Statement in Opposition to Coyote Killing Contests

Signed by more than 70 prominent conservation scientists

On behalf of Project Coyote's Science Advisory Board and the undersigned scientists, we express our support for the prohibition of coyote killing contests—events in which participants compete to kill coyotes for prizes—that are promoted throughout the United States.

The most general reason to prohibit CKCs is that hunters and wildlife managers believe, as a community, that killing animals without an adequate reason is unjustified and unsportsmanlike. Killing an animal for a prize or trophy constitutes killing without an adequate reason. Insomuch as CKCs are primarily motivated by killing for a prize or trophy, they are wrong.

Some advocates of CKCs argue that they are important for achieving management objectives for other species, especially game species. There is no credible evidence that indiscriminate killing of coyotes or other predators effectively serves any genuine interest in managing other species. If leaders in the hunting and wildlife management community believe that CKCs, in general, serve important objectives, then the principles of wildlife management mandate that (1) these objectives be articulated and vetted by the best-available science, and (2) some reasonable, science-based case be made to justify a CKC as an appropriate means for achieving these objectives. In the absence of such an evaluation, CKCs should be prohibited.

Advocates of CKCs might argue that they are an important means for realizing one or both of these objectives: (1) decrease the loss of livestock to depredation, and (2) increase the abundance of prey species in the interest of maximizing hunting success by humans.

With respect to objective (1), a great deal of science has been developed on how to effectively manage depredations, including both lethal and non-lethal methods. Lessons from that science include:

(i) Indiscriminate killing is ineffective and it is plausible, perhaps likely, that when associated with a CKC it would lead to increased risk of depredations. A primary reason for this concern is that only some, often only a few, individual predators participate in depredation. Indiscriminate and "pre-emptive" killing of predators associated with CKCs can lead to the disruption of predators' social structure and foraging ecology in ways that increase the likelihood of depredations. In hunted (exploited) coyote populations, for example, the number of surviving pups that must be fed by the alpha parents and the

number of transient individuals may increase. These factors may predispose more coyotes to depredate livestock.

(ii) The indiscriminate killing associated with a CKC does not target: (a) the offending predator, (b) the site where depredation has occurred, and (c) the time when depredation has occurred. This renders CKCs ineffective as a means of depredation control.

While managing to reduce the loss of livestock is a common goal for all stakeholders, CKCs do not contribute to this goal and may work against it.

With respect to objective (2), a large body of science indicates that killing predators, especially under circumstances associated with CKCs, is not a reliable means of increasing ungulate abundance. The circumstances most likely to result in increased ungulate abundance are also the circumstances most likely to impair important ecosystem benefits and services that predators provide. Even when predators are killed to the point of impairing the ecosystem services, there is still no assurance that ungulate abundance will increase. The reason being is that ungulate abundance is frequently limited by factors other than predators – factors such as habitat and climate.

Beyond objectives (1) and (2), which focus on affecting game populations and livestock depredations, lies a need to better recognize and celebrate the predators' valuable contribution to the health and vitality of our ecosystems. For example, predators serve human interests through beneficial effects such as rodent control and disease prevention and promoting diverse plant communities and soil fertility. Thus, reduction of the distribution and numbers of apex predators can have detrimental ecological effects.

Some advocates of CKCs might also believe that killing coyotes is vitally important for preventing coyote populations from growing out of control. This concern is unjustified. Science demonstrates that unexploited coyote populations self-regulate their numbers by means of dominant individuals defending non-overlapping territories and suppressing subordinate pack members from breeding.

John A. Vucetich, PhD
Houghton, MI
Associate Professor
School of Forest Resources and Environmental Science
Michigan Technological Univ.
Science Advisory Board, Project Coyote

David Parsons, MS
Albuquerque, NM
Carnivore Conservation Biologist, Rewilding Institute
Science Advisory Board, Project Coyote

Robert Crabtree, PhD
Victoria, British Columbia
Founder & Chief Scientist Yellowstone Ecological Research Center
Research Associate Professor, Department of Ecosystem and Conservation Science, University of Montana
Science Advisory Board, Project Coyote

Michael Paul Nelson, PhD
Corvallis, OR
Professor, and Ruth H. Spaniol Chair of Renewable Resources
Oregon State University
Science Advisory Board, Project Coyote

Michael Soulé, PhD
Paonia, CO
Professor Emeritus
Dept. Environmental Studies, University of California, Santa Cruz
Co-founder, Society for Conservation Biology
Science Advisory Board, Project Coyote

Paul Paquet, PhD
Meacham, Saskatchewan
Senior Scientist Carnivore Specialist, Raincoast Conservation Foundation
Science Advisory Board, Project Coyote

Jeremy T. Bruskotter, PhD
Columbus, Ohio
Associate Professor School of Environment & Natural Resources
The Ohio State University
Science Advisory Board, Project Coyote

Marc Bekoff, PhD
Boulder, CO
Professor Emeritus, University of Colorado, Boulder
Science Advisory Board, Project Coyote

Bradley J. Bergstrom, PhD
Valdosta, GA
Professor of Biology, Valdosta State University
Science Advisory Board, Project Coyote

Shelley M. Alexander, PhD
Calgary, Alberta
Associate Professor, Geography, University of Calgary
Science Advisory Board, Project Coyote

Adrian Treves, PhD
Madison, WI
Associate Professor
University of Wisconsin-Madison
Science Advisory Board, Project Coyote

John Hadidian, PhD
Gaithersburg, MD
Science Advisory Board, Project Coyote

Rick Hopkins, PhD
San Jose, CA
Principal and Senior Conservation Biologist
Live Oak Associates, Inc.
Science Advisory Board, Project Coyote

Jennifer Wolch, PhD
Berkeley, CA
Dean, College of Environmental Design
Science Advisory Board, Project Coyote

Becky Weed, MS
Belgrade, MT
Thirteen Mile Lamb and Wool Co.
Advisory Board, Project Coyote

Chris Schadler, MS, MA
Webster, NH
Wild Canid Specialist
NH & VT Rep., Project Coyote

William J. Ripple, PhD
Portland, OR
Distinguished Professor of Ecology
Oregon State University

Paul Beier, PhD
Flagstaff, AZ
Regents' Professor, School of Forestry, Northern Arizona University, Flagstaff AZ
Past President, Society for Conservation Biology

David Mattson, PhD
Livingston, MT
Lecturer and Senior Visiting Scientist, Yale School of Forestry & Environmental Studies
USGS Colorado Plateau Research Station Leader (retired)
USGS Research Wildlife Biologist (retired)
Past Western Field Director, MIT-USGS Science Impact Collaborative

Melissa Savage, PhD
Los Angeles, CA
Professor Emerita
University of California, Los Angeles

Philip Hedrick PhD
Tempe, AZ
Ullman Professor of Conservation Biology
Arizona State University

Megan Isadore
Forest Knolls, CA
Co-founder and Executive Director
River Otter Ecology Project
Member, IUCN Otter Specialist Group
Founder, Good Riddance! Wildlife Exclusions, LLC

David Fraser, PhD
Vancouver, Canada
Professor
University of British Columbia

Bernard E. Rollin, PhD
Fort Collins, CO
University Distinguished Professor
Professor of Philosophy
Professor of Animal Sciences
Professor of Biomedical Sciences
University Bioethicist

Malcolm R. MacPherson, PhD
Santa Fe, NM
Retired Scientist
Member AAAS and the Society for Conservation Biology

Bob Ferris, MA
Eugene, OR
Executive Director, Cascadia Wildlands

Simon Gadbois, PhD
Halifax, NS, Canada
Director of the Canid Behaviour Research Team
Dalhousie University, Canada

Zoë Jewell, MA, MSc, Vet. MB, MRCVS
Sydney, Australia
Adjunct Faculty, Nicholas School of the Environment, Duke University
Associate Academic, Center for Compassionate Conservation,
University of Technology, Sydney, Australia

Chris Dairmont, PhD
Victoria, BC
Hakai-Raincoast Professor
University of Victoria

Dale Jamieson, PhD
New York, NY
Professor of Environmental Studies, Philosophy, and Bioethics, Affiliated Professor of Law, Director of the Animal Studies Initiative
New York University

Kevin Crooks, PhD
Fort Collins, CO
Monfort Professor, Department of Fish, Wildlife, and Conservation Biology
Colorado State University

William Lynn, PhD
Marlborough, MA
Research Scientist
Marsh Institute, Clark University

Jonathan Way, PhD
Osterville, MA
Eastern Coyote Research
Research Scientist, Clark University

Geri T. Vistein, MS
Belfast, Maine
Carnivore Conservation Biologist
Executive Director and Founder, Coyote Center for Carnivore Ecology and Coexistence

Lisa Micheli, PhD
Santa Rosa, CA
Executive Director
Pepperwood's Dwight Center for Conservation Science

Winston Thomas, PhD
Founder and CEO, Canine Genetics, LLC
San Mateo, CA

Megan M. Draheim, PhD
Washington, DC
Visiting Associate Professor
Virginia Tech Center for Leadership in Global Sustainability
Director, The District Coyote Project

Stephen F. Stringham, PhD
Soldotna, AK
Predator Biologist
President, WildWatch Consulting
Chair, Advisory Committee, BEAR League

Bonny Laura Schumaker, PhD
La Canada, CA
Physicist & Technical Manager, Retired
(Theoretical Astrophysics and Remote Sensing)
California institute of Technology / Jet Propulsion Laboratory
Founder and President, OnWingsOfCare.org

Rolf Peterson, PhD
Robbins Professor of Sustainable Environmental Management
School of Forest Resources and Environmental Science
Michigan Technological University

David Johns, PhD
Hatfield School of Government
Portland State University
Portland, OR

Thomas L. Serfass, PhD
Frostburg, Maryland
Professor of Wildlife Ecology and Chair, Department of Biology and Natural Resources
North American Coordinator, IUCN Otter Specialist Group
Frostburg State University

Robert Schmidt, PhD
Salt Lake City, UT
Associate Professor, Dept. Environment and Society
Utah State University

Arnold Newman, PhD, Executive Director
Sherman Oaks, CA
The International Society for the Preservation of the Tropical Rainforest

Susan E. Townsend, PhD
Oakland, CA
Wildlife Ecology and Consulting

Ian R. MacDonald, PhD
Tallahassee, FL
Florida State University

Martin B. Main, PhD
Gainesville, FL
Professor, Wildlife Ecology and Conservation
Associate Dean and Program Leader, Natural Resources Extension
University of Florida

Guillaume Chapron, PhD
Sweden
Associate Professor
Grimsö Wildlife Research Station
Swedish University of Agricultural Sciences

Jill Sideman, PhD
Tiburon, California
Environmental Management Consultant

Richard P. Reading, PhD
Denver, CO
Department of Conservation Biology
Denver Zoological Foundation

José Vicente López-Bao, PhD
Spain
Research Unit of Biodiversity (UO/CSIC/PA)
Oviedo University

Francisco J. Santiago-Ávila, MEM, MPP
Madison, WI
Graduate Research Scholar, PhD Candidate
Carnivore Conservation Lab
University of Wisconsin - Madison

Alexandra Pineda Guerrero, MS
PhD Student, Environment & Resources
Carnivore Coexistence Lab
Nelson Institute For Environmental Studies
University of Wisconsin-Madison

Miha Krofel, PhD
Slovenia
Assistant Professor and Wildlife Researcher
University of Ljubljana
Biotechnical Faculty, Department for Forestry and Renewable Forest Resources

Brian Schuh, MS
Madison, WI
Carnivore Coexistence Lab
University of Wisconsin - Madison

Andrés Ordiz, PhD
Norway
Faculty of Environmental Sciences and Natural Resources Management
Norweighan University of Life Sciences

Alejandra Zarzo-Arias, PhD
Spain
Research Unit of Biodiversity (UO/CSIC/PA)
University of Oviedo

Jennifer A. Leonard, PhD
Seville, Spain
Doñana Biological Research Station
Spanish National Research Council

Jorge Echegaray, MSc
Spain
Wildlife Researcher for Spanish Conservationist NGOs
Director of the Project "Wolf in the Basque Country"

Bridgett M. vonHoldt, PhD
Princeton, NJ
Assistant Professor
Department of Ecology & Evolutionary Biology
Princeton University

Carles Vilà, PhD
Seville, Spain
Doñana Biological Station
Spanish National Research Council (CSIC)

Klaus-Peter Koepfli, PhD
Washington, D.C.
Conservation Biologist
Smithsonian Conservation Biology Institute

Robert Long, PhD
Seattle, WA
Senior Conservation Scientist
Woodland Park Zoo

Alberto Fernández-Gil, PhD
Estación Biológica de Doñana (CSIC)
Spain

Rich Bard
Portland, ME
Wildlife Biologist

Franz Camenzind, PhD
Science Advisory Board, Project Coyote

Brad Purcell, PhD
Science Advisory Board, Project Coyote
Australia
The Dingo Tracker – Wildlife & Ecological Consulting

Chris Mowry, PhD
Mt. Berry, GA
Associate Professor of Biology
Berry College
Department of Biology

Ryan Bell, MA Biology
Phoenix, AZ
Miami University

John Miles, PhD
Bellingham, WA
Professor Emeritis
Huxley School of the Environment
Western Washington University

Susan Morgan, PhD
Arroyo Seco, NM
President
The Rewilding Institute

Omar Ohrens, PhD
Madison, WI
Visiting Assistant Professor
Carnivore Coexistence Lab
University of Wisconsin - Madison

****

Appendix A. Additional Literature Cited

Here we provide additional scientific explanation (with citations) for two ideas expressed in this letter.

(1) **Some advocates of wildlife killing contests (WKCs) believe they are necessary or beneficial for effective management of livestock depredation.** We indicated that WKCs are unlikely to have this effect. The reason why is that most individual predators do not participate in livestock depredations (Gipson 1975; Knowlton et al. 1999; Sacks et al. 1999a, 1999b; Linnell et al. 1999; Stahl and Vandel 2001; Blejwas et al. 2002; Treves et al. 2002; Treves and Naughton-Treves 2005). Consequently, effective management of depredation requires (1) targeting the offending individual(s), and (2) intervening close to the site where the depredations occurred as well as responding in a timely manner (Gipson 1975; Sacks et al. 1999a, 1999b; Smith et al. 2000; Bangs and Shivik 2001). WKCs do not represent the kind of targeted effort required for effective management of livestock depredations.

Moreover, indiscriminate killing of predators is likely to exacerbate risks to livestock. The reason is that killing social carnivores like coyotes (and wolves) can lead to the disruption of predators' social and foraging ecology in ways that increase the number of transient individuals (Bjorge and Gunson 1985; Haber 1996; Treves and Naughton-Treves 2005; Brainerd et al. 2008). These transient individuals that have not been acculturated (aversively conditioned) to living in areas with livestock may be more likely to kill livestock. Studies by USDA's Wildlife Services clearly indicate that many, if not most, depredations are inflicted by the breeders (i.e., alphas) in coyote social groups (Knowlton et al. 1999; Sacks et al. 1999b). Even if the offending individuals are removed, they can be replaced by other members of the social group or from populations outside the area where the WKC is occurring. In some cases, this can also increase reproductive performance in coyotes (Crabtree and Sheldon 1999; Knowlton et al. 1999). Scientific evidence is increasingly suggesting that harvesting predators can exacerbate losses to livestock (Collins et al. 2002; Treves et al. 2010, Peebles et al. 2013, Wielgus and Peebles 2014).

(2) **Some advocates of wildlife killing contests believe they are necessary or beneficial for increasing the abundance of ungulate populations. We had indicated in our letter that WKCs are unlikely to have that effect.** The reason why is two fold:

(i) Killing predators cannot result in increased ungulate abundance in cases where the ungulate population is not limited by predators, but is instead limited by other factors, such as climatic conditions or food availability (Sæther 1997; Forchhammer et al. 1998; Coulson et al. 2000; Parker et al 2009). Without careful study, the claim that killing predators will improve wild ungulate populations is simply an unsupported assumption. Moreover, scientists are not good at understanding the conditions that cause a population to be limited by predators as opposed to other factors (Vucetich et al. 2005; Wilmers et al. 2006). For example, an experimental study in Idaho (Hurley et al. 2011) found that annual removal of coyotes was not an effective method to

increase mule deer populations because coyote removal increased neonate fawn survival only under particular combinations of prey densities and weather conditions.

(ii) Even in cases where predators do limit prey abundance, human-caused mortality (HCM) could only lead to an increase in prey abundance if the rate of HCM was sufficient to result in a significant reduction in predator abundance. Human-caused mortality is not a reliable means of reducing coyote abundance unless the rate of HCM exceeds 70% (Connolly and Lonhurst 1975). It is difficult to imagine that any set of WKCs would be intense enough or frequent enough to result in that rate of HCM.

Finally, the interest of some advocates of WKCs (i.e., increased ungulate abundance) is antithetical to good natural resource management practices in cases where increased ungulate abundances present a risk of overbrowsing (e.g., Côté et al. 2004).

Thank you for allowing us to further explain ourselves. If additional explanation on this or any other topic would be of value, please let us know. We would be eager to provide any such explanations.

Citations

Bangs, E., & Shivik, J. A. (2001). Managing wolf conflict with livestock in the northwestern United States. USDA National Wildlife Research Center-Staff Publications, 550.

Blejwas K.M., Sacks B.N., Jaeger M.M., McCullough D.R. (2002). The effectiveness of selective removal of breeding coyotes in reducing sheep predation. J Wildl Manage 66, 451-462.

Brainerd, S. M., Andrén, H., Bangs, E. E., Bradley, E. H., Fontaine, J. A., Hall, W. & Wydeven, A. P. (2008). The effects of breeder loss on wolves. The Journal of Wildlife Management, 72(1), 89-98.

Bjorge, R. R., and J. R. Gunson. (1985). Evaluation of wolf control to reduce cattle predation in Alberta. Journal of Range Management 38:483-486.

Collins, G.H., R. B. Wielgus, And G. M. Koehler. (2002). Effects of sex and age on American black bear conifer damage and control. Ursus 13:231–236.

Connolly, G. E., and W. M. Longhurst. (1975). The effects of control on coyote populations: A simulation model. Division Agricultural Science, University of California, Davis, Bulletin 1872.

Côté, S. D., Rooney, T. P., Tremblay, J. P., Dussault, C., & Waller, D. M. (2004). Ecological impacts of deer overabundance. Annual Review of Ecology, Evolution, and Systematics, 113-147.

Coulson, T., Milner–Gulland, E. J., & Clutton–Brock, T. (2000). The relative roles of density and climatic variation on population dynamics and fecundity rates in three contrasting ungulate species. Proceedings of the Royal Society of London. Series B: Biological Sciences, 267(1454), 1771-1779.

Crabtree, R. L., and J. W. Sheldon. (1999). Coyotes and canid coexistence. In Carnivores in ecosystems: The Yellowstone experience, ed. T. W. Clark et al., 127–163. New Haven: Yale University Press.

Forchhammer, M. C., Stenseth, N. C., Post, E., & Landvatn, R. (1998). Population dynamics of Norwegian red deer: density–dependence and climatic variation. Proceedings of the Royal Society of London. Series B: Biological Sciences, 265(1393), 341-350.

Gipson P.S. (1975). Efficiency of trapping in capturing offending coyotes. Wildlife Management 39, 45-47.

Knowlton F.F., E. M. Gese, Jaeger M.M. (1999). Coyote depredation control: An interface between biology and management. Journal of Range Management **5**2, 398-412.

Haber, G. C. (1996). Biological, conservation, and ethical implications of exploiting and controlling wolves. Conservation Biology 10:1068-1081.

Linnell J.D.C., Odden J., Smith M.E., Aanes R., Swenson J.E. (1999). Large carnivores that kill livestock: do problem individuals really exist? Wildl Soc Bull 27, 698-705.

Parker, K. L., Barboza, P. S., & Gillingham, M. P. (2009). Nutrition integrates environmental responses of ungulates. Functional Ecology, 23(1), 57-69.

Peebles, K. A., R. B. Wielgus, B. T. Maletzke, And M. E. Swanson. (2013). Effects of remedial sport hunting on cougar complaints and livestock depredations. PloS ONE. DOI: 10.1371/journal.pone.0079713.

Ritchie EG, Elmhagen B, Glen AS, Letnic M, Ludwig G, McDonald RA. (2012). Ecosystem restoration with teeth: what role for predators? In: Trends Ecol. Evol. 27(5):265-271.

Sacks B.N., Blejwas K.M., Jaeger M.M. (1999a). Relative vulnerability of coyotes to removal methods on a northern California ranch. J Wildl Manage 63, 939-949;

Sacks, B. N., M. M. Jaeger, J. C. C. Neale, and D. R. McCullough. (1999). Territoriality and breeding status of coyotes relative to sheep predation. Journal of Wildlife Management 63:593-605.

Sæther, B. E. (1997). Environmental stochasticity and population dynamics of large herbivores: a search for mechanisms. Trends in Ecology & Evolution, 12(4), 143-149.

Smith, M. E., Linnell, J. D., Odden, J., & Swenson, J. E. (2000). Review of methods to reduce livestock depredation II. Aversive conditioning, deterrents and repellents. Acta Agriculturae Scandinavica, Section A-Animal Science, 50(4), 304-315

Stahl P., Vandel J.M. (2001). Factors influencing lynx depredation on sheep in France: Problem individuals and habitat. Carnivore Damage Prevention News 4, 6-8.

Treves A., Naughton-Treves L. (2005). Evaluating lethal control in the management of human-wildlife conflict. pp. 86-106 in R. Woodroffe, S. Thirgood, A. Rabinowitz editors. People and Wildlife, Conflict or Coexistence. Cambridge University Press, Cambridge, UK.

Treves, A., R. L. Jurewicz, L. Naughton-Treves, R. A. Rose, R. C. Willging, and A. P. Wydeven. (2002). Wolf depredation on domestic animals: control and compensation in Wisconsin, 1976-2000. Wildlife Society Bulletin 30:231-241.

Treves, A., K. J. Kapp, And D. Macfarland. (2010). American black bear nuisance complaints and hunter take. Ursus 21:30–42. doi: 10.2192/09gr012.1

Vucetich, J. A., Smith, D. W., & Stahler, D. R. (2005). Influence of harvest, climate and wolf predation on Yellowstone elk, 1961□2004. Oikos, 111(2), 259-270.

Wielgus, R. B. And K. A. Peebles. (2014). Effects of Wolf Mortality on Livestock Depredations. PLoS ONE 9(12): e113505. doi:10.1371/journal.pone.0113505.

Wilmers, C. C., Post, E., Peterson, R. O., & Vucetich, J. A. (2006). Predator disease outbreak modulates top-down, bottom-up and climatic effects on herbivore population dynamics. Ecology Letters, 9(4), 383-389.