



## Effects of increased bedload on algal- and detrital-based stream food webs: Experimental manipulation of sediment and macroconsumers

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**ABSTRACT:** Sedimentation poses a significant threat to stream ecosystems throughout the world, and increases in bedload can be especially detrimental to benthic communities. To examine how increased bedload affects algal- and detrital based stream communities, we manipulated sediment (via daily sediment addition to 0.25-m<sup>2</sup> areas of stream bottom) and top-down effects of macroconsumers (fishes and crayfish, via electric exclusion) in two factorial experiments, one using tiles and one using leaf packs as sampling substrates. Sediment addition had significant effects on both algal- and detrital-based stream benthic communities, most notably via the alteration of macroconsumer-mediated biotic interactions; these effects largely were due to sediment transport across the stream bottom, rather than sediment deposition. In the tile experiment, macroconsumers reduced total insect biomass and biomass of several dominant insect taxa under ambient sediment conditions. Sediment addition eliminated all macroconsumer effects except their reduction of chironomid biomass. In the leaf pack experiment, sediment addition eliminated macroconsumer effects on fungal accumulation rates; in general, however, leaf packs were not as affected by sediment addition as tiles. Direct effects of sediment addition were minimal in both experiments: algal composition was altered on tiles, while dipteran predator biomass tended to decline in leaf packs. These experiments demonstrate that small, environmentally realistic increases in bedload affect benthic communities, primarily via the alteration of macroconsumer effects. Although indirect effects of sedimentation have been examined less frequently than direct biotic responses, this study demonstrates the importance of sediment regime in determining the outcome of fish and crayfish-mediated species interactions.

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