IOWA'S WATER

Ambient Monitoring Program

Lake Water Quality Summary 2011

Water Quality Parameter	Units	Number of Samples	Min Value	Percentiles					Max Value
				10th	25th	50th	75th	90th	
Ammonia	mg/L	392	<0.15	<0.15	<0.15	<0.15	<0.15	0.22	1.3
Alkalinity (as CaCO3)	mg/L	392	48	82	101	133	176	210	307
Chlorophyll a	µg/L	392	<5.0	<5.0	12.6	31.6	50.8	80.8	226.6
Dissolved Organic Carbon	mg/L	392	<7.6	<7.6	<7.6	<7.6	<7.6	<7.6	13.2
Dissolved Oxygen	mg/L	392	0.1	0.3	0.4	7.4	9.8	11.7	30.2
Inorganic Suspended Solids	mg/L	392	<5.0	<5.0	<5.0	<5.0	8.6	15.2	378
Lake Depth	m	392	0.7	2.6	3.9	5.5	7.5	10.9	39.1
Nitrate + Nitrite (as N)	mg/L	392	<0.58	<0.58	<0.58	<0.58	0.8	3.8	14
Orthophosphate (as P)	mg/L	392	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.61
pH		392	7	7.9	8.2	8.4	8.6	8.9	9.9
Phytoplankton Wet Mass	mg/L	392	1	6	11	18	31	53	605
Secchi Depth	m	392	0.1	0.3	0.5	0.7	1.2	2	8.9
Specific Conductance	µmhos/cm	392	90	170	230	300	410	490	810
Temperature	°C	392	13.4	18.1	21.2	23.5	27.3	29.1	31.6
Thermocline Depth	m	392	NIL	NIL	NIL	1.8	3.1	4.9	16.7
Total Kjeldahl Nitrogen	mg/L	390	<0.5	<0.5	0.5	1.2	1.9	2.6	12.9
Total Phosphorus (as P)	mg/L	392	<0.02	0.03	0.04	0.07	0.12	0.18	0.61
Total Suspended Solids	mg/L	392	<6.0	<6.0	7.2	12	19.2	30.6	452
Turbidity	NTU	391	0.2	2.6	6.5	14.1	26.8	42.4	138.5
Volatile Suspended Solids	mg/L	392	<8.0	<8.0	<8.0	<8.0	11.4	17	92
Zooplankton Dry Mass	mg/L	392	2	37	72	159	306	595	2,628

µg /L – micrograms per liter (parts per billion)
mg/L – milligrams per liter (parts per million)
µmhos/cm – micromhos per centimeter
NTU – Nephelometric Turbidity Units
< – less than detection limit shown
m – meters

Raw data available through STORET:
https://programs.iowadnr.gov/iastoret/

Note: This summary only includes the lakes monitored as part of the ambient lake monitoring program. 132 lakes were sampled in 2008; 131 lakes in 2000, 2003, 2005; 130 lakes in 2001, 2002, 2006, 2009, 2011; 129 lakes in 2007 and 2010; 127 lakes in 2004. Additional lake sites throughout Iowa are also monitored, but are not included in this summary since their sampling frequency, sites, and parameters vary from the fixed network.

Carlson's Trophic State Index Values for 2011

The large amount of water quality data collected by the ambient lake monitoring program can be difficult to evaluate. A trophic state index (TSI) is a useful way to analyze the data collected. A TSI condenses water quality data into a single, numerical index. The most widely used and accepted TSI, called the Carlson TSI, was developed by Bob Carlson (1977). Carlson TSI values range from 0 to 100. The Carlson TSI values can be used to divide lakes into four main lake productivity categories (amount of biological activity or relative nutrient richness): oligotrophic (least productive), mesotrophic (moderately productive), eutrophic (very productive), and hypereutrophic (extremely productive). Mesotrophic lakes, for example, generally have a good balance between water quality and algae/fish production. Eutrophic lakes have less desirable water quality and can have an overabundance of algae. Hypereutrophic lakes have poor water quality and experience frequent algae blooms. For 2011, based on the average chlorophyll a TSI value for each lake, 11 lakes were mesotrophic, 105 lakes were eutrophic, and 16 lakes were hypereutrophic. For 2011, based on the average total phosphorus TSI value for each lake, 10 lakes were mesotrophic, 85 lakes were eutrophic, and 37 lakes were hypereutrophic.

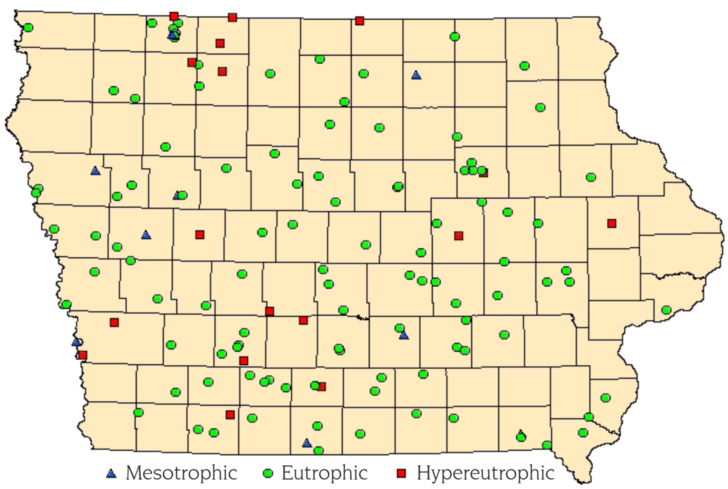

Figure 1. Average Carlson Trophic State Index (TSI) scores for chlorphyll a based on data for 2011.

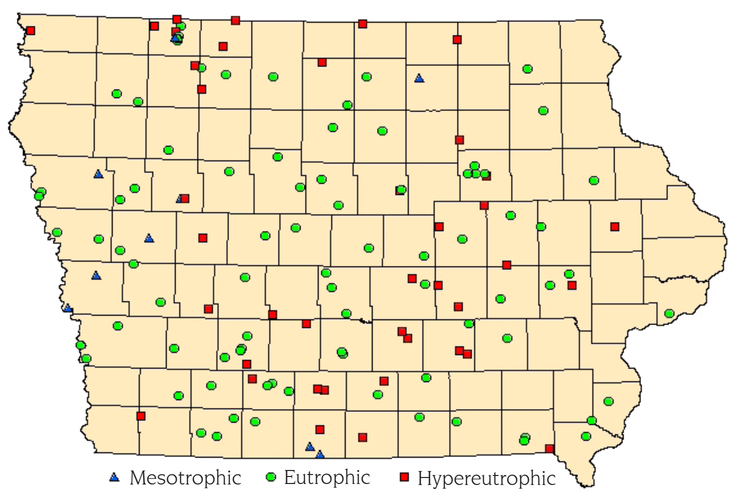

Figure 2. Average Carlson Trophic State Index (TSI) scores for total phosphorus based on data for 2011.

References

Carlson, Robert E., 1977, A Trophic State Index for Lakes, Limnology and Oceanography, Vol. 22, No. 2 (Mar., 1977), p. 361-369.

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