



Rattlesnake Creek, Montmorency County

Written by Tim Cwalinski, Fisheries Biologist, MDNR Gaylord

Rattlesnake Creek is a small designated trout stream in western Montmorency County. It flows for approximately three miles northward and is a tributary to the East Branch Black River, a popular brook trout stream. Rattlesnake Creek is a Type 1 trout stream with a daily bag limit of 5 fish, and minimum size of brook trout at 8 inches. The reaches of the East Branch Black River in the vicinity of Rattlesnake Creek are popular among trout anglers, including consumptive users. Rattlesnake Creek itself has minimal to absent fishing pressure due to its size and accessibility. The creek is recognized as a quality cold-water brook trout nursery stream.

The riparian area along the creek is mostly under public ownership except the west bank of the lowest reaches. The stream originates in a heavily forested reach of the county and flows through a white cedar and spruce forest until it enters into Section 23. It is in this section that past beaver activity along the stream has reshaped the corridor. It still flows through tracts of spruce and white cedar, however the streamside canopy in the lower reaches is dominated by encompassing tag alders and grassy banks. Beaver activity in recent years was restricted to small, relict beaver dams. A recent walk (June 2008) along much of the stream found no active beaver except near the mouth. This dam was removed by crews of the Upper Black River Watershed Committee, and future efforts will be made to maintain a beaver dam free stream in order to ensure complete fish passage of brook trout for both thermal refuge and spawning.

Gradient of Rattlesnake Creek (calculated by GIS) is 14 foot/mile and is not flashy. The bottom substrate is primarily detritus and sand. Natural gravel is nearly non-existent. A steel bridge crosses the creek in the southern part of Section 23. Gravel and cobble (along with some sand) has washed into the stream at this location over the years and has formed a suitable spawning site for brook trout. In-stream woody debris is abundant. The site is used by pods of spawning brook trout each November. Other spawning areas, at least those with pea gravel, are limited.

The local fisheries biologist and work crew leader of the Upper Black River Watershed Restoration Committee (UBWRC) walked the entire length of the creek in early-May 2006. Spawning habitat was again noted as lacking. Beaver (inactive) dams were found in the lower reaches. Creek chubs as well as brook trout estimated at 4-9 inches in length were noted along the course of the walk.

No fish community surveys existed for this creek prior to 2008. Hourly and monthly water temperature was gathered for the stream near its mouth in both 2004 and 2007. Results show that it is a cold water designated stream (average July temperature less than 63.5°F). Summer monthly averages were 61°F or less (Table 1). Maximum temperatures were in the 70's, but these were rarely attained, especially in a colder summer such as 2004.

MDNR Fisheries Division personnel have put together a management plan for Rattlesnake Creek which includes fish community inventory, beaver and beaver dam removal, and spawning habitat enhancement. The highlight of the plan is potential modification of spawning habitat by adding artificial spawning areas to the stream.

Spawning Enhancement

Research and local management personnel walked the more accessible parts of the creek in early June 2008 in order to prescribe specific changes to habitat at specific locations. MDNR policy and procedure for "spawning riffle" enhancement calls for the following steps:



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Table 1. Summer temperatures of Rattlesnake Creek near the mouth in various years.

Year	Month	Minimum Temp °F	Average Temp °F	Maximum Temp °F
04	June	46	55	71
04	July	50	58	66
04	August	47	56	64
07	June	49	60	72
07	July	49	60	72
07	August	48	61	73
08	June	49	57	68
08	July	51	60	67
08	August	49	58	67
09	June	--	55	66
09	July	--	56	65
09	August	--	58	66

Objective: increase age-1 and older population of brook trout in Rattlesnake Creek (measurable) and East Branch Black River (not measurable)

visual monitoring prior to treatment and 1 and 3 years after treatment

substrate characterization prior to treatment and 1 and 3 years after treatment

GPS coordinates at relevant sites

photo documentation 1 year before treatment, and 1 and 3 years after treatment

electrofishing 2 consecutive years before, followed by a transitional period of 1 year, then 2 consecutive years after treatment (this may be reduced to 1 year of sampling before due to stream size, and no transitional period)

The following locations are prescribed spawning riffle locations and/or electrofishing sites.

Site 1 The small field near mouth: 45.06556, 84.28194

This site is approximately 300 feet upstream from the mouth and is often the site of the temperature logger placement. It is highly accessible from the first small field (food plot) off Rattlesnake Creek Road. It is state land. A spawning riffle is prescribed here as well as pre- and post- brook trout population estimates or CPUE estimates.

Site 2 the railroad grade: 45.06358, 84.28136

This site is an abandoned railroad site which offers quality substrate (wood pilings) to build spawning grounds on top. It is approximately 400 feet upstream of previous site. It is highly accessible from a camping spot culdesac located off of Rattlesnake Creek Road. A spawning riffle is prescribed here as well as pre- and post- brook trout population estimates or CPUE estimates.

Site 3 the private bridge: 45.06032, 84.28118

This site is the private bridge over the creek further upstream of the former 2 sites. It has much deposited gravel and cobble from the bridge in the stream and offers a popular spawning site annually for brook trout. This site is prescribed for post- brook trout population estimates or CPUE estimates.



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Site 4 the upstream large field: 45.05701, 84.28024

This site is the third and last of the prescribed spawning riffles to be constructed. It is adjacent to the southernmost field (wildlife plot) on the creek at the end of Rattlesnake Creek Road. It is highly accessible and has a more suitable sand bottom with some good wood to put in the gravel location. A spawning riffle is prescribed here as well as pre- and post- brook trout population estimates or CPUE estimates.

Fish population surveys will be accomplished and designed by DNR Fisheries Division research section and will begin in fall 2008. Riffle construction will be attempted by summer of 2009. Techniques for construction will follow those by Bassett (2006). Pea gravel 0.5-1.0 inches in diameter will be sloped up to rock sills which will be constructed of cobble 3-8 inches in diameter or that equal to what exists upstream near the bridge (crossing). Banks will be armored slightly to reduce side cutting. We will put in roughly 2 spawning sites per site with a distance of roughly 1-3 channel widths between each site and each spawning site will be equal to 1-2 channel widths. Sill heights will be adjusted to achieve desired current velocities. The stream is approximately 11 feet wide at most locations, so each structure/complex will typically be less than 40 feet. See figure below.

Work may be accomplished through a variety of means including DNR personnel, UBRWRC personnel and volunteers, or outside Trout Unlimited work groups. Materials may be paid for also by a variety of methods (Trout Unlimited, UBRWRC, Montmorency Conservation District).

Preliminary calculations (11 ft stream width, 11 ft structure length, 0.8 ft deep/ 2 riffle per site/ 3 sites) show a need for 21.6 cubic yards of rock materials.

Fish Community Survey 2008

DNR Fisheries Division conducted brook trout population estimates at the four sites already mentioned in late August of both 2008 and 2009. The plan calls for 2 years of fish sampling prior to any habitat enhancement. Table 2 lists the survey sites and lengths of each station. Estimates were made with a stream shocker unit and 2 electrofishing probes. Thus, sampling was highly efficient in this small stream and population estimates are very precise.

Estimates of brook trout by year are provided in Table 3 and 4. Rattlesnake Creek is considered a nursery stream and “pump” to the East Branch Black River. It was recommended (Chuck Bassett, USFS personal communication) that spawning enhancement projects could be made at streams (riffle additions) where young-of-year brook trout numbers are less than 500/acre. For the four sites on Rattlesnake Creek, the average YOY density was 380 YOY/acre and 552 YOY/acre, for 2008 and 2009, respectively. Age and growth results for all four stations combined were a growth index of +0.5 inches, which is a half inch above the statewide average growth for this species.

References

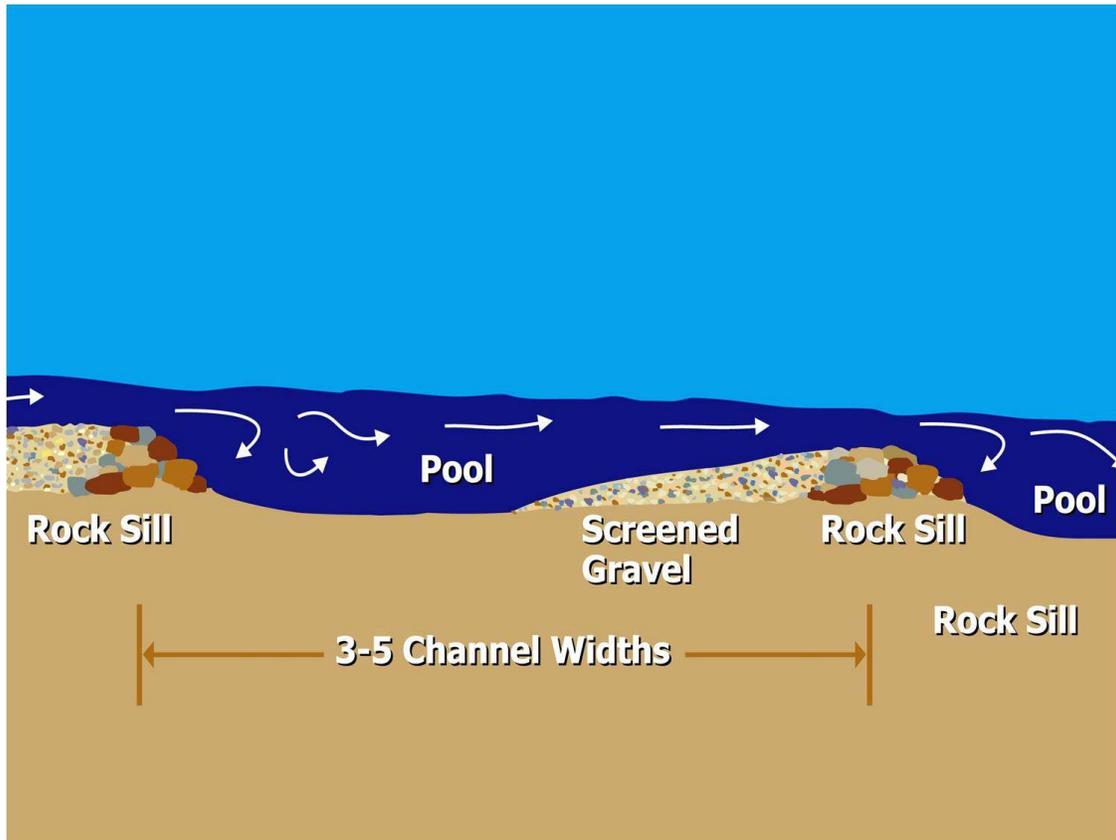
Bassett, C. 2006. Evaluation of constructed spawning habitat in the Hiawatha National Forest. Michigan Department of Natural Resources Fisheries Division Trout Committee Meeting, RAM Center, Roscommon, MI, Feb 28-Mar 2, 2006.



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Figure 1. Habitat improvement plan for 3 sites on Rattlesnake Creek, planned for summer 2010.



Fish Surveys at 4 sites – August 27, 2008

Table 2. Surveyed reaches of Rattlesnake Creek in late August. Brook trout estimates are provided. Minimum size for this stream is 8 inches.

Site	Length (ft)	Prescribed gravel addition?	No. of YOY/stream foot 2008	No. of YOY/stream foot 2009
1- downstream meadow	300	yes	0.25	0.20
2 – railroad grade	600	yes	0.08	0.11
3 – private bridge	300	no	0.09	0.24
4 – upstream meadow	300	yes	0.07	0.15



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Table 3. Additional brook trout estimates by station and averaged for Rattlesnake Creek, 2008. YAO= yearling and older.

Site	Length (ft)	Acres	YOY	YAO	Total	YOY/acre	YAO/acre	Total/acre
1- downstream meadow	300	0.10	76	36	112	760	360	1,120
2 – railroad grade	600	0.18	45	49	94	250	272	522
3 – private bridge	300	0.09	26	16	42	289	178	467
4 – upstream meadow	300	0.10	22	16	38	220	160	380
AVERAGE						380	243	622

Table 4. Additional brook trout estimates by station and averaged for Rattlesnake Creek, 2009. YAO= yearling and older.

Site	Length (ft)	Acres	YOY	YAO	Total	YOY/acre	YAO/acre	Total/acre
1- downstream meadow	300	0.10	59	34	93	590	340	930
2 – railroad grade	600	0.18	68	48	114	378	267	633
3 – private bridge	300	0.09	72	15	87	800	167	967
4 – upstream meadow	300	0.10	44	13	57	440	130	570
AVERAGE						552	226	775

Table 4. YOY per acre estimates by site, by year.

Site	YOY/acre 2008	YOY/acre 2009
1- downstream meadow	760	480
2 – railroad grade	250	365
3 – private bridge	289	800
4 – upstream meadow	220	440
AVG	380	521