ANNOTATED BIBLIOGRAPHY
for
Species Richness For Submersed
Aquatic Plants in Worldwide Waterways

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ANNOTATED BIBLIOGRAPHY

The purpose of this report is to provide an annotated bibliography of a database from literature references of the species richness of submersed, aquatic, vascular plant communities from worldwide lakes and streams.

TABLE EXPLANATION

An explanation of the data table is given here.

LAKES (Col. 1). Name of lake or river.

LOCATION (Col. 2). City, county or country of lake.

pH (Col. 4). $|\log_{10}$ [Hydrogen ion]$|$.

ALK (Col. 5). Alkalinity, $mgCaCO^3/L$.

ANC (Col. 6). Acid neutralizing capacity, ueq/L.

TP (Col. 7). Total phosphorus, ppm.

COND (Col. 8). Conductivity, umhos/cm.

SECCHI (Col. 9). Transparency measurement, m.

CLIMATE (Col. 11). Climate at each location.

1 - Temperate
2 - Sub-Tropical
3 - Tropical
4 - Unknown

CONTINENT (Col. 12). Continent for each location.

1 - North America
2 - South America
3 - Europe
4 - Asia
5 - Africa
6 - Australia/New Zealand

TROPH STAT (Col. 13). Trophic status for each location.

1 - Acid
2 - Oligotrophic
3 - Mesotrophic
4 - Eutrophic
5 - Saline
6 - Unknown

OF SPP. (Col. 14). The number of submersed aquatic vascular plants present in the lake or river. This does not include the macroalga Chara or Nitella, also not included are emergent and floating leaved species.

REFERENCE (Col. 15). Citation of the reference used.

REFERENCES

Beard, Thomas D. 1973. Overwinter drawdown: Impact on the aquatic vegetation in Murphy Flowage, Wisconsin. Dept of Natural Resources. Technical Bulletin No 61. Madison, Wisconsin.

Best, E.P.H. 1982. the aquatic macrophytes of Lake Vechten. Species composition, spatial distribution and production. Hydrobiologia 95:65-77.

Best, E.P.H. 1987. The submerged macrophytes in Lake Maarsseveen I: Changes in species composition and Biomass over a six year period. Hydrobiological Bulletin 21(1):55-60

Boylen, Charles W., Robert Singer and Deborah A. Roberts. 1985. Biological and chemical field survey of small New Hampshire lakes sensitive to acid deposition. FWI Report #85-1. Rensselaer Fresh Water Institute, Rensselaer Polytechnic Institute, Troy, NY.

Brown, Helen Davis. 1987. Aquatic macrophytes of Lake Mize, Florida, 1968-1980. Bulletin of the Torrey Botanical Club 114(2):180-182.

Burgermeister, P.G. and Jean-Bernard Lachavanne. 1984. Caracteerisation de la vegetation macrophytique d'un lac hautement eutrophe: le Greifensee (Suisse). Schweiz. Z. Hydrol. 46(1):117-138.

Butcher, R.W. 1933. Studies on the ecology of rivers. I. On the distribution of macrophytic vegetation in the rivers of Britain. Journal of Ecology 21:58-91.

Casper, S.J., H.D. Drausch and W. Scheffler. 1985. Ch. 5. The Plant Communities. pp. 129-195. In: Lake Stechlin: A Temperate Oligotrophic Lake. S.J. Casper ed. Monographiae Biological Vol 58. Dr. W. Junk Publishers, Dordrecht. 553pp.

Cassie, V., P.T. Freeman. 1980. Observations on some chemical parameters and the phytoplankton of five west coast dune lakes in Northland, New Zealand. New Zealand Journal of Botany 18:299-320.

Chapman, V.J., B.T. Coffey and J.M.A. Brown. 1971. Submerged vegetation of the Rotorua and Waikato Lakes. 2. Cyclic change in Lake Rotoiti. New Zealand Journal of Marine and Freshwater Research 5:461-482.

Clayton, J.S., V.J. Chapman and J.M.A. Brown. 1981. Submerged vegetation of the Rotorua and Waikato Lakes. 4. Lake Rotoma. New Zealand Journal of Marine and Freshwater Research 15:447-457.

Coffey, Brian T. and John S. Clayton. 1987. Submerged macrophytes of Lake Pupuke, Takapuna, New Zealand. New Zealand Journal of Marine and Freshwater Research 21:193-198.

Congdon, R.A. and A.J. McComb. 1981. The vegetation of the Blackwood River estuary, South-west Australia. Journal of Ecology 69:1-16.

Crowder, A.A., J.M. Bristow, M.R. King and S. Vanderkloet. 1977. The aquatic macrophytes of some lakes in southeastern Ontario. Le Naturaliste Canadien 104:457-464.

Crowder, A.A., J.M. Bristow, M.R. Kind and S.Vanderkloet. 1977. Distribution, seasonality, and biomass of aquatic macrophytes in Lake Opinicon (Eastern Ontario). Le Naturaliste Canadien 104:441-456.

Cruz, Gustavo Adolfo and Rolando Delgado. 1986. distribucion de las macrofitas en el Lago Yojoa, Honduras. Review Biol. Trop. 34(1):141-149.

Dale, H.M. and G.E. Miller. 1978. Changes in the aquatic macrophyte flora of whitewater lake near Sudbury, Ontario from 1947 to 1977. Canadian Field-Naturalist 92(3):264-270.

Dale, H.M. and C.E. Garton. 1984. The aquatic macrophyte vegetation of an isolated island lake adjacent to Lake Nipigon, Ontario: a comparative study after a fifty-six year interval. Canadian Field-Naturalist 98(3):444-450.

Dale, H.M. 1986. comparison of the 1984 aquatic macrophyte flora in Lake Temagami, Northern Ontario, with the flora published in 1930. Canadian Field-Naturalist 100(4):571-573.

Denny, Patrick. 1973. Lakes of south-western Uganda. II. Vegetation studies on Lake Bunyonyi. Freshwater Biology 3:123-135.

Dickman, M., J. Smol and P. Steele. 1980. The impact of industrial shock loading on selected biocenoses in the lower Welland River, Ontario. Water Pollution Research Journal of Canada 15(1):17-31.

Esteves, Von Francisco de Assis. 1979. Die bedeutung der aquatischen Makrophyten fur den Stoffhaushalt des Schohsees. I. Die Produktion an Biomasse. Hydrobiologia Supplement 2:117-143.

Finlayson, C.M., Tom P. Farrell and Dilwyn J. Griffiths. 1980. Studies of the hydrobiology of a tropical lake in north-western Queensland. III. Growth, chemical composition and potential for harvesting of the aquatic vegetation. Australian Journal of Marine and Freshwater Research 35:525-536.

Forest, Herman S. 1977. Study of submersed aquatic vascular plants in Northern Glacial Lakes (New York State, USA). Folia Geobototanical Phytotaxonomy 12:329-341.

Forsberg, Curt. 1960. Subaquatic macrovegetation in Osbysjon, Djursholm. Oikos 11:11, Copenhagen 1960.

Fraser, D. and J.K. Morton. 1983. Aquatic plants in Lake Superior Provincial Park in relation to water chemistry. Canadian Field-Naturalist 97(2):181-186.

Gladyshev, A.I. and Sh.I. Kogan. 1977. The dynamics of macrophyte and phytoplankton biomass in a floodplain lake of the Middle Amu-Dar'ya. Hydrobiolgia Journal 13(1):74-81.

Green, J.D. 1975. Physiochemical features of Lake Ototoa, a sand dune lake in northern New Zealand. New Zealand Journal of Marine and Freshwater Research 9:199-222.

Hammer, U. Theodore and J. Michael Heseltine. 1988. Aquatic macrophytes in saline lakes of the Canadian prairies. Hydrobiologia 158:101-116.

Holmes, N.T.H. and B.A. Whitton. 1977. Macrophytic vegetation of the River Swale, Yorkshire. Freshwater Biology 7:545-558.

Howard-Williams, C. and B.H. Walker. 1974. The vegetation of a tropical African Lake: Classification and ordination of the vegetation of Lake Chilwa (Malawi). Journal of Ecology 62:831-854.

Howard-Williams, C. 1979. Ch.6. Distribution, biomass and role of aquatic macrophytes in Lake Sibaya. pp.88-107. In: Lake Sibaya. B.R. Allanson, ed. Monographiae Biologicae vol. 36. Dr. W. Junk Publishers The Hague.

Howard-Williams, Clive, John Davies and Warwick F. Vincent. 1986. Horizontal and vertical variability in the distribution of aquatic macrophytes in Lake Waikaremoana. New Zealand Journal of Marine and Freshwater Research 20:55-65.

Hunt, G.S. 1963. Wild celery in the lower Detroit River. Ecology 44(2):360-370.

Hunter, Malcolm L., Jody J. Jones, Jack W. Witham and Terry M. Mingo. 1986. Biomass and species richness of aquatic macrophytes in foru Maine (U.S.A.) lakes of different acidity. Aquatic Botany 24:91-95.

Husband, B.C. and M. Hickman. 1985. Growth and biomass allocation of Ruppia occidentalis in three lake, differing in salinity. Canadian Journal of Botany 63(11):2004-2014.

Jones, G. and D.R. Cullimore. 1973. Influence of macro-nutrients on the relative growth of water plants in the Qu'appll e lakes. Environmental Pollution 4:283-290.

Juge, Raphaelle, G.Lods-Crozet, A. Noetzlin, J. Perfetta and J.B. Lachavanne. 1985. La vegetation macrophytique d'un lac hautement eutrophe du Plateau suisse: Le Baldegger See. Schweiz. Z. Hydrol. 47(1):64-75.

Jupp, B.P. and D.H.N. Spence. 1977. Limitations on macrophytes in a eutrophic lake, Loch Leven. 1. Effects of phytoplankton. Journal of Ecology 65:175-186.

Keough, Janet R. 1986. The Mink river - A freshwater estuary. Wisconsin Academy of Sciences, Arts and Letters 74:1-11.

Kullberg, R.G. 1974. Distribution of aquatic macrophytes related to paper mill effluents in a southern Michigan stream. The American Midland Naturalist 91(2):271-281.

Kunii, Hidenobu and Kazumi Maeda. 1982. Seasonal and long-term changes in surface cover of aquatic plants in a shallow pond, Ojaga-ike, Chiba, Japan. Hydrobiologia 87:45-55.

Kunii, Hidenobu, Takayoshi Tsuchiya, Kiyoshi Matsui and Isao Ikusima. 1985. Present state of aquatic plants in lake Biwa and its surrounding water bodies. Japan Journal of Limnology 46(3):215-218.

Kunii, Hidenobu. 1986. Aquatic plants found in Lake Shinji and some small rivers located nearby the mouth of the River Hii. Studies of the Sanin Region. Natural Environment 2:53-57.

Kunii, Hidenobu and Rika Tsubaki. 1987. Aquatic plants and seasonal changes of water quality in Pond Engi-ike, Shimane Prefecture. Studies of the Sanin Region. Natural Environment 3:7-12.

Lillie, Richard A. 1988. A survey of the aquatic plant community of Devils Lake, Wisconsin. Proc. Aquatic Plant Control Research Program Nov 1987. Portland Oregon.

Livingston, M.E., B.J. biggs, J.S. Gifford. 1986. Inventory of New Zealand lakes Water & Soil Misc. Publication No 80, NWASCA, Wellington.

Loeb, Stanford L. and Scott H. Hackley. 1988. The didtribution of submerged macrophytes in Lake Tahoe, California and Nevada, and the possible influence of groundwater seepage. Verh. Internat. Verein. Limnol. 23:1927-1933.

Love, R.J.R. and G.G.C. Robinson. 1977. The primary productivity of submerged macrophytes in West Blue Lake, Manitoba. Canadian Journal of Botany. 55:118-127.

Mace, S.E., P. Sorge and T. Lowry. 1984. Impacts of phosphorus on streams. Milwaukee, WI. Wis. Dept. Natural Resourc., Bureau Water Resourc. Manage., Southeastern District. (April 1984).

Machena, Cecil and Nils Kautsky. 1988. A quantitative diving survey of benthic vegetation and fauna in Lake Kariba, a tropical man-made lake. Freshwater Biology 19:1-14.

Madsen, J.D. and M.S. Adams 1985. The aquatic macrophyte communities of two streams in Wisconsin. Wisconsin Academy of Sciences, Arts and Letters 73:198-216.

Madsen, J.D., M.S. Adams and Wm. Kleindl. 1989. The aquatic macrophyte community of Black Earth Creek, Wisconsin: 1981 to 1986. Wisconsin Academy of Sciences. Transactions Galley.

Miller, G.L. 1978. An ecological inventory of aquatic vegetation in the major lakes of Cayuga county, New York and recommendations for their management. Cayuga county Environmental Management Council. Aubun, New York.

Miller, G.E. and H.M. Dale. 1979. Apparent differences in aquatic macrophytes floras of eight lakes in Muskoka District, Ontario from 1953 to 1977. Canadian Field-Naturalist 93(4):386-390.

Musil, C.F., J.O. Grunow and C.H. Bornman. 1973. Classification and ordination of aquatic macrophytes in the Pongolo River pans, Natal. Bothalia 11(1 & 2):181-190.

Neil, John H. and Gintas A. Kamaitis. 1985. Aquatic plant assessment Cook's Bay, Lake Simcoe. Distribution, biomass, tissue nutrients and species composition. Ontario Ministry of the Enviroment. P.O. A84494.

Nichols, S.A. and Scott Mori. 1971. The littoral macrophyte vegetation of Lake Wingra. An example of a Myriophyllum spicatum invasion in a southern Wisconsin lake. Transactions of Wisconsin Academy of Sciences, Arts and Letters 59:107-119.

Nicholson, Stuart S. 1981. Changes in submersed macrophytes in chautauqua Lake, 1937-1975. Freshwater Biology 11:523-530.

Niemeier, Paul E. and Wayne A. Hubert. 1986. The 85-year history of the aquatic macrophyte species composition in a eutrophic prairie lake (United States). Aquatic Botany 25:83-89.

Obot, Emmanuel A. 1986. Ecological comparison of the pre- and post-impoundment macrophyte flora of the river Niger and Lake Kainji, Nigeria. Vegetatio 68:67-70.

Owen, G. and I. Wile. 1975. Causes, consequences and control of excessive aquatic plant growths in Lake St. Francis. Ontario Ministry of the Environment. Unpublished report.

Ozimek, Teresa and Andrzej Kowalczewski. 1984. Long-term changes of the submerged macrophytes in eutrophic Lake Mikolajskie. Aquatic Botany 19:1-11.

Peck, J.H. and M.M. Smart. 1986. An assessment of the aquatic and wetland vegetation of the Upper Mississippi River. Hydrobiologia 136:57-76.

Penuelas, J. and F. Sabater. 1987. Distribution of macrophytes in relation to environmental factors in the Ter River, N.E. Spain. Int. Revue ges. Hydrobiologia 72(1):41-58.

Purohit, Rekha and S.P. Singh. 1985. Submerged macrophytic vegetation in relation to eutrophication level in Kumaun Himalaya. Environmental Pollution 39:161-173.

Rao, S.V.R. and L.P. Mall. 1981. Effect of sewage and industrial wastes on the floristic composition and distribution of macrophytic vegetation in the River Khan. Water Research 15:287-288.

Rickett, H.W. 1921. A quantitative study of the larger aquatic plants of Lake Mendota. Trans. Wisconsin Academy of Sciences, Arts and Letters Vol 20.

Roberts, D.A. 1983. The effects of acidification on the macrophyte communities of nine Adirondack lakes. Masters Thesis. Rensselaer Polytechnic Institute, Troy, NY.

Rodgers, J.H., M.E. McKevitt, D.O. Hammerlund, K.L. Dickson and J.Carirns. 1983. primary production and decomposition of submergent and emergent aquatic plants of two Appalachian rivers. Fontaine, T.D. and S.M. Bartell, eds. Dynamics of Lotic Ecosystems. Ann Arbor Science, Ann Arbor, Mi 494pp.

Sahai, R. and A.B. Sinha. 1976. Ch.15. Productivity of submerged macrophytes in polluted and non-polluted regions of the eutrophic lake, Ramgarh (U.P.). pp. 131-140 in Aquatic Weeds in south East Asia. C.K. Varshney and J. Rzoslia, ed. Proceedings of a regional seminar on noxious aquatic vegetaton, New Delli, 12-17. Dex. 1973. Dr. W. Junk B.V., The Hague. 1976. 396pp.

Sand-Jensen, Kaj and Morten Sondergaard. 1979. Distribution and quantitative development of aquatic macrophytes in relation to sediment characteristics in oligotrophic Lake Kalgaard, Denmark. Freshwater Biology 9:1-11.

Sastroutomo, S.S. 1982. Summer biomass of aquatic macrophytes in relation to sediment characteristics in Lake Aino-numa, Miyagi. Jap. Journal of Ecology 32:45-55.

Schiener, F. 1979. Submerged macrophytes in the open lake. distribution pattern, production and long term changes. ch. 19, pp 235-250. In: Neusiedlersee: The limnology of a shallow lake in Central Europe. H. Loffler, ed. Monogr. biol. 37. Junk, The Hague. 543pp.

Schloesser, D.W. and B.A. Manny. 1986. Distribution of submersed macrophytes in the St. Clair-Detroit River system, 1978. Journal of Freshwater Ecology 3(4):537-544.

Sirjola, Esko. 1969. Aquatic vegetation of the river Teuronjoki, south Finland, and its relation to water velocity. Ann. Bot. Fenn. 6:68-75.

Smith, S.G. 1978. Aquatic macrophytes of the Pine and Popple river system, Florence and Forest Counties, Wisconsin. Transactions of Wisconsin Academy of Sciences, Arts and Letters 66:143-185.

Southwick, C.H. and F.W. Pine. 1975. Abundance of submerged vascular vegetation in the Rhode river from 1966 to 1973. Chesapeake Science 16(1):147-151.

Spence, D.H.N., A.M. Barclay and E.D. Allen. 1983?. Limnology and macrophyte vegetation of a deep, clear limestone lake, Loch Borralie. Transactions of Botanical Society of Edinburgh 44:187-204.

Swindale, Delle H. and John T. Curtis. 1957. Phytosociology of the larger submerged plants in Wisconsin Lakes. Ecology 38(3):397-407.

Taggett, Leslie. 1989. Aquatic plant inventory of the Lake George region. FWI Report #89-2. Rensselaer Fresh Water Institute, Rensselaer Polytechnic Institute, Troy, NY.

Tanner,C.C., J.S. Clayton and B.T. Coffey. 1985. Notes on the submerged vegetation of Lakes Heron, Clearwater, and Camp Canterbury, Suth Island, New Zealand. New Zealand Journal of Botany 23:213-218.

Tanner C.C., J.S. Clayton and L.M. Harper. 1986. Observations on aquatic macrophytes in 26 northern New Zealand lakes. New Zealand Journal of Botany 24:539-551.

Tarver, David P. 1980. Water fluctuation and the aquatic flora of Lake Miccosukee. Journal of Aquatic Plant Management 18:19-23.

Thomson J.W. 1944. A survey of the larger aquatic plants and bank flora of the Brule River. Transactions of Wisconsin Academy of Sciences, Arts and Letters 36:57-76.

Titus, John E. 1983. Submersed macrophyte vegetation and depth distribution in Chenango Lake, New York. Bulletin of the Torrey Botanical Club 110(2):176-183.

Titus, John E. and Mark D. Stephens. 1983. Neighbor influences and seasonal growth patterns for Vallisneria americana in a mesotrophic lake. Oecologia 56:23-29.

Toivonen and Teuvo Lappalainen. 1980. Ecology and production of aquatic macrophytes in oligotrophic, mesohumic lake Suomunjarvi, Eastern Finland. Ann. Bot. Fennici 17:69-85.

Unni, K.S. 1976. Production of submerged aquatic plant communities of Doodhadhari Lake Raipur.(M.P. India). Hydrobiologia 48(2):175-177.

Unni, K.S. 1977. The distribution and production of macrophytes in Lunz Mittersee and Lunz Untersee. Hydrobiologia 56(1):89-94.

Uotila, P. 1971. Distribution and ecological features of hydrophytes in the polluted Lake Vanajavesi, S. Finland. Ann. Bot. Fennici 8:257-295.

Van der Valk, A.G. and L.C. Bliss. 1971. Hydrarch succession and net primary production of oxbow lakes in central Alberta. Canadian Journal of Botany 49:1177-1199.

Volker, Roger and S. Galen Smith. 1965. Changes in the aquatic vascular flora of Lake East Okoboji in historic times. Iowa Academy of Science 72:65-72.

Wade, P.M. 1983. Changes in the aquatic macrophyte flora of the Snowdonia Lakes, North Wales: 1726 to 1983. Proceeding of the International Symposium of Aquatic Macrophytes. pp. 282-286.

Ward, Jonet and Joy Talbot. 1984. Distribution of aquatic macrophytes in Lake Alexandrina, New Zealand. New Zealand Journal of Marine and Freshwater Research 18:211-220.

Wile I. 1975. Lake restoration through mechanical harvesting of aquatic vegetation. Verh. Internat. Verein. Limnol. 19:650-671.

Wile, I. 1974. The macrophytes of the Kawartha Lakes - 1972. Water Resources Branch, Ontario Minitry of the Environment., Unpubl. report. November 1974.

Wile I. 1975. Lake restoration through mechanical harvesting of aquatic vegetation. Verh. Internat. Verein. Limnol. 19:660-671.

Wile, I., G.Hitchin, and G. Beggs. 1979. Impact of mechanical harvesting of Chemung Lake. pp. 145-159. In: Aquatic Plants, Lake Management, and Ecosystem Consequences of Lake Harvesting. J.E. Breck, R.T. Prentki and O.L. Loucks, eds. Proc. Conf. 14-16 Feb. 1979, Inst. Environ, Studies, Univ. Wisconsin-Madison. 435pp.

Wile, I., G.E. Miller, G.G. Hitchin and G.L. Beggs. 1985. Species composition and biomass of the macrophyte vegetation in one acidified and two acid-sensitive lakes in Ontario. Canadian Field-Naturalist 99:308-312.

Wilson, L.R. 1935. Lake development and plant succession in vilas County, Wisconsin. Part I. The medium hard water lakes. Ecological Monographs 5(2):207-247.

Wilson, L.R. 1941. The larger aquatic vegetation of Trout Lake, Vilas county, Wisconsin. Transactions of Wisconsin Academy of sciences, Arts, and Letters vol 33.

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
AMBA	JAPAN	M	M	M	M	M	M	1	4	7	9	KUNII 1986
ANTELOPE LAKE	SASKATCHEWAN	9.0	M	M	M	12	M	1	1	5	3	HAMMER & HESELTINE, 1988
ARTHUR LAKE	SASKATCHEWAN	8.6	M	M	M	7	M	1	1	5	1	HAMMER & HESELTINE, 1988
ASHIPPUN RIVER		M	M	M	M	M	M	1	1	7	8	MACE, ET. AL, 1984
AXE LAKE	MUSKOKA ONT	6.3	5	M	M	35	6.7	1	1	2	12	MILLER & DALE, 1979
BADFISH CREEK	WISCONSIN	M	M	M	M	M	M	1	1	7	2	MADSEN, ET AL. 1989
BALDEGGERSEE	SWITZERLAND	M	M	M	M	M	M	1	3	6	7	JUGE, ET AL. 1985
BALSAM LAKE	ONTARIO	M	M	M	M	M	M	1	1	6	17	WILE, 1974
BARK RIVER		M	M	M	M	M	M	1	1	7	8	MACE, ET. AL, 1984
BASIN LAKE	SASKATCHEWAN	9.1	M	M	M	16	M	1	1	5	2	HAMMER & HESELTINE, 1988
BEAN	CARROLL C. NH	5.5	M	13	7	16	M	1	1	1	10	BOYLEN, ET AL. 1985
BEATTY LAKE	MUSKOKA ONT	6.3	5	M	M	35	6.7	1	1	2	9	MILLER & DALE, 1979
BEAVER	GRAFTON C. NH	5.1	M	-24	3	17	M	1	1	1	5	BOYLEN, ET AL. 1985
BHIM TAL	HIMALAYA	7.8	127	M	25	M	2.2	1	4	4	6	PUROHIT & SINGH, 1985
BIG QUILL LAKE	SASKATCHEWAN	8.7	M	M	M	45	M	1	1	5	2	HAMMER & HESELTINE, 1988
BLACK EARTH CR	WISCONSIN	8.0	281.6	M	0.31	466	M	1	1	7	7	MADSEN AND ADAMS, 1985
BLACKWOOD R EST	SW AUSTRALIA	M	M	M	M	M	M	1	6	6	10	CONGDON & McCOMB, 1981
BLUE	CARROLL CO NH	6.1	M	61	4	17	M	1	1	2	10	BOYLEN, ET AL. 1985
BOULDER	ONTARIO	M	40	M	M	265	M	1	1	4	11	FRASER & MORTON, 1983
BRULE RIVER	WISCONSIN	M	M	M	M	M	M	1	1	7	19	THOMSON, 1944
BUCK LAKE	MUSKOKA ONT	6.3	2.5	M	M	35	9.2	1	1	2	16	MILLER & DALE, 1979
BUFFALO LAKE	ALBERTA	9.2	961	M	4	2450	M	1	1	5	9	HUSBAND & HICKMAN, 1985
BUFFALO POUND LK	SASKATCHEWAN	M	M	M	9	M	M	1	1	2	3	JONES & CULLIMORE, 1973
BURKE LAKE	SASKATCHEWAN	9.6	M	M	M	34	M	1	1	5	1	HAMMER & HESELTINE, 1988
CALDWELL	CHESHIRE C NH	5.0	M	-17	2	20	M	1	1	1	8	BOYLEN, ET AL. 1985
CAMERON LAKE	ONTARIO	M	M	M	M	M	M	1	1	6	10	WILE, 1974
CANADICE LAKE	NEW YORK	M	M	M	M	M	6.0	1	1	6	7	FOREST, 1977
CANANDAIGUA LAKE	NEW YORK	M	M	M	M	M	M	1	1	6	12	FOREST, 1977
CARSON LAKE	ONTARIO	6.5	M	M	M	56	M	1	1	2	7	CROWDER, ET AL. 1977
CAYUGA LAKE	CAYUGA, NY	M	M	M	M	M	3.6	1	1	3	11	MILLER, 1978
CEDAR CREEK		M	M	M	M	M	M	1	1	7	1	MACE, ET. AL, 1984
CHAPPICE LAKE	ALBERTA	9.1	M	M	M	40	M	1	1	5	1	HAMMER & HESELTINE, 1988
CHARLESTON LAKE	ONTARIO	8.7	M	M	M	220	M	1	1	3	12	CROWDER, ET AL. 1977
CHAUTAUQUA LAKE	W. NEW YORK	M	50.3	M	M	M	4.5	1	1	4	22	NICHOLSON, 1980
CHEMUNG LAKE	ONTARIO	M	M	M	M	M	M	1	1	6	19	WILE, 1974
CHENANGO LAKE	NEW YORK	8.2	2.1	M	M	M	M	1	1	3	16	TITUS, 1983, TITUS & STEPHENS, 1983
CLEAR LAKE	IOWA	M	150	M	M	M	0.3	1	1	4	24	NIEMEIER & HUBERT, 1986
CLEAR & STONY LK	ONTARIO	M	M	M	M	M	M	1	1	6	19	WILE, 1974
CLEARWATER LAKE	ONTARIO	4.4	0	M	4	86	9.7	1	1	1	7	WILE, ET AL., 1979
COLLETTE	ONTARIO	M	10	M	M	95	M	1	1	2	9	FRASER & MORTON, 1983
COMO LAKE	CAYUGA, NY	M	M	M	M	M	2.3	1	1	4	11	MILLER, G.L., 1978
CONE	GRAFTON CO NH	4.8	M	-31	4	22	M	1	1	1	5	BOYLEN, ET AL. 1985
CONESUS LAKE	NEW YORK	M	M	M	M	M	M	1	1	6	11	FOREST, 1977
CRANE	CHESHIRE C NH	5.3	M	-23	4	58	M	1	1	1	9	BOYLEN, ET AL. 1985
CRESCENT	ONTARIO	M	8	M	M	32	M	1	1	2	8	FRASER & MORTON, 1983
CROOKED LAKE	SASKATCHEWAN	M	M	M	3.5	M	M	1	1	2	3	JONES & CULLIMORE, 1973
CROSS LAKE	CAYUGA, NY	M	M	M	M	M	1.2	1	1	4	4	MILLER, 1978

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
CULTURE POND	JAPAN	M	M	M	M	M	M	2	4	6	3	KUNII, ET AL., 1985
DANJO-IKE	JAPAN	M	M	M	M	M	M	2	4	6	1	KUNII, ET AL., 1985
DEAD OTTER	ONTARIO	M	17	M	M	70	M	1	1	2	15	FRASER & MORTON, 1983
DEADMAN'S BAY	ONTARIO	8.5	M	M	M	316	M	1	1	4	13	CROWDER, ET AL. 1977
DEADMOOSE LAKE	SASKATCHEWAN	8.9	M	M	M	28	M	1	1	5	2	HAMMER & HESELTINE, 1988
DEER 1 POND	HAMILTON CO.	6.6	30	M	M	M	M	1	1	2	11	ROBERTS, 1983
DEER 2 POND	HAMILTON CO.	M	6.9	91	M	M	M	1	1	2	21	ROBERTS, 1983
DETROIT RIVER	DETROIT, MI	8.0	M	M	M	M	2.0	1	1	7	19	HUNT, 1963
DEVILS LAKE	WISCONSIN	M	M	M	M	M	6.0	1	1	2	11	LILLIE, 1988
DOC GREIG	ONTARIO	M	4	M	M	28	M	1	1	2	5	FRASER & MORTON, 1983
DOODHADHARI LAKE	PAIPUR INDIA	M	M	M	M	M	M	1	4	6	5	UNNI, 1976
DUCK LAKE	CAYUGA, NY	M	M	M	M	M	0.5	1	1	4	14	MILLER, 1978
EAGLE LAKE	MUSKOKA ONT	6.3	5	M	M	35	6.7	1	1	2	11	MILLER & DALE, 1979
EAGLE LAKE	ESSEX CO. NY	8.0	29.3	M	M	99	M	1	1	2	19	TAGGETT, 1989
EAST	GRAFTON CO NH	5.3	M	27	4	19	M	1	1	1	9	BOYLEN, ET AL. 1985
EAST LAKE	ONTARIO	8.5	M	M	M	226	M	1	1	4	6	CROWDER, ET AL. 1977
EAST POND	HAMILTON CO.	6.4	25	M	M	M	M	1	1	2	9	ROBERTS, 1983
ECHO	GRAFTON CO NH	6.2	M	98	4	113	M	1	1	2	8	BOYLEN, ET AL. 1985
ECHO LAKE	SASKATCHEWAN	M	M	M	10.9	M	M	1	1	2	2	JONES & CULLIMORE, 1973
FOX RIVER		M	M	M	M	M	M	1	1	7	5	MACE, ET. AL, 1984
FROGPOND CREEK	WISCONSIN	M	M	M	M	M	M	1	1	7	2	MADSEN, ET AL. 1989
FUNA	JAPAN	M	M	M	M	M	M	1	4	7	11	KUNII, 1986
GAKUTOYA	JAPAN	M	M	M	M	M	M	1	4	7	9	KUNII, 1986
GARFOOT CREEK	WISCONSIN	M	M	M	M	M	M	1	1	7	1	MADSEN, ET AL. 1989
GOEMON	JAPAN	M	M	M	M	M	M	1	4	7	6	KUNII, 1986
GOOSEBERRY LAKE	ALBERTA	9.5	M	M	M	33	M	1	1	5	1	HAMMER & HESELTINE, 1988
GREIFENSEE	SWITZERLAND	M	M	M	M	M	M	1	3	4	9	BURGERMEISTER & LACHAVANNE, 1984
GUNZAKAI	JAPAN	M	M	M	M	M	M	1	4	7	9	KUNII, 1986
HALLS CREEK	FLORENCE CO.	M	M	M	M	M	M	1	1	7	13	SMITH, 1978
HARP LAKE	ONTARIO	6.7	92	50	5	29	3.4	1	1	2	11	WILE, ET AL., 1979
HEMENWAY	CARROLL CO NH	5.2	M	-30	8	14	M	1	1	1	5	BOYLEN, ET AL. 1985
HEMLOCK LAKE	NEW YORK	M	M	M	M	M	M	1	1	6	8	FOREST, 1977
HIRA-KO	SHINA, JAPAN	M	M	M	M	M	M	2	4	6	0	KUNII, ET AL., 1985
HISHI-NO-KO	AZUCHI, JAPAN	M	M	M	M	M	M	2	4	6	3	KUNII, ET AL., 1985
HONEOYE LAKE	NEW YORK	8.0	75	M	M	190	M	1	1	4	12	FOREST, 1977
HORN LAKE	MUSKOKA ONT	6.3	2.5	M	M	35	9.2	1	1	2	10	MILLER & DALE, 1979
HUMBOLDT LAKE	SASKATCHEWAN	8.9	M	M	M	4	M	1	1	5	4	HAMMER & HESELTINE, 1988
JONES CREEK	FLORENCE C WI	M	M	M	M	M	M	1	1	7	5	SMITH, 1978
KATCHEWANOOKA LK	ONTARIO	M	M	M	M	M	M	1	1	6	14	WILE, 1974
KATEPWA LAKE	SASKATCHEWAN	M	M	M	11.1	M	M	1	1	2	3	JONES & CULLIMORE, 1973
KENNEY	ONTARIO	M	16	M	M	75	M	1	1	2	8	FRASER & MORTON, 1983
KIAH	CARROLL CO NH	5.6	M	-5	8	17	M	1	1	1	7	BOYLEN, ET AL. 1985
KILLARNEY LAKE	ALBERTA	9.3	M	M	M	6	M	1	1	5	2	HAMMER & HESELTINE, 1988
KILLMAN POND	MAINE	6.5	83	M	M	30	2.8	1	1	2	7	HUNTER, ET AL., 1986
KINGSTON MILLS	ONTARIO	8.2	M	M	M	216	M	1	1	3	12	CROWDER, ET AL. 1977
KINGSTONE CREEK	FLORENCE CO.	M	M	M	M	M	M	1	1	7	5	SMITH, 1978
KOMATSU-NUMA	JAPAN	M	M	M	M	M	M	2	4	6	0	KUNII, ET AL., 1985

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
LAKE AINO-NUMA	MIYAGI, JAPAN	M	M	M	M	M	M	2	4	6	5	SASTROUTOMO, 1982
LAKE ALEXANDRINA	NEW ZEALAND	M	M	M	M	M	M	1	6	6	7	WARD & TALBOT, 1984
LAKE BEZYMYANNOYE	USSR	7.4	M	M	12	M	M	1	3	5	4	GLADYSHEV & KOGAN, 1977
LAKE BIWA	JAPAN	M	M	M	M	M	M	2	4	6	16	KUNII, ET AL., 1985
LAKE BUNYONYI	UGANDA	M	M	M	M	M	M	3	5	6	4	DENNY, 1973
LAKE CAMP	NEW ZEALAND	7.5	34.5	M	M	53	M	1	6	3	7	TANNER, ET AL., 1985
LAKE CARROT	NEW ZEALAND	M	M	M	M	M	M	2	6	4	3	TANNER, ET AL., 1986
LAKE CHILWA	EAST AFRICA	9.1	M	M	M	2000	0.1	3	5	5	4	HOWARD-WILLIAMS & WALKER, 1974
LAKE CLEARWATER	NEW ZEALAND	7.5	34.5	M	M	38	M	1	6	3	10	TANNER, ET AL., 1985; STOUT, 1969
LAKE EAST OKOBOJI	IOWA	M	M	M	M	M	M	1	1	4	7	VOLKER & SMITH, 1965
LAKE ELLEN	WISCONSIN	M	M	M	M	M	M	1	1	6	6	SWINDALE & CURTIS, 1957
LAKE GEORGE	WARREN CO. NY	7.6	22.5	M	7	108	M	1	1	2	48	FWI, UNPUBL.
LAKE HERON	NEW ZEALAND	M	34.5	M	M	M	M	1	6	3	11	TANNER, ET AL., 1985; STOUT, 1969
LAKE HUMUHUMU	NEW ZEALAND	M	M	M	M	M	4.8	2	6	3	9	TANNER, ET AL., 1986; LIVINGSTON, ET AL. 1986
LAKE KAHUPARERE	NEW ZEALAND	M	M	M	M	M	M	2	6	4	6	TANNER, ET AL., 1986
LAKE KAINJI	NIGERIA	M	M	M	M	M	M	3	5	6	10	OBOT, 1986
LAKE KAI-IWI	NEW ZEALAND	6.3	6.25	M	M	M	7.5	2	6	3	3	TANNER, ET AL., 1986; LIVINGSTON, ET AL. 1986
LAKE KALGAARD	DENMARK	7.3	M	M	M	66	4.6	1	3	2	5	SAND-JENSEN & SONDERGAARD, 1979
LAKE KANONO	NEW ZEALAND	7.7	M	M	M	155	M	2	6	3	7	TANNER, ET AL., 1986; CASSIE & FREEMAN, 1980
LAKE KARIBA	ZIMBABWE	M	M	M	M	M	M	3	5	3	5	MACHENA & KAUTSKY, 1988
LK MAARSSEVEEN 1	NETHERLANDS	M	M	M	M	M	M	1	3	2	12	BEST, 1987
LAKE MENDOTA	DANE CO WI	8.7	M	M	M	285	M	1	1	4	14	RICKETT, 1921
LAKE MICCOSUKEE	FLORIDA	M	M	M	M	M	M	2	1	6	3	TARVER, 1980
LAKE MIKOLAJSKIE	N. POLAND	M	M	M	M	M	M	1	3	4	14	OZIMEK & KOWALCZEWSKI, 1984
LAKE MIZE	FLORIDA	M	M	M	M	M	M	2	1	3	3	BROWN, 1987
LAKE MOONDARRA	AUSTRALIA	M	M	M	M	M	M	3	6	6	9	FINAYSON, ET AL. 1980
LAKE NGAKAPUA	NEW ZEALAND	M	M	M	M	M	M	2	6	4	2	TANNER, ET AL., 1986
LAKE NGAKEKETA	NEW ZEALAND	M	M	M	M	M	M	2	6	4	5	TANNER, ET AL., 1986
LAKE NGATU	NEW ZEALAND	7.8	11	M	M	M	4.0	2	6	3	8	TANNER, ET AL., 1986; LIVINGSTON ET AL. 1986
LAKE NIPIGON	ONTARIO	7.4	68.4	M	M	110	4.5	1	1	2	5	DALE & GARTON, 1984
LK OF TWO RIVERS	ONTARIO	6.3	M	M	M	33	M	1	1	2	8	CROWDER, ET AL. 1977
LAKE OMAPERE	NEW ZEALAND	M	M	M	M	M	0.9	2	6	4	5	TANNER, ET AL., 1986
LAKE OPINICON	ONTARIO	8.1	86	M	2	185	2.9	1	1	3	27	CROWDER, ET AL., 1977
LAKE OSBY	SWEDEN	M	M	M	M	M	M	1	3	7	3	FORSBERG, 1960
LAKE OTOTOA	NEW ZEALAND	7.3	50	M	M	M	7.1	2	6	2	4	TANNER, ET AL., 1986; GREEN 1975
LAKE OWHAREITI	NEW ZEALAND	M	M	M	M	M	1.8	2	6	4	2	TANNER, ET AL., 1986; LIVINGSTON, ET AL. 1986
LAKE PUPUKE	NEW ZEALAND	8.2	M	M	M	M	3.3	2	6	4	7	COFFEY & CLAYTON, 1987
LAKE ROTOITI	NEW ZEALAND	7.5	M	M	M	M	5.0	2	6	3	20	COFFEY & CLAYTON, 1987
LAKE ROTOKAWAU 1	NEW ZEALAND	M	M	M	M	M	M	2	6	3	3	TANNER, ET AL., 1986
LAKE ROTOKAWAU 2	NEW ZEALAND	M	M	M	M	M	M	2	6	2	7	TANNER, ET AL., 1986
LAKE ROTOMA	NEW ZEALAND	7.5	M	M	M	M	11.0	2	6	2	10	CLAYTON, ET AT. 1981
LAKE ROTOROA	NEW ZEALAND	6.3	16	M	M	M	M	1	6	3	6	TANNER, ET AL., 1986
LAKE ROTOTUNA	NEW ZEALAND	M	M	M	M	M	M	2	6	4	6	TANNER, ET AL., 1986
LAKE SCHOH	N. GERMANY	M	M	M	M	M	M	1	3	6	11	ESTEVES, 1979
LAKE SHAG	NEW ZEALAND	M	M	M	M	M	M	2	6	4	6	TANNER, ET AL., 1986
LAKE SHINJI	JAPAN	M	M	M	M	M	M	2	4	6	8	KUNII, 1986
LAKE SIBAYA	SOUTH AFRICA	M	M	M	M	M	M	3	5	6	6	HOWARD-WILLIAMS, 1979

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
LAKE SIMCOE	ONTARIO	M	M	M	M	M	M	1	1	3	10	NEIL & KAMAITIS, 1985
LAKE STECHLIN	W. GERMANY	M	M	M	M	M	M	1	3	2	7	CASPER, ET AL., 1985
LAKE ST. FRANCIS	ONTARIO	M	M	M	M	M	3.5	1	1	3	8	OWEN & WILE, 1975
LAKE SUOMUNJARVI	E. FINLAND	M	17.3	M	M	M	M	1	3	2	8	TOIVONEN & LAPPALAINEN, 1980
LAKE SUPERIOR	NEW YORK	M	M	M	M	M	0.5	1	1	4	11	FOREST, 1977
LAKE SWAN	NEW ZEALAND	6.2	M	M	M	M	M	2	6	4	7	TANNER, ET AL., 1986
LAKE TAHAROA	NEW ZEALAND	6.5	2	M	M	174	M	2	6	2	1	TANNER, ET AL., 1986; CASSIE & FREEMAN, 1980
LAKE TAHOE	CALIFORNIA	M	M	M	M	M	M	1	1	2	6	LOEB & HACKLEY, 1988
LAKE TEMAGAMI	ONTARIO	M	M	M	M	M	M	1	1	6	36	DALE, 1986
LAKE UNURSEE	AUSTRIA	M	M	M	M	M	M	1	3	6	4	UNNI, 1977
LAKE VANA JAVESI	S. FINLAND	M	M	M	M	M	M	1	3	4	5	UOTILA, 1971
LAKE VECHTEN	NETHERLANDS	M	M	M	M	M	M	1	3	4	2	BEST, 1982
LAKE WAHAKARI	NEW ZEALAND	M	M	M	M	M	6.3	2	6	3	6	TANNER, ET AL., 1986; LIVINGSTON, ET AL 1986
LAKE WAIHOPO	NEW ZEALAND	M	M	M	M	M	M	2	6	4	2	TANNER, ET AL., 1986
LAKE WAIKAREMOANA	NEW ZEALAND	M	M	M	M	M	11.0	1	6	2	4	HOWARD-WILLIAMS, ET AL., 1986
LAKE WAIKERE	NEW ZEALAND	6.4	5.5	M	M	172	M	2	6	2	2	TANNER, ET AL., 1986; CASSIE & FREEMAN, 1980
LAKE WAINGATA	NEW ZEALAND	M	M	M	M	M	M	2	6	3	7	TANNER, ET AL., 1986; CASSIE & FREEMAN, 1980; LIVINGSTON, ET AL. 1986
LAKE WAIPARERA	NEW ZEALAND	7.4	20	M	M	M	M	2	6	3	3	TANNER, ET AL., 1986
LAKE WINGRA	DANE CO. WI	M	M	M	M	M	M	1	1	4	13	NICHOLS & MORI, 1971
LAKE YOJOA	HONDURAS	M	M	M	M	M	M	3	2	6	7	CRUZ & DELGADO, 1986
LANDON BAY	ONTARIO	8.5	M	M	M	265	M	1	1	4	9	CROWDER, ET AL. 1977
LAST MOUNTAIN LK	SASKATCHEWAN	M	M	M	2.6	M	M	1	1	2	5	JONES & CULLIMORE, 1973
LAWRENCE CREEK	WISCONSIN	8.0	158.9	M	0.1	305	M	1	1	7	4	MADSEN AND ADAMS, 1985
LENORE LAKE	SASKATCHEWAN	8.7	M	M	M	5	M	1	1	5	1	HAMMER & HESELTINE, 1988
LIME LAKE	ONTARIO	7.5	M	M	M	312	M	1	1	4	6	CROWDER, ET AL. 1977
LITTLE JOHN LAKE	VILAS CO. WI	8.4	M	M	M	71	M	1	1	2	10	WILSON, 1935
LITTLE QUILL LAKE	SASKATCHEWAN	8.7	M	M	M	8	M	1	1	5	1	HAMMER & HESELTINE, 1988
LITTLE SODUS BAY	CAYUGA, NY	M	M	M	M	M	2.0	1	1	4	11	MILLER, G.L., 1978
LITTLE SUGAR R	WISCONSIN	M	M	M	M	M	M	1	1	7	3	MADSEN, ET AL. 1989
LOCH BORRALIE	BRITAIN	8.5	2.28	M	50	363	M	1	3	4	9	SPENCE, ET AL., 1983
LOCH LEVEN	EDINBURGH	8.3	1	M	0.05	M	M	1	3	4	9	JUPP & SPENCE, 1977
LONG	COOS CO. NH	6.1	M	96	6	28	M	1	1	2	6	BOYLEN, ET AL. 1985
LONG LK OUTLET CK	FLORENCE CO.	M	M	M	M	M	M	1	1	7	12	SMITH, 1978
LOON	GRAFTON CO NH	5.2	M	-22	4	21	M	1	1	1	6	BOYLEN, ET AL. 1985
LOON LAKE	WARREN CO. NY	6.9	13.4	M	M	72	M	1	1	2	22	TAGGETT, 1989
LOUGHBOROUGH LAKE	ONTARIO	8.5	M	M	M	240	M	1	1	4	12	CROWDER, ET AL. 1977
LOWER WELLAND R	ONTARIO	7.8	M	M	0.143	321	M	1	1	7	5	DICKMAN, ET.AL. 1980
LYON LAKE	HERKIMER C NY	4.4	-37	M	M	M	M	1	1	1	8	ROBERTS, 1983
MANITO LAKE	SASKATCHEWAN	9.3	M	M	M	24	M	1	1	5	1	HAMMER & HESELTINE, 1988
MANZOJI	JAPAN	M	M	M	M	M	M	1	4	7	7	KUNII, 1986
MATSUNOKI-NAIKO	JAPAN	M	M	M	M	M	M	2	4	6	4	KUNII, ET AL., 1985
MAZINAW LAKE	ONTARIO	6.9	M	M	M	57	M	1	1	2	10	CROWDER, ET AL. 1977
MIDDLE LAKE	SASKATCHEWAN	8.9	M	M	M	22	M	1	1	5	2	HAMMER & HESELTINE, 1988
MIJIN POND	ONTARIO	M	25	M	M	230	M	1	1	4	5	FRASER & MORTON, 1983
MILWAUKEE RIVER		M	M	M	M	M	M	1	1	7	10	MACE, ET. AL, 1984
MINK RIVER	WISCONSIN	M	M	M	M	M	M	1	1	7	6	KEOUGH, 1986

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
MIQUELON LAKE	ALBERTA	9.5	M	M	M	6900	M	1	1	5	2	HUSBAND & HICKMAN, 1985
MISSION LAKE	SASKATCHEWAN	M	M	M	6.5	M	M	1	1	2	5	JONES & CULLIMORE, 1973
MOM	ONTARIO	M	12	M	M	65	M	1	1	2	4	FRASER & MORTON, 1983
MOODY	CARROLL CO NH	6.0	M	22	5	16	M	1	1	2	11	BOYLEN, ET AL. 1985
MOOSE	ONTARIO	M	21	M	M	315	M	1	1	4	9	FRASER & MORTON, 1983
MOUNT VERNON CR	WISCONSIN	M	M	M	M	M	M	1	1	7	4	MADSEN, ET AL. 1989
MUD LAKE	ONTARIO	8.4	M	M	M	260	M	1	1	4	6	CROWDER, ET AL. 1977
MUD POND	MAINE	4.5	-45	M	M	33	5.6	1	1	2	6	HUNTER, ET AL., 1986
MUKWONAGO RIVER		M	M	M	M	M	M	1	1	7	8	MACE, ET. AL, 1984
MUNN	COOS CO. NH	6.4	M	50	4	23	M	1	1	2	4	BOYLEN, ET AL. 1985
MURPHY FLOWAGE	WISCONSIN	M	M	M	M	M	M	1	1	7	15	BEARD, 1973
MUSKELLUNGE LAKE	VILAS CO. WI	8.2	M	M	M	53	M	1	1	2	22	WILSON, 1935
NAINI TAL	HIMALAYA	7.5	183	M	30	M	1.2	1	4	4	5	PUROHIT & SINGH, 1985
NAPANEE RIVER	ONTARIO	7.1	M	M	M	124	M	1	1	3	18	CROWDER, ET AL. 1977
NAUKUCHIYA TAL	HIMALAYA	8.2	88	M	10	M	3.1	1	4	3	3	PUROHIT & SINGH, 1985
NEUSIEDLERSEE	CENT. EUROPE	M	M	M	M	M	M	1	3	6	4	SCHIEMER, 1979
NEW FOREST ST	BRITIAN	M	M	M	M	M	M	1	3	7	7	BUTCHER, 1933
NEW RIVER	GILES CO. VA	7.7	44	M	0.1	130	M	1	1	7	5	RODGERS, ET.AL. 1983
NODA-NUMA	HIKONE, JAPAN	M	M	M	M	M	M	2	4	6	4	KUNII, ET AL., 1985
NORTH TUGBOAT	ONTARIO	M	53	M	M	130	M	1	1	3	13	FRASER & MORTON, 1983
NOTOGAWA	JAPAN	M	M	M	M	M	M	2	4	6	4	KUNII, ET AL., 1985
NO-IKE	JAPAN	M	M	M	M	M	M	2	4	6	2	KUNII, ET AL., 1985
OJAGA-IKE POND	CHIBA, JAPAN	8.4	M	M	M	M	2.7	2	4	3	7	KUNII & MAEDA, 1982
OLD WIVES LAKE	SASKATCHEWAN	9.5	M	M	M	13	M	1	1	5	2	HAMMER & HESELTINE, 1988
OREGON BRANCH	WISCONSIN	M	M	M	M	M	M	1	1	7	0	MADSEN, ET AL. 1989
OTOMEGA-IKE	JAPAN	M	M	M	M	M	M	2	4	6	0	KUNII, ET AL., 1985
OTTER LAKE	CAYUGA, NY	M	M	M	M	M	1.0	1	1	4	7	MILLER, 1978
OWASCO LAKE	CAYUGA, NY	M	M	M	M	M	4.0	1	1	2	15	MILLER, 1978
OXBOW LAKE NO. 1	ALBERTA	M	M	M	M	M	M	1	1	6	2	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 11	ALBERTA	M	M	M	M	M	M	1	1	6	3	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 12	ALBERTA	M	M	M	M	M	M	1	1	6	4	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 2	ALBERTA	M	M	M	M	M	M	1	1	6	2	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 3	ALBERTA	M	M	M	M	M	M	1	1	6	4	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 4	ALBERTA	M	M	M	M	M	M	1	1	6	2	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 5	ALBERTA	M	M	M	M	M	M	1	1	6	4	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 6	ALBERTA	M	M	M	M	M	M	1	1	6	5	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 7	ALBERTA	M	M	M	M	M	M	1	1	6	3	VAN DER VALK & BLISS, 1971
OXBOW LAKE NO. 8	ALBERTA	M	M	M	M	M	M	1	1	6	2	VAN DER VALK & BLISS, 1971
O-IKE	KUSATSU JAPAN	M	M	M	M	M	M	2	4	6	1	KUNII, ET AL., 1985
PARADOX LAKE	ESSEX CO. NY	7.6	17.7	M	M	69	M	1	1	2	13	TAGGETT, 1989
PARKER LAKE	CAYUGA, NY	M	M	M	M	M	0.5	1	1	4	1	MILLER, 1978
PASQUA LAKE	SASKATCHEWAN	M	M	M	6.3	M	M	1	1	2	2	JONES & CULLIMORE, 1973
PEARL CULTURE PD	JAPAN	M	M	M	M	M	M	2	4	6	2	KUNII, ET AL., 1985
PEARL CULTURE PD	SHINA, JAPAN	M	M	M	M	M	M	2	4	6	1	KUNII, ET AL., 1985
PEARL CULTURE PD	JAPAN	M	M	M	M	M	M	2	4	6	4	KUNII, ET AL., 1985
PEWAUKEE RIVER		M	M	M	M	M	M	1	1	7	4	MACE, ET. AL, 1984
PHILLIPS	COOS CO. NH	6.9	M	90	11	26	M	1	1	2	7	BOYLEN, ET AL. 1985

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
PIGEON LAKE	ALBERTA	8.5	147.5	M	7	330	M	1	1	5	19	HUSBAND & HICKMAN, 1985
PINE RIVER	FLORENCE CO.	M	M	M	M	M	M	1	1	7	15	SMITH, 1978
POND ENGI-IKE	JAPAN	6.4	7	M	M	78	1.0	2	4	6	6	KUNII, 1987
PONGOLO RIVER	NATAL, S. AFR	M	M	M	M	M	M	3	5	7	4	MUSIL, ET. AL. 1973
POPPLE RIVER	FLORENCE CO.	M	M	M	M	M	M	1	1	7	8	SMITH, 1978
PORTAGE CREEK	KALAMAZOO MI	M	150	M	M	392	M	1	1	7	4	KULLBERG, 1973
PORTER LAKE	SASKATCHEWAN	9.0	M	M	M	24	M	1	1	5	1	HAMMER & HESELTINE, 1988
P# 1	JAPAN	6.8	26	M	0.5	75	0.8	2	4	4	1	KUNII, UNPUBL.
P# 10	JAPAN	7.5	22	M	0.5	91	1.2	2	4	4	0	KUNII, UNPUBL.
P# 11	JAPAN	7.2	10	M	0.5	110	3.0	2	4	3	5	KUNII, UNPUBL.
P# 12	JAPAN	6.4	10	M	0.5	61	0.8	2	4	4	2	KUNII, UNPUBL.
P# 13	JAPAN	7.0	17.5	M	0.5	69	1.0	2	4	4	3	KUNII, UNPUBL.
P# 14	JAPAN	5.6	2.5	M	0.5	52	1.7	2	4	4	1	KUNII, UNPUBL.
P# 15	JAPAN	6.7	2	M	0.5	68	0.7	2	4	4	4	KUNII, UNPUBL.
P# 16	JAPAN	7.1	34.5	M	0.5	136	0.9	2	4	4	0	KUNII, UNPUBL.
P# 17	JAPAN	6.9	22	M	0.5	195	1.0	2	4	4	0	KUNII, UNPUBL.
P# 18	JAPAN	6.8	34.5	M	0.5	123	1.9	2	4	4	0	KUNII, UNPUBL.
P# 19	JAPAN	6.9	22.5	M	0.5	93	0.7	2	4	4	0	KUNII, UNPUBL.
P# 2	JAPAN	6.6	9	M	0.5	42	0.4	2	4	4	0	KUNII, UNPUBL.
P# 20	JAPAN	6.6	35	M	0.5	117	0.9	2	4	4	2	KUNII, UNPUBL.
P# 21	JAPAN	6.5	39	M	0.5	132	1.0	2	4	4	6	KUNII, UNPUBL.
P# 22	JAPAN	6.4	7	M	0.5	78	1.0	2	4	4	6	KUNII, UNPUBL.
P# 23	JAPAN	6.4	10	M	0.5	73	1.0	2	4	4	5	KUNII, UNPUBL.
P# 24	JAPAN	6.3	21.5	M	0.5	106	0.6	2	4	4	3	KUNII, UNPUBL.
P# 25	JAPAN	6.2	9	M	0.5	78	1.8	2	4	4	1	KUNII, UNPUBL.
P# 26	JAPAN	8.0	4.5	M	0.5	153	0.7	2	4	4	1	KUNII, UNPUBL.
P# 27	JAPAN	6.1	40.5	M	0.5	58	1.4	2	4	4	4	KUNII, UNPUBL.
P# 28	JAPAN	6.8	6.5	M	0.5	60	0.9	2	4	4	3	KUNII, UNPUBL.
P# 29	JAPAN	6.7	31.5	M	0.5	97	1.2	2	4	4	1	KUNII, UNPUBL.
P# 3	JAPAN	6.5	21	M	0.5	67	0.9	2	4	4	1	KUNII, UNPUBL.
P# 30	JAPAN	7.5	43	M	0.5	127	0.4	2	4	4	0	KUNII, UNPUBL.
P# 31	JAPAN	7.1	43	M	0.5	108	1.9	2	4	4	1	KUNII, UNPUBL.
P# 32	JAPAN	6.6	32.5	M	0.5	102	1.2	2	4	4	4	KUNII, UNPUBL.
P# 33	JAPAN	6.4	22	M	0.5	66	0.4	2	4	4	1	KUNII, UNPUBL.
P# 34	JAPAN	6.9	11	M	0.5	56	2.5	2	4	3	4	KUNII, UNPUBL.
P# 35	JAPAN	9.1	20.5	M	0.5	71	0.3	2	4	4	1	KUNII, UNPUBL.
P# 36	JAPAN	5.7	2	M	0.5	15	0.5	2	4	4	1	KUNII, UNPUBL.
P# 37	JAPAN	6.9	12	M	0.5	64	1.0	2	4	4	2	KUNII, UNPUBL.
P# 38	JAPAN	5.2	3	M	0.5	57	0.3	2	4	4	2	KUNII, UNPUBL.
P# 39	JAPAN	4.5	0	M	0.5	112	1.7	2	4	4	3	KUNII, UNPUBL.
P# 4	JAPAN	6.9	18	M	0.5	57	1.2	2	4	4	3	KUNII, UNPUBL.
P# 40	JAPAN	5.5	2.5	M	0.5	44	1.0	2	4	4	3	KUNII, UNPUBL.
P# 41	JAPAN	6.4	27	M	0.5	85	0.6	2	4	4	1	KUNII, UNPUBL.
P# 42	JAPAN	6.6	12	M	0.5	113	0.7	2	4	4	4	KUNII, UNPUBL.
P# 43	JAPAN	6.3	12	M	0.5	80	0.6	2	4	4	0	KUNII, UNPUBL.
P# 44	JAPAN	6.5	17.5	M	0.5	69	0.9	2	4	4	0	KUNII, UNPUBL.
P# 45	JAPAN	6.8	15.5	M	0.5	77	2.4	2	4	4	4	KUNII, UNPUBL.

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

	LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L		TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
P#	46	JAPAN	6.9	2		M	12	111	1.7	2	4	4	5	KUNII, UNPUBL.
P#	47	JAPAN	6.9	19		M	6	170	1.1	2	4	4	4	KUNII, UNPUBL.
P#	48	JAPAN	6.4	5		M	13	79	1.3	2	4	4	1	KUNII, UNPUBL.
P#	49	JAPAN	6.5	7		M	11.5	67	1.3	2	4	4	1	KUNII, UNPUBL.
P#	5	JAPAN	6.6	8.5		M	0.5	48	1.0	2	4	4	3	KUNII, UNPUBL.
P#	50	JAPAN	6.2	7		M	11.5	95	1.3	2	4	4	2	KUNII, UNPUBL.
P#	51	JAPAN	6.5	17		M	15.5	253	2.1	2	4	4	4	KUNII, UNPUBL.
P#	52	JAPAN	6.8	10.5		M	10	275	0.9	2	4	4	3	KUNII, UNPUBL.
P#	53	JAPAN	6.5	12		M	8	116	2.2	2	4	4	6	KUNII, UNPUBL.
P#	54	JAPAN	6.8	23		M	18.5	200	1.2	2	4	4	2	KUNII, UNPUBL.
P#	55	JAPAN	6.3	2		M	9	113	1.1	2	4	4	2	KUNII, UNPUBL.
P#	56	JAPAN	6.8	17.5		M	17.5	199	M	2	4	M	3	KUNII, UNPUBL.
P#	57	JAPAN	6.6	24		M	22.5	133	M	2	4	M	1	KUNII, UNPUBL.
P#	58	JAPAN	7.1	21		M	19.5	91	1.8	2	4	4	4	KUNII, UNPUBL.
P#	59	JAPAN	6.2	-50		M	13.5	64	M	2	4	M	2	KUNII, UNPUBL.
P#	6	JAPAN	6.5	27.5		M	0.5	109	0.2	2	4	4	1	KUNII, UNPUBL.
P#	60	JAPAN	6.0	11.5		M	19.5	77	M	2	4	M	1	KUNII, UNPUBL.
P#	61	JAPAN	6.0	3.5		M	10	37	M	2	4	M	2	KUNII, UNPUBL.
P#	62	JAPAN	6.7	0.15		M	18.5	91	0.6	2	4	4	0	KUNII, UNPUBL.
P#	63	JAPAN	6.4	0.1		M	9.3	93	0.7	2	4	4	2	KUNII, UNPUBL.
P#	64	JAPAN	6.9	0		M	12.8	158	2.2	2	4	4	1	KUNII, UNPUBL.
P#	65	JAPAN	6.4	0.05		M	28	138	1.0	2	4	4	0	KUNII, UNPUBL.
P#	66	JAPAN	6.9	0.6		M	17.5	100	M	2	4	M	0	KUNII, UNPUBL.
P#	67	JAPAN	7.2	0		M	11.8	92	1.2	2	4	4	4	KUNII, UNPUBL.
P#	68	JAPAN	6.4	0		M	30.5	110	M	2	4	M	0	KUNII, UNPUBL.
P#	69	JAPAN	M	0.15		M	9.3	102	0.6	2	4	4	1	KUNII, UNPUBL.
P#	7	JAPAN	7.0	22		M	0.5	78	1.6	2	4	4	3	KUNII, UNPUBL.
P#	70	JAPAN	7.1	0		M	8	98	1.6	2	4	4	3	KUNII, UNPUBL.
P#	71	JAPAN	6.8	0		M	11.8	95	1.5	2	4	4	2	KUNII, UNPUBL.
P#	72	JAPAN	7.1	0.4		M	24	115	M	2	4	M	0	KUNII, UNPUBL.
P#	73	JAPAN	6.8	0.05		M	17.5	113	1.1	2	4	4	4	KUNII, UNPUBL.
P#	74	JAPAN	6.6	0.1		M	21.8	104	M	2	4	M	0	KUNII, UNPUBL.
P#	75	JAPAN	7.4	0.15		M	30.8	242	0.7	2	4	4	3	KUNII, UNPUBL.
P#	76	JAPAN	6.9	0.15		M	18.5	96	0.6	2	4	4	1	KUNII, UNPUBL.
P#	77	JAPAN	6.6	0.25		M	8	74	1.3	2	4	4	5	KUNII, UNPUBL.
P#	78	JAPAN	6.6	-50		M	0.5	138	2.9	2	4	4	1	KUNII, UNPUBL.
P#	79	JAPAN	6.5	0.25		M	14.5	154	0.4	2	4	4	8	KUNII, UNPUBL.
P#	8	JAPAN	8.0	109.5		M	0.5	329	0.9	2	4	4	2	KUNII, UNPUBL.
P#	80	JAPAN	7.2	0.25		M	18.5	146	1.2	2	4	4	0	KUNII, UNPUBL.
P#	81	JAPAN	7.1	0.1		M	9.5	146	2.0	2	4	4	5	KUNII, UNPUBL.
P#	82	JAPAN	7.1	0.1		M	13.5	155	0.8	2	4	4	0	KUNII, UNPUBL.
P#	83	JAPAN	6.0	0.1		M	9.5	64	1.1	2	4	4	4	KUNII, UNPUBL.
P#	84	JAPAN	6.2	0.1		M	7	69	0.8	2	4	4	1	KUNII, UNPUBL.
P#	85	JAPAN	6.9	0.1		M	14.5	M	M	2	4	M	3	KUNII, UNPUBL.
P#	86	JAPAN	6.4	0.35		M	7	129	1.6	2	4	4	2	KUNII, UNPUBL.
P#	87	JAPAN	6.7	0.3		M	7	126	0.9	2	4	4	2	KUNII, UNPUBL.
P#	88	JAPAN	7.0	0.15		M	22	194	1.4	2	4	4	4	KUNII, UNPUBL.

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L		TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
P# 89	JAPAN	7.5	0	M		17.5	135	1.7	2	4	4	0	KUNII, UNPUBL.
P# 9	JAPAN	6.5	5.5	M		0.5	67	0.7	2	4	4	1	KUNII, UNPUBL.
P# 90	JAPAN	6.3	0	M		16.5	106	M	2	4	M	1	KUNII, UNPUBL.
P# 91	JAPAN	6.5	0.05	M		16.5	90	M	2	4	M	1	KUNII, UNPUBL.
P# 92	JAPAN	6.3	0.15	M		88.5	228	1.0	2	4	4	2	KUNII, UNPUBL.
P# 93	JAPAN	5.9	4	M		4.7	86	2.1	2	4	4	1	KUNII, UNPUBL.
P# 94	JAPAN	6.9	0.15	M		6.6	119	M	2	4	4	5	KUNII, UNPUBL.
P# 95	JAPAN	7.1	0.15	M		8.5	245	1.1	2	4	4	3	KUNII, UNPUBL.
P# 96	JAPAN	6.5	0.4	M		16.1	107	1.3	2	4	4	1	KUNII, UNPUBL.
P# 97	JAPAN	6.4	0	M		2.8	180	2.3	2	4	4	6	KUNII, UNPUBL.
P# 98	JAPAN	7.3	0.1	M		6.6	146	0.7	2	4	4	5	KUNII, UNPUBL.
P# 99	JAPAN	6.9	0	M		14.2	117	1.1	2	4	4	4	KUNII, UNPUBL.
P# 100	JAPAN	8.2	0.15	M		19.9	129	1.1	2	4	4	4	KUNII, UNPUBL.
P# 101	JAPAN	6.6	0.1	M		10.4	141	M	2	4	M	1	KUNII, UNPUBL.
P# 102	JAPAN	7.0	0.25	M		14.2	92	2.1	2	4	4	4	KUNII, UNPUBL.
P# 103	JAPAN	6.5	0	M		10.4	46	0.7	2	4	4	3	KUNII, UNPUBL.
P# 104	JAPAN	6.4	0.15	M		10.4	43	M	2	4	M	3	KUNII, UNPUBL.
P# 105	JAPAN	7.2	0.25	M		25.7	63	M	2	4	M	4	KUNII, UNPUBL.
P# 106	JAPAN	6.6	0	M		37.1	132	M	2	4	M	3	KUNII, UNPUBL.
P# 107	JAPAN	7.6	0.1	M		10.4	140	M	2	4	M	4	KUNII, UNPUBL.
P# 108	JAPAN	6.7	0.25	M		6.6	70	M	2	4	M	3	KUNII, UNPUBL.
P# 109	JAPAN	6.9	0.1	M		10.4	39	M	2	4	M	3	KUNII, UNPUBL.
P# 110	JAPAN	6.3	0	M		20	110	1.2	2	4	4	3	KUNII, UNPUBL.
P# 111	JAPAN	7.4	0	M		6.6	149	1.3	2	4	4	2	KUNII, UNPUBL.
P# 112	JAPAN	5.6	M	M		12.3	113	2.1	2	4	4	1	KUNII, UNPUBL.
P# 113	JAPAN	5.8	0.25	M		10.4	26	M	2	4	M	2	KUNII, UNPUBL.
P# 114	JAPAN	7.2	0	M		23.8	134	M	2	4	M	2	KUNII, UNPUBL.
P# 115	JAPAN	6.4	0.15	M		23.8	67	M	2	4	M	0	KUNII, UNPUBL.
P# 116	JAPAN	6.8	23.5	M		14.2	102	M	2	4	M	1	KUNII, UNPUBL.
P# 117	JAPAN	6.6	0	M		10.4	78	M	2	4	M	1	KUNII, UNPUBL.
P# 118	JAPAN	6.0	0.1	M		4.7	87	M	2	4	M	2	KUNII, UNPUBL.
P# 119	JAPAN	6.2	0.35	M		12.3	110	1.4	2	4	4	2	KUNII, UNPUBL.
P# 120	JAPAN	7.4	0.1	M		227	117	1.2	2	4	4	6	KUNII, UNPUBL.
P# 121	JAPAN	5.9	2.5	M		19.9	140	M	2	4	M	1	KUNII, UNPUBL.
P# 122	JAPAN	6.7	0.25	M		19.9	119	1.3	2	4	4	0	KUNII, UNPUBL.
P# 123	JAPAN	6.8	0.1	M		37.1	120	1.1	2	4	4	5	KUNII, UNPUBL.
P# 124	JAPAN	6.7	0.1	M		18	162	1.4	2	4	4	4	KUNII, UNPUBL.
P# 125	JAPAN	6.8	0.1	M		14.2	119	1.2	2	4	4	6	KUNII, UNPUBL.
P# 126	JAPAN	7.4	0.1	M		10.4	135	0.9	2	4	4	1	KUNII, UNPUBL.
P# 127	JAPAN	6.4	0.6	M		10.4	100	1.1	2	4	4	4	KUNII, UNPUBL.
P# 128	JAPAN	7.2	0	M		14.2	124	1.7	2	4	4	2	KUNII, UNPUBL.
P# 129	JAPAN	6.7	25.5	M		6.6	164	M	2	4	M	3	KUNII, UNPUBL.
P# 130	JAPAN	5.4	2	M		14.2	132	M	2	4	M	1	KUNII, UNPUBL.
P# 131	JAPAN	6.8	0.1	M		18	169	1.4	2	4	4	5	KUNII, UNPUBL.
P# 132	JAPAN	6.5	0.15	M		8.5	136	M	2	4	M	1	KUNII, UNPUBL.
P# 133	JAPAN	6.0	0.5	M		8.5	139	M	2	4	M	3	KUNII, UNPUBL.
P# 134	JAPAN	6.0	0.35	M		16.1	113	M	2	4	M	2	KUNII, UNPUBL.

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
P# 135	JAPAN	6.0	0	M	56.1	116	0.7	2	4	4	0	KUNII, UNPUBL.
P# 136	JAPAN	6.4	M	M	10.4	117	0.4	2	4	4	5	KUNII, UNPUBL.
P# 137	JAPAN	6.0	0.5	M	14.2	85	1.2	2	4	4	5	KUNII, UNPUBL.
P# 138	JAPAN	6.0	0	M	6.6	91	M	2	4	M	2	KUNII, UNPUBL.
P# 139	JAPAN	5.5	0.15	M	6.6	108	M	2	4	M	1	KUNII, UNPUBL.
P# 140	JAPAN	6.9	0.35	M	31.4	M	M	2	4	M	3	KUNII, UNPUBL.
P# 141	JAPAN	7.1	0.1	M	35.2	222	1.2	2	4	4	3	KUNII, UNPUBL.
P# 142	JAPAN	6.7	0.15	M	16.1	104	0.7	2	4	4	1	KUNII, UNPUBL.
P# 143	JAPAN	6.6	0.15	M	10.4	74	M	2	4	M	2	KUNII, UNPUBL.
P# 144	JAPAN	6.4	0.25	M	240.8	60	M	2	4	M	1	KUNII, UNPUBL.
P# 145	JAPAN	6.2	0.25	M	35.2	118	1.9	2	4	4	7	KUNII, UNPUBL.
P# 146	JAPAN	6.4	6	M	4.7	120	2.1	2	4	4	3	KUNII, UNPUBL.
P# 147	JAPAN	6.0	0.85	M	35.2	94	0.6	2	4	4	2	KUNII, UNPUBL.
P# 148	JAPAN	8.1	0.35	M	35.2	104	1.8	2	4	4	4	KUNII, UNPUBL.
P# 149	JAPAN	6.2	78.3	M	40.9	78	0.8	2	4	4	5	KUNII, UNPUBL.
QUINTE-ADOLPHUS	ONTARIO	8.2	M	M	M	294	M	1	1	4	10	CROWDER, ET AL. 1977
QUINTE-HAY BAY	ONTARIO	8.2	M	M	M	246	M	1	1	4	7	CROWDER, ET AL. 1977
QUINTE-PICTON	ONTARIO	8.2	M	M	M	271	M	1	1	4	9	CROWDER, ET AL. 1977
QUINTE-TRENTON	ONTARIO	8.2	M	M	M	230	M	1	1	4	11	CROWDER, ET AL. 1977
RABBIT BLANKET	ONTARIO	M	22	M	M	80	M	1	1	2	12	FRASER & MORTON, 1983
RAINY LAKE	MUSKOKA ONT	6.3	2.5	M	M	35	6.7	1	1	2	22	MILLER & DALE, 1979
RAMGARH LK	INDIA	M	M	M	M	M	M	3	4	4	5	SAHAI & SINHA, 1976
RED CHALK LAKE	ONTARIO	6.6	95	50	5	34	5.1	1	1	2	11	WILE, ET AL., 1979
REDBERRY LAKE	SASKATCHEWAN	8.7	M	M	M	16	M	1	1	5	2	HAMMER & HESELTINE, 1988
RHODE RIVER	ANNAPOLIS, MD	M	M	M	M	M	M	1	1	7	6	SOUTHWICK AND PINE, 1975
RICE LAKE	ONTARIO	M	M	M	M	M	M	1	1	6	9	WILE, 1974
RIVER DOVE	DERBYSHIRE UK	M	M	M	M	M	M	1	3	7	5	BUTCHER, 1933
RIVER ITCHEN	HAMPSHIRE, UK	7.5	M	M	M	M	M	1	3	7	10	BUTCHER, 1933
RIVER KHAN	INDORE, INDIA	M	M	M	M	M	M	3	4	7	6	RAO, & MALL, 1981
RIVER LARK	SUFFOLK, UK	7.5	M	M	M	M	M	1	3	7	11	BUTCHER, 1933
RIVER LEVEN	LANCASHIRE UK	7.2	M	M	M	M	M	1	3	7	4	BUTCHER, 1933
RIVER MOLE	LANCASHIRE UK	M	M	M	M	M	M	1	3	7	3	BUTCHER, 1933
RIVER TEES	BRITIAN	M	M	M	M	M	M	1	3	7	9	BUTCHER, 1933
RIVER TERN	SHROPSHIRE UK	8.0	M	M	M	M	M	1	3	7	7	BUTCHER, 1933
RIVER TEURONJOKI	S. FINLAND	M	M	M	M	M	M	1	3	7	9	SIRJOLA, 1969
RIVER WHARFE	YORKSHIRE, UK	M	M	M	M	M	M	1	3	7	5	BUTCHER, 1933
ROCKY	GRAFTON CO NH	5.6	M	23	8	18	M	1	1	2	6	BOYLEN, ET AL. 1985
RONDEN	JAPAN	M	M	M	M	M	M	1	4	7	11	KUNII, 1986
ROUND	COOS CO. NH	6.6	M	239	4	41	M	1	1	2	13	BOYLEN, ET AL. 1985
RUSSELL	GRAFTON CO NH	5.9	M	18	3	21	M	1	1	2	9	BOYLEN, ET AL. 1985
RUSTLE	ONTARIO	M	7	M	M	33	M	1	1	2	8	FRASER & MORTON, 1983
RUTLAND BRANCH	WISCONSIN	M	M	M	M	M	M	1	1	7	4	MADSEN, ET AL. 1989
SALMON POND	MAINE	6.3	44	M	M	22	5.3	1	1	2	11	HUNTER, ET AL., 1986
SAND LAKE	ONTARIO	8.3	M	M	M	165	M	1	1	3	21	CROWDER, ET AL. 1977
SANNOH	JAPAN	M	M	M	M	M	M	1	4	7	11	KUNII, 1986
SCHROON LAKE	WARREN CO. NY	7.4	12.4	M	M	61	M	1	1	2	18	TAGGETT, 1989
SCUPPERNONG RIVER		M	M	M	M	M	M	1	1	7	5	MACE, ET. AL, 1984

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
SEAGRAM LAKE	SASKATCHEWAN	9.5	M	M	M	29	M	1	1	5	2	HAMMER & HESELTINE, 1988
SESSIONS	COOS CO. NH	6.1	M	70	6	24	M	1	1	2	2	BOYLEN, ET AL. 1985
SHALLOW POND	HERKIMER CO.	4.4	-38	M	M	M	M	1	1	1	8	ROBERTS, 1983
SHINDATE	JAPAN	M	M	M	M	M	M	1	4	7	4	KUNII, 1986
SICKLE	ONTARIO	M	8	M	M	41	M	1	1	2	10	FRASER & MORTON, 1983
SILVER LAKE	HERKIMER CO.	4.8	8.5	M	M	27	M	1	1	1	7	ROBERTS, 1983
SILVER LAKE	VILAS CO. WI	7.8	M	M	M	59	M	1	1	2	12	WILSON, 1935
SIMCOE IS. CHL	ONTARIO	8.5	M	M	M	312	M	1	1	4	10	CROWDER, ET AL. 1977
SKANEATELES LAKE	CAYUGA, NY	M	M	M	M	M	7.0	1	1	2	14	MILLER, 1978
SKELETON LAKE	MUSKOKA ONT	6.3	5	M	M	35	6.7	1	1	2	13	MILLER & DALE, 1979
SNOWDONIA LAKES	N. WALES	M	M	M	M	M	M	1	3	6	16	WADE, 1983
SONE-NUMA	HIKONE, JAPAN	M	M	M	M	M	M	2	4	6	5	KUNII, ET AL., 1985
SOUTH POND	HAMILTON CO.	5.1	-3	M	M	M	M	1	1	1	6	ROBERTS, 1983
SOUTH TUGBOAT	ONTARIO	M	48	M	M	100	M	1	1	2	9	FRASER & MORTON, 1983
SPRING CREEK	WISCONSIN	M	M	M	M	M	M	1	1	7	2	MADSEN, ET AL. 1989
STONY POND	LEWIS CO. NY	6.0	17	M	M	M	M	1	1	2	11	ROBERTS, 1983
ST. CLAIR RIVER	MICHIGAN	M	M	M	M	M	M	1	1	7	15	SCHLOESSER & MANNY, 1986
SWALE		M	M	M	M	M	M	1	3	7	14	HOLMES AND WHITTON, 1977
SWEENEY LAKE	ONEIDA CO. WI	8.2	M	M	M	60	0.6	1	1	4	15	WILSON, 1935
S. CHEMUNG LAKE	ONTARIO	7.6	158	M	0.02	466	2.6	1	1	7	17	WILE, 1970
S.PIGEON LAKE	ONTARIO	M	M	M	M	M	M	1	1	6	13	WILE, 1974
TAKASE	JAPAN	M	M	M	M	M	M	1	4	7	9	KUNII, 1986
TEAPOT LAKE	ONTARIO	7.2	34.2	M	M	39	4.5	1	1	2	8	DALE & GARTON, 1984
TEES		M	M	M	M	M	M	1	3	7	12	HOLMES AND WHITTON, 1977
TENJIN	JAPAN	M	M	M	M	M	M	1	4	7	6	KUNII, 1986
TER RIVER	N.E. SPAIN	M	M	M	M	M	M	1	3	7	9	PENUELAS & SABATER, 1987
THREE MILE	MUSKOKA ONT	6.3	9	M	M	56	2.1	1	1	2	14	MILLER & DALE, 1979
TONREN-IKE	KUSATSU JAPAN	M	M	M	M	M	M	2	4	6	0	KUNII, ET AL., 1985
TROUT LAKE	VILAS CO. WI	M	M	M	M	M	M	1	1	2	28	WILSON, 1941
TWEED RIVER	NE ENGLAND	M	M	M	M	M	M	1	3	7	16	HOLMES AND WHITTON, 1977
TWITCHEL LAKE	HERKIMER CO.	5.5	0.4	M	M	20	M	1	1	1	3	TAGGETT, 1989
TYNE		M	M	M	M	M	M	1	3	7	11	HOLMES AND WHITTON, 1977
UNKNOWN POND	JAPAN	M	M	M	M	M	M	2	4	6	1	KUNII, ET AL., 1985
UNNAMED LAKE 1	NEW ZEALAND	M	M	M	M	M	M	2	6	4	2	TANNER, ET AL., 1986
UNNAMED LAKE 2	NEW ZEALAND	M	M	M	M	M	M	2	6	4	2	TANNER, ET AL., 1986
UNNAMED LAKE 3	NEW ZEALAND	M	M	M	M	M	M	2	6	4	2	TANNER, ET AL., 1986
UNNAMED POND	MAINE	4.8	M	M	M	18	7.0	1	1	2	3	HUNTER, ET AL., 1986
UPPER HALL	CARROLL CO NH	5.4	M	9	7	19	M	1	1	1	12	BOYLEN, ET AL. 1985
UPPER MISSISSIPPI		M	M	M	M	M	M	1	1	7	12	PECK & SMART, 1986
VARTY LAKE	ONTARIO	7.5	M	M	M	165	M	1	1	3	5	CROWDER, ET AL. 1977
VERMONT CREEK	WISCONSIN	M	M	M	M	M	M	1	1	7	3	MADSEN, ET AL. 1989
WAKAW LAKE	SASKATCHEWAN	8.3	M	M	M	4	M	1	1	5	8	HAMMER & HESELTINE, 1988
WALDSEA LAKE	SASKATCHEWAN	8.5	M	M	M	25	M	1	1	5	2	HAMMER & HESELTINE, 1988
WANAKA	NEW ZEALAND	7.2	M	M	M	M	17.0	1	6	2	19	CLAYTON 1983
WATAUGA RIVER	CARTER CO. TN	7.3	34	M	0.1	95	M	1	1	7	3	RODGERS, ET.AL. 1983
WEAR RIVER		M	M	M	M	M	M	1	1	7	13	HOLMES AND WHITTON, 1977
WEST BLUE LAKE	MANITOBA	M	M	M	M	M	M	1	1	6	5	LOVE & ROBINSON, 1976

SUBMERSED AQUATIC VASCULAR PLANT SPECIES RICHNESS

SPECIES RICHNESS IN WORLDWIDE WATERWAYS

LAKE	LOCATION	pH	ALK mg/L	ANC ueq/L	TP	COND umhos	SECCHI (m)	CLIM	CONT	TROP STAT	# OF SPP.	REFERENCE
WEST LAKE	ONTARIO	8.5	M	M	M	M	M	1	1	4	17	CROWDER, ET AL. 1977
WEST LAKE	HAMILTON CO.	M	M	M	M	M	M	1	1	2	7	MADSEN, UNPUBL.
WHITEWATER LAKE	SUDBURY,ONT	7.8	24	M	M	174	M	1	1	3	20	DALE & MILLER, 1978
WOODS CREEK	FLORENCE CO.	M	M	M	M	M	M	1	1	7	9	SMITH, 1978
WOODS LAKE	HERKIMER CO.	4.9	-19	M	M	M	M	1	1	1	11	ROBERTS, 1983
YUYA	JAPAN	M	M	M	M	M	M	1	4	7	0	KUNII, 1986