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## Impact of changing DOC concentrations on the potential distribution of acid sensitive biota in a boreal stream network

H. Laudon<sup>1</sup> and I. Buffam<sup>2</sup>

<sup>1</sup>Department of Ecology and Environmental Sciences, Umeå University, Umeå, Sweden

<sup>2</sup>Department of Forest Ecology, Swedish University of Agricultural Sciences, Umeå, Sweden

**Abstract.** DOC concentrations have increased in many surface waters in Europe and North America over the past few decades. As DOC exudes a strong influence on pH this DOC increase could have detrimental effects on acid sensitive biota in many streams and lakes. To investigate the potential implications of changes in the DOC concentration on stream water biota, we have used a mesoscale boreal stream network in northern Sweden as a case study. The network was sampled for stream water chemistry at 60 locations during both winter base flow and spring flood periods, representing the extremes experienced annually in these streams both in terms of discharge and acidity. The effect of changing DOC on pH was modeled for all sampling locations using an organic acid model, with input DOC concentrations for different scenarios adjusted by between -30% and +50% from measured present concentrations. The resulting effect on pH was then used to quantify the proportion of stream length in the catchment with pH below the acid thresholds of pH 5.5 and pH 5.0. The results suggest that a change in stream water DOC during base flow would have only a limited effect on pH and hence on the stream length with pH below the acid thresholds. During the spring flood on the other hand a change in DOC would strongly influence pH and the stream length with pH below the acid thresholds. For example an increase in DOC concentration of 30% at all sites would increase the proportion of stream length with pH below 5.5 from 37% to 65%, and the proportion of stream length with pH below 5.0 would increase from 18% to 27%. The results suggest that in high DOC waters, even a marginal change in the DOC concentration could impact acid sensitive biota in a large portion of the aquatic landscape.

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