

## NORMAN G. REICHENBACH

Professor  
Liberty University

### Education/Previous Employment

B.S., Zoology 1976, The Ohio State University  
M.S., Zoology 1981, The Ohio State University  
Ph.D., Entomology 1984, The Ohio State University  
Research Scientist, 1987, Battelle  
Principal Research Scientist, 1990, Battelle  
Assistant Professor, 1991, Liberty University  
Mariculture consultant, 1993, Oceanographic Society of Maldives

### Current Work

My teaching responsibilities include ecology, environmental biology and zoology. I am also conducting ecological research on the Peaks of Otter Salamander (ecophysiological boundaries of its distribution), prairie garter snake (Ohio endangered species restoration program), timber rattlesnake (identification of critical habitat in the Blue Ridge National Park) and eastern box turtle (assessment of non resident movement patterns and survival rates).

### Qualifications

I have a broad background in biology having done field and laboratory research on both vertebrates and invertebrates. Areas of specialization include quantitative ecology and reptile and amphibian conservation. I enjoy applying my skills in experimental design and statistics to practical ecological/environmental problems. I have published articles ranging from statistical considerations in biomonitoring to the conservation and management of endangered species.

### Previous Experience

Timbering Impacts on the Peaks of Otter salamander. Twelve year project supported by the US Forest Service that assessed the impacts of clearcuts and shelterwood cuts on the Peaks of Otter salamander. The project resulted in two publications in the Journal of Herpetology.

Laamu Atoll Mariculture Project. Project director for a community development project on establishing a mariculture industry in the Republic of Maldives. I focused on sea cucumbers and seaweeds in this United Nations Food and Agriculture Organization sponsored project.

Aquatic Ecology/Rapid Bioassessments. Task leader in the collection and quantitative analysis of fish and benthos data from streams in order to assess the impact of point and area source contamination on the aquatic community.

Entomology (Ph.D. research). Principal researcher for a 3 year project on a quantitative evaluation of temperature effects on various aspects of the population dynamics of the spruce budworm. Stochastic processes were considered in modeling the population dynamics of this insect.

Herpetology (Master's research). Principal researcher on a 3 year field and laboratory study on syntopic species of garter snakes which included population dynamics, bioenergetics, conservation, and management techniques. One species was endangered in Ohio.

Biomonitoring. Task leader on an automated biomonitoring system. Hardware and software development and data base management, quality control and data evaluation were components of this task. New methods for statistical analysis of biomonitoring data were developed.

Risk Assessment. Task leader on risk assessment projects including quantification of risk from carcinogenic chemicals in drinking water, assessment of risk from pathogens in sewage sludge and calculation of exposure to air pollutants.

Biotechnology-Environmental Fate. Task leader for evaluating computer models for use in assessing exposure and risk from bioengineered organisms. Adaptation of a chemical fate model to assess the fate of microorganisms in multimedia environments was also done.

Endangered Species. Intern with the Ohio Department of Natural Resources for surveys on rare and endangered species of reptiles and amphibians.

Toxicology/Teratology. Statistician for studies in toxicology/teratology. Tasks involved experimental design and data analysis.

Data Base Management. Manager of several tasks involving environmental data bases. Data form development, input and data manipulation procedures and quality control were components of these tasks. These tasks required the use of both mainframe computers and PCs in conjunction with software such as the Statistical Analysis System (SAS), SYSTAT, EXCEL, and LOTUS.

Fisheries. Researcher on the impact of parasites on yellow perch in Lake Erie during a 3 year fisheries management study on yellow perch.

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Aquaculture Research leader for grow out of shrimp in an indoor, recirculating aquaculture system (Inland Ocean business); Sole proprietor for a business which produced herbs and catfish from a hydroponic/aquaculture system (HydroHarvest).

## Professional Affiliations

Society for the Study of Amphibians and Reptiles  
Virginia Herpetological Society  
Virginia Natural History Society

## Publications and Presentations

Reichenbach, N. and G. Dalrymple. 1980. An ecological perspective in the conservation of an endangered species in Ohio: the prairie garter snake, *Thamnophis radix*. Twentieth Ohio Fish and Wildlife Conference.

Reichenbach, N. and G. Dalrymple. 1980. On the evidence and criteria for interspecific competition in snakes. *J. Herpetology*. 14:409-412.

Reichenbach, N. 1980. What good is breathing underwater to a snake? *J. Northern Ohio Assoc. Herp.*, 6:2-4.

Dalrymple, G. and N. Reichenbach. 1981. Interactions between the prairie garter snake, *Thamnophis radix*, and the common garter snake, *Thamnophis sirtalis* in Ohio. Pages 244-250, In: Proceedings of the Sixth North American Prairie Conference, The Ohio State University, Ohio Biol. Surv. Biol. Notes, 15:278

Reichenbach, N. 1981. First record for the striped color morph of *Plethodon cinereus* from a Lake Erie Island. *Herp. Review* 12:53

Reichenbach, N. 1983. An aggregation of female garter snakes under corrugated metal sheets. *J. Herpetology*. 17:412-413

Reichenbach, N. and W. Collins. 1984. Multiple logit analyses of the effects of temperature and humidity on the toxicity of propoxur to german cockroaches (Orthoptera: Blattellidae) and western spruce budworm (Lepidoptera: Tortricidae). *J. Econ. Entomol.* 77:31-35.

Reichenbach, N. and G. Stairs. 1984. Response of the western spruce budworm (Lepidoptera: Tortricidae) to temperature and humidity: Developmental rates and survivorship. *Environ. Entomol.* 13:611-618.

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Dalrymple, G. and N. Reichenbach. 1984. Conservation and management of an endangered species of snake in Ohio. *Biological Conservation* 30:195-200.

Reichenbach, N. and G. Stairs. 1984. Response of the western spruce budworm (Lepidoptera: Tortricidae) to temperature: The stochastic nature of developmental rates and diapause termination. *Environ. Entomol.* 13:1549-1556.

Reichenbach, N. 1985. Response of the western spruce budworm to temperature and dose of a virus, a growth regulator, and an organophosphate. *Entomologia Experimentalis et Applicata* 38:57-63.

Reichenbach, N. and G. Stairs. 1985. Bioenergetics of the western spruce budworm (Lepidoptera: Tortricidae) with comments on endo and ectotherm population energetics. *Canadian J. Zoology*, 63:1330-1338.

Horner R. and N. Reichenbach. 1985. Multivariate modeling of toxicological data. Society of Environmental Toxicology and Chemistry, Sixth Annual Meeting.

Chesson, J., D. Margeson, J. Ogden, N. Reichenbach, K. Bauer, P. Constant, F. Bergman, D. Rose, G. Atkinson. 1985. Evaluation of asbestos abatement techniques. Phase I: Removal. Office of Toxic Substance, U.S. EPA 560/5-85-019.

Reichenbach, N. and G. Dalrymple. 1986. Energy consumption, life histories, and the avoidance of potential competition in two species of garter snake. *J. Herpetology*. 20:131-151.

Reichenbach, N., B. Cornaby, and G. Wickramanayake. 1986. Exposure Pathways and Assessment for pathogens and bioengineered microorganisms: Model development and application. IV International Congress of Ecology.

Reichenbach, N., R. Hayward, L. B. Goss, L. Dickson, and T. Wildoner, Jr., 1986. Altered ventilatory frequency from fish in an automated biomonitoring system: How to evaluate if it is significant. Society of Environmental Toxicology and Chemistry, Seventh Annual Meeting.

Goss, L., B. Cornaby, K. Duke, N. Reichenbach, P. Sticksel, and M. Zanetos. 1986. An assessment of exposure models for bioengineered microorganisms. *Aquatic Toxicology and Environmental Fate: Ninth Volume, ASTM STP 921*. T. M. Poston and R. Purdy, eds. American Society for Testing and Materials, Philadelphia, 1986, pp 192-206.

Cornaby, B., N. Reichenbach, and G. Wickramanayake. 1986. Environmental fate of genetically-altered microorganisms: Possibilities and Probabilities. Society for Risk Analysis Annual Meeting.

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Reichenbach, N., J. Fava, G. Wickramanayake, A. Gavaskar, and C. Delos. 1987. Application of EPA's toxic control policy: A pilot study approach. ASTM, Aquatic Toxicology and Hazard Assessment, Eleventh Symposium.

Reichenbach, N.G. 1988. Applicability of the microbial fate model MICROBE-SCREEN in biotechnology monitoring studies, U.S. EPA-OTS/ORD Exposure Assessment Seminar Series, August 11, Washington D.C.

Carr, R.S., N.E. Barrows, N.G. Reichenbach, G.M. DeGraeve, T.L. Pollock, J. A. Fava, and A.H. Glickman. 1988. Investigation of preference-avoidance response to an oil refinery effluent with striped bass and steelhead trout. Annual Meeting for the Society of Environmental Toxicology and Chemistry, November 13-17, Arlington, VA

Reichenbach, N.G., R. Hayward, L.A. Dickson, and T.J. Wildoner, Jr. 1988. Calibration of ventilatory responses of bluegill to complex effluents using acute daphnia toxicity tests. Annual Meeting for the Society of Environmental Toxicology and Chemistry, November 13-17, Arlington, VA

Hayward, R. S., N.G. Reichenbach, Goss, L.B., Dickson, L.A., and T.J. Wildoner, Jr. 1988. Altered ventilatory frequency from fish in an automated biomonitoring system: How to evaluate if it is significant. Chapter 4 in Automated Biomonitoring: Living Sensors as Environmental Monitors, Gruber, D. and Diamond, J. (eds.), Halsted Press, pp 47-64.

Hayward, R., N. Reichenbach, L.A. Dickson, and T.J. Wildoner, Jr. 1988. Variability among bluegill ventilatory rates for effluent toxicity biomonitoring. *Wat. Res.* 22:1311-1315.

Vigon, B., N. Reichenbach, R. Moss, S. Gautney, J. Johnson, J. Bain, and R. Scudder. 1989. The TVA Moving-Manifold Targeted-Chlorination System: Second Field Demonstration. Electric Power Research Institute Report, EPRI GS-6253.

Duke, K., B. Cornaby, N. Reichenbach, J. Rench, and R. Velagaleti. 1990. Ecological and Human Health Risk Assessments of Biotechnology. American Chemical Society Meetings, April 12-15, Boston, MA.

Reichenbach, N., G. Wickramanayake, and D. Evers. 1990. Modeling Environmental Fate of Biotechnology Releases. American Chemical Society Meetings, April 12-15, Boston, MA.

Carr, R.S., N.E. Barrows, N.G. Reichenbach, G.M. DeGraeve, T.L. Pollock, J. A. Fava, and A.H. Glickman. 1990. Investigation of preference-avoidance response to an oil refinery effluent with striped bass and steelhead trout. *Environ. Tox. and Chem.* 12:23-28.

Velagaleti, R., D. Kramer, S. Marsh, N. Reichenbach, and D. Fleischman. 1990. Some approaches to rapid and presymptom diagnosis of chemical stress in plants. *Plants for Toxicity Assessment*, ASTM STP 1091, W. Wang, J. Gorsuch, and W. Lower, eds. American Society for Testing and Materials, Philadelphia, pp 333-345.

Wickramanayke, G., R. Hinchee, J. Kittel, N. Reichenbach, and B. Nielson. 1991. Evaluation of external vapor monitoring devices for underground petroleum products storage tanks. *Hazardous Mat. Control* 4:32-40.

Kramer, P, Reichenbach, N., M. Hayslett, and P. Sattler. 1993. Population Dynamics and conservation of the Peaks of Otter salamander, *Plethodon hubrichti*. *J. Herpetology* 27:431-435.

Sluka, R. and N. Reichenbach. 1995. Grouper density and diversity at two sites in the Republic of Maldives. *Atoll Research Bulletin* 438, 16pp.

Reichenbach, N. and S. Holloway. 1995. Potential for asexual propagation of several commercially important species of tropical sea cucumber (Echinodermata). *J. World Aquaculture Society* 26:272-278.

Reichenbach, N., Y. Nishar, and A. Saeed. 1996. Species and size related trends in asexual propagation of commercially important species of tropical sea cucumbers (Holothuroidea). *J. World Aquaculture Society* 27:475-482.

Sattler, P. and N. Reichenbach. 1998. The effects of timbering on *Plethodon hubrichti*: short term effects. *J. Herp.* 32:399-404.

Reichenbach, N. 1999. Ecology and fishery biology of *Holothuria fuscogilva* in the Maldives, Indian Ocean (Echinodermata: Holothuroidea). *Bull. Mar. Sci.* 64:103-113.

Reichenbach, N. 2000. Syntopic occurrence of *Eurycea lucifuga* (Cave salamander), *E. longicauda longicauda* (Long-tailed salamander), and *E. guttolineata* (Three-lined salamander) in the Piedmont of Virginia. *Catesbeiana* 20:32-33.

Howard, J. and N. Reichenbach. 2001. Sensitivity of spotted salamander (*Ambystoma maculatum*) embryos to UV-B radiation in Central Virginia. *Catesbeiana* 21:69-74.

Reichenbach, N. 2002. Laamu Atoll Mariculture Project: Sea cucumber Mariculture. Online report Oceanographic Society of Maldives. 54 pp.

Reichenbach, N and S. Holloway. 2002. Laamu Atoll Mariculture Project: Seaweed Mariculture. Online report Oceanographic Society of Maldives. 42 pp.

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Reichenbach, N. 2003. Status of the Peaks of Otter Salamander. Presentation at the 2003 Virginia Herpetological Society Fall Meeting.

Aasen, G. and N. Reichenbach. 2004. Is the red-backed salamander (*Plethodon cinereus*) encroaching upon populations of the Peaks of Otter Salamander (*P. hubrichti*)? *Catesbeiana* 24:17-20.

Reichenbach, N, J. Zealand and A. Washington. 2004. Conservation of the timber rattlesnake along the Blue Ridge Parkway. Invited speaker to Lynchburg College Biology Seminar Series, Fall 2004.

Kniowski, A. and N. Reichenbach. 2005. The Peaks of Otter salamander in the contact zone with the Redback salamander. Presentation at the 2005 Virginia Herpetological Society Fall Meeting.

Zealand, J., J. Kirshberger, J. Mason and N. Reichenbach. 2005. Population model for Timber Rattlesnakes (*Crotalus horridus*) in the Blue Ridge Mountains. Presentation at the 2005 Virginia Herpetological Society Fall Meeting.

Kniowski, A. and N. Reichenbach. 2006. *Plethodon hubrichti* (Peaks of Otter Salamander) reproduction. *Herp. Review* 37:332.

Wynn, D., N. Reichenbach, C. Caldwell, P. Johantgen, K. Becka, K. Stanford, G. Burghardt. 2006. The Plains Garter Snake Recovery Program at Killdeer Plains Wildlife Area: A Chronological Account. Ohio Reptile Research & Conservation Conference, March 11, Columbus, Ohio.

N. Reichenbach, D. Wynn, C. Caldwell, P. Johantgen, K. Becka, K. Stanford, G. Burghardt. 2006. Chronological Account of the Restoration Program for the State Endangered Plains Garter Snake in Ohio. Presentation at the 2006 Virginia Herpetological Society Fall Meeting.

Reichenbach, N., M. LeMon, and J. Hinson. 2006. Ecology of a salamander assemblage, including disjunct populations of *Eurycea lucifuga* and *E. l. longicauda*, in an abandoned Virginia mine. *Banisteria* 28:44-48.

Kniowski, A. and N. Reichenbach. 2006. *Plethodon hubrichti* reproduction. *Herpetological Review* 37:332.

Fredrickson, A., T. Brophy and N. Reichenbach. 2007. Ecophysiological boundaries for the distribution of the Peaks of Otter Salamander (*Plethodon hubrichti*). Presentation at the 2007 Virginia Herpetological Society Fall Meeting.

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Reichenbach, N. and P. Sattler. 2007. The effects of timbering on *Plethodon hubrichti* over 12 years. J. Herp. 41:621-628.