CURRICULUM VITAE

University of Idaho

NAME: Jason William Karl

DATE: Jan 9, 2024

RANK OR TITLE: Professor, Harold F. and Ruth M. Heady Endowed Chair of Rangeland Ecology

DEPARTMENT: Forest, Rangeland, and Fire Science

OFFICE LOCATION AND CAMPUS ZIP: CNR 205D, MS 1135

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https://www.uidaho.edu/cnr/faculty/karl

DATE OF FIRST EMPLOYMENT AT UI: August 14, 2017

DATE OF TENURE: Tenured

DATE OF PRESENT RANK OR TITLE: July 1, 2023

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

Ph.D., Michigan State University, East Lansing, MI, May 2009, Fisheries and Wildlife/Environmental Science and Public Policy
M.S., University of Idaho, Moscow, ID, May 1998, Environmental Science
B.S., University of Idaho, Moscow, ID, May 1996, Wildlife Resources

EXPERIENCE:

Teaching, Extension and Research Appointments:

2023 – Present	Professor, Department of Forest, Rangeland, and Fire Sciences, University of Idaho
2023 – Present	Director, University of Idaho Rangeland Center
2017 – 2023	Associate Professor, Department of Forest, Rangeland, and Fire Sciences, University of Idaho
2013 – 2017	Category I Research Ecologist, USDA Agricultural Research Service, Las Cruces, NM
2009 – 2013	Post-doctoral Research Ecologist, USDA Agricultural Research Service, Las Cruces, NM
2002 – 2009	Spatial Ecologist, The Nature Conservancy, Hailey, ID
1999 – 2001	Senior GIS Analyst, Pacific Biodiversity Institute, Winthrop, WA
1996 – 1999	Senior GIS Analyst, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, ID

Consulting:

2001 – Present	Sound Science LLC, Senior Ecologist, GIS and statistical consulting

TEACHING ACCOMPLISHMENTS: (Academic and Extension teaching)

Areas of Specialization:

Rangeland ecology, natural resource monitoring, data science, spatial analysis, remote sensing

Courses Taught:

FW 419: GIS for Natural Resources, FW 419 (Michigan State University), 2008 – 2009
FOR 546: Science Synthesis and Communications, 2020-2024
REM 252: Wildland Plant Identification, 2018 – 2019
REM 410: Principles of Vegetation Measurement and Assessment, 2017 – 2024
REM 460: Integrated Field Studies in Rangelands, 2019-2024
REM 475: Remote Sensing Applications of Unmanned Aerial Systems, 2019 – 2024
REM 476: Unmanned Aerial Systems Operations, 2020 - 2023
REM 504/520: Advanced Vegetation Monitoring, 2018 – 2024

REM 504: Data Science for Natural Resources, 2018 – 2019

Students Advised:

Undergraduate Students:

Advise 6 students per semester in Rangeland Conservation
Advisor, Range Club, University of Idaho, 2017-2023
Supervisor, 4 Rangeland Center Interns, 2023-2024
Co-Advisor, College of Engineering Senior Design Projects
Virtual Fencing, 2018-2019, 2019-2020
Drone Development, 2018-2019
Thermal sensor drone integration, 2024-2025

Undergraduate Researchers (9):
Kennedy Beech, 2019-2020
Dan Lauritzen, 2018-2020
Jared Parsons, 2019-2020
Kyle Ureta, 2020-2021
Sam Fulbright, 2020-2021
Ryan Robles, 2020-2021
Luke Johnson, 2021-2022
Tyler Ernst, 2021-2022
Connor Bryant, 2023-2024

Graduate Students:

Currently Advising as Major Professor or Committee Member (9):
Leah Dreesmann (**Major Advisor)**, Ph.D. Natural Resources, 2021-present
Jacqueline Snow (**Co-Major Advisor**), M.S. Environmental Science, 2023-present
Johanna Castro-Karney (**Co-Major Advisor**), M.S. Natural Resources, 2024-present
Samuel Fulbright (**Major Advisor**), M.S. Natural Resources, 2024-present
Kaden Ball (**Committee Member**), M.S. Geography, 2024-present
Dan Lauritzen (**Committee Member**), Ph.D., Natural Resources, 2021-present
Phineas Lampman (**Committee Member**), Ph.D., Natural Resources, 2022-present
Matthew Steinwurtzel (**Committee Member**), M.S., Natural Resources, 2022-present
Matthew Modlin (**Committee Member**), Ph.D., Natural Resources, 2022-present

Advised to completion of degree as major professor (13) or committee member (13):
Sarah Burnett (**Co-major Advisor**), Animal and Range Science, New Mexico State University, M.S., 2014
Sarah McCord (**Co-major Advisor**), Geography, New Mexico State University, M.S., 2016
Sean DiStefano (**Co-major Advisor**), Animal and Range Science, New Mexico State University, M.S., 2018
Venkata Ramakanth (**Committee Member**), M.S. Computer Science, New Mexico State University, 2011
Samuel Perry (**Committee Member**), M.S. Agricultural Economics, New Mexico State University, 2013
Christine Laney (**Committee Member**), Ph.D. Bioinformatics, University of Texas at El Paso, 2014
David Kimiti (**Committee Member**), Ph.D. Animal and Range Science, New Mexico State University, 2017
Jeffrey Gillan (**Committee Member**), Ph.D. Natural Resources, University of Arizona, 2019
Ian Smith (**Committee Member**), M.S. Natural Resource, 2019
William Gentry (**Major Advisor)**, M.S., Natural Resources, 2019
Ian Hellman (**Committee Member**), M.S. Water Resources, 2019
Emily Washburne (**Major Advisor)**, MNR, Natural Resources, 2019
Alex Traynor (**Major Advisor**), MS Natural Resources, 2020
Nelson Stauffer (**Major Advisor**), M.S. Natural Resources, 2021
Charles Jones **(Major Advisor)**, M.S. Natural Resources, 2021

Taylor Fletcher (**Major Advisor)**, M.S. Natural Resources, 2021
Lindsey Rusch (**Committee Member**), M.S. Natural Resources, 2021
Sean DiStefano (**Major Advisor**), Ph.D. Natural Resources, 2022
Jared Parsons (**Major Advisor**), MNR, Natural Resources, 2022
Abihav Shrestha (**Committee Member**), M.S. Geography, 2023
Joshua Picote (**Major Advisor**), Ph.D. Natural Resources, 2023
Leah Dreesmann (**Committee Member**), M.S. Statistics, 2024
Eric Winford (**Committee Member**), Ph.D. Natural Resources, 2024
Derek Tilley (**Major Advisor**), Ph.D. Natural Resources, 2021-2024
Daniel Ramirez (**Committee Member**), M.S. Rangeland Management, Texas A&M University Kingsville, 2022-2024
JB Playfair (**Committee Member**), M.S., Natural Resources, 2021-2024

Postdocs Advised (3):

Dr. Vincent Jansen, 2018-2022, Currently Remote Sensing Scientist, Washington Department of Fish and Wildlife, Olympia, WA
Dr. Jonathan Maynard, 2013-2017, Currently Research Ecologist, USDA Agricultural Research Service, Corvalis, OR
Dr. Kert Young, 2013-2016, Currently Assistant Professor, New Mexico State University Agricultural Extension, Las Cruces, NM

Technicians:

Jeffrey Gillan (ARS), 2010 - 2016
Sarah McCord (ARS), 2012 - 2017
Nelson Stauffer (ARS), 2014 - 2017
Cynthia Hart (ARS), 2011 - 2014
Ruben Baca (ARS), 2016 - 2017
Sean Perry (ARS), 2014 - 2017
Dan Lauritzen, 2018 – 2020
Matthew Shryock, 2018 – 2022
Jared Parsons, 2019 – 2022
Matthew Steinwurtzel, 2022 – 2023
JB Playfair, 2024-present

Courses Developed:

FOR 546: Science Synthesis and Communications
REM 404: Drone Build/Fly
REM 460: Integrated Field Studies in Rangelands
REM 475: Remote Sensing Applications of Unmanned Aerial Systems
REM 476: Unmanned Aerial Systems Operations
REM 504: Data Science for Natural Resources
REM 520: Advanced Vegetation Measurement & Monitoring

Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:

2022	Sagebrush Saturday at Rinker Rock Creek Ranch: workshop presentation on using drones for livestock and grazing management. Hailey, ID
2022	Family Forest Landowners & Managers Conference: workshop presentation on using drones in logging. Moscow, ID
2022	Idaho Weed Control Association: Workshop presentation on using drones for invasive species management. Boise, ID
2021	UI Extension Workshop: Designing, Interpreting, and Applying Rangeland Monitoring to Management. Co-instructor. Murphy, ID
2021	UI Extension Forestry LEAP Update program presentation: Opportunities for Drones in Logging.
2020	UI Extension Workshop: Designing, Interpreting, and Applying Rangeland Monitoring to Management. Co-instructor. Murphy, ID
2019	Idaho Cattle Association Panel Discussion on Engaging with Rangeland Science,

Invited Panelist. Sun Valley, ID

2019 Utah BLM Range Program Annual Meeting, Monitoring Methods and Sampling Design, Instructor. Provo, UT

2019 Annual Zumwalt Prairie Partners Meeting, Oregon Chapter of The Nature Conservancy. Invited speaker. Enterprise, OR

2018 UI Extension Rangeland Monitoring Workshop, Co-instructor. Rinker Rock Creek Ranch, Hailey, ID.

2018 Bureau of Land Management AIM Core Methods Training, Co-instructor. Twin Falls, ID

2018 UI CALS Drone Demo Day, Co-instructor. Craigmont, ID

2017 Bureau of Land Management AIM Core Methods Training, Co-instructor. Las Cruces, NM, Reno, NV

2016 Bureau of Land Management AIM Core Methods Training. Co-instructor. Las Cruces, NM, Billings, MT

2016 Bureau of Land Management AIM Project Leads Training. Co-instructor. Reno, NV, Casper, WY, Albuquerque, NM

2015 Bureau of Land Management AIM Core Methods Training. Co-instructor. Boise, ID, Moab, UT, Reno, NV

2015 Bureau of Land Management AIM Project Leads Training. Co-instructor. Grand Junction, CO, Boise, ID, Anchorage, AK

2014 Bureau of Land Management AIM Core Methods Training. Co-instructor. Reno, NV, Moab, UT

2011 USFS Monitoring and Assessment Workshop. Co-instructor. Salt Lake City, UT

2010 U.S. Army Training Support System Workshop, Monitoring for Range Training Lands Assessment. Co-instructor. Chicago, IL

2009 U.S. Army Training Support System Workshop, Monitoring for Range Training Lands Assessment. Co-instructor. Indianapolis, IN

Guest Lectures in UI Courses:

ASM 305 – *GPS and Precision Agriculture*, Fall 2018
ECE 491 – *Senior Seminar*, Spring 2018, Fall 2018
FOR/NRS 375 – *Introduction to Spatial Analysis for Natural Resource Management*, Fall 2018, Fall 2019, Spring 2020, Spring 2022, Spring/Fall 2023, Spring/Fall 2024
FOR/NRS 472 – *Remote Sensing of the Environment*, Spring 2020
NR 211 – Undergraduate Research Experience, Fall 2021, Fall 2022, Fall 2023, Fall 2024
REM 151 – *Rangeland Principles*, Fall 2018
REM 252 – *Wildland Plant Identification*, Spring 2022, Spring 2023
REM 429 – *Landscape Ecology*, Spring 2019, Spring 2020

Materials Developed:

Drone Lab website (https://uidronelab.org) – online tutorials and datasets for drone mapping
JournalMap (https://journalmap.org) – a geographic-based search engine for scientific literature
RangeDocs (https://docs.rangelandsgateway.org) – a topic-specific information system for finding information on rangeland management from open-access technical handbooks and manuals.
Landscape Toolbox Learning Portal (http://learn.landscapetoolbox.org) – learning resources and reviews for vegetation monitoring methods and rangeland plant identification.
Landscape Toolbox (http://www.landscapetoolbox.org) – resources for rangeland monitoring and assessment via field and remote sensing methods.

SCHOLARSHIP ACCOMPLISHMENTS:

Google h-index = 29

Publications, Exhibitions, Performances, Recitals:
(* denotes student, post-doctoral associate or technician)

Refereed/Adjudicated: (i.e. books, book chaps., journals, proc., abstr., etc)

1. Reynolds, Lindsay, Joanna Lemly, Melissa Dickard, Sarah Marshall, Mary Manning, Scott Miller, Emily J. Kachergis, Sarah E. McCord, and Jason W. Karl. "AIM National Aquatic Monitoring

Framework: Field Protocol for Lentic Riparian and Wetland Systems." Technical Reference. Denver, CO: Bureau of Land Management, 2024. https://www.blm.gov/noc/blm-library/technical-reference/aim-national-aquatic-monitoring-framework-field-protocol-lentic.

2. Olsen, Liv Kathrine Berg, Jeremy Kenyon, and Jason W. Karl. "WHERE IN THE WORLD IS THIS RESEARCH? Improving Discovery of Literature through Geographic Inference," 2021. https://api.semanticscholar.org/CorpusID:235691382.
3. Karl, J.W., Herrick, J.E., and D.A. Pyke. 2017. Monitoring protocols: options, approaches, implementation, and benefits. In *Rangeland Systems: Processes, Management and Challenges*, D.D. Briske (ed.), pp 527–67. Springer Series on Environmental Management. Springer Verlag.
4. Unnasch, R.S. and Karl, J.W. 2012. Scale and conservation planning. *In*: Craighead, L. (ed). Conservation Planning. ESRI Press. Redlands, CA.
5. Karl, J.W., and Porter, M. 2006. Digital aerial sketch-mapping for early detection and mapping of invasive species. *In:* Invasive Plant Inventory Methods. Center for Invasive Plant Management, Montana State University, Bozeman, MT.
6. Karl, J.W., Svancara, L.K., Heglund, P.J., Wright, N.M., and Scott, J.M. 2002. Species commonness and the accuracy of habitat-relationship models. In Scott, J.M., P.J. Heglund, and M.L. Morrison (eds). Predicting Species Occurrences. Island Press. Washington, D.C.
7. Morrison, P., and Karl, J.W. 2001. Pacific Biodiversity Institute. Pp 76-79 *in* Convis, C.L. Jr. (ed.). Conservation geography: case studies in GIS, computer mapping, and activism. ESRI Press. Redlands, CA.

Peer Reviewed/Evaluated: (e.g., journals, articles, proceedings, abstracts, etc.)

8. Dreesmann, Leah T.*, Timothy R. Johnson, and Jason W. Karl. "Quantifying Observer Variance in Expansive Monitoring Program Indicator Data with Heterogeneous-Variance Mixed-Effects Models." Ecological Informatics, December 2024, 102946. https://doi.org/10.1016/j.ecoinf.2024.102946.
9. McCord, Sarah E., Joseph R. Brehm, Lea A. Condon, Leah T. Dreesmann*, Lisa M. Ellsworth, Matthew J. Germino, Jeffrey E. Herrick, et al. "Evaluation of the Gap Intercept Method to Measure Rangeland Connectivity." Rangeland Ecology & Management, 2024. https://doi.org/10.1016/j.rama.2024.09.001.
10. Kenyon, Jeremy, Jason W. Karl, and Bruce Godfrey. "Evaluation of Placename Geoparsers." Journal of Map & Geography Libraries, 2024, 1–13. https://doi.org/10.1080/15420353.2024.2357115.
11. Shrestha, Abhinav*, Jeffrey A. Hicke, Arjan J. H. Meddens, Jason W. Karl, and Amanda T. Stahl. "Evaluating a Novel Approach to Detect the Vertical Structure of Insect Damage in Trees Using Multispectral and Three-Dimensional Data from Drone Imagery in the Northern Rocky Mountains, USA." Remote Sensing 16, no. 8 (April 12, 2024): 1365. https://doi.org/10.3390/rs16081365.
12. Harrison, Georgia R.*, Abhinav Shrestha*, Eva K. Strand, and Jason W. Karl. "A Comparison and Development of Methods for Estimating Shrub Volume Using Drone-imagery-derived Point Clouds." Ecosphere 15, no. 5 (May 2024): e4877. https://doi.org/10.1002/ecs2.4877.
13. De Stefano, Sean*, Jason W. Karl, and Michael C. Duniway. "Using the TSS-RESTREND Methodology to Diagnose Post-Reclamation Vegetation Trends on the Western Slope of Colorado." Reclamation Sciences, no. 1 (2024): 48–62. https://doi.org/10.21000/RCSC-202300002.
14. Rush, Lindsey M., Leona K. Svancara, Ian T. Smith, Sonya J. Knetter, Jason W. Karl, and Janet L. Rachlow. 2023. Intraspecific Variation in Habitat Relationships for Pygmy Rabbits: Implications for Conservation of Habitat Specialists. Ecosphere 14(7):e4625. https://doi.org/10.1002/ecs2.4625.
15. Hess, Andrew, Scott Huber, John H Bergeron, Gary McCuin, Melanie Hess, Tracy Shane, Jason Karl, Mike Cox, and Robert Washington-Allen. 2023. Developing Precision Agriculture Tools to Capture Behavior and Performance in Extensively Managed Sheep. Journal of Animal Science 101, no. Supplement_3: 308–9. https://doi.org/10.1093/jas/skad281.368.
16. Bergeron, John H, Scott Huber, Tracy Shane, Jason Karl, Melanie Hess, Robert Washington-Allen, Mike Cox, and Andrew Hess. 2023. Repeatability of Rangeland Behavioral and Social Traits Derived from GPS Collars. Journal of Animal Science 101, no. Supplement_3 42–43. https://doi.org/10.1093/jas/skad281.051.
17. Tilley*, Derek, April Hulet, Shaun Bushman, Charles Goebel, Jason Karl, Stephen Love, and Mary Wolf. "When a Weed Is Not a Weed: Succession Management Using Early Seral Natives for Intermountain Rangeland Restoration." Rangelands 44, no. 4 (August 2022): 270–80. https://doi.org/10.1016/j.rala.2022.05.001.
18. Di Stéfano*, Sean, Jason W. Karl, Michael C. Duniway, Robert Heinse, April Hulet, and J.D. Wulfhorst. "Oil and Gas Reclamation on US Public Lands: How It Works and Improving the Process

with Land Potential Concepts." Rangelands 43, no. 6 (December 2021): 211–21. https://doi.org/10/gnvpzz.

19. Smith, Ian T., Sonya J. Knetter, Leona K. Svancara, Jason W. Karl, Timothy R. Johnson, and Janet L. Rachlow. "Overlap Between Sagebrush Habitat Specialists Differs Among Seasons: Implications for Umbrella Species Conservation." Rangeland Ecology & Management 78 (September 2021): 142–54. https://doi.org/10.1016/j.rama.2021.06.007.
20. Zhang, Junzhe, Gregory S. Okin, Bo Zhou, and Jason W. Karl. "UAV-derived Imagery for Vegetation Structure Estimation in Rangelands: Validation and Application." Ecosphere 12, no. 11 (November 2021). https://doi.org/10/gnkd2p.
21. Allred, B., Bestelmeyer, B., Boyd, C., Brown, C., Davies, K., Ellsworth, L., Erickson, T., Fuhlendorf, S., Griffiths, T., Jansen, V., Jones, M., Karl, J., Maestas, J., Maynard, J., McCord, S., Naugle, D., Starns, H., Twidwell, D., Uden, D. 2021. Improving Landsat predictions of rangeland fractional cover with multitask learning and uncertainty. Methods in Ecology and Evolution 2041-210X.13564. https://doi.org/10.1111/2041-210X.13564
22. Jansen*, Vincent, Alexander C.E. Traynor, Jason W. Karl, Nika Lepak, and James Sprinkle. "Monitoring Grazing Use: Strategies for Leveraging Technology and Adapting to Variability." *Rangelands*, August 2021, S0190052821000687. https://doi.org/10/gnvpzs.
23. Wardropper, Chloe B., Jay P. Angerer, Morey Burnham, Maria E. Fernández-Giménez, Vincent S. Jansen*, Jason W. Karl, Katherine Lee, and Katherine Wollstein. "Improving Rangeland Climate Services for Ranchers and Pastoralists with Social Science." Current Opinion in Environmental Sustainability 52 (2021): 82–91. https://doi.org/10/gmjbss.
24. Stauffer*, Nelson G., Michael C. Duniway, Jason W. Karl, and Travis W. Nauman. "Sampling Design Workflows and Tools to Support Adaptive Monitoring and Management." Rangelands, September 2021, S0190052821000870. https://doi.org/10/gnvpzv.
25. McCord, Sarah E., Justin L. Welty, Jennifer Courtwright, Catherine Dillon, Alex Traynor, Sarah H. Burnett, Ericha M. Courtright, et al. "Ten Practical Questions to Improve Data Quality." Rangelands, August 2021, S0190052821000699. https://doi.org/10/gnvpzt.
26. McCord, Sarah E, Nicholas P Webb, Justin W Van Zee, Sarah H Burnett, Erica M Christensen, Ericha M Courtright, Christine M Laney, et al. "Provoking a Cultural Shift in Data Quality." BioScience, March 31, 2021, biab020. https://doi.org/10.1093/biosci/biab020.
27. Jansen*, V.S., C.A. Kolden, H.J. Schmalz, J.W. Karl, and R.V. Taylor. "Using Satellite-Based Vegetation Data for Short-Term Grazing Monitoring to Inform Adaptive Management." Rangeland Ecology & Management 76 (May 2021): 30–42. https://doi.org/10.1016/j.rama.2021.01.006.
28. Cunliffe, A.M., Anderson, K., Boschetti, F., Brazier, R.E., Graham, H.A., Myers-Smith, I.H., Astor, T., Boer, M.M., Calvo, L., Clark, P.E., Cramer, M.D., Encinas-Lara, M.S., Escarzaga, S.M., Fernández-Guisuraga, J.M., Fisher, A.G., Gdulová, K., Gillespie, B., Griebel, A., Hanan, N.P., Hanggito, M.S., Haselberger, S., Havrilla, C.A., Heilman, P., Ji, W., Karl, J.W., Kirchhoff, M., Kraushaar, S., Lyons, M.B., Marzolff, I., Mauritz, M.E., McIntire, C.D., Metzen, D., Méndez-Barroso, L.A., Power, S.C., Prošek, J., Sanz-Ablanedo, E., Sauer, K.J., Schulze-Brüninghoff, D., Šímová, P., Sitch, S., Smit, J., Steele, C.M., Suárez-Seoane, S., Tweedie, C.E., Vargas, S.A., Villarreal, M.L., Visser, F., Wachendorf, M., Wirnsberger, H., Wojcikiewicz, R. 2021. Drone-derived canopy height predicts biomass across non-forest ecosystems globally. Remote Sensing in Ecology and Conservation, July 7, 2021, rse2.228. https://doi.org/10.1002/rse2.228.
29. Hellman*, Ian, Robert Heinse, Jason W. Karl, and Mark Corrao. "Detection of Terracettes in Semi-Arid Rangelands Using Fourier-Based Image Analysis of Very High-Resolution Satellite Imagery: Detection of Terracettes Using Fourier-Based Image Analysis." *Earth Surface Processes and Landforms*, August 4, 2020. https://doi.org/10.1002/esp.4971.
30. Whiting, M., Salley, S., James, D., Karl, J.W., and C. Brungard. 2020. Rapid bulk density measurement using mobile device photogrammetry. Journal of the Soil Science Society of America. saj2.20063. doi:10.1002/saj2.20063.
31. DiStefano, S.*, Karl, J.W., Bailey, D., and S. Hale. 2020. Evaluation of the automated reference toolset as a method to select reference sites for oil and gas reclamation on Colorado rangelands. Journal of Environmental Management. 265:110578. doi:10.1016/j.jenvman.2020.110578
32. Karl, J.W., Yelich, J., Ellison, M.J., and D. Lauritzen*. 2020. Estimates of willow (*Salix spp.*) canopy volume using unmanned aerial systems. Rangeland Ecology and Management. doi: 10.1016/j.rama.2020.03.001

33. Gillan, J.K.*, J.W. Karl, and W.J.D. van Leeuwen. 2020. Integrating Drone Imagery with Existing Rangeland Monitoring Programs. Environmental Monitoring and Assessment 192(5): 269. doi:10.1007/s10661-020-8216-3.
34. Traynor, A.C.E.*, Karl, J.W., and Z.M. Davidson. (2020). Using assessment, inventory, and monitoring data for adaptive management of northern New Mexico rangelands. Rangelands: 42(4).
35. Webb, N.P., Kachergis E., Miller, S.W., McCord, S.E., Bestelmeyer, B.T., Brown, J., Chappell, A., Karl, J.W., et al. 2020. Indicators and Benchmarks for Wind Erosion Monitoring, Assessment and Management. Ecological Indicators 110 (March 2020): 105881. doi:10.1016/j.ecolind.2019.105881.
36. Karl, J.W., and J.E. Sprinkle. 2019. Low-Cost Livestock Global Positioning System Collar from Commercial Off-the-Shelf Parts. Rangeland Ecology & Management, October 2019, S1550742419300582. doi:10.1016/j.rama.2019.08.003.
37. Salley, S.W., Herrick, J.E., Holmes, C.V., Karl, J.W., Levi, M.R., McCord. S.E., van der Waal, C., and J.W. Van Zee. 2018. A Comparison of Soil Texture-by-Feel Estimates: Implications for the Citizen Soil Scientist. Soil Science Society of America Journal 82, no. 6 (2018): 1526. doi:10.2136/sssaj2018.04.0137.
38. SRM Rangeland Assessment and Monitoring Committee. 2018. Utilization and Residual Measurements: Tools for Adaptive Rangeland Management. Rangelands 40, no. 5 (October 2018): 146–51. doi:10.1016/j.rala.2018.07.003.
39. Jones, Matthew O., Brady W. Allred, David E. Naugle, Jeremy D. Maestas, Patrick Donnelly, Loretta J. Metz, Jason Karl, et al. Innovation in Rangeland Monitoring: Annual, 30 m, Plant Functional Type Percent Cover Maps for U.S. Rangelands, 1984-2017. *Ecosphere* 9, no. 9 (September 2018): e02430.
40. DiStefano*, S., Karl, J.W., McCord*, S.E., Stauffer*, N.G., Makela, P.D., and M. Manning. 2018. Comparison of two vegetation height methods for assessing greater sage-grouse seasonal habitat. The Wildlife Society Bulletin 42(2):213-224.
41. Karl, J.W. 2018. Mining location information from life- and earth-science studies to facilitate knowledge discovery. Journal of Librarianship and Information Sciences 096100061875941.
42. Salley, S.W., Herrick, J.E., Holmes, C., Karl, J.W., Levi, M.R., McCord*, S.E., van der Wall, C., and J.W. Van Zee. 2018. Assessing and improving the quality of citizen scientists' soil hand texture estimates. Journal of Soil and Water Conservation 82(6):15-26.
43. SRM Assessment and Monitoring Committee. 2018. Utilization and residual measurements: tools for adaptive rangeland management. Rangelands 40(5)146-151.
44. Browning, D., J. Karl, D. Morin, A. Richardson, and C. Tweedie. 2017. Phenocams Bridge the Gap between Field and Satellite Observations in an Arid Grassland Ecosystem. Remote Sensing 9:1071.
45. Browning, D. M., J. J. Maynard*, J. W. Karl, and D. C. Peters. 2017. Breaks in MODIS time series portend vegetation change: verification using long-term data in an arid grassland ecosystem. Ecological Applications 27:1677–1693.
46. *Gillan, J., J. Karl, A. Elaksher, and M. Duniway. 2017. Fine-Resolution Repeat Topographic Surveying of Dryland Landscapes Using UAS-Based Structure-from-Motion Photogrammetry: Assessing Accuracy and Precision against Traditional Ground-Based Erosion Measurements. Remote Sensing 9:437.
47. *Maynard, J. J., and J. W. Karl. 2017. A hyper-temporal remote sensing protocol for high-resolution mapping of ecological sites. D. Rocchini, editor. PLOS ONE 12:e0175201.
48. *McCord, S. E., M. Buenemann, J. W. Karl, D. M. Browning, and B. C. Hadley. 2017. Integrating Remotely Sensed Imagery and Existing Multiscale Field Data to Derive Rangeland Indicators: Application of Bayesian Additive Regression Trees. Rangeland Ecology & Management 70:644–655.
49. SRM Assessment and Monitoring Committee. 2017. Does Size Matter? Animal Units and Animal Unit Months. Rangelands 39:17–19.
50. Webb, N. P., J. W. Van Zee, J. W. Karl, J. E. Herrick, E. M. Courtright, B. J. Billings, R. Boyd, A. Chappell, M. C. Duniway, J. D. Derner, J. L. Hand, E. Kachergis, S. E. McCord*, B. A. Newingham, F. B. Pierson, J. L. Steiner, J. Tatarko, N. H. Tedela, D. Toledo, and R. Scott Van Pelt. 2017. Enhancing Wind Erosion Monitoring and Assessment for U.S. Rangelands. Rangelands.

51. Karl, J.W., McCord, S.E.*, and B.C. Hadley. 2017. A Comparison of Cover Calculation Techniques for Relating Point-Intercept Vegetation Sampling to Remote Sensing Imagery. Ecological Indicators 73:156–65. doi:10.1016/j.ecolind.2016.09.034.
52. Gillan, J.K.*, Karl, J.W., Barger, N.N., Elaksher, A., and M.C. Duniway. 2016. Spatially Explicit Rangeland Erosion Monitoring Using High-Resolution Digital Aerial Imagery. Rangeland Ecology & Management 69(2):95–107. doi:10.1016/j.rama.2015.10.012.
53. Karl, J.W., and C.J. Talbot. 2016. Role of Data and Inference in the Development and Application of Ecological Site Concepts and State-and-Transition Models. Rangelands. 38(6):322–328. doi:10.1016/j.rala.2016.10.009.
54. Karl, J.W., Karl, M., McCord, S.E.*, and E. Kachergis. 2016. Critical Evaluations of Vegetation Cover Measurement Techniques: A Response to Thacker et al. (2015). Rangelands 38(5):297–300. doi:10.1016/j.rala.2016.08.005.
55. Herrick, J. E., Beh, A., Barrios, E., Coetzee, NM., Bovier, I., Dent, D., Elias, E.H., Hengle, T., Karl, J. W., Liniger, H., Matuszak, J., Neff, J., Ndungu, L., Obersteiner, M., Shepard, K., Urama K., Van Den Bosch, R., Webb, N. 2016. The land-potential knowledge system (LandPKS): mobile apps and collaboration for optimizing climate change investments. Ecosystem Health and Sustainability. 2(3): e01209. doi:10.1002/ehs2.1209.
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Other: (reports, proceedings, papers, citations and references, performances)

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92. Karl, J.W. 2009. GIS Tools for RTLA. U.S. Army Environmental Command, Range and Training Lands Assessment.
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99. Herrick, J.E., Urama, K.C., Karl, J.W., Boos, J., Johnson, M.V., Shepherd, K.D., and J. Hempel. A land-potential knowledge system (LandPKS) based on local and scientific knowledge of land productivity and resilience." United National Convention to Combat Desertification.
100. Bestelmeyer, B.T., Brown, J.R., Karl, J.W., Herrick, J.E., and K.M. Havstad. 2013. Toward a Method of Collaborative, Evidence-Based Response to Desertification. In Proceedings of the 22nd International Grassland Congress, pp.1076–83. Syndey, Australia: New South Wales Department of Primary Industry. 2013.
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102. Karl, J.W., Laliberte, A. S., and Rango, A. 2010. Spatial dependence of predictions from image segmentation: a method to determine appropriate scales for producing land-management information. In: The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Vol. XXXVIII-4/C7.
103. Herrick, J.E., Bestelmeyer, B.T., Brown, J.R. and Karl, J. W. 2010. Land health and ecological sites: application to land use planning and management. In: Memorias de I Congeso Internacional de Pastizales Chiapas, Chiapas, Mexico.
104. Karl, J.W. 1994. Nest Site Characteristics of Sharp-Shinned Hawks in Idaho's Frank Church-River of No Return Wilderness. Idaho Forest, Wildlife, and Range Experiment Station, University of Idaho. Moscow, ID.
105. Karl, J.W. 2014. JournalMap: map-based discovery of scholarly literature. Wiley Exchanges, Discover the Future of Research. John Wiley & Sons, Inc. https://hub.wiley.com/community/exchanges/discover/blog/2014/09/09/journalmap-map-based-discovery-of-scholarly-literature
106. Karl, J.W. 2005. The Nature Conservancy uses mobile GIS technology in fight against invasive species. ESRI ArcNews 27(3):30-31.

Peer Reviewed/Evaluated (currently scheduled or submitted):

Winford, E.M., Goebel, P.C., Lynch, L.M., Karl, J.W., and A. Maas. *In review.* Meta-Analysis of Low-Tech, Process-Based Approaches for Riparian Restoration. River Research and Application.

Dalke, A., Karl, J.W., Kenyon, J., Pfander, J., Merrigan, S. Di Stefano, S., King, M.E., Winford, E.M., and K. Launchbaugh. *In review.* RangeDocs: searchable science for rangeland management. Rangelands.

Snow, J.C., Zajchowski, C., and J.W. Karl. *In review.* A systematic review of recreation ecology in rangeland settings: Informing Leave No Trace guidelines. Journal of Interpretation Research.

Professional Meeting Papers, Workshops, Showings, Recitals: (provide date and location)
Authored or co-authored with students, technicians, and collaborators >120 presentations at national or international professional meetings (Society for Range Management, Ecological Society of America, Society for Conservation Biology, International Society for Ecological Informatics, Geographic Object-based Image Analysis Conference, United National Convention to Combat Desertification Science Conference, Society for Scholarly Publishing).

Invited presentations:

"Supporting Outcome-based Management on Private and Public Rangelands: Training Ag Professionals on Monitoring Techniques." Invited presentation for the symposium: Nurturing knowledge from the range: what we can learn from rancher-driven research at the 2024 Society for Range Management Annual Meeting, Sparks, NV.

"Tangled in complexity: can a simpler, cheaper approach to virtual fencing manage livestock effectively on open rangelands?" Invited presentation for the symposium: Geospatial Technologies at the 2023 Society for Range Management Annual Meeting, Boise, ID.

"Development and Implementation of an Open-hardware GPS Tracker for Livestock Location Studies." Invited presentation for the symposium: How-to of Innovative Technologies for Monitoring and Assessment of Rangelands at Local to Global Scales at the 2022 Society for Range Management Annual Meeting, Albuquerque, NM.

"Transforming livestock grazing through virtual fencing." UI Renfrew Colloquium presentation given with K. Launchbaugh, M. Hefeida, and G. Murdock. Moscow, ID, Apr 2018.

"JournalMap." Invited presentation given at UI GIS Day, Moscow, ID, Nov 2017.

"Challenges & opportunities with standardized monitoring for management decision-making." Invited presentation given at the AIM Monitoring Symposium at the 2018 Society for Range Management Annual Meeting, Reno, NV, Feb 2018.

"The role of data and inference in the development and application of ecological site descriptions." Invited presentation given at the Ecological Site Symposium at the 2017 Society for Range Management Annual Meeting, St. George, UT, Feb 2017.

"Implementing the Bureau of Land Management's Assessment, Inventory, and Monitoring Program: applications and data mining opportunities." Guest lecture to the School of Natural Resources and the Environment at University of Arizona. February 2016.

"JournalMap." Invited presentation at the Allen Press 2015 Emerging Trends in Scholarly Publishing Seminar in Washington, D.C. April 2015.

"Leveraging the 'where' in scholarly literature: enabling geographic-based knowledge discovery." Invited presentation at the 2014 Society for Scholarly Publishing annual conference in Boston, MD. May 2014.

"Using spatial statistics and point-pattern simulations to assess the relationship between Greater Sage-grouse and man-made features." Guest lecture to the Department of Plant and Wildlife Sciences at Brigham Young University. February 2013.

"JournalMap." Invited presentation at the International Association of Scientific, Technical, and Medical Publishers annual Innovations Seminar in London, UK. December 2013.

Geo-semantic searching for ecological knowledge. Guest lecture to the University of Texas at El Paso CyberShare Group. October 2012.

"Scaling properties of semi-arid ecosystems through image segmentation: multivariate correlations across scales and identifying appropriate scales." Invited presentation to the 2011 University of Texas at El Paso Bioinformatics Symposium. April 2011.

Grants and Contracts Awarded: (provide principal and co investigators, title, sponsor, funding dates, amount)
Total to date at the University of Idaho as PI, Co-PI, or Senior Personnel: **$4,821,219**

Active:

RAD: Restoration Assessment and Documentation. USDI Bureau of Land Management, Idaho State Office. **$1,500,000**. Winford, E.M., Karl, J.W. (Co-PI).

Dormant Season Grazing to Reduce Cheatgrass and Promote Perennial Bunchgrasses. USDA Forest Service, Caribou-Targhee National Forest. **$100,000**. Winford, E.M., Karl, J.W. (Co-PI).

Development of automated workflows to process drone imagery for conservation easement monitoring. Montana Chapter of The Nature Conservancy and The Climate Trust. **$35,000**. Karl, J.W. (PI)

Acquisition of an unmanned-aerial systems (UAS) lidar system for sustainable agriculture. USDA-NIFA Equipment Grant Program, **$110,865**. Karl, J.W. (PI), Ryu, J., Li, C., Eitel, J.U.H., Keefe, R., Winford, E., Walsh, O.

Creating a multi-purpose, public-facing academic research database platform for agricultural data with geolocation data correlation. Institute of Museum and Library Sciences, **$250,000**. J. Kenyon, J. Karl (Co-PI), L. Olsen.

Technology to Manage Livestock Location Within RANGE and REALITY. USDA-NIFA, **$983,199**. K. Launchbaugh, G. Murdoch, T. Hudson, K. Lee, J. Karl (Co-PI), J. Sprinkle, D. Shrestha.

Understanding sources of error in the BLM's Terrestrial AIM program. USDI Bureau of Land Management, **$266,692**. J. Karl (PI)

Past:

Assessing the effectiveness of beaver dam analogues (BDAs). NRCS Idaho Conservation Innovation Grant. **$73,463** (awarded, funds pending). C. Goebel, M. Ellison, C. Jones, J.W. Karl, A. Morris. E. Winford.

Assessing the utility of drones for pheasant and turkey upland gamebird surveys. Washington Department of Fish and Wildlife, **$93,343**. J. Karl (PI).

Measuring recreation use and its potential impacts on grazing cattle at Rinker Rock Creek Ranch. Little Endowment, **$5,000.** J. Karl (PI), E. Winford, C. Packer, J. Sprinkle.

Developing automated workflows for processing UAV imagery. Montana Chapter of The Nature Conservancy, **$22,000**. J. Karl (PI), V. Jansen.

Developing vegetation metrics for oil and gas reclamation success. US Geological Survey. **$39,708**. J. Karl (PI), S. Di Stéfano.

Planning the Creation of a Multi-Purpose, Public Facing Academic Research Database Platform for Agricultural Data with Geolocation Data Correlation. Institute of Museum and Library Sciences **$99,969**. J. Kenyon, L. Olsen, J. Karl (Co-PI).

A National Grazingland Information System: Expanding GlobalRangelands.org Through A Grazingland Thesaurus and Mobile Content Access. NRCS Conservation Innovation Grant. **$616,586**. J. Karl (**PI**), J. Kenyon, G. Ruyle, J. Pfander.

Deploying CERT: Integrating satellite and field measures for improved grazingland management at ranch scales. NRCS Conservation Innovation Grant. **$661,118** (**plus $100,000** cash match from The Nature Conservancy). J. Karl (**PI**), K. Launchbaugh, C. Conway.

Supporting outcome-based management on private and public rangelands: training agricultural professionals on monitoring techniques. NIFA Western SARE. **$72,519**. J.W. Karl (**PI**), E. Winford, A. Hulet, A. Quandt, J.E. Herrick.

USDA NIFA McIntire-Stennis. Managing for resilient rangelands: advancing land health monitoring for maintaining rangeland potential. **$235,000**. J.W. Karl (**PI**)

Development and testing of low-cost GPS collar systems for livestock using commercial off-the-shelf parts. David Little Livestock Range Management Endowment. **$4,059.** J.W. Karl (**PI),** C. Conway.

USDA Foreign Agricultural Service. Expression of interest to host a Borlaug Fellow from Mongolia. **$31,057** (A. Cibils, J.W. Karl, B. Bestelmeyer).

USDI Bureau of Land Management. 2017-2022 Technical support for assessment and monitoring-related projects. – interagency agreement. **$2,859,000** (J.W. Karl, J.E. Herrick).

USDI Bureau of Land Management. 2012-2017 Technical support for assessment and monitoring-related projects. – interagency agreement. **$2,557,000** (J. Herrick, J.W. Karl).

US Department of Defense Environmental Security Technology Certification Program. 2012. Automated Geospatial Watershed Assessment (AGWA) to aid in sustaining military mission and training.

$1,169,000 total **($265,750** to USDA-ARS Jornada). (D.C. Goodrich, P. Heilman, D.P. Guertin, L. Levick, J.W. Karl)

USDI Bureau of Land Management. 2010. Taking A.I.M. to the field – interagency agreement. **$185,000** (J. Herrick, J.W. Karl)

USDA Natural Resources Conservation Service. 2009. Evaluating long-term carbon storage potential on private rangelands using dynamic landscape modeling. **$69,334** (J.W. Karl, R. Unnasch)

USDI Bureau of Land Management. 2008. Cumulative landscape assessment and restoration planning tools for evaluating management scenarios in the Castle Creek and Wildhorse areas of Idaho. **$25,000** (J.W. Karl, D. Major, K. Colson)

M.J. Murdock Charitable Trust. 2007. A landscape toolbox for effective management of arid rangelands. **$370,000** (J. W. Karl, A. Sands, D. Major, L. Lunte, E. Stone, W. Whelan)

Lava Lake Foundation for Science and Conservation. 2007. Developing a multi-scale assessment and monitoring framework for rangeland landscapes**. $24,000** (J.W. Karl, A. Sands, B. Maurer)

Rodney Johnson/Katherine Ordway Science Endowment, The Nature Conservancy. 2007. Developing a multi-scale assessment and monitoring framework for rangeland landscapes. **$40,000** (J.W. Karl, J. Yeo, A. Sands, B. Maurer)

Wilburforce Foundation. 2004. Multi-scale conservation planning for conservation of private, working forests in north-central Idaho. **$25,000** (T. Klahr, J.W. Karl)

Honors and Awards:

2023 Range Science Education Council/Society for Range Management Outstanding Undergraduate Teaching Award.
2020 Best Paper Award, Geoscience Information Society, for "Mining Location Information from Life- and Earth-science Studies to Facilitate Knowledge Discovery"
2020 UI Excellence in Interdisciplinary and Collaborative Efforts Award
2020 CNR Outstanding Continuing Education & Service Award
2020 CNR Boot-in-the-Butt Award
2016 USDA-ARS Plains Area Early Career Scientist of the Year
2014 Federal Laboratory Consortium, Mid-Continent Region, Notable Technological Development for JournalMap
2007 Environmental Science and Policy Doctoral Fellowship, Michigan State University
2001 ESRI Special Achievement in GIS award for work with Pacific Biodiversity Institute
1994 Kurt Berklund Honorarium for Undergraduate Research

SERVICE:

University Committee and Service Assignments:

2023 – present Director, UI Rangeland Center
2021 – present UI IRIC Facility Committee (Co-chair)
2019 – present UI Unmanned Aerial Systems Committee (Chair)
2021 CNR/CALS Search Committee, Rangeland Extension Specialist Faculty Search (Chair)
2021 CALS-SWS Search Committee, Precision Agriculture Faculty Search (Member)
2018 – 2023 CNR Awards Committee
2019 Interim Director of the UI Rangeland Center
2019 – present Rinker Rock Creek Ranch Research and Monitoring Committee (Member)
2019 – 2020 UI College of Natural Resources Dean Search Committee (Member)
2019 CNR-NRS Search Committee for LTAR Post-Docs (Member)

External Reviews:

2016 USDA-ARS Research Evaluation Performance System Panelist (USDA-ARS promotion system)

Professional and Scholarly Organizations (including memberships, committee assignments, editorial services, offices held and dates)

Leadership roles in scientific journals

2017 – present Editor in Chief, *Rangelands*
2017 – present Editorial Board Member, *Fire*

2010 Guest Editor, *Rangelands*

Membership and roles in professional organizations

2005 – present Society for Range Management
2013 – present Committee Member Remote Sensing/GIS Committee
2015 Chair Remote Sensing/GIS Committee
2015 – 2017 USDA-ARS Representative to the Rangeland Assessment and Monitoring Committee
2017 – present Committee Member Rangeland Assessment and Monitoring Committee
2007 – 2014 Ecological Society of America

Reviewing of scholarly work

2010 – present Various BLM and USFS manuals, technical reports, and monitoring plans.
2010 – present External reviewer for USGS and USDA-ARS scientific manuscripts (required before submission for publication).
2005 – present Reviewed manuscripts for:
Rangeland Ecology & Management, Rangelands, Ecosphere, Restoration Ecology, Ecological Applications, International Journal of Remote Sensing, Ecological Informatics, Current Landscape Ecology Reports, Environmental Health and Sustainability, Journal of Arid Environments, Journal of Librarianship and Information Science, Environmental Monitoring and Assessment, Journal of Environmental Management, Invasive Plant Science and Management, Frontiers in Ecology and the Environment, Applied Vegetation Science, Journal of Vegetation Science, Evolutionary Ecology Reviews
2011 – 2017 Reviewer for the following books: *Review of the NRCS National Resource Inventory Conservation Effects Assessment Program; EcoTrends; US Forest Service Rangeland Vegetation Assessment, Inventory, Monitoring, and Analysis Handbook*.

Organization Roles at Conferences and Professional Meetings

2023 Planning committee lead, Rangeland Center Fall Forum, Boise, ID, Oct 2023
2020 Planning committee, program co-chair for the 2021 Society for Range Management Annual Meeting (to be held virtually, Feb 2021).
2020 "Open(source) Range", Co-organizer, Symposium at the 2020 Society for Range Management Annual Meeting, Denver, CO
2018 "2nd University of Idaho Drone Summit", Convener + Co-organizer, Moscow, ID, Nov 2018
2018 "1st University of Idaho Drone Summit", Convener + Co-organizer, Moscow, ID, Apr 2018
2015 "Monitoring for Adaptive Management: Implementing the BLM AIM Strategy", Co-organizer + Convener, Symposium at 2015 Society for Range Management annual meeting, Sacramento, CA.
2015 "Building Bridges – Using Unmanned Aerial Systems (UASs) Imagery to Link Ecological Observations". Co-organizer. Organized Oral Session at 2015 Ecological Society of America meeting. Baltimore, MD.
2015 "Hacking ecology: the infiltration of coding in ecology for data integration, analysis, and visualization". Co-organizer. Ignite session at 2015 Ecological Society of America meeting. Baltimore, MD.

Outreach Service:

2017 – present Member of the UI Rangeland Center
2018 – present Member of the Rangelands Partnership, a collective of rangeland professionals and science librarians from 19 western states to improve the accessibility of information for sustainable land management.
2015 – 2022 Technical advisor to the USDA-ARS Land Potential Knowledge System (LandPKS) project
2013 – 2017 Member of the Bureau of Land Management's national Assessment, Inventory, and Monitoring Program core leadership team
2016 – 2017 Faculty mentor for a USDA Foreign Agricultural Service Borlaug Fellowship recipient from Mongolia

2013 – present	Lead PI on the JournalMap.org project to provide a geographic literature search engine for natural resource and agricultural literature. JournalMap currently has >30,000 articles and agreements with 7 publishers to index content.
2009 – present	Lead PI for the Landscape Toolbox project which organized and presents information on rangeland monitoring and assessment. The LandscapeToolbox.org domain of websites sees **monthly** web usage of over 10,000 unique sessions.
2009 – present	Monitoring program reviews, assistance with data analysis, and site visits with various BLM, FS, State, and private rangeland practitioners
2014	USFWS Wolverine Science Panel Workshop

PROFESSIONAL DEVELOPMENT:

Scholarship:

CITI Investigators Training Modules

Introduction to Animal Care and Use (2018)
Working with Cattle in Agricultural Research Settings (2018)

Administration/Management:

Title IX Training (annually)
FERPA Training (annually)
IT Security Training (annually)
UI Defensive Driving (2017, 2022)
P Card and Travel Training at the University of Idaho (2017)
Diversity & Inclusion at the University of Idaho (2017)
Safety & security Awareness at the University of Idaho (2017)
Our Inclusive Workplace (2017)
University of Idaho Mission and Goals (2017)
University of Idaho Stewardship of Resources & Ethical Conduct (2017)

Other:

Red Cross Basic First Aid/CPR (2013-2017)
FAA Remote Pilot Certification (2018-Present)
Youth Protection Trainings – BSA (2005-2019)