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## PAUL B. HOOK

### Wetland and Watershed Scientist, Intermountain Aquatics, Inc.

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## PROFESSIONAL FOCUS AND EXPERTISE

### Consulting

Ecology, management, and restoration of wetland, riparian, and rangeland ecosystems  
Watershed analysis and best management practice design for water resource protection  
Native-plant-based streambank bioengineering and treatment wetland practices  
Landscape-scale landuse and conservation planning

### Research

Effects of native and invasive plants on biogeochemistry, soils, and hydrology in wetland, riparian, and rangeland ecosystems  
Pollutant removal processes and plant effects in wastewater treatment wetlands and riparian buffers  
Wetland and riparian restoration

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## EDUCATION

- Ph.D. 1992** **Range Science and Interdisciplinary Program in Ecological Studies, Colorado State University.** Emphasis in ecosystem ecology and biogeochemistry  
Dissertation: *Individual-Plant Scale Patterns of Roots and Soil Resources in Shortgrass Steppe.*
- M.S. 1988** **Biology, East Carolina University.** Emphasis in wetland ecology. Thesis:  
*Influence of Hydrology and Related Variables on Primary Productivity in an Irregularly Flooded Brackish Marsh.*
- B.S. 1984** **Botany, University of Washington.** Emphasis in plant ecology and soil science.  
*Magna cum laude.*
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## PROFESSIONAL CERTIFICATIONS

Certified Senior Ecologist, Ecological Society of America Board of Professional Certification  
Professional Wetland Scientist, Society of Wetland Scientists Professional Certification Program

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## EMPLOYMENT HISTORY

2003 - present	Senior Wetland and Watershed Scientist, Intermountain Aquatics Inc., Driggs, ID
2004 - 2007	Research Scientist, Center for Biofilm Engineering, Montana State University, Bozeman, MT
2001 - 2003	Wetland and Water Resource Consultant, Livingston, MT
1994 - 2001	Assistant Professor of Watershed Management, Dept. of Land Resources and Environmental Sciences (1998-2001), and Dept. of Animal and Range Sciences (1994-1998), Montana State University, Bozeman, MT
1992 - 1994	Postdoctoral Researcher, Department of Forest Sciences, Colorado State University, Fort Collins, CO
1988 - 1992	Graduate Research Assistant, Department of Range Science, Colorado State University, Fort Collins, CO
1986 - 1988	Graduate Research Assistant, Department of Biology, East Carolina University, Greenville, NC
1986	Associate Scientist, National Stream Survey, Lockheed Engineering and Management Services Co., Las Vegas, NV
1984 - 1986	Riparian Inventory Technician, Nez Perce National Forest, Grangeville, ID

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## REPRESENTATIVE PROJECTS AT INTERMOUNTAIN AQUATICS, INC.

(\*Primary responsibility. \*\*Joint responsibility with one or more colleagues.)

### **Wastewater reuse for wetland habitat, Twin Falls, ID** (design project, 2007-ongoing).

Develop wetland habitat concept and hydrologic and vegetation design for creation of waterbird and riparian songbird habitat with treated municipal wastewater.\*

### **Riparian restoration monitoring, Big Wood River, ID** (compliance monitoring and research project, 2012). Develop and implement monitoring plan for habitat restoration and creation project involving 150 ha of wetland and upland habitat, 10 km of stream channel manipulation, and extensive changes in surface and groundwater hydrology.\*\*

### **Residential wastewater treatment wetland, Jackson, WY** (research and demonstration project, 2009-2011). Developed design for a cold-climate treatment wetland based on original research, primary literature, and evolving practice in countries using related systems. Supervised construction.\*\* Prepared research plan, analyzed performance data, and interpreted results in regulatory framework for approval as an enhanced nitrogen-removal technology in sensitive watersheds.\*

### **Stormwater and habitat wetland design and grant writing, Jackson, WY** (design-build project, 2005-2011). Conducted feasibility analysis and developed design concept for stormwater treatment wetland and habitat enhancements in an urban open space. Performed watershed and site hydrologic analyses and led project design.\* Performed ecological

analyses and prepared revegetation design, monitoring plan, operation and maintenance manual, reports and grant application.\*\*

**Conservation and water resource planning for rural residential developments, Teton**

**County, ID** (multiple analysis and planning projects, 2007-2011). Conducted ecological and water resource assessments and developed open space protection and management plans for proposed subdivisions ranging from 100 ha to >2,000 ha. Partnered with NGOs to provided significant input to County planning officials regarding development ordinances and impacts of specific rural subdivisions on regional species of concern. Assessments were based on: detailed analysis of two large landscapes within the county ( $\approx 5,000$  ha and  $\approx 3,000$  ha); known patterns of habitat use and movement by big game, sandhill cranes, and waterbirds within these landscapes; direct monitoring of wildlife and habitat; research literature related to effects of land use and human disturbance on wildlife; and investigation of conservation elements of development ordinances in other locations.\*\*

**Wetland hydrologic analysis and design, Teton County, ID** (multiple projects 2007-ongoing)

Analyzed watershed hydrology and projected wetland water balance and water level regimes for habitat creation within cropland landscapes undergoing restoration. Planned and supervised snowpack and runoff sampling in watersheds of interest. Developed wetland designs.\*\*

**Stream restoration and reed canarygrass control research, Silver Creek Preserve, ID**

(restoration and research project, 2005-2008). Designed, conducted, and analyzed field trials and replicated experiment to evaluate alternative practices to control a dominant invasive grass and replace it with native riparian vegetation. Documented interactions between riparian and aquatic vegetation, stream hydrology, riparian zone hydrology, and herbivory that influenced outcomes.\*

**Sage-steppe and aspen woodland revegetation trials, Teton County, ID** (research project, 2008-ongoing). Designed field trials of revegetation methods to restore native sage-steppe and riparian woodland vegetation to benefit sharptail grouse, mule deer, and breeding songbirds in a landscape strongly influenced by redistribution of snow by wind.\*\*

**Hydrologic analysis for wetland and stream restoration, Foster Slough, ID** (research project,

2005-2007). Analyzed shallow groundwater well and stream gauge data for a 1,400 ha, regionally significant complex of wetlands (wet meadows, depression wetlands, fen-like groundwater wetlands, and floodplain sloughs), pastures, and streams to understand system hydrology and evaluate options to enhance nesting and brood-rearing habitat of long-billed curlew and other waterbirds. Analysis also incorporated historic aerial photography, previous studies of regional groundwater hydrology and surficial geology, and information on irrigation practices.\*

**Golf course water quality analysis and Best Management Practices design, Jackson, WY**

(impact analysis and mitigation project, 2005-2006). Synthesized research literature on golf course and turf-grass impacts on wildlife and water quality and use of riparian buffers and treatment wetlands to reduce transport of nutrients, pesticides, herbicides, and sediment to surface waters.\* Designed riparian and wetland features to mitigate potential water quality impacts at a golf course located at the headwaters a Class 1 stream.\*\*

**Thermal and nutrient impact analysis and mitigation plan for constructed ponds, Jackson, WY** (impact analysis project, 2003-2004). Analyzed water temperature data and modeled potential thermal degradation of Snake River Cutthroat Trout habitat due to planned construction of artificial ponds. Developed mitigation and monitoring plan based on field data, hydrologic mixing analysis, regulations, and research literature on trout species' responses to thermal stress.\*

**Wetland plant nursery design and construction, Rexburg, ID** (design-build project, 2003-2004). Designed and managed construction of a unique and successful 3-ha wetland nursery for production of pre-vegetated coir products for stream rehabilitation and shoreline bioengineering.\*

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## SELECTED PROJECT REPORTS

**P.B. Hook**, E. August and K.M. Salsbury. 2011. Fish Creek Residential Wastewater Treatment Wetland Demonstration Project – Completion Report. Prepared for: One Percent for the Tetons, Teton Conservation District, Teton County Engineering Department, and Wyoming Department of Environmental Quality by Intermountain Aquatics, Inc., Driggs, ID.

**P.B. Hook** and MRGESCP Monitoring Plan Team. 2010. Pilot Habitat Restoration Effectiveness Monitoring Plan – Prepared for Middle Rio Grande Endangered Species Collaborative Program (MRGESCP), Bureau of Reclamation Albuquerque Area Office. Prepared By Intermountain Aquatics, Inc., Driggs, Idaho

Remlinger, B., **P.B. Hook**, E. August and K.M. Salsbury. 2009. Residential Wetland Wastewater Treatment Demonstration Project Design. Prepared for Teton County, WY, by Intermountain Aquatics, Inc., Driggs, ID.

**Hook, P.B.**, B. Remlinger, E. August and J.K. Klausmann. 2009. Karns Meadow Stormwater Wetland Preliminary Design and Implementation Plan. Prepared for Town of Jackson, WY, by Intermountain Aquatics, Inc., Driggs, ID.

**Hook, P.B.**, and J.K. Klausmann. 2008. Streamside Revegetation and Reed Canarygrass Suppression at Silver Creek Preserve, Project Completion Report Prepared for The Nature Conservancy, Idaho Field Office, Hailey, ID, by Intermountain Aquatics, Inc., Driggs, ID.

**Hook, P.B.**, J. Goodell and J.K. Klausmann. 2008. J Lazy H Ranch Natural Resource Inventory and Analysis. Prepared for Hoopes Green, LLC, Driggs, ID, by Intermountain Aquatics, Inc., Driggs, ID.

**Hook, P.B.**, J. Goodell and J.K. Klausmann. 2008. J Lazy H Ranch Open Space Management Plan. Prepared for Hoopes Green, LLC, Driggs, ID, by Intermountain Aquatics, Inc., Driggs, ID.

Klausmann, J.K., **P.B. Hook**, J. Goodell, B. Remlinger, and K. Copeland. 2008. Natural Resource and Open Space Review: Mahogany Ridge Preliminary Plat Subdivision Application. Prepared for Valley Advocates for Responsible Development, Driggs, ID, by Intermountain Aquatics, Inc., Driggs, ID.

- August, E., **P.B. Hook**, and K.M. Salsbury. 2006. Reed Canarygrass Distribution at the Nature Conservancy's Silver Creek Preserve. Prepared for The Nature Conservancy, Idaho Field Office, Hailey, ID, by Intermountain Aquatics, Inc., Driggs, ID.
- Hook, P.B.**, K.M. Salsbury and J.K. Klausmann. 2006. Foster Slough Hydrology Study Final Technical Report. Prepared for Teton Regional Land Trust, Driggs, ID, by Intermountain Aquatics, Inc., Driggs, ID.
- Salsbury, K.M., B. Remlinger, **P.B. Hook** and E. August. 2006. Teton Village Golf Course Natural Resource Management Plan. Prepared for Snake River Associates, Wilson, WY, by Intermountain Aquatics, Inc., Driggs, ID.
- Hook, P.B.**, and J.K. Klausmann. 2005. Karns Meadow Stormwater Treatment Wetland Feasibility Study. Prepared for Teton Conservation District and Town of Jackson, WY, by Intermountain Aquatics, Inc., Driggs, ID.
- Hook, P.B.** 2004. Risk Assessment, Monitoring Plan and Mitigation Plan for Potential Thermal Degradation by Golf Course Pond System at 3 Creek Ranch Development. Prepared for 3 Creek Ranch, Jackson, WY, by Intermountain Aquatics, Inc., Driggs, ID.
- Klausmann, J.K., and **P.B. Hook**. 2001. Comparison of Seven Methods for Revegetating Sedge-Dominated Rocky Mountain Wetlands. Project completion report for USEPA Region 8 104(b)(3) Wetlands Protection Grant to Teton County, WY. Intermountain Aquatics, Inc., Driggs, ID.

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## PEER-REVIEWED JOURNAL ARTICLES AND BOOK CHAPTERS

- Mburu, N., D. Sanchez-Ramos, D.P.L. Rousseau, J.J.A. van Bruggen, G. Thumbi, O.R. Stein, P.B. Hook, P.N.L. Lens. 2012 Simulation of carbon, nitrogen and sulphur conversion in batch-operated experimental wetland mesocosms. *Ecological Engineering* 42 :304-315.
- Taylor, C.R., **P.B. Hook**, O.R. Stein and C.A. Zabinski. 2011. Seasonal effects of 19 plant species on COD removal in subsurface treatment wetland microcosms. *Ecological Engineering* 37(5):703-710.
- Burke, I.C., A.R. Mosier, **P.B. Hook**, D.G. Milchunas, J.E. Barrett, M.A. Vinton, R.L. McCulley, J.P. Kaye, R.A. Gill, H.E. Epstein, R.H. Kelly, W.J. Parton, C.M. Yonker, P. Lowe and W.K. Lauenroth. 2008. Soil organic matter and nutrient dynamics of shortgrass steppe ecosystems. Chapter 13, in: W.K. Lauenroth and I.C. Burke (eds.), *Ecology of the Shortgrass Steppe: A Long Term Perspective*. Oxford University Press, New York, NY.
- Stein, O.R., B.W. Towler, **P.B. Hook** and J.A. Biederman. 2007. On fitting the k-C\* first order model to batch loaded sub-surface treatment wetlands. *Water Science and Technology* 56(3):93-99.
- Stein, O.R., D.J. Borden-Stewart, **P.B. Hook** and W.L. Jones. 2007. Seasonal influence on sulfate reduction and metal sequestration in subsurface treatment wetlands. *Water Research* 41(15):3440-3448.
- Sheley, R.L., **P.B. Hook** and R.R. LeCain. 2006. Establishment of native and invasive plants along a rangeland riparian gradient. *Ecological Restoration* 24 (3):173-181.

- Stein, O.R., J.A. Biederman, **P.B. Hook** and W.C. Allen. 2006. Plant species and temperature effects on the k-C\* first order model for COD removal in batch-loaded SSF wetlands. *Ecological Engineering* 26(2):100-112.
- Riley, K.A., O.R. Stein and **P.B. Hook**. 2005. Ammonium removal in constructed wetland microcosms as influenced by season and organic carbon load. *Journal of Environmental Science and Health Part A – Toxic/Hazardous Substances and Environmental Engineering* 40(6-7):1109-1121.
- Stein, O.R., and **P.B. Hook**. 2005. Temperature, plants and oxygen: how does season affect constructed wetland performance? *Journal of Environmental Science and Health Part A – Toxic/Hazardous Substances and Environmental Engineering* 40(6-7):1331-1342.
- Hook, P. B.**, B.E. Olson and J.M. Wraith. 2004. Effects of the invasive forb *Centaurea maculosa* on grassland carbon and nitrogen pools in Montana, USA. *Ecosystems* 7(6): 686–694.
- Hook, P.B.** 2003. Sediment retention in rangeland riparian buffers. *Journal of Environmental Quality* 32(3):1130-1137.
- Hook, P.B.**, O.R. Stein, W.C. Allen and J.A. Biederman. 2003. Plant species effects on seasonal performance patterns in model subsurface wetlands. Chapter 5, in: Ü. Mander and P.D. Jenssen (eds.), *Constructed Wetlands for Wastewater Treatment in Cold Climates*, pp. 87-105. WIT Press, Ashurst, UK
- Stein, O.R., **P.B. Hook**, J.A. Biederman, W.C. Allen and D.J. Borden. 2003. Does batch operation enhance oxidation in subsurface constructed wetlands? *Water Science and Technology* 48(5):149-156.
- Allen, W.C., **P.B. Hook**, J.A. Biederman and O.R. Stein. 2002. Temperature and wetland plant species effects on wastewater treatment and root-zone oxidation. *Journal of Environmental Quality* 31(3):1010-1016.
- Hook, P.B.**, and I.C. Burke. 2000. Biogeochemistry in a shortgrass landscape: control by topography, soil texture, and microclimate. *Ecology* 81(10): 2686-2703.
- Law, D.J., C.B. Marlow, J.C. Mosley, S. Custer, **P. Hook** and B. Leinard. 2000. Water table dynamics and soil texture of three riparian plant communities. *Northwest Science* 74(3):234-241.
- Burke, I.C., W.K. Lauenroth, M.A. Vinton, **P.B. Hook**, R.H. Kelly, H.E. Epstein, M.R. Aguiar, M.D. Robles, M.O. Aguilera, K.L. Murphy and R.A. Gill. 1998. Plant-soil interactions in temperate grasslands. *Biogeochemistry* 42 (1-2):121-143.
- Hook, P.B.**, and I.C. Burke. 1995. Evaluation of methods for estimating nitrogen availability in a semiarid grassland. *Soil Science Society of America Journal* 59(3):831-837.
- Ihori, T., I.C. Burke and **P.B. Hook**. 1995. Nitrogen mineralization in native, cultivated, and abandoned fields in shortgrass steppe. *Plant and Soil* 171(2):203-208.
- Hook, P.B.**, and W.K. Lauenroth. 1994. Root system response of a perennial bunchgrass to neighbourhood-scale soil water heterogeneity. *Functional Ecology* 8(6):738-745.
- Hook, P.B.**, W.K. Lauenroth and I.C. Burke. 1994. Spatial patterns of roots in a semiarid grassland: abundance of canopy openings and regeneration gaps. *Journal of Ecology* 82(3):485-494.

Hook, W.R., N.J. Livingston, Z.J. Sun and **P.B. Hook**. 1992. Remote diode shorting improves measurement of soil water by time domain reflectometry. *Soil Science Society of America Journal* 56(5):1384-1391.

**Hook, P.B.**, I.C. Burke and W.K. Lauenroth. 1991. Heterogeneity of soil and plant N and C associated with individual plants and openings in North American shortgrass steppe. *Plant and Soil* 138(2):247-256.

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## CONFERENCE PAPERS, PRESENTATIONS AND MAGAZINE ARTICLES (2006-2011)

Allen, C.R., **P.B. Hook**, O.R. Stein, W.C. Allen, and R.L. Schultz. 2011. Nitrogen removal as influenced by temperature, plant species and residence time interactions in model treatment wetlands. Abstracts, Joint Meeting of the Society of Wetland Scientists, WETPOL and Wetland Biogeochemistry Symposium. July 3-8, 2011. Prague, Czech Republic.

Klausmann, J.K., **P.B. Hook** and D. Ellis. 2009. Techniques and relative success for establishing and augmenting sago pondweed and other high value swan foods. Greater Yellowstone Trumpeter Swan Working Group Annual Meeting, October 14-15, 2009, West Yellowstone, MT.

**Hook, P.B.**, C.R. Taylor, O.R. Stein and C.A. Zabinski. 2009. Patterns of rootzone oxidation in treatment wetland microcosms across diverse plant species. pp. 31-32, in J.M. Bayona and Joan García (eds.), Abstracts, WETPOL 2009 – Third Wetland Pollutant Dynamics and Control Symposium, September 20-24, 2009. Barcelona, Spain. (Plenary, delivered by ORS)

Rousseau, D.P.L., A. Gaviano, O.R. Stein, **P.B. Hook** and P.N.L. Lens. 2009. Simulation of carbon, nitrogen and sulphur cycles in batch-operated, lab-scale treatment wetlands: an application of CWM1. pp. 73-74. In J.M. Bayona and Joan García (eds.), Abstracts, WETPOL 2009 – Third Wetland Pollutant Dynamics and Control Symposium, September 20-24, 2009. Barcelona, Spain.

**Hook, P.B.**, C.R. Taylor, O.R. Stein and C.A. Zabinski. 2009. Interaction of plant species and temperature controls seasonal patterns of rootzone oxidation in model wetlands. Society of Wetland Scientists Annual International Meeting – Wetland Biogeochemistry Symposium, June 21-26, 2009, Madison, WI.

**Hook, P.B.**, K.M. Salsbury and J.M. Klausmann. 2009. Revegetation of reed canarygrass infested riparian areas: performance of pre-planted coir after 3-6 years. pp. 597-629, in: R.I. Barnhisel (ed.), Proceedings of the 11th Billings Land Reclamation Symposium and 26th Annual Meeting of the American Society of Mining and Reclamation, 2009 Joint Conference, May 30-June 5, 2009, Billings, MT. American Society of Mining and Reclamation, Lexington, KY. CD-ROM.

Taylor, C. R., **P. B. Hook**, C. A. Zabinski and O.R. Stein. 2009. Native plant material selection for water treatment wetlands. pp. 1436-1454, in: R.I. Barnhisel (ed.), Proceedings of the 11th Billings Land Reclamation Symposium and 26th Annual Meeting of the American Society of Mining and Reclamation, 2009 Joint Conference, May 30-June 5, 2009, Billings, MT. American Society of Mining and Reclamation, Lexington, KY. CD-ROM.

- Rousseau, D.P.L., W. Shi, O.R. Stein and **P.B. Hook**. 2008. Simulation of COD removal in lab-scale constructed wetlands: Influence of electron acceptors. Proceedings of the 11th International Conference on Wetland Systems for Water Pollution Control, Indore, India, November 1-7, 2008. Vol 1:526-534.
- Schultz, R.L., O.R. Stein and **P.B. Hook**. 2008. Temperature, plant species and residence time interactions in treatment wetlands. Proceedings of the 11th International Conference on Wetland Systems for Water Pollution Control, November 1-7, 2008, Indore, India. Vol 1:161-167.
- Taylor, C.L., O.R. Stein, **P.B. Hook** and C.A. Zabinski. 2008. Comparing 19 plant species' seasonal effects on COD removal in model constructed wetlands. Proceedings of the 11th International Conference on Wetland Systems for Water Pollution Control, November 1-7, 2008, Indore, India. Vol 1:131-138.
- Klausmann, J.K., **P.B. Hook** and J. Goodell. 2008. Growing houses in the fields: can priority wildlife coexist with residential development in Teton County? Idaho Chapter of The Wildlife Society, Annual Meeting, March 4-7, 2008, Boise, ID.
- Goodell, J., J.K. Klausmann and **P.B. Hook**. 2008. From farms to subdivisions: wildlife monitoring and resource planning in a pre-development, agricultural landscape in eastern Idaho. Idaho Chapter of The Wildlife Society, Annual Meeting, March 4-7, 2008, Boise, ID.
- Salsbury, K.M., and **P.B. Hook**. 2008. Vegetating channel constrictors using wetland plants. 2008. River Restoration Northwest Stream Restoration Design Symposium, February 5-7, 2008, Stevenson, WA.
- Hook, P.B.**, O.R. Stein and A.K. Camper. 2008. Seasonal, operational, and plant effects on water treatment processes in constructed wetlands. Project Director's Meeting, Water and Watersheds Program, USDA-CSREES National Research Initiative, and National Water Conference, February 3-7, 2008, Reno, NV.
- Taylor C.R., and **P.B. Hook**. 2007. Choosing plant species to optimize aerobic processes in wastewater treatment wetlands. Society of Wetland Scientists 28th Annual International Meeting, June 10-15, 2007, Sacramento, CA.
- Hook, P.B.**, K.M. Salsbury and J.M. Klausmann. 2007. Hydrologic diversity and restoration potential in the Foster Slough wetland complex, Teton Basin, Idaho. Society of Wetland Scientists 28th Annual International Meeting, June 10-15, 2007, Sacramento, CA.
- Hook, P.B.**, O.R. Stein, and A.K. Camper. 2007. Seasonal, operational, and plant effects on oxygen potential and microbial responses influencing constructed wetland performance. Project Director's Meeting, Water and Watersheds Program, USDA-CSREES National Research Initiative, and National Water Conference, January 28-February 1, 2007, Savannah, GA.
- Hook, P.B.** 2006. Pre-vegetated coir achieves rapid results in reconstructed stormwater channel. Land and Water 50(1):7-11.
- Hook, P.B.** and J.K. Klausmann. 2006. Dos and don'ts of successful revegetation with pre-planted coir blankets. pp. 375-397, in R.I. Barnhisel (ed.), Proceedings of the 10<sup>th</sup> Billings Land Reclamation Symposium, June 4-8, 2006, Billings, MT. BLRS and American Society of Mining and Reclamation, Lexington, KY. CD-ROM.



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## **GRADUATE STUDENT THESES SUPERVISED**

- Taylor, C.R. 2009. Selecting plant species to optimize wastewater treatment in constructed wetlands. M.S. Thesis. Montana State University, Bozeman (co-advised with C.A. Zabinski and O.R. Stein).
- LeCain, R.R., 2000 Establishment of native and invasive species along a riparian resource gradient. M.S. Thesis. Montana State University, Bozeman
- Novak, T.M.K. 2000. Wetlands and copper concentrations across a headwater catchment impacted by acid rock drainage. M.S. Thesis. Montana State University, Bozeman
- Allen, W.C., 1999. Seasonal plant effects on wastewater treatment and root-zone oxidation in model wetlands. M.S. Thesis. Montana State University, Bozeman
- Borth, C.S. 1998. Effects of land use on vegetation in glaciated depressional wetlands in western Montana. M.S. Thesis, Montana State University, Bozeman
- Klausmann, J.M. 1998. A comparison of techniques for establishing Nebraska sedge and hardstem bulrush. M.S. Thesis. Montana State University, Bozeman

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## **RESEARCH GRANTS AND CONTRACTS AT MONTANA STATE UNIVERSITY**

- Seasonal, operational, and plant effects on oxygen potential and microbial responses influencing constructed wetlands performance, 2004, USDA-CSREES National Research Initiative, \$424,997, (co-PI)
- Success of spotted knapweed: competition or site alteration? 1999, USDA-CSREES National Research Initiative, \$165,836, (co-PI)
- Analytical facilities to support research and outreach in nitrogen fertilizer management, 1999, Montana Fertilizer Tax Program, \$37,000, (co-PI)
- Comparison of techniques for establishing wetland plants on alluvial substrates in Teton County, WY, 1999, USEPA Region 8 104(b)(3) Wetlands Protection Grant to Teton Cty, WY, \$31,000, (Collaboration with Intermountain Aquatics)
- Improved C, N, and S analytical facilities for research in land resource management, 1998, USDA-CSREES National Research Initiative, \$74,944, (co-PI)
- Evaluation of processes controlling sediment entrapment by rangeland riparian vegetation, 1997, USGS Regional Water Res. CGP, \$60,000, (co-PI)
- Process-based design criteria and performance expectations for constructed wetlands, 1997, USDA-CSREES National Research Initiative, \$116,664, (co-PI)
- Developing vegetation-based multimetric indices to assess land use and water quality impacts in glaciated depressional wetlands in western Montana. 1997, Montana Department of Environmental Quality, \$30,000 (PI)

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## **COURSES TAUGHT AT MONTANA STATE UNIVERSITY (1994-2000)**

Watershed Management (Undergraduate)

Wetland and Riparian Ecosystems (Graduate)

Ecosystem Measurements (Graduate)

Advanced Natural Resource Ecology (Graduate)

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## **PROFESSIONAL SERVICE ACTIVITIES**

Reviewed research proposals for USDA-NRI Competitive Grants Program, National Science Foundation, USGS Biological Resources Division, The Nature Conservancy, Montana Department of Environmental Quality, Montana University System Water Resources Center, and Montana Agricultural Experiment Station.

Reviewed manuscripts for *Journal of Soil and Water Conservation*, *Journal of Environmental Quality*, *Soil Science Society of America Journal*, *American Midland Naturalist*, *Biogeochemistry*, *Ecological Applications*, *Ecology*, *Ecosystems*, *Journal of Range Management*, *New Phytologist*, and other journals.

Reviewed environmental impact documents, subdivision applications, development ordinances, and other planning documents related to riparian and watershed management and open space conservation.

Society of Wetland Scientists: President Rocky Mountain Chapter (1997-1998) & Vice President (1996-1997), Member National Board of Directors (1997-1998); Co-Chair 1997 Annual Meeting Technical Program Planning Committee; Chair, Bioremediation and Treatment Wetlands Session, 2002 Annual Meeting.

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