Michigan Department of Natural Resources
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SPRING BROOK

Kalamazoo County (T1S, R11W, Sections 25-27 and T1S, R10W, Sections 5-8, 12, 17-20, 29, 30)

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Environment

Spring Brook is a small second-order tributary to the Kalamazoo River. Located in north central Kalamazoo County, this high-quality designated trout stream has a top-quality coldwater designation. Spring Brook enters the Kalamazoo River 5 miles north of downtown Kalamazoo.

Most of Spring Brook flows through a shrubby wetland. Near the lower end the brook enters a manicured subdivision, then agricultural land, and finally wooded wetland at the mouth. The underlying coarse soils in this drainage are almost entirely made up of glacial outwash. Top soil characteristics are nearly level to rolling, well-drained, and moderately fine textured.

Spring Brook's main source of water is the numerous springs which erupt in many areas along the entire 9.3 mile water course. Five small first-order tributaries feed Spring Brook. These tributaries (also spring fed) account for an additional 7 miles of stream, although two of the tributaries are intermittent in nature. Spring Brook falls 160 feet from its uppermost source spring to the Kalamazoo River. The drainage area is 31.1 square miles. The stream discharge averages 17 cubic feet per second (Cronk *et al.* 1978) and is extremely stable.

Spring Brook averages 13.5 feet wide and 14 inches deep. Aquatic habitat throughout most of the stream is excellent. The site at CD Avenue (refer to fish collection forms, 1991) serves as a reference site for MDNR Surface Water Quality Division's GLEAS Procedure #51. The habitat characteristics of Spring Brook was scored using this procedure as one of the five top streams in the entire state (MDNR SWQD 1991). Habitat components throughout the stream include undercut banks, pools, riffles, logs, overhanging brush, and watercress. Most of these characteristics were rated as abundant to extremely abundant.

Bottom substrates in the three survey sites averaged 5% boulders, 10% cobble, 54% gravel, 21% sand, and 10% silt. Little substrate embeddedness by sand and silt was observed. No information could be found on any water quality parameters. Because of many springs, water temperatures rarely exceed 64°F.

Benthic macroinvertebrates are plentiful. A total of 26 taxa were recorded in 1991. Mayflies and caddisflies were extremely common, and stoneflies were also abundant. Few streams in the State rival Spring Brook in insect diversity.

Development in the watershed is limited. The upper two-thirds is relatively natural due to the wetland corridor. Low density housing exists in this area. The lower third of the watershed is primarily subdivision with manicured lawns to the stream bank, and active farm land. No State-owned land exists along Spring Brook and several sections are posted "no fishing". However, several large sections are open to fishing with landowner permission.

Fishery Resource

Spring Brook has been managed for trout since at least 1926. Stocking records indicate that brook trout were stocked from 1933 to 1958, while brown trout were stocked from 1948 to 1957, and in 1968 and 1969. Rainbow trout were stocked only in 1949, but catch records indicate the presence of this species in 1929 as well. A small privately operated fish hatchery that consisted of three ponds existed adjacent to the creek (T1S, R10W, Section 19) around the turn of the century. I believe, however, it did not operate long, as a 1926 field investigation reported a survey site near "the old hatchery site". It is not known what was reared there, but it probably was some species of trout. The ponds still exist, but are not used.

The earliest fishery survey on record was conducted in 1926. The investigators found brook trout, mottled sculpin, and blacknose dace. The type of gear used was not recorded, but it was probably a seine.

A unique fish management problem occurred in the mid 1940s. Anglers placed a dam at the mouth of Spring Brook and diverted its waters through a shallow, open ditch into Farwell Creek, and then into Burns Creek. This latter stream empties into the Kalamazoo River approximately 2 miles north of the original mouth of Spring Brook. The diversion was designed to prevent trout from entering the Kalamazoo River so near the City of Kalamazoo, where pollution was thought to be a "menace to fish life" (Pratt 1953). The success of the dam was never evaluated, and it does not exist today.

The most complete historical inventory occurred in 1949 and 1950 (Pratt 1953). Species present then were brook trout, brown trout, rainbow trout, white sucker, blacknose dace, mottled sculpin, and grass pickerel. Spring Brook was very productive, as indicated by mark-recapture estimates (Petersen formula) of fish populations. In June of 1950 there were an estimated 205.6 pounds of trout per acre. All other species accounted for another 57 pounds per acre. However, note that of the estimated trout biomass, stocked trout represented a substantial percentage. For example, in 1949 Spring Brook was stocked with 3,900 brown trout averaging 9.0 inches and 3,200 brook trout averaging 8.0 inches.

Pratt (1953) attempted to determine the survival of hatchery trout and their effect on wild trout. He concluded that the hatchery trout provided a significant portion of the population and recommended legal-size trout be stocked on a monthly basis during the first portion of the trout season. This has since been proven to be a poor recommendation, since stocking was discontinued in 1969 and the stream continues to provide an extremely good, well-known trout fishery.

Fish surveys during the 1960s and 1970s indicated the same species composition, plus an occasional creek chub, American brook Lamprey, and young-of-the-year (YOY) large-mouth bass. Bass were undoubtedly escaping to the creek from many of the numerous ponds that riparians dug adjacent to the creek. In a 1982 survey, several green sunfish and rock bass were collected.

The fish community of today is not much different from that of 65 years ago. In July 1991, population estimates (Bailey modification of the Petersen formula) were conducted on three sections of Spring Brook with 110-volt D.C. electrofishing gear. Brown trout provided the majority of the biomass, with the remainder made up of brook trout, mottled sculpin, and white sucker (Table 1). Two smallmouth bass were captured at Riverview Drive, the lowermost site surveyed. Not found, for reasons unknown, were blacknose dace (formerly abundant) and several other species previously reported as rare.

The trout fishery in Spring Brook is considered to be one of the best in Southern Michigan. Although few brook trout are found in the mainstream, their presence still attracts anglers. Brown trout sustain the fishery. Trout biomass estimates (pounds per acre) at three stations ranged from 56 at Riverview Drive subdivision area to 101 at site CD Avenue (undisturbed wetland area), and

averaged 83.5.

The trout population in Spring Brook is comparable with the best trout streams that Michigan has to offer (Gowing and Alexander 1980). Although the 1991 estimate is not as high as the 1950 estimate, (83 versus 205 pounds per acre) it probably does not indicate a significant decline in trout quality. The 1991 data is for wild trout only, whereas the prior estimate includes both wild and stocked trout. In addition, the statistical confidence limit on the 1950 estimate is probably wide. The 1991 survey had an average electrofishing efficiency of 74%, whereas the 1950 estimate had an efficiency of only 40%.

Brown trout are the mainstay of the fishery. We collected browns ranging from 2 to 20 inches. All specimens were extremely healthy in appearance. Recruitment of YOY brown trout is good (Figure 1), although our efficiency on 2-4 inch trout was poor overall. Brook trout are sparse, and all were collected from one pool at the Riverview Drive site. No YOY brook trout were captured. These most likely can be found in the upper headwater areas and tributaries that were not surveyed. Pratt (1953) suggested that most of these tributaries contained brook trout and would continue to seed the mainstream. A tributary survey should be made to determine if this is true.

Age and growth characteristics of brown trout in Spring Brook are good for the population as a whole (Table 2). However, growth becomes slower with each successive year class. This may be density related. Three observations have been derived from their age-frequency distribution (Table 3). First, the typical ineffectiveness of electroshocking YOY trout shows up. Our efficiency with this age group was very poor. Second, a depressed (weak) age one cohort is evident. Electroshocking efficiency of age one or older was very good. Third, a significant mortality (angling and/or natural) occurs between age II and III. Few trout survive in Spring Brook past age III. I believe a large portion of this mortality is angling related. Compared with the estimated age frequency from 1950 (Table 3), the age structure for 1991 is very similar except for a notable decrease in survival of age II to age III brown trout. Perhaps most of the harvest in 1950 was made up of stocked trout, and the bulk of the wild trout were left alone.

Management Direction

Few if any streams in Southern Michigan rival Spring Brook in production of wild trout. Although it has enjoyed a good reputation for decades, the stream is not overfished. The stream does have its faithful anglers, however, many of whom like to take a limit or two of trout home each year. The environmental conditions of the watershed appear little changed over the last 60-70 years. Perhaps the only threat in the near future will be the continued residential development in the watershed. This may lead to increased nutrient enrichment of the stream from both septic systems and lawn fertilizers.

Spring Brook should continue to be managed as a top-quality, coldwater designated trout stream. Significant natural reproduction of brown trout and some reproduction by brook trout will continue to provide the creek with excellent angling opportunities. Stocking Spring Brook would probably be detrimental to the wild population.

No fisheries management action need be taken at this time. Continued monitoring of the stream conditions by faithful riparian landowners will keep us appraised of problems as they arise. Our management goal into the next century should be to maintain the existing fishery at its present level by working with stream riparian landowners to maintain careful habitat management.

Report completed: October 1992.

References

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Table 1.-Species, relative abundance, and length of fish collected by stream electrofishing at three stations on Spring Brook, July 29-30, 1991.

Common Name	Number	Percent	Length range (inch group)
Brown trout	444	68.9	2.0 - 20.0
Mottled sculpin	182	28.2	1.0 - 4.0
White sucker	12	1.8	12.0 - 15.0
Brook trout	5	0.8	7.0 - 10.0
Smallmouth bass	2	0.3	12.0 - 13.0
Total	645	100.	

Table 2.-Average total length (inches) at age, and growth relative to the state average, for fish sampled from Spring Brook July 29-30, 1991. Number of fish aged is given in parentheses.

	Age								Mean growth
Species	0	I	II	III	IV	V	VI	VII	index[1]
Brown trout	4.7	6.1	8.7	11.4	--	16.4	--	--	+1.6
	(2)	(11)	(17)	(2)	--	(1)	--	--	--
State Avg.	2.5	5.8	8.8	11.8	--	17.8	--	--	--

[1]Mean growth index is the average deviation from the state average length.

Table 3.-Estimated age frequency (percent) of fish caught from Spring Brook with stream electroshocking equipment, July 29-30, 1991. These are compared to the estimated age frequency of brown trout collected in 1950 (Pratt 1953).

	Age								Number
Species	0	I	II	III	IV	V	VI	VII	Caught

Brown trout 1991	21	34	40	4	--	1	--	--	444
Brown trout 1950	10	35	31	20	1	1	1		?

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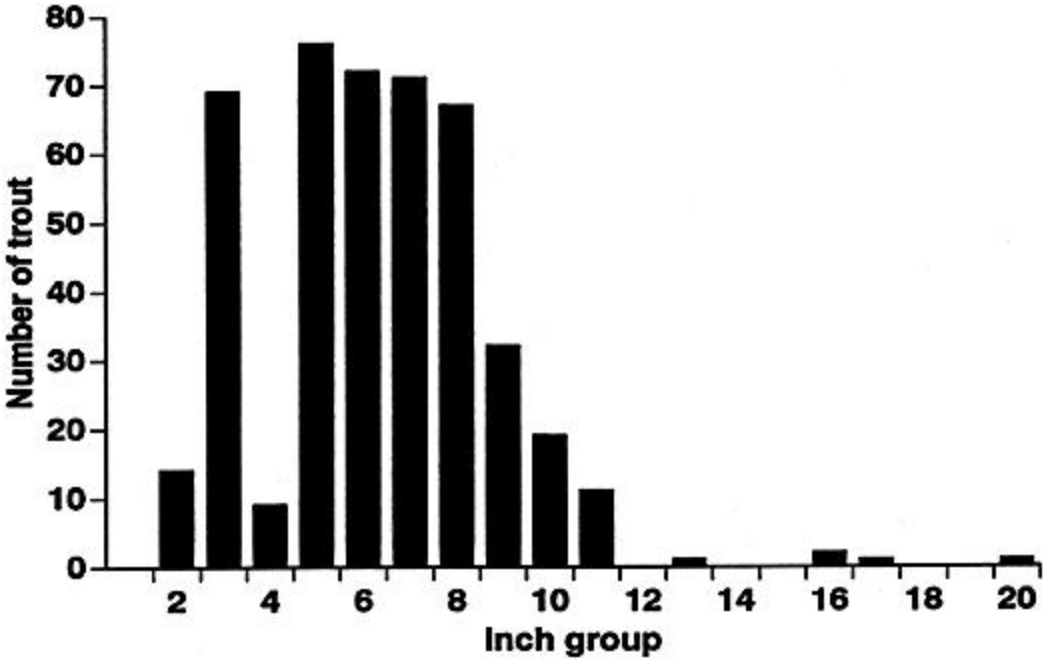

Figure 1.—Length frequency of all brown trout captured from three survey stations in Spring Brook, 1991.