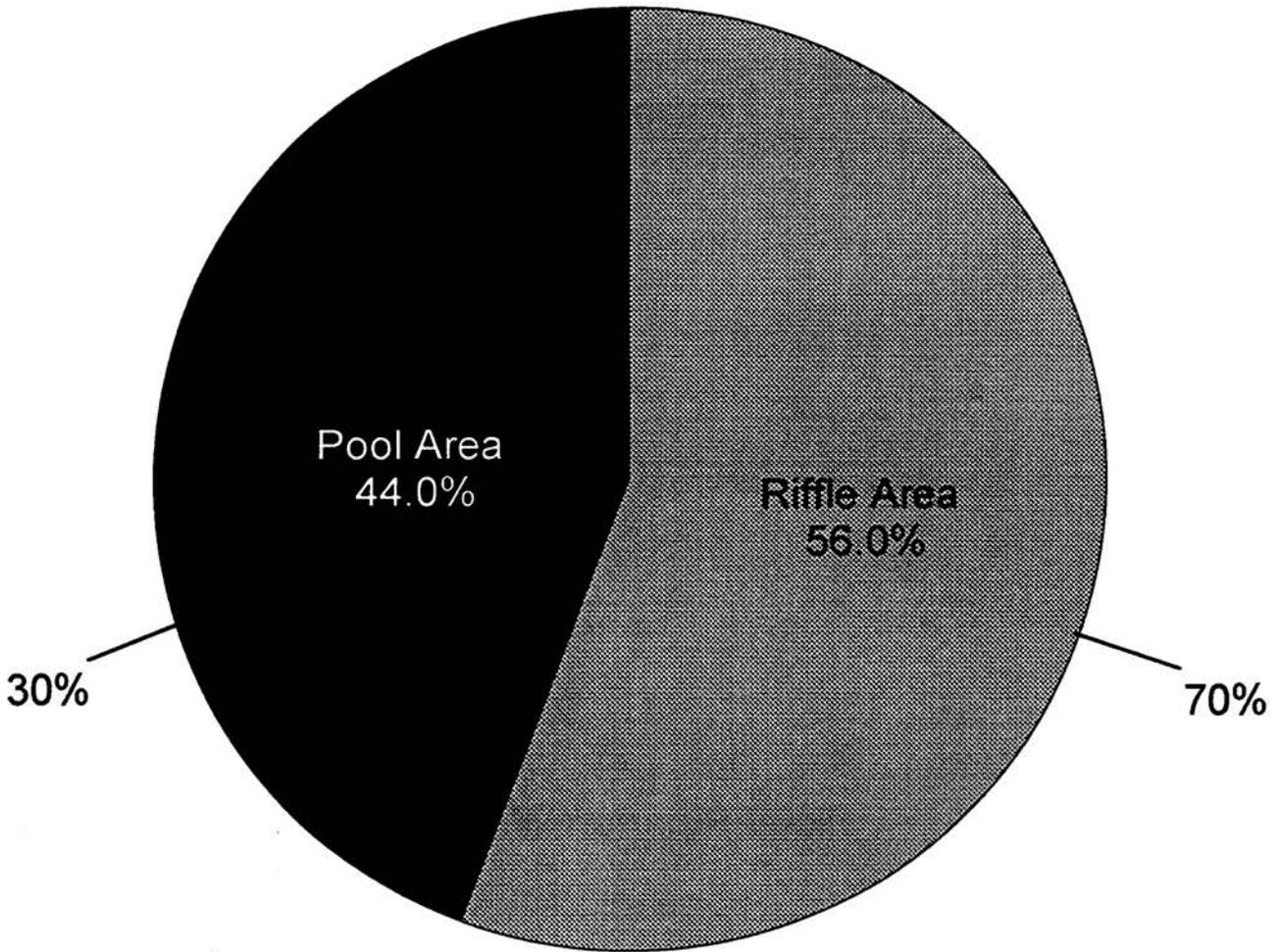
## Laurel Creek Substrate Composition



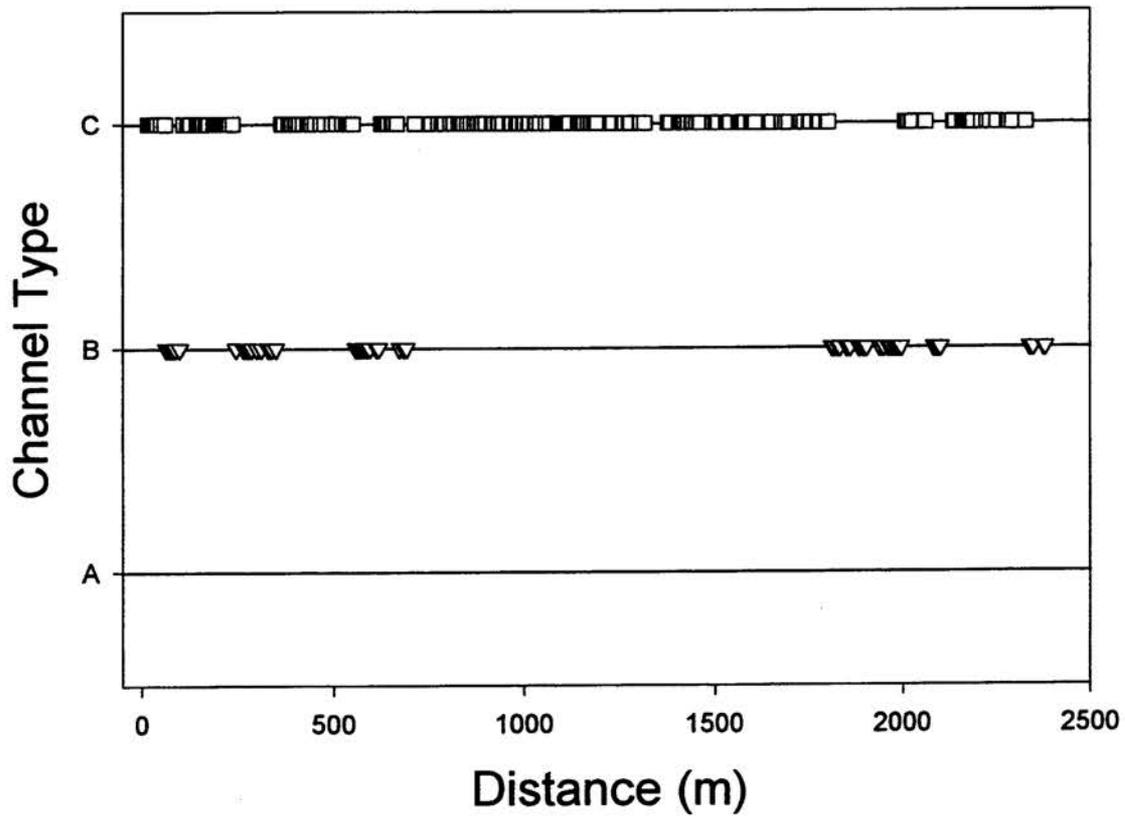
**Riparian Width****Stream: Laurel Creek****Number of Measurements: 10****Mean Width: 23.7m Std Dev: 17.3****Max: 65.4m Min: 8.8m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Laurel Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Laurel Creek Rosgen's Channel Type Distribution



**Stream:** Nettle Hollow

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 06/22/1999

**Downstream Starting Point:** Confluence with Big Stony Creek

**Total Distance Surveyed:** 1.2 kilometers

**Percent of Total Area - Pools:** 39.6%

Number of Pools: 72

Number of Pools per kilometer: 60

Total Pool Area: 1013.0 sq. meters  $\pm$  131.0

Mean Pool Area: 14.1 sq. meters

Correction Factor: 0.94

Mean Maximum Depth: 25.6 cm

Mean Average Depth: 18.4 cm

Mean Average Residual Pool Depth: 17.3 cm

**Percent of Total Area - Riffles:** 60.4%

Number of Riffles: 61

Number of Riffles per kilometer: 50.8

Total Riffle Area: 1547.3 sq. meters  $\pm$  138.9

Mean Riffle Area: 25.4 sq. meters

Correction Factor: 1.05

Mean Maximum Depth: 14.3 cm

Mean Average Depth: 7.6 cm

**Number of Large Woody Debris Pieces per kilometer:** 278.5

Wood < 5 m and < 55 cm: 156.9

Wood < 5 m and > 55 cm: 16.8

Wood > 5 m and < 55 cm: 88.0

Wood > 5 m and > 55 cm: 16.8

**Mean Channel Width:** 5.4 m

**Mean Riparian Width:** 20.8 m

Mean Maximum Riparian Distance (either side): 11.9 m

Mean Minimum Riparian Distance (either side): 3.5 m

Maximum Riparian Width (Total): 19.3 m

Minimum Riparian Width (Total): 0.3 m

Nettle Hollow Continued.

**Percent of Pool Habitat Surveyed as Glides: 59.7%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 51.6%

Channel Type B: 48.4%

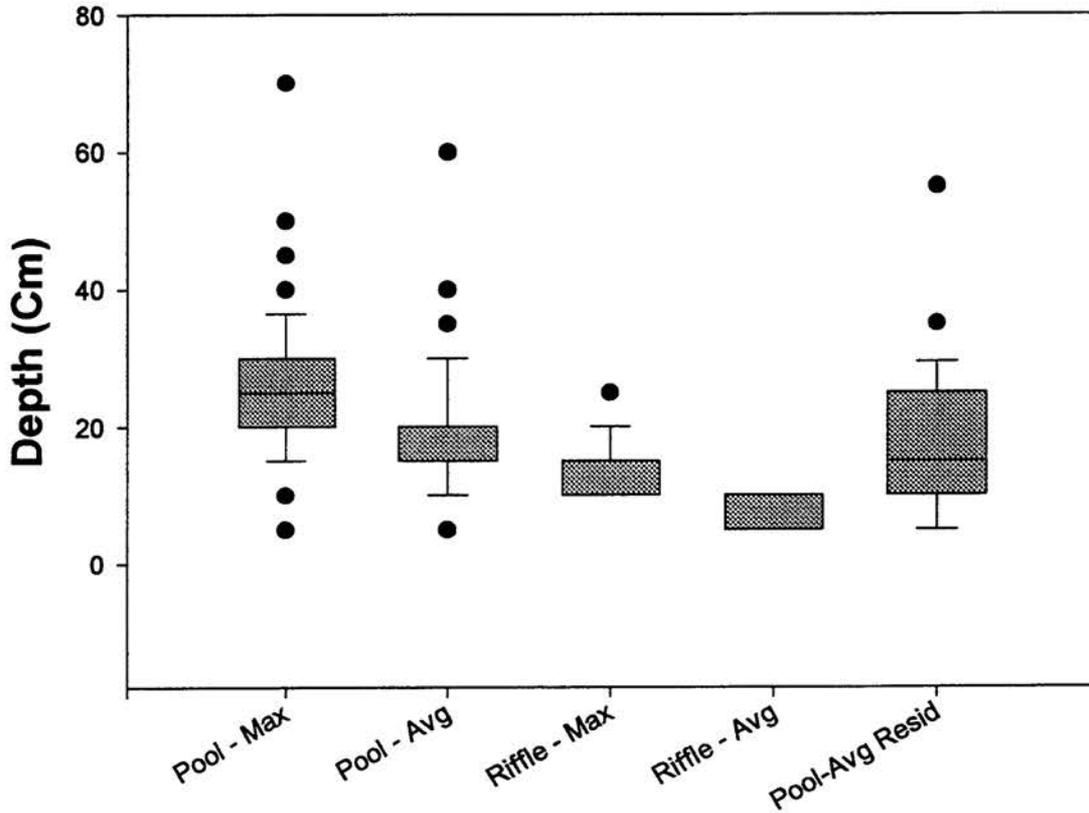
Channel Type C: 0.0 %

Channel Type D: 0.0 %

**Percent Pools with  $\geq$  35% Embeddedness: 11.1%**

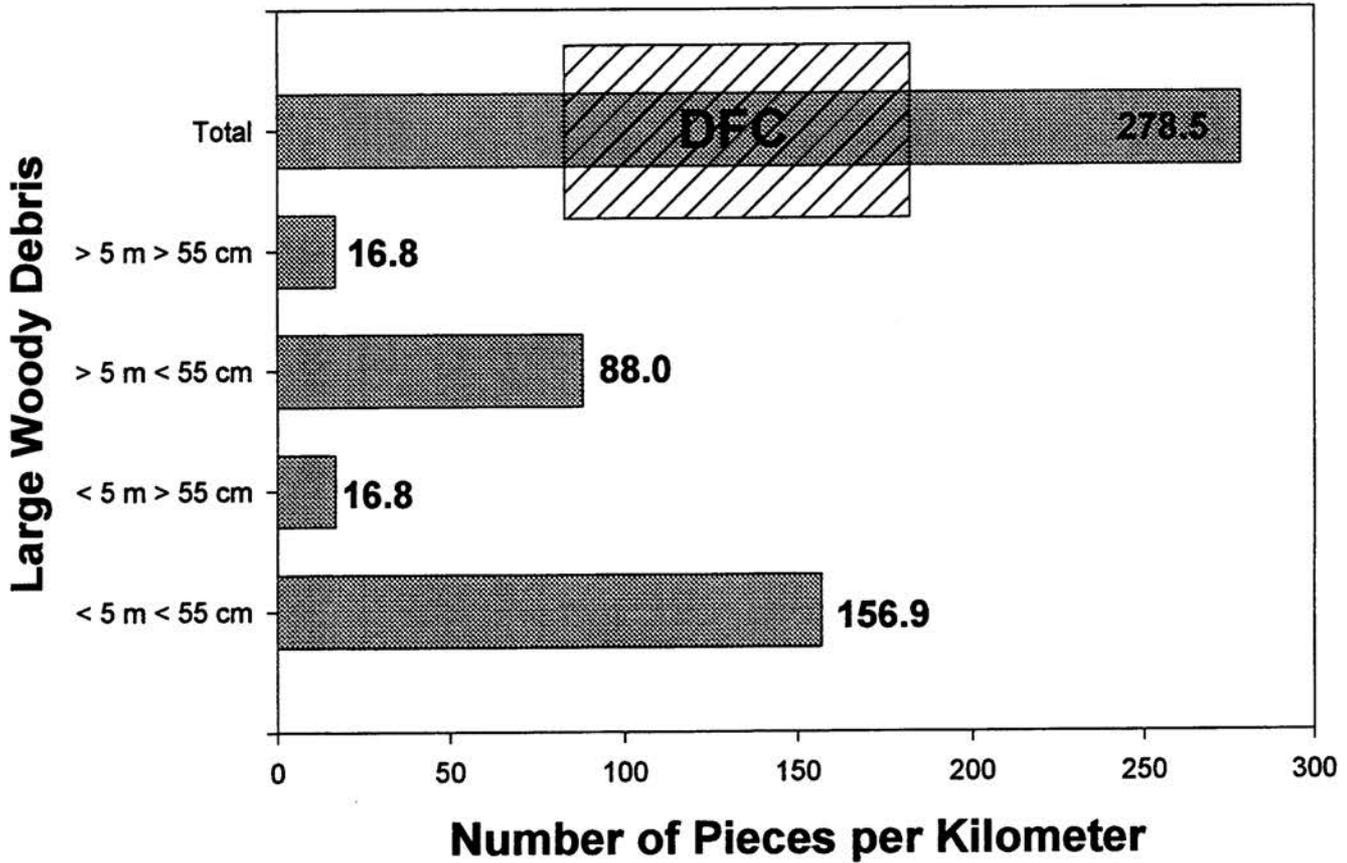
**Average Channel Gradient: 13.8**

## Nettle Hollow

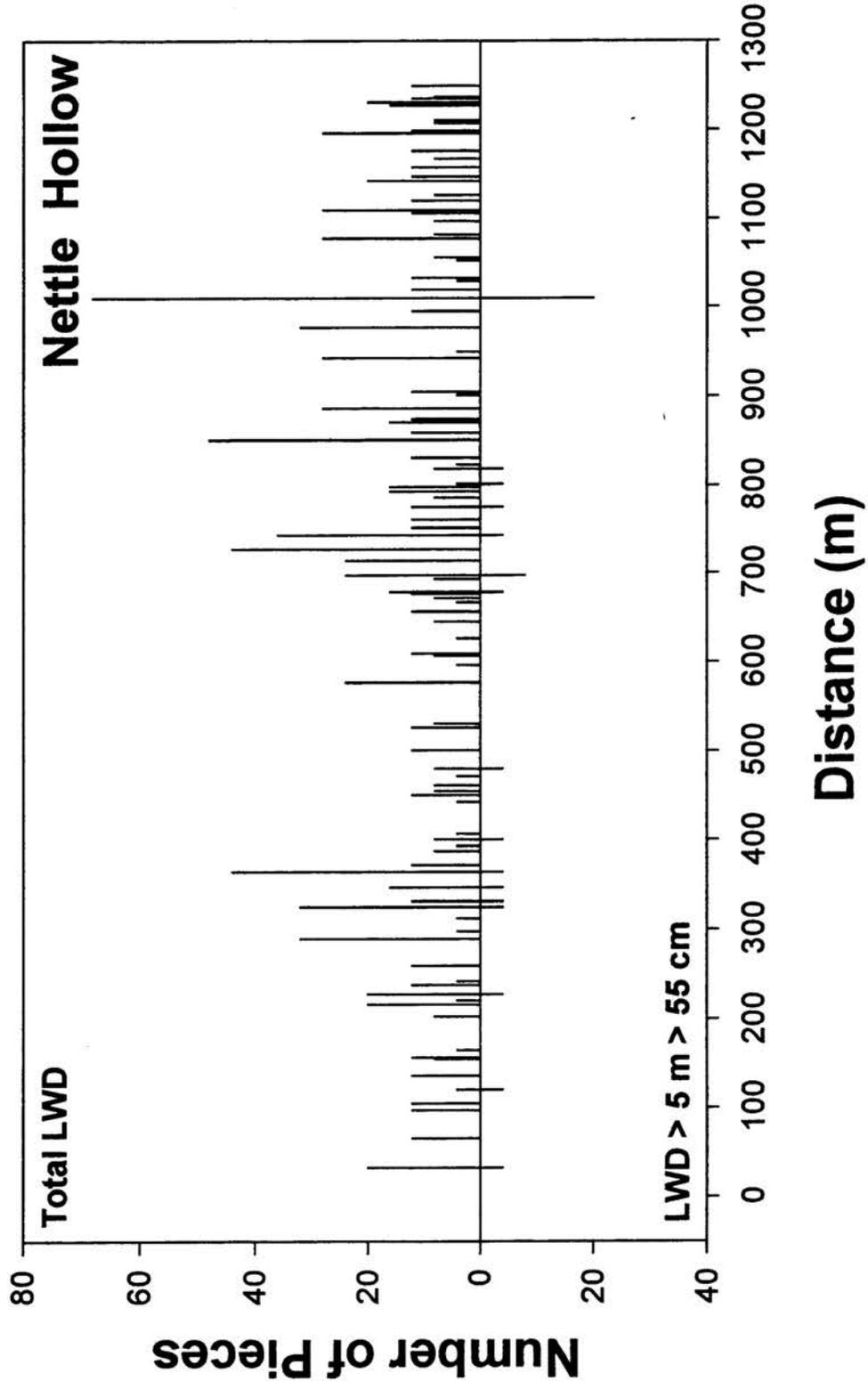


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

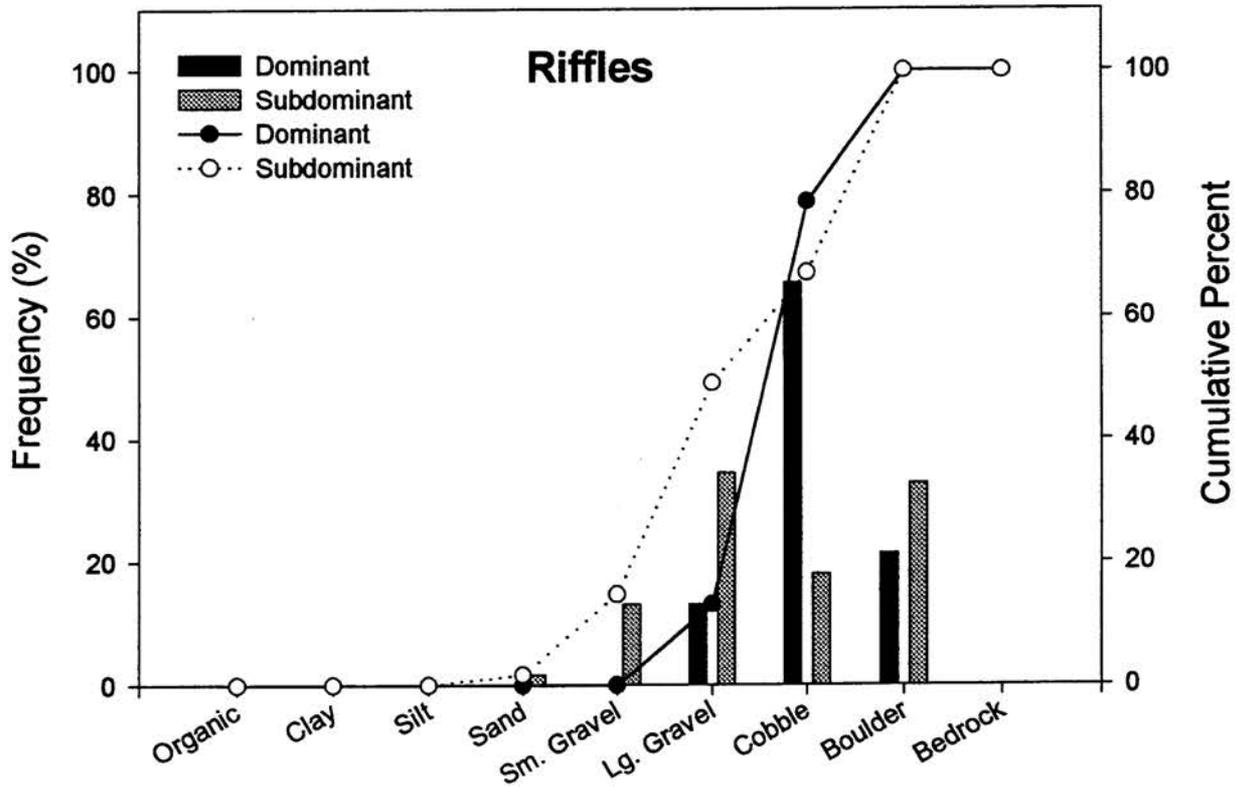
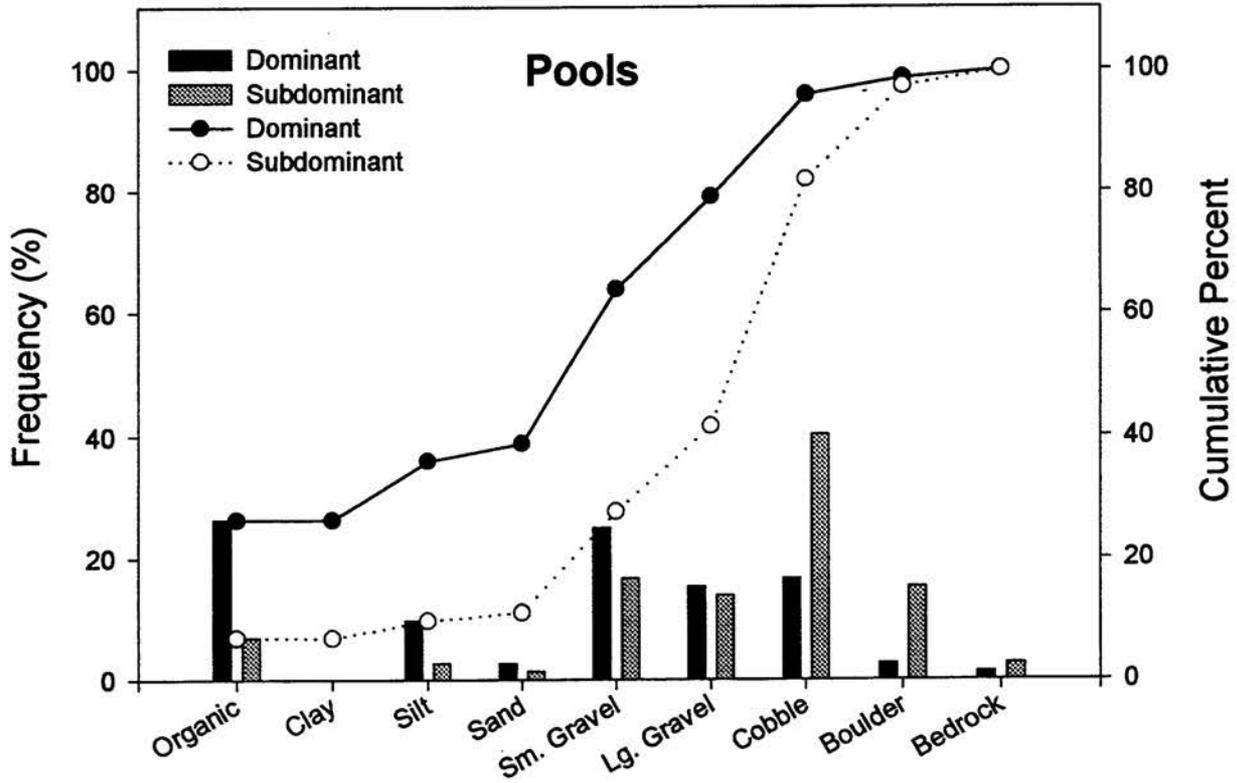
## Nettle Hollow

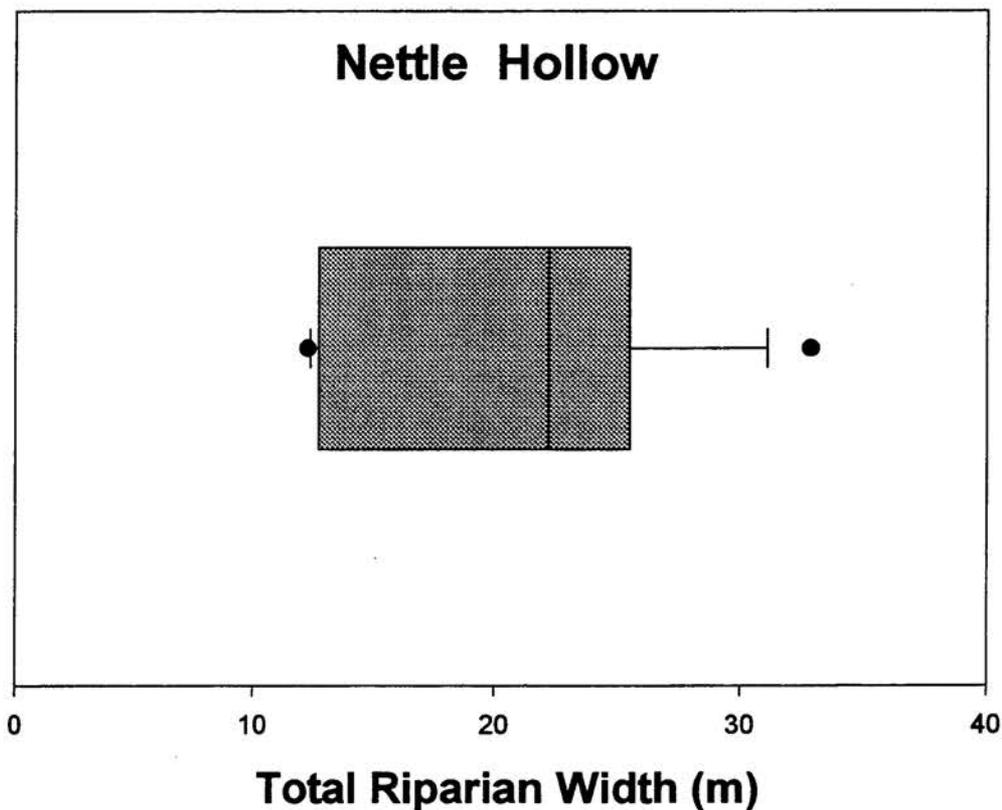


# Distribution and Abundance of Large Woody Debris



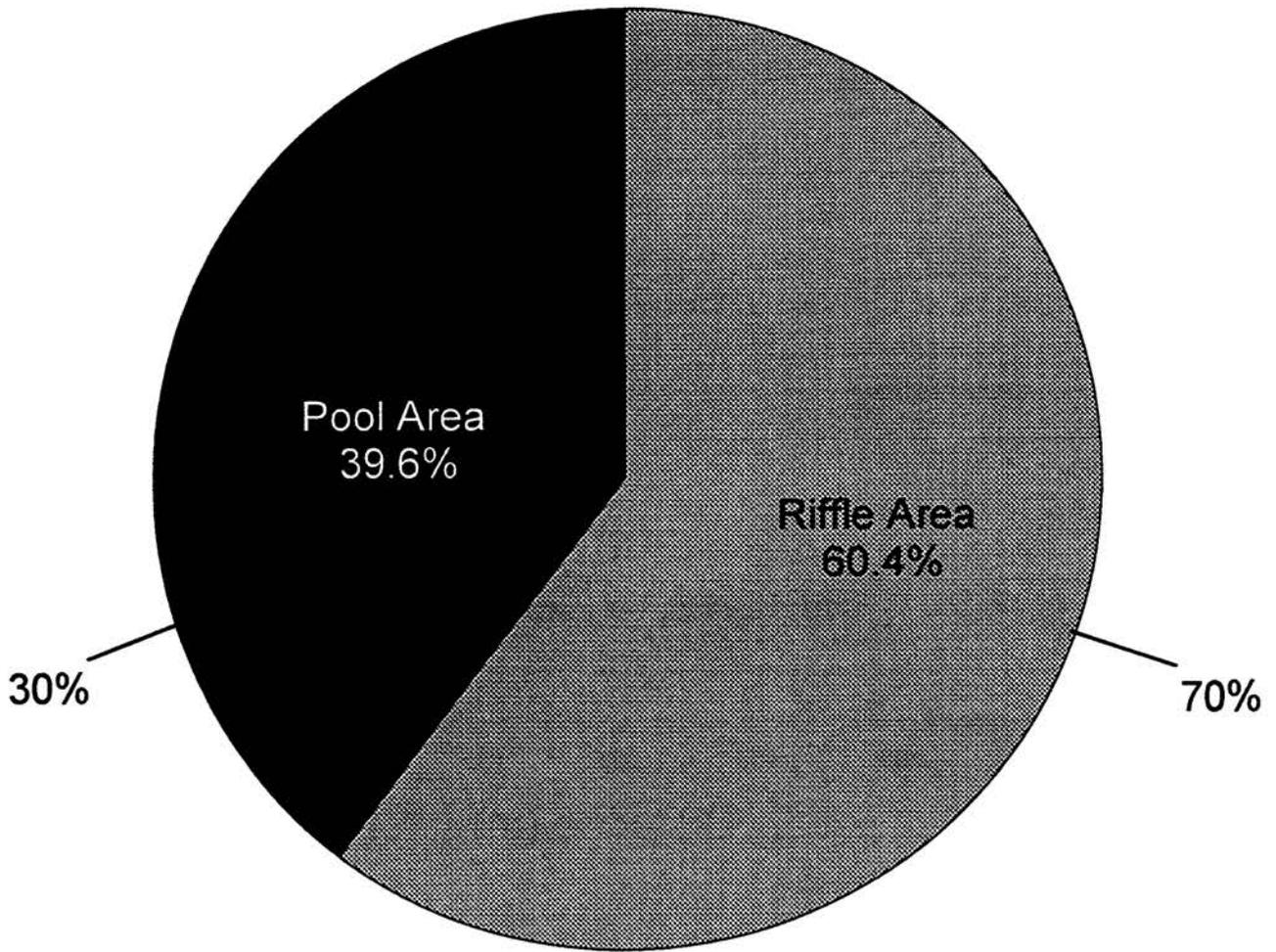
## Nettle Hollow Substrate Composition



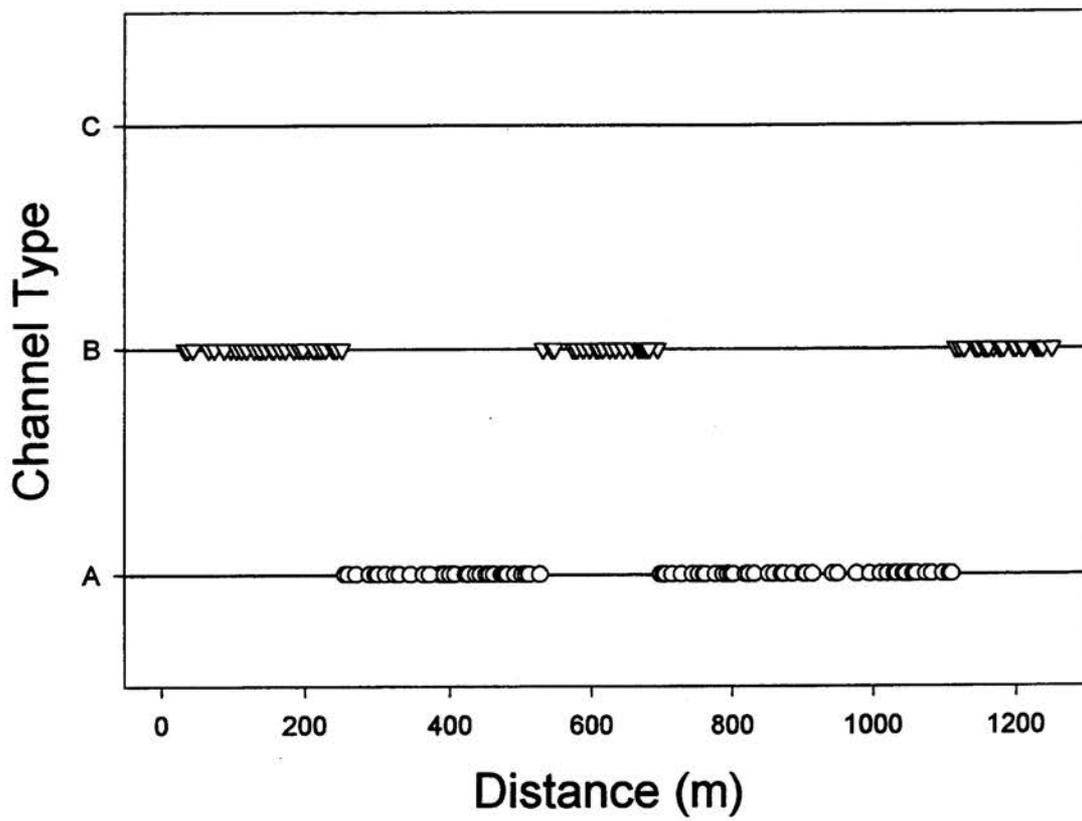
**Riparian Width****Stream: Nettle Hollow****Number of Measurements: 8****Mean Width: 20.8m Std Dev: 7.6****Max: 32.9m Min: 12.3m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Nettle Hollow  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Nettle Hollow Rosgen's Channel Type Distribution



**Stream:** North Fork of Stony Creek

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 06/29/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 8.4 kilometers

**Percent of Total Area - Pools:** 71.5%

**Number of Pools:** 478

**Number of Pools per kilometer:** 56.9

**Total Pool Area:** 27498.1 sq. meters  $\pm$  2836.7

**Mean Pool Area:** 57.5 sq. meters

**Correction Factor:** 1.01

**Mean Maximum Depth:** 44.9 cm

**Mean Average Depth:** 23.9 cm

**Mean Average Residual Pool Depth:** 9.1 cm

**Percent of Total Area - Riffles:** 28.5%

**Number of Riffles:** 321

**Number of Riffles per kilometer:** 38.2

**Total Riffle Area:** 14221.1 sq. meters  $\pm$  2462.3

**Mean Riffle Area:** 44.3 sq. meters

**Correction Factor:** 1.03

**Mean Maximum Depth:** 20.6 cm

**Mean Average Depth:** 11.3 cm

**Number of Large Woody Debris Pieces per kilometer:** 104.1

**Wood < 5 m and < 55 cm:** 38.3

**Wood < 5 m and > 55 cm:** 16.9

**Wood > 5 m and < 55 cm:** 19.0

**Wood > 5 m and > 55 cm:** 29.9

**Mean Channel Width:** 7.3 m

**Mean Riparian Width:** 106.8 m

**Mean Maximum Riparian Distance (either side):** 84.0 m

**Mean Minimum Riparian Distance (either side):** 15.5 m

**Maximum Riparian Width (Total):** 220.9 m

**Minimum Riparian Width (Total):** 14.6 m

North Fork of Stony Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 12.6%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 6.5%

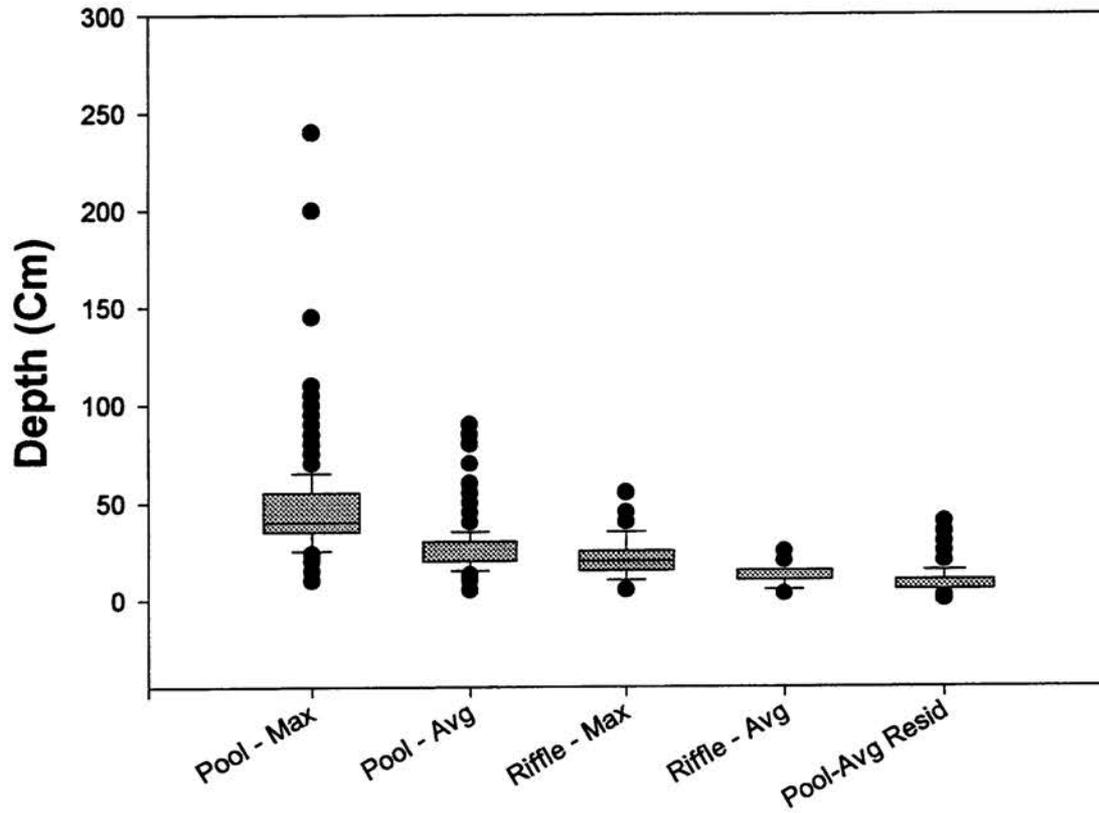
Channel Type C: 93.5%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 31.6%**

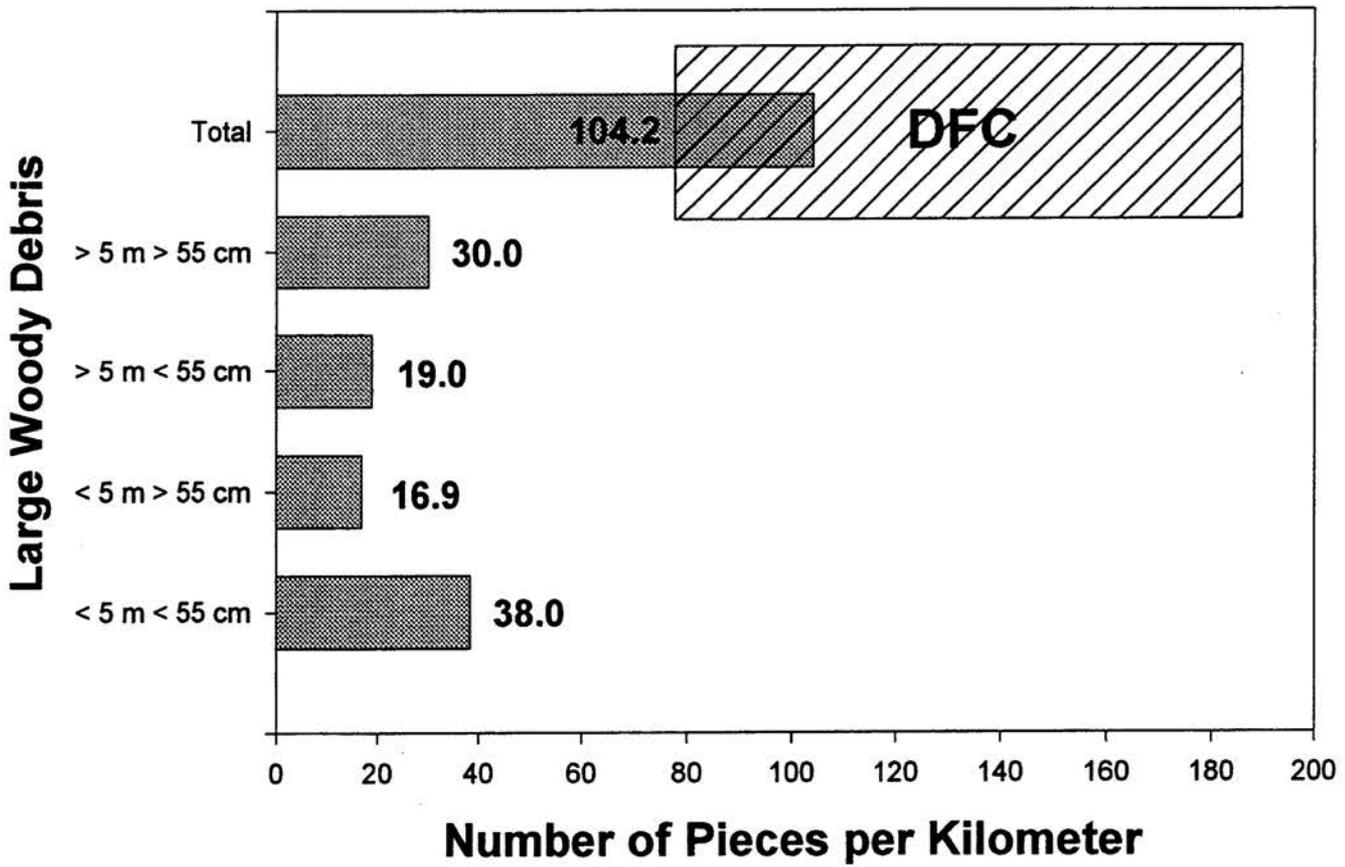
**Average Channel Gradient: 4.2**

## North Fork Stony Creek

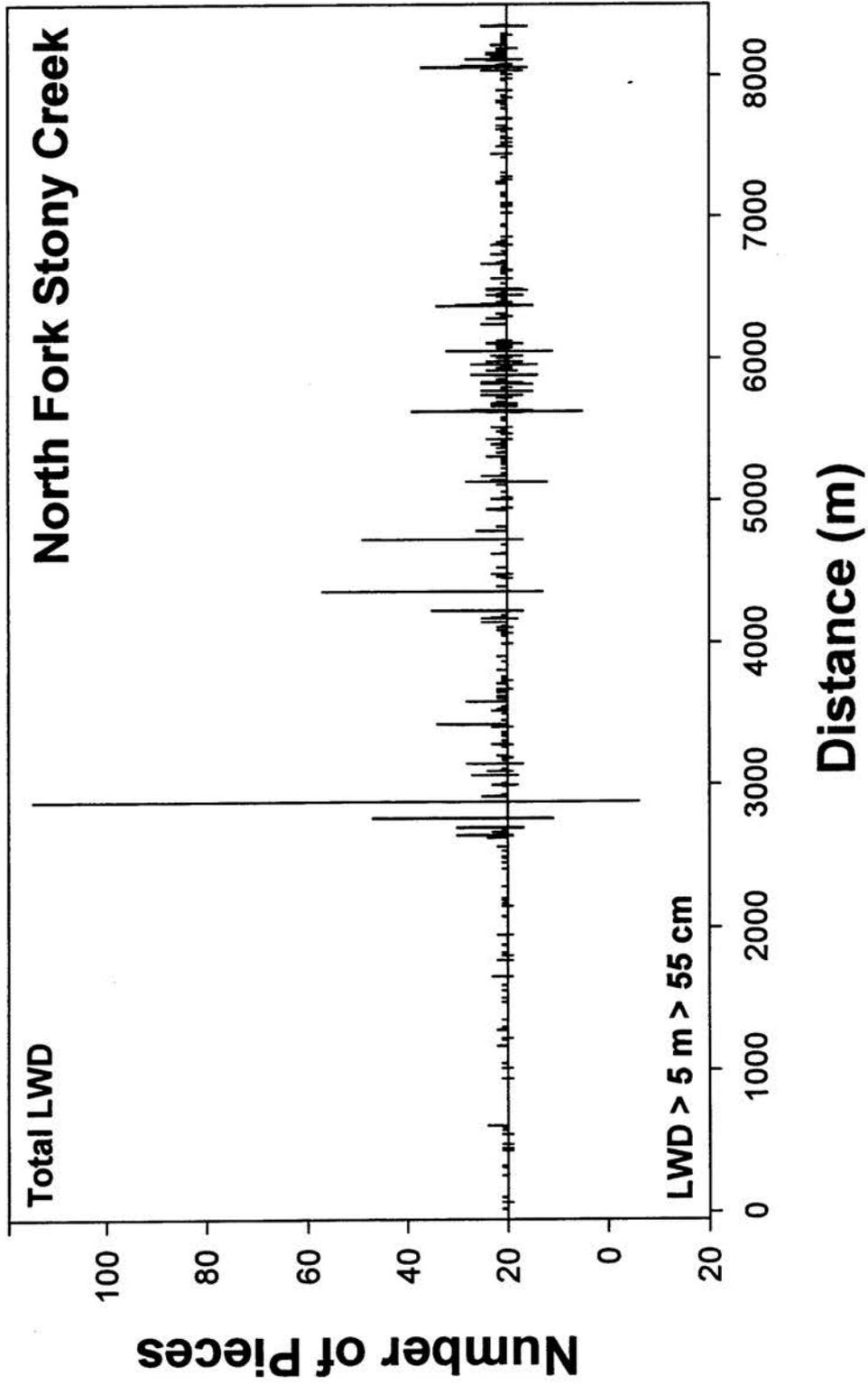


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

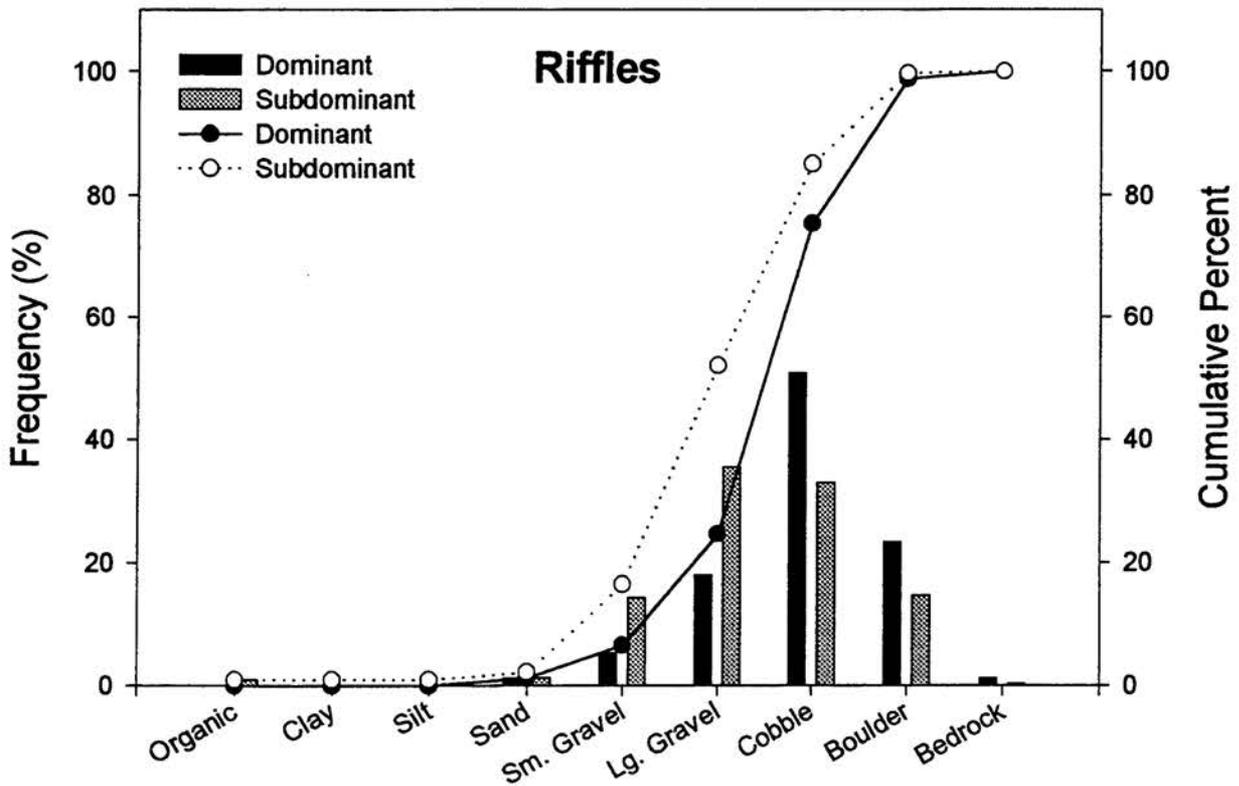
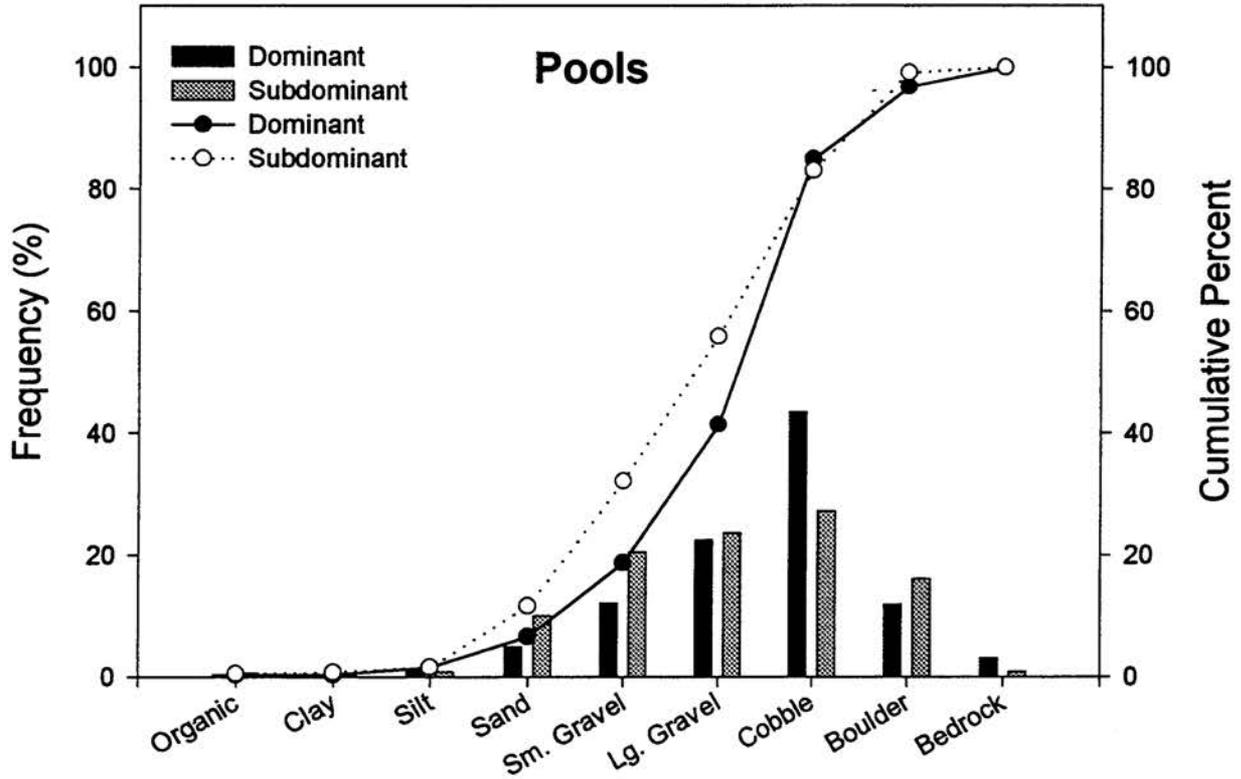
## North Fork Stony Creek

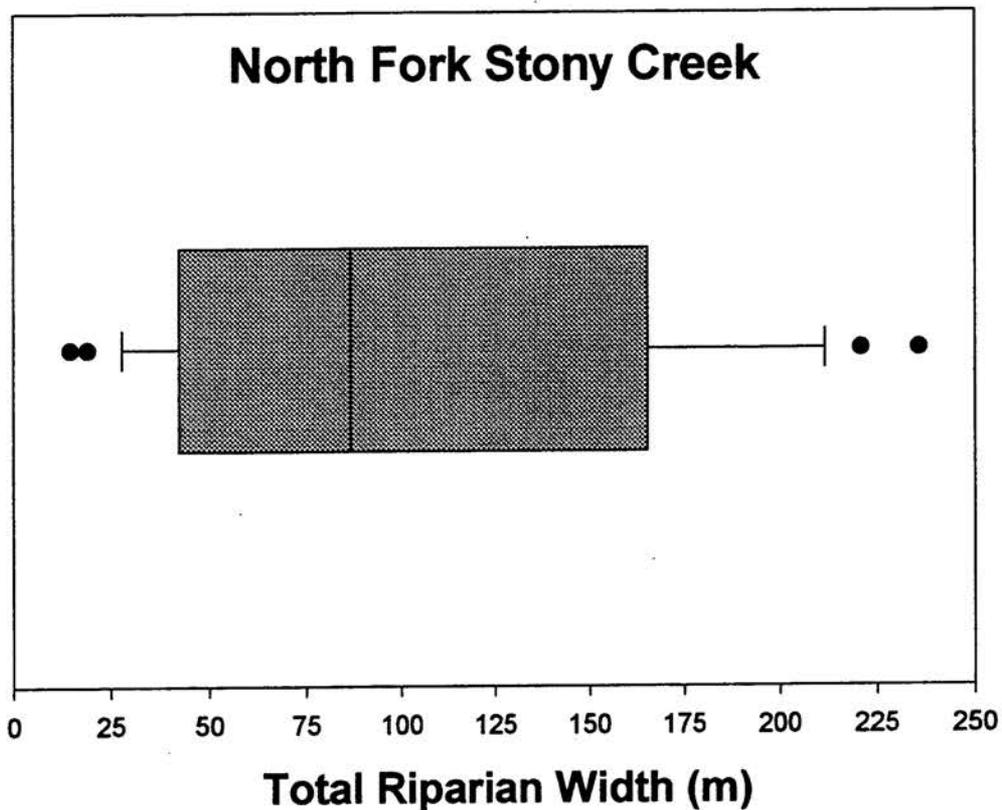


# Distribution and Abundance of Large Woody Debris



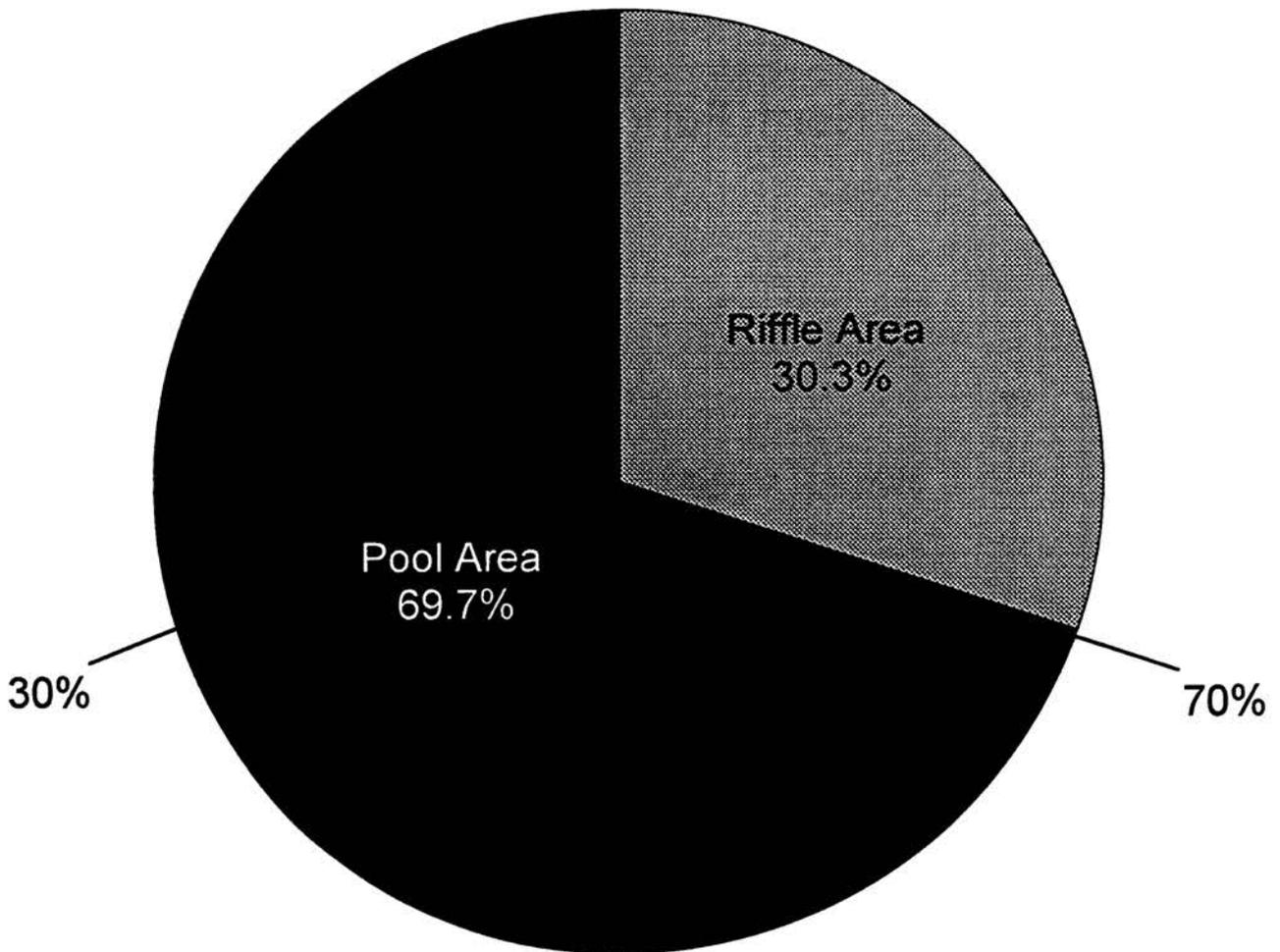
## North Fork Stony Creek Substrate Composition



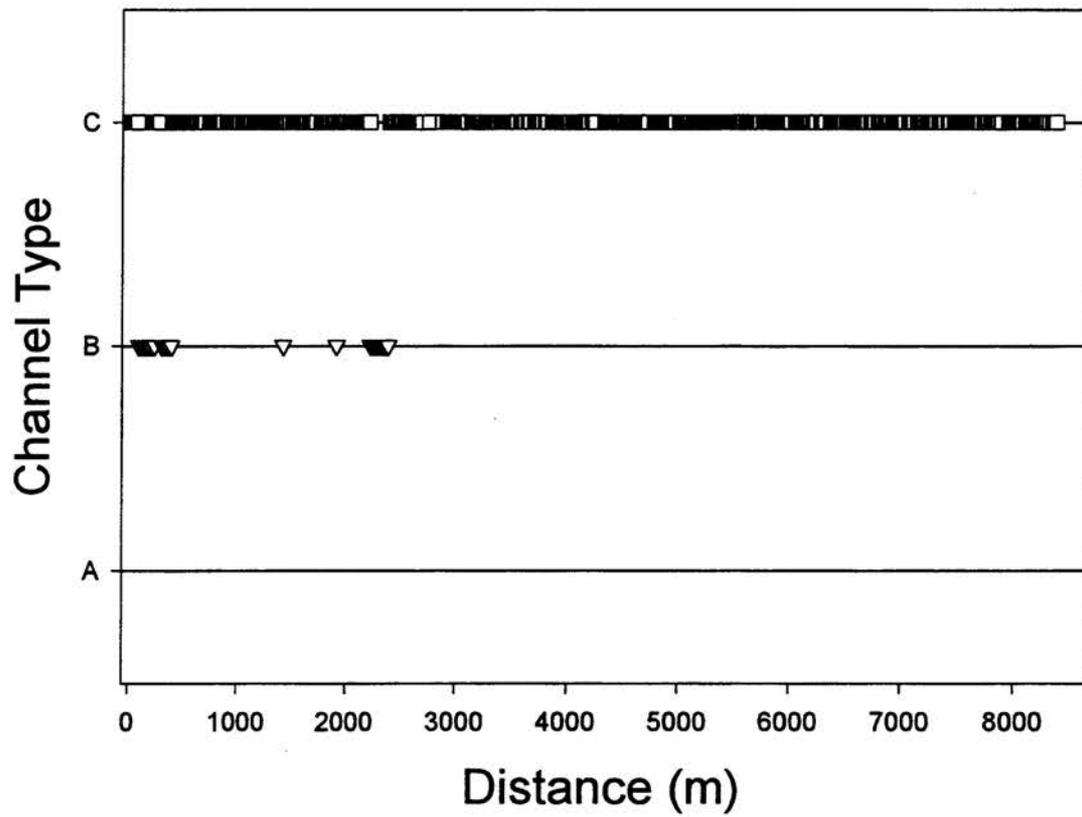
**Riparian Width****Stream: North Fork Stony Creek****Number of Measurements: 24****Mean Width: 106.8m Std Dev: 72.4****Max: 235.7m Min: 14.6m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**North Fork Stony Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## North Fork Stony Creek Rosgen's Channel Type Distribution



**Stream:** Pine Swamp Branch

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 06/08/1999

**Downstream Starting Point:** Confluence with Big Stony Creek

**Total Distance Surveyed:** 0.6 kilometers

**Percent of Total Area - Pools:** 15.9%

**Number of Pools:** 34

**Number of Pools per kilometer:** 53.1

**Total Pool Area:** 381.3 sq. meters  $\pm$  54.7

**Mean Pool Area:** 11.2 sq. meters

**Correction Factor:** 1.18

**Mean Maximum Depth:** 28.7 cm

**Mean Average Depth:** 14.6 cm

**Mean Average Residual Pool Depth:** 7.6 cm

**Percent of Total Area - Riffles:** 84.1%

**Number of Riffles:** 32

**Number of Riffles per kilometer:** 50

**Total Riffle Area:** 1266.5 sq. meters  $\pm$  345.2

**Mean Riffle Area:** 39.8 sq. meters

**Correction Factor:** 1.40

**Mean Maximum Depth:** 16.7 cm

**Mean Average Depth:** 4.3 cm

**Number of Large Woody Debris Pieces per kilometer:** 194.3

**Wood < 5 m and < 55 cm:** 129.0

**Wood < 5 m and > 55 cm:** 26.4

**Wood > 5 m and < 55 cm:** 31.1

**Wood > 5 m and > 55 cm:** 7.8

**Mean Channel Width:** 3.2 m

**Mean Riparian Width:** 9.0 m

**Mean Maximum Riparian Distance (either side):** 4.4 m

**Mean Minimum Riparian Distance (either side):** 1.4 m

**Maximum Riparian Width (Total):** 0.3 m

**Minimum Riparian Width (Total):** 7.3 m

Pine Swamp Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 0.0%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 83.3%

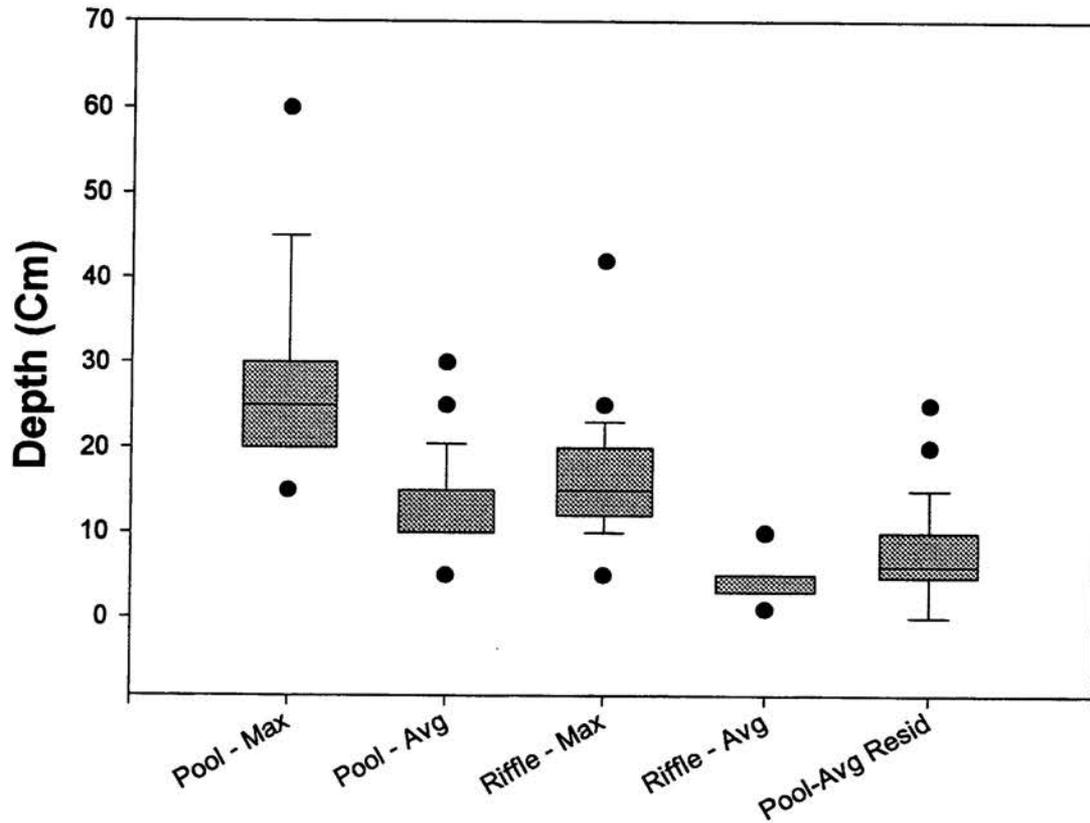
Channel Type C: 16.7%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 5.9%**

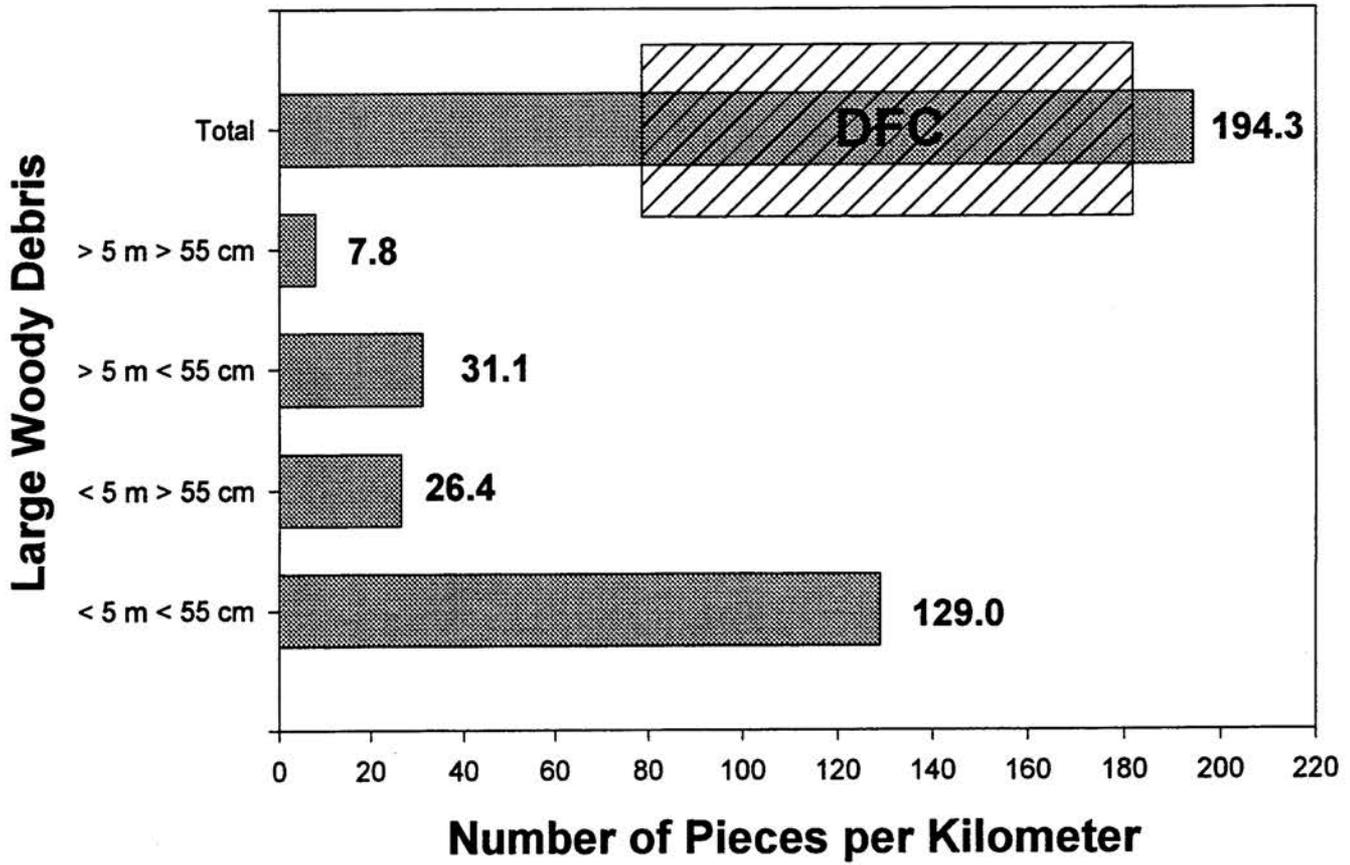
**Average Channel Gradient: 18.3**

## Pine Swamp Branch

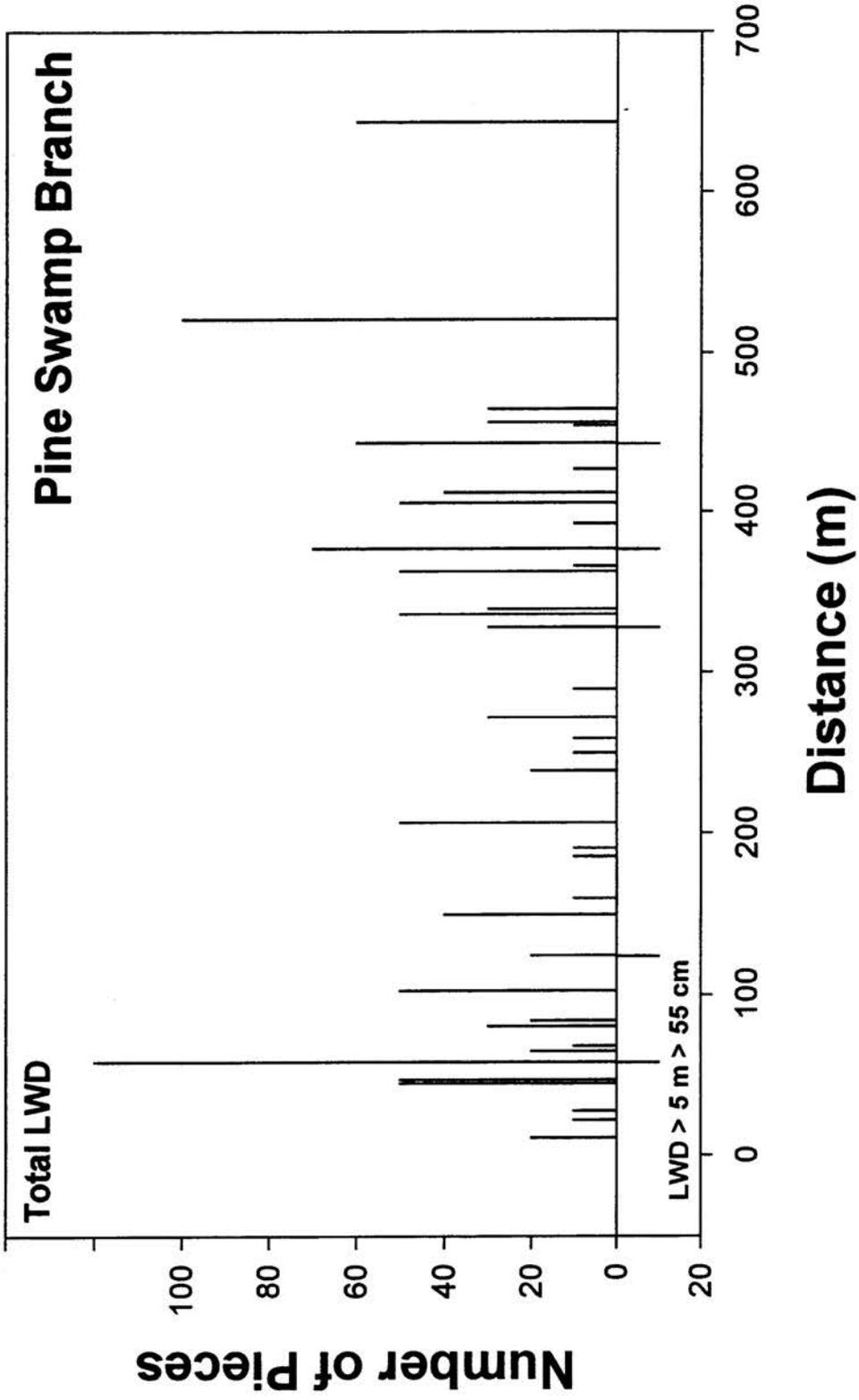


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

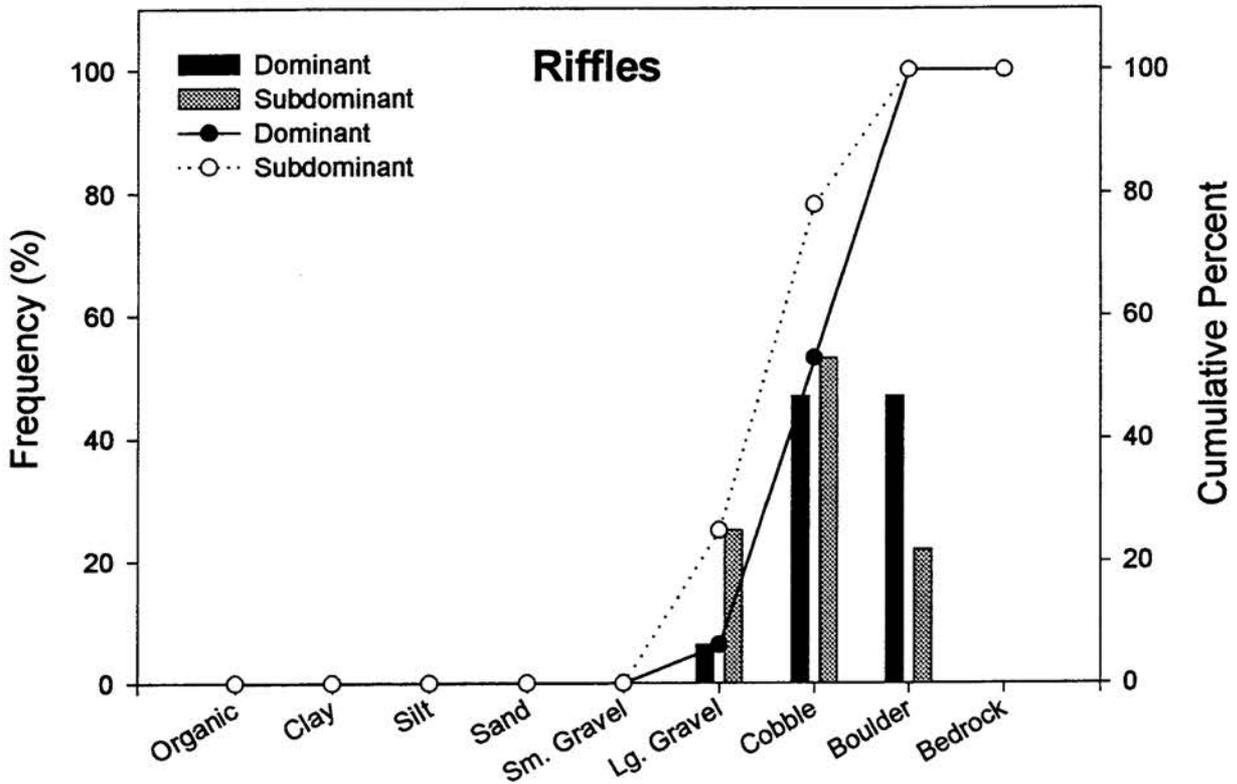
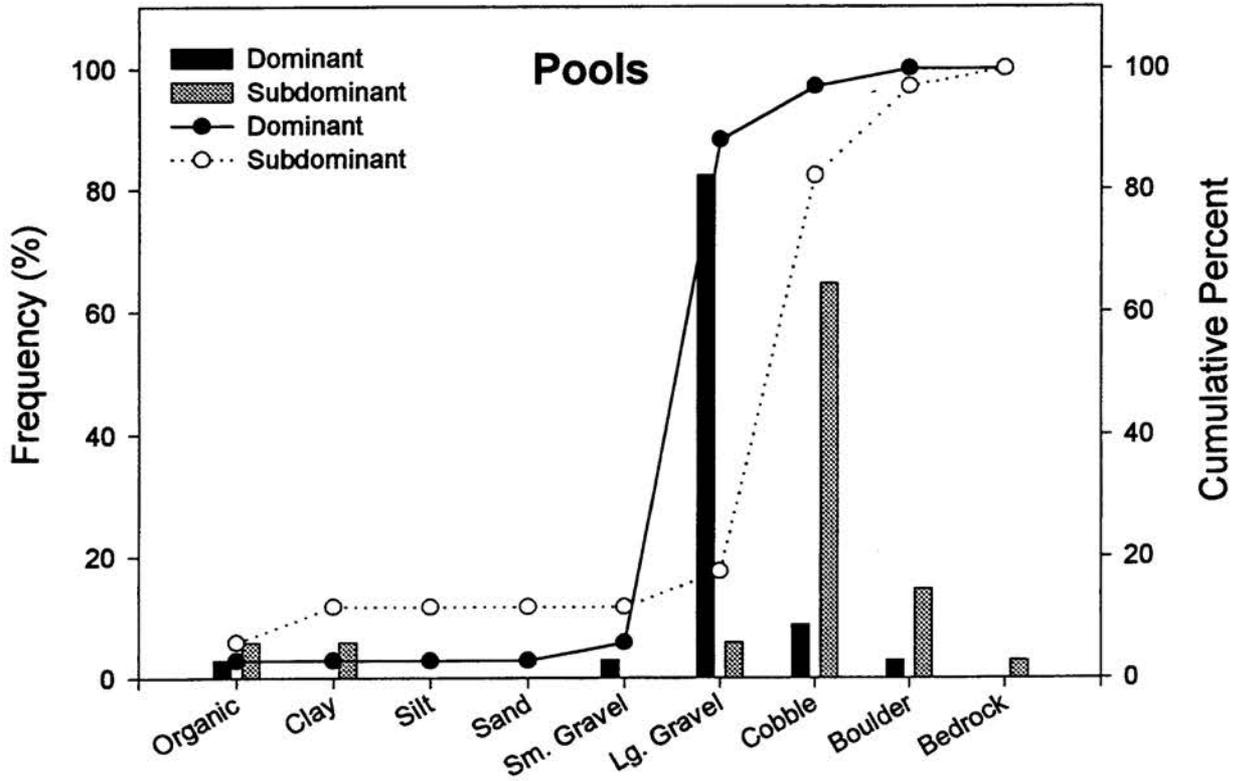
## Pine Swamp Branch

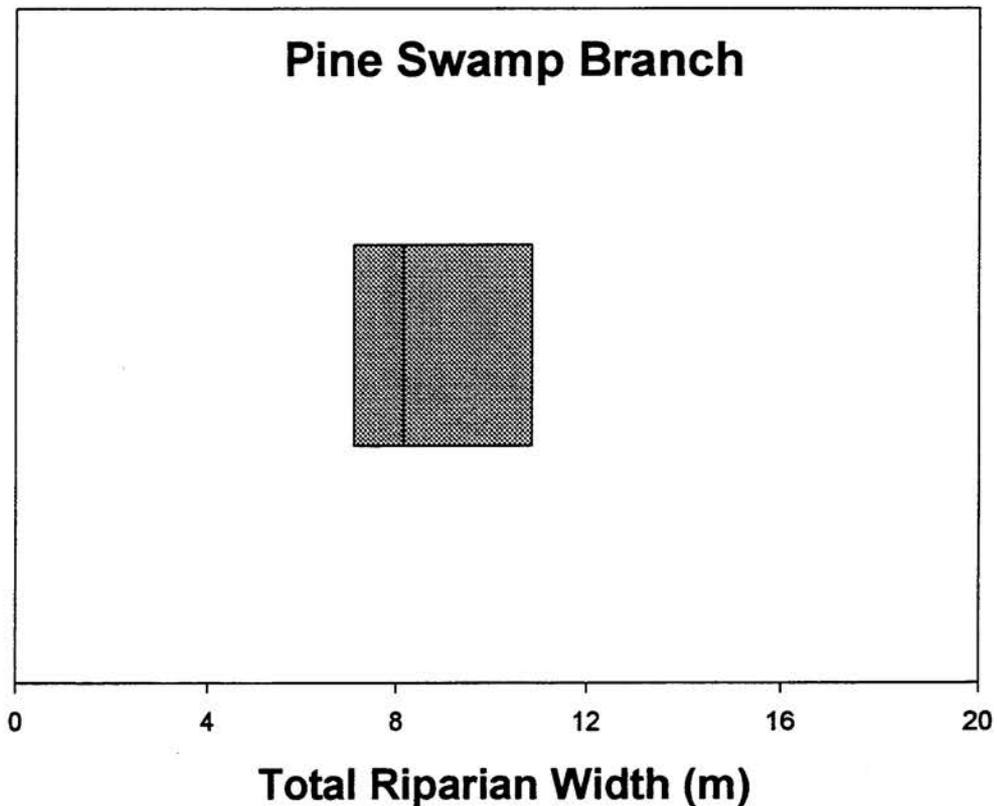


# Distribution and Abundance of Large Woody Debris



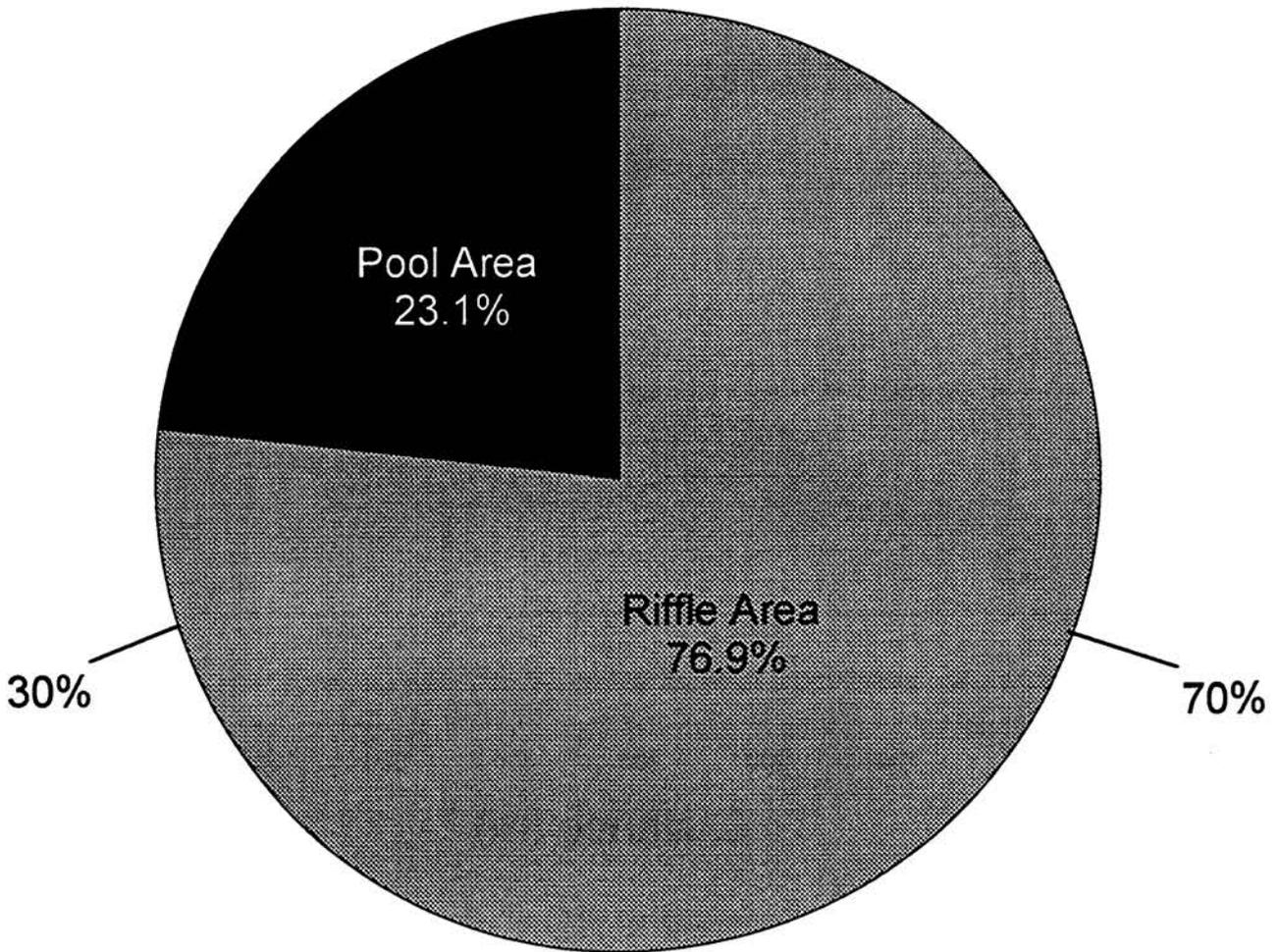
# Pine Swamp Branch Substrate Composition



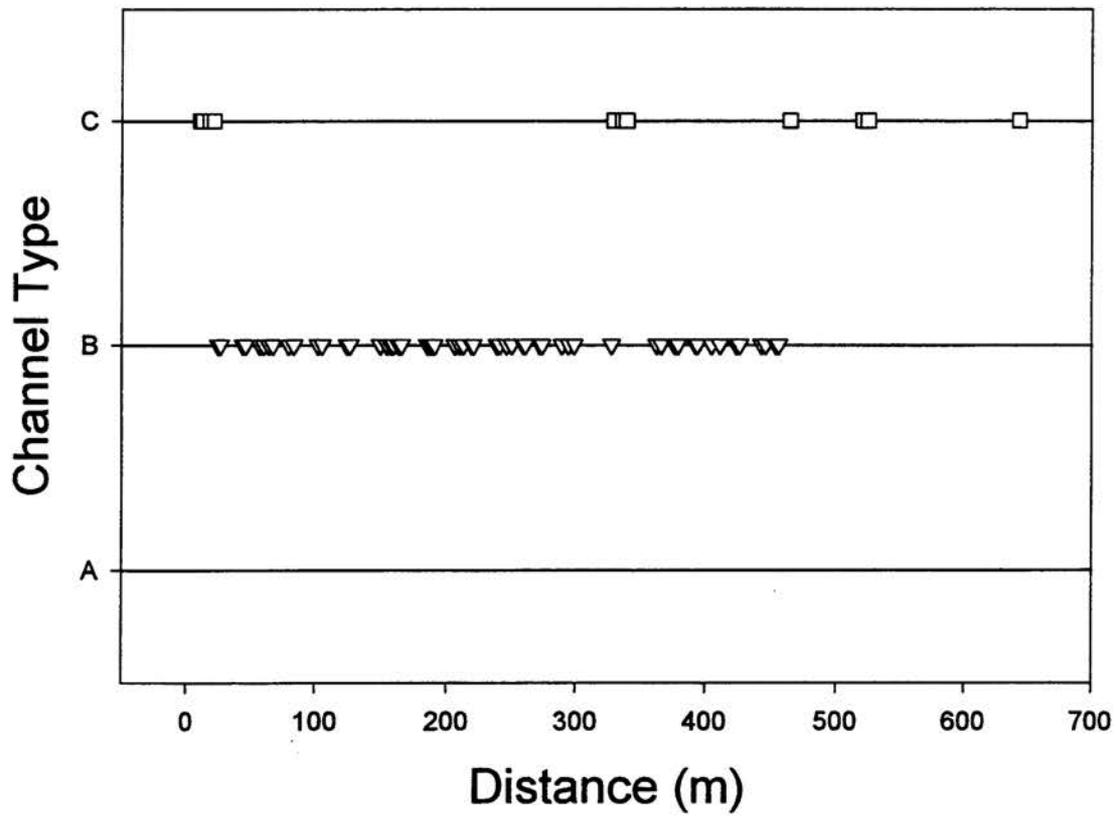
**Riparian Width****Stream: Pine Swamp Branch****Number of Measurements: 4****Mean Width: 9.0m Std Dev: 2.8****Max: 13.0m Min: 6.6m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Pine Swamp Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Pine Swamp Branch Rosgen's Channel Type Distribution



**Stream:** Unnamed Tributary of White Rock Branch

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 08/06/1999

**Downstream Starting Point:** Confluence with White Rocks Branch

**Total Distance Surveyed:** 1.0 kilometers

**Percent of Total Area - Pools:** 30.5%

Number of Pools: 41

Number of Pools per kilometer: 43.2

Total Pool Area: 776.4 sq. meters  $\pm$  65.8

Mean Pool Area: 18.9 sq. meters

Correction Factor: 0.85

Mean Maximum Depth: 32.3 cm

Mean Average Depth: 24.1 cm

Mean Average Residual Pool Depth: 20.7 cm

**Percent of Total Area - Riffles:** 69.5%

Number of Riffles: 35

Number of Riffles per kilometer: 36.8

Total Riffle Area: 1772.0 sq. meters  $\pm$  126.2

Mean Riffle Area: 50.6 sq. meters

Correction Factor: 1.02

Mean Maximum Depth: 15.7 cm

Mean Average Depth: 9.6 cm

**Number of Large Woody Debris Pieces per kilometer:** 304.3

Wood < 5 m and < 55 cm: 161.6

Wood < 5 m and > 55 cm: 9.4

Wood > 5 m and < 55 cm: 108.1

Wood > 5 m and > 55 cm: 25.2

**Mean Channel Width:** 5.3 m

**Mean Riparian Width:** 41.4 m

Mean Maximum Riparian Distance (either side): 31.1 m

Mean Minimum Riparian Distance (either side): 5.0 m

Maximum Riparian Width (Total): 80.6 m

Minimum Riparian Width (Total): 22.0 m

Unnamed Tributary of White Rock Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 42.0%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 83.9%

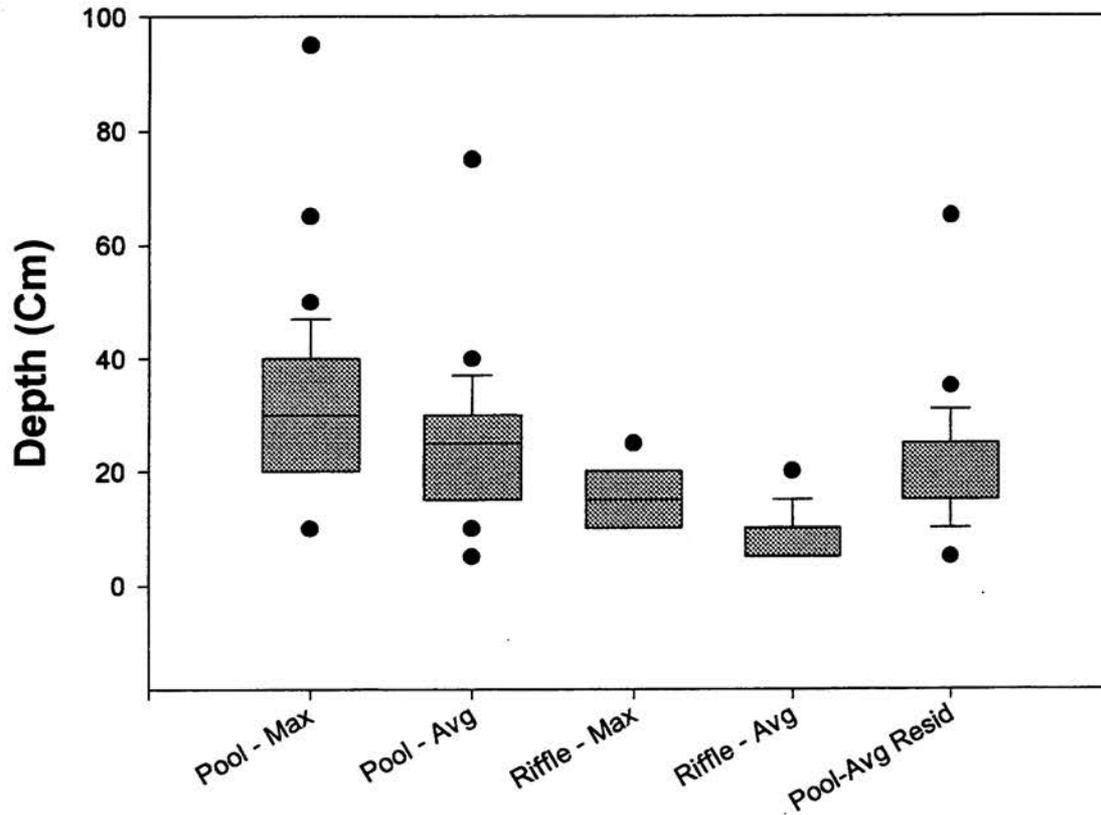
Channel Type C: 14.7%

Channel Type D: 1.5%

**Percent Pools with  $\geq$  35% Embeddedness: 68.3%**

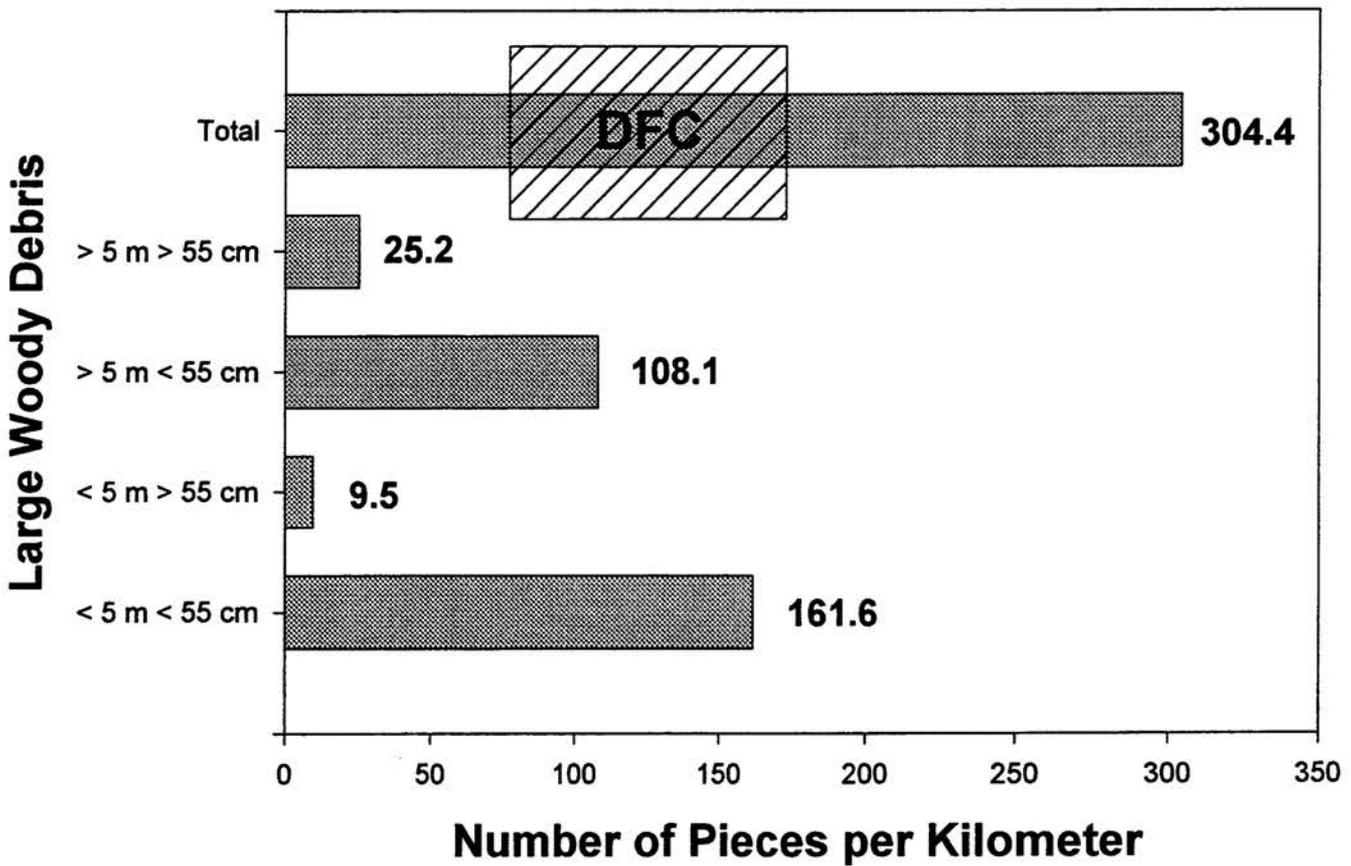
**Average Channel Gradient: 4.6**

## Unnamed Tributary of White Rock Branch

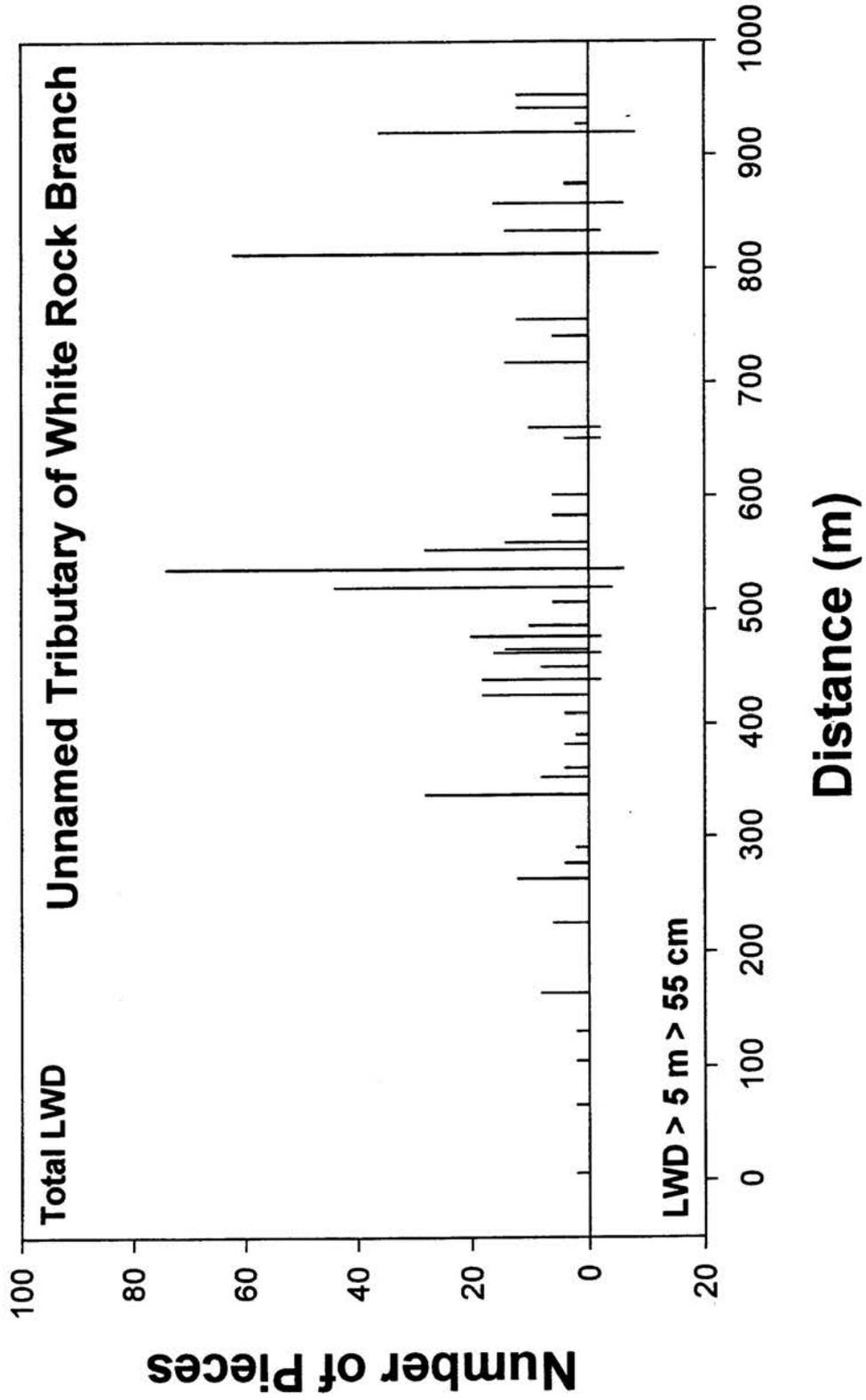


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

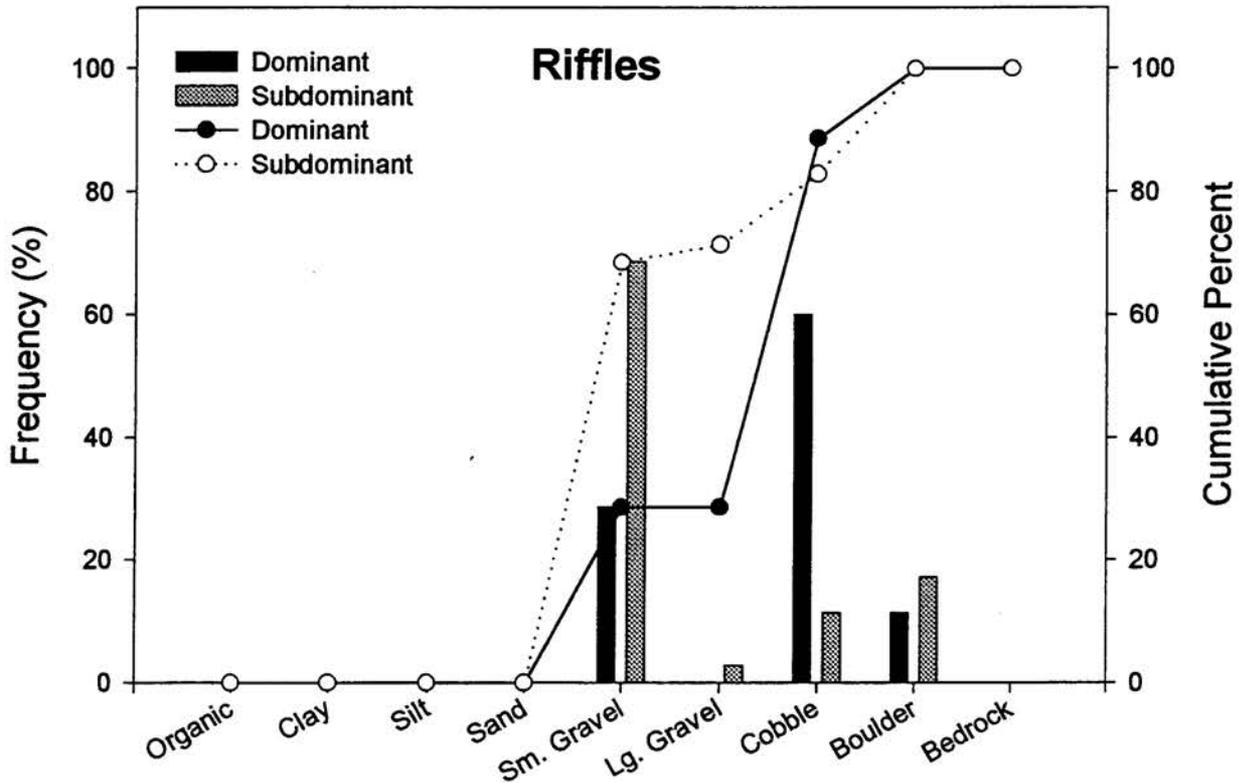
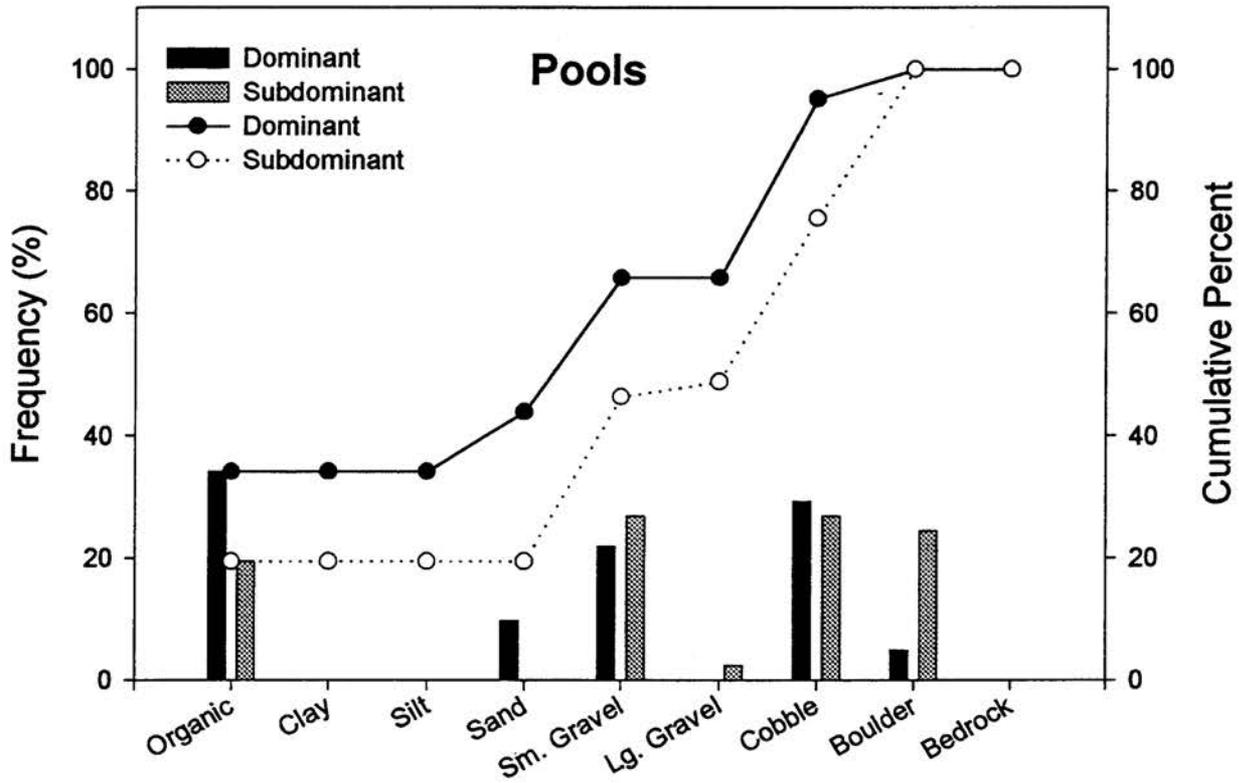
## Unnamed Tributary of White Rock Branch

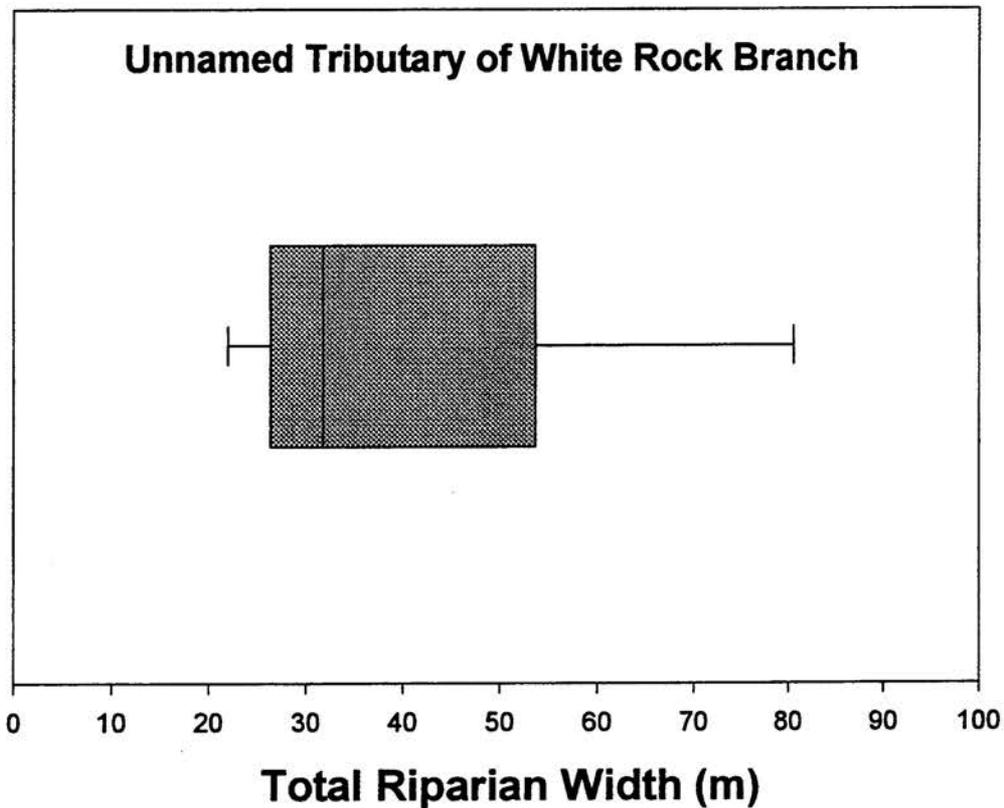


# Distribution and Abundance of Large Woody Debris



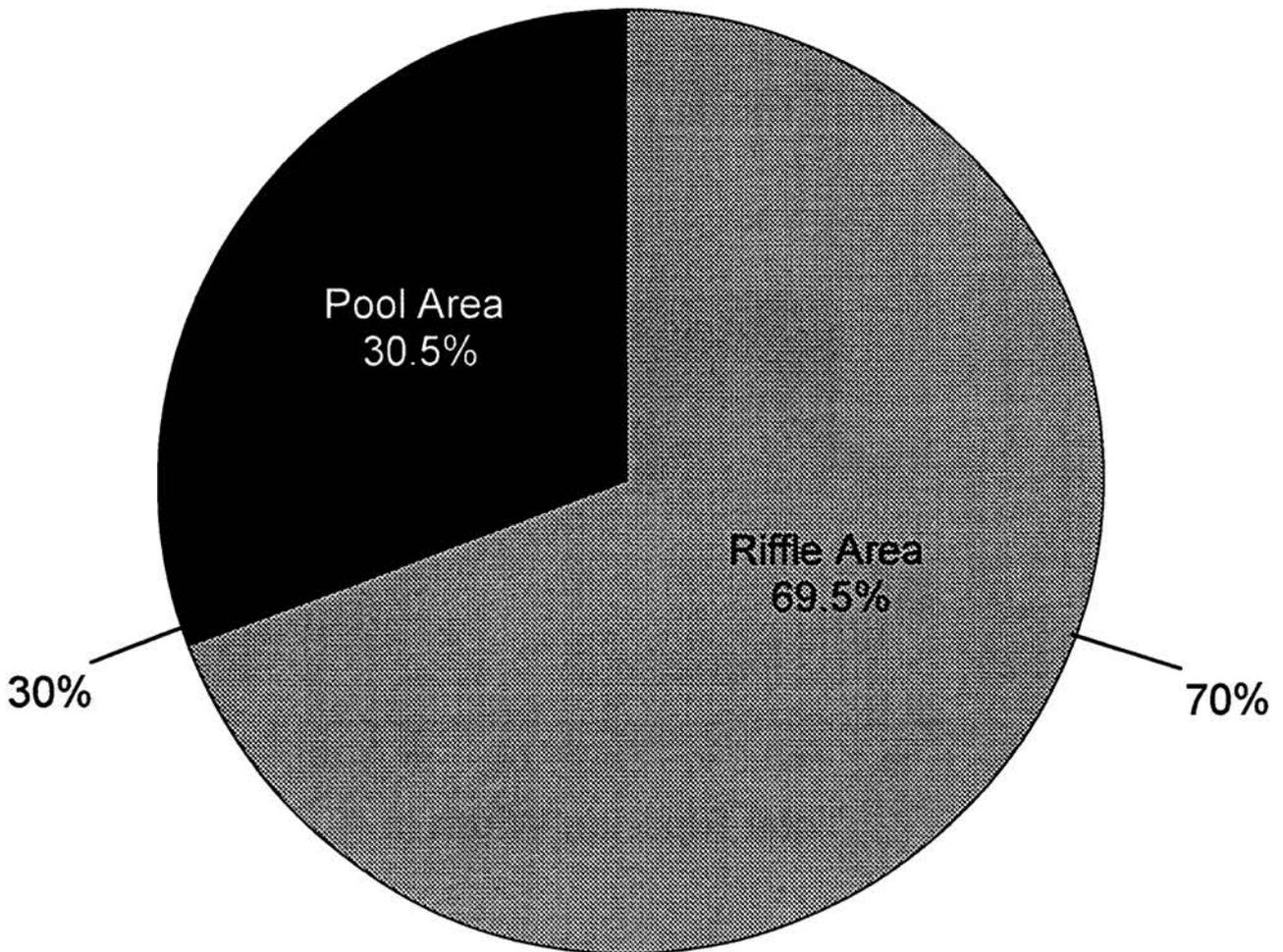
## Unnamed Tributary of White Rock Branch Substrate Composition



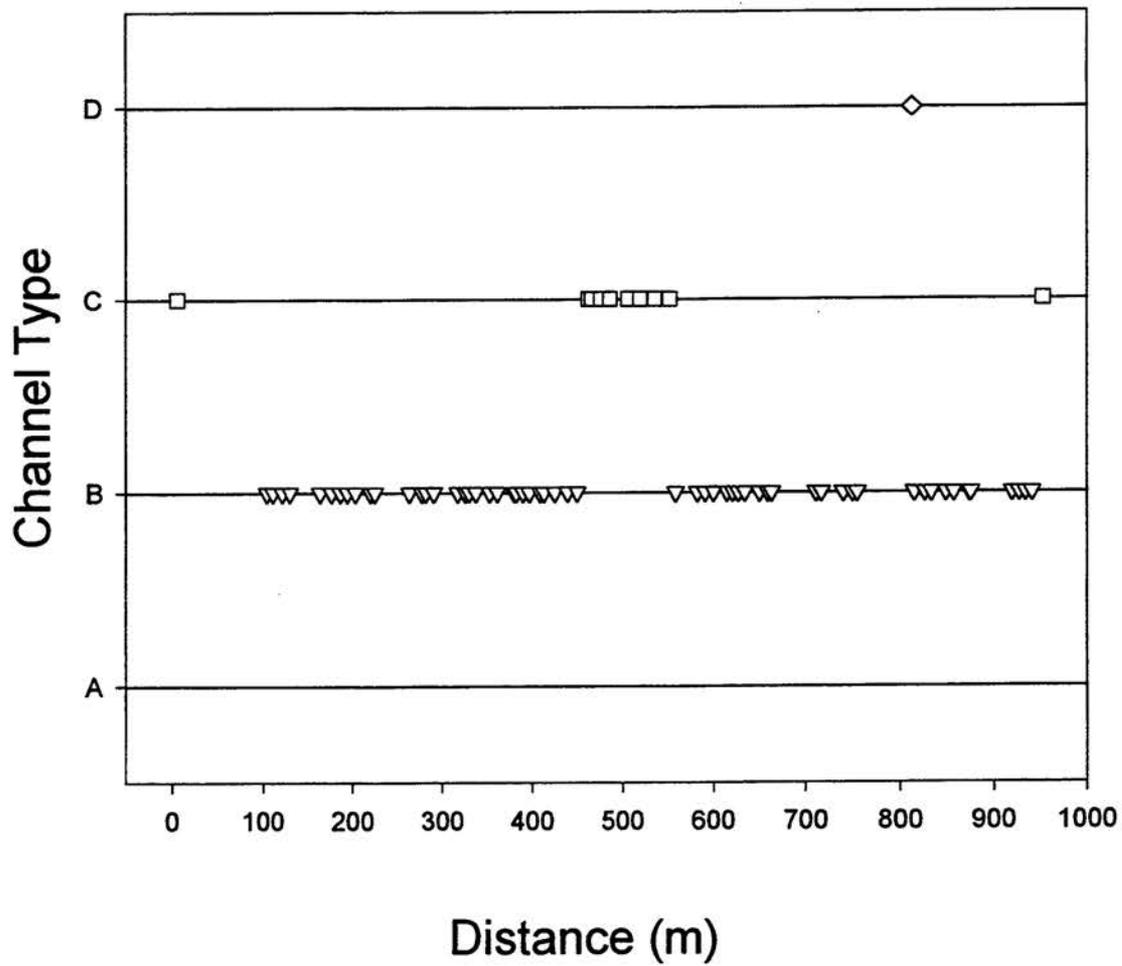
**Riparian Width****Stream: Unnamed Tributary of White Rock Branch****Number of Measurements: 5****Mean Width: 41.4m Std Dev: 23.5****Max: 80.6m Min: 22.0m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Unnamed Tributary of White Rock Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## Unnamed Tributary of White Rock Branch Rosgen's Channel Type Distribution



**Stream:** White Rocks Branch

**District:** Blacksburg

**Quadrangle:** Interior

**Sample Date:** 08/29/99

**Downstream Starting Point:** Confluence with Big Stony Creek

**Total Distance Surveyed:** 4.5 kilometers

**Percent of Total Area - Pools:** 49.9%

Number of Pools: 175

Number of Pools per kilometer: 38.9

Total Pool Area: 12413.6 sq. meters  $\pm$  642.9

Mean Pool Area: 70.9 sq. meters

Correction Factor: 1.02

Mean Maximum Depth: 40.4 cm

Mean Average Depth: 23.3 cm

Mean Average Residual Pool Depth: 10.2 cm

**Percent of Total Area - Riffles:** 50.1%

Number of Riffles: 131

Number of Riffles per kilometer: 29.1

Total Riffle Area: 12461.8 sq. meters  $\pm$  2826.5

Mean Riffle Area: 95.1 sq. meters

Correction Factor: 1.08

Mean Maximum Depth: 23.0 cm

Mean Average Depth: 11.5 cm

**Number of Large Woody Debris Pieces per kilometer:** 254.6

Wood < 5 m and < 55 cm: 172.3

Wood < 5 m and > 55 cm: 20.1

Wood > 5 m and < 55 cm: 51.4

Wood > 5 m and > 55 cm: 10.8

**Mean Channel Width:** 6.3 m

**Mean Riparian Width:** 31.3 m

Mean Maximum Riparian Distance (either side): 21.2 m

Mean Minimum Riparian Distance (either side): 3.8 m

Maximum Riparian Width (Total): 42.6 m

Minimum Riparian Width (Total): 11.5 m

White Rocks Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 0.7%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 15.6%

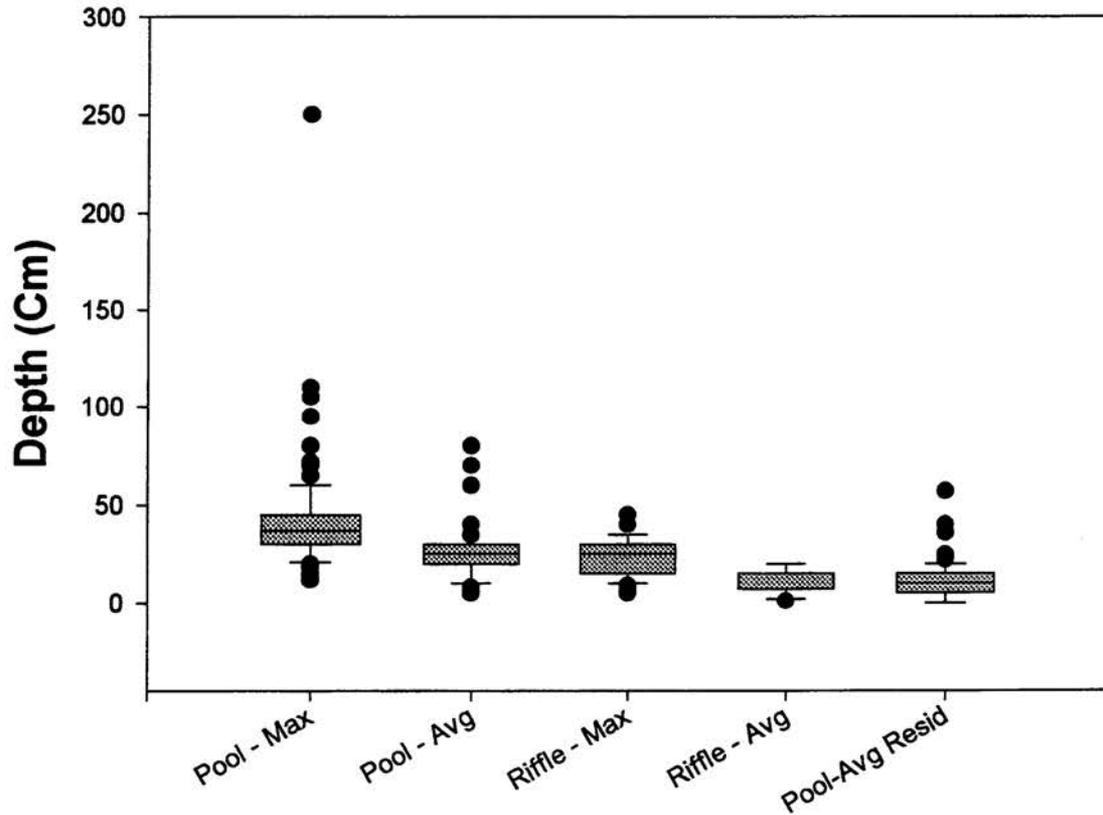
Channel Type C: 84.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 48.0%**

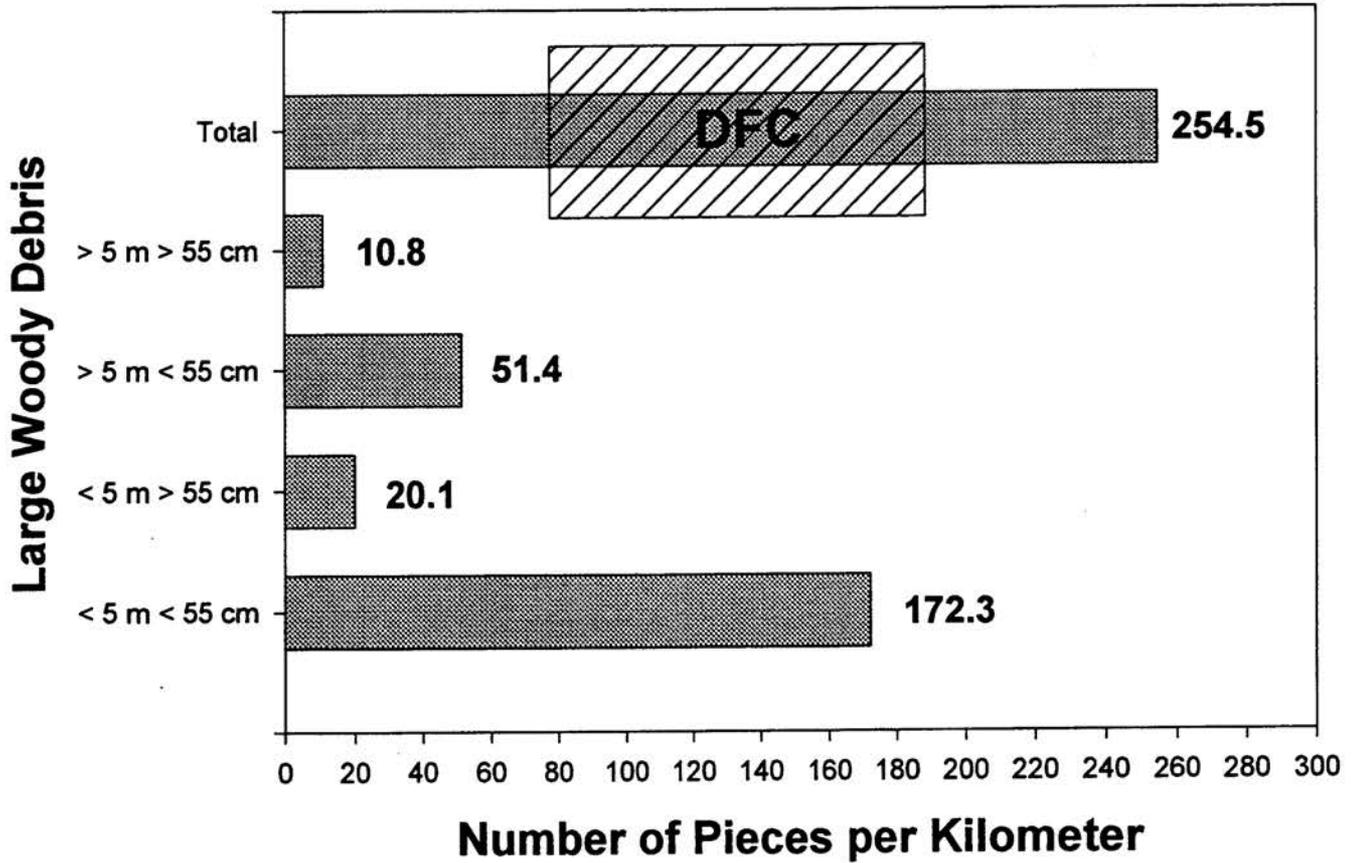
**Average Channel Gradient: 4.3**

## White Rock Branch

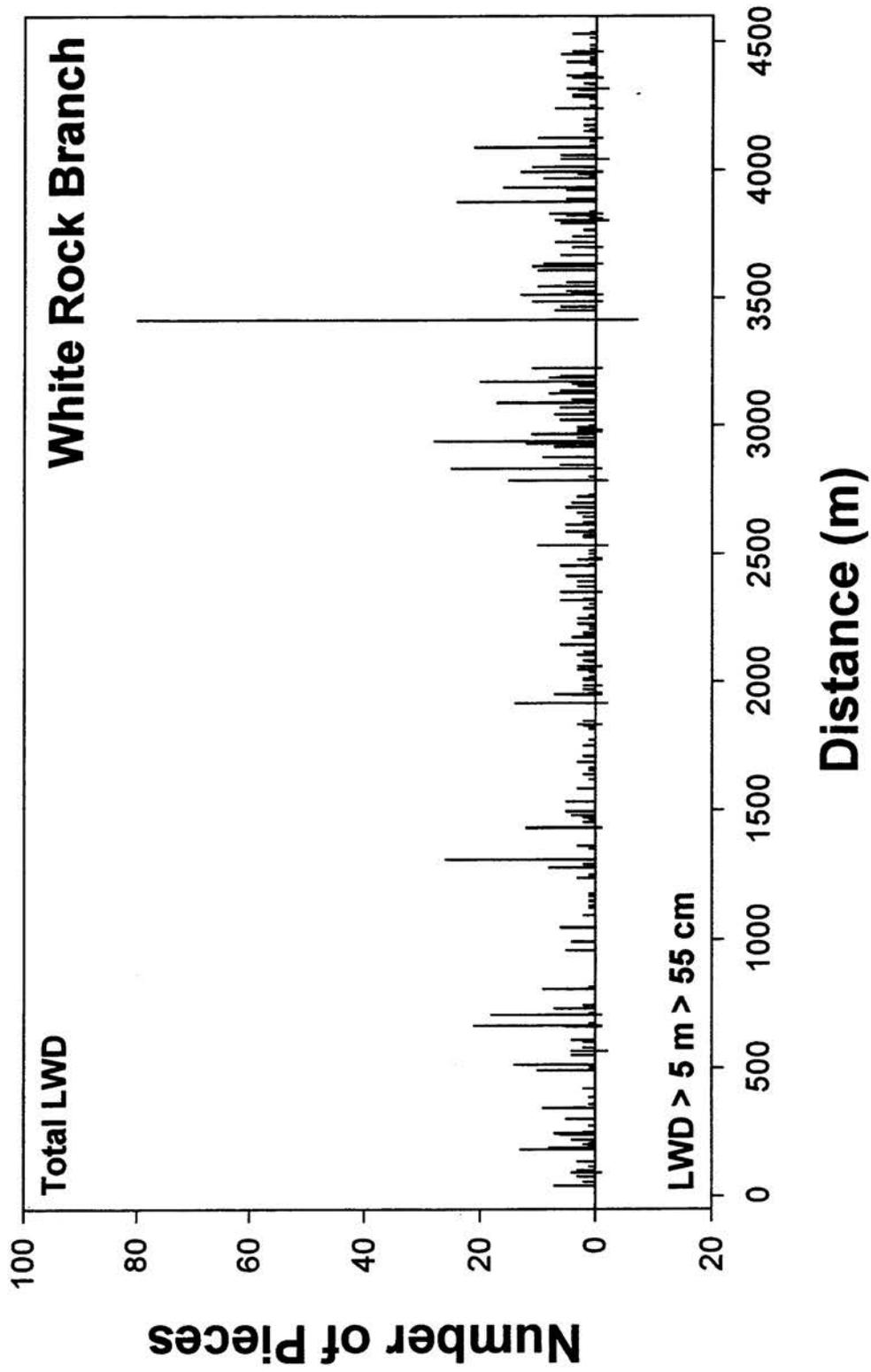


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

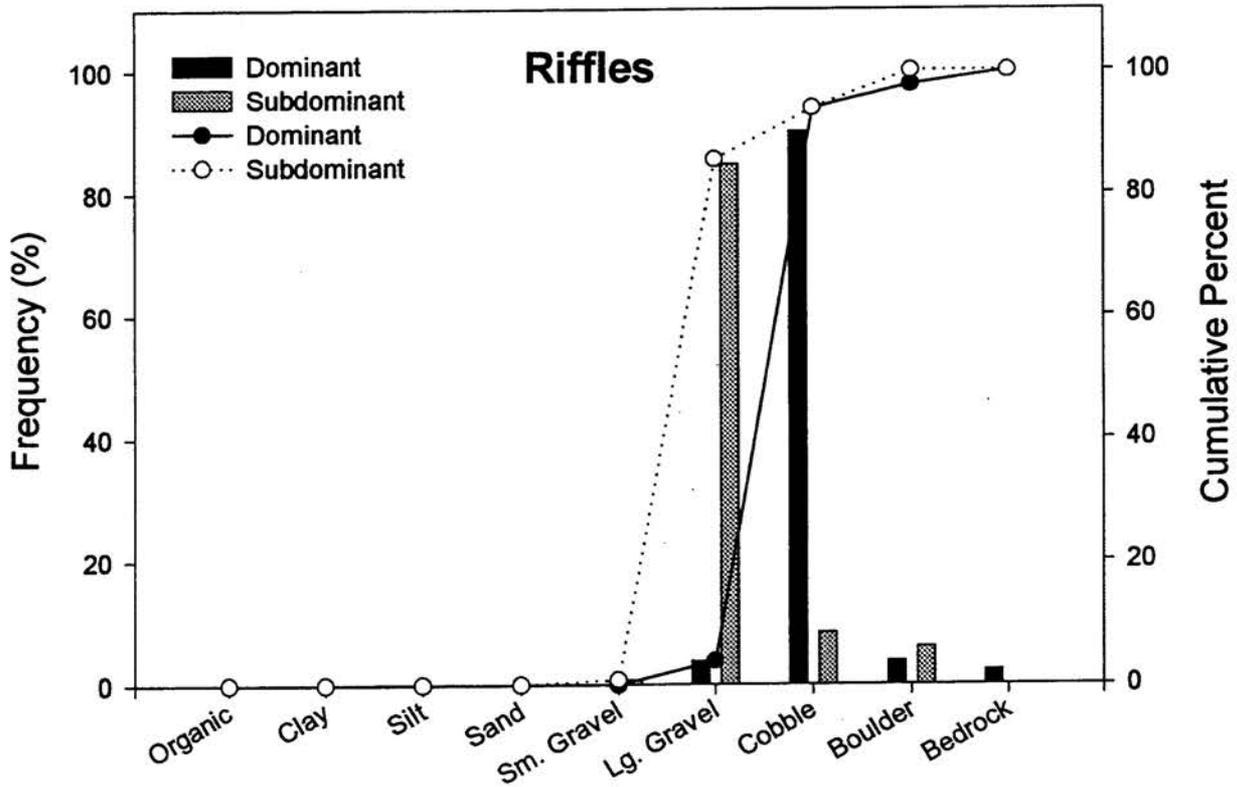
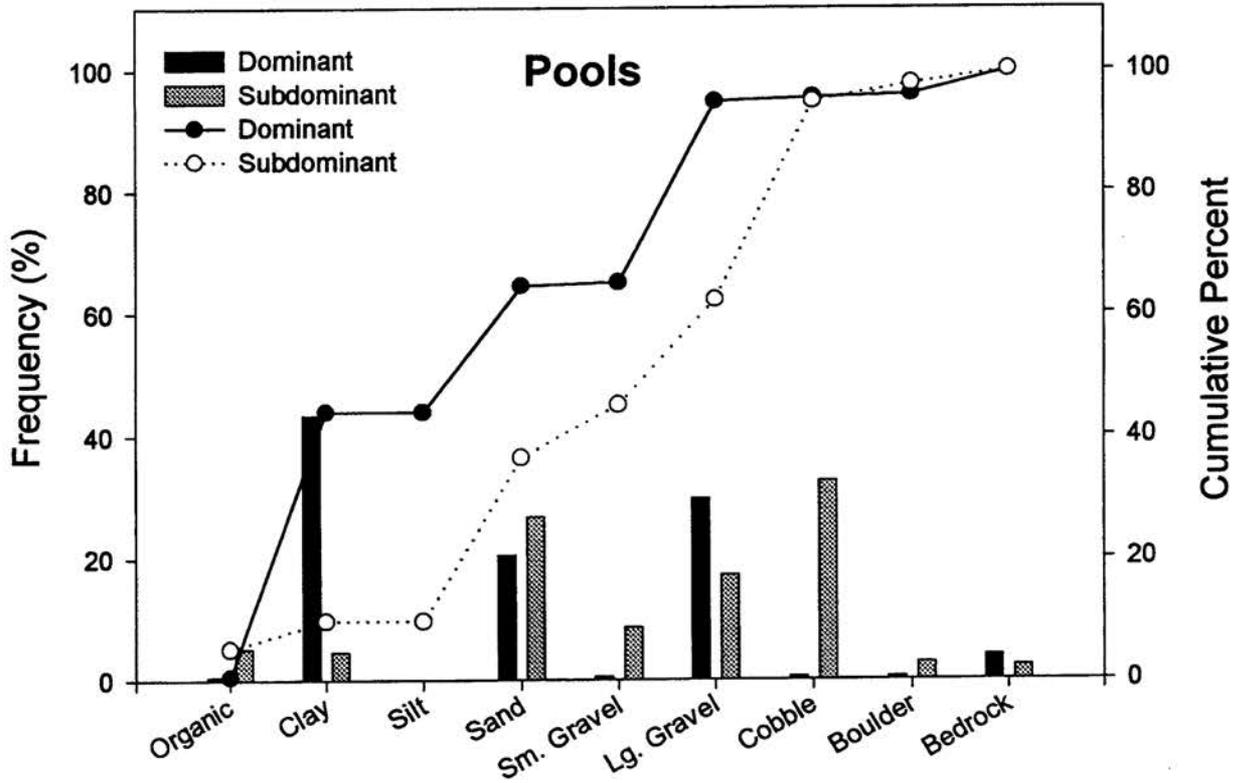
## White Rock Branch

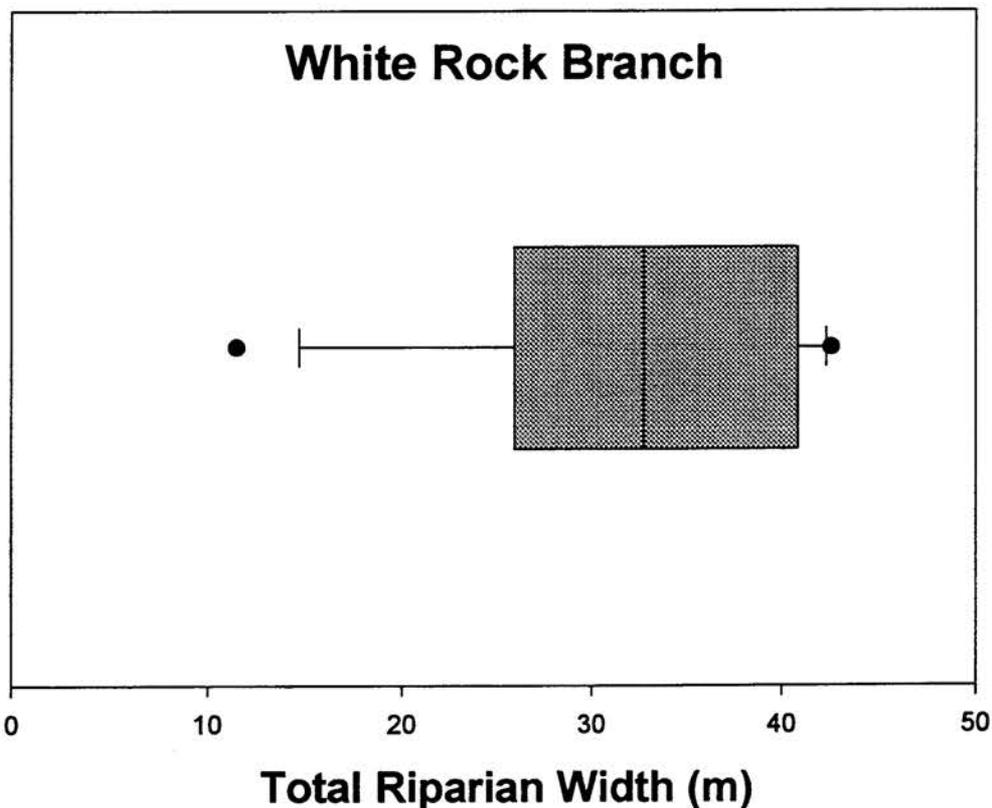


# Distribution and Abundance of Large Woody Debris



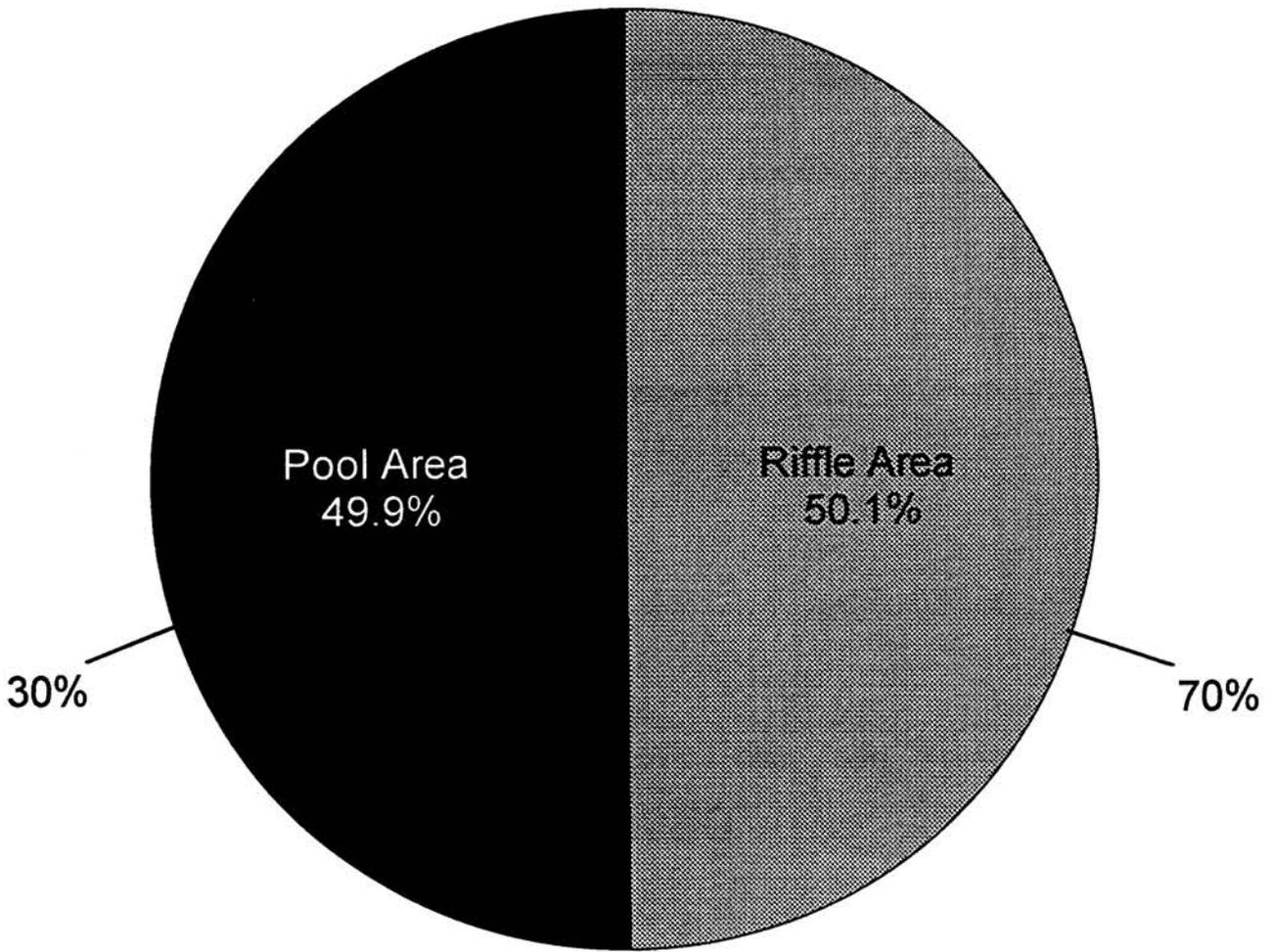
## White Rock Branch Substrate Composition



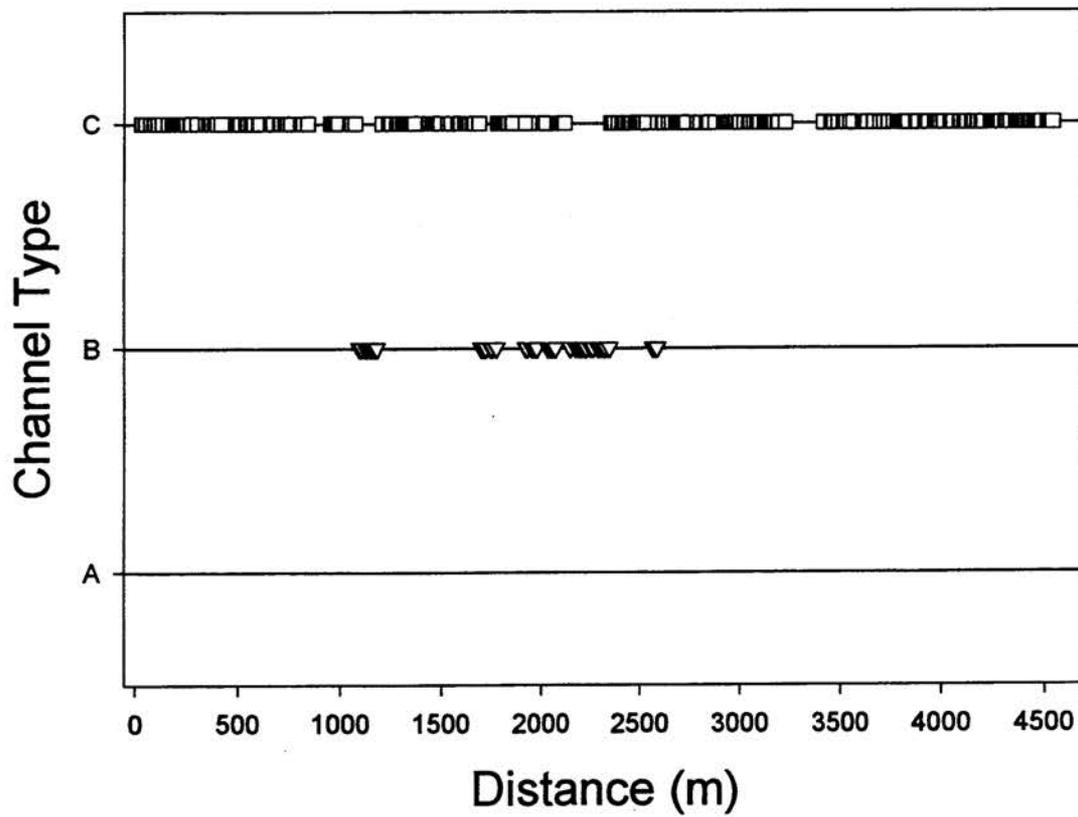
**Riparian Width****Stream: White Rock Branch****Number of Measurements: 9****Mean Width: 31.2m Std Dev: 10.5****Max: 42.6m Min: 11.5m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**White Rock Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## White Rock Branch Rosgen's Channel Type Distribution



## Waiteville Quadrangle

**Stream:** Johns Creek

**District:** Blacksburg

**Quadrangle:** Wait/Newport

**Sample Date:** 07/28/1999

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 3.1 kilometers

**Percent of Total Area - Pools:** 27.3%

Number of Pools: 81

Number of Pools per kilometer: 26.1

Total Pool Area: 2982.3 sq. meters  $\pm$  380.9

Mean Pool Area: 36.8 sq. meters

Correction Factor: 0.98

Mean Maximum Depth: 43.2 cm

Mean Average Depth: 31.6 cm

Mean Average Residual Pool Depth: 21.1 cm

**Percent of Total Area - Riffles:** 72.7%

Number of Riffles: 67

Number of Riffles per kilometer: 21.6

Total Riffle Area: 7929.4 sq. meters  $\pm$  608.8

Mean Riffle Area: 118.3 sq. meters

Correction Factor: 1.05

Mean Maximum Depth: 20.6 cm

Mean Average Depth: 11.9 cm

**Number of Large Woody Debris Pieces per kilometer:** 85.7

Wood < 5 m and < 55 cm: 45.0

Wood < 5 m and > 55 cm: 5.5

Wood > 5 m and < 55 cm: 28.7

Wood > 5 m and > 55 cm: 6.5

**Mean Channel Width:** 9.0 m

**Mean Riparian Width:** 53.5 m

Mean Maximum Riparian Distance (either side): 40.6 m

Mean Minimum Riparian Distance (either side): 3.9 m

Maximum Riparian Width (Total): 101.8 m

Minimum Riparian Width (Total): 0.6 m

Johns Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 9.9%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 0.6%

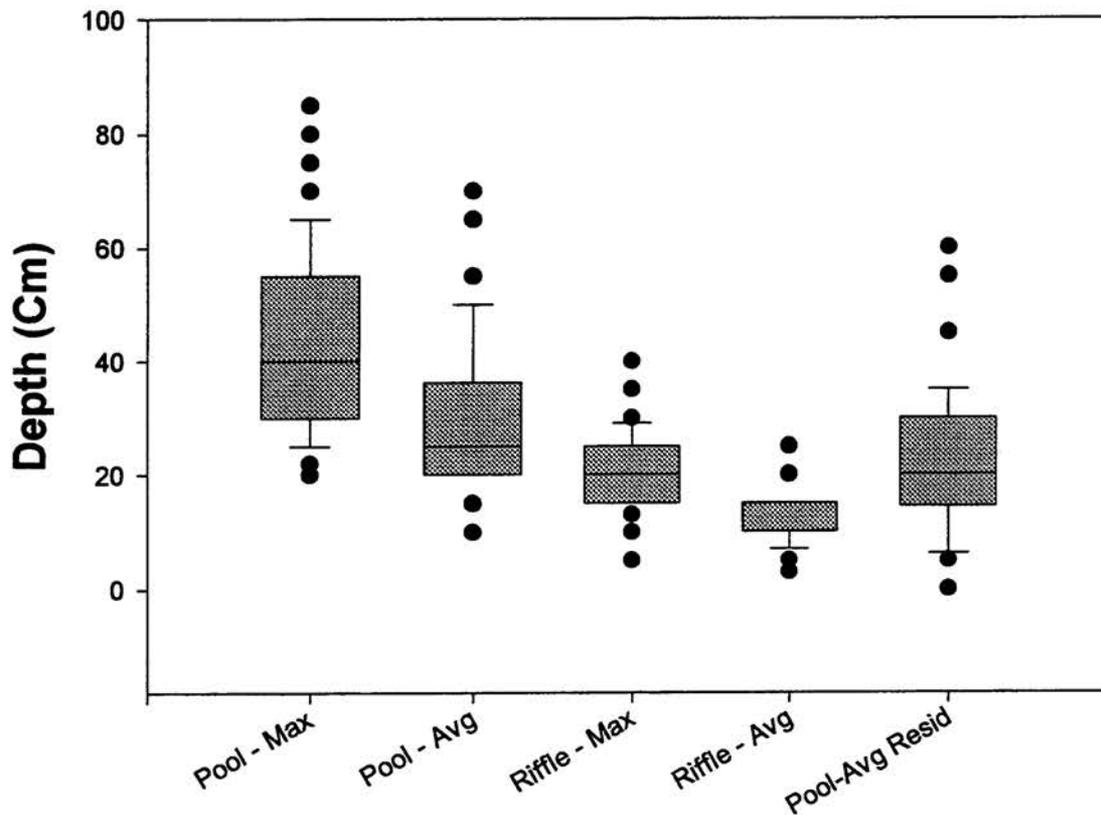
Channel Type C: 99.4%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 7.4%**

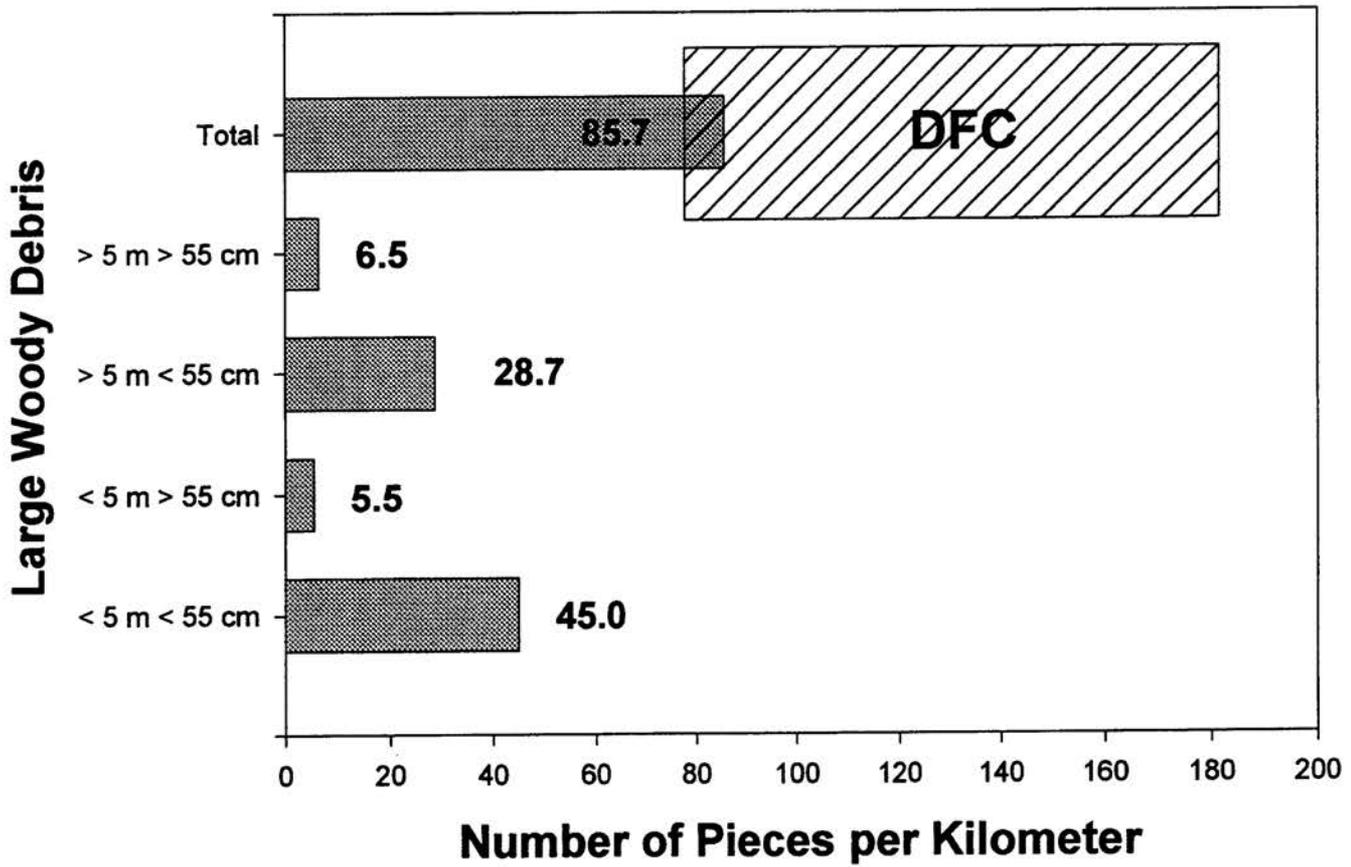
**Average Channel Gradient: 8.0**

## Johns Creek

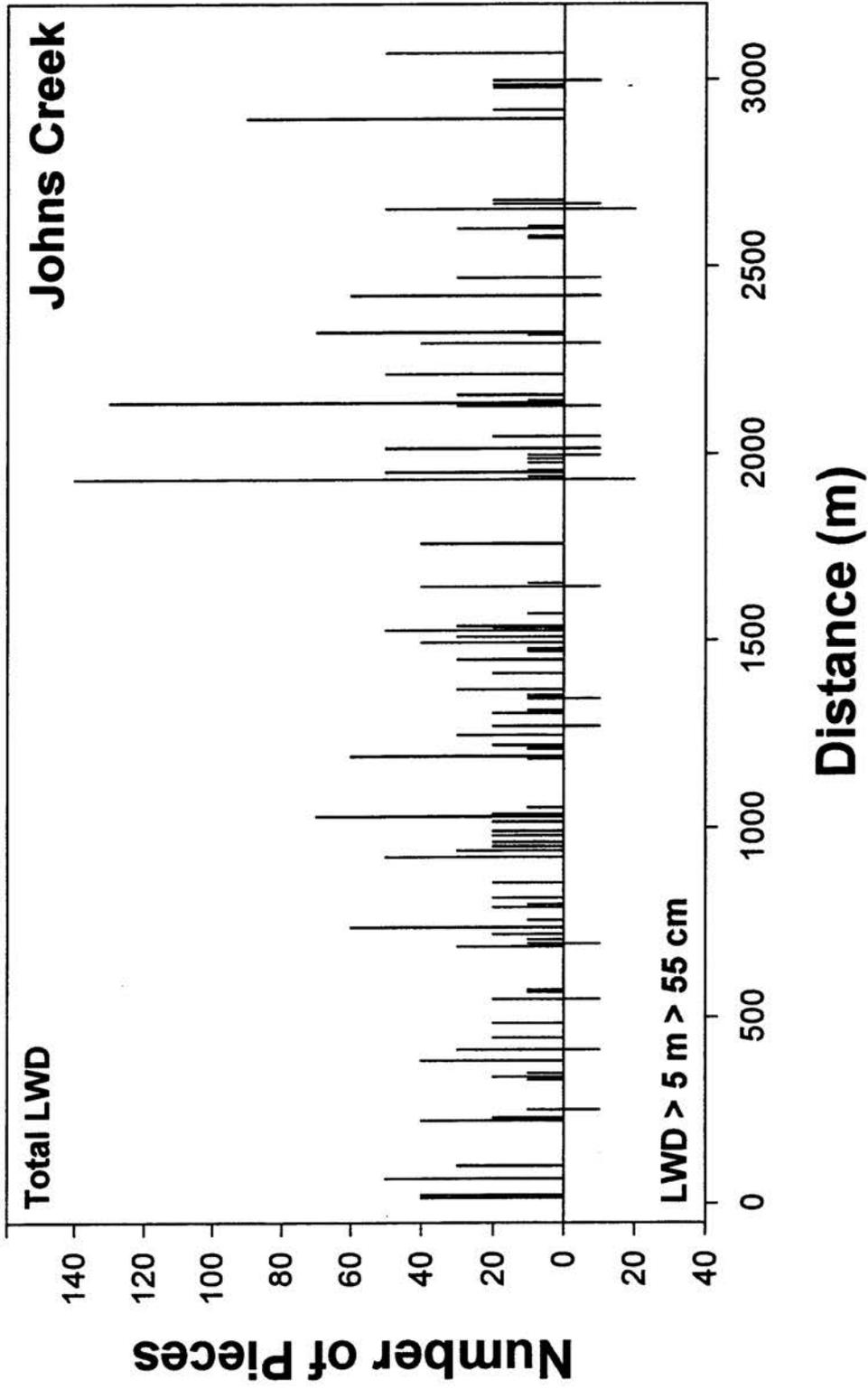


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

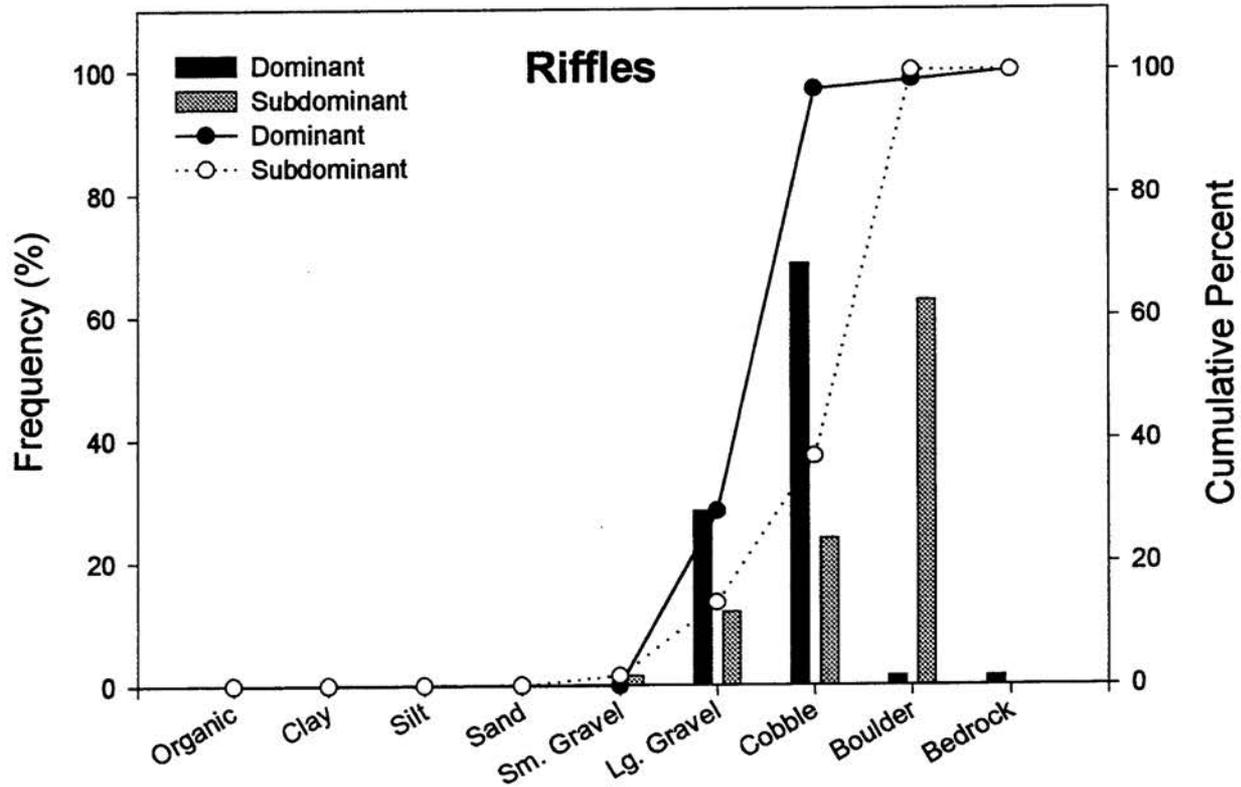
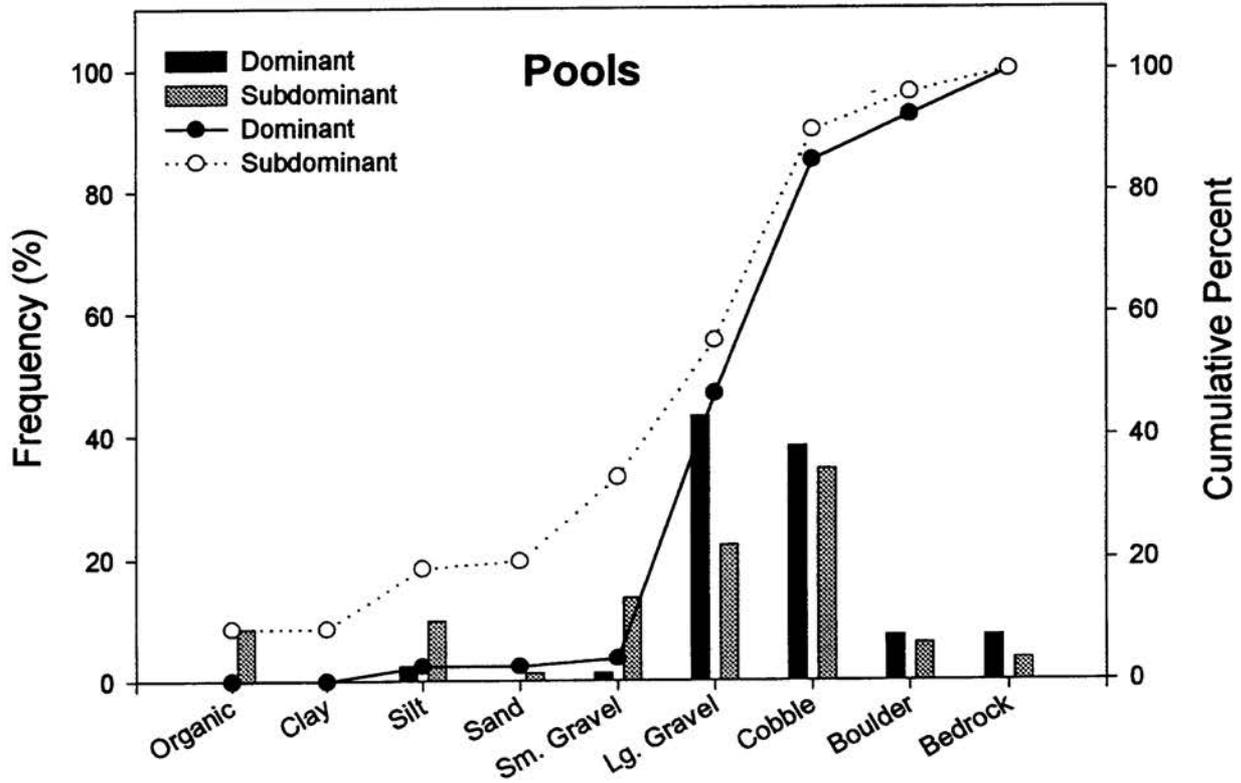
## Johns Creek

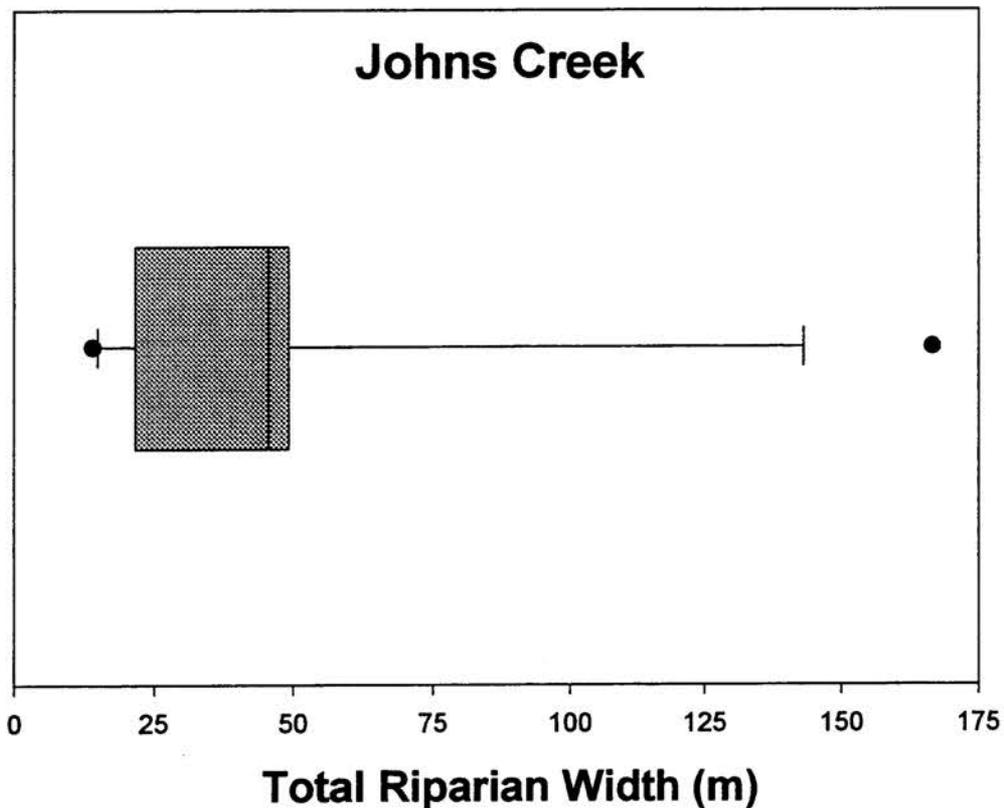


# Distribution and Abundance of Large Woody Debris



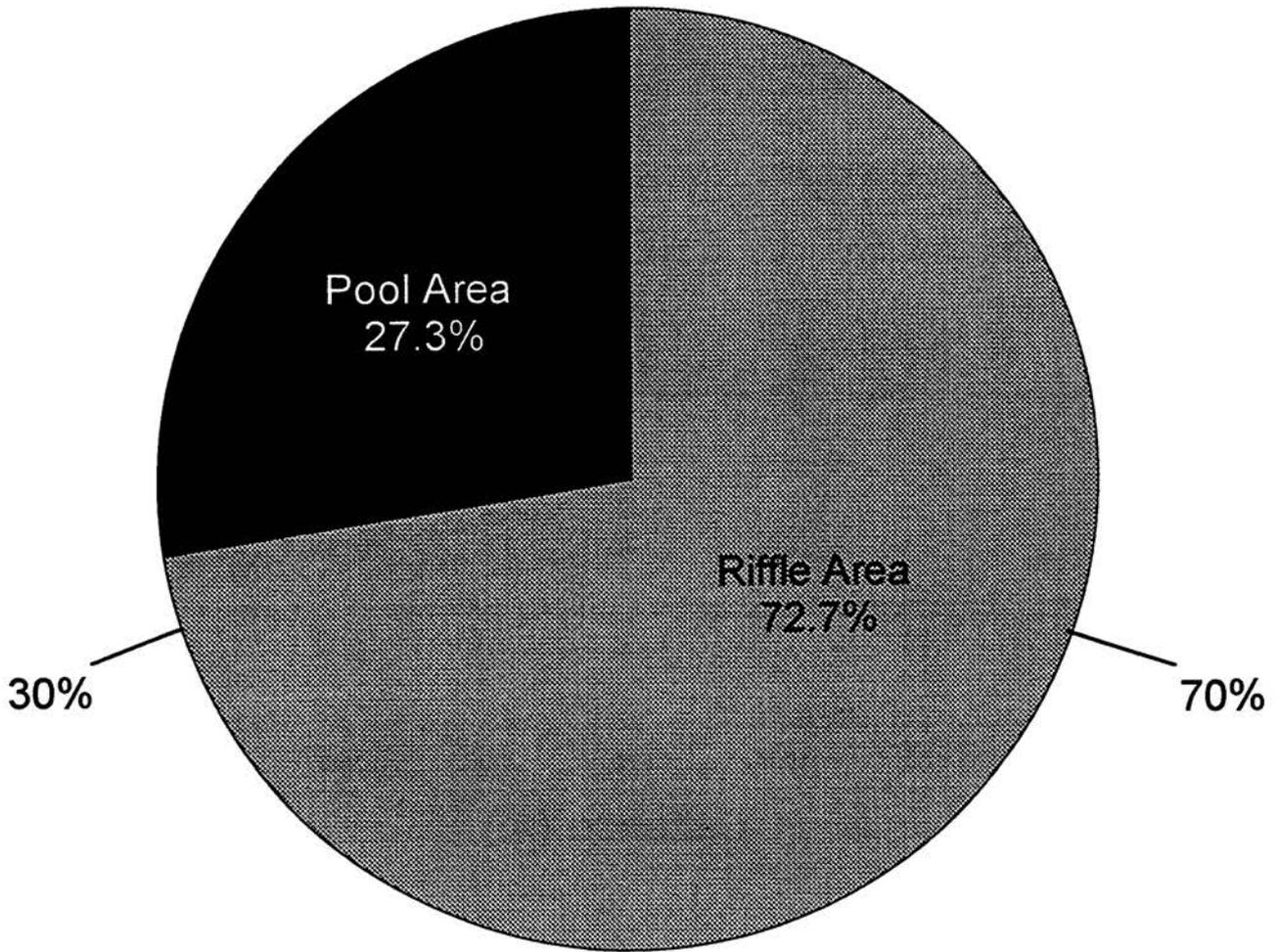
# Johns Creek Substrate Composition



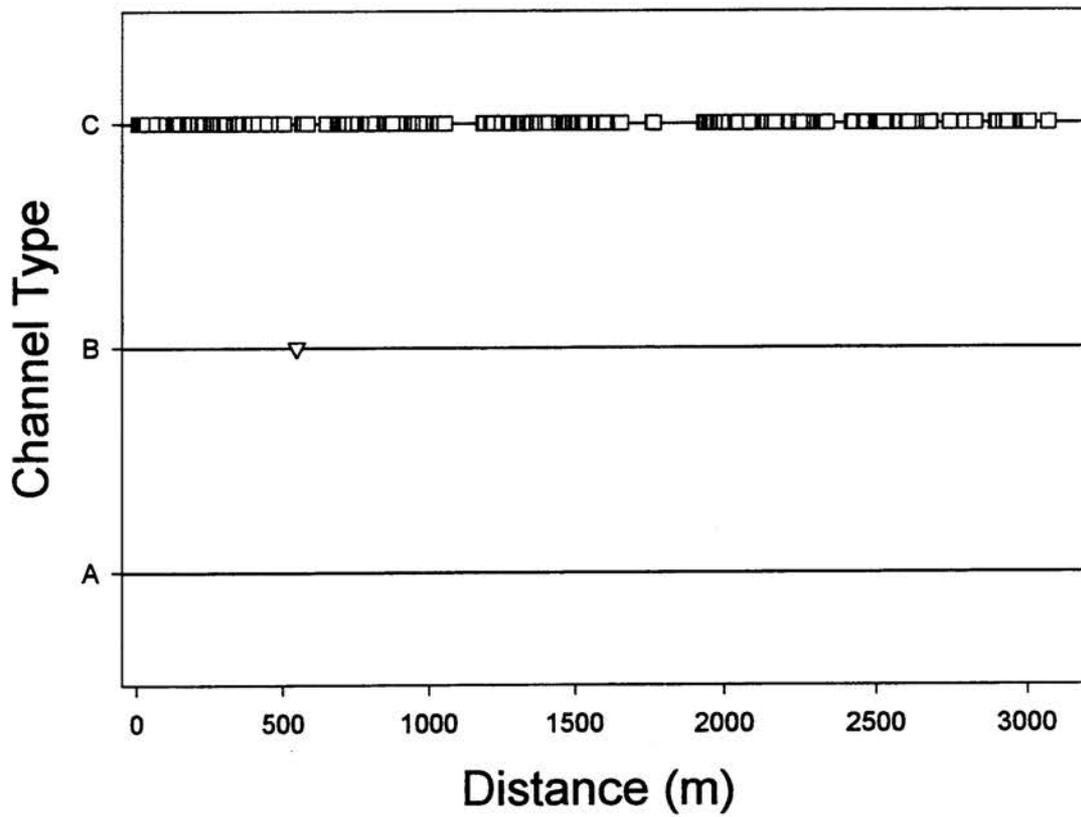
**Riparian Width****Stream: Johns Creek****Number of Measurements: 7****Mean Width: 53.5m Std Dev: 51.9****Max: 166.5m Min: 14.1m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**Johns Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



# Johns Creek Rosgen's Channel Type Distribution



**Stream:** South Fork Potts Creek

**District:** Blacksburg

**Quadrangle:** Waiteville

**Sample Date:** 08/08/1999

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 2.9 kilometers

**Percent of Total Area - Pools:** 49.6%

**Number of Pools:** 164

**Number of Pools per kilometer:** 56.6

**Total Pool Area:** 3074.8 sq. meters  $\pm$  214.3

**Mean Pool Area:** 18.7 sq. meters

**Correction Factor:** 1.03

**Mean Maximum Depth:** 25.6 cm

**Mean Average Depth:** 18.9 cm

**Mean Average Residual Pool Depth:** 15.8 cm

**Percent of Total Area - Riffles:** 50.4%

**Number of Riffles:** 134

**Number of Riffles per kilometer:** 46.2

**Total Riffle Area:** 3127.0 sq. meters  $\pm$  324.6

**Mean Riffle Area:** 23.3 sq. meters

**Correction Factor:** 0.99

**Mean Maximum Depth:** 11.0 cm

**Mean Average Depth:** 6.5 cm

**Number of Large Woody Debris Pieces per kilometer:** 201.7

Wood < 5 m and < 55 cm: 147.6

Wood < 5 m and > 55 cm: 5.8

Wood > 5 m and < 55 cm: 42.2

Wood > 5 m and > 55 cm: 6.1

**Mean Channel Width:** 4.5 m

**Mean Riparian Width:** 23.3 m

**Mean Maximum Riparian Distance (either side):** 15.6 m

**Mean Minimum Riparian Distance (either side):** 3.5 m

**Maximum Riparian Width (Total):** 0.2 m

**Minimum Riparian Width (Total):** 21.4 m

South Fork Potts Creek Continued.

**Percent of Pool Habitat Surveyed as Glides: 53.6%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 0.0%

Channel Type B: 97.7%

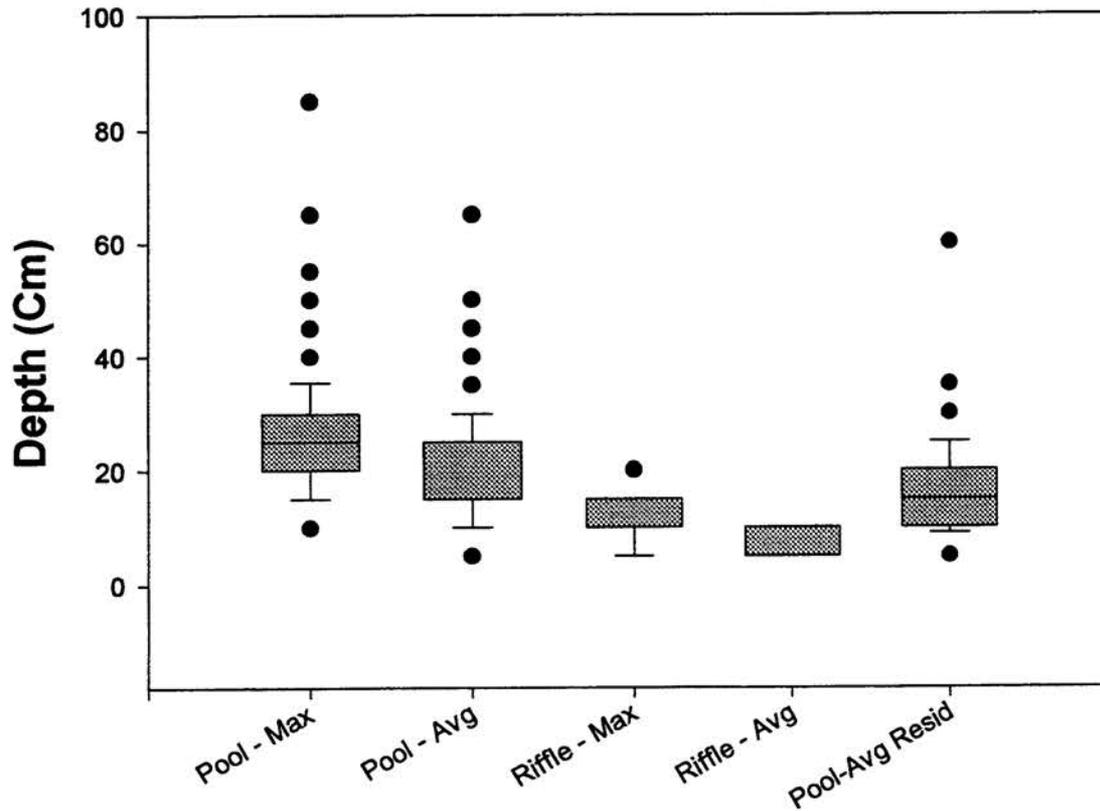
Channel Type C: 2.3%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 12.2%**

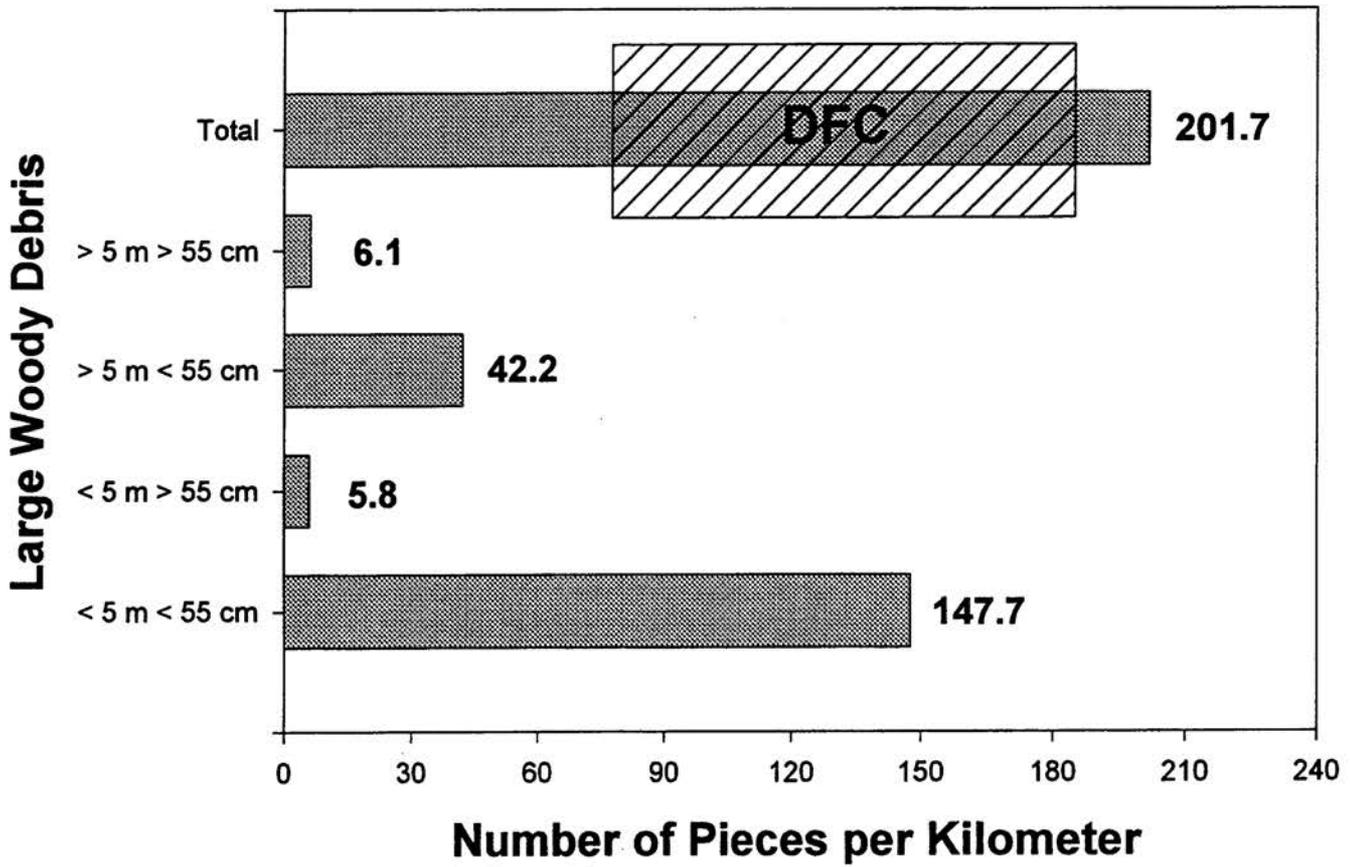
**Average Channel Gradient: 5.7**

## South Fork Potts Creek

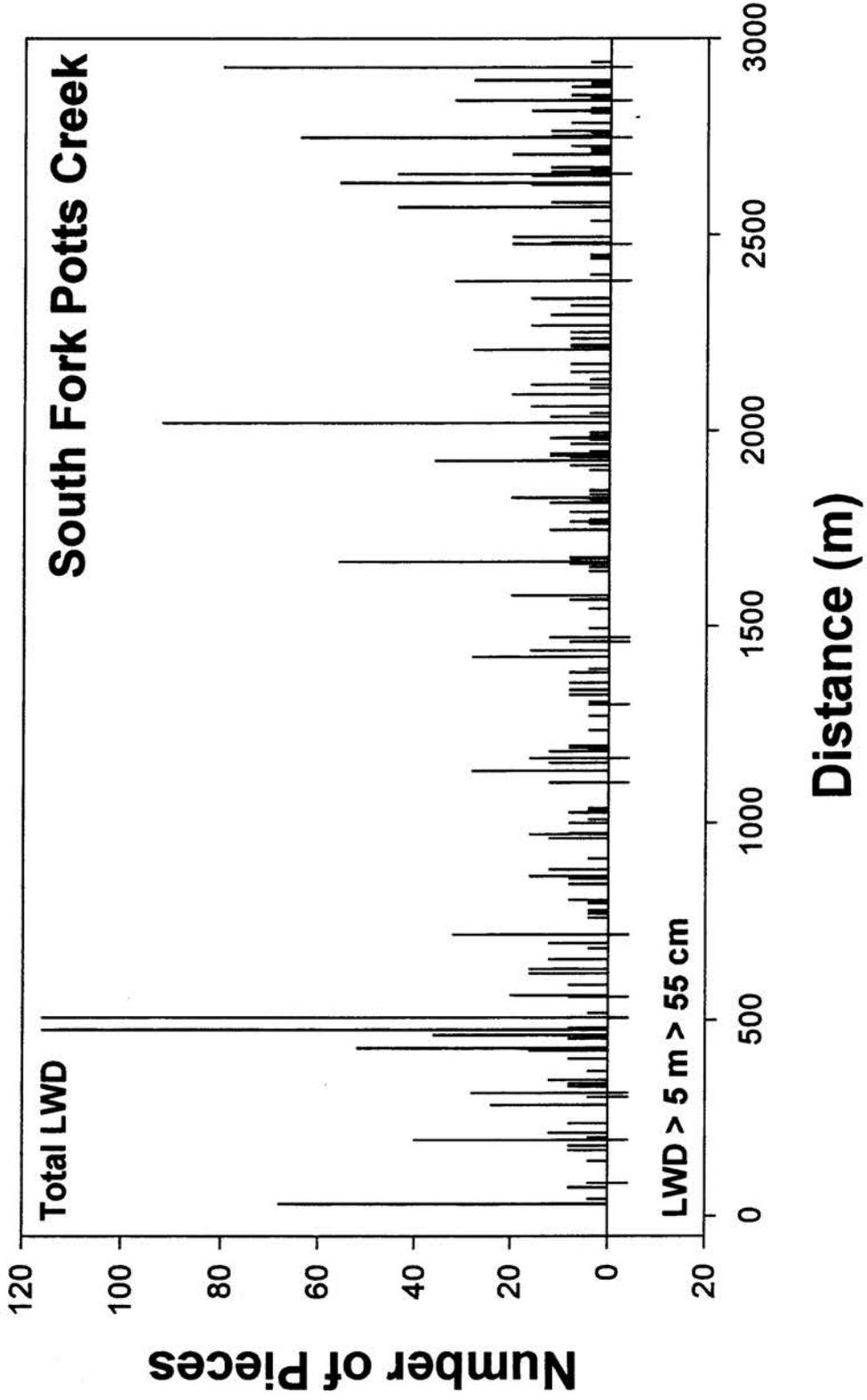


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

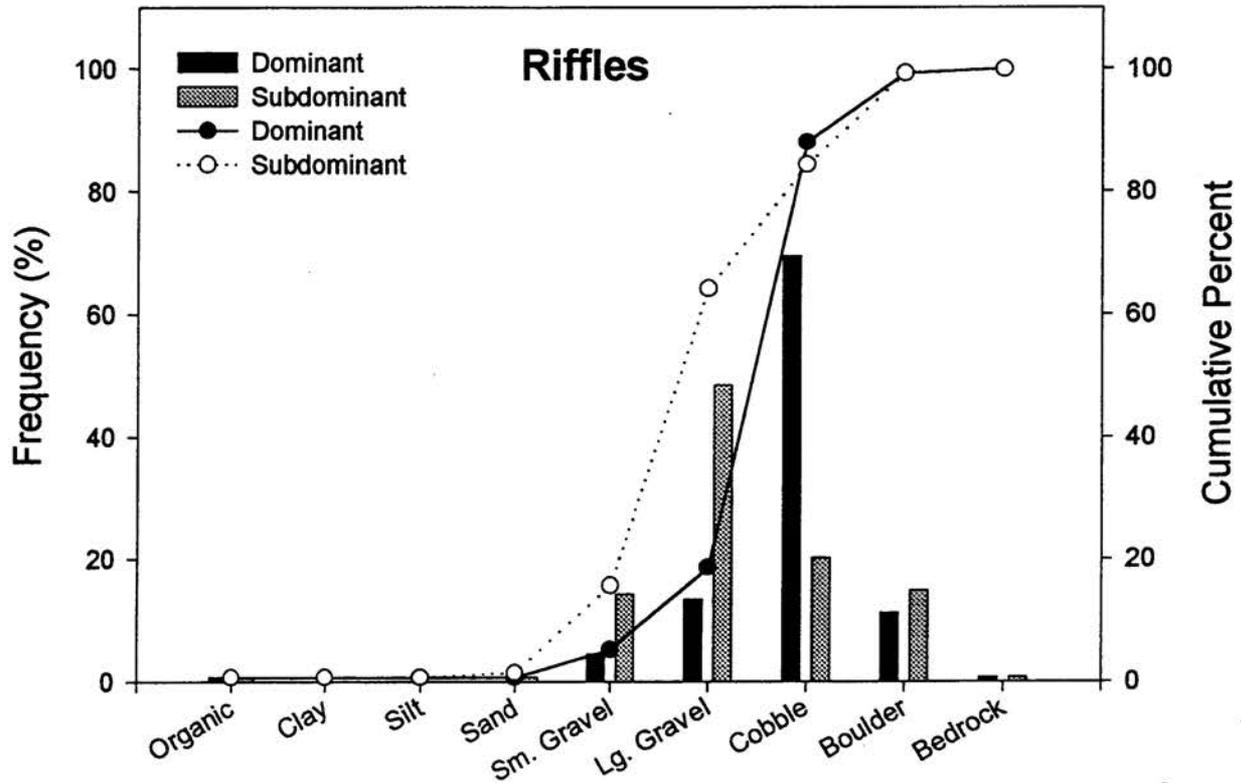
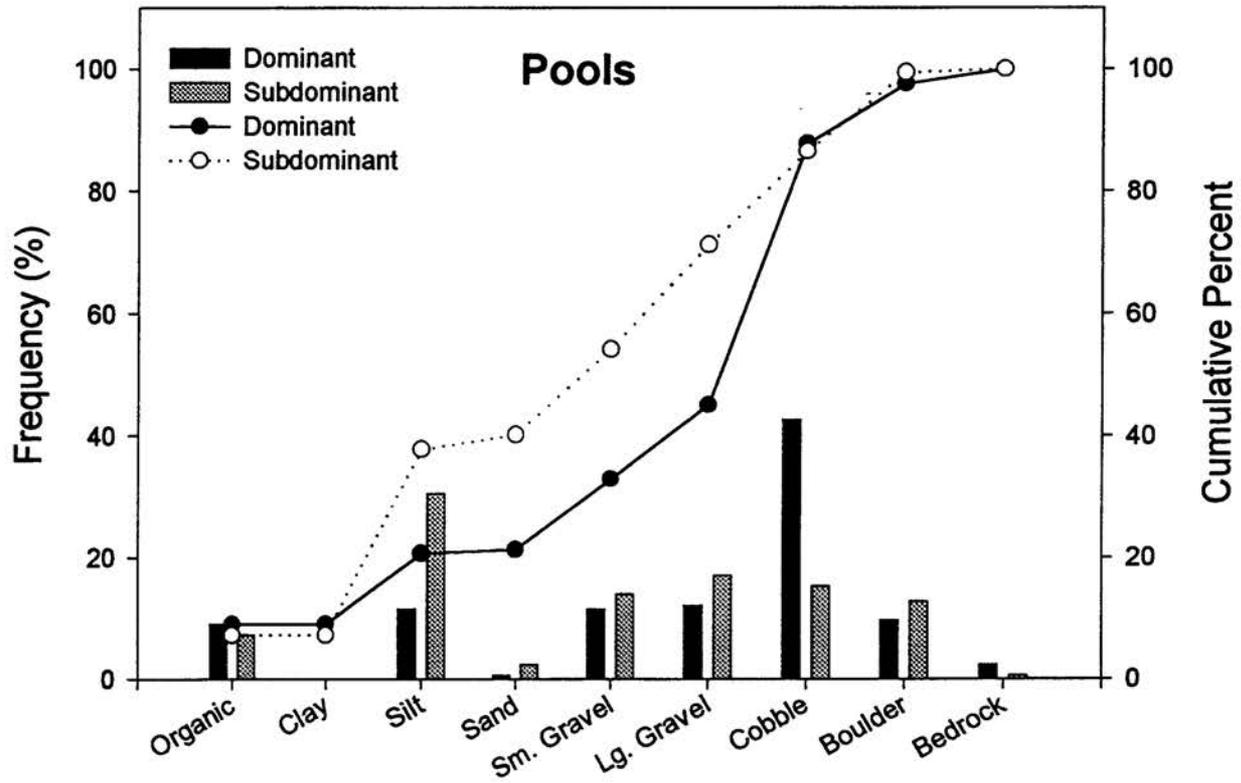
## South Fork Potts Creek

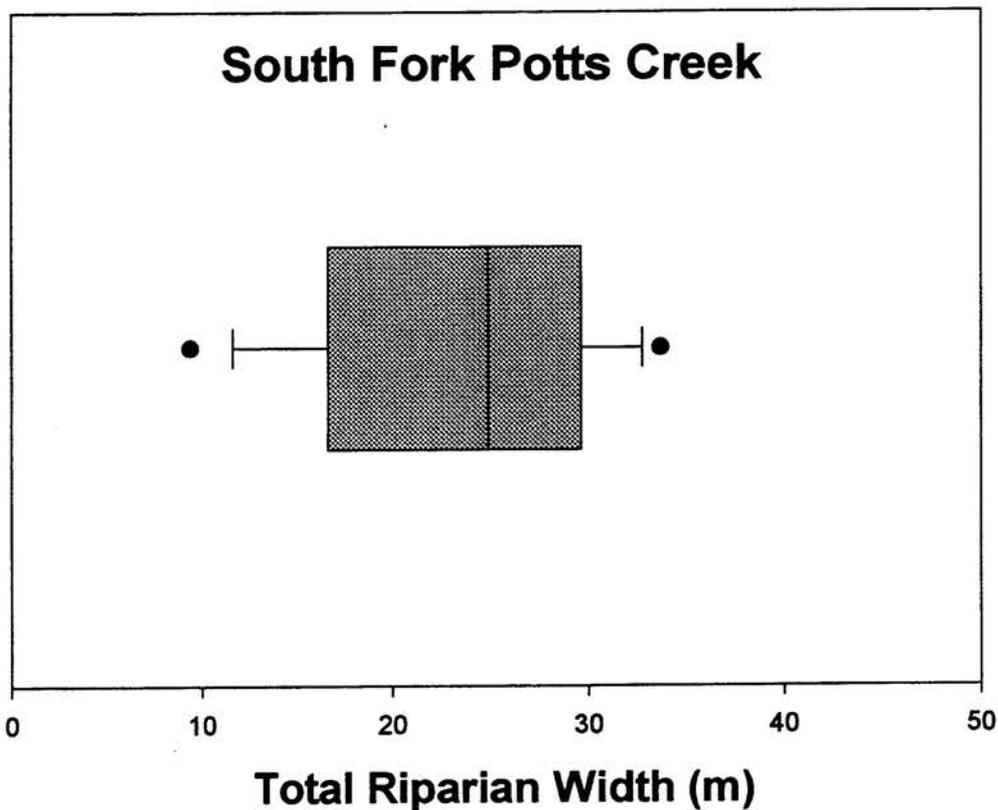


# Distribution and Abundance of Large Woody Debris



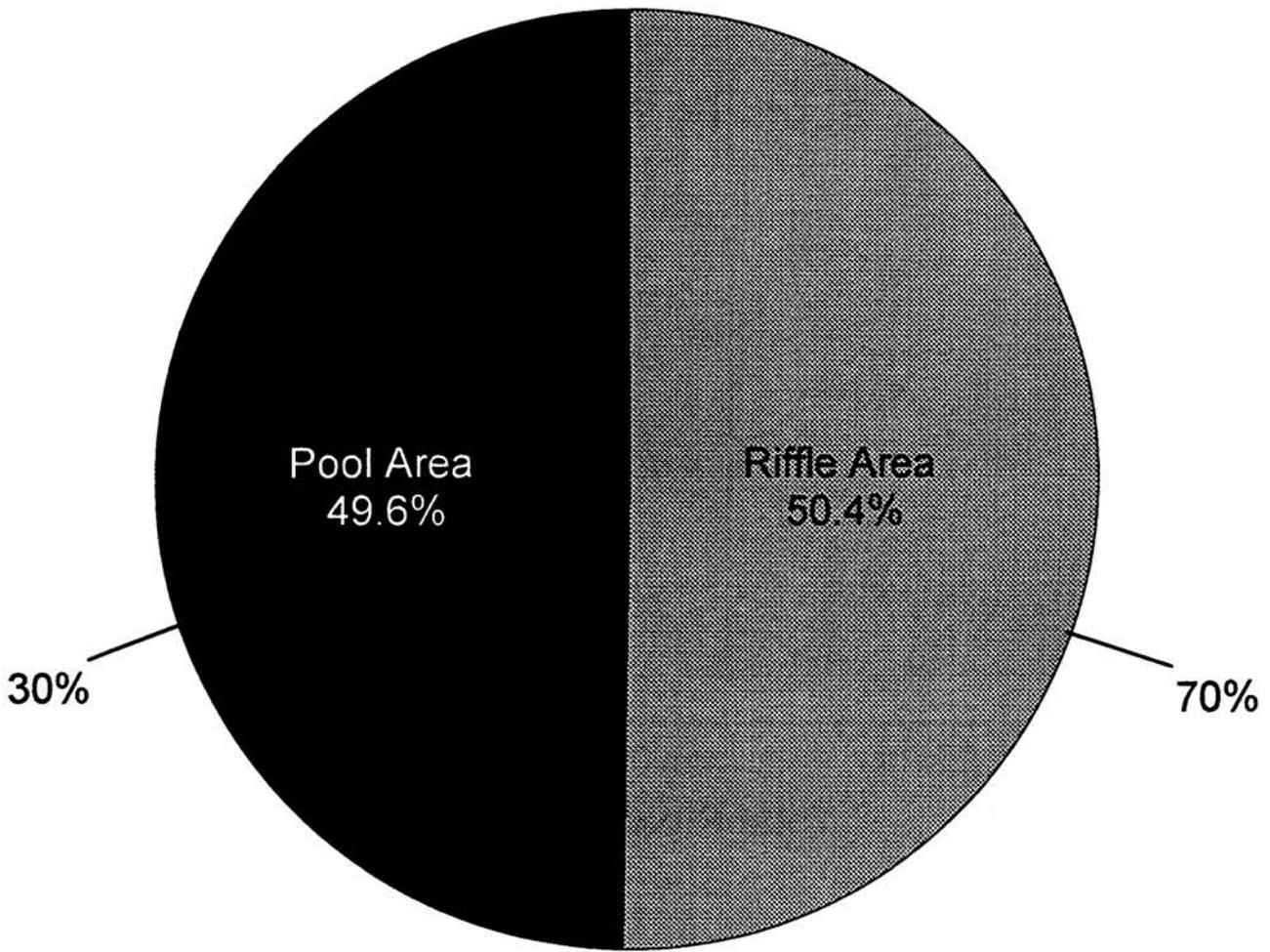
## South Fork Potts Creek Substrate Composition



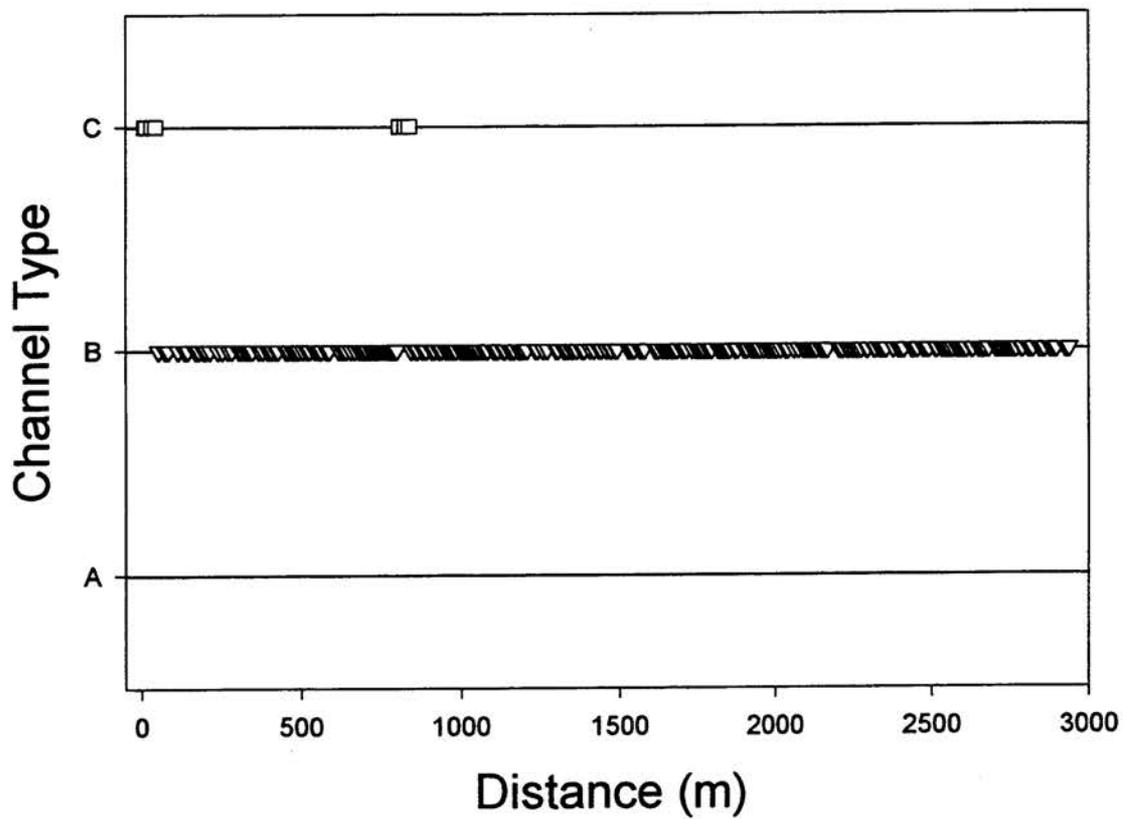
**Riparian Width****Stream: South Fork Potts Creek****Number of Measurements: 13****Mean Width: 23.3m Std Dev: 8.1****Max: 33.7m Min: 9.4m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**South Fork Potts Creek  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## South Fork Potts Creek Rosgen's Channel Type Distribution



**Stream:** War Spur Branch

**District:** Blacksburg

**Quadrangle:** Waiteville

**Sample Date:** 06/01/99

**Downstream Starting Point:** Forest Service Boundary

**Total Distance Surveyed:** 3.5 kilometers

**Percent of Total Area - Pools:** 27.0%

**Number of Pools:** 238

**Number of Pools per kilometer:** 68.0

**Total Pool Area:** 2106.4 sq. meters  $\pm$  113.6

**Mean Pool Area:** 8.85 sq. meters

**Correction Factor:** 1.10

**Mean Maximum Depth:** 36.5 cm

**Mean Average Depth:** 19.7 cm

**Mean Average Residual Pool Depth:** 13.2 cm

**Percent of Total Area - Riffles:** 73.0%

**Number of Riffles:** 214

**Number of Riffles per kilometer:** 61.1

**Total Riffle Area:** 5708.9 sq. meters  $\pm$  202.8

**Mean Riffle Area:** 26.7 sq. meters

**Correction Factor:** 1.10

**Mean Maximum Depth:** 18.3 cm

**Mean Average Depth:** 7.7 cm

**Number of Large Woody Debris Pieces per kilometer:** 200.8

**Wood < 5 m and < 55 cm:** 122.6

**Wood < 5 m and > 55 cm:** 5.8

**Wood > 5 m and < 55 cm:** 55.1

**Wood > 5 m and > 55 cm:** 17.3

**Mean Channel Width:** 4.5 m

**Mean Riparian Width:** 39.2 m

**Mean Maximum Riparian Distance (either side):** 31.3 m

**Mean Minimum Riparian Distance (either side):** 3.4 m

**Maximum Riparian Width (Total):** 213.9 m

**Minimum Riparian Width (Total):** 10.4 m

War Spur Branch Continued.

**Percent of Pool Habitat Surveyed as Glides: 0%**

**Rosgen's Channel Type Frequency:**

Channel Type A: 60.2%

Channel Type B: 34.0%

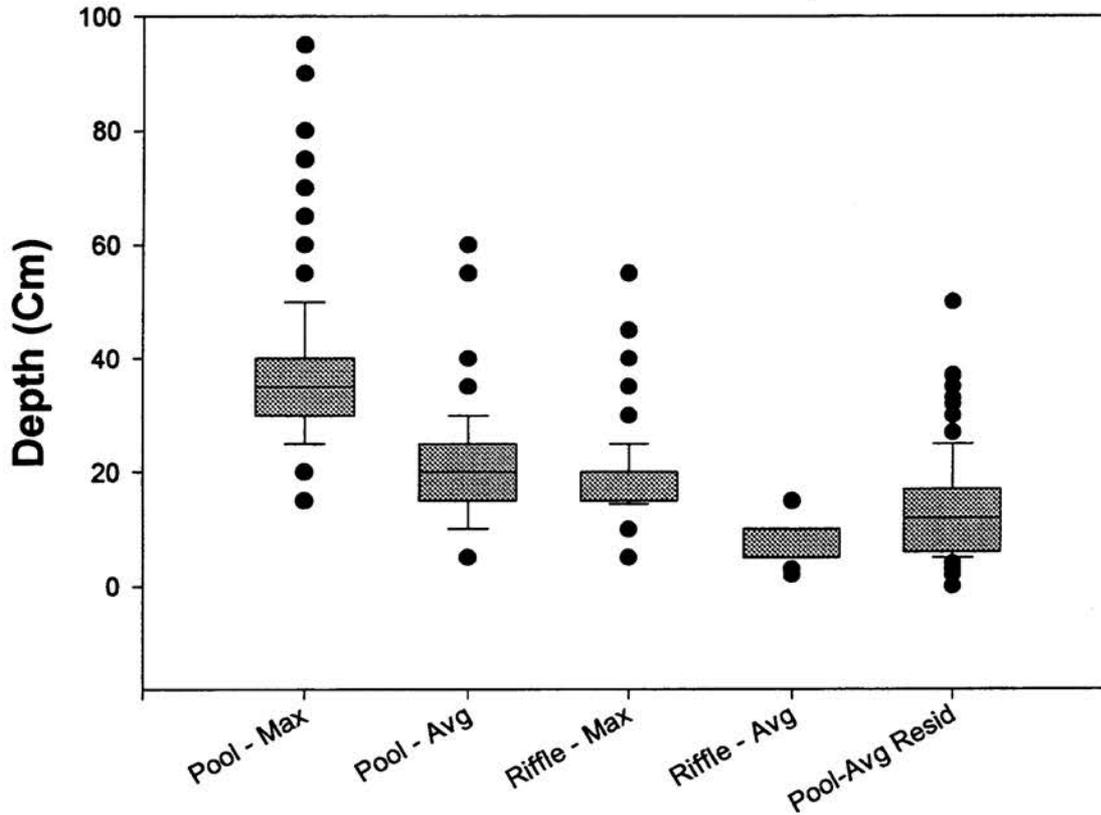
Channel Type C: 5.8%

Channel Type D: 0.0%

**Percent Pools with  $\geq$  35% Embeddedness: 0.8%**

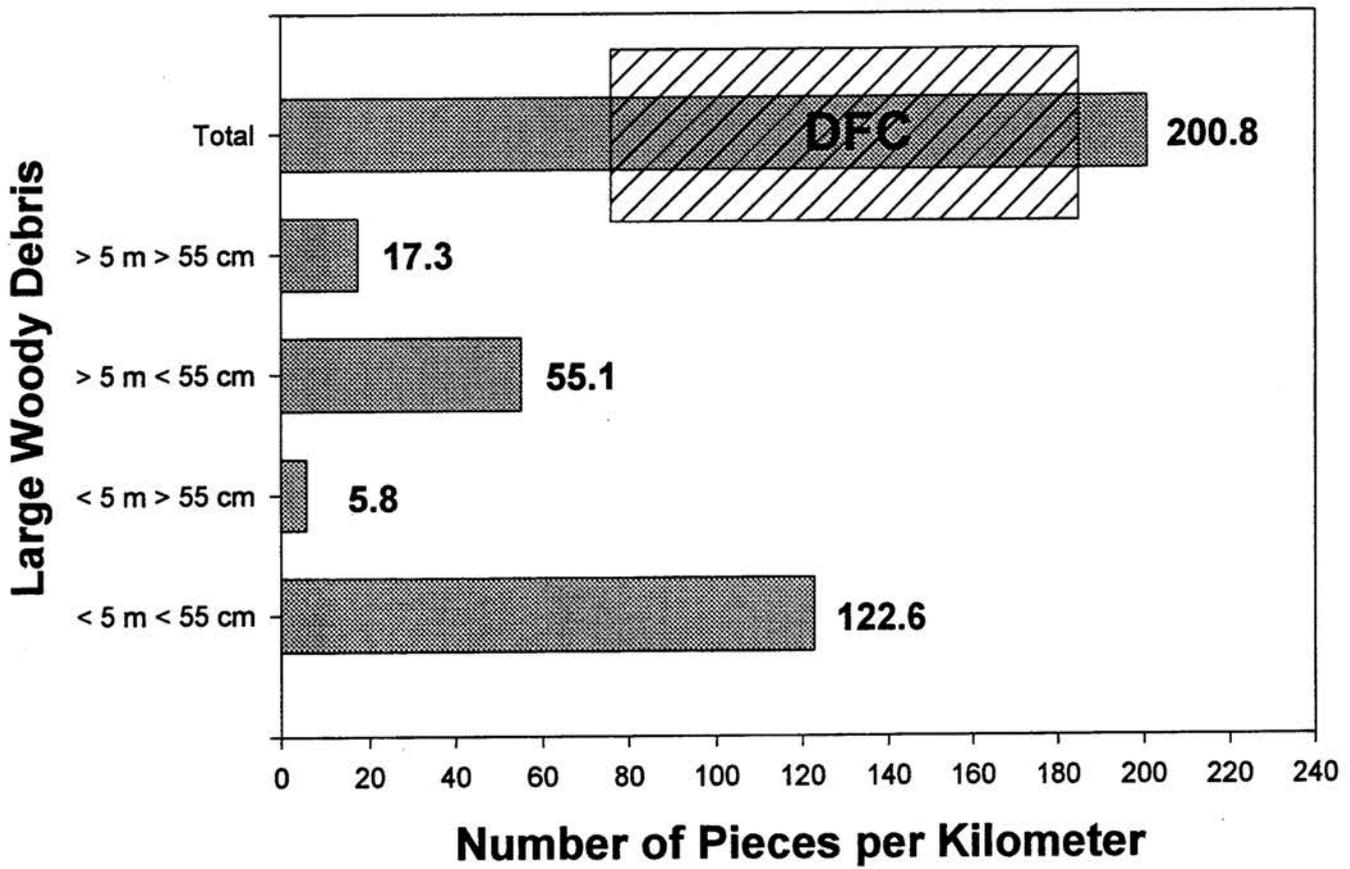
**Average Channel Gradient: 16.1**

## War Spur Branch

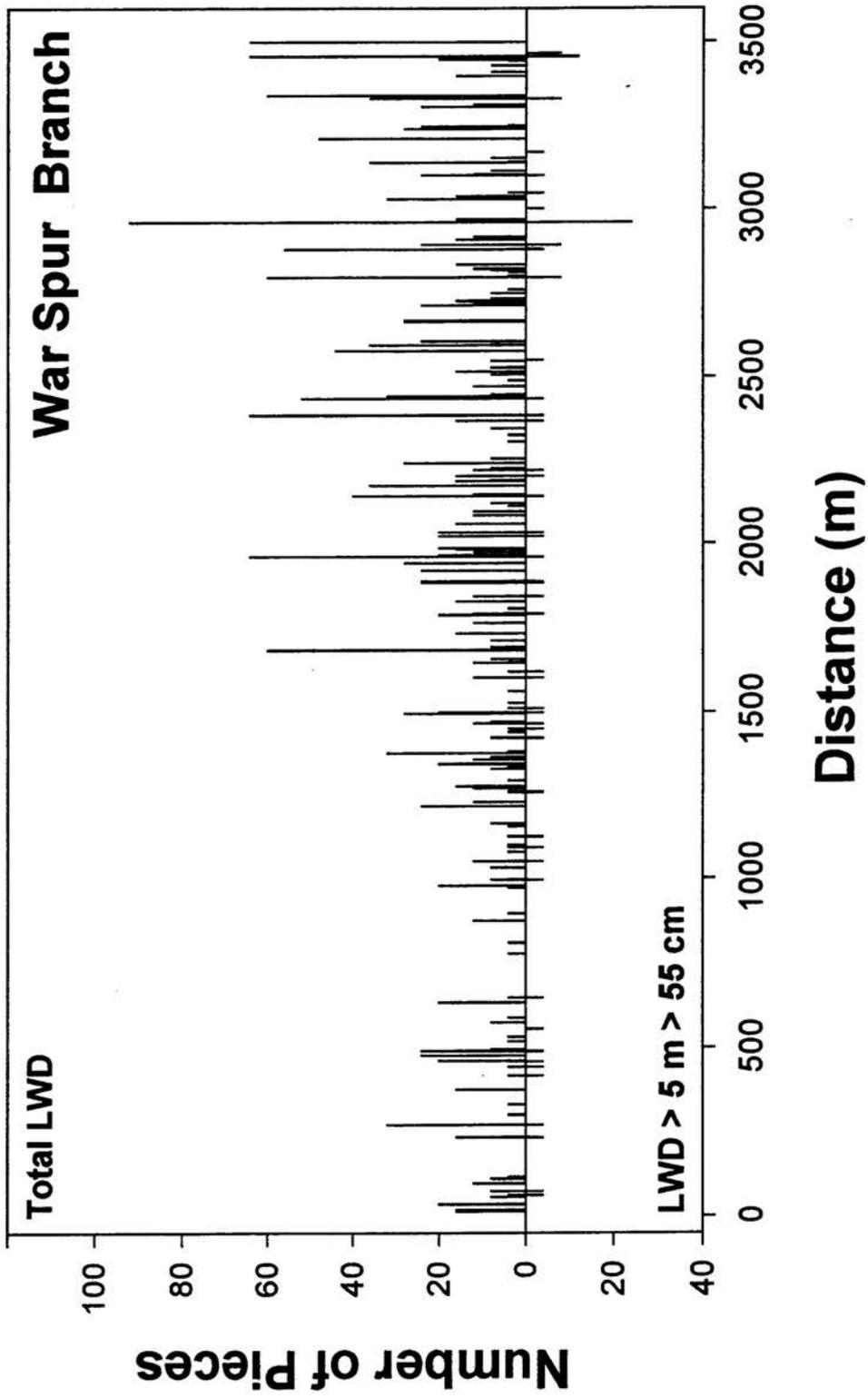


**Box plots representing maximum and average depths for pools and riffles, and average residual pool depths for this stream. The boxes enclose the middle 50% of the observations, the bar in the center of the boxes represent the median, and the capped lines extending above and below the boxes represent the 90% and 10% quantiles.**

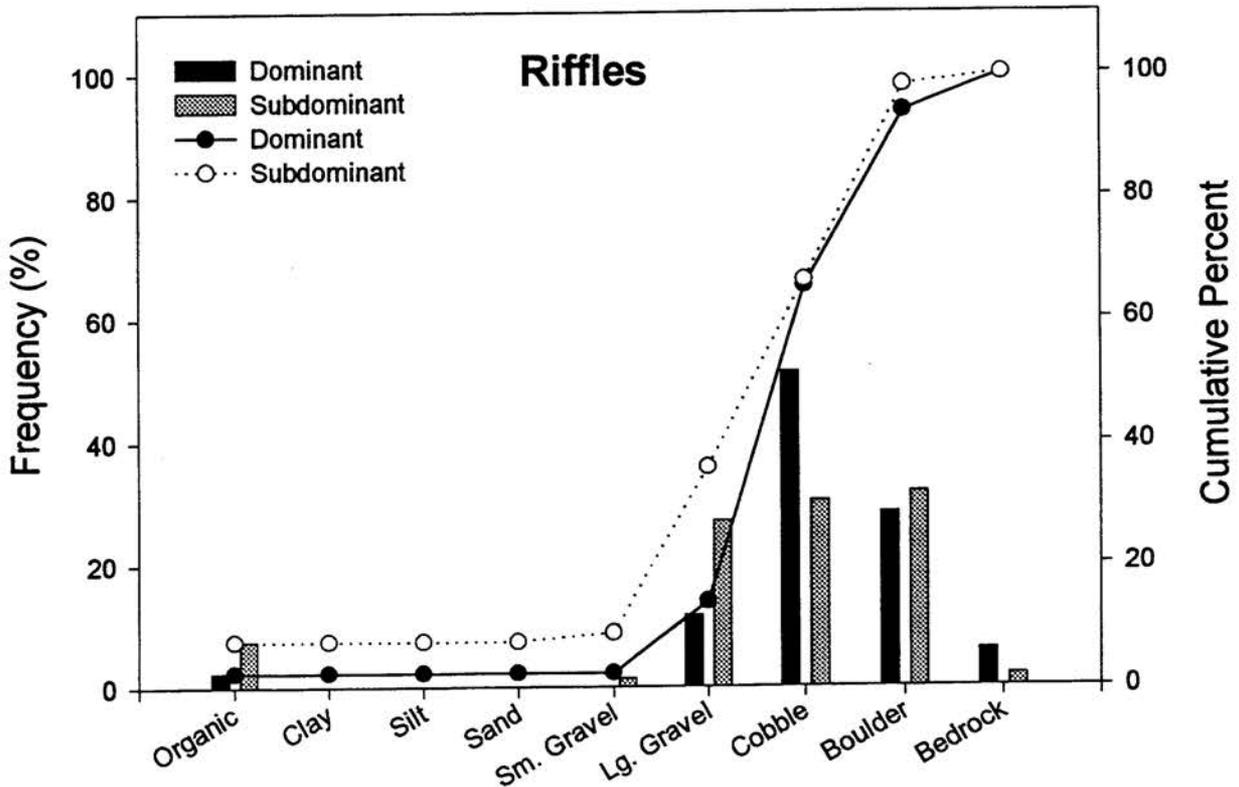
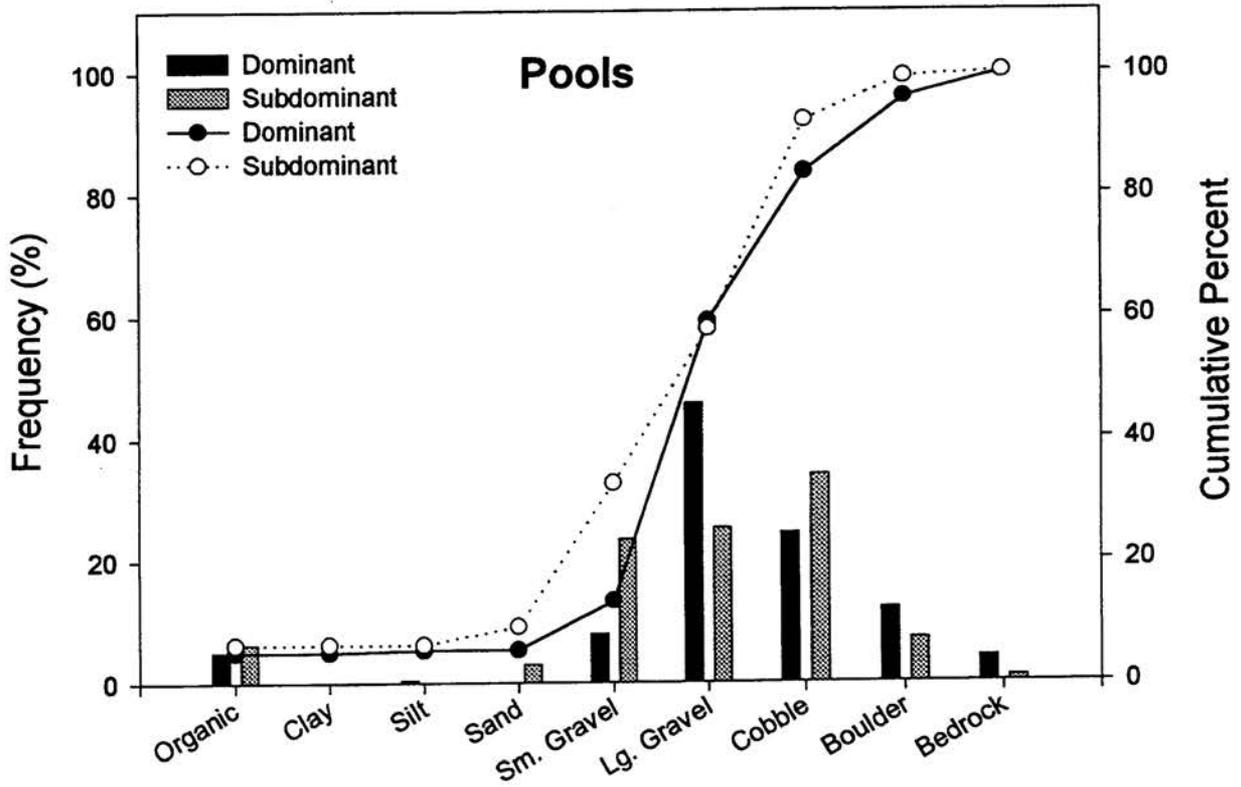
## War Spur Branch

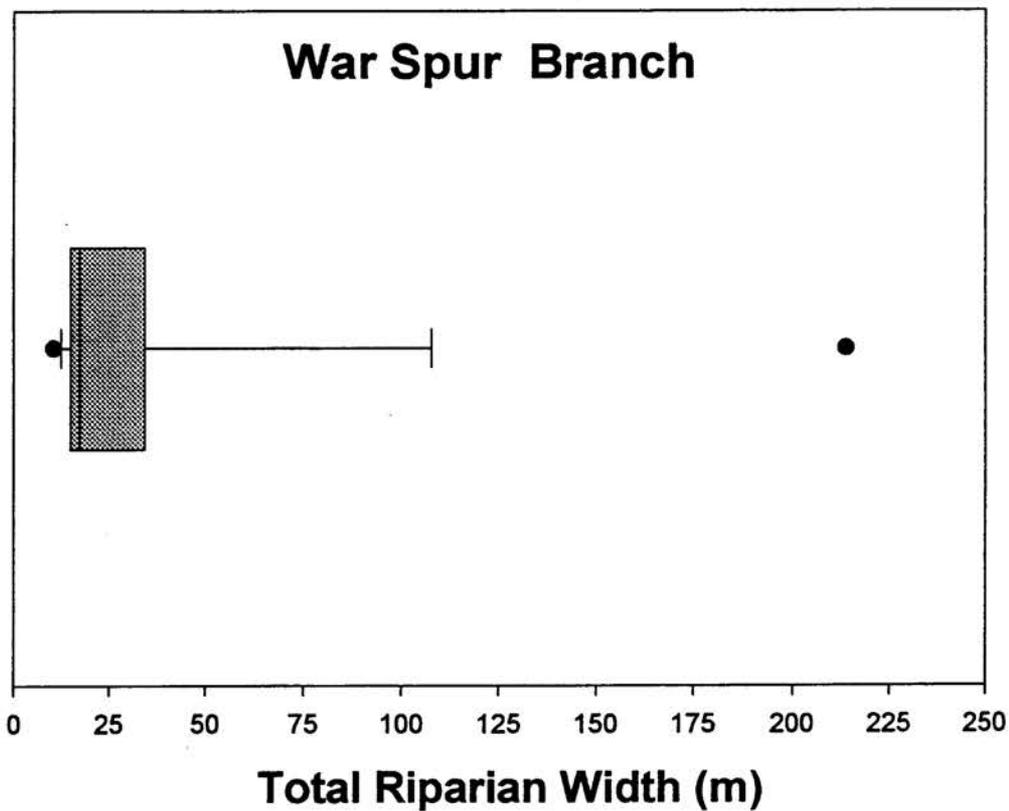


# Distribution and Abundance of Large Woody Debris



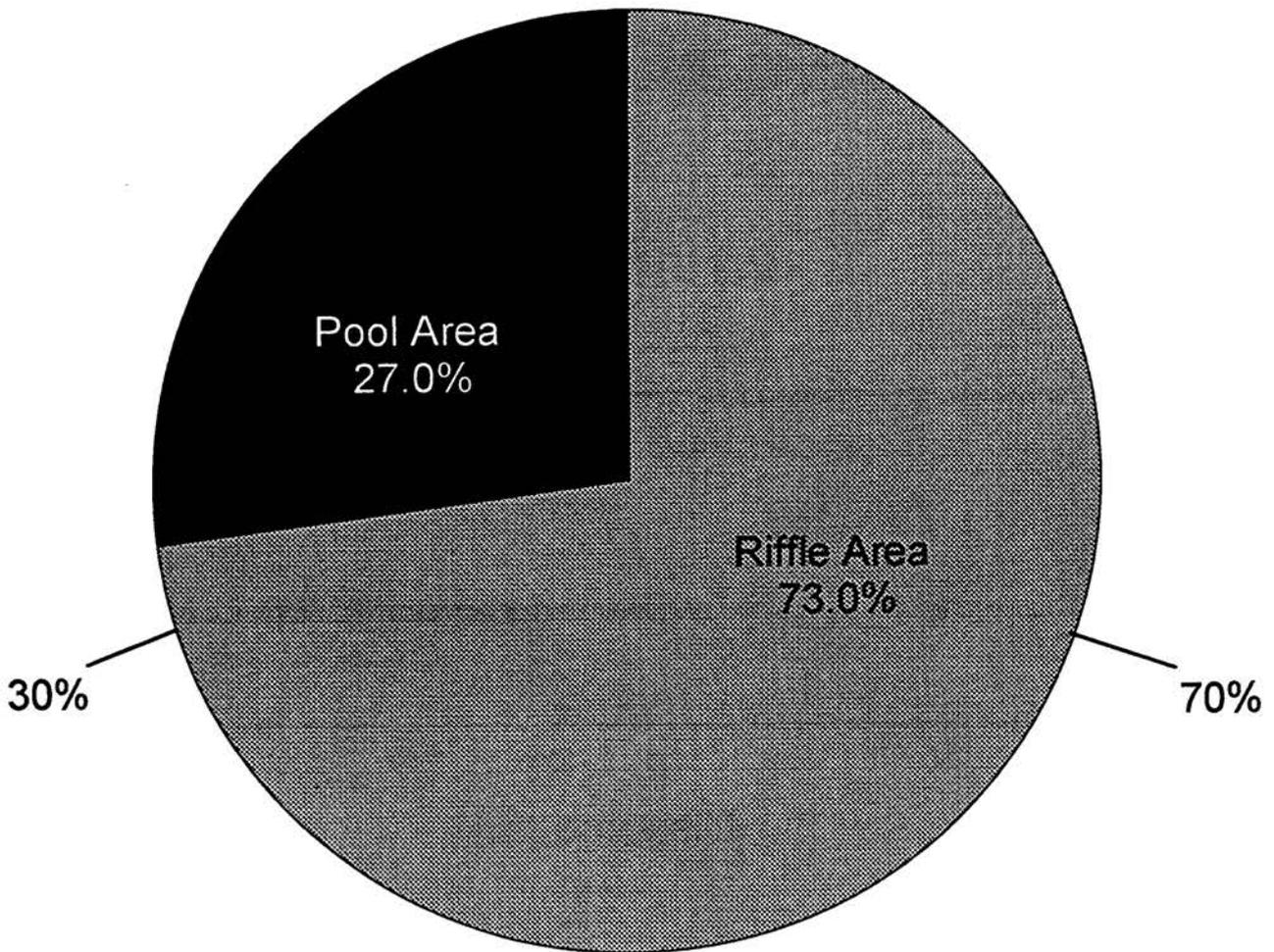
## War Spur Branch Substrate Composition



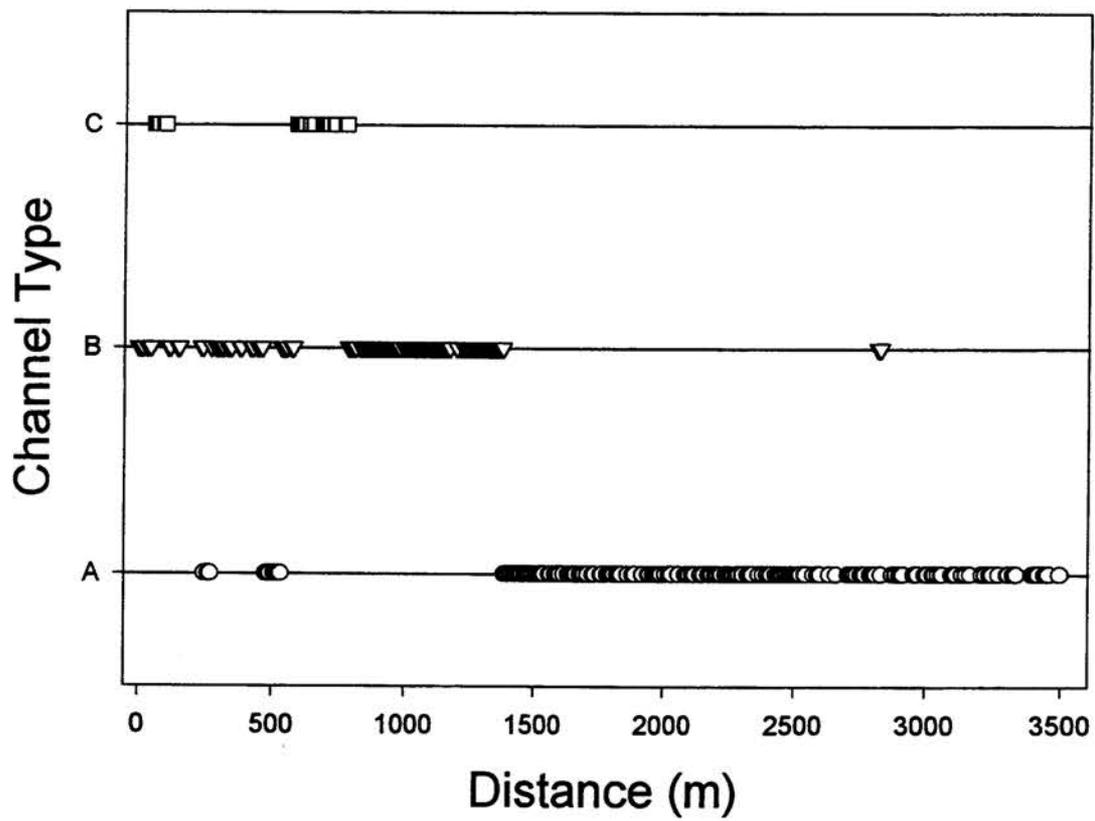
**Riparian Width****Stream: War Spur Branch****Number of Measurements: 12****Mean Width: 39.2m Std Dev: 57.0****Max: 213.9m Min: 10.4m**

Box plot of total riparian width. The box encloses the middle 50% of the observations, the bar in the center of the box represents the median, and the capped lines extending above and below the box represent the 90% and 10% quantiles.

**War Spur Branch  
Pool:Riffle Ratio  
DFC: 30 - 70% of the Stream Area  
in Pool Habitat**



## War Spur Branch Rosgen's Channel Type Distribution



### Appendix 1a. Substrate classification criteria.

#### SUBSTRATE CLASSES

1	organic debris
2	clay
3	silt
4	silt- 2mm sand
5	2-10mm small gravel
6	1-10cm large gravel
7	11-30cm cobble
8	30cm boulder
9	bedrock

### Appendix 1b. Large woody debris (LWD) classification criteria.

#### LWD SIZE CLASSES

- 1 < 5 m (length) and < 55 cm (diameter)
- 2 < 5 m (length) and > 55 cm (diameter)
- 3 > 5 m (length) and < 55 cm (diameter)
- 4 > 5 m (length) and > 55 cm (diameter)

### Appendix 1c. Rosgen's channel type criteria, table from Rosgen 1996.

Stream TYPE →	A	B	C	D	DA	E	F	G	
Dominated Bed Material	Bedrock 1								
	Boulder 2								
	Cobble 3								
	Gravel 4								
	Sand 5								
	Silt-Clay 6								
Entrchmnt	< 1.4	1.4 - 2.2	> 2.2	n/a	> 4.0	> 2.2	< 1.4	< 1.4	
WD Ratio	< 12	> 12	> 12	> 40	< 40	< 12	> 12	< 12	
Sinuosity	1 - 1.2	> 1.2	> 1.2	n/a	variable	> 1.5	> 1.2	> 1.2	
Slope	.04-.099	.02-.039	< .02	< .04	< .005	< .02	< .02	.02-.039	

