

RESEARCH INTERESTS My research interests are in many facets of ecology but with a particular interest in how nutritional relationships between individuals and their environment influence animal behavior and population dynamics. Some of these relationships include nutritional responses to habitat conditions, migration ecology, predator-prey interactions, inter- and intra-specific competition, and wildlife responses to anthropogenic disturbance. Furthermore, I am drawn to research that yields practical applications to wildlife conservation and management.

EDUCATION

University of Wyoming – Dept. of Zoology and Physiology

May 2013-May 2017 – MS in Zoology and Physiology

Thesis: Risk effects of human disturbance on the foodscape for a large herbivore: nutritional relationships among behavior, forage availability, and human disturbance

Oregon State University – Ecampus

Fall 2012 - Non-Degree Graduate Student – Methods of Data Analysis, 4cr.

University of Minnesota – Duluth

May 2007 - BS in Biology and BA in Environmental Studies

UMD Study Abroad Program July 2005 – November 2005

The University of Waikato

Hamilton, New Zealand

RESEARCH EXPERIENCE

Research Scientist

January 2016-Present

Haub School of Environment and Natural Resources, University of Wyoming, Laramie, WY

I lead and assist with various research and outreach projects including the Wyoming Range Mule Deer Project, where I designed, implemented, and oversaw a fawn survival component of this research. Currently, I am leading and assisting with research in the fitness benefits of phenology tracking during migration of mule deer, habitat selection of bighorn sheep following translocation, fitness consequences of animal handling and capture techniques, and evaluating the efficacy of enhancement treatments to moose habitat. Also, I am leading various outreach projects including designing a website aimed at disseminating research findings from our research group and creating a film project, “Deer 139”, which shares stories of migration ecology with a public audience (see deer139film.org). Daily activities include the following:

Project planning, fundraising, and management: ~ Prepare research proposals ~ Prepare project budgets ~ Design protocols for data collection ~ Supervise and train technicians, interns, and volunteers ~ Manage field logistics

Data collection: ~ Capture, handle, and collar adults and neonates of various ungulate species including mule deer, elk, moose, bighorn sheep, mountain goats, and pronghorn ~ Collect biological samples from captured animals including blood, feces, and samples used for disease screening (e.g., tonsils swabs, skin biopsies, etc.) ~ Locate radio-collared mule deer via ground or aerial radio telemetry ~ Conduct classification surveys and reproduction surveys (i.e., fawn recruitment) ~ Monitor forage availability and quality of numerous species across various habitats ~ Retrieve collars and perform field necropsies ~ Evaluate cause-specific mortality of neonate mule deer

Data management: ~ Design and manage large databases in Excel, Access and ArcGIS

Data analysis: ~ Analyze spatial and non-spatial data using R, ArcGIS and Excel ~ Provide statistical summaries of data collected

Dissemination of research findings: ~ Produce maps and other interpretive tools for partnered agencies to use for management strategies of ungulate populations ~ Prepare technical reports for project partners and funders ~ Prepare manuscripts for scientific publication ~ Participate in public education and outreach, including presentations to audiences of all ages and leading in-class activities for K-12 students ~ Present research findings at professional and public meetings

Graduate Assistant**May 2013-May 2017****Wyoming Cooperative Fish and Wildlife Research Unit – Department of Zoology and Physiology, University of Wyoming, Laramie, WY**

~ Designed, implemented, and oversaw various components of the Wyoming Range Mule Deer Project in western Wyoming ~ Captured, handled, and collared adults and neonates of various ungulate species including mule deer, elk, moose, bighorn sheep, mountain goats, and pronghorn ~ Collected biological samples from captured animals including blood, feces, and samples used for disease screening (e.g., tonsils swabs, skin biopsies, etc.) ~ Located radio-collared mule deer via ground or aerial radio telemetry ~ Conducted behavioral observations, classification surveys, and reproduction surveys (i.e., fawn recruitment) of mule deer ~ Monitored forage production and use ~ Collected and analyzed forage samples for nutritional quality ~ Collected fecal samples for diet composition ~ Performed vegetation surveys for biomass, density, abundance, and cover of forage species ~ Retrieved collars and perform field necropsies ~ Evaluated cause-specific mortality of neonate mule deer ~ Designed and managed large databases in Excel, Access and ArcGIS ~ Analyzed spatial and nonspatial data using R, ArcGIS and Excel ~ Provided statistical summaries of data collected ~ Produced maps and other interpretive tools for partnered agencies to use for management strategies of ungulate populations ~ Prepared technical reports for project partners and funders ~ Prepared manuscripts for scientific publication ~ Prepared research proposals ~ Participated in public education and outreach ~ Designed protocols for data collection on biological surveys ~ Supervised and trained technicians, interns, and volunteers ~ Managed daily field logistics ~ Presented research findings at professional and public meetings

Research Associate**May 2011 – February 2013****Teton Science Schools - Conservation Research Center, Jackson, WY**

~ Captured, chemically immobilized, collared and collected biological samples from mule deer ~ Located radio-collared mule deer via ground or aerial radio telemetry ~ Conducted behavioral observations and fawn surveys ~ Field mapped vegetation cover types ~ Retrieved collars and performed necropsies ~ Designed and managed databases in Excel, Access and ArcGIS ~ Analyzed data using R, ArcGIS and Excel ~ Produced maps and other interpretive tools ~ Participated in public education and outreach ~ Established and maintained landowner and partner relationships ~ Supervised technicians and volunteers ~ Assisted in project planning and study design ~ Assisted in report writing ~ Performed literature reviews ~ Assisted with implementation of other CRC projects

Wildlife Technician**December 2010 - April 2011****University of Montana - Rocky Mountain Research Station, Missoula, MT**

*Work performed in White River National Forest

~ Captured, chemically immobilized and collared Canada lynx ~ Located radio-collared lynx ~ Surveyed for lynx presence ~ Performed equipment maintenance ~ Winter backcountry travel (via skis, snowshoes and snowmobiles)

Biological Research Technician (Wildlife) May 2010 – September 2010**U.S. Forest Service – Bridger-Teton National Forest, Big Piney, WY**

~ Conducted presence/absence surveys for various wildlife including northern goshawks, Brewer's sparrows, boreal toads, brook trout, and American pikas ~ Surveyed habitat quality of riparian areas following

Wyoming Habitat Assessment Methodology (WHAM) ~ Assisted with habitat assessments of Canada lynx habitat ~ Data entry and management

Bighorn Sheep Field Technician January 2009 - September 2010

University of Wyoming – WY Cooperative Fish and Wildlife Research Unit, Laramie, WY

*Work performed in Grand Teton National Park and Jedediah Smith Wilderness Area

~ Located radio-collared Rocky Mountain bighorn sheep ~ Collected data on behavior, nutrition (through fecal samples) & lambing success of bighorn sheep ~ Conducted vegetation surveys ~ Conducted winter backcountry use surveys ~ Educated winter recreationists on project goals and bighorn sheep ecology

ADDITIONAL WORK EXPERIENCE

Field Technician, Craighead Beringia-South, Kelly, WY - Feb. 2013 - April 2013

Wolverine Project Volunteer, Wildlife Conservation Society, Jackson, WY - April 2011 - May 2011

Habitat Restoration Technician, Intermountain Aquatics, Inc., Driggs, ID - Nov. 2009 & Nov. 2010

Wilderness Trails Technician, Teton Valley Trails and Pathways, Driggs, ID - Sept. 2009

Volunteer, Volunteer Peten, San Andres, Guatemala - April 2009

Mule Deer Field Technician, Washington State University, Pullman, WA - Oct. 2008 - Dec. 2008

Avian Field Assistant, University of Wyoming, WY Cooperative Research Unit, Laramie, WY - May 2008 - Aug. 2008

Gray Wolf Conservation and Management Program Volunteer, Montana Fish, Wildlife, and Parks, Kalispell, MT - July 2007 - Oct. 2007

Undergraduate Research Assistant, University of Minnesota, Natural Resources Research Institute, Duluth, MN - Feb. 2007-July 2007

Water Programs Paraprofessional, Minnesota Pollution Control Agency, Duluth, MN - Dec. 2005-May 2007

Research Volunteer, Hartley Nature Center, Duluth, MN - April 2005-July 2005

TEACHING EXPERIENCE

Resort Naturalist, Grand Targhee Resort, Alta, WY - December 2008-April 2009

Docent, Lake Superior Zoo, Duluth, Minnesota - 2004

Volunteer Staff, University of Minnesota-Duluth Outdoor Program, Duluth, MN - 2003-2005

CERTIFICATIONS AND TRAINING

American Red Cross Wilderness First Aid and Adult CPR/AED – April 2017

WMI Wilderness First Responder - May 2015

DOI A-100 Basic Aviation Safety – February 2014

SOLO Wilderness First Responder - May 2012

GWR Wildlife Handling and Chemical Immobilization - January 2012

FS Snowmobile Operation - Jan. 2011

ASI ATV Operation - May 2010

AAI Avalanche Level I - Dec. 2009

GRANTS

2016 – Wyoming Game and Fish Department Commissioner Licenses - \$270,000

2017 – Knobloch Family Foundation, Project Grant - \$10,000

2018 – National Geographic Society, Long Distance Migration Grant - \$25,000

2018 – Muley Fanatics Foundation, Project Grant - \$7,500

SCHOLARSHIPS AND AWARDS

2014 – L. Floyd Clarke Greater Yellowstone Scholarship - \$2,000

2015 – WEST Research Award for Quantitative Analysis in Wildlife Ecology - \$2,500

2016 – Honorable Mention for Best Student Presentation – The Wildlife Society Annual National Meeting, Raleigh, NC

2016 – Best Student Presentation – The Wildlife Society Wyoming Chapter Annual Meeting, Cody, WY

2017 – *Summa cum laude* graduate honors

PUBLICATIONS

Ellen O. Aikens, Matthew J. Kauffman, Jerod A. Merkle, **Samantha P.H. Dwinell**, Gary L. Fralick, and Kevin L. Monteith. 2017. The greenscape shapes surfing of resource waves in a large migratory herbivore. *Ecology Letters* 20:741-750.

Hall Sawyer, Jerod A. Merkle, Arthur D. Middleton, **Samantha P.H. Dwinell**, and Kevin L. Monteith. 2019. Migratory plasticity is not ubiquitous among large herbivores. *Journal of Animal Ecology*. *In Press*.

Samantha P.H. Dwinell, Hall Sawyer, Jeffrey L. Beck, Jill Randall, Jennifer S. Forbey, Gary L. Fralick, and Kevin L. Monteith. Where to forage when afraid: does risk-averse behavior compromise use of the foodscape? *Ecological Applications*. *In Review*.

Ellen O. Aikens, Kevin L. Monteith, Jerod A. Merkle, **Samantha P.H. Dwinell**, Gary L. Fralick, Matthew J. Kauffman. Drought shortens spring, impedes resource tracking and mediates a trade-off between resource quality and stability for migratory mule deer. *Nature Climate change*. *In Review*

Samantha P.H. Dwinell, Hall Sawyer, Gary L. Fralick, Mathew J. Kauffman, and Kevin L. Monteith. Nutritional consequences of risk-sensitive foraging in a human-altered landscape. *Journal of Applied Ecology*. *In Prep*.

ORAL/POSTER PRESENTATIONS

Dwinell, S. P. H., H. Sawyer, J.L. Beck, J. Randall, J.S. Forbey, G.L. Fralick, and K.L. Monteith. Where to forage when afraid: does risk-averse behavior compromise use of the foodscape? 9th International Deer Biology Congress, Estes Park, CO, August 6-10, 2018

Dwinell, S. P. H., “Wyoming Range Mule Deer Project: Research Update”. Annual Mule Deer Initiative Public Meetings, Wyoming Game and Fish Department, Afton, Kemmerer, Jackson, and Pinedale, WY, January 15-18, 2018

Dwinell, S. P. H., G.L. Fralick, R. Kaiser, M. Thonhoff, J. Randall, and K.L. Monteith. “The Lasting Effects of Winter: Carryover Effects of Severe Winter Conditions in Reproduction of Mule Deer”. The Wildlife Society Wyoming Chapter Annual Meeting, Oral Presentation, Jackson, WY, December 6, 2017

Dwinell, S. P. H., H. Sawyer, J. Randall, J.L. Beck, G.L. Fralick, and K.L. Monteith. “Risk Effects of Human Disturbance on the Winter Foodscape”. The Wildlife Society Annual National Meeting, Oral Presentation, Albuquerque, NM, September 27, 2017

Dwinell, S. P. H., M.L. Kauffman, H. Sawyer, G.L. Fralick, and K.L. Monteith. “Risk-Effects of a Human-Altered Landscape: Nutritional Tradeoffs in Behavior of Mule Deer”. The Wildlife Society Wyoming Chapter Annual Meeting, Oral Presentation, Cody, WY, November 16, 2016

Dwinell, S. P. H., M.L. Kauffman, H. Sawyer, G.L. Fralick, and K.L. Monteith. “Risk-Effects of a Human-Altered Landscape: Nutritional Tradeoffs in Behavior of Mule Deer”. The Wildlife Society Annual Meeting, Oral Presentation, Raleigh, NC, October 17, 2016

Dwinell, S. P. H., “Nutritional Ecology of Wyoming Range Mule Deer: Linking the Individual to the Landscape”. Wyoming Game and Fish Department Commission Meeting, Cheyenne, WY, March 23, 2016

- Dwinnell, S. P. H., “Wyoming Range Mule Deer Project: Research Update”. Annual Mule Deer Initiative Public Meetings, Wyoming Game and Fish Department, Afton, Kemmerer, Jackson, and Pinedale, WY, January 7-10, 2016
- Dwinnell, S. P. H., M.J. Kauffman, H. Sawyer, G.L. Fralick, and K.L. Monteith. “Nutritional Relationships Between Mule Deer Behavior And Human Disturbance”. The Wildlife Society Wyoming Chapter Annual Meeting, Oral Presentation, Lander, WY, December 3, 2015
- Dwinnell, S. P. H., M.J. Kauffman, H. Sawyer, G.L. Fralick, and K.L. Monteith. “Nutritional Relationships Between Mule Deer Behavior And Human Disturbance”. The Wildlife Society Annual National Meeting, Poster Session, Pittsburgh, PA, October 27, 2014
- Dwinnell, S. P. H., M.J. Kauffman, H. Sawyer, G.L. Fralick, and K.L. Monteith. “Nutritional Relationships Between Mule Deer Behavior And Human Disturbance”. The Wildlife Society Wyoming Chapter Annual Meeting, Poster Session, Sheridan, WY, August 26, 2014
- Dwinnell, S. P. H., “Risk Effects of a Human Impacted Landscape: Nutritional Tradeoffs in Behavior of Mule Deer” University of Wyoming Zoology and Physiology Department Brown Bag Seminar, Laramie, WY, March 31, 2014
- Dwinnell, S. P. H., K.L. Monteith, H. Sawyer, J.E. Randall, A.B. Courtemanch, G.L. Fralick, S.G. Smith, and M.J. Kauffman. “Quantifying the Effects of Indirect Habitat Loss on Behavior, Nutrition, and Fitness of Mule Deer”. The Wildlife Society Wyoming Chapter Annual Meeting, Poster Session, Rock Springs, WY, October 29, 2013.
- Hall, E., S. Dwinnell, L. Work, P. Hallsten, G. Fralick, D. Brimeyer, S. Dewey, B. Hammond. "Understanding Mule Deer (*Odocoileus hemionus*) Movements and Responses to Roadways in Northwest Wyoming". The Wildlife Society Wyoming Chapter Annual Meeting, Poster Session, Jackson, WY, December 9, 2011.

MEMBERSHIPS

The Wildlife Society 2009-present
 Society for Conservation Biology 2008-present
 UMD Biology Club 2004-2006

RELEVANT SKILLS

Technical Field Skills: Radio telemetry; animal capture including helicopter net-gun, drop-net, stationary traps (e.g., culvert, Clover, and Havahart); handling and collecting biological data (e.g., morphometric measurements, blood samples, tooth extraction for aging, pregnancy using ultrasonography, and various disease sampling) from various species including many ungulate species, large carnivores, fish, passerines, and small mammals; Rocky Mountain plant identification; various techniques for vegetation surveys; animal track and sign identification; field necropsy; GPS, map and compass navigation (on and off trail); ATV and snowmobile operation; summer and winter backcountry travel and camping

Computer Software Proficiency: ArcGIS 9.3 and 10.0 (spatial analysis, geodatabase management and cartography); Program R (data manipulation, analysis, remote sensing, figure preparation); Microsoft Office (Word, Excel, Access, Powerpoint, Outlook); Sigma Plot; EndNote

Analysis Skills: Home range delineation (e.g., kernel utilization distributions, Brownian bridge movement models, minimum convex polygons, local convex hull, net-squared displacement); machine learning approaches (e.g., random forest); multi-variate regression modeling (e.g., generalized linear mixed models, spatial autoregressive models, and logistic regression); resource selection models (e.g., traditional RSF approaches, count-based RSF, and step-selection functions); survival analysis (e.g., Cox proportional hazards)

Communication Skills: Public speaking; communication of scientific data to a variety of audiences; technical writing (e.g., peer-review publications, research proposals, research briefs, and technical reports); cartography; film production

HOBBIES Backpacking, backcountry skiing, Nordic skiing, hunting, mountain biking, mountaineering, packrafting, wildlife and adventure photography—basically anything outdoors.