

With biodiversity under threat, scientists suggest the need for a new biorepository—on the moon

July 31 2024



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With numerous species facing extinction, an international team of researchers has proposed an innovative solution to protect the planet's

biodiversity: a lunar biorepository. This concept, detailed in a [recent article](#) in the journal *BioScience*, is aimed at creating a passive, long-lasting storage facility for cryopreserved samples of Earth's most at-risk animal species.

Led by Dr. Mary Hagedorn of the Smithsonian's National Zoo and Conservation Biology Institute, the team envisions taking advantage of the moon's naturally [cold temperatures](#), particularly in permanently shadowed regions near the poles, where temperatures remain consistently below -196 degrees Celsius. Such conditions are ideal for long-term storage of biological samples without the need for [human intervention](#) or power supplies, two factors that could threaten the resilience of Earth-based repositories. Other key advantages of a lunar facility include protection from Earth-based [natural disasters](#), climate change, and geopolitical conflicts.

An initial focus in the development of a lunar biorepository would be on cryopreserving animal skin samples with fibroblast cells. The author team has already begun developing protocols using the Starry Goby (*Asterropteryx semipunctata*) as an exemplar [species](#), with other species to follow. The authors also plan to "leverage the continental-scale sampling that is currently underway at the U S National Science Foundation's National 190 Ecological Observatory Network (NEON)" as a source for future fibroblast cell development.

Challenges to be addressed include developing robust packaging for space transport, mitigating radiation effects, and establishing the complex international governance frameworks for the repository, and the authors for broad collaboration among nations, agencies, and international stakeholders to realize this decades-long program. Next steps include expanding partnerships, particularly with space research agencies, and conducting further testing on Earth and aboard the International Space Station.

Despite the challenges to be overcome, the authors highlight that the need for action is acute: "Because of myriad anthropogenic drivers, a high proportion of species and ecosystems face destabilization and extinction threats that are accelerating faster than our ability to save these species in their natural environment."

More information: Mary Hagedorn et al, Safeguarding Earth's Biodiversity By Creating a Lunar Biorepository, *BioScience* (2024). [DOI: 10.1093/biosci/biae058](https://doi.org/10.1093/biosci/biae058)

Provided by American Institute of Biological Sciences

Citation: With biodiversity under threat, scientists suggest the need for a new biorepository—on the moon (2024, July 31) retrieved 31 July 2024 from <https://phys.org/news/2024-07-biodiversity-threat-scientists-biorepository-moon.html>

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