

### **Beaver Creek**

Crawford County, T25N, R2-4W  
South Branch Au Sable River watershed, last surveyed 2014

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### **Environment**

Beaver Creek is a designated Michigan trout stream and a major tributary to the South Branch Au Sable River in Crawford County. It flows for approximately 14 miles in an easterly direction and empties into the river just north of the town of Roscommon (Figure 1). It crosses under a number of roads, including Michigan freeways Interstate 75 and U.S. 27. It has a relatively low gradient for most of its reaches, and flows through a variety of riparian types including tag alder, brushland, and upland hardwood and conifer types. Land ownership along its course is nearly an even mixture of private and public land. The public land in this corridor is managed by the State of Michigan's DNR Forest Resource Division. The creek is intermittent or very narrow in its headwaters, which are formed by natural seepage and springs. It gains some volume, likely from groundwater, between the freeway crossings, and eventually becomes its widest in reaches east of Interstate 75 Highway. Discharge is rarely never more than 20 cubic feet per second. Two or three small inlets enter the creek, and all are warm water, low gradient streams. Bottom substrate is typically sand and silt, with gravel found in some of the lower reaches near the confluence with the South Branch Au Sable River. Oil and gas exploration and development is prominent in this watershed, with the first wells developed in the late 1940s.

A recent road-creek crossing inventory was done on this watershed by Huron Pines, a local conservation agency, and it rated each Beaver Creek road-creek crossing based on measured impairments (perched culverts, sedimentation, etc). Four crossings were rated as severe, three crossings as moderate, and three crossings as minor for impairment. Detailed data for each crossing can be viewed at: <http://www.northernmichiganstreams.org>.

### **History**

The first aquatic examinations of the Beaver Creek watershed were made by the Michigan Department of Conservation (MDOC) in the 1920s at various locations. It was considered a marginal (or warmer) trout stream in some reaches. Trout mortality was considered high due to warm water caused by beaver activity, and otter were also considered to be inhabiting this watershed in high numbers. Otters are known to prey on fish, in particular, trout. Brook trout inhabited many locations of the creek, but not in high numbers. Other species observed in the 1920s were creek chubs, white sucker, sculpin, blacknose shiner, dace, Johnny darter, and northern pike.

Supplemental stocking was recommended after the initial examinations of the creek in the 1920s, but it took until 1937 to be accomplished. Brook trout fingerlings, and then legal size fish, were stocked in various years starting in 1937, and eventually ending after 1964 (Table 1).

Additional sampling of the creek by MDOC was conducted in the 1940s. Poor habitat from an overabundance of beaver was thought to continually plague the creek during this period, and especially

in Section 36 (mid to lower reaches). Regardless, brook trout stocking efforts continued in most years of this decade, though stocking efforts focused on upstream reaches.

Brook trout stocking efforts were discontinued again in Beaver Creek for most of the 1950s (Table 1) due to perceived poor water conditions from overabundant beaver. Fishing pressure was considered light in the mid to late 1950s and the trout population and fishery was considered "ruined" from beaver and otter numbers. Despite this, brook and brown trout could still be captured in various parts of the creek, and stocking was again initiated for brook trout in 1958 and continued for more than half a decade (Table 1). Records also indicate that MDOC was collecting water temperature data for the creek (location unknown) from 1958-1963, with average July temperatures ranging from 55-63 Fahrenheit.

The next fish assessment of Beaver Creek was made at two locations in 1967. MDOC used direct current electrofishing to capture fish in two small reaches of the creek, including upstream of Johnson Road, as well as a station in Section 36. The Johnson Road station is near Interstate-75, and considered upstream of the problematic warming reaches of Beaver Creek. At this station, personnel collected 15 brook trout (2-11 inches), 7 brown trout (5-8 inches), and one 10 inch rainbow trout. At the station downstream of the impaired reach, they collected 1 brook trout, and 23 brown trout (4-18 inches). Trout were collected in fair numbers at each station, yet brook trout numbers significantly declined downstream where brown trout were more prevalent. Other species collected were white suckers, creek chubs, shiners, central mudminnows, blacknose dace, and sculpins. At that time, Beaver Creek was considered an important contributor of trout to the popular South Branch Au Sable River.

Nearly four decades passed before Beaver Creek was closely examined by fisheries managers in August of 2006. Michigan Department of Natural Resources (MDNR) Fisheries Division conducted a survey of Beaver Creek at a 500 foot station upstream of Pioneer Road. This station was immediately downstream of the lowest gradient reach of stream, and where beaver ponding was prominent. Effort consisted of direct current electrofishing. Tag alder canopy was prominent along the creek, and aquatic vegetation could be found within the creek. Average stream width was 20 feet, while average stream depth was 1 foot. Bottom substrate was primarily silt and sand. Overall, conditions were thought to be poor for coldwater species. No trout were collected in the survey, while 13 species of warm and coolwater fish were collected (Table 2).

In 2012, efforts were made again to capture water temperature data for Beaver Creek near its confluence with the South Branch Au Sable River. This was a cooperative effort between MDNR and local angling groups. Average summer temperatures were very marginal for trout (Table 3), and maximum temperatures were very high.

### **Current Status**

Fish community surveys were made at three stations on Beaver Creek by DNR Fisheries Division on July 23, 2014. The purpose was to gain updated fisheries data at multiple locations in the creek. We used a backpack electrofishing unit with one probe to capture trout. We did not collect other non-trout species, but we did note their presence.

Station 1 was furthest upstream at Reigle Road, just west of I-75 on the dividing line of sections 33 and 34. We surveyed a 537 foot reach of stream both downstream and upstream of the closed road

crossing. This small bridge crossing was in poor condition and is a significant contributor to in-stream sediment. According to county officials, it is scheduled for replacement once additional funds become available. The creek at this station ranged from 9-12 feet wide. Aquatic vegetation was present in some areas, while bottom substrate was a blend of sand, detritus, and some gravel. Woody structure was present at moderate levels in the stream. Water temperature during the morning survey was 55 degrees Fahrenheit. Riparian corridor vegetation consisted of tag alder, forbs, tamarack, and aspen. Non-trout species observed included mottled sculpins, white suckers, creek chubs, and blacknose dace, all typical northern Michigan small stream fish species. Brook trout dominated the trout catch. We captured 30 brook trout in the station, ranging from 2 through 10 inches (Table 4). Juvenile brook trout were collected, so natural reproduction is likely occurring in this reach of creek. Twenty-seven percent (8/30) of the brook trout collected were legal size (7 inches or larger). Only two brown trout were collected (Table 4).

Station 2 was a 447 foot reach of creek directly upstream of Billman Road in the center of section 36. This reach of creek is approximately 15 feet wide, and flows rather sluggishly over a sand and silt substrate. Undercut banks are not common, nor is in-stream cover. The riparian zone is grassland forbs and tag alders. The water temperature during the survey was 65 degrees Fahrenheit, which was 10 degrees warmer than the previous surveyed location a few miles upstream. Between the two sampling stations is a reach of low gradient water prone to beaver damming. The creek also receives the outlet of Mud Lake just upstream of Billman Road. Species diversity, as would be expected, was higher at the warmer Billman Road survey site. Nine species of fish other than trout were collected including common shiners, white suckers, Johnny darters, creek chubs, hornyhead chubs, rock bass, central mudminnows, pumpkinseed and green sunfish. Four brown trout ranging from 5-7 inches were also collected (Table 5).

Station 3 was near the mouth of Beaver Creek, about one mile upstream from its confluence with the South Branch Au Sable River. The same backpack electrofishing gear was used for 492 feet directly upstream of Stephan Bridge Road. Creek gradient was much higher at this location, at least near the free-span bridge. Cobble and gravel were prevalent in the survey reach, as was sand in the upper reaches. Woody structure in the creek was present in moderate amounts. Riparian zone was a hardwood and coniferous mixture, as well as cut grass (residential yard). Stream width was highly variable, from 8-24 feet. Water temperature at the time of the survey was 64 degrees Fahrenheit. Not including trout, 7 species of fish were collected at this station. All species observed were consistent with those found at the upstream sites, with the exception that rainbow darters were also collected. Nine trout were collected, including both brook and brown trout (Table 6). Brook trout ranged from 2-7 inches, and brown trout were 6-10 inches. Again, some reproduction is likely occurring at this reach of creek since juvenile brook trout were collected here.

Age and length results for both species, combined for all three stations, can be found in Tables 7 and 8. Three age classes of brook trout (0 through 2) were found, which is typical for a northern Michigan small trout stream. Brook trout reach legal size (7 inches) at age 1 (Table 7). Two age classes (1 and 2) of brown trout were collected (Table 8) in Beaver Creek and they reach legal size (8 inches) at approximately age 2.

## **Analysis and Discussion**

The purpose of the 2014 fish survey at multiple locations on Beaver Creek was to provide a better understanding of the nature of Beaver Creek. Fisheries Division reviews most natural resource development in this region, and survey results will allow us to provide a more informed review on many ongoing or planned future development activities. For example, oil and gas development is significant in the upper reaches of this watershed, and likely will continue to be for many decades to come. In addition, state forest land encompasses this watershed and timber management is ongoing. Fisheries Division reviews all timber cutting activities on state land within the Beaver Creek watershed in accordance with the Department of Natural Resources Forestry Resource Division protocols.

Beaver Creek starts off as a small cold water stream in southwestern Crawford County and flows easterly to one of the most popular trout rivers in Michigan (South Branch Au Sable River). The character of the creek changes as it progresses downstream through low gradient swampy reaches. Water temperatures increase, as does fish diversity. Trout are present throughout the length of the creek, although they are more abundant in the upper reaches (upstream of I-75) or near the confluence with the South Branch Au Sable River. Brook and brown trout sizes and age distributions for this creek are similar to other small Michigan creeks.

### **Management Direction**

Beaver Creek has marginal water temperatures for trout in its mid-reaches, and more suitable cold water for trout in its upper and lower reaches. Fishing pressure for this creek is unknown, but it is likely very low with little impact on the trout community. It currently is managed with standard Michigan Type 1 trout regulations (where all tackle types may be used, fishing season is from the last Saturday in April through September, anglers may keep five trout per day, and minimum size limits are 7 inches for brook trout and 8 inches for brown trout). This regulation type is appropriate for Beaver Creek.

The primary management goal for Beaver Creek should be resource protection. Recent road-stream crossing inventories have been accomplished for the Au Sable River watershed. Some of the higher priority crossings in need of repair are within the Beaver Creek sub-watershed. These specific sites will continue to be prioritized within the context of the needs of the entire Au Sable River watershed. Fisheries Division will continue to review all future oil and gas development within this watershed as well as all timber harvest activities on state forest land.

### **References**

Figure 1. Map of Beaver Creek and watershed. Dotted blue line indicates the Beaver Creek sub-watershed

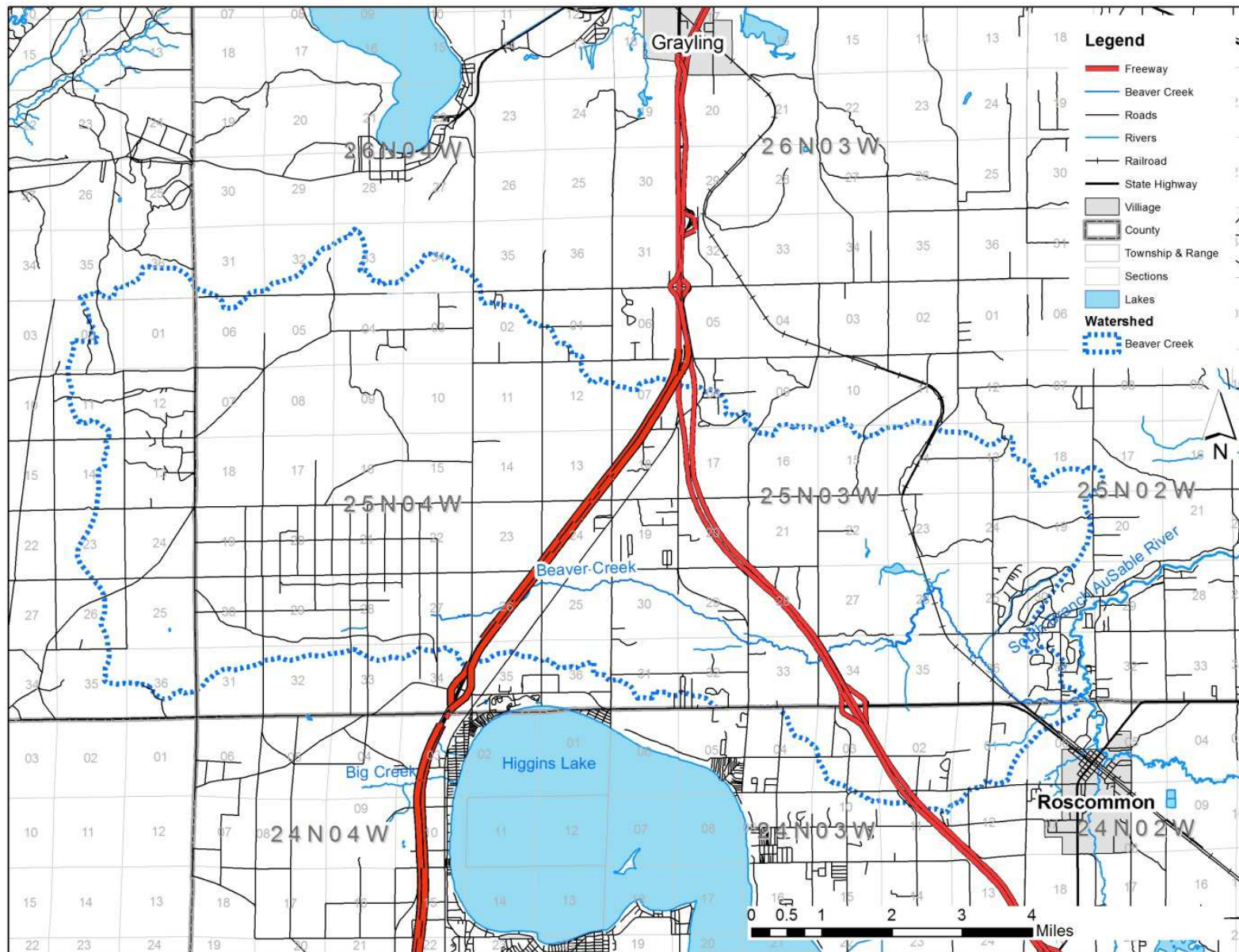


Table 1. Known stocking efforts by the State of Michigan for Beaver Creek, Crawford County.

<b>Year</b>	<b>Species</b>	<b>Number stocked</b>	<b>Size</b>
1937	Brook trout	12,700	7 months old
1938	Brook trout	19,125	6 months old
1939	Brook trout	5,000	7 months old
1941	Brook trout	10,000	7 months old
1942	Brook trout	15,000	3 months old
1945	Brook trout	1,100	Legal size
1946	Brook trout	400	Legal size
1947	Brook trout	1,800	Legal size
1958	Brook trout	800	Legal size
1959	Brook trout	1,000	Legal size
1960	Brook trout	1,000	Legal size
1961	Brook trout	600	Legal size
1962	Brook trout	600	Legal size
1963	Brook trout	600	Legal size
1964	Brook trout	600	Legal size
1965	Rainbow trout	600	Legal size

Table 2. Species and relative abundance of fishes collected with direct current electrofishing gear in a 500 foot station of Beaver Creek upstream of Pioneer Road, August 14, 2006.

<b>Common name</b>	<b>Number</b>	<b>Length range</b>
		<i>(inches)</i>
Common shiner	363	1 – 4
Hornyhead chub	228	1 – 5
Creek chub	195	1 – 5
Blacknose dace	128	1 – 3
Johnny darter	64	1 – 3
Central mudminnow	17	1 – 3
Rock bass	16	1 – 4
White sucker	7	6 – 7
Green sunfish	5	2 – 3
Brassy minnow	4	2
Pumpkinseed	2	2
Black bullhead	1	3
Northern redbelly dace	1	2
<b>Total</b>	1,031	

Table 3. Summer water temperature (F) data for Beaver Creek near the confluence with the South Branch Au Sable River, 2012. Data collected cooperatively between the MDNR and Mason-Griffith Chapter of Trout Unlimited.

<b>Month</b>	<b>Average</b>	<b>Maximum</b>
June	65	77
July	71	81
August	66	76

Table 4. Length-frequency distribution of trout collected in Beaver Creek at the Riegle Road station, July 23, 2014. Station was 537 feet in length both up and downstream of bridge, Sections 33 and 34. Water temperature 55F.

<b>Length (inches)</b>	<b>Brook Trout</b>	<b>Brown trout</b>
1-2		
2-3	4	
3-4	2	
4-5	2	
5-6	9	
6-7	5	1
7-8	4	
8-9	2	1
9-10	1	
10-11	1	

Table 5. Length-frequency distribution of trout collected in Beaver Creek at the Billman Road station, July 23, 2014. Station was 447 feet in length upstream of bridge, Section 36. Water temperature 65F.

<b>Length (inches)</b>	<b>Brook Trout</b>	<b>Brown trout</b>
1-2		
2-3		
3-4		
4-5		
5-6		3
6-7		
7-8		1
8-9		
9-10		
10-11		

Table 6. Length-frequency distribution of trout collected in Beaver Creek at the Stephan Bridge Road station, July 23, 2014. Station was 492 feet in length upstream of bridge, Section 31. Water temperature was 64F.

<b>Length (inches)</b>	<b>Brook Trout</b>	<b>Brown trout</b>
1-2		
2-3	2	
3-4	1	
4-5		
5-6		
6-7		2
7-8	1	1
8-9		
9-10		1
10-11		1

Table 7. Length-frequency of brook trout collected between three stations of Beaver Creek in July 2014.

<b>Length group (in)</b>	<b>Number of brook trout collected</b>	<b>Ages represented</b>
2-3	6	0
3-4	3	0, II
4-5	2	I
5-6	9	I
6-7	5	I
7-8	5	I
8-9	2	I
9-10	1	II
10-11	1	II

Table 8. Length-frequency of brown trout collected between three stations of Beaver Creek in July 2014.

<b>Length group (in)</b>	<b>Number of brown trout collected</b>	<b>Ages represented</b>
2-3		
3-4		
4-5		
5-6	3	I
6-7	3	I
7-8	2	I
8-9	1	II
9-10	1	I
10-11	1	II