Spring Brook

Charlevoix County
Bear River watershed, surveyed 2009

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Environment

Spring Brook is a small groundwater fed stream in eastern Charlevoix County. It is formed by the confluence of the South and North branches which are both approximately seven miles long. The mainstem of Spring Brook starts when both streams merge near Harmon Road. Spring Brook proper then flows through a thick lowland swamp for two miles until it merges with the outlet of Walloon Lake, also called the Bear River, which flows north to the city of Petoskey and Little Traverse Bay, Lake Michigan.

North Branch Spring Brook has less gradient than the South Branch and has a bottom dominated by sand and silt, with some gravel present. This branch is cold but is slightly warmer than the South Branch. The South Branch begins at a series of springs in a region of high relief known as the Chandler Hills. Groundwater accrual is high throughout its course and it flows through a spruce and white cedar dominated canopy. It has one major tributary known as Gimlet Creek. Road-stream crossings are present along both branches and inventories of these structures were made as recently as the year 2000. Riparian ownership of the entire Spring Brook watershed is predominantly protected state land with a small interspersion of private ownership.

History

The first aquatic surveys of the Spring Brook watershed were made in 1926 on both the North and South branches. Surveyors of the time observed brook trout juveniles and adults ranging from 2-6 inche in the North Branch, and 3-4 inches in the South Branch. Aquatic community data is lacking for Spring Brook and its branches from 1926 to 1960. However, stocking records of brook trout exist from roughly 1947 through 1965. During this period a combination of brook trout fry, fingerlings, and legal size fish were stocked. Brown trout were thought to be stocked in the system during these early years but such records could not be found. It is believed that neither brook nor brown trout were native to this watershed.

The Bear River (downstream of the confluence with Spring Brook), has a long stocking history. Brown trout were stocked in this river for many years prior to 1979 and were fin clipped since 1975, brook trout from 1981 through 1994, and brown trout again from 1995 through 2004. It is important to document the historic stocking of the Bear River downstream of the Spring Brook watershed, because they impact recreational fishing and management in Spring Brook and its branches. Many efforts were pursued to create a brown trout fishery in the Bear River in the early 1970s, and even included a 1973 chemical reclamation of part of this river, followed by brown trout stocking efforts. It was during this decade that brook trout anglers of Spring Brook voiced their concerns over brown trout stocking efforts downstream and eventual migration of this species into the branches of Spring Brook. In addition, anglers were concerned over the possible competition with newly introduced species such as salmon downstream in Lake Michigan.

The files indicate that brief fish community surveys were conducted in Spring Brook in 1960, 1966, and 1968. Recommendations from these surveys were made to discontinue trout stocking efforts since natural reproduction of these species was considered excellent in this watershed. Coho salmon natural reproduction was also documented in Spring Brook during the 1968 survey. It was during the early 1970s that fish management was directed at increasing brown trout densities in the Bear River. Angler complaints were well documented at this time and echoed the theme of disdain against migration of brown trout to the Spring Brook watershed. An angler fishing summary from 1969 through 1977 for Spring Brook showed significantly increased brown trout catches and decreasing brook trout catches. Anglers were worried that brown trout would migrate upstream from the Bear River during the summer when this river routinely exceeds optimal water temperatures for brown trout. Angler reports verified this concern. It was at this point that fisheries surveys in the Spring Brook branches began to intensify.

An initial fish community survey utilizing stream electrofishing was made in the summer of 1976 at unknown locations. This initial survey found that brown trout were becoming more abundant in the Spring Brook system. Growth rates of this species were more than two inches above the statewide average at the time, and four year classes (ages 1-4) were represented. Fair numbers of 12-19 inch fish were found. Brook trout were also collected and in higher numbers than brown trout. However, only two year classes (ages 1-2) were found with very few legal fish.

Two electrofishing surveys, a mark and recapture study in June, and a species composition assessment later in the summer were conducted in Spring Brook in 1977. This was done to determine if brown trout stocking efforts further downstream (below County Line Road) would have less of an impact on Spring Brook populations. The June survey included five stations including two on the North Branch and three on the South Branch. The North Branch stations were 100 feet each side of the Major Road Bridge. The South Branch stations included 1000 feet below Harmon Road, 500 feet upstream of Harmon Road, and 500 feet downstream of Harmon Road.

From the 1977 survey it appeared that both brook and brown trout numbers increased at Harmon Road (further downstream) while at Major Road brown trout numbers increased and brook trout decreased. In the July 1976 survey 59 brown trout were surveyed at Harmon Road, 38 of which were fin clipped, 33 had a dorsal 1976 clip, and 5 had an adipose 1975 clip. Thus, 64% of the brown trout collected were fish that were planted in the Bear River. During the June 1977 survey only 6 brown trout were collected at Harmon Road, one of which was a dorsal 1976 clip. At the same station in August 1977, 52 brown trout were taken of which 5 were clipped. While the total number of brown trout taken in August was quite comparable to July 1976, only 9.6% were from Bear River stocking efforts. No clipped trout were taken at Major Road in either 1976 or 1977. Fisheries managers of the time concluded that by moving Bear River brown trout stocking efforts further downstream 5 miles that they reduced the number of planted brown trout emigrating into Spring Brook.

Population estimates for brook trout were made in June 1977 both above and below Harmon Road and above Major Road. These estimates for legal size fish compared favorably to the nearby West Branch Maple River which was considered a quality brook trout stream. The brook trout numbers in Spring Brook were considered normal with average growth and it was recommended that future population estimates be conducted using the stations established in 1977 to assess any trends in trout densities.

The previously surveyed stations were surveyed on both branches of Spring Brook in August of 1978. No brown trout were collected at the 200 foot Major Road sampling location on the North Branch. Brook trout numbers were normal though at this location. The South Branch stations again included 1,500 feet at Harmon Road and 500 feet at Major Road (all upstream). Again, brook trout estimates were considered good when compared to other northern Michigan trout streams. Clipped stocked brown trout comprised only 1% of the brown trout catch compared to previous surveys (64% in 1976; 17% in June 1977; 10 % in August 1977). Thus, stocking brown trout further downstream in the Bear River was working to reduce upstream emigration.

The same sites in Spring Brook were surveyed in August 1979 for the same reasons. It was apparent to managers that brown trout numbers had increased since the 1960s, but the trend in the last three years had been a steady decrease in their densities. At Major Road the brook trout have fluctuated since the 1960s, but from 1976 on the brown trout have shown the same decreasing trend. The brown trout stocked in the Bear River in previous years had been fin clipped, yet no fin clipped brown trout were taken at any of the survey stations in 1979. Population estimates had been generated since 1977 at the survey station 1000 feet below Harmon Road. Total brook trout numbers for this station were as follows: 324 in 1977; 508 in 1978; 257 in 1979). While the numbers of brook trout varied considerably at this station over time, the numbers compared favorably to other local streams and were well within the range of normal year to year variation.

The next fish community survey in Spring Brook was made nearly two decades later in the summer of 1998 by Michigan Department of Natural Resources Fisheries Division. The purpose of the survey was the same as in the past, to assess whether or not brook trout were still the dominant species in the headwaters and to see if any brown trout were still found in the lower reaches. Three sites were surveyed. The first site was the final 1,200 feet of Spring Brook prior to its confluence with the Bear River. The site was surveyed with a stream shocker and probes. Brown trout were the dominant trout by number (Table 1) with 28 fish captured ranging in length from 5-18 inches. Two small brook trout were also collected. At this time, brown trout were being stocked in the lower Bear River so the results were anticipated. In addition, five adult steelhead were collected in early August. The second sampling location was a 400 foot section of the South Branch on private land in section 20, which is located not far downstream from Major Road. No brown trout were collected and brook trout densities were good (Table 1), although few legal fish were collected. Fish were sampled at this location (and the North Branch) with backpack electrofishing units. Only brook trout were collected at the third station located on the North Branch. This station was 200 feet long off Springvale Road, in the headwaters. Legal fish were not abundant, but brook trout numbers were good (Table 1).

After a long history of stocking brown trout in the Bear River (downstream of Spring Brook), this practice was discontinued after 2004. Reasons cited were slow growth and poor survival of brown trout in the Bear River mainstem. The Bear River mainstem was considered to have marginal trout habitat, mainly as a product of high water temperatures. Angler use of the Bear River brown trout fishery was also minimal.

Current Status

The most recent fish community survey in the Spring Brook watershed occurred on August 13, 2009 in the South Branch. The location was the Major Road crossing and included 800 feet upstream from the

road. Sampling was done with a stream shocker and 2 probes. Sampling efficiency was considered very good and followed the standardized Status and Trends sampling protocol established by MDNR Fisheries Division. The riparian corridor was predominantly white cedar and spruce trees. Water clarity was excellent. Submerged logs, woody debris, and undercut banks were all considered abundant along with some overhanging tag alders. Average stream width was nearly 20 feet and average water depth was 1.3 feet. The bottom substrate was predominantly sand. Stream discharge was 9.8 cubic feet per second. This was considered classic brook trout nursery water.

A temperature logger was installed in the creek in spring and removed in fall. It recorded water temperature every hour. Results demonstrated that the South Branch of Spring Brook at Major Road receives extremely high amounts of groundwater. Average monthly temperatures at this station through the summer never exceeded 52 degrees Fahrenheit, while maximum temperatures were just over 60 degrees (Table 2). This is high quality groundwater and perfect for a brook trout nursery stream.

The fish community survey produced a total catch of 382 fish, which included 131 brook trout (Table 3). No brown trout were collected in the survey while one yearling rainbow trout (steelhead) was collected. The fish community was typical of a cold, groundwater fed northern Michigan stream. Only 2% of the total brook trout were legal size, which is 8 inches or larger (Table 4). Good numbers of age 0 through 3 brook trout were collected, indicating stable recruitment.

Seven additional species of fish were collected in this reach of stream, with most indicative of a cold stream in northern Michigan. One yearling rainbow trout (steelhead) was collected which shows that some potadromous fish still migrate into these reaches of stream, although it is probably limited by downstream barriers.

Analysis and Discussion

Overall, the brook trout population in this reach of South Branch Spring Brook looked healthy. Harvest is unknown, but a beaten path along the stream indicates that fishing occurs on occasion, but is probably not enough to have any impact on the population. Based on this survey and those done in 1998, it appears that brook trout are the dominant fish in the upper and middle reaches of both the North and South Branch Spring Brook. Lower Spring Brook had dominant brown trout in it in 1998, but most of these are likely wild fish. The discontinuation of the brown trout stocking effort in the Bear River may increase this division between brown and brook trout in Spring Brook. The upper reaches of Spring Brook, particularly the South Branch, may be too cold for brown trout and will allow brook trout to continue to flourish.

Management Direction

Brook trout are the dominant fish in Spring Brook, particularly in upstream reaches. This is what anglers wanted over thirty years ago and it has dictated management into this century. Brown trout are not stocked in the lower Bear River anymore due to poor survival, thus less and less upstream emigration of this species might be realized. Spring Brook will continue to support a brook trout fishery and is managed appropriately with Type 1 stream regulations where trout minimum size is eight inches, all tackle types are allowed, the daily bag limit is five fish, and the fishing season is from the last Saturday in April through September 30th. This watershed provides limited natural recruitment

of potadromous species such as steelhead. Thus, competition with naturalized species such as brook trout will be limited. Brook trout are not stocked in Spring Brook, and based on recent and historical surveys, do not need stocked now or probably into the future.

The condition of road-stream crossings in the entire Bear River watershed (including Spring Brook branches) were inventoried in summer 2000 by a Conservation Reserve Alliance and Tipp of the Mitt Watershed Council. Fisheries and habitat managers should work cooperatively with these non-profit organizations to continue to remove structures in Spring Brook which hinder quality fish passage or are erosion hazards.

References

Table 1. Trout length-frequencies based on the 1998 survey catches at three locations in the Spring Brook watershed.

Length group (in)	1,200 (ft) upstream of Bear river		South Br Spring Bk 400 ft, T33N, R4W, S30	North Br Spring Bk 200 ft, T33N, R5W, S14
	Brook trout	Brown trout	Brook trout	Brook trout
1				
2			5	9
3			5	1
4			1	6
5	1	1	20	9
6	1		15	6
7		4	7	4
8		15	2	1
9		5		
10		1		
11		1		
12				
13				
14				
15				
16				
17				
18		1		

Table 2. Summary data for temperatures of the South Branch Spring Brook at Major Road, from June 11 through August, 2009. All readings in Fahrenheit.

Month	Average	Maximum
June	52.0	61.5
July	50.9	60.0
August	51.3	59.6

Table 3. Species composition from survey of 800 ft of South Branch Spring Brook with a stream shocker in August 2009, at Major Road.

Species	Number	Length Range (in)
Blacknose dace	207	1.0 – 4.9
Brook trout	131	2.1 – 9.6
Slimy sculpin	30	1.0 – 4.9
Creek chub	7	1.0 – 4.9
Central mudminnow	2	2.0 -2.9
Northern redbelly dace	2	2.0 – 2.9
Yellow perch	2	3.0 – 4.9
Rainbow trout (steelhead)	1	7.2

Table 4. Length-frequency of brook trout collected in 800 feet of South Branch Spring Brook at Major Road on August 13, 2009.

Length group (in)	Number of brook trout collected	Ages represented
2	10	0
3	55	0
4	1	0
5	34	I
6	22	I
7	6	I, II
8	2	II
9	1	II