

LOWER CANNON AT FARIBAULT



Lower Cannon River Faribault (LCF-20)

Location:

River mile: 58

U.S.G.S. quad: Faribault; 44093-C3

Township: T110N R20W S30

Lat./Long: 44°18'30"/92°16'

Other info.:

Type: Small River downstream of confluence with Straight River

Stream Order: 5

Drainage area: 850

Riparian: Forest, recreational park, and industry

Instream: Rip rap at canoe landing with sand, and silt in channel

Gradient: 4.5



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/17/95 River Mile 58 Watershed Number _____
 Location LCF-20 U.S.G.S. quad Faribault
 Township T110N R20W Section 30 Lat./Long. 44°18'30" / 92°16'

64.5
Total QHEI

1. SUBSTRATE (Check ONLY two substrate TYPES). % Pool/Riffle substrates optional.

Type	Pool	Riffle	Type	Pool	Riffle	Quality
<input type="checkbox"/> Boulder (7)	_____	_____	<input checked="" type="checkbox"/> Gravel (5)	_____	_____	<i>Check all that apply:</i>
<input checked="" type="checkbox"/> Cobble (6)	_____	_____	<input type="checkbox"/> Sand (4)	_____	_____	<input checked="" type="checkbox"/> Silt covered (-1)
<input type="checkbox"/> Hardpan (3)	_____	_____	<input type="checkbox"/> Bedrock (3)	_____	_____	<input type="checkbox"/> Silt free (1)
<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	<input type="checkbox"/> Boulders as slabs (1)
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	<input type="checkbox"/> Embedded (-2)

10
Substrate

Comments _____

2. INSTREAM COVER

Type (Check ALL that apply)	Amount (Check ONLY one)
<input checked="" type="checkbox"/> Undercut banks (1)	<input type="checkbox"/> Extensive (7)
<input checked="" type="checkbox"/> Overhanging vegetation (1)	<input type="checkbox"/> Moderate (5)
<input type="checkbox"/> Shallows (in slow water) (1)	<input checked="" type="checkbox"/> Sparse (3)
<input checked="" type="checkbox"/> Logs or woody debris (1)	<input type="checkbox"/> Nearly absent (1)
<input type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input checked="" type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	

7
Cover

Comments _____

3. CHANNEL MORPHOLOGY (Check ONLY one under each category)

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4)	<input type="checkbox"/> Excellent (4)	<input checked="" type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input checked="" type="checkbox"/> Impound
<input checked="" type="checkbox"/> Moderate (3)	<input type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input type="checkbox"/> Low (1)	<input type="checkbox"/> Leveed
<input type="checkbox"/> None (1)	<input checked="" type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		

10
Channel

Comments _____

4. RIPARIAN ZONE AND BANK EROSION *River right looking downstream*

(Check single most predominant, on each bank, under each category)

Riparian Width		Flood Plain Quality		Bank Erosion	
L	R	L	R	L	R
<input type="checkbox"/> Extensive >100m (3)	<input type="checkbox"/> Open pasture (1)	<input type="checkbox"/> Forest, swamp (3)	<input type="checkbox"/> None (5)	<input type="checkbox"/> None (5)	
<input checked="" type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input type="checkbox"/> Shrub (4)	<input type="checkbox"/> Little (4)	<input type="checkbox"/> Little (4)	
<input type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input checked="" type="checkbox"/> Residential, Park (2)	<input checked="" type="checkbox"/> Moderate (3)	<input checked="" type="checkbox"/> Moderate (3)	
<input checked="" type="checkbox"/> Narrow 5-10m (2)	<input type="checkbox"/> Rowcrop (1)	<input type="checkbox"/> Urban	<input type="checkbox"/> Heavy (2)	<input type="checkbox"/> Heavy (2)	
<input type="checkbox"/> Very Narrow 1-5m (1)	<input type="checkbox"/> Conservation tillage (2)		<input type="checkbox"/> Severe (1)	<input type="checkbox"/> Severe (1)	
<input type="checkbox"/> None (0)					

8.5
Riparian

Comments _____

5. POOL/GLIDE AND RIFFLE/RUN QUALITY

Maximum Depth (Check 1)	Pool Cover (Check 1)	Overall Current Velocity (Check ALL that apply)	Morphology (Check 1)
<input checked="" type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Fast (1)	<input checked="" type="checkbox"/> Pool width = riffle width (1)
<input type="checkbox"/> 0.4-0.7m (1)	<input checked="" type="checkbox"/> Sparse (1)	<input checked="" type="checkbox"/> Moderate (1)	<input type="checkbox"/> Pool width < riffle width (0)
<input type="checkbox"/> < 0.4m (0)	<input type="checkbox"/> Nearly absent (0)	<input checked="" type="checkbox"/> Slow (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Intermittent (-2)	
		<input checked="" type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	

8
Pool/
Riffle

Riffle/Run Depth (Check 1)	Riffle/Run Substrate (Check 1)	Riffle/Run Substrate Quality (Check 1)
<input type="checkbox"/> Generally <10cm (1)	<input type="checkbox"/> Stable (cobble, boulder) (1)	<input checked="" type="checkbox"/> Embedded (0)
<input type="checkbox"/> Generally >10cm Max <50 (2)	<input checked="" type="checkbox"/> Unstable (gravel, sand) (0)	<input type="checkbox"/> Not embedded (1)
<input type="checkbox"/> Generally >10cm Max >50 (3)		
<input checked="" type="checkbox"/> No riffle (0)		

Comments _____

6. GRADIENT
(ft/mi)

4.48

6
Gradient

7. DRAINAGE AREA
(square mile)

850

15
Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/12/96 River Mile 58 Watershed Number _____
 Location LCF-20 U.S.G.S. quad Faribault
 Township T110N R20W Section 30 Lat./Long. 44°18.37N 92°16.14W

64.5
Total QHEI

1. SUBSTRATE (Check ONLY two substrate TYPES). % Pool/Riffle substrates optional.

Type	Pool	Riffle	Type	Pool	Riffle	Quality
<input type="checkbox"/> Boulder (7)	_____	_____	<input checked="" type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input checked="" type="checkbox"/> Silt covered (-1) <input type="checkbox"/> Silt free (1) <input type="checkbox"/> Boulders as slabs (1) <input type="checkbox"/> Embedded (-2)
<input checked="" type="checkbox"/> Cobble (6)	_____	_____	<input type="checkbox"/> Sand (4)	_____	_____	
<input type="checkbox"/> Hardpan (3)	_____	_____	<input type="checkbox"/> Bedrock (3)	_____	_____	
<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	
Comments _____						

10
Substrate

2. INSTREAM COVER

Type (Check ALL that apply)	Amount (Check ONLY one)
<input checked="" type="checkbox"/> Undercut banks (1)	<input type="checkbox"/> Extensive (7)
<input checked="" type="checkbox"/> Overhanging vegetation (1)	<input type="checkbox"/> Moderate (5)
<input type="checkbox"/> Shallows (in slow water) (1)	<input checked="" type="checkbox"/> Sparse (3)
<input checked="" type="checkbox"/> Logs or woody debris (1)	<input type="checkbox"/> Nearly absent (1)
<input checked="" type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	
Comments _____	

7
Cover

3. CHANNEL MORPHOLOGY (Check ONLY one under each category)

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4)	<input type="checkbox"/> Excellent (4)	<input checked="" type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input checked="" type="checkbox"/> Impound
<input checked="" type="checkbox"/> Moderate (3)	<input type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input type="checkbox"/> Low (1)	<input type="checkbox"/> Leveed
<input type="checkbox"/> None (1)	<input checked="" type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		
Comments _____				

10
Channel

4. RIPARIAN ZONE AND BANK EROSION *River right looking downstream*

(Check single most predominant, on each bank, under each category)

Riparian Width	Flood Plain Quality	Bank Erosion
L R	L R	L R
<input type="checkbox"/> Extensive >100m (5)	<input type="checkbox"/> Open pasture (1)	<input type="checkbox"/> None (5)
<input checked="" type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input type="checkbox"/> Little (4)
<input type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input checked="" type="checkbox"/> Moderate (3)
<input checked="" type="checkbox"/> Narrow 5-10m (2)	<input type="checkbox"/> Rowcrop (1)	<input type="checkbox"/> Heavy (2)
<input type="checkbox"/> Very Narrow 1-5m (1)	<input type="checkbox"/> Conservation tillage (2)	<input type="checkbox"/> Severe (1)
<input type="checkbox"/> None (0)		
	<input type="checkbox"/> Forest, swamp (3)	
	<input type="checkbox"/> Shrub (4)	
	<input checked="" type="checkbox"/> Residential, Park (2)	
	<input type="checkbox"/> Urban	
Comments _____		

8.5
Riparian

5. POOL/GLIDE AND RIFFLE/RUN QUALITY

Maximum Depth (Check 1)	Pool Cover (Check 1)	Overall Current Velocity (Check ALL that apply)	Morphology (Check 1)
<input checked="" type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Fast (1)	<input checked="" type="checkbox"/> Pool width = riffle width (1)
<input type="checkbox"/> 0.4-0.7m (1)	<input checked="" type="checkbox"/> Sparse (1)	<input checked="" type="checkbox"/> Moderate (1)	<input type="checkbox"/> Pool width < riffle width (0)
<input type="checkbox"/> < 0.4m (0)	<input type="checkbox"/> Nearly absent (0)	<input checked="" type="checkbox"/> Slow (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Intermittent (-2)	
		<input checked="" type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	
Comments _____			
Riffle/Run Depth (Check 1)	Riffle/Run Substrate (Check 1)	Riffle/Run Substrate Quality (Check 1)	<div style="border: 2px solid black; padding: 5px; font-size: 24pt; text-align: center;">8</div> Pool/ Riffle
<input type="checkbox"/> Generally <10cm (1)	<input type="checkbox"/> Stable (cobble, boulder) (1)	<input checked="" type="checkbox"/> Embedded (0)	
<input type="checkbox"/> Generally >10cm Max <50 (2)	<input checked="" type="checkbox"/> Unstable (gravel, sand) (0)	<input type="checkbox"/> Not embedded (1)	
<input type="checkbox"/> Generally >10cm Max >50 (3)			
<input checked="" type="checkbox"/> No riffle (0)			
Comments _____			

6. GRADIENT (ft/mi) _____

6
Gradient

7. DRAINAGE AREA (square mile) _____

15
Drainage Area

SITE **LCF-20** Location LOWER CANNON BELOW CONFLUENCE OF STRAIGHT RIVER

	1994	1995	1996
SUBSTRATE	10	10	10
INSTREAM COVER	7	7	7
CHANNEL MORPHOLOGY	10	10	10
RIPARIAN	8.5	8.5	8.5
CHANNEL QUALITY	9	8	8
GRADIENT 6 DRAINAGE 15	QHEI 1994 65.5	QHEI 1995 64.5	QHEI 1996 64.5

EXTENT OF CHANGE IN LOCATION
 No change in location. Poor site, consider a change in the future.

RAPID HABITAT BIOASSESSMENT 1995	130
FISH COVER	12
MACRO COVER	5
EMBEDDEDNESS	10
VELOCITY\DEPTH	7
CHANNEL	18
SEDIMENT	8
RIFFLES	4
CHANNEL FLOW	17
BANK EROSION	12
VEGETATION	9
GRAZING	16
RIPARIAN	12

LOWER CANNON RIVER (LCF-20)

At Faribault below the confluence with the Straight River

Riparian: Forest, Recreational park, and industrial

Instream: Rip rap, cobble, gravel, sand, and silt

Macroinvertebrate Metrics

<u>Metric</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>Average</u>	<u>Overall Impact</u>
QHEI	65.5	64.5	64.5	64.8	
ICI	20	29	30	26.3	Slight
Richness	17	15.5	18.5	17	Moderate
Diversity	2.5	2.3	2.3	2.4	Slight
Equitability	0.47	0.41	0.46	.45	Moderate
Scraper/Filterer Ratio	0.58	0.04	0.36		
Tolerance Range	2-9	3-10	3-10	3-10	

Macroinvertebrate Taxa and Numbers of Individuals

[#] = Tolerance Values (Source is Illinois Environmental Protection Agency)

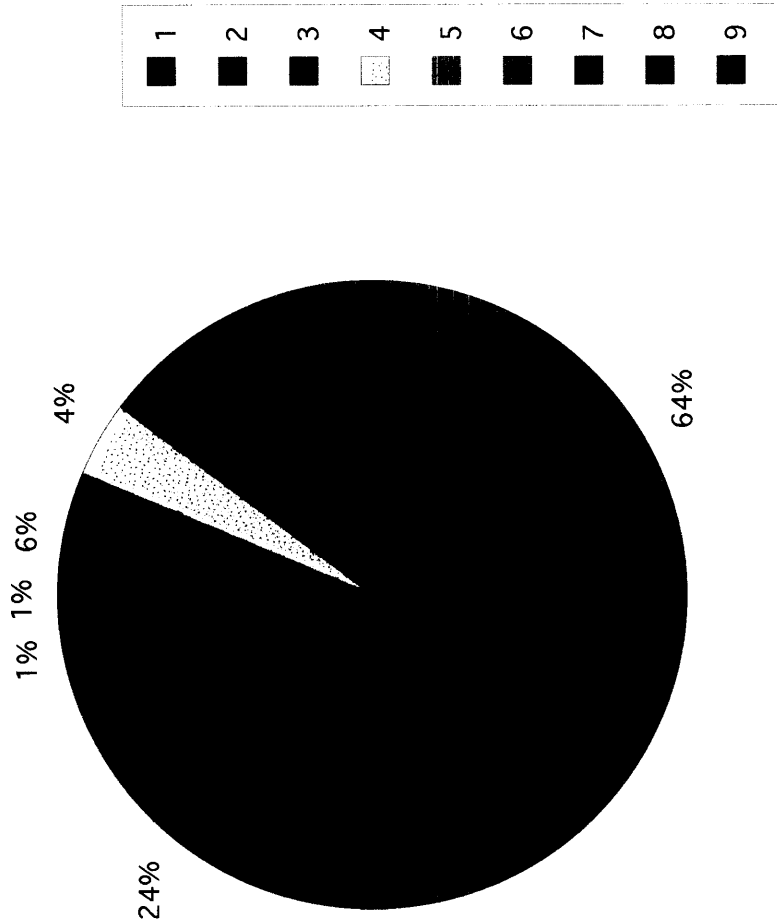
	<u>June 94</u>	<u>July 94</u>	<u>June 95</u>	<u>July 95</u>	<u>June 96</u>	<u>July 96</u>
Gastropoda						
Physa [9]	-	1	-	-	-	-
Stoneflies						
Perlesta [3]	3	-	11	-	44	-
Pteronarcys [2]	-	1	-	-	-	1
Beetles						
Dubiraphia [5]	-	-	-	-	1	2
Stenelmis [7]	1	6	1	-	3	-
Macronychus [2]	-	4	-	-	-	-
Mayflies						
Baetis [4]	-	-	-	4	-	6
Heptagenia [3]	15	20	13	-	10	2
Stenacron [4]	-	-	4	4	11	6
Stenonema [4]	33	149	3	88	41	24
Pseudocloeon [4]	-	-	-	-	1	-
Caenis [6]	-	-	-	-	4	-
Tricorythodes [5]	1	10	10	8	17	-
Caddisflies						
Cheumatopsyche [6]351		114	243	1171	37	432
Hydropsyche [5] 3372		153	159	249	53	3168
Neureclipsis [3]	-	-	423	112	-	-
Polycentropus [3]	-	-	51	16	2	-
True Flies						
Simuliidae [4-6]	-	-	-	-	-	14
Hemerodromia [6]	5	-	-	36	4	16
Atherix [4]	8	5	-	40	-	8
Midges						
Cricotopus [8]	2	5	12	-	42	66
Dicrotendipes [6]	-	-	4	-	-	-
Polypedilum [6]	31	32	21	44	7	140
Eukiefferiella [4]	15	-	-	-	3	15
Rheotanytarsus [6]	8	2	-	-	3	15
Paratanytarsus [?]	-	-	-	-	3	-
Nanoclaudius [6]	-	4	-	-	-	-
Thienemannimyia [6]	-	-	-	16	7	-
Rheocricotopus [6]	1	-	-	-	-	-
Tanytarsus [7]	-	-	-	4	-	-
Endochironomus [6]	-	-	4	-	-	-
Stenochironomus [3]	-	-	4	-	-	-
Glyptotendipes [10]	-	-	79	-	7	-
Psectrocladius [5]	-	-	1	-	-	-

Lower Cannon at Faribault (LCF-20)

Site	NUMBER OF INSECTS BY TOLERANCE RATING									PERCENT IN TOLERANCE RANK									
	1	2	3	4	5	6	7	8	9+	TOTAL	1	2	3	4	5	6	7	8	9
LCF 1994	0	5	38	210	3536	548	7	7	1	4352	0%	0%	1%	5%	81%	13%	0%	0%	0%
LCF 1995	0	0	630	143	427	1527	5	12	79	2823	0%	0%	22%	5%	15%	54%	0%	0%	3%
LCF 1996	0	1	58	97	3241	679	3	108	7	4194	0%	0%	1%	2%	77%	16%	0%	3%	0%
LCF TOTAL	0	6	726	450	7204	2754	15	127	87	11369	0%	0%	6%	4%	63%	24%	0%	1%	1%

Percent Macroinvertebrates by Tolerance Rank

Tolerance Rank



LOWER CANNON NORTH OF FARIBAULT [LCF]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	1.08	1.06	1.9	1.4
AMMONIA NITROGEN	0.1	0.203	0.093	0.039
KJELDAHL NITROGEN	2.84	2.59	3.85	2.31
ORTHOPHOSPHATE	0.051	0.113	0.141	0.203
TOTAL PHOSPHORUS	0.13	0.228	0.25	0.232
PORE WATER				
NITRATE NITROGEN	0.069	0.773	----	----
AMMONIA NITROGEN	2.04	0.695	----	----
KJELDAHL NITROGEN	4.67	2.3	----	----
ORTHOPHOSPHATE	0.096	0.03	----	----
TOTAL PHOSPHORUS	0.176	0.036	----	----
STREAM LOAD				
TURBIDITY	----	----	18	22
TOTAL SUSPENDED SOLIDS	----	----	58.39	47.21
TOTAL VOLATILE SOLIDS	----	----	14.73	11.23
CONDUCTIVITY	0.616	0.559	----	0.645
OTHER				
pH	8.7	8.9	8.5	8.4
ALKALINITY	----	----	240	260
TEMPERATURE	23.6	29.1	25	23.8

LOWER CANNON RIVER AT FARIBAULT

The Lower Cannon River monitoring site is located at river mile 58 just below the confluence with the Straight River downstream from Faribault Canning Company. At this site the stream is a 5th order stream draining 850 square miles. The artificial substrate samplers were placed just beyond the rip rap at the canoe landing. Little was known about the substrate across the rest of the stream at this location because of the rapid current until this past year. It is composed of sand and gravel bars overlying cobble that is embedded in the channel. Where the current is strong the bars do not form and the cobble bottom is exposed. Where the current slows significantly, as downstream from the rip rap, a thick layer of silt and mud settles out. The QHEI score at this site is 64.5 out of a range of 56.5 to 71 for all Lower Cannon main stem sites. Channel quality and instream cover metrics brought down the score at this site.

The caddisfly population at this site was extremely high. During each year of the study over 2000 net spinning caddisflies were collected and identified. Of the 11,369 insects collected and identified, 10,105 were caddisflies or 88% of the total population. In 1995 a large population (602) of caddisflies of the families *Neuroclipsis* and *Polycentropus* were collected. These caddisflies are not net spinners and have a tolerance rank of 3 rather than 5 or 6 as do the net spinners. Beyond the caddisflies, the next most common insects collected were midges and mayflies. The ICI and Diversity scored in the slight impact range while the Richness and Equitability scored in the moderate impact range. Filterers out numbered scrapers by a wide margin during all three years of the study which might be expected given the instream cover at the site. Tolerance rank 5 made up 64% of the population while rank 6 made up 24%. No other tolerance rank made up more than 6% of the total population.

Phosphorus values for the Straight River (greater than .25 mg/L) are higher than the Cannon River (less than .25 mg/L) and are probably the reason for increases as you go downstream from Faribault. Whenever water slows, as in a reservoir behind a dam, some of the phosphorus begins to settle out and the phosphorus values begin to decrease. This may be the reason the Cannon River at Faribault has slightly lower values than the Upper Cannon River at Morristown. The Straight River has higher values however, sampling was done is only about 100 feet downstream from where the Straight River and Cannon River come together. We sampled on the Cannon River side of the stream and it is likely that mixing had not yet taken place. Surface nitrate values are below 2 mg/L and increase as you go downstream as a result of mixing with the Straight river which has concentrations of over 4.0 mg/L. TSS and TVS concentrations are higher here than most sites. The Straight River at Faribault has lower values and the dam just upstream on the Cannon you might think would allow much of the sediment to settle out and reduce the TSS and TVS values, but this does not seem to be the case. During a period of heavy flow, it is interesting to note the color and sediment load carried by the Straight River compared to the Cannon River as they come together upstream of this location. The Straight River appears to carry much more sediment than the Cannon because of its darker color.