

Channelization and Mitigation: Their Effects on Macroinvertebrate Communities of the Olentangy River, Columbus, Ohio

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ABSTRACT

The difference between macroinvertebrate communities in ecologically different sections of the Olentangy River was evaluated to determine the relative effects of channelization and the effectiveness of improvement devices in the river. The diversity, density of individuals, and standing crop of the macrobenthic communities of the natural and channelized areas proved to be different ($P = 0.001$). No statistical difference was found between the natural area and the channelized site with improvement devices (mitigation); however, both the natural area and the mitigated area had significantly greater diversity, numbers, and biomass than the unmitigated area.

INTRODUCTION

Since the Watershed Protection and Flood Prevention Act (P.L. 566) was passed in 1954, research dealing with effects of stream alteration has taken place in conjunction with the nearly 16,000 km of streams which have been altered since that time (Gillette 1972).

Although most channelization is carried out by federal agencies, such as the Army Corps of Engineers and the Soil Conservation Service, some is done concurrently with urban and industrial development and with the activities of such groups as the Farmers Home Administration, the Office of Emergency Preparedness, the Tennessee Valley Authority, and state and local highway departments.

Stream channelization is often called stream modification, channel improvement, or stream alteration. The basic premise of channelization is that the rapid movement of water downstream is facilitated; it is hoped that faster movement helps prevent flooding. Channelization involves the reshaping of the waterway and can include shortening, straightening, widening, realigning, deepening,

removing obstructions to flow, and increasing the gradient. Such modifications often seriously damage macroinvertebrate community structure.

On the other hand, stream improvement is the intentional control of environmental conditions to augment the production of desired species or to abate destructive stream alteration activities. Stream improvement structures such as deflectors, weirs, artificial riffles, supplemental planting of riparian vegetation, and riprap may be defined as mitigation devices where they are used in channelized or similarly altered streams. Such structures, when used in channelized streams, may help mitigate the harmful effects of channelization. Although stream improvement structures have been in use for many years (Trautman 1939), only in about the last 10 years or so have such structures been used to mitigate altered streams (Perry 1974). Bilyeu (1975) suggested various means for improving a modified stream through the use of artificial structures. The U.S. Soil Conservation Service has issued Watersheds Memorandum 108 and Technical Report No. 25 (U.S. Soil Conservation Service 1971a, 1971b) that suggested that loss to the stream biota may be mitigated by incorporating various habitat improvement structures into watershed projects as an alternative to conventional channelization designs. The technical report specifi-

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