

BRIAN C. MURRAY

Interim Director, Nicholas Institute for Energy, Environment & Sustainability
Research Professor, Nicholas School of the Environment
Research Professor, Sanford School of Public Policy
Duke University
Durham, NC 27708

Email : bcmurray@duke.edu
Phone : 919-613-1324

Date last updated: September 29, 2023

Education

Ph.D., Resource Economics and Policy, Duke University, Durham, North Carolina, 1992
M.S., Resource Economics and Policy, Duke University, Durham, North Carolina, 1987
B.S., Economics and Finance (cum laude), University of Delaware, Newark, Delaware, 1983

Summary of Professional Experience

Dr. Murray is Interim Director of the Nicholas Institute for Energy, Environment & Sustainability; Research Professor at the Nicholas School of the Environment; Research Professor at the Sanford School of Public Policy; and a Faculty Associate of the Duke Initiative for Science & Society. In 2015 he was Fulbright Visiting Research Chair in Environment and Economy at University of Ottawa's Institute of the Environment. He is widely recognized for his work on the economics of energy and climate change policy, including the design of cap-and-trade policy elements to address cost containment and inclusion of offsets from traditionally uncapped sectors such as forestry, agriculture, and coastal ecosystems. Members of the United States Congress, state legislators and regulators have sought the counsel of Dr. Murray and colleagues in developing climate change legislative proposals and regulatory options. Their development of the cost containment reserve mechanism is now in use in several greenhouse cap-and-trade programs in North America. Dr. Murray has been invited as a co-author of several national and international assessments of natural resources, especially related to climate change. Of particular note, he serves on a National Academy of Sciences panel on greenhouse gases and the tax code, where he led the panel's efforts on biofuel subsidies. He was a convening lead author of the Intergovernmental Panel on Climate Change's Special Report on Land Use, Land Use Change, and Forestry. He has convened several forums of economic modeling experts to examine and communicate the results of their climate, energy and land use policy efforts to the public and private sectors. His research has examined the economic effects of traditional command-based regulatory strategies for pollution control and more market-oriented approaches such as cap-and-trade programs and emission taxes. He has been a consultant to a wide range of clientele in the public and private sector, including numerous federal government agencies, members of Congress and their staff, state regulatory agencies, CEOs and senior staff from Fortune 500 companies, trade groups, nongovernmental organizations, and other academic institutions. His work has been published in books, edited volumes, and professional journals, including *Science*, *Nature Climate Change*, *The American Economic Review*, *The Review of Economics and Statistics*, *American Journal of Agricultural Economics*, *Journal of Environmental Economics and Management*, *Land Economics*, *Review of Environmental Economics and Policy*,

Environmental and Resource Economics, Ecological Economics, PLOS One, Ecological Applications, Climatic Change, Mitigation and Adaptation Strategies for Global Change, Energy Journal, Energy Policy, and Forest Science. Murray is an invited regular contributor to *Forbes*. Prior to returning to Duke in 2006, Dr. Murray was Director of the Center for Regulatory Economics and Policy Research at RTI International, a university-affiliated not-for-profit research institution.

Professional Experience

- 2021- Nicholas Institute for Energy, Environment & Sustainability
Interim Director

- 2018-21 Duke University Energy Initiative
Director

- 2019- Sanford School of Public Policy, Duke University
Research Professor (Full rank)

- 2017- Faculty Associate of the Duke Initiative for Science & Society

- 2016-17 Duke University Energy Initiative
Interim Director

- 2006-17 Nicholas Institute for Environmental Policy Solutions, Duke University
Director for Economic Analysis

- 2015 University of Ottawa, Institute of the Environment,
Fulbright Visiting Research Chair in Environment and Economy

- 2007 - Duke University, Nicholas School of the Environment
Research Professor (Full rank)

- 1992 to 2006 RTI International, Center for Regulatory Economics and Policy
Research, Research Triangle Park, NC
Senior Economist and Director (after 2004)

- 1999 to 2006 North Carolina State University, College of Forest Resources,
Adjunct Assistant Professor

- 1994 to 2002 Duke University, Nicholas School of the Environment, Durham, NC
Adjunct Associate Professor

- 1986 to 1992 U.S. Department of Agriculture, Forest Service
Research Economist

- 1983 to 1985 Arthur Andersen and Company
Management Information Systems Consultant

Program Development

Dr. Murray is the Interim Director of the Nicholas Institute for Energy, Environment & Sustainability, formed in 2021 by the merger of the Nicholas Institute for Environmental Policy Solutions and Duke University Energy Initiative. Prior to that he was director of the Energy Initiative, a university-wide interdisciplinary collaboration focused on *advancing an accessible, affordable, reliable, and clean energy system*. Prior to that he was Director for Economic Analysis of the Nicholas Institute, an organization focused on *helping decision makers create timely, effective and economically practical solutions to the world's critical environmental challenges*. Dr. Murray oversees all strategic aspects of the Institute's education, research and engagement portfolios and has primary responsibility for its fundraising efforts.

Dr. Murray came to Duke's original Nicholas Institute in March of 2006 as Director for Economic Analysis, shortly after that institute's launch. His responsibilities involved overseeing the Institute's economics portfolio and staff of economists and working with the Institute director, other senior directors, faculty, and staff to identify opportunities for the application of sound economic principles and advanced analysis to develop solutions to our most important environmental policy problems. He has initiated a number of key initiatives at the Institute that have directly influenced the development of policies at federal, state and international levels, especially in the areas of climate change policy. He was responsible for ensuring the quality of the Institute's economics work, its applicability to the problems being addressed and, and communicating to policy makers in the public, private and NGO sectors and to the media.

Prior to his appointments at Duke, Dr. Murray was Director of RTI's Center for Regulatory Economics and Policy Research (REPR), a group of 35 research professionals whose mission is to improve the human condition through public policy informed by rigorous analysis integrating economics and related disciplines. The Center's work spanned the policy domains of the environment, natural resources, agriculture, public health, food safety, energy, and technology. The Center's sponsors included US EPA, USDA, DOE, FDA, Centers for Disease Control and Prevention (CDC), DHS, National Park Service, The World Bank, Conservation International, and the United Nations.

Honors and Awards (selected)

Fulbright Research Chair in Environment and Economy, University of Ottawa, 2015
National Academy of Sciences select committee on greenhouse gases and the tax code, 2011-12
Intergovernmental Panel on Climate Change
Distinguished Publication Award, 2004, RTI International
Frequently Published Author Award, 2004, RTI International
Career Author Award, 2003, RTI International
American Agricultural Economics Association Outstanding Dissertation Award nominee, 1993
Dorothy Hoener Scholarship, Oregon State University, 1988
Graduate Student of the Year, Duke University School of Forestry & Environmental Studies, 1987
Omicron Delta Epsilon, National Economics Honor Society, 1983

Professional Associations

Board of Advisors, Colorado Energy and Water Institute (2019-)
Board of Trustees, The Nature Conservancy of North Carolina (2018-)
Board Member, Center for Climate, Energy, Environment and Economics (CE³), University of North Carolina – Chapel Hill (2016-)
Fulbright Scholars Program
Editorial Board, *Greenhouse Gas Measurement and Management*, 2009-12
Board of Directors, Triangle Census Research Data Center, 2001-2007
Intergovernmental Panel on Climate Change, 1999-2000 (invited)
National Climate Assessment Team, 1999-2001 (invited)
American Economics Association
Association of Environmental and Resource Economists

Teaching

Energy Policy for a Changing World (2021-)
Transformation of the U.S. Electric Power Sector (2018)
Economic Instruments for Environmental Protection (2018)
Special Topics in Environmental Policy: Clean Power Plan (2016)
Coastal Conservation Economics (online offering, 2015)
Economics of Environmental Management (2011-)
Environmental Management in a Changing World: Coping with Sea Level Rise (Duke program in Venice) (2014-)
Bass Connections

- Coal and America (2019-20)
- Coal in America (2018-19)
- Feasibility Study for a Campus Digester – (2015-16)
- Options for Regulating Greenhouse Gases from Oil Refineries - (2013-14)

Ecosystem Service Markets in Practice (2008)
Collaborative Research on REDD (2010, joint with NC State and UNC-Chapel Hill)
Case Studies in Resource Management (1993-94)

Other University Service (selected)

Nicholas School of the Environment Board of Visitors (2022-)
Duke University Climate Initiative Steering Group Co-lead (2020-)
Duke Co-curricular planning group for COVID-19 response (2020)
Nicholas Institute Strategic Advisory Council (2019-)
Science and Society Faculty Governance Committee (2017-)
Duke University Library Council (2017-)
Steering Group, Energy Access Project at Duke (2017-)
Co-director, 2017 Winter Forum on Global Energy Access
Chair, Duke Environmental and Energy Economics Working Group (2006-)
Director, Duke Environmental Economics Doctoral Scholars Program (2013-)
Duke University Energy Initiative – Nicholas Institute task force (2015)
Faculty working group, Environmental Management and Policy Program, Duke-Kunshan U (2014)

Duke University Energy Initiative, Faculty Advisory Committee (2012-)

Core faculty, University Program in Environmental Policy (2011-)

Search committees

- Vice President and Director of Athletics, Duke University
- Faculty in Energy Policy, Sanford School of Public Policy and the Duke University Energy Initiative (2016-17)
- Director, Climate and Energy Program, Nicholas Institute
- Dean, Nicholas School of the Environment (2013-14)
- Director, Oceans and Coastal Policy, Nicholas Institute (2014)
- Faculty in Energy Policy (2013-14), Sanford School and Duke U Energy Initiative
- Faculty in Energy and Environmental Policy (2010-11), Sanford/Nicholas Institute
- Director, Strategy and Planning, Nicholas Institute (2012)

Duke Forest Advisory Committee (2011-14)

Faculty advisor, Duke Environmental Markets Student Group (2010-13)

Faculty advisor, Duke student delegation, UN Framework Convention on Climate Change (2009-2012)

Winter Forum co-organizer

- 2009-10 (inaugural)
- 2016-17

Publications

Google Scholar H-index: 45; I-10 index: 94, Citations: 10,253

Journal Articles (74)

74. Dauwalter, T, A. Daraeepour, B. Higgins, S. Blumsack, B. Murray, and D. Patino-Echeverri. 2023. "Coalition Stability in PJM: Exploring the Consequences of State Defection from the Wholesale Market." *Energy Law Journal* (Forthcoming).
73. Ren, S., W. Hu, K., Bradbury, D. Harrison-Atlas, L. Malaguzzi Valeri, B. Murray, and J.M. Malof. 2022. "Automated Extraction of Energy Systems Information from Remotely Sensed Data: A Review and Analysis." *Applied Energy* 326 (2022) 119876 <https://doi.org/10.1016/j.apenergy.2022.119876>
72. Murray, B.C and W. Niver. 2020. "A 21st Century Low-Carbon Transition in U.S. Electric Power: Extent, Contributing Factors, and Implications" *Review of Policy Research*. 37(3) (2020) : 412-438. 10.1111/ropr.12388.
71. Vegh, T and B.C. Murray. 2020. "Incentivizing the Reduction of Pollution at U.S. Dairies: Addressing Additionality When Multiple Environmental Credit Payments Are Combined." *Journal of Agriculture, Food Systems, and Community Development*, 9(2): 123-139.
70. Zeff, H., D. Kaczan, G. W. Characklis, M. Jeuland, B. Murray. 2019. "The

- potential implications of groundwater trading and reformed water rights in the Diamond Valley, Nevada.” *Journal of Water Resources Planning and Management* 145(6): 05019009.
69. Murray, B.C., J. Bistline, J. Creason, E. Wright, A. Kanudia, and F. delaChesnaye. 2018 “The EMF 32 Study on Technology and Climate Policy Strategies for Greenhouse Gas Reductions in the U.S. Electric Power Sector: An Overview”. *Energy Economics* 73 (2018) 286–289.
 68. Creason, J.R.; J.E. Bistline ; E. Hodson; B. Murray , C.G. Rossmann.. 2018. “Effects of Technology Assumptions on US Power Sector Capacity, Generation and Emissions Projections: Results from the EMF 32 Model Intercomparison Project.” *Energy Economics* (2018) 290–306.
 67. Bistline, J. E., E. Hodson, C.G. Rossman, J. Creason, B. Murray, A. Barron. 2018. “Electric Sector Policy, Technological Change, and U.S. Emissions Reductions Goals: Results from the EMF 32 Model Intercomparison Project”. *Energy Economics* (2018) 307-325.
 66. Konschnik, K and B.C. Murray. 2018. “FERC’s resilience order may suggest reliability tweaks, rather than novel solutions.” (Invited) *Utility Dive* (Feb 2, 2018). <https://www.utilitydive.com/news/fercs-resilience-order-may-suggest-reliability-tweaks-rather-than-novel-s/515944/>
 65. Galik, C.S., B.C. Murray, and M.C. Parish. 2017. “Near-Term Pathways for Achieving Forest and Agricultural Greenhouse Gas Mitigation in the U.S.” *Climate* 5(3), 69 doi:[10.3390/cli5030069](https://doi.org/10.3390/cli5030069).
 64. Aldy, J.E., M Hafstead, G.E. Metcalf, B.C. Murray, W.A Pizer, C. Reichert, and R.C. Williams III. 2017. “Increasing Emissions Certainty under a Carbon Tax.” *Harvard Environmental Law Review* Vol. 41: 1-13.
 63. Murray, B.C., W.A Pizer, C. Reichert. 2017. “Increasing Emissions Certainty under a Carbon Tax.” *Harvard Environmental Law Review* Vol. 41: 14-27.
 62. Monast, J; B.C. Murray, and J.B. Wiener. 2017. “On Morals, Markets and Climate Change: Exploring Pope Francis’ Challenge.” *Law and Contemporary Problems* Vol 80 (1): 135-162.
 61. Ross, M.T and B.C. Murray. 2016. “What is the Fuel of the Future? Prospects under the Clean Power Plan.” *Energy Economics* 60 (Nov, 2016): 451-459.
 60. Murray, B.C. 2016. “Ecosystem Services in Practice.” *Canadian Public Policy* Vol. 42, No. S1: S24–S31, November 2016. doi:10.3138/cpp.2015-022
 59. Galik, C.S., B.C. Murray, S. Mitchell, P. Cottle. 2016. “Alternative Approaches for Addressing Non-permanence in Carbon Projects: An Application to Afforestation and Reforestation under the Clean Development Mechanism.” *Mitigation and Adaptation Strategies for Global Change* Vol 21 (1):101–118 <http://link.springer.com/article/10.1007/s11027-014-9573-4>

58. Murray, B.C., C.S. Galik, and T. Vegh. 2015. "Biogas in the United States: Estimating Future Production and Learning from International Experiences." *Mitigation and Adaptation Strategies for Global Change*, first online: 06 September 2015. DOI: 10.1007/s11027-015-9683-7
57. Miteva, D.A., B.C. Murray, and S.K. Pattanayak. 2015. "Do protected areas reduce blue carbon emissions? A quasi-experimental evaluation of mangroves in Indonesia." *Ecological Economics* 119: 127-135.
56. Murray, B.C. and P.T. Maniloff. 2015. "Why Have Greenhouse Emissions in RGGI States Declined? An Econometric Attribution to Economic, Energy Market, and Policy Factors" *Energy Economics* 51 (2015): 581-589
55. Murray, B. and N. Rivers. 2015. "British Columbia's Revenue-neutral Carbon Tax: A review of the Latest "Grand Experiment" in Environmental Policy." *Energy Policy* 86 (2015) 674–683.
54. McCarl, B.A. and B.C. Murray. 2015. "Theme Overview: Revisiting the Evidence and Potential Solutions on Climate Change." *Choices* 2nd Quarter 2015 • 30(2).
53. Murray, B.C. 2015. "Why Have Carbon Markets Not Delivered Agricultural Emission Reductions in the United States?" *Choices* 2nd Quarter 2015 • 30(2).
52. Murray, B., W. Pizer and M. Ross. 2015. "Regulating Existing Power Plants under the U.S. Clean Air Act: Present and Future Consequences of Key Design Choices." *Energy Policy* 83: 87-98.
51. Pizer, W., M.J. Adler, J. Aldy, D. Anthoff, M. Cropper, K. Gillingham, M. Greenstone, B. Murray, R. Newell, W. Pizer, R. Richels, A. Rowell, S. Waldhoff, and J. Wiener. 2014. "Using and improving the social cost of carbon." *Science* . Vol. 346 no. 6214 pp. 1189-1190 (5 Dec, 2014)
50. Murray, B.C. and J.M. Monast. 2014. "Greenhouse Gas Controls and the States." *EM Magazine*, June, 2014. Invited feature article (reviewed).
49. Murray, B.C., M. Cropper, F de la Chesnaye, and J.M. Reilly. 2014. "How Effective are U.S. Renewable Energy Subsidies in Cutting Greenhouse Gases?" *The American Economic Review: Papers and Proceedings 2014* 104(5): 569–574
48. Pendleton, L.H., A.E. Sutton-Grier, D.R. Gordon, B.C. Murray, B.E. Victor, R.B. Griffis, J.A.V. Lechuga, C. Giri. 2013. "Considering "Coastal Carbon" in Existing U.S. Federal Statutes and Policies." *Coastal Management* 41(5): 439-456.
47. Mosnier, A.; P. Havlík; H. Valin; J. Baker; B. Murray; S. Feng; M. Obersteiner; B.A. McCarl; S. K. Rose; U. A. Schneider. 2013. "Alternative U.S. Biofuel Mandates and Global GHG emissions: The Role of Land Use Change, Crop Management and Yield Growth." *Energy Policy*.
46. Baker, J.S., B.C. Murray, B.A. McCarl, S. Feng, R. and R. Johansson. 2012. "Implications of Alternative Agricultural Productivity Growth Assumptions on Land Management.

- Greenhouse Gas Emissions, and Mitigation Potential.” *American Journal of Agricultural Economics*. doi: 10.1093/ajae/aas114 First published online: December 16, 2012.
45. Galik, C.S., B.C. Murray, D.E. Mercer. 2012. “Where is the carbon? Carbon sequestration potential from private forestland in the U.S. South.” *Journal of Forestry*. DOI: <http://dx.doi.org/10.5849/jof.12-055>. Appeared or available online: November 22, 2012
 44. Murray, B.C. “Mangroves Hidden Value.” 2012. *Nature Climate Change* 2, 773–774 doi:10.1038/nclimate1729 Published online 26 October 2012
 43. Pendleton L, Donato DC, Murray BC, Crooks S, Jenkins WA, et al. 2012. Estimating Global “Blue Carbon” Emissions from Conversion and Degradation of Vegetated Coastal Ecosystems. *PLoS ONE* 7(9): e43542. doi:10.1371/journal.pone.0043542
 42. McKinley, D.C., M. G. Ryan, R.A. Birdsey, C.P. Giardina, M. E. Harmon, L.S. Heath, R.A. Houghton, R.B. Jackson, J.F. Morrison, B.C. Murray, D.E. Pataki, K. E. Skog. 2011. “A synthesis of current knowledge on forests and carbon storage in the United States.” *Ecological Applications*: 21(6), 2011, pp. 1902–1924.
 41. Murray, B.C. and J.S. Baker. 2011. “An Output-based Intensity Approach for Crediting Greenhouse Gas Mitigation in Agriculture: Explanation and Policy Implications.” *Greenhouse Gas Measurement and Management*. Vol. 1: 27-36.
 40. Lopomo, G., L.M. Marx, D. McAdams, B. Murray. 2011. “Carbon Allowance Auction Design.” *Review of Environmental Economics and Policy* 5(1): 25-43.
 39. Murray, B.C.. 2010. “Pricing Carbon and Other Options for Addressing the Economic Challenges of U.S. Climate Legislation.” Invited article for *Aspen Institute Congressional Program Series* Vol. 25(2): 21-30.
 38. Ryan, M.G., M. E. Harmon, R. A. Birdsey, C.P. Giardina, L. S. Heath, R.A. Houghton, R. B. Jackson, D. C. McKinley, J.F. Morrison, B. C. Murray, D.E. Pataki, K. E. Skog. 2010. “A Synthesis of the Science on Forests and Carbon for U.S. Forests.” *Issues in Ecology*. Issue 13, Spring 2010, pp. 1-16.
 37. Baker, J.S., B.A. McCarl, B. C. Murray, S.K. Rose, R. J. Alig, D.Adams, G. Latta, R. Beach, A. Daigneault. 2010. “Net-Farm Income and Land Use under a U.S. Greenhouse Gas Cap-and-Trade.” *Policy Issues*, P17 (April).
 36. Jenkins, W.A., B.C. Murray, R.A. Kramer, and S.P. Faulkner. 2010. “Valuing Ecosystem Services from Wetlands Restoration in the Lower Mississippi Alluvial Valley.” *Ecological Economics* 69 (5): 1051–1061.
 35. Murray, B.C. and L.P. Olander. 2009. “REDD, White, and Blue.” Invited article for *Carbon Finance*, vol. 6, issue 9.
 34. Murray, B.C. 2009. “The Economics of Climate Change Prevention: Benefits, Costs and Policy Options.” Invited article for *Aspen Institute Congressional Program Series* Vol. 24(2): 43-50.

33. Murray, B.C. 2009. "Economics and the Climate Change Mitigation Portfolio" *Journal of Land, Resources, and Environmental Law* 29(1):39-52
32. Murray, B.C., and H. Hosterman. 2009. "Climate Change, Cap-and-Trade and the Outlook for U.S. Policy." *North Carolina Journal of International Law and Commercial Regulation*.34(3):699-720
31. Piñeiro, G, E.G. Jobbágy, J. Baker, B.C. Murray, and R.B. Jackson. 2009. "Set-Asides Can Be Better Climate Investment than Corn-Ethanol" *Ecological Applications* 19(2): 277-282
30. Murray, B.C, R.G. Newell, and W.A. Pizer. 2009. "Balancing Cost and Emissions Certainty:An Allowance Reserve for Cap-and-Trade." *Review of Environmental Economics and Policy* 3(1): 84-103
29. Murray, B.C. "Offsets Improve Flexibility." Invited article ("Another View"), *Environmental Forum*, November/December 2008, P.39
28. Olander, L.P., H.K. Gibbs, M. Steininger, J. J. Swenson, and B.C. Murray. 2008. "Reference Scenarios for Deforestation and Forest Degradation in Support of REDD: A Review of Data and Methods." *Environmental Research Letters* 3(2008).
27. Depro, B, B. Murray, R. Alig, A. Shanks. 2008. "Public Land, Timber Harvests, and Climate Mitigation: Quantifying Carbon Sequestration Potential on U.S. Public Timberlands." *Forest Ecology and Management* 255:1122-1134.
26. Kim, M, B.A. McCarl, and B.C. Murray. 2008. "Permanence Discounting for Land-Based Carbon Sequestration." *Ecological Economics*. 64:763-769.
25. Murray, B.C., B.L. Sohngen, and M.T. Ross. 2007. "Economic Consequences of Consideration of Permanence, Leakage and Additionality for Soil Carbon Sequestration Projects." *Climatic Change* 80:127-143.
24. Pattanayak, Subhrendu; Katherine Dickinson; Catherine Corey; Brian Murray; Erin Sills; and Randall Kramer. 2006. "Deforestation, Malaria and Poverty: A Call for Transdisciplinary Research to Support the Design of Cross-Sectoral Policies." *Sustainability: Science, Practice, & Policy* 2(2):1-12
23. DeAngelo, B.J., F. de la Chesnaye, R.H. Beach, A. Sommer, and B.C. Murray. 2006 "Methane and Nitrous Oxide Mitigation in Agriculture." *The Energy Journal*. Special issue (eds: de la Chesnaye, F and J. Weyant) pp: 89-108.
22. Jackson, R.B.. E.G. Jobbágy, R. Avissar, S. Baidya Roy, D. Barrett, C.W. Cook, K.A. Farley, D.C. le Maitre, B.A. McCarl, and B.C. Murray. 2005. "Trading Water for Carbon with Biological Carbon Sequestration." *Science* 310: 1944-1947.
21. Beach, R.H., S.K. Pattanayak, R.C. Abt, B.C. Murray, and J.C. Yang. 2005. "Empirical Studies of Non-Industrial Private Forest Management: A Review and Synthesis." *Forest Policy and Economics* 7(3):261-281.
20. Pattanayak, S.K. B.A. McCarl, A.J. Sommer, B.C. Murray, T. Bondelid, D. Gillig, and B. DeAngelo. 2005. "Water Quality Co-effects of Greenhouse Gas Mitigation in U.S. Agriculture." *Climatic Change* 71(3):341-372.

19. Murray, B.C., W.N. Thurman, and A. Keeler. 2005. "Tax Interaction Effects, Environmental Regulation, and 'Rule of Thumb' Adjustments to Social Cost." *Environmental and Resource Economics* 30(1):73-92.
18. Murray, B.C. 2004. "Overview of Agricultural and Forestry GHG Offsets on the U.S. Landscape." *Choices* Fall:13-18.
17. Pattanayak, S.K., R.C. Abt, A.J. Sommer, F. Cabbage, B.C. Murray, J.C. Yang, D. Wear, and S. Ahn. 2004. "Forest Forecasts: Does Individual Heterogeneity Matter for Market and Landscape Outcomes?" *Forest Policy and Economics* 6:243-260.
16. Wear, D.N. and B.C. Murray. 2004. "Federal Timber Restrictions, Interregional Spillovers, and the Impact on U.S. Softwood Markets." *Journal of Environmental Economics and Management* 47(2):307-330.
15. Murray, B.C., B.A. McCarl, and H. Lee. 2004. "Estimating Leakage from Forest Carbon Sequestration Programs." *Land Economics* 80(1):109-124.
14. Pattanayak, S.K., B.C. Murray, and R.C. Abt. 2002. "How Joint is Joint Forest Production? An Econometric Analysis of Timber Supply Conditional on Endogenous Amenity Values." *Forest Science* 48(3):479-491.
13. Muth, M.K., S.A. Karns, D.W. Anderson, and B.C. Murray. 2002. "Economic Effects of Post-Harvest Treatment Requirements for Oysters." *Agricultural and Resource Economics Review* 31(2):171-186.
12. Abt, R.C., and B.C. Murray. 2001. "Southeastern U.S. Timber Market Response to Climate Change Impacts on Forestry and Agriculture." *World Resource Review* 13(2):171-186.
11. Murray, B.C., R.C. Abt, D.N. Wear, P.J. Parks, and I.W. Hardie. 2001. "Land Allocation in the Southeastern U.S. in Response to Climate Change Impacts on Forestry and Agriculture." *World Resources Review* 13(2):239-251.
10. Murray, B.C., and R.C. Abt. 2001. "Estimating Price Compensation Requirements for Eco-certified Forestry." *Ecological Economics* 36(1):149-163.
9. Murray, B.C., S.P. Prisley, R.A. Birdsey, and R.N. Sampson. 2000. "Carbon Sinks Provisions in the Kyoto Protocol: Potential Relevance for U.S. Forests." *Journal of Forestry* 98(9): 6-11.
8. Murray, B.C. 2000. "Carbon Values, Reforestation, and 'Perverse' Incentives Under the Kyoto Protocol: An Empirical Analysis." *Mitigation and Adaptation Strategies for Global Change* 5(3):271-295.
7. McNulty, Steven G., Jennifer A. Moore, Louis Iverson, Anantha Prasad, Robert Abt, Bryan Smith, Ge Sun, Michael Gavazzi, John Bartlett, Brian Murray, Robert Mickler, and John D. Aber. 2000. "Development and Application of Linked Regional Scale Growth, Biogeography, and Economic Models for Southeastern United States Pine Forests." *World Resources Review* 12(2):298-320.

6. Anderson, D.A., B.C. Murray, J.L. Teague, and R.C. Lindrooth. 1998. "Exit from the Meatpacking Industry: A Microdata Analysis." *American Journal of Agricultural Economics* 80(1):96-106.
5. Murray, B.C., and D.N. Wear. 1998. "Federal Timber Restrictions and Interregional Arbitrage in U.S. Lumber." *Land Economics*. 74(1):76-91.
4. Murray, B.C. 1995. "Measuring Oligopsony Power with Shadow Prices: U.S. Markets for Pulpwood and Sawlogs." *The Review of Economics and Statistics* 77(3):486-498.
3. Murray, B.C. 1995. "Oligopsony, Vertical Integration, and Output Substitution: Welfare Effects in U.S. Pulpwood Markets." *Land Economics* 71(2):193-206.
2. Parks, P.J., and B.C. Murray. 1994. "Land Attributes and Land Use Change: Nonindustrial Forest Use in the Pacific Northwest." *Forest Science* 40(3):558-575.
1. Abt, R.C., J. Brunet, B.C. Murray, and D.G. Roberts. 1994. "Productivity Growth and Price Trends in the North American Sawmilling Industry: An Interregional Comparison." *Canadian Journal of Forest Research* 24:139-148.

Edited Volumes, Books and Monographs (peer-reviewed) (35)

35. Vegh, T., L. Pendleton, B. Murray, T. Troxler, K. Zhang, E. Castañeda-Moya, G. Guannel, and A. Sutton-Grier. 2018. "Ecosystem Services and Economic Valuation: co-benefits of coastal wetlands" Chapter 18 in: L. Windham-Myers, S. Crooks, and T. Troxler (eds.). *A Blue Carbon Primer: The State of Coastal Wetland Carbon Science, Policy, and Practice*. CRC Press, Boca Raton, FL.
34. Murray, B.C., M.L. Cropper, F. C. de la Chesnaye and J.M. Reilly. 2017, 'How Effective are US Renewable Energy Subsidies in Cutting Greenhouse Gases?' in *The Economics of Renewable Energy* (ed, R Fouquet), Edgar Elgar. Curated from article with same name and author list in the *American Economic Review: Papers and Proceedings*.
33. Murray, B.C. 2016. "Forests, Finance, and the Paris Agreement" in Stavins, R.N. and R.C. Stowe, eds. "The Paris Agreement and Beyond: International Climate Change Policy Post-2020." Paper, [Harvard Project on Climate Agreements, Belfer Center for Science and International Affairs, Harvard Kennedy School](https://www.harvardprojectonclimate.com/wp-content/uploads/2016/10/Forests-Finance-and-the-Paris-Agreement.pdf), October 2016.
32. Streck, C., B. Murray, A. Aquino, L. Durschinger, M. Estrada, C. Parker, and A. Zeleke. 2015. "Financing Land Use Mitigation: A Practical Guide for Decision-Makers." Prepared with support from cooperative agreement # S-LMAQM-13-CA-1128 with U.S. Department of State. <http://www.winrock.org/document/financing-land-use-mitigation-a-practical-guide-for-decision-makers/>
31. Murray, B., Vincent, J., and G. Van Houtven. 2014. "Different Uses of the Ecosystem Services Framework: Scenario Analysis and Green Accounting." In *Federal Resource Management and Ecosystem Services Guidebook*, edited by Lydia Olander. Durham, NC: National Ecosystem Services Partnership, Duke University, 2014. <https://nespguidebook.com/assessment-framework/comparison-to-green-accounting/>

30. Pendleton, L, B. Murray, D. Gordon, D. Cooley and T. Vegh. 2014. "Harnessing the Financial Value of Coastal 'Blue' Carbon." Chapter 17, in *Valuing Ecosystem Services: Methodological Issues and Case Studies*. Edward Elgar.
29. Estrada, M, D. Lee, B. Murray, R. O'Sullivan, J Penman, and C Streck. 2014. *Land Use in a Future Climate Agreement*. Prepared with support from cooperative agreement # S-LMAQM-13-CA-1128 with U.S. Department of State.
28. Murray, B.C. 2014. "Pigouvian Taxes." In *Environmental and Natural Resource Economics: An Encyclopedia*. ABC CLIO.
27. Murray, B.C. 2014. "Kenneth Boulding." In *Environmental and Natural Resource Economics: An Encyclopedia*. ABC CLIO.
26. Murray, B.C., P.T. Maniloff, J. Monast. 2013. "Design Issues for Linking Carbon Markets," chapter in *Designing Integration: Regional Governance on Climate Change in North America*. University of Toronto Press.
25. Nordhaus, W.D., S.A. Merrill, and P.T. Beaton, (Ed's); M.L Cropper, F. de la Chesnaye, N. Diffenbaugh, D.G. Hawkins, R.F. Mann, B.C. Murray, J.M. Reilly, D. Shindell, E. Toder, R.C. Williams III, C. Wolfram. 2013. *Effects of U.S. tax Policy on Greenhouse Gas Emissions*. National Research Council of the National Academies. The National Academies Press, Washington, DC. www.nap.edu.
24. Murray, B.C. 2013. "Economics of Forest Carbon Sequestration as a Climate Change Mitigation Strategy." In *Encyclopedia of Energy, Natural Resource and Environmental Economics*. Elsevier.
23. Beaudoin, Y., L. Pendleton and 29 contributing authors (including B. Murray). 2012. *Why Value the Oceans?* Prepared for The Economics of Ecosystems and Biodiversity (TEEB) by UNEP/GRID- Arendal and Duke University's Nicholas Institute for Environmental Policy Solutions.
22. Beach, R., D. Adams, R. Alig, J. Baker, G. Latta, B. McCarl, B. Murray, S. Rose, and E. White. 2011. *Model Description for the Forest and Agricultural Sector Optimization Model with Greenhouse Gases (FASOMGHG)*. U.S. Environmental Protection Agency Climate Change Division.
21. Baker, J.S. and B.C. Murray. 2012. "An Emissions-intensity Approach for Crediting Greenhouse Gas Mitigation and Agriculture: Reconciling Climate and Food Security Objectives in the Developing World," Chapter 21 in *Climate Change Mitigation in Agriculture*. (Wollenberg, E, Nihart, A, Tapio-Biström, ML, Grieg-Gran, M, eds). Earthscan, London.
20. Murray, B.C. 2010. "Emissions Offsets in a Greenhouse Gas Cap-and-Trade Policy." In *Issues of the Day: 100 Commentaries on Climate, Energy, the Environment, Transportation, and Public Health Policy*, I.W.H Parry and F. Day (eds.), p. 30-31. RFF Press, Resources for the Future, Washington, DC.

19. Murray, B.C. 2009. "Leakage from an Avoided Deforestation Compensation Policy: Concepts, Empirical Evidence, and Corrective Policy Options," chapter in *Avoided Deforestation: Prospects for Mitigating Climate Change*, C. Palmer and S. Engel, (eds). (Oxford, UK: Routledge).
18. Brown, S., B.Murray, T. Pearson, and B. Sohngen. 2007. Contributing authors, "Improved Forest Management" chapter of *Voluntary Carbon Standard: Agriculture, Forestry, and Land Use Guidance Document*. Copyright of the Voluntary Carbon Standard (VCS) Association.
17. Sohngen, B., M. Gytarsky, G. Korovin, L Laestadius, B. Murray, A. Utkin, D. Zamolodchikov. 2005. *Stocks and Flows: Carbon Inventory and Mitigation Potential of the Russian Forest and Land Base*. World Resources Institute, Washington, DC (available at www.wri.org).
16. Murray, B.C., B.L. Sohngen, A.J. Sommer, B.M. Depro, K.M. Jones, B.A. McCarl, D. Gillig, B. DeAngelo, and K. Andrasko. 2005. EPA-R-05-006. "Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture." Washington, D.C: U.S. Environmental Protection Agency, Office of Atmospheric Programs.
15. Ross, M.T., B.C. Murray, R.H. Beach, and B.M. Depro. Forthcoming. "State-level Economic Impacts of Global Climate Change Policies: Analysis of the Climate Stewardship Act of 2003." Pew Center on Global Climate Change.
14. McCarl, Bruce A., Kim, Man-Keun, Lee, Heng-Chi, Murray, Brian C., Sands, Ronald D., and Schneider, Uwe A. Forthcoming. "Insights from Agricultural and Forestry GHG Offset Studies that Might Influence IAM Modeling." In *Integrated Assessment of Human Induced Climate Change*, Michael Schlesinger, Haroon Kheshti, Joel Smith, Francisco de la Chesnaye, John Reilly, Tom Wilson, and Charlie Kolstad (eds.).
13. Lee, H-C, B.A. McCarl, D. Gillig, and B. Murray. 2006. "U.S. Agriculture and Forestry Greenhouse Mitigation Over Time." In *Rural Lands, Agriculture and Climate beyond 2015: Usage and Management Responses*, F. Brouwer and B.A. McCarl (eds.), Dordrecht, The Netherlands: Kluwer Academic Publishers.
12. Andrasko, K., S. Rose, R.J. Alig, J. Lewandrowski, R. MacGregor, and B.C. Murray. 2005. "Agriculture, Forestry, and Greenhouse Gases: Research Provides Insights for Public Policy." Issue Report (6), Oak Brook, IL: Farm Foundation.
11. Prestemon, J.P, and B.C. Murray. 2003. "Timber Production and Markets." Section 1 introduction in *Forests in a Market Economy*, Kluwer.
10. Murray, B.C. 2003. "Carbon Sequestration: A Jointly Produced Forest Output." Chapter 13 in *Forests in a Market Economy*, Kluwer.
9. Murray, B.C., and J.P. Prestemon. 2003. "Timber Market Structure and Efficiency: Theory and Evidence." Chapter 10 in *Forests in a Market Economy*, Kluwer.

8. Ritschard, R., J. O'Brien, U. Hatch, J. Jones, S. Jagtap, S. McNulty, B. Abt, B. Murray, J. Cruise, and 10 others. December 2002. *Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change—Southeast*. Report of the Southeastern Regional Assessment Team for the U.S. Global Change Research Program. Sponsored by NASA.
7. Burkett, V; R. Ritschard; S. McNulty; J. O'Brien; R. Abt; J. Jones; U. Hatch; B. Murray; S. Jagtap; and J. Cruise. 2000. "The Potential Consequences of Climate Variability and Change for the Southeastern United States." Chapter 5 in *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. Foundation Report of the National Assessment Synthesis Team. U.S. Global Change Research Program. Cambridge University Press.
6. Murray, B. 2000. Contributor to "Southeast" section of *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. Overview document of the National Assessment Synthesis Team. U.S. Global Change Research Program. Cambridge University Press.
5. Watson, R.T. and 34 others. 2000. "Summary for Policymakers." In *Special Report on Land Use, Land Use Change, and Forestry*, R.T. Watson, I.R. Noble, B. Bolin, N.H. Ravindranath, D.J. Verardo, and D.J. Dokken (eds.), Intergovernmental Panel on Climate Change, Geneva, Switzerland: Cambridge University Press.
4. Noble, I., M. Apps, R. Houghton, D. Lashof, W. Makundi, D. Murdiyarsa, B. Murray, W. Sombroek, R. Valentini, and 26 others. 2000. "Implications of Different Definitions and Generic Issues," Chapter 2 In *Special Report on Land Use, Land Use Change, and Forestry*, R.T. Watson, I.R. Noble, B. Bolin, N.H. Ravindranath, D.J. Verardo, and D.J. Dokken (eds.), Intergovernmental Panel on Climate Change, Geneva, Switzerland: Cambridge University Press.
3. Schlamadinger, B., T. Karjalainen and 21 others. 2000. "Afforestation, Reforestation, and Deforestation (ARD) Activities." Chapter 3 In *Special Report on Land Use, Land Use Change, and Forestry*, R.T. Watson, I.R. Noble, B. Bolin, N.H. Ravindranath, D.J. Verardo, and D.J. Dokken (eds.), Intergovernmental Panel on Climate Change, Geneva, Switzerland: Cambridge University Press.
2. Alig, R.J., W.G. Hohenstein, B.C. Murray, and R.G. Haight. 1990. "Area Changes in Timberland by Ownership and Forest Type in the United States by Region and State, 1952-1987, with Projections to 2040." General Technical Report SE-64, Forest Service, Southeastern Forest Experiment Station. Asheville, North Carolina: U.S. Department of Agriculture.
1. Alig, R.J., F.C. White, and B.C. Murray. 1988. "Economic Factors Influencing Land Use Changes in the South-Central United States." Research Paper SE-272, Forest Service, Southeastern Forest Experiment Station. Asheville, North Carolina: U.S. Department of Agriculture.

Online Policy Papers and Reports (61)

61. Ewing, J., M. Ross, A. Pickle, R. Stout, and B. Murray. 2022. “Pathways to Net-Zero for the U.S. Energy Transition.” Report NI-R 22-06, Nicholas Institute for Energy, Environment & Sustainability, Duke University.
60. Zeff, H., G. Characklis, M. Jeuland, D. Kaczan, B. Murray, and K. Locklier. 2016. “Benefits, Costs, and Distributional Impacts of a Groundwater Trading Program in the Diamond Valley, Nevada.” Report NI R 16-02, Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_r_16-02.pdf
59. Murray, B., W.A Pizer, and C. Reichert. 2016. “Increasing Emissions Certainty under a Carbon Tax.” Policy Brief NI PB 16-03. Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_pb_16-03.pdf
58. Ross, Martin T., David Hoppock, and Brian Murray. 2016. “Ongoing Evolution of the Electricity Industry: Effects of Market Conditions and the Clean Power Plan on States.” Working Paper NI WP 16-07. Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_16-07_final.pdf
57. Litz, F and B.C. Murray. 2016. “Mass-Based Trading under the Clean Power Plan: Options for Allowance Allocation” Working Paper NI WP 16-04, Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_16-04_0.pdf
56. Murray, B.C. and N. Rivers. 2015. “British Columbia’s Revenue-Neutral Carbon Tax: A Review of the Latest ‘Grand Experiment’ in Environmental Policy.” Working Paper NI WP 15-04, Nicholas Institute for Environmental Policy Solutions, Duke University.
55. Ross, M.T., D. Hoppock, and B.C. Murray. 2015. “Assessing Impacts of the Clean Power Plan on Southeast States.” Working Paper NI WP 15-03, Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_15-03_full_pdf.pdf
54. Ross, M.T., B.C. Murray, and D. Hoppock. 2015. “The Clean Power Plan: Implications of Three Compliance Decisions for U.S. States.” Working Paper NI WP 15-02, Nicholas Institute for Environmental Policy Solutions, Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_15-02_full_pdf.pdf
53. Murray, B.C, and T. Vegh. 2015. “Incentivizing the Reduction of Pollution at Dairies: How to Address Additionality When Multiple Environmental Credit Payments Are Combined.” Working Paper NI WP 15-01, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_15-01_full_pdf.pdf

52. Monast, J, T. Profeta, J. Tarr, B. Murray. 2015. “Enhancing Compliance Flexibility under the Clean Power Plan: A Common Elements Approach to Capturing Low-Cost Emissions Reductions.” Policy Brief NI PB 15-01, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_pb_15-01.pdf
51. Murray, B., T. Profeta, and W. Pizer. 2014. “Assessing Carbon-Pricing Options in the United States.” Working Paper NI WP 14-09, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_14-09_final.pdf
50. Murray, B.C., W.A. Pizer, and M. Ross. 2014. “Regulating Existing Power Plants under the Clean Air Act: Present and Future Consequences.” Working Paper NI WP 14-07, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_wp_14-07.pdf
49. Vegh, T., M. Jungwiwattanaporn, L. Pendleton, and B. Murray. 2014. *Mangrove Ecosystem Services Valuation: State of the Literature*. Report NI WP 14-06. Nicholas Institute for Environmental Policy Solutions, Duke University.
48. Murray, B.C., P.T. Maniloff and E.M. Murray. 2014. “Why Have Greenhouse Emissions in RGGI States Declined? An Econometric Attribution to Economic, Energy Market, and Policy Factors.” Duke Environmental Economics Working Paper Series Working Paper EE 14-0. <http://sites.nicholasinstitute.duke.edu/environmentaleconomics/working-paper-series/>
47. Murray, B.C., C. Galik, and T. Vegh. 2014. *Biogas in the United States: An Assessment of Market Potential in a Carbon-constrained Future*. Report NI R 14-02, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_r_14-02_full_pdf.pdf
46. Murray, B.C., P.S. Kasibhatla. 2013. “Equating Permanence of Emission Reductions and Carbon Sequestration: Scientific and Economic Foundations for Policy Options.” Duke Environmental Economics Working Paper Series Working Paper EE 13-08. December, 2013 <http://sites.nicholasinstitute.duke.edu/environmentaleconomics/working-paper-series/>
45. Murray, B.C., J.M. Busch, R.T. Woodward, and W.A. Jenkins. 2013. “Designing Cap and Trade to Correct for Non-Additional Offsets.” Duke Environmental Economics Working Paper Series Working Paper EE 13-05.
<https://sites.nicholasinstitute.duke.edu/environmentaleconomics/working-paper-series/2013-papers/>
44. Cooley, D., B. Murray, M. Ross, M. Lee, K. Yeh. 2013. *An Economic Examination of North Carolina’s Landfill Biogas Development Potential*. Report NI R 13-03, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/sites/default/files/publications/ni_r_13-03_0.pdf
43. Murray, B.C and T. Vegh. 2012. “Incorporating Blue Carbon as a Mitigation Action under the United Nations Framework on Climate Change: Technical Issues to Address.” Report NI

- R 12-05 ,Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/economics/naturalresources/blue-carbon-unfccc/at_download/paper
42. Murray, B.C., C.S. Galik, S. Mitchell, P. Cottle. 2012. “Alternative Approaches to Addressing the Risk of Non-Permanence in Afforestation and Reforestation Projects under the Clean Development Mechanism.” Paper prepared for World Bank Carbon Finance Unit. http://nicholasinstitute.duke.edu/climate/policydesign/alternative-approaches-to-addressing-the-risk-of-non-permanence/at_download/paper
41. Hoppock, D, S.K. Adair, B. Murray, and J. Tarr. 2012. “Benefits of Early State Action in Environmental Regulation of Electric Utilities: North Carolina’s Clean Smokestacks Act.” Working Paper NI WP 12-05, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/climate/policydesign/benefits-of-early-state-action-in-environmental-regulation-of-electric-utilities/at_download/paper
40. Mosnier, A.; P. Havlík, H. Valin, J.S. Baker, B.C. Murray, S. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, U.A. Schneider. 2012. *The Net Global Effects of Alternative U.S. Biofuel Mandates: Fossil Fuel Displacement, Indirect Land Use Change, and the Role of Agricultural Productivity Growth*. Report NI R 12-01, Nicholas Institute for Environmental Policy Solutions, Duke University.
<http://nicholasinstitute.duke.edu/climate/policydesign/net-global-effects-of-alternative-u.s.-biofuel-mandates>
39. Gordon, D., B. C. Murray, L. Pendleton, B. Victor. 2012. *Financing Options for Blue Carbon Opportunities and Lessons from the REDD+ Experience*. Report NI R 11-11, Nicholas Institute for Environmental Policy Solutions, Duke University.
<http://nicholasinstitute.duke.edu/economics/naturalresources/financing-options-for-blue-carbon>
38. Olander, L.P., A.J. Eagle, J.S. Baker, K. Haugen-Kozyra, B.C. Murray, A. Kravchenko, L.R. Henry, R.B. Jackson. 2011. *Assessing Greenhouse Gas Mitigation Opportunities and Implementation Strategies for Agricultural Land Management in the United States*. Report NI R 11-09, Nicholas Institute for Environmental Policy Solutions, Duke University. http://nicholasinstitute.duke.edu/ecosystem/t-agg/assessing-greenhouse-gas-mitigation-opportunities-and-implementation-strategies-for-agricultural-land-management-in-the-united-states/at_download/paper
37. Baker, J.S.; B.C. Murray; B.A. McCarl; S.K. Rose; and J. Schneck. 2011. *Greenhouse Gas Emissions and Nitrogen Use in U.S. Agriculture: Historic Trends, Future Projections, and Biofuel Policy Impacts*. Report NI-R 11-08. Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/climate/policydesign/greenhouse-gas-emissions-and-nitrogen-use-in-u.s.-agriculture/at_download/paper
36. Murray, Brian C.; Mazurek, Jan V.; Profeta, Timothy H. 2011. “Examination of the Carbon Fee Alternative for the State of California.” Policy Brief NI-PB-11-03, Nicholas Institute for Environmental Policy Solutions, Duke University.
<http://nicholasinstitute.duke.edu/climate/policydesign/examination-of-carbon-fee-for-california>

35. Murray, Brian; Jonas Monast, Chi-Jen Yang, and Justine Chow. 2011. “The United States, China, and the Competition for Clean Energy”. Policy Brief NI PB 11-05, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/climate/lowcarbontech/us-china-competition-for-clean-energy/at_download/paper
34. Sifleet, S., L. Pendleton, B.C. Murray. 2011. *State of the Science on Coastal Blue Carbon: A Summary for Policymakers*. Report NI-R 11-06. Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/economics/naturalresources/state-of-science-coastal-blue-carbon/at_download/paper
33. Murray, B.C., L. Pendleton, W.A. Jenkins, S. Sifleet, 2011. *Green Payments for Blue Carbon Economic Incentives for Protecting Threatened Coastal Habitats*. Report NI-R 11-04. Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/economics/naturalresources/blue-carbon-report/at_download/paper
32. Beach, R.H., Adams, D., Alig, R., Baker, J., Latta, G.S., McCarl, B.A., Murray, B.C., Rose, S.K. and White, E. 2010. ‘Model Documentation for the Forest and Agricultural Sector Optimization Model with Greenhouse Gases (FASOMGHG).’ RTI International.
31. Schneck, J.D., B.C. Murray, C.S. Galik, W.A. Jenkins. 2011. “Demand for REDD Carbon Credits: A Primer on Buyers, Markets, and Factors Impacting Prices.” Working Paper NI WP 11-01. Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/economics/naturalresources/demand-for-redd-carbon-credits/at_download/paper
30. Schneck, J., B.C. Murray, E. Gumerman, S. Tegen. 2010. “Estimating the Employment Impacts of Energy and Environmental Policies and Programs: Workshop Summary Report” Policy Brief NI PB 10-06, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/economics/climatechange/policy/estimating-employment-impacts/at_download/paper
29. Murray, B.C., W.A. Jenkins, S. Sifleet, L. Pendleton., and A. Baldera. 2010. “Payments for Blue Carbon: Potential for Protecting Threatened Coastal Habitats.” Policy Brief NI PB 10-05, Nicholas Institute for Environmental Policy Solutions, Duke University.
http://nicholasinstitute.duke.edu/oceans/marinees/blue-carbon/at_download/paper
28. Murray, B.C., W.A. Jenkins. 2010. “Designing Cap-and-Trade to Account for ‘Imperfect’ Offsets.” Duke Environmental Economics Working Paper Series Working Paper EE 10-03. <http://nicholasinstitute.duke.edu/economics/environmental-economics-working-paper-series/designing-cap-and-trade-imperfect-offsets>
27. Murray, B.C., J.S. Baker. 2010. “An Output-based Intensity Approach for Crediting Greenhouse Gas Mitigation in Agriculture: Explanation and Policy Implications.” Working paper, Nicholas Institute for Environmental Policy Solutions, Duke University.
<http://www.nicholas.duke.edu/institute/output.offsets.pdf>

26. Lawlor, K., W.A. Jenkins, L.P. Olander, B.A. Murray. 2009. Expanding the Scope of International Terrestrial Carbon Options: Implications of REDD+ and Beyond. Nicholas Institute Draft Report, Duke University.
http://www.nicholas.duke.edu/institute/Implications_of_REDD.12.09.pdf
25. Murray, B.C., L.P. Olander, and D.P. Kanak. 2009. Forging a Path for High Quality Compliance REDD Credits. Nicholas Institute Report NI R 09-06, Duke University.
http://www.nicholas.duke.edu/institute/Compliance_REDD_Credits.12.09.pdf
24. Olander, L.P., D. Cooley, B. Murray, and J. Mazurek. 2009. "Addressing Uncertainty in Investment in Initial Offsets Projects." Policy memo, Nicholas Institute for Environmental Policy Solutions, Duke University. October, 2009
http://www.nicholas.duke.edu/institute/carboncosts/NIoffsets_final.pdf
23. Maniloff, P. and B. Murray. 2009. "Allowance Price Containment Options for Cap-and-Trade Legislation." Policy memo, Nicholas Institute for Environmental Policy Solutions, Duke University. October, 2009.
http://nicholas.duke.edu/institute/carboncosts/price%20containment_final.pdf
22. Cooley, D., L.P. Olander, and B. Murray. 2009. "The Effects of Performance Standards on Offsets Supply in HR 2454" Policy memo, Nicholas Institute for Environmental Policy Solutions, Duke University. October, 2009
<http://www.nicholas.duke.edu/institute/performance.memo.pdf>
21. Baker, J., B. McCarl, B. Murray, S. Rose, R. Alig, D. Adams, G. Latta, R. Beach, and A. Daigneault. 2009. "The Effects of Low-Carbon Policies on Net Farm Income," Working Paper NI-WP-09-04, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/ni.wp.09.04.pdf>
20. Murray, B.C. 2009. "Much Ado About Carbon Offsets," *Seed Magazine* Catalyst discussion, initiated by commentary by Maywa Montenegro.
http://seedmagazine.com/content/article/much_ado_about_carbon_offsets/
19. Mazurek, J., B.C. Murray, L.P. Olander. 2009. "Conquering Cost: Optimal Policy Approaches to the Cost of Climate Change." Nicholas Institute. July 30.
<http://www.nicholas.duke.edu/institute/products.html>
18. Murray, B.C., B.A. McCarl, J.S. Baker. 2009. "How Might Carbon Prices and Energy Costs Affect Returns to Agricultural Producers?" Policy Commentary NI C 09-01, Nicholas Institute for Environmental Policy Solutions, Duke University
http://www.nicholas.duke.edu/institute/NI_C_09-01.pdf
17. Murray, B.C., W.A. Jenkins. 2009. "The Economics of Offsets in a Greenhouse Gas Compliance Market." Policy Brief NI PB 09-11, Nicholas Institute for Environmental Policy Solutions, Duke University.
<https://nicholasinstitute.duke.edu/sites/default/files/publications/offsetseries5-paper.pdf>
16. Murray, B.C., R. Lubowski, B. Sohngen. 2009. "Including Reduced Emissions from International Forest Carbon in Climate Policy: Understanding the Economics." Report NI-R-09-03, Nicholas Institute for Environmental Policy Solutions, Duke University
<http://www.nicholas.duke.edu/institute/carbon.economy.06.09.pdf>

- Policy Brief NI-PB-09-02, Nicholas Institute for Environmental Policy Solutions, Duke University. http://www.nicholas.duke.edu/institute/policy_brief.09.02.pdf
15. Murray, B.C., W.A. Jenkins, R.A. Kramer, and S.P. Faulkner. 2009. *Valuing Ecosystem Services from Wetlands Restoration in the Mississippi Alluvial Valley*. Report NI-R-09-02, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/msvalley.pdf>
 14. Jenkins, W.A., L.P. Olander, and B.C. Murray. 2009. "Addressing Leakage in a Greenhouse Gas Mitigation Offsets Program for Forestry and Agriculture." Policy Brief NI PB 09-03, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/offsetseries4.pdf>
 13. Murray, B.C. 2008. "Emissions Offsets in a Greenhouse Gas Cap-and-Trade Policy." *Weekly Policy Commentary*, Resources for the Future. November 17, 2008. http://www.rff.org/Publications/WPC/Pages/11_17_08_Emissions_Offset.aspx
 12. Murray, B.C. and L.P.Olander. 2008. "Addressing Impermanence Risk and Liability in Agriculture, land Use Change, and Forest Carbon Projects." Policy Brief NI PB 08-01-C, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/offsetseries3.pdf>
 11. Olander, L.P. and B.C. Murray. 2008. "Offsets: An Important Piece of the Climate Policy Puzzle" Policy Brief NI PB 08-01-A, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/offsetseries1.pdf>
 10. Olander, L.P and B.C. Murray.. 2008. "Treatment of Early Agricultural and Forestry Actors in a Federal Cap-and-Trade ." Policy Brief NI PB 08-01-B, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/offsetseries2.pdf>
 9. Galik, C.S., D. deB. Richter, M. L. Mobley, L. P. Olander, and B.C. Murray. "A Critical Comparison and Virtual "Field Test" of Forest Management Carbon Offset Protocols." Report CCPP 08-03, Climate Change Policy Partnership, Duke University. <http://www.nicholas.duke.edu/institute/ccppoffsets.pdf>
 8. Murray, B.C, R.G. Newell, and W.A. Pizer. 2008. "Balancing Cost and Emissions Certainty:An Allowance Reserve for Cap-and-Trade." Jointly posted as: *Nicholas Institute Working Paper NI-WP-08-03* (<http://www.nicholas.duke.edu/institute/wp-costemissions.pdf>), *Resources for the Future Discussion Paper 08-24* (<http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=20517>) and *National Bureau for Economics Research Working Paper14258* (<http://www.nber.org/papers/w14258>)
 7. Murray, B.C. 2008. *Leakage from an Avoided Deforestation Compensation Policy: Concepts, Empirical Evidence, and Corrective Policy Options*. Working Paper NI-WP 08-02, Nicholas Institute for Environmental Policy Solutions, Duke University, June 2008.
 6. Murray, B.C., L.P. Olander. 2008. *A Core Participation Requirement for Creation of a REDD Market*. Short Policy Brief, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/pb-redd.pdf>

5. Murray, B.C. and M.T. Ross. 2007. *The Lieberman-Warner America's Climate Security Act: A Preliminary Assessment of Potential Economic Impacts*. Policy Brief NI PB 07-04, Nicholas Institute for Environmental Policy Solutions, Duke University. <http://www.nicholas.duke.edu/institute/econsummary.pdf>
4. Murray, B; M. Ross; and E. Gummerman. 2007. *A Path to Greenhouse Gas Reductions in the United States: Economic Modeling of Interim National Targets*. Working Paper NI-WP 07-06, Nicholas Institute for Environmental Policy Solutions, Duke University, September 2007. www.nicholas.duke.edu/institute/wp-greenhousegas.pdf
3. Sagarin, R., M. Dawson, D. Karl, A. Michael, B. Murray, M. Orbach, N. St. Clair. 2007. *Iron Fertilization in the Ocean for Climate Mitigation: Legal, Economic, and Environmental Challenges*. Working Paper NI-WP-07-07. Nicholas Institute for Environmental Policy Solutions, Duke University, October 2007. <http://www.nicholas.duke.edu/institute/ironfertilization.pdf>
2. Olander, L.P.; B.C. Murray. 2007. "A New Opportunity to Help Mitigate Climate Change, Save Forests, and Reach Development Goals." Prepared for the United Nations Foundation. Working Paper NI-WP-07-03. Nicholas Institute for Environmental Policy Solutions, Duke University. July, 2007. <http://www.nicholas.duke.edu/institute/>
1. Olander, L.P., B.C. Murray, H. Gibbs, and M Steninger. 2006. *Establishing Credible National Baselines for Efforts to Reduce Emissions from Degradation and Deforestation*. Working Paper NI-WP-06-01. Nicholas Institute for Environmental Policy Solutions, Duke University. December, 2006. <http://www.nicholas.duke.edu/institute/baselines-draft.pdf>

Other Papers (22)

22. Ren, S., W. Hu, K. Bradbury, D. Harrison-Atlas, L. Malaguzzi Valeri, B. Murray, J.M. Malof. 2022. "Automated Extraction of Energy Systems Information from Remotely Sensed Data: A Review and Analysis." Available online at ArXiv: <https://arxiv.org/abs/2202.12939>.
21. Murray, B.C., D. Broekhoff, L Durschinger. 2013. "Using Buffer Mechanisms to Manage Risks for REDD+ Emission Reduction Programs under the Carbon Fund: An Options Assessment." Prepared for the Forest Carbon Partnership Facility's Carbon Fund, Managed by the Facility Management Team housed at the World Bank/Carbon Finance Unit. October 15, 2013.
20. Murray, B.C.; C. S. Galik, W. A. Jenkins, and J. D. Schneck. 2010. *Project Standards Development for the Amazon Forest Carbon Partnership: An Assessment of Options for Additionality, Permanence, and Leakage*. Prepared for the Amazon Forest Carbon Partnership, Nicholas Institute for Environmental Policy Solutions, Duke University.
19. Murray, B.C., L.P. Olander, and D.P. Kanak. 2009. "Forging a Path for High-Quality Compliance REDD Credits." Draft Report, Nicholas Institute for Environmental Policy Solutions, Duke University.

18. Expert Panelist: for Government Accountability Office (GAO). 2008. INTERNATIONAL CLIMATE CHANGE PROGRAMS: Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism. GAO Report GAO-09-151, Washington, DC . 65 pp. <http://www.gao.gov/cgi-bin/getrpt?GAO-09-151>
17. Murray, B.C; E. Gumerman. 2007. "Including Transportation in a Cap and Trade Program with and Without Complementary Policies: A Preliminary Assessment of Relevant Economic Modeling Results."
16. Murray, B.C.; L.P. Olander. 2007. "Principles for Setting National Baselines for Reduced Emissions from Deforestation and Degradation"
15. Murray, B.C.; S. Brown. 2007. "Methods for Quantifying the Net GHG Offsets of a Forest Management Project in the U.S." Prepared for US EPA Office of Atmospheric Programs Climate Change Division.
14. Murray, B.C. and J.P. Fay. "Methods for Quantifying the Net GHG Offset Potential of an Afforestation Project in the U.S." Prepared for US EPA Climate Change Division, October, 2006.
13. Sohngen, B; D. Zamolodchikov; B. Murray; K. Andrasko; M. Gytarsky; G. Korovin. 2007. "The Marginal Cost of Carbon Sequestration in Russia: Lessons from Top-Down and Bottom-up Analysis.
12. Murray B., Nicholson R., Ross M., Holloway T., Patil S. (2006) Biomass Energy Consumption in the Forest Products Industry. Report prepared for the U.S. Department of Energy - Energy Information Administration. RTI International, Research Triangle Park, NC. 81p. http://tonto.eia.doe.gov/FTP/ROOT/renewables/rti_biomass_report_2006.pdf
11. Murray, B.C. and B.L. Sohngen. "Leakage in Land Use, Land Use Change, and Forest Sector Projects: A Synthesis of Issues and Estimation Approaches." Working paper for EPA Office of Atmospheric Programs, Climate Change Division. Can be obtained by emailing brian.murray@duke.edu.
10. Murray, B., M.Ross, and L. Clayton. "Options for Addressing the Reversibility ("Impermanence") of GHG Benefits from Carbon Sequestration Projects in Agriculture, Land Use Change, and Forestry." Working paper for EPA Office of Atmospheric Programs, Climate Change Division. Can be obtained by emailing brian.murray@duke.edu.
9. Murray, BC and AJ Sommer, Setting Baselines for GHG Mitigation Projects in Agriculture, Land Use Change and Forestry: A Comparison of Bottom-Up and Top-Down Approaches. Paper prepared for US EPA Climate Change Division. Can be obtained by emailing brian.murray@duke.edu.
8. Ross, Martin T., Michael P. Gallaher, Brian C. Murray, Wanda W. Throneburg, and Arik Levinson. July 2004. "PACE Survey: Background, Applications, and Data Quality Issues." Research Triangle Park, NC: RTI International. Available at <[http://yosemite.epa.gov/ee/epa/eed.nsf/ffb05b5f4a2cf40985256d2d00740681/cf0ffb9e37c9a7eb85256edd004d3282/\\$FILE/2004-09.pdf](http://yosemite.epa.gov/ee/epa/eed.nsf/ffb05b5f4a2cf40985256d2d00740681/cf0ffb9e37c9a7eb85256edd004d3282/$FILE/2004-09.pdf)>.

7. Murray, B.C., G.L. Van Houtven, M.E. Deerhake, R.C. Dodd, M.I. Lowry, C. Yao, A.M. Miles, E.J. Bowman, M.C. Bruhn, J.L. Game, D. Phaneuf, A. Sommer, J-C Yang, S. Patil, S.A. Guthrie, J.C. Cajka, and J.B. Coburn. "Benefits of Adopting Environmentally Superior Swine Waste Management Technologies in North Carolina: An Environmental and Economic Assessment." Prepared for the Animal and Poultry Waste Management Center, North Carolina State University, November 2003.
6. Beach, R.H, B.C. Murray, M.K. Wohlgenant, and N. Piggott. 2003. "Interaction Effects of Promotion, Research, and Price Supports for U.S. Cotton." RTI Working Paper.
5. McCarl, B.A., B.C. Murray, and U. Schneider. 2002. "The Comparative Value of Biological Carbon Sequestration." RTI Working Paper.
4. McCarl, B.A., and B.C. Murray. 2002. "Harvesting the Greenhouse: Comparing Biological Sequestration with Emissions Offsets." Working Paper, Texas A&M University.
3. Schneider, U.A., B.A. McCarl, B.C. Murray, J.R. Williams, and R.D. Sands. August 2001. "Economic Potential of Greenhouse Gas Emission Reductions: Comparative Role for Soil Sequestration in Agriculture and Forestry." Working paper 01-WP 281. Ames, IA: Center for Agricultural and Rural Development (CARD).
2. Murray, B.C., W.N. Thurman, and A. Keeler. September 2000. "Adjusting for Tax Interaction Effects in the Economic Analysis of Environmental Regulation: Some Practical Considerations." White paper prepared for the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Innovative Strategies and Economics Group.
1. Murray, B.C., and R.C. Lindrooth. 1998. "Pollution Prevention in the U.S. Chemical Industry: An Empirical Analysis." RTI working paper.

Conference Proceedings (13)

13. Flatt, V (on behalf of all participants). 2018. "Federal Pricing of Carbon: A snapshot from February 2018." Summary of the proceedings from workshop at University of Houston, Feb (2018).
<http://www.law.uh.edu/eenrcenter/resources/whitepapers/Carbon%20Pricing%20Snapshot%20February%202018.pdf>
12. Murray, B.C. 2008. "Permanence and Reversal Risk in Agriculture, Land Use Change and Forest Carbon Projects." Workshop proceedings, *Agriculture's Role in Mitigating Climate Change*, Sponsored by American Farmland Trust, Economic Research Service and Farm Foundation, August 13-14, 2008, Washington, DC.
11. DeAngelo, B., K. Weitz, M. Bahner, A. Zapata, B. Murray, and R. Beach. "Near-Term Trends and Mitigation Options for Black and Organic Carbon Emissions from Major Source Regions." In *Proceedings of the Fourth International Symposium on Non-CO₂ Greenhouse Gases*, Utrecht, The Netherlands, July 4-6, 2005.
10. Sommer, A., B. Murray, and K. Andrasko. "Project Specific or Performance-Standard Baseline? Testing the Alternatives for a Forest Carbon Sequestration Project." Prepared for the proceedings of the 3rd DOE Carbon Sequestration Conference, May 3-6, 2004, Alexandria VA.

9. Murray, Brian C., George L. Van Houtven, Marion E. Deerhake, Randall C. Dodd, Michael I. Lowry, Chengwei Yao, Amy Miles, Dan J. Phaneuf, Allan Sommer, James C. Cajka, Jeff B. Coburn, and Sumeet Patil. "Economic Feasibility Assessment of the Smithfield Foods Agreement: Environmental Modeling and Benefits Components." Proceedings of the North Carolina State University Animal Waste Workshop, October 16-17, 2003.
8. Murray, B.C. "Alternative Methods to Estimate LUCF Project Baselines Using Public Natural Resource Data Sets." DOE Second Annual Carbon Sequestration Conference. May 5-8, 2003. Alexandria, VA.
7. McCarl, B.A., H. Lee, D. Gillig, and B.C. Murray. "Economic Explorations on the Potential Role of Agriculture and Forestry in Mitigating Greenhouse Gas Emissions: Findings and Research Directions." DOE Second Annual Carbon Sequestration Conference. May 5-8, 2003. Alexandria, VA.
6. Pattanayak, S. K., R. Beach, R. Abt, B. Murray, and J.C. Yang. "Empirical Studies of Nonindustrial Private Forest Management: A Critical Review." In *Proceedings of the Southern Forest Economics Workshop*, Virginia Beach, VA, March 2002.
5. McCarl, B.A., U. Schneider, B. Murray, J. Williams, and R.D. Sands. 2001. "Economic Potential of Greenhouse Gas Emission Reductions: Comparative Role for Soil Sequestration in Agriculture." Proceedings, First National Conference on Carbon Sequestration, Washington, DC, May 14-17, 2001.
4. Abt, R.C, B.C. Murray, and S. McNulty. "Modeling the Economic and Ecological Impact of Climate Change on Southern Forests." In *Conference Proceedings of the Southern Forest Economics Workgroup*. Biloxi, MS.
3. Murray, B.C., and R.C. Abt. 1999. "Forest Certification in the U.S. South: Some Empirical Evidence on Price Premium Requirements." In *Proceedings of the 1998 Southern Forest Economics Workshop*, Williamsburg, VA, March 1998. Part II: 220-227. Southern Research Station, USDA Forest Service.
2. Murray, B.C., D.G. Roberts, R.C. Abt, and J. Brunet. 1992. "Factor Productivity Growth: An Inter-Regional Comparison of the Sawmilling Industries in the United States and Canada." In *Proceedings of the Forest Sector, Trade, and Environmental Impact Models: Theory and Applications*. Seattle, Washington: Center for International Trade in Forest Products.
1. Lee, K.J., and B.C. Murray. 1990. "An Econometric Model of Private Land Management in Georgia." In *Proceedings of the Southern Forest Economics Workshop on Evaluating Even and All-Aged Timber Management Options for Southern Forest Land*. Gen. Tech. Rpt. SO-79. New Orleans, LA: USDA Forest Service, Southern Forest Experiment Station.