



Questions, questions....

- Extinction- a way of life?
- Humans- a 'recent' addition to the extinction process?
- IAS- the risks of taking a narrow view?

Extinction as a way of life

- 96-98% of all species on Earth now extinct
- "struggle for existence" Darwin, 1859
- Understanding the process- lessons from islands...
- (MacArthur & Wilson, 1967)

Evidence for the theory

Diamond (1969)- turnover in bird species on Californian Channel Islands

Simberloff & Wilson (1969)- Equilibrium in insect species richness on near and far islands in Florida keys

Adding humans to the mix

- *Humans as invasive species?*

Adapted from Martin, 1985

	Continents of human origin	Continents of human invasion	Prehistorically inhabited impacts on island endemics
Loss of large sp.	Moderate		
Loss of small sp.	Few		
Rate of disappearance	Gradual		
Extinction order	Oldest		
Archaeological evidence	Common		

Adding humans to the mix

- *Is H. erectus blame?*

Adapted from Martin, 1985

	Continents of human origin	Continents of human invasion	Prehistorically inhabited impacts on island endemics
Loss of large sp.	Moderate	Many	
Loss of small sp.	Few	Few	
Rate of disappearance	Gradual	Sudden	
Extinction order	Oldest	Intermediate	
Archaeological evidence	Common	Rare	

Adding humans to the mix

- *Is H. erectus to blame?*

Adapted from Martin, 1985



	Continents of human origin	Continents of human invasion	Prehistorically inhabited impacts on island endemics
Loss of large sp.	Moderate	Many	Total
Loss of small sp.	Few	Few	Many
Rate of disappearance	Gradual	Sudden	Mostly sudden
Extinction order	Oldest	Intermediate	Youngest
Archaeological evidence	Common	Rare	Often rare

A long history of extinctions...

Region	Prehistoric	AD1600 -1899	AD1900 -1994		
Pacific	90				
Indonesia & Borneo	--				
Indian Ocean	11				
Philippines	--				
Caribbean	34				
N. Guinea & Melanesia	10				
Atlantic Ocean	3				
Med. Sea	10				
TOTAL	158				

A long history of extinctions...

Region	Prehistoric	AD1600 -1899	AD1900 -1994		
Pacific	90	28			
Indonesia & Borneo	--	0			
Indian Ocean	11	30			
Philippines	--	0			
Caribbean	34	2			
N. Guinea & Melanesia	10	2			
Atlantic Ocean	3	3			
Med. Sea	10	0			
TOTAL	158	65			

A long history of extinctions...

Region	Prehistoric	AD1600 -1899	AD1900 -1994		
Pacific	90	28	23		
Indonesia & Borneo	--	0	2		
Indian Ocean	11	30	1		
Philippines	--	0	1		
Caribbean	34	2	1		
N. Guinea & Melanesia	10	2	3		
Atlantic Ocean	3	3	1		
Med. Sea	10	0	0		
TOTAL	158	65	32		

A long history of extinctions...

Region	Prehistoric	AD1600 -1899	AD1900 -1994	Approx. No endemics	%threatened endemics
Pacific	90	28	23	290	38
Indonesia & Borneo	--	0	2	390	22
Indian Ocean	11	30	1	200	33
Philippines	--	0	1	180	19
Caribbean	34	2	1	140	22
N. Guinea & Melanesia	10	2	3	500	10
Atlantic Ocean	3	3	1	50	50
Med. Sea	10	0	0	--	--
TOTAL	158	65	32	1750	23

What have we done...?

?

What have we done...?



Agents of destruction...



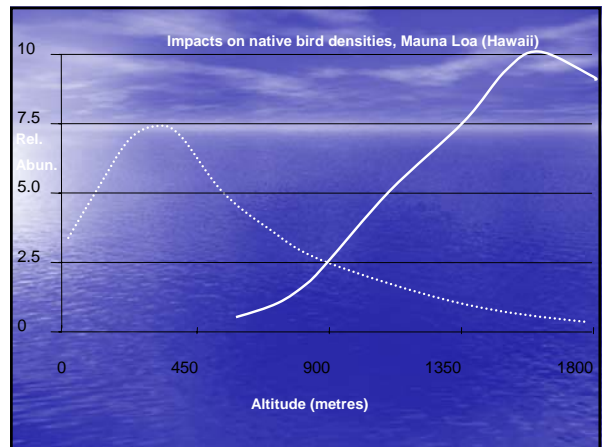
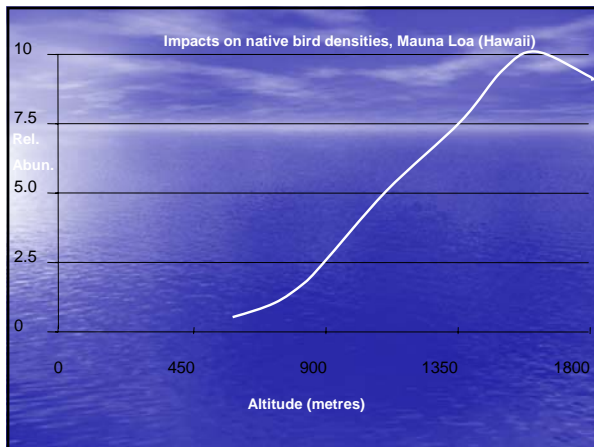
- Introduced species

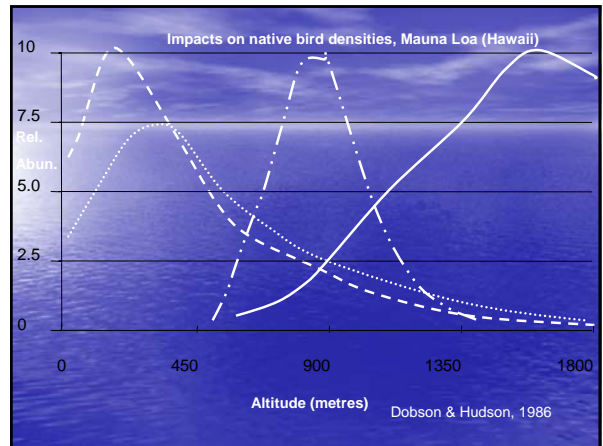
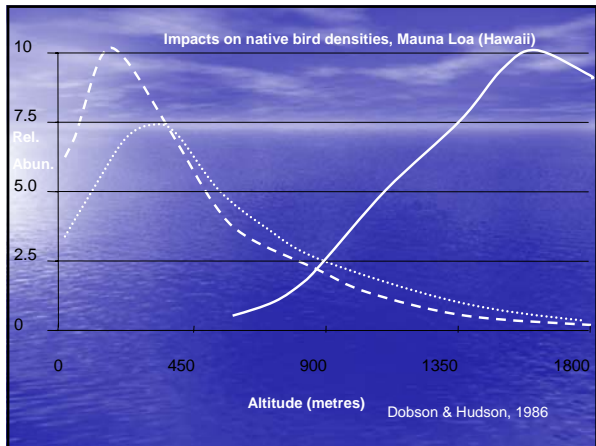
Carriers of disease...

- Introduced diseases...
- Psittacine beak and feather disease?
- Trichomoniasis?
- Others we don't know about...?



A complex problem...





Trip through time....

- Pacific ocean islands settled over 3000y
- Hawaii settled over 2000ya

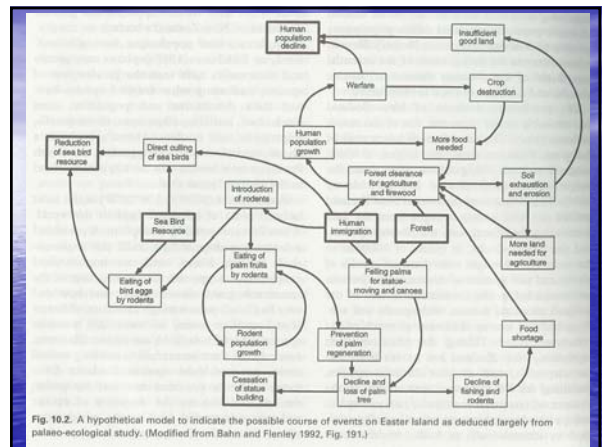
"[The voyagers] went ashore and found the land fertile and pleasant, filled with 'awa, coconut trees and so on, and Hawai'iloa, the chief, gave that land his name. Here they dwelt a long time and when their canoe was filled with vegetable food and fish, they returned to their native country with the intention of returning to Hawai'i- nei, which they preferred to their own country"

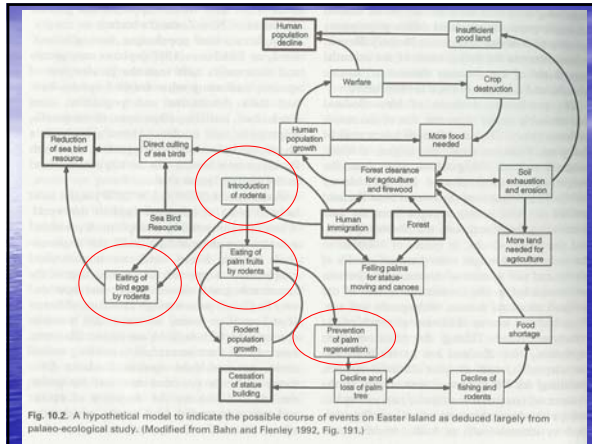
Trip through time....

- Polynesians introduced 3200 sp arthropod, cats, dogs, sheep, pigs, flightless geese, horses, black rats, goats, mongooses....
- What would have happened if they never built that canoe...?

Trip through time....

- Easter Island settled 300AD
- Forest that had been present for >33,000y was cleared within 1200y
- Today <25% of the 200 vascular plants are native
- What happened to the people....?





IAS resource...a case in point

- Lac Alaotra
- The largest lake on the island...
- 23,000ha of marsh *zetra*

IAS resource...a case in point

- 80% surface area loss...burning continues
- Endangered Meller's duck *Anas melleri*
- Displacement of genus *Paratilapia*
- ...& the Critically Endangered Lac Alaotran gentle lemur *Haplemur griseus alaotrensis*

IAS resource...a case in point

- The invasive fibata...
- "...So the people light a fire to reveal the fish resting underneath, the fibata, that live in the zetra."

IAS resource...a case in point

- "...today I could earn 20,000 Ariary or 2000 Ariary"

But that's Madagascar....

- ...and in Mauritius?
- Gorgeous guava jam
- \$3 million annual income
- >1000 livelihoods on the line
- ...and we wonder why we are battling alone?

In summary...

- Extinction is a natural process but the rate is in override
- Human-precipitated extinctions on islands are not a recent phenomenon
- Predation by humans historically the key threat...now its introduced species and disease...
- Key threat identification is complex
- Cannot afford to adopt a purely biological approach to threats to island biodiversity
- ...and one final point...

Are species ever out of danger?



An example of the sexual dimorphism between the male golden toad (left) and the female (Baker, 2004).

The Costa Rican Golden toad

How much *could* they have in common???

The Mauritius pink pigeon

