

Alan William McIntosh

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Education

1966 B.S. University of Illinois
1968 M.S. University of Illinois (Zoology)
1972 Ph.D. Michigan State University (Fisheries and Wildlife)

Professional Experience

2004 – Present Professor, The Rubenstein School of Environment and Natural Resources, and
Chair, of Environmental Sciences, The University of Vermont

1993-2004 Director, Vermont Water Resources and Lake Studies Center, and Professor, The
Rubenstein School of Environment and Natural Resources, The University of
Vermont

1987-1993 The University of Vermont, Associate Professor of Natural Resources

1977-1989 Rutgers University, Associate Professor of Environmental Science

1973-1977 Assistant Professor, Purdue University

1972-1973 Post-doctorate, Purdue University

Teaching Experience

1973-1977 Purdue University. Two undergraduate and two graduate courses in environmental
health and environmental quality analysis.

1978-1986 Rutgers University. Two graduate courses: Environmental Sciences 519 (Fate and
Effects of Trace Contaminants in Surface Waters) and Environmental Sciences 520
(Techniques in Biological Monitoring).

Teaching Experience (Continued)

1983-present The University of Vermont:

- ENSC 1: Introduction to Environmental Sciences
- ENSC 222: Pollution Ecology
- NR 270: Toxic/Hazardous Substances in Surface Waters

Independently Refereed Publications

- McIntosh, A. and N. Kevern. 1974. Toxicity of copper to zooplankton. *J. Environm. Qual.* 3(2):166-170.
- McIntosh, A. 1974. Notes on the use of copper sulfate in ponds. *Bull. Environm. Contam. Toxicol.* 14(4):425-432.
- Peyton, T., A. McIntosh, V. Anderson and K. Yost. 1976. Aerial input of heavy metals into an aquatic ecosystem. *Water, Air and Soil Pollut.* 5(4):443-451.
- Atchison, G., B. Murphy, W. Bishop, A. McIntosh and R. Mayes. 1977. Trace metal contamination of bluegill (*Lepomis macrochirus*) from two Indiana lakes. *Trans. Amer. Fish. Soc.* 106(6):637-640.
- Mayes, R.A., A. McIntosh and V. Anderson. 1977. Uptake of cadmium and lead by a rooted aquatic macrophyte (*Elodea canadensis*). *Ecology* 58(5):1176-1180.
- Romano, R., A. McIntosh, W. Kessler, V. Anderson and J. Bell. 1977. Trace metal discharges of the Grand Calumet River. *J. Great Lakes Res.* 3(1-2):144-147.
- Wentsel, R., A. McIntosh and G. Atchison. 1977. Sublethal effects of heavy metal contaminated sediment on midge larvae (*Chironomus tentans*). *Hydrobiologia* 56(2):153-156.
- Wentsel, R., A. McIntosh, W. McCafferty, G. Atchison and V. Anderson. 1977. Avoidance response of midge larvae (*Chironomus tentans*) to sediments containing heavy metals. *Hydrobiologia* 55(2):171-175.
- Wentsel, R., A. McIntosh and V. Anderson. 1977. Sediment contamination and benthic macroinvertebrate distribution in a metal-impacted lake. *Environm. Pollut.* 14(3):187-193.
- Johnson, G., A. McIntosh and G. Atchison. 1978. The use of periphyton as a monitor of trace metals in two contaminated Indiana lakes. *Bull. Environm. Contam. Toxicol.* 19:733-740.

Independently Refereed Publications (Continued)

McIntosh, A., B. Shephard, R. Mayes, G. Atchison and D. Nelson. 1978. Some aspects of sediment distribution and macrophyte cycling of heavy metals in a contaminated lake. *J. Environm. Qual.* 7(3):301-305.

Murphy, B., G. Atchison and A. McIntosh. 1978. Cadmium and zinc in muscle of bluegill (*Lepomis macrochirus*) and largemouth bass (*Micropterus salmoides*) from an industrially contaminated lake. *Environm. Pollut.* 17:253-257.

Murphy, B., G. Atchison, D. Kolar and A. McIntosh. 1978. Cadmium and zinc content of fish from an industrially contaminated lake. *J. Fish Biology* 13:327-335.

Sullivan, J., G. Atchison, D. Kolar and A. McIntosh. 1978. Changes in the predator-prey behavior of fathead minnow (*Pimephales promelas*) and largemouth bass (*Micropterus salmoides*) caused by cadmium. *J. Fish. Res. Bd. Can.* 35(4):446-451.

Sullivan, J., B. Murphy, G. Atchison and A. McIntosh. 1978. Time dependent cadmium uptake by fathead minnows (*Pimephales promelas*) during field and laboratory exposure. *Hydrobiologia* 57(2):65-68.

Wentzel, R., A. McIntosh and G. Atchison. 1978. Evidence of resistance to metals in larvae of midge (*Chironomus tentans*) in a metal contaminated lake. *Bull. Environm. Contam. Toxicol.* 20:451-455.

Wentzel, R., A. McIntosh and W. McCafferty. 1978. Emergence of the midge *Chironomus tentans* when exposed to heavy metal-contaminated sediment. *Hydrobiologia* 57(3):195-196.

Michaud, M.T., G. Atchison, A. McIntosh, R.A. Mayes and D.W. Nelson. 1979. Changes in phosphorus concentrations in a eutrophic lake as a result of macrophyte-kill following herbicide application. *Hydrobiologia* 66(2):105-111.

Whipple, W., Jr. and A. McIntosh. 1979. Stream surveillance and monitoring in urbanizing areas. *Water and Sewage Works* 4:72-75.

Nugent, C., G. Atchison, D. Nelson and A. McIntosh. 1980. The effects of heavy metals on microbial biomass in sediments of Palestine Lake. *Hydrobiologia* 70:69-73.

Shephard, B., A. McIntosh, G. Atchison and D. Nelson. 1980. Aspects of the aquatic chemistry of cadmium and zinc in a heavy metal-contaminated lake. *Water Research* 14:1061-1066.

Independently Refereed Publications (Continued)

- Bishop, W.E. and A. McIntosh. 1981. Acute lethality and effects of sublethal cadmium exposure on ventilation frequency and cough rate of bluegill (*Lepomis macrochirus*). Arch. Environm. Contam. Toxicol. 10:519-530.
- Newman, M.C. and A. McIntosh. 1982. The influence of lead in components of a freshwater ecosystem on molluscan tissue lead concentrations. Aquatic Toxicol. 2:1-19.
- Newman, M.C., A. McIntosh and V. Greenhut. 1983. Geochemical factors complicating the use of aufwuchs as a biomonitor for lead levels in two New Jersey reservoirs. Water Research 17(6):625-630.
- Newman, M.C. and A. McIntosh. 1983. Lead elimination and size effects on accumulation by two freshwater gastropods. Arch. Environm. Contam. Toxicol. 12:25-29.
- Newman, M.C. and A. McIntosh. 1983. Slow accumulation of lead from contaminated food sources by the freshwater gastropods, *Physa integra* and *Campeloma decisum*. Arch. Environm. Contam. Toxicol. 12:685-692.
- Faust, S.D. and A. McIntosh. 1983. Buffer capacities of fresh water lakes sensitive to acid deposition. Environm. Sci. and Health A18(1):155-161.
- Garie, H.L. and A. McIntosh. 1986. Distribution of benthic macroinvertebrates in a stream exposed to urban runoff. Water Res. Bull. 22(3):447-455.
- Lewis, T.E. and A. McIntosh. 1986. Uptake of sediment-bound lead and zinc by the freshwater isopod *Asellus communis* at three different pH levels. Arch. Environm. Cont. Toxicol. 15:495-504.
- Sprenger, M.S., A. McIntosh and T. Lewis. 1987. Distribution of selected trace elements in the water and sediments of six acidic lakes. Arch. Environm. Cont. Toxicol. 16:383-390.
- Sprenger, M.D., A.W. McIntosh and S. Hoenig. 1988. Concentrations of trace elements in yellow perch (*Perca flavescens*) from six acidic lakes. Water, Air and Soil Pollut. 37:375-388.
- Nugent, C., G. Atchison, D. Nelson and A. McIntosh. 1980. The effects of heavy metals on microbial biomass in sediments of Palestine Lake. Hydrobiologia 70:69-73.
- Nugent, C., G. Atchison, D. Nelson and A. McIntosh. 1980. The effects of heavy metals on microbial biomass in sediments of Palestine Lake. Hydrobiologia 70:69-73.

Independently Refereed Publications (Continued)

- Lewis, T.E. and A. McIntosh. 1989. The covariation of select trace elements with binding substrates in cores collected from two contaminated sediments. *Bull. Environ. Contam. Toxicol.* 43(4):518-528.
- McIntosh, A. 1991. Trace metals in freshwater sediments. A review of the literature and an assessment of research needs. In Metal Ecotoxicology: Concepts and Applications, M.C. Newman and A. McIntosh, eds. Lewis Publishers, Inc. pp. 243-260.
- Duchovnay, A.D., J. Reid and A. McIntosh. 1992. Occurrence of *Thermocyclops crassus* in Lake Champlain. *J. Great Lakes Res.* 18(3):415-419.
- Douglas, W.S., A. McIntosh and J. Clausen. 1993. Toxicity of sediments containing atrazine and carbofuran to larvae of the midge, *Chironomus tentans*. *Environ. Toxicol. Contam.* 12:847-853.
- Lester, D. and A. McIntosh. 1994. Uptake of PCB congeners by the freshwater shrimp, *Mysis relicta*. *Environ. Toxicol. Chem.* 13(11):1825-1841. (Awarded Best Student Paper of the Year).
- Watzin, M.C., A.W. McIntosh, E.A. Brown, R. Lacey, D.C. Lester, K.L. Newbrough, and A.R. Williams. 1997. Assessing sediment quality in highly heterogeneous environments: a case study of a small urban harbor in Lake Champlain. *Environ. Toxicol. Chem.* 16:2125-2135.
- Lacey, R., M.C. Watzin and A.W. McIntosh. 1999. Sediment organic matter content as a confounding factor in toxicity tests with *Chironomus tentans*. *Environ. Toxicol. Chem.* 18(2):231-236.
- Watzin, M.C. and A.W. McIntosh. 1999. Aquatic ecosystems in agricultural landscapes: A review of ecological indicators and achievable ecological outcomes. *J. Soil and Water Conservation* 54(4):636-644.
- McIntosh, A.W., W.B. Bowden, E. Fitzgerald, A. Hackman, B. Kirk, J. Todd, H. Vladich, A. Voinov, and J. Bartlett. 2006. RAN: Working with neighborhoods to manage stormwater. May/June issue of *Stormwater*.

Invited Papers

- Sprenger, M. and A. McIntosh. 1989. Relationship between concentrations of aluminum, cadmium, lead and zinc in water, sediments and aquatic macrophytes in six acidic lakes. *Arch. Environm. Contam. Toxicol.* 18:225-231.

Invited Papers (Continued)

- Newman, M.C. and A. McIntosh. 1989. Appropriateness of aufwuchs as a monitor of bioaccumulation. Environm. Pollut. 60(132):83-100.
- McIntosh, A., M. Watzin and J. King. 1999. Toxic substances in Lake Champlain. In Lake Champlain in Transition: From Research Toward Restoration, ed. by T.O. Manley and P.L. Manley. Amer. Geophys. Union, Washington D.C. pp. 239-259.
- Shambaugh, A., A. Duchovnay, and A. McIntosh. 1999. Phytoplankton and zooplankton of Lake Champlain. In Lake Champlain in Transition: From Research Toward Restoration, ed. by T.O. Manley and P.L. Manley. Amer. Geophys. Union, Washington D.C. pp. 323-340.
- Watzin, M.C. and A.W. McIntosh. 1999. Aquatic ecosystems in agricultural landscape: A review of ecological indicators and achievable ecological outcomes. J. Soil and Water Conserv. 54(4):636-644.

Book

- Newman, M.C. and A. McIntosh (eds). 1991. Metal Ecotoxicology: Current Concepts and Applications. CRC Press.

Book Chapter

- McIntosh, A. 1991. Trace metals in freshwater sediments: A review of the literature and an assessment of research needs. In Metal Ecotoxicology: Current Concepts and Applications. CRC Press. pp. 243-260.

Technical Reports (Peer Reviewed)

- McIntosh, A., et. al. 1994. An assessment of sediment-associated contaminants in Lake Champlain - Phase I. Lake Champlain Basin Program. Technical Report No. 5. U.S. Environmental Protection Agency, Boston, MA. 325 p.
- McIntosh, A., et al. 1997. An assessment of sediment-associated contaminants in Lake Champlain - Phase II. Lake Champlain Basin Program. Technical Report No. 23B. U.S. Environmental Protection Agency, Boston, MA 534 p.
- Watzin, M.C. and A.W. McIntosh. 1998. Aquatic ecosystems in agricultural landscapes: achievable ecological outcomes and targeted indicators of ecological health. USDA Natural Resources Conservation Service Technical Report Series.

Other Technical Reports

Watzin, M.C. and A.W. McIntosh. 2001. The Burlington Bay Project: Water Quality and Ecosystem Health along the Shores of Lake Champlain. 42 p.

Watzin, M.C. and A.W. McIntosh. 2002. The Burlington Bay Project: Water Quality and Ecosystem Health along the Shores of Lake Champlain. 30 p.

People, Plankton and Pollution: The State of Burlington Bay. May 2005. With M. Watzin, A. Shambaugh, E. Miller, A. Mahar, A. Pitt. 17 p.

Book Reviews

Copper in the Environment: Part I: Ecological Cycling (Ed. by J. Nriagu). Bioscience (1983).

Introduction to Environmental Sciences (S. Luoma). Bioscience 35(6):373 (1987).

Presentations at Professional Meetings/Conferences (Since 1992)

Initial findings of a biological monitoring program in Lake Champlain. International Assoc. Great Lakes Res. Conf. June 3, 1992. Waterloo, Ontario, with A. Shambaugh, A. Duchovnay, and A. Williams.

The use of *Mysis relicta* to assess bioavailability of PCB's in Lake Champlain sediments. International Assoc. Great Lakes Res. Conf. June 3, 1992. Waterloo, Ontario, with D. Lester and R. Furbush.

Assessment of sediment associated contaminants in Lake Champlain. 13th annual SETAC meeting. Presented Nov. 8-12, 1992. Cincinnati, Ohio, with D. Lester, A. Hunt, A. Williams, R. Fuller, and J. King.

Accumulation of PCB's from Lake Champlain sediments by *Mysis relicta*. 13th annual SETAC meeting. To be Presented Nov. 8-12, 1992. Cincinnati, Ohio, with D. Lester.

Accumulation of polychlorinated biphenyl congeners by the freshwater shrimp *Mysis relicta*. 14th annual SETAC meeting. Nov. 18, 1993 with D. Lester.

Biological assessment of sediment associated contaminants in two areas of Lake Champlain. 14th annual SETAC meeting. Nov. 18, 1993 with D. Lester et al.

Presentations at Professional Meetings/Conferences (Since 1992) (Continued)

Head capsule deformities in midge larvae exposed to Burlington Harbor (Lake Champlain) sediments - field and laboratory investigations. 15th annual SETAC meeting. Nov. 2, 1994 with D. Lester et al.

Ecological imported of sediment-associated arsenic in Malletts Bay, Lake Champlain, VT. 15th annual SETAC meeting. Nov. 2, 1994 with D. Lester et al.

The problem of variability in assessing sediment toxicity. 16th annual SETAC meeting. Nov. 7, 1995 with M. Watzin et. al.

Sediment toxicity in Lake Champlain: lessons learned. 18th annual SETAC meeting. November, 1997 with M. Watzin.

Externally Funded Grants, Contracts, and Gifts Since 1996:

<u>Year Started</u>	<u>Founding Source</u>	<u>Funding</u>	<u>Title</u>
1991-1997	U.S. EPA	\$980,000	An assessment of toxic substances in Lake Champlain sediments (with A. Hunt, J. King, and R. Fuller)
1992-1997	Kelsey Trust	\$150,000	Construction of Lake Champlain Studies Center
1996-1998	U.S.D.A.-NRCS	\$37,000	Identifying indicators of ecological health and achievable ecological outcomes in agricultural watersheds (with M. Watzin)
1998	U.S.D.A. NRI Seed Grant program	\$25,000	A database to help select indicators in agricultural watersheds (with M. Watzin)
1999-2004	Green Mountain Power Corp.	\$1,000,000	Burlington Bay Project (with M. Watzin)

Externally Funded Grants, Contracts, and Gifts Since 1996: (Continued)

<u><i>Year Started</i></u>	<u><i>Founding Source</i></u>	<u><i>Funding</i></u>	<u><i>Title</i></u>
1999-2000	U.S. EPA	\$941,511	Vermont EPA-EPSCoR Program (Project Manager)
1999-2004	The University of Vermont	\$20,000/year	Campus Storm Water Monitoring Program
2000-2002	Lintilhac Foundation	\$40,000	AP Environmental Sciences Course development
2003-2007	U.S. EPA	\$900,000	Redesigning the American Neighborhood (Project Manager)