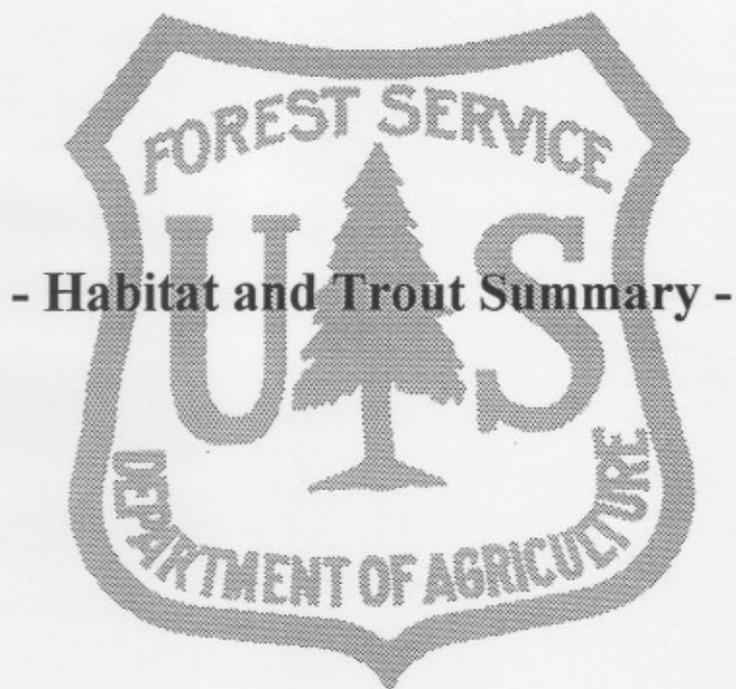


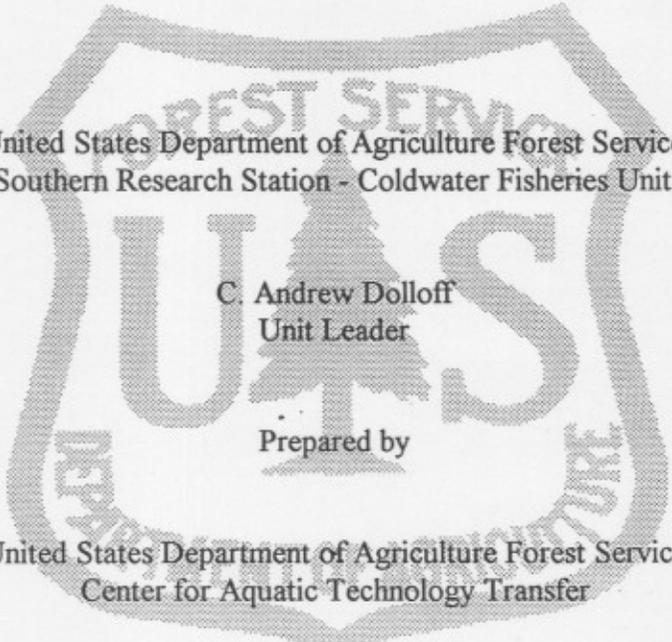
**West Fork Chattooga Watershed:
Overflow Creek, Abes Creek, East Fork Overflow Creek,
and West Fork Overflow Creek**



**Southern Research Station
Coldwater Fisheries Research Unit
and
Center for Aquatic Technology Transfer**

**West Fork Chattooga Watershed:
Overflow Creek, Abes Creek, East Fork Overflow Creek, and West Fork
Overflow Creek**

- Habitat and Trout Summary -



United States Department of Agriculture Forest Service
Southern Research Station - Coldwater Fisheries Unit

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February 1996

Background

Between Spring 1989 and Fall 1993 we inventoried 10 streams in the Chattooga watershed in Georgia and North Carolina. Basinwide Visual Estimation Techniques (BVET) were used to estimate stream habitat, fish abundance, and fish distribution in each selected stream.

Here we provide a summary of Spring 1993 habitat conditions, trout distribution and density, and length frequency of trout in four streams in North Carolina for the North Carolina Wildlife Resources Commission. These streams are 1) Overflow Creek, 2) East Fork Overflow Creek, 3) Abes Creek, and 4) West Fork Overflow Creek.

Methods

Surveys started at stream confluences and progressed upstream to the end of the respective stratum. Overflow Creek began at Three Forks, Georgia and ended at the confluence of East Fork Overflow Creek and Abes Creek. Surveys for Abes Creek, East Fork Overflow Creek, and West Fork Overflow Creek began at their confluence with Overflow Creek and ended when survey crews determined the stream to be intermittent.

Habitat Survey - Visual estimation techniques were used to estimate total surface area of selected habitat types and abundance of trout in West Fork Chattooga watershed. Sampling strata were based on naturally occurring habitat units such as pools, glides, riffles, and cascades (Dolloff et al. 1993).

All habitat in the study section was classified and inventoried by a two-person crew. On the first pass through the study section one crew member identified each habitat unit by type, visually classified the dominant and subdominant substratum (Table 1), and estimated surface area. Another crew member estimated the average and maximum depth of each habitat unit and counted pieces of large woody debris in each of seven size classes (Table 1). 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 0.05-m increments. The length (0.1 m) of each habitat unit was measured with a hip chain.

The first unit of each habitat type selected for intensive sampling (e.g. accurate measurement of surface area, diver estimation of fish abundance and distribution) was determined randomly; additional units were selected systematically. Selected habitat units were measured and marked with an identification flag at the upper and lower boundaries. The area of these systematically selected habitat units was measured with a 15-m measuring tape.

Underwater Survey - Underwater observations were made in systematically selected habitat units. When a sample unit was encountered, two observers, using face masks and snorkels, started at the downstream end and proceeded slowly upstream to the head of the unit while searching for all species of fish.

Electrofishing Survey - Trout abundance was determined in systematically selected snorkeled habitat units by three-pass removal using two AC backpack electrofishing units (Zippin 1958). All fish captured during the two- or three-pass depletions were identified, weighed (g), and measured (mm).

Table 1. Criteria for substrate and large woody debris (LWD) classifications.

SUBSTRATE		LWD SIZE		
CLASS	Diameter	CLASS	Length	Diameter
organic debris		1	$\geq 1; < 5$ m	5-10cm
clay		2	$\geq 1; < 5$ m	10-50cm
silt		3	$\geq 1; < 5$ m	> 50cm
sand	silt- 2mm	4	≥ 5 m	5-10cm
small gravel	2-10mm	5	≥ 5 m	10-50cm
large gravel	1-10cm	6	≥ 5 m	> 50cm
cobble	11-30cm	7	root wads	
boulder	30cm			
bedrock				

User's Guide

Stream summaries are organized by watershed position: downstream to upstream. Each stream summary contains seven graphs, respectively:

- 1) Length frequency of all trout species capture during electrofishing surveys. Each length frequency histogram is accompanied by a table of the survey data. Data labeled 'Extra' represent fish collected in addition to those in the systematically selected habitat units.
- 2) Box plots of the surface area of all habitats inventoried in each stream. Visual estimates of surface area were corrected by multiplying all estimates by a calibration ratio (Hankin and Reeves 1988). The box encloses the middle 50% of the observations, the capped lines below and above the box represents the 10% and 90% quantiles, respectively, and the solid line in the box represents the median.
- 3) Box plots of the maximum depth of all habitats inventoried in each stream. The box encloses the middle 50% of the observations, the capped lines below and above the box represents the 10% and 90% quantiles, respectively, and the solid line in the box represents the median.
- 4) Dominant substrate composition by habitat type in each stream. Bars represent frequency (percent) and dots represent cumulative percent.
- 5) Pieces of large woody debris by size class in each stream. Bars represent frequency (percent) and dots represent cumulative percent.
- 6) Distribution of large woody debris in each stream.

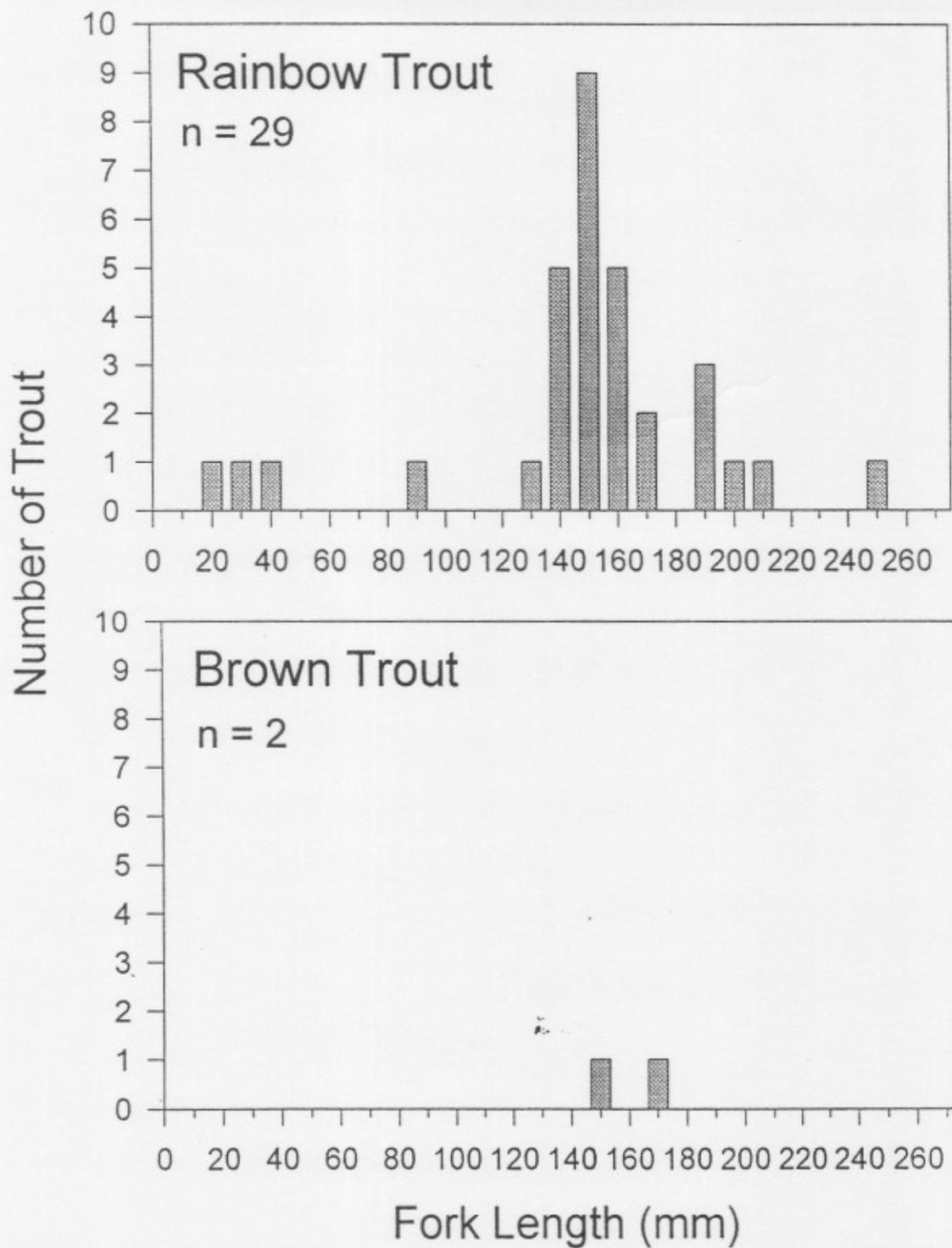
7) Distribution and relative abundance (number / 100 m²) of all trout species in each stream. Densities are based on diver counts.

*Habitat was summarized from 380 habitat units (37 cascades, 57 riffles, 113 glides, 173 pools) in Overflow Creek, 269 habitat units (34 cascades, 54 riffles, 45 glides, 136 pools) in Abes Creek, 361 habitat units (58 cascades, 70 riffles, 69 glides, 164 pools) in East Fork Overflow Creek, and 224 habitat units (43 cascades, 41 riffles, 54 glides, 86 pools) in East Fork Overflow Creek.

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.
- Zippin, C. 1959. The removal method of population estimation. *Journal of Wildlife Management*. 22: 82-90.

Overflow Creek

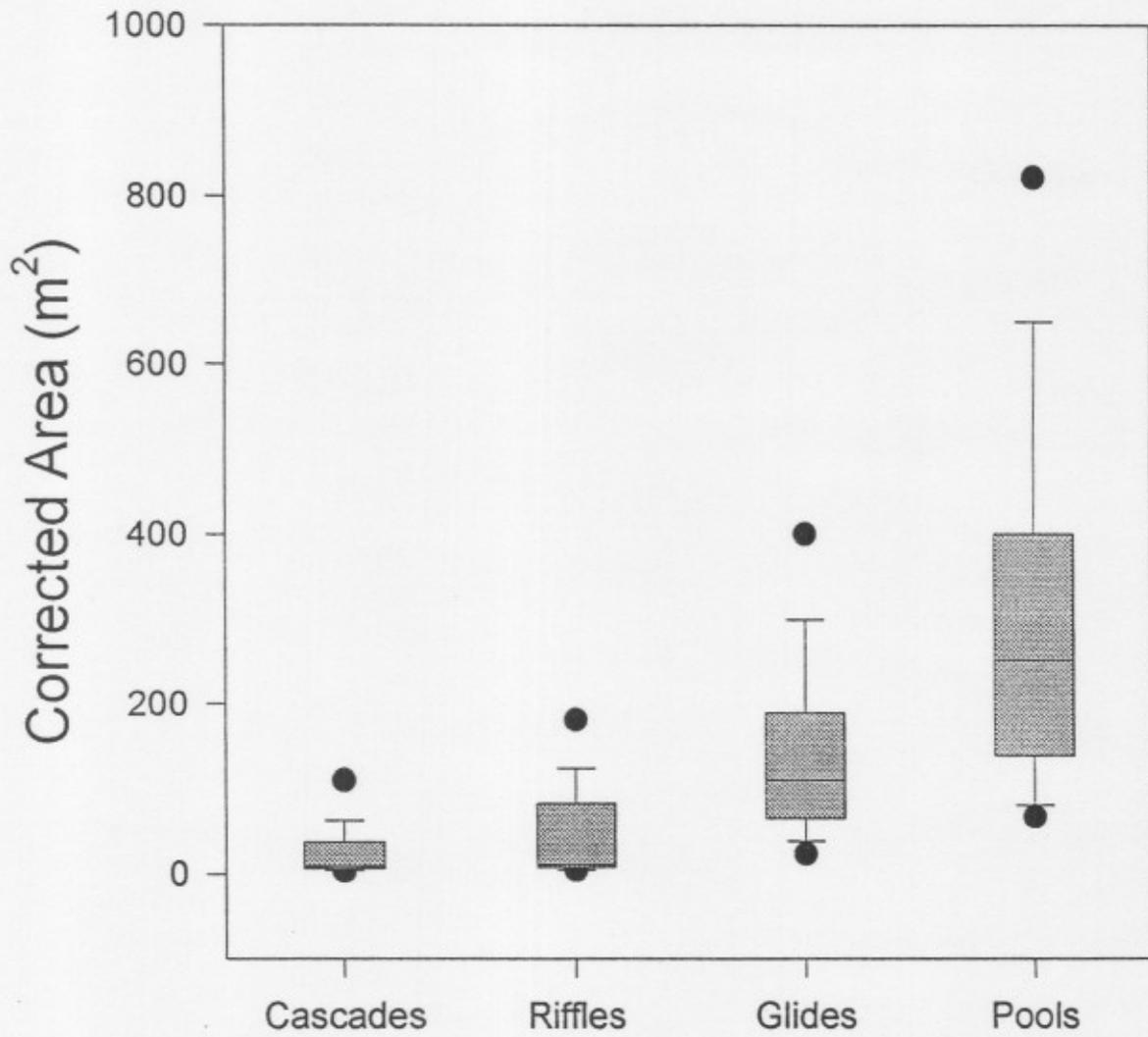


Length frequency of trout in Overflow Creek, Georgia captured near the North Carolina state line in Spring 1993. Lengths (total and fork) and weights are given in Table 2.

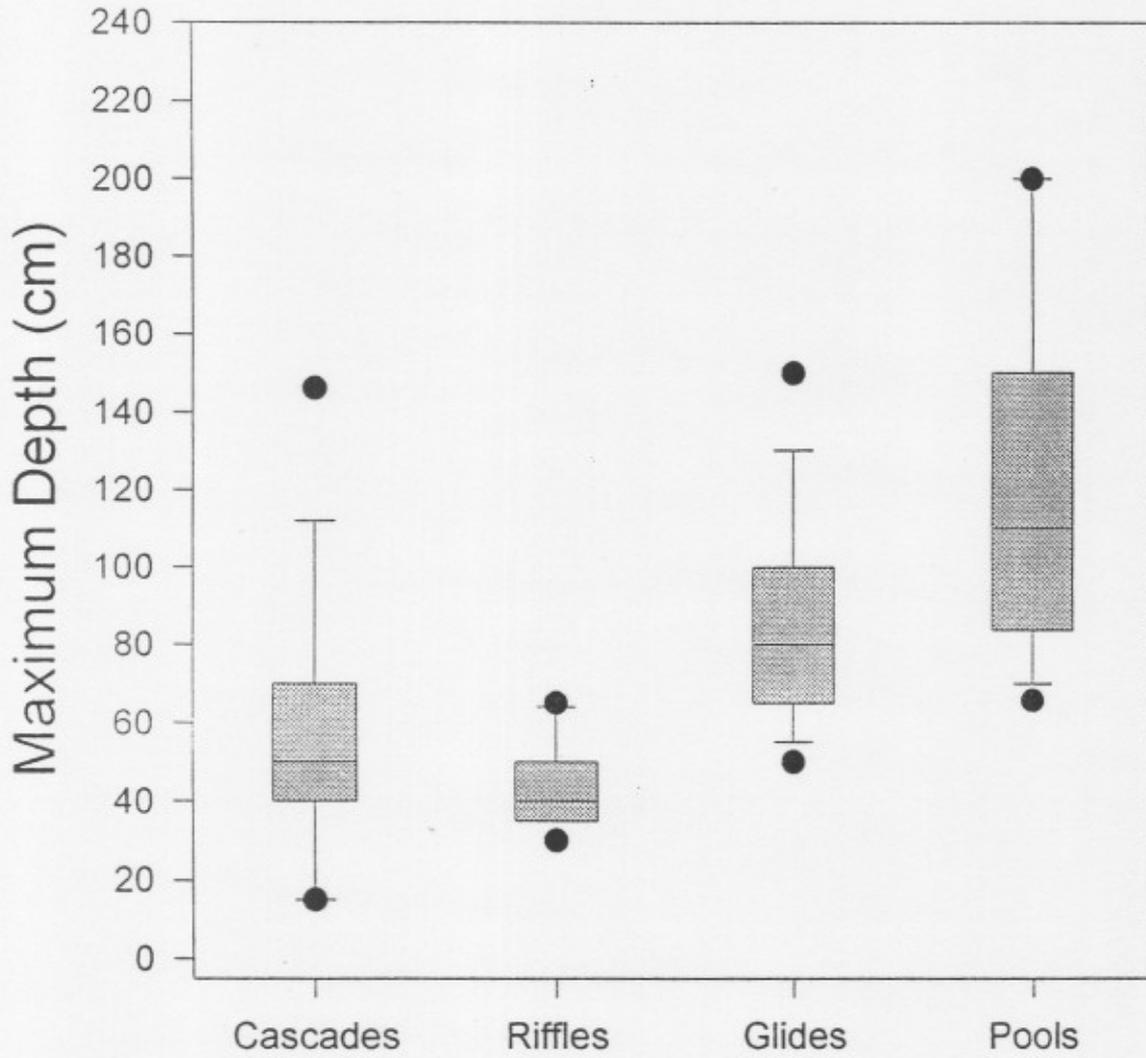
Table 2. Electrofishing data collected in Overflow Creek, Georgia near the North Carolina state line in Spring 1993.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Pool	172.3	1	Rainbow Trout	183	190	75.8
		1	Rainbow Trout	148	155	37.1
		1	Rainbow Trout	142	151	34.7
		2	Rainbow Trout	143	152	37.2
		2	Rainbow Trout	154	161	41.4
		3	Rainbow Trout	22	22	0.2
		3	Rainbow Trout	139	151	39.2
		3	Rainbow Trout	157	167	42.2
Glide	217.5	1	Rainbow Trout	200	211	101.6
		1	Rainbow Trout	148	160	37.8
		1	Rainbow Trout	181	190	73.6
		1	Rainbow Trout	141	149	34.7
		2	Rainbow Trout	245	259	142.8
		2	Rainbow Trout	142	156	40.9
		3	Rainbow Trout	153	161	45.0
		3	Rainbow Trout	190	202	74.4
		3	Rainbow Trout	150	158	42.9
		3	Rainbow Trout	169	180	58.1
Riffle	126.0	1	Rainbow Trout	151	159	43.8
		1	Rainbow Trout	36	37	0.5
		2	NONE			
		3	NONE			
Pool	180.5	1	Rainbow Trout	19	19	0.1
		1	Rainbow Trout	135	143	28.9
		1	Rainbow Trout	137	145	27.5
		1	Rainbow Trout	145	157	37.5
		2	Rainbow Trout	203	220	91.1
		2	Brown Trout	149	159	43.0
		3	Rainbow Trout	136	145	37.5
Pool	453.0	1	Rainbow Trout	129	137	25.5
		1	Brown Trout	169	180	55.2
		1	Blacknose Dace	85	92	9.6
		2	Rainbow Trout	155	165	44.1
		3	Rainbow Trout	137	146	33.1
Riffle	62.4	1	NONE			
		2	NONE			
		3	NONE			

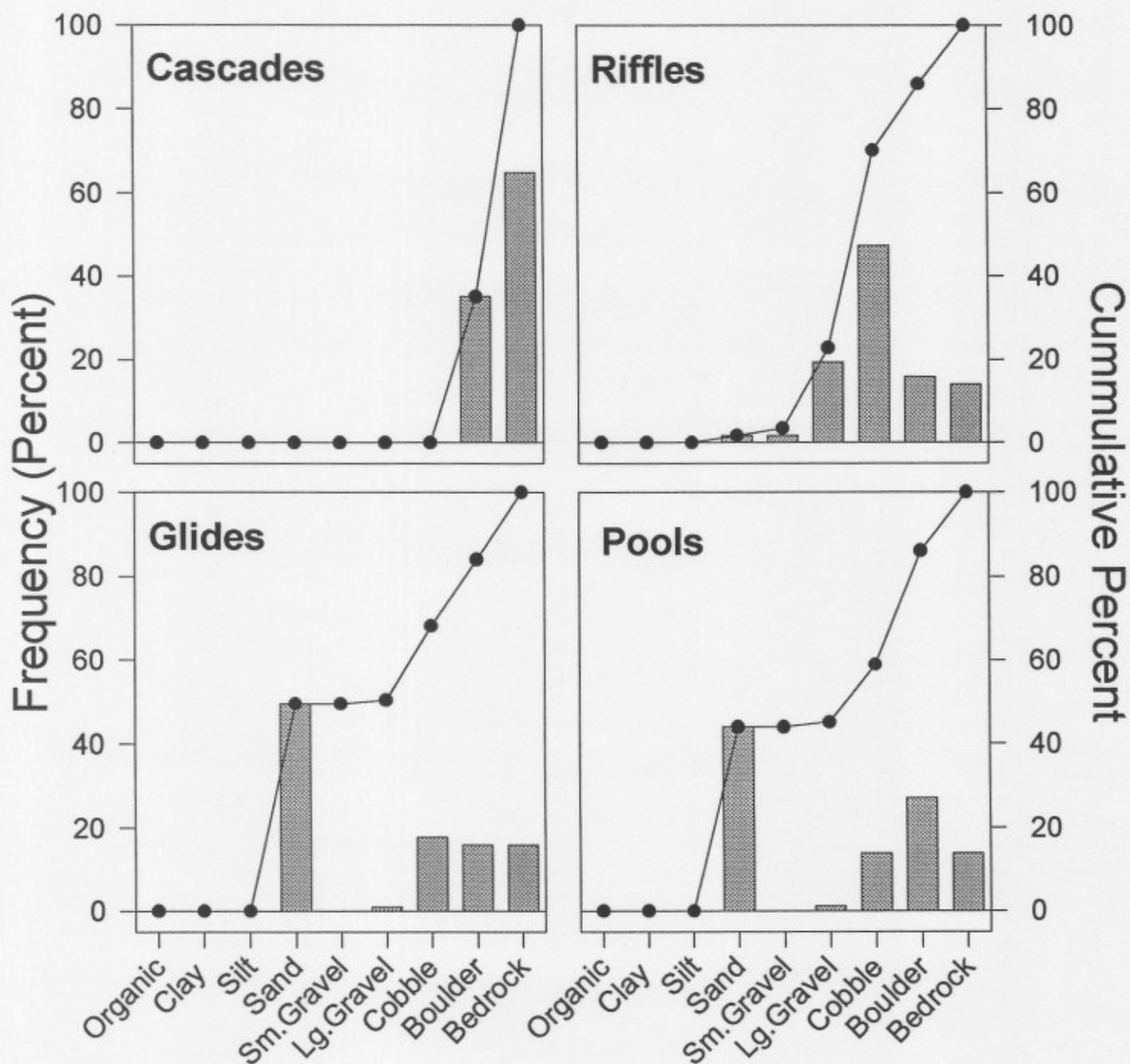
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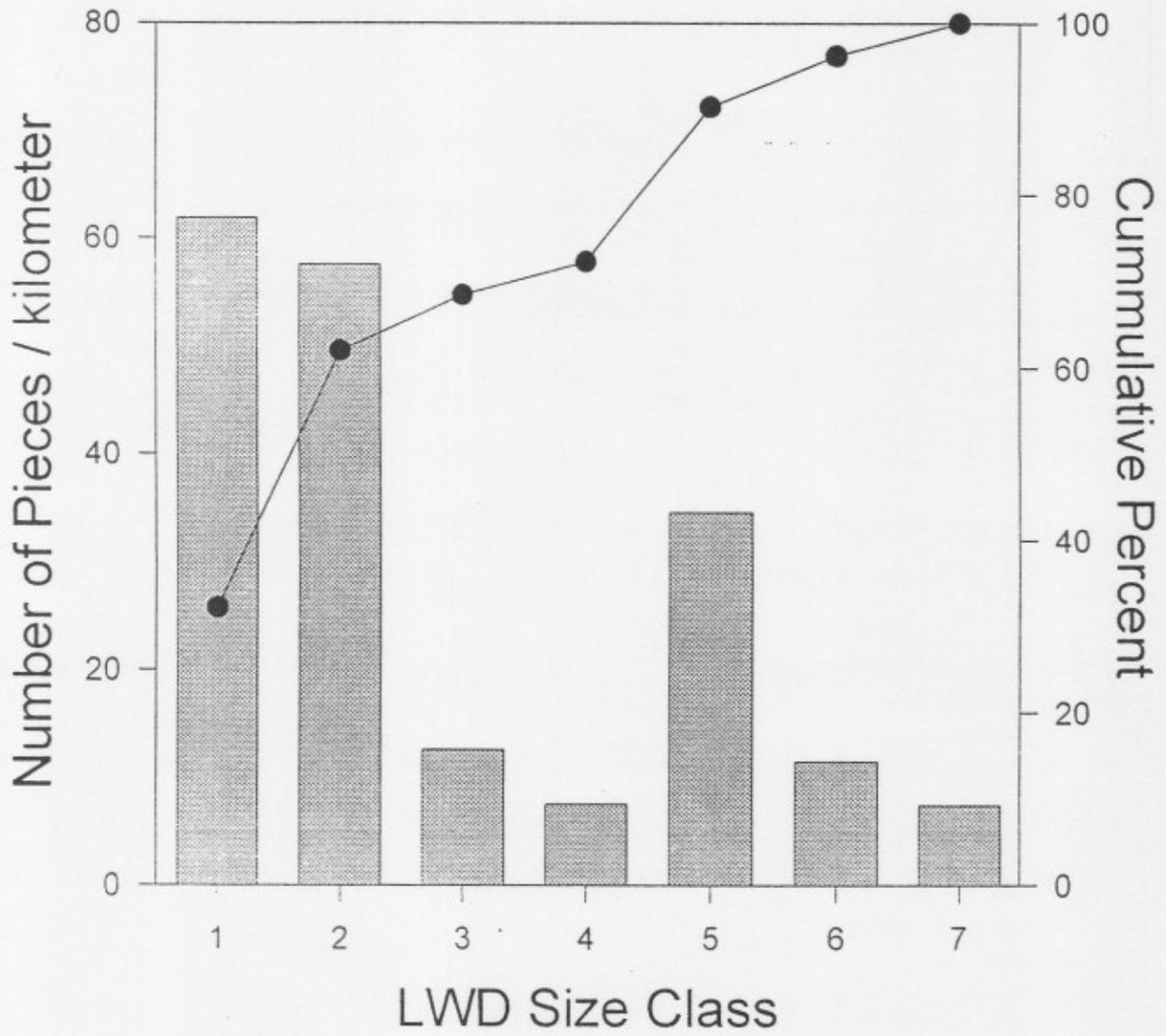
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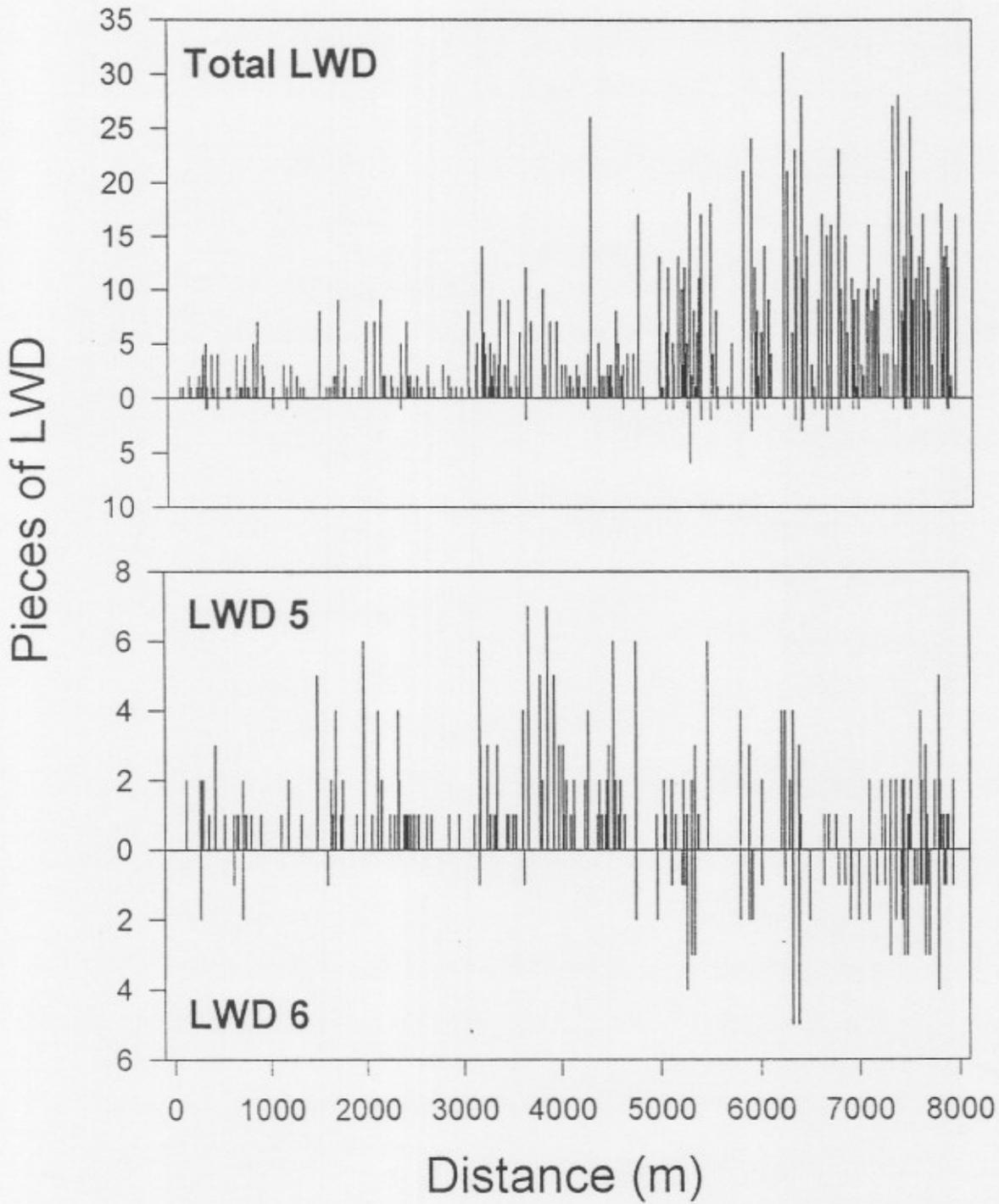
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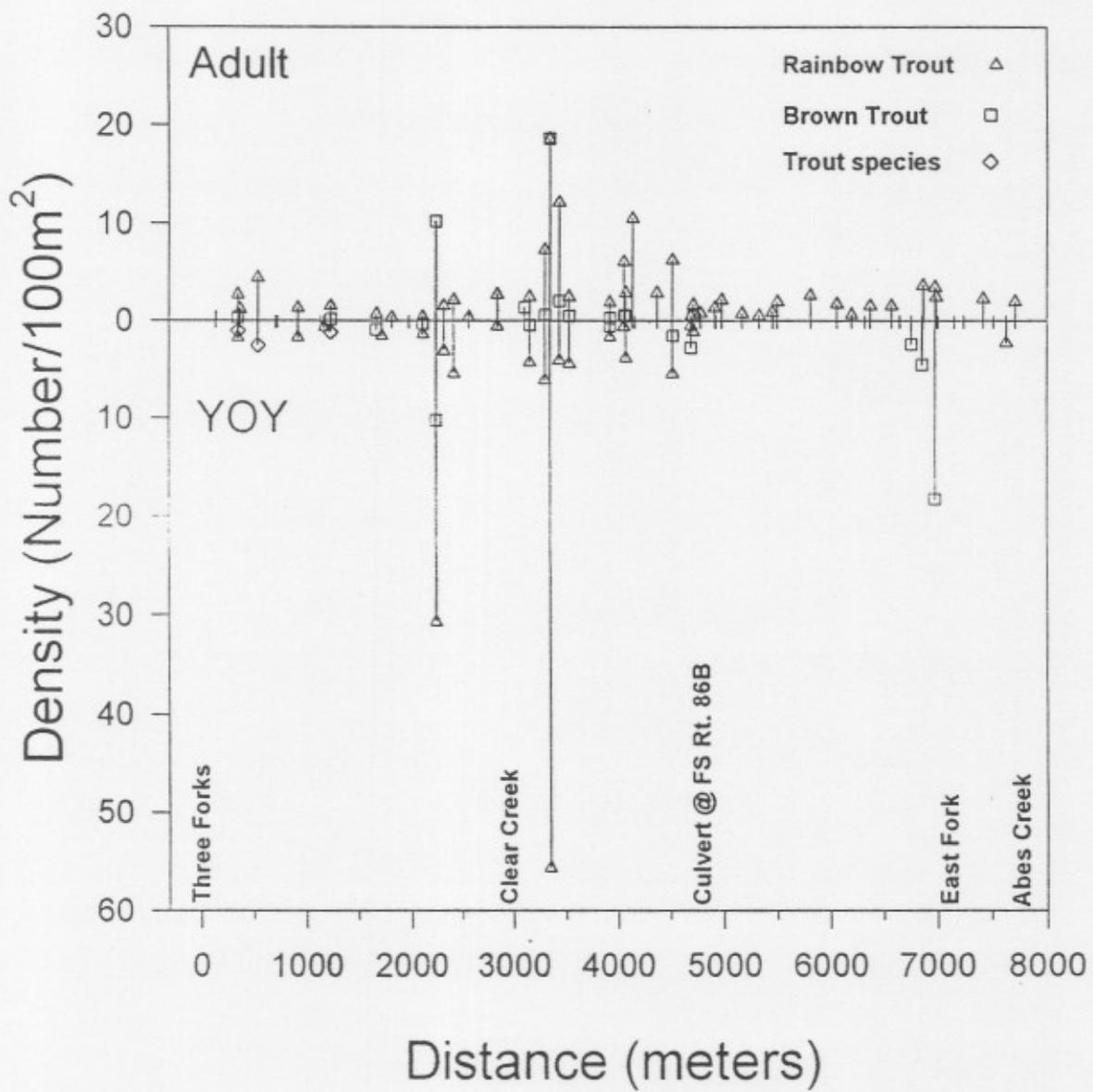
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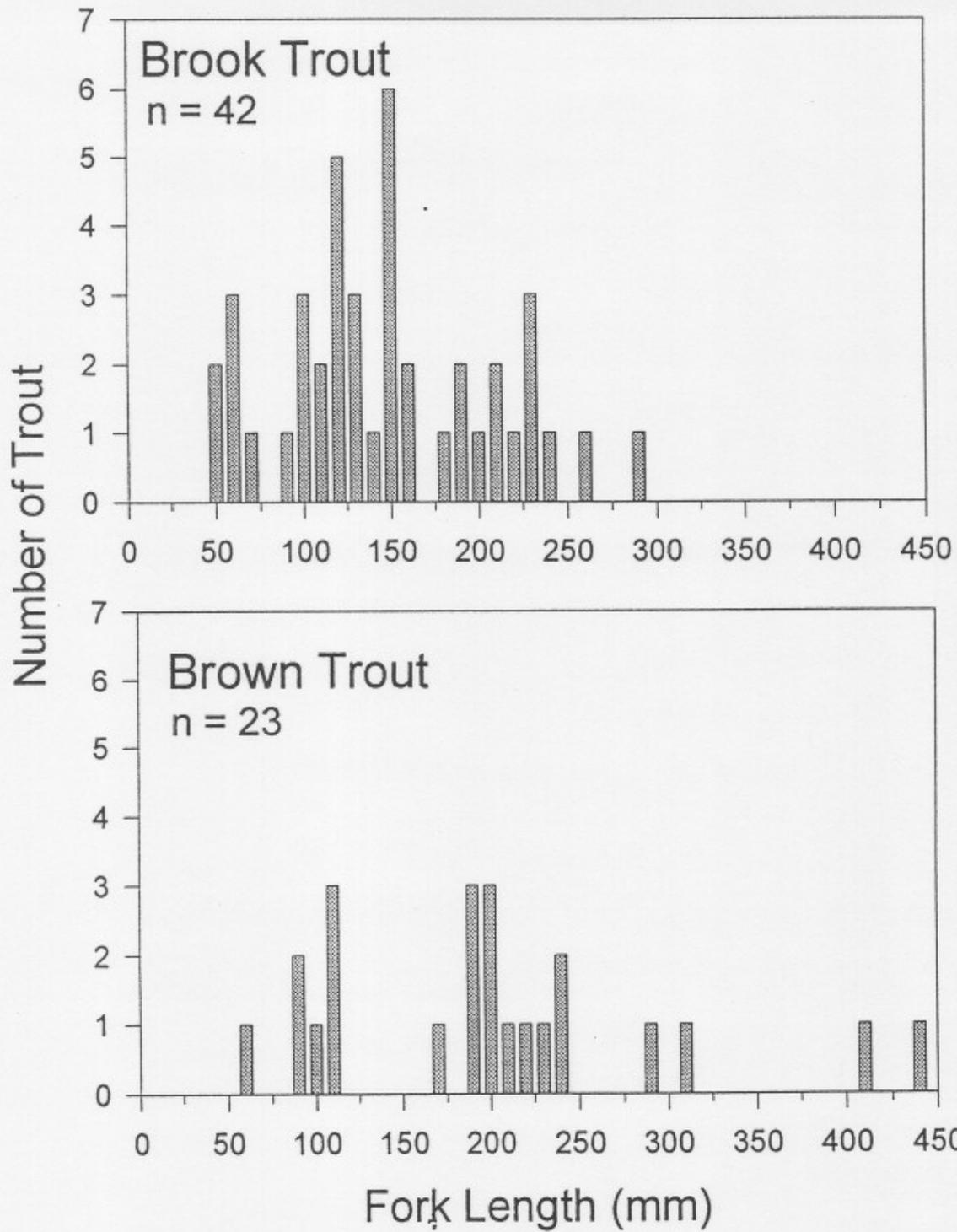
Overflow



Overflow



**East Fork Overflow
Creek**



Length frequency of trout in systematically selected habitat units in East Fork Overflow Creek, North Carolina in Spring 1993. Lengths (total and fork) and weights are given in Table 3.

Table 3. Electrofishing data collected in systematically selected habitat units in East Fork Overflow Creek, North Carolina in Spring 1993.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Cascade	9.2	1	None			
		2	None			
Pool	696.0	1	Brown Trout	103	105	2.9
		2	Brown Trout	60	70	3.4
			Brown Trout	107	108	2.5
			Brown Trout	110	150	6.9
		3	Brown Trout	88	90	1.8
			Brown Trout	90	92	2.6
Riffle	36.0	1	None			
		2	None			
Riffle	46.8	1	None			
		2	None			
Riffle	106.2	1	None			
		2	None			
Pool	37.5	1	Brook Trout	81	83	1.3
		2	None			
Riffle	23.5	1	None			
		2	None			
Pool	28.6	1	None			
		2	None			
Pool	65.0	1	None			
		2	None			
Pool	41.3	1	None			
		2	None			
Cascade	6.3	1	None			
		2	None			
Riffle	19.8	1	None			
		2	None			
Pool	72.6	1	None			
		2	Brook Trout	215	228	149.2
		3	Brook Trout	222	234	137.0
Cascade	25.4	1	Brook Trout	100	106	13.1
		1	Brook Trout	126	132	24.9
Extra			Brook Trout	104	109	11.7
			Brook Trout	97	102	9.6
			Brook Trout	100	115	10.5
			Brook Trout	145	150	28.3
			Brook Trout	52	54	1.8
			Brook Trout	205	213	93.3

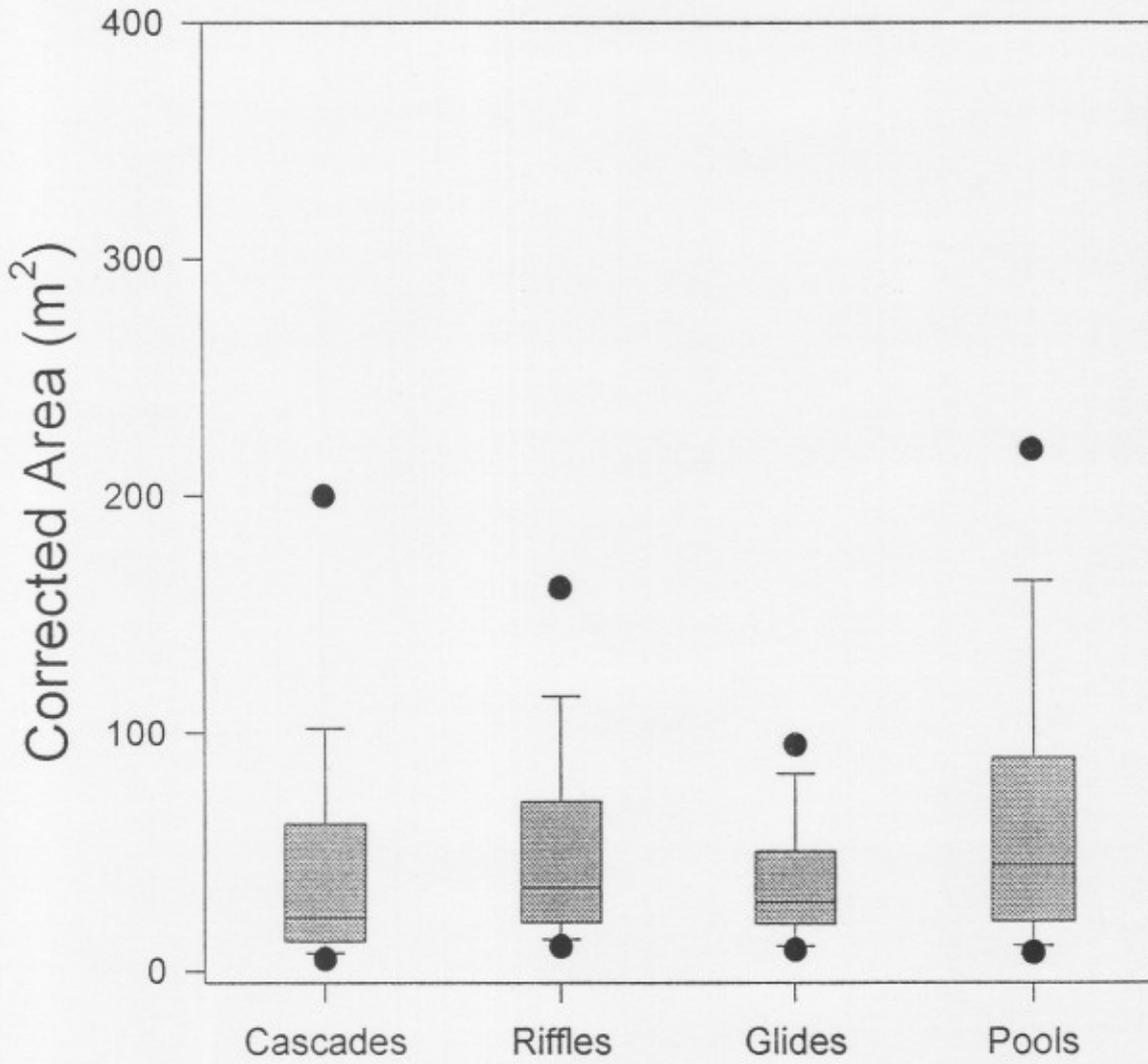
Table 3. Continued.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Extra			Brook Trout	116	123	16.2
			Brook Trout	49	51	1.4
			Brook Trout	47	50	1.0
			Brook Trout	200	210	55.6
			Brook Trout	160	168	23.8
			Brook Trout	256	262	144.7
			Brook Trout	204	208	60.9
			Brook Trout	226	236	66.1
			Brook Trout	145	151	33.1
			Brook Trout	119	125	16.3
			Brook Trout	104	109	12.1
			Brook Trout	124	131	22.5
			Brook Trout	155	164	44.1
			Brook Trout	150	158	27.0
			Brook Trout	133	140	25.5
			Brook Trout	190	200	84.0
			Brook Trout	180	190	62.1
			Brook Trout	290	304	254.8
			Brook Trout	230	240	80.8
			Brook Trout	55	57	1.9
			Brook Trout	63	66	3.1
			Brook Trout	113	118	15.5
			Brook Trout	149	155	35.5
			Brook Trout	183	187	21.5
			Brook Trout	119	126	21.1
			Brook Trout	235	248	164.3
			Brook Trout	59	61	2.1
			Brook Trout	142	148	29.0
			Brook Trout	120	129	19.8
			Brown Trout	212	214	67.7
			Brown Trout	234	242	115.4
			Brown Trout	240	252	126.2
			Brown Trout	184	192	52.1
			Brown Trout	402		500.0
			Brown Trout	435	444	
			Brown Trout	306	315	222.6
			Brown Trout	200	207	62.1
			Brown Trout	190	200	52.0
			Brown Trout	204	212	55.4
			Brown Trout	200	210	61.2
			Brown Trout	200	210	55.9
			Brown Trout	188	192	46.1

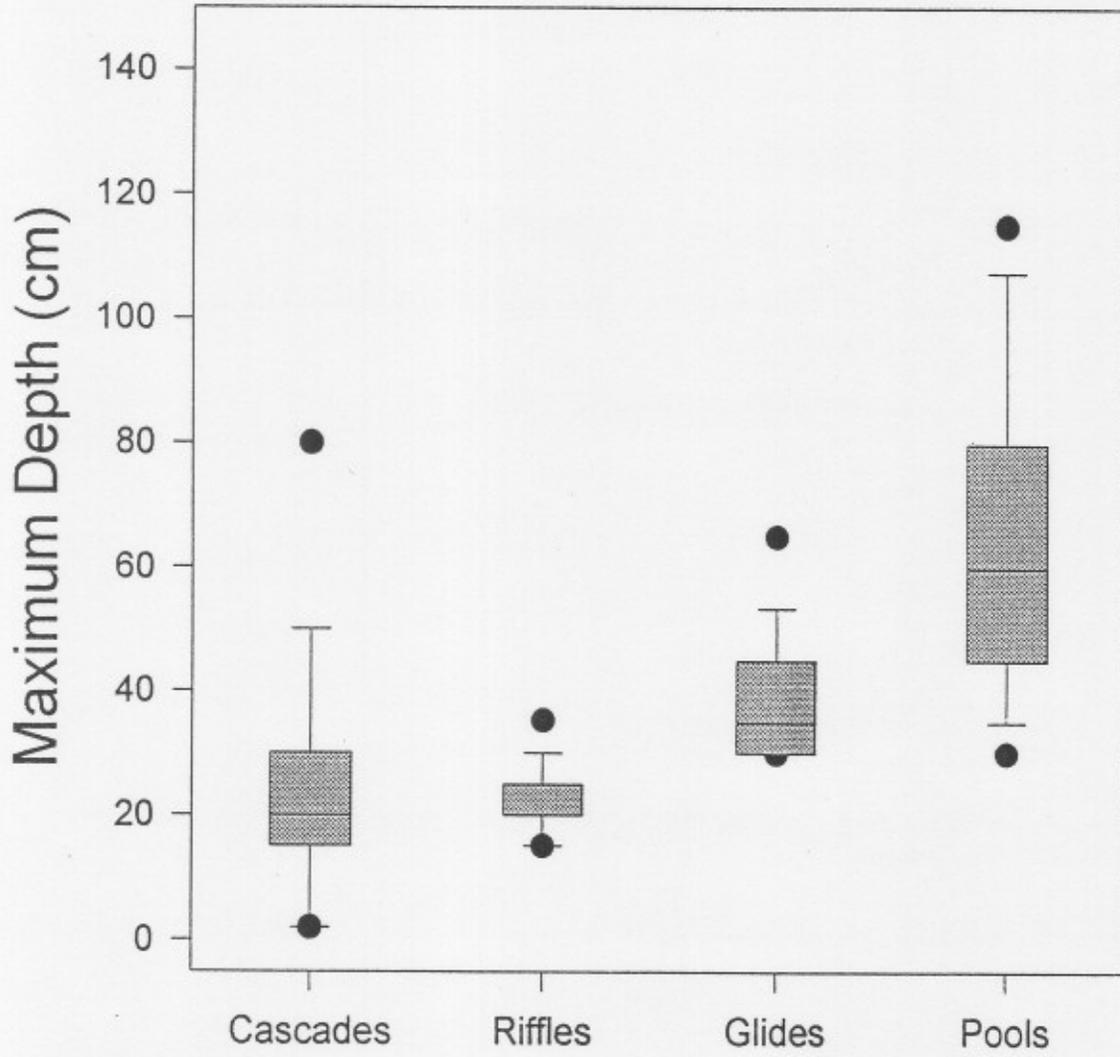
Table 3. Continued.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Extra			Brown Trout	286	292	202.4
			Brown Trout	222	230	96.7
			Brown Trout	168	172	29.0
			Brown Trout	94	98	3.4

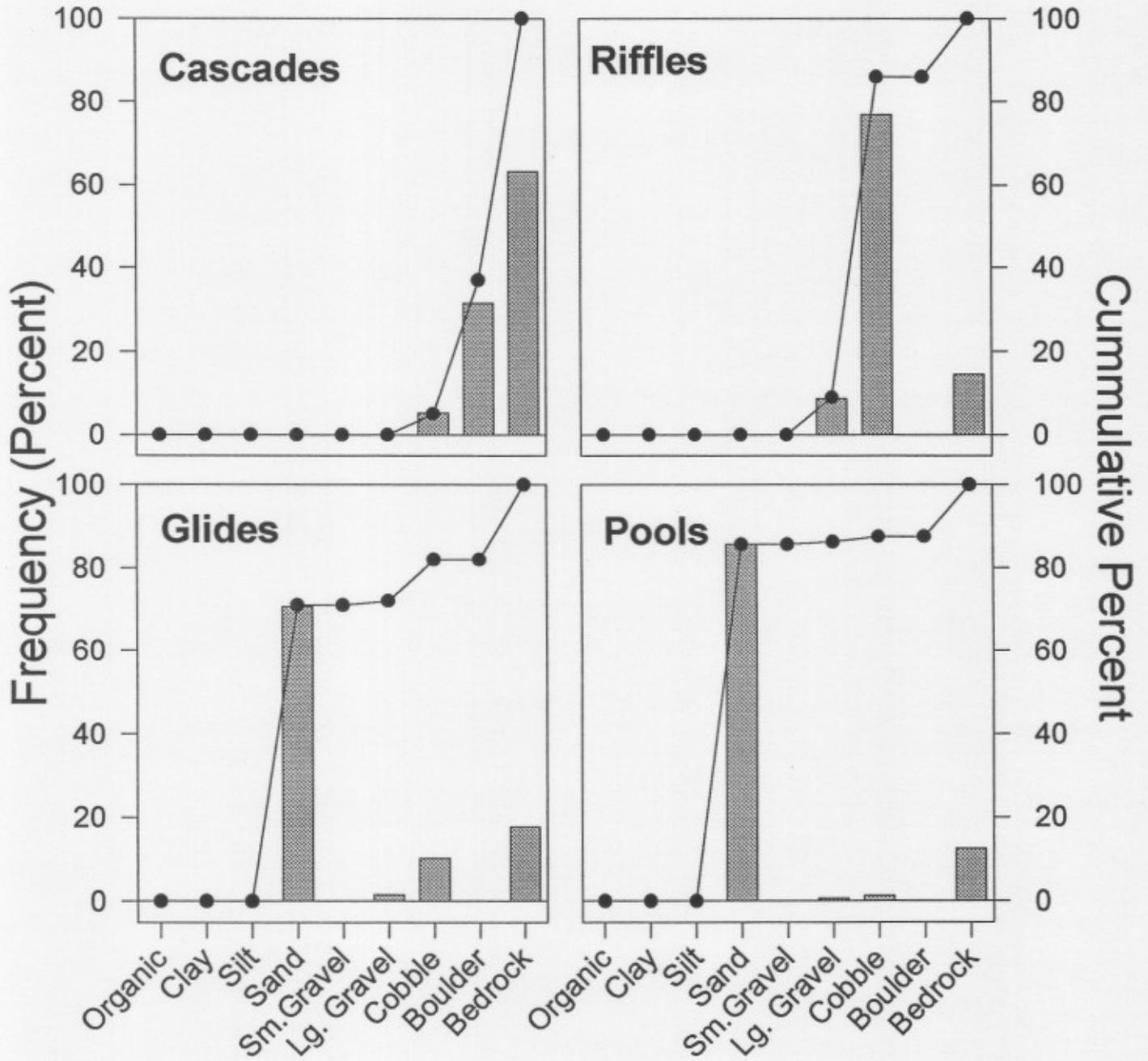
East Fork Overflow



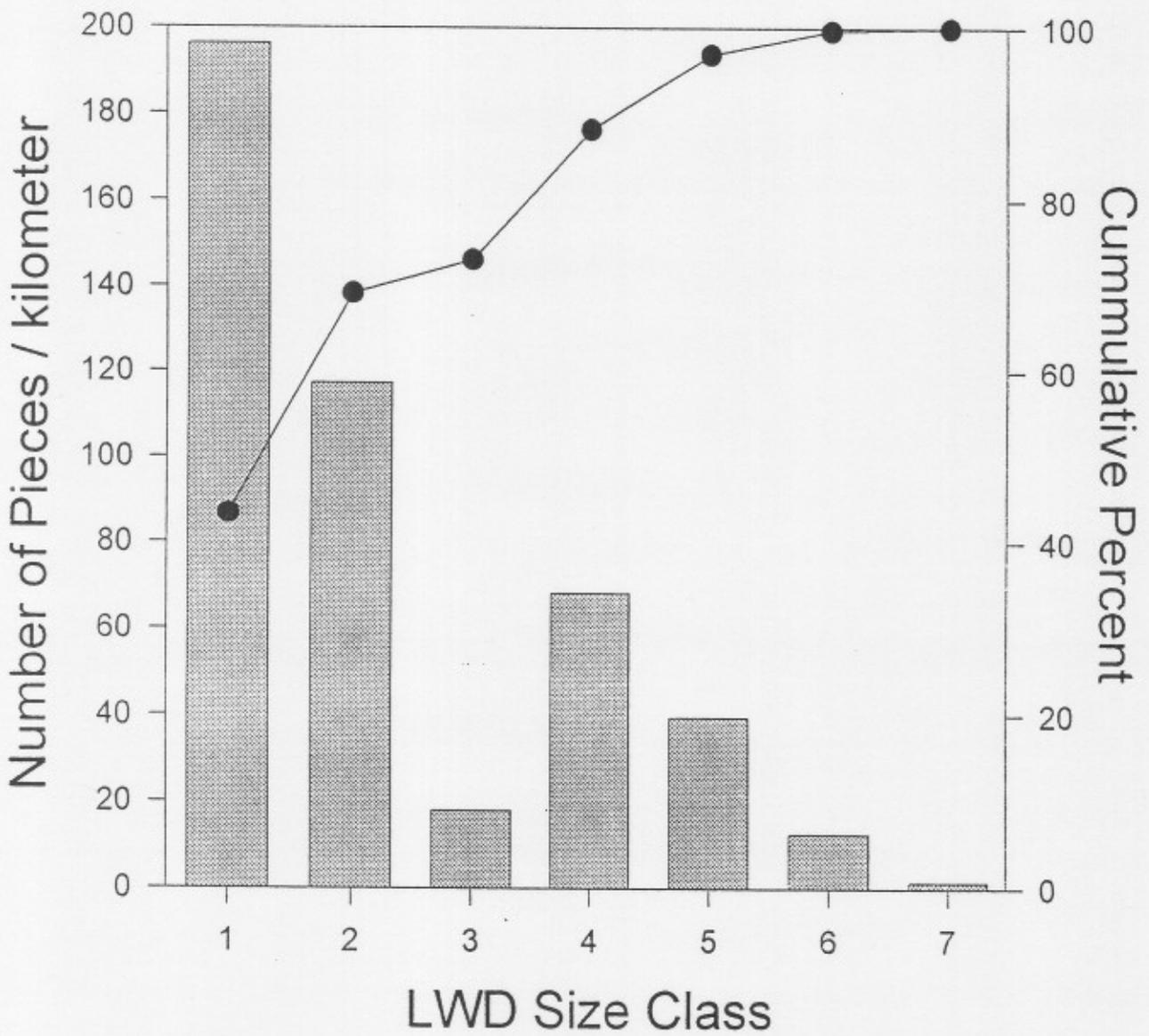
East Fork Overflow



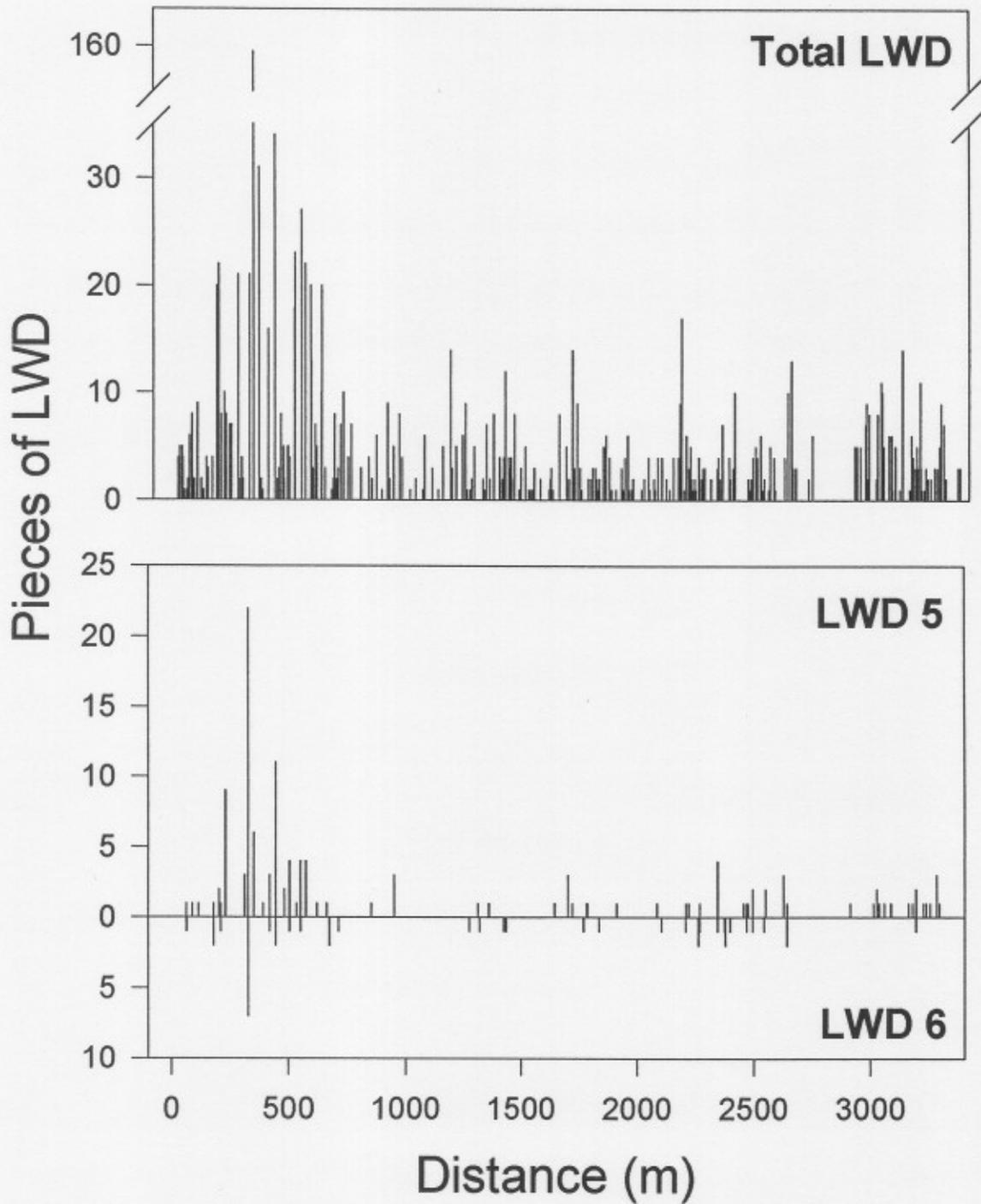
East Fork Overflow



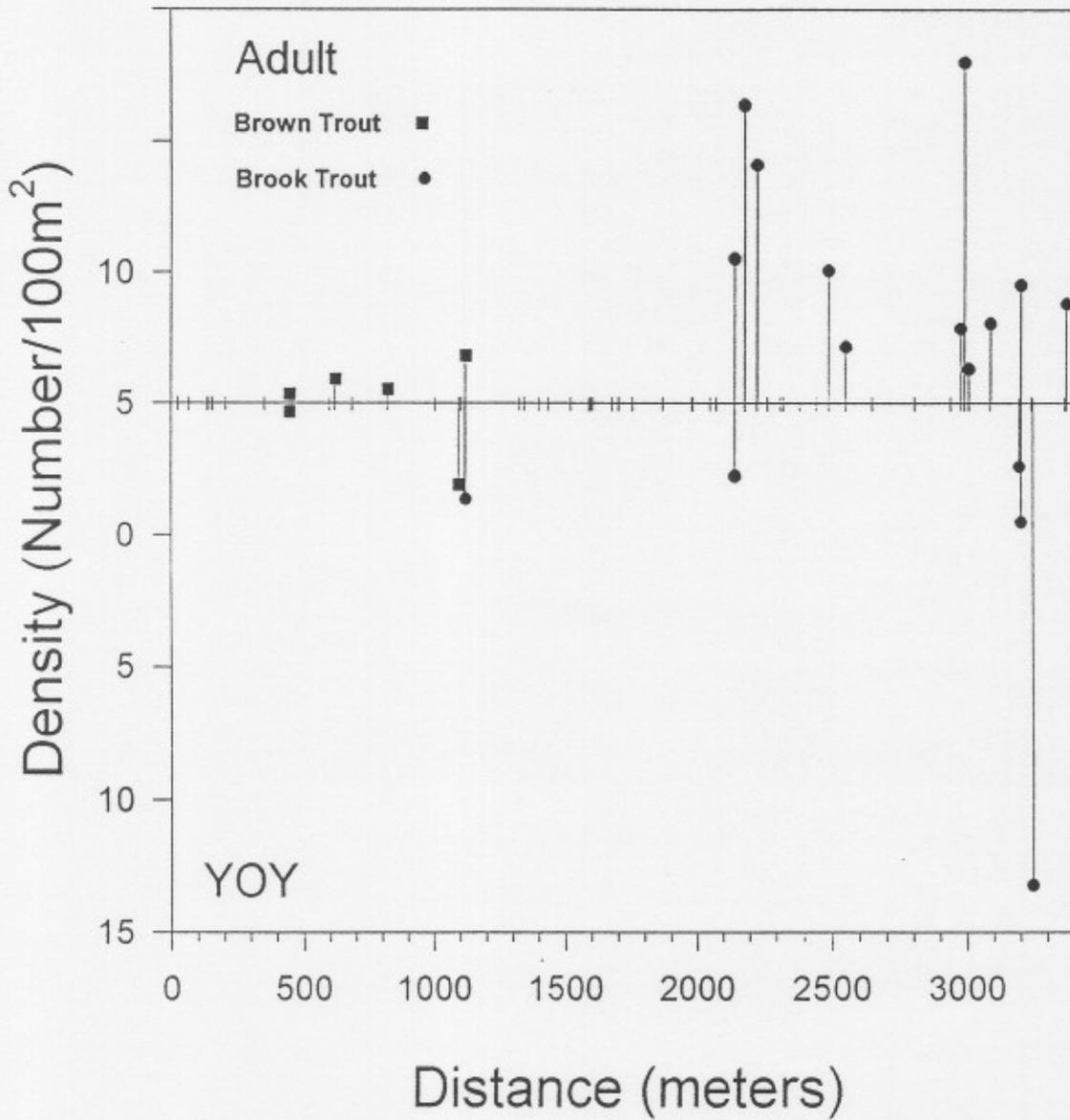
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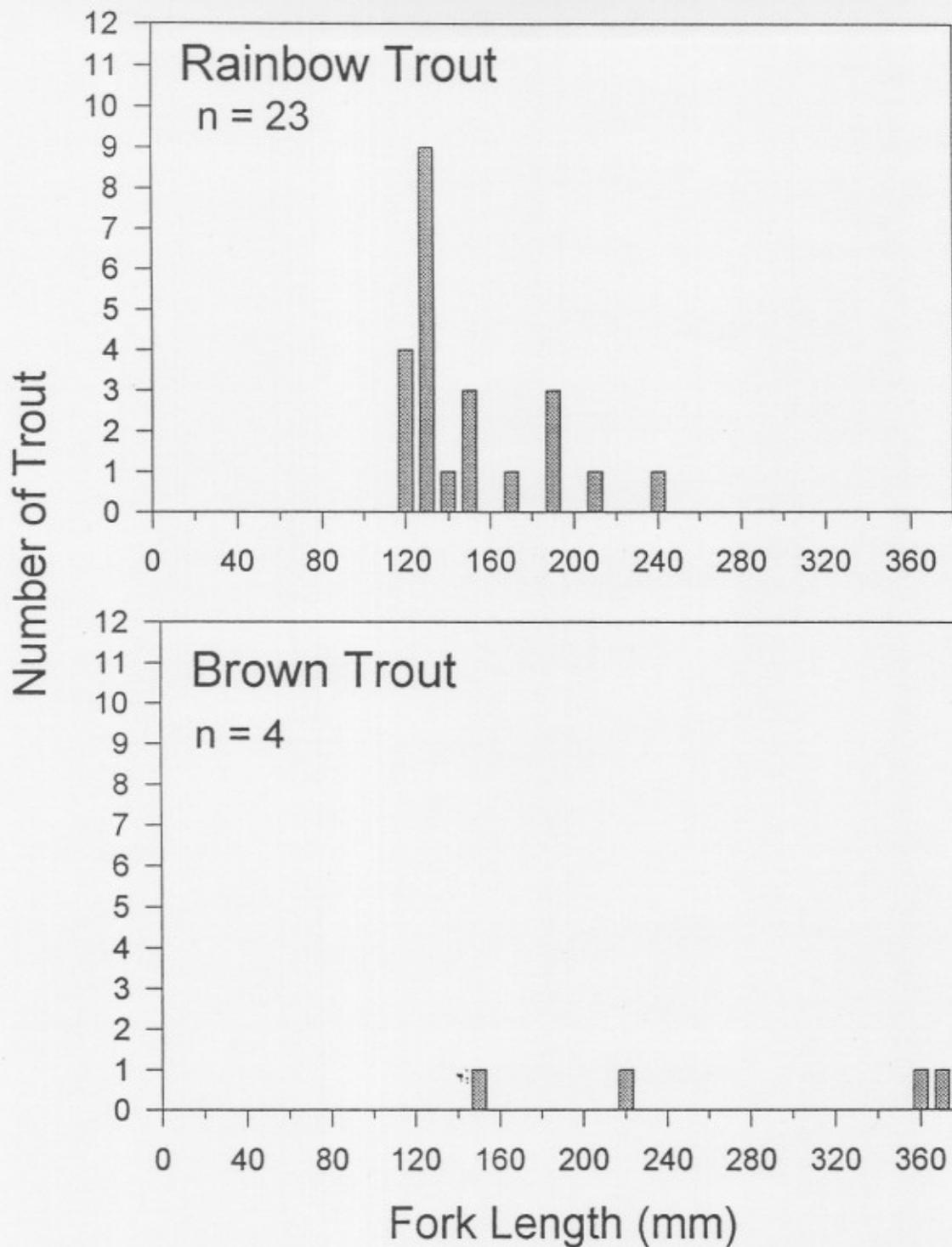
East Fork Overflow



East Fork Overflow



Abes Creek



Length frequency of trout in in systematically selected habitat units in Abes Creek, North Carolina in Spring 1993. Lengths (total and fork) and weights are given in Table 4.

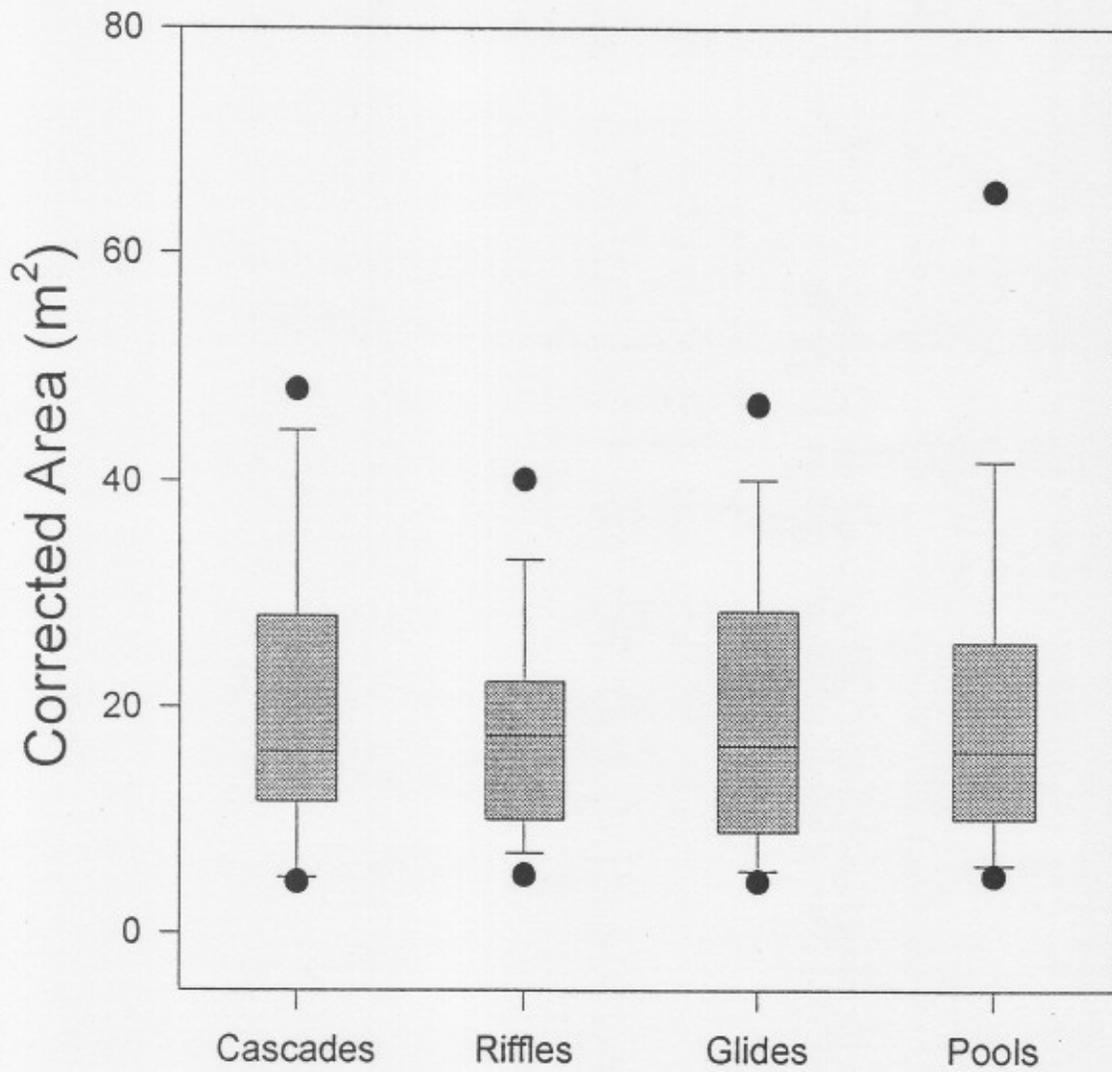
Table 4. Electrofishing data collected in systematically selected habitat units in Abes Creek, North Carolina in Spring 1993.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Riffle	12.0	1	NONE			
		2	NONE			
Pool	40.2	1	NONE			
		2	NONE			
Glide	8.0	1	NONE			
		2	NONE			
Cascade	4.6	1	NONE			
		2	NONE			
Riffle	12.6	1	NONE			
		2	NONE			
Pool	13.2	1	NONE			
		2	NONE			
Cascade	18.0	1	NONE			
		2	NONE			
Pool	8.6	1	NONE			
		2	NONE			
Cascade	20.0	1	NONE			
		2	NONE			
Riffle	19.9	1	NONE			
		2	NONE			
Pool	51.8	1	NONE			
		2	Rainbow Trout	204	98.8	219
		3	NONE			
Extra			Brown Trout	361		407
			Brown Trout	148	39.9	159
			Brown Trout	212	125.3	224
			Brown Trout	354		360
			Rainbow Trout	235	165.8	249
			Rainbow Trout	113	19.8	121
			Rainbow Trout	188	86.7	199
			Rainbow Trout	122	26.1	130
			Rainbow Trout	186	76.5	199
			Rainbow Trout	128	23.7	138
			Rainbow Trout	112	19.1	120
			Rainbow Trout	168	58.6	180
			Rainbow Trout	187	76.2	201
			Rainbow Trout	137	28.1	147
			Rainbow Trout	124	24.3	133
			Rainbow Trout	129	27.5	137
			Rainbow Trout	120	26	125

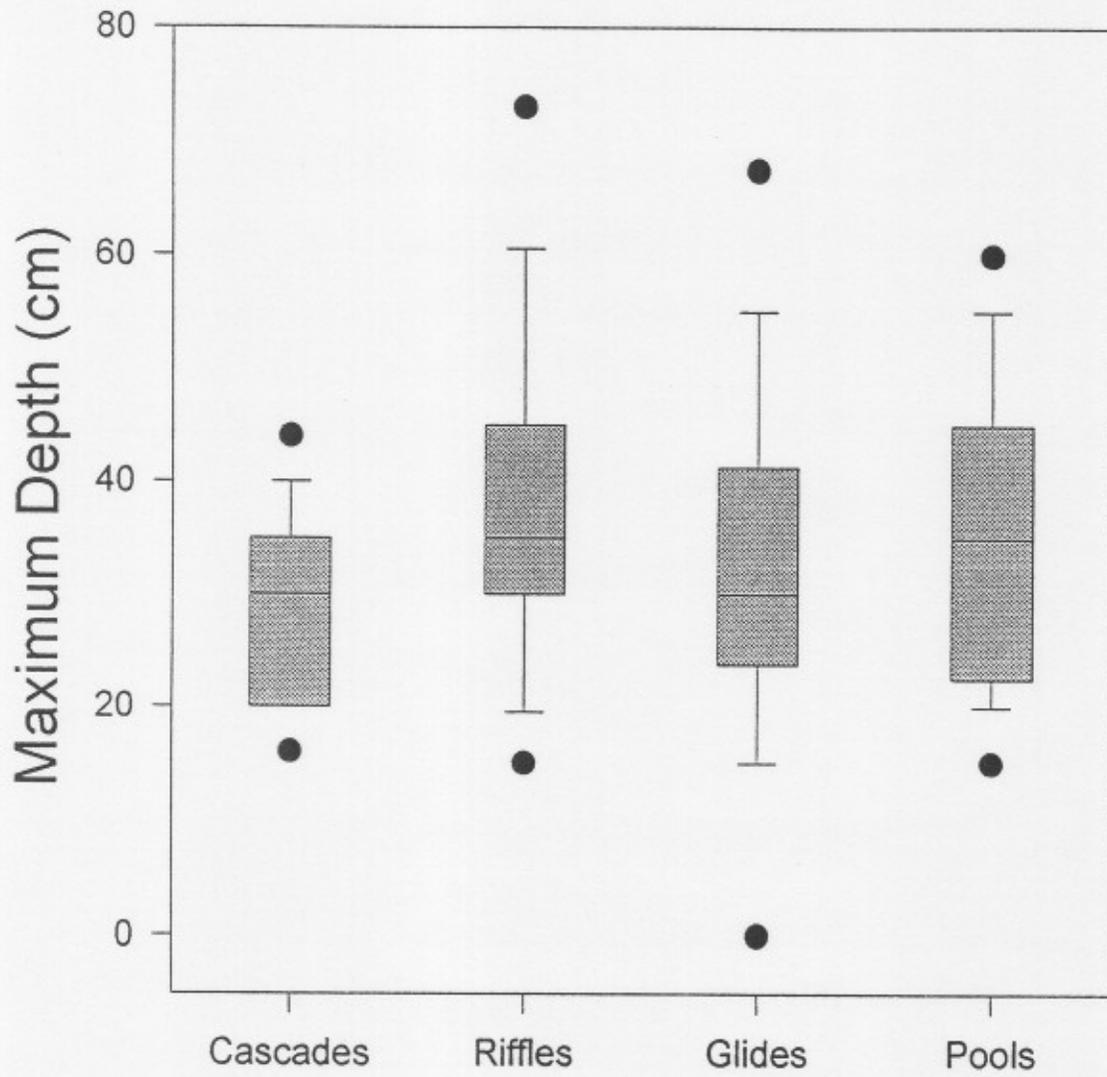
Table 4. Continued

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Extra			Rainbow Trout	121	27.7	129
			Rainbow Trout	124	22.1	132
			Rainbow Trout	130	28.3	139
			Rainbow Trout	117	19	129
			Rainbow Trout	129	25.3	138
			Rainbow Trout	148	36.7	146
			Rainbow Trout	146	36.7	156
			Rainbow Trout	121	22.5	148
			Rainbow Trout	144	36.9	154

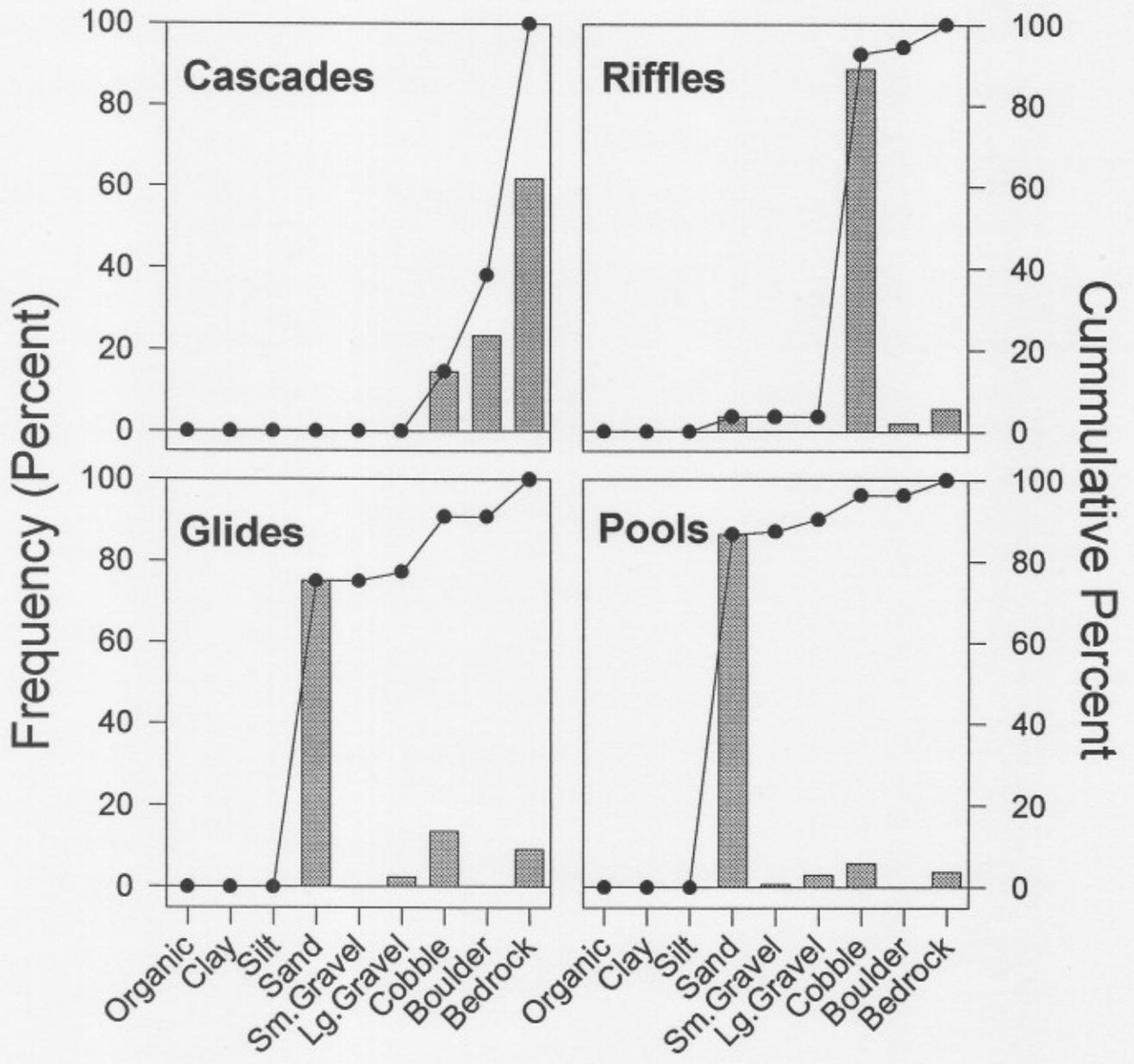
Abes Creek



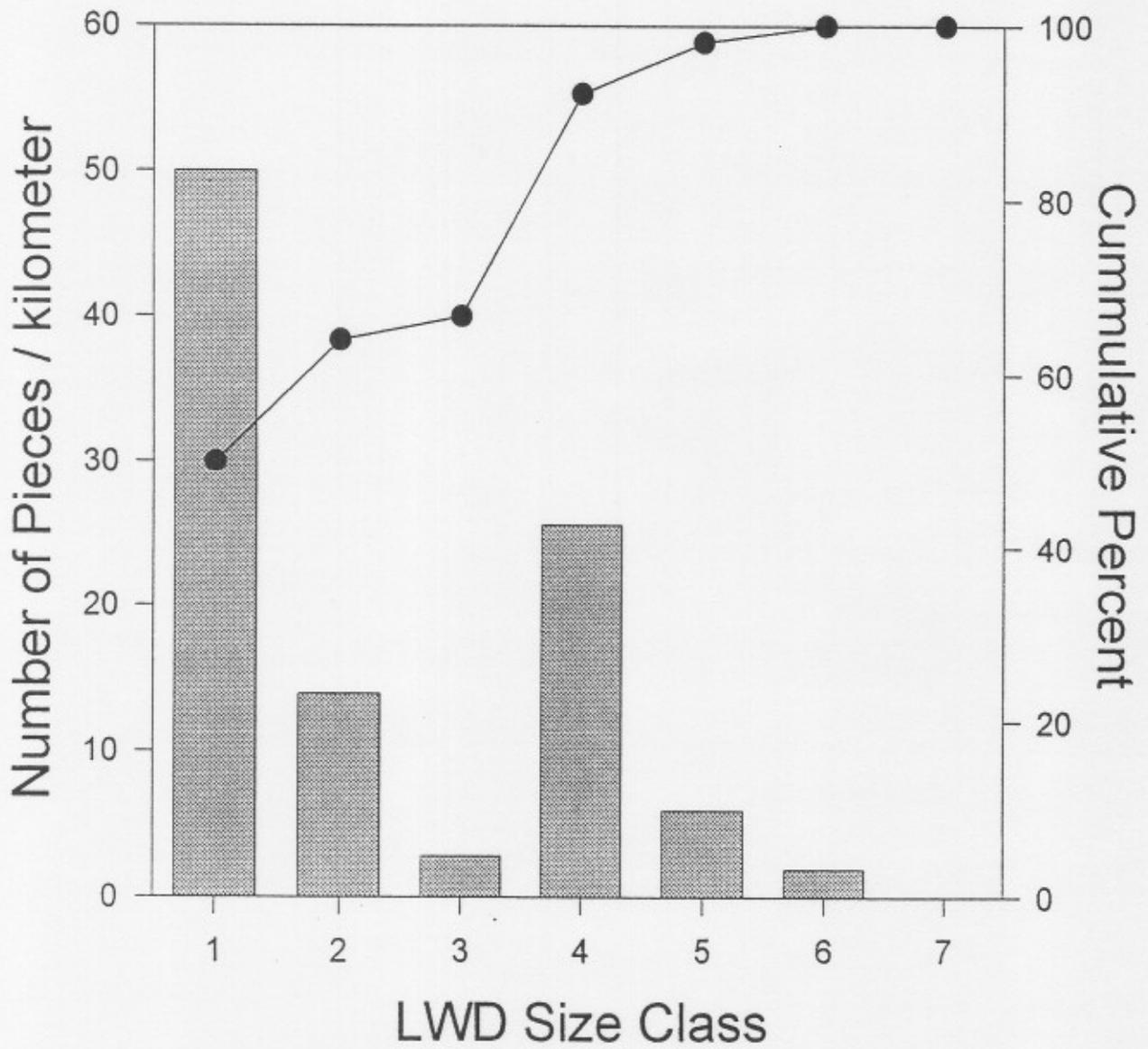
Abes Creek



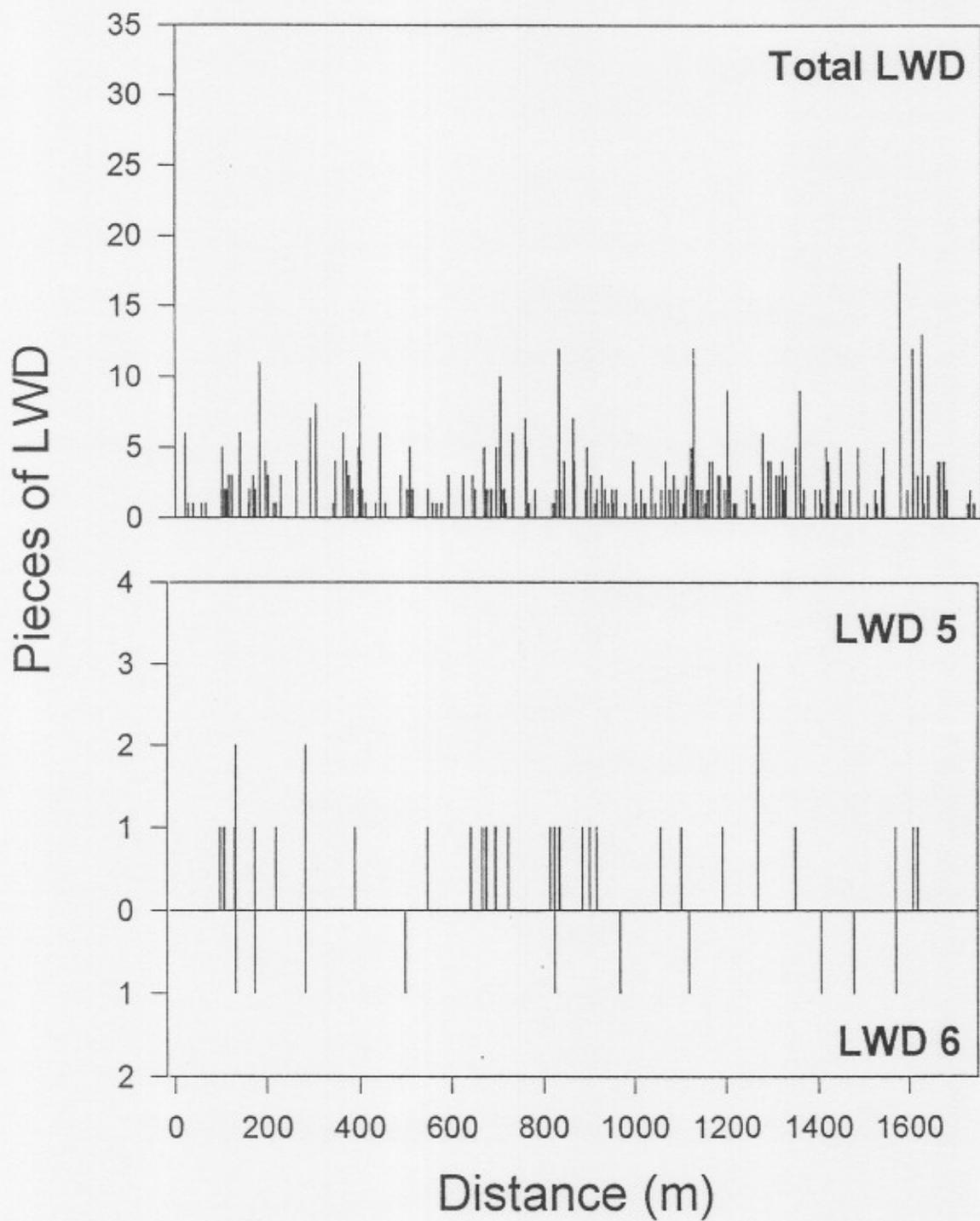
Abes



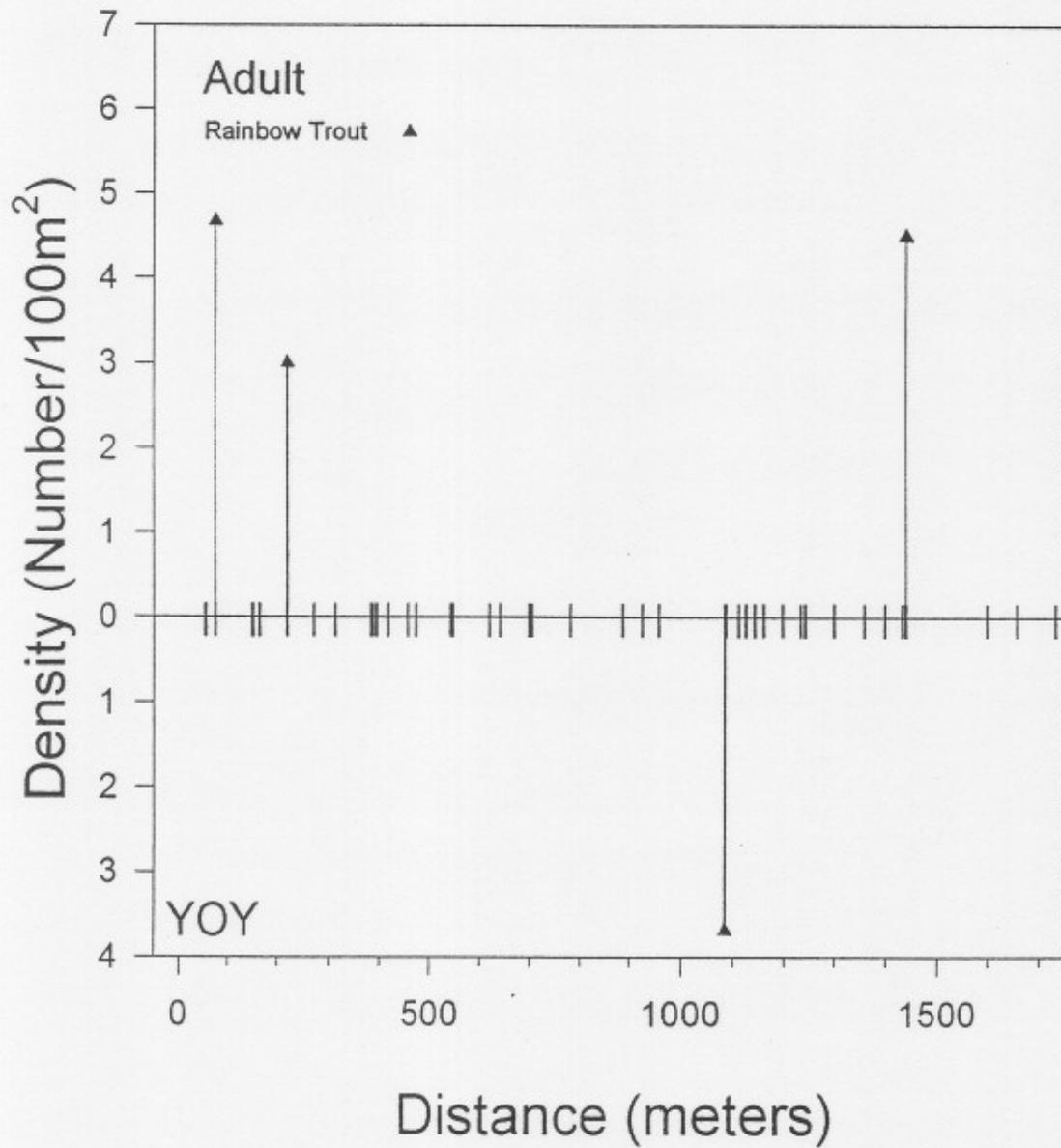
Abes Creek



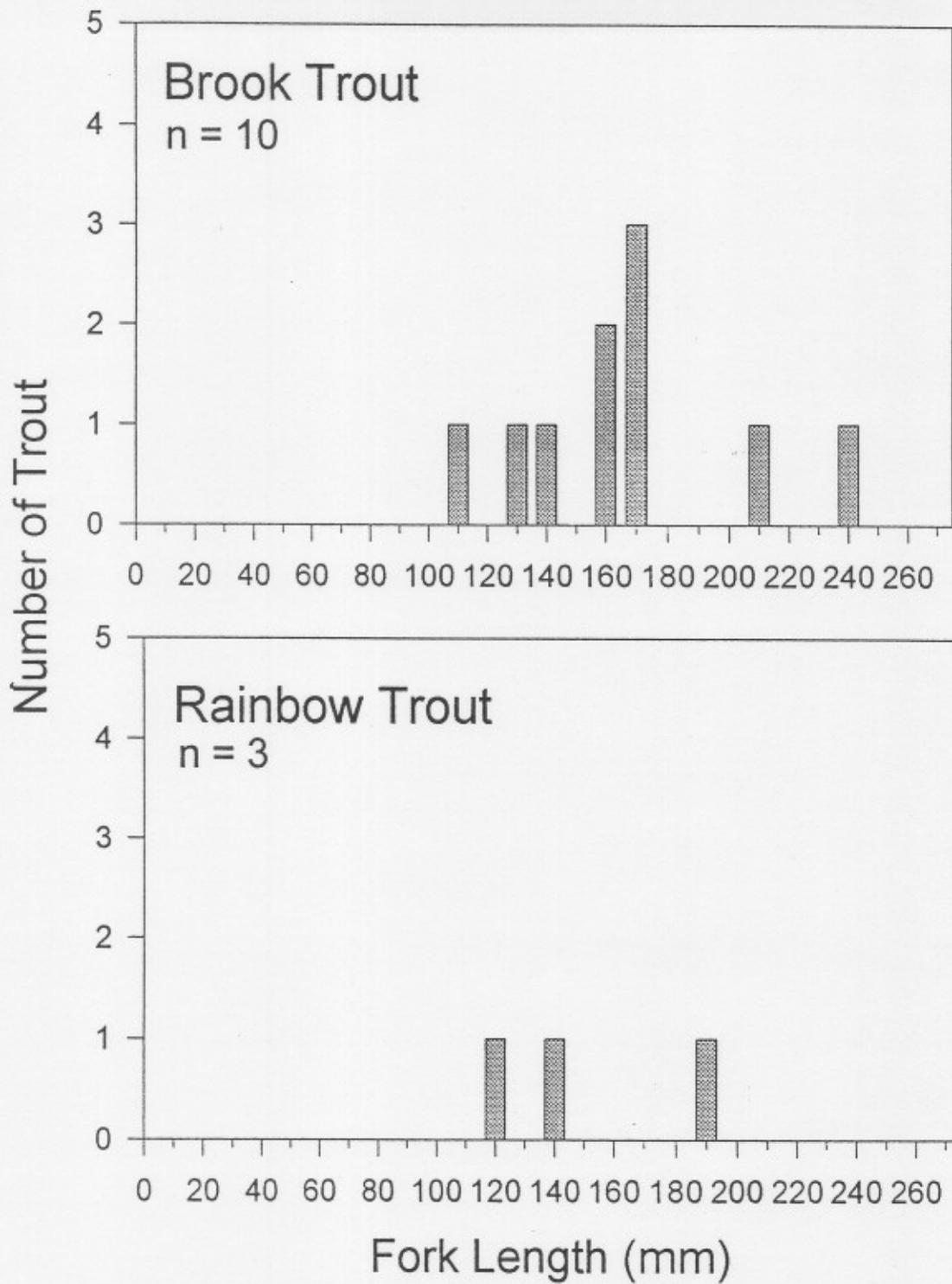
Abes Creek



Abes Creek



**West Fork Overflow
Creek**

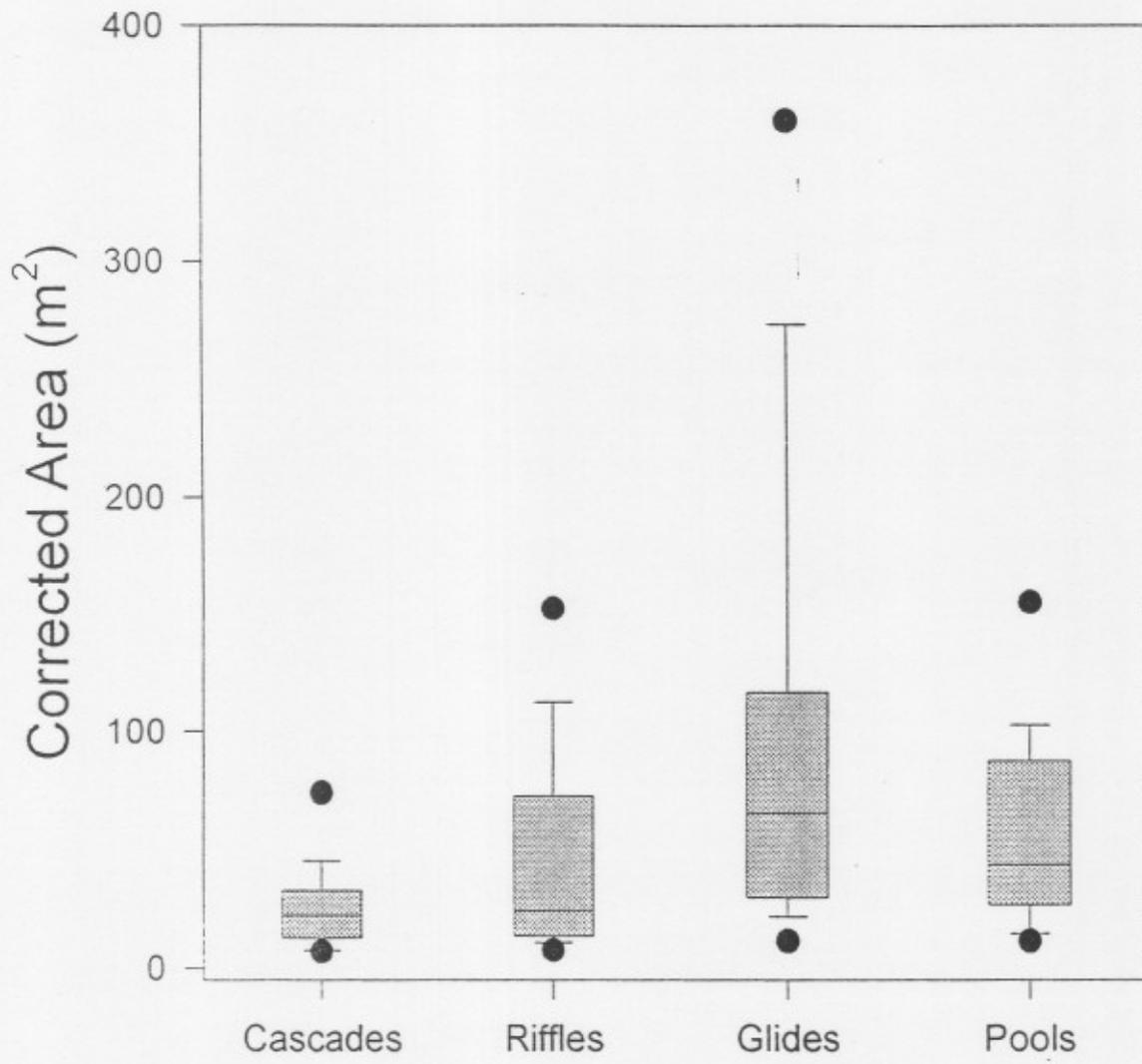


Length frequency of trout in systematically selected habitat units in West Fork Overflow Creek, North Carolina in Spring 1993. Lengths (total and fork) and weights are given in Table 5.

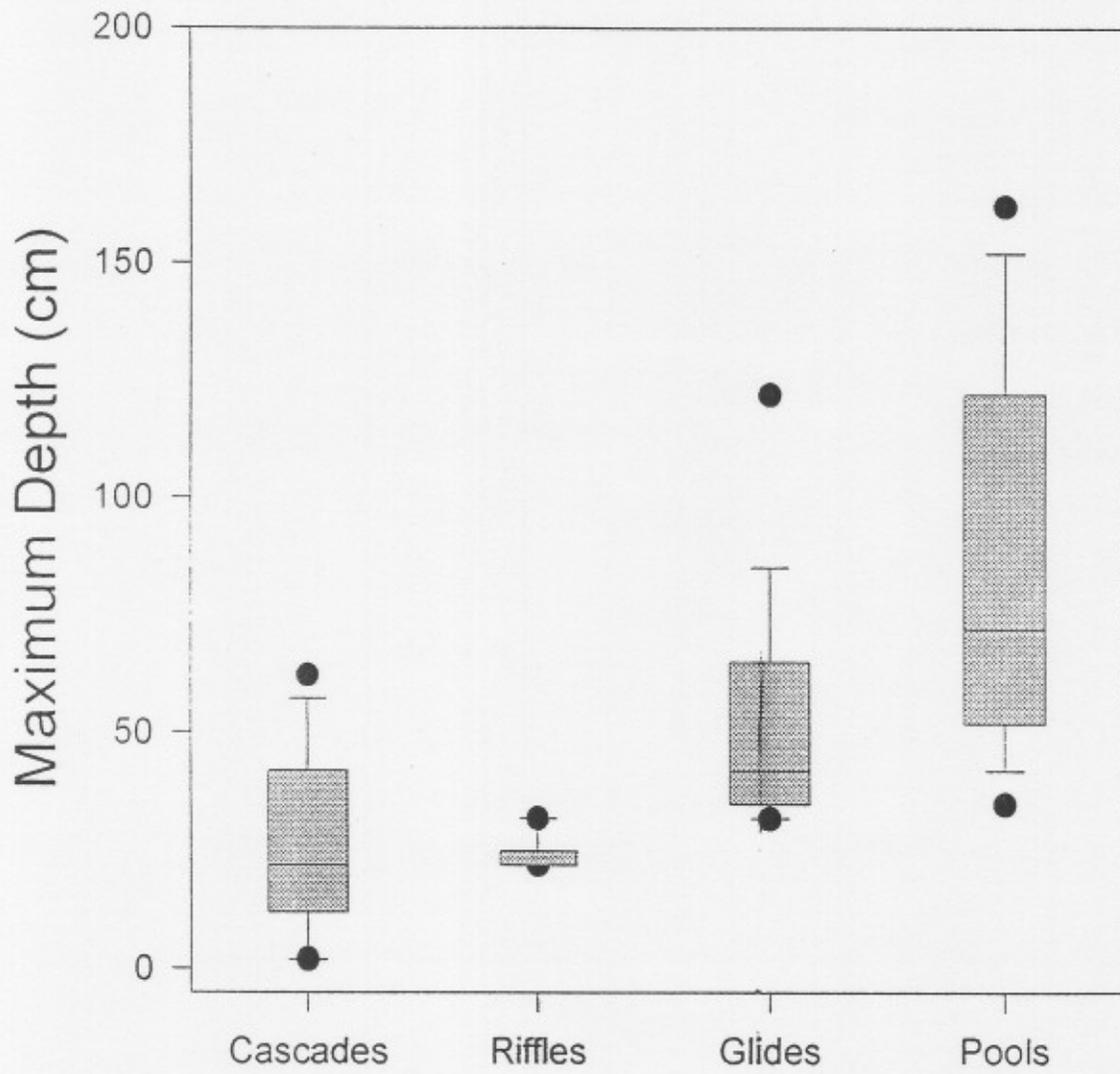
Table 5. Electrofishing data collected in systematically selected habitat units in West Fork Overflow Creek, North Carolina in Spring 1993.

Habitat	Area (m ²)	Pass	Species	Fork Length (mm)	Total Length (mm)	Weight (g)
Riffle	74.9	1	Rainbow Trout	116	124	13.6
		1	Rainbow Trout	136	146	21.8
		2	NONE			
Cascade	7.9	1	NONE			
		2	NONE			
Glide	216.0	1	Brook Trout	165	173	62.9
		2	NONE			
Riffle	25.0	1	NONE			
		2	NONE			
Cascade	10.0	1	Brook Trout	167	177	54.7
		2	NONE			
Pool	33.0	1	NONE			
		2	NONE			
Riffle	26.0	1	NONE			
		2	NONE			
Pool	51.4	1	NONE			
		2	NONE			
Riffle	29.6	1	NONE			
		2	NONE			
Glide	18.4	1	NONE			
		2	NONE			
Extra			Rainbow Trout	190	202	78.5
			Brook Trout	152	160	41.0
			Brook Trout	103	110	13
			Brook Trout	130	141	30.4
			Brook Trout	136	143	29.8
			Brook Trout	169	177	59.6
			Brook Trout	204	214	93.3
			Brook Trout	157	162	50.3
			Brook Trout	231	244	90.6

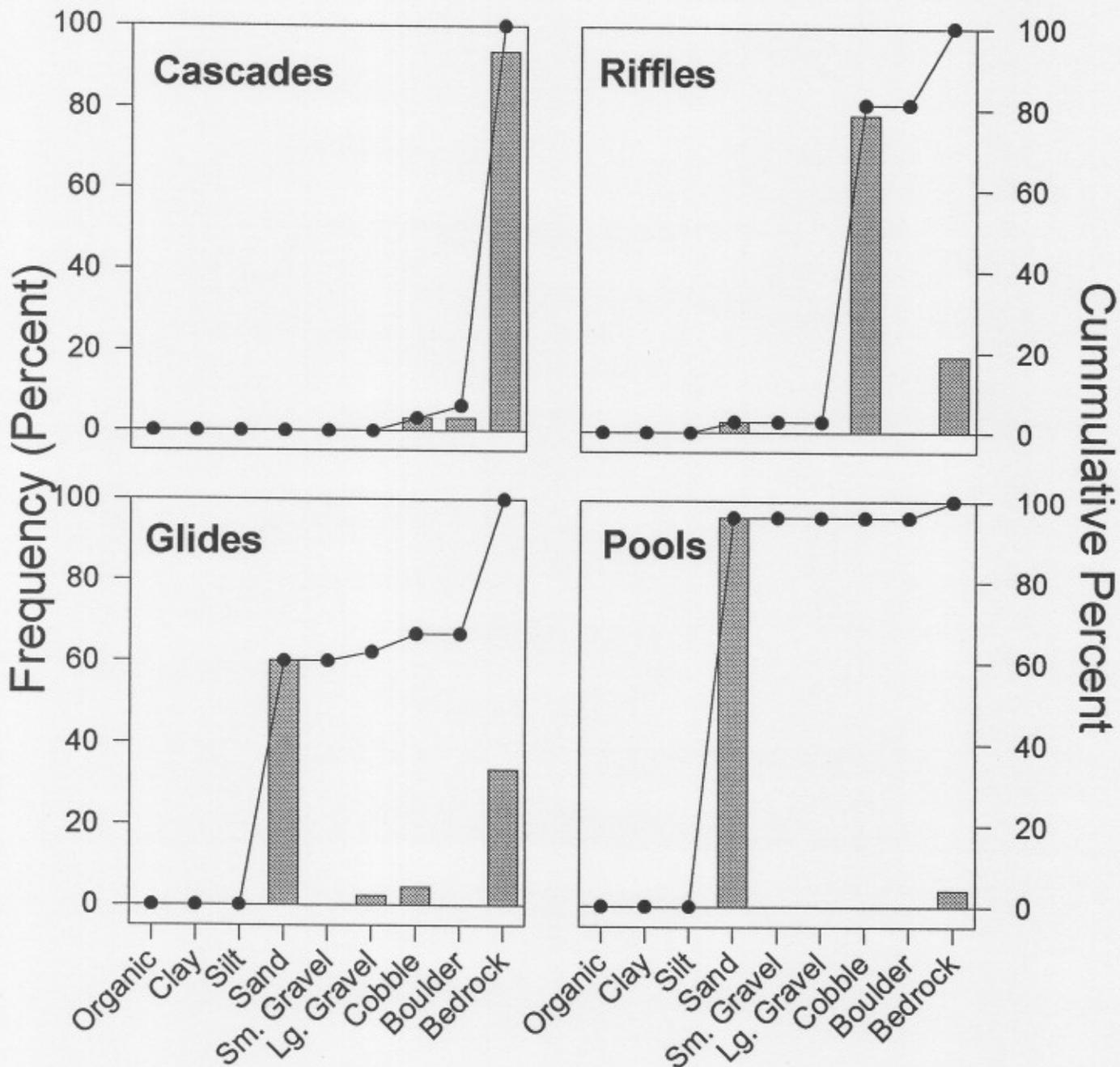
West Fork Overflow



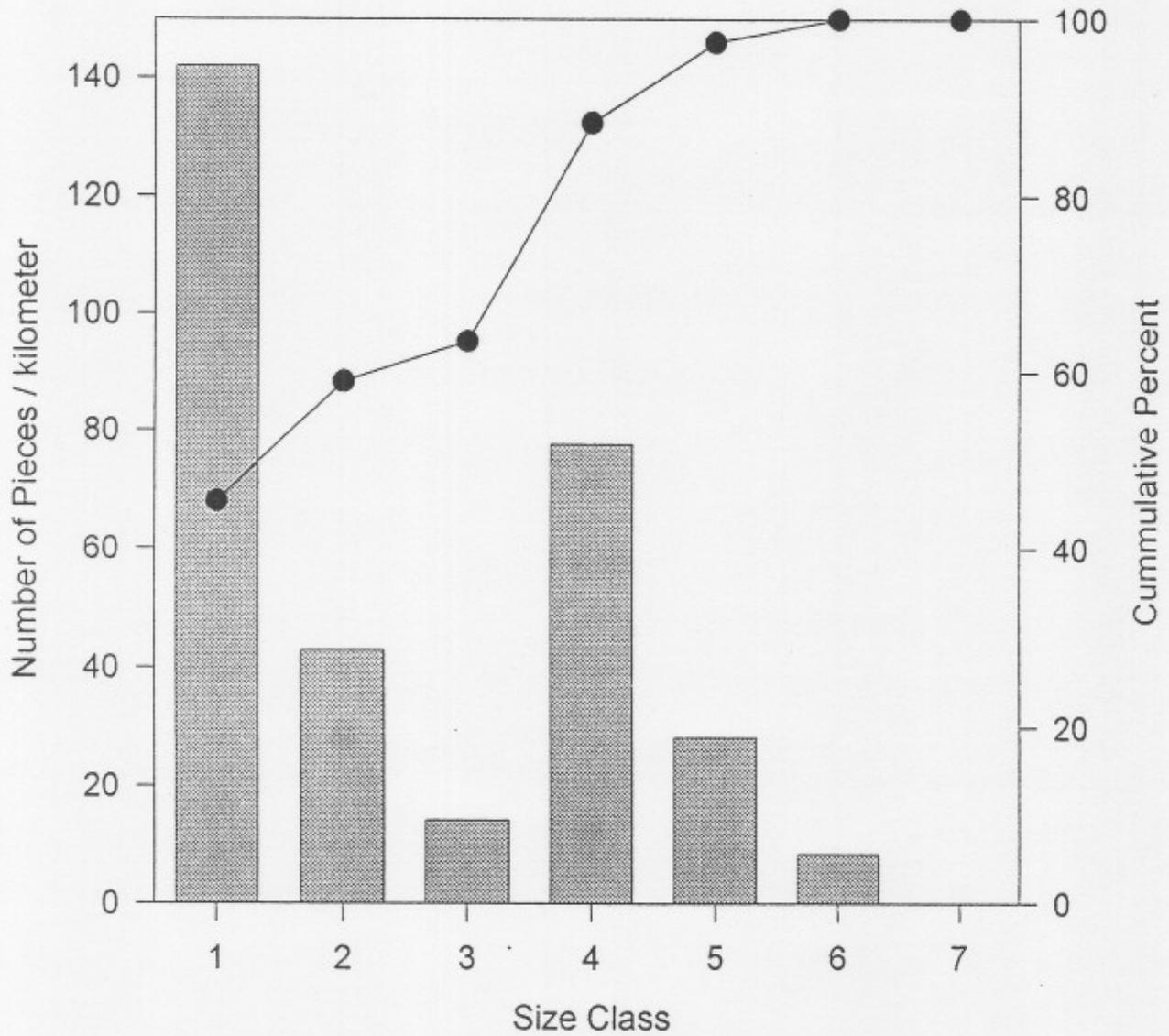
West Fork Overflow



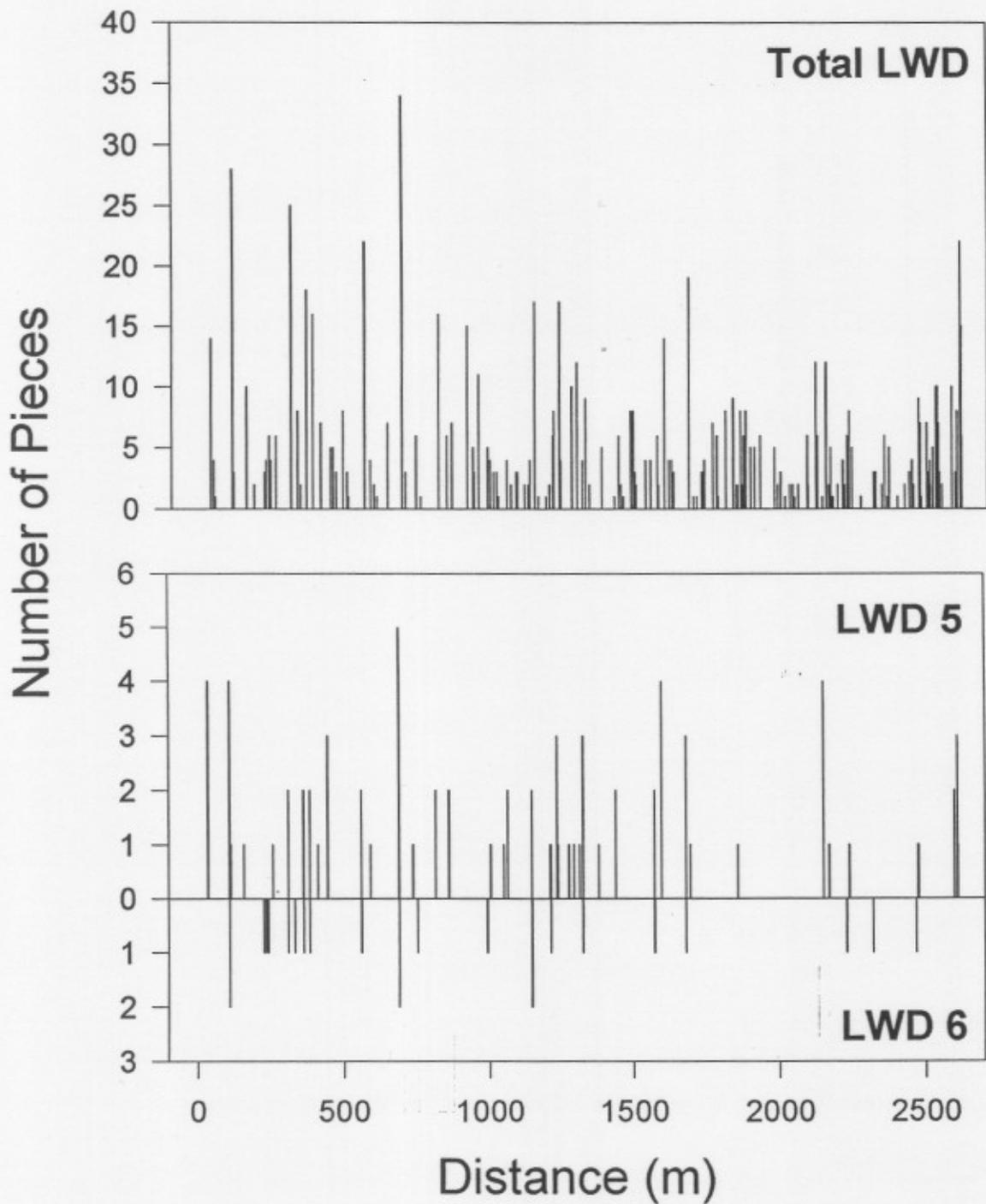
West Fork Overflow



West Fork Overflow Creek Large Woody Debris Frequency



West Fork Overflow Creek Large Woody Debris Distribution



West Fork Overflow

