

## Courtney R. Hammond Wagner

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### EDUCATION & TRAINING

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<b>Postdoctoral Scholar, Woods Institute for the Environment, Stanford University</b>	2019 – Present
<b>Ph.D., Natural Resources, University of Vermont</b>	2014 – 2019
<b>Ecological Economics Graduate Certificate, University of Vermont</b>	2014 – 2019
<b>BA, Psychology (<i>Magna cum laude</i>, <i>Phi Beta Kappa</i>), Dartmouth College</b>	2007 – 2011

### RESEARCH EXPERIENCE

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**Mandating climate-informed planning: a path to robust decision making?** 2019 – Present

- Analysis of groundwater sustainability plans to examine factors that enable integration of climate change in groundwater sustainability plans (*on-going*)

**Role of groundwater recharge credits in achieving groundwater sustainability** 2019 – Present

- Agent-based modeling approach, integrating individual decision rules, community dynamics and groundwater model to identify conditions under which recharge credits facilitate sustainable management. (*on-going*)

**Governing Water Quality in Agricultural Watersheds (Dissertation)** 2014 – 2019  
 Advisors: William ‘Breck’ Bowden and Asim Zia

- Multi-level statistical modeling of New Zealand national farmer survey to examine adoption of nutrient management behaviors under different types of water quality regulation
- Network analysis of qualitative interview data to compare farmer behavior and outcomes in three case study water quality regulations in Vermont, USA and New Zealand

**Identifying nitrogen hotspots in the US to improve nitrogen management** 2014 – 2019  
 PIs: Meredith Niles and Eric Roy, Gund Institute for Environment Catalyst Award.

- Built database of social, economic and ecological data to analyze county-level nitrogen-use efficiency to identify opportunities to improve nitrogen management

**Farmer Perceptions and the Balance of Groundwater and Economic Sustainability** 2016 – 2019  
 PIs: Charles Young and Meredith Niles, USDA Water for Agriculture grant

- Analyzed farmer perceptions and behavior regarding sustainable groundwater management with regression modeling and cluster analysis

**Modelling adaptation and vulnerability to climate risks from the “ground-up”** 2016 – 2017

- Member of SESYNC Graduate Research pursuit to study smallholder agriculturalists adaptation in India
- Structural equation modeling and agent based modeling of household survey data

### PEER REVIEWED ARTICLES

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11) **Hammond Wagner, C.**, Greenhalgh, S., Niles, M. T., Zia, A. and Bowden, W. B. (2020). A social-ecological systems approach to understanding farmer nutrient management behavior under water quality regulation. Accepted at *Ecology & Society*.

10) **Hammond Wagner, C.** and Niles, M. T. (2020). What is fair in groundwater allocation? Distributive and procedural fairness perceptions of California’s Sustainable Groundwater Management Act. *Society & Natural Resources*, DOI: 10.1080/08941920.2020.1752339.

- 9) **Hammond Wagner, C.** (2019). Strengthening the institution-behavior link in the SES Framework to facilitate comparative analysis of environmental public goods dilemmas. *Complexity, Governance & Networks*, 5(1), 5-23.
- 8) **Hammond Wagner, C.**, Niles, M. T., and Roy, E. D. (2019). US county-level agricultural crop production typology. *BMC Research Notes*, 12 (1).
- 7) **Hammond Wagner, C.** (2019). US Fresh Water Law & Governance in the Anthropocene: A Critique of the Riparian Rights Legal Framework as a Basis for Water Governance in Vermont. *Vermont Law Review*, 43, 549
- 6) Niles, M. T., & **Hammond Wagner, C.** (2019). The carrot or the stick? Drivers of California farmer support for varying groundwater management policies. *Environmental Research Communications*, 1(4), 045001.
- 5) Shah, S., **Hammond Wagner, C.**, Sanga, U., Park, H., Demange, L.H.M.L., Gueiros, C. and Niles, M.T. (2019). Do household capitals mediate agricultural adaptation to hydro-climatic change? Evidence from the Indo-Gangetic Plains (India). *Frontiers in Sustainable Foods Systems* 3, 1.
- 4) Niles, M and **Hammond Wagner, C.** (2017). Farmers share their perspectives on California water management and the Sustainable Groundwater Management Act. *California Agriculture*. <https://doi.org/10.3733/ca.2017a0040>.
- 3) Byerly, H., Balmford, A., Ferraro, P.J., **Hammond Wagner, C.**, Palchack, E., Polasky, S., Ricketts, T.H., Schwartz, A., and Fisher, B. (2017). Evidence and opportunities for nudging pro-environmental behavior. *Frontiers in Ecology and the Environment*, 16(3), 159-168.
- 2) **Hammond Wagner, C.**, Cox, M., and Bazo Robles, J. L. (2016) Pesticide lock-in in Peruvian small scale agriculture. *Ecological Economics*, 129, 72-81.
- 1) Zia, A. and **Hammond Wagner, C.** (2015). Mainstreaming early warning systems in development and planning processes: Multi-level implementation of Sendai framework in Indus and Sahel. *International Journal of Disaster Risk Science*, 6(2), 189-199.

## ARTICLES IN REVIEW & PREPARATION

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- 4) Santana, Francisca N., **Hammond Wagner, C.**, Berlin, N., Bloomfield, L. S. P., Bower, E. R., Fischer, S. L., Santos, B. S., Smith, G., Muraida, C. T., and Wong-Parodi, G. (2020). A path forward for qualitative research on sustainability in the COVID-19 pandemic. In review at *Sustainability Science*.
- 3) Roy, E., **Hammond Wagner, C.**, and Niles, M. (2020). Nitrogen hotspots and contributing factors in US agriculture. In review at *Proceedings of the National Academies of Sciences of the United States*.
- 2) **Hammond Wagner, C.**, Zia, A. Greenhalgh, S., Stahlmann-Brown, P., and Niles, M. T. (2020). From watershed limits to farm-scale decisions: The impact of mandatory water quality policy on farm management behavior and decision making. *In preparation*.
- 1) Sanga, U., Park, H., Shah, S., **Hammond Wagner, C.**, and Ligmann-Zielinska, A. (2020). How do farmers adapt to climate change? Evaluating alternative decision-making processes of farmers in northern Indian using an empirical agent-based model. *In preparation*.

## FELLOWSHIPS, GRANTS, AWARDS (career total \$103,115)

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Vermont Water Resources and Lake Studies Center and USGS National Institutes Water Resources Graduate Research Grant (\$6,615)	2018
SESYNC Graduate Research Fellow (\$2,000)	2016 – 2017
National Science Foundation East Asian Pacific Summer Institute (EAPSI) Fellowship for Summer Research in New Zealand (\$5,000)	2016
University of Vermont Thomas J. Votta Scholarship for Environmental Best Practices (\$4,000)	2016
Canadian Social Sciences and Humanities Research Council Economics for the Anthropocene Graduate Research Fellowship (\$82,500)	2014 – 2017

Dartmouth Stefansson Fellowship to fund internship in Barrow, Alaska (\$3,000)	2011
NCAA Woman of the Year Honoree (service, athletic success and academic excellence)	2011
Dean's Plate Award for contributions to the Dartmouth Community	2011

## CONFERENCE PRESENTATIONS (\*Indicates presenter)

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- 12) **Hammond Wagner, C.\***, He, X., Moran, T., and, Bryant, B. (2019). Integrating climate change into groundwater planning: Assessment of draft Groundwater Sustainability Plans under the Sustainable Groundwater Management Act. American Geophysical Union Fall Meeting. San Francisco, California. 12/09/2019
- 11) He, X.\*, Moran, T., Wei, Z., Bryant, B., **Hammond Wagner, C.**, Mach, K., and Freyberg, D.L. (2019). Quantifying changing characteristics of water available for groundwater recharge under climate change. American Geophysical Union Fall Meeting. San Francisco, California. 12/09/2019
- 10) **Hammond Wagner, C.\*** (2019). Strengthening the institution-behavior link in the SES framework to analyze agricultural water quality management. Paper presented at WOW6: Workshop on the Ostrom Workshop, Indiana University Bloomington, Indiana. 06/20/19.
- 9) **Hammond Wagner, C.\***, Shah, S. H., Sanga, U., Park, H., Demange, L.H.M.L., Gueiros, C. and Niles, M. (2018). Do household capitals mediate agricultural adaptation to hydro-climatic change? A SESYNC graduate pursuit study with evidence form the Indo-Gangetic Plains (India). Paper presented at the Boundary Spanning: Advances in Socio-Environmental Systems Research Symposium at the National Socio-Environmental Synthesis Center, Annapolis, Maryland. 06/13/2018.
- 8) **Hammond Wagner, C.\*** (2018). Vermont water quality policy and farmer decision making. Paper presented at the University of Vermont Student Research Conference, Burlington, Vermont. 04/19/2018.
- 7) Park, H.\*, Sanga, U.\*, Gueiros, C., Shah, S., **Hammond Wagner, C.**, and L.H.M.L. Demange (2018). Causes and behavior for farmers' adaptation in agrarian settings: evidence from Indo-Gangetic Plains of India. Paper presented at the American Association of Geographers Annual Meeting, New Orleans, Louisiana. 04/12/2018.
- 6) **Hammond Wagner, C.\*** (2017). Water quality policy and farmer decision making. Paper presented at the United States Society for Ecological Economics, St. Paul, Minnesota. 06/26/2017.
- 5) **Hammond Wagner, C.\*** (2017). Foundations of Ecological Economics: Governance and Institutions. Paper presented at the United States Society for Ecological Economics, St. Paul, Minnesota. 06/25/2017.
- 4) Shah, S.\*, **Hammond Wagner, C.\***, Demange, L.H.M.L., Park, H., Sanga, U., and C. Gueiros (2017). Modelling adaptation to socio-environmental change from the "ground-up": A case of smallholder agriculturalists in northern India. Paper presented at the American Association of Geographers Annual Meeting, Boston, Massachusetts. 04/08/2017.
- 3) **Hammond Wagner, C.\*** (2015). US fresh water law and governance in the Anthropocene: A critique of the Riparian Rights legal framework as a basis for water governance in Vermont. Paper presented at the Canadian and United States Societies for Ecological Economics, Vancouver, BC, Canada. 10/03/2015.
- 2) Fox, M. J.\*, Spencer, P.\* and **Hammond Wagner, C.\***. Envisioning Theories of Change in Ecological Economics: Early Career Workshop and Networking. Facilitated workshop at the Canadian and United States Societies for Ecological Economics, Vancouver, BC, Canada. 10/02/2015.
- 1) Brown, C.\*, Zia, A., and C. **Hammond Wagner\*** (2014). Environmental diplomacy & community-based efforts to enhance resilience of the Lake Champlain Basin Ecosystem. Paper presented at the Borders in Globalization Conference, Carleton University and the University of Ottawa, Ottawa, Canada. 09/27/2014.

## REPORTS

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3) **Hammond Wagner, C.**, Gourevitch, J., Horner, K., et al. 2019. "Payment for Ecosystem Services for Vermont." Issue Paper 19-01. Burlington, VT: Gund Institute for Environment.

2) Kaine, G., Kirk, N., Kalaugher, E., Hyslop, J., and **C. Hammond Wagner** (2018). Exploring the role of values and place in perceptions of natural resource policy – Taupō, Waikato and the Selwyn Waihora. A report to AgResearch as a part of the Making SENZS project for the New Zealand Ministry of Business, Innovation and Employment.

1) Kalaugher, E., Kaine, G., Hyslop, J., Kirk, N., **Hammond Wagner, C.** and G. Harmsworth (2017). Exploring the role of values and place in perceptions of natural resource policy: the case of Lake Taupō. A report to AgResearch as a part of the Making SENZS project for the New Zealand Ministry of Business, Innovation and Employment.

## INVITED TALKS

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- **Hammond Wagner, C.** "Water policy design: A socio-behavioral approach for more effective outcomes." *Bill Lane Center for the American West Working Group*, Stanford University, Stanford, CA. 03/06/2020.
- **Hammond Wagner, C.** "Rules and Incentives for Water Governance." *Center for Environmental Policy and Behavior*, University of California, Davis, Davis, CA. 10/31/2019.
- Gourevitch, J., Kinnebrew, E., Recchia, E., Wiegman, A., White, A. & **Hammond Wagner, C.** "Payment for Ecosystem Services Proposal for Vermont." *Lake Champlain Basin Program Steering Committee*, Essex, Vermont. 06/06/2019.
- Kinnebrew, E., White, A., Ricketts, T. & **Hammond Wagner, C.** "Payment for Ecosystem Services Proposal for Vermont." *Vermont Agriculture and Water Quality Working Group*, Burlington, VT. 05/16/2019.
- Gourevitch, J., Horner, K., Kinnebrew, E., Maden, B., Recchia, E., Wiegman, A., White, A., Ricketts, T., Roy, E., & **Hammond Wagner, C.** "Payment for Ecosystem Services Proposal for Vermont." *Gund Institute's graduate student seminar*, University of Vermont, Burlington, VT. 05/02/2019.
- **Hammond Wagner, C.** and S. Greenhalgh. "New Zealand Water Quality Policy Insights for Vermont." *Vermont Dairy and Water Collaborative*. Burlington, Vermont. 09/25/2018.
- **Hammond Wagner, C.** "New Zealand Water Quality Policy Insights for Vermont." *Conservation Law Foundation*. Montpelier, VT. 08/16/2018.

## SCIENCE COMMUNICATION

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### Research Briefs

- Niles, M.T. and **Hammond Wagner, C.** (2020) "Fresno county farmer perspectives on water management and the sustainable groundwater management act (SGMA)"
- Niles, M.T. and **Hammond Wagner, C.** (2020) "Madera county farmer perspectives on water management and the sustainable groundwater management act (SGMA)"
- Niles, M.T. and **Hammond Wagner, C.** (2020) "San Luis Obispo county farmer perspectives on water management and the sustainable groundwater management act (SGMA)"
- **Hammond Wagner, C.**, Greenhalgh, S., Niles, M. T., Zia, A. and Bowden, W. B. (2019). "Farmer nutrient management and water quality regulation in Vermont."
- **Hammond Wagner, C.**, Greenhalgh, S., Niles, M. T., Zia, A. and Bowden, W. B. (2019). "Farmer nutrient management and water quality regulation in New Zealand."
- Niles, M. T., **Hammond Wagner, C.**, Mehta, V. K., and Sicke, K. (2019). "Yolo county farmers' perspectives on water management and the Sustainable Groundwater Management Act (SGMA): Research briefing 3 of 3: Farmer current and future groundwater management practices."
- Niles, M. T., **Hammond Wagner, C.**, Mehta, V. K., and Sicke, K. (2019). "Yolo county farmers' perspectives on water management and the Sustainable Groundwater Management Act (SGMA): Research briefing 2 of 3: Farmer participation and policy preferences for SGMA."
- Niles, M. T., **Hammond Wagner, C.**, Mehta, V. K., and Sicke, K. (2019). "Yolo county farmers' perspectives on water management and the Sustainable Groundwater Management Act (SGMA): Research briefing 1 of 3: Farmer concerns and perceptions of groundwater conditions."

*Blog posts & Op-eds*

- **Hammond Wagner, C.** and Morgan, C. (2018). We need an inclusive ecological economics. *Economics for the Anthropocene Blog (E4A-net.org)*. 08/01/2016. *Blog post*
- **Hammond Wagner, C.** (2016). New Zealand's Water Governance Experiment. *Economics for the Anthropocene Blog (E4A-net.org)*. 07/26/2018. *Blog post*
- Niles, M. T., and **Hammond Wagner, C.** (2016). "Farmer perspectives on California water management and the implementation of the Sustainable Groundwater Management Act." *Research Brief*
- **Hammond Wagner, C.** A clean lake needs a change in culture. *Burlington Free Press*. 06/19/2015. *Op-Ed*

*Videos & Exhibits*

- **Hammond, C.** *Polar Science and Engineering: Drilling Back Through Time*, produced for the US Ice Drilling Program, featured on the homepage NSF science news site Science 360, 11/01/2013, *Video*
- **Hammond, C.** *Science in Greenland: It's a Girl Thing*, produced for the Dartmouth NSF-funded IGERT, featured on NY Times Dot Earth Blog and Huffington Post Green Blog, 09/01/2012. *Video*
- **Hammond, C.** "Barrow, Alaska: Freeze-up." Russo Gallery, Dartmouth College. Gallery exhibition. Collection of photographs and quotes chronicling the change in seasons from fall to winter in Barrow, Alaska, and the shift in seasons due to climate change. 08/01/2012 – 08/31/2012. *Exhibit*

**TEACHING****Course Co-Instructor**, University of Vermont, Burlington, VT*University of Vermont*

Land Use Policy and Economics

Spring 2018

- Upper level undergraduate course, 14 students, 3 credit hours
- Co-designed course (new offering) with Dr. Hilary Byerly and Dr. Brendan Fisher
- Out of 30 classes, taught 10 individually and co-taught 5

Water Quality and the Future of Farming in Vermont

Spring 2019

- Graduate seminar, 7 students, 3 credit hours
- Co-designed course with ecologist Dr. Taylor Ricketts and biogeochemist Dr. Eric Roy
- Co-planned and co-facilitated each class period (15 total)

**Advising**

- Overseeing Stanford EIPER MS student's Independent Study Spring 2020
- Advised two University of Vermont undergraduate research assistants 2017 & 2018

**Graduate Teaching Assistant**, University of Vermont, Burlington, VT

Introduction to Environmental Studies

2014 &amp; 2018

- Introductory course, 200 + students, 4 credit hours
- Designed 5 3-hour lab sections for the course
- Managed 18 undergraduate TAs

International Environmental Studies

Spring 2015

- Introductory course, 200 + students, 4 credit hours
- Managed 16 undergraduate TAs

**Guest Lectures**, University of Vermont, Burlington, VT & Stanford University, Stanford, CA

- "Institutional Analysis of Water Quality Policy: Lake Taupo." Environmental Governance, Stanford University. 1/21/20 & 1/23/20.
- "Taxes." CDAE 254: Microeconomics for Applied Economics, University of Vermont. 11/15/2018.
- "Ecological Economics." ENVS1: Introduction to Environmental Studies, University of Vermont. 28/09/2018.
- "Social Dynamics of Ecological Assessment." Environmental Assessment, University of Vermont. 04/04/2017.

- “Agricultural Non-Point Source Pollution Challenges and Opportunities in the Anthropocene.” 03/22/2017. Water as a Natural Resource, University of Vermont.
- “Vermont Agricultural Water Quality Policy.” Food Systems, Science and Policy, University of Vermont. 03/24/2016.
- “Environmental Governance: The challenge of common-pool resources.” International Environmental Studies, University of Vermont. 04/20/2015.

## PROFESSIONAL EXPERIENCE

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<b>Energy Efficiency Evaluation Consultant</b> , Navigant Consulting, Vancouver, WA	2013 – 2014
<b>Science Digital Communication Consultant</b> , Freelance, Portland, OR	2013 – 2014
<b>Organic Farming and Health Promotion Field Research Fellow</b> , Dartmouth Center for Health Care Delivery Science, Mala, Peru	2013 – 2013
<b>Ecology Research Associate</b> , Dartmouth College, Hanover, NH	2011 – 2012
<b>Science Community Outreach Intern</b> , Barrow Arctic Science Consortium, Barrow, AK	2011 - 2011

## SERVICE & LEADERSHIP

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2020 – Present	Member of 500 Women Scientist’s Palo Alto pod
2015 – Present	Manuscript Referee – <i>Environmental Research Letters; Ecological Economics; Waste Management; Hydrology and Earth Systems Sciences; Climatic Change; Environment, Development and Sustainability; Environmental Management</i>
2018 – 2019	Member of the University of Vermont Graduate Student Senate <i>Family Leave Act Committee</i>
2016 – 2017	Graduate Student Board Member <i>United States Association for Ecological Economics</i>
2015 – 2016	President of the Rubenstein Graduate Student Association, University of Vermont

## Professional Association Membership

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International Association for Society and Natural Resources  
 International Association for the Study of the Commons  
 American Geophysical Union  
 International Society for Ecological Economics  
 Association for Environmental Studies and Sciences

## ADDITIONAL TRAINING

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2020	Rising Environmental Leaders Program, Woods Institute for the Environment, Stanford University
2018	COMPASS, Science Communication Workshop
2016	Introduction to Spatial Agent-Based Modeling, 5-day course with SESYNC, Annapolis, MD.
2015	Fundamentals in Ecosystem Ecology Course, 2-week course, Cary Institute of Ecosystem Studies, Millbrook, NY

## TECHNICAL SKILLS

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<b>Statistical Computing &amp; Programming:</b>	R ▪ Stata ▪ NetLogo
<b>Qualitative Analysis:</b>	NVivo ▪ HyperResearch
<b>Geospatial Analysis:</b>	ArcGIS ▪ Dinamica
<b>Design:</b>	Photoshop ▪ Final Cut Pro
<b>Language:</b>	<b>English:</b> Native Language ▪ <b>Spanish:</b> Proficient