Reptile conservation in Mauritius: Restoring island biodiversity

Reptile conservation in Mauritius: Restoring island biodiversity

- The uniqueness of islands
- Reptiles of Mauritius: the need for conservation
- Use of translocation as a conservation tool
- How to decide on what to move - where and when
- Progress in Mauritius

Island Biodiversity & Reptile Extinction

- Islands maintain some of the richest biodiversity in the World
  - Mauritius in a major biodiversity hotspot
- Isolation and uniqueness > vulnerability to extinction
- Since the 17th Century 75% of all animal extinctions have occurred on islands

Island Biodiversity & Reptile Extinction

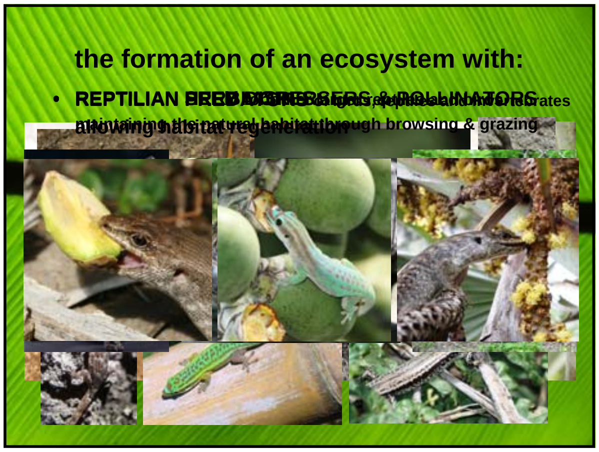
- [illegible] biodiversity

Mauritian reptiles

- Although the Mascarenes have lost more species, Mauritius still maintains one of the richest reptile diversities in the World

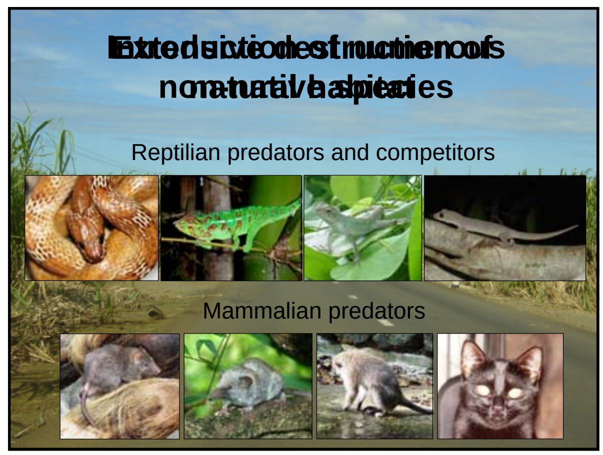
Mauritian reptiles

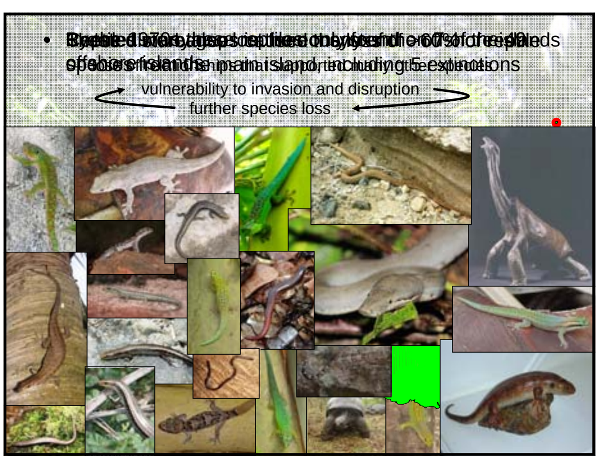
- [illegible]


the formation of an ecosystem with:


Unfortunately
People arrived and most of this
unique ecosystem was rapidly destroyed

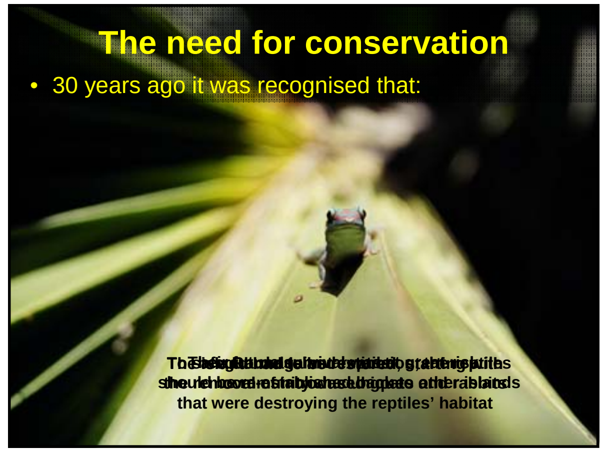

Extensive destruction of
natural habitat


Reptilian predators and competitors
Mammalian predators

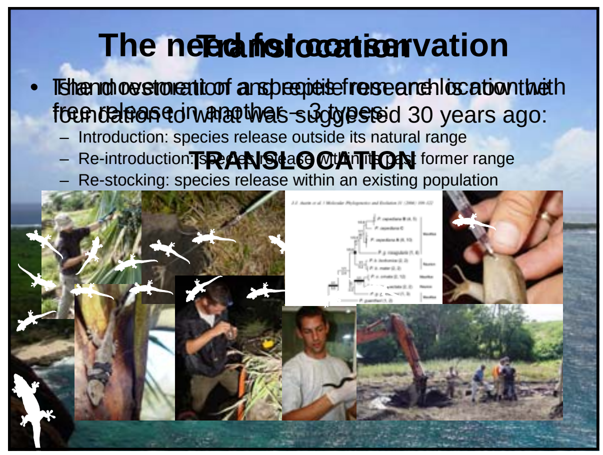

vulnerability to invasion and disruption
further species loss

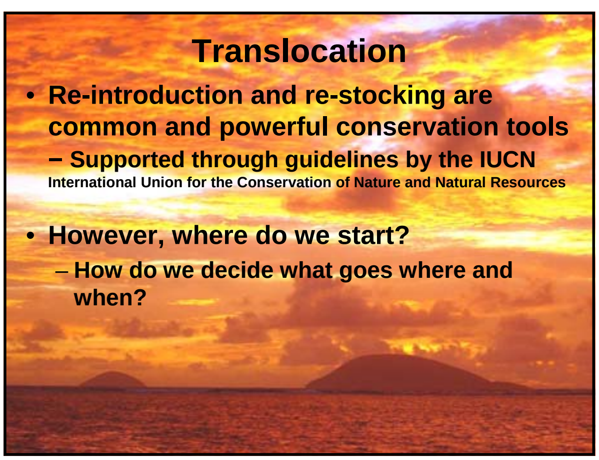

Round Island
One of the last locations in the western Indian Ocean to remain free of introduced mammalian predators
Such as rats – the world's worst invasive

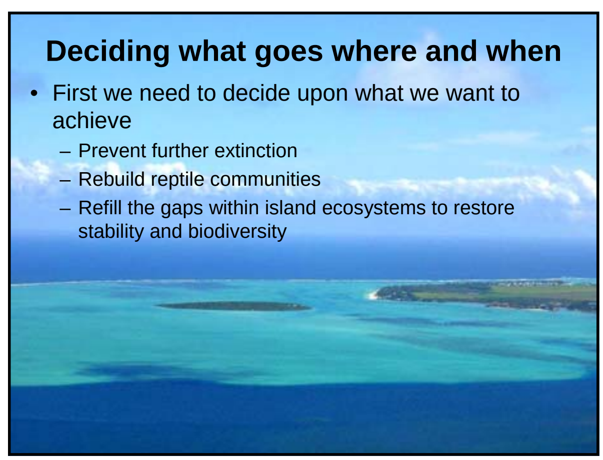

Round Island
Ornate day gecko, *Phelsuma ornata*
Bojer's skink, *Gongylomorphus bojerii*
HOME TO THE LAST SEMI-INTACT REPTILE COMMUNITY WITHIN THE MASCARENES
Bouton's skink, *Cryptoblepharus boutonii*
Bullock & North 1975


The need for conservation
• 30 years ago it was recognised that:
that were destroying the reptiles' habitat


The need for conservation
health and disease, and past and present distributions

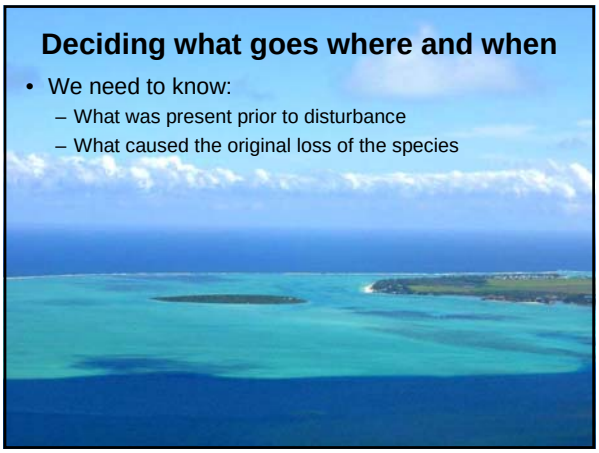

– Introduction: species release outside its natural range
– Re-stocking: species release within an existing population


Translocation
• Re-introduction and re-stocking are common and powerful conservation tools
– Supported through guidelines by the IUCN
International Union for the Conservation of Nature and Natural Resources
• However, where do we start?
– How do we decide what goes where and when?


Deciding what goes where and when
• First we need to decide upon what we want to achieve
– Prevent further extinction
– Rebuild reptile communities
– Refill the gaps within island ecosystems to restore stability and biodiversity

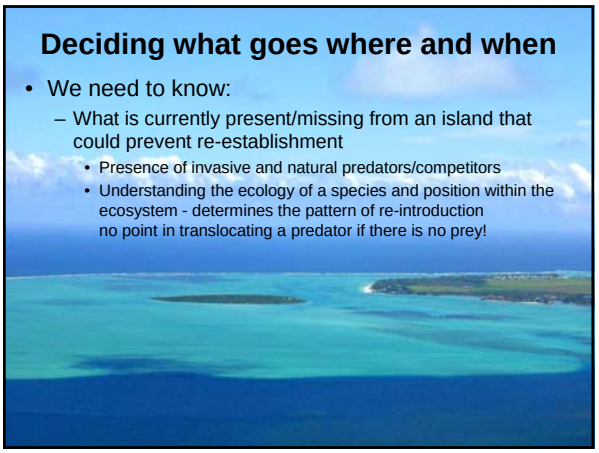
Deciding what goes where and when

- We need to know:
  - What was present prior to disturbance
  - What caused the original loss of the species



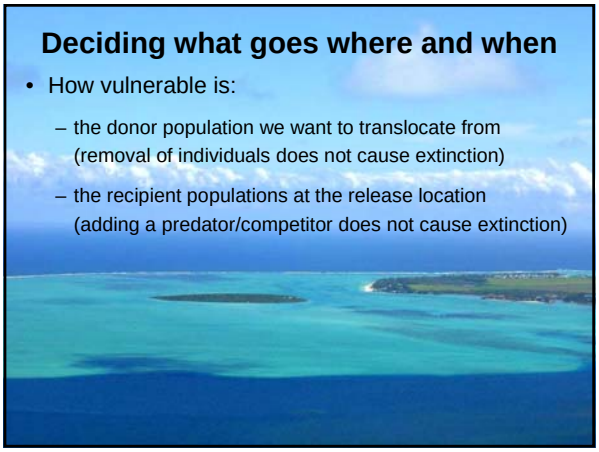
Deciding what goes where and when

- We need to know:
  - What is currently present/missing from an island that could prevent re-establishment
    - Presence of invasive and natural predators/competitors
    - Understanding the ecology of a species and position within the ecosystem - determines the pattern of re-introduction
      no point in translocating a predator if there is no prey!



Deciding what goes where and when

- How vulnerable is:
  - the donor population we want to translocate from (removal of individuals does not cause extinction)
  - the recipient populations at the release location (adding a predator/competitor does not cause extinction)

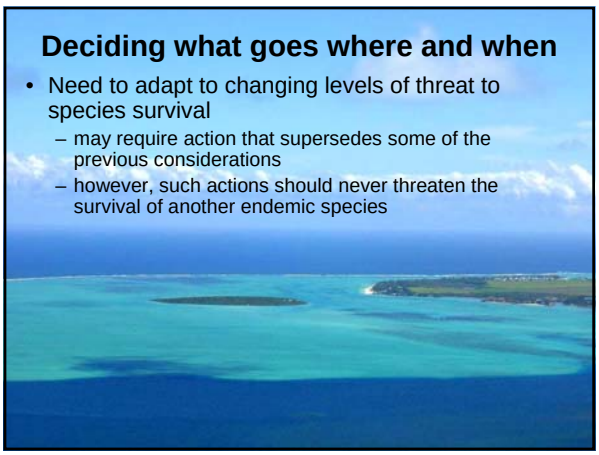


Deciding what goes where and when

- How secure are the release sites in terms of:
  - The status of the location (nature reserve or golf course)
  - Proposed plans for development (tourism – plantation – recreation)

Deciding what goes where and when

- Need to adapt to changing levels of threat to species survival
  - may require action that supersedes some of the previous considerations
  - however, such actions should never threaten the survival of another endemic species



Deciding what goes where and when

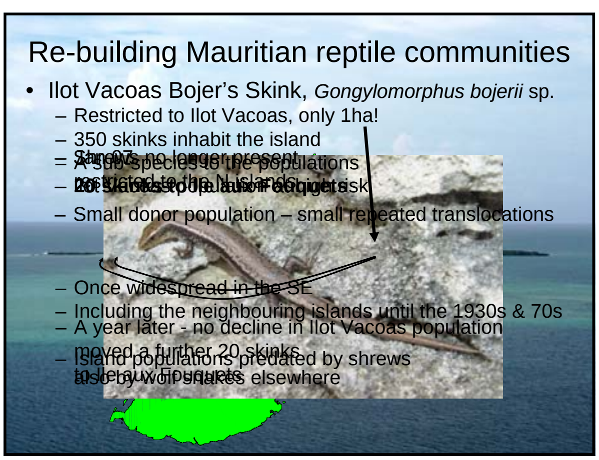
- Three decades of island work and reptile research has answered many of the questions required for certain translocations to occur

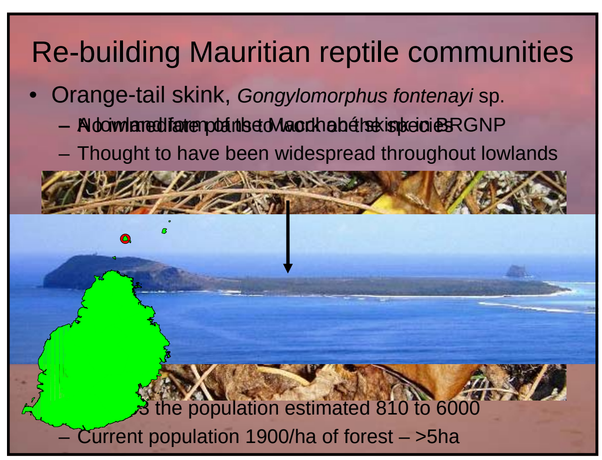

Re-building Mauritian reptile communities
In 2006, we initiated the first lizard translocations within the Indian Ocean
To date we have translocated five species to four islands
DARWIN INITIATIVE


Re-building Mauritian reptile communities
Telfair's skink Leiolopisma telfairii
Sufficiently high population to remove some for translocation


Re-building Mauritian reptile communities
Telfair's skink Leiolopisma telfairii
For Ile aux Aigrettes
Wolf snake, Lycodon aulicus
Huge benefits by removing these species

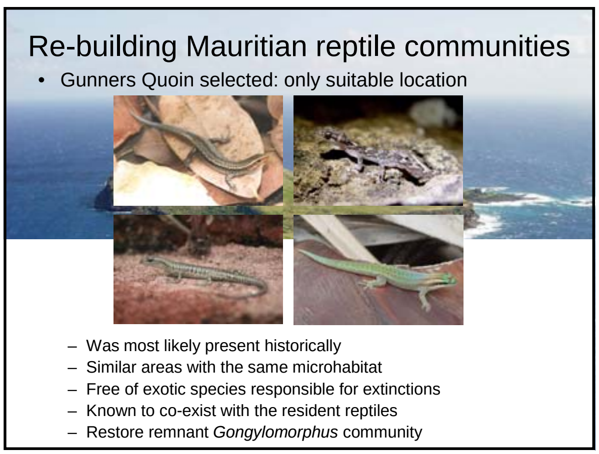

Re-building Mauritian reptile communities
Telfair's skink Leiolopisma telfairii
For Gunners Quoin
All reptiles endemic/native - known to have co-existed
Abundant food sources – fruits, invertebrates, reptiles


Re-building Mauritian reptile communities
Ilot Vacoas Bojer's Skink, Gongylomorphus bojerii sp.
Restricted to Ilot Vacoas, only 1ha!
350 skinks inhabit the island
Small donor population – small repeated translocations
Once widespread in the SE
Including the neighbouring islands until the 1930s & 70s
A year later - no decline in Ilot Vacoas population


Re-building Mauritian reptile communities
Orange-tail skink, Gongylomorphus fontenayi sp.
Thought to have been widespread throughout lowlands
Current population 1900/ha of forest – >5ha

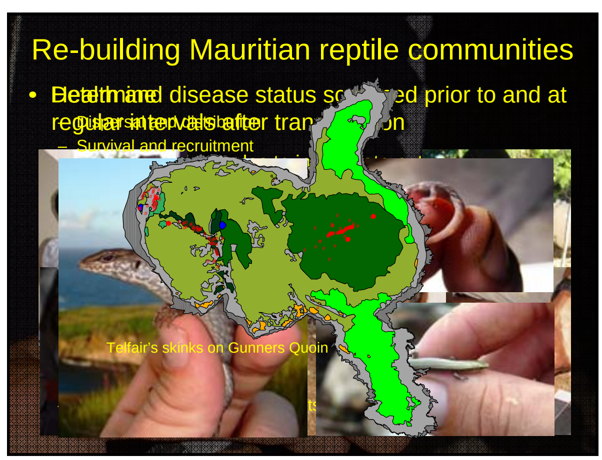

Re-building Mauritian reptile communities
• Orange-tail skink, *Gongylomorphus fontenayi* sp.
– Sept 2007 road opened through the population
– Many unconfirmed plans to enhance tourism
– Similar island developments = musk shrew and wolf snake = extinction of *Gongylomorphus*
– We needed to take action, whilst healthy population


Re-building Mauritian reptile communities
• Orange-tail skink, *Gongylomorphus fontenayi* sp.
• In Feb 2008 we translocated 82 skinks to Gunners Quoin
Northern Mauritius


Re-building Mauritian reptile communities
• Gunners Quoin selected: only suitable location
– Was most likely present historically
– Similar areas with the same microhabitat
– Free of exotic species responsible for extinctions
– Known to co-exist with the resident reptiles
– Restore remnant *Gongylomorphus* community


Re-building Mauritian reptile communities
• Known to have co-existed with Telfair's skink - occasional predator


Re-building Mauritian reptile communities
– Telfair's skinks were PIT tagged
– Species too small for tagging given photographic IDs
– Pattern of scaring, missing toes/claws, tail breaks recorded


Re-building Mauritian reptile communities
– Survival and recruitment
Telfair's skinks on Gunners Quoin

Re-building Mauritian reptile communities

- Investigate the IMPACT on the islands to:
  - Survey resident terrestrial species prior to and frequently after translocation

The future for Mauritian reptiles

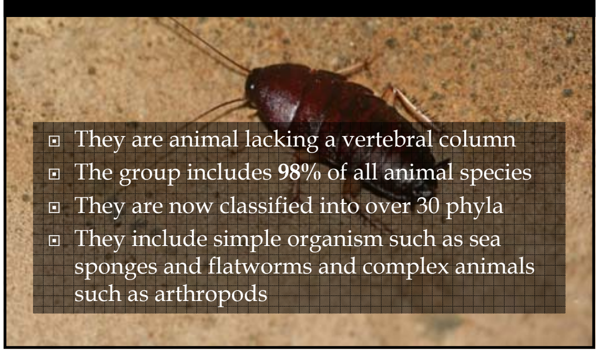
- The impacts so far have ... potential benefits to island ecosystems

Where do we go from here?

- Ultimately we want rebuild island ecosystems to support apex predators, like the keel-scaled boa
- Rebuild the ecosystem step-by-step
- Each translocation put in place to support the next

INVERTEBRATES

What are Invertebrates?



- They are animal lacking a vertebral column
- The group includes **98%** of all animal species
- They are now classified into over 30 phyla
- They include simple organism such as sea sponges and flatworms and complex animals such as arthropods

Main Invertebrate Phyla

- **Annelida** (segmented worms)
- **Arthropoda** (insects, arachnids, crustaceans)
- **Mollusca** (snails)
- Cnidaria (jellyfish)
- Echinodermata (sea urchins, starfish)
- Nematoda (round worms)
- Platehelminthes (tape worm)
- Nematomorpha
- Porifera (sponges)

Importance of Invertebrates

- Economic and ecological role (pollination, production of silk and honey)
- **Their abundance and diversity have been used as an indicator of ecosystem health and biodiversity**
- **Act as building block in the habitat structure because of the various important ecosystem function they perform**
- **Key component of food chain**

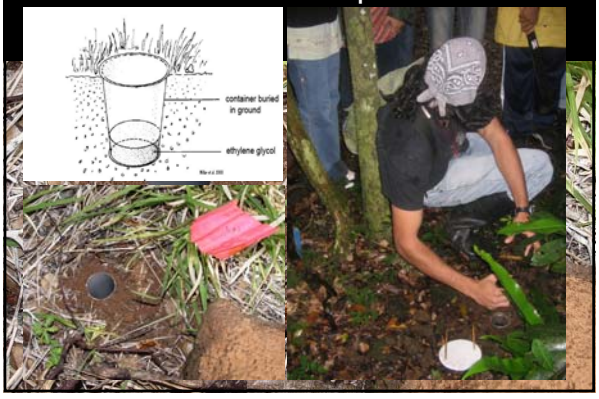
Food Web

Who eats who?

Collecting Invertebrates

- **Pitfall traps**
- **Moczarsky-winkler selector** and Berlese funnel
- Hand collecting
- Nets (arial nets, sweep nets, aquatic nets)
- Beating sheets
- Malaise trap, Flight-intercept trap
- Sticky trap
- Light trap
- Fogging and mist blowing

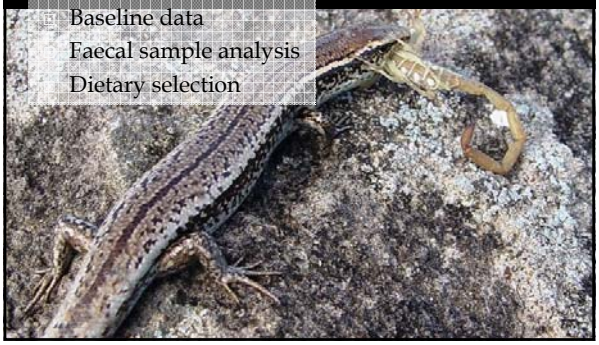
Pitfall trap



Winkler selector

Impact of reptile translocation on invertebrates

- Baseline data
- Faecal sample analysis
- Dietary selection



Baseline data

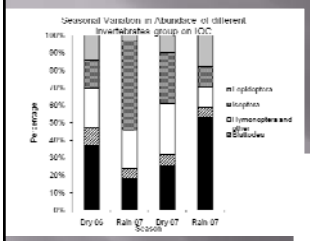
- Over 800 000 specimen collected
- Species identified to order level
- Seasonal variation
- Rats and shrew cause drastic decline in invertebrates population
- New discoveries

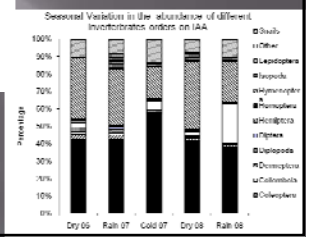
Sorting and identification

Main Groups of invertebrates collected:

- Coleoptera
- Hymenoptera
- Collembola
- Blattodea
- Orthoptera
- Hemiptera
- Lepidoptera (larvae)
- Araneae
- Acari
- Diplopoda
- Chilopoda

Seasonal Variation





Dietary Selection

Faeces analyses