Synthetic Biology:

Conservation's Friend or Foe?

toronto ZOO

GUARDIANS OF WILD

Biotechnology for Conservation

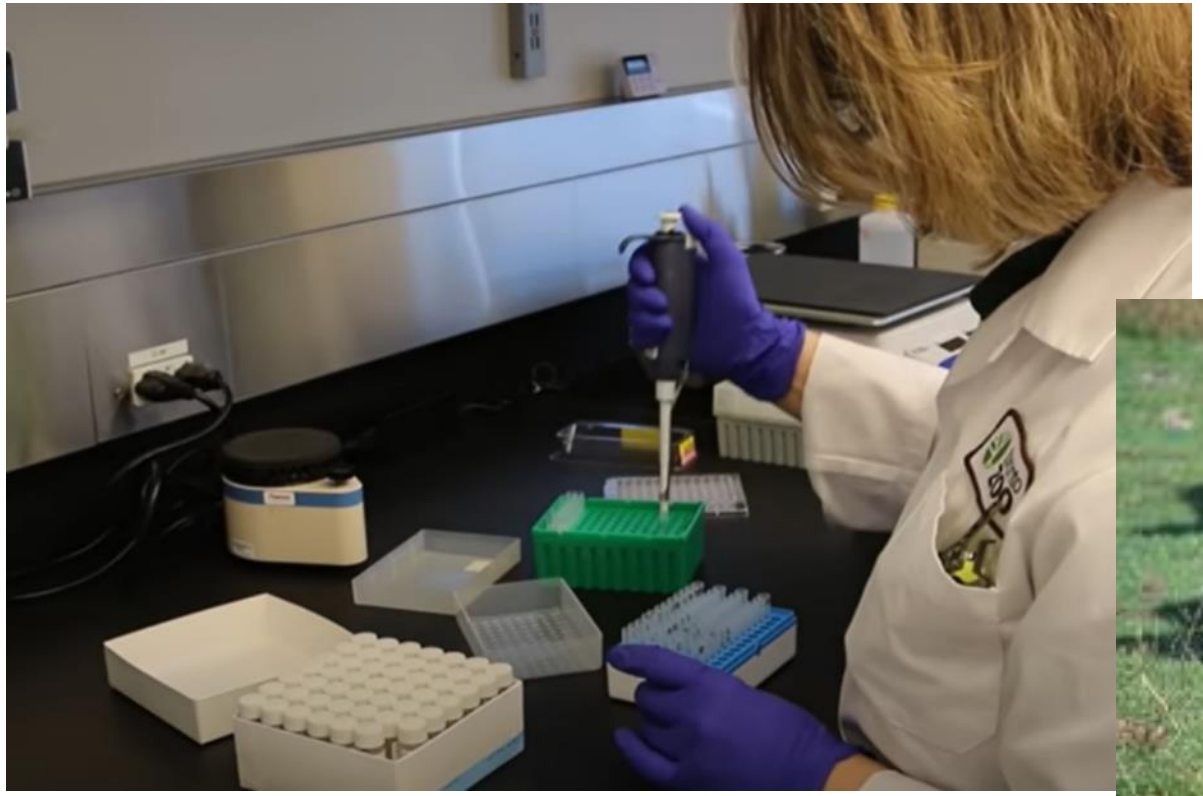
Species Monitoring:

- Genetic Identification
- Pregnancy Detection

Species Preservation:

- Cell Cryopreservation
- Artificial Insemination

Biotechnology for Conservation



A Growing Field of Discovery

Synthetic Biology

Re-design or create new biological systems for ‘useful’ purposes by engineering them to have new abilities.

Genome Editing

- Making small, precise changes to an organism’s existing DNA to achieve a specific outcome

Genome Writing

- Creating new DNA sequences to insert into existing chromosomes or synthetically generated chromosomes

De-Extinction

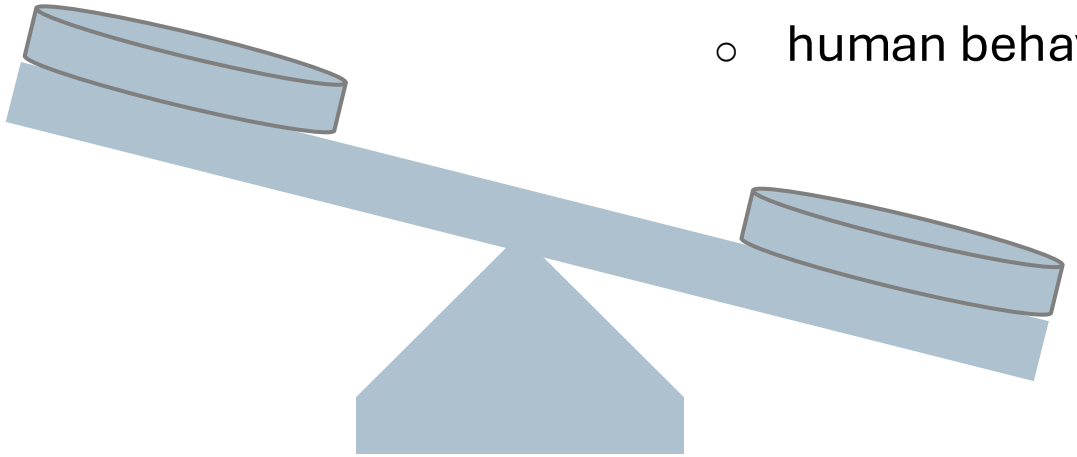
Cryopreserved DNA, tissues and reproductive cells, known as biobanking

Reference genomes, which are blueprints for an individual's genetic make-up

De-Extinction: Benefits vs Risks

- Restore damaged ecosystems and enhance ecosystem resilience

- Existing species and ecosystems
  - mutation rates, selective advantage, disease emergence
- ‘Synthesized’ species
  - individual and population welfare
- Conservation efforts
  - human behaviour and attitude



Why Should We Care?

Re-wilding in Canada

Lack of governance and standards

Invasion Biology

Corporate ownership of wildlife

Unintended Consequences

Why Should We Care?

IUCN Policy Development Working Group on Synthetic Biology in relation to Nature Conservation

Rue Mauverney 28
1196 Gland
CH-Switzerland

28 August 2024

NGOs urge IUCN to halt the development of its policy on synthetic biology in relation to nature conservation

Our Next Steps

PRIORITY INITIATIVES

The iconic victories we will achieve

These are the five priority areas for the next three years:

1. Save Canadian species by braiding traditional knowledge and conservation science to deliver biobanking, conservation breeding and translocation programs.
2. Establish international standards and Canadian priorities for the biobanking initiative.
3. Make the Zoo a must-see destination, delivering customized experiences and facilities resulting in increased attendance and community engagement.
4. Connect every student in Toronto, York and Durham, with a Zoo visit enabling them to discover conservation science experiences and make memories that last a lifetime.
5. Embrace an innovation culture to build the most technologically advanced Zoo in the world.

Our Next Steps

- Understand the synthetic biology landscape
- Raise awareness within the conservation community, Indigenous communities, and Canadian government and non-governmental organizations
- Prepare a white paper and scientific review of the literature
- Develop governance and technical standards
- Grow national global partnerships for responsible and inclusive biobanking

IUCN COMMISSION GROUP
IUCN SSC Animal Biobanking for Conservation Specialist Group

ASSOCIATION OF ZOOS & AQUARIUMS Biobanking Scientific Advisory Group

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Questions?

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