Table A-1: Review of Terrestrial Sensitivity Mapping Projects

Mapping Factor and Source	Sensitivity Criteria	Ideal Parameters	Surrogate Parameters	Data Base	Sensitivity Evaluation
Bedrock and Hydrochemical					
Hendrey et al., (1980) USGS	potential buffering capacity	chemical composition	———	state geology maps	Type I: low to no buffering capacity Type II: medium/low Type III: medium/high Type IV: infinite
Kramer (1976,1977,1978,1979) McMaster University	regions experiencing change in organic and biological character in excess of natural limits for a given period of time	(1) lake water data: pH, specific conductivity, temperature, secchi depth, alkalinity, chlorophyll, phytoplankton; (2) soil data: colour, depth, thickness of units, texture, B exchange capacity	calcite saturation index (CSI)	field data	non-susceptible probably susceptible susceptible to reduced pH
Shilts et al, (1980) GSC	predictable buffering response to acid loading	chemical composition	specifically: type and amount of labile mineral phases	geologic maps	high sensitivity intermediate-high intermediate-low low sensitivity
Surficial Materials					
Shilts et al, (1980) GSC	predictable buffering response to acid loading	origin of surficial deposits, presence/ absence of carbonates bedrock carbonate availability	———	lithologic maps glacial history National Geochemical Reconnaissance Program	low sensitivity intermediate or indeterminate high
Soils					
Klopatek, Harris and Olson (1980)Oak Ridge National Laboratory	susceptibility to accelerated soil acidification	1) soil pH 2) total base contents 3) organic matter 4) clay content 5) H^+ eq/m^2	2) Base Saturation CEC 5) pH and annual average precipitation (cm)	Geoecology Data Base National Atlas (USGS,1970) soil great group phase information USDA-SCS (1960, 1975) Buol et al. (1973) Mole (1975), Hoyle (1973) Cogbill & Likens (1974)	Type I) more sensitive Type II) Type III) less sensitive Type IV)
McFee (1980) USEPA	fraction of exchangeable cations leached from upper 25 cm soil by 25 years precipitation with average pH 3.7 at a rate of 100 cm/yr (100 kg $CaCO_3$ eq/ha)	1) total buffering capacity or CEC 2) base saturation 3) management system 4) presence or absence of carbonates	1) clay and organic content 2) pH	soil survey, laboratory data and descriptions (USDA)	non-sensitive slightly sensitive sensitive
Wong and Coote (1980) CDA	fraction of exchangeable bases leached from plowed layer (15 cm) in 25 years with inputs of 60kg $CaCO_3$ eq/ha.	1) CEC 2) base saturation 3) exchange	1) clay content 2) pH 3) clay content, pH (assumes uniform organic content)	CanSIS, published soil reports, provincial soil testing laboratories	sensitive moderately sensitive non-sensitive
Vegetation					
Klopatek, Harris & Olson (1980) Oak Ridge National Laboratory	Impact of SO_2 on sensitive species (soybeans & softwood forest)	soybean yield softwood productivity projected regional SO_2 concentrations for 1985		Geoecology Data Base Census of Agriculture, 1969 Davis (1978)	no impact low impact medium impact high impact
Robitaille (1980) CFS	detrimental effects of acid (SO_2) impingement on vegetation	relative terrain sensitivity (RTS)	1) dominant forest species and relative abundance 2) relative species sensitivity to SO_2	Rowe (1972) Pallesiar (1972) Jeffree (1979)	high sensitivity intermediate low sensitivity
Terrestrial					
Cowell et al, (1981) Environment Canada	sensitivities bases on forest productivity & aquatic inputs	1) exchangeable bases 2) soil depth 3) parent material or bedrock	1) texture & petrography	Ecodistrict Data Base Ontario Land Inventory Bedrock Geology	Low sensitivity, moderate, high, variable
Robitaille (1979) CFS and Robitaille & Rennie (1980) CFS	combination of individual vegetation and soil sensitivities	1) species sensitivity 2) pH 3) CEC 4) organic matter content 5) texture		Rowe (1972) Pallesiar (1972) Jeffree (1979) Soil map of Canada (CDA)	very sensitive sensitive tolerant

From: Cowell et al., 1981