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Stakeholder acceptance of wild equid fertility control mirrors global shifts in attitudes to wildlife management

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Abstract: Wild equid (horses [*Equus ferus*] and burros [*E. asinus*]) populations have increased on public lands in the United States since the passage of the Wild Free-Roaming Horses and Burros Act of 1971. As of March 1, 2022, the Bureau of Land Management (BLM) estimated that wild equid populations on designated herd management areas (HMAs) may exceed 82,000 animals. In 2020, the total population of wild equids in the United States was estimated to exceed 300,000 animals. The BLM sets an appropriate management level (AML) for wild horse and burro herds on each HMA and removes animals when AMLs are exceeded. At present, the number of animals removed and placed in long-term holding is greater than the number adopted and sold. In 2021, the cost of caring for 59,000 animals in government holding facilities was >$72 million USD. Although the management of wild equid populations remains controversial among stakeholders, fertility control has gained wider acceptance, with injectable immunocontraceptive vaccines already employed to manage herds. Contemporary stakeholder views of wild equid management decisions may also reflect global shifts in public attitudes to wildlife management. These attitudes are driving both decisions and innovations in alternative approaches, such as fertility control, to manage wildlife. In this context, the Botstiber Institute for Wildlife Fertility Control is acting as a catalyst to advance the use of effective, sustainable fertility control methods to mitigate human–wildlife conflicts and promote coexistence worldwide.

Key words: contraceptive vaccines, fertility control, free-roaming equids, human–wildlife conflicts, wildlife management

In 1971, the U.S. Congress unanimously passed the Wild Free-Roaming Horses and Burros Act of 1971 (WFRHBA), which declared that "wild free-roaming horses (*Equus caballus*) and burros (*E. asinus*) are living symbols of the historic and pioneer spirit of the West and… shall be protected from capture, branding, harassment, or death" (Public Law 92-195 1971). With increased protection, free-roaming equid populations increased on designated public lands. In March 2022, the Bureau of Land Management (BLM) estimated free-roaming equid populations exceeded 82,000 animals on BLM-administered herd management areas (HMAs; BLM 2022). Schoenecker et al. (2021) estimated that the total U.S. population of free-roaming equids may now exceed 300,000.

Concomitantly, as free-roaming equid populations increased, stakeholder disputes over the management of America's wild equids have evolved into a fiscal and political quagmire that is now one of the most critical and complex wildlife management issues in the United States (Norris 2018, Scasta et al. 2018). As amended by the Public Rangelands Improvement Act (PRIA), WFRHBA directs the BLM to manage wild equids by setting appropriate management levels (AMLs; Public Law 95-514 1978). An AML is an estimate of the optimum number of wild horses and burros that results in a "thriving natural ecological balance and avoids deterioration of the range" for each BLM HMA. The aggregate AML that the BLM has established for 177 HMAs covering 12,788,066 ha of public lands (of which 10,886.043 ha are under BLM management) is 26,690 animals (BLM 2022). Herds can grow at an average rate of 20% annually, and when herd populations exceed established AMLs, the BLM conducts gathers to remove excess animals from HMAs (Garrott 2018).

Gathers typically occur every 3–5 years on HMAs above AML to ensure the BLM complies with the requirements of the amended act. Gathered animals are transported to government holding facilities where they are processed in consideration for adoption. Animals not adopted may be transported to contracted longer-term holding pastures where they are cared for until their death. From 1971 to 2021, the BLM has removed and adopted out >250,000 animals (BLM 2022).

In recent years, the number of animals removed from the range and placed in long-term holding has exceeded the number adopted and sold. As a result, off-range wild horse management costs have increased dramatically. As of December 2021, the cost of caring for 59,000 animals in off-range government holding facilities accounted for 64% (>$72 million USD) of the program's total annual expenditures of $112 million USD (BLM 2022). The costs associated with the off-the-range care of wild horses continue to increase because mortality rates in captivity are low and the average life span of wild horses and burros in captivity is approximately 30 years.

In March 2022, the BLM estimated that 82,384 free-roaming equids exist on BLM HMAs. This estimate is >50,000 animals over the BLM's established aggregate AML (BLM 2022). Not every HMA is affected adversely, but free-roaming equid populations that exceed target levels can negatively impact on the overall health of rangelands, which is detrimental to the long-term welfare of these animals and to the other wild and domestic grazers that exist on public lands (Danvir 2018).

Free-roaming equid management remains a highly controversial and contentious issue among stakeholder groups (Scasta et al. 2018). According to a 2013 National Academy of Sciences (NAS) report, "in some citizen groups, horses are highly valued and beloved animals that should receive a greater share of BLM resources. In other organizations, free-ranging horses are competition for agriculture and wildlife and interlopers and stressors of fragile ecosystems" (NAS 2013).

One management approach that is becoming more widely accepted by free-roaming equid stakeholder groups and by the public is fertility control (Kane 2018, Frey et al. 2022). Since the 1970s, the BLM has supported research to develop safe, practical, effective, and long-lasting free-roaming equid fertility control methods (BLM 2021). In October 2021, the agency announced that the development of long-lasting fertility control methods for mares remains its highest research priority (BLM 2021). Decreasing population growth rates is a key component of the BLM's wild horse and burro management strategy because it will ultimately lead to a reduction in the need and frequency of free-roaming equid removals and programmatic operating costs.

In the United States, injectable immunocontraceptive vaccines, such as porcine zona pellucida vaccines and GonaCon, have been proven safe and effective (Killian et al. 2008, Gray et al. 2010, Rutberg et al. 2017, Baker et al. 2018, Kane 2018, Kirkpatrick and Turner 2020, Bechert et al. 2022). Population modeling has demonstrated that, when coupled with strategic gather and removal scenarios, these vaccines can be used to stabilize growth rates and reduce free-roaming equid populations and programmatic costs over time (Bartholow 2007, de Seve and Boyles Griffin 2013, Folt et al. 2022). The BLM is using these vaccines to manage several herds, but improvements to existing methods and the development of promising new methods, such as longer-acting vaccines and intrauterine devices, will be essential to expand the use of fertility control and ultimately implement a more sustainable, fiscally responsible, and widely accepted approach to managing wild equids (Kane 2018, Bechert et al. 2022).

Incorporating public attitudes into free-roaming equid management decisions emerged as early as 1982, when the National Research Council (NRC) noted that public opinion was the "major motivation behind the wild horse and burro protection program and a primary criterion of management success" (NRC 1982). The NAS (2013) concluded that "control strategies must be responsive to public attitudes and preferences and could not be based only on biological or cost considerations."

The impact of stakeholder views on free-roaming equid management decisions in the

United States is also a reflection of how global shifts in public attitudes in the twenty-first century are driving both wildlife management decisions and innovations in alternative approaches (e.g., fertility control) to mitigating human–wildlife conflicts (HWCs; Dunn et al. 2018, Manfredo et al. 2020, Frey et al. 2022, Massei 2023).

Human–wildlife conflicts, defined as interactions between humans and wildlife with either real or perceived adverse economic or environmental outcomes (Messmer 2000, Abrahms 2021), cost the global economy billions of dollars annually, can have significant impacts on human livelihoods and on the environment, and are increasing worldwide (Marchini and Crawshaw 2015, Massei et al. 2015, Messmer 2020, Conover and Conover 2022).

Most HWCs are due to local populations of wildlife exceeding the so-called social carrying capacity (Carpenter et al. 2000). In these instances, wildlife is referred to as overabundant (Messmer 2009, Drijfhout et al. 2020, Valente et al. 2020), with some stakeholders demanding reductions in local densities and others opposing the use of traditional, lethal methods. In addition to wild equids in the United States and Australia (Norris 2018, Scasta et al. 2018), examples of overabundant wildlife include African and Asian elephants (*Loxodonta africana* and *Elephas maximus*), urban white-tailed deer (*Odocoileus virginianus*) in the United States, peri-urban marsupials in Australia (Wimpenny et al. 2021), brush-tailed opossums (*Trichosurus vulpecula*) in New Zealand (Ji 2009), wild pigs (*Sus scrofa*; Massei et al. 2011, 2015; Snow et al. 2017) and commensal rodents (Ruscoe et al. 2022) worldwide, primates in Africa and Asia, and urban geese (*Branta canadensis*) and pigeons (*Columba livia*) in many parts of the world (Fox 2019).

Traditionally, many HWCs have been managed by lethal methods involving shooting, trapping, and toxicants (Conover and Conover 2022). However, opposition to culling has become widespread due to concerns about animal welfare, human safety in urban settings, environmental impact of toxicants such as rodenticides, and a lack of efficacy of lethal control in addressing impacts and achieving desired outcomes (Sharp and Saunders 2008, Dubois et al. 2017, Jacoblinnert et al. 2021).

Social studies on public attitudes and values suggest that people living in urban areas are less affected by HWCs, less likely to rely on wildlife for sustenance, more prone to regard animals as companions as opposed to a food source or threat to property and safety, and to enjoy the presence of wildlife in their surroundings (Teel et al 2010). Most people in cities have very little contact with free-roaming wildlife, usually learn about wildlife through television programs and social media, and often express strong views, amplified by the internet, against lethal control to manage wildlife (Manfredo et al. 2020). The results of social studies show that a gradual shift has occurred from a view of treating wildlife in utilitarian terms toward mutualism, a position that views wildlife "as part of one's social network and worthy of care and compassion" (Manfredo et al. 2020).

The public shift in attitudes is also changing the way we talk about controlling the number of animals—from the traditional "wildlife management" to "resolution of human–wildlife conflicts," through to "human–wildlife interactions" and lately to "coexistence" (Madden 2004, König et al. 2020, Conover and Conover 2022). In parallel, a growing transdisciplinary community has called for a more holistic approach, referred to as "One Health," to reduce the impact of HWCs, and in particular of disease outbreaks, through improved cross-sectoral coordination (Kelly et al. 2017, Messmer 2020).

This growing antipathy toward lethal methods places increasing constraints on wildlife management options. Consequently, there has been growing interest in nonlethal methods such as wildlife fertility control (WFC; Kirkpatrick et al. 2011, Massei and Cowan 2014, Hobbs and Hinds 2018, Wimpenny et al. 2021). Resolving HWCs requires achieving a difficult balance between several competing goals: mitigating the impacts of a local animal population, maintaining the ecological role of that species within the environment, ensuring animal welfare standards, and managing public expectations (Dunn et al. 2018, Wimpenny et al. 2021). In these contexts, fertility control may provide an important nonlethal alternative to traditional lethal methods and may garner broader stakeholder support for wildlife management decisions over time.

Significant progress has been made in the development of contraceptive drugs and delivery systems in the twenty-first century, as well as on modeling the impact of fertility control on population dynamics. However, challenges related to feasibility, costs, and sustainability of fertility control to mitigate HWCs remain.

In 2016, the Dietrich W. Botstiber Foundation in partnership with the Humane Society of the United States, established the Botstiber Institute for Wildlife Fertility Control (BIWFC 2022). The primary aim of the BIWFC is to advance the use of effective, sustainable fertility control methods to mitigate human–wildlife conflicts and promote coexistence worldwide. To that end, the BIWFC hosts and sponsors events, such as conferences, workshops, symposia, and seminars, provides grants to support wildlife fertility control projects, and maintains a robust public education program to raise awareness and understanding about the role that fertility control can play in mitigating HWCs.

The activity of the BIWFC recently culminated with the organization of the 9th International Conference on Wildlife Fertility Control in Colorado Springs, Colorado, USA, in May 2022. Like previous conferences in this series, the conference in Colorado Springs brought together biologists, ecologists, veterinarians, wildlife managers, and policy makers to explore contexts and species for which fertility control appears a reasonable approach to mitigating HWCs. Acknowledging the importance of considering the human dimensions associated with wildlife management and HWCs, a significant addition to the conference was the participation of social scientists.

For years, understanding public values and attitudes associated with this fast-growing field has taken a back seat to the development and field testing of new agents, delivery methods, and procedures. Through trial and error, the wildlife fertility control field has learned the hard way that, to be successful, practical field applications of these approaches must be preceded by a dynamic stakeholder engagement and outreach process. To help incorporate these types of processes on the front end of mitigation planning, we will need to collaborate with our colleagues in the human dimensions of wildlife field. This will facilitate the development of guidelines that can be followed to ensure that any management action is justified and has broad public and stakeholder support prior to implementation.

Stakeholder engagement and outreach have also been central to the BIWFC sponsoring and participating in the fourth Free-Roaming Equids and Ecosystem Sustainability Summit in St. George, Utah, USA, in October 2022. As future decisions on wildlife management, including options to control wild equids, will be increasingly affected by public attitudes and values, the main challenge for the scientific community will be to incorporate the views of stakeholders into different population management scenarios. By bringing together interdisciplinary panels of experts, the BIWFC will continue to act as a catalyst to promote stakeholder participation in developing and implementing publicly acceptable and sustainable solutions to mitigating human–wildlife conflicts.

Literature cited

Abrahms, B. 2021. Human–wildlife conflict under climate change. Science 373:484–485.

Baker, D. L., J. G. Powers, J. L. Ransom, B. E. McCann, M. W. Oehler, J. E. Bruemmer, N. L. Galloway, D. C. Eckery, and T. M. Nett. 2018. Reimmunization increases contraceptive effectiveness of gonadotropin-releasing hormone vaccine (GonaCon-Equine) in free-ranging horses (*Equus caballus*): limitations and side effects. PLOS ONE 13(7): e0201570.

Bartholow, J. M. 2007. Economic benefit of fertility control in wild horse populations. Journal of Wildlife Management 71:2811–2819.

Bechert, U. S., J. W. Turner, Jr., D. L. Baker, D. C. Eckery, J. Bruemmer, C. Lyman, T. Prado, S. R. B. King, and M. A. Fraker. 2022. Fertility control options for management of free-roaming horse populations. Human–Wildlife Interactions 16(2).

Botstiber Institute for Wildlife Fertility Control (BIWFC). 2022. Homepage. Botstiber Institute for Wildlife Fertility Control, Media, Pennsylvania, USA, <https://www.wildlifefertilitycontrol.org/>. Accessed March 24, 2022.

Bureau of Land Management (BLM). 2021. BLM Wild Horse and Burro Program, 2021 strategic research plan. Bureau of Land Management, Washington, D.C., USA, <https://www.blm.gov/sites/blm.gov/files/docs/2021-11/IB2022-008_att1.pdf>. Accessed March 24, 2022.

Bureau of Land Management (BLM). 2022. Wild Horse and Burro Program data. Bureau of

Land Management, Washington, D.C., USA, <https://www.blm.gov/programs/wild-horse-and-burro/about-the-program/program-data>. Accessed March 24, 2022.

Carpenter, L. H., D. J. Decker, and J. F. Lipscomb. 2000. Stakeholder acceptance capacity in wildlife management. Human Dimensions of Wildlife 5:5–19.

Conover, M. R., and D. O. Conover. 2022. Human–wildlife interactions: from conflict to coexistence. CRC Press, Boca Raton, Florida, USA.

Danvir, R. E. 2018. Multiple-use management of western U.S. rangelands: wild horses, wildlife, and livestock. Human–Wildlife Interactions 12:5–17.

de Seve, C. W., and S. L. Boyles Griffin. 2013. An economic model demonstrating the long-term cost benefits of incorporating fertility control into wild horse (*Equus caballus*) management programs on public lands in the United States. Journal of Zoo and Wildlife Medicine 44:34–37.

Drijfhout, M., D. Kendal, and P. T. Green. 2020. Understanding the human dimensions of managing overabundant charismatic wildlife in Australia. Biological Conservation 244:108506.

Dubois, S., N. Fenwick, E. A. Ryan, L. Baker, S. E. Baker, N. J. Beausoleil, S. Carter, B. Cartwright, F. Costa, C. Draper, and J. Griffin. 2017. International consensus principles for ethical wildlife control. Conservation Biology 31:753–760.

Dunn, M., M. Marzano, J. Forster, and R. M. Gill. 2018. Public attitudes towards “pest” management: perceptions on squirrel management strategies in the UK. Biological Conservation 222:52–63.

Folt, B., L. S. Ekernas, and K. A. Schoenecker. 2022. Multi-objective modeling as a decision-support tool for free-roaming horse management. Human–Wildlife Interactions 16(2).

Fox, A. D. 2019. Urban geese—looking to North America for experiences to guide management in Europe. Wildfowl 69:3–27.

Frey, S. N., J. L. Beck, J. D. Scasta, and L. Singletary. 2022. U.S. public opinion of reproductive control options for free-roaming horses on western public lands. Human–Wildlife Interactions 16(2).

Garrott, R. A. 2018. Wild horse demography: implications for sustainable management within economic constraints. Human–Wildlife Interactions 12:46–57.

Gray M. E., D. S. Thain, E. Z. Cameron, and L. A. Miller. 2010. Multi-year fertility reduction in free-roaming feral horses with single-injection immunocontraceptive formulations. Wildlife Research 37:475–481.

Hobbs, R. J., and L. A. Hinds. 2018. Could current fertility control methods be effective for landscape-scale management of populations of wild horses (*Equus caballus*) in Australia? Wildlife Research 45:195–207.

Jacoblinnert, K., J. Jacob, Z. Zhang, and L. A. Hinds. 2021. The status of fertility control for rodents—recent achievements and future directions. Integrative Zoology 17: 964–980.

Ji, W. 2009. A review of the potential of fertility control to manage brushtail possums in New Zealand. Human–Wildlife Interactions 3:20–29.

Kane, A. J. 2018. A review of contemporary contraceptives and sterilization techniques for feral horses. Human–Wildlife Interactions 12:111–116.

Kelly, T. R., W. B. Karesh, C. K. Johnson, K. V. Gilardi, S. J. Anthony, T. Goldstein, S. H. Olson, C. Machalaba, J. A. Mazet, and Predict Consortium. 2017. One Health proof of concept: bringing a transdisciplinary approach to surveillance for zoonotic viruses at the human–wild animal interface. Preventive Veterinary Medicine 137:112–118.

Killian, G., D. Thain, N. K. Diehl, J. Rhyan, and L. A. Miller. 2008. Four-year contraception rates of mares treated with single-injection porcine zona pellucida and GnRH vaccines and intrauterine devices. Wildlife Research 35:531–539.

Kirkpatrick, J. F., R. O. Lyda, and K. M. Frank. 2011. Contraceptive vaccines for wildlife: a review. American Journal of Reproductive Immunology 66:40–50.

Kirkpatrick, J. F., and J. W. Turner. 2020. Wildlife contraception and political cuisinarts. Pages 225–238 *in* M. Allen and J. W. Howell, editors. Groupthink in science. Springer, Cham, Switzerland.

König, H. J., C. Kiffner, S. Kramer□Schadt, C. Fürst, O. Keuling, and A. T. Ford. 2020. Human–wildlife coexistence in a changing world. Conservation Biology 34:786–794.

Madden, F. 2004. Creating coexistence between humans and wildlife: global perspectives on local efforts to address human–wildlife conflict. Human Dimensions of Wildlife 9:247–257.

Manfredo, M. J., T. L. Teel, A. W. Don Carlos, L. Sullivan, A. D. Bright, A. M. Dietsch, J. Bruskotter, and D. Fulton. 2020. The changing sociocultural context of wildlife conservation. Conservation Biology 34:1549–1559.

Marchini, S., and P. G. Crawshaw, Jr. 2015. Human–wildlife conflicts in Brazil: a fast-growing issue. Human Dimensions of Wildlife 20:323–328.

Massei, G. 2023. Fertility control for wildlife: a European perspective. Animals 13:428.

Massei, G., and D. P. Cowan. 2014. Fertility control to mitigate human–wildlife conflicts: a review. Wildlife Research 41:1–21.

Massei, G., J. Kindberg, A. Licoppe, D. Gačić, N. Šprem, J. Kamler, E. Baubet, U. Hohmann, A. Monaco, J. Ozoliņš, S. Cellina, T. Podgórski, C. Fonseca, N. Markov, B. Pokorny, C. Rosell, and A. Náhlik. 2015. Wild boar populations up, numbers of hunters down? A review of trends and implications for Europe. Pest Management Science 71:492–500.

Massei, G., S. Roy, and R. Bunting. 2011. Too many hogs? A review of methods to mitigate impact by wild boar and feral pigs. Human–Wildlife Interactions 5:79–99.

Messmer, T. A. 2000. The emergence of human–wildlife conflict management: turning challenges into opportunities. International Biodeterioration and Biodegradation 45:97–102.

Messmer, T. A. 2009. Human–wildlife conflicts: emerging challenges and opportunities. Human–Wildlife Conflicts 3:10–17.

Messmer, T. A. 2020. Humans, wildlife, and our environment: One Health is the common link. Human–Wildlife Interactions 14:137–140.

National Academy of Sciences (NAS). 2013. Using science to improve the BLM Wild Horse and Burro Program: a way forward. The National Academies Press, Washington, D.C., USA.

National Research Council (NRC). 1982. Wild and free-roaming horses and burros. Final report. The National Academies Press, Washington, D.C., USA.

Norris, K. A. 2018. A review of contemporary U.S. wild horse and burro management policies relative to desired management outcomes. Human–Wildlife Interactions 12:18–30.

Public Law 92-195. 1971. The Wild Free-Roaming Horses and Burros Act of 1971. Authenticated U.S. Government information. U.S. Government Printing Office, Washington, D.C., USA, <https://www.wildhorseandburro.blm.gov/92-195.htm>. Accessed December 28, 2017.

Public Law 95-514. 1978. Public Rangelands Improvement Act of 1978. 43 USC 1901. Authenticated U.S. Government information. U.S. Government Printing Office, Washington, D.C., USA, <https://www.govinfo.gov/content/pkg/STATUTE-92/pdf/STATUTE-92-Pg1803.pdf>. Accessed May 4, 2022.

Ruscoe, W. A., P. R. Brown, S. Henry, N. van de Weyer, F. Robinson, L. A. Hinds, and G. R. Singleton. 2022. Conservation agriculture practices have changed habitat use by rodent pests: implications for management of feral house mice. Journal of Pest Science 95:493–503.

Rutberg, A., K. Grams, J. W. Turner, and H. Hopkins. 2017. Contraceptive efficacy of priming and boosting doses of controlled-release PZP in wild horses. Wildlife Research 44:174–181.

Scasta, J. D., J. D. Hennig, and J. L. Beck. 2018. Framing contemporary U.S. wild horse and burro management processes in a dynamic ecological, sociological, and political environment. Human–Wildlife Interactions 12:31–45.

Schoenecker, K. A., S. B. King, and T. A. Messmer. 2021. The wildlife profession's duty in achieving science-based sustainable management of free-roaming equids. Journal of Wildlife Management 85:1057–1061.

Sharp, T., and G. Saunders. 2008. A model for assessing the relative humaneness of pest animal control methods. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, Australia.

Snow, N. P., M. A. Jarzyna, and K. C. VerCauteren. 2017. Interpreting and predicting the spread of invasive wild pigs. Journal of Applied Ecology 54:2022–2032.

Teel, T. L., M. J. Manfredo, F. S. Jensen, A. E. Buijs, A. Fischer, C. Riepe, R. Arlinghaus, and M. H. Jacobs. 2010. Understanding the cognitive basis for human–wildlife relationships as a key to successful protected-area management. International Journal of Sociology 40:104–123.

Valente, A. M., P. Acevedo, A. M. Figueiredo, C. Fonseca, and R. T. Torres. 2020. Overabundant wild ungulate populations in Europe: management with consideration of socio□ecological consequences. Mammal Review 50:353–366.

Wimpenny, C., L. A. Hinds, C. A. Herbert, M. Wilson, and G. Coulson. 2021. Fertility control for managing macropods—current approaches and future prospects. Ecological Management and Restoration 22:147–156.

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