

Brazil's preventable bridge disasters

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SCIENCE 17 Nov 2022 Vol 378, Issue 6621 p. 718 DOI: 10.1126/science.adf2868

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Edited by Jennifer Sills

Editorial Retraction

On 21 July 2017, *Science* published the Report "Chiral Majorana fermion modes in a quantum anomalous Hall insulator-superconductor structure" by Q. L. He *et al.* (1). Readers who failed to reproduce the findings requested raw data files from the authors, which they provided. Subsequently, the provenance of the raw data came into question; additionally, an analysis of the raw and published data revealed serious irregularities and discrepancies. These issues have caused the editors at *Science* to lose all confidence in the conclusions of the paper, and we are therefore proceeding with an Editorial Retraction. Authors A. L. Stem, J. Wang, and B. Lian agree with this decision. Authors Q. L. He, L. Pan, X. Che, G. Yin, E. S. Choi, K. Murata, X. Kou, Z. Chen, T. Nie, Q. Shao, Y. Fan, K. Liu, J. Xia, and K. L. Wang disagree with this decision. Authors E. C. Burks and Q. Zhou did not respond. Author S.-C. Zhang is deceased.

This Retraction replaces the Editorial Expression of Concern posted on 16 December 2021 (2).

H. Holden Thorp
Editor-in-Chief

REFERENCES AND NOTES

1. Q. L. He *et al.*, *Science* **357**, 294 (2017).
2. H. H. Thorp, *Science* **374**, 1454 (2021).

10.1126/science.adf7575

Brazil's preventable bridge disasters

In October, a second bridge collapsed within 10 days on Brazil's controversial BR 319 highway (1), as biologists predicted could happen (2). Bridges collapse regularly in Brazil, and the events are often associated with flooding (3). Brazil's environmental legislation theoretically protects locations that are likely to flood from development, but a legal loophole allows infrastructure projects to proceed if they are considered to be in the public interest. If Brazil's government does not take action to restrict use of the loophole, preventable disasters will continue to occur.

Brazilian Law 12,651, known as the Forest Code (4), was enacted to prevent natural disasters and protect

infrastructure. The legislation designates Permanent Protection Areas around water bodies to guarantee the health of riparian areas that can buffer floods. According to the law, construction is forbidden in these important ecosystems. The law also protects riparian systems in the Amazon, which has heavy rainfall, fragile soils, and often superficial water tables.

Earth-moving companies are the primary beneficiaries of the law's loophole. The companies argue that the cost savings of bulldozing earthen access ramps across protected riparian areas justifies the added risks. However, the embankments they build funnel the main flow of flood waters around the pylons of bridges, increasing the pressure and the likelihood of collapse. In some cases, the bridge holds up and only the access ramps are washed away, after which the earth-moving companies are paid to restore the road. The companies benefit, perhaps unwittingly, but the economy and local population suffer.

The Forest Code is good, evidence-based policy, but it must be enforced wisely to maximize its impact. The loophole was included so that infrastructure truly in the public good, such as bridges required for access, could be constructed in the riparian zone. The policy was not designed to license the wholesale destruction of protected areas, along with their essential ecosystem functions in flood mitigation. Brazil must acknowledge that it is almost

never in the public interest to destroy Permanent Protection Areas and risk provoking disasters.

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2. C. Rosa *et al.*, *Aquat. Conserv. Mar. Freshw. Ecosys.* **31**, 1548 (2021).
3. "Queda de pontes e viadutos no Brasil," *Folha de São Paulo* (2018); <https://fotografia.folha.uol.com.br/galerias/1617195713692955-queda-de-pontes-e-viadutos> [in Portuguese].
4. Câmara dos Deputados, "Legislação Informatizado - Lei nº 12.651, de 25 de maio de 2012 - publicação original" (2012); <https://www2.camara.leg.br/legin/fed/lei/2012/lei-12651-25-maio-2012-613076-publicacaooriginal-136199-pl.html> [in Portuguese].

10.1126/science.adf2868

Welcoming Taiwan's diaspora scientists

Academia Sinica, the highest research academy in Taiwan, recently announced 19 newly elected Members and 3 Honorary Members (1) after a 2-year pandemic delay. Because in 2020, the Taiwanese authority declared that only Taiwanese citizens could be nominated as Members of Academia Sinica (2), another five candidates remain



A loophole has allowed construction in Brazil's protected areas, contributing to multiple bridge collapses.

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References and Notes

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