W. David Walter

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EDUCATION

B.Sc. 1995. Wildlife Biology, State University of New York - College of Environmental Science and Forestry

M.Sc. 2000. Wildlife Ecology, University of New Hampshire

Walter, W.D. 2000. A field test of the PZP immunocontraceptive vaccine on a population of white-tailed deer (Odocoileus virginianus) in suburban Connecticut. Thesis, University of New Hampshire, Durham, New Hampshire. 75 pp.

PhD. 2006. Conservation Science - Wildlife Ecology, Oklahoma State University

Walter, W.D. 2006. Ecology of a colonizing population of Rocky Mountain elk (*Cervus elaphus*). Dissertation, Oklahoma State University, Stillwater, Oklahoma. 151 pp.

POSITIONS HELD

- Assistant Unit Leader, PA Cooperative Fish & Wildlife Research Unit, U.S. Geological Survey 2011 Present
- From: 2009 To: 2011 Post-doctoral researcher, National Wildlife Research Center, USDA/APHIS/WS, Fort Collins, Colorado and the University of Nebraska, Lincoln
- From: 2008 To: 2009 Post-doctoral researcher, Colorado Cooperative Fish and Wildlife Research Unit, Colorado State University, Fort Collins, Colorado
- From: 2007 To: 2008 Post-doctoral researcher, National Wildlife Research Center, USDA/APHIS/WS, Fort Collins, Colorado and the University of Nebraska, Lincoln
- From: 2006 To: 2007 Research Associate, Oklahoma State University, Stillwater, Oklahoma
- From: 2001 To: 2006 PhD Graduate Assistant, Oklahoma Cooperative Fish and Wildlife Research Unit, Oklahoma State University, Stillwater, Oklahoma
- From: 2000 To: 2001 Wildlife Researcher, Connecticut Department of Environmental Protection-Wildlife Division, North Franklin, Connecticut

Current and Recent Projects

Since starting with the Cooperative Fish and Wildlife Research Units Program in 2011, I have been part of - as either PI or co-PI - proposals awarded for over \$4,355,000 in total project funding. Projects 6-16 are active projects.

- Study Title: Modeling potential habitat for pheasant population restoration; Role: Co-Principal Investigator; Funding: Pennsylvania Game Commission; Dates: July 2015–December 2017; Time: 5%; Description: Research on Wild Pheasant Restoration Areas (WPRAs) was being conducted that provided an opportunity to evaluate models under which habitat conditions for wild pheasant populations have met established pheasant density goals based on habitat and landscape composition at the WPRAs [B56].
- Study Title: Muskrat ecology and disease; Role: Principal Investigator; Funding: Pennsylvania Game Commission; Dates: February 2016–June 2019; Time: 20%; Description: This study was designed to investigate the survival, movements, and potential threats to muskrats [B65, B68, B71, B72].
- 3. Study Title: Landscape genetics of white-tailed deer to assess population structure for surveillance of chronic wasting disease; Role: Principal Investigator; Funding: Pennsylvania Game Commission; Dates: February 2016–June 2019; Time: 10%; Description: We documented that widespread gene flow (F_{ST} < 1.0) and an isolation-by-distance pattern of population structure for deer that was previously undocumented in the region indicating that migration from the core area in West Virginia was likely responsible for chronic wasting disease spread to adjacent states [B53, B59, B61, B63, B64].

- 4. Study Title: The effects of targeted removal of deer groups on the epidemiology of chronic wasting disease in wild white-tailed deer in Pennsylvania; Role: Principal Investigator; Funding: Pennsylvania Game Commission; Dates: July 2017–June 2021; Time: 10%; Description: Potential elimination of chronic wasting disease in free-ranging deer has occurred (e.g., New York) so it might be possible to focus targeted removal efforts on locations where CWD positive animals are found at or beyond the fringe of an infected area to assess the most suitable method to decrease prevalence and minimize/eliminate transmission out of the disease management area [B74].
- 5. **Study Title**: Modeling the risk of West Nile Virus to Ruffed Grouse Populations in Pennsylvania; **Role**: Principal Investigator; **Funding**: Pennsylvania Game Commission; **Dates**: July 2018–June 2022; **Time**: 20%; **Description**: Our objectives are to identify the mosquito species that coexist with ruffed grouse in early successional habitat, which mosquito species are important vectors of WNV for ruffed grouse, and which environmental factors increase the risk of WNV exposure to ruffed grouse [**B67**].
- 6. Study Title: Genetic Assignment of White-Tailed Deer to Population of Origin; Role: Principal Investigator; Funding: Pennsylvania Game Commission; Dates: September 2019–June 2023; Time: 20%; Description: Landscape genetics can provide the necessary framework to understand landscape features, dispersal characteristics of deer, and transmission and spread of CWD through assessment of population structure using genotypes of deer susceptible to disease [B59], genetic assignment of captive and wild deer [B63], and 11 subpopulations within the Disease Management Areas 1–3 in Pennsylvania and in Maryland/Virginia [B69, B102].
- 7. Study Title: Optimizing CWD surveillance: regional synthesis of demographic, spatial, and transmission-risk factors (2019) Funding: Michigan Department of Natural Resources CWD RFP; Dates: July 2019–June 2021; Time: 10%; Principal Investigators: Krysten Schuler (Cornell University), Sonja Christensen (Michigan State University), W. David Walter (USGS PA Coop Unit), Daniel Walsh (USGS National Wildlife Health Center), Chris Jennelle (Minnesota Department of Natural Resources), Brenda Hanley (Cornell University); Role: Co-Principal Investigator providing surveillance data from mid-Atlantic region to combine with surveillance data from mid-west to optimize surveillance of chronic wasting disease (Sub-award through Cornell University; A8).
- 8. **Study Title**: Optimizing CWD Surveillance: Regional Synthesis of Demographic, Spatial, and Transmission-Risk Factors; **Role**: Co-Principal Investigator; **Funding**: Cornell University; **Dates**: September 2019–August 2022; **Time**: 20%; **Description**: Several modeling efforts have examined risk factors for chronic wasting disease (CWD), however, we have planned a rigorous integration of various models to derive a more powerful CWD sampling strategy [**B104**].
- 9. **Study Title**: Parturition timing and calf survival in Pennsylvania elk; **Role**: Principal Investigator; **Funding**: Pennsylvania Game Commission; **Dates**: July 2020–June 2023; **Time**: 20%; **Description**: The increase in pregnancy rates between autumn and late winter indicates asynchronous breeding in Pennsylvania elk so defining the calving season through use of vaginal implant transmitter technology and calf survival using GPS collars will identify factors that affect recruitment [**B97**, **B98**, **B100**].
- 10. **Study Title**: Minnesota white-tailed deer genetics within chronic wasting disease areas; **Role**: Principal Investigator; **Funding**: Minnesota Department of Natural Resources, United States Department of Agriculture (\$50,000); **Dates**: July 2020–June 2021; **Time**: 10%; **Description**: The objectives of this project are to conduct genetic analysis testing on wild white-tailed deer to identify shared ancestry (11 msats and mtDNA haplotypes) and susceptibility to chronic wasting disease (PRNP genotypes at codons 95, 96, 116) for deer in various regions throughout the state of Minnesota [**B100**].
- 11. Study Title: Regional assessment of cause-specific mortality in white-tailed deer populations, and influence of landscape attributes and deer density on CWD spread through juvenile deer dispersal and seasonal movements (2018) Funding: NA. Dates: July 2019–June 2021; Principal Investigators: Andrew Norton, Chris Jennelle (MN Department of Natural Resources) and Daniel Walsh (USGS National Wildlife Health Center). Role: Collaborator providing GPS locations from white-tailed deer in the Mid-Atlantic Region and Lead Role in identifying definition of dispersal and risk of infection across the landscape [B65].
- 12. **Study Title**: Linking Genetics to Movements of White-tailed deer to Assist Surveillance for Chronic Wasting Disease; **Role**: Principal Investigator; **Funding**: U.S. Geological Survey; **Dates**: July 2020–June 2024; **Time**: 10%; **Description**: We genotyped the prion gene of individuals sampled from distinct populations of

- wild white-tailed deer that have experienced CWD for 10–20 years (Maryland/Pennsylvania/Virginia; **A3** and **A6**), an area with no current infection (New York; added in 2020), and an area with a recent infection (Ohio; added in 2022) to determine the level of CWD susceptible deer (**B59**) in various subpopulations throughout the region to help managers understand the potential genetic risk factors for CWD in these populations.
- 13. Establishing a national tissue and reagents repository for chronic wasting disease; **Role**: Principal Investigator; **Funding**: U.S. Geological Survey; **Dates**: September 2021–September 2023; **Time**: 20%; **Description**: The overall goal of this project is to establish a repository of CWD field isolates from a wide-ranging geographic location in North America that will allow, for the first time, the means to begin to assess the distribution and frequency of chronic wasting disease strains in North America
- 14. Agent-based models to inform management of white-tailed deer for chronic wasting disease; **Role**: Principal Investigator; **Funding**: Pennsylvania Game Commission; **Dates**: July 2022–June 2025; **Time**: 20%; **Description**: Objectives of this study are to compile a review of the deer behavior literature on contacts, associations, and observational data for white-tailed deer to compile sex/age-specific likelihood of contacts to inform transmission coefficients for agent-based models.
- 15. Assessment of movement of prions across the captive-wild interface; Role: Principal Investigator; Funding: USDA-APHIS-Wildlife Service, National Wildlife Research Center; Dates: August 2021–August 2024; Time: 10%; Description: Our primary objective is to determine potential exchange of infectious prion protein material between captive cervid facilities and surrounding areas using Real-Time Quaking-Induced Conversion (RT-QuIC) assays.
- 16. Targeted surveillance for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in wildlife; **Role**: Principal Investigator; **Funding**: U.S. Department of Agriculture's Animal and Plant Health Inspection Service under a provision of the American Rescue Plan Act; **Dates**: November 2022–October 2025; **Time**: 20%; **Description**: To understand epidemiological risk factors of SARS-CoV-2 emergence in cervids.
- 17. Population models to inform management of black bear statewide in Pennsylvania; Role: Co-Principal Investigator; Funding: Pennsylvania Game Commission; Dates: July 2024–June 2029; Time: 20%; Description: A Statistical Population Reconstruction (SPR) model will be prepared to estimate abundance, bear densities, and harvest rates at the state and Wildlife Management Units levels in Pennsylvania.
- 18. Genetic assignment tests using single nucleotide polymorphisms in white-tailed deer as a management tool for chronic wasting disease; **Role**: Principal Investigator; **Funding**: U.S. Department of Agriculture's Animal, Plant Health Inspection Service, Wildlife Services; **Dates**: September 2024–October 2025; **Time**: 20%; **Description**: to develop methods for genetic assignment tests to infer subpopulation of origin of wild white-tailed deer using single nucleotide polymorphisms.

PUBLICATIONS (* = graduate/undergraduate student or post-doctoral researcher, \dagger = indicates Open Access) 2025

- 82. Diefenbach, D. R., M. J. Cherry, S. D. Cote, R. W. DeYoung, S. A. Gallina Tessaro, B. R. Patterson, and W.D. Walter. 2024. Chapter 49. White-tailed Deer *Odocoileus virginianus* (Zimmerman 1780). In M. Mellotti and S. Focardi, Eds. Deer of the World. Springer 975 pp. https://doi.org/10.1007/978-3-031-17756-9.
- 81. Pepin, KM, MA Combs, G Bastille-Rousseau, ME Craft, P Cross, MA Diuk-Wasser, RB Gagne, T Gallo, T Garwood, JD Heale, J Hewitt, J Høy-Petersen, J Malmberg, J Mullinax, L Plimpton, L Smith, MC VanAcker, K VerCauteren, JC Chandler, **WD Walter**, G Wilson-Henjum, G Wittemyer, K Manlove. 2025. Expanding national-scale wildlife disease intelligence systems with research networks. Ecology and Evolution 15: e71492. https://doi.org/10.1002/ece3.71492.
- 80. Hewitt, J., G. Wilson-Henjum, J.C. Chandler, A. Phillips, D.G. Diel, W.D. Walter, A. Baker, J. Høy-Petersen, G. Bastille-Rousseau, T. Kishimoto, G. Wittemyer, J. Alder, K.R., S. Hathaway, K.R. Manlove, T. Gallo, J. Mullinax, C. Coriell, M. Payne, M.E. Craft, T.J. Garwood, T.M. Wolf, M.A. Diuk-Wasser, M.C. VanAcker, L.D. Plimton, M.Q. Wilber, D. Grove, J. Koseiwska, L.I. Muller, K.M. Pepin. 2025. Evaluation of SARS-CoV-2 antibody detection methods for wild Cervidae. Preventive Veterinary Medicine 106522, https://doi.org/10.1016/j.prevetmed.2025.106522;

- Diefenbach, D. R., J. Trowbridge, A. Van Buskirk, T. McConnell, K. Lamp, T. A. Marques, W. D. Walter, B. D. Wallingford, and C. S. Rosenberry. 2025. Accounting for non-random samples with distance sampling to estimate population density. Journal of Applied Ecology 62 (4): 986–994. https://doi.org/10.1111/1365-2664.70006
- 78. Walter, W.D., A. Herbst, C. Lue, J. Bartz, and M.C. Hopkins. 2025. Overview of North American isolates of chronic wasting disease used for strain research. Pathogens, Special Issue: Advances in Chronic Wasting Disease 14:250; https://doi.org/10.3390/pathogens14030250
- 77. *†Fameli, A., C.S. Jennelle, J. Edson, E. Hildebrand, M. Carstensen, and W.D. Walter. 2024. Relatedness of white-tailed deer from culling efforts within disease management zones in Minnesota. Special Issue on Advances in Chronic Wasting Disease, Pathogens 2025, 14, 67. https://doi.org/10.3390/pathogens14010067.

2024

- 76. Atmeh, K., C. Bonenfant, J. Gaillard, M. Garel, A. J. M. Hewison, P. Marchand, N. Morellet, P. Anderwald, B. Buuveibaatar, J. L. Beck, M. S. Becker, F. M. van Beest, J. Berg, U. A. Bergvall, R. B. Boone, M. S. Boyce, S. Chamaillé-Jammes, Y. Chaval, C. Buyanaa, D. Christianson, S. Ciuti, S. D. Côté, D. R. Diefenbach, Egil Droge, J. T. du Toit, S. Dwinnell, J. Fennessy, F. Filli, D. Fortin, E. E. Hart, M. Hayes, M. Hebblewhite, M. Heim, I. Herfindal, M. Heurich, C. von Hoerman, K. Huggler, C. Jackson, A. F. Jakes, P. F. Jones, P. Kaczensky, M. Kauffman, P. Kjellander, T. LaSharr, L. Egil Loe, R. May, P. McLoughlin, E. L. Meisingset, E. Merrill, K. L. Monteith, T. Mueller, A. Mysterud, D. Nandintsetseg, K. Olson, J. Payne, S. Pearson, Å. Ø. Pedersen, D. Ranglack, A. K. Reinking, T. Rempfler, C. G. Rice, E. Røskaft, B. Sæther, S. Saïd, H. Santacreu, N. M. Schmidt, D. Smit, J. A. Stabach, M. St-Laurent, J. Taillon, W. D. Walter, K. White, G. Péron, A. Loison. 2024. Neonatal antipredator tactics shape female movement patterns in large herbivores. Nature Ecology and Evolution https://doi.org/10.1038/s41559-024-02565-8
- 75. *Corondi, A.M, J.D. Brown, J.E. Banfield, and **W.D. Walter**. 2024. Comparison of butorphanol-azaperone-medetomidine and nalbuphine-medetomidine-azaperone in free-ranging elk (*Cervus canadensis*) in Pennsylvania. Journal of Wildlife Diseases. 60(4): 950–955.
- 74. †Bondo, K.J., C.S. Rosenberry, D. Stainbrook, **W.D. Walter**. 2024. Comparing risk of chronic wasting disease occurrence using Bayesian hierarchical spatial models and different surveillance types. Ecological Modeling 493:110756 10.1016/j.ecolmodel.2024.110756.
- 73. †Walter, W.D., A. Fameli, K. Russo-Petrick, J.E. Edson, C.S. Rosenberry, K.L. Schuler, M.J. Tonkovich. Large-scale assessment of genetic structure to assess risk of populations of a large herbivore to chronic wasting disease. Ecology and Evolution 14, e11347 10.1002/ece3.11347.
- 72. *†Pearce, D.L., J.E. Edson, C.S. Jennelle, and W.D. Walter. 2024. Evaluation of DNA yield from various tissue and sampling sources for use in single nucleotide polymorphism panels. Scientific Reports 14, 11340; 10.1038/s41598-024-56128-9.
- Schwabenlander, M.D., J.C. Bartz, M. Carstensen, A. Fameli, L. Glaser, R.J. Larsen, M. Li, L.L. Lindsey, J.D. Oliver, R. Shoemaker, G. Rowden, S. Stone, W.D. Walter, T.M. Wolf, P.A. Larsen. 2024. Prion forensics: a multidisciplinary approach to investigate CWD at an illegal deer carcass disposal site. Prion Prion, 18(1):72-86; DOI: 10.1080/19336896.2024.2343298
- 70. †Walter, W.D., B. Hanley, C.E. Them, C. Mitchell, J. D. Kelly, D. Grove, N. Hollingshead, R.C. Abbott, and K. Schuler. 2024. Predicting the odds of chronic wasting disease with the Habitat Risk Software. Spatial and Spatio-Temporal Epidemiology 49:100650.

- *†Bondo, K.J., *D. Montecino-Latorre, L. Williams, M. Helwig, K. Duren, M. Hutchinson, and W.D. Walter. 2023. Spatial Modeling of two mosquito vectors of West Nile virus using integrated nested Laplace approximations. Ecosphere 14(1):e4346
- 68. Gundermann, K. P., D. R. Diefenbach, **W.D. Walter**, A. M. Corondi, J. E. Banfield, B. D. Wallingford, D. P. Stainbrook, C. S. Rosenberry, and F. E. Buderman. 2023. Change-point models for identifying behavioral transitions in wild animals. Movement Ecology 11, 65.

- 67. Niedringhaus, K.D, L.S. Ganoe, M. Lovallo, **W.D. Walter**, M.J. Yabsley, and J.D. Brown. 2022. Fatal infection with *Versteria* sp. in a muskrat, with implications for human health. Journal of Veterinary Diagnostic Investigation 34(2):314–318.
- 66. *Khouri, R.M, D.C. Wagner, and W. D. Walter. 2022. Efficacy of secondary electric fences at preventing direct contact among white-tailed deer. Wildlife Society Bulletin 46:e1350.
- Jennelle, C.S., W.D. Walter, J. Crawford, C.S. Rosenberry, B.D. Wallingford. 2022. Movement of white-tailed deer in contrasting landscapes influences management of chronic wasting disease. Journal of Wildlife Management 86:e22306.
- 64. *Fameli, A, J. Edson, J.E. Banfield, C.S. Rosenberry, and W.D. Walter. 2022. Variability in prion protein genotypes by spatial unit to inform susceptibility to chronic wasting disease. Prion 16(1):254-264.

2021

- 63. *Ganoe, L.S., M.J. Lovallo, J.D. Brown, and W.D. Walter. 2021. Ecology of an isolated muskrat population during regional population declines. Northeastern Naturalist 28(1):49–64.
- 62. *Edson, J., J. Brown, W.M. Miller, W.D. Walter. 2021. Comparison of sample types from white-tailed deer (Odocoileus virginianus) for DNA extraction and analyses. Scientific Reports 11, 10003.
- 61. *Bauder, J.M., C.S. Anderson, H.L. Gibbs, M.J. Tonkovich, and **W.D. Walter**. 2021. Landscape features fail to explain spatial genetic structure in white-tailed deer across Ohio, USA. Journal of Wildlife Management 85(8):1669–1684.
- 60. *Ganoe, L.S., J.D. Brown, M.J. Lovallo, M.J. Yabsley, K.B. Garrett, A.T. Thompson, R.H. Poppenga, M.G. Ruder, and W.D. Walter. 2021. Surveillance for diseases, pathogens, and toxicants of muskrat (Ondatra zibethicus) in Pennsylvania and surrounding regions. PlosONE 16(12):e0260987.

2020

- 59. *†Miller, W.L. and W.D. Walter. 2020. Can genetic assignment tests provide insight on the influence of captive egression on the epizootiology of chronic wasting disease? Evolutionary Applications. 13:715–726.
- 58. *†Miller, W.M., C.M. Miller-Butterworth, D.R. Diefenbach, and **W.D. Walter**. 2020. Assessment of spatial genetic structure to identify populations at risk for infection of an emerging epizootic disease. Ecology and Evolution 10(9):3977–3990.
- 57. *†Ganoe, L.S., J.D. Brown, M.J. Yabsley, M.J. Lovallo, and **W.D. Walter**. 2020. A review of pathogens, diseases, and contaminants of muskrats (*Ondatra zibethicus*) in North America. Frontiers in Veterinary Science 7:233.
- 56. †Ensminger, D.C., C. Pritchard, T. Langkilde, T. Gingery, J.E. Banfield, and W.D. Walter. 2020. The influence of hunting pressure and ecological factors on fecal glucocorticoid metabolites in wild elk. Wildlife Biology 2020(2).
- 55. *Ahrestani, F.S, M.A. Ternent, M.J. Lovallo, and **W.D. Walter**. 2020. Resource use by American black bears in suburbia: a landholder step selection approach. Human-Wildlife Interactions 14(2):11.

- 54. †Amor, J.M., R. Newman, W.F. Jensen, B.C. Rundquist, **W.D. Walter**, and J.R. Boulanger. 2019. Seasonal home ranges and habitat selection of three elk herds in North Dakota. PlosONE 14(2):0211650.
- 53. *†Miller, W.L. and **W.D. Walter**. 2019. Spatial heterogeneity of prion gene polymorphisms in an area recently infected by chronic wasting disease. Prion 13(1):65-76.
- 52. Schneider, A.L., A.T. Gilbert, **W.D. Walter**, G.S. Vandeberg, and J.R. Boulanger. 2019. Spatial ecology of urban striped skunks (*Mephitis mephitis*) in the Northern Great Plains: A framework for future oral rabies vaccination programs. Urban Ecosystems 22:539–552.

51. *†Miller, W.L., J. Edson, P. Pietrandrea, C. Miller-Butterworth, and **W.D. Walter**. 2019. Identification and evaluation of a core microsatellite panel for use in white-tailed deer (Odocoileus virginianus). BMC Genetics 20:49.

2018

- 50. *Williamson, L.T., **W.D. Walter**, S.R. Klinger, D.R. Diefenbach. 2018. Estimating detection probability for bird population density estimates. Journal of Wildlife Management 82(8):1680–1688.
- 49. †Walter, W.D., T.S. Evans, D. Stainbrook, B.D. Wallingford, C.S. Rosenberry, and D.R. Diefenbach. 2018. Heterogeneity of a landscape influences size of home range in a North American cervid. Scientific Reports 7:14667.

2017

- 48. *†Miller, W.L. and **W.D. Walter**. 2017. CWDPRNP: 2017 a tool for cervid prion sequence analysis in program R. Bioinformatics 33(19):3096–3097.
- 47. *†Carrollo, E.M., H.E. Johnson, J.W. Fischer, M. Hammond, P.D. Dorsey, C.W. Anderson, K.C. VerCauteren, and W.D. Walter. 2017. Influence of precipitation and crop germination on resource selection by mule deer (*Odocoileus hemionus*) in southwest Colorado. Scientific Reports 7:15234.

2016

- 46. *Evans, T.S., M. Kirchgessner, B. Eyler, C.W. Ryan, and W.D. Walter. 2016. Habitat influences distribution of chronic wasting disease in white-tailed deer. Journal of Wildlife Management 80(2):284–291.
- 45. Haley, N.J., C. Siepker, **W.D. Walter**, B.V. Thomsen, J.J. Greenlee, A.D. Lehmkuhl, and J.A. Richt. 2016. Antemortem detection of chronic wasting disease prions in nasal brush collections and rectal biopsies from white-tailed deer by real time quaking-induced conversion. Journal of Clinical Microbiology 54(4):1108–1116.
- 44. Haley, N.J., C. Siepker, L.L. Hoon-Hanks, G. Mitchell, W.D. Walter, M. Manca, R.J. Monello, J.G. Powers, M.A. Wild, E.A. Hoover, B. Caughey, and J. Richt. 2016. Seeded amplification of chronic wasting disease prions in nasal brushings and recto-anal mucosal associated lymphoid tissues from elk by real time quaking-induced conversion. Journal of Clinical Microbiology 54(4):1117–1126.
- 43. Fischer, J.W., D. McMurtry, C.R. Blass, **W.D. Walter**, J. Beringer, and K.C. VerCauteren. 2016. Effects of simulated removal activities on movements and space use of feral swine. European Journal of Wildlife Research 62(3):285–292.
- 42. Fischer, J.W., C.R. Blass, **W.D. Walter**, C.W. Anderson, M.J. Lavelle, W.H. Hall, and K.C. VerCauteren. 2016. Evaluating a strategy to deliver vaccine to white-tailed deer at a landscape level. Wildlife Society Bulletin 40(2):394–399.
- 41. King, D.T., J.W. Fischer, B. Strickland, **W.D. Walter**, F.L. Cunningham, and G. Wang. 2016. Winter and summer home ranges of American white pelicans (*Pelecanus erythrorhynchos*) captured at loafing sites in the southeastern United States. Waterbirds 39(3):287–294.

2015

40. †Walter, W.D., D.P. Onorato, and J.W. Fischer. 2015. Is there a single best estimator? Selection of home range estimators using area-under-the-curve. Movement Ecology 3, 10.

- 39. Johnson, H.E., J.W. Fischer, M Hammond, P. Dorsey, **W.D. Walter**, C.W. Anderson, and K.C. VerCauteren. 2014. Evaluation of techniques to reduce deer and elk damage to agricultural crops. Wildlife Society Bulletin 38(2):358–365.
- 38. Walter, W.D., Kurle, C.M., and J.B. Hopkins III. 2014. Applications of stable isotope analysis in mammalian ecology. Isotopes in Environmental and Health Studies 50(3):287–290.
- 37. Walter, W.D. 2014. Use of stable isotopes to identify dietary differences and subpopulations of a free-ranging generalist herbivore. Isotopes in Environmental and Health Studies 50(3):399–413.

- 36. †Walter, W.D., R. Smith, M. Vanderklok, and K.C. VerCauteren. 2014. Linking bovine tuberculosis on cattle farms to white-tailed deer and environmental variables using Bayesian hierarchical analysis. PLoS ONE 9(3):e90925.
- 35. *Evans, T.S., K.L. Schuler, and **W.D. Walter**. 2014. Surveillance and monitoring of white-tailed deer for chronic wasting disease in the northeastern United States. Journal of Fish and Wildlife Management 5(2):387–393.

2013

- 34. Walter, W.D., J.W. Fischer, C.W. Anderson, D.R. Marks, T. Deliberto, S. Robbe-Austerman, and K.C. VerCauteren. 2013. Surveillance and movements of Virginia opossum (*Didelphis virginiana*) in the bovine tuberculosis region of Michigan. Epidemiology and Infection, Special Issue on TB, 141(7):1498–1508.
- 33. Walter, W.D., J.W. Fischer, T.J. Zimmerman, S.E. Hygnstrom, J.A. Jenks, and K.C. VerCauteren. 2013. Topographic home range of large mammals: is planimetric home range still a viable method? Prairie Naturalist 45(1):21–27.
- 32. Fischer, J.W., **W.D. Walter**, and M.A. Avery. 2013. Brownian bridge movement models to characterize home ranges of avian species. The Condor 115(2):298–305.
- 31. Berentsen, A.R., M.R. Dunbar, C.E. Fitzpatrick, and W.D. Walter. 2013. Spatial ecology of urban raccoons in Northeastern Ohio: implications for oral rabies vaccination. Prairie Naturalist 45(1):39–45.

2012

- 30. Walter, W.D., J.W. Fischer, M.A. Avery J.S. Humphrey, T.S. Daughtery, M.P. Milleson, and E.A. Tillman. 2012. Using three-dimensional flight patterns at airfields to identify hotspots for avian-aircraft collisions. Applied Geography 35:53–59.
- 29. Henningsen, J.C., A.L. Williams, C.M. Tate, S.A. Kilpatrick, and **W.D. Walter**. 2012. Distribution and prevalence of Elaeophora schneideri in moose in Wyoming. Alces 48:35–44.
- 28. Walter, W.D., C.W. Anderson, and K.C. VerCauteren. 2012. Evaluation of remote delivery of passive infrared transponder (PIT) technology to mark large mammals. PLoS ONE 7(9): e44838.
- 27. Walter, W.D., C. W. Anderson, R. Smith, M. Vanderklok, J. Averill, and K.C. VerCauteren. 2012. On-farm mitigation of transmission of tuberculosis from white-tailed deer to cattle: literature review and recommendations. Veterinary Medicine International 616318.
- 26. Walter, W.D., J.W. Fischer, C.W. Anderson, D.R. Marks, T. Deliberto, S. Robbe-Austerman, and K.C. VerCauteren. 2013. Surveillance and movements of Virginia opossum (*Didelphis virginiana*) in the bovine tuberculosis region of Michigan. Epidemiology and Infection, Special Issue on TB, 141(7):1498–1508.

- 25. Walter, W.D., D.P. Walsh, M.L. Farnsworth, D.L. Winkelman, and M.W. Miller. 2011. Soil clay content underlies prion infection odds. Nature Communications 2:200.
- 24. Walter, W.D., D.M. Baasch, S.E. Hygnstrom, B.D. Trindle, A.J. Tyre, J.J. Millspaugh, C.J. Frost, J.R. Boner, and K.C. VerCauteren. 2011. Space use of sympatric deer in a riparian ecosystem in an area chronic wasting disease is endemic. Wildlife Biology 17(2):191–209.
- 23. Walter, W.D., J. Beringer, L.P. Hansen, J.W. Fischer, J.J. Millspaugh, and K.C. VerCauteren. 2011. Factors affecting space use overlap by white-tailed deer in an urban landscape. International Journal of Geographical Information Science 25(3):379–392.
- 22. Avery, M.L., J.S. Humphrey, T.S. Daughtery, J.W. Fischer, M.P. Milleson, E.A. Tillman, W.E. Bruce, and W.D. Walter. 2011. Vulture flight behavior and implications to aircraft safety. Journal of Wildlife Management 75(7):1581–1587.
- 21. VerCauteren, K.C., C.W. Anderson, T.R. Van Deelen, D. Drake, **W.D. Walter**, S.M. Vantassel, and S.E. Hygnstrom. 2011. Regulated commercial harvest to manage overabundant white-tailed deer: an idea to consider? Wildlife Society Bulletin 35(3):185–194.

20. Walter, W.D., J.W. Fischer, S. Baruch-Mordo, and K.C. VerCauteren. 2011. What is the proper method to delineate home range of an animal using today's advanced GPS telemetry systems: the initial step. In: Modern telemetry, Intech, Open Access Publisher.

2010

- 19. Walter, W.D., D.M. Leslie, Jr., E.C. Hellgren, and D.M. Engle. 2010. Identification of subpopulations of North American elk (Cervus elaphus) using multiple lines of evidence: habitat use, dietary choice, and fecal stable isotopes. Ecological Research 25:789–800.
- 18. Davis, C A., D.M. Leslie, Jr., W.D. Walter, and A.E. Graber. 2010. Mountain biking trail use affects reproductive success of nesting gold-cheeked warblers. Wilson Journal of Ornithology 122:465–474.
- 17. Walter, W.D., M.J. Lavelle, J.W. Fischer, T.J. Johnson, S.E. Hygnstrom, and K.C. VerCauteren. 2010. Management of damage by elk (Cervus elaphus) in North America: a review. Wildlife Research 37(8):630–646.

2009

- 16. Walter, W.D., K.C. VerCauteren, J.M. Gilsdorf, and S.E. Hygnstrom. 2009. Crop, native vegetation, and biofuels: response of white-tailed deer to changing management priorities. Journal of Wildlife Management 73(3):339–344.
- Walter, W.D., K.C. VerCauteren, H. Campa, III, W.R. Clark, J.W. Fischer, S.E. Hygnstrom, N.E. Mathews, C.K. Nielsen, E.M. Schauber, T.R. Van Deelen, and S.R. Winterstein. 2009. Regional assessment on influence of landscape configuration and connectivity on range size of white-tailed deer. Landscape Ecology. 24(10): 1405–1420.
- 14. Walter, W.D., and D.M. Leslie, Jr. 2009. Stable isotope ratio analysis to differentiate temporal diets of a free-ranging herbivore. Rapid Communications in Mass Spectrometry. 23(14): 2190–2194.
- 13. Spraker, T.R., K.C. VerCauteren, T.L. Gidlewski, R.D. Munger, **W.D. Walter**, A. Balachandran, and K.I. O'Rourke. 2009. Impact of age and sex of Rocky Mountain elk (Cervus elaphus nelsoni) on follicle counts from rectal mucosal biopsies for preclinical detection of chronic wasting disease. Journal of Veterinary Diagnostic Investigation. 21(6): 868–870.
- 12. Walter, W.D., T.J. Zimmerman, D.M. Leslie, Jr., and J.A. Jenks. 2009. Dietary response of sympatric deer to fire using stable isotope analysis of liver tissue. Wildlife Biology in Practice 5:128–135.
- 11. Ward, A.I., K.C. VerCauteren, W.D. Walter, E. Gilot-Fromont, S. Rossi, G. Edwards-Jones, M. Lambert, M.R. Hutchings, and R.J. Delahay. 2009. Options for the control of disease 3: targeting the environment. Pages 147–168 in R.J. Delahay, M.R. Hutchings, and G.C. Smith (eds) Management of disease in wild mammals. Springer.

2008

10. Gildorf, J.M., K.C. Vercauteren, S.E. Hygnstrom, **W.D. Walter**, J.R. Boner, and G.M. Clements. 2008. An integrated vehicle-mounted telemetry system for VHF telemetry applications. Journal of Wildlife Management 72(5):1241–1246.

2006

9. Walter, W.D., D.M. Leslie, Jr., and J.A. Jenks. 2006. Response of Rocky Mountain elk (*Cervus elaphus*) to wind-power development in southwestern Oklahoma. American Midland Naturalist 156:363–375.

- 8. Walter, W.D., D.M. Leslie, Jr., J.H. Herner-Thogmartin, K.G. Smith, and M.E. Cartwright. 2005. Efficacy of immobilizing free-ranging elk with Telazol and xylazine hydrochloride using transmitter-equipped darts. Journal of Wildlife Diseases 41:395–400.
- 7. Walter, W.D., R.L. Bryant, and D.M. Leslie, Jr. 2005. Unusual documentation of elk behaviors using automated cameras. Proceedings of the Oklahoma Academy of Science 85:81–83.

6. Walter, W.D., H.J. Kilpatrick, and M.A. Gregonis. 2003. Does immunocontraception improve condition of free-ranging white-tailed deer? Journal of Wildlife Management 67:762–766.

2002

- 5. Walter, W.D., P. J. Pekins, A.T. Rutberg, and H.J. Kilpatrick. 2002. Evaluation of immunocontraception in a free-ranging suburban white-tailed deer herd. Wildlife Society Bulletin 30:186–192.
- 4. Walter, W.D., P.J. Pekins, A.T. Rutberg, and H.J. Kilpatrick. 2002. Evaluation of immunocontraceptive adjuvants, titers, and fecal pregnancy indicators in free-ranging white-tailed deer. Wildlife Society Bulletin 30:908–914.
- 3. Walter, W.D., and D.M. Leslie, Jr. 2002. Harvest strategies and numbers of elk (Cervus elaphus) in Oklahoma, 1987–2201. Proceedings of the Oklahoma Academy of Science 82:89–94.

1999

2. Kilpatrick, H.J., and W.D. Walter. 1999. A controlled archery deer hunt in a residential community: cost, effectiveness, and deer recovery rates. Wildlife Society Bulletin 27:115–123.

1997

 Kilpatrick, H.J., and W.D. Walter. 1997. Urban deer management: a community vote. Wildlife Society Bulletin 25:388–390.

Published data and code

- †Walter, W.D. and J.W. Fischer. 2014. Manual of Applied Spatial Ecology. https://ecosystems.psu.edu/research/labs/walter-lab/manual; BAO Approval: 08/20/2014; IPDS: IP-056793
- 2. Walter, W.D. and W. Miller. 2019. walterASEL/Miller-et-al.—Assignment: Initial (Version v01)[Dataset]. Zenodo. https://zenodo.org/record/3530546
- 3. Miller, W. and W.D. Walter. 2020. Spatial genetic structure to identify populations at risk [Data set]. Zenodo. https://zenodo.org/record/3676888
- Walter, W.D. 2020. Ensminger et al 2020 Fecal glucocorticoid metabolites in harvested elk [Data set]. Zenodo. https://zenodo.org/record/3856428
- 5. ^εBauder, J. and W.D. Walter. 2021. Bauder Et Al. Landscape features fail to explain spatial genetic structure (Version v2) [Data set]. Zenodo. https://zenodo.org/record/5142120
- Mitchell, C., Walter, W. D., Hollingshead, N., and Schuler, K. 2021. Processing of Geospatial Data for the Habitat Risk Software. Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P9MR2N4H. BAO Approval: 04/2023; IPDS: IP-132500
- FBondo, K.J., *D. Montecino-Latorre, W.D. Walter. 2023. Spatial modeling of two mosquito vectors of West Nile virus using integrated nested Laplace approximations. Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P9QAB3ZZ. BAO Approval: 10/2022; IPDS: IP-145784
- 8. ^εBondo, K.J., *D. Montecino-Latorre, **W.D. Walter**. 2023. Workflow to acquire and process large spatial data and build complex models. Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P90NHXN3. BAO Approval: 02/2023; IPDS: IP-149386
- γPearce, D.L. and W.D. Walter. 2023. Evaluation of DNA yield from various tissue and sampling sources for use in single nucleotide polymorphism panels. Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P96QMZUE. BAO Approval: 07/2023; IPDS: IP-155395

- Walter, W.D. and ^γD. Pearce. 2023. Evaluation of DNA yield from various sources for use in single nucleotide polymorphism panels. U.S. Geological Survey data release. Reston, Va. https://doi.org/10.5066/P96VPBSO. BAO Approval: 07/2023; IPDS: IP-155360
- 11. Hanley, B.J., C. I. Mitchell, **W.D. Walter**, J. Kelly, D. Grove, R.C. Abbott, N. Hollingshead, and K.L. Schuler. 2023. Habitat Risk Software. U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P9541B7T. BAO Approval: 08/2023; IPDS: IP-139116
- Walter, W.D., Hollingshead, N., Kelly, J., Grove, D., Abbot, R., and Schuler, K. 2023. Input for Habitat Risk Software. Version 1.0.0: U.S. Geological Survey data release. Reston, Va. https://doi.org/10.5066/ P9CMQWRB. BAO Approval: 08/2023; IPDS: IP-IP-156764
- εA. Fameli, K. Russo-Petrick, J.E. Edson, and W.D. Walter. 2023. Population genetic structure of white-tailed deer using microsatellites across the Mid-Atlantic. Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P9XBNYCR. BAO Approval: 10/2023; IPDS: IP-157264
- 14. Walter, W.D., A. Fameli, K. Russo-Petrick, J.E. Edson. 2023. Microsatellite genotypes and metadata for white-tailed deer samples from the Mid-Atlantic region of USA: U.S. Geological Survey data release, https://doi.org/10.5066/P965MK53. BAO Approval: 10/2023; IPDS: IP-157262
- 15. Hanley, B. J, C.I. Mitchell, **W.D. Walter**, D.P. Walsh, C.S. Jennelle, N.A. Hollingshead, R.C. Abbott, J.D. Kelly, D. Grove, E. Them,, S.A. Christensen, M.S. Ahmed, L.A. Miller, and K.L. Schuler. 2023. Chronic wasting disease surveillance optimization software (n×12). Version 1.0.0: U.S. Geological Survey software release. Reston, Va. https://doi.org/10.5066/P9W7JVNJ. BAO Approval: 10/2023; IPDS: IP-157568
- ^εBondo, K.J. and W.D. Walter. Comparing datasets by surveillance method using spatial models. Version 1.0.0: U.S. Geological Survey software release. Reston, VA. https://doi.org/10.5066/P9348BA8. BAO approval: 12/2023; IPDS: IP-159716.
- ^εFameli, A.F., Edson, J., and Walter, W.D. 2024, White-tailed deer from culling efforts in Minnesota. U.S. Geological Survey data release, https://doi.org/10.5066/P13BGPFC. BAO approval: 04/0923; IPDS: IP-164568.
- 18. ^εWehr, N., and **Walter, W.D.** 2025. Contact rates for identifying interactions of white-tailed deer in a chronic wasting disease management area: U.S. Geological Survey software release, https://doi.org/10.5066/P14RVZKJ

Unpublished technical reports

- 1. Kilpatrick, H.J., M.A. Gregonis, **Walter, W.D.**, K.K. Lima, and K.A. Eccleston. 1996. Wild turkey program annual report, 1995. Connecticut Department of Environmental Protection, Wildlife Division. Hartford, CT. 27pp.
- Kilpatrick, H.J., M.A. Gregonis, K.K. Lima, K.A. Eccleston, and Walter, W.D. 1996. Connecticut deer program 5-year summary, 1991-1995. Connecticut Department of Environmental Protection, Wildlife Division. Hartford, CT. 24pp.
- 3. Kilpatrick, H.J., M.A. Gregonis, W.A. Stober, K.K. Lima, and Walter, W.D. 1997. Connecticut deer program summary, 1996. Connecticut Department of Environmental Protection, Wildlife Division. Hartford, CT. 24pp.
- 4. Walter, W.D., M.A. Gregonis and H.J. Kilpatrick. 2001. Preliminary assessment of New England cottontail (Sylvilagus transitionalis) and eastern cottontail (Sylvilagus floridanus) distribution in Connecticut, October 2000–June 2001. Progress Report. Connecticut Department of Environmental Protection, Bureau of Natural Resources, Wildlife Division. 65 pp.
- 5. Walter, W.D. and D.M. Leslie, Jr. 2002–2006. Population characteristics and movements of elk (*Cervus elaphus*) outside the Wichita Mountains Wildlife Refuge. Performance Report, Federal Aid Project W-148-R, Oklahoma Department of Wildlife Conservation, Oklahoma City. 16pp.

- 6. Walter, W.D. and D.M. Leslie, Jr. 2006. Population characteristics and movements of elk (*Cervus ela-phus*) outside the Wichita Mountains Wildlife Refuge. Final Report, Federal Aid Project W-148-R Oklahoma Department of Wildlife Conservation, Oklahoma City. 23 pp.
- Avery, M.L., J.S. Humphrey, E.A. Tillman, M.P. Milleson, J.W. Fischer, T.S. Daughtery, W.E. Bruce, and W.D. Walter. 2010. Vulture Movements and Activity at Marine Corps Air Station, Beaufort, SC. Final Report, Southern Division, Naval Facilities Engineering Command, Beaufort, SC.
- 8. Walter, W.D., C.W. Anderson, M.J. Lavelle, J. W. Fischer, S.E. Hygnstrom, and K.C. VerCauteren. 2010. Assessment of methods for redistributing elk to benefit vegetation in Rocky Mountain National Park. Final report, Rocky Mountain National Park, Estes Park, CO.
- 9. Walter, W.D., C.W. Anderson, and K.C. VerCauteren. 2011. Recommendations for on-farm wildlife mitigation practices to prevent transmission of bovine tuberculosis between livestock and white-tailed deer. Final Report, Michigan Department of Agriculture-Animal Industry Division.
- 10. †Carlson, C.M., Hopkins, M.C., Nguyen, N.T., Richards, B.J., Walsh, D.P., and Walter, W.D. 2018. Chronic wasting disease: status, science, and management support by the U.S. Geological Survey: U.S. Geological Survey Fact Sheet 2017-1138, 8 p.; BAO Approval: 10/25/2017; IPDS: IP-086268; Concept & Design: 20%; Data: 20%; Analysis/Interpretation: 50%; Writing: 25%
- 11. †Hopkins, M.C., Carlson, C.M., Cross, P.C., Johnson, C.J., Richards, B.J., Russell, R.E., Samuel, M.D., Sargeant, G.A., Walsh, D.P., and **Walter, W.D.** 2019. Chronic wasting disease—Research by the U.S. Geological Survey and partners: U.S. Geological Survey Open-File Report 2019–1109, 29 p.; BAO Approval: 09/18/2019; IPDS: IP-074357; Concept & Design: 20%; Data: 20%; Analysis/Interpretation: 50%; Writing: 25%

Presentations-Contributed presentations with only 11 (Invited) of 83 shown (citations for remaining presentations available upon request

- 1. **INVITED:** Walter, W.D. 2013. Online Database Infrastructures in Animal Ecology: A Novel way of Data Management and Sharing of Animal derived Sensor Data. The National Wildlife Research Center, Fort Collins, CO, USA.
- 2. **INVITED:** Walter, W.D. 2015. Chronic wasting disease in white-tailed deer in the east: Coping With Disease (CWD). Adirondack Ecological Center, State University of New York Environmental Science and Forestry, Newcomb, NY, USA.
- 3. **INVITED: Walter, W.D.** 2016. Genetics of cervids and susceptibility to chronic wasting disease. Working Group Meeting on Chronic Wasting Disease in Eurasia. Newcastle University, Newcastle, UK.
- 4. **INVITED: Walter, W.D.** 2016. CWD genetics in the wild and model results outline potential for spread within Pennsylvania. Presented to the Pennsylvania Department of Agriculture, Harrisburg, PA, USA.
- 5. **INVITED:** Walter, W.D. 2017. Truths and myths about chronic wasting disease. South Central Task Force Agriculture Subcommittee, USDA/APHIS/WS, Harrisburg, PA, USA.
- 6. **INVITED: Walter, W.D.** 2017. Truths and myths about chronic wasting disease. Indiana Chapter of the Wildlife Society, West Lafayette, IN, USA.
- 7. **INVITED:** Walter, W.D. 2017. CWD genetics in the wild and model results outline potential for spread within Pennsylvania. The Pennsylvania Department of Agriculture's CWD Discussion and Open Forum in Harrisburg, PA, USA.
- 8. **INVITED:** Walter, W.D. 2018. Forecasting the spread of CWD in the Mid-Atlantic region...and beyond? 2018 Interstate CWD Meeting, University Park, USA.
- 9. **INVITED:** Walter, W.D., F.S. Ahrestani, and W.L. Miller. 2019. Synergy of genetics and diffusion dynamics in white-tailed deer to understand epidemiology of chronic wasting disease. First Annual Chronic Wasting Disease Research Symposium. East Lansing, MI, USA.

- 10. INVITED SEMINAR AND GUEST LECTURE: Walter, W.D. 2019. Genetics of cervids as it relates to susceptibility to chronic wasting disease. Eastern Tennessee State University. Johnson City, TN, USA.
- 11. INVITED Walter, W.D. 2024. Deer demographic dynamics, social behavior, management, and their relevance to deer as reservoirs of disease. Conference on health and emerging disease in wild cervids. Fort Collins, CO, USA.

References

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