

THE RELATIVE SENSITIVITY OF ECOSYSTEMS IN EUROPE TO ACIDIC DEPOSITIONS

A Preliminary Assessment of the Sensitivity of Aquatic and Terrestrial Ecosystems

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MAPPING PROCEDURES

The basis of the mapping procedure adopted in preparing this preliminary assessment of the relative sensitivity of ecosystems in Europe to the indirect effects of acidic depositions has been the use of readily available data on the main environmental characteristics which influence the response of ecosystems to acidic depositions. Thus, different geology (bedrock lithology), soil types, land use and amounts of rainfall have been assigned to categories and combined using a weighting procedure to obtain five broad classes of relative sensitivity. The categories and associated weights are shown.

Combination results in eight classes (0-7) and the higher scores (2,3,4,5,6,7) have been aggregated in pairs with 0 and 1 give five classes in all of increasing relative sensitivity (1, 2, 3, 4, 5) that are mapped here.

Factor	Weight	Category	Weighting
Rock type	2	I - siliceous slow weathering rocks	1
		II - faster weathering rocks	0
	1	I - major acid buffering < pH 4.5	1
		II - major acid buffering > pH 4.5	0
Land use	3	I - coniferous forest	1
		II - rough grazing	2/3
	1	III - deciduous forest	1/3
		IV - arable land	0
Rainfall	1	I - >1200mm (mean annual)	1
		II - <1200mm (mean annual)	0

There are published estimates available of zero-effect levels for acidic depositions for a range of ecosystems from several European countries. These are referred to as critical load values. It is possible to apply the range of these values, or values associated to them, to the relative sensitivity classes that have been mapped. In this way a map of critical loads, or target loads, can be obtained. In terms of total deposition of acidity, the target deposition levels, based on critical load estimates that might be applied, are shown here:

Relative sensitivity class	Target deposition levels (Req H ⁺ km ⁻² yr ⁻¹)
1	> 160
2	160
3	80
4	40
5	20

There are uncertainties attached to estimates of critical load values, their exact correspondence to relative sensitivity classes, the reliability of the information used to designate environmental criteria and the weightings employed to combine factors to obtain a single relative sensitivity ranking. Critical loads can be mapped by direct site investigation and by subsequent modelling procedures. Such procedures are time consuming and will need to be consistently applied before comprehensive maps of Europe can be produced from them. The map produced here is an interim attempt to provide a preliminary reference map for Europe based on easily available, relevant information.

For further details of the procedures employed here see: Kuylenstierna, J.C.I. & Chadwick, M.J. (1989). The relative sensitivity of ecosystems in Europe to the indirect effects of acidic depositions. In *Regional Acidification Models* (ed. by J. Kinnari, D.F. Brakke, A. Jenkins, S.A. Norton and R.E. Wright). Springer-Verlag, Heidelberg.

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