# ESRM 350

## Insularity

**Autumn 2013**

**“Generally, I like all islands. There, it is easier to rule”**

**-** Albert Camus, French-Algerian writer and philosopher

# Insularity

- The state of living in geographically isolated environments
  - e.g., on islands, or in isolated fragments (surrounded by extensive matrix)
- Insular species tend to be more susceptible to population declines and extinctions than “mainland” or “continental” species

Drake et al. (2002) *J Biogeography*

# Insularity and Extinction

**Table 2** Extinctions since 1500 according to IUCN and CREO, with per species and per unit area rates.

| | Number | % | Per $10^6$ km$^2$ | vs. Fossil turnover |
|---|---|---|---|---|
| Mammals | | | | |
| Continents | 3 | 0.081% | 0.025 | 0.89–7.4 |
| Islands | 58 | 7.4% | 4.43 | 82–702 |
| Ratio (I/C) | | 91 | 176 | 95 |
| Birds | | | | |
| Continents | 6 | 0.062% | 0.050 | 0.69–5.9 |
| Islands | 122 | 8.86% | 9.38 | 98–844 |
| Ratio (I/C) | | 143 | 187 | 143 |

IUCN, International Union for the Conservation of Nature and Natural Resources; CREO, Committee on Recently Extinct Organisms.

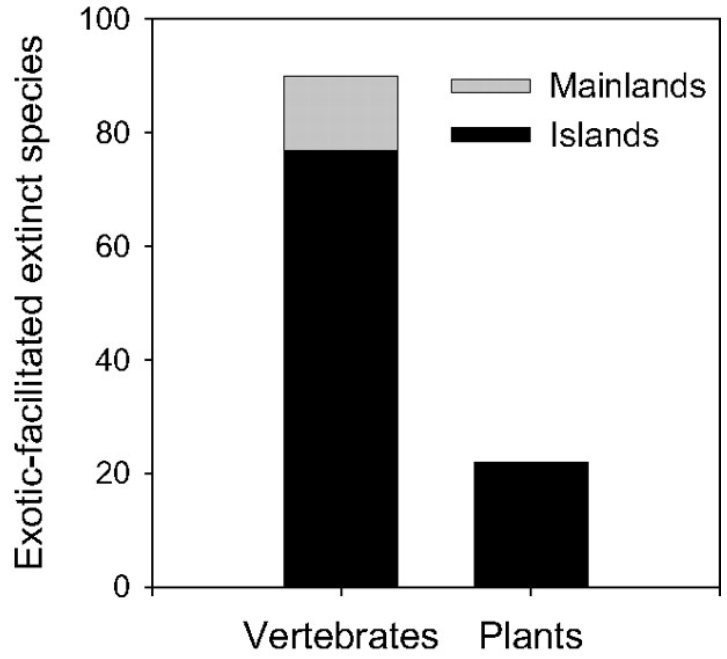
CREO, Committee on Recently Extinct Organisms

Loehle and Eschenbach (2011) *Div and Distr*

Spectacled Cormorant (*Phalacrocorax perspicillatus*)

- Once inhabited Bering Island
- Largest species of cormorant (12-14 lbs)
- Described as “clumsy and nearly flightless”
- First identified by Georg Steller (German explorer and zoologist) in 1741
- After discovery, collected for food and feathers
- Reported extinct around 1850

# Invasive Effects Larger on Islands




- Most known extinctions caused by invasives have occurred on islands

# Invasive Brown Tree Snakes: No More Birds on Guam

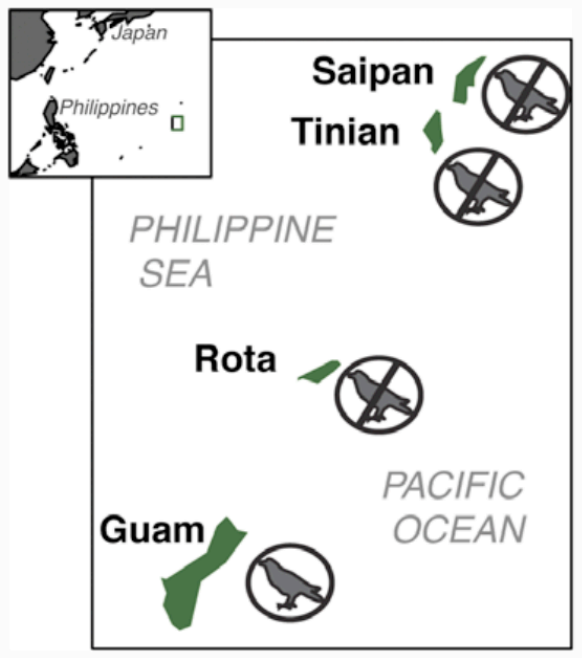


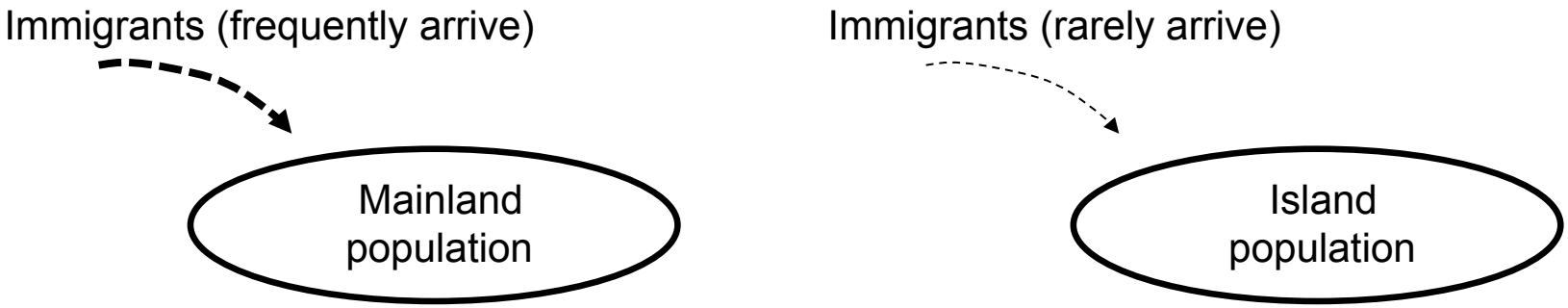

**Figure 1. Map of the Mariana Islands.** All forest birds are functionally extinct on the island of Guam, whereas relatively healthy bird populations remain on three nearby islands of Saipan, Tinian and Rota.
doi:10.1371/journal.pone.0043446.g001

brown tree snake (*Boiga irregularis*)

Rogers et al. (2012) *PLOS One*

# Why are Insular Species More Vulnerable?

- **Rescue Effect**
  - insular populations are cut off from “rescue” by immigrants, whose arrival can buffer against losses and avert extinction



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- **Lack of co-evolution**
  - insular organisms lack adaptations to cope with competitors, predators, parasites, and invasives
  - e.g., insular taxa are often naïve
    - fail to recognize threat posed by exotic predators

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Mala or rufous hare-wallaby
(*Lagochetes hirsutus hirsutus* )

1.3 kg

Feral cats

Hardman and Moro (2006) *Wildlife Research*

# Five Minute Paper

## Questions & Insights