

BRUCE J. PETERSON

The Ecosystems Center
Marine Biological Laboratory
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Birthplace: Chicago, Illinois
US Citizen

Research Interests: The theme of my research is the general topic of aquatic productivity. My approach to understanding aquatic productivity has been through the study of the cycles of water, carbon, nitrogen, phosphorus and sulfur at the process, ecosystem, and global levels.

Education: Ph.D., Cornell University, Ithaca, NY, 1971
B.S., Bates College, Lewiston, ME, 1967, Biology (with honors)

Research Experience:

January 1976 - Present: The Ecosystems Center, Marine Biological Laboratory, Woods Hole, Massachusetts. Senior Scientist, December 1987 to Present. Research on biological processes at the ecosystem level with emphasis on cycling of nitrogen, phosphorus, sulfur and carbon. Associate Scientist, January 1980 to December 1987; Assistant Scientist, January 1977 to January 1980; Postdoctoral Associate, January 1976 to January 1977

July 1975 to December 1975 – Postdoctoral Research, North Carolina State University, Raleigh, North Carolina. Develop nutrient cycling process models based on field measurements of nitrogen, phosphorus and carbon cycling in the Pamlico River Estuary of North Carolina.

May 1974 to November 1974 – Postdoctoral Research, Hubbard Brook Ecosystem Study. Study carbon, nitrogen and phosphorus cycling in plankton and benthos.

June 1968 to April 1974. Cornell University, Ithaca, New York. Research Associate, June 1971 to April 1974. Nutrient limitation, phosphorus cycling and primary productivity in Cayuga Lake, New York. Research Assistant, June 1969 to September 1970. Cayuga Lake studies. Research Assistant, June 1968 to September 1968: Conduct sampling program as part of Bell Station Nuclear Power Plant impact studies.

Teaching Experience:

January 2006 to Present- Course lecturer and graduate student advisor in Brown-MBL joint program.

September, 1997 to Present - Course lecturing and laboratory teaching in the Semester in Environmental Science offered at the Marine Biological Laboratory.

January 1976 to Present - Course lecturing and laboratory teaching during the January and Summer Ecology Courses offered at the Marine Biological Laboratory (1976 to 1981). Research program advisor to Year-in-Science, Interns-in-Science, Surdna fellowship students, REU students, postdoctoral researchers and graduate students.

Honors and Professional Societies:

Phi Beta Kappa, Bates College, 1967
Member, American Society of Limnology and Oceanography
Member, American Association for the Advancement of Science
Fellow, American Association for the Advancement of Science
Member, Marine Biological Laboratory Corporation

Member, Estuarine Research Federation
Member, American Geophysical Union
Member, North American Benthological Society

Reviewer:

NSF - Polar Programs
Ecology
Ecosystems (Panel Member 1987-1988)
Atmospheric Chemistry
Biological Oceanography
Hydrology
U. S. Department of Energy
U. S. Department of Agriculture
NASA

Reviewer for Journals:

Limnology and Oceanography
Science
Ecology
Biogeochemistry
North American Benthological Society Journal
Canadian Journal of Fisheries and Aquatic Sciences
Global Biogeochemical Cycles

Service to Societies:

Editorial Board, Limnology and Oceanography, 1982-1985
Board Member at Large, Limnology and Oceanography, 1984-1987
Program Manager for ASLO Winter Meeting with AGU, 1986

Publications and Theses:

1. Peterson, B. J. 1971. The role of zooplankton in the phosphorus cycle of Cayuga Lake. Ph.D. Thesis. Cornell University, Ithaca, New York. 131 pp.
2. Peterson, B. J., J. P. Barlow and A. E. Savage. 1973. Experimental studies on phytoplankton succession in Cayuga Lake. Publ. No. 71, Cornell University Water Resources and Marine Science Center, Ithaca, New York.
3. Barlow, J. P., W. R. Schaffner, F. DeNoyelles, Jr. and B. J. Peterson. 1973. Continuous flow nutrient bioassays with natural phytoplankton populations, pp. 209-319. In: G. E. Glass (ed.), Bioassay Techniques and Environmental Chemistry. Ann Arbor Sci. Publishers.
4. Barlow, J. P., B. J. Peterson and A. E. Savage. 1973. Continuous flow studies of phosphorus as a limiting nutrient for Cayuga Lake phytoplankton, pp. 7-14. Proc. 16th Conference Great Lakes Res. (Int. Assoc. Great Lakes Res.).

5. Peterson, B. J., J. P. Barlow and A. E. Savage. 1974. The physiological state with respect to phosphorus of Cayuga Lake phytoplankton. *Limnol. Oceanogr.* 19:396-408.
6. Peterson, B. J. 1977. Phytoplankton production and phosphorus supply in Cayuga Lake 1968-1973. *Hydrobiologia* 54:113-127.
7. Peterson, B. J. 1978. Radiocarbon uptake: Its relation to net particulate carbon production. *Limnol. Oceanogr.* 23:178-184.
8. Peterson, B. J., J. E. Hobbie and J. Haney. 1978. *Daphnia* grazing on natural bacteria. *Limnol. Oceanogr.* 23:1039-1044.
9. Jordan, M. J., and B. J. Peterson. 1978. Sulfate uptake as a measure of bacterial production. *Limnol. Oceanogr.* 23:146-150.
10. Jordan, M. J., J. E. Hobbie and B. J. Peterson. 1978. Effect of petroleum hydrocarbons on microbial populations in an Arctic lake. *Arctic* 31:170-179.
11. Tiwari, J. L., J. E. Hobbie and B. J. Peterson. 1978. Random differential equations as models of ecosystems III. Bayesian inference for parameters. *Math. Biosci.* 38:247-258.
12. Eppley, R. W., and B. J. Peterson. 1979. The flux of particulate organic matter to the deep ocean and its relation to planktonic new production. *Nature* 282:677-680.
13. Hall, C. A. S., N. Tempel and B. J. Peterson. 1979. A benthic chamber for intensely metabolic lotic systems. *Estuaries* 2:178-183.
14. Peterson, B. J. 1980. Aquatic primary productivity and the ^{14}C - CO_2 method: A history of the plankton productivity problem. *Ann. Rev. Ecol. Syst.* 11:359-385.
15. Peterson, B. J., R. W. Howarth, F. Lipshultz and D. Ashendorf. 1980. Salt marsh detritus: An alternative interpretation of stable carbon isotope ratios and the fate of *Spartina alterniflora*. *Oikos* 34:173-177.
16. Peterson, B. J. 1981. Perspectives on the importance of the oceanic particulate flux in the global carbon cycle. *Ocean Science and Engineering* 6:71-108.
17. Peterson, B. J., J. E. Hobbie, T. L. Corliss and K. Kriet. 1981. A continuous-flow periphyton bioassay: Tests of nutrient limitation in a tundra stream. *Limnol. Oceanogr.* 28:583-591.
18. Peterson, B. J., P. A. Steudler, R. W. Howarth, A. I. Friedlander, D. Juers and F. P. Bowles. 1981. Tidal export of reduced sulfur from a salt marsh ecosystem. In: R. O. Hallberg (ed.), *Proc. 5th International Symposium on Environmental Biogeochemistry*. *Ecol. Bull.* 35:153-165.
20. Moore, B., R. D. Boone, J. E. Hobbie, R. A. Houghton, J. M. Melillo, B. J. Peterson, G. R. Shaver, C. J. Vorosmarty and G. M. Woodwell. 1981. A simple model for analysis of the role of terrestrial ecosystems in the global carbon budget, pp. 365-385. In: B. Bolin (ed.), *Modelling the Global Carbon Cycle*, SCOPE 16. John Wiley and Sons, New York.
21. Hobbie, J. E., T. L. Corliss and B. J. Peterson. 1983. Seasonal patterns of bacterial abundance in an arctic lake and arctic streams. *Arctic Alp. Res.* 15:253-259.
22. Houghton, R. A., J. E. Hobbie, J. M. Melillo, B. Moore, B. J. Peterson, G. R. Shaver and G. M. Woodwell. 1983. Changes in the carbon content of terrestrial biota and soils between 1860 and 1980: A net release of CO_2 to the atmosphere. *Ecol. Monogr.* 53:235-262.
23. Howarth, R. W., A. Giblin, J. Gale, B. J. Peterson and G. W. Luther III. 1983. Reduced sulfur compounds in the porewaters of a New England salt marsh. In: R. O. Hallberg (ed.), *Proc. 5th International Symposium on Environmental Biogeochemistry*. *Ecol. Bull.* 35:135-152.
24. Woodwell, G. M., R. A. Houghton, J. E. Hobbie, J. M. Melillo, B. Moore, B. J. Peterson and G. R. Shaver. 1983. Global deforestation: Contribution to atmospheric carbon dioxide. *Science* 222:1081-1086.

25. Peterson, B. J., and J. M. Melillo. 1984. Global carbon-nitrogen-phosphorus cycle interactions: A key to solving the atmospheric CO₂ balance problem?, pp. 97-116. In: Moore and Pastor (eds.), *The Interaction of Global Biochemical Cycles*. NASA JPL Publication 84-21.
26. Hobbie, J. E., J. Cole, J. Dungan, R. Houghton and B. J. Peterson. 1984. The controversy on the role of the biota in the global CO₂ balance. *BioScience* 34:492-498.
27. Kirchman, D., B. J. Peterson and D. Juers. 1984. Bacterial growth and tidal variation in bacterial abundance in the Great Sippewissett salt marsh. *Mar. Ecol. Prog. Ser.* 19:247-259.
28. Steudler, P. A., and B. J. Peterson. 1984. Contribution of gaseous sulfur from salt marshes to the global sulfur cycle. *Nature* 311:455-457.
29. Woodwell, G. M., J. E. Hobbie, R. A. Houghton, J. M. Melillo, B. Moore, A. B. Park, B. J. Peterson and G. R. Shaver. 1984. Measurement of changes in the vegetation of the earth by satellite imagery, pp. 221-241. In: G. M. Woodwell (ed.), *The Role of Terrestrial Vegetation in the Global Carbon Cycle: Measurement by Remote Sensing*, SCOPE 23. John Wiley and Sons, New York.
30. Peterson, B. J., and J. M. Melillo. 1985. The potential storage of carbon caused by eutrophication of the biosphere. *Tellus* 37:117-127.
31. Peterson, B. J., R. W. Howarth and R. H. Garritt. 1985. Multiple stable isotopes used to trace the flow of organic matter flow in estuarine food webs. *Science* 227:1361-1363.
32. Peterson, B. J., J. E. Hobbie, A. Hershey, M. Lock, T. Ford, R. Vestal, M. Hullar, R. Ventullo and G. Volk. 1985. Transformation of a tundra river from heterotrophy to autotrophy by addition of phosphorus. *Science* 229:1383-1386.
33. Steudler, P. A., and B. J. Peterson. 1985. Annual cycle of gaseous sulfur emissions from a New England *Spartina alterniflora* marsh. *Atmos. Environ.* 19:1411-1416.
34. Peterson, B. J., J. E. Hobbie and T. L. Corliss. 1986. Carbon flow in a tundra stream ecosystem. *Can. J. Fish. Aquatic. Sci.* 43:1259-1270.
35. Peterson, B. J., R. W. Howarth and R. H. Garritt. 1986. Sulfur and carbon isotopes as tracers of organic matter flow. *Ecology* 67:865-874.
36. Gildea, M. P., B. Moore III, C. J. Vorosmarty, B. Bergquist, J. M. Melillo, K. Nadelhoffer, and B. J. Peterson. 1986. A global model of nutrient cycling: I. Introduction, model structure and terrestrial mobilization of nutrients, pp. 1-31. In: D. Correll (ed.), *Watershed Research Perspectives*. Smithsonian Environmental Research Center Symposium Volume.
37. Vorosmarty, C. J., M. P. Gildea, B. Moore III, B. J. Peterson, B. Bergquist and J. M. Melillo. 1986. A global model of nutrient cycling: II. Aquatic processing, retention and distribution of nutrients in large drainage basins, pp. 32-56. In: D. Correll (ed.), *Watershed Research Perspectives*. Smithsonian Environmental Research Center Symposium Volume, Smithsonian Institution Press, Washington, DC.
38. Peterson, B. J., and B. Fry. 1987. Stable isotopes in ecosystem studies. *Annual Review of Ecology and Systematics* 18:293-320.
39. Houghton, R. A., R. D. Boone, J. R. Fruci, J. E. Hobbie, J. M. Melillo, C. A. Palm, B. J. Peterson, G. R. Shaver, G. M. Woodwell, B. Moore, D. L. Skole, and N. Myers. 1987. The flux of carbon from terrestrial ecosystems to the atmosphere in 1980 due to changes in land use: geographic distribution of the global flux. *Tellus* 39B:122-139.
40. Peterson, B. J. and R. W. Howarth. 1987. Sulfur, carbon and nitrogen stable isotopic tracers of organic matter flow in the salt marsh estuaries of Sapelo Island, Georgia. *Limnol. Oceanogr.* 32:1195-1213.

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45. Vorosmarty, C. J., B. Moore III, A. L. Grace, M. P. Gildea, J. M. Melillo, B. J. Peterson, E. B. Rastetter and P. A. Steudler. 1989. Continental scale models of water balance and fluvial transport: An application to South America. *Global Biogeochemical Cycles* 3(3):241-265.
46. Coffin, R. B., B. Fry, B. J. Peterson and R. T. Wright. 1989. Carbon isotope compositions of estuarine bacteria. *Limnol. Oceanogr.* 34:1305-1310.
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48. Bowden, W. B., C. J. Vorosmarty, J. T. Morris, B. J. Peterson, J. E. Hobbie, P. A. Steudler and B. A. Moore III. 1991. Transport and processing of nitrogen in a tidal freshwater marsh. *Water Resources Research* 27:389-408.
49. Kling, G. W., A. E. Giblin, B. Fry and B. J. Peterson. 1991. The role of seasonal turnover in lake alkalinity dynamics. *Limnol. Oceanogr.* 36:106-122.
50. Hobbie, J. E., B. J. Peterson, G. R. Shaver and W. J. O'Brien. 1991. The Toolik Lake Project: Terrestrial and freshwater research on change in the Arctic. *Proceedings of a University of Alaska Conference, "International Conference on the Role of the Polar Regions in Global Change"*, June 1990, Volume II: 378-383.
51. Bowden, W. B., B. J. Peterson, J. C. Finlay and J. Tucker. 1992. Epilithic chlorophyll *a*, photosynthesis and respiration in control and fertilized reaches of a tundra stream. *Hydrobiologia* 240:121-131.
52. Deegan, L. A. and B. J. Peterson. 1992. Whole river fertilization stimulates fish production in an arctic tundra river. *Canadian Journal of Fisheries and Aquatic Sciences* 49:1890-1901.
53. Kriet, K., B. J. Peterson and T. L. Corliss. 1992. Water and sediment export of the upper Kuparuk River drainage of the North Slope of Alaska. *Hydrobiologia* 240: 71-81.
54. Fry, B., M. Hullar, B. J. Peterson, S. Saupe and R. T. Wright. 1992. DOC production in a salt marsh estuary. *Arch. Hydrobiol. Beih.* 37:1-8.
55. Peterson, B. J., T. L. Corliss, K. Kriet and J. E. Hobbie. 1992. Nitrogen and phosphorus concentrations and export for the upper Kuparuk River on the North Slope of Alaska in 1980. *Hydrobiologia* 240: 61-69.
56. Fry, B., S. Saupe, M. Hullar and B. J. Peterson. 1993. Platinum-catalyzed combustion of DOC in sealed tubes for stable isotopic analysis. *Marine Chemistry* 41:187-193.
57. Peterson, B. J., L. Deegan, J. Helfrich, J. E. Hobbie, M. Hullar, B. Moller, T. E. Ford, A. Hershey, A. Hiltner, G. Kipphut, M. A. Lock, D. M. Fiebig, V. McKinely, M. C. Miller, J. R. Vestal, R.

- Ventullo and G. Volk. 1993. Biological responses of a tundra river to fertilization. *Ecology* 74(3):653-672.
58. Hershey, A. E., J. Pastor, B. J. Peterson and G. W. Kling. 1993. Stable isotopes resolve the drift paradox for *Baetis* mayflies in an arctic river. *Ecology* 74(8):2315-2325.
59. Peterson, B., B. Fry, L. Deegan and A. Hershey. 1993. The trophic significance of epilithic algal production in a fertilized tundra river ecosystem. *Limnology and Oceanography* 38(4):872-878.
60. Peterson, B. J., B. Fry, M. Hullar, S. Saupe and R. Wright. 1994. The distribution and stable carbon isotopic composition of dissolved organic carbon in estuaries. *Estuaries* 17(1B):111-121.
61. Deegan, L. A., J. Finn, C. Hopkinson, B. J. Peterson, A. E. Giblin, B. Fry and J. E. Hobbie. 1995. Flow model analysis of the effects of organic matter-nutrient interactions on estuarine trophic dynamics, pp. 273-281. In: K. Dyer and R. Orth (eds.), *International Symposium Series, Changes in Fluxes in Estuaries: Implications from Science to Management*. Olsen & Olsen, Denmark, Sweden.
62. Fry, B. A. E. Giblin, M. Dornblaser and B. J. Peterson. 1995. Stable sulfur isotopic compositions of chromium-reducible sulfur in lake sediments, pp. 397-410. In: M. A. Vairavamurthy and M. A. A. Schoonens (eds.). *Geochemical Transformations of Sedimentary Sulfur*. American Chemical Society. ACS Symposium Series 612.
63. Fry, B., D. E. Jones, G. W. Kling, R. B. McKane, K. J. Nadelhoffer and B. J. Peterson. 1995. Adding ¹⁵N tracers to ecosystem experiments, pp. 17-192. In: E. Wada, T. Yoneyama, M. Minagawa, T. Ando and B. Fry (eds.). *Stable Isotopes in the Biosphere*. Kyoto University Press. Kyoto, Japan.
64. Hobbie, J.E., L. A. Deegan, B. J. Peterson, E. B. Rastetter, G. R. Shaver, G. W. Kling, W. J. O'Brien, F. S. Chapin, M. C. Miller, G. W. Kipphut, W. B. Bowden, A. E. Hershey and M. E. McDonald. 1995. Long-term measurements at the Arctic LTER site, pp. 391-409. In: T. M. Powell and J. H. Steele (eds.). *Ecological Times Series*. Chapman and Hall, New York.
65. Hershey, A. E. and B. J. Peterson. 1996. Chapter 24. Stream Food Webs. In: Lamberti and Hauer (eds.), *Methods in Stream Ecology*. Academic Press, San Diego, CA.
66. Hullar, M. A. J., B. Fry, B. J. Peterson, and R. T. Wright. 1996. Microbial utilization of estuarine dissolved organic carbon: A stable isotope tracer approach tested by mass balance. *Applied and Environmental Microbiology* 62(7):2489-2493.
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69. Peterson, B. J., G. W. Kling, and M. Bahr. 1997. A tracer investigation of nitrogen cycling in a pristine tundra river. *Canadian Journal Fisheries and Aquatic Sciences*. 54:2361-2367.
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