



A treaty under negotiation can help protect marine biodiversity and ensure sustainable use of the high seas.

Edited by Jennifer Sills

Protect high seas biodiversity

The high seas—marine areas beyond national jurisdiction (1)—cover nearly half of Earth's surface (2). The high seas support our planet in countless ways, from regulating the climate, to feeding millions of people, to supporting industries that contribute billions of dollars to the global economy (3). Even so, less than 1% of the high seas are fully protected (4), and the current patchwork of management and lack of oversight leaves them vulnerable to abuse. In 2017, the United Nations resolved to develop an international treaty for the conservation and sustainable use of the high seas. Negotiations are set to end this year. We must ensure that the forthcoming framework conserves high-seas biodiversity and promotes sustainable and equitable use.

To maximize biodiversity protection beyond national jurisdiction, the high seas treaty should incorporate the timely establishment of a network of fully protected marine protected areas for diverse habitats in strategic locations. Fully protected marine reserves in the open ocean preserve fish populations, protect fragile and valuable ecosystems, and increase

ecosystem resilience (5, 6). Implementing effective marine protected areas will require a coordinated approach across existing regional and sectoral bodies and the scientific community (6, 7).

The treaty should also provide a robust framework to assess the environmental impacts of activities on the high seas. Such evaluations should use comprehensive and rigorous global standards and transparent monitoring. Where necessary, existing assessment processes should be reimagined to better measure cumulative impacts. Because the high seas are dynamic and poorly understood, strategic environmental assessments will be required to design effective policies in the future (7).

Finally, the treaty should establish a robust institutional framework that will enable the successful implementation of these safeguards. At a minimum, the changes will require an administrative body, a decision-making body, a scientific committee with influence over decision-making, and a compliance committee. All activities, decisions, and plans should be open and transparent.

Every year, vulnerable and under-studied marine ecosystems are substantially, and in some cases permanently, altered by human activities (8, 9). The proposed treaty provides an opportunity to conserve the high seas for generations to

come and create a more equitable ocean for all humankind (10, 11). We call on all nations to construct an ambitious treaty and conclude these negotiations as soon as possible, to finally put legal protection in place for the unprotected half of our planet (12).

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12. Scientists who wish to support this Letter can add their signature here: <http://protectthehighseas.com/>.

COMPETING INTERESTS

H.H.-D. has received honoraria and fees for consulting related to the Internationally Legally Binding Instrument on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ treaty) from the Deep-Ocean Stewardship Initiative, High Seas Alliance, Intergovernmental Oceanographic Commission of UN Educational, Scientific and Cultural Organization.

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Trophy hunting undermines public trust

In March, one of the largest brown bears in Europe was shot in the Eastern Carpathians, Romania. A member of one of Europe's royal families allegedly paid at least EUR7000 for the hunt (1), even though the brown bear is strictly protected in Romania and bear trophy hunting is banned (2). The government's tolerance of trophy hunts and inadequate oversight of hunting permits threaten protected species and undermine public trust.

Under provisions of Article 16(1) of the EU Habitats Directive, the national wildlife authority can grant permission for lethal removal of brown bears if a bear is deemed a repeated threat to livestock, crops, or human life (3). However, the local wildlife administrators allowed trophy hunting by issuing a permit, approved by the Ministry of Environment and the local Environmental Protection Agency, that was intended for a nuisance animal. The event

is under investigation as wildlife crime (4).

In Romania, wildlife authorities are mandated by law to protect people's lives and livelihoods through lethal and nonlethal management of problem bears (1). In this case, the authorities breached public trust by not enforcing current legislation and giving game managers, often private entities, complete control over which animal is removed and when. Thus, wildlife authorities failed to protect people's livelihoods and enabled an illegal trophy hunt of a nonoffending bear. This event shows that wildlife species in Romania are still at the mercy of the rich and powerful (5) despite being protected by European legislation (3).

To regain the trust of local communities and society at large, the Romanian government must deliver and enforce effective legislation that allows for accountable management of nuisance animals. Transparent large carnivore management should be rooted in social realities and the best available science and capitalize on the opportunities afforded by the trophy hunt ban to facilitate positive change (6). The European Commission can actively assist member states to manage the increasingly abundant and conflictual large carnivore populations.

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Brazil's doomed environmental licensing

On 13 May 2021, Brazil's Chamber of Deputies approved bill 3729/2004 (1, 2), which essentially abolishes environmental licensing. The procedural changes outlined by the bill will have catastrophic effects on Brazil's environment. The February 2021 takeover of both houses of

Congress by a coalition of parties supporting President Jair Bolsonaro's positions on the environment (3) practically guarantees that the bill will soon be approved by the Federal Senate and then signed by Bolsonaro. Nevertheless, efforts to influence the Senate vote, in addition to legal challenges, can and must continue.

The bill creates a new "general law for environmental licensing" that allows any project, including highways, ports, railways, and large dams, to be built under a kind of self-licensing by means of a mere "declaration of adhesion and commitment" by the proponent affirming intention to abide by requirements established by the licensing authority. This means that licenses will be issued automatically without any analysis by technical staff in the environmental agencies. For some types of projects, even this token declaration will be unnecessary, including projects for agriculture (and biofuels), cattle ranching, low-voltage electricity distribution, and water and sewage treatment systems. The bill essentially eliminates public participation in the process, as well as the roles of agencies such as the Chico Mendes Institute of Biodiversity Conservation and the National Foundation of the Indian, which are responsible, respectively, for conservation units (protected areas for biodiversity) and for guaranteeing rights of Indigenous peoples.

One of the first Amazonian infrastructure projects likely to benefit from the new licensing procedures is the planned reconstruction of the environmentally disastrous Highway BR-319, which, together with its planned side roads, would open a vast area of Amazonia to deforestation (4). Amazon deforestation contributes to climate change and loss of ecosystem services with consequences for Brazil and for the entire world. The effective end to environmental licensing will make it much more difficult for countries importing Brazilian commodities to identify imports whose production and transport are not tied to deforestation and associated land grabbing and violation of the rights of traditional peoples (5, 6).

The vice-president of Brazil's Senate has announced the intention to hold public hearings before the vote on the bill (7). The Federal Public Ministry (a public prosecutor's office for defending the rights of the people) has analyzed the bill and considers it unconstitutional (8). This is important in both the legislative and the legal battles but is no guarantee of the bill's defeat in either the legislature or the courts. In addition to discussion in

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the Senate, it is important that the bill be discussed transparently with the citizens of Brazil, who should be aware of the impacts of approval.

Bills such as this one, which has been pending in congressional committees since 2004, can suddenly surge forth for a plenary vote when the political climate is favorable, as it is now. Almost all bills presented for a plenary vote are passed, and the key decision is in the hands of the president of the chamber in bringing a bill to the floor. This presents an opportunity for influence from abroad, given that the presidencies of both houses are controlled by the “ruralist” voting block that represents agribusiness. Brazil’s agribusiness leaders are sensitive to reputational risks that can cause countries, companies, and consumers to boycott or impose conditions on Brazilian commodities.

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TECHNICAL COMMENT ABSTRACTS

Comment on “Individual heterozygosity predicts translocation success in threatened desert tortoises”

Philip W. Hedrick

Scott *et al.* (Reports, 27 November 2020, p. 1086) suggest, on the basis of conclusions obtained from a desert tortoise

reintroduction program, that higher genomic heterozygosity should be used to identify individuals for successful translocation. I contend that this recommendation is questionable given these relocated tortoises’ unknown origin, their high mortality, insufficient data on resident tortoises and other components of fitness, and potential allelic dropout.

Full text: [dx.doi.org/10.1126/science.abg2673](https://doi.org/10.1126/science.abg2673)

Response to Comment on “Individual heterozygosity predicts translocation success in threatened desert tortoises”

Peter A. Scott, Linda J. Allison, Kimberleigh J. Field, Roy C. Averill-Murray, H. Bradley Shaffer Hedrick brings up several potential concerns that he feels challenge or limit our main finding. Hedrick does not comment on our empirical results, but rather argues that several factors may confound or invalidate our conclusion. Many of these concerns focus on unknown ecological aspects of the translocated tortoises, but we believe there is no reason to conclude that they bias the results or interpretation as presented in our original paper.

Full text: [dx.doi.org/10.1126/science.abg3199](https://doi.org/10.1126/science.abg3199)

Comment on “Individual heterozygosity predicts translocation success in threatened desert tortoises”

Bengt Hansson, Hernán E. Morales, Cock van Oosterhout

Scott *et al.* (Reports, 27 November 2020, p. 1086) bring much-needed attention to species conservation by demonstrating heterozygote superiority among translocated tortoises. However, we believe that their recommended heterozygosity decision rule risks taking conservation genomics backward. We argue that their advice could misguide conservation management aimed at establishing viable populations, and that it can be improved by also assessing the genetic load.

Full text: [dx.doi.org/10.1126/science.abh1105](https://doi.org/10.1126/science.abh1105)

Response to Comment on “Individual heterozygosity predicts translocation success in threatened desert tortoises”

Peter A. Scott, Linda J. Allison, Kimberleigh J. Field, Roy C. Averill-Murray, H. Bradley Shaffer Hansson *et al.* argue that our main finding could provide an overly simplistic metric for maximizing genetic rescue. They agree that translocating the most genetically diverse individuals led to a large increase in translocated tortoise survival, but recommend instead moving individuals that have a low genetic load and the greatest representation of metapopulation diversity. Their recommendation is based on specific model assumptions and fitness effects that are often unknown and are not generalizable to many endangered species applications.

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Science

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Rebecca R. Helm, Nichola Clark, Harriet Harden-Davies, Diva Amon, Peter Girguis, Cesar Bordehore, Sylvia Earle, Mark J Gibbons, Yimnang Golbuu, Steven H. D. Haddock, Jonathan D. R. Houghton, Jamileh Javidpour, Douglas J. McCauley, Lance Morgan, David Obura, Evgeny A. Pakhomov, Kylie A. Pitt, Jorge Jimenez Ramon, Rashid Sumaila and Jean-Baptiste Thiebot

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