



Fish facilitate wave resuspension of sediment

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ABSTRACT: The resuspension of sediment by waves or currents is a major cause of turbidity in many shallow waters. Here we show that bottom-feeding fish greatly facilitate this process by reducing the erosion resistance of the sediment. We use a fish-removal experiment from a large Dutch lake to show that the absence of fish makes sediment resistant to wind effects, and we use controlled lab experiments to demonstrate that the effect of fish can be explained by the characteristic hole-punching behavior used in the search for food. Undisturbed sediment in the laboratory consolidated rapidly. The critical water velocity needed for resuspension roughly doubled in 2 weeks. However, the acquired erosion resistance could be virtually eliminated by holes corresponding to only 2% of the sediment area. An analysis of a model based on our experimental results suggested that benthivorous fish may prevent sediment consolidation that, in the absence of fish, would sufficiently stabilize the sediment during a quiet period to resist wave resuspension during subsequent windy periods. Our results imply that, even in exposed shallow lakes that are turbid because of wind resuspension, a temporary reduction of fish stock may work as **“shock therapy”** to restore an alternative stable clear-water state.

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