

The Utility of Accessioned Collections for Conservation Management of Endangered Species



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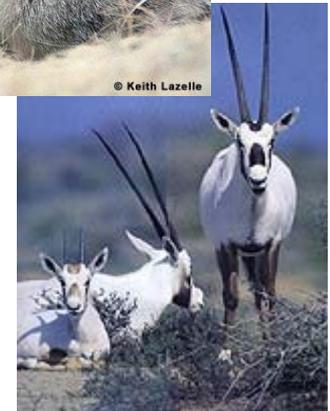
University of Florida

Bio of a Museum Collection End-User



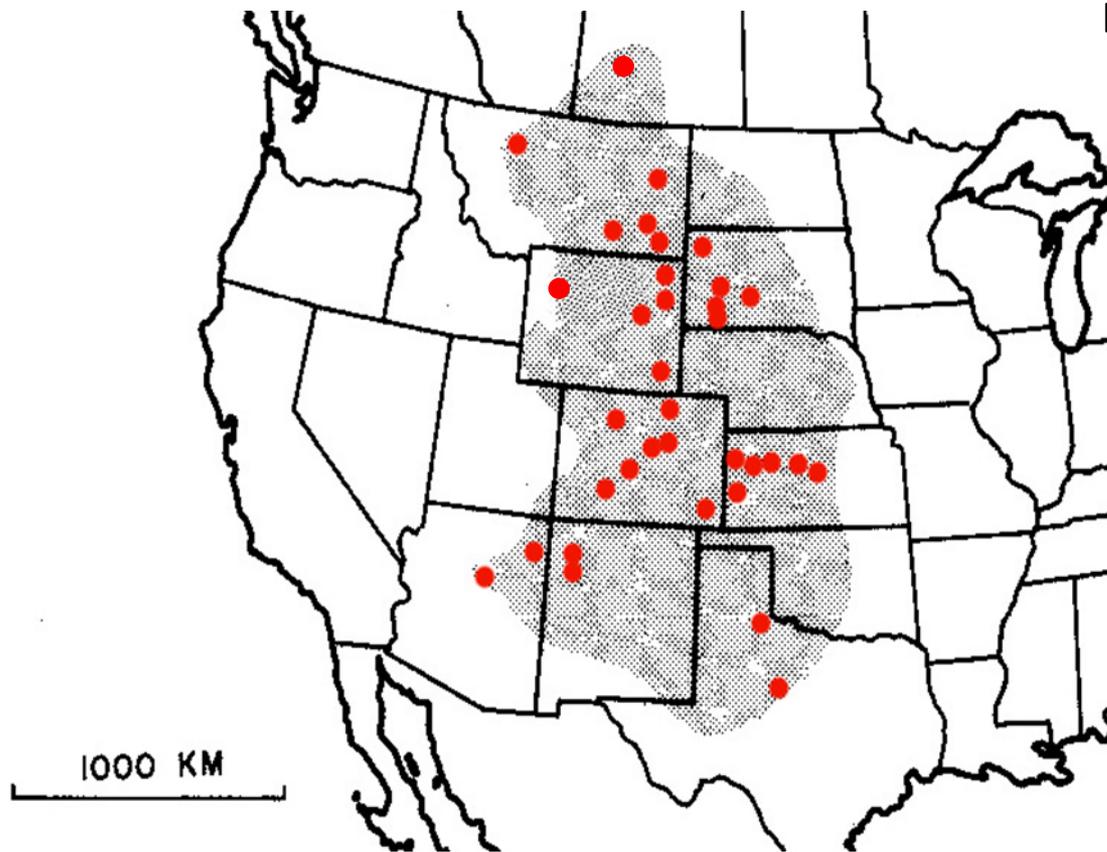
Conservation Management of Endangered Species

- Define
 - Distribution or Population information
- Manage
 - Natural history/critical habitat
- Protect
 - Forensics



How can natural history museums help?

Provide temporal and spatial breadth and resolution



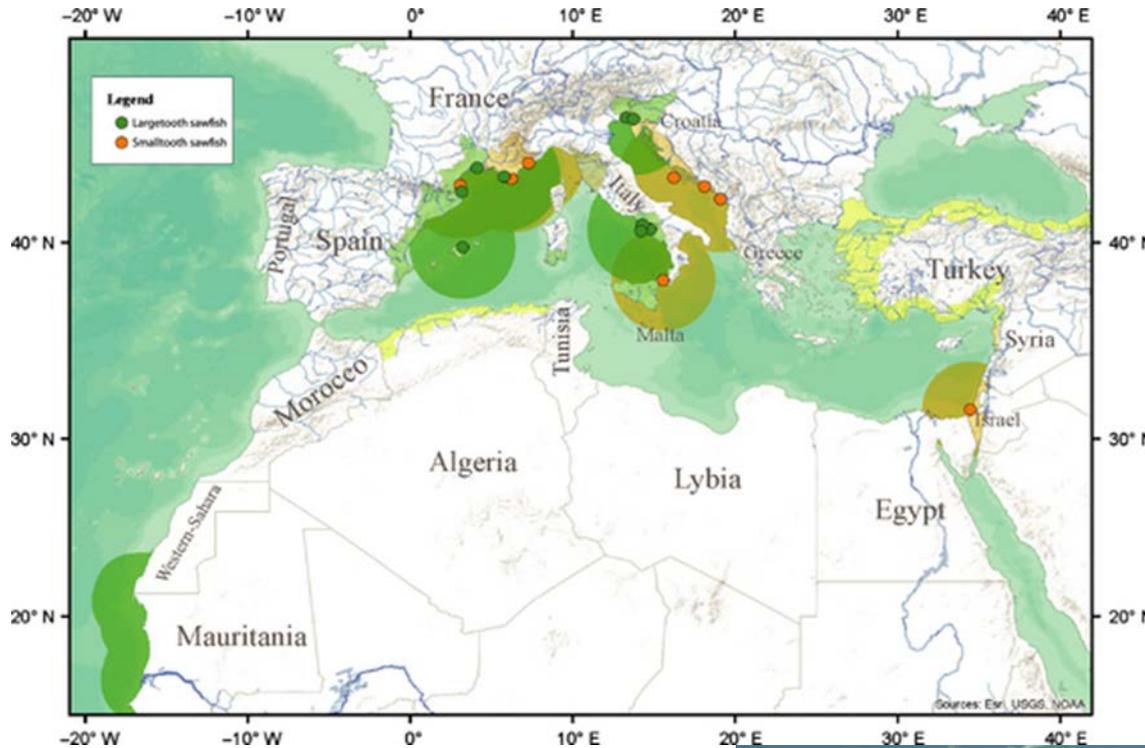
Black-footed Ferret, *Mustela nigripes*



From 1884 to 2009

Distribution

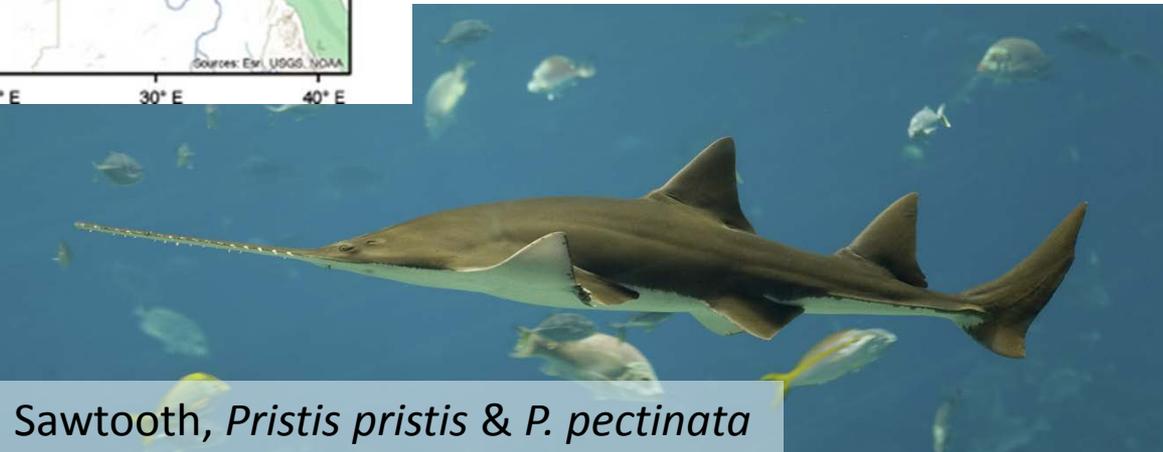
Range shifts, contractions, expansions



Ferretti et al. 2015

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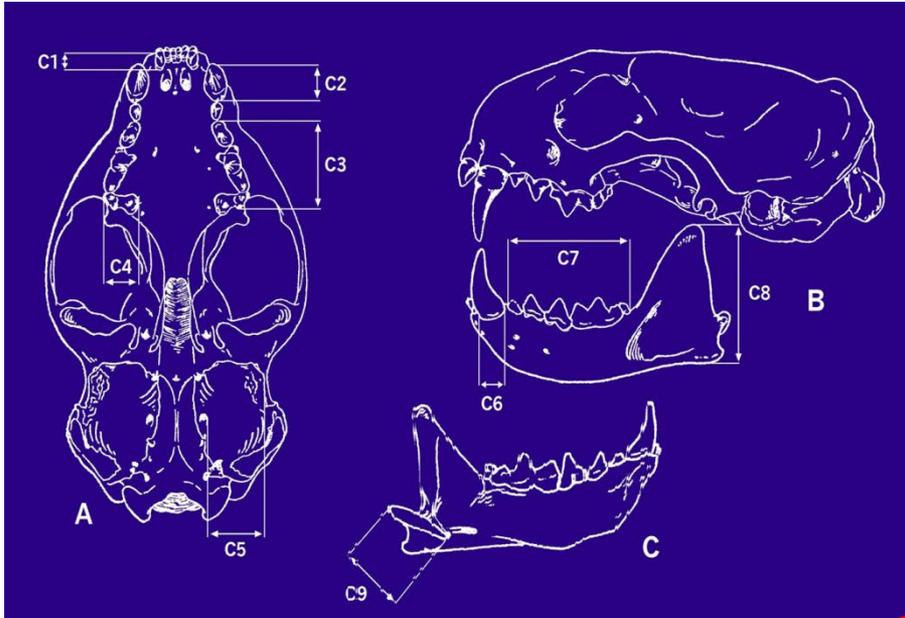
- 👤 Every accession counts
- 👤 Published holdings influence decision-making
- 👤 Small collections need assistance



Sawtooth, *Pristis pristis* & *P. pectinata*

Morphometrics

Taxonomy, functional anatomy, phenotype alteration



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- Keep collecting
- Keep digitizing

Wisely, Ososky, and Buskirk 2002

Wisely et al. 2005

Pre-captive

Large

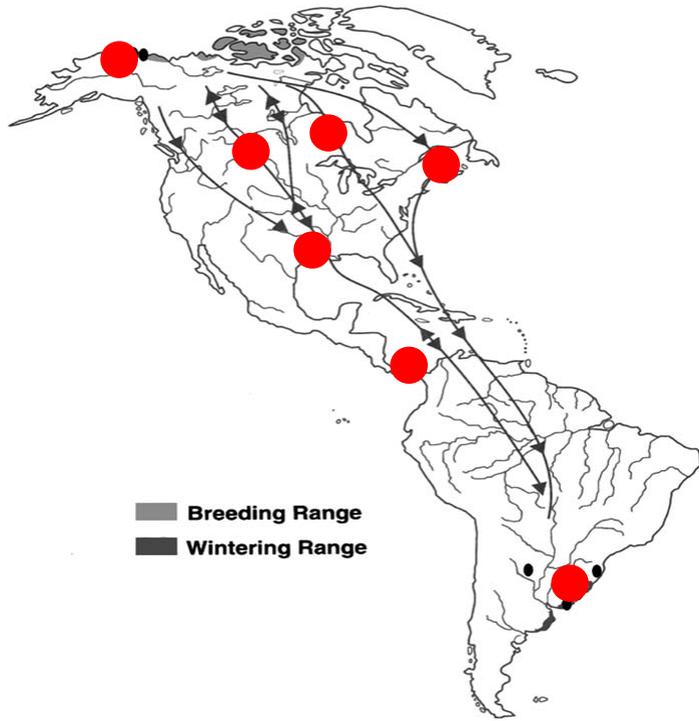
Captive
Small

Reintroduced

Large

Molecular Ecology

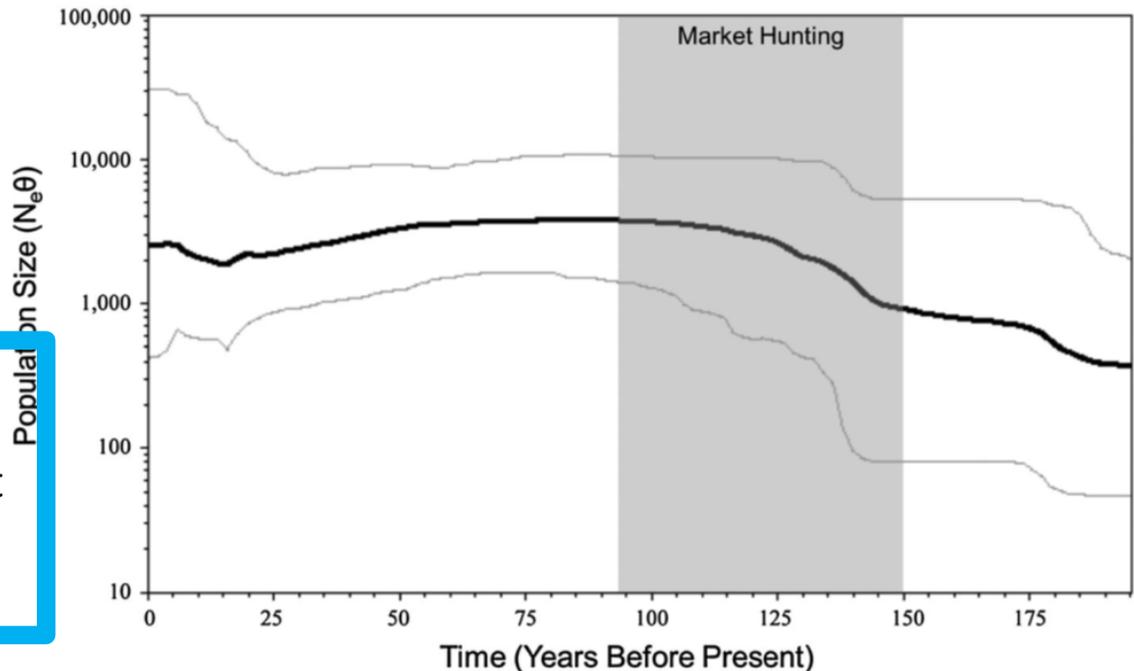
Distinct subpopulations, Population decline



Buff-Breasted Sandpiper
Calidris subruficollis

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- 👤 Sample the distributional extent
- 👤 Update destructive sampling policy



Assisted Breeding

With cryopreserved, accessioned collections



- Male gametes
- Female gametes
- Somatic cells



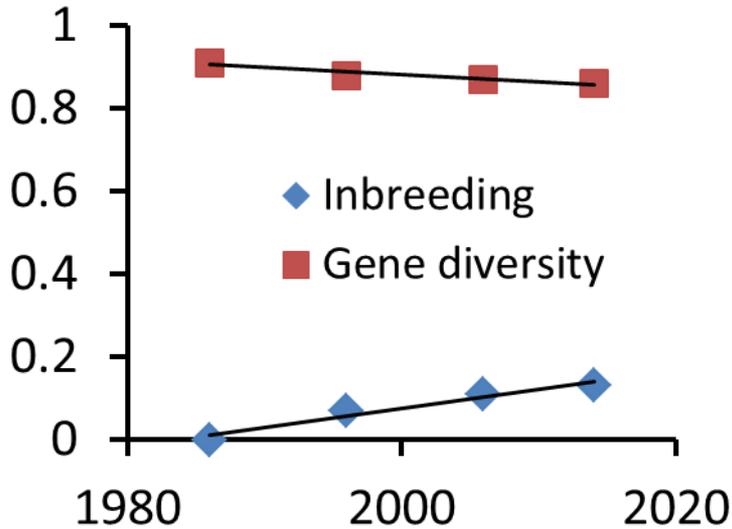
3 Institutions



Assisted Breeding for Conservation



Assisted Breeding in Black-footed Ferrets



Genetic diversity is dwindling



Dr. JoGayle Howard



Mike Lockhart

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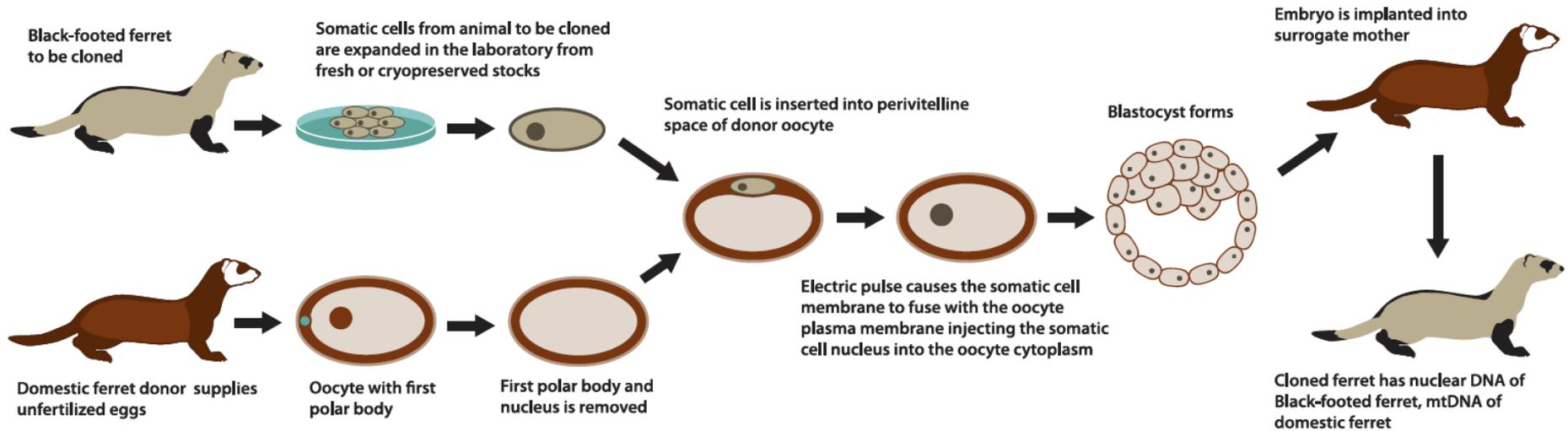
- GRB's are curated, accessioned collections of living cells
- Provide spatial and temporal breadth

- > 140 kits produced
- Slowed genetic drift
- Decreased inbreeding

Genome Resource Bank

21st Century Genetic Rescue of Endangered Species

Somatic Cell Nuclear Transfer



Resources

Research Labs

SSP Captive Breeding Facilities

FWS Recovery Team

Outside facilitator for Strategic Plan

Funding

Output

Activities

Participants

Test compatibility and feasibility of donated oocyte and nucleus

Test efficacy of methods to increase blastocyst survival

Test methods for producing a full term clonal organism

Evaluate clonal organisms for juvenile and adult abnormalities

Backcross clonal organisms to captive population

Develop clonal ancestors

Incorporate clonal lineage with captive lineage

Benchmark Research Lab

Research Lab w/ Animal Care Facility

Captive Breeding Specialists

Outcomes

Short-term

Medium-Term

Long-Term

Production of a viable blastocyst

Development of a protocol for successful production of healthy blastocysts

Production of a viable clonal offspring

Development of a protocol for producing healthy clonal offspring

Production of a lineage of healthy clonal offspring without donor oocyte cytoplasmic material

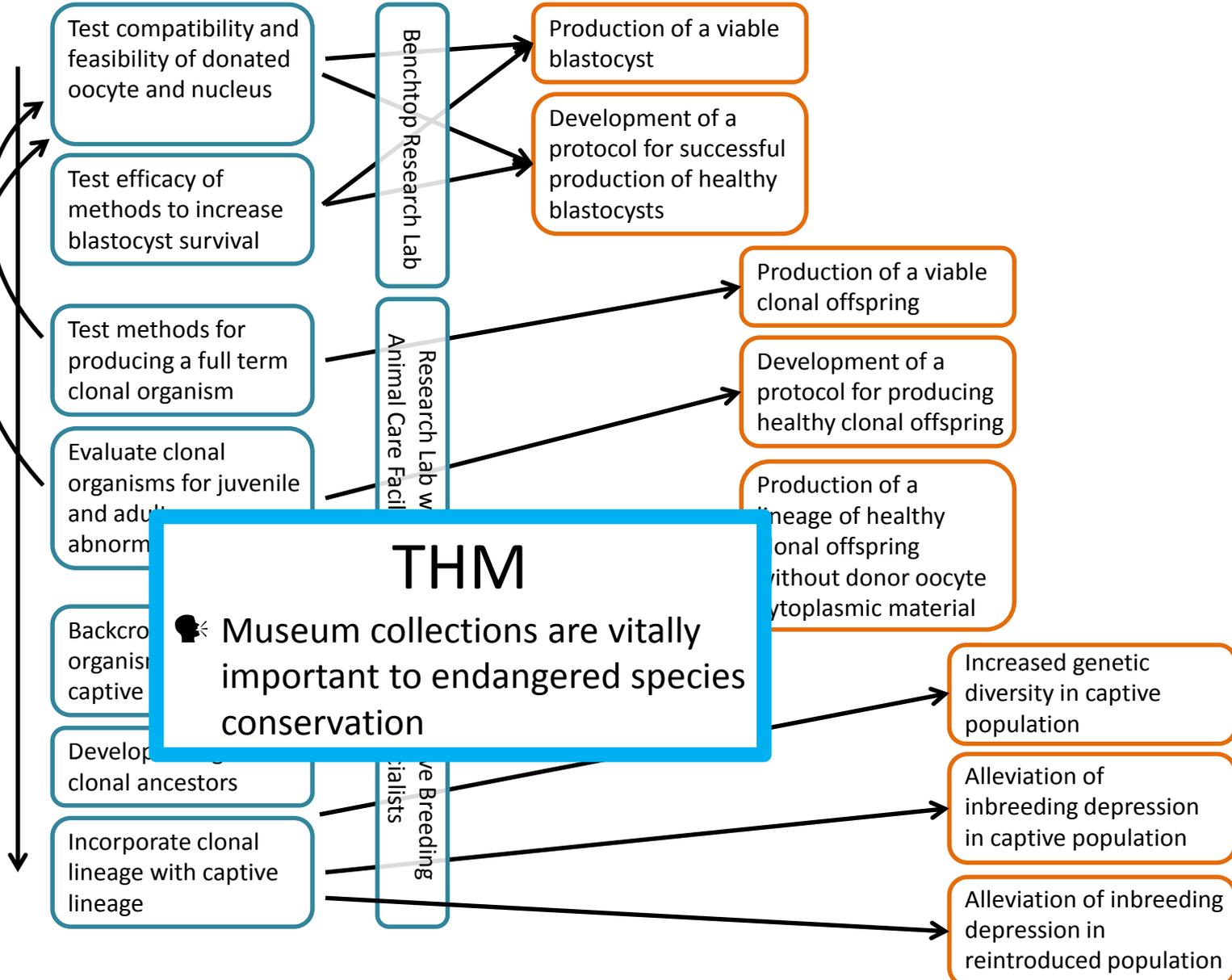
Increased genetic diversity in captive population

Alleviation of inbreeding depression in captive population

Alleviation of inbreeding depression in reintroduced population

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🧠 Museum collections are vitally important to endangered species conservation



Thank you!

Questions?

