

## Conservation Guidelines for Michigan Lakes

Table 1.—Water chemistry values for lakes in the Upper Peninsula of Michigan (EPA Subregion 2B) and the upper Great Lakes area (EPA Subregion 2D, which includes the northern Lower Peninsula of Michigan)<sup>1</sup>. Water sampling and analysis were conducted by the U.S. Environmental Protection Agency for the National Acid Precipitation Assessment Program. Only lakes at least 4 hectares (9.9 acres) in surface area were sampled. Values are shown for the 20<sup>th</sup> percentile, the 50<sup>th</sup> percentile (median), and the 80<sup>th</sup> percentile, as reported in Linthurst et al. (1986); some units were converted from  $\mu\text{eq}\cdot\text{L}^{-1}$  to  $\text{mg}\cdot\text{L}^{-1}$ .

Variable	Units	Upper Peninsula			Northern Lower Peninsula		
		20th	50th	80th	20th	50th	80th
pH		6.07	7.10	7.82	6.63	7.39	8.07
ANC <sup>2</sup>	$\mu\text{eq/L}$	0.0	0.0	0.0	0.0	0.0	0.0
DOC <sup>3</sup>	$\text{mg/L}$	3.4	6.8	11.2	5.2	8.8	13.0
Ext. Al <sup>4</sup>	$\mu\text{g/L}$	0.0	3.0	11.9	0.2	3.3	8.2
Sulfate	$\text{mg/L}$	2.4	3.7	5.0	1.4	2.4	4.1
Calcium	$\text{mg/L}$	1.7	4.9	19.4	1.8	10.5	23.8
Nitrate	$\text{mg/L}$	0.0	0.0	0.1	0.0	0.0	0.2
Ammonium	$\text{mg/L}$	0.0	0.0	0.1	0.0	0.0	0.1
Phosphate-total	$\mu\text{g/L}$	6.8	12.6	18.8	9.8	18.9	31.1
True color	PCU	16	31	74	15	39	74
Turbidity	NTU	0.6	0.9	1.6	0.5	1.0	2.0
Secchi depth	feet	3.0	4.9	9.5	3.3	6.2	10.8
Sodium	$\text{mg/L}$	0.3	0.7	1.1	0.5	1.5	2.7
Potassium	$\text{mg/L}$	0.3	0.5	0.8	0.6	0.8	1.2
Magnesium	$\text{mg/L}$	0.5	1.8	5.1	0.8	4.1	8.5
Iron	$\mu\text{g/L}$	13.8	49.9	201.2	2.1	44.0	196.6
Manganese	$\mu\text{g/L}$	0.0	0.0	20.4	0.0	0.0	9.1
Aluminum-total	$\mu\text{g/L}$	12.5	30.9	107.6	8.0	19.7	48.1
Silica	$\text{mg/L}$	0.3	2.3	6.1	0.3	2.4	9.0
DIC <sup>5</sup>	$\text{mg/L}$	1.0	4.5	14.8	1.7	9.5	22.1
Chloride	$\text{mg/L}$	0.2	0.4	0.8	0.4	0.8	3.8
Conductance	$\mu\text{S/cm}$	20.5	47.2	132.9	24.7	91.6	198.7
Bicarbonate	$\text{mg/L}$	1.8	16.8	70.7	4.3	46.5	115.9

<sup>1</sup> Sampling in Michigan conducted from October 9 to November 6, 1984. Subregion 2B included 133 Michigan lakes and 13 Wisconsin lakes. Subregion 2D included 10 Michigan lakes and 131 Wisconsin and Minnesota lakes.

<sup>2</sup> Acid Neutralizing Capacity.

<sup>3</sup> Dissolved Organic Carbon.

<sup>4</sup> Extractable Aluminum.

<sup>5</sup> Dissolved Inorganic Carbon.

Table 2.–Classification of water based on hardness (Shaw et al. 1996).

Hardness level	Concentration (mg/l)
Soft	0–60
Moderate	61–120
Hard	121–180
Very hard	>180

Table 3.–Water quality parameters in relation to trophic status (Carlson 1977).

Lake trophic state	Phosphorus (mg/l)	Transparency (Secchi disk, ft)	Chlorophyll-a (mg/l)
Oligotrophic	<0.010	>15.0	<0.0020
Mesotrophic	0.010–0.030	6.0–15.0	0.0020–0.010
Eutrophic	>0.030	<6.0	>0.010