

Patrick G. Lawrence, PhD

Agricultural Consultant and Owner, Repliculture LLC

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I am a broadly trained scientist with cross-functional experience in agriculture, environmental modeling, technology, and cross-sector collaborations.

Education

Montana State University: Ph.D. in Ecology and Environmental Science 2015
Dissertation focus: Understanding the long-term ecological, economic and social resilience of Montana's dryland agroecosystems. Work included soil, nutrient, crop, and economic fieldwork and modeling in addition to social science sampling methodologies.

Montana State University: B.S. in Land Resources Analysis and Management 2007

Employment History

Agroecology/Analytical Consultant & Owner, Repliculture LLC, Bozeman, MT 2016 – Present
Provide strategic, domain, and analytical consulting services in agricultural systems to private and academic clients. Focus on agricultural carbon sequestration, organic agriculture, and site-specific farming. Extensive collaboration with the Sustainable Food Lab and Cool Farm Alliance on farming emissions-reduction projects across supply chains using the Cool Farm Tool.

Director of Operations - High Mowing Organic Seeds, Wolcott, VT 2016-2018
Lead scientific and management efforts to improve operational efficiency. Duties include procurement, quality control, fulfillment, and contract seed production. Implement data-driven initiatives to improve seed quality, crop success rates, and probabilistic decision-making.

Environmental Modeler/Geospatial Scientist – Stone Environmental, Montpelier, VT 2015-2016
Geospatial modeling of agricultural systems using various crop and deterministic environmental models. Designed data processing/ analytical pipelines for national raster and vector datasets.

Summer Science Intern Educator – Chief Dull Knife College, Lama Deer, MT 2014
Established and coordinated a summer environmental science internship program for Northern Cheyenne Native American students at a tribal college. Responsible for 4 faculty members, 10 college students, and 7 high-school students.

Weed Ecology Research Assistant – MSU Weed Ecology/Agroecology Lab, Bozeman, MT 2008 – 2015
Responsible for a suite of research projects including landscape-scale population modeling, viability studies, dispersal monitoring, and agricultural experimentation. Developed a web application using logistic regression to predict occurrence of invasive species over the entire Western US.

GIS Specialist, River Design Group, Inc. Whitefish, MT

2008 – 2009

GIS specialist for a river restoration firm operating in Montana, Idaho and Oregon. Responsible for general geographic data management/analysis and integration with hydrologic engineering CAD data. Produced cartographic outputs for government organizations and private clients.

Program Assistant and Researcher, BioRegions International, Bozeman, MT.

2007

Researched the movement and dynamics of sand dunes and eroded areas in the Darbad Valley, Mongolia using LANDSAT imagery. Assisted in developing an ecological education curriculum for local secondary schools.

Grants/Awards

- USDA AFRI Predoctoral Fellowship (2015 – declined)
- Contributed to developing multiple USDA AFRI and state grants
- National American Colleges and Teachers of Agriculture Graduate Teaching Award (2014)
- Montana Institute on Ecosystems NSF EPSCoR Graduate Fellow (2012 – 2015)
- International Society for Precision Agriculture Outstanding Graduate Student Award (2014)
- Western Sustainable Agriculture Research and Education (SARE) Graduate Student Grant (2011 - present)
- American Society for Mongolian Studies Fellowship (2007)

Teaching

- ENSC 443: Weed Ecology and Management (Primary Instructor, Fall 2014)
- Chief Dull Knife College summer internship program coordinator/lead (Summer 2014)
- Teaching Assistant for Land Resources/ Env Science Intro Course, MSU, Bozeman, MT (Fall 2010)
- Teaching assistant for Soil Science lab course and Holistic Thought & Management, MSU, Bozeman, MT (Fall 2006, Fall 2007, Spring 2007)

Publications

Lawrence, PG, Roper W, Morris TF, and K Guillard. 2020. Guiding soil sampling strategies using classical and spatial statistics: A Review. *Agronomy Journal* 112 (1): 493-510.

<https://access.onlinelibrary.wiley.com/doi/10.1002/agj2.20048>

Lawrence, PG, Maxwell BD, Rew LJ, Bekkerman A, and Ellis C. 2018. Vulnerability of Dryland Agricultural Regimes to Economic and Climatic Change. *Ecology and Society* 23: 34. [online] URL:

<https://www.ecologyandsociety.org/vol23/iss1/art34/>

Lawrence, PG, Rew LJ, and Maxwell BD. 2015. A Probabilistic Bayesian Framework for Progressively Updating Site-Specific Recommendations. *Precision Agriculture* 16: 275-296.

Lawrence, PG, Rew L.J., and Maxwell B.D. 2014. Optimizing Site-Specific Adaptive Management Using a Probabilistic Framework: Evaluating Model Performance Using Historic Data. Oral Paper presented at the 12th International Conference on Precision Agriculture, Sacramento, CA.

Jordan N, Grossman J, **Lawrence P**, Harmon A, Dyer W, Maxwell B, Cadieux KV, Galt R, Rojas A, Byker C, Ahmed S, Bass T, Kebreab E, Singh V, Michaels T, and Tzenis C. 2014. New Curricula for Undergraduate Food-Systems Education: A Sustainable Agriculture Education Perspective. *North American Colleges and Teachers of Agriculture Journal* 2014: 302-310.

Maxwell B., Backus V., Hohmann M.G., Irvine K.M., **Lawrence P.**, Lehnhoff E., and Rew L., 2012, Comparison of transect-based standard and adaptive sampling methods for invasive plant species, *Invasive plant science and management*, v. 5, p. 178-193.