

May 26, 1931

REPORT NO. 67

EFFECT ON FISH LIFE OF BACKWASH EFFLUENT FROM IRON-

REMOVING FILTERS

On April 29, 1931, the Water Service Company of Libertyville, Illinois, requested our opinion as to the effect on the fish life of a small lake of the backwash effluent of a large filter, which discharges oxidized iron. In our reply we stated that "in general our experience is that even trout do well in water with much depositing iron. Fish eggs when coated with iron apparently are smothered. That perhaps would be the chief bad effect of iron-rich water on fish life".

The danger of putting enough oxidized iron into even a small lake to cover any fish eggs is slight, unless the fish happened to spawn in the direct current of the filter backwash.

In order to determine whether or not the oxidized iron from such a filter is a toxic to fish, we took a sample of the undiluted backwash when containing the maximum amount of iron sludge, obtained from an "Iron Trap Filter" after a full run. This red water was then placed in three small aquaria, to which compressed air was connected and fish added.

The fish used in this experiment were:

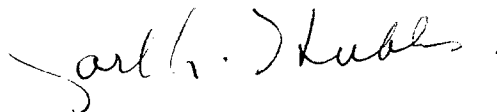
Common name	Scientific name	No.	Standard lengths, mm.
Common sucker	<i>Catostomus c. commersonni</i>	6	57, 74, 90, 90, 92, 104
Black-nose dace	<i>Rhinichthys atronasus meleagris</i>	1	70
Common shiner	<i>Notropis cornutus chrysocephalus</i>	3	45, 54, 60
" "	" " <i>frontalis</i>	2	54, 68
Blunt-nose minnow	<i>Hyborhynchus notatus</i>	1	73
Perch	<i>Perca flavescens</i>	1	93
Hybrid sunfish	<i>Apomotis X Lepomotis</i>	2	58, 59
Brook stickleback	<i>Mucalia inconstans</i>	1	41

The fish were maintained for ten days at room temperature in the aerated iron-rich backwash. All remained alive for a week. In one of the aquaria four fish then died (two suckers, one minnow, one sunfish) but all the fish in two other aquaria survived for ten days.

We conclude that the oxidized iron in the filter backwash had no specific toxicity to fish life, at least not enough toxicity to be considered as possibly harmful to fish in any water into which such filters are backwashed.

The filter backwash we assume contains in addition to the iron a rather high content of putrescible organic matter. We avoided the oxygen-depleting action of such material in our test by the use of compressed air bubbled through the water. As a potential source of pollution the discharge of iron-removing filters should be considered as of the oxygen-consuming, non-toxic sort. In other words, to avoid loss of fish through the discharge of such wastes, sufficient dilution is required to prevent any material reduction in oxygen content.

INSTITUTE FOR FISHERIES RESEARCH



Carl L. Hubbs
Director

Report submitted to:

Clarence W. Crosby, the Water Service Co., Libertyville, Ill.

Carbon copies to:

Fred A. Westerman, Dept. of Conservation, Lansing
Milton Adams, Stream Commission, Lansing.
W. A. Dalee, 4829 Woodward Avenue, Detroit, Michigan
John L. Astrom, Water Refining Co., Fort Wayne, Ind.