

International Scientists and Economists Statement on Biofuels and Land Use

A letter to the European Commission

As scientists and economists involved in the field of climate, energy, and land use, we are writing to you to recommend that policies recognize and account for indirect land use change as a part of the lifecycle analyses of greenhouse gas (GHG) emissions from biofuels. This will encourage development of sustainable, low-carbon fuels that avoid conflict with food production and minimize harmful environmental impacts.

Our comments are relevant to your deliberations on indirect land use change emissions in the context of the Renewable Energy and Fuel Quality Directives. For policies like these to successfully reduce GHG emissions, it is critical to include all major sources of emissions, including those associated with changes in land use.

Peer-reviewed research over the last several years, including studies commissioned by the European Commission, indicates that conventional biofuels can directly or indirectly result in substantial GHG emissions through the conversion of forests and grasslands to croplands or pasture to accommodate biofuel production. Increased demand for crops to make fuel results in higher global commodity prices that can induce farmers in other countries to plow up new ground, including sensitive, high-carbon ecosystems such as tropical forests in South America and Southeast Asia or peatland in Southeast Asia. The conditions for this to occur are not relegated to the future, but are already in place. The Directives do not currently account for these emissions in their lifecycle analysis or elsewhere, giving biofuels credit for greater carbon savings than actually achieved.

There are uncertainties inherent in estimating the magnitude of indirect land use emissions from biofuels, but a policy that implicitly or explicitly assigns a value of zero is clearly not supported by the science. All the studies of land use change indicate that the emissions related to biofuels expansion are significant and can be quite large. Exhaust pipe emissions for biofuels are, by convention, ignored in performing lifecycle GHG emissions analysis for biofuels. This accounting convention is flawed, as was described in the opinion of the European Environment Agency Scientific Committee on 15 September 2011.¹ To justify the omission of exhaust pipe emissions, it is essential to account for changes in land use.

The current scientific understanding is sufficient to warrant immediate action, as has already been recognized in the U.S. federal Renewable Fuel Standard and California Low Carbon Fuels Standard. A regulation based on a robust framework of science can be adjusted as the analysis matures.

¹ <http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas>

Without addressing land use change, the European Union's target for renewable energy in transport may fail to deliver genuine carbon savings in the real world. It could end up as merely an exercise on paper that promotes widespread deforestation and higher food prices.

It has been suggested that higher GHG thresholds for direct emissions are an adequate substitute for accounting for indirect land use change emissions. However, a problem in the accounting cannot be fixed by changing the threshold. A complete accounting is essential to assuring that promised carbon reductions are credible. Flawed accounting could even encourage greater expansion of biofuels that cause damaging changes in land use, as described in the September 15 EEA Scientific Committee opinion.

Biofuels policies should encourage a growing clean energy market and create jobs producing low carbon biofuels that avoid land use change. Strategic investment decisions must be based upon the best available assessments of the GHG emissions of alternative fuel pathways. Promptly establishing a credible framework that includes indirect land use change will signal the market to invest in biofuels that minimize deforestation and competition with food.

The president of the commission has pledged "a fundamental review of the way EU institutions access and use scientific advice."² We urge you to align the EU biofuels policy with the best scientific knowledge and take into account emissions from indirect changes in land use.

²<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/09/391&format=HTML&aged=0&language=EN&guiLanguage=en>

Sincerely,

Daniel Kammen, Ph.D.

Chief Technical Specialist for Renewable Energy
and Energy Efficiency
World Bank
Washington, DC United States

Stuart Pimm, Ph.D.

Doris Duke Professor of Conservation Ecology
Duke University
Durham, NC United States
Dr. A. H. Heineken Prize for Environmental Sciences
Tyler Prize for Environmental Achievement

Helmut Haberl, Ph.D.

Professor
Alpen-Adria Universität Klagenfurt
Vienna, Austria

Kenneth Arrow, Ph.D.

Professor Emeritus
Stanford University
Stanford, CA United States
Nobel Memorial Prize in Economic Science,
U.S. National Medal of Science Member,
U.S. National Academy of Sciences

Prem Bindraban, Ph.D.

Director of ISRIC
World Soil Information (ISRIC)
Wageningen, Netherlands

Aviel Verbruggen, Ph.D.

Full Professor
University of Antwerp
Antwerp, Belgium

Institutions are listed for identification purposes only.

Peter Frumhoff, Ph.D.

Director of Science and Policy
Union of Concerned Scientists
Cambridge, MA United States
Lead author, 4th Assessment Report of the IPCC
Lead author, IPCC Special Report on Land Use, Land-use Change and Forestry

David Foster, Ph.D.

Director, Harvard Forest
Harvard University
Petersham, MA United States

Geoffrey Heal, Ph.D.

Donald C. Waite III Professor of Social Enterprise
Columbia University
New York, NY United States
Past President, Association of Environmental and Resource Economists
Chairman of the Board and Co-Founder, Coalition for Rainforest Nations

Eirik Romstad, Ph.D.

Senior Research Fellow
Norwegian University of Life Sciences
Aas, Norway
Past President, European Association of Agricultural Economists

Thomas Lovejoy, Ph.D.

Biodiversity Chair
The H. John Heinz III Center for Science, Economics and the Environment
Washington, DC United States
Tyler Prize for Environmental Achievement

William H. Schlesinger, Ph.D.

President
Cary Institute of Ecosystem Studies
Millbrook, NY United States
Past President, Ecological Society of America
Member, The National Academy of Sciences

William Laurance, Ph.D.

Distinguished Research Professor
James Cook University
Smithfield, Australia

Daniel Tan, Ph.D.

Senior Lecturer
The University of Sydney
Sydney, Australia

Juliana Lutz, Ph.D.

Institute of Social Ecology, Alpen-Adria
Universitaet Klagenfurt
Vienna, Austria

Klaus Radunsky, Ph.D.

Head of Emission Trading Unit
Umweltbundesamt
Vienna, Austria

Gabriel Singer, Ph.D.

University of Vienna
Vienna, Austria

Karlheinz Erb, Ph.D.

Associate Professor
Institute of Social Ecology, Alpen-Adria
Universitaet Klagenfurt
Vienna, Austria

Susanne Kummer, Ph.D.

University of Natural Resources & Life Science
Vienna, Austria

Patrick Meyfroidt, Ph.D.

Université Catholique de Louvain
Louvain-La-Neuve, Belgium

Matteo Campioli, Ph.D.

University of Antwerp
Antwerp, Belgium

Rudy van Diggelen, Ph.D.

Professor
University of Antwerp
Antwerpen, Belgium

Olivier Hardy, Ph.D.

Research Associate
Université Libre de Bruxelles
Brussels, Belgium

Ingrid Parmentier, Ph.D.

Université Libre de Bruxelles
Brussels, Belgium

Sara Vicca, Ph.D.

University of Antwerp
Wilrijk, Belgium

Kostadin Gechev, Ph.D.

Professor
Institute of Plant Physiology & Genetics, Bulgarian
Academy of Sciences
Sofia, Bulgaria

Judi Krzyzanowski, Ph.D.

Krzyzanowski Consulting, University of British
Columbia
Stirling-Rawdon, ON Canada

Jens Bo Holm-nielsen, Ph.D.

Head of Center, Bioenergy
Aalborg University
Ribe, Denmark

Jens-Christian Svenning, Ph.D.

Professor
Aarhus University
Aarhus, Denmark

Rolf Czeskleba-Dupont, Ph.D.

Scientific Assistant
Roskilde University
Hvalsoe, Denmark

Jyrki Jauhiainen, Ph.D.

Research Coordinator
University of Helsinki
Helsinki, Finland

Irmeli Mustalahti, Ph.D.

Researcher
University of Helsinki
Vantaa, Finland

Jan Kunnas, Ph.D.

University of Jyväskylä
Jyväskylä, Finland

Tarja Ketola, Ph.D.

Adjunct Professor
University of Turku
Turku, Finland

Kim Pingoud, Ph.D.

Senior Scientist
VTT Technical Research Centre of Finland
Espoo, Finland

Ilkka Savolainen, Ph.D.

VTT Technical Research Centre of Finland
Espoo, Finland

Philippe Quirion, Ph.D.

Researcher
National Center for Scientific Research (CNRS)
Paris, France

Bruno Dorin, Ph.D.

Researcher
Agricultural Research for Development (CIRAD)
Montpellier, France

Tonya Lander, Ph.D.

National Institute for Agricultural Research
(INRA)
Avignon, France

Yann Clough, Ph.D.

Georg-August-Universität Göttingen
Göttingen, Germany

Maria Mueller-Lindenlauf, Ph.D.

Senior Scientist
Institute for Energy and Environmental Research
Heidelberg (IFEU)
Heidelberg, Germany

Lutz Breuer, Ph.D.

Senior Scientist
JLU Giessen
Giessen, Germany

Michael Trepel, Ph.D.

Kiel University
Flintbek, Germany

Florian Siegert, Ph.D.

Professor
Ludwig-Maximilians-University Munich
Munich, Germany

Gunnar Brehm, Ph.D.

Phyletisches Museum
Jena, Germany

Susann Reiner, Ph.D.

Rainforest Institute
Freiburg, Germany

Gerald Moser, Ph.D.

Scientific Assistant
University of Giessen
Giessen, Germany

Rainer Wirth, Ph.D.

Researcher and Lecturer
University of Kaiserslautern
Kaiserslautern, Germany

Oliver Reiser, Ph.D.

Professor of Chemistry
University of Regensburg
Regensburg, Germany

Gerhard Zotz, Ph.D.

Professor
University Oldenburg
Oldenburg, Germany

Donal Murphy-Bokern, Ph.D.

Lohne, Germany

Tobias Plieninger, Ph.D.

Berlin-Brandenburg Academy of Sciences
Berlin, Germany

Malte Unger, Ph.D.

CAU Kiel
Kiel, Germany

Jens Born, Ph.D.

Professor of Chemical technology
Flensburg University of Applied Sciences
Flensburg, Germany

Heiko Keller, Ph.D.

Institute for Energy and Environmental Research
Heidelberg (IFEU)
Heidelberg, Germany

Guido Reinhardt, Ph.D.

Scientific Director
Institute for Energy and Environmental Research
Heidelberg (IFEU)
Heidelberg, Germany

Klaus Butterbach-Bahl, Ph.D.
Karlsruhe Institute of Technology
Garmisch-Partenkirchen, Germany

Bernhard Knierim, Ph.D.
Lawrence Berkeley National Lab, JBEI
Berlin, Germany

Rainer Putz, Ph.D.
Rainforest Institute
Freiburg, Germany

Karlheinz Knickel, Ph.D.
Sustainability Strategies and Innovation
SD Innovation
Frankfurt, Germany

Ute Knoerr, Ph.D.
State Museum of Natural History, Stuttgart
Stuttgart, Germany

Hans-Georg Frede, Ph.D.
Universität Gießen
Giessen, Germany

Claudia Kammann, Ph.D.
Postdoc Researcher
University of Gießen
Wettenberg, Germany

Bernhard Schuldt, Ph.D.
University of Goettingen
Goettingen, Germany

Florian Werner, Ph.D.
Research Scientist
University of Oldenburg
Oldenburg, Germany

Konstans Wells, Ph.D.
University of Ulm
Ulm, Germany

Karachepone Ninan, Ph.D.
Professor
Institute for Social and Economic Change
Bangalore, India

Shankar Raman, Ph.D.
Senior Scientist
Nature Conservation Foundation
Valparai, India

Eswaran Somanathan, Ph.D.
Professor
Indian Statistical Institute
New Delhi, India

Henry Neufeldt, Ph.D.
International Center for Research in Agroforestry
(ICRAF)
Nairobi, Kenya

Jose Luis Martinez, Ph.D.
Universidad de Tabasco
Villahermosa, Mexico

Peter Verburg, Ph.D.
Professor
VU University Amsterdam
Amsterdam, Netherlands

Aljosja Hooijer, Ph.D.
Senior Adviser
Deltares
Delft, Netherlands

Agata Klimkowska, Ph.D.

Researcher
Foundation Bargerveen
Nijmegen, Netherlands

Dirk Strijker, Ph.D.

Professor
Groningen University
Groningen, Netherlands

Geert Woltjer, Ph.D.

Senior Researcher
Wageningen University and Research Centre
Delft, Netherlands

Suzi Kerr, Ph.D.

Senior Fellow
Motu Economic and Public Policy Research
Wellington, New Zealand

Anthony Clark, Ph.D.

Climate Change Analyst
Wellington, New Zealand

W Troy Baisden, Ph.D.

Head of Department
National Isotope Centre - GNS Science
Lower Hutt, New Zealand

Miguel L. Munguira, Ph.D.

Universidad Autonoma Madrid
Madrid, Spain

Daigee Shaw, Ph.D.

Research Fellow
Academia Sinica
Taipei, Taiwan

Tom Fayle, Ph.D.

Postdoctoral Researcher
Imperial College London
London, United Kingdom

Ben Phalan, Ph.D.

University of Cambridge
Cambridge, United Kingdom

Matthew Struebig, Ph.D.

Research Fellow
University of Kent
London, United Kingdom

Martin Warren, Ph.D.

Butterfly Conservation
Dorchester, United Kingdom

Jorn Scharlemann, Ph.D.

Senior Scientist
United Nations Environmental Program - World
Conservation Monitoring Centre (UNEP - WCMC)
Cambridge, United Kingdom

David Coomes, Ph.D.

University of Cambridge
Cambridge, United Kingdom

Simon Lewis, Ph.D.

Royal Society research fellow
University of Leeds
London, United Kingdom

Susan Page, Ph.D.

Head of Department
University of Leicester
Leicester, United Kingdom

Bruce Wright, Ph.D.

Executive Director
Conservation Science Institute
Palmer, AK United States

Dustin Mulvaney, Ph.D.

Professor of Sustainable Energy Resource
San Jose State University
San Jose, CA United States

Justin Schmidt, Ph.D.

Biologist
Southwestern Biological Institute
Tucson, AZ United States

Megan Hall, Ph.D.

Project Scientist
University of California, Berkeley
Berkeley, CA United States

Carolyn Enquist, Ph.D.

University of Arizona
Tucson, AZ United States

John Harte, Ph.D.

Professor of Ecosystem Sciences
University of California, Berkeley
Berkeley, CA United States

Mathias van Thiel, Ph.D.

Chemist
Hayward, CA United States

Julie Jedlicka, Ph.D.

Postdoctoral Fellow
University of California, Berkeley
El Cerrito, CA United States

Anne Cohen, Ph.D.

Research Fellow
California Academy of Sciences
San Rafael, CA United States

Michael O'Hare, Ph.D.

Professor of Public Policy
University of California, Berkeley
Berkeley, CA United States

Nathah Carlson, Ph.D.

California Lutheran University
Thousand Oaks, CA United States

Richard Plevin, Ph.D.

Assistant Research Engineer
University of California, Berkeley
Berkeley, CA United States

Sherman Lewis, Ph.D.

Professor Emeritus
California State University, East Bay
Hayward, CA United States

Ben Ramage, Ph.D.

Postdoctoral Researcher
University of California, Berkeley
Oakland, CA United States

David Gallo, Ph.D.

Professor Emeritus
California State University, Chico
Chico, CA United States

Julie Witcover, Ph.D.

University of California, Davis
Davis, CA United States

John Holtzclaw, Ph.D.

Environmental Science
San Francisco, CA United States

Sonia Yeh, Ph.D.

Research Engineer
University of California, Davis
Davis, CA United States

Richard Ambrose, Ph.D.

Professor
University of California, Los Angeles
Agoura Hills, CA United States

Erin Conlisk, Ph.D.

University of California, Riverside
San Diego, CA United States

Linda Anderson, Ph.D.

Researcher
University of California, Santa Cruz
Felton, CA United States

Karen Holl, Ph.D.

Professor
University of California, Santa Cruz
Felton, CA United States

Jed Fuhrman, Ph.D.

Professor (endowed chair)
University of Southern California
Topanga, CA United States

Howard Wilshire, Ph.D.

Research Geologist
Sebastopol, CA United States

John McKean, Ph.D.

Professor Emeritus
Colorado State University
Masonville, CO United States

Matthew Preston, Ph.D.

University of California, Davis
Boulder, CO United States

JoAnne Howe, Ph.D.

Professor Emeritus of Economics
University of Colorado, Boulder
Boulder, CO United States

David Armstrong, Ph.D.

Professor Emeritus
University of Colorado, Boulder
Loveland, CO United States

Robin Chazdon, Ph.D.

Professor
University of Connecticut
Storrs, CT United States

Jeremy Martin, Ph.D.

Senior Scientist
Union of Concerned Scientists
Washington, DC United States

Jeffrey O'Hara, Ph.D.

Agricultural Economist
Union of Concerned Scientists
Washington, DC United States

Linda Winston, Ph.D.

Biology
Seaford, DE United States

Tom Poulson, Ph.D.

Ecology
Jupiter, FL United States

Richard Glick, Ph.D.

President
The Corporation for Future Resources (CFR)
Tallahassee, FL United States

Gustav Paulay, Ph.D.

Professor
University of Florida
Gainesville, FL United States

Armando Tasistro, Ph.D.

University of Georgia
Watkinsville, GA United States

Gabriel Peckham, Ph.D.

Principal Investigator
Black Ivory Biotech
Honolulu, HI United States

Michael Parke, Ph.D.

University of Hawaii
Honolulu, HI United States

Russ Benedict, Ph.D.

Associate Professor
Central College
Pella, IA United States

Erwin Klaas, Ph.D.

Professor Emeritus
Iowa State University
Ames, IA United States

Jason Koontz, Ph.D.

Associate Professor and Co-Chair
Augustana College
Rock Island, IL United States

Karen Glennemeier, Ph.D.

Science Director
National Audubon Society
Wilmette, IL United States

Bert Menco, Ph.D.

Northwestern University
Evanston, IL United States

Gregory Owens, Ph.D.

Richland Community College
Decatur, IL United States

Leslie Duram, Ph.D.

Professor and Chair
Southern Illinois University
Carbondale, IL United States

James Shapiro, Ph.D.

Professor of Microbiology
University of Chicago
Chicago, IL United States

Lauren Quinn, Ph.D.

Postdoctoral researcher
University of Illinois
Urbana, IL United States

Zewei Miao, Ph.D.

Visiting Research Assistant Professor
University of Illinois, Urbana-Champaign
Urbana, IL United States

Edmond Zaborski, Ph.D.

Visiting Research Scientist
University of Illinois, Urbana-Champaign
Mahomet, IL United States

George Bakken, Ph.D.

Professor of Biology
Indiana State University
Terre Haute, IN United States

David Burress, Ph.D.

President
Ad Astra Institute of Kansas
Lawrence, KS United States

Gilford Ikenberry, Ph.D.
McPherson College
McPherson, KS United States

Deborah Hill, Ph.D.
Professor
University of Kentucky
Lexington, KY United States

Susan Goldhor, Ph.D.
Director
Center for Applied Regional Studies
Cambridge, MA United States

James Fay, Ph.D.
Professor Emeritus
Massachusetts Institute of Technology
Weston, MA United States

Alfred Eipper, Ph.D.
Ecologist
Easthampton, MA United States

Elske Smith, Ph.D.
Professor Emeritus
Lenox, MA United States

D. Snyder, Ph.D.
Professor Emeritus
Amherst, MA United States

W. Reid Goforth, Ph.D.
Biology
Port Republic, MD United States

Amy McKinney, Ph.D.
Postdoctoral Research Associate
Rocky Mountain Biological Laboratory
United States

Tom Tietenberg, Ph.D.
Mitchell Family Professor of Economics, Emeritus
Colby College
Waterville, ME United States

Edward Parson, Ph.D.
Professor of Law, Professor of Environment
University of Michigan
Ann Arbor, MI United States

Peter Reich, Ph.D.
Professor
University of Minnesota
St Paul, MN United States

Margaret Kuchenreuther, Ph.D.
University of Minnesota, Morris
Morris, MN United States

Cyrus Bina, Ph.D.
Distinguished Research Professor of Economics
University of Minnesota, Morris
Morris, MN United States

Tim Dickson, Ph.D.
Michigan State University
Hickory Corners, MO United States

Stephen Mudrick, Ph.D.
Associate Professor Emeritus of Atmospheric
Science
University of Missouri
Columbia, MO United States

James Lazell, Ph.D.
President
The Conservation Agency
Jackson, MS United States

David Grant, Ph.D.

Professor Emeritus of Biology
Davidson College
Davidson, NC United States

Thomas Struhsaker, Ph.D.

Adjunct Professor
Duke University
Durham, NC United States

Daniel Graham, Ph.D.

Adjunct Professor
North Carolina State University
Chapel Hill, NC United States

Jo Ellen Brandmeyer, Ph.D.

Research Environmental Engineer 3
RTI International
Chapel Hill, NC United States

Richard Bilsborrow, Ph.D.

Professor
University of North Carolina
Chapel Hill, NC United States

Carol Seagle, Ph.D.

Professor
University of North Carolina, Chapel Hill
Chapel Hill, NC United States

Nicanor Saliendra, Ph.D.

Ecologist
United States Department of Agriculture,
Agricultural Research Service
Mandan, ND United States

Hendrik Van Den Berg, Ph.D.

Professor of Economics
University of Nebraska
Lincoln, NE United States

Ahmet Baytas, Ph.D.

Professor of Economics
Montclair State University
Montclair, NJ United States

Ron Hutchison, Ph.D.

Associate Professor of Biology
Richard Stockton College
Northfield, NJ United States

Rebecca Summer, Ph.D.

Gila Regional Information Project
Silver City, NM United States

Vincent Gutschick, Ph.D.

Director
Global Change Consulting Consortium
Las Cruces, NM United States

Richard Ostfeld, Ph.D.

Senior Scientist
Cary Institute of Ecosystem Studies
Red Hook, NY United States

Antonio Bento, Ph.D.

Professor
Cornell University
Ithaca, NY United States

Christopher Jensen, Ph.D.

Assistant Professor
Pratt Institute
Brooklyn, NY United States

David Borton, Ph.D.

Rensselaer Polytechnic Institute
Troy, NY United States

Judith Weis, Ph.D.

Professor
Rutgers University
New York, NY United States

Andrew Nelson, Ph.D.

State University of New York, Oswego
Oswego, NY United States

Paula Gonzalez, Ph.D.

Biology
Cincinnati, OH United States

Theresa Pretlow, Ph.D.

Professor Emerita
Case Western Reserve University
Cleveland, OH United States

Gerald Sgro, Ph.D.

John Carroll University
Cleveland Heights, OH United States

David Gorchoy, Ph.D.

Professor
Miami University
Oxford, OH United States

Liza Comita, Ph.D.

Ohio State University
Columbus, OH United States

David Modarelli, Ph.D.

University of Akron
Akron, OH United States

Stacy Philpott, Ph.D.

University of Toledo
Toledo, OH United States

David Fuller, Ph.D.

Biology
Brookings, OR United States

Peter Bayley, Ph.D.

Oregon State University
Corvallis, OR United States

William Stephen, Ph.D.

Professor Emeritus
Oregon State University
Corvallis, OR United States

Barbara Roy, Ph.D.

Professor
University of Oregon
Eugene, OR United States

Frank Benford, Ph.D.

Salem, OR United States

Kenneth Bergman, Ph.D.

Ashland, OR United States

John Sorrentino, Ph.D.

Associate Professor
Temple University
Ambler, PA United States

Scott Bearer, Ph.D.

Senior Conservation Scientist
The Nature Conservancy
Williamsport, PA United States

Edward Thornton, Ph.D.

Professor of Chemistry
University of Pennsylvania
Swarthmore, PA United States

Eric Vonwettberg, Ph.D.

Assistant Professor
Florida International University
Providence, RI United States

Vsevolod Gurevich, Ph.D.

Professor
Vanderbilt University
Nashville, TN United States

Elin Pierce, Ph.D.

Wildlife Biologist
Millington, TN United States

Brian Shmaefsky, Ph.D.

Professor of Biology
Lone Star College, Kingwood
Kingwood, TX United States

David Newburn, Ph.D.

Assistant Professor
Texas A&M University
College Station, TX United States

Craig Linder, Ph.D.

Associate Professor
University of Texas, Austin
Austin, TX United States

Phyllis Coley, Ph.D.

Distinguished Professor of Biology
University of Utah
Salt Lake City, UT United States

Robert Nadeau, Ph.D.

Professor Environmental Science Public
George Mason University
Fairfax Station, VA United States

John Cairns, Ph.D.

University Distinguished Professor of
Environment
Virginia Tech
Blacksburg, VA United States

John Cannon, Ph.D.

Conservation Biologist
Front Royal, VA United States

Marc Lapin, Ph.D.

Middlebury College
Cornwall, VT United States

Margaret Alic, Ph.D.

Biology
Eastsound, WA United States

David Nelson, Ph.D.

Biology
Ritzville, WA United States

Steven Hoffman, Ph.D.

University of Wisconsin, Madison
Bow, WA United States

Bob Gillespie, Ph.D.

Wenatchee Valley College
Wenatchee, WA United States

Erica Young, Ph.D.

University of Wisconsin
Milwaukee, WI United States

Suzanne Hagell, Ph.D.

Research Associate
University of Wisconsin, Madison
Madison, WI United States

Richard Lindroth, Ph.D.

Associate Dean for Research
University of Wisconsin, Madison
Madison, WI United States

Bart Geerts, Ph.D.

Professor
University of Wyoming
Laramie, WY United States

Signers as of December 1, 2011.