

(bit.ly/1dSph2X), which represents a global framework for the exploitation and conservation of marine resources.

*Food security is not an issue:* I agree with Simmonds and Corkeron that culling whales would not lead to any measurable increase in commercially valuable fish stocks (see Gerber *et al.* 2009). While there is currently no pressing food security issue that whaling would resolve, this will probably become an issue for at least some nation states likely to be affected by climate change over the next 50 years. As suggested, both biological and socioeconomic variables will need to be considered in reaching a compromise on sustainable whale management.

*Animal welfare concerns are legitimate:* Indeed, a plurality of values (including animal welfare) should be acknowledged in any management system. This requires an open mind for the many values that people associate with whales.

I am glad that the editorial has sparked discussion about alternative approaches to reach our shared goals of large whale sustainability and conservation. Only with such healthy debate can we begin moving toward identifying points of agreement. I am optimistic that evidence from our successes and failures in whale management can help shape an agreement that ensures the realization of these collective goals.

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## Toward carrion-free ecosystems?

In Spain, after an outbreak of bovine spongiform encephalopathy (Donázar *et al.* 2009; Margalida *et al.* 2012) and the approval of the use of diclofenac – a nonsteroidal anti-inflammatory drug – in animal health applications (Margalida *et al.* 2014), a new conflict has emerged between veterinary management and biodiversity conservation. Two of the country's largest regions – Castilla-La Mancha and Extremadura – have recently approved veterinary regulations (Order 15/01/15 and Resolution 19/10/15, respectively) establishing new protocols for managing the carcasses of hunted wild ungulates, purportedly aimed at improving animal health. The measures seek to reduce the prevalence of bovine tuberculosis (TB) in wild ungulates by requiring the removal of such carcasses from the field, so as to decrease the likelihood of their consumption by known reservoir species of TB such as wild boar (*Sus scrofa*). However, these regulations, which will limit scavenging opportunities and related ecological processes, cannot be justified on the basis of current animal health legislation (regulations 1069/2009 and 142/2011 of the European Union) and may even contradict European legislation on the protection of wild species (Birds and Habitats Directives 2009/147/CE and 92/43/CEE, respectively). Also, despite indirect evidence (eg Nugent *et al.* 2002), there is no scientific consensus regarding the link between wild boar scavenging on wild ungulate carcasses and TB prevalence (Gortázar *et al.* 2015).

According to existing national legislation, any by-products from big game hunting (such as meat, horn, or bone) sold commercially for human use or consumption require a thorough veterinary inspection on-site (in the field) to determine whether disease is present. If disease is detected, the carcass and its by-products must be eliminated (incinerated or buried).

However, in the absence of disease, the carcass and its by-products may be approved for human use or consumption. Any unusable parts such as viscera are usually left in the field and are intended to be consumed by vultures and other scavengers, which normally quickly dispose of the remains. Thus, at this time, only the remains of animals fit for human consumption are provided to scavengers.

In contrast, the new regulations prohibit depositing wild ungulate by-products in situ in areas where TB is documented, regardless of the health status of the hunted individuals. These regulations propose that all by-products, including those from carcasses deemed disease-free, must be buried, transported by specialized companies to designated locations for incineration, or in rare cases taken to fenced 600–1000-m<sup>2</sup> feeding stations for vultures (this lattermost option is possible only in Castilla-La Mancha). This contrasts with traditional, more sustainable scenarios in which disease-free animal remains – intended for consumption by scavengers – were placed at various unfenced sites typically far from human activity, within vulture protected areas already established by Spanish law in 2011 (Royal Decree 1632). The new regulations will substantially reduce an important food source for endangered species, including vultures; will raise financial costs for hunting managers, estate owners, and natural resource management agencies (given that the removal of carcasses for incineration is partially subsidized by the government); may lead to other negative environmental impacts such as increased atmospheric greenhouse-gas emissions (Morales-Reyes *et al.* 2015); and advocate for non-selective management of hunting remains regardless of the risk they pose. Crucially, whether the new measures will help to decrease the risk of transmission of diseases such as TB to humans or to domestic livestock is highly questionable. At best, it would take considerable time and sampling effort to demonstrate that the actions have the desired effects.

Unlike domestic livestock management, for which existing animal health protocols appear to be effective, wild ungulate management includes numerous uncontrollable factors that cannot be fully addressed from a veterinary-only perspective. Evaluation of other variables – such as habitat use, population densities, and game management considerations – is required.

The progressive implementation of “aseptic” strategies in natural resource management ignores potentially troubling consequences for ecosystem health, as in the case of the outbreak of bovine spongiform encephalopathy (Donazar *et al.* 2009). Spain currently supports the largest known population of vultures in Europe. The carrion provided by domestic and wild ungulates has sustained this rich community of obligate scavengers, which is imperiled at an international scale. Thus, envi-

ronmental practices based on aseptic ecosystem schedules should be revised and a dialogue between hunters, veterinarians, conservationists, and policy makers is urgently needed.

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