P concentrations have not declined and may actually have increased, and nitrate concentrations have declined sharply. Thus, stream nutrient and sediment concentrations can respond in contrasting ways to changes in agriculture, and temporal trends can moderate, accelerate, or reverse over decadal timescales. Management strategies must consider contrasting temporal responses of water quality indicators and may need to be adaptively adjusted at scales of years to decades.


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North Atlantic Oscillation Influences Swedish Nutrient Leaching

The North Atlantic Oscillation is an irregular fluctuation of atmospheric pressure over the North Atlantic Ocean, and this natural phenomenon dictates the severity of winter in the northern hemisphere.

Researchers in Sweden, publishing their findings in the *Journal of Environmental Quality*, found this oscillation to be significantly related to winter temperature and snow accumulation in Sweden. At these higher latitudes, the diffuse leaching of phosphorus and nitrogen from arable land to water mainly occurs during high-flow conditions in winter. For nutrient planning and sustainable agriculture management, any linkage between such nutrient pollution and weather phenomena needs attention. However, sites are few where all agricultural practices have been carefully recorded and the nutrient exports have been based on flow-proportional taken water sampling.

The North Atlantic Oscillation was significantly related to the nutrient export from two such carefully investigated agricultural catchments on the coast of southwest Sweden. The agricultural pressure on the larger catchment was relatively steady over time, with no clear trends in the study period (2004–2016). However, in the small catchment, the oscillation influenced the loss of soil phosphorus less than plowing down a strategic located unfertilized buffer zone. These results give new perspectives on water quality under varied cold winters in southwest Sweden.

Adapted from Ulén, B., E. Lewan, K. Kyllmar, M. Blomberg, and S. Andersson. 2018. Impact of the North Atlantic Oscillation on Swedish winter climate and nutrient leaching. J. Environ. Qual. 48. View the full open access article online at http://doi.org/10.2134/jeq2018.06.0237

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Opposite page: Phosphorus discharges from no-till and autumn plowing were compared during nine years in a pipe-drained field in Jokioinen, Finland. Photo by Jaakko Heikkinen. Below: Episode of snowmelt after a cold winter in southern Sweden. Photo by Barbro Ulén.