

EDWARD B. RASTETTER

Senior Scientist

The Ecosystems Center
Marine Biological Laboratory
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Education: Ph.D., University of Virginia, Department of Environmental Sciences, 1986.
Dissertation: The Regulation of Ecosystem Processes within a Sealed Aquatic Microcosm

B.S., University of Hawaii, Zoology and Mathematics, 1976. Marine Options degree in Marine Environmental Management under the Sea Grant Program.

Honors: 1981-1984, Dean's Reserve Fellowship, University of Virginia

Elected Societies: Full member of the Society of the Sigma Xi (1980)

Editorial Board: Ecosystems (1998- present)

Research Experience:

April 2004: Royal Society of Edinburgh visiting Scientist at the The Macaulay Institute, Aberdeen Scotland

April-May 1996: Visiting Scientist, Swedish Agricultural University, Uppsala, Sweden

November 2002 - Present: Senior Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA .

February 1994 - November 2002: Associate Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA .

June 1987 - February 1994: Assistant Scientist, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA.

February 1986 - June 1987: Postdoctoral Research Associate, The Ecosystems Center, Marine Biological Laboratory. Modeling global carbon cycling.

September 1985 - January 1986: Postdoctoral Research Associate, University of Virginia, Department of Environmental Sciences. Modeling the effects of acid rain on the soils of small forested catchments.

January 1985 - August 1985: Research Assistant, University of Virginia, Department of Environmental Sciences. Development of a model of community succession on coastal barrier islands and in mangrove forests.

March 1976 - June 1979: Biologist, Research Corporation of the University of Hawaii, on contract to the Naval Ocean Systems Center, Hawaii Laboratory, Kaneohe, Hawaii.

February 1975 - March 1976: Biologist, Marine Options Program, University of Hawaii Sea Grant, on contract to the Naval Undersea Center, Hawaii Laboratory, Kaneohe, Hawaii

Teaching Experience:

Designed and taught a short course entitled: A Review of Calculus and Linear Algebra for the Environmental Sciences (August 1983).

Teaching assistant in the following courses: Systems Analysis (Fall 1979, Spring 1981), Applied Hydrology (Spring 1980, Spring 1981), Terrestrial Ecology (Fall 1981).

Organized and lectured in a series of workshops for beginning graduate students on "Mathematical Modeling in Ecology," funded by the Clowes Fund (1989 - 1992).

Designed and taught an undergraduate course in Mathematical Modeling for the Semester in Environmental Sciences (1997 - present)

Mathematical modeling for non-programmers, Brown University (Spring 2006, Spring 2012)

Student Committees

Freddrick Wikström, Opponent for PhD defense, Swedish Agricultural University, Uppsala, Sweden
 David Bryant, PhD committee, University of New Hampshire
 Seeta Sistla, PhD committee, University of California at Santa Barbara
 Chelsea Nagy, PhD committee, Brown
 Laura Garrison, PhD committee, Brown

Tenure Review Committee

Riitta Hyvönen-Olsson, Faculty of Forestry, Swedish Agricultural University, Uppsala, Sweden

Post-Doctoral Fellows

Michael Ryan, 1988-1990
 Robert McKane 1990-1994
 David Fernandes 1994-1996
 Mathew Williams 1994-1997
 Darrell Herbert 1996-1999
 Severine Le Dizes 2000-2001
 Gabrielle Holmes 2008-2009
 Adrian Rocha 2010 -2012
 Yueyang Jiang 2012-2015

MBL Committees

Hughes Library Planning Committee 1988-89
 MBL Computer Services Committee, Chair 1989
 Housing, Food Services, and Child Care Committee, 2000-2010
 Buildings and Grounds Committee, 2010-present
 MBL Housing Study, fall 2000
 Resident Science Task Force, Spring 2002
 MBL Institutional Committee 2012 -2014
 MBL Science Council 2013 - present
 MBL POM director search, 2013

Publications:

- Rastetter, E. B., and W. J. Cooke. 1979. Responses of marine fouling communities to sewage abatement in Kaneohe Bay, Oahu, Hawaii. *Marine Biology* 53:271-280.
- Grovhoug, J. G., and E. B. Rastetter. 1980. Marine fouling dynamics in Hawaiian nearshore ecosystems: a suggested technique for comparison and evaluation. 5th International Congress on Marine Corrosion and Fouling, Madrid, pp. 249-266.
- Hornberger, G. M., and E. B. Rastetter. 1982. Sensitivity analysis as an aid in modelling and control of (poorly-defined) ecological systems. NASA Technical Report CR-166308.
- Hornberger, G. M., B. J. Cosby and E. B. Rastetter. 1986. Regionalization of predictions of effects of atmospheric acidic deposition on surface waters. Proc. International Conference on Water Quality Modelling in the Inland Natural Environment, Bournemouth, England, 10-13 June 1986.
- Rastetter, E. B. 1986a. The Regulation of Ecosystem Processes within a Sealed Aquatic Microcosm. Ph.D. thesis to The University of Virginia.
- Rastetter, E. B. 1986b. Analysis of community interactions using linear transfer function models. *Ecological Modelling* 36:101-117.
- Cosby, B. J., G. M. Hornberger, E. B. Rastetter, J. N. Galloway and R. F. Wright. 1986. Estimating catchment water quality response to acid deposition using mathematical models of soil ion exchange

- processes. Workshop on Mechanisms of Ion Transport in Soils, Swiss Federal Institute of Hydrology, Zurich Switzerland, 20-23 May 1985.
- Vörösmarty, C.J., B. Moore, M.P. Gildea, B. Peterson, J. Melillo, D. Kicklighter, J. Raich, E. Rastetter, and P. Steudler. 1988. A global, georeferenced model of hydrology and water quality applied to the Amazon Basin. In: Nittrouer, C. and D. DeMaster (eds.), Proc. of AGU Chapman Conference on the Amazon Dispersal System. Charleston, SC.
- Moore, B., M. P. Gildea, C. J. Vorosmarty, D. L. Skole, J. Melillo, B. J. Peterson, E. Rastetter and P. Steudler. 1989. Strategy for understanding changes in the metabolic system of the planet, pp. 118-141. In: M. B. Ramble, L. Margulis and R. Fester (eds.), *Global Ecology*. Academic Press.
- Shugart, H. H., P. J. Michaels, T. M. Smith, D. A. Weinstein and E. B. Rastetter. 1988. Simulation models of forest succession, pp. 125-153. In: T. Rosswall and R. G. Woodmansee and P. G. Risser (eds.), *Scales and Global Change. Spatial and Temporal Variability in Biospheric and Geospheric Processes*. SCOPE 35. John Wiley & Sons, New York.
- Shugart, H. H., G. B. Bonan and E. B. Rastetter. 1988. Niche theory and community organization. *Can. J. Bot.* 66:2634-2639.
- 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.
- Ryan, P. F., G. M. Hornberger, B. J. Cosby, J. N. Galloway, J. R. Webb and E. B. Rastetter. 1989. Changes in the chemical composition of stream water in two catchments in the Shenandoah National Park, VA, in response to atmospheric deposition of sulfur. *Water Resources Research* 25:2091-2099.
- Rastetter, E. B. 1991. A spatially explicit model of vegetation-habitat interactions on barrier islands, pp. 353-378. Chapter 14. In: M. G. Tuner and R. H. Gardner (eds.), *Quantitative Methods in Landscape Ecology*. Springer-Verlag, New York.
- Rastetter, E. B., M. G. Ryan, G. R. Shaver, J. M. Melillo, K. J. Nadelhoffer, J. E. Hobbie and J. D. Aber. 1991. A general biogeochemical model describing the responses of the C and N cycles in terrestrial ecosystems to changes in CO₂, climate and N deposition. *Tree Physiology* 9:101-126.
- Raich, J. W., E. B. Rastetter, J. M. Melillo, D. W. Kicklighter, P. A. Steudler, B. J. Peterson, A. L. Grace, B. Moore III and C. J. Vorosmarty. 1991. Potential net primary productivity in South America: Application of a global model. *Ecological Applications* 1:399-429.
- Vörösmarty, C.J., B. Moore III, A. Grace, B.J. Peterson, E.B. Rastetter, and J. Melillo. 1991. Distributed parameter models to analyze the impact of human disturbance of the surface hydrology of a large tropical drainage basin in southern Africa. In: van de Ven, F.H.M., D. Gutknecht, D.P. Loucks and K.A. Salewicz (eds.), *Hydrology for the Water Management of Large River Basins*, pp. 233-44. IAHS Publication #201, Wallingford, UK.
- Rastetter, E. B., A. W. King, B. J. Cosby, G. M. Hornberger, R. V. O'Neill and J. E. Hobbie. 1992a. Aggregating fine-scale ecological knowledge to model coarser-scale attributes of ecosystems. *Ecological Applications* 2:55-70.
- Rastetter, E. B., R. B. McKane, G. R. Shaver and J. M. Melillo. 1992b. Changes in C storage by terrestrial ecosystems: How C-N interactions restrict responses to CO₂ and temperature. *Water, Air & Soil Pollution* 64:327-344.
- Rastetter, E. B., and G. R. Shaver. 1992. A model of multiple element limitation for acclimating vegetation. *Ecology* 73:1157-1174.
- Shaver, G. R., W. D. Billings, F. S. Chapin, III, A. E. Giblin, K. J. Nadelhoffer, W. C. Oechel and E. B. Rastetter. 1992. Global change and the carbon balance of arctic ecosystems. *BioScience* 42(6):433-441.
- Kicklighter, D. W., J. M. Melillo, W. T. Peterjohn, E. B. Rastetter, A. D. McGuire, P. A. Steudler and J. D. Aber. 1994. Aspects of spatial and temporal aggregation in estimating regional carbon dioxide fluxes from temperate forest soils. *Journal of Geophysical Research* 99:1303-1315.
- Rastetter, E. B., and G. R. Shaver. 1995. Functional redundancy and process aggregation: Linking ecosystems to species. In: C. G. Jones and J. H. Lawton (eds.) *Linking Species and Ecosystems*. Chapman and Hall, New York, pp. 215-223.
- 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, Michael 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.), *Biological Time Series*. Chapman and Hall, New York.
- McKane, R. B., E. B. Rastetter, J. M. Melillo, G. R. Shaver, C. S. Hopkins, D. N. Fernandes, D. L. Skole and W. H. Chomentowski. 1995. Effects of global change on carbon storage in tropical forests of South America. *Global Biogeochemical Cycles* 9(3):329-350.
- Johnson, L. C., G. R. Shaver, A. Giblin, K. Nadelhoffer, E. Rastetter, J. Laundre and G. Murray. 1996. Effects of enhanced drainage and elevated temperature on carbon balance of tussock tundra microcosms. *Oecologia* 108:737-748.
- Rastetter, E. B. 1996. Validating models of ecosystem response to global change. *BioScience* 46(3):190-198.
- Ryan, M. G., E. R. Hunt, Jr., R. E. McMurtrie, G. I. Ågren, J. D. Aber, A. D. Friend, E. B. Rastetter, W. Pulliam, J. Raison and S. Lindner. 1996(a). Comparing models of ecosystem function for temperate conifer forests. I. Model description and validation. In: A. Breymeyer, D. O. Hall, J. M. Melillo and G. I. Ågren (eds.), *Global Change: Effects on Coniferous Forests and Grasslands*. SCOPE 56. John Wiley & Sons, New York, pp 313-362.
- Ryan, M. G., R. E. McMurtrie, G. I. Ågren, E. R. Hunt, Jr., J. D. Aber, A. D. Friend, E. B. Rastetter and W. M. Pulliam. 1996(b). Comparing models of ecosystem function for temperate conifer forests. II. Simulations of the effect of climatic change,. In: A. Breymeyer, D. O. Hall, J. M. Melillo and G. I. Ågren (eds.), *Global Change: Effects on Coniferous Forests and Grasslands*. SCOPE 56. John Wiley & Sons, New York, pp 363-387.
- Shaver, G. R., A. E. Giblin, K. J. Nadelhoffer and E. B. Rastetter. 1996. Plant functional types and ecosystem change in arctic tundras. In: T. Smith, H. Shugart and I. Woodward (eds.), Plant Functional Types. Cambridge University Press, Cambridge, UK.
- Townsend, A. R., and E. B. Rastetter. 1996. Nutrient constraints over carbon storage in forested ecosystems, pp. 35-45. In: M. Apps and D. Price (eds.), *Forest Ecosystems, Forest Management and the Global Carbon Cycle*. NATO ASI Series, Vol I 40. Springer-Verlag, Berlin.
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- Williams, M., E. B. Rastetter, D. N. Fernandes, M. L. Goulden, S. C. Wofsy, G. R. Shaver, J. M. Melillo, J. W. Munger, S.-M. Fan and K. J. Nadelhoffer. 1996. Modelling the soil-plant-atmosphere continuum in a *Quercus-Acer* stand at Harvard Forest: the regulation of stomatal conductance by light, nitrogen and soil/plant hydraulic properties. *Plant, Cell and Environment* 19:911-927.
- McKane, R., E. Rastetter, G. Shaver, K. Nadelhoffer, A. Giblin, J. Laundre and F. Chapin. 1997a. Climatic effects on tundra carbon storage inferred from experimental data and a model. *Ecology* 78:1170-1187.
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- (ed.), *Disturbance and Recovery in Arctic Lands: An Ecological Perspective*. Kluwer Academic Publishers, Dordrecht.
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- Williams, M., Y. Malhi, A.D. Nobre, E.B. Rastetter, J. Grace, and M.G. Pereira. 1998. Seasonal variation in net carbon exchange and evapotranspiration in a Brazilian rain forest: a modelling analysis. *Plant, Cell, and Environment* 21: 953-968.
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- Williams, M. and E. B. Rastetter. 1999. Vegetation characteristics and primary productivity along an arctic transect: implications for scaling up. *Journal of Ecology*. 87: 885-898.
- Williams, M., W. Eugster, E. B. Rastetter, J. P. McFadden and F. S. Chapin III. 2000. The controls on net ecosystem productivity along an arctic transect: a model comparison with flux measurements. *Global Change Biology* Vol. 6, Supplement I:116-126.
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