

Table 12.3 Water Quality in European Lakes, 1994

Source: European Environment Agency

Lake	Countries	Surface Area (km ²)	Volume (km ³)	Maximum Depth (m)	Mean Depth (m)	Catchment Area (km ²)	Years of Data	Secchi Depth (m) (a)	pH	Concentration of			
										Chlorophyll (µg/l)	Phosphorous (µg/l)	Nitrogen (mg/l)	Chloride (mg/l)
Ammersee	DE	47	1.8	81	38	993	1975	4.0	X	X	55	X	X
Arreso	DK	42	0.1	6	3	258	1990	0.4	9.5	345	514	3.5	X
Attersee	AT	46	3.9	171	84	464	1975-79	8.0-9.0	8.0	X	7	X	X
Balaton	HU	593	1.9	12	3	5,181	1979-83	0.6	8.4	8-36	30.86	0.7-1.4	X
Bodensee	AT, DE, CH	539	49.0	252	90	10,900	1991	X	X	X	32	1.0	X
Bolsena	IT	114	9.2	151	81	273	X	7.0	X	X	25	X	X
Bracciano	IT	57	5.1	165	89	147	X	6.0	X	X	10	X	X
Chiemsee	DE	80	2.0	73	26	1,399	1983	X	X	6	30	X	X
Como	IT	146	22.5	410	153	4,570	X	1.0	X	X	48	X	X
Corrib	IR	170	X	X	X	X	1991	4.7	X	3	11	X	X
Derg	IR	116	0.9	36	8	10,280	1991-92	1.7	X	17	43	X	X
Dospat reservoir	BG	22	0.4	46	20	432	1984-86	X	6.5	45	60	0.8	X
Dubasari	MD	68	0.3	20	4	53,590	1991	X	8.0	X	111	1.9	49.0
Eemmeer & Gooimeer	NL	54	X	10	2	X	1990	X	8.8	130	680	0.4	X
Femunden	NO	204	6.0	150	30	1,723	1991	11.0	6.7	1	4	0.2	X
Garda	IT	368	49.0	350	133	2,290	X	5.0	X	X	10	X	X
Haringvliet	NL	86	X	38	10	X	1990	1.0	8.1	9	195	0.3	X
Hjälmarén	SE	478	3.0	20	6	3,569	1990	2.0	7.6	12	46	0.7	12.0
Ijsselmeer	NL	2,000	X	6	5	X	1990	1.0	8.5	81	170	0.1	X
Ilmen	RS	1,124	2.9	10	3	66,400	X	X	X	3	70	0.9	28.0
Inari	FI	1,102	15.1	96	14	13,400	1991	8.0	7.2	1	4	0.2	X
Iseo	IT	61	7.6	251	123	1,736	X	4.0	X	X	32	X	X
Lac Léman	FR, CH	584	89.0	310	153	7,975	1991	8.0	X	6	52	0.7	6.0
Lac Lucerne	CH	114	11.8	214	104	1,831	1991	X	X	X	5	0.6	X
Lac Neuchâtel	CH	218	14.0	152	64	2,670	1991	12.0	8.4	1	20	1.3	X
Ladoga	RS	17,670	908.0	258	51	258,600	1976-85	3.0	X	3	27	0.6	X
Lago Maggiore	IT, CH	213	37.5	372	177	6,598	X	2.0	8.8	3	14-25	0.9	X
Lago Trasimeno	IT	124	0.6	6	5	396	X	1.0	X	X	55	X	X
Lebsko	PL	71	0.1	6	2	1,536	1990	1.0	X	100	137	1.6	X
Loch Awe	UK	39	1.2	94	32	780	1977-78	3.0	6.9	2	X	X	X
Loch Lomond	UK	71	2.6	190	37	781	1991-92	X	8.9	137	120	2.2	X
Loch Morar	UK	27	2.3	310	87	142	1977-78	6-10	6.6	1	X	X	X
Loch Ness	UK	56	7.5	230	132	1,775	1977-78	4.0	6.7	1	X	X	X
Lough Neigh	UK	396	4.8	34	12	4,453	1975-87	1.1	8.3	49	108	2.2	X
Mälaren	SE	1,140	14.0	61	13	21,463	1990	1.0	7.6	10	32	0.9	8.0
Mamry Pólnocne	PL	26	0.3	44	12	596	1990	4.0	X	3	60	1.0	X
Markemeer	NL	670	X	5	4	X	1990	X	8.3	10	45	0.1	X
Mask	IR	80	X	X	X	X	1991	4.5	X	3	11	X	X
Mjøsa	NO	362	56.2	449	153	16,420	1991	9.0	7.1	3	7	0.4	X
Müritz	DE	114	0.9	31	8	X	X	2.0	X	X	80	X	X
Neusiedlersee	AT, HU	300	0.3	2	1	1,000	1977	X	8.7	12	102	X	X
Niegocin	PL	26	0.3	40	10	378	1990	1.0	X	34	300	1.3	X
Ohri	AL	363	52.6	287	145	599	X	X	X	X	X	X	X
Omega	RS	9,670	292.0	120	30	52,970	1967-89	4.0	X	4	12	0.6	2.0
Oulujärvi	FI	893	6.8	35	8	19,000	1991	2.0	6.7	7	14	0.4	X
Øyeren	NO	85	1.1	70	13	40,000	1991	3.0	7.2	4	9	0.4	X
Päijänne	FI	1,054	17.8	98	17	25,400	1991	X	7.1	X	7	0.5	X
Peipus	EE, RS	3,570	27.0	47	7	44,350	1980-86	1.8-3.6	7.8-8.1	14	X	0.8	5.3-11.8
Pielinen	FI	867	8.5	60	10	12,823	1991	4.0	6.4	3	10	0.5	X
Prespa	AL, GR	329	5.9	35	18	599	X	X	X	X	X	X	X
Randsfjorden	NO	137	6.1	121	44	3,663	1991	8.0	7.3	1	5	0.5	X
Ree	IR	105	0.7	35	6	4,530	1993-94	1.5	X	15	40	X	X
Saimaa	FI	1,147	13.9	82	12	60,100	1991	4.0	6.9	3	6	0.5	X
Shkrodra	AL, FYROM	368	2.9	10	8	1,026	1972-73	4.0	7.8	X	X	X	X
Sniardwy	PL	114	0.7	23	6	2,425	1990	2.0	X	17	115	1.1	X
Snåsavatnet	NO	121	5.5	121	46	1,433	1988	4.0	7.1	2	5	0.2	X
Starnberger See	DE	56	3.0	128	53	258	1978-79	8.0	X	6	26	X	X
Storsjøen	NO	51	7.1	309	145	1,912	1990	X	7.0	2	8	0.2	X
Thingvalla	IS	84	2.9	114	34	X	1975	X	7.3	X	X	0.1	7.0
Thrichonis	GR	97	X	58	X	215	1978	6.0	8.3	1	24	0.2	X
Tyriffjorden	NO	121	13.8	295	114	9,808	1991	7.0	X	2	5	0.4	X
Volvi	GR	67	0.9	23	14	1,247	1985-86	1.6	8.5	X	X	0.0	X
Vänern	SE	5,670	152.0	106	27	41,180	1990	5.0	7.4	2	9	0.8	6.0
Vättern	SE	1,912	74.0	128	39	4,447	1990	12.0	7.5	1	6	0.7	9.0
Vortjärn	EE	270	0.8	6	3	3,100	1991	X	7.8	22	43	2.4	17.0
Windermere	UK	15	0.3	64	24	231	1991-92	X	7.0	23	20	1.0	X
Zürich See	CH	90	3.9	143	51	1,740	1991	X	X	X	45	0.8	X

Notes: a. Indicates water transparency. AL: Albania; AT: Austria; BG: Bulgaria; CH: Switzerland; DE: Germany; DK: Denmark; EE: Estonia; FI: Finland; FR: France; FYROM: Former Yugoslav Rep of Macedonia; GR: Greece; HU: Hungary; IR: Ireland; IS: Iceland; IT: Italy; MD: Moldova; NL: the Netherlands; NO: Norway; PL: Poland; RS: Russian Federation; SE: Sweden; UK: United Kingdom.

Table 12.3 Water Quality in European Lakes, 1994

Source: Physical lake characteristics and water quality data: P. Kristensen and H.O. Hansen, *European Rivers and Lakes---Assessment of Their Environmental State*, European Environment Agency Environmental Monographs No. 1 (European Environment Agency, Copenhagen, 1994).

These data were compiled from questionnaires distributed to the European countries, scientific literature, National State of the Environment reports, and from the International Lake Environment Committee Foundation database. Because these data are from very different primary sources, lake data are not strictly comparable. The table, however, provides a good indication of the lake water quality in various European regions.

The majority of European lakes have a small surface area between 0.01--1.0 square kilometers. There are 16,000 lakes with a surface area larger than 1 square kilometer. Of these, 14,525 are located in the Nordic countries and the Russian Federation. For the purpose of this table, a subset of the most well-known lakes in Europe was selected. These were data-rich lakes representing different regions in Europe. Lakes are identified by the name most commonly used in the country or region where they are located.

Measurements of *surface area* are generally reported as the largest area for lakes subject to normal size variations and usually include the area of any islands within the lakes.

Calculation of *volume* and *mean depth* requires detailed knowledge of the lake bottom and is usually estimated. *Maximum depth* can be measured directly. Mean and maximum depths and water volume are important factors in understanding potential productivity.

Catchment area is the area of the drainage basin (excluding the area of the lake) that provides water to the lake.

Years of data shows the years for which water quality data were available. Some countries specified annual averages, while others provided only summer averages. For countries showing more than one year, water quality data represent an average for the period shown. Therefore, care should be taken when making comparisons. For some countries, the year or period of the data is unknown and has been marked as missing data.

Secchi depth is a measure of transparency of water obtained by lowering a white disk into the water until it is no longer visible.

The *pH* of the water can range from pH 4 for acidic waters to a pH 11 for alkaline waters. A pH 7 is neutral.

Concentrations of *chlorophyll*, *phosphorous*, *nitrogen*, and *chloride* provide information on the nutrient and pollution levels of a lake. Lakes located in pristine areas usually have low nutrient levels (total phosphorous concentrations are less than 10 to 20 micrograms per liter and total nitrogen concentrations are less than 0.5 milligrams per liter). The nutrient levels in a lake depend on the external loading and on the characteristics of the catchment area. Lakes in catchment areas with intensive agriculture have more nutrient loadings from fertilizer runoff, etc. High nutrient levels produce an increase in phytoplankton (chlorophyll levels), which in turn increases the turbidity of the water (low water transparency) and can alter the biological composition of the aquatic community.