MORATORIUM NEEDED

Genetic engineering is being proposed as a tool to remove invasives, restore endangered species and bring extinct species back to life. Biotechnology companies also promise to develop genetically modified organisms (GMOs) to replicate "ecosystem services" that society needs, such as for food and fuel, removing our dependence on functioning ecosystems.

However, these proposals come with very serious risks, could alter entire ecosystems, and once released, cannot be recalled or reversed. Most often, these proposals also support corporate agendas.

> "If permanent, far-reaching and inheritable genetic modifications of wild organisms, which go far beyond previous human interventions, become a reality and are accepted as legitimate instruments of nature conservation, the idea of protecting nature turns into the idea of re-designing nature."

— FEDERAL AGENCY FOR NATURE CONSERVATION, FEDERAL REPUBLIC OF GERMANY, 2022[3]

We need a moratorium on genetically engineering species for release into the open environment.

A moratorium on genetically engineering wild species in natural ecosystems will be debated at the October 2025 World Conservation Congress of the International Union for Conservation of Nature (IUCN).

Take Action:

- **Join the campaign to stop the release of genetically engineered trees.**
- **Join the campaign for a moratorium on genetic engineering in the wild.**

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Canadian Biotechnology Action Network

Collaborative Campaigning for Food Sovereignty and Environmental Justice

WHAT IS GENETIC ENGINEERING?

Genetic engineering (genetic modification or GM) directly changes the genetic makeup of an organism, bypassing normal plant or animal reproduction to create new characteristics. Genetic engineering, including the more recent developments referred to as synthetic biology allow humans **unprecedented power over organisms and natural systems.**

Genetic engineering includes techniques that make changes to DNA by inserting genetic material from other organisms, or, in the case of genome editing, by introducing genetic material that performs "edits" within an organism's genome.

The processes of genetic engineering can be imprecise and create genetic errors, often resulting in unanticipated changes. For example, the CRISPR genome editing system can make unintended edits to the host's DNA at unexpected places, not just the target location. Genome editing can cause extensive deletions and complex re-arrangements of DNA, and unwanted DNA can also unexpectedly integrate into the host organism during the process.

Even small changes in a DNA sequence can have big effects.

All types of genetic engineering can cause unexpected and unpredictable effects because the functioning of genes is coordinated by a complex regulatory network that is still poorly understood. This means that it is not possible to predict the nature and consequences of all the interactions between altered genetic material and other genes within an organism. Such unintended effects, as well as the intended GM trait, can have an impact on environmental safety.

Unexpected traits can also be the product of gene-environment interactions and only later become apparent in an organism, for example, during times of environmental stress such as drought.

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“DE-EXTINCTION”

Can we bring extinct species back using genetic engineering?

In April 2025, the US biotechnology company Colossal Laboratories & Biosciences announced it had achieved a “de-extinction” of the dire wolf. The company claims it has “successfully restored a once-eradicated species” and says, “our team is proud to return the dire wolf to its rightful place in the ecosystem.”

The dire wolf went extinct over 10,000 years ago.

In reality, these animals are genetically engineered gray wolves. The company used genome editing to make 20 “edits” to 14 genes in gray wolves to replicate some known genetic characteristics of dire wolves (a dire wolf’s genome is 2.5 million DNA base pairs, encoding about 19,000 genes).

The company says the three living **genetically engineered wolves** are in a 2,000-acre secret location in the US, surrounded by a 10-foot fence.

> **“We’re going to call them de-extinct dire wolves. You can call them proxy dire wolves or Colossal dire wolves. Or, you can call them gray wolves with 20 edits that recreate functional dire wolves in the ecosystems of today.”**
>
> — BETH SHAPIRO, CHIEF SCIENCE OFFICER, COLOSSAL LABORATORIES & BIOSCIENCES

Colossal says it is also working to revive the woolly mammoth, the dodo and the Tasmanian tiger and says, “We are elevating expectations for de-extinction by rebuilding species to be stronger and more resilient than their predecessors.”

The International Union for Conservation of Nature says the term “de-extinction” is misleading and that such organisms should be referred to as “proxies.”[1]

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GENETICALLY ENGINEERED AMERICAN CHESTNUT

Can we restore endangered species with genetic engineering?

Researchers at the State University of New York College of Environmental Science and Forestry want government approval in the US and Canada to plant a genetically engineered (GE) American chestnut tree in forests.

They have genetically engineered an American chestnut that they claim can survive the blight that decimated populations in the 20th century. Their goal is to release this genetically engineered tree into the wild, to “restore” the endangered species by allowing it to cross-pollinate with remaining wild trees.

If approved, this GE tree would be **the first-ever genetically engineered plant released with the purpose of spreading freely through wild ecosystems**. It will be difficult or impossible to track where the GE tree spreads or recall it once released.

The GE chestnut’s release would be a **large-scale open-air experiment** because we do not know how it will impact other forest trees, plants and animals. The ability of this GM tree to function as intended, and its impacts on forest ecosystems, will only be known after decades, centuries, or millennia,

Field tests began in 2016 and, by 2023, The American Chestnut Foundation reported that the tests showed the GE tree does not work as intended.[2] The GE trees are not blight-tolerant, and are also short and have very low survival rates. However, the developers dispute the significance of the findings and continue to pursue approval, and the US government is close to allowing its release.

> **“We disagree with the concept that this is a restoration tree, and believe its release will contaminate the remaining population of American Chestnuts and result in possible greater harms.”**
>
> — CANADIAN CHESTNUT COUNCIL TO THE UNITED STATES DEPARTMENT OF AGRICULTURE, 2022.

cban.ca/trees

ENGINEERING ECOSYSTEMS

Can we remove invasive species with genetic engineering?

Gene drive organisms are being designed to push new genes through an entire population of a species in the wild. These genetically engineered organisms are proposed for release in the wild to alter, replace, or eliminate target populations or possibly entire species.

The technology aims to overcome natural patterns of inheritance to **“force” genetic modifications in wild species**. In a population, a mutation with no fitness benefit quickly disappears with the Mendelian inheritance rate of 50%, but a synthetic gene drive system with a near 100% inheritance rate ensures the spread of a trait, even if that trait has a clear fitness cost.

Theoretically, the technology could be used to **spread any genetic instructions through a wild population**. Gene drives are being proposed to remove invasive species by disabling vital genes and disrupting reproduction, either by causing sterility or altering sex ratios. For example, experiments in fruit flies disrupt an essential gene for development of females, causing all offspring to develop as males.

> **“Engineered gene drives alter interlinked, highly complex systems – cells, organisms, ecosystems and evolutionary dynamics – which means that the results and risks of their introduction are unlikely to be sufficiently predictable for safe use.”**
>
> – THE GENE DRIVE MONITOR PROJECT, GENEDRIVEMONITOR.ORG

Genetically engineering organisms in the wild, or eliminating populations, could disrupt whole ecosystems in ways that are difficult or impossible to predict. Because gene drives would be living, evolving organisms, they will also mutate and change over time. Once released, gene drive organisms **cannot be recalled**, and the changes they create in the genetic make-up of the target population are likely irreversible.

Despite the technical challenges and ecological risks, a great deal of energy and investment is behind an attempt to make this technology a reality.

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1 IUCN, IUCN SSC Guiding Principles on Creating Proxies of Extinct Species for Conservation Benefit, 2016.

2 The American Chestnut Foundation, Darling Performance Results, 2023. https://tacf.org/darling-58-performance/

3 Federal Republic of Germany, Federal Agency for Nature Conservation. Genetic engineering, nature conservation and biological diversity: Boundaries of design. Viewpoint. Bonn. 2022.