

ABSTRACT

Comparisons of growth rates for brown trout (Salmo trutta) were made for two intervals, one during and the other after termination of the discharge of primary treated domestic sewage effluent into parts of the Au Sable River system, Michigan.

The ages of a total of 3,394 brown trout from the mainstream, South Branch, and North Branch Au Sable River were assessed from scale samples. Estimations of length at age and the annual growth increment in length were obtained by conventional back-calculation methods.

The growth rates of brown trout after termination of discharges from sewage treatment plants into the mainstream at Grayling and into the South Branch at Roscommon were found to be significantly slower than during the discharge period. No change in growth rate occurred for the same time intervals on the control, the North Branch, into which no sewage plants have discharged.

The sewage treatment effluents formerly discharged into the Au Sable River stimulated biological production of aquatic plants and invertebrates. Increased trout production resulted through better growth rates.

Following cessation of sewage input, aquatic production declined in the affected river sections. In terms of growth of brown trout, this was apparently due most directly to lowered food production, specifically of the amphipod Gammarus fasciatus and the isopod Asellus militaris.

Back calculation of trout lengths at various ages, made from scale measurements, tended to become progressively longer as older fish were used. This is the reverse of the usual manifestation of Lee's phenomenon of apparent change in the rate of growth. Size selective avian predation of the smallest trout of a cohort is suggested as the principal cause for this reversal.