

James N. McNair

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Current Position

Associate Research Scientist, Annis Water Resources Institute, Grand Valley State University.

Education

1979: Ph.D. Biology (Ecology and Theoretical Biology), University of Pennsylvania.

1974: B.S. Biology *cum laude*, Davidson College.

Academic Honors and Fellowships

1978–1979: N.I.H. Trainee in Theoretical Biology, University of Pennsylvania

1976–1978: University Fellow, University of Pennsylvania

1974: Graduated *cum laude* and Phi Beta Kappa from Davidson College.

Professional Experience

2009–present: Associate Research Scientist, Annis Water Resources Institute, Grand Valley State University.

2000–2009: Adjunct Professor of Biology, Department of Biology, University of Pennsylvania.

1991–2009: Senior Scientist and Head, Quantitative Population Biology Section, Patrick Center for Environmental Research, Academy of Natural Sciences of Philadelphia.

1986–1991: Research Associate, Environmental Research Division, Academy of Natural Sciences of Philadelphia.

1980–1986: Assistant Professor of Biology, Purdue University.

Research Areas

Stochastic models of particle transport in turbulent flows (including microorganisms, invertebrates, and fine particulate organic matter in freshwater, estuarine, and marine systems); deterministic and stochastic models of benthic insect distributions in streams; density-dependent dynamics of physiologically-structured population models; physiologically based models of microbial uptake and loss of xenobiotics; effects of novel trace contaminants on cyanobacteria, algae, rotifers, cladocerans, and nematodes; spatially explicit watershed models linking landuse/landcover-derived stressors to ecological conditions in streams; applications of artificial neural networks to problems in watershed hydrology and watershed-

scale assessment of ecological risk; spatial dynamics of invasive Norway maple populations in urban forests; morphological variation within and among populations of invasive Japanese knotweed; management strategies for controlling invasive plants.

Courses Taught

Ecology — A dual-level (undergraduate and graduate) course emphasizing population dynamics and community ecology.

Evolution — A dual-level course emphasizing population genetics, molecular evolution, and speciation.

Theoretical Ecology — A dual-level course covering a selection of basic methods in applied mathematics (e.g., linear algebra, difference equations, Markov chains, differential equations, systems, stability analysis) and some of their specific applications in theoretical population, community, and behavioral ecology.

Mathematical Ecology — A graduate-level course covering difference equation models, ordinary differential equation models, and continuum transport models (parabolic and hyperbolic partial differential equation models).

Workshops Taught

Adaptive Management of Natural Resources — A 6-hour series of lectures on the history, types, and statistical methods of adaptive management, delivered in August, 2008, to students and faculty from Nanjing University, China, as part of a week-long workshop organized jointly by the Academy of Natural Sciences and St. Joseph's University.

Statistical Methods for Aquatic Bioassay Experiments — The statistical portion of a week-long workshop on aquatic bioassay methods that was offered annually at the Academy of Natural Sciences during the 1990s.

Publications

McNair, J.N. 2009. Two new methods for predicting effects of landcover-related stressors on stream biotic integrity at the catchment scale. *Proceedings of the Academy of Natural Sciences of Philadelphia* **158**: 61–88.

Araújo, A. and McNair, J.N. 2007. Individual- and population-level effects of antimicrobials on the rotifers, *Brachionus calyciflorus* and *B. plicatilis*. *Hydrobiologia* **593**: 185–199.

Johnson, T.E., McNair, J.N., Srivastava, P., and Hart, D.D. 2007. Stream ecosystem responses to spatially variable landcover: a model for developing riparian restoration strategies. *Freshwater Biology* **52**: 680–695.

O'Connor, M.P., Agosta, S.J., Hansen, F., Kemp, S.J., Sieg, A.E., McNair, J.N. and Dunham, A.E. 2007. Phylogeny, regression, and the allometry of physiological traits. *American Naturalist* **170**: 431–442.

O'Connor, M.P., Agosta, S.J., Hansen, F., Kemp, S.J., Sieg, A.E., Wallace, B.P., McNair, J.N. and Dunham, A.E. 2007. Size, selection, and physiology: Reconsidering the mechanistic basis of the metabolic theory of ecology. *Oikos* **116**: 1058–1072.

McNair, J.N. 2006. Probabilistic settling in the Local Exchange Model of turbulent particle transport. *Journal of Theoretical Biology* **241**: 420–437.

- Srivastava, P., McNair, J.N., and Johnson, T.E. 2006. Comparison of process-based and artificial neural network approaches for streamflow modeling in an agricultural watershed. *Journal of the American Water Resources Association* **42**:545–563.
- Fingerut, J.T., Hart, D.D. and McNair, J.N. 2006. Silk use enhances benthic invertebrate settlement. *Oecologia* **150**: 202–212.
- Bram, M.R. and McNair, J.N. 2004. Seed germinability and its seasonal onset in three populations of Japanese knotweed. *Weed Science* **52**: 759–767.
- McNair, J.N. and Newbold, J.D. 2001. Turbulent transport of suspended particles and dispersing benthic organisms: the hitting-distance problem for the Local Exchange Model. *Journal of Theoretical Biology* **209**: 351–369.
- McNair, J.N. 2000. Turbulent transport of suspended particles and dispersing benthic larvae: the hitting-time distribution of the Local Exchange Model. *Journal of Theoretical Biology* **202**:231–246.
- Goulden, C.E., Moeller, R.E., McNair, J.N., and Place, A.R. 1999. Lipid dietary dependencies in zooplankton. Pages 91–108 in: Arts, M.T. and Wainman, B.C. (Eds.) *Lipids in Freshwater Ecosystems*. New York: Springer-Verlag.
- McNair, J.N., Boraas, M.E., and Seale, D.B. 1998. Size-structure dynamics of the rotifer chemostat: a simple physiologically structured model. *Hydrobiologia* **387/388**:469–476.
- Boraas, M.E., Seale, D.B., Boxhorn, J.E., and McNair, J.N. 1998. Rotifer size distribution changes during transient phases in open cultures. *Hydrobiologia* **387/388**:477–482.
- McNair, J.N., Newbold, J.D., and Hart, D.D. 1997. Turbulent transport of suspended particles and dispersing benthic organisms: how long to hit bottom? *Journal of Theoretical Biology* **188**:29–52.
- McNair, J.N. 1995. Ontogenetic patterns of density-dependent mortality: contrasting stability effects in populations with adult dominance. *Journal of Theoretical Biology* **175**:207–230.
- McNair, J.N., Goulden, C.E., and Ziegenfuss, M.C. 1995. Is there a place for ecotoxicology? *Setac News* **15**:18–21.
- McNair, J.N. and Goulden, C.E. 1991. The dynamics of age-structured populations with a gestation period: density-independent growth and egg ratio methods for estimating the birth rate. *Theoretical Population Biology* **39**:1–29.
- McNair, J.N. 1989. Stability effects of a juvenile period in age-structured populations. *Journal of Theoretical Biology* **137**:397–422.
- McNair, J.N. 1987. Stability effects of prey refuges with entry-exit dynamics. *Journal of Theoretical Biology* **125**:449–464.
- McNair, J.N. 1987. The effect of variability on the optimal size of a feeding territory. *American Zoologist* **27**:249–258.
- McNair, J.N. 1987. A reconciliation of simple and complex models of age-dependent predation. *Theoretical Population Biology* **32**:383–392.
- McNair, J.N. 1986. The effects of prey refuges on predator-prey interactions: a reconsideration. *Theoretical Population Biology* **29**:38–63.
- McNair, J.N. 1985. Optimal foraging for operant conditioners. *Behavior and Brain Science* **8**:343–344.
- Minchella, D.J., B.K. Leathers, K.M. Brown and J.N. McNair. 1985. Host and parasite counteradaptations: an example from a freshwater snail. *American Naturalist* **126**:843–854.
- McNair, J.N. 1983. A class of patch-use strategies. *American Zoologist* **23**:303–313.

- McNair, J.N. 1982. Optimal giving-up times and the marginal value theorem. *American Naturalist* **119**:511–529.
- McNair, J.N. 1981. A stochastic foraging model with predator training effects: II. Optimal diets. *Theoretical Population Biology* **19**:147–162.
- McNair, J.N. 1980. A stochastic foraging model with predator training effects: I. Functional response, switching, and run lengths. *Theoretical Population Biology* **17**:141–166.
- McNair, J.N. 1979. A generalized model of optimal diets. *Theoretical Population Biology* **15**:159–170.
- McNair, J.N. 1979. A model of tentacle function in certain suctorians. *Journal of Theoretical Biology* **78**:593–610.
- McNair, J.N. 1979. *Moina rostrata*: a new species of Moinidae (Cladocera). *Notulae Naturae, Academy of Natural Sciences of Philadelphia* **457**:1–6.
- McNair, J.N. 1976. Sexual forms and phylogenetic positions of *Moina reticulata* Daday and *Moina minuta* Hansen (Cladocera: Moinidae). *Proceedings of the Academy of Natural Sciences of Philadelphia* **128**:41–48.

Published Reviews

- 1990: Cushing, J.M. Some competition models for size-structured populations. *Rocky Mountain Journal of Mathematics* **20**:879–897. (In: *Mathematical Reviews*)
- 1990: Freedman, H.I. A model of predator-prey dynamics as modified by the action of a parasite. *Mathematical Biosciences* **99**:143–155. (In: *Mathematical Reviews*)
- 1990: Hofbauer, J. and So, J. W.-H. Multiple limit cycles for predator-prey models. *Mathematical Biosciences* **99**:71–75. (In: *Mathematical Reviews*)
- 1990: Waltman, P. Coexistence in chemostat-like models. *Rocky Mountain Journal of Mathematics* **20**:777–807. (In: *Mathematical Reviews*)
- 1989: So, J.W.-H. and P. Waltman. A nonlinear boundary value problem arising from competition in the chemostat. *Applied Mathematics and Computation* **32**:169–183. (In: *Mathematical Reviews*)
- 1989: Lui, R. Biological growth and spread modeled by systems of recursions. I. Mathematical theory. *Mathematical Biosciences* **93**:269–295. (In: *Mathematical Reviews*)
- 1989: Lui, R. Biological growth and spread modeled by systems of recursions. II. Biological theory. *Mathematical Biosciences* **93**:297–312. (In: *Mathematical Reviews*)
- 1989: Kirlinger, G. Two predators feeding on two prey species: a result on permanence. *Mathematical Biosciences* **96**:1–32. (In: *Mathematical Reviews*)
- 1988: Mimura, M., Kan-on, Y., and Nishiura, Y. Oscillations in segregation of competing populations, pp. 717–733, in: *Mathematical Ecology* (Trieste, 1986). World Sci. Publishing, Teaneck, NJ. (In: *Mathematical Reviews*)

Technical Reports

- McNair, J.N. 2008. Development and use of an improved tool to maximize the environmental benefits of stream restoration and protection activities in the Schuylkill River watershed. Prepared for U.S. EPA. Academy of Natural Sciences of Philadelphia. 77 pages.

- McNair, J.N. 2007. Development and use of an improved tool to maximize the environmental benefits of stream restoration and protection activities in the Schuylkill River watershed. Prepared for U.S. EPA Region 3. Academy of Natural Sciences of Philadelphia. 104 pages.
- McNair, J.N. 2007. Development of a watershed management tool to predict and maximize the benefits of riparian restoration projects. Prepared for the Pennsylvania Department of Environmental Protection. Academy of Natural Sciences of Philadelphia. 84 pages.
- McNair, J.N. and Horwitz, R.J. 2007. PCB concentrations in fishes from the Housatonic River, Connecticut, 1984-2006, and benthic insects, 1978-2006. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 86 pages.
- Bouchard, R., Acker, R., Depew, M., Horwitz, R.J., McNair, J.N., and Velinsky, D. 2006. 2005 Sabine River studies for the Texas Eastman Division, Eastman Chemical Company. Prepared for the Texas Eastman Division, Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 151 pages.
- McNair, J.N. 2005. Enhancing the effectiveness of vegetation restoration and maintenance activities in Philadelphia's Fairmount Park system. Prepared for the William Penn Foundation. Academy of Natural Sciences of Philadelphia. 56 pages.
- McNair, J.N. 2005. An assessment of selected management practices for invasive Japanese knotweed and Norway maple in Philadelphia's Fairmount Park System. Prepared for the Fairmount Park Commission. Academy of Natural Sciences of Philadelphia. 50 pages.
- McNair, J.N. 2005. A Review of the Normandeau Report on Potential Short-term Biological Impacts of a Fly Ash Spill at the PPL Martins Creek, LLC Power Plant. Prepared for PPL Martins Creek LLC. Academy of Natural Sciences of Philadelphia.
- McNair, J.N. 2005. An overview of the 2003 biological studies of the Guadalupe River. Prepared for INVISTA S.a.r.l. Academy of Natural Sciences of Philadelphia. 22 pages.
- McNair, J.N. and Horwitz, R.J. 2005. PCB concentrations in fishes from the Housatonic River, Connecticut, 1984-2004, and benthic insects, 1978-2005. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 89 pages.
- Bouchard, R., Charles, D., Horwitz, R.J., Marshall, B., McNair, J.N. and Velinsky, D. 2005. Biological and Chemical Studies of the Guadalupe River, 2003. Prepared for INVISTA S.a.r.l. Academy of Natural Sciences of Philadelphia. 151 pages.
- McNair, J.N., Johnson, T. and Srivastava, P. 2004. A watershed-level assessment to guide restoration planning and maximize the benefits of riparian restoration. Prepared for Pennsylvania Department of Environmental Protection. Academy of Natural Sciences of Philadelphia. 60 pages.
- Brown, R., Hart, D.D. and McNair, J.N. 2004. A Risk Assessment Framework for Determining the Potential Ecological Effects of Dam Removal. Prepared for Pennsylvania Department of Environmental Protection. Academy of Natural Sciences of Philadelphia. 105 pages.
- McNair, J.N. and Horwitz, R.J. 2003. PCB concentrations in fishes from the Housatonic River, Connecticut, 1984-2002, and benthic insects, 1978-2002. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 48 pages.
- Srivastava, P., Carr, Hart, D.D. and McNair, J.N. 2003. A compilation and evaluation of stream restoration projects: learning from past projects to improve future success. Prepared for the William Penn Foundation. Academy of Natural Sciences of Philadelphia. 73 pages.
- McNair, J.N. 2002. An overview of the 2001 biological studies of the Guadalupe River. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia. 16 pages.

- McNair, J.N. and Horwitz, R.J. 2001. PCB concentrations in fishes from the Housatonic River, Connecticut, 1984-2000, and in benthic insects, 1978-2001. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 70 pages.
- McNair, J.N. 2001. An overview of the 2000 biological and chemical studies of the Guadalupe River. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia. 19 pages.
- McNair, J.N., Acker, F., Charles, D., Horwitz, R.J. and Marshall, B. 2000. Biological studies on the upper Delaware River: Final Report. Prepared for Roche Vitamins, Inc. Academy of Natural Sciences of Philadelphia. 99 pages.
- Kreeger, D. and McNair, J.N. 2000. Algal bioconcentration of radionuclides: 2000 Special “BCF” study - Phase II: Bioconcentration of Cs-137 by the green algal *Ankistrodesmus falcatus* in exponential and stationary phase. Prepared for PPL Susquehanna, LLC. Academy of Natural Sciences of Philadelphia. 31 pages.
- Bouchard, R., Charles, D., Horwitz, R.J., Marshall, B., McNair, J.N. and Velinsky, D. 2000. Biological and chemical studies of the Guadalupe River, 1999. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia.
- Bouchard, R., Acker, F., Grant, R., Hart, D.D., Horwitz, R.J., McNair, J.N. and Velinsky, D. 2000. 1999 Savannah River Biological Surveys for Westinghouse Savannah River Company. Prepared for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 235 pages.
- McNair, J.N. 1999. Review of Nitrate and Nitrite on the Guadalupe River, 1998-1999. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia. 10 pages.
- McNair, J.N. 1999. An Overview of Biological and Chemical Studies of the Guadalupe River, 1996-1997. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia.
- Biggs, R.B., Horwitz, R.J., McNair, J.N. 1999. The Delaware Estuary Ecosystem. Prepared for Public Service Electric and Gas. Academy of Natural Sciences of Philadelphia. 412 pages.
- Horwitz, R.J. and McNair, J.N. 1999. PCB Concentrations in Fishes and Benthic Insects from the Housatonic River, Connecticut, in 1984 to 1998. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 50 pages.
- Bouchard, R., Acker, F., Grant, R., Hart, D.D., Horwitz, R.J., McNair, J.N. and Velinsky, D. 1999. 1998 Savannah River Biological Surveys for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 246 pages.
- McNair, J.N., Acker, F., Bouchard, R., Hart, D.D., Horwitz, R.J., and Velinsky, D. 1998. Aquatic field studies in the Congaree River near Columbia, South Carolina, 1997. Prepared for the Carolina Eastman Division of Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 139 pages.
- McNair, J.N., Acker, F., Bouchard, R., Hart, D.D., Horwitz, R.J. and Velinsky, D. 1998. Aquatic field studies in the vicinity of Kingsport, Tennessee, 1997. Prepared for Tennessee Eastman Division of Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 213 pages.
- Bouchard, R., Acker, F., Grant, R., Horwitz, R.J., Marshall, B., McNair, J.N. 1998. 1997 Savannah River biological surveys for Westinghouse Savannah River Company. Prepared for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 201 pages.

- McNair, J.N. and Horwitz, R.J. 1997. PCB concentrations in fishes and benthic insects from the Housatonic River, Connecticut, in 1984 to 1996. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 47 pages.
- McNair, J.N. 1997. An assessment of the U.S. Fish and Wildlife Service's literature review of mercury effects on fish and wildlife resources. Prepared for Aluminum Company of America. Academy of Natural Sciences of Philadelphia. 185 pages.
- McNair, J.N., Bouchard, R., Grant, R., Hart, D.D., Horwitz, R.J. and Velinsky, D. 1997. Aquatic field studies in the White River near Batesville, Arkansas. Prepared for Arkansas Eastman Division of Eastman Chemical. Academy of Natural Sciences of Philadelphia. 172 pages.
- Bouchard, R., Acker, F., Grant, R., Hart, D.D., Horwitz, R.J., McNair, J.N. and Velinsky, D. 1997. 1996 Savannah River biological surveys for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 336 pages.
- McNair, J.N., Grant, R., Hart, D.D. and Horwitz, R.J. 1996. Savannah River cursory surveys for Westinghouse Savannah River Company, 1995. Prepared for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 131 pages.
- McNair, J.N. 1996. An assessment of the U.S. Fish and Wildlife Service's Phase II report on accumulation of mercury in sediments, prey, and shorebirds of Lavaca Bay. Aluminum Company of America. Academy of Natural Sciences of Philadelphia. 11 pages.
- McNair, J.N. 1996. Addendum to Academy of Natural Sciences Report No. 94-23F: Potential biological impacts of altered metal and nutrient loadings to the Guadalupe River. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia.
- Bouchard, R., Grant, R., Hart, D.D., Horwitz, R.J., McNair, J.N., and Velinsky, D. 1996. 1995 Sabine River studies for Texas Eastman Company. Prepared for Texas Eastman Division of Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 193 pages.
- Bouchard, R., Grant, R., Hart, D.D., Horwitz, R.J., Isquith, M. and McNair, J.N. 1996. 1995 Savannah River biological survey in the vicinity of Georgia Power and Light's Vogtle Nuclear Power Plant Site for Westinghouse Savannah River Company. Prepared for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 221 pages.
- McNair, J.N. and Horwitz, R.J. 1995. PCB concentrations in fishes and benthic insects from the Housatonic River, Connecticut, in 1984 to 1994. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 103 pages.
- McNair, J.N. 1995. Potential biological impacts of altered metal and nutrient loadings to the Guadalupe River. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia. 23 pages.
- McNair, J.N. 1995. Biological and mixing zone studies on the upper Delaware River. Final Report. Prepared for Hoffmann LaRoche, Inc. Academy of Natural Sciences of Philadelphia. 128 pages.
- Bouchard, R., Grant, R., Hermanson, Hart, D.D., Horwitz, R.J., Isquith, M. and McNair, J.N. 1995. 1994 Savannah River biological survey in the vicinity of Georgia Power and Light's Vogtle Nuclear Power Plant site for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 196 pages.
- McNair, J.N. and Riedel, F. 1994. Projected impacts of altered metal and nutrient loadings to the Guadalupe River. Prepared for E.I. du Pont de Nemours & Company, Victoria, Texas. Academy of Natural Sciences of Philadelphia. 16 pages.

- McNair, J.N. and Newbold, J.D. 1994. Issues regarding estimated impacts of the lower Susquehanna River reservoir system on sediment and nutrient discharge to Chesapeake Bay. Prepared for Safe Harbor Water Power Corp. Academy of Natural Sciences of Philadelphia. 20 pages.
- McNair, J.N. 1994. Preliminary assessment of data from the U.S. Fish and Wildlife Service's 1991-1992 Lavaca Bay injury study. Aluminum Company of America. Academy of Natural Sciences of Philadelphia. 22 pages.
- Horwitz, R.J. and McNair, J.N. 1994. PCB concentrations in fishes from the Housatonic River, Connecticut, in 1984 to 1992: Addendum. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 17 pages.
- Bouchard, R., Grant, R., Hart, D.D., Horwitz, R.J. and McNair, J.N. 1994. Progress report on 1993 river quality surveys conducted by The Academy of Natural Sciences of Philadelphia on the Savannah River. Prepared for the Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 17 pages.
- Bouchard, R., Acker, F., Grant, R., Hart, D.D., Hermanson, Horwitz, R.J. and McNair, J.N. 1994. Savannah River biological surveys, 1993. Prepared for the Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia.
- McNair, J.N., Kiry, P., Bouchard, R., Sweeney, B. and Horwitz, R.J. 1993. White River studies, 1991. Prepared for the Arkansas Eastman Division of the Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 197 pages.
- McNair, J.N. 1993. Rainbow trout acute toxicity tests for Quaker Chemical Corporation. Prepared for Quaker Chemical Corporation. Academy of Natural Sciences of Philadelphia. 12 pages.
- Horwitz, R.J. and McNair, J.N. 1993. PCB concentrations in fishes from the Housatonic River, Connecticut in 1984-1992. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 146 pages.
- McNair, J.N., Kiry, P., Jackson, J., Bouchard, R. and Horwitz, R.J. 1992. 1991 Studies on the White River: Interim report. Arkansas Eastman Division of the Eastman Chemical Company. Academy of Natural Sciences of Philadelphia. 12 pages.
- McNair, J.N. 1992. Data report on results of 48-h *Daphnia magna* bioassay of methyl anthranilate toxicity, for Monell Chemical Senses Center. Academy of Natural Sciences of Philadelphia. 38 pages.
- Bouchard, R., Acker, F., Grant, R., Hermanson, M., Horwitz, R.J., Isquith, M. and McNair, J.N. 1992. Preliminary report of Savannah River water quality surveys for Westinghouse Savannah River Company. Academy of Natural Sciences of Philadelphia. 8 pages.
- McNair, J.N. and Brennan, D. 1991. Metals studies on the Guadalupe River, 1989. Prepared for E.I. du Pont de Nemours & Company. Academy of Natural Sciences of Philadelphia. 50 pages.
- McNair, J.N. 1991. Status and trends of toxic pollutants in the Delaware Estuary. Prepared for the Delaware Estuary Program and U.S. EPA. Academy of Natural Sciences of Philadelphia. 177 pages.
- McNair, J.N. 1991. Results of the model search and selection process for the Niagara River and Lake Ontario. Prepared for BCM Engineers, Inc. and Occidental Chemical Co. Academy of Natural Sciences of Philadelphia. 7 pages.
- Horwitz, R.J. and McNair, J.N. 1991. PCB concentrations in fishes from the Housatonic River, Connecticut in 1984-1990. Prepared for General Electric Company. Academy of Natural Sciences of Philadelphia. 132 pages.

- McNair, J.N. and Goulden, C.E. 1990. Chronic bioassay tests of prechlorination effluent for the City of Philadelphia's Southeast water pollution control plant: Second monthly test. Prepared for the City of Philadelphia. Academy of Natural Sciences of Philadelphia. 9 pages.
- McNair, J.N. and Goulden, C.E. 1990. Chronic bioassay tests of prechlorination effluent for the City of Philadelphia's Southeast water pollution control plant: First monthly test. Prepared for the City of Philadelphia. Academy of Natural Sciences of Philadelphia. 9 pages.
- McNair, J.N. and Goulden, C.E. 1989. Divinylbenzene bioassay conducted for the City of Philadelphia Water Department. Academy of Natural Sciences of Philadelphia. 15 pages.
- Horwitz, R.J., McNair, J.N. and Ford, E. 1989. A literature review of methanol in aquatic ecosystems and a conceptual proposal for modeling studies. Prepared for the Sun Oil Company. Academy of Natural Sciences of Philadelphia. 22 pages.

Extramural Seminars¹

- McNair, J. N. 2008. Transport processes as a unifying conceptual framework in basic and applied ecology. Invited seminar presented to the Annis Water Resources Institute, Grand Valley State University, 6 October 2008.
- McNair, J. N. 2007. Strategic land protection and restoration to maximize stream ecological integrity: development and implementation of a GIS-based decision-support tool. Invited seminar presented to the Department of Marine and Ecological Sciences, Florida Gulf Coast University, 12 June 2007.
- McNair, J. N. 2007. Strategic land protection and restoration to maximize stream ecological integrity: development and implementation of a GIS-based decision-support tool. Invited seminar presented to U.S. EPA Region 3, 5 June 2007.
- McNair, J. N. 2007. The Local Exchange Model of turbulent particle transport in streams. Invited seminar presented to the Department of Biology, University of Akron, 20 May 2007.
- McNair, J. N. 2006. An overview of PPCPs (pharmaceuticals and personal care products) in the environment. Invited seminar presented to U.S. EPA Region 3, Philadelphia, PA, 27 October 2006.
- McNair, J. N., Srivastava, P., Johnson, T. E., and Hart, D. D. 2004. A watershed approach to determining the benefits of riparian restoration. 2004 Wetlands Workshop, Atlantic City, NJ, 25 October 2004.
- McNair, J. N. 2003. The ecology and control of invasive Japanese knotweed in urban parks of Philadelphia. Invited seminar presented at the 2003 Wetlands Workshop, Atlantic City, NJ, 28 October 2003.
- McNair, J. N. 2003. On-going studies of Japanese knotweed in Philadelphia's urban parks. Invited seminar presented at the conference on "Aquatic Invaders of the Delaware Estuary", sponsored by NOAA, Pennsylvania Sea Grant, Delaware Estuary Program, Partnership for the Delaware Estuary, and Pennsylvania Department of Environmental Protection's Coastal Zone Management Program, held at Penn State Great Valley, 20 May 2003.
- McNair, J. N. and Srivastava, P. 2003. Artificial neural networks as a tool in watershed hydrology. Invited seminar presented at the 2003 American Water Resources Association Mid-Atlantic Region Conference on "Technology Advances in Water Resources", Philadelphia, PA, 1 May 2003.
- McNair, J. N. 2002. Stochastic and deterministic models of stream insect transport on different spatial scales. Invited seminar presented to the Department of Biology, University of Pennsylvania, 10 December 2002.

¹ Only seminars presented by J. N. McNair are listed; seminars presented by co-authors are not shown.

- McNair, J. N. 2002. Adaptive management project update: results of project year 3. Seminar presented to the Natural Lands Restoration and Environmental Education Program, Fairmount Park Commission, January 2002.
- McNair, J. N. 2001. Adaptive management of invasive exotic plants in Philadelphia's Fairmount Park system. Invited seminar presented to the Pennsylvania Deer Management Forum, Harrisburg, PA, 18 December 2001.
- McNair, J.N. 2001. The local exchange model: a simple stochastic diffusion model of turbulent particle transport. Invited paper presented at the 2001 American Society of Limnology and Oceanography meeting, Albuquerque, NM.
- McNair, J. N. 2001. Ongoing studies of two invasive species (Japanese knotweed and Norway maple) in woodlands of Philadelphia's Fairmount Park system. Lecture presented to the Department of Biology, University of Pennsylvania.
- McNair, J.N. 2000. Particle transport by turbulent fluids: dispersal of seeds, pollen, fine particulate organic matter, and benthic invertebrate larvae. Invited lecture, Department of Biology, University of Pennsylvania.
- McNair, J.N. 1998. Towards a theory of stressed populations, with applications to the rotifer chemostat. Invited lecture, Department of Biology, University of Pennsylvania.
- McNair, J. N., Boraas, M.E., and Seale, D.B. 1997. Size-structure dynamics of the rotifer chemostat: a simple physiologically structured model. Paper presented at the VIII International Rotifer Symposium, held at St. John's University, Collegetown, Minnesota.
- McNair, J. N. 1996. Population consequences of allocation in a physiologically structured model of the rotifer chemostat. Invited lecture, international symposium on "Resource Allocation Processes: the Connection Between Individual and Population Levels of Biological Organization", held at the University of Georgia's Savannah River Ecology Laboratory.
- McNair, J.N. 1996. Classical versus physiologically structured models of the rotifer chemostat. Department of Biological Sciences, University of Wisconsin, Milwaukee.
- McNair, J.N. 1995. A simple physiologically structured model of a rotifer chemostat. American Society of Zoologists Annual Meeting.
- McNair, J.N. 1995. Classical versus physiologically structured models of rotifer population dynamics in a chemostat. Department of Biology, University of Pennsylvania.
- McNair, J.N. 1994. Physiologically structured population models: techniques for theoretical and applied ecology. Invited lecture, Department of Ecology and Evolutionary Biology, University of California at Irvine.
- McNair, J.N. 1994. Physiologically structured population models: bridging the gap between theoretical and applied ecology. Invited lecture, Biology Department, Davidson College.
- McNair, J.N. 1993. Continuum population models. Department of Biology, University of Pennsylvania.
- McNair, J.N. 1989. On the "principle of prey protection" in predator-prey interactions. Invited lecture, Department of Biology, Pennsylvania State University.
- McNair, J.N. 1989. Causes of spontaneous oscillation in age- and density-dependent population growth. Invited lecture, Department of Biology, Pennsylvania State University.
- McNair, J.N. 1987. Refuges and other sources of prey protection: their effects on predator-prey dynamics. Invited lecture, Department of Ecology and Evolutionary Biology, University of California, Irvine.

- McNair, J.N. 1987. Refuges and other sources of prey protection: their effects on predator-prey dynamics. Invited lecture, Department of Biology, University of California, Riverside.
- McNair, J.N. 1986. Refuges and other sources of prey protection: their effects on predator-prey dynamics. Invited lecture, Zoologische Museum der Universität Zürich (Switzerland).
- McNair, J.N. 1985. Predator-prey interactions with refuges: What do we really know? Invited lecture, Department of Biology, Indiana University.
- McNair, J.N. 1984. The effects of variability on the optimal size of a feeding territory. Invited lecture, Symposium on Territoriality, American Society of Zoologists Annual Meeting.
- McNair, J.N. 1983. Destabilizing effects of prey refuges on predator-prey interactions. American Society of Zoologists Annual Meeting.
- McNair, J.N. 1982. A class of foraging models for optimal patch use. Invited lecture, Annual Midwest Population Biology Conference.
- McNair, J.N. 1982. Dynamic prey refuges in predator-prey interactions. Invited lecture, Department of Ecology, Ethology, and Evolution, University of Illinois.
- McNair, J.N. 1981. Some implications of predator training effects for foraging theory. Invited lecture, Symposium on Foraging Ecology, Ecological Society of America Annual Meeting.
- McNair, J.N. 1981. Some consequences of predator training effects. Invited lecture, Kellogg Biological Station, Michigan State University.
- McNair, J.N. 1981. A class of patch-use strategies. Invited lecture, Symposium on Optimization of Behavior, American Society of Zoologists Annual Meeting.

Selected Grants and Contracts in the Last 10 Years

Current Projects

- Newbold, J.D., Aufdenkampe, A.K., Kaplan, L.A., Packman, A. and McNair, J.N. 2006–2009. Collaborative Research: Seston Contributions to metabolism Across Longitudinal Ecosystems (SCALE) — Dynamics of Organic Particles in River Networks. Funded by the National Science Foundation. Role: Co-PI. Amount: \$600,000
- Apse, C., McNair, J.N. and Hart, D.D. 2005–2008. Strategic land protection and restoration to maximize stream ecological integrity: development and implementation of an empirically-based decision support tool. Funded by The Nature Conservancy (R.J. Kose). Role: Co-PI. Amount: \$59,136.
- McNair, J.N. 2006–2008. An assessment of alternative algal bioassay protocols. Funded by Environmental Associates of the Academy of Natural Sciences. Role: PI and Project Leader. Amount: \$10,000.

Completed Projects

- McNair, J.N. and Hart, D.D. 2005–2008. Development and use of an improved tool to maximize the environmental benefits of stream restoration and protection activities. Funded by U.S. EPA Region III. Role: PI and Project Leader. Amount: \$150,000.
- McNair, J.N., Srivastava, P., and Hart, D.D. 2005–2007. Development of a watershed management tool to predict and maximize the benefits of riparian restoration projects. Funded by Pennsylvania Department of Environmental Protection. Role: PI and Project Leader. Amount: \$100,000.

- McNair, J.N. and Horwitz, R.J. 2006–2007. 2006 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$225,000.
- McNair, J.N., Horwitz, R.J., Velinsky, D. and Thomas, R. 2005–2007. Independent third-party oversight and assessment of biological impact studies following a major fly-ash-slurry spill into the Delaware River. Funded by PPL Martins Creek LLC. Role: PI and Project Leader. Amount: \$61,853.
- McNair, J.N. and Witmer, R. 2005. Restoration of riparian buffer habitat along Cobbs Creek and Tacony Creek by removal of invasive Japanese knotweed. Funded by National Fisheries and Wildlife Foundation. Role: PI and Project Leader. Amount: \$15,000.
- McNair, J.N. and Horwitz, R.J. 2004–2005. 2004 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$260,000.
- McNair, J.N., Srivastava, P., Araújo, A. 2004–2005. An integrated approach for examining novel trace contaminants in the environment: transport, fate, and ecological effects of antimicrobials. Funded by Environmental Associates of the Academy of Natural Sciences. Role: PI and Project Leader. Amount: \$50,000
- Hart, D.D., Srivastava, P., and McNair, J.N. 2003–2005. A compilation and evaluation of stream restoration projects. Funded by Pennsylvania Department of Environmental Protection and William Penn Foundation. Role: PI. Amount: \$308,000.
- McNair, J.N. and Horwitz, R.J. 2002–2003. 2002 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$196,492.
- McNair, J.N. and Horwitz, R.J. 2000–2001. 2000 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$147,435.
- McNair, J.N. and Hart, D.D. 1999–2005. Enhancing the effectiveness of vegetation restoration and maintenance activities in Philadelphia’s Fairmount Park system. Funded by the William Penn Foundation. Role: PI and Project Leader. Amount: \$1,210,000.
- Kreeger, D. and McNair, J.N. 1999–2000. Algal bioconcentration of radionuclides: 2000 Special “BCF” study - Phase II: Bioconcentration of Cs-137 by the green algal *Ankistrodesmus falcatus* in exponential and stationary phase. Funded by PPL Susquehanna, LLC. Role: PI. Amount: \$40,775
- McNair, J.N., Acker, F., Charles, D., Horwitz, R.J. and Marshall, B. 1998–2000. Biological studies on the upper Delaware River. Funded by Roche Vitamins, Inc. Role: PI and Project Leader. Amount: \$111,858.
- Biggs, R.B., Horwitz, R.J., McNair, J.N. 1998–1999. A technical overview of the Delaware River’s estuarine ecosystem. Funded by Public Service Electric and Gas. Role: PI and Project Leader. Amount: \$30,253
- McNair, J.N. and Horwitz, R.J. 1998–1999. 1998 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$133,561.
- McNair, J.N., Acker, F., Bouchard, R., Hart, D.D., Horwitz, R.J., and Velinsky, D. 1997–1998. Aquatic field studies in the Congaree River near Columbia, South Carolina. Funded by the Carolina Eastman Division of Eastman Chemical Company. Role: PI and Project Leader. Amount: \$200,000.

- McNair, J.N., Acker, F., Bouchard, R., Hart, D.D., Horwitz, R.J. and Velinsky, D. 1997–1998. Aquatic field studies in the vicinity of Kingsport, Tennessee. Funded by Tennessee Eastman Division of Eastman Chemical Company. Role: PI and Project Leader. Amount: \$250,000
- McNair, J.N. and Horwitz, R.J. 1996–1997. 1996 biological monitoring studies on the Connecticut portion of the Housatonic River. Funded by General Electric Company. Role: PI and Project Leader. Amount: \$116,796.
- McNair, J.N., Bouchard, R., Grant, R., Hart, D.D., Horwitz, R.J. and Velinsky, D. 1996–1997. Aquatic field studies in the White River near Batesville, Arkansas. Funded by Arkansas Eastman Division of Eastman Chemical. Role: PI and Project Leader. Amount: \$194,500

Symposia and Tutorials Organized

- 1993: McNair, J. N. (organizer and moderator). What is structured population dynamics? Tutorial presented by J.M. Cushing and G. Uribe at the annual meeting of the Society for Industrial and Applied Mathematics.
- 1993: McNair, J.N. (organizer and moderator). Mathematical and computational aspects of physiologically structured population models. Symposium at the annual meeting of the Society for Industrial and Applied Mathematics.

Other Recent Professional Activities

- Ongoing: Regularly serve as a reviewer for various journals, including (recently) *Ecology*, *American Naturalist*, *Limnology and Oceanography*, *Hydrobiologia*, *Journal of the North American Benthological Society*, *Water Resources Research*, *Archiv für Hydrobiologie* (now *Fundamental and Applied Limnology*), *International Society for Microbial Ecology Journal*
- 2004: Served on EPA STAR review panel for RFA, “Understanding Ecological Thresholds in Aquatic Systems Through Retrospective Analysis”, Washington, DC, 15–16 November 2004.

Selected Applied Project Experience at the Academy of Natural Sciences

- 2006–2007 (also 2004–2005, 2002–2003, 2000–2001, 1998–1999, 1996–1997, 1994–1995, 1992–1993 1990–1991): Assessing spatial and temporal trends in PCB concentrations in fish and benthic insects in the Connecticut portion of the Housatonic River (Role: project leader and PI)
- 2005–2007: Development and use of an improved tool to maximize the environmental benefits of stream restoration and protection activities. Funded by U.S. EPA Region III. (Role: project leader and PI) . (Role: PI and Project Leader)
- 2005–2006: Independent third-party oversight and assessment of biological impact studies following a major fly-ash-slurry spill into the Delaware River by PPL’s Martins Creek generating station. (Role: project leader and PI)
- 2003–2006: Development of a practical, quasi-mechanistic model for quantifying the influence of spatially variable riparian and upland habitat on measures of stream ecosystem integrity. (Role: PI)
- 2003–2006: Development of a methodology for assessing outcomes of stream restoration projects. (Role: PI)
- 2002–2006: Development and application of rotifer bioassay techniques for assessing individual-level and population-level effects of anthropogenic antibiotics and other PPCPs (pharmaceuticals and personal care products). (Role: project leader and PI)

- 2000: Assessing the feasibility and utility of algal bioconcentration factors for dissolved radionuclides, Phase 2: development of a physiologically based model of radionuclide uptake and loss by aquatic unicellular algae, and application to *Ankistrodesmus falcatus* in batch culture. (Role: PI)
- 1999-2005: Enhancing the Effectiveness of Vegetation Restoration and Maintenance Activities in Philadelphia's Fairmount Park System — a 4-year study using field and laboratory experiments to assess alternative methods of controlling the invasive exotic plants, Norway maple and Japanese knotweed. (Role: project leader and PI)
- 1998: Localization of Iodine-131 sources to the Susquehanna River near Scranton and Wilkes-Barre, Pennsylvania. (Role: PI)
- 1998: Assessing the feasibility and utility of algal bioconcentration factors for dissolved radionuclides, Phase 1: literature review. (Role: PI)
- 1997–1998: Aquatic field studies in the vicinity of Kingsport, Tennessee. (Role: project leader)
- 1997–1998: Aquatic field studies in the Congaree River near Columbia, South Carolina. (Role: project leader and PI)
- 1996–1997: Aquatic field studies in the White River near Batesville, Arkansas. (Role: project leader and PI)
- 1994–1995: Assessment of the role of the lower Susquehanna River reservoir system in sediment and nutrient inputs to the Chesapeake Bay. (Role: project leader and PI)
- 1994–1995: Assessment of potential toxic and nutrient impacts of an altered effluent discharge to the lower Guadalupe River (Texas). (Role: project leader and PI)
- 1994: Assessment of Still River Aroclor 1242 inputs to the Housatonic River, based on congener specific PCB analyses and estimated Aroclor 1242, 1256, and 1260 concentrations in smallmouth bass. (Role: project leader)
- 1994: Development and application of a two-dimensional advection-dispersion model of cross-channel mixing by effluent in the upper Delaware River. (Role: project leader and PI)
- 1992–1994: Integrative assessment of anthropogenic impacts on the Lake Ontario and Niagara River fish communities. (Role: project leader)
- 1990–1993: Modeling of PCB bioaccumulation by brown trout in the Housatonic River, Connecticut. (Role: project leader and PI)
- 1992: Assessment of proposed New Jersey regulations for cleanup of contaminated sites, with emphasis on procedures for ecological risk assessment. (Role: project leader and PI)
- 1991: Assessment of status and trends of toxic pollutants in the Delaware Estuary. (Role: project leader and PI)
- 1990: Literature review of PCB dynamics and bioaccumulation in the Hudson River and similar ecosystems. (Role: project leader and PI)
- 1990: Chronic bioassay tests of prechlorination effluent for the City of Philadelphia's Southeast Water Pollution Control Plant. (Role: PI)
- 1989: Spatial models of methanol dispersion and bacterial biodegradation in estuaries. (Role: PI)

Postdoctoral Fellows Trained in the Last 10 Years

Adriana Araújo (PhD, Nagasaki University, Japan)

Margot Bram (PhD, Rutgers University)

Rob Witmer (PhD, Virginia Tech)

Service on Graduate Student Committees in the Last 10 Years

Mike Angeletta (Doctoral committee, University of Pennsylvania)

Steve Beaupre (Doctoral committee, University of Pennsylvania)

Dina Fonseca (Doctoral committee, University of Pennsylvania)

Stan Kemp (Doctoral committee, University of Pennsylvania)

Helen Murphy (Doctoral committee, University of Pennsylvania)

Mike Sears (Doctoral committee, University of Pennsylvania)

Roland Wall (Masters committee, University of Delaware)