

Curriculum Vitae

KATHLEEN A. MILLER

PERSONAL

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Current Address: Institute for the Study of Society and Environment (ISSE)
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ACADEMIC BACKGROUND

1985 Ph.D. Economics, University of Washington
1976 M.A. Economics, University of Washington
1974 B.A. Anthropology, University of Washington

DISSERTATION RESEARCH

"The Right to Use vs. the Right to Sell: Water Rights in the Western United States."

HONORS

1974 Magna Cum Laude, Phi Beta Kappa

PROFESSIONAL EXPERIENCE

1993-Present Scientist III, Environmental and Societal Impacts Group, National Center for Atmospheric Research

5/05-9/06 Interim Deputy Head, Institute for the Study of Society and Environment, National Center for Atmospheric Research

4/97-8/99 Interim Head, Environmental and Societal Impacts Group, National Center for Atmospheric Research

1/99-5/00 Instructor, *Policy Responses to Global Environmental Change*, Environmental Certificate Program, University of Colorado

2/00 - Present Faculty Affiliate, Department of Earth Resources, Colorado State University

1992-94 Special Graduate Faculty Appointment, Department of Economics, University of Colorado

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- 1988-93 Scientist II, Environmental and Societal Impacts Group, National Center for Atmospheric Research
- 1986-87 Adjunct Associate Professor, *Natural Resources Economics*, Department of Economics, University of Colorado
- 1985-88 Scientist I, Environmental and Societal Impacts Group, National Center for Atmospheric Research
- 1983-85 Predoctoral Teaching Associate, *Introduction to Macroeconomic Theory; Economic History of the Western World; Introduction to Economics; Introduction to Microeconomic Theory*, Department of Economics, University of Washington
- 1982 Instructional Assistant, *Intensive Summer Program in Public Administration*, Graduate School of Public Affairs, University of Washington
- 1980-81 Research Assistant, computer programmer, Fred Hutchinson Cancer Center, Seattle, Washington
- 1978-80 Graduate Staff Assistant, statistical research, Affirmative Action Office, University of Washington
- 1979-80 Economist, Economic feasibility of Sol Duc Hot Springs Resort, L. and M. Economic Research, research performed on contract for the National Park Service
- 1977-78 Graduate Research Assistant, Outer Continental Shelf Technology Assessment Project, Social Management of Technology Program, University of Washington
- 1977 Pre-doctoral Teaching Associate, *Introduction to Microeconomic Theory*, Department of Economics, University of Washington
- 1975-76 Graduate Staff Assistant, statistical research, Affirmative Action Office, University of Washington
- 1974-75 Teaching Assistant, *Introduction to Economics*, Department of Economics, University of Washington

PUBLICATIONS

Peer Reviewed

Kathleen A. Miller, 2008. Climate Change and Water Resources: The Challenges Ahead. *International Affairs*. Spring/Summer 2008 *In Press*.

- Z. W. Kundzewicz, L. J. Mata, N.W. Arnell, P. Döll, B. Jimenez, K. Miller, T. Oki, Z. Şen, and I. Shiklomanov, 2008. The implications of projected climate change for freshwater resources and their management, *Hydrological Sciences Journal*, **53**(1): 3-10.
- K.A. Miller, 2007. "Fish Stew: Uncertainty, Conflicting Interests and Climate Regime Shifts," Chapter 13 – pp. 207-221 in T. Bjørndal, D. V. Gordon, R. Arnason and U. R. Sumaila (eds.) *Advances in Fisheries Economics: Festschrift in Honour of Professor Gordon R. Munro*. Blackwell: Oxford, U.K.
- R. McKelvey, P. V. Golubtsov, G. Cripe and K.A. Miller, 2007. "The Incomplete Information Stochastic Split-Stream Model: An Overview." Chapter 10 – pp.159-183 in T. Bjørndal, D. V. Gordon, R. Arnason and U. R. Sumaila (eds.) *Advances in Fisheries Economics: Festschrift in Honour of Professor Gordon R. Munro*. Blackwell: Oxford, U.K.
- Kathleen A. Miller, 2007. Climate Change and Water in the West: Complexities, Uncertainties and Strategies for Adaptation, *Journal of Land, Resources and Environmental Law* **27**(1): 87-96.
- Z.W. Kundzewicz, L.J. Mata (Coordinating Lead Authors); N. Arnell, P. Döll, P.Kabat, B. Jimenez, K. Miller, T. Oki, Z. Sen and I. Shiklomanov (Lead Authors), *et. al.*, 2007. Chapter 3 – Freshwater Resources and their Management. IPCC WGII Fourth Assessment Report.
- Kathleen Miller, 2007. Climate Variability and Tropical Tuna: Management Challenges for Highly Migratory Fish Stocks, *Marine Policy*, **31**(1): 56-70.
[doi:10.1016/j.marpol.2006.05.006].
- Kathleen Miller and David Yates, 2006. *Climate Change and Water Resources: A Primer for Municipal Water Providers*. AWWA Research Foundation, Denver, CO, 83 pp.
- Robert McKelvey, Peter V. Golubtsov, Kathleen Miller, and Greg Cripe, 2006. "Bi-national Management of a Transboundary Marine Fishery: Modeling the Destabilizing Impacts of Erratic Climatic Shifts," Chapter 9 – pp. 236-261, in Rögnvaldur Hannesson, Manuel Barange, and Samuel F. Herrick, Jr., eds., *Climate Change and the Economics of the World's Fisheries: Examples of Small Pelagic Stocks*, in the series *New Horizons in Environmental Economics*, Edward Elgar, Cheltenham, UK.
- Rebecca E. Morss, Kathleen A. Miller and Maxine Vasil, 2005. A Systematic Economic Approach to Evaluating Public Investment in Observations for Weather Forecasting. *Monthly Weather Review* **113**(2): 374-388.
- Kathleen Miller and Gordon R. Munro, 2004. Climate and Cooperation: A New Perspective on the Management of Shared Fish Stocks, *Marine Resource Economics* **19**(3): 367-393.
- Robert McKelvey, Kathleen Miller and Peter Golubtsov, 2003. "Fish-Wars Revisited: A Stochastic Incomplete-Information Harvesting Game," Chapter 6 – pp. 93-112, in Justus

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Wesseler, Hans-Peter Weikard, and Robert D. Weaver, eds., *Risk and Uncertainty in Environmental and Natural Resources Economics*, Edward Elgar.

Kathleen Miller and Steven Gloss, 2003. "Climate Variability, Social, Policy and Institutional Issues," Chapter 15 - pp. 251-269 in William Lewis (ed.), *Water and Climate in the Western United States*. University Press of Colorado, Boulder, CO.

Kathleen A. Miller and Mary W. Downton, 2003. "Transboundary Fisheries: Pacific Salmon," Chapter 46 - pp.851-864 in Thomas D. Potter and Bradley R. Colman (eds.), *Handbook of Weather, Climate and Water : Atmospheric Chemistry, Hydrology and Societal Impacts*. John Wiley & Sons, Hoboken, NJ.

Robert McKelvey and Kathleen A. Miller, 2002. "The Pacific Salmon Dispute: Rationalizing a Dysfunctional Joint Venture," in K. D. Lynch, M. L. Jones and W. W. Taylor, eds., *Sustaining North American Salmon: Perspectives Across Regions and Disciplines*, American Fisheries Society, Bethesda, MD..

Kathleen A. Miller, Gordon R. Munro, Ted L. McDorman, Robert McKelvey and Peter Tyedmers, 2001. *The 1999 Pacific Salmon Agreement: A Sustainable Solution?* Canadian – American Public Policy Occasional Paper, No. 47. Canadian – American Center, University of Maine, Orono, ME.

S.J. Cohen and K.A. Miller (Co-ordinating Lead Authors), 2001. "North America," Ch.15, pp.733-800 in *Climate Change 2001: Impacts Adaptation and Vulnerability*. Intergovernmental Panel on Climate Change (IPCC), Working Group II Third Assessment Report. Cambridge, UK: Cambridge University Press.

K.S. White et al. (K. Miller, Lead Author), 2001. "Technical Summary" pp. 19-73 in *Climate Change 2001: Impacts Adaptation and Vulnerability*. Intergovernmental Panel on Climate Change (IPCC), Working Group II Third Assessment Report. Cambridge, UK: Cambridge University Press.

S.J. Cohen, K.A. Miller A. F. Hamlet and W. Avis, 2000. "Climate Change and Resource Management in the Columbia River Basin," *Water International*, **25**(2): 253-272.

Kathleen A. Miller, 2000. Pacific Salmon Fisheries: Climate, Information and Adaptation in a Conflict-Ridden Context, *Climatic Change*, **45**(1):37-61.

Kathleen A. Miller, 2000. "Managing Supply Variability: The Use of Water Banks in the Western United States, in D. A. Wilhite (ed.), *Drought: A Global Assessment*, Volume II, pp.70-86. Routledge, London.

Kevin E. Trenberth, Kathleen Miller, Linda Mearns and Steven Rhodes, 2000. *Effects of Changing Climate on Weather and Human Activities*, Earth Science and Human Impacts Series, Global Change Instruction Program, UCAR. University Science Books, Sausalito, CA.

- Dennis Ojima, Luis Garcia, E. Elgaali, Kathleen Miller, Timothy Kittel and Jill Lockett, 1999. "Potential Climate Change Impact on Water Resources in the Great Plains, *Journal of the American Water Resources Association*, **35**(6): 1443-1454.
- National Research Council, Panel on the Human Dimensions of Seasonal-to-Interannual Climate Variability (K. Miller, member), P. C. Stern and W. Easterling, (eds.), 1999. *Making Climate Forecasts Matter*. National Academy Press, Washington, D.C.
- Mary W. Downton and Kathleen A. Miller, 1998. Relationships Between Alaskan Salmon Catch and North Pacific Climate on Interannual and Decadal Time Scales, *Canadian Journal of Fisheries and Aquatic Sciences*, **55**: 2255-2265.
- Kathleen A. Miller, Steven L. Rhodes and Lawrence J. MacDonnell, 1997. Water Allocation in a Changing Climate: Institutions and Adaptation, *Climatic Change*, **35**: 157-177.
- Kathleen A. Miller, 1997. "Use of Mathematical Models in Policy Evaluation: Comments," in *Modeling Environmental Policy*, Wade E. Martin and Lisa A. McDonald, (eds.), pp. 185-197. Kluwer, Boston.
- David Schimel et al. (Kathleen Miller, contributing author), 1997. *Stabilization of Atmospheric Greenhouse Gases: Physical, Biological and Socio-Economic Implications*, IPCC Technical Paper III, Intergovernmental Panel on Climate Change.
- Kathleen A. Miller, Steven L. Rhodes and Lawrence J. MacDonnell, 1996. Global Change in Microcosm: The Case of U.S. Water Institutions, *Policy Sciences*, **29**(4): 271-290.
- Kathleen A. Miller, 1996. Salmon Stock Variability and the Political Economy of the Pacific Salmon Treaty, *Contemporary Economic Policy*, **14**(3): 112-129.
- Kathleen A. Miller, 1996. "Water Banking to Manage Supply Variability," pp.185-210 in Darwin C. Hall, (ed). *Marginal Cost Rate Design and Wholesale Water Markets: Advances in the Economics of Environmental Resources, Volume 1.*, JAI Press, Greenwich, CT.
- Kathleen A. Miller, Lawrence J. MacDonnell, and Steven L. Rhodes, 1993. Groundwater Rights in an Uncertain Environment: Theoretical Perspectives on the San Luis Valley, *Natural Resources Journal*, **33**(3): 727-758.
- Kathleen A. Miller and Mary W. Downton, 1993. The Freeze Risk to Florida Citrus Part I: Investment Decisions, *Journal of Climate*, **6**(2): 354-363.
- Mary W. Downton and Kathleen A. Miller, 1993. The Freeze Risk to Florida Citrus Part II: Temperature Variability and Circulation Patterns, *Journal of Climate*, **6**(2): 364-372.
- Steven L. Rhodes, Kathleen A. Miller, and Lawrence J. MacDonnell, 1992. Institutional Responses to Climate Change: Water Provider Organizations in the Denver Metropolitan Region," *Water Resources Research*, **28**(1): 11-18.

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- Kathleen A. Miller and David L. Fluharty, 1992. "El Niño and Variability in the Northeast Pacific Salmon Fishery." Chapter 4 – pp. 49-88 in Michael H. Glantz, (ed.), *Climate Variability, Climate Change and Fisheries*, Cambridge University Press.
- Kathleen A. Miller, 1991. Response of Florida Citrus Growers to the Freezes of the 1980s, *Climate Research*, 1(2): 133-144.
- Kathleen A. Miller, 1990. "Water, Electricity, and Institutional Innovation." Chapter 16 – pp. 367-394 in Paul E. Waggoner, (ed.), *Climate Change and U.S. Water Resources*, Wiley, New York.
- Kathleen A. Miller, 1989. Climate Change: Water Rights and Electric Utilities, *Energy Policy*, 8: 420-424.
- Kathleen A. Miller, 1989. "Hydropower, Water Institutions and CO₂-Induced Climate Change: A Snake River Case Study," *Int. J. of Water Resources Development*, 5(2): 71-83.
- Kathleen A. Miller, 1988. "Private and Public Sector Responses to Florida Citrus Freezes," pp.375-406 in Michael H. Glantz, (ed.), *Societal Responses to Regional Climate Change: Forecasting by Analogy*, Westview Press.
- Kathleen A. Miller and Michael H. Glantz, 1988. Climate and Economic Competitiveness: Florida Freezes and the Global Citrus Processing Industry, *Climatic Change*, 12: 135-164.
- Mary W. Downton, Thomas R. Stewart, and Kathleen A. Miller, 1988. Estimating Historical Heating and Cooling Needs: Per Capita Degree Days, *Journal of Climate and Applied Meteorology*, 27(1): 84-90.
- Kathleen A. Miller, 1987. The Right to Use Versus the Right to Sell: Spillover Effects and Constraints on the Water Rights of Irrigation Organization Members, *Water Resources Research*, 23(12): 2166-2174.
- Helen Remick and Kathleen A. Miller, 1978. Participation Rates in High School Mathematics and Science Courses, *The Physics Teacher*, May 1978.

Manuscripts in Press/Review/Preparation

- Bryson Bates, Zbigniew W. Kundzewicz, Shaohong Wu, Nigel Arnell, Virginia Burkett, Petra Döll, Daniel Gwary, BertJan Heij, Blanca Jiménez, Georg Kaser, Akio Kitoh, Sari Kovats, Pushpam Kumar, Chris Magadza, Daniel Martino, Luis José Mata, Mahmoud Medany, Kathleen Miller, Taikan Oki, Balgis Osman, Terry Prowse, Roger Pulwarty, Jouni Räisänen, Jim Renwick, Francesco Tubiello, Richard Wood, and Zong-Ci Zhao, 2008. *Technical Paper on Climate Change and Water. In Review.*
- Kathleen Miller, Rémi Monguel and Gail Osherenko (eds.). *Fast Fish, Faster Fishers and a Changing Environment: Challenges for the Management of Oceanic Top Predators* (Book manuscript in preparation, 2008).

Stacey Schulte and Kathleen Miller. Wildfire risk and climate change: The influence on homeowner mitigation behavior in the wildland-urban interface (Revisions in preparation for *Society and Natural Resources*, 2008).

Major Reports

Ojima, D.S., J.M. Lockett and the Central Great Plains Steering Committee and Assessment Team (K. Miller, member), *Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change - Central Great Plains*. Report for the U.S. Global Change Research Program. Colorado State University. 103 pp., 2002.

Water Cycle Study Group (K. Miller member), *A Plan for a New Science Initiative on the Global Water Cycle*, U.S. Global Change Research Program, Washington, D.C., 2001.

K. Miller, L. Mearns, G. Larsen and H. Gilbert (*U.S. Team*); S. Cohen, J. Browne, L. Mortsch, and W. Avis (*Canadian Team*). "Introduction," "Vulnerability Assessment - U.S. / Canadian Boundary Regions," and "Implications of Climate Change for the Columbia River Basin," in *Climate Variability and Transboundary Freshwater Resources in North America*," report to the NAFTA Commission for Environmental Cooperation, Montreal, 1998.

Kathleen A. Miller, *Climate Variability, Climate Change and Western Water*, Report to the Western Water Policy Review Advisory Commission, NTIS, Springfield, VA, 1997.

Kathleen A. Miller and Robert K. Parkin, eds., *An Institute on the Economics of the Climate Resource*, Final Report, NOAA contract # NA94AANAG0380, University Corporation for Atmospheric Research, Boulder, CO, 1996.

Lawrence J. MacDonnell, Charles W. Howe, Kathleen A. Miller, Teresa A. Rice and Sarah F. Bates. *Water Banks in the West*, Natural Resources Law Center, University of Colorado School of Law, 1994.

also published as: *Using Water Banks to Promote More Flexible Water Use*, Project Completion Report: USGS Grant #1434-92-G-2253, Principal Investigator: Lawrence J. MacDonnell, Co-principal Investigators: Sarah Bates, Charles Howe, Kathleen A. Miller and Teresa Rice, 1994.

Kathleen A. Miller, "Economics, Lake Levels and Conflict: A Historical Perspective on Chicago's Diversions," in *The Lake Michigan Diversion at Chicago and Urban Drought: Past Present and Future Regional Impacts and Responses to Global Climate Change*. Final Report, NOAA contract # 50WCNR306047, Stanley A. Changnon, ed., 1994.

Other Publications

Kathleen Miller, 2007. The Challenge of Change: Managing for the Sustainability of Oceanic Top Predator Species. *GLOBEC International Newsletter*, **13(3)**: 47.

Rebecca E. Morss and Kathleen A. Miller. Evaluating the Optimal Level and Mix of Public

Investment in Observations for Weather Prediction: An Economic Approach, in *Proceedings of the 2005 THORPEX Conference, 2005*.

Kathleen Miller, Gordon R. Munro and Trond Bjørndal. Climate, Competition and the Management of Shared Fish Stocks, in *What are Responsible Fisheries? Proceedings of the Twelfth Biennial Conference of the International Institute of Fisheries Economics and Trade (IIFET). 2004*

Kathleen A. Miller, "North American Pacific Salmon: A Case of Fragile Cooperation" in FAO Fisheries Report No. 695 Supplement: Papers presented at the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks, Bergen, Norway – 7-10 October 2002, pp. 105-122. FAO, Rome, 2003. *Also available online at:* <ftp://ftp.fao.org/fi/DOCUMENT/ec-sfs/2002/MillerPacificSalmon-sept17.pdf>.

Kathleen Miller, "Book Review: *The Tornado: Nature's Ultimate Windstorm* by T. Grazulis," *Journal of the West*, 41(4):88, Fall 2002.

Kathleen A. Miller and Gordon R. Munro, "Cooperation and Conflict in the Management of Transboundary Fishery Resources," Proceedings of the Second World Congress of Environmental and Resource Economics, Monterey, CA June 2002, *available online at:* <http://weber.ucsd.edu/%7Ecarsonvs/papers/440.pdf>.

Robert McKelvey and Kathleen Miller, "A Stochastic Split-Stream Harvesting Model: Insights on Information and the Pacific Salmon War," Proceedings of the International Conference on Risk and Uncertainty in Environmental and Resource Economics, Wageningen, Netherlands, June 2002.

Kathleen A. Miller, "Climate and Water Resources in the West: Past and Future," *Journal of the West*, 40(3): 39-47, 2001.

Kathleen Miller, "Book Review: *Due to the Weather: Ways the Elements Affect Our Lives* by A. Resnick," *Bulletin of the American Meteorological Society*, 82(8): 1759, 2001.

K. A. Miller, G. Munro, R. McKelvey and P. Tyedmers, "Climate, Uncertainty and the Pacific Salmon Treaty: Insights on the Harvest Management Game," in *Microbehavior and Macroresults: Proceedings of the Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade, July 10-14, 2000, Corvallis, Oregon, USA*. Compiled by Richard S. Johnston and Ann L. Shriver. IIFET, Corvallis, 2001.

R. Pielke, Jr. M. Betsill, M. Downton, J. Firor, D. Jamieson, R. Katz, M. Lahsen, J. Magistro, L. Mearns and K. Miller, "Book Review: *Human Choice and Climate Change*, S. Rayner and E. Malone eds." *Bulletin of the American Meteorological Society*, 80(7): 1441-1443, 1999.

R. McKelvey and K. Miller. Cooperative Management of Transboundary Shared Stocks: Some Principles Drawn from the Theory of Games, *Ecosystem Considerations in Fisheries Management, 16th Lowell Wakefield Fisheries Symposium, Abstracts*, University of Alaska Sea Grant, Fairbanks, 1998.

Kathleen A. Miller, "Climate, Salmon Abundance and the Political Economy of the Pacific

Salmon Treaty," in *A Systems Approach to ENSO: A Colloquium on El Niño-Southern Oscillation (ENSO): Atmospheric, Oceanic Societal Environmental and Policy Perspectives*, M. H. Glantz, (organizer), 1997.

Roger A. Pielke Jr. et al, (Kathleen A. Miller, contributing author), "Meeting Summary: Societal Aspects of Weather: Report of the Sixth Prospectus Development Team of the U.S. Weather Research Program to NOAA and NSF," *Bulletin of the American Meteorological Society*, 78(5): 867-876, 1997.

Kathleen A. Miller, "Economics of the Climate Resource," in *Symposium on Environmental Applications*, Jan. 28 - Feb 2, 1996, Atlanta GA, Preprints, American Meteorological Society, Boston MA.

Kathleen A. Miller, "Climatic Variations and the Political Economy of the Pacific Salmon Fishery," in *Workshop Report, Usable Science II: The Potential Use and Misuse of El Niño Information in North America*. Environmental and Societal Impacts Group, National Center for Atmospheric Research, 1994.

Kathleen A. Miller, "Thoughts on Creeping Environmental Problems: An Economic Perspective," in *Report: Workshop on Creeping Environmental Phenomena*. 1994.

Kathleen A. Miller, Steven L. Rhodes, and Lawrence J. MacDonnell, "Climate Change and Water Law: Defining Rights to a Changing Resource," in *Proceedings of the American Water Resources Association Symposium on "Effects of Human-Induced Changes on Hydrologic Systems,"* 1994.

Kathleen A. Miller, Lawrence J. MacDonnell, and Steven L. Rhodes, "Property Rights and Groundwater Development in a Changing Climate: A Case Study," in *Proceedings of The First National Conference on Climate Change and Water Resources Management*, 1992.

Steven L. Rhodes, Kathleen A. Miller, and Lawrence J. MacDonnell, "Planning for Municipal Water Supplies with a Future Climate Change: The Two Forks Veto as an Analogue," in *Proceedings of the First National Conference on Climate Change and Water Resources Management*, 1992.

Kathleen A. Miller and David L. Fluharty, "Societal Impacts of El Niño and Variability in the Northeast Pacific Salmon Fishery," *Northwest Environmental Journal*, Fall/Winter 1991.

Kathleen A. Miller, book review of *Assessing the Social Implications of Climate Fluctuations: A Guide to Climate Impact Studies*, by W.E. Riebsame. *Climatic Change*, Vol. 16, 147-149, 1990.

Kathleen A. Miller, "Hydropower Generation and CO₂-Induced Climate Change: The Potential for Adjustment through Water Markets," in *Proceedings of the Sixth International Water Resources Association World Congress on Water Resources*, Ottawa, Vol. 2, 450-459, 1988.

PROFESSIONAL PRESENTATIONS

- Aug. 2007 House Select Committee on Energy Independence and Global Warming, NCAR – Committee Staff visit. “ISSE-NCAR Research on Climate Change and Water Resources” (*Invited*).
- June 2007 The Changing Climate Issue: Reporting Ahead of the Curve: A Seminar for Print, Radio and TV Journalists and Editors, Portland Oregon. “Climate Change and Water Resources.” (*Invited*).
- April 2007 House Committee on Energy and Commerce, Washington D.C., Staff Briefing on IPCC Working Group II Report, Sponsored by Pew Center on Global Climate Change. “IPCC WGII Chapter 3: Freshwater Resources and Their Management” (*Invited*).
- April 2007 Rocky Mountain Water Supply Sustainability Workshop, sponsored by MWH, Broomfield, CO. Keynote Talk: “Climate Change and Water Supplies: Understanding the Cloudy Crystal Ball,” (*Invited*).
- March 2006 Wallace Stegner Center Eleventh Annual Symposium, *Global Climate Change: The Arctic to the Rocky Mountain West*, Salt Lake City, Utah. “Climate Change and Water in the West: Complexities, Uncertainties and Strategies for Adaptation” (*Invited*).
- February 2006 Workshop sponsored by Thames Water and American Water, *Climate Change – A Strategic Perspective*, San Francisco, CA. “US Climate Change Research: Scenarios and Planning Tools” (*Invited*).
- October 2005 Workshop Sponsored by the Cities of Seattle, Tacoma and Everett Washington, *Climate Change And Water Resources: A Workshop For Municipal Water Suppliers*, Seattle City Hall, “What is climate change and how do we know what’s happening?” (*Invited*)
- August 2005 World Fish Center and NOAA Fisheries Consultation on *The Impact of Global Climate Change on Aquatic Resources, Food and Income Security of Fishing Dependent Populations*, University of California, San Diego, “Shared Fisheries and Climatic Uncertainties: Why is Cooperation Fragile?” (*Invited*)
- June 2005 Workshop on *Economic Effects of Climate Change on Fisheries*, SNF – Institute for Research in Economics and Business Administration, Bergen, Norway, “Climate Variability and Highly Migratory Fish Stocks: Challenges for Tropical Tuna Management” (*Invited*)
- February 2005 NCAR, Advanced Study Program Seminar, “Climate Variability and Multi-national Marine Fisheries: Will Better Information Promote Sustainability?” (*Invited*).

- December 2004 CLIoTOP Working Group 5 Inaugural Meeting, East-West Center, University of Hawaii, Honolulu, "Climate, Uncertainty and Shared Fish Stocks"
- July 2004 Twelfth Biennial Conference of the International Institute of Fisheries Economics and Trade, Tokyo Japan, "Climate, Competition and the Management of Shared Fish Stocks."
- February 2004 Natural Resource Ecology Laboratory (NREL), Colorado State University, Fort Collins, CO, "Climate, Competition and the Management of Shared Fish Stocks." (*Invited*)
- October 2002 NOAA Office of Global Programs, Human Dimensions of Global Change Research, Principal Investigators Meeting, Seabrook Island, South Carolina, "Climate Variations and the International Management of the North American Pacific Salmon Fishery: A Game Theoretic Perspective." (*Invited*)
- October 2002 Norway-FAO Expert Consultation on the Management of Shared Fish Stocks, Bergen, Norway, "North American Pacific Salmon: A Case of Fragile Cooperation" (*Invited*)
- June 2002 International Conference on Risk and Uncertainty in Environmental and Resource Economics, Wageningen, Netherlands, "A Stochastic Split-Stream Harvesting Model: Insights on Information and the Pacific Salmon War."
- June 2002 Second World Congress of Environmental and Resource Economics, Monterey, CA, "Cooperation and Conflict in the Management of Transboundary Fishery Resources."
- October 2001 Colorado State University Chapter of the American Fisheries Society "The 1999 Pacific Salmon Agreement: A Sustainable Solution to the Management Game?" (*Invited*)
- September 2001 Institute for Behavioral Sciences, University of Colorado, Boulder, "The 1999 Pacific Salmon Agreement: A Sustainable Solution to the Management Game?" (*Invited*)
- October 2000 Joint University of British Columbia, University of Washington Conference, Rethinking the Line: The Canada U.S. Border, Vancouver, B.C. "Climate, Uncertainty and the Pacific Salmon Treaty: Insights on the Harvest Management Game," (*Invited*)
- July 2000 Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade, Corvallis, OR. "Climate, Uncertainty and the Pacific Salmon Treaty: Insights on the Harvest Management Game."

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- February 2000 AAAS Annual Meeting, Washington D.C. "Human Water and Land Uses: Vulnerabilities, Values and Management Options." *(Invited)*
- October 1999 United States - Canada Symposium on North American Climate Change and Weather Extremes, Atlanta, GA "Climate Change, Extremes and Water Resources: Science/Assessment Perspective." *(Invited)*.
- April 1999 NOAA/OGP Symposium on Human Dimensions, Tucson, AZ "Climate and the Pacific Salmon Dispute — Modeling the Implications of Divided Authority." *(Invited)*.
- October 1998 Workshop on Basic Research Needs to Achieve Sustainability: The Carbon Problem, Tucson, AZ "Human and Ecosystem Service Impacts: Water Resources." *(Invited)*.
- September 1998 U.S. National Assessment, Water Resources Workshop, West Palm Beach, FL, "Central Great Plains Water Issues." *(Invited)*.
- September 1998 Northwest Fisheries Association, Seattle, WA, "Climate, Salmon Stocks and the Pacific Salmon Treaty." *(Invited)*.
- July 1998 Workshop on the Art and Science of Model-Building, University of Montana, Missoula, MT, "Context for Modeling the Pacific Salmon Treaty Game." *(Invited)*.
- January 1998 University of Colorado Symposium on El Niño: The Hype and the Reality, Boulder, CO, "An Example of an Environmental and Economic Impact: Pacific Salmon." *(Invited)*.
- November 1997 Western Washington State University, Bellingham WA, "Climate, Salmon Abundance and the Pacific Salmon Treaty." *(Invited)*.
- October 1997 Symposium on Climate Variability, Climate Change and Water Resource Management, Colorado Springs, CO, "Climate Variability, Climate Change and Western Water." *(Invited)*.
- July 1997 ASP Colloquium on El Niño-Southern Oscillation (ENSO): Atmospheric, Oceanic, Societal, Environmental and Policy Perspectives, Boulder, CO, "Climate, Salmon Abundance and the Political Economy of the Pacific Salmon Treaty." *(Invited)*.
- May 1997 Ninth Institute for Natural Resources Law Teachers, Park City, UT, "Global Warming and its Implications for Water Planning." *(Invited)*.
- March 1997 Water Education Foundation 14th Annual Executive Briefing, Sacramento, CA, "Climate Change and Western Water." *(Invited)*.
- November 1996 Western Water Policy Review Commission, San Diego, CA, "Climate

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- August 1996 American Fisheries Society 126th Annual Meeting, Dearborn, MI, "Stock Variability and the Political Economics of the Pacific Salmon Treaty."
- June 1996 European Association of Environmental and Resource Economists 7th Annual Conference, Lisbon, Portugal, "Property and Water: A Historical Analysis."
- May 1996 U.S. Weather Research Program, Prospectus Development Team #6 on Societal and Economic Impacts, Washington D.C., "An Economic Perspective." (*Invited*).
- January 1996 Symposium on Environmental Applications, American Meteorological Society, Atlanta GA, "Economics of the Climate Resource." (*Invited*).
- November 1995 Institute for Behavioral Sciences, University of Colorado, Boulder, "Stock Variability and the Political Economics of the Pacific Salmon Treaty."
- July 1995 Western Economic Association International 70th Annual Conference, San Diego, CA, "Climatic Variations and the Pacific Salmon Fishery."
- April 1995 Economic History Seminar Series, University of Colorado, "Property and Water: a Historical Analysis." (*Invited*).
- February 1995 Planning Workshop on Climate Modeling of the Inter-American Institute for Global Change Research, NCAR, Boulder, "Climate and the Political Economy of the Pacific Salmon Fishery." (*Invited*).
- November 1994 Workshop on the Use and Misuse of El Niño Information in North America, Boulder, "Salmon." (*Invited*).
- October 1994 Institute for Behavioral Sciences, University of Colorado, "Water Banks in the West."
- June 1994 American Water Resources Association Symposium on Effects of Human-Induced Changes on Hydrologic Systems, Jackson Hole, Wyoming, "Climate Change and Water Law: Defining Rights to a Changing Resource."
- June 1993 Western Economic Association, 68th Annual Conference, Lake Tahoe Nevada, "Water Banking: Management of Supply Variability."
- December 1992 UCAR/NCAR Joint Director's Committees Meeting, "US Water Institutions and Adaptation to Climate Change."
- April 1992 International Workshop for Environmental Policy Modeling, Steamboat Springs, Colorado, presentation for panel discussion: "Problems in the Use of Mathematical Modeling in the Policy Process." (*Invited*).
- November 1991 First National Conference on Climate Change and Water Resources

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- Management, Albuquerque, New Mexico: "Property Rights and Groundwater Development in a Changing Climate: A Case Study." *(Invited)*.
- October 1991 Colorado School of Mines, Golden, Colorado, Department of Mineral Economics: "Climate Change and Water Institutions: Evidence from the San Luis Valley." *(Invited)*.
- October 1991 NCAR/USDA Forest Service Workshop on Water Resources and Global Change, presentation for panel discussion: "Research and Policy Implications." *(Invited)*.
- September 1991 Utah State University, Conference on the Future of Western Water: "Climate Change and the Future of Western Irrigated Agriculture." *(Invited)*.
- June 1991 Western Economic Association 66th Annual International Conference, Seattle, Washington: "Transaction Costs of Water Reallocation: The Effects of Climatic Uncertainty."
- July 1990 Western Economic Association 65th Annual International Conference, San Diego: "Climate Change and Western Water Institutions."
- October 1988 Association for Public Policy Analysis and Management, 20th Annual Research Conference, presentation for panel discussion: "Near-term Policy Implications of CO₂-trace Gas-induced Climate Change." *(Invited)*.
- May 1988 Sixth International Water Resources Association World Congress, Ottawa, Ontario: "Hydropower Generation and CO₂-induced Climate Change: The Potential for Adjustment Through Water Markets."
- April 1986 Department of Geography, University of Colorado: "The Right to Use vs. The Right to Sell: Water Rights in the Western United States." *(Invited)*.
- March 1986 Department of Economics, University of Colorado: "Collective Action to Internalize Externalities: The Role of Irrigation Organizations." *(Invited)*.
- January 1986 ASP seminar: "Economic Institutions and Climate: The Economics of Water Rights in the Western United States."
- December 1985 Department of Economics, University of Colorado: "The Right to Use vs. the Right to Sell: Water Rights in the Western United States." *(Invited)*.

OTHER PROFESSIONAL ACTIVITIES

Teaching Activities:

- graduate seminar - ARSC 5020/7020, "Policy Responses to Global Environmental Change," Arts and Sciences Environmental Certificate Program, University of Colorado, 1999; 2000.
- member of dissertation committee for Arlie Huffman, Department of Earth Resources, Colorado State University, 2000.
- mentor for UCAR SOARS program minority intern, Shaan Bliss, 1999.
- upper division course, "Natural Resources Economics," Department of Economics, University of Colorado, Spring 1987.
- member of dissertation committee and sponsor for NCAR Graduate Research Assistant, Lynne Bennett, 1992-1994.
- mentor for summer minority interns 1989, 1991.
- mentor for visiting post-M.A. scholar, Ana Maria Molina, 1991, 1992.
- presentations to university classes, journalists and other groups of visitors to NCAR.

Scientific Service:

Member, Transition Planning Team for GLOBEC and IMBER.

Project Lead/Organizer, NSF-Sponsored Workshop: "The Challenge of Change: Managing for Sustainability of Oceanic Top Predator Species," UC Santa Barbara, April 12-14, 2007.

Co-organizer, AwwaRF-Sponsored Workshop: "Incorporating Climate Change Information in Water Utility Planning: A Collaborative, Decision Analytic Approach," NCAR, Aug. 28-29, 2007.

Member, Scientific Steering Committee for GLOBEC, EUR-OCEANS, FAO sponsored symposium on "Coping with global change in marine social-ecological systems" (*appointment effective 4/07*)

Lead Author, IPCC WGII Fourth Assessment Report, Chapter 3: "Freshwater Resources and their Management." (*appointment effective 3/06*).

Participant, World Fish Center and NOAA Fisheries Consultation on *The Impact of Global Climate Change on Aquatic Resources, Food and Income Security of Fishing Dependent Populations*, University of California, San Diego, October 2005.

Member, Scientific Steering Committee of the GLOBEC-CLIOTOP (Climate Impacts on Oceanic Top Predators) Project (*appointment beginning 3/21/05*)

Organizer and Co-Chair, First meeting of Working Group 5 -- *Socioeconomic Aspects and Management Strategies* of the CLIOTOP (Climate Impacts on Oceanic Top Predators) project under the auspices of IGBP-GLOBEC (International Geosphere-Biosphere Programme - Global Ocean Ecosystem Dynamics), December 1-3 2004, University of Hawaii, Honolulu.

Co-Organizer, Workshop on Climate Change and Water Utilities. NCAR, Boulder, CO. March 15-16 2004.

Co-Organizer, Symposium on the Impacts of Water Variability: Benefits and Challenges, American Meteorological Society 2003 Annual Meeting, 2002-2003.

Member, Expert Panel - Norway-FAO Expert Consultation on the Management of Shared Fish Stocks, 2002

Co-ordinating Lead Author, Chapter 15 - North America, IPCC, Working Group II, Third Assessment Report, 1999-2001.

Member, Water Cycle Study Group, U.S. Global Change Research Program, 2000-2001.

Member, Steering Committee, Southwest Region - U.S. National Assessment, 1998-2000.

Member, NCAR Human Subjects Committee, 2004-present.

Member and Chair: ISSE Visitors Committee, 2004-present.

Member, NCAR Directors Committee, 4/97-8/99.

Member, National Academy of Sciences/National Research Council Panel on the Human Dimensions of Seasonal-to-Interannual Climate Variability, 1997-1999

Member, Oversight Committee, National Research Council Assessment of Future Roles, Challenges and Opportunities for the U.S. Geological Survey, 1998.

Regional Representative, Central Great Plains, U.S. National Assessment Water Resources Workshop, 1998.

Member, Sixth Prospectus Development Team, U.S. Weather Research Program, 1997.

Organizer, *Institute on the Economics of the Climate Resource*, Boulder, CO, 1995.

Organizer and Chair, Sessions/Symposia at Professional meetings of *Western Economic Association*; *American Fisheries Society*.

Member, AAAS Climate and Water Panel, 1987-1989.

Co-owner/moderator, CLIM-ECON e-mail discussion group.

Reviewer, National Research Council Report – *Managing the Columbia River: Instream Flows, Water Withdrawals, and Salmon Survival*, 2004.

Referee, journal articles – AIRG Science Series, *Bulletin of the American Meteorological Society*, *Canadian Geographer*, *Climatic Change*, *Climate Research*, *Coastal Management*, *Contemporary Economic Policy*, *The Geographical Review*, *Journal of the American Water Resources Association*, *Journal of Environment and Development*, *Journal of Environmental Economics and Management*, *Journal of Water Resources Planning and Management*, *Mitigation and Adaptation Strategies for Global Change*, *Northwest Environmental Journal*, and *Water Resources Research*, 1986-present.

Reviewer, proposals – National Science Foundation; Alaska Sea Grant Program; NOAA Office of Global Programs; Arizona Water Resources Research Program; National Institute for Global Environmental Change; Social Sciences and Humanities Research Council of Canada.

Referee, proceedings papers - *Proceedings, 5th Scientific Assembly of the International Association of Hydrological Sciences*, 1996.

Member, Review Panel - NOAA Federal/State Cooperative Program in Atmospheric Modification Research (AMP), October 1991.

Member, NCAR Council on Family and Work, 1990 - 1995.

Deputy Head, Environmental and Societal Impacts Group, 7/89 - 7/92.

GRANTS/CONTRACTS

- 2006- American Water Works Association Research Foundation, "Incorporating climate change information in water utility planning: A collaborative, decision analytic approach," with David Yates, Research Applications Program, NCAR.
- 2005- National Science Foundation, "Workshop on Climate, Uncertainty, and Multilateral Management of Harvested Highly-Migratory Marine Fish Stocks," with Peter Jacques, Robert McKelvey, and Gail Osherenko
- 2003- National Science Foundation, "Collaborative Research: Sustaining Cooperative Multinational Management of Marine Fisheries in the Face of Environmental Variability," with Robert McKelvey (*Emeritus*, University of Montana).
- 2003-06 American Water Works Association Research Foundation, "Workshop on the Impacts of Global Climate Change on Water Utilities," with David Yates, Research Applications Program, NCAR.
- 1998-03 NOAA Office of Global Programs, "Climatic Variations and the International Management of the North American Pacific Salmon Fishery: A Game Theoretic Perspective," with Robert McKelvey (*Emeritus*, University of Montana) and Gordon R. Munro (University of British Columbia).
- 1997-98 NAFTA Commission for Environmental Cooperation, "Climate Variability and Transboundary Freshwater Resources in North America," with Linda O. Mearns.
- 1996-97 Western Water Policy Review Advisory Commission, "Climate Change Climate Variability and Western Water."
- 1994-95 NOAA Office of Global Programs, "Institute on the Economics of the Climate Resource."
- 1992-94 U.S. Geological Survey, "Using Water Banks to Promote more Flexible Water Use," in conjunction with Lawrence J. MacDonnell, Charles Howe, Sarah Bates, and Teresa Rice (University of Colorado).
- 1981-84 Sloan Foundation Grant, doctoral dissertation research.

RESEARCH INTERESTS

Climate-society interactions
Natural resource economics
Economics of uncertainty and climatic variability
Climate resources and economic growth and development
American and European economic history
Property rights and contractual choice theory.