

# Geographical and Sustainability Sciences

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## Silvia Secchi

*Professor*

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### Education:

PhD, Iowa State University

### Office:

310 Jessup Hall

### Phone:

319-335-1927

### Office Hours:

Monday - Wednesday 8:30 - 9:30 AM in person

Friday 1:30 – 3:30 PM via Zoom

### Research Interests:

Environmental impacts of agriculture, Water sustainability. Floodplain policy, Conservation policy, Adaptation and mitigation to climate change, Land use science, Integrated modeling

### Academic experience:

2017-current	University of Iowa	Iowa City, IA
Associate Professor	Department of Geographical and Sustainability Sciences	Public Policy Center
2014-2017	Southern Illinois University	Carbondale, IL
Associate Professor	Department of Geography and Environmental Resources	
2008-2014	Southern Illinois University	Carbondale, IL
Assistant Professor	Department of Agribusiness Economics	



2004-2008 Associate Scientist	Iowa State University Center for Agricultural and Rural Development	Ames, IA, USA
2001-2004 Assistant Scientist	Iowa State University Center for Agricultural and Rural Development	Ames, IA, USA
1996 – 2000 Research Assistant	Iowa State University Center for Agricultural and Rural Development	Ames, IA, USA
1995 - 1996 Research Associate	University of Reading Centre for Agricultural Strategy	Reading, England

**Google Scholar:** <https://scholar.google.com/citations?user=rXte6MIAAAAJ&hl=en&oi=ao>

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Broadly speaking, I am interested in the nexus between humans and the environment, the tools and methodologies we use to understand it, the policies we adopt to change it, and the pedagogy of teaching it.

Specifically, most of my work focuses on the Mississippi River Basin – I have done research on land based energy production, water quality, adaptation to climate change, floodplain management, invasive species and farmers’ attitudes in the watershed. I believe in place-based education. Studying multiple aspects of the complex relationship between humans and the Great River has given me a very rich lens through which to learn, research and teach a system approach to address environmental problems.

I am trained as a natural resource economist, and I identify as an economist, a geographer and a transdisciplinary scholar. My research typically involves many collaborators from other disciplines, and it integrates economic, geographical, and environmental models.

**Courses:**

Contemporary Environmental Issues  
Environmental Economics and Policy  
Geography, People and the Environment

## Environmental Decision Making

### Interdisciplinary Approaches to Environmental Issues

#### **Graduate Advisees:**

Shanna McClain (with C. Bruch) – Ph.D. in Environmental Resources & Policy, SIUC (IGERT fellow), 2016. AAAS fellow

Mukesh Bhattarai – Ph.D. in Environmental Resources & Policy, SIUC, 2016. Independent consultant

Awoke Teshager (with J. Schoof) – Ph.D. in Environmental Resources & Policy, SIUC, 2016 Postdoctoral Research fellow at the Graham Sustainability Institute, University of Michigan

Tom Shaw – Ph.D. in Environmental Resources & Policy, SIUC, 2015, Director of Environmental Services at Big Rivers Electric Corporation

Sarah Varble – Ph.D. in Environmental Resources & Policy, SIUC, 2014. New Products Manager, Fall Creek Farm & Nursery, Inc.

#### **Grants & Funding:**

USDA NIFA – Costs of continuous conservation tillage: estimation with incomplete data (with L. Kurkalova, T. Wade and R. Claassen), 2016-2018, \$499,995.

Argonne National Lab (DoE funds) – Landscape by Design – Valuation of Ecosystem Services, 2015-2017, \$49,736.

National Science Foundation - DYN COUPLED NATURAL-HUMAN. People, Water, and Climate: Adaptation and Resilience in Agricultural Watersheds (with D. Bennett, N. Basu, M. Muste, W. Gutowski) 2011-2017, \$1,011,832.

Illinois DNR – Training, Certification, Pilot Incentive, Marketing, And Removal Research Project for the long-term strategy in reducing and controlling Asian Carp populations (with J. Garvey), 2011, \$1,500,000.

National Science Foundation - DYN COUPLED NATURAL-HUMAN. Climate Change, Hydrology, and Landscapes of America's Heartland: A Multi-scale Natural-Human System (With C. Lant, S. Kraft, G. Misma, J. Nicklow, and J. Schoof) 2010-2014, \$1,430,000.

USDA CSREES AFRI Agribusiness Markets and Trade. An Analysis of the Impact of Biofuel Expansion through Linking of Agricultural and Energy Markets (With A. Elobeid and L. Kurkalova) 2010-2014, \$360,396.

The Nature Conservancy. Floodplain Restoration Strategies Integrating Biomass plantings and Ecosystem Service Payments (With S. Kraft) 2009-2013, \$112,536.

National Science Foundation Cyber-Enabled Discovery and Innovation Type II. Understanding Water-Human Dynamics with Intelligent Digital Watersheds. (with J. Schnoor, M. Muste, A. Kusiak and D. Bennett). 2009-2012, \$899,391.

EPA, Region 7. Biofuel Feedstock Landscape Coverage for Five Biofuel Industry Scenarios (with R. Cruse, A. Elobeid and S. Tokgoz) 2008-2010, \$150,000.

Department of Energy-USDA. Expansion of ethanol production: evaluation of costs and benefits to rural communities in the Upper Mississippi River Basin. (with L. Kurkalova, C.L. Kling, P.W. Gassman, M. Jha, A. Carriquiry and D. Otto) 2006-2009, \$676,722.

USDA Natural Resources Conservation Service. Environmental Credit Trading Handbook. 2006-2007 (with C.L. Kling), \$84,150.

Prairie Rivers of Iowa R.C. & D and USDA Natural Resources Conservation Service. Rapid Watershed Assessment for the Boone River, the Upper Iowa and the South Skunk Watersheds (with T. Isenhardt, C.L. Kling, P.W. Gassman and M. Tomer) 2006-2007, \$72,500.

NASA and USDA Cooperative State Research, Education, and Extension Service. Interactive Drivers of Land Use/Land Cover Change in Agricultural Areas: Climate and Land Manager Choices. (with C.L. Kling, H. Feng, P.W. Gassman, and E. Tackle) 2006-2008, \$465,900.

Iowa Farm Bureau, Leopold Center for Sustainable Development, Iowa Soybean Association, Iowa Corn Growers Association. Assessment of Conservation Practices on Agricultural Cropland in Iowa (with C.L. Kling, H. Feng, P. Gassman, and M. Jha) 2006, \$72,500.

USDA CSREES Integrated Projects. Water Resource Degradation in the Boone Watershed: Integrating Stakeholder Knowledge and Preferences

with Economic and Watershed Models (with C.L. Kling, M. Duffy, L. Kurkalova, H. Feng, P.W. Gassman, and J. Cooper) 2005-2008, \$590,000.

Prairie Rivers of Iowa R.C. & D and Leopold Center for Sustainable Development. Boone River Watershed and Gordon's Marsh Project (with C.L. Kling, and P.W. Gassman) 2005-2006, \$35,000.

Iowa State Water Resources Research Institute. Improving Water Quality in Iowa Rivers: Cost-Benefit Analysis of Adopting New Conservation Practices and Changing Agricultural Land Use (with C.L. Kling, H. Feng, P.W. Gassman, and L. Kurkalova) 2005-2006, \$39,600

National Science Foundation. Biocomplexity of Integrated Perennial-Annual Agroecosystems (Senior Personnel. Principal Investigators: H. Asbjornsen, R. M. Cruse, C.L. Kling, M. Z. Liebman, J. D. Opsomer) 2005-2007, \$ 99,998.

Iowa Department of Natural Resources. Costs of Adopting Conservation Practices on Agricultural Cropland in Iowa and Possible Nutrient Standards (with C.L. Kling, H. Feng, P. Gassman, and L. Kurkalova) 2004, \$53,360.

**Selected Publications:**

(Asterisks denote graduate students advisees)

Teshager, A. D.\*, Gassman, P. W., Secchi, S., & Schoof, J. T. (2017). Simulation of targeted pollutant-mitigation-strategies to reduce nitrate and sediment hotspots in agricultural watershed. *Science of The Total Environment*, 607(Supplement C), 1188-1200. doi:<https://doi.org/10.1016/j.scitotenv.2017.07.048>

Bhattarai, M.D.\*, Secchi, S., & Schoof, J. (2017). Projecting corn and soybeans yields under climate change in a Corn Belt watershed. *Agricultural Systems*, 152, 90-99. doi: <http://dx.doi.org/10.1016/j.agsy.2016.12.013> .

Bhattarai, M.D.\*, Secchi, S., & Schoof, J. (2017). An Analysis of the Climate Change Mitigation Potential through Soil Organic Carbon Sequestration in a Corn Belt Watershed. *Environmental Management*, 59(1), 77-86. doi: 10.1007/s00267-016-0771-6.

Trlica, A., Walia, M. K., Krausz, R., Secchi, S., & Cook, R. L. (2016). Continuous Corn and Corn–Soybean Profits over a 45-Year Tillage and Fertilizer Experiment. *Agronomy Journal*. doi: 10.2134/agronj2016.06.0377.

Guida, R.J.\*, Remo, J.W.F., & Secchi, S. (2016). Tradeoffs of strategically reconnecting rivers to their floodplains: The case of the Lower Illinois River (USA). *Science of the Total Environment*, 572, 43-55. doi: <http://dx.doi.org/10.1016/j.scitotenv.2016.07.190>.

McClain, S.N.\*, Bruch, C., & Secchi, S. (2016). Adaptation in the Tisza: innovation and tribulation at the sub-basin level. *Water International*, 41(6), 813-834. doi: 10.1080/02508060.2016.1214774

Guida, R.J.\*, Remo, J.W.F., & Secchi, S. (2016). Applying geospatial tools to assess the agricultural value of Lower Illinois River floodplain levee districts. *Applied Geography*, 74, 123-135. doi: <http://dx.doi.org/10.1016/j.apgeog.2016.07.002> .

Teshager, A.D.\*, Gassman, P.W., Schoof, J.T., & Secchi, S. (2016). Assessment of impacts of agricultural and climate change scenarios on watershed water quantity and quality, and crop production. *Hydrology and Earth System Sciences*, 20(8), 3325-3342. doi: 10.5194/hess-20-3325-2016.

Remo, J.W.F., Guida, R.J.\*, & Secchi, S. (2016). Screening the Suitability of Levee Protected Areas for Strategic Floodplain Reconnection Along the LaGrange Segment of the Illinois River, USA. *River Research and Applications*. doi: 10.1002/rra.3055.

Wade, T., Kurkalova, L., & Secchi, S. (2016). Modeling Field-Level Conservation Tillage Adoption with Aggregate Choice Data. *Journal of Agricultural and Resource Economics*, 41(2), 266–285.

Teshager, A.D.\*, Gassman, P.W., Secchi, S., Schoof, J.T., & Misgna, G. (2016). Modeling Agricultural Watersheds with the Soil and Water Assessment Tool (SWAT): Calibration and Validation with a Novel Procedure for Spatially Explicit HRUs. *Environmental Management*, 57(4), 894-911. doi: 10.1007/s00267-015-0636-4 .

Varble, S.\*, Secchi, S., & Druschke, C.G. (2016). An Examination of Growing Trends in Land Tenure and Conservation Practice Adoption:

Results from a Farmer Survey in Iowa. *Environmental Management*, 57(2), 318-330. doi: 10.1007/s00267-015-0619-5.

Cooke S.L., A.C. Lloyd\*, A.D. Montebianco and S. Secchi. 2015. Moving to higher ground: Ecosystems, Economics and Equity in the Floodplain. National Center for Case Study Teaching in Science. URL: [http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case\\_id=778&id=778](http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=778&id=778)

Ding, D., Bennett, D., & Secchi, S. (2015). Investigating impacts of alternative crop market scenarios on land use change with an agent-based model. *Land*, 4(4), 1110-1137.

Dodder, R.S., Kaplan, P.O., Elobeid, A., Tokgoz, S., Secchi, S., & Kurkalova, L.A. (2015). Impact of energy prices and cellulosic biomass supply on agriculture, energy, and the environment: An integrated modeling approach. *Energy Economics*, 51, 77-87. doi: <http://dx.doi.org/10.1016/j.eneco.2015.06.008>.

Smith, S., Varble, S.\*, & Secchi, S. (2015). Fish Consumers: Environmental Attitudes and Purchasing Behavior. *Journal of Food Products Marketing*, 1-17. doi: 10.1080/10454446.2014.940114.

Liu, C.-C., Herriges, J.A., Kling, C.L., Secchi, S., Nassauer, J.I., & Phaneuf, D.J. (2014). A Comparison of Value Elicitation Question Formats in Multiple-Good Contingent Valuation. *Frontiers of Economics in China*, 9(1), 85-108. doi: <http://dx.doi.org/10.3868/s060-003-014-0006-2>.

Druschke, C.G.\*, & Secchi, S. (2014). The impact of gender on agricultural conservation knowledge and attitudes in an Iowa watershed. *Journal of Soil and Water Conservation*, 69(2), 95-106. doi: 10.2489/jswc.69.2.95.

Secchi S. (2013). Integrated Modeling for Conservation Policy Support. *Choices*, 28(3), 1-5.

Banerjee, S., Secchi, S., Fargione, J., Polasky, S., & Kraft, S.E. (2013). How to sell ecosystem services: a guide for designing new markets. *Frontiers in Ecology and the Environment*, 11(6), 297-304. doi: 10.1890/120044.

Elobeid, A., Tokgoz, S., Dodder, R., Johnson, T., Kaplan, O., Kurkalova, L., & Secchi, S. (2013). Integration of agricultural and energy system models

for biofuel assessment. *Environmental Modelling & Software*, 48, 1-16. doi: <http://dx.doi.org/10.1016/j.envsoft.2013.05.007>

Varble, S.\*, & Secchi, S. (2013). Human consumption as an invasive species management strategy. A preliminary assessment of the marketing potential of invasive Asian carp in the US. *Appetite*, 65, 58-67. doi: <http://dx.doi.org/10.1016/j.appet.2013.01.022>.

Muste, M., Bennett, D., Secchi, S., Schnoor, J., Kusiak, A., Arnold, N., . . . Rapolu, U. (2013). End-To-End Cyberinfrastructure for Decision-Making Support in Watershed Management. *Journal of Water Resources Planning and Management*, 139(5). doi: doi:10.1061/(ASCE)WR.1943-5452.0000289.

Secchi, S., Garvey, J., & Whiles, M. (2012). Multifunctional Floodplain Management: Looking Ahead From the 2011 Mississippi Floods. *National Wetlands Newsletter*, 34(5), 21-24.

Secchi, S., Gassman, P. W., Jha, M., Kurkalova, L., & Kling, C. L. (2011). Potential water quality changes due to corn expansion in the Upper Mississippi River Basin. *Ecological Applications*, 21(4), 1068-1084. doi: 10.1890/09-0619.1.

Kling, K.L., S. Secchi, and M. Peters. 2011. NRCS Environmental Credit Trading Reference. Washington D.C. U.S. Department of Agriculture. URL: [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1045650.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1045650.pdf)

Secchi, S., Kurkalova, L., Gassman, P. W., & Hart, C. (2011). Land use change in a biofuels hotspot: The case of Iowa, USA. *Biomass and Bioenergy*, 35(6), 2391-2400.

Nassauer, J. I., Dowdell, J. A., Wang, Z., McKahn, D., Chilcott, B., Kling, C. L., & Secchi, S. (2011). Iowa farmers' responses to transformative scenarios for Corn Belt agriculture. *Journal of Soil and Water Conservation*, 66(1), 18A-24A. doi: 10.2489/jswc.66.1.18A

Secchi S. and S. Soman. 2010. Mandatory and Voluntary Conservation Policies: Competing Visions or Complementary Approaches? In: Human Dimensions of Soil and Water Conservation: A Global Perspective. (T. Napier, ed.) Nova Science Publishers. [peer reviewed]



Rabotyagov, S., Campbell, T., Jha, M., Gassman, P. W., Arnold, J., Kurkalova, L., . . . Kling, C. L. (2009). Least-cost control of agricultural nutrient contributions to the Gulf of Mexico hypoxic zone. *Ecological Applications*, 20(6), 1542-1555. doi: 10.1890/08-0680.1.

Opperman, J. J., Galloway, G. E., Fargione, J., Mount, J. F., Richter, B. D., & Secchi, S. (2009). Sustainable floodplains through large-scale reconnection to rivers. *Science*, 326(5959), 1487-1488. doi: 10.1126/science.1178256.

Secchi, S., Gassman, P. W., Williams, J. R., & Babcock, B. A. (2009). Corn-based ethanol production and environmental quality: A case of Iowa and the Conservation Reserve Program. *Environmental Management*, 44(4), 732-744.

Kurkalova L., S. Secchi, and P. W. Gassman. 2009. Corn Stover Harvesting: Potential Supply and Water Quality Implications. In: Handbook of Bioenergy Economics and Policy (M. Khanna, J. Scheffran, and D. Zilberman, eds.) Springer. [peer reviewed]

Secchi, S., Tyndall, J., Schulte, L. A., & Asbjornsen, H. (2008). High crop prices and conservation - Raising the stakes. *Journal of Soil and Water Conservation*, 63(3), 68A-73A. [2009 Editor's Choice Award]

Schulte, L.A., H. Asbjornsen, R. Atwell, C. Hart, M. Helmers, T. Isenhardt, R. Kolka, M. Liebman, J. Neal, M. O'Neal, R. Schultz, S. Secchi, J. Thompson, M. Tomer, and J. Tyndall. 2008. Targeted Conservation Approaches for Improving Water Quality: Multiple Benefits for Expanded Opportunities. PMR 1002. Iowa State University Extension, Ames, IA.

Secchi, S., Jha, M., Kurkalova, L., Feng, H. H., Gassman, P. W., & Kling, C. L. (2007). Privatizing ecosystem services: Water quality effects from a carbon market. *Choices*, 22(2), 97-102.

Secchi, S., Gassman, P. W., Jha, M., Kurkalova, L., Feng, H. H., Campbell, T., & Kling, C. L. (2007). The cost of cleaner water: Assessing agricultural pollution reduction at the watershed scale. *Journal of Soil and Water Conservation*, 62(1), 10-21.

Feng H. H., C. Kling L. Kurkalova, and S. Secchi. 2007. Subsidies! The Other Incentive-Based Instrument: the Case of the Conservation Reserve Program. In: Moving to Markets in Environmental Regulation: Lessons

from Twenty Years of Experience ( J. Freeman and C. Kolstad, eds.)  
Oxford University Press, New York. [peer reviewed]

Gassman P.W., S. Secchi, M. Jha and L.A. Kurkalova. 2006. Upper Mississippi River Basin modeling system part 1: SWAT Input data requirement and Issues. In: Coastal Hydrology and Processes (V.P. Singh and Y.J. Xu eds.) Water Resources Publications, Highland Ranch, CO.

Jha M., P.W. Gassman, S. Secchi, and J. Arnold. 2006. Upper Mississippi River Basin modeling system part 2: Baseline Simulation Results In: Coastal Hydrology and Processes (V.P. Singh and Y.J. Xu eds.) Water Resources Publications, Highland Ranch, CO.

Kling C.L., S. Secchi, M. Jha, H. Feng, P.W. Gassman, and L.A. Kurkalova. 2006. Upper Mississippi River Basin modeling system part 3: Conservation practice scenario results. In: Coastal Hydrology and Processes (V.P. Singh and Y.J. Xu eds.) Water Resources Publications, Highland Ranch, CO.

Secchi S., T. M. Hurley, B. Babcock and R. L. Hellmich. 2006. Managing European Corn Borer Resistance to Bt Corn with Dynamic Refuges. In: Regulating Agricultural Biotechnology: Economics and Policy (R. Just, J. Alston, and D. Zilberman eds.) Springer.

Herriges, J. A., Secchi, S., & Babcock, B. A. (2005). Living with hogs in Iowa: The impact of livestock facilities on rural residential property values. *Land Economics*, 81(4), 530-545.

Jha, M., Gassman, P. W., Secchi, S., Gu, R., & Arnold, J. (2004). Effect of watershed subdivision on SWAT flow, sediment, and nutrient predictions. *JAWRA Journal of the American Water Resources Association*, 40(3), 811-825. doi: 10.1111/j.1752-1688.2004.tb04460.x

Secchi S., B. A. Babcock. 2003. Pest Mobility, Market Share, and the Efficacy of Using Refuge Requirements for Resistance Management. In: Battling Resistance to Antibiotics and Pesticides: An Economic Approach (R. Laxminarayan, ed.), Resources for the Future, Washington DC. [peer reviewed]

Hurley, T., Secchi, S., Babcock, B., & Hellmich, R. (2002). Managing the risk Of European Corn Borer resistance to Bt corn. *Environmental and Resource Economics*, 22(4), 537-558. doi: 10.1023/a:1019858732103.