RETRACTION
of Research Article "Integrative phylogenomics positions sponges at the root of the animal tree"

On 13 November 2025, *Science* published the Research Article "Integrative phylogenomics positions sponges at the root of the animal tree" by Jacob L. Steenwyk and Nicole King (*1*). The authors alerted us that errors in the analysis pipeline had affected the results to an extent that they are no longer reliable. Two aspects of the data analysis introduced artifacts. First, an imbalance between the number of sponges and ctenophores in the dataset biased one of the scoring metrics, thereby influencing the outcomes. Second, part of the analysis involved collapsing internal nodes, which was not properly accommodated by the software used. The authors thank Casey W. Dunn and colleagues for bringing this to their attention, as detailed in an eLetter and in Steenwyk and King's eLetter Response, both available at https://www.science.org/doi/10.1126/science.adw9456#elettersSection. Given these issues, both authors have requested a Retraction. *Science* is therefore retracting the Research Article.

H. Holden Thorp, Editor-in-Chief, *Science*

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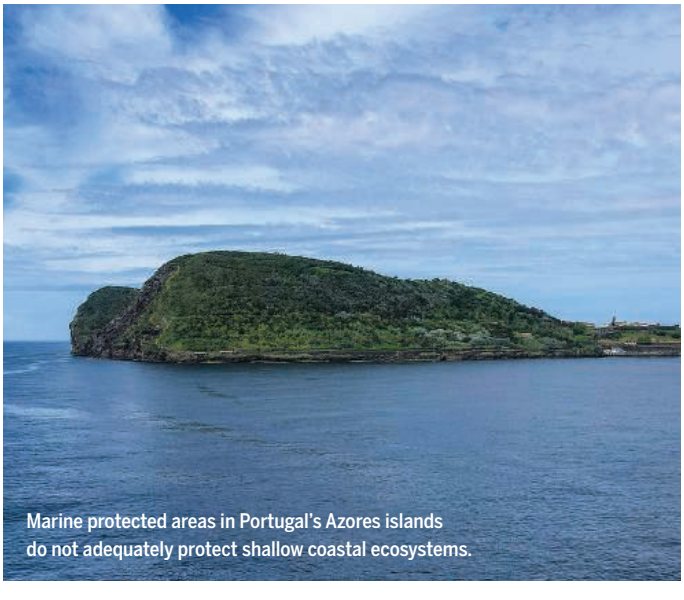
Ineffective marine protected areas in Azores

The Azores islands, an autonomous region of Portugal, are a volcanic archipelago in deep waters, located above large seamounts in the Atlantic Ocean (*1*). The islands are considered a biodiversity hotspot of endemic corals; hydrothermal vent ecosystems; and many species of fishes, whales, dolphins, sharks, and rays (*2*). Beginning on 1 January, the Azores government increased its marine protected areas (MPAs) by 30% in an effort to meet the European Union conservation target ahead of schedule (*3*). However, the newly established MPAs will not protect the Azores' fisheries or vulnerable coastal ecosystems.



Marine protected areas in Portugal's Azores islands do not adequately protect shallow coastal ecosystems.

PHOTO: JOÃO BERNARDO BARREIROS

Most of the Azores' MPAs are in deep waters, and none adequately protects shallow coastal ecosystems, where most fishing biomass is concentrated (*4*, *5*). Moreover, only about half of the recently designated MPAs, which are in seas where fishers target highly mobile, pelagic fish species, such as tuna (*6*), are classified as no-take zones. This decision—to increase MPAs but to cover only deep-sea areas and not fully prohibit fishing—sidelines decades of local marine science (*4*, *7*, *8*). Meanwhile, weak enforcement of land-use planning and pollution regulations on the islands continues to threaten coastal water quality (*9*, *10*).

Other countries have also presented a bold conservation image to the international community but have failed to support their claims with the underlying protected area design. For example, the UK's Chagos Archipelago and Pitcairn islands, France's New Caledonia, and the US's Pacific Remote Islands all remain inadequately protected (*11*). Worldwide, political and economic interests, short electoral cycles, and corporatism often override evidence-based conservation measures (*12*).

Effective biodiversity protection of the marine ecosystems of the Azores and elsewhere, including appropriately designed MPAs, requires governance structures grounded in science, transparent management, and meaningful participation of stakeholders (*2*). Rather than being driven by political considerations and narrow economic interests, MPAs should be established in geographic areas where protection would demonstrably benefit biodiversity and support long-term ecological and socioeconomic resilience.

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Halt illegal cyber tiger trade in Asia

Tigers (*Panthera tigris*), one of the iconic big cats in Asia, are listed as Endangered on the International Union for Conservation of Nature (IUCN)'s Red List of Threatened Species (*1*). As a result of habitat loss, human-felid conflicts, and poaching, the population of mature wild tigers declined from about 100,000 in 1900 to an estimated 3140 in 2021 (*1*). Asian governments have implemented measures to halt the illegal tiger trade, but as traditional markets have shut down, online trafficking has proliferated. To protect

Illegal online trading increasingly threatens Asian big cats such as tigers (*Panthera tigris*).

PHOTO: MARION VOLLBORN/BIA/MINDEN PICTURES

tigers and other big cats, Asian countries should increase efforts to shut down illegal online markets.

In Asia and beyond, there is a long history of demand for medicinal and decorative big cat parts and derivatives, such as teeth, pelts, and bones (*2*–*4*). To address poaching and illegal international trade—the primary and imminent threats to wild tigers' survival (*3*)—Asian governments have legalized tiger farming to meet the market demand and have cracked down on organized wildlife trafficking crimes (*4*). Between January 2000 and June 2025, wildlife enforcement officers seized more than 3808 illegally trafficked tigers, about 80% of which were from 13 Asian tiger-range countries (*3*).

However, despite decades of regulatory and enforcement efforts, the illicit tiger trade continues to grow. South Africa's decision to halt the export of lion parts (*5*), preference for wild tiger products over farmed ones (*6*), and overexploitation feedback loops (*4*) have contributed to increasing demand for wild tigers. To evade regulations, markets have evolved.

Illegal wildlife trade now thrives on open e-commerce websites (*7*). Esoteric cyber trades are increasingly conducted on social media platforms and through courier companies and logistics industries (*8*). In 2016, about 300,000 illicit online wildlife advertisements were found and removed by the Asian internet company Tencent (*7*). In addition, traffickers and criminal networks have begun to exploit the dark web (*9*), a network of sites that requires a specific browser to view and makes tracking activities difficult.

Asian governments should establish a platform to share information about illegal activities and jointly fight against unauthorized tiger trade on both e-commerce websites and the dark web. Moreover, because protecting tigers may lead to a shift to illegal online trade of African lions (*10*) and South American jaguars (*11*), policy-makers should develop an integrated strategy to protect not only tigers but all big cats. Finally, to improve the tracking of illegal wildlife cyber trade, authorities in trade hotspots, such as the Sino-Vietnamese border, the Russian Far East, and Central Africa (*2*), should regularly deploy real-time detection of environmental DNA (*12*).

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