

**CURRICULUM VITAE**  
of  
Arthur L. Buikema, Jr.  
February 2000

Home: (540) 552-3514  
Office: (540) 231-5180 or 231-6407  
Birth: February 4, 1941; Evergreen Park, Illinois  
Marital Status: Married and children

Title: Alumni Distinguished Professor  
Professor of Ecology, Environmental Sciences, Evolution and Systematics  
Associated (teaching) Professor, Family & Child Development  
Associated (teaching) Professor, Landscape Architecture

**EDUCATION:**

B.S. Elmhurst College, Elmhurst, Illinois (1962)  
M.A. University of Kansas, Lawrence, Kansas (1965)  
Ph.D. University of Kansas, Lawrence, Kansas (1970)

**ADDITIONAL TRAINING:**

Oak Ridge Associated Universities course in Radioisotope theory and techniques (1969)  
Expert Witness Training, EPA

**SABBATICAL EXPERIENCE:**

USEPA, Senior Scientific Advisor/Aquatic Ecologist, Office of Pesticide Programs,  
Environmental Effects Branch (1988-1990)

**PHD. THESIS:**

Some effects of light on the biology of the cladoceran, *Daphnia pulex*. Dissert. Abst. 1970:3761B-3762B

**CERTIFICATION:**

Ecological Society of America (Senior Ecologist) 1984 to present

**HONORS, AWARDS, ETC.:**

Teaching Awards: Va Tech  
XCaliber Award for Excellence in Course Development Using Technology, 2000  
Alumni Distinguished Professor (1999-present)  
Citation by the AAHE, ACPA and NASPA for exemplary Wellness Living Program (1998)  
XCaliber Certificate for Excellence in Course Development Using Technology, 1997  
CASE Outstanding Faculty Award nominee (1998)  
State Council of Higher Education's Outstanding Faculty Award, Nominee, 1996,1997

Outstanding Biology Teacher of the Year Award, Va Tech Biology Club, 1996  
 Certificate of Teaching Excellence, College of Arts and Sciences, 1996  
 Alumni Teaching Excellence Award, 1996  
 Outstanding Teacher, Biology Department (1995)  
 Diggs Teaching Scholar Award (1995)  
 Dedicated Teaching Assignment (1993-2000)  
 Academy of Teaching Excellence Inductee (1988, 1996)  
 Sporn Award for Excellence in Teaching an Introductory Subject (1988)  
 G. Burke Johnson Renaissance Man Award; Omicron Delta Kappa (1988)  
 Teaching-Learning Summer Faculty Fellowship (1987)  
 Virginia Polytechnic Institute and State University Award for Teaching Excellence (1974)

**Teaching Awards (National and International)**  
 Outstanding Teaching Award, Four-Year College and University, National Association of Biology Teachers (2000)  
 SETAC - ABC Laboratories Environmental Education Award (1994)

**Certificates of Appreciation**  
 International Study Abroad Va Tech (2000)  
 Local Human Rights Committee, Community Services Board (2000)  
 Its a Life you Can live with, Health Education, Va Tech (1992-1993)  
 Golden Key Honors Society (1999)  
 Certification of Appreciation, Virginia State Air Pollution Control Board (1987)

**Academic Awards**  
 NSF Summer Traineeship for Graduate Teaching Assistants - University of Kansas (1967)  
 NSF Predoctoral Award - Duke Marine Laboratory (Summer 1966)  
 NSF Summer Fellowship for Graduate Teaching Assistants - University of Kansas (1964)  
 DeBruine Biology Award - Elmhurst College (1961)  
 Deans List, Elmhurst College, 4 semesters

**Honors Society**  
 Golden Key National Honor Society Honorary Member (1995)

**EMPLOYMENT (PERMANENT):**

**St. Olaf College**

Assistant Professor of Biology; 1967 to 1971.

**Virginia Polytechnic Institute and State University.**

Assistant Professor of Zoology: 1971 to 1974.

Associate Professor of Zoology: 1974 to 1980

Professor of Zoology: 1980 to present

Alumni Distinguished Professor: 1999 to present

Assistant Director, University Center for Environmental Studies; 1978 to 1983.

**Virginia Polytechnic Institute And State University Duties:**

Currently, the appointment is 100% instruction appointment and an academic year position.

**EMPLOYMENT (TEMPORARY):**

NSF Summer Institute: Secondary Science Training Program Summer, 1968, St. Olaf College; taught -- An Introduction to Environmental Biology and Physiology.

Associated Colleges of the Midwest Wilderness Field Station; summers, 1969-72, Instructor of Biology. Taught courses in Aquatic Ecology; Field Invertebrate Zoology and Environmental Science (non-major).

**EMPLOYMENT (UNDERGRADUATE AND GRADUATE STUDENT):**

Elmhurst College - teaching assistant  
General Biology - 4 semesters  
Microbiology - 2 semesters  
University of Kansas - teaching assistant  
General Biology - 6 semesters  
Comparative Physiology - 2 semesters  
Invertebrate Zoology - 1 semester  
Limnology - 1 semester  
University of Kansas - research assistant  
Environmental biology of crayfish - 2 years; with K. B. Armitage  
Effects of thyroxine on the metabolism of some lizards - 1 summer (1969); with M. Maher.

**COURSES TAUGHT:**

Biology  
Honors Biology (major and non-major)  
General Biology (non-major)  
Principles of Biology (major)  
General Physiology  
Comparative Animal Physiology  
Invertebrate Physiology  
Invertebrate Zoology  
Aquatic Ecology  
Environmental Biology  
Field Biology of the Everglades  
Introduction to Scientific Research  
Environmental Stress  
Ecological Physiology of Invertebrates  
Graduate and Undergraduate Research  
Aquatic Ecology (Advanced Topics)  
Zooplankton Ecology  
Honors Colloquium  
Alcoholism, Facts and Myths  
Hazard Evaluation  
Creativity  
Science and the Family  
Post-Modern Male: Issues of Men in response to Feminism  
Educational Counseling and Administration  
Counseling the Addict  
Family & Child Development  
Addictions and The Family

**CURRENT ACTIVE SOCIETY MEMBERSHIPS:**

North American Benthological

Society Sigma Xi  
Virginia Academy of Sciences  
International Society for Theoretical and Applied Limnology  
Society of Environmental Toxicology and Chemistry  
Ecological Society of America  
International Association for Neuro-Linguistic Programming  
Inland Lighthouse Authority, UK

#### **PHOTOGRAPHIC WORK:**

Investigations in General Biology by K. B. Armitage, 1970,  
Academic Press; with N. J. Willems  
Cover photograph, Journal of Testing and Evaluation, March  
1976. Daphnia  
Cover photograph. "Today, Tomorrow Together. . ." Program  
for the National Association for Environmental Education. 1979.  
ASTM document on Daphnia Toxicity Test Methodology

#### **BIBLIOGRAPHIC LISTING:**

Who's Who in the South and Southwest;  
American Men and Women of Science;  
Personalities of the South.

#### **RESEARCH INTERESTS:**

Aquatic toxicology  
Environmental physiology, esp. fresh-water invertebrates  
Invertebrate ecology  
Invertebrate behavior as affected by stress .  
Blocks to changing teaching strategies

Funded research from the following agencies totaling over \$2,00,000 (many projects were with co-principal investigators; more detailed list at end of document):

Office of the Water Resources Technology  
U.S. Environmental Protection Agency  
Army Corps of Engineers  
American Petroleum Institute  
Virginia Academy of Science  
American Philosophical Society  
Energy Resources and Development Administration  
Virginia Polytechnic Small Research Projects Exxon  
Appalachian Power Company  
American Cancer Society (small projects)  
Mobil Oil  
Texaco Oil  
Federal Mogul  
U.S. Air Force  
Hercules, Inc.

Roanoke Electric Steel  
Virginia State Air Pollution Control Board  
American Electric Power Company

**CONSULTANT FOR THE FOLLOWING AGENCIES:**

State of Virginia (Va. State Water Control Board, Va. State  
Air Pollution Control Board Department of Fisheries).  
Teledyne-Brown Engineering  
Environmental Science Associates  
General Motors  
FMC Corporation: Viscose and Industrial Chemical Divisions  
CDM - Limnetics  
Duke Power Company  
Metcalf and Eddy, Engineers  
Environmental Research and Technology, Inc.  
American Petroleum Institute  
Conservation Foundation  
Chemical Manufacturing Association  
Battelle, Columbus  
U.S. Environmental Protection Agency  
Copper Development Association  
Hazelton Environmental Sciences, Corp.  
NUS Corporation  
Life Systems, Inc.  
Standard Oil of Indiana  
Homestake Mining Co.  
Utilities Water Action Group (UWAG)  
MacMillian Publishers, Inc.  
Proctor and Gamble (Buckeye Cellulose)  
Jones, Day, Reavis & Pogue  
Hercules, Inc.  
Research Evaluation, Inc.  
Harper and Row, Inc.  
Prentice Hall  
Simon Schuster  
Mosby-Times Mirror  
Saunders Publishing Co.  
Harcourt Brace  
Appalachian Power Company  
American Electric Power Company

These activities have included zooplankton collection and identification, periphyton analyses, macrobenthos collection and identification, bioassays with invertebrates and fish, water quality analyses, environmental impact assessments, and assessment of water quality criteria published in the Federal Register. Work for publishers was to review textbooks, laser disks, CD-ROMs, etc for teaching.

**INVITED PAPERS/PARTICIPATION(\*)** (Some of these overlap with papers presented at scientific meetings)

1. Nonphotoperiodic light response of Daphnia. Special Symposium on Cladoceran Ecology, AIBS 1970.
2. Environmental Mini-Courses for Teachers K-14. NSTA Regional Meeting, Washington, D. C. 1974.
3. Ecological studies utilizing a diversity index. NSTA National Meeting, Philadelphia, 1975.
- \*4. Estimating the hazard of chemical substances to aquatic life, Pellston, Michigan, 1977.
5. Use of aquatic invertebrate life history information for bioassay work. 26th Annual Meeting of NABS, Winnipeg, 1978.
6. Usefulness of enzyme inhibition to detect toxicants in sediments. ACS-JCS, Honolulu, 1979.
7. Macroinvertebrate toxicity data and water quality criteria - a biologists perspective. 27th Annual Meeting of NABS, La Crosse, Wisc. 1979.
8. Toxicity tests and water quality criteria. 2nd Annual Meeting of SPIB, Washington, D.C., 1979.
9. Use of life history stages in toxicity testing. 1st National Meeting of American College of Toxicology, Washington, D.C., 1979.
- \*10. Workshop on Health and Environmental Effects of Coal Gasification and Liquefaction Technologies. DOE/HEW/EPA. Leesburg, VA., 1979.
- \*11. TSCA-ITC Workshop on Scoring Chemicals for Health and Ecological Effects Testing. Austin, Texas, 1979.
12. Secondary productivity in Smith Mountain Lake and its potential impact on the sports fishery. ACSE Symposium on Surface-Water impoundments, Minneapolis, 1980.
13. Misuse of scientific information in the development of water quality criteria. ACS Annual Meeting, Las Vegas, 1980.
14. Water quality criteria - an academicians perspective. Symposium in the Development, Use and Value of Water Quality Criteria and Standards., Washington, D.C., 1980.
- \*15. Workshop on approaches to the characterization of aqueous effluents from the oil refinery industry, Leeuven, Belgium, 1981.
16. Verifying predictions of environmental harm. NOAA workshop on meaningful measures of verifying marine pollution effects, Pensacola, 1982.
- \*17. Gordon Conference on Environmental Science: Water. Vermont, 1982.
18. Correspondence of laboratory and field toxicity results of multiple species toxicity testing. ESA/SETAC Workshop on Multi-Species Toxicity Testing. Blacksburg, VA. 1983.
19. Symposium on New Research Techniques. 31st Annual North American Benthological Society, LaCrosse, Wisconsin. 1983.

20. International SCOMSEQ Workshop on Complex Mixture Testing. Surrey, England. August 1983.
- \*21. NATO Workshop on Ecoaccidents. The Netherlands, September 1983.
22. USEPA Region 6 Effluent Toxicity Testing and Biomonitoring Workshop Dallas, Texas. February 1983.
- \*23. USEPA Workshop on Development of Daphnia Chronic Test Protocols, Cleveland, Ohio. February 1983.
24. Environmental Issues in Virginia. Governor's Commission on Virginia's Future. Blacksburg, VA. January 1983.
25. Environmental Issues in Virginia's Future. Brush Mountain Colloquy. Blacksburg, VA. May 1983.
26. Validation of Water Quality Criteria for Selected Metals. 4th Annual Meeting of SETAC, Arlington, VA. 1983.
27. Biological monitoring of refinery aqueous effluents. In: Biological Impact Assessments of Oil Industry Waste Water Systems and Mining Developments. British Petroleum, Shrewsbury, U.K. 1983.
28. Comparison of biomonitoring techniques for evaluating effects of jet fuel on bluegill sunfish (*Lepomis macrochirus*). Freshwater Biological Monitoring. Cardiff, U.K. 1984.
29. USEPA, Workshop on Auditing *Daphnia* testing methods and data. 1985.
30. ASTM, Symposium on Community Toxicity Texts. 1986.
31. NACA, Workshop on Aquatic Issues in Pesticide Registration. 1986.
32. USEPA, Workshop on mesocosm protocols for pesticide registration. 1986.
33. USEPA, Mesocosms Protocols Review. Duluth, Minnesota, Sept. 1987.
34. USEPA and Alaska Dept. of Fish and Game. Public Symposium on Restoration following the Valdez oil spill. Summary Keynote Speaker. 1990.
35. SETAC. Symposium on simulated field studies in aquatic ecological risk assessment. 1990. (2 papers).

**BOOKS, BOOK CHAPTERS, MONOGRAPHS, AND REVIEWS (\*Not Peer Reviewed)**

1. Buikema, A. L., Jr., J. Cairns, Jr., and G. W. Sullivan. 1974. Rotifers as monitors of heavy metal pollution in water. Va. Water Resources Res. Bull. No. 71. 74 pp.

- \*2. Buikema, A. L., Jr., and A. C. Hendricks. 1975. Amphibians. In J. Cairns, Jr. and K. L. Dickson (eds.). Preliminary Environmental Analysis of Burnsville, Leading Creek and West Fork Lakes Project. Phase One. 1973. U.S. Army Corps of Engineers.
- \*3. Hendricks, A. C., E. F. Benfield, and A. L. Buikema, Jr. 1975. The Role of Aquatic Invertebrates. In J. Cairns, Jr. and K. L. Dickson (eds.). West Fork Lakes Project. Phase One. 1973. U.S. Army Corps of Engineers.
4. Miller, J. D., and A. L. Buikema, Jr. 1976. Observations on the ecology of the spring form of Gammarus minus (Form III) Say. *Crustaceana Suppl.* 4:153-163.
5. Hall, Greenville B., G. Prescott, and Arthur L. Buikema, Jr. 1976. Algal dynamics of Pandapas Pond, Jefferson National Forest. pp 81-101 in O. K. Miller and B. C. Parker (eds.). *The Distribution History of the Biota of the Southern Appalachians. Part III. Algae and Fungi.*
6. Buikema, A. L., Jr., J. Cairns, Jr., T. H. Krakauer and P. C. Edmunds. 1977. Studies on the culturing and ecology of the rotifer Polyarthra vulgaris. Environmental Protection Agency, Ecological Research Series. EPA-600/3-77-051. 53 p.
7. Buikema, A. L., Jr., C. L. See, and J. Cairns, Jr. 1977. Assessment of rotifers for acute determination of selected inorganic pollutants. *Va. Water Resources Res. Bull. No. 92.*
8. Cairns, J., Jr., A. L. Buikema, Jr., A. Heath, and B. C. Parker. 1971. Interactions of temperature and toxicity of six water pollutants on aquatic organisms. *Va. Water Resources Res. Bull. No. 106.*
- \*9. Herricks, E. E., and A. L. Buikema, Jr. 1977. Water Pollution: Freshwater Aquatic Organisms. In Literature Review Issue. *J. Water Pollut. Contr. Fed. Vol. 49(6):1493-1506.*
- \*10. Buikema, A. L., Jr., and E. E. Herricks. 1978. Water Pollution: Freshwater Aquatic Organisms. In Literature Review Issue. *J. Water Pollut. Contr. Fed. Vol. 50:1637-1648.*
11. Macek, K., W. Birge, F. L. Mayer, A. L. Buikema, Jr. and A. W. Maki. 1978. Introduction to a discussion of the use of aquatic toxicity tests for evaluation of the effects of toxic substances: Discussion Session Synopsis. P. 27-33. In Cairns, Dickson, and Maki (eds.). *Estimating the Hazard of Chemical substances to Aquatic Life. ASTM STP 657. American Society for Testing and Materials, Philadelphia.*
12. Buikema, A. L., Jr., S. R. Sherberger, G. W. Knauer, L. A. Newbern, J. T. Reading and J. Cairns, Jr. 1978. Effects of simulated entrainment on the biology of a freshwater cladoceran. pp. 809-825. In Thorp and Gibbons (eds.). *Energy and Environmental Stress in Aquatic Systems. DOE Symposium Series 48 (Conf-771114). NTIS, Springfield, Va.*
13. Buikema, A. L., Jr., M. J. McGinniss and J. Cairns, Jr. 1979. Phenolics in aquatic ecosystems: a selected review of the literature. *Marine Environ. Res. 2:87-181 (entire issue).*
14. Buikema, A. L., Jr. and J. Cairns, Jr. 1979. Toxicity tests and water quality criteria - a biologist's perspective. In G. Cox (ed.). *Ecological Damage Assessment. The Society of Petroleum Industry Biologists.*
- \*15. Gehrs, C., K. Biesinger, and A. L. Buikema, Jr., et al. 1979. Water Quantity, Quality and Ecological Effects: Panel Report. pp. 113-160. In Brown and Witter (eds.). *Health and*

Environmental Effects of Coal Gasification and Liquefaction Technologies. Mitre Corp. for Federal Interagency Committee on the Health and Environmental Effects of Energy Technologies. DOE/HEW/EPA-03. MTR-79WOO137.

\*16. Buikema, A. L., Jr. and E. F. Benfield. 1979. Water Pollution: Freshwater Aquatic Organisms. In Literature Review Issue. Water Pollut. Contr. Fed. Vol. 51:1708-1717.

17. Buikema, A. L., Jr., K. E. Schwaab and J. Cairns, Jr. 1980. Pollution Assessment: A Training Manual. UNESCO's Man and the Biosphere program. U.S. MAB Handbook No. 1. 15 p.

18. Buikema, A. L., Jr. and A. C. Hendricks. 1980. Benzene, xylene and toluene in aquatic systems: a review, American Petroleum Institute. Technical Series. Washington D.C. 69 p.

19. Buikema, A. L., Jr. and P. H. Loeffelman. 1980. Effects of pumpback storage on zooplankton populations. In J. Clugston (ed.). Proceedings of Workshop on Environmental Impacts of Pumped Storage Hydroelectric Operations. U.S. Fish and Wildlife Service.

20. Buikema, A. L., Jr., C. L. Rutherford and J. Cairns, Jr. 1979. Screening sediments for potential toxicity by in vitro enzyme inhibition. p. 463-476. In Baker (ed.). Processes Involving Contaminants and Sediments. Vol. 1. Ann Arbor Science, Inc. Ann Arbor, Mich.

21. Geiger, J. G., A. L. Buikema, Jr. and J. Cairns, Jr. 1980. A tentative seven-day test for predicting effects of stress on populations of Daphnia pulex. p. 13-26. In Eaton, Parrish and Hendricks (eds.). Third ASTM Symposium on Aquatic Toxicology. ASTM STP 707. American Society for Testing and Materials, Philadelphia, Pa.

22. Buikema, A. L., Jr. and J. R. Holsinger (eds.). 1980. Studies on Gammaridae II. Crustaceana. Supplement 6. 252 p.

\*23. Buikema, A. L. Jr. and E. F. Benfield. 1980. Water Pollution: Freshwater Aquatic Organisms. In Literature Review Issue. J. Water Pollut. Contr. Fed. 52(6):1670-1686.

24. Buikema, A. L., Jr., A. Chester and H. R. Steeves, III. 1980. Intersexuality in Gammarus minus. p. 109-117. In Buikema and Holsinger (eds.). Studies on Gammaridae II. Crustaceana. Supplement 6.

25. Buikema, A. L., Jr. and J. Cairns, Jr. (eds.). 1980. Aquatic Invertebrate Bioassays. ASTM STP 715. American Society for Testing and Materials. Philadelphia, Pa. 209 p.

26. Buikema, A. L., Jr., J. G. Geiger and D. R. Lee. 1980. Daphnia Toxicity Tests. p. 48-69. In Buikema and Cairns (eds.). Aquatic Invertebrate Bioassays. ASTM STP 715. American Society for Testing and Materials. Philadelphia, Pa.

27. Benfield, E. F. and A. L. Buikema, Jr. 1980. Synthesis of miscellaneous invertebrate toxicity tests. p. 174-187. In Buikema and Cairns (eds.). Aquatic Invertebrate Bioassays. ASTM STP 715. American Society for Testing and Materials. Philadelphia, Pa.

28. Buikema, A. L., Jr., B. R. Niederlehner and J. Cairns, Jr. 1980. The use of grass shrimp in toxicity tests. p. 155-173. In Buikema and Cairns (eds.). Aquatic Invertebrate Bioassays. ASTM STP 715. American Society for Testing and Materials. Philadelphia, Pa.

29. Buikema, A. L., Jr. and J. Cairns, Jr. 1980. Summary. p. 201-204. In Buikema and Cairns (eds.). Aquatic Invertebrate Bioassays. ASTM STP 715. American Society for Testing and Materials. Philadelphia, Pa.
30. Buikema, A. L., Jr. and P. H. Loeffelman. 1980. Secondary productivity in Smith Mountain Lake and its potential impact on the sports fishery. pp. 1383-1391. In H. Stefan (ed.). Symposium on Surface-Water Impoundments. ASCE, Minneapolis, Minn.
31. Holsinger, J. R., and A. L. Buikema, Jr. (eds.). 1981. Proceedings of the International Symposium on Groundwater Ecology. Suppl. Int. J. Speleol. 171 pp.
- \*32. Buikema, A. L., Jr., E. F. Benfield, and B. R. Niederlehner. 1981. Effects of Pollution on Freshwater Invertebrates. J. Water Pollut. Contr. Fed. 53(6):1007-1015.
33. Holsinger, J. R., and A. L. Buikema, Jr. 1981. International Symposium on Groundwater Biology: Introduction. pp. 3-7. In J. R. Holsinger and A. L. Buikema, Jr. (eds.). International Symposium on Groundwater Biology. Int. J. Speleol. 11(1-2):1-171.
34. Buikema, A. L., Jr., B. R. Niederlehner, and J. Cairns, Jr. 1982. Biological Monitoring, Part IV. Toxicity Testing. Water Res. 16:239-262.
35. Matthews, R. A., A. L. Buikema, Jr., J. Cairns, Jr., and J. H. Rodgers, Jr. 1982. Biological Monitoring, Part II. Receiving system functional methods, relationships and indices. Water Res. 16:129-139.
- \*36. Buikema, A. L., Jr., E. F. Benfield, and B. R. Niederlehner. 1982. Effects of pollution on freshwater invertebrates. J. Water Pollut. Contr. Fed. 54(6):862-868.
37. Matthews, R. A., P. F. Kondratieff, and A. L. Buikema, Jr. 1982. A seasonal analysis of stress in a stream ecosystem using a nontaxonomic approach. pp. 326-340. In Pearson, Foster and Bishop (eds.). Fifth ASTM Symposium on Aquatic Toxicology. ASTM STP 766. American Society for Testing and Materials. Philadelphia, Pa.
38. Cairns, J., Jr., A. L. Buikema, Jr., et al. 1983. Biological Monitoring. Pergamon Press.
39. Buikema, A. L., Jr., J. Cairns, Jr. and W. H. Yongue, Jr. 1983. Correlation between the autotrophic index and protozoan colonization rates as indicators of pollution stress. pp. 204-215. In Bishop, Caldwell and Heidolph (eds.). Aquatic Toxicology and Hazard Assessment: 6th Symposium, ASTM STP 802, American Society for Testing and Materials. Philadelphia, Pa.
40. Cairns, J., Jr., and A. L. Buikema, Jr. 1983. Verifying predictions of environmental safety and harm. In H. White (ed.). Meaningful verification of marine pollution effects. J. Wiley and Sons.
41. Buikema, A. L., Jr. 1983. Inter- and intralaboratory variation in conducting static acute toxicity tests with Daphnia magna exposed to effluents and reference toxicants. Publication 4362. American Petroleum Institute, Washington D.C. 37 pp.
- \*42. Buikema, A. L., Jr., E. F. Benfield, and C. A. Pittinger. 1983. Effects of pollution on freshwater invertebrates. J. Water Pollut. Contr. Fed. 55:829-833.

43. Cairns, J., Jr., and A. L. Buikema, Jr. 1984. Testing with complex mixtures. In J. Cairns, Jr. (ed.). *Complex Mixture Testing*, Springer Verlag
44. Cairns, J. Jr., and A. L. Buikema, Jr. (Eds.) 1984. *Restoration of Habitats Impacted by Oil Spills*. Ann Arbor Science. 182 pp. (plus two chapter: Introduction and Workshop Summary).
45. Doane, T. R., J. Cairns, Jr., and A. L. Buikema, Jr. 1984. Comparison of biomonitoring techniques for evaluating effects of jet fuel on bluegill sunfish (*Lepomis macrochirus*). pp 103-112. In: D. Pascoe and R. W. Edwards (Eds.) *Advances in Water Pollution Control - Freshwater Biological Monitoring*. Pergamon Press, Inc. New York.
- \*46. Cairns, J. Jr., A. L. Buikema, Jr., T. R. Doane. 1984. Sublethal Effects of JP-4 on *Lepomis macrochirus*. NTIS PC A02/MF A01. 11 p.
- \*47. Cairns, J., Jr., A. L. Buikema, Jr., T. R. Doane and B. Niederlehner. 1984. A novel approach for predicting sublethal effects of toxicants to aquatic organisms. AFOSR report. 129 pp. NTIS.
- \*48. Doane, T. R. and A. L. Buikema, Jr. 1984. *Biomonitoring of the Aquatic Environment: State of the Art*. Presentation to 15th Bioenvironmental Engineering Symposium. Brooks AFB.
- \*49. Phipps, G. L., M. J. Harden, E. N. Leonard, T. H. Roush, D. L. Spehar, C. E. Stephan, Q. H. Pickering, and A. L. Buikema, Jr. 1984. Effects of pollution on freshwater organisms. *J. Water Pollut. Control Fed.* 56:725-758.
50. Niederlehner, B. R., J. R. Pratt, A. L. Buikema, Jr., and J. Cairns, Jr. 1986. Comparison of Estimates of Hazard Derived at Three Levels of Complexity. pp. 30-48. In J. Cairns, Jr. (ed.) *Community Toxicity Testing*. ASTM STP 920. American Society for Testing and Materials, Philadelphia.
51. Cairns, J., Jr., and A. L. Buikema, Jr. 1987. Estimating the Impact of Pulses of Mixtures of Chemicals upon Aquatic Organisms. pp. 285-300. In: Vouk, V. B., G. C. Butler, A. C. Upton, D. V. Parke, and S. C. Asher (eds.) *Methods for Assessing the Effects of Mixtures of Chemicals*. SCOPE.
52. Jenkins, D. G., R. J. Layton and A. L. Buikema, Jr. 1990. State-of-the-art in aquatic ecological risk assessment. pp. 18-32. In J. R. Voshell, (Ed.) *Using Mesocosms to Assess the Aquatic Ecological Risk of Pesticides: Theory and Practice*. Special Symposium Publication. Ecological Society of America.
53. Buikema, A. L., Jr. 1990. Summary of Oil Spill Restoration Symposium. pp. 129-142. In: Restoration Planning Work Group (eds.) *Restoration following the Exxon Valdez Oil Spill*. Alaska Departments of Fish and Game, Natural Resources and Environmental Conservation; U.S. Departments of Agriculture, Commerce and Interior; and the U.S. Environmental Protection Agency. Anchorage, Alaska.
54. Buikema, A. L., Jr., and J. R. Voshell, Jr. 1992. Toxicity testing using freshwater benthic macroinvertebrates. pp. 344-398. In D. M. Rosenberg and V. H. Resh. (Eds.). *Freshwater Biomonitoring and Benthic Macroinvertebrates*. Chapman and Hall. New York.
55. Buikema, A. L., Jr. 1992. Analysis of Fish Full Life-Cycle Tests. pp. 50-53. *Improving Aquatic Risk Assessment under FIFRA*. RESOLVE. World Wildlife Fund, Washington, DC.

56. Brassard, C., A. L. Buikema, Jr., T. Bailey, M. Frankenberry, R. Lee, A. Stavola, C. Stunkard and L. W. Touart. 1994. EPA mesocosm study review. In: R. L. Graney, J. H. Kennedy, and J. Rodgers, (Eds.). Utilization of Simulated Field Studies in Aquatic Ecological Risk Assessment. Society of Environmental Toxicology and Chemistry. Special Publications Series. Lewis Publications, Inc., Chelsea, Michigan.
57. Christman, V. D., J. R. Voshell, D. G. Jenkins, M. S. Rosenzweig, R. J. Layton, and A. L. Buikema, Jr. 1994. Ecological development and biometry of untreated pond mesocosms. pp. 105-127. In: R. L. Graney, J. H. Kennedy and J. Rodgers (Eds.) Utilization of Simulated Field Studies in Aquatic Ecological Risk Assessment. Society of Environmental Toxicology and Chemistry. Special Publications Series. Lewis Publications, Inc., Chelsea, Michigan.
58. Lauth, J. R., G. I. Scott, D. S. Cherry and A. L. Buikema, Jr. 1995. A modular estuarine mesocosm. Environmental Toxicology and Chemistry.
59. Buikema, A. L., Jr., and B. Ward 1998. Plain Talk about Teaching on the Web Harcourt Brace.
60. Schaeffer, M., and A. L. Buikema, Jr. 1998. Introductory Biology Laboratory Manual., Va Tech. (first online manual for sale in the bookstore at Va Tech).
61. Buikema, A. L., Jr. 2000. Cheetahs, an endangered species - can and should they be saved? Web based module for Bio Inquiry (Biology Text book ), John Wiley and Sons, Inc. 570 pages plus pictures)
62. Buikema, A. L., Jr. 2000. Biotechnology: what does it mean at the level of cells and tissues? Web based module for Bio Inquiry (Biology Text book ), John Wiley and Sons, Inc. 408 pages plus pictures)
63. Buikema, A. L., Jr. 2000. How is biotechnology being used to replace body parts and restore ecosystems? Web based module for Bio Inquiry (Biology Text book ), John Wiley and Sons, Inc. 633 pages plus pictures)
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## PAPERS

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#### LIMITED DISTRIBUTION REPORTS

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#### **FUNDED RESEARCH PROJECTS**

1. Virginia Polytechnic Institute and State University Small Projects; \$480; The effect of sublethal concentrations of toxicants on the population dynamics of a littoral rotifer. (Buikema).
2. American Philosophical Society; \$650; The development of investigations into invertebrate bioassays using planarians. (Buikema and Cairns).
3. Office of Water Resources Research; \$6836; Development of acute bioassay techniques for freshwater limnetic rotifers. (Buikema and Cairns).

4. Environmental Protection Agency; \$28,836.31; Development of culture and acute bioassay techniques for freshwater limnetic rotifers (Buikema and Cairns).
5. Army Corps of Engineers; \$150,000; participant in the aquatic biology portion. (Cairns, Dickson, Buikema, Hendricks, Ross, et al.).
6. American Petroleum Institute; \$15,515. Development of simple bioassay procedures to evaluate the toxicity of refinery effluents to freshwater macroinvertebrates (Cairns, Buikema and Dickson).
7. Va. Acad. Sci. \$325. Some biological investigations in the Dismal Swamp and Lake Drummond. (Buikema and Benfield).
8. Virginia Polytechnic Institute and State University Small Project. \$575. Microflora, microfauna and fish of selected areas of South Florida. (Buikema and Maughan).
9. American Petroleum Institute. \$23,500. Development of simple bioassay procedures to evaluate the effects of refinery effluents to freshwater macroinvertebrates. Phase II. (Buikema and Cairns).
10. American Petroleum Institute. \$26,400. The development of simple bioassay procedures to evaluate the effects of refinery effluents to estuarine macroinvertebrates. Phase I. (Buikema and Cairns).
11. American Petroleum Institute. \$4,350. Usefulness of enzyme activity to monitor petroleum effluents. Phase I. (Buikema, Cairns, and Rutherford).
12. Office of Water Resources Research. \$9,085. Assessment of rotifers for acute determination of selected inorganic pollutants. (Buikema and Cairns).
13. Office to Water Resources Research. \$30,000. Interactions of temperature on toxicity of six water pollutants on aquatic organisms. (Cairns, Buikema, Health and Parker).
14. Energy Research and Development Administration. \$99,843. The development of biological indices for identifying and evaluating impacts of pollutants on freshwater ecosystems. (Cairns, Buikema, Benfield, Dickson and Hendricks).
15. Exxon Oil Company. \$625. Daphnia toxicity tests. (Buikema).
16. American Petroleum Institute. \$32,015. Development of a simple freshwater bioassay method for evaluating petroleum refinery effluents. Phase III. (Buikema and Cairns).
17. American Petroleum Institute. \$26,400. Development of a simple estuarine bioassay technique for screening refinery effluents. Phase II. (Buikema and Cairns).
18. American Petroleum Institute. \$14,725. Usefulness of enzyme activity to monitor petroleum effluents. Phase II. (Buikema, Cairns, and Rutherford).
19. ERDA. \$100,000. Development of biological indices for identifying and evaluating impacts of pollutants on freshwater ecosystems. Phase II. (Cairns, Dickson, Buikema, et al.).

20. EPA/UW-S. \$36,192. Development of bioassay procedures for defining pollution of harbor sediments. (Buikema, Cairns and Rutherford).
21. Appalachian Power Company. \$14,617. Effects of pumped-storage operations on zooplankton populations of Smith Mountain Lake, Virginia. (Buikema).
22. Virginia Polytechnic Institute and State University. \$800. Vitamins in natural ecosystems (Buikema and Miles).
23. National Science Foundation. \$425. International Travel Award. (Buikema).
24. American Petroleum Institute. \$32,528. Correlation between bioassay sensitivities of estuarine organisms. (Buikema and Cairns).
25. American Petroleum Institute. \$29,874. The effects of 1977 refinery effluent guidelines on freshwater organisms. (Buikema and Cairns).
26. American Petroleum Institute. \$36,710. Effects of 1977 refinery effluent guidelines of estuarine organisms. (Buikema and Cairns).
27. Man in the Biosphere Program. \$600. A training manual for assessing biological complexity and healthiness. (Buikema, Schwaab and Cairns).
28. American Petroleum Institute. \$40,000. Sublethal effects of refinery effluents on estuarine organisms. (Buikema and Cairns).
29. National Science Foundation. \$15,327. International Symposium on Groundwater Biology. (Buikema and Holsinger).
30. American Cancer Society. \$1,500. Neoplasms in *Daphnia pulex*. (Buikema and Stetler).
31. VPI&SU Small Projects. \$800. Conodonts - a biologist's interpretation of a geologist's enigma. (Buikema).
32. American Petroleum Institute. \$7,000. Hydrocarbon induction of neoplasms in *Daphnia:ehp1.* (Buikema and Cairns).
33. American Petroleum Institute. \$110,000. Effect of refinery effluents on riverine ecosystems. (Buikema, Benfield, Hendricks, and Cairns).
34. Proctor and Gamble. \$7,000. Grant-in-aid. (Cairns and Buikema).
35. Mobil Oil. \$6,000. Grant-in-aid. (Cairns and Buikema).
36. Texaco. \$5,000. Grant-in-aid. (Cairns and Buikema).
37. Environmental Protection Agency. \$49,621. Development and validation of freshwater chronic toxicity test methods to evaluate energy related toxicants. Part I. (Buikema, Benfield, Cairns and Cherry).

38. Exxon, Inc. \$30,000. Research needs in oil spill prevention and management. (Cairns and Buikema).
39. VPI&SU. \$2,000. Literature survey of biological effects of the Panama sea-level canal. (Buikema, Ruska and Cairns). Joint effort with 8 other groups on Va. Tech campus.
40. Environmental Protection Agency. \$80,997. Development and validation of freshwater chronic toxicity test methods to evaluate energy related toxicants. Part II. (Buikema, Benfield, Cairns and Cherry).
41. Exxon, Inc. \$45,000. Workshop on research needs for recovery and restoration of environments impacted by oil spills and/or spill cleanup operations. (Cairns and Buikema),.
42. Air Force (DOD). \$44,659. Monitoring sublethal effects of JP-4 jet fuel to fish. Part I. (Cairns and Buikema).
43. Federal Mogul. \$2,000. Biological studies on Cedar Run, Va. (Buikema).
44. Air Force (DOD). \$81,578. Monitoring sublethal effects of JP-4 jet fuel to fish. Part II. (Cairns and Buikema).
45. Hercules, Inc. \$27,508. Survey of the New River. (Buikema, Cairns, Cherry and Porter).
46. Roanoke Electric Steel. \$12,000. Grant-in-aid to continue ecological research. (Buikema and Benfield).
47. Virginia Air Pollution Control Board. \$18,000. Acid Rain Analysis. - year 1. (Buikema and Chevone)
48. Virginia Institute of Marine Sciences. \$5,589. Ames mutagenicity analyses of Elizabeth River sediments. (Buikema and Pittinger).
49. Air Force Office of Sponsored Research. \$82,208. Monitoring sublethal effects of JP-4 jet fuel to fish. Part III. (Cairns and Buikema).
50. Hercules, Inc. \$2,700. Toxicity studies. (Buikema).
51. Virginia Air Pollution Control Board. \$21,000. Acid Rain Studies - year 2. (Buikema and Chevone)
52. Virginia Academy of Sciences, \$360, (Buikema and Jenkins)
53. Virginia State Air Pollution Control Board. \$30,140. Acid Rain Studies - year 3. (Buikema and Chevone).
54. Jones, Day Reavis & Pogue. \$15,000. Toxicity Studies with Trace Metals. (Buikema).
55. Virginia Air Pollution Control Board. \$28,641. Acid Rain Analysis. - year 4. (Buikema & Chevone).

56. Roanoke Electric Steel Corp. \$1,200. Aquatic Toxicity Studies. (Buikema).
57. Hercules, Inc. \$6,300. Aquatic Toxicity Studies. (Buikema).
58. Virginia State Air Pollution Control Board: Resources at Risk \$49,658. (Buikema, Chevone, Johnson and Ehrich).
59. Roanoke Electric Steel Corporation. Aquatic toxicity Studies. \$1,250 (Buikema).
60. Roanoke Electric Steel Corporation. Grant-in-aid. \$6,000. (Benfield and Buikema).
61. Hercules, Radford Army Ammunition Plant. Aquatic Toxicity Studies. \$7,000. (Buikema).
62. Ecological Consultants. Aquatic Toxicity Studies. \$750. (Buikema).
63. Virginia Air Pollution Control Board. Acid Rain Analysis - year 5. \$29,500. (Buikema and Chevone).
64. Roanoke Electric Steel Corporation. Grant-in-aid. \$7,000. (Benfield and Buikema).
65. Ecological Consultants. Aquatic Toxicity Studies. \$1,500. (Buikema).
66. Roanoke Electric Steel Corporation. Studies on Ecological Effects of Effluents. \$7,000. (Buikema and Benfield).
67. USEPA. Mesocosm studies; Validation of Effects Models and Evaluation of Biological End Points for Ecological Risk Assessment using Pond Mesocosms. Cooperative agreement. \$49,100. (Voshell and Buikema).
69. USEPA. Mesocosm studies; Validation of Effects Models and Evaluation of Biological End Points for Ecological Risk Assessment using Pond Mesocosms. Cooperative agreement. \$21,000. (Voshell and Buikema).
70. Virginia State Air Pollution Control Board: Analysis of Rain Water \$30,000 - year 6. (Buikema and Chevone).
71. Roanoke Electric Steel Corporation. Studies on Toxicity of Effluents. \$750. (Buikema and Benfield).
72. USEPA. Fate of Bacillus sphaericus. microbial pest control agent in the environment. \$40,000. (Yousten and Buikema).
73. Roanoke Electric Steel (\$5,000) Research on water quality criteria for heavy metals. (Buikema).
74. Teaching-learning Grant: Va Tech (\$5,000) Development of Honors Course in Biology. (Buikema, Esem and Wallace).

75. Roanoke Electric Steel (\$8,500) Grant-in-aid: Research on water quality criteria for heavy metals. (Buikema)
76. NOAA (\$2,499) The simulation of a tidal estuary to test the toxicity of the pesticide aldicarb to estuarine ecosystems. Phase I. Collection of samples for replicated simulations. (Lauth, Buikema, Cherry)
77. NOAA (\$2,499) The simulation of a tidal estuary to test the toxicity of the pesticide azinphos-methyl to estuarine ecosystems. Phase I. Collection of samples for replicated simulations. (Lauth, Buikema, Cherry)
78. VQUEST Grant (SCHEV) (\$730,000) Interdisciplinary Science and Mathematics Education Project (Patty, Erickson, Glasson, Buikema, Viers, Zirkle)
79. VT Teaching Learning Grant. 1995-1996. Using computers to teach introductory biology. \$5,500 (Buikema and Braunschweig)
80. VT Affirmative Action Incentive Grants Program. 1995-1996. Development of strategies to teach biology to the challenged individual. \$2,500 (Buikema and Braunschweig)
81. Sloan Foundation 1995-1997. Asynchronous Communications Courses to Enable Student Success. (Roy, Moore, Taylor, Buikema, Claus and Neal. \$200,000)
82. Teaching-Learning Grant. 1996-1997. Effectiveness of different educational modalities on student and course content retention, attitude change and career goal attainment in the Biological Sciences (Buikema, Holmes and Hergert)

#### GRADUATE STUDENTS SUPERVISED

1. Gail Sullivan. M.S. 1973. Acute bioassays for assessing the toxicity of six heavy metals and factors affecting zinc toxicity to the rotifer, Philodina (near acuticornis).
2. Paul C. Edmunds. M.S. 1974. Seasonal fluctuations of rotifer populations related to selected biological, chemical and physical parameters in a small mountain pond, Jefferson National Forest, Virginia.
3. Kathryn B. Anderson. M.S. 1975. Zooplankton populations dynamics in relation to selected limnological parameters in Lake Drummond, The Great Dismal Swamp, Virginia.
4. J. Preston Newman, Jr. M.S. 1975. The effects of heavy metal on the asexual reproduction of Aeolosoma headleyi. Beddard (Annelida).
5. David R. Lee. Ph.D. 1976. Development of bioassay techniques using Daphnia pulex for monitoring refinery effluents.
6. Carolyn See. Ph.D. 1976. Effects of heavy metals on the behavior of the planarian, Dugesia tigrina.
7. Paul Loeffelman. M.S. 1976. The effects of pumped-storage operations on the zooplankton dynamics of Smith Mountain Lake.

8. J. Dale Miller. M.S. 1977. Factors influencing the abundance and life history of the spring-form of Gammarus minus Say.
9. William Trush. M.S. 1977. Island biogeography of streams.
10. Matthew McGinnis. M.S. 1977. Interactions of acute thermal shock and simulated effluents to Daphnia pulex.
11. Jeannie Miles Potter. M.S. 1978. Vitamin relationships in a soft water appalachian pond.
12. Robert Honig. M.S. 1979. Effects of refinery effluents on periphyton communities in artificial streams.
13. James Geiger. Ph.D. 1978. Effects of water soluble hydrocarbons on the physiology and reproduction of the waterflea, Daphnia pulex.
14. Gregory Knauer. M.S. 1978. Population dynamics of the rotifer Polyarthra vulgaris.
15. Jeffrey Reading. M.S. 1978. Effects of selenium on aquatic organisms.
16. Tom Abbott. Ph.D. 1980. The effects of selective foraging mechanisms on trout trophic ecology (with Cairns).
17. Robin Matthews. Ph.D. 1981. Autotrophic index for monitoring pollution stress.
18. Carolyn Hax. M.S. 1983. Effects of stress on growth and reproduction of midges.
19. Charles Pittinger. Ph.D. 1984. Use of Ames mutagenicity test to analyze for potential carcinogens in edible shellfish.
20. Thomas Doane. Ph.D. 1984. Effects of JP-4 jet fuel water soluble fraction to fishes. (with Cairns).
21. Barbara R. Niederlehner. M.S. 1984. Effects of cadmium stress to the midge Chironomus riparius.
22. David Toczydlowski. M.S. 1985. Aquatic microbiol community responses to stress: Comparison of taxonomic & nontaxonomic studies.
23. Karen Christensen. M.S. 1985. Comparison of protozoan and macroinvertebrate colonization rates as a function of stress.
24. Jay Garland. M.S. 1985. Utilization of dissolved organic matter by freshwater oligochaetes.
25. David Jenkins. M.S. 1986. Zooplankton dynamics as a function of perturbation.
26. Dave Jenkins. 1990. Ph.D. Colonization of zooplankton populations in artificial ponds.
27. Michael Rosenzweig. 1990. M.S. Colonization of phytoplankton populations in artificial ponds.

28. Kevin Simon. 1994. M.S. Affect of organic pollution on cave communities.
29. Rhonda Wilhite. M.S. Microbiol communities in freshwater marshes. (1996).
30. Andrea Dvorak. M.S. Behavior of grass ship. (1996).
31. Lance Rutherford. PhD. Identifying Blocks to Change in Teaching Assistants. (Expected completion, Spring 2001)

## **BS HONOR'S THESIS IN BIOLOGY**

Ann Chester - Intersex in gammarid amphipods. (1977).

## **COMMITTEE AND PUBLIC SERVICE**

### **University:**

Mentor, Stacey D. Smith, Daughtrey Scholar, Morris K. Udall Scholar, Marshal Scholar  
 Mentor, Mary Sproull, Daughtrey Scholar  
 Ad hoc committee to survey and evaluate environmentally related courses at Virginia Tech (1972)  
 Ad hoc council on teacher evaluation (1975-1978)  
 Ad hoc committee to evaluate consulting policy at Virginia Tech (1976)  
 Quality Assurance Units Panel (1980)  
 Continuing Education Center Users Advisory Board ( 1981-1982)  
 Dedication of UCES Ecosystems Simulation Laboratory (1979)  
 Resource Support for the CEC Committee on the University's Role in Continuing Education (1984)  
 Review of grant proposals for Virginia Agricultural Experiment Station (1982, 1984)  
 Honors Program - Arts and Sciences Investigative Board (1985-1988)  
 In-Service Resident Hall Training Program (October 1986).  
 Faculty Advisor to Student Office on Alcohol and Substance Abuse (1987-1989).  
 ad Hoc Committee on Alcohol and Substance Abuse Substance Abuse Advisory Counsel (1987-1988)  
 Community Task Force on Substance Abuse, Alcohol Task Force Committee, University Health Services (1990)  
 Drug Prevention Program Committee Member and Presenter, Office of Dean of Students (1990).  
 Member, Board of Directors, Northern Virginia Chapter, Virginia Tech Alumni Association (1989-1990).  
 University Substance Abuse Advisory Committee, Dean of Students Office (1991-1995).  
 Community Task Force on Substance Abuse (University Committee Member) (1990-1991).  
 Peer Education Counselor Trainer, Health Services (1990-1992).  
 Virginia Tech Task Force on Men's Issues (1992-1993).  
 Fulbright-Hays Review Committee (1993-1995)  
 Academy of Teaching Excellent Nominations Committee (1993)  
 Honors Program Leader, Summer Reading Program (1993)  
 Alcohol Forum Steering Committee (1994-1995)  
 Center for Excellence in Undergraduate Teaching, Advisory Committee (1994-1995)  
 Committee for University Writing Program (1994-1995)  
 Graduate School, GTA Workshop Presenter. (1994-1997)

Diggs Teaching Scholar Award Committee, 1995-1996, Chair, 1996-1997  
Academy of Teaching Excellence, Alumni Teaching Awards Committee, 1996-1998, Chair 1997  
WELLness Living Community Program 1996-1998 (Chair of Seminar Program)  
White Ribbon Steering committee, University Counseling Center (1995, 1996)  
Daughtrey Scholarship Committee, Committee Chair (1998-1999)  
Computer Requirement Support Task Group, Chair of the Courses and Curriculum Issues,  
Academic Advisory Committee (1997-1999)  
Area 4 Core Assessment (1999-2000)  
New Computer Requirement, Chair of the Course and Curriculum Issues Work Group,  
Academic Advisory Committee (1997-1999)  
Premed Interview Committee member (1997-1999)  
Honors Community Committee member (1999)  
Alumni Teaching Award Committee member (1996-1999)  
Review of the Undergraduate Honors System Committee member (1999)  
Committee member to develop the VT ASAP (Alcohol Awareness Safety Program) for  
Counseling Center (1999)

#### **College of Arts and Sciences:**

Committee on Excellence in Teaching (1995-1997), Chair, 1997

#### **College of Education**

Science Education Position, Search Committee (1995-1996)

#### **Department:**

Executive Personnel (1982-1983)  
Graduate Training and Curriculum (1972-1973)  
Career Advising (1973-1975)  
Educational Advisor for the Center for Systematic Collections (1974)  
Curriculum Committee (1973-1974, 1994-1999)  
Graduate Student Selection (1975-1979)  
Systems Analyst Search Committee (1975)  
Search Committee for joint Biology - Education position (1975)  
Self Study Committee: Graduate Program (1976)  
Self Study Committee: Public Services (1976)  
Departmental News Release (1976-1979)  
Animal Ecologist Search Committee (1976)  
Animal Physiologist Search Committee (1976)  
Invertebrate Zoologist Search Committee (1977-1978)  
Aquatic Ecologist Search Committee (1978)  
Evaluation of faculty teaching (11 persons; 1980-1983)  
Evaluation of faculty being considered for promotion and tenure (3; 1980)  
Committee on Collections (1981-1983)  
Diagnostic-Qualification Examination Committee (1983-1986)  
Graduate Degree Implementation Committee (1986)  
Ad Hoc committee for brochure in Aquatic Ecology (1985-1986)  
Ad Hoc committee on Student Coop Programs (1986-1987)  
Teaching Evaluations (1986-1988)

Undergraduate Awards (1986-1987)  
Teacher Evaluation Committee (1990-1992)  
Faculty Recognition (1991-1992)  
Departmental Seminar (1992-1996)  
Honors Advisor (1993-1998)  
Co-coordinator for Freshmen Biology (1993-2000)  
Teaching Enhancement Committee (1996-2000)

**Professional:**

Virginia Academy of Science (VAS)  
Chairman, Dismal Swamp Editorial Board (1975)  
Judge, VJAS (1981-1983; 1985)

North American Benthological Society (NABS)  
Nomination and Place Committee (1976-1977)  
Local Arrangement Committee for 1977 Meeting - Exhibitors (1977)  
Virginia Representative to Executive Board (1976-1977)  
Committee on Toxicologist Directory

Association of Southeastern Biologists (NSB)  
Local Arrangements Committee for 1975 Meeting  
Section Leader for papers on Aquatic Ecology (1977-1978)  
Conservation Committee (1978-1979)

U.S. Environmental Protection Agency  
Conservation Foundation Aquatic Dialogue Group (1990-1991)  
Risk Assessment Forum, Case Histories Workshop (1991)  
USEPA, FIFRA Scientific Advisory Panel (1998)

American Society for Testing and Materials (ASTM)  
E47.21 committee on toxicity testing  
E35.21 committee on standardized Daphnia culturing methods  
D19.21 committee on effluent toxicity testing  
19.21 Task Group chairman of committee to standardize Daphnia screening procedure  
D19.23 committee to standardize zooplankton collection procedures  
Co-chairman for Symposium on "Aquatic Invertebrate Bioassays"  
Chairperson, Paper Session, 5th Symposium on Aquatic Toxicology

International Association for Groundwater Biologists  
Co-organizer for 1978 meetings held at Virginia Tech  
Advisory Board for the 1981 meetings held in Poland (1978-1981)

Water Pollution Control Federation (WPCF)  
Research Committee (1976-1984). Literature Reviews.  
Ad hoc committee on Toxic Substances (1978-1979)  
Subcommittee on Literature Review and Coordination (1985-1986)

National Association for Environmental Education (NAEE)  
Co-organizer for 8th Annual Meeting of the National Association for Environmental Education (1979)

Workshop on Biological Indicators (1980)  
Workshop on Coal Gasification and Liquification (HEW, EPA, and DOE): Panelist on section on Water Quality, Quantity and Aquatic Effects (1978)  
Science Seminars for Elementary School Teachers Workshop on Changes in Living Communities  
Society for Environmental Chemistry and Toxicology (SETAC)

Education Committee (1985-1986)  
 Exhibits Coordinator (1983-1984)  
 Editorial Board (1984-1986)  
 Chairperson, Paper Session, 4th Annual Meeting (1983)  
 Virginia Water Resources Research Center  
 Member, Ad hoc Committee on Inventory and Monitoring  
 Advances in Modern Environmental Toxicology,  
 Editorial Advisory Board (1979-1980)  
 Journal of Environmental Pathology,  
 Toxicology and Oncology. Section Associate Editor, (1983-1985);  
 Editorial Board (1985-1993)  
 Outside Reviewer  
 University of Tennessee, 1980, Promotion and Tenure  
 East Stroudsbury State University, 1983, M.S. Thesis  
 Virginia Institute for Marine Sciences, 1985, Promotion and Tenure.  
 Illinois State Natural History Survey Division, 1985, Promotion and Tenure.  
 Memphis State University, 1993, Promotion and Tenure  
 Tennessee Technological University, 1991, Promotion and Tenure.  
 Clemson University, 1995, Promotion and Tenure

**Federal and State Agencies:**

Virginia State Air Pollution Control Board  
 Member of Acid Rain Technical Advisory Committee (1982-86)  
 Preparation for 1985 state budget amendment on acid rain research.  
 Virginia Council on the Environment  
 Co-organized Public Hearing held at VPI&SU, April 29, 1982.  
 Presented to Council a Review of Current Toxic Regulations that  
 Affect Virginia  
 Virginia's Governor's "Commission on Virginia's Future"; presented  
 talk on current Environmental Issues in Virginia  
 USEPA  
 Participant in Workshop on QA for Daphnia testing methodology.  
 Conservation Foundation,  
 Aquatic Field Studies Dialogue Group (national committee).  
 Dept. of Army  
 Quality Assurance Review Panel for Research Program  
 State of New York  
 Scientific Review Group for Development of Water Quality Standards,  
 Division of Water, New York State Department of Environmental  
 Conservation, Albany NY (1986)  
 Virginia State Police  
 DARE Program for High School Students

**Public:**

Vice President, Montgomery Council of PTA's (1974)  
 Girl Scout Leader, Brownie Troup 510, Belmont Farms (1974)  
 Belview PTA  
 Budget Committee (1975-1976)  
 County Council Committee (1975-1976)

Lutheran Outdoor Ministries Managing Group - Hungry Mother Retreat (1976-1978)  
 Lutheran Outdoor Ministries - Virginia Synod (1977-1978)  
 Luther Memorial Lutheran Church (various committees)  
     Church Council (1976-1980)  
     Finance Committee (1977-1978)  
     Youth Ministry (1977, 1980)  
     Campus Ministry (1978-1979, 1982)  
     Workshop and Music Committee (1982-1983)  
     Centennial Committee (1982-1985)  
     Mutual Ministries Council (1983-1986)  
     Lay Communion Assistant (1982-1986)  
     Social Ministries (1986)  
 Aid Association for Lutherans  
     Chapter Vice-President (1982)  
 Raft, Inc. (1985-1988)  
 Montgomery County Task Group Against Drunk Driving  
     Consultant & Lecturer on Substance Abuse (1984-1988)  
 YMCA Free University - Taught courses in  
     Chinese cooking (1985-1986)  
     Alcoholism and the Family (1986-1999)  
 NRV Lutheran Lay School of Religion (1986)  
 Local Human Rights Committee, Community Services Board (1993-2000)  
     Vice Chair (1998-1999), Chair (1999-2000)

#### **ADMINISTRATIVE ASSIGNMENTS**

1971-1972 Accountant for grants held by the Center for Environmental studies (Monitored 11 grants)

1973-1974 Grant administrator for the Aquatic Ecology Group and Center for Environmental Studies (Monitored 28 grants).

1976-1985 Supervised up to 6 secretaries and 5 laboratory technicians  
 Supervise 1 laboratory technician.

#### **REVIEWER OF MANUSCRIPTS:**

Journal of Protozoology  
 Fisheries Research Board of Canada  
 Canadian Journal of Fisheries and Aquatic Services  
 Water Research  
 Nature  
 Environmental Science and Technology  
 Journal Environmental Pathology and Toxicology  
 Oecologia  
 Water Resources Bulletin  
 Arctic and Alpine Research  
 American Society for Testing and Materials  
 Marine Environmental Research  
 Symposium on Freshwater Microbial Communities

Symposium on the Antarctic  
Symposium on Processes of Environmental Contamination and Toxicology  
Marine Biology  
Thermal Ecology Symposium  
Chesapeake Science  
Symposium on Recovery of Damaged Ecosystems  
Special Technical Publications of Environmental Protection Services  
of Canada  
Transactions of American Fisheries Society  
Archives for Environmental Contamination and Toxicology  
American Midland Naturalist  
Periodicum Biologicium  
Hydrobiologia  
Environmental Toxicology and Chemistry  
Environmental Pollution  
OWRT  
Journal of Phycology  
Ecotoxicology and Environmental Restoration

**REVIEWED GRANT PROPOSALS FOR:**

National Science Foundation  
U.S. Environmental Protection Agency  
Maryland Academy of Sciences  
Electric Power Institute  
U.S. Army - Biomedical Command  
Faculty Grants - Indiana University at Purdue  
Michigan Sea Grants Program  
Department of Energy  
New Jersey EPA  
Va Tech Small Grants

**REFERENCES**

Dr. Joseph Cowles, Head, Department of Biology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0406. Phone: (540) 231-8928; email: cowlesjr@vt.edu

Dr. Benjamin C. Johnson. Landscape Architecture, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0113. Phone: (540) 231-5698; email: johnsonb@vt.edu

## TEACHING AND EDUCATIONAL INNOVATIONS:

### K-12 Teachers

The development of environmental mini-courses for elementary and secondary school teachers. Taught courses in stream, pond and salt marsh ecology.

### College Courses

**Experimental General Biology course for non-majors.** Development of an experimental General Biology course for non-majors. See publication on "Achieving Relevance through Biology." (1971)

**Honors Biology** began teaching in 1991. I revived a course that was attracting no students. Since its inception, I have added labs, and the course is the only (as far as I know) freshman writing intensive course on campus. Course is student assignment oriented which is unusual for a freshman introductory science course. There are no lectures. Emphasis is on critical thinking, writing and reading. Once a week, outside lecturers are brought in for 3 reasons: 1) demonstrate the interdisciplinary nature of the course (by inviting poets, philosophers, artists, historians, theologians, etc); 2) emphasize the role of research in the sciences, and 3) emphasize women in the sciences with the intent to retain women.

**Experimental General Biology:** taught one to see if the teaching philosophy that I use in Honors will work for nonmajors. The first time I had 16 students who stayed in the course. The second two times, I taught both session of summer school in 1995. With the exception of the outside speakers, I have taught experimental sections of General Biology (nonmajor) in a similar manner as the Honors course above. General students are capable of the same critical thinking skills as the biology majors are. The majors and nonmajors are equally grounded in concepts. The only difference is that the majors are more grounded in facts.

**Post-Modern Male** This is an Honors Colloquium designed and taught by me and Robert Miller (Clinical Psychologist, VT Counseling center). It is on the issues of men in response to feminism. It is taught each Fall. The course was designed in response to VP Tom Goodale's concern over the fact that there are women's study courses, but no courses about men. This course is also over subscribed and each term we have a waiting list of students who wish to take it.

## TEACHING MATERIALS DEVELOPED AND TEACHING INNOVATIONS

**Introductory Biology Labs.** As part of the dedicated teaching assignment, I am working with Suzanne Braunschweig to convert the cookbook introductory biology laboratories into student driven investigative exercises to teach the students through experience the scientific method. We have modified approximately 50% of the labs to date. We are also developing under a variety of funding agencies computerized presentations for our 35 GTAs to use. This is being done in part to bridge the language barriers, provide consistency among 96 lab sections a week, and ultimately, to provide tutorials that will be available on line for students to preview before class, or to use as review for lab exams.

As part of a Teaching-Learning Grant, Suzanne Braunschweig and I have developed a fetal pig dissection tutorial with a self-test. This tutorial was developed to assist students in studying for a lab practical exam. Assistance is needed since the students cannot take the pig out of the lab. This concept is now being carried further with a book publisher. We have developed a demo for Prentice Hall that will add many other features such as audio and script presentations, sign language, choice of languages (english, spanish, french), an audio and phonetic pronunciation guide for terms, histology, human health notes and physiology animations.

**Addictions and the Family (FCD).** I have been teaching this course since 1985 for free. This course is centered on self-reflection based on a variety of experiential exercises including conduct of an intervention, caretaking and responsibility, risk taking and honesty (by attending 12-Step meetings, role plays, construction of a genogram, etc. This course is typically over enrolled each semester and has a waiting list for spring semester.

**Honors Biology:** Developed this course as writing intensive. Students are given the same writing exercises that I have had to deal with in my career. They include: an unbiased position paper on a contentious issue (written for an administrator or senator, etc.), writing a test protocol to refute the presumption under the Federal Insecticide, Fungicide and Rodenticide Act, other experimental designs, research reports in publishable format, construction of a site specific taxonomic key, etc.

Currently, I have a portion of the course on line so students can share ideas. In Spring 1996, all students will be assigned to a chat room where they will post routine questions regarding the course material and then find solutions together. As a result, we will not formally meet once a week, except on line. The use of the online chatroom will be used to break the paradigm that you need to meet in a classroom for three hours to get three hours credit.

**General Biology for the Learning Challenged.** In Spring 1996 I will co-teach a course to the only deaf student that Virginia Tech has. Using computers, we will explore alternative ways to communicate biological concepts to deaf students. Working with this student will

**General Biology - Distance Learning.** In first Summer 1995, we developed a version of a distance learning course. Lectures presented on campus and videotaped. Tapes were sent to NOVA for students up their to take the course at their leisure. Eight students were enrolled and felt that this helped them take course that they would not have been able to take on campus because of their work schedule. In first Summer 1996, General Biology will be taught online as a Cyberschool course. It will be a self-paced, accelerated, course for the motivated student. "Lecture" will be online via a chatroom.

**Ecology.** During second summer 1996, I will teach an accelerated three-week intensive Ecology course. Course was designed to meet the Virginia Standards of Learning. A course that meets the needs of our majors and those obtaining a certificate in teaching. Rather than lectures, the course will be taught in the field. A major course requirement will be for the student (on paper) to recreate an ecosystem found in one part of the world in the piedmont region of Virginia or the prairies of the midwest. The system they import must be self sustaining for a minimum of 5 years. Examples might include coral reefs, rain or cloud forests, taiga, etc. Energy subsidies can only be used in the initial construction of the ecosystem.

**College Teaching: Biology.** Developed for Spring 1998. A course about teaching Biology to better prepare our graduate students for the job place.