

SILVER CREEK

Allegan County, Gun

*Plain Township
(T1N, R11W, Sections 24-26, 34, 35) and
Kalamazoo County, Cooper Township (T1S, R11W, Sections 3, 4)
Surveyed August 14 and 15, 1991*

James L. Dexter, Jr.

Environment

Silver Creek is a small second-order tributary to the Kalamazoo River. Located in the extreme corner of southeastern Allegan County and north-central Kalamazoo County, this high quality designated trout stream has a top-quality coldwater designation. Silver Creek enters the Kalamazoo River about 4 miles southeast of the City of Plainwell.

The creek flows through two distinct land use areas. The upper half is a combination of fallow farm land and scrub shrub wetland; the lower half is dominated by active farm land (crops and cattle) and the Kalamazoo River Floodplain, and is interspersed with scrub shrub wetland. The underlying soils in this drainage are mostly composed of poorly drained loamy sands. The creek runs parallel to the Kalamazoo Moraine.

Estimated to be 5.4 miles in length, Silver Creek's original source was two very large springs. One has been dammed to form Lake Doster No. 1. It now has a submerged pipe to discharge to the creek, although it is not a typical bottom-draw structure. Other numerous springs erupt from the ground along the entire water course. Silver Creek falls 115 feet from its source to its confluence with the Kalamazoo River. The drainage area is 20.5 square miles, and the average stream discharge is 12 cubic feet per second (Cronk et al 1978). An interesting hydrological note is that even though the soils are defined as poorly drained, the stream is quite stable, rising and falling quickly during any major rain event.

Silver Creek averages 14.3 feet in width and 11 inches in depth. Aquatic habitat through much of the stream is excellent. The survey site upstream of M-89 serves as a reference site for MDNR Surface Water Quality Division's GLEAS Procedure #51. The habitat characteristics of Silver Creek were rated very high in relation to other small cold water streams in the State. Habitat components throughout the stream course include pools, undercut banks, overhanging vegetation, logs, riffles, rocks and boulders, and watercress. These components can be rated as common to abundant.

Bottom substrates in the three survey sites averaged 5% boulder, 30% rock, 45% gravel, 16% sand, and 4% silt. Substrate embeddedness by sand and silt was not deemed excessive. Water quality parameters collected in September 1975 indicated the following: Dissolved oxygen greater than 8.0 ppm, pH 8.0-8.5, alkalinity 170-268 ppm, and hardness 200-300 ppm. Other measured parameters can be found in a Surface Water Quality Division staff report by Evans *et al.* (1975). Water temperatures rarely exceed 70° in the warmest months (Dexter, personal records).

Benthic macroinvertebrates are plentiful. A total of 29 taxa were collected during the GLEAS

Procedure #51 sampling. Mayflies and caddisflies were extremely common. Stoneflies were also present. Silver Creek ranks very high in insect species diversity compared to other area trout streams.

Development in the watershed is limited. Few houses are found along the creek banks, but a large development has formed around Lake Doster No. 1. The only other development would include the few active farms along the stream corridor. No State-owned land is found along Silver Creek, however, the entire creek is accessible by landowner permission. The upper area just north of M-89 is also a designated county drain (known as Lower Doster Drain).

Fishery Resource

Silver Creek has been managed for trout since at least 1933. Stocking records indicate that brook trout were stocked from 1933 through 1962 in most years, while brown trout were stocked just once in 1943. Stocking was discontinued in 1962, and the brown and brook trout populations have been self sustaining since that time. Through the 1960s, the fishery in Silver Creek was almost 100% brook trout in the upper half and a combination of brook trout and brown trout in the lower half.

A small diversion dam built in the 1800s below M-89 (T1N, R11W, Section 34, behind old Gun Plain Township Hall) once diverted the creek from its original channel into a series of ponds and through another dam structure which fed a grist mill. For decades the second dam effectively blocked most brown trout out of the upper half of the stream. In the fall of 1973, the owner of this dam pulled the boards out of the dam to flush sediments, and shortly thereafter was killed in an auto accident. The extended period of time that the boards were out (about a year) allowed full incursion of brown trout to the upper waters. Subsequently, the dam was closed again and has not been opened since. The first diversion dam also fell into disrepair and was abandoned, allowing the majority of the stream flow to return to its original channel. The grist mill burned to the ground in the late 1970s, and the current owner's plan to produce electricity fell by the wayside. The ponds have since silted in, and the owner currently is trying to secure permits to once again divert a considerable amount of the flow to the ponds.

Many land use changes have caused management problems that have plagued this stream. In 1962 the main spring source for Silver Creek was dammed to create Lake Doster No. 1. This 155-acre artificial impoundment supposedly cut off one of the major brook trout spawning areas. In addition, its summer discharge temperatures exceed 75° F. This has undoubtedly led to the demise of the self-sustaining brook trout population. Hokanson *et al.* (1973) suggested that the natural occurrence of self-sustaining brook trout populations are limited at stream temperatures above 66.2-68° F. Silver Creek is typically 66-70° F in the summer (Dexter, personal observations).

In 1974, the Lake Doster Development Company applied for a permit to construct Lake Doster No. 2. This proposed 570-acre impoundment would have inundated the creek from M-89 upstream. This proposal was strongly opposed by the DNR and the permit application was finally denied. However, in 1981 the State Court forced the DNR to issue the permit. The bad economic climate at that time kept the development company from starting the project before the permit expired (even after a 1-year extension). The company has since not pursued that development.

In 1981 a major fish kill (but not total) occurred on Silver Creek from M-89 downstream. A sewage pumping station that serves the Lake Doster community malfunctioned and sent raw sewage directly into the creek. Apparently, maintenance of the station was not being handled correctly. The City of Plainwell and the township have amended their maintenance agreement and no problems have occurred since.

In 1989 the Lake Doster Development Company placed a small D-shaped culvert across the creek above M-89 while constructing a road leading to a new gravel operation. This culvert placement

was deemed illegal by the DNR, but not by the Allegan County Drain Commissioner, who gave approval to the Development Company for this placement. Further investigation into this matter showed that the DNR could not get the culverts removed because they were placed in the legally designated Lower Doster Drain, which the drain commissioner had ultimate authority over.

This culvert crossing allowed the development company access to a gravel deposit in the upper headwater area. In 1992, an overflow from the gravel washing basin leaked into an abandoned farm tile and caused a serious turbidity problem. Quick action by landowners, the DNR, and the development company stopped the problem before a serious fish kill occurred. The abandoned tile has been broken and filled.

The only other aquatic resource threat on the stream has been a local farmer whose cattle had complete access to almost a half mile of stream. The cattle seriously damaged riparian vegetation and streambanks, causing severe erosion and loss of fish habitat. It has taken 5 years to convince the landowner to fence the creek off to cattle access. This will be completed in 1993 by the landowner, Soil Conservation Service, and MDNR's Surface Water Quality Division.

The earliest fishery survey on record was conducted in 1954. This one-station survey (location unknown) showed a good brown trout population and a few brook trout, along with blacknose dace, rainbow darters, and mottled sculpins. Numerous additional surveys were conducted from 1967 through 1981 because of the need to document impact of Lake Doster No. 1 and the potential impact of Lake Doster No. 2. These surveys were similar, with many brook trout in the upper areas through the mid 1970s, and many brown trout in the lower areas. Species collected in surveys after 1954 included white suckers, creek chubs, american brook lamprey, grass pickerel, central mudminnow, and some centrarchids--although their numbers were never very high.

The fish community of today is a little different from that of 50 years ago (Table 1). Brown trout now dominate the entire creek, although a remnant brook trout population remains. This is most likely due to a combination effect of higher water temperatures due to Lake Doster No. 1, and the brown trout out-competing the brook trout. Brook trout are confined mostly to the upper one-third of the creek, although they may be more abundant in the extreme headwater areas above the Lake Doster outlet (not surveyed in 1991). Species other than trout are not numerous. Some come from the outlets of a few farm ponds located along the waterway, while others (such as smallmouth bass) have free access to the creek from the Kalamazoo River.

The 1991 fishery survey was conducted at three locations. Population estimates (Bailey modification of the Peterson method) were made at each site. The lengths of survey sections ranged from 800 to 1,050 feet (see fish collection forms, population estimate forms and fish growth forms for detailed information). Brown trout biomass estimates at the three survey sites ranged from 62 pounds per acre (above M-89) to 120 pounds per acre (below M-89). Estimated number of brown trout ranged from 446 (above M-89) per acre to 917 per acre (Dalrymple farm at the county line). Brook trout were found only above M-89 (50 fish/acre and 6.2 pounds/acre). Our electroshocking efficiency ranged from 64.8% to 72.2%.

The trout fishery today is considered by many anglers to be one of the best in southern Michigan. Spring Brook in Kalamazoo County is about the only stream in the area that can compare to Silver Creek in quality. Although brook trout in Silver Creek are not as abundant as in previous years, their presence still attracts many anglers. Brown trout, however, sustain the fishery. We collected brown trout from 2 to 16 inches long, and brook trout from 5 to 9 inches long. All trout appeared very healthy.

Recruitment of young-of-the-year brown trout (2 to 4 inches long in [Figure 1](#)) is very good. No young-of-the-year brook trout were collected. These probably could be found upstream from the survey stations. Age and growth of brown trout is at the state average for the population as a

whole. The brook trout population is growing at a rate above the state average. Growth slows in each successive year, and is best in first year of life. This may be density related or environmentally related (temperature).

The estimated age frequency of brown trout (Table 3) does not show anything surprising. The mortality rate appears normal, but the proportion of 2-year olds may be somewhat depressed. This is most likely due to this age group becoming vulnerable to harvest. Also, between age group 0 and 1, the typical ineffectiveness of electroshocking young-of-the-year trout shows up. Even though the length frequency data shows good recruitment, the electroshocking efficiency on this age group was about 51%.

Habitat degradation has undoubtedly occurred since the construction of Lake Doster No. 1. In the 1975 SWQD staff report on Silver Creek, 33 different taxa of insects were found above M-89. The 1991 survey in the same area found only 29. Also, water temperatures in the upper portions of the stream have warmed considerably due to the Lake Doster discharge.

Management Direction

Very few streams in Southern Michigan rival Silver Creek in production of wild trout. The biomass of trout that it produces ranks it with some of the best trout streams in the state. Although it has enjoyed a good reputation for decades, the stream is not overfished. The stream does have its faithful anglers, however, many who like to take home a limit or two of trout each year. The environmental conditions of the watershed have changed quite a lot in the last 30 years. Stream mileage has been lost due to Lake Doster No. 1, water temperatures have increased, and continued threats of siltation and development occurs in the headwater area. Brown trout are prospering, however, perhaps to the demise of brook trout.

Silver Creek should continue to be managed as a top-quality coldwater, designated trout stream. Significant natural reproduction of brown trout and limited natural reproduction of brook trout will continue to provide the creek with excellent angling opportunities. No fisheries management action need be taken at this time, except to assure that the fencing project at the Dalrymple farm is completed. If land ownership of that farm transfers in the near future, the Fisheries Division should pursue a full scale habitat improvement project on that portion of stream that is extensively damaged by cattle. The present landowner will not allow us to do that work.

Continued monitoring of the stream by landowners and anglers will keep us apprised of problems as they arise. Our management goal into the next century should be to maintain the existing excellent trout fishery at its present capacity by working with stream riparian owners to maintain careful habitat management.

Report completed: January 1993.

References

- Cronk, C., et al. (21 authors). 1978. Kalamazoo County. Geology and the Environment. Western Michigan University, Kalamazoo.
- Evans, E. D. Tierney, A. Massey. 1975. Staff Report. Silver Creek, Allegan County Michigan, September 16, 1975. Michigan Department of Natural Resources, Surface Water Quality Division, Lansing and Plainwell files.
- Hokanson, K.E.F., J.H. McCormick, B.R. Jones, and J.H. Tucker. 1973. Thermal requirements for maturation, spawning, and embryo survival of the brook trout, *Salvelinus fontinalis*. Journal of the Fisheries Research Board of Canada 30:975-984.
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Table 1.-Species, relative abundance, and length of fish collected by streamshocker during marking runs at three stations on Silver Creek, Gun Plain Twp., August 14-15, 1991.

<u>Species</u>	<u>Number</u>	<u>Percent</u>	<u>Length range (inches)¹</u>
Brown trout	462	62.4	2-16
Mottled sculpin	140	18.9	1-4
White sucker	38	5.1	2-14
Creek chub	27	3.6	2-5
Bluegill	26	3.5	1-7
Lamprey ammocete	18	2.4	3-6
Brook trout	12	1.6	5-9
Bullhead	9	1.2	1-6
Smallmouth bass	2	0.3	10-13
Green sunfish	2	0.3	2-3
Central mudminnow	2	0.3	1
Northern hogsucker	1	0.2	13
Largemouth bass	1	0.2	1
Blacknose dace	many		
Total	740	100.0	

¹Fish were measured to inch group: eg., "1" = 1.0 to 1.9 inches; "2" = 2.0 to 2.9 inches; etc.

Table 2.-Average total unweighted length (inches) at age, and growth relative to the state average, for fish sampled from Silver Creek, Gun Plain Twp., with DC streamshocker, August 14-15, 1991. Number of fish aged is given in parentheses.

Species	Age						Mean growth index ¹
	0	I	II	III	IV	V	
Brown trout	4.4 (5)	6.5 (15)	8.9 (9)	11.5 (17)	14.6 (4)	16.0 (4)	-0.1
Brook trout	6.6 (10)	8.8 (2)	- -	- -	- -	- -	+0.9

¹Mean growth index is the average deviation from the state average length at age.

Table 3.-Estimated age frequency (percent) of fish caught from Silver Creek, Gun Plain Twp., with streamshocker on August 14-15, 1991.

Species	Age						Number caught
	0	I	II	III	IV	V	

Brown trout	45	32	10	11	1	1	-	462
Brook trout	-	85	15	-	-	-	-	12

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Questions, comments and suggestions are always welcome! Send them to
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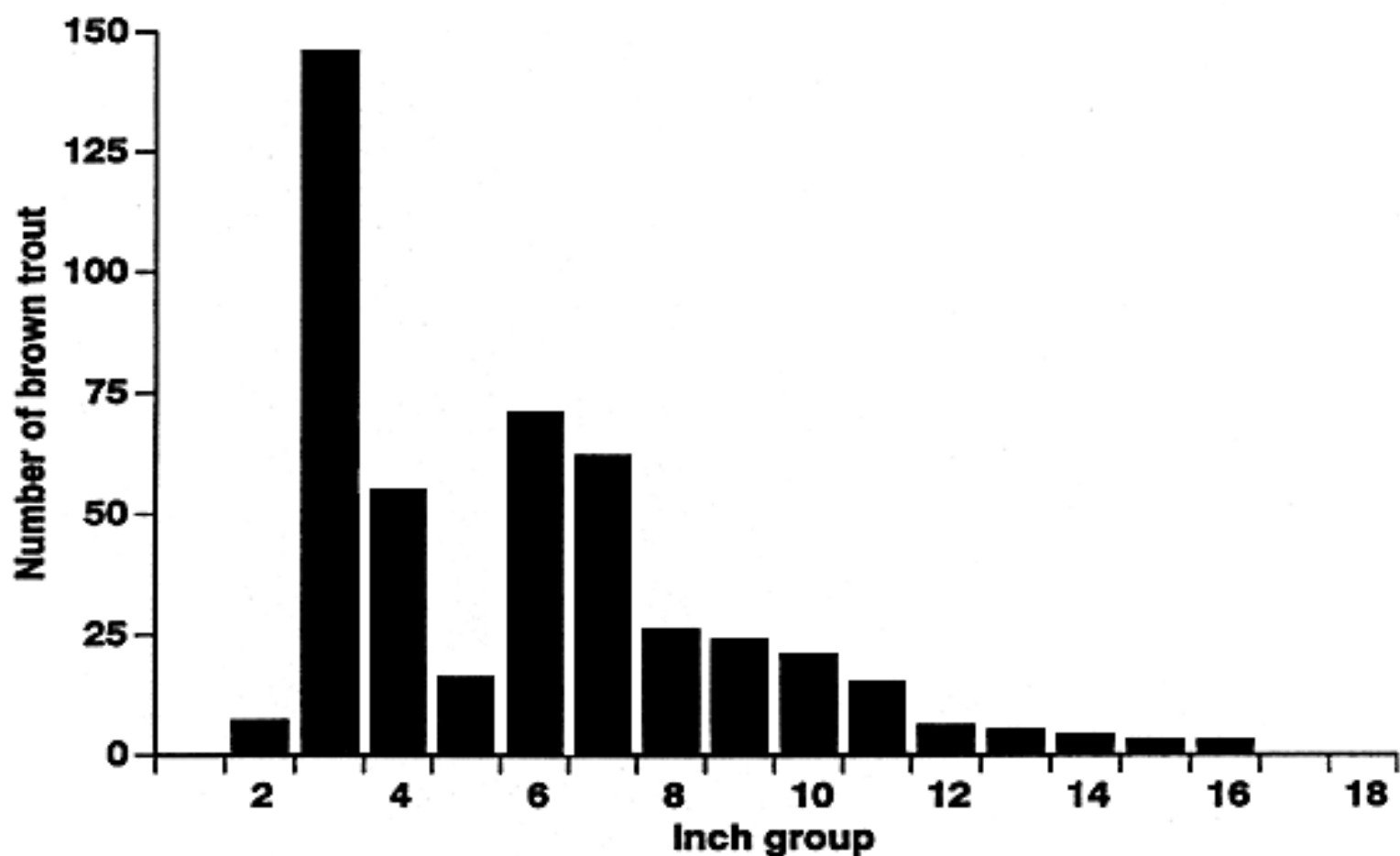


Figure 1.—Length frequency of all brown trout captured in the marking run from three sites on Silver Creek, Allegan Co., August 1991