The Utility of Accessioned Collections for Conservation Management of Endangered Species

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Bio of a Museum Collection End-User
Conservation Management of Endangered Species

- **Define**
  - Distribution or Population information

- **Manage**
  - Natural history/critical habitat

- **Protect**
  - Forensics

![Conservation management examples](images)
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

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

Ferretti et al. 2015
Morphometrics
Taxonomy, functional anatomy, phenotype alteration

Pre-captive
Large

Captive
Small

Reintroduced
Large

Wisely, Ososky, and Buskirk 2002
Wisely et al. 2005

THM
- Keep collecting
- Keep digitizing
Molecular Ecology
Distinct subpopulations, Population decline

Buff-Breasted Sandpiper
*Calidris subruficollis*

THM
- Sample the distributional extent
- Update destructive sampling policy
Assisted Breeding
With cryopreserved, accessioned collections

- Male gametes
- Female gametes
- Somatic cells

3 Institutions

The Frozen Ark
Saving the DNA of endangered species
Assisted Breeding for Conservation
Assisted Breeding in Black-footed Ferrets

Genetic diversity is dwindling

THM
- 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

Black-footed ferret to be cloned

Somatic cells from animal to be cloned are expanded in the laboratory from fresh or cryopreserved stocks

Somatic cell is inserted into perivitelline space of donor oocyte

Electric pulse causes the somatic cell membrane to fuse with the oocyte plasma membrane injecting the somatic cell nucleus into the oocyte cytoplasm

Blastocyst forms

Embryo is implanted into surrogate mother

Cloned ferret has nuclear DNA of Black-footed ferret, mtDNA of domestic ferret

Domestic ferret donor supplies unfertilized eggs

Oocyte with first polar body

First polar body and nucleus is removed
Museum collections are vitally important to endangered species conservation.
Thank you!

Questions?