

Finally, while it is true that welfare concerns have come to the fore in recent years as a reason to oppose whaling, this does not mean that such arguments are unsound or unscientific, nor that conservation-related concerns have been dismissed. Commercial whaling meets no pressing human need, and its resumption would be an unnecessary and – given the arguably positive ecosystem role of whales – dangerous ecological experiment. The available evidence suggests that ending the moratorium is far less likely to result in “an agreement that ensures sustainability and effective conservation of large whales” than the current, admittedly imperfect, situation.

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## Beyond the whaling stalemate

As my 6-year-old daughter would say, whales are my favorite animal. Having spent countless hours on the water observing whale behavior, the idea of hunting these magical creatures is heartbreaking. Simmonds (representing the Humane Society) is also concerned about welfare issues, yet many cultures have strong traditions associated with hunting whales (including the legally sanctioned aboriginal hunt for bowhead whales in US Arctic waters). Indeed, since the global moratorium on commercial whaling was agreed on in 1982, the whaling debate has shifted from concerns over sustainability to concerns about animal welfare. Recognizing that there is a mismatch between conservation issues that threaten whales (eg ship strikes, entanglement) and solutions discussed in the whaling dispute, my proposal is that we “agree to disagree” about the value we assign to whales, and focus on points of agreement. While resolution of all the points raised by Simmonds and Corkeron will likely not change their position regarding whale management, given diverging values, here I respond to each identified point of “disagreement” and suggest departure points for achieving shared goals of sustainability and conservation of whales.

*The IWC is effective as is and a compromise agreement will increase hunting:* Indeed, the International Whaling Commission (IWC) has advanced its conservation mandate and furthered knowledge of whale populations. Yet the existing management regime is no panacea. The aforementioned whaling moratorium

aimed to provide a 10-year window to conduct stock assessments, develop a quota system, and recover depleted stocks. The moratorium was never intended as a permanent solution and has proven to be less than perfect over the past 3 decades. For example, as noted by Simmonds and Corkeron, the IWC has made little progress in recovering the J-stock of minke whales during this period, which underscores the need to consider new policy instruments. Indeed, policy instruments such as market-based approaches (eg Gerber *et al.* 2014) could be established such that future quotas do not exceed limits on anthropogenic removal levels consistent with recovery. Rather than debate the moratorium, a productive path forward is to learn from past experience to improve future management.

*Cheating is inevitable:* Of course cheating would likely occur in the absence of international observers and a comprehensive DNA register. With necessary resources and commitment, there is no reason why we cannot design a system to ensure no cheating, despite the fact that we have not succeeded thus far. A combination of establishing a DNA register, collecting DNA from all landed whales, implementing electronic monitoring, and improving observer coverage would likely make cheating very difficult (certainly no worse than that in commercial fishing). The main issue here is that the IWC has not been able to agree on the elements that would constitute a “revised management scheme”, which is precisely why we should re-open discussion about a compromise agreement.

*Japan will not comply with the ICJ:* To date, Japan has complied with the International Court of Justice (ICJ) and has revised its new research whaling program to no longer target humpbacks and fin whales in the Southern Ocean. Indeed, Japan recently exempted itself from the ICJ process regarding marine living resource issues. Instead, any future dispute about whale management will be handled by the 1982 United Nations Convention on the Law of the Sea

([bit.ly/1dSph2X](http://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.