



Understanding Species Decline Where Do We Start?



Know Your Species

- What is already known?
- What do we need to know?
- How can we fill in the gaps?



How many are there?

- Are they common, rare or endangered?
- Is the population declining, increasing or fluctuating?
- What is their distribution?
 - Any historic changes?
 - Is this distribution known or inferred?



Why is the Population Declining? First principles

- Poor survival
- Poor productivity

What Controls Populations?
Food
Disease
Predators/competitors
Breeding sites
Weather
Anthropogenic



Proposing hypotheses about why the species is declining

Likely contenders:

- Habitat destruction
 - No where to live
- Habitat degradation
 - Possible loss of nest sites
 - Change in food supply



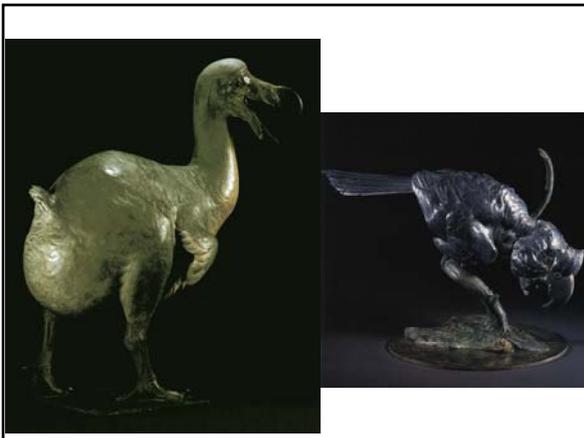
Constructing Ecological Histories Looking to the past to plan the future

- How far back do we go?
 - Since last ice age about 10,000 years ago
 - Since 1600
- Collecting data on
 - History of habitat change
 - History of extinctions
 - History of introductions
 - Impacts of man



Looking for Correlations

- Can we think of any examples of introductions of exotic species in the Mascarenes and subsequent extinctions of natives?



Looking for Correlations

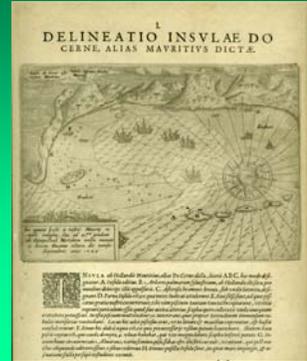


Extinction Cascade

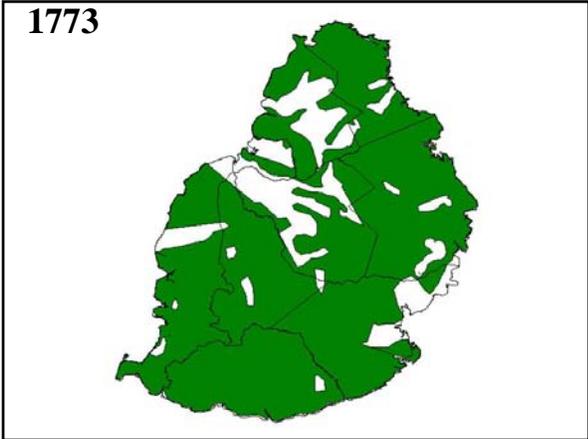


How much do we know? Using data from many disciplines

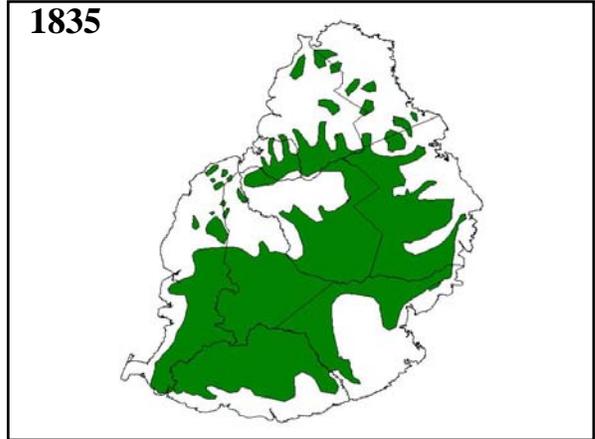
- Published data
- Maps



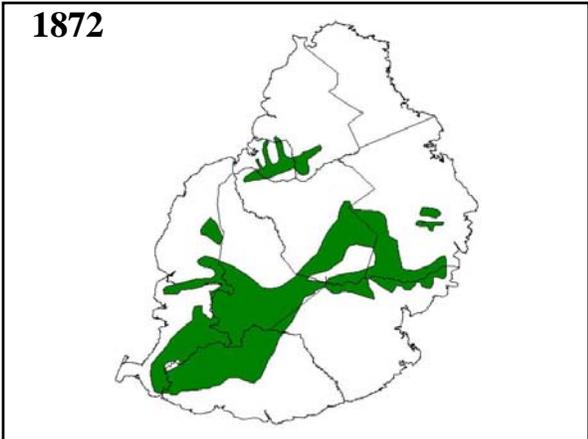
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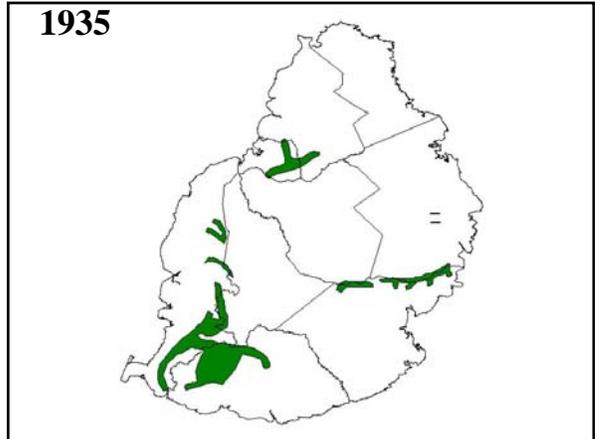
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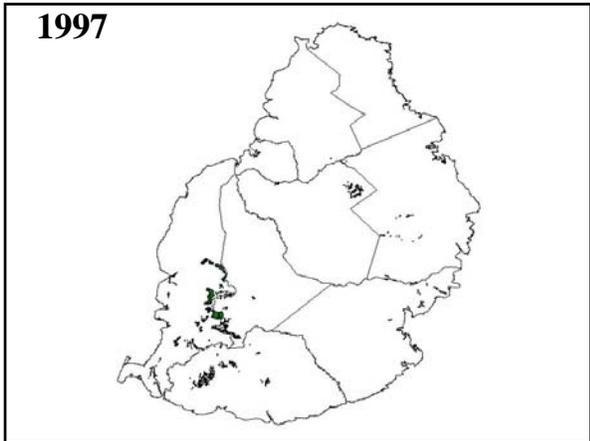


1872



1935





Historic data

- Early texts
- Pictorial information

Cabling

- Deriving knowledge using different types of information, different qualities, from many disciplines and weaving it as strands of knowledge to construct explanations.
- Using data from sub-fossils together with more complete archival research into the early written and pictorial accounts.

Cabling

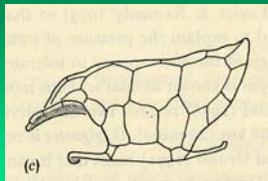
- Data viewed in the context of a carefully researched history of extinctions and introductions
- Information can be interpreted or reinterpreted, based on contemporary knowledge, research and experiences from the source island or elsewhere.
- Gaps in our knowledge can be filled by using knowledge from elsewhere.

Data from different sources

- Published, mainstream and grey
- Unwritten, speak to locals
- Museums, herbaria
- Comparative data

Understanding Morphology

Reconstructions



Digging into the past

- Using fossil record to tell us what was present.
- Using early accounts, but are they reliable?



A clear lesson from ecological histories

- Looking at relict populations in isolation can be misleading
- Always look at species abundance, distribution and ecology in historic context
- Rare species on islands may once have been very abundant



What do we do after compiling data showing species decline?

- Do we react?
- Collect more data?
- Or both?



How do we react? If species Critically Endangered

- Propose likely hypotheses for rarity.
- Test hypotheses and monitor.
- Closely monitor species and react to problems.
- Evaluate methods and change as appropriate.
- Use experienced personnel.



Causes of population decline and corrective management

PROBLEM

SOLUTION

Food shortage

Supplemental feeding

Predators and competitors

Predator and competitor control

Disease

Disease control

Shortage of breeding sites

Create breeding sites, nest boxes

Habitat destruction/modification

Habitat restoration