



Feral equids, such as these donkeys in the US Mojave desert, affect desert ecosystems by digging wells to access water.

Edited by Jennifer Sills

## Feral equids' varied effects on ecosystems

In their Report “Equids engineer desert water availability” (30 April, p. 491), E. J. Lundgren and coauthors present observations of feral burros digging shallow wells and suggest that these wells may benefit native wildlife and ecosystems by increasing the number of water sites. The authors consider feral equids (horses and burros) to be beneficial but fail to acknowledge substantial research establishing the many negative effects that feral equids have on arid ecosystems. The positive view presented by Lundgren *et al.* is troubling because growing feral equid populations in the western United States are a serious concern for natural resource managers (1).

Feral equids compete with native wildlife for food and water and displace native ungulates from water (2–5). Their presence has been associated with decreased diversity of native species at water, and native species have been observed to visit water less frequently and spend less time at water when equids are present (6). Reduced access to water is particularly detrimental in arid landscapes, especially during drought.

The addition of a small number of shallow wells does not benefit native wildlife when their overall access to water is

reduced by equids. Lundgren *et al.* present no data to demonstrate an overall benefit to wildlife. We urge caution in speculating that the addition of a few localized wells benefits native species. Feral equids have also altered plant composition, reduced plant diversity and cover, and increased soil compaction and erosion (7–9), thereby putting native habitats at risk. This, together with poorly controlled equid population growth, results in degraded habitats with decreased carrying capacities. Effective management of feral equids will benefit from the public's accurate understanding of their overall effects on ecosystems.

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## Response

Rubin *et al.* rightly point out that feral equids have diverse effects on ecosystems, including exerting strong herbivory pressure and dominating water sources. These effects are common to all large herbivores [e.g., (1–3)]. If we did not already know that feral equids were introduced, would we be able to tell from their actual effects? Just as elephants can dominate water sources in Africa (4), most animal communities show dominance hierarchies at limiting resources [e.g., (5)]. Preliminary evidence indicates that this is true for feral donkeys, but only where cougars are absent (6).

The effects of organisms depend on the ecological context of the population. Feral equids can be the primary prey of cougars (7). Yet predation, as well as the near-ubiquitous persecution of predators, has been overlooked in nearly all research regarding the effects of feral equids—including in the studies cited by Rubin *et al.* Much as the return of wolves to Yellowstone National Park changed the behavior and thus the effects of elk (8), the effects of feral equids would likely change if we protected their predators.

The effects of organisms are also scale-dependent and diverse, and they may appear contradictory. For example, beaver herbivory can deforest ecologically important riparian woodlands, yet beavers can also create ecologically important wetlands (9). Elephant disturbance can create

essential habitat for small vertebrates at the patch scale but appear to suppress their diversity and abundance at broader scales (3, 10). Likewise, while feral equids can have all the effects that Rubin *et al.* describe, our Report shows that they can also dig wells up to 2 m in depth—at times providing the only water available. Feral donkey disturbance also appears important to maintaining open-water habitat at desert springs; several endemic and endangered freshwater fish populations in both North America and Australia went extinct following feral donkey eradication (11). Describing feral equids as either ecological heroes or as invasive pests oversimplifies complexity and moralizes ecology.

Feral equids, like other introduced species, can change ecosystems in ways that alarm us. However, our desire to fight these changes can hinder our ability to study them with openness and curiosity, and in light of Earth's dynamic history (12).

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## Academic bullying: How to be an ally

Academic bullying and harassment are all too common, and institutional reactions are often inadequate (1, 2). Although reports often focus on what the targets

of bullying can do to protect themselves [e.g., (3)], it is important to acknowledge that all members of the scientific community can and must address academic bullying. If witnesses to harassment, members of investigative committees, journal editors, other gatekeepers, and individuals at every level of the scientific community all leverage their knowledge and power to combat bullying, we can create a safer and more civil scientific environment.

Witnesses of academic bullying can report the incident to trustworthy resources at the relevant institution and funding agency. For example, in the United States, one could report unacceptable behavior to a university ombudsman or submit a bullying report to the US National Institutes of Health (NIH) (4). The NIH has removed more than 70 lab leaders from their grants (5), demonstrating that such reports by witnesses can be effective. The UK Wellcome Trust also invites such reports (6) and has withdrawn funding from scientists accordingly [e.g., (7)]. Actions by funding agencies can prevent decisions that just pass the harasser (8) to a different environment where they can focus on new targets.

Members of institutional academic bullying investigation committees can take steps to get unbiased and comprehensive reports of the bullying behavior. To do so, they should ask former lab members about the perpetrator, given that their feedback is likely to be more accurate, honest, and informative than that of current lab members, whose serious reservations might include fear of retaliation. Committee members can support targets during the course of investigation by putting in place a constant monitoring system to prevent retaliation against the target. They can also avoid unnecessary delays in the investigation process, while making sure not to sacrifice quality for speed. Efficient investigations show respect for the target and minimize visa issues for international students. To increase transparency, committees should make available at least one example of the outcome of a previous investigation, including discipline and punishment of the perpetrator and support for the target.

Journal editors can be open to submissions about sexual harassment, academic bullying, and imbalances in diversity (9), regardless of the main scope of the journal. The publication's readership, regardless of discipline, has a right to be aware of these issues. Publishing such information empowers readers to contribute to the global efforts to address these issues.

Members of gatekeeping organizations for scientific metrics (such as institution and hospital rankings) and clubs (such as national academies of sciences) can consider academic bullying in their criteria. The US National Academy of Sciences, for example, ejected members in response to validated sexual harassment allegations (10). In 2018, AAAS (the publisher of *Science*) established a new policy for ejecting harassers among AAAS fellows (11).

Individuals in all positions in the scientific community, regardless of their seniority or whether they have witnessed offensive behavior, can help address inequities, harassment, bullying, and discrimination in STEM by refusing to remain neutral about these issues. They can demand more accountability and more transparency about expectations, consequences, and reporting guidelines. They can also work to increase awareness about academic bullying and harassment by sharing studies, reports, and their own experiences.

Evidence shows that incidents of sexual harassment do not decrease simply as a result of strong policies and legal recourse (12). Diminishing academic harassment in science requires attention and collaborative action by all members of the scientific workforce (8).

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## COMPETING INTERESTS

M.M. is a co-founder and director of the Academic Parity Movement ([www.paritymovement.org](http://www.paritymovement.org)), a nonprofit organization dedicated to addressing academic discrimination, violence, and incivility, and receives royalties/honoraria for his published books, plenary lectures, and licensed patents.

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## Feral equids' varied effects on ecosystems—Response

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