

# CV

*Paul Chafee Cross*

---

Wildlife Researcher, Terrestrial Ecology Branch Chief,  
Northern Rocky Mountain Science Center, U.S. Geological Survey  
2327 University Way, Suite 2, Bozeman, MT 59715

[www.usgs.gov/staff-profiles/paul-cross](http://www.usgs.gov/staff-profiles/paul-cross), orcid: 0000-0001-8045-5213

email: [pcross@usgs.gov](mailto:pcross@usgs.gov)

cellphone: 406-581-1763

Updated: September 06, 2019

---

## Education

Ph.D. Environmental Science, Policy & Mang., University of California, Berkeley, CA 2005

B.A., Environmental Science, University of Virginia, Charlottesville, VA 1998

## Research Experience

Wildlife Health Researcher, U.S. Geological Survey 2005-present

Faculty Affiliate, Montana State University 2006-present

Graduate Student Researcher, U.C. Berkeley 1999-2005

## Publications

### In review

Brandell, E, E. S. Almberg, P. C. Cross, A. Dobson, D. Smith, and P. Hudson (2020).

“The invasion, dynamics, and consequences of infectious diseases in Yellowstone’s wolves”. In: *Yellowstone Wolves: Two Decades of Science and Discovery*. Ed. by D. Smith, D. MacNulty and D. R. Stahler. Chicago: University of Chicago.

Cotterill, G. G, P. C. Cross, J. A. Merkle, J. D. Rogerson, B. M. Scurlock, and J. T. Du Toit (2020). “Parsing the effects of management efforts and environmental drivers on a chronic wildlife disease”. In: *Journal of Applied Ecology* In Review, pp. 000-000.

Kamath, P. L, K. Manlove, E. F. Cassirer, P. C. Cross, and T. E. Besser (2020). “Genetic structure of *Mycoplasma ovipneumoniae* informs pathogen spillover dynamics between domestic and bighorn sheep in the western United States”. In: *Scientific Reports* In review, pp. 000-000.

Rayl, N. D, J. A. Merkle, K. M. Proffitt, E. S. Almberg, J. D. Jones, J. A. Gude, and P. C. Cross (2020). “Elk migration influences the risk of disease spillover in the Greater Yellowstone Ecosystem”. In: *Journal of Animal Ecology* In review, pp. 000-000.

## 2019

Cross, P, D. J. Prosser, A. M. Ramey, E. M. Hanks, and K. M. Pepin (2019). “Confronting models with data: The challenges of estimating disease spillover”. In: *Philosophical Transactions of the Royal Society B: Biological Sciences* 374. DOI: [10.1098/rstb.2018.0435](https://doi.org/10.1098/rstb.2018.0435). URL: <https://doi.org/10.1098/rstb.2018.0435>.

Manlove, K, M. Branan, R. S. Miller, E. F. Cassirer, K. Baker, D. Bradway, S. Sweeney, K. L. Marshall, P. C. Cross, and T. E. Besser (2019). “Risk factors and productivity losses associated with *Mycoplasma ovipneumoniae* infection in United States domestic sheep operations”. In: *Preventative Veterinary Medicine* 168, pp. 30-38. DOI: [10.1016/j.prevetmed.2019.04.006](https://doi.org/10.1016/j.prevetmed.2019.04.006). URL: <https://www.sciencedirect.com/science/article/pii/S0167587718304446>.

Manlove, K, L. M. Sampson, B. Borremans, E. Cassirer, R. Miller, K. Pepin, T. Besser, and P. Cross (2019). “Epidemic growth rates and host movement patterns shape management performance for pathogen spillover at the wildlife–livestock interface”. In: *Philosophical Transactions of the Royal Society B: Biological Sciences* 374. DOI: [10.1098/rstb.2018.0343](https://doi.org/10.1098/rstb.2018.0343). URL: <https://doi.org/10.1098/rstb.2018.0343>.

Rayl, N. D, K. M. Proffitt, E. S. Almberg, J. A. Merkle, J. H. Jones, J. A. Gude, and P. C. Cross (2019). “Modelling Elk-to-Livestock Transmission Risk to Predict Hotspots of Brucellosis Spillover”. In: *Journal of Wildlife Management* 83.4, pp. 817-829. DOI: [10.1002/jwmg.21645](https://doi.org/10.1002/jwmg.21645). URL: <https://doi.org/10.1002/jwmg.21645>.

Sokolow, S. H, N. Nova, K. Pepin, A. J. Peel, J. R. Pulliam, K. Manlove, P. C. Cross, D. J. Becker, R. K. Plowright, H. McCallum, and G. A. De Leo (2019). “Ecological interventions to prevent and manage zoonotic pathogen spillover”. In: *Philosophical Transactions of the Royal Society B: Biological Sciences* 374. DOI: [10.1098/rstb.2018.0342](https://doi.org/10.1098/rstb.2018.0342). URL: <https://doi.org/10.1098/rstb.2018.0342>.

Wijeyakulasuriya, D, E. Hank, B. Shaby, and P. Cross (2019). “Extreme value based methods for modeling elk yearly movements”. In: *Journal of Agricultural, Biological and Environmental Statistics* 24.1, pp. 73-91. DOI: [10.1007/s13253-018-00342-2](https://doi.org/10.1007/s13253-018-00342-2).

## 2018

Astorga, F, S. Carver, E. S. Almberg, G. R. Sousa, K. Wingfield, K. D. Niedringhaus, P. Van Wick, L. Rossi, Y. Xie, P. Cross, S. Angelone, C. Gortázar, and L. E. Escobar (2018). “International meeting on sarcoptic mange in wildlife, June 2018, Blacksburg, Virginia, USA”. In: *Parasites & Vectors* 11, p. 449. ISSN: 1756-3305. DOI: [10.1186/s13071-018-3015-1](https://doi.org/10.1186/s13071-018-3015-1).

Brennan, A, E. M. Hanks, J. A. Merkle, E. K. Cole, S. R. Dewey, A. B. Courtemanch, and P. C. Cross (2018). “Examining speed versus selection in connectivity models using elk migration as an example”. In: *Landscape Ecology* 33.6, pp. 955-968. ISSN: 0921-2973 1572-9761. DOI: [10.1007/s10980-018-0642-z](https://doi.org/10.1007/s10980-018-0642-z).

Cotterill, G. G, P. C. Cross, E. K. Cole, R. K. Fuda, J. D. Rogerson, B. M. Scurlock, and J.

T. du Toit (2018). “Winter feeding of elk in the Greater Yellowstone Ecosystem and its effects on disease dynamics”. In: *Philos Trans R Soc Lond B Biol Sci* 373.1745, p. 20170093. ISSN: 1471-2970 (Electronic) 0962-8436 (Linking). DOI: [10.1098/rstb.2017.0093](https://doi.org/10.1098/rstb.2017.0093). URL: <https://www.ncbi.nlm.nih.gov/pubmed/29531148>.

Cotterill, G. G, P. C. Cross, A. D. Middleton, J. D. Rogerson, B. M. Scurlock, and J. T. du Toit (2018). “Hidden cost of disease in a free-ranging ungulate: brucellosis reduces mid-winter pregnancy in elk”. In: *Ecol Evol* 8.22, pp. 10733-10742. ISSN: 2045-7758 (Print) 2045-7758 (Linking). DOI: [10.1002/ece3.4521](https://doi.org/10.1002/ece3.4521). URL: <https://www.ncbi.nlm.nih.gov/pubmed/30519402>.

Cross, P. C, F. T. van Manen, M. Viana, E. S. Almberg, D. Bachen, E. E. Brandell, M. A. Haroldson, P. J. Hudson, D. R. Stahler, and D. W. Smith (2018). “Estimating distemper virus dynamics among wolves and grizzly bears using serology and Bayesian state-space models”. In: *Ecol Evol* 8.17, pp. 8726-8735. ISSN: 2045-7758 (Print) 2045-7758 (Linking). DOI: [10.1002/ece3.4396](https://doi.org/10.1002/ece3.4396). URL: <https://www.ncbi.nlm.nih.gov/pubmed/30271540>.

Haggerty, J. H, K. Epstein, M. Stone, and P. C. Cross (2018). “Land Use Diversification and Intensification on Elk Winter Range in Greater Yellowstone: Framework and Agenda for Social-Ecological Research”. In: *Rangeland Ecology & Management* 71.2, pp. 171-174. ISSN: 15507424. DOI: [10.1016/j.rama.2017.11.002](https://doi.org/10.1016/j.rama.2017.11.002).

Huyvaert, K. P, R. E. Russell, K. A. Patyk, M. E. Craft, P. C. Cross, M. G. Garner, M. K. Martin, P. Nol, and D. P. Walsh (2018). “Challenges and Opportunities Developing Mathematical Models of Shared Pathogens of Domestic and Wild Animals”. In: *Vet Sci* 5.4. ISSN: 2306-7381 (Electronic) 2306-7381 (Linking). DOI: [10.3390/vetsci5040092](https://doi.org/10.3390/vetsci5040092). URL: <https://www.ncbi.nlm.nih.gov/pubmed/30380736>.

Manlove, K, C. M. Aiello, P. Sah, B. Cummins, P. J. Hudson, and P. C. Cross (2018). “The ecology of movement and behavior: A saturated tripartite model for describing animal contacts”. In: *Proceedings of the Royal Society B: Biological Sciences* 285, p. 20180670. DOI: [10.1098/rspb.2018.0670](https://doi.org/10.1098/rspb.2018.0670).

Merkle, J. A, P. C. Cross, B. M. Scurlock, E. K. Cole, A. B. Courtemanch, S. R. Dewey, and M. J. Kauffman (2018). “Linking spring phenology with mechanistic models of host movement to predict disease transmission risk”. In: *Journal of Applied Ecology* 55, pp. 810-819. ISSN: 00218901. DOI: [10.1111/1365-2664.13022](https://doi.org/10.1111/1365-2664.13022).

Rayl, N. D., K. M. Proffitt, E. S. Almberg, J. A. Merkle, J. H. Jones, J. A. Gude, and P. C. Cross (2018). *Modelling elk-to-livestock transmission risk to identify hotspots of brucellosis spillover*. Report. Montana Fish, Wildlife and Parks.

## 2017

Benavides, J. A, D. Caillaud, B. M. Scurlock, E. J. Maichak, W. H. Edwards, and P. C. Cross (2017). “Estimating loss of *Brucella abortus* antibodies from age-specific serological data in elk”. In: *EcoHealth* 14.2, pp. 234-243. ISSN: 1612-9210 (Electronic) 1612-9202

(Linking). DOI: [10.1007/s10393-017-1235-z](https://doi.org/10.1007/s10393-017-1235-z). URL: <https://www.ncbi.nlm.nih.gov/pubmed/28508154>.

Brennan, A, P. C. Cross, K. Portacci, B. M. Scurlock, and W. H. Edwards (2017). “Shifting brucellosis risk in livestock coincides with spreading seroprevalence in elk”. In: *PLoS One* 12.6, p. e0178780. DOI: [10.1371/journal.pone.0178780](https://doi.org/10.1371/journal.pone.0178780). URL: <https://www.ncbi.nlm.nih.gov/pubmed/28609437>.

Cassirer, E. F, K. R. Manlove, E. S. Almberg, P. L. Kamath, M. Cox, P. Wolff, A. Roug, J. Shannon, R. Robinson, R. B. Harris, B. J. Gonzales, R. K. Plowright, P. J. Hudson, P. C. Cross, A. Dobson, et al. (2017). “Pneumonia in bighorn sheep: Risk and resilience”. In: *The Journal of Wildlife Management*. ISSN: 0022541X. DOI: [10.1002/jwmg.21309](https://doi.org/10.1002/jwmg.21309).

Maichak, E. J, B. M. Scurlock, P. C. Cross, J. D. Rogerson, W. H. Edwards, B. Wise, S. G. Smith, and T. J. Kreeger (2017). “Assessment of the *Brucella abortus* Strain 19 ballistic vaccination program in elk on winter feedgrounds of Wyoming, USA”. In: *Wildlife Society Bulletin* 41.1, pp. 70-79. DOI: [10.1002/wsb.734](https://doi.org/10.1002/wsb.734).

Manlove, K. R, E. F. Cassirer, R. K. Plowright, P. C. Cross, and P. J. Hudson (2017). “Contact and contagion: Bighorn sheep demographic states vary in probability of transmission given contact”. In: *Journal of Animal Ecology* 86, pp. 908-920. DOI: [10.1111/1365-2656.12664](https://doi.org/10.1111/1365-2656.12664).

National Academies of Sciences, E. and Medicine (2017). *Revisiting Brucellosis in the Greater Yellowstone Area*. Washington, DC: The National Academies Press, p. 209. ISBN: 978-0-309-45831-3. DOI: [10.17226/24750](https://doi.org/10.17226/24750). URL: <https://doi.org/10.17226/24750>.

Pepin, K. M, S. L. Kay, B. D. Golas, S. S. Shriner, A. T. Gilbert, R. S. Miller, A. L. Graham, S. Riley, P. C. Cross, M. D. Samuel, M. B. Hooten, J. A. Hoeting, J. O. Lloyd-Smith, C. T. Webb, and M. G. Buhnerkempe (2017). “Inferring infection hazard in wildlife populations by linking data across individual and population scales”. In: *Ecology Letters* 20.3, pp. 275-292. DOI: [10.1111/ele.12732](https://doi.org/10.1111/ele.12732).

Sah, P, S. Leu, P. C. Cross, P. J. Hudson, and S. Bansal (2017). “Unraveling the disease consequences and mechanisms of modular structure in animal social networks”. In: *Proceedings of the National Academy of Science of the United States of America* 114.16, pp. 4165-4170. DOI: [10.1073/pnas.1613616114](https://doi.org/10.1073/pnas.1613616114).

Toit, J. du, P. Cross, and M. Valeix (2017). “Weaving wildlife into a framework for rangeland resilience”. In: *Rangeland Systems: Processes, Management and Challenges*. Ed. by D. Briske. Springer, pp. 395-428. DOI: [10.1007/978-3-319-46709-2](https://doi.org/10.1007/978-3-319-46709-2).

## 2016

Almberg, E. S, P. C. Cross, P. J. Hudson, A. P. Dobson, D. W. Smith, and D. R. Stahler (2016). “Infectious diseases of wolves in Yellowstone”. In: *Yellowstone Science* 24.1, pp. 47-49. URL: [www.nps.gov/yell/learn/ys-24-1-infectious-diseases-of-wolves-in-yellowstone.htm](http://www.nps.gov/yell/learn/ys-24-1-infectious-diseases-of-wolves-in-yellowstone.htm).

- Cross, P. C, E. S. Almberg, C. G. Haase, P. J. Hudson, S. K. Maloney, M. C. Metz, A. J. Munn, P. Nugent, O. Putzeys, D. R. Stahler, A. C. Stewart, and D. W. Smith (2016). “Energetic costs of mange in Yellowstone wolves estimated from infrared thermography”. In: *Ecology* 97.8, pp. 1938-1948. DOI: [10.1890/15-1346.1](https://doi.org/10.1890/15-1346.1).
- Ebinger, M. R, M. A. Haroldson, F. T. van Manen, C. M. Costello, D. D. Bjornlie, D. J. Thompson, K. A. Gunther, J. K. Fortin, J. E. Teisberg, S. R. Pils, P. J. White, S. L. Cain, and P. C. Cross (2016). “Detecting grizzly bear use of ungulate carcasses using global positioning system telemetry and activity data”. In: *Oecologia* 181.3, pp. 695-708. ISSN: 1432-1939 (Electronic) 0029-8549 (Linking). DOI: [10.1007/s00442-016-3594-5](https://doi.org/10.1007/s00442-016-3594-5).
- Kamath, P, J. Foster, K. Drees, C. Quance, G. Luikart, N. Anderson, P. Clarke, E. Cole, W. Edwards, J. Rhyen, J. Treanor, R. Wallen, S. Robbe-Austerman, and P. Cross (2016). “Genomics reveals historic and contemporary transmission dynamics of a bacterial disease among wildlife and livestock”. In: *Nature Communications* 7, p. 11448. DOI: [10.1038/ncomms11448](https://doi.org/10.1038/ncomms11448).
- Leach, C, C. Webb, and P. Cross (2016). “When environmentally persistent pathogens transform good habitat into ecological traps”. In: *Royal Society Open Science* 3, p. 160051. DOI: [10.1098/rsos.160051](https://doi.org/10.1098/rsos.160051).
- Manlove, K. R, J. G. Walker, M. E. Craft, K. P. Huyvaert, M. B. Joseph, R. S. Miller, P. Nol, K. A. Patyk, D. O’Brien, D. P. Walsh, and P. C. Cross (2016). ”“One Health” or three? Publication silos among the one health disciplines”. In: *PLoS Biology* 14.4, p. e1002448. DOI: [10.1371/journal.pbio.1002448](https://doi.org/10.1371/journal.pbio.1002448).
- Manlove, K, E. F. Cassirer, P. C. Cross, R. K. Plowright, and P. J. Hudson (2016). “Disease introduction is associated with a phase transition in bighorn sheep demographics”. In: *Ecology* 97.10, pp. 2593-2602. DOI: [10.1002/ecy.1520](https://doi.org/10.1002/ecy.1520).

## 2015

- Almberg, E. S, P. C. Cross, A. P. Dobson, D. W. Smith, M. C. Metz, D. R. Stahler, and P. J. Hudson (2015). “Social living mitigates the costs of a chronic illness in a cooperative carnivore”. In: *Ecology Letters* 18.7, pp. 660-7. DOI: [10.1111/ele.12444](https://doi.org/10.1111/ele.12444).
- Brennan, A, P. C. Cross, and S. Creel (2015). “Managing more than the mean: using quantile regression to identify factors related to large elk groups”. In: *Journal of Applied Ecology* 52, pp. 1656-1664. ISSN: 00218901. DOI: [10.1111/1365-2664.12514](https://doi.org/10.1111/1365-2664.12514).
- Cole, E. K, A. M. Foley, J. M. Warren, B. L. Smith, S. R. Dewey, D. G. Brimeyer, W. S. Fairbanks, H. Sawyer, and P. C. Cross (2015). “Changing migratory patterns in the Jackson elk herd”. In: *Journal of Wildlife Management* 79.6, pp. 877-886. DOI: [10.1002/jwmg.917](https://doi.org/10.1002/jwmg.917).
- Cross, P. C, E. J. Maichak, J. D. Rogerson, K. M. Irvine, J. D. Jones, D. M. Heisey, W. H. Edwards, and B. M. Scurlock (2015). “Estimating the phenology of elk brucellosis transmission with hierarchical models of cause-specific and baseline hazards”. In: *Journal of Wildlife Management* 79.5, pp. 739-748. DOI: [10.1002/jwmg.883](https://doi.org/10.1002/jwmg.883).

Foley, A. M, P. C. Cross, D. A. Christianson, B. M. Scurlock, and S. Creel (2015). “Influences of supplemental feeding on winter elk calf:cow ratios in the southern Greater Yellowstone Ecosystem”. In: *Journal of Wildlife Management* 79.6, pp. 887-897. DOI: [10.1002/jwmg.908](https://doi.org/10.1002/jwmg.908).

Gorsich, E. E, V. O. Ezenwa, P. C. Cross, R. G. Bengis, and A. E. Jolles (2015). “Context-dependent survival, fecundity and predicted population-level consequences of brucellosis in African buffalo”. In: *Journal of Animal Ecology* 84.4, pp. 999-1009. DOI: [10.1111/1365-2656.12356](https://doi.org/10.1111/1365-2656.12356).

Sepulveda, M, K. Pelican, P. Cross, A. Eguren, and R. Singer (2015). “Fine-scale movements of rural free-ranging dogs in conservation areas in the temperate rainforest of the coastal range of southern Chile”. In: *Mammalian Biology* 80.4, pp. 290-297. ISSN: 16165047. DOI: [10.1016/j.mambio.2015.03.001](https://doi.org/10.1016/j.mambio.2015.03.001).

## 2014

Benavides, J. A, P. C. Cross, G. Luikart, and S. Creel (2014). “Limitations to estimating bacterial cross-species transmission using genetic and genomic markers: inferences from simulation modeling”. In: *Evolutionary Applications* 7.7, pp. 774-87. DOI: [10.1111/eva.12173](https://doi.org/10.1111/eva.12173).

Brennan, A, P. C. Cross, M. D. Higgs, W. H. Edwards, B. M. Scurlock, and S. Creel (2014). “A multi-scale assessment of animal aggregation patterns to understand increasing pathogen seroprevalence”. In: *Ecosphere* 5.10, p. art138. ISSN: 2150-8925. DOI: [10.1890/es14-00181.1](https://doi.org/10.1890/es14-00181.1).

Hand, B. K, S. Chen, N. Anderson, A. Beja-Pereira, P. C. Cross, M. Ebinger, H. Edwards, R. A. Garrott, M. D. Kardos, M. Kauffman, E. L. Landguth, A. Middleton, B. Scurlock, P. J. White, P. Zager, et al. (2014). “Sex-biased gene flow among elk in the Greater Yellowstone Ecosystem”. In: *Journal of Fish and Wildlife Management* 5.1, pp. 124-132. ISSN: 1944-687X. DOI: [10.3996/022012-jfwm-017](https://doi.org/10.3996/022012-jfwm-017).

Jones, J. D, M. J. Kauffman, K. L. Monteith, B. M. Scurlock, S. E. Albeke, and P. C. Cross (2014). “Supplemental feeding alters migration of a temperate ungulate”. In: *Ecological Applications* 24.7, pp. 1769-1779. DOI: [10.1890/13-2092.1](https://doi.org/10.1890/13-2092.1).

Kamath, P. L, D. Elleder, L. Bao, P. C. Cross, J. H. Powell, and M. Poss (2014). “The population history of endogenous retroviruses in mule deer (*Odocoileus hemionus*)”. In: *Journal of Heredity* 105.2, pp. 173-87. DOI: [10.1093/jhered/est088](https://doi.org/10.1093/jhered/est088).

Manlove, K. R, E. F. Cassirer, P. C. Cross, R. K. Plowright, and P. J. Hudson (2014). “Costs and benefits of group living with disease: a case study of pneumonia in bighorn lambs (*Ovis canadensis*)”. In: *Proc Biol Sci* 281.1797, p. 20142331. DOI: [10.1098/rspb.2014.2331](https://doi.org/10.1098/rspb.2014.2331).

Viana, M, R. Mancy, R. Biek, S. Cleaveland, P. C. Cross, J. O. Lloyd-Smith, and D. T. Haydon (2014). “Assembling evidence for identifying reservoirs of infection”. In: *Trends in Ecology & Evolution* 29.5, pp. 270-9. DOI: [10.1016/j.tree.2014.03.002](https://doi.org/10.1016/j.tree.2014.03.002).



## 2013

Brennan, A, P. C. Cross, D. E. Ausband, A. Barbknecht, and S. Creel (2013). “Testing automated howling devices in a wintertime wolf survey”. In: *Wildlife Society Bulletin* 37.2, pp. 389-393. DOI: [10.1002/wsb.269](https://doi.org/10.1002/wsb.269).

Brennan, A, P. C. Cross, M. Higgs, J. P. Beckman, R. W. Klaver, B. Scurlock, and S. Creel (2013). “Inferential consequences of modeling rather than measuring snow accumulation in studies of animal ecology”. In: *Ecological Applications* 23.3, pp. 643-653. DOI: [10.1890/12-0959.1](https://doi.org/10.1890/12-0959.1).

Bright, P. R, H. T. Buxton, L. S. Balistrieri, L. B. Barber, F. H. Chapelle, P. C. Cross, D. P. Krabbenhoft, G. S. Plumlee, J. M. Sleeman, D. E. Tillitt, P. L. Toccoalino, and J. R. Winton (2013). *USGS Environmental Health Science Strategy – Providing Environmental Health Science for a Changing World*. U.S. Geological Survey. URL: <https://pubs.er.usgs.gov/publication/ofr20121069>.

Cassirer, E. F, R. K. Plowright, K. R. Manlove, P. C. Cross, A. P. Dobson, K. A. Potter, P. J. Hudson, and A. White (2013). “Spatio-temporal dynamics of pneumonia in bighorn sheep”. In: *Journal of Animal Ecology* 82, pp. 518-528. ISSN: 00218790. DOI: [10.1111/1365-2656.12031](https://doi.org/10.1111/1365-2656.12031).

Cross, P. C, D. Caillaud, and D. M. Heisey (2013). “Underestimating the effects of spatial heterogeneity due to individual movement and spatial scale: infectious disease as an example”. In: *Landscape Ecology* 28.2, pp. 247-257. DOI: [10.1007/s10980-012-9830-4](https://doi.org/10.1007/s10980-012-9830-4).

Cross, P. C, T. Creech, M. Ebinger, K. Manlove, K. Irvine, J. Henningsen, J. Rogerson, B. Scurlock, and S. Creel (2013). “Female elk contacts are neither frequency nor density dependent”. In: *Ecology* 94.9, pp. 2076-2086. DOI: [10.1890/12-2086.1](https://doi.org/10.1890/12-2086.1).

Cross, P. C, E. Maichak, A. Brennan, B. Scurlock, J. Henningsen, and G. Luikart (2013). “An ecological perspective on *Brucella abortus* in the western United States”. In: *Rev sci tech Off int Epiz* 32.1, pp. 79-87.

Joseph, M. B, J. R. Mihaljevic, A. L. Arellano, J. G. Kueneman, D. L. Preston, P. C. Cross, and P. T. J. Johnson (2013). “Taming wildlife disease: bridging the gap between science and management”. In: *Journal of Applied Ecology* 50, pp. 702-712. ISSN: 00218901. DOI: [10.1111/1365-2664.12084](https://doi.org/10.1111/1365-2664.12084).

Plowright, R, K. Manlove, E. F. Cassirer, P. C. Cross, T. Besser, and P. Hudson (2013). “Use of exposure history to identify patterns of immunity to pneumonia in bighorn sheep (*Ovis canadensis*)”. In: *PLoS ONE* 8.4, p. e61919. DOI: [10.1371/journal.pone.0061919.g001](https://doi.org/10.1371/journal.pone.0061919.g001).

Powell, J. H, S. T. Kalinowski, M. D. Higgs, M. R. Ebinger, N. V. Vu, and P. C. Cross (2013). “Microsatellites indicate minimal barriers to mule deer *Odocoileus hemionus* dispersal across Montana, USA”. In: *Wildlife Biology* 19, pp. 102-110. DOI: [10.2981/11-081](https://doi.org/10.2981/11-081).

## 2012

- Almberg, E. S, P. C. Cross, A. P. Dobson, D. W. Smith, and P. J. Hudson (2012). "Parasite invasion following host reintroduction: a case study of Yellowstone's wolves". In: *Philosophical Transactions of the Royal Society B: Biological Sciences* 367.1604, pp. 2840-2851. DOI: [10.1098/rstb.2011.0369](https://doi.org/10.1098/rstb.2011.0369).
- Creech, T, P. C. Cross, B. Scurlock, E. Maichak, J. Rogerson, J. Henningsen, and S. Creel (2012). "Effects of low-density feeding on elk-fetus contact rates on Wyoming feedgrounds". In: *Journal of Wildlife Management* 76.5, pp. 877-886. DOI: [10.1002/jwmg.331](https://doi.org/10.1002/jwmg.331).
- Cross, P. C, T. G. Creech, M. R. Ebinger, D. M. Heisey, K. Irvine, and S. Creel (2012). "Wildlife contact analysis: emerging methods, questions, and challenges". In: *Behavioral Ecology and Sociobiology* 66.10, pp. 1437-1447. DOI: [10.1007/s00265-012-1376-6](https://doi.org/10.1007/s00265-012-1376-6).
- Forristal, V. E, S. Creel, M. Taper, B. Scurlock, and P. C. Cross (2012). "Effects of supplemental feeding and aggregation on fecal glucocorticoid metabolite concentrations in elk". In: *Journal of Wildlife Management* 76.4, pp. 694-702. DOI: [10.1002/jwmg.312](https://doi.org/10.1002/jwmg.312).
- Plowright, R. K, P. C. Cross, G. M. Tabor, E. S. Almberg, L. Bienen, and P. J. Hudson (2012). "Anthropogenic change and conservation medicine". In: *New Directions in Conservation Medicine: Applied Cases of Ecological Health*. Ed. by A. Aguirre, R. S. Ostfeld and P. Daszak. New York: Oxford University Press. Chap. 8, pp. 111-121.
- Ryan, S. J, P. C. Cross, J. Winnie, C. Hay, J. Bowers, and W. M. Getz (2012). "The utility of normalized difference vegetation index for predicting African buffalo forage quality". In: *Journal of Wildlife Management* 76.7, pp. 1499-1508. DOI: [10.1002/jwmg.407](https://doi.org/10.1002/jwmg.407).

## 2011

- Almberg, E. S, L. D. Mech, P. C. Cross, D. W. Smith, J. Sheldon, and R. Crabtree (2011). "Infectious disease in Yellowstone National Park's canid community". In: *Yellowstone Science* 19.2, pp. 16-25. URL: <http://pubs.er.usgs.gov/publication/70044063>.
- Almberg, E, P. C. Cross, C. Johnson, D. Heisey, and B. Richards (2011). "Modeling routes of chronic wasting disease transmission: Environmental prion persistence promotes deer population decline and extinction". In: *PLoS ONE* 6.5, p. e19896. DOI: [10.1371/journal.pone.0019896](https://doi.org/10.1371/journal.pone.0019896).
- Bai, Y, P. C. Cross, L. Malania, and M. Kosoy (2011). "Isolation of Bartonella capreoli from elk". In: *Veterinary Microbiology* 148.2-4, pp. 329-32. DOI: [10.1016/j.vetmic.2010.09.022](https://doi.org/10.1016/j.vetmic.2010.09.022).
- Ebinger, M. R, P. C. Cross, R. L. Wallen, P. J. White, and J. Treanor (2011). "Simulating sterilization, vaccination, and test-and-remove as brucellosis control measures in bison". In: *Ecological Applications* 21.8, pp. 2944-2959. DOI: [10.1890/1052-3175\(2011\)21\[2944:SIMULATING\]2.0.CO;2](https://doi.org/10.1890/1052-3175(2011)21[2944:SIMULATING]2.0.CO;2).
- LaBeaud, A, P. Cross, W. Getz, and C. King (2011). "Rift Valley Fever Virus infection in African Buffalo (Syncerus caffer) herds in rural South Africa: Evidence of interepidemic



transmission”. In: *American Journal of Tropical Medicine and Hygiene* 89.4, pp. 641-646. DOI: [10.4269/ajtmh.2011.10-0187](https://doi.org/10.4269/ajtmh.2011.10-0187).

Serrano, E, P. C. Cross, M. Beneria, A. Ficapal, J. Curia, X. Marco, S. Lavin, and I. Marco (2011). “Decreasing prevalence of brucellosis in red deer through efforts to control disease in livestock”. In: *Epidemiology and infection* 139.10, pp. 1626-1630. DOI: [10.1017/S0950268811000951](https://doi.org/10.1017/S0950268811000951).

## 2010

Almberg, E, P. C. Cross, and D. Smith (2010). “Persistence of canine distemper virus in the Greater Yellowstone Ecosystem’s carnivore community”. In: *Ecological Applications* 20.7, pp. 2058-2074. DOI: [10.1890/09-1225.1](https://doi.org/10.1890/09-1225.1).

Cross, P. C, E. Cole, A. Dobson, W. H. Edwards, K. L. Hamlin, G. Luikart, A. Middleton, B. Scurlock, and P. White (2010). “Probable causes of increasing elk brucellosis in the Greater Yellowstone Ecosystem”. In: *Ecological Applications* 20.1, pp. 278-288. DOI: [10.1890/08-2062.1](https://doi.org/10.1890/08-2062.1).

Cross, P. C, M. Ebinger, V. Patrek, and R. Wallen (2010). “Brucellosis in cattle, bison, and elk: Management conflicts in a society with diverse values”. In: *Knowing Yellowstone: Science in America’s First National Park*. Ed. by J. Johnson. Boulder, CO: Taylor Trade Publishing, pp. 81-94.

Cross, P. C, D. Heisey, B. Scurlock, W. H. Edwards, M. Ebinger, and A. Brennan (2010). “Mapping brucellosis increases relative to elk density using hierarchical Bayesian models”. In: *PLoS ONE* 5.4, p. e10322. DOI: [10.1371/journal.pone.0010322](https://doi.org/10.1371/journal.pone.0010322).

Heisey, D. M, E. E. Osnas, P. C. Cross, D. O. Joly, J. A. Langenberg, and M. W. Miller (2010a). “Linking process to pattern: estimating spatiotemporal dynamics of a wildlife epidemic from cross-sectional data”. In: *Ecological Monographs* 80.2, pp. 221-240. ISSN: 0012-9615. DOI: [Doi 10.1890/09-0052.1](https://doi.org/10.1890/09-0052.1).

Heisey, D, E. E. Osnas, P. C. Cross, D. Joly, J. A. Langenberg, and M. Miller (2010b). “Rejoinder: sifting through model space”. In: *Ecology* 91.12, pp. 3503-3514. DOI: [10.1890/10-0894.1](https://doi.org/10.1890/10-0894.1).

Polansky, L, G. Wittemyer, P. C. Cross, C. Tambling, and W. M. Getz (2010). “From moonlight to movement and synchronized randomness: Fourier and wavelet analyses of animal location time series data”. In: *Ecology* 91.5, pp. 1506-1518. DOI: [10.1890/08-2159.1](https://doi.org/10.1890/08-2159.1).

Wittekindt, N, A. Padhi, S. Schuster, J. Qi, F. Zhao, L. Tomsho, L. Kasson, M. Packard, P. C. Cross, and M. Poss (2010). “Lymph node meta-transcriptomics: exploring the host microbiome”. In: *PLoS ONE* 5.10, p. e13432. DOI: [10.1371/journal.pone.0013432](https://doi.org/10.1371/journal.pone.0013432).

## 2009

Bar-David, S, I. Bar-David, P. C. Cross, S. Ryan, C. Knechtel, and W. M. Getz (2009). “Methods for assessing movement path recursion with application to African buffalo in

South Africa". In: *Ecology* 90.9, pp. 2467-2479. DOI: [10.1890/08-1532.1](https://doi.org/10.1890/08-1532.1).

Cross, P. C, J. Drewe, V. Patrek, G. Pearce, M. D. Samuel, and R. Delahay (2009). "Wildlife population structure and parasite transmission: Implications for disease management". In: *Management of Disease in Wild Mammals*. Ed. by R. Delahay, G. C. Smith and M. R. Hutchings. Tokyo: Springer. Chap. 2, pp. 9-30.

Cross, P. C, D. Heisey, J. A. Bowers, C. T. Hay, J. Wolhuter, P. Buss, M. Hofmeyr, A. Michel, R. Bengis, T. Bird, I. Whyte, J. Du Toit, and W. M. Getz (2009). "Disease, predation and demography: assessing the impacts of bovine tuberculosis on African buffalo by monitoring at individual and population levels". In: *Journal of Applied Ecology* 46, pp. 467-475. DOI: [10.1111/j.1365-2664.2008.01589.x](https://doi.org/10.1111/j.1365-2664.2008.01589.x).

Maichak, E, B. Scurlock, J. Rogerson, L. Meadows, A. Barbknecht, W. H. Edwards, and P. C. Cross (2009). "Effects of management, behavior, and scavenging on risk of brucellosis transmission in elk of western Wyoming". In: *Journal of Wildlife Diseases* 45.2, pp. 398-410. DOI: [10.7589/0090-3558-45.2.398](https://doi.org/10.7589/0090-3558-45.2.398).

Oosthuizen, W, P. Cross, J. Bowers, C. Hay, M. Ebinger, P. Buss, M. Hofmeyr, and E. Z. Cameron (2009). "Effects of chemical immobilization on survival of African buffalo in the Kruger National Park". In: *Journal of Wildlife Management* 73.1, pp. 149-153. DOI: [10.2193/2008-071](https://doi.org/10.2193/2008-071).

Wolhuter, J, R. Bengis, B. Reilly, and P. C. Cross (2009). "Clinical demodicosis in African Buffalo (*Syncerus caffer*) in the Kruger National Park". In: *Journal of Wildlife Diseases* 45.2, pp. 502-504. DOI: [10.7589/0090-3558-45.2.502](https://doi.org/10.7589/0090-3558-45.2.502).

## 2008

Conner, M. C, M. Ebinger, J. A. Blanchong, and P. C. Cross (2008). "Infectious disease in cervids of North America: Data, models, and management challenges". In: *Annals of the New York Academy of Sciences* 1134, pp. 146-172. DOI: [10.1196/annals.1439.005](https://doi.org/10.1196/annals.1439.005).

Hay, C. T, P. C. Cross, and P. J. Funston (2008). "Trade-offs between predation and foraging explain sexual segregation in African buffalo". In: *Journal of Animal Ecology* 77, pp. 850-858. DOI: [10.1111/j.1365-2656.2008.01409.x](https://doi.org/10.1111/j.1365-2656.2008.01409.x).

Winnie, J. J, P. C. Cross, and W. M. Getz (2008). "Habitat quality and heterogeneity influence distribution and behavior in African Buffalo (*Syncerus caffer*)". In: *Ecology* 89.5, pp. 1457-1468. DOI: [10.1890/07-0772.1](https://doi.org/10.1890/07-0772.1).

## 2007

Conner, M. M, J. Gross, P. C. Cross, M. D. Samuel, D. McKinnon, and M. Miller (2007). *Scale-dependent approaches to modeling spatial epidemiology of chronic wasting disease*. Utah Division of Wildlife Resources. URL: <http://wildlife.utah.gov/diseases/cwd/e-book/>.

Cross, P. C, W. H. Edwards, B. Scurlock, E. Maichak, and J. Rogerson (2007). "Effects of management and climate on elk brucellosis in the Greater Yellowstone Ecosystem". In:

*Ecological Applications* 17.4, pp. 957-964. DOI: [10.1890/06-1603](https://doi.org/10.1890/06-1603).

Cross, P. C, P. L. Johnson, J. O. Lloyd-Smith, and W. M. Getz (2007). "Utility of  $R_0$  as a predictor of disease invasion in structured populations". In: *Journal of the Royal Society Interface* 4, pp. 315-324. DOI: [10.1098/rsif.2006.0185](https://doi.org/10.1098/rsif.2006.0185).

Cross, P. C. and G. Plumb (2007). "Wildlife health initiatives in Yellowstone National Park". In: *Yellowstone Science* 15.2, pp. 4-7. URL: <http://www.nps.gov/yell/planyourvisit/yellsci-issues.htm>.

Getz, W. M, S. Fortmann-Roe, P. Cross, A. Lyons, S. Ryan, and C. Wilmers (2007). "LoCoH: nonparametric kernel methods for constructing home ranges and utilization distributions". In: *PLoS ONE* 2.2, p. e207. DOI: [10.1371/journal.pone.0000207](https://doi.org/10.1371/journal.pone.0000207).

Hines, A, V. O. Ezenwa, P. C. Cross, and J. Rogerson (2007). "Effects of supplemental feeding on gastrointestinal parasite infection in elk (*Cervus elaphus*): Preliminary observations". In: *Veterinary Parasitology* 148.3-4, pp. 350-355. DOI: [10.1016/j.vetpar.2007.07.006](https://doi.org/10.1016/j.vetpar.2007.07.006).

## 2006

Cross, P. C. and W. M. Getz (2006). "Assessing vaccination as a control strategy in an ongoing epidemic: Bovine tuberculosis in African Buffalo". In: *Ecological Modelling* 196, pp. 494-504. DOI: [10.1016/j.ecolmodel.2006.02.009](https://doi.org/10.1016/j.ecolmodel.2006.02.009).

Getz, W. M, J. O. Lloyd-Smith, P. C. Cross, S. Bar-David, P. L. Johnson, T. C. Porco, and M. S. Sanchez (2006). "Modeling the invasion and spread of contagious disease in heterogeneous populations". In: *Disease Evolution: Models, Concepts and Data Analyses*. Ed. by Z. Feng, U. Dieckmann and S. A. Levin. Vol. 71. AMS-DIMACS, pp. 113-144. ISBN: 978-1-4704-4028-2.

Michel, A. L, R. G. Bengis, D. F. Keet, M. Hofmeyr, L. M. de Klerk, P. C. Cross, A. E. Jolles, D. Cooper, I. J. Whyte, P. Buss, and J. Godfroid (2006). "Wildlife tuberculosis in South African conservation areas: Implications and challenges". In: *Veterinary Microbiology* 112.2-4, pp. 91-100. DOI: [:10.1016/j.vetmic.2005.11.035](https://doi.org/10.1016/j.vetmic.2005.11.035).

## 2005

Cross, P. C, J. O. Lloyd-Smith, and W. Getz (2005). "Disentangling association patterns in fission-fusion societies using African buffalo as an example". In: *Animal Behavior* 69.2, pp. 499-506. DOI: [10.1016/j.anbehav.2004.08.006](https://doi.org/10.1016/j.anbehav.2004.08.006).

Cross, P. C, J. O. Lloyd-Smith, P. L. Johnson, and W. M. Getz (2005). "Duelling timescales of host mixing and disease recovery determine disease invasion in structured populations". In: *Ecology Letters* 8, pp. 587-595. DOI: [10.1111/j.1461-0248.2005.00760.x](https://doi.org/10.1111/j.1461-0248.2005.00760.x).

Lloyd-Smith, J. O, P. C. Cross, C. J. Briggs, M. Daugherty, W. M. Getz, J. Latto, M. S. Sanchez, A. B. Smith, and A. Swei (2005). "Should we expect population thresholds for

wildlife disease?” In: *Trends in Ecology & Evolution* 20.9, pp. 511-519. DOI: [10.1016/j.tree.2005.07.004](https://doi.org/10.1016/j.tree.2005.07.004).

## 2004

Cross, P. C, J. O. Lloyd-Smith, J. Bowers, C. Hay, M. Hofmeyr, and W. M. Getz (2004). “Integrating association data and disease dynamics in a social ungulate: bovine tuberculosis in African buffalo in the Kruger National Park”. In: *Annales Zoologici Fennici* 41, pp. 879-892. URL: <http://www.jstor.org/stable/23736148>.

Macandza, V, N. Owen-Smith, and P. C. Cross (2004). “Forage selection by African buffalo (*Syncerus caffer*) through the dry season in two landscapes of the Kruger National Park”. In: *South African Journal of Wildlife Research* 34.2, pp. 113-121.

## 2003

Caron, A, P. C. Cross, and J. du Toit (2003). “Ecological implications of bovine tuberculosis in African Buffalo herds”. In: *Ecological Applications* 13.5, pp. 1338-1345. DOI: [10.1890/02-5266](https://doi.org/10.1890/02-5266).

## Grey Literature

Rayl, ND, Proffitt, KM, Almberg, ES, Merkle, JA, Jones, JH, Gude, JA & Cross, PC. 2018 Modelling elk-to-livestock transmission risk to identify hotspots of brucellosis spillover. pp. 1-56, Montana Fish, Wildlife and Parks.

Ebinger, MR & PC Cross. 2008. Surveillance for brucellosis in Yellowstone bison: The power of various strategies to detect vaccination effects. National Park Service, Mammoth, WY, YCR-2008-04. 69 pages.

## Databases

van Manen, F.T., Smith, D.W., Haroldson, M.A., Stahler, D.R., Almberg, E.S., Whitman, C.L., and Cross, P.C., 2018, Canine distemper virus antibody titer results for grizzly bears and wolves in the Greater Yellowstone Ecosystem 1984-2014: U.S. Geological Survey data release, <https://doi.org/10.5066/P96E4UCK>.

Merkle, JA, PC Cross, BM Scurlock, EK Cole, AB Courtemanch, SR Dewey, MJ Kauffman, and KE Szcudronski, 2017, Elk movement and predicted number of brucellosis-induced abortion events in the southern Greater Yellowstone Ecosystem (1993-2015): U.S. Geological Survey data release, <https://doi.org/10.5066/F7474803>.

Brennan, A., Courtemanch, A.B., Cole, E.K., Dewey, S.R., and Cross, P.C., 2018, Elk GPS collar data from National Elk Refuge (2006-2015): U.S. Geological Survey data release, <https://doi.org/10.5066/F7FF3RNW>.

Cross, PC, DM Heisey, JA Bowers, CT. Hay, J Wolhuter, P Buss, M Hofmeyr, A Michel, R Bengis, T Bird, IJ Whyte, JT Du Toit, and WM Getz. 2009. Buffalo herd tracking with VHF and GPS data. <http://www.Movebank.org>.

Cross PC, Heisey DM, Bowers JA, Hay CT, Wolhuter J, Buss P, Hofmeyr M, Michel AL, Bengis RG, Bird TLF, Du Toit JT, Getz WM (2008) Data from: Disease, predation and demography: assessing the impacts of bovine tuberculosis on African buffalo by monitoring at individual and population levels. Dryad Digital Repository.  
<http://dx.doi.org/10.5061/dryad.5hh3h>

Gorsich EE, Ezenwa VO, Cross PC, Bengis RG, Jolles AE (2015) Data from: Context-dependent survival, fecundity, and predicted population-level consequences of brucellosis in African buffalo. Dryad Digital Repository  
<http://dx.doi.org/10.5061/dryad.p6678>.

## Students

Gavin Cotterill. In progress. Managing disease in the supplemental feeding grounds of Wyoming. Utah State University. Co-supervisor: JT Du Toit  
Ellen Brandell. In progress. Disease impacts on wolves in Yellowstone National Park. Penn State University. Co-supervisor: PJ Hudson  
Angela Brennan. 2014. Broad-scale determinants of elk aggregation and brucellosis seroprevalence. Montana State University. Co-supervisor: S Creel.  
Tyler Creech. 2011. Heterogeneity in the fine-scale contact patterns of elk as determined by proximity collars. Montana State University. Co-supervisor: S Creel  
Victoria Forristal (formerly Patrek). 2009. Masters. Fat but not happy: The Effects of Supplemental Feeding on Stress Hormone Levels in Elk. Montana State University. Co-supervisors: M Taper, S Creel  
Craig Hay. 2006 Choice of Social environment of male buffalo (*Syncerus caffer*) in the Kruger National Park, South Africa. Tshwane University of Technology. South Africa. Co-supervisor: P Funston  
Chris Oosthuizen. 2006. Honour's thesis: Chemical immobilization of African buffalo (*Syncerus caffer*) in Kruger National Park: Evaluating effects on survival and reproduction. University of Pretoria. South Africa. Co-supervisor: E Cameron

## Post-docs

Alynn Martin. 2019-present. USGS. Brucellosis and bighorn sheep disease.  
Nathaniel Rayl. 2016-2018. USGS. Montana livestock risk assessments.  
Kezia Manlove. 2016-2018. Washington State University. Bighorn sheep pneumonia. Co-supervisor: Tom Besser. USDA funding.  
Angela Brennan. 2015-2016. Montana State University. Livestock-wildlife risk assessments. USDA funding.  
Julio Benavides. 2014-2015. Montana State University. Epidemiology of elk brucellosis. Co-supervisor: Scott Creel.

Aaron Foley. 2014-2015 USGS and Montana State University. Elk migration and cow-calf ratios in western Wyoming. Co-supervisor: Scott Creel. Partially funded by the U.S. Fish and Wildlife Service.

Pauline Kamath. 2011-2015. USGS. Population genetics and wildlife disease.

## Field Supervisor

Manlove, K. 2017. Penn State University. Supervisor: PJ Hudson

Almberg, ES. 2015. The Invasion, Dynamics, and Impacts of Infectious Disease in Yellowstone's Wolf Population. Penn State University. Supervisor: PJ Hudson

Bowers, JA. 2006. Master's thesis: Feeding patch selection of African Buffalo (*Syncerus caffer*) in the central region of the Kruger National Park. Tshwane University of Technology. South Africa

Tania Bird. 2004. Master's thesis: Influence of bovine tuberculosis (*Mycobacterium bovis*) on condition and reproductive success of females African buffalo (*Syncerus caffer*) in Kruger National Park. University of Pretoria. South Africa

Shane Abeare. 2004. Master's thesis: Dry season habitat and patch selection by African buffalo herds: test of a new home range estimator. University of Pretoria. South Africa

Valerio Macandza 2002. Master's thesis: Forage selection by African buffalo in the late dry season in two landscapes. Witwatersrand University. South Africa

Alex Caron. 2001. Master's thesis: Ecological implications of bovine tuberculosis in African Buffalo. University of Pretoria. South Africa

## Teaching

Data Analysis and Multi-level / Hierarchical Modeling in Ecology (1 credit) Fall 2009. MSU.

Modeling Infectious Disease (3 day workshop) 2009. Univ. of Montana.

EcoLunch Seminar (1 credit) Fall 2008. MSU.

Plant-Disease Invasion Seminar (graduate seminar). Fall 2006. MSU.

Wildlife Ecology (4 credits with lab) Spring 2005. Co-Lecturer UC Berkeley.

Disease Ecology (1 credit) 2004. Co-supervised graduate seminar on disease ecology, UC Berkeley

Modeling Infectious Disease (1 week short-course) 2001. Univ. of Witwatersrand, South Africa

## Grants/Awards

USGS Performance Award (2018-2012, 2010-2007)

USGS Cyclical \$30,000 Chronic wasting disease 2018

USGS Environmental Health Mission Area \$120,000 Chronic wasting disease

NSF GRIP Supervisor: *Fusobacterium* and the elk microbiome

USDA grant to Univ of Washington, PI. \$96,000 Livestock-wildlife disease modeling 2016

USGS Grade Promotion to GS-15



MT Fish Wildlife and Parks: \$90,000 Brucellosis risk assessment	2015
USGS \$133,000 Greater Yellowstone ecosystem disease research.	
NIMBioS Workshop (Co-PI) ~\$60,000	2013
NSF Dissertation Improvement Grant (Co-PI) \$19,343	
USGS, PI \$ 98,000 Greater Yellowstone ecosystem disease research	
USGS Powell Center Grant, Co-PI (declined)	2012
USGS, PI \$75,000, Disease effects on Yellowstone Wolves.	
USFWS, PI\$45,000, Elk space-use of the National Elk Refuge.	
Morris Animal Foundation, Co-PI \$ 75,000.	
USGS Best Paper in Biology	2011
USGS Grade Promotion	
NSF-NIH Ecology of Infectious Disease Program, co-PI \$1,971,033,	2010
USGS, PI \$75,000, Park Oriented Biological Support Grant	
USGS, PI \$39,000, Modeling environmental transmission of Chronic Wasting Disease	2009
USGS, Co-PI \$320,000, Global Climate Change Initiative	2008
Co-PI \$112,180, Wyoming Livestock-Wildlife Disease Initiative	
Co-PI \$281,000, Wyoming Game and Fish Department: Tracking elk movements.	
USGS, Co-PI \$750,000 with Mary Poss (Penn State): Viral tracking of mule deer and elk.	
2007	
NPS, PI \$10,000: Brucellosis in Yellowstone National Park	2006
USGS, PI \$210,000 for chronic wasting disease research.	2005
NSF-NIH Ecology of Infectious Disease Grant. \$1.8 million. Initiated, co-authored, and developed the research program with Dr. Wayne Getz.	1999

## Invited Presentations

Greater Yellowstone Coordinating Committee. CWD review.	2019
MSU Institute on Ecosystems Seminar.	2018
SERDP workshop on emerging infectious disease. Emigrant, MT.	
Brucellosis review for state wildlife and livestock agency partners. Bozeman, MT.	
Plenary: International Deer Congress, Estes Park, CO.	
Invited Panelist. Linking science and management. GYE Biennial Meeting, Big Sky MT.	
Virginia Tech workshop on mange.	
Univ. of Minnesota Veterinary Medicine Seminar.	
Glasgow University Ecology Seminar, Glasgow, UK.	2017
Chile, Universidad Andres Bello, Santiago.	
University of California at Berkeley, Wildlife Seminar	
Plenary, 12th Western States and Provinces Deer and Elk Workshop. Sun Valley, ID.	
Penn State University, Center for Infectious Disease Dynamics Seminar.	
USDA/APHIS Briefing on the National Academy of Sciences Report.	
Utah State University Ecology Seminar. Logan, UT	2016
UCLA Ecology Seminar, Los Angeles, CA.	
Patuxent USGS Seminar.	
Georgetown Ecology Seminar, Washington, D.C.	

South Africa, 50th Anniv. Mammal Research Institute, South Africa	
K-5 science and technology night, Bozeman MT.	
MT Conservation Biology Evening Lecture, Bozeman MT	2015
The National Academy of Sciences, Washington DC	
Wildlife Society Meeting, Winnipeg, Canada	2014
University of Sherbrooke Ecology Seminar, Canada	
NIH Rocky Mountain Lab, Hamilton MT	
Chile, 18th Congreso Chileno de Medicina Veterinaria	
Chile, Univ. Catolica, Dept. Seminar	
Public Talk, Emerging wildlife pandemics, Menlo Park, CA	
Steering Committee & Speaker. Foreign Animal Disease, Shepardstown WV	2013
Interagency Bison Management Plan Meeting. Chico MT	
European Conservation Biology Meeting, Glasgow UK	2012
Wildlife disease management workshop, Penn State Univ.	2011
Ecology and Evolution of Infectious Disease Meeting, Santa Barbara.	
RAPPID-NIH Movement and Mosquito-Transmitted Diseases Meeting, Washington D.C.	
Keynote: Berryman Institute Biennial Meeting, Logan UT.	2010
RAPPID-NIH Movement and Mosquito-Transmitted Diseases Meeting, Washington D.C.	
Kopriva Lecture: MSU College of Arts and Science, Bozeman, MT	2009
Colorado State University, Dept. Seminar, Fort Collins, CO	
10th Biennial Conference of Research on the Colorado Plateau Speaker, ESA,	

## Service

Associate Editor, Ecological Applications	ongoing
Chair, USGS Animal Use and Care Committee for NOROCK.	
Northern Yellowstone Cooperative Wildlife Working Group.	
External Review of USDA Cattle Fever Tick Eradication Program.	2018-2019
Associate Editor, Journal of Wildlife Management	2015-2017
National Academy of Science Panel Member: Revisiting Brucellosis in the GYE	
Dept. Homeland Security IPT for outbreak response and assessment tools.	2016
Red Wolf Recovery Implementation Team, USFWS.	2014
Participant, Wildlife Conservation Society Wildlife Health Program, Internal Strategic Workshop for future research.	
Steering Committee, Group Leader & Speaker. Foreign Animal Disease National Preparedness Workshop. USGS/DHS/USDA/CDC.	2013
Member Environmental Health Strategic Science Planning Team	2011
Co-coordinator & originator, NIH & DHS RAPIDD Working group on cross-species transmission. 15 participants	
Participant, NIH & DHS RAPIDD Working group on movement and mosquito-borne diseases.	
USGS representative. Northern Rockies NEON committee.	
Organizer, Greater Yellowstone Brucellosis Research Meeting (2 days), 60 participants, 27 speakers, Bozeman MT	2009

Participant, Dept. of Interior Avian Influenza Preparedness workshop, Madison WI  
 Participant, Yellowstone National Park Science Agenda Workshop, Bozeman MT  
 Steering Committee, Yellowstone National Park Wildlife Health Program Meeting. 2007  
 Participant, USDA workshop: The Science of Surveillance, Control and Eradication of  
 Catastrophic Diseases in Wildlife, Pinagree Park CO  
 Participant, Disease and conservation of mammals, Conservation International 2006  
 USGS representative. Greater Yellowstone Interagency Brucellosis Committee 2005-8

## Reviewer

*Journals* (since 2004): Nature, Ecol App, J Anim Ecol, J App Ecol, Proc Roy Soc B, Phil Trans Roy Soc, Biol Letters, Cons Bio, Biol Cons, Anim Cons, Biodiv Cons, Behavior, Envi Cons, J Wildl Dis, Wildl Bio, PloS ONE, EcoHealth, J Theo Bio, SA J Wildl Res, Ann Zoo Fennici, Ecol Mod, USGS FSP, USGS Study Plans

*Funding Agencies*: National Science Foundation, Wildlife Conservation Society, Wellcome Trust, Biotechnology and Biological Sciences Research Council UK, Natural Environment Research Council UK, South African National Research Foundation, Alberta Prion Research Institute, National Institutes of Health

## Press and Outreach

[Naturally Speaking](#) Podcast 2017  
[Bozeman Daily Chronicle](#). National Academy of Sciences Brucellosis Report. 2016  
[Missoulain Billings Gazette](#) Mange in Yellowstone  
[The Economist](#) Yellowstone Mange 2015  
[Montana PBS](#) Silencing the Thunder Brucellosis Documentary 2014  
[NSF Science 360](#) Yellowstone Mange.  
[Discovery Channel](#): Curiosity X-Ray Yellowstone 2012  
[Wired Magazine](#) Thermal imagery of Yellowstone Wolves  
[Science World Scholastic Magazine](#) K-12 Education on Yellowstone Wolves  
[Yellowstone Wolf Citizen Science Webpage](#)

## References

Dr. Claudia Regan, Center Director, Northern Rocky Mountain Science Center, USGS, 2327 University Way, Suite 2, Bozeman MT 59715.

Phone: (406) 994-7972 Email: [cregan@usgs.gov](mailto:cregan@usgs.gov)

Mr. Brandon Scurlock, Brucellosis-Feedground-Habitat Supervisor, Wyoming Game and Fish Department, Pinedale Office, PO Box 850, Pinedale, WY 82941.

Phone: (307) 367-4347ext224 Email: [bscurlock@wyo.gov](mailto:bscurlock@wyo.gov)

Dr. Doug W. Smith, Yellowstone Center for Resources, Wolf Project, Yellowstone National Park, WY 82190  
Phone: (307) 344-2242 Email: [doug\\_smith@nps.gov](mailto:doug_smith@nps.gov)