

## REPORT ON THE IMPROVEMENTS IN THE EAST BRANCH OF THE BLACK RIVER

In October 1934 a third check was made on the improvements which had been placed in the East Branch of the Black River in 1931. The whole of the improved section was examined and notes were taken on the various changes.

One of the outstanding changes is the great amount of sand which has been added to the stream below the upper dam. The greatest source of this undesirable material is the dam. During the summer of 1932 the dam was repaired several times by the addition of large quantities of earth. The addition of earth had to be repeated several times as the earth was continually being washed down into the stream. When the dam went out in the spring of 1933 a great deal of sand was deposited in the stream. Large areas of gravel bottom were covered with sand and many pools were filled. The stream bottom was formerly gravel for a distance of several hundred yards below the dam; but now the section is covered with a layer of sand 2 to 6 inches deep, except in the vicinity of the barriers. Many pools have been filled or partially filled, and some plant beds have been destroyed. Since the bottom has been covered by sand, except in the vicinity of improvement devices, it is apparent that food production has been reduced, since sand bottom is not nearly as productive as gravel bottom.

The winter of 1933-1934 was the most severe on record. Conditions in the streams were the most rigorous known and the improvement devices have been subjected without doubt to the most severe conditions that they will be called upon to withstand. Ice, which is the most destructive force on the barrier<sup>s</sup>, was as much as 21 inches thick in the East Branch. It was therefore very gratifying to find that, in spite of

these adverse conditions, only 2 improvement devices were destroyed and 1 badly injured. Several other improvement devices are in need of minor repairs, however, since they have not been touched for two years. It would be well to do this work in the near future.

Since the installation of the improvement devices, several types of improvements have been brought about. In the sand section between the dams many fine, large pools have been formed. Each device has formed one pool and some have formed as many as three pools. These pools vary in size but many are quite large,--the largest covering about 800 square feet.

The deflectors have produced five riffle areas. They have also uncovered a considerable amount of gravel and formed many shallow mucky areas. These mucky areas are suitable for the young trout, since they serve as a natural habitat and they are rich in food for the young. Brush shelters which were placed in these mucky areas as cover for the young fish are holding well. These shelters were installed in 1932 as part of the work which Dr. Snyder had carried out that year.

The deflectors have also produced numerous gravel bars which are adaptable for the spawning of trout if the water supply is proper. Plant beds are also appearing in the mucky areas. These beds consist of Chara, Ludwigia, Vallisneria and watercress. The presence of watercress is perhaps due to the seed which has been planted in past years. At present there is very little of it but it is hoped it will spread.

The improvement devices have produced, in all, 3,890 square feet of plant beds and 16,420 square feet of mucky area. The results of the insect counts will show just how important these are in the production of food.

It had been planned to make the rechecks on the fish and insect counts last fall; but it was found to be impossible to do so. An attempt was made to make the fish counts but the high water and the immense number of floating leaves made it impossible to hold the nets. The leaves quickly filled the nets so the water flowed over the top of them. Nevertheless, stakes were placed at each of the counts so they will be

ready when the counts can be made. All the rechecks on the insect counts were not made, since most of the adults had emerged and a correct comparison with the former counts which were taken during the summer could not be made. Only a few counts were made in order to discover how the population varied with the season. Even though all the forms are very small in October and have a very small volume, the counts show a marked increase in food production around the barriers. This increase should be even more apparent next summer when the forms are larger. A few results of the insect counts are given in the following tables:

<u>Barrier</u>	<u>Year</u>	<u>Type of bottom</u>	<u>Production in 4 sq. ft.</u>	<u>Increase</u>
501	1931	Gravel	2.5 cc.	
501	1934	Rubble and muck	10.8 cc.	4.32 times
502	1931	Fine gravel	1.1 cc.	
502	1934	Gravel and muck	4.0 cc.	3.64 times
506	1931	Gravel	3.05 cc.	
506	1934	Rubble and rocks	59.82 cc.	19.61 times
528	1931	Rubble and rocks	3.7 cc.	
528	1934	Rubble and rocks	19.27 cc.	5.2 times

Four data sheets are also added to give an idea of the different forms which were taken in the counts.

Barrier No. 501

Montmorency County, East Branch of Black River, Black River Ranch. Oct. 20, 1934. "In swift water around the end of the barrier (wing). Rubble and rock bottom. Water 20 inches deep. Current very swift. Taken in center of channel".

<u>Species</u>	<u>No. of species</u>	<u>No. of individuals</u>	<u>Volume</u>	
<u>Annelida</u>				
<del>MOLLUSCA</del>				
Tubificidae	1	1	0.100 cc.	
Lumbriculidae	1	4		
ARTHROPODA				
Insecta				
Neuroptera				
Sialidae				
<u>Sialis</u> sp.	1	2	0.050 cc.	
Corydalidae				
<u>Chauliodes</u> sp.	1	4	0.300 cc.	
Ephemeroidea				
Ephemeridae				
<u>Hexagenia</u> sp.	1	1	1.000 cc.	
Heptageniidae				
<u>Heptagenia</u> sp.	1	21		
Siphuridae				
<u>Elasturus?</u> sp.	1	85		
<u>Genus?</u> sp.?	1			
Odonata				
Gomphidae				
<u>Ophiogomphus</u> sp.	1	4 (3 large, 1 small)	1.100 cc.	
Plecoptera				
Perlidae				
<u>Togoperla</u> media	1	6	0.250	
perlid sp.	1	12		
Hemiptera				
Corixidae				
Genus? sp.?	1	1	too small to measure	
Coleoptera				
Elmidae				
Genus? sp.?	2 (30 larvae 4 adults)	34	0.075 cc.	
Trichoptera				
Sericoctenatidae				
<u>Helicopsyche</u> borealis	1	2	0.010 cc.	
Genus? sp.?	2	2		
Hydropsychidae				
<u>Hydropsyche</u> alternans	1	370	1.400 cc.	
Philopotamidae				
<u>Chimarra</u> sp.	1	37	0.200 cc.	
Diptera				
Tipulidae				
<u>Antocha</u> sp.	1	2	0.020 cc.	
<u>Penthoptera</u> sp.(?)	1	1		
Chironomidae				
Genus? sp.?	2	14		
Simuliidae				
<u>Simulium</u> sp.	1	2		

Species	No. of species	No. of individuals	Volume
Rhagionidae			
<u>Atherix</u> sp.	1	34	0.900

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Total volume from 2 square ft. 5.405 cc.

Mayflies of this sample very small and hard to determine. Dragonfly naiads apparently composed of 1 new-hatched specimen and 3 at least 1 year old.

## Barrier No. 506

Montgomery County, East Branch of Black River, Black River Ranch. Oct. 21, 1934. "Over gravel and rubble in fast water around the end of the wing. Water 20 inches deep. No Fissidens. Smaller rocks than 506".

Species	No. of species	No. of individuals	Volume
<b>MOLLUSCA</b>			
<b>Sphaeriidae</b>			
<u>Musculium</u> sp.?	1	1	0.050 cc.
<b>ANNELIDA</b>			
<b>Lumbriculidae</b>			
<u>Helodrilus</u> sp.?	1	1	0.100 cc.
<b>ARTHROPODA</b>			
<b>Insecta</b>			
<b>Neuroptera</b>			
<b>Corydalidae</b>			
<u>Chauliodes</u> sp.	1	4	0.400
<b>Ephemera</b>			
<b>Ephemeridae</b>			
<u>Hexagenia</u> sp.	1	3	0.200
<b>Leptophlebiidae</b>			
<u>Leptophlebia</u> sp.	1	3	0.075
<b>Heptageniidae</b>			
<u>Heptagenia</u> sp.	1	5	0.040
<b>Odonata</b>			
<b>Gomphidae</b>			
<u>Ohlogomphus</u> sp.	1	1	0.250
<b>Plecoptera</b>			
<b>Taeniopterygidae</b>			
<u>Taeniopteryx nivalis</u>		1	0.005
<b>Perlidae</b>			
<u>Neophasganophora capitata</u>		3	0.100
<u>Togoperla media</u>		1	0.010
<u>Genus? sp.?</u>	1	1	0.010
<b>Coleoptera</b>			
<b>Elmidae</b>			
<u>Stenelmis</u> sp.?	2 (2 adults, 11 larvae)	13	0.050
<b>Trichoptera</b>			
<b>Sericostomatidae</b>			
<u>Brachycentrus nigrisoma</u>		1	0.100
<u>Helicopsyche borealis</u>		3	0.005
<b>Hydropsychidae</b>			
<u>Hydropsyche alternans</u>		51	0.200
<b>Philopotamidae</b>			
<u>Chimarra</u> sp.	1	12	0.100
<b>Diptera</b>			
<b>Tipulidae</b>			
<u>Antocha</u> sp.	1	22	0.090
<b>Pentoptera</b> sp.?	1	2	0.100
<b>Chironomidae</b>			
<u>Genus? sp.?</u>	3	5	0.040

Rhagionidae  
Atherix sp.

1

7

0.075

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Total volume from 2 square feet 2,000 cc.

Almost all forms very small,--apparently hatched out recently. Chauliodes larva probably at least one year old, perhaps two.

Barrier No. 506

Montmorency County, East Branch of Black River, Black River Ranch. Oct. 21, 1934. "In the very swift water below the barrier. Boulder and rubble bottom. Water 22 inches deep. Fissidens very thick on the stones".

Species	No. of species	No. of individuals	Volume
MOLLUSCA			
Sphaeriidae			
<u>Pisidium</u> sp.	1	1	0.005 cc.
ANNELIDA			
Lumbriculidae			
<u>Helodrilus</u> sp.?	1	21	0.150
ARTHROPODA			
Crustacea			
Astacidae			
<u>Cambarus</u> ( <u>Faxonius</u> ) <u>propinquus</u>		1	2.750
Insecta			
Neuroptera			
Corydalidae			
<u>Chauliodes</u> sp.	1	20	1.450
Ephemera			
Heptageniidae			
<u>Heptagenia</u> sp.	1-2	30	0.100
Ephemere			
Ephemere			
<u>Ephemere</u> sp.	1	152	0.400
Leptophlebiidae			
<u>Leptophlebia</u> sp.	1	18	0.050
Siphuridae			
<u>Chironomus</u> sp.	1	27	0.250
Plecoptera			
Taeniopterygidae			
<u>Taeniopteryx</u> <u>nivalis</u>	1	1	0.050
Perlidae			
<u>Isoperla</u> <u>bilineata</u> (?)	1	7	0.050
<u>Neophasganophora</u> <u>capitata</u>		5	0.050
<u>Togoperla</u> <u>media</u>	1	29	0.600
Coleoptera			
Elmidae			
<u>Stenelmis</u> sp.?	2	37 (31 larvae, 6 adults)	0.100
Trichoptera			
Sericostomatidae			
<u>Brahhycentrus</u> <u>nigrisoma</u> (with case)		1	0.050
Hydropsychidae			
<u>Hydropsyche</u> <u>alternans</u>	1	1573	6.800
Psychomyidae			
No keys available	2	8	0.050
Philopotamidae			
<u>Chimarra</u> sp.	1	157 (155 larvae, 2 pupae)	1.250
Diptera			
Chironomidae			
<u>Metricnemis</u> sp.?	1	6	0.050
Rhagionidae			
<u>Atherix</u> sp.	1	21	0.800

Total volume from 1 sq. ft. 14.955 cc.

In this sample, it should be noted that by far the largest single item is the Hydropsyche; and since most of this came from the Fissidens on a single large stone,



Barrier No. 528

Montmorency County, East Branch of Black River. Oct. 19, 1954. "In fast water around the end of the barrier, over rubble and rocks, about 1 ft. deep. Pisidens on the stones. Sand and small material washed away".

Species	No. of species	No. of individuals	Volume
ANNELIDA			
Oligochaeta			
Tubificidae	1	6	0.010 cc.
Lumbricidae	1	1	
Hirudinea			
Glossiphoniidae	1	1	
ARTHROPODA			
Insecta			
Neuroptera			
Corydalidae			
<u>Chauliodes</u> sp.	1	23	1.200
Ephemera			
Ephemeridae			
<u>Hexagenia</u> sp.	1	1	Too small to measure
<u>Leptophlebiidae</u>			
<u>Leptophlebia</u> sp.	1	22	0.100
Ephemerellidae			
<u>Ephemerella</u> sp.	1	244	0.800
Siphuridae			
<u>Chirotenetes</u> sp.	1	12	0.100
Heptageniidae			
<u>Heptagenia</u> sp.	1	50	0.100
Odonata			
Gomphidae			
<u>Ophiogomphus</u> sp.	1	7	1.300
Plecoptera			
Pteridae			
<u>Togoperla media</u>	1 (?)	55	1.100
Coleoptera			
Elmidae			
<u>Stenelmis</u> sp.?	2	22 (19 larvae, 3 adults)	0.200
Trichoptera			
Sericoxomatidae			
<u>Brachycentrus nigrisoma</u>	1	1	0.010
<u>Helicopsyche borealis</u>	1	4 empty cases	.....
Hydropsychidae			
<u>Hydropsyche</u> sp.	1	433	2.500
Phlebotamidae			
<u>Chimarra</u> sp.*	1	244 (239 larvae, 5 pupae)	1.250
+ two specimens too small to name or measure			
Diptera			
Tipulidae			
Penthoptera sp.?	1	2	0.050
<u>Ericcera</u> sp.?	1	1	0.005
Chironomidae			
Genera? spp.?	3	20	0.005
Simuliidae			
<u>Simulium</u> sp.	1	2	0.005

Rhagionidae  
Atherix sp.

1

55

0.800

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Total volume from 2 square feet

9.635 cc.

- \* The determination of the pupae of Shinarrha was made possible by the discovery of a pupal cell whose occupant was still in larval form. The cell was of fine sand, oval, smooth, fastened to small gravel with silk.

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