

Position Paper on IUCN Policy on synthetic biology

Synthetic biology represents a groundbreaking field with great potential to contribute to conservation efforts, offering innovative tools to address biodiversity loss, restore ecosystems, and mitigate climate impacts. Recognizing its relevance to nature conservation, [the International Union for Conservation of Nature \(IUCN\)](#) is currently developing a dedicated policy initiated by [Resolution 123](#) and to be adopted at the [2025 World Conservation Congress](#).

This policy has been developed through a transparent, member-driven process. It draws on wide consultation, including input from a randomly selected group of IUCN members, a multi-stakeholder Working Group, and external peer reviews. The resulting [draft](#) reflects the diverse perspectives of IUCN's membership and aims to provide balanced, science-based guidance on synthetic biology.

Response to motion 133 on a moratorium on genetically engineered wild species

In parallel to the motion to adopt this policy, a group of IUCN non-governmental Members submitted [Motion 133](#), which calls for a moratorium on the use of synthetic biology tools, including engineered gene drives and other genetic modifications, in wild species within natural ecosystems. While the proponents cite the need for caution when researching and implementing conservational tools, the motion diverges significantly from the proposed IUCN policy on synthetic biology, potentially closing the door to innovative conservation solutions and limiting governments' decision-making authority.

Motion 133 departs from existing international decisions and disrupts the inclusive and transparent process already underway within IUCN. It also risks limiting the ability of national authorities to assess and explore potential conservation tools. IUCN's role is to support dialogue, provide scientifically grounded guidance, and respect the diversity of contexts and approaches among its members. An approach that enables responsible research, guided by transparency, scientific evidence and national discretion, offers a more constructive path forward and promising outcomes.

- **The call for a moratorium reflects the view of a narrow subset of IUCN members:** Only a limited number of national and international non-governmental organizations co-sponsored this motion. This stands in stark contrast to the proposed IUCN policy on synthetic biology, which was formally requested by members and followed the principles established in the Resolution 123. It has been developed through a transparent and inclusive process, including expert peer reviews and broad engagement from IUCN constituents.
- **IUCN is an advisory body and does not have the mandate to dictate regulation or prohibit activities:** Decisions on whether and how to research, develop, or use synthetic biology tools rest with national authorities. IUCN's role is to provide technical guidance, support the development or improvement of relevant legislation, and help strengthen members' institutional capacities.

- **The moratorium motion is redundant:** The proposed IUCN policy on synthetic biology reinforces the authority of national governments to adopt precautionary measures and make final decisions on the research and use of synthetic biology products, based on their own case-by-case assessment. In addition, the call for a moratorium stands in tension with decisions already made under the Convention on Biological Diversity (CBD), where Parties, including many IUCN Member States, explicitly rejected calls for a moratorium on synthetic biology research and gene drive releases in both 2016 and 2018.
- **The moratorium motion would limit informed decision-making:** Releases for the purpose of evaluation are often necessary to generate the data needed for informed decisions about synthetic biology. Preventing these would stall progress and hinder countries' ability to evaluate potential benefits for conservation or public health. Imposing a broad moratorium at this stage could also discourage investment, limit scientific exploration, and reduce opportunities for inclusive dialogue on how these technologies might help address biodiversity loss.

Motion 087: The IUCN Policy on Synthetic Biology

IUCN plays a key role in shaping global conservation efforts, and the policy will serve as an essential reference for governments, organizations, and other stakeholders. The Network welcomes the transparent and inclusive approach that has characterized the policy development process. The Citizens' Assembly and peer review opportunities enabled broad participation, knowledge-sharing, and integrating diverse perspectives to guide policy formulation.

It is critical that the IUCN policy builds on established agreements and frameworks which

recognize the transformative potential of synthetic biology approaches and the need for innovation to reverse the current biodiversity crisis. To encourage coherence with the decisions taken by the Convention on Biological Diversity (CBD), the policy should be balanced and scientifically grounded, supporting responsible research and safe application of these technologies for a more sustainable future. It should also focus on the issues and areas within IUCN's scope and mandate and offer flexibility, in acknowledgement of the different approaches IUCN Member States may take to the regulation and use of synthetic biology products in their jurisdictions.

Innovation is key to the success of conservation efforts

As noted in the [IUCN Assessment of Synthetic Biology and Biodiversity Conservation](#), research in the field of synthetic biology is ongoing. The state of knowledge is growing rapidly, offering possible tools to complement existing methods to stop extinctions, improve climate change adaptation and reduce pollution:

- To restore genetic diversity in endangered species, researchers are leveraging the potential of biobanking and cloning. In 2020, the [first-ever cloned black-footed ferret](#) was born from cryopreserved cells from the 1980s, introducing previously lost genetic variation back into the population to enhance resilience against disease and environmental changes. This represents a significant step in safeguarding the future of the black-footed ferret and other species by overcoming the genetic challenges that have hindered recovery efforts to date.

- To reduce water pollution, synthetic biology is being used to clean wastewater by using a granular material capable of attracting micropollutants and chemicals. The [World Health Organization](#) estimates that to achieve universal coverage with basic drinking water services, the current rate of progress must increase sixfold as water scarcity is exacerbated by climate change, population growth, and urbanization.
- To reduce coral reef degradation due to climate change, scientists are researching the possibility of modifying coral genomes to better withstand rising ocean temperatures, acidification, and pollution. Corals are an essential source of nutrients for marine food chains, provide habitats for many marine organisms, and protect coastlines from wave action, among many other important ecosystem functions. In 2024, three-quarters of Australia's Great Barrier Reef were hit by a major coral bleaching event likely caused by heat stress, according to the [Great Barrier Reef Marine Park Authority](#).
- Researchers are also investigating the use of gene drive approaches as an additional tool to control invasive alien species (IAS), alongside existing methods. Present research is focused on mice and rats, the primary cause of extinctions on islands. Using data from the [IUCN Red List of Threatened Species](#), the [2023 Assessment Report](#) of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) found that IAS have been a significant driver of 60% of documented plant and animal extinctions. Similar gene drive strategies are also being considered to protect bird species threatened by avian malaria.

The IUCN synthetic biology policy should be consistent with existing national and international frameworks.

The current draft has made significant progress in offering a balanced perspective that aligns with existing international frameworks such as the CBD and the Cartagena Protocol, which already provide robust frameworks for the assessment, regulation, and governance of synthetic biology applications. The draft emphasizes the need for science-based and case-by-case risk assessment, to reflect the diversity and complexity of synthetic biology products and the environments in which they may be applied. By recognizing the benefits and risks associated with different products of synthetic biology, the draft echoes international best practices in this field.

The policy should recognize existing impact assessment methodologies. These are well established and scientifically sound. There is no need to reinvent the wheel.

When assessing the impacts of synthetic biology products, national authorities can make use of different and complementary methodologies to ensure all relevant aspects are considered before their research, development or use. Environmental or Ecological Risk Assessment (ERA) is a key component of impact assessments and essential to help regulators make informed decisions. However, ERA is not the only component of an impact assessment. To account for socio-economic and cultural aspects, for example, experts can use the Environmental, Social, and Health Impact Assessment (ESHIA) outcomes, which are often mandated in many countries, in addition to ERAs. The combination of different methodologies is key to ensure synthetic biology products are effective and safe. It is important to emphasize that while risks and benefits might be assessed separately as they entail different approaches and methodologies, both aspects are equally important to ensure well-informed decisions of any synthetic biology product. It is also key that the policy uses terms that are clearly

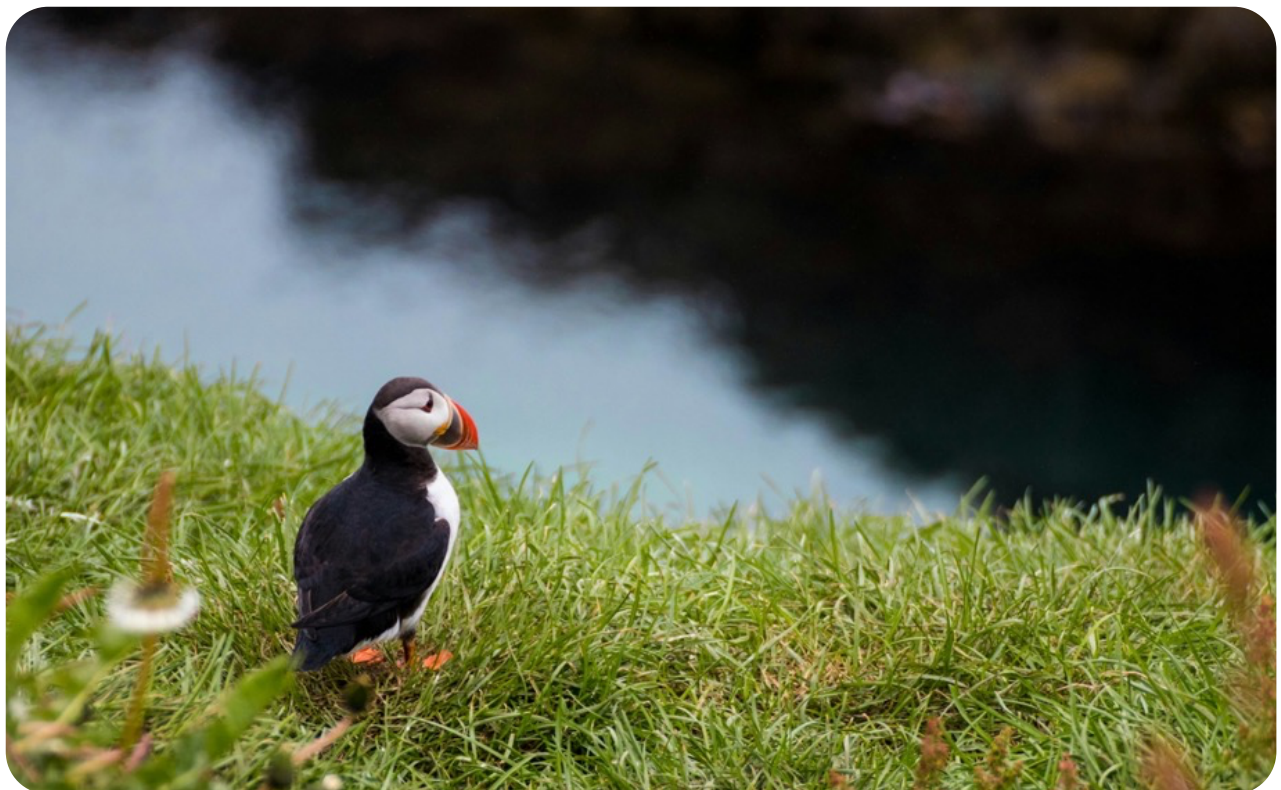
defined to ensure accuracy and prevent misinterpretation.

Synthetic biology is a diverse and dynamic field. It is not possible to establish a common, single cut-off-criteria to decide on whether to allow research or use all synthetic biology products.

There are many types of synthetic biology applications, each with different potential uses and contexts. A one-size-fits-all approach to determining whether to research or apply synthetic biology products is therefore not feasible. National authorities can decide whether to require specific permitting or authorization processes for different products of synthetic biology, in keeping with their national regulatory frameworks and legislation.

By framing the policy as complementary guidance to existing frameworks, IUCN boosts credibility and facilitates adoption by its Member States.

IUCN's role is advisory—offering guidance on best practices, strengthening Members' institutional capacities, and assisting in the development or improvement of relevant legislation. Much of the current draft is focused on the actions that States should take to ensure the responsible use of synthetic biology. By positioning the policy as guidance that complements rather than contradicts established agreements, such as those under the CBD to which its Member States are Party, IUCN can strengthen its credibility and ensure its recommendations are more readily implemented by national authorities. It should not aim to dictate how national authorities should conduct internal affairs, including risk assessments, stakeholder consultations, or liability and redress mechanisms.



The policy should recognize the importance of research in developing new tools to address biodiversity loss and emphasize the role that research plays in addressing uncertainties around specific applications of synthetic biology.

The draft interprets knowledge gaps and data deficiencies in synthetic biology applications as reasons to prohibit their use, rather than recognizing them as areas for further research. This undermines the fundamental purpose of

scientific inquiry and the ability to bridge these gaps. The policy must both distinguish between different products or areas of synthetic biology and acknowledge that the role of research is to address these knowledge gaps to ensure new conservation tools are effective and safe for use. The policy should recognize that different synthetic biology products are at different stages of research, development and use—many are no longer “new,” and existing knowledge has already addressed some of the initial uncertainties.

Despite progress, current conservation tools are failing to reverse biodiversity loss trends. Innovation is critical to deliver solutions on the time and scale necessary to overcome the current environmental crisis. The IUCN policy on synthetic biology conservation presents a critical opportunity to shape the responsible development and application of synthetic biology in nature conservation. By ensuring a balanced assessment of risks and benefits, recognizing scientifically sound methodologies and concepts, and building on existing frameworks, IUCN’s policy can help build a robust foundation for informed decision-making. Moving forward, IUCN’s guidance should remain adaptable, ensuring that future synthetic biology approaches are assessed fairly and effectively to maximize their positive impact on global conservation goals.