

MATTHEW D. MADSEN, PH.D.

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RESEARCH OBJECTIVE

The primary objective of my research program is to determine the limiting factors controlling rangeland-seeding success and to utilize this knowledge in the development of methodologies and technologies that result in the establishment of functional plant communities. Linked objectives include: 1) quantifying the role and impact of edaphic, climatic and biotic factors on plant survival and plant productivity; 2) determining how barriers to restoration success vary across the landscape; and 3) developing and or identifying seed enhancement technologies (e.g., seed coating, pelleting, deterrents, biological and physiological treatments, and other non-traditional methods) that are capable of mitigating ecological processes and conditions limiting plant establishment. In addition to rangeland systems, I am also seeking to develop and apply innovative seed enhancement technologies for use in other ecosystem types and in various agricultural sectors.

EDUCATION

2010	Ph.D.	Wildlife and Wildlands Cons.	Brigham Young University, Provo UT
2007	M.S.	Soil Science	Utah State University, Logan UT
2004	B.S.	Watershed Science	Utah State University, Logan UT

Thesis – Measurement of fine spatial scale ecohydrologic gradients in a pinyon-juniper ecosystem. Thesis. Utah State University, Logan Utah. 97 p.

Dissertation – Influence of soil water repellency on postfire revegetation success and management techniques to improve establishment of desired species. Dissertation. Brigham Young University, Provo Utah. 158 p.

PROFESSIONAL EXPERIENCE

- Assistant Professor, Department of Plant and Wildlife Sciences, Brigham Young University, Provo, UT (2015-present)

- Research Ecologist, Eastern Oregon Agricultural Research Center, USDA-Agricultural Research Service, Burns, OR (2010-2015)

RESEARCH SUPPORT

Extramural Grants Awarded	Amount
Career total	\$4,542,345
Lead author career total	\$802,085
Grants awarded at BYU	\$2,442,794
Lead author grants awarded at BYU	\$687,085

- Erickson, T., D. Merritt, A. Guzzomi, M. Munoz-Rojas, S. Wishart, P. Chester, B. Parsons, D. Lynch, J. James, **M. Madsen**, S. Abella. Global Innovation Linkages Programme. Eco-engineering solutions to improve mine-site rehabilitation outcomes. Australian Department of Industry, Innovation and Science, 2017-2021 (\$974,652). [*All spending will be made through Kings Park and Botanical Garden*]
- **Madsen, M.D.** Use of seed enhancement technologies to improve low sagebrush establishment. University of Nevada Reno Foundation Account, 2017-2019 (\$55,364).
- Petersen, S.L., V.J. Anderson, N.C. Hansen, B.G. Hopkins, R.T. Larsen, **M.D. Madsen**, B.R. McMillan, and T.S. Smith. Natural Resources Support-Hill AFB and UTTR DOD Army USACE, 2017-2018 (\$382,269).
- St. Clair, S.B., **M.D. Madsen**, R.A. Gill, and B.A. Roundy. Post-fire recovery of Great Basin sagebrush habitat using seed coating technology and herbicides to overcome abiotic and biotic limitations to native plant establishment. Joint Fire Sciences, 2017-2020 (\$398,788) [*Grant was written and is being managed jointly with Dr. Sam St. Clair.*]
- **Madsen, M.D.** Investigating seed enhancements for improving establishment of native grasses in the Great Basin National Park. National Park Service, 2016-2019 (\$122,333).
- **Madsen, M.D.** Optimizing the timing of seed germination to improve plant establishment in the sagebrush steppe. Oregon Department of Fish and Wildlife. 2016-2018. (Three separate grants have been awarded totaling \$310,000).
- **Madsen, M.D.** Novel seed treatments to reduce the risk of post-fire seeding failure. Utah Division of Wildlife Resources. 2017-2020 (\$196,588).
- **Madsen, M.D.** Targeted spring grazing on the Kaibab Plateau. Arizona Game and Fish Department. 2016 (\$2,800).

Extramural funding obtained outside of BYU

- **Madsen, M.D.**, L.M. Porensky and E.A. Leger. Overcoming the limiting factors impairing seeding success on the Kane and Two Mile Ranches. Arizona Game and Fish Department. 2014 (\$25,000).

- Davies, K.W., Boyd C.S., and **M.D. Madsen**. Restoring sage-grouse habitat after fire: Success of different restoration methods across an elevation gradient. Joint Fire Science Program. 2013-2016 (\$425,000).
- Kerby, J., **M. Madsen**, C Boyd, T. Svejcar, G. Fuller, and A. Talsma. Precision Restoration: Using innovative technology to overcome ecological barriers to restoration of sage-steppe. Priscilla Bullitt Collins Trust Northwest Conservation Fund 2012-2015 (\$500,000).
- James, J.J, E.A. Leger, R.L. Sheley, **M.D. Madsen**, S.P. Hardegree, and P.B. Adler. A systems approach to seedling establishment on degraded rangeland: Managing ecological processes driving recruitment bottlenecks. USDA Rangeland Research Program. 2011-2014 (\$500,000).
- **Madsen, M.D.** Cooperative Research and Development Agreement (CRADA) for the research and development of surfactant seed coating technology with Aquatrols Corporation of America. 2011-2013 (\$90,000).

Extramural funding obtained during graduate school. I was the main author on all grants but due to my status as a student, I could not be lead author

- Roundy, B.A., **M.D. Madsen**, S.L. Petersen, and V.J. Anderson. Innovative use of seed coating technologies for restoration of infiltration and functional plant communities in burned semi-arid rangelands. USDA Rangeland Research Program. 2009-2012 (\$436,600).
- Petersen, S.P., **M.D. Madsen**, and B.A. Roundy. Innovative use of seed pelleting technologies for the restoration of arid and semi-arid rangelands. State of Utah, Invasive Species Mitigation Fund. 2008-2009 (\$66,022).
- Petersen, S.L., **M.D. Madsen**, B.A. Roundy, B.G. Hopkins and R.F. Miller. Management techniques to improve establishment of desired species in the presence of hydrophobic soil. Natural Resources Conservation Service, Conservation Innovation Grants. 2008-2010 (\$56,929).

PATENTS

- **Madsen, M.D.** 2017. Unconventional method for coating sagebrush seeds to improve seed flowability. US provisional patent #62/452,091.
- **Madsen, M.D.**, and T.J. Svejcar. 2016. Development and application of “Seed Pillow” technology for overcoming the limiting factors controlling rangeland reseeding success. U.S. Patent Application No. 14/039,873, Patent Publication No. US9326451 B1.
- **Madsen, M.D.**, S.J. Kostka, and M.F. McMillan. 2015. Seed composition for enhancing germination and plant growth having a low-dose application of non-ionic alkyl terminated block copolymer surfactant. US Patent Application No. 62/055,386.
- **Madsen, M.D.**, S.L. Petersen, and A.G. Taylor. 2010. Seed coating compositions and methods for applying soil surfactants to water-repellent soil. US Patent Application No. WO/2010/111309. International Application No. PCT/US2010/28371. European

patent number 02410833/EP-B1, Chinese Patent No. CN 102438439 B, Israel patent No. 215329, Australian Patent No. 2010230024.

REFEREED PUBLICATIONS

41 total, 21 since arriving at BYU, and 7 publications with students. Students mentored in Madsen lab are underlined.

1. Richardson, W.C., D.R. Whitaker, K.P. Sant, N.S. Barney, and R.S. Call, B.A. Roundy, Z.T. Aanderud, M.D. Madsen. 2018. Use of auto-germ to model germination timing in the sagebrush-steppe. *Ecology and Evolution*. 8(23):11533-11542. <https://doi.org/10.1002/ece3.4591>
2. Chandler, D.G., Y. Cheng, M.S. Seyfried, M.D. Madsen, C.E. Johnson, and C.J. Williams 2018. Seasonal Wetness, Soil Organic Carbon, and Fire Influence Soil Hydrological Properties and Water Repellency in a Sagebrush-Steppe Ecosystem. *Water Resources Research*. 54(10):8514-8527. <https://doi:10.1029/2017WR021567>
3. Brown, V.S., A.L. Ritchie, J.C. Stevens, R.J. Harris, M.D. Madsen, and T.E. Erickson. 2018. Protecting direct seeded grasses from herbicide application: can new extruded pellet formulations be used in restoring natural plant communities? *Restoration Ecology*. Published Ahead of Press. <https://doi:10.1111/rec.12903>
4. Madsen, M.D., L. Svejcar, J. Radke, and A. Hulet. 2018. Inducing rapid seed germination of native cool season grasses with solid matrix priming and seed extrusion technology. *PLOS ONE*. 13(10):e0204380. <https://doi.org/10.1371/journal.pone.0204380>
5. Porensky, L.M., B.L. Perryman, M.A. Williamson, M.D. Madsen, and E.A. Leger. 2018. Combining active restoration and targeted grazing to establish native plants and reduce fuel loads in invaded ecosystems. *Ecology and Evolution*. 8(24):12533-12546. <https://doi.org/10.1002/ece3.4642>
6. Hart, A., E. Martin, M.D. Madsen, and K. Kettenring. 2018. Effects of surfactant seed coating and water level on alkali bulrush germination and biomass. *Journal of Student Research*. <http://www.jofsr.com/index.php/path/article/view/452>
7. Chandler D.G., N. Day, M.D. Madsen, and J. Belnap. 2018. Amendments fail to hasten biocrust recovery or soil stability at a disturbed dryland sandy site. *Restoration Ecology*. <https://doi.org/10.1111/rec.12870>
8. Kildesheva, O.A., T.E. Erickson, M.D. Madsen, K.W. Dixon, and D.J. Merritt. 2018. Seed germination and dormancy traits of forbs and shrubs important for restoration of North American dryland ecosystems. *Plant Biology*. <https://doi.org/10.1111/plb.12892>
9. Pearson, D.E., M. Valliant, C. Carlson, G. C. Thelen, Y.K. Ortega, J.L. Orrock, and M.D. Madsen. 2018. Spicing up restoration: can chili peppers improve restoration seeding by reducing seed predation? *Restoration Ecology*. <https://doi.org/10.1111/rec.12862>

10. Kildisheva, O.A., T.E. Erickson, D.J. Merritt, **M.D. Madsen**, K.W. Dixon, J. Vargas, R. Amarteifio, and A.T. Kramer. 2018. Do abrasion- or temperature-based techniques more effectively relieve physical dormancy in seeds of cold desert perennials? *Rangeland Ecology & Management*. 71:318-322. <https://doi.org/10.1016/j.rama.2018.02.004>
11. Davies, K.W., C.S. Boyd, **M.D. Madsen**, J. Kerby, and A. Hulet. 2018. Evaluating a seed technology for sagebrush restoration across an elevation gradient: Support for Bet Hedging. *Rangeland Ecology & Management*. 71:19-24. <https://doi.org/10.1016/j.rama.2017.07.006>
12. Erickson, T.E., M. Munoz-Rojas, O.A. Kildisheva, B.A. Stokes, S.A. White, J.L. Heyes, E.L. Dalziell, W. Lewandrowski, J.J. James, **M.D. Madsen**, S.R. Turner, and D.J. Merritt. 2017. Benefits of adopting seed-based technologies for rehabilitation in the mining sector: a pilbara perspective. *Australian Journal of Botany*. 65(8):646-660. <https://doi.org/10.1071/BT17154>
13. Davies, K.W., **M.D. Madsen**, and A. Hulet. 2017. Using activated carbon to limit herbicide effects to seeded bunchgrass when revegetating annual grass-invaded rangelands. *Rangeland Ecology & Management* 70:604-608. <https://doi.org/10.1016/j.rama.2017.04.004>.
14. Zvirzdin, D.L., B.A. Roundy, N.S. Barney, S.L. Petersen, V.J. Anderson, and **M.D. Madsen**. 2017. Post-fire soil water repellency: extent, severity and thickness relative to ecological site characteristics within piñon-juniper woodlands. *Ecology and Evolution* 7:4630-4639. <https://doi.org/10.1002/ece3.3039>
15. Fernelius, K.J., **M.D. Madsen**, B.G. Hopkins, S. Bansal, V.J. Anderson, D.L. Egget, and B.A. Roundy. 2017. Post-fire interactions between soil water repellency, islands of fertility and *Bromus tectorum* invisibility. *Journal of Arid Environments*: 144: 98-109. <http://dx.doi.org/10.1016/j.jaridenv.2017.04.005>
16. **Madsen, M.D.**, K.W. Davies, C.S. Boyd, J.D. Kerby, and T.J. Svejcar. 2016. Emerging seed enhancement technologies for overcoming barriers to restoration. *Restoration Ecology*: 24: S77-S84. <http://dx.doi.org/10.3368/npj.17.3.230>
17. Roundy B.A., and **M.D. Madsen**. 2016. Frost dynamics of sagebrush steppe soils. *Soil Science Society of America Journal* 80: 1403-1410. <http://dx.doi.org/10.2136/sssaj2016.03.0087>
18. **Madsen, M.D.**, A. Hulet, K. Phillips, J.L. Staley, K.W. Davies, and T.J. Svejcar. 2016. Extruded seed pellets: A novel approach to enhancing sagebrush seedling emergence. *Native Plants Journal* 17: 230-243. <http://dx.doi.org/10.3368/npj.17.3.230>
19. **Madsen, M.D.**, S.J. Kostka, M.A. Fidanza, N.S. Barney, T. Badrakh and M.F. McMillan. 2016. Low-dose Application of non-ionic alkyl terminated block copolymer surfactant enhances turfgrass seed germination and plant growth. *HortTechnology* 26: 379-385.
20. **Madsen, M.D.**, D.L. Zvirzdin, S.L. Petersen, B.G. Hopkins, and B.A. Roundy. 2015. Anchor chaining's influence on soil hydrology and seeding success in burned piñon-juniper woodlands. *Rangeland Ecology & Management* 68: 231-240. <http://dx.doi.org/10.1016/j.rama.2015.03.010>

21. Davies, K.W., C.S. Boyd, D.D. Johnson, A.M. Nafus, and **M.D. Madsen**. 2015. Success of seeding native compared to introduced perennial vegetation for revegetating medusahead-invaded sagebrush rangeland. *Rangeland Ecology & Management* 68:224-230. <http://dx.doi.org/10.1016/j.rama.2015.03.004>
22. Davies, K.W, **M.D. Madsen**, A.M. Nafus, C.S. Boyd, and D.D. Johnson. 2014. Can imazapic and seeding be applied simultaneously to rehabilitate medusahead-invaded rangeland? Single vs. multiple entry. *Rangeland Ecology and Management*: 67: 650-656. <http://dx.doi.org/10.2111/REM-D-14-00019.1>
23. Davies, K.W., J. D. Bates, **M.D. Madsen**, and A.M. Nafus. 2014. Restoration of mountain big sagebrush steppe following prescribed burning to control western juniper. *Environmental Management* 53:1015–1022. <HTTP://DX.DOI.ORG/10.1007/s00267-014-0255-5>
24. Svejcar, A.J., C.S. Boyd, K.W. Davies, **M.D. Madsen**, J. D. Bates, R.L. Sheley, C. Marlow, D. Bohnert, M. Borman, R. Mata-Gonzalez, J. Buckhouse, T. Stringham, B. Perryman, S. Swanson, K. Tate, M. George, G. Ruyle, B. Roundy, C. Call, K.B. Jensen, K. Launchbaugh, A. Gearhart, L.T. Vermeire, J. Tanaka, J.D. Derner, G.W. Frasier, and K.M. Havstad. 2014. Western land managers will need all available tools for adapting to climate change, including grazing: A critique of Beschta et al. *Environmental Management* 53:1035–1038. <http://dx.doi.org/10.1007/s00267-013-0218-2>
25. **Madsen, M.D.**, D.L. Zvirzdin, B.A. Roundy, and S.J. Kostka. 2014. Improving reseeded success after catastrophic wildfire with surfactant seed coating technology. *American Society for Testing and Materials STP* 1569: 44–55. <http://dx.doi.org/10.1520/%20STP156920120181>
26. **Madsen, M.D.**, K.W. Davies, D.L. Mummey, and T.J. Svejcar. 2014. Improving Restoration of Exotic Annual Grass-Invaded Rangelands Through Activated Carbon Seed Enhancement Technologies. *Rangeland Ecology & Management* 67:61-67. <https://doi.org/10.2111/REM-D-13-00050.1>
27. **Madsen, M.D.**, K.W. Davies, C.S. Boyd, J.D. Kerby, D.L. Carter, and T.J. Svejcar. 2013. Restoring North America's sagebrush steppe ecosystem using seed enhancement technologies. *Proceedings of the International Grassland Congress, Sydney, Australia – September 15-19, 2013*. (Peer-Reviewed Conference Proceeding).
28. **Madsen, M.D.**, E.G. Coronel, and B.G. Hopkins. 2013. Soil surfactant products for improving hydrologic function in post-fire water repellent soil. *Soil Science Society of America Journal* 77: 1825–1830. <http://dx.doi.org/10.2136/sssaj2012.0305>
29. Davies, K.W., A.M. Nafus, and **M.D. Madsen**. 2013. Medusahead invasion along unimproved roads, animal trails, and random transects. *Western North American Naturalist* 73: 54–59. <http://dx.doi.org/10.3398/064.073.0105>
30. **Madsen, M.D.**, S.J. Kostka, A. Hulet, B.E. Mackey, M.A. Harrison, and M.F. McMillan. 2013. Surfactant Seed Coating – A strategy to improve turfgrass establishment on water repellent soils. *International Symposium on Adjuvants for Agrochemicals*. p.205-210. (Peer-Reviewed Conference Proceeding).

31. **Madsen, M.D.**, K.W. Davies, C.J. Williams, and T.J. Svejcar. 2012. Agglomerating seeds to enhance native seedling emergence and growth. *Journal of Applied Ecology* 49:431–438. <http://dx.doi.org/10.1111/j.1365-2664.2012.02118.x>
32. **Madsen, M.D.**, S.L. Petersen, B.A. Roundy, B.G. Hopkins, and A.G. Taylor. 2012. Comparison of post-fire soil water repellency amelioration strategies on bluebunch wheatgrass and cheatgrass survival. *Rangeland Ecology and Management* 65: 182–188. <http://dx.doi.org/10.2111/REM-D-10-00152.1>
33. **Madsen, M.D.**, S.L. Petersen, K.J. Fernelius, B.A. Roundy, A.G. Taylor, and B.G. Hopkins. 2012. Influence of soil water repellency on seedling emergence and plant survival in a burned semi-arid woodland. *Arid Land Research and Management* 26: 236–249. <http://dx.doi.org/10.1080/15324982.2012.680655>
34. **Madsen, M.D.**, S. J. Kostka, A.L. Inouye, and D.L. Zvirzdin. 2012. Post-fire restoration of soil hydrology and wildland vegetation using surfactant seed coating technology. *Rangeland Ecology & Management* 65:253–259. <http://dx.doi.org/10.2111/REM-D-11-00083.1>
35. **Madsen, M.D.**, D.L. Zvirzdin, B.D. Davis, S.L. Petersen, and B.A. Roundy. 2011. Feature extraction techniques for measuring piñon and juniper tree cover and density, and comparison with field based management surveys. *Environmental Management* 47:766–776. <http://dx.doi.org/10.1007/s00267-011-9634-3>
36. **Madsen, M.D.**, D.L. Zvirzdin, S.L. Petersen, B.G. Hopkins, B.A. Roundy, and D.G. Chandler. 2011. Soil water repellency within a burned piñon-juniper woodland: spatial distribution, severity, and ecohydrologic implications. *Soil Science Society of America Journal* 75: 1543–1553. <http://dx.doi.org/10.2136/sssaj2010.0320>
37. Davies, K.W., S.L. Petersen, D.D. Johnson, D.B. Davis, **M.D. Madsen**, D.L. Zvirzdin, and J.D. Bates. 2010. Estimating juniper cover from NAIP imagery and evaluating relationships between potential cover and environmental variables. *Rangeland Ecology & Management* 63:630–637. <http://dx.doi.org/10.2111/REM-D-09-00129.1>
38. **Madsen, M.D.**, D.G. Chandler, and J. Belnap. 2008. Spatial gradients in ecohydrologic properties within a pinyon-juniper ecosystem. *Ecohydrology* 1:349–360. <http://dx.doi.org/10.1002/eco.29>
39. **Madsen, M.D.**, and D.G. Chandler. 2007. Automation and use of mini disk infiltrometers. *Soil Science Society of America Journal* 71:1469–1472. <http://dx.doi.org/10.2136/sssaj2007.0009N>
40. **Madsen, M.D.**, D.G. Chandler, and W.D. Reynolds. 2007. Accounting for bias and boundary condition effects on measurements of saturated core hydraulic conductivity. *Soil Science Society of America Journal* 72:750–757. <http://dx.doi.org/10.2136/sssaj2007.0254>
41. Lebron, I., **M.D. Madsen**, D.G. Chandler, D.A. Robinson, O. Wendroth, and J. Belnap. 2007. Ecohydrological controls on soil moisture and hydraulic conductivity within a pinyon-juniper woodland. *Water Resources Research* 43: W08422. <http://dx.doi.org/10.1029/2006WR005398>

SCIENTIFIC PRESENTATIONS

82 total, 37 since arriving at BYU, 17 presentation with students from Madsen lab (students mentored in Madsen lab are underlined).

1. **Madsen, M.D.** 2018. Use of seed enhancement technologies for overcoming abiotic and biotic limitations to native plant establishment. National Conference on Ecosystem Restoration, New Orleans, Louisiana, USA, August 26-30.
2. Erickson, T.E., A.L. Guzzomi, **M.D. Madsen**, M. Thacker, O.A. Kildisheva, S.R. Turner, J.J. James, S.R. Abella, M. Muñoz-Rojas, and D.J. Merritt. 2018. Recent advancements in restoration-engineering and seed enhancement technologies for use in mine rehabilitation. National Conference on Ecosystem Restoration, New Orleans, Louisiana, USA, August 26-30.
3. Sowards, T., Z. Aanderud, S. Petersen, S. St. Clair, S. Kitchen, B. Roundy, and **M.D. Madsen**. 2018. Efficacy of abscisic acid in delaying germination of *pseudotsuga* spicata to reduce seeding failure in sagebrush-steppe restoration efforts. National Conference on Ecosystem Restoration, New Orleans, Louisiana, USA, August 26-30.
4. Taylor, J.B., S. St. Clair, **M.D. Madsen**, and D. Pearson. 2018. Seed coating technologies that reduce rodent granivory during rangeland reseeding. National Conference on Ecosystem Restoration, New Orleans, Louisiana, USA, August 26-30.
5. Porensky, L., E.A. Leger, B. Perryman, J. Davison, M. Williamson, and **M.D. Madsen**. 2018. Moisture, plant-plant interactions and herbivory as drivers of rangeland restorations success in the Western US. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
6. Hoose, B.W., W. Richardson, R.M. Anderson, B. Geary, and **M.D. Madsen**. 2018. Adding aqueous sugar solution to topsoil to test fungicide seed treatments against native pathogens. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
7. **Madsen, M.D.**, W. Richardson, R. Call, B. Hoose, and R.M. Anderson. 2018. Use of seed enhancement technologies for overcoming abiotic and biotic limitations to native plant establishment. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
8. Call, R., and **M.D. Madsen**. 2018. Emerging seed enhancements to improve sagebrush post-fire/restoration seeding success. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
9. Richardson, W.C., B.A. Roundy, Z. Aanderud, K. Sant, and **M.D. Madsen**. 2018. A novel approach to model germination timing of native plant species in the great basin. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
10. Anderson, R.M., B. Hoose, J. Radke, and **M.D. Madsen**. 2018. Improving seeding success in the sagebrush steppe with seed priming and deep furrow plantings. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
11. Thacker, M., T.E. Erickson, D. Tryon, S. Larson, and **M.D. Madsen**. 2018. Use of flash flaming technology to improve seed handling and delivery of winterfat seeds.

- 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
12. Parkinson, M.E., **M.D. Madsen**, B.G. Hopkins, and N.C. Hansen. 2018. Use of phosphorus fertilizer as a seed coating enhance seedling growth of bluebunch wheatgrass. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
 13. Sowards, T. G., **M.D. Madsen**, B.A. Roundy, and S. St. Clair. 2018. Efficacy of abscisic acid in reducing seeding failure by delaying germination of *pseudorogenia spicata*. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
 14. Keefer, C.E., R. Call, S. St. Clair, B.A. Roundy, T. Stringham, and **M.D. Madsen**. 2018. Laboratory evaluation of abscisic acid and gibberellic acid seed coatings to improve germination timing of wyoming big sagebrush. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
 15. Morris, J.R., S.L. Peterson, **M.D. Madsen**, and B.R. McMillan. 2018. Immature seedling fate and growth dynamics of the native grass, *elymus elymoides*. 71st Annual Meeting for the Society of Range Management, Sparks, Nevada, USA, January 28- February 2.
 16. Call, R.S., B.W. Hoose, W.C. Richardson, T.H. Bates, and **M.D. Madsen**. 2017. Development of sagebrush seed agglomerates to improve sagebrush seeding success. Annual Meeting for the Utah Chapter Society for Range Management, Midvale, Utah, November 2 - 3. [*Invited Presentation*]
 17. Richardson, W.C., **M.D. Madsen**, K. Phillips, B.A. Roundy, and D.R. Whitaker. 2017. The use of predictive modeling to establish the practicality of coating seeds with abscisic acid. Annual Meeting for the Utah Chapter Society for Range Management, Midvale, Utah, November 2 - 3. [*Invited Presentation*]
 18. Nelson S.V., W. Petersen, J.D. Svedin, N.C. Hansen, **M.D. Madsen**, V.J. Anderson, and B.G. Hopkins. 2017. Polyacrylamide for increasing soil moisture and seeding success. Agronomy Crop and Soil Science Societies of America Annual Meeting. Tampa, FL. October 22 - 25.
 19. **Madsen, M.D.**, and T. Stringham. 2017. Great Basin Sagebrush Restoration Fund. Nevada Mining Association Environmental Committee, Elko, Nevada, USA, October 12. [*Invited Presentation*]
 20. Call, R.S., W.C. Richardson, and **M.D. Madsen**. 2017. Novel Seed Treatments to Reduce the Risk of Sagebrush Post-Fire Seeding Failure. 14th Biennial Conference of Science & Management on the Colorado Plateau & Southwest Region, Flagstaff, Arizona, USA, September 11-14. [*Invited Presentation*]
 21. Richardson, W.C., **M.D. Madsen**, and B.A. Roundy. 2017. The use of predictive modeling to enhance restoration techniques. 14th Biannual Conference of Science and Management on the Colorado Plateau and Southwest Region, Flagstaff, Arizona, USA. September 11- 14. [*Invited Presentation*]

22. Call, R.S., W.C. Richardson, and M.D. Madsen. 2017. New types of seed preparation and restoration seeding methods. Annual Meeting for the Colorado Plateau Native Plant Program, Monticello, Utah, USA, February 28 - March 1. [*Invited Presentation*]
23. Richardson, W.C., M.D. Madsen, R.S. Call, and B.A. Roundy. 2017. Novel seed treatments to reduce the risk of post-fire seeding failure. Colorado Plateau Native Plant Program Annual Meeting, Monticello, Utah, USA. February 28 – March 2. [*Invited Presentation*]
24. Madsen, M.D., R.S. Call, T.H. Bates, W.C. Richardson, K. Phillips, and T.W. Whitlock. 2017. Novel seed technologies to enhance Wyoming big sagebrush seed delivery and performance. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2 [*Invited Presentation*].
25. Anderson, R.M., M.D. Madsen, W.C. Richardson, K. Phillips, T.H. Bates, D.R. Whitaker, and G. Poulson. 2017. Use of solid matrix priming and extrusion technology to improve seed germination timing. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
26. Morris, J.R., **M.D. Madsen**, J. Taylor, S.L. Petersen, C.R. Lawrence, and V.J. Anderson. 2017. Novel approach for improving rangeland seeding success with imazapic herbicide, cultivator sweeps, and a rangeland drill. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
27. Bates, T.W., M.D. Madsen, R.S. Call, R.M. Anderson, and B.W. Hoose. 2017. Novel techniques for improving sagebrush seed delivery. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
28. Nelson, S., W. Petersen, J. Svedin, **M. Madsen**, V. Anderson, N. Hansen, and B. Hopkins. 2017. Mulch and polyacrylamide for increasing soil moisture and seeding success. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
29. Call, R.S., M.D. Madsen, W.C. Richardson, and T.H. Bates. 2017. The use of fungicides, abscisic acid, and hydrophobic coatings to improve sagebrush seeding success. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
30. Phillips, K., D.R. Whitaker, R.D. Schenk, and M.D. Madsen. 2017. Hydrophobic seed coatings for improving rangeland restoration: fall re-seeding. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
31. Richardson, W.C., M.D. Madsen, K. Phillips, B.A. Roundy, and D.R. Whitaker. 2017. The use of predictive modeling to establish the practicality of coating seeds with abscisic acid. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
32. Fund, A., K. Hulvey, D. Johnson, D. Tilley, S. Jensen, and **M. Madsen**. 2017. Novel techniques for enhancing native forb germination and establishment on great basin rangelands. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
33. Morris, J.R., S.L. Petersen, and **M.D. Madsen**. 2017. Effects of soil type and precipitation on seedling demography of the native grass, *Elymus Elymoides*. Annual

- Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
34. Hulet, A., K. Davies, **M. Madsen**, C. Boyd, and M. Gregg. 2017. Restoring sagebrush after mega-fires: success of different restoration methods across and elevation gradient. Annual Meeting for the Society for Range Management, Saint George, Utah, USA, January 29 - February 2.
 35. **Madsen, M.D.** 2016. Novel seed treatments to reduce the risk of post-fire seeding failure. Western Native Plant Conference, Vancouver, Washington, USA, December 6-8 [*Invited Presentation*].
 36. **Madsen, M.D.** 2016. Potential application of seed coating technologies for restoration degraded semi-arid rangelands. The Science Academy, Yinchuan, China. September 23 -October 2 [*Invited Presentation*]
 37. **Madsen, M.D.**, A. Hulet, and L. Svejcar 2016. Inducing rapid seed germination of native cool season grasses with solid matrix priming and seed extrusion technology. Annual Meeting for the Society for Range Management, Corpus Christi, Texas, USA, January 21-February 4.
 38. **Madsen, M.D.**, M. Herbert, M. Winn, A. McFarland, M.F. McMillan, and S.J. Kostka. 2015. Influence on non-ionic surfactant seed coatings for promoting germination and plant growth under deficit irrigation and non-optimal temperatures. American Society for Horticultural Science, New Orleans, Louisiana, USA, August 4-7 [*Invited Presentation*].
 39. **M.D. Madsen**. 2015. Use of seed enhancement technologies for overcoming the limiting factors impairing rangeland seeding success. Seminar to the Department of Plant & Wildlife Sciences, Brigham Young University, Provo, UT, February 19 [*Invited Presentation*].
 40. **M.D. Madsen**. 2015. Seed enablement technologies of the Great Basin. National Native Seed Conference. Santa Fe, New Mexico, USA. April 13-16 [*Invited Presentation*].
 41. **Madsen, M.D.**, A. Hulet, K.W. Davies, C.S. Boyd, T. Badrakh, J.D. Kerby, B.A. Roundy, and T.J. Svejcar. 2015. Seed enhancement technologies for overcoming barriers to restoration. Annual Meeting for the Society of Range Management. Sacramento CA January 31-February 6.
 42. Hulet, A., K.W. Davies, and **M.D. Madsen**. 2014. The use of seed enhancement technologies to improve sagebrush establishment across an elevation gradient. The Next Steppe: Sage-Grouse and Rangeland Wildfire in the Great Basin, Boise, ID, November 5-7.
 43. McMillan, M.F., J.L. Cisar, **M.D. Madsen**, K. Williams, and S.J. Kostka. 2014. Experimental seed coatings increase percent emergence and cover under deficit irrigation. International Horticultural Congress. Brisbane, Australia. August 17-22.
 44. McMillan, M.F., J.L. Cisar, **M.D. Madsen**, K. Williams, and S.J. Kostka. 2014. Experimental seed coatings improve seed germination and cover in water repellent soils. European Turfgrass Society, Osnabrueck, Germany, July 6– 9.
 45. **Madsen, M.D.** D.L. Zvirzdin, K.J. Fernelius, M.F. McMillan, and S.J. Kostka. 2014. Ecohydrologic implications and management of post-fire soil water repellency in

- burned piñon-juniper woodlands. European Geosciences Union General Assembly. Vienna, Austria. April 27-May 2 [*Invited Presentation*].
46. **Madsen, M.D.** 2013. Seed enhancement technologies for improving native plant establishment. Intermountain Native Plant Summit VII. Boise, Idaho. March 26-27 [*Invited Presentation*].
 47. **Madsen, M.D.**, K.W. Davies, C.S. Boyd, and T.A. Svejcar. 2013. Restoring North America's sagebrush steppe ecosystem using seed enhancement technologies. 22nd International Grasslands Congress, Sydney Australia. September 15-19 [*Keynote Speaker*].
 48. **Madsen, M.D.**, S.J. Kostka, A. Hulet, B.E. Mackey, M.A. Harrison, and M.F. McMillan. 2013. Surfactant Seed Coating – A strategy to improve turfgrass establishment on water repellent soils. Biohydrology Conference, Landau/Pfalz, Germany, May 21-24.
 49. **Madsen, M.D.**, D.L. Zvirzdin, and S.J. Kostka. 2013. Improving reseeding success after catastrophic wildfire – shifting the paradigm with surfactant seed coatings. Biohydrology Conference, Landau/Pfalz, Germany, May 21-24.
 50. **Madsen, M.D.**, D.L. Zvirzdin, and S.J. Kostka. 2013. Improving rangeland seeding success in post-fire water repellent soil using surfactant seed coating technology. European Geosciences Union General Assembly. Vienna, Austria. April 7-12.
 51. **Madsen, M.D.**, S.J. Kostka, A. Hulet, B.E. Mackey, M.A. Harrison, and M.F. McMillan. 2013. Surfactant Seed Coating – A strategy to improve turfgrass establishment on water repellent soils. International Symposium on Adjuvants for Agrochemicals, Foz do Iguaçu, Brazil - April 22-26, 2013.
 52. **Madsen, M.D.**, and D.L. Zvirzdin. 2013. Improving rangeland seeding success in post-fire water repellent soil using surfactant seed coating technology. Annual Meeting for the Society of Range Management. Oklahoma, Oklahoma City. February 2-8.
 53. **Madsen, M.D.**, and K.L. Munday. 2013. Use of Biosol Forte as a seed coating to improve stand establishment of native bunchgrass species. Annual Meeting for the Society of Range Management. Oklahoma, Oklahoma City. February 2-8.
 54. **Madsen, M.D.**, S.J. Kostka, A.L. Inouye, and D.L. Zvirzdin. 2012. Post-fire Restoration of soil hydrology and wildland vegetation using surfactant seed coating technology. European Geosciences Union General Assembly, Vienna, Austria. April 22-27.
 55. **Madsen, M.D.**, D.L. Zvirzdin, and S.J. Kostka. 2012. Improving reseeding success after catastrophic wildfire with surfactant seed coating technology. ASTM International's 33rd Symposium on Pesticide Formulation and Delivery Systems, Atlanta Georgia. October 23-25.
 56. D.L. Zvirzdin, **M.D. Madsen**, and B.A. Roundy. 2012. Ecological site characteristics related to the formation of post-fire soil water repellency within piñon-juniper woodlands. Annual Meeting for the Society of Range Management. Oklahoma, Spokane, WA January 28-February 3.

57. **Madsen, M.D.**, K.W. Davies, and T.A. Svejcar. 2012. Field response of seed agglomerate technology: First Year Evaluation. Annual Meeting for the Society of Range Management. Oklahoma, Spokane, WA January 28-February 3.
58. Fernelius, K. and **M.D. Madsen**. 2012. Influence of post-fire soil water repellency on soil nitrogen, soil moisture, and seedling growth. Annual Meeting for the Society of Range Management. Oklahoma, Spokane, WA January 28-February 3.
59. **Madsen, M.D.**, S. J. Kostka, A.L. Inouye, and D.L. Zvirzdin. 2011. Innovative use of seed coating technology for the restoration of soil hydrology and wildland vegetation in post-fire water repellent soil. Interior West Fire Ecology Conference Challenges and Opportunities in a Changing World. Snowbird, UT. November 14.
60. **Madsen, M.D.**, K.W. Davies, T. Svejcar, and J. Williams. 2011. Use of seed agglomeration technology for enhancing seedling emergence in the presence of physical soil crust. Annual Meeting for the Society of Range Management. Billings, Montana. February 5-11 [*Invited Presentation*].
61. Zvirzdin, D.L., **M.D. Madsen**, and B.A. Roundy. 2011. Post-fire soil water repellency, a preliminary report: Extent and characteristics within the pinyon-juniper woodlands of the eastern Great Basin. Annual Meeting for the Society of Range Management. Billings, Montana. February 5-11.
62. Roundy, B.A., A. Hulet, N.L. Cline, L. Crook, K. Young and **M.D. Madsen**. 2011. Fire rehabilitation decision making. Annual Meeting for the Society of Range Management. Billings, Montana. February 5-11.
63. **Madsen, M.D.**, D.L. Zvirzdin, S.L. Petersen, and B.A. Roundy. 2010. Influence of anchor chaining on postfire soil water repellency and subsequent revegetation success within pinyon-juniper woodlands. Annual Meeting for the Society of Range Management. Denver, Colorado. February 7-11.
64. **Madsen, M.D.**, S.L. Petersen, and B.A. Roundy. 2010. Seed coating application of wetting agents on native grass seeds for improving post-fire restoration: Greenhouse evaluation. Annual Meeting for the Society of Range Management. Denver, Colorado. February 7-11.
65. Zvirzdin, D.L., **M.D. Madsen**, S.L. Petersen, and B.A. Roundy. 2010. Spatial distribution of post-fire water repellency: assessment of the Milford Flat fire. Annual Meeting for the Society of Range Management. Denver, Colorado. February 7-11.
66. **Madsen, M.D.**, and S.L. Petersen. 2009. Influence of post-fire soil water repellence and simulated rainfall regimes on revegetation success. AGU Chapman Conference, Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions. Boise and Sun Valley, ID. October 4-8.
67. Chandler, D.G., M.S. Seyfried, and **M.D. Madsen**. 2009. Infiltrability response to vegetation and fire across a sage-steppe catchment. AGU Chapman Conference, Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions. Boise and Sun Valley, ID. October 4-8.
68. Chandler, D.G., **Madsen, M.D.**, and S.L. Petersen. 2009. Extent and severity of postfire soil water repellency within a piñon-juniper ecosystem. Soil Science Society of America annual meetings. Pittsburgh, PA November 1-5.

69. **Madsen, M.D.**, S.L. Petersen, B.G. Hopkins, and B.A. Roundy. 2009. Influence of water repellency on post-fire revegetation. Soil Science Society of America annual meetings. Pittsburgh, PA November 1-5.
70. **Madsen, M.D.**, S.L. Petersen, and D.G. Chandler. 2009. Postfire water repellency: extent, severity, and restoration within a pinyon-juniper ecosystem. United States Regional Association of the International Association for Landscape Ecology. Snowbird, UT. April 12-16.
71. Zvirzdin, D.L., **M.D. Madsen**, B.D. Davis, and S.L. Petersen. 2009. Innovative feature extraction techniques for estimating pinyon and juniper cover and density from high resolution, aerial photographs, and their relationship to field-based measurements. United States Regional Association of the International Association for Landscape Ecology. Snowbird, UT. April 12-16.
72. **Madsen, M.D.**, B.D. Davis, S.L. Petersen, and D.L. Zvirzdin. 2009. Comparison of pinyon and juniper cover and density measurements obtained through remotely sensed imagery and field based rangeland studies. Annual Meeting for the Society of Range Management. Albuquerque, NM. Feb. 8-12.
73. **Madsen, M.D.**, S.L. Petersen, B.A. Roundy, A.G. Taylor and B.G. Hopkins. 2009. Innovative use of seed coating technologies for the restoration of soil wettability and perennial grasses on burned semi-arid rangelands. Annual Meeting for the Society for Range Management. Albuquerque, NM. February 8-12.
74. **Madsen, M.D.**, S.L. Petersen, and B.A. Roundy. 2009. Postfire hydrophobicity: spatial extent, severity, and restoration. Utah State Annual Meeting for the Society of Range Management. Provo, UT. November 6-7.
75. **Madsen, M.D.** and S.L. Petersen. 2008. Influence of postfire water repellency: assessment of the Milford Flat Fire. Annual Meeting for the Society of Range Management. Louisville, KY. January 26-31.
76. Chandler, D.G. and **M.D. Madsen**. 2008. Spatial Gradients In ecohydrologic Properties within a Pinyon-Juniper Ecosystem. American Geophysical Union, Fall Meeting. December 15-19.
77. **Madsen, M.D.**, and D.G. Chandler. 2007. Automation and use of mini disk infiltrometers. Inland Northwest Research Alliance. Environmental Sensing Symposium, Boise State University. October 25-26.
78. **Madsen, M.D.** and B.A. Roundy. 2006. Brigham Young University: Current research in the Great Basin. Workshop on Collaborative Watershed Management & Research in the Great Basin Reno, NV. November 28-30.
79. **Madsen, M.D.**, and D.G. Chandler. 2006. Spatial and seasonal dependence of vegetation related soil hydrologic properties in a pinyon-juniper woodland. USU, Water Initiative, Spring Runoff Conference. March 29-30.
80. Wendroth, O., I. Lebron, **M.D. Madsen**, D. Robinson, J. Belnap, and D.G. Chandler. 2006. Spatial process of soil hydrological state variables in a pinyon-juniper woodland. Soil Science Society of America Conference, 70th Annual Meeting of the Soil Science Society of America, Indianapolis, IN. November 12-16.
81. Chandler D.G., and **M.D. Madsen**. 2005. Small scale variability of infiltration and hydraulic conductivity in a pinyon-juniper ecosystem. Soil Science Society of

America Conference 69th Annual Meeting of the Soil Science Society of America, Salt Lake City, UT.

82. Lebron, I., D.G. Chandler, D.A. Robinson, J. Belnap, and **M.D. Madsen**. 2005. The effect of anthropogenic disturbance in the ecohydrology of Pinyon Juniper woodlands with soil biocrust. American Geophysical Union Fall Meeting, San Francisco, CA. December 5-9.

GRADUATE STUDENT ADVISEES (11)

1. Rhett Anderson (2018-present) Developing techniques for priming wildland seeds. Two publications in preparation. Presented at the Society for Range Management Meetings. Participant in Life Sciences Undergraduate Research Poster Competition.
2. Travis G. Sowards, Ph.D. Wildlife and Wildlands Conservation candidate, BYU (2017- present). Dissertation Title: Efficacy of abscisic acid in prolonging dormancy of Great Basin bunchgrasses and reducing seeding failure in post-fire restoration efforts.
3. Morgan E. Parkinson, M.S. Environmental Science candidate, BYU (2017- present). Thesis Title: Use of fertilizers and biological seed treatments to improve seeding success of native species in the sagebrush steppe.
4. Chelsea Keefer, M.S. Environmental Science candidate, BYU (2017- present). Thesis Title: Evaluation of abscisic acid, gibberellic acid and planting dates to improve germination timing of sagebrush species. [*Co-advised with Dr. Samuel B. St. Clair*].
5. Tyson Terry, M.S. Environmental Science candidate, BYU (2017- present). Thesis Title: Evaluation of soil active herbicides, activated carbon seed coatings, and microsite manipulations to restore native plants in cheatgrass dominated rangelands [*Co-advised with Dr. Samuel B. St. Clair*].
6. Justin Taylor, M.S. Environmental Science candidate, BYU (2017 - present). Thesis Title: Rodent repellent seed coatings for rangeland restoration [*Co-advised with Dr. Samuel B. St. Clair*].
7. William C. Richardson. M.S. Wildlife and Wildlands Conservation candidate, BYU (2016-2018). Establishing the practicality of coating seeds with abscisic acid through germination modeling and field plantings.
8. Ryan S. Call. M.S. Wildlife and Wildlands Conservation candidate, BYU (2016-2018). Novel techniques for improving sagebrush seed delivery and plant establishment.
9. Turmandakh Badrakh. M.S. Wildlife and Wildlands Conservation, BYU (2014-2016). Effects of abscisic acid (ABA) on the germination rate of three rangeland species [*Co-advised with Dr. Bruce Roundy*].
10. Kaitlynn J. Fernelius. M.S. Wildlife and Wildlands Conservation, BYU (2014-2016). Post-fire interactions between soil water repellency, islands of fertility, and *Bromus tectorum* invasibility. [*Co-advised with Dr. Bruce Roundy*]

11. Daniel L. Zvirzdin. M.S. Wildlife and Wildlands Conservation, BYU (2010-2012). Post-fire soil water repellency: extent, severity and thickness relative to ecological site characteristics within piñon-juniper woodlands. [*Co-advised with Dr. Bruce Roundy*]

THESIS/DISSERTATION COMMITTEE MEMBER (7)

1. Emily Martin, Ph.D. Ecology USU (2017 - present) Seed-based restoration of native plant communities following *phragmites* control in Great Salt Lake wetlands.
2. Shannon Nelson, M.S. Environmental Science candidate, BYU (2016 - present) Use of polyacrylamide for rangeland seedings.
3. Jesse Morris, M.S. Wildlife and Wildlands Conservation candidate, BYU (2016 - present) Monitoring seedling emergence with repeat photography.
4. Rebekah Stanton, Ph.D. Environmental Science candidate, BYU (2016 - present) Impacts of rodent predation on plant recruitment in the sagebrush-steppe.
5. Rachel Fugal, Ph.D. Wildlife and Wildlands Conservation candidate, BYU (2016 - present) Impact of commercial seed collection activities on native forb populations.
6. Olga Kildisheva, Ph.D. Biological Sciences candidate, UWA (2015 - present) Improving the outcomes of seed-based restoration in cold and hot deserts: An investigation into seed dormancy, germination, and seed enhancement.

MENTORED UNDERGRADUATE RESEARCHERS (41)

1. Nicholask Hayward (2018) Evaluated the potential for priming Wyoming big sagebrush seeds.
2. Savahana Fahning (2018) Assisted in evaluating multiple plant hormone treatments for distributing sagebrush seed germination time.
3. Kierstin McClintock (2018) Assisted in laboratory and fall field research plantings.
4. Chad Camp (2018-present) Evaluated different activated carbon coatings in various sites across the Great Basin.
5. Britta Hansen (2018) Assisted in laboratory and fall field research plantings.
6. Jackson Chandler (2018) Assisted in laboratory and fall field research plantings.
7. Madison Mittleman (2018) Assisted in laboratory and fall field research plantings.
8. Colten Brown (2018) Assisted in laboratory and fall field research planting.
9. Mitchell Thacker (2016-present) Use of flash flaming technology to improve seed handling and delivery of winterfat seeds. 1st Place in BYU College of Life Sciences Undergraduate Research Poster Competition. Publication in preparation.
10. Karma Phillips (2015 - 2017) Development of a hydrophobic seed coating to delay germination of fall sown seeds. Coauthor on one publication. Presented at the Society for Range Management Meetings. 1st Place in BYU Life Sciences Undergraduate Research Poster Competition.
11. Benjamin Hoose (2016-present) Developing fungicide seed treatments for application on wildland seeds. Two publications in preparation. Coauthor presentation at the Society for Range Management Meetings. Participant in Life Sciences Undergraduate

Research Poster Competition. Awarded a BYU ORCA Undergraduate Research Grant in 2016.

12. Rhett Anderson (2016-2018) Developing techniques for priming wildland seeds. Two publications in preparation. Presented at the Society for Range Management Meetings. Participant in Life Sciences Undergraduate Research Poster Competition.
13. Dallin Whitaker (2016-2018) Helped create “Auto-Germ,” which is an Excel workbook that allows a user to estimate field germination timing based on wet-thermal accumulation models and field data. First author on one publication that is in review.
14. Kyler Sant (2016-2018) Helped create “Auto-Germ,” which is an Excel workbook that allows a user to estimate field germination timing based on wet-thermal accumulation models and field data. Coauthor on one publication that is in review.
15. David Tryon (2016-2018) Evaluation of flash-flaming techniques to remove appendages from wildland seeds. Publication in preparation. Presenting in the upcoming Society for Range Management meetings.
16. Tom Bates (2015 - 2016) Use of seed agglomeration technology to improve seed flowability and germination of sagebrush seeds. Presented at the Society for Range Management Meetings. Coauthor on one publication that is in preparation.
17. William Richardson (2016) Application of abscisic acid to wildland seeds. Currently conducting his M.S. degree under my supervision.
18. Soren Larson Research (2017) Determination of appropriate coating materials for delivery of abscisic acid to wildland seeds.
19. Janae Radke (2016 - present) Methods for improving sagebrush seed germination timing.
20. Gabriel Poulson (2016) Helped process seed germination data for use in publications and research reports.
21. Rebecca Schenk (2016 - 2017) Development of a hydrophobic seed coating to delay germination of fall sown seeds. Coauthor on a presentation at the Society for Range Management Meetings.
22. Adrian Rivera-Alicea (2017) Assist in planting and monitoring of various seed coating research trials.
23. Gariella Loosle (2017) Assist in planting and monitoring of various seed coating research trials.
24. Courtney Hill (2017) Assist in planting and monitoring of various seed coating research trials.
25. Erik Kemp (2016) Assisted in planting and monitoring of various seed coating research trials.
26. Elysse Ostlund (2016) Assisted in planting and monitoring of various seed coating research trials.
27. Jessie Draper (2016) Assisted in planting and monitoring of various seed coating research trials.
28. Sotia Chheng (2016) Assisted in planting and monitoring of various seed coating research trials.
29. Evan Rees (2016 - 2017) Effects of abscisic acid on seed germination timing

30. James DeMordaunt (2016) Assisted in planting and monitoring of various seed coating research trials.
31. Zachary Brinkerhoff (2016) Assisted in planting and monitoring of various seed coating research trials.
32. Madison Kaye Winn (2016) Assisted in planting and monitoring of various seed coating research trials.
33. Natalie Bostwick (2016) Teaching assistant for PWS 215 Principles of Rangeland Management.
34. Elizabeth Baum (2015 - 2016) Evaluation of various agricultural fungicides on rangeland seeds.
35. Eliza Logan (2015) Growing seedling for restoration at Hill Airforce Training and Testing Range.
36. Alia welsh (2015) Assisted in installing field seeding trials.
37. Mikayla Herbert (2015 - 2016) Development of a low-dose surfactant seed coating for to improving onion germination.
38. Samantha Thompson (2015) Assisted in installing field seeding trials.
39. Devin Wadsworth (2015) Assisted in installing field seeding trials.
40. Isabell Rennie (2015 - 2016) Assisted in installing fall field trials and managing laboratory germination experiments.
41. Karlee Humrich (2015 - 2016) Assisted in the development of a hydrophobic seed coating to delay germination of fall sown seeds. Awarded a BYU ORCA Undergraduate Research Grant in 2015.

TEACHING

Courses taught

Winter 2018

- *PWS 215: Principles of Range Management Section 001*
- *PWS 411: Watershed Management Section 001*
- *PWS 494R: Mentored Learning Experience Section 024*
- *PWS 697R: Research Section 022*
- *PWS 699R: Master's Thesis Section 022*

Fall 2017

- *PWS 416: Rangeland Improvement Section 001*
- *PWS 494R: Mentored Learning Experience Section 024*
- *PWS 697R: Research Section 23*

Summer 2017

- *PWS 697R: Research Section 9*

Spring 2017

- *PWS 697R: Research Section 9*

PWS 215 Principles of Rangeland Ecology and Management, 3 cr. The course synthesizes the ecological principles that drive rangeland ecosystems and teaches strategies for multiple use management, including livestock grazing, wildlife, timber, water, and recreation. Topics emphasized include the history of range management, vegetation management, grazing management principles and impacts, and livestock and wildlife interactions.

PWS 416 Rangeland Improvement and Restoration, 3 cr. The course teaches students how to use ecological principles to plan and apply biological, chemical, mechanical, and prescribed fire treatments for the enhancement of land to improve wildlife habitat, livestock grazing, watershed health, and other land management goals.

PWS 411 Watershed Management, 3 cr. The course will help students understand ecological and hydrological processes and concepts and apply them to watershed management actions such as harvesting, grazing, and restoration.

CITIZENSHIP

Institutional committees and service

- Coach students in the Department of Plant and Wildlife Science to prepare them to compete in the Society for Range Management Undergraduate Range Management Exam (URME) that is given at both the state and national levels (2016 - present). As coach, I meet with the students once a week and help prepare them for competition through lectures, games, practice exams, and various other learning activities. With Dr. Steven Petersen (Coach for the Plant ID team) we organize travel to the competitions, and work with coaches from other universities to conduct the competitions.
- Member of the Sagebrush Seed Working group (2017 - present)
- Committee member, Graduate Student selection committee (2017 - present)
- Post-hoc committee member to determine the future state of the department (2017 - present)
- Committee member, PWS Faculty search committee (2017)
- Department representative for the Harold B. Lee Library Journal Evaluation Project (2016)

Journal Reviews

- Serves as peer reviewer for these scientific journals: 1) Restoration Ecology, 2) Arid Land Research and Management, 3) Sustainability, 4) Rangelands, 5) Ecohydrology, 6) Rangeland Ecology & Management, 7) Environmental Management, 8) Canadian Journal of Soil Science, 9) Soil Science Society of America Journal, 10) International Journal of Wildland Fire, 10) Ecological Engineering, 11) Forests, 12) Ecological Engineering, 13) Trends in Plant Science, 14) Journal of Applied Ecology, 15) Journal of Arid Environments, and 16) The Rangeland Journal
- I will be on the editorial board for the journal “Seeds” (<http://www.mdpi.com/journal/seeds>)

MEDIA ARTICLES/INTERVIEWS

1. “Spicing up restoration: can a dash of pepper powder defend native plants?” The Science Breaker, Dean Pearson, USA, December 20, 2018.
<https://www.thesciencebreaker.org/breaks/plant-biology/spicing-up-restoration-can-a-dash-of-pepper-powder-defend-native-plants>
2. “Yellow Jacket Water Manager goes International!” Barenbrug USA, July 13, 2017.
https://twitter.com/Barenbrug_CA/status/885442418891513856
3. “Aquatrols and Barenbrug discuss Yellow Jacket seed coating with Aquatrols Seed Enhancement Technology” CCSAA tv February 9, 2017.
<https://www.pscptv.com/w/1OyJAowqVRwKb?t=4>
4. “Yellow + blue = green” Barenbrug USA, September 1, 2016.
<https://twitter.com/MatthewDMadsen?lang=en>
5. “Tech Transfer: Seed Coatings” BYU’s Top of Mind, November 2, 2015.
<http://www.byuradio.org/episode/440c1b22-bd67-4333-b96a-8d76d7cf1620?autoplay=true>
6. “Aquatrols Seed Enhancement Technology in the News” Aquatrols Corporation of America, November 4, 2015.
<http://blog.aquatrols.com/aquatrols-seed-enhancement-in-the-news/>
7. “Pasta And Doughnut Machines Reinvent Range Restoration with Sagebrush Tortellini” Oregon Public Broadcasting, October 26, 2015.
<http://www.opb.org/television/programs/ofg/segment/pasta-machine-reinvents-range-restoration-with-sagebrush-tortellini/>
8. “How a doughnut maker, pasta machine and science could save the sagebrush steppe” The Oregonian, August 25, 2015.
http://www.oregonlive.com/environment/index.ssf/2015/08/how_a_donut_maker_pasta_machin.html

9. "Scientists use pasta machines to help native grasses" National Public Radio, Here and Now, June 15, 2015.
<http://hereandnow.wbur.org/2015/06/16/pasta-pillows-native-grasses>
10. "Lessons from novel partnership for seed enhancement" 22nd International Grassland Congress, September 15, 2013.
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HONORS AND AWARDS

- Early Career Research Scientist of the Year for the Agricultural Research Service Pacific West Area (Awarded, September 2014).
- 2nd place in the Ph.D. Student Poster Presentation Contest. Society for Range Management annual meeting. Albuquerque, NM. Feb. 8-12, 2009.