Chapter 15

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Invasive Species and Environmental Changes in New Zealand

New Zealand

Isolated from other landmass for over 60 million years.

Resulting in the evolution of
endemic flora and fauna.

e.g.

Kiwi

Kakapo

Tuatara

No mammals except some bats.

Settled by Polynesian 700 years ago.

With many alien organisms.

e.g.

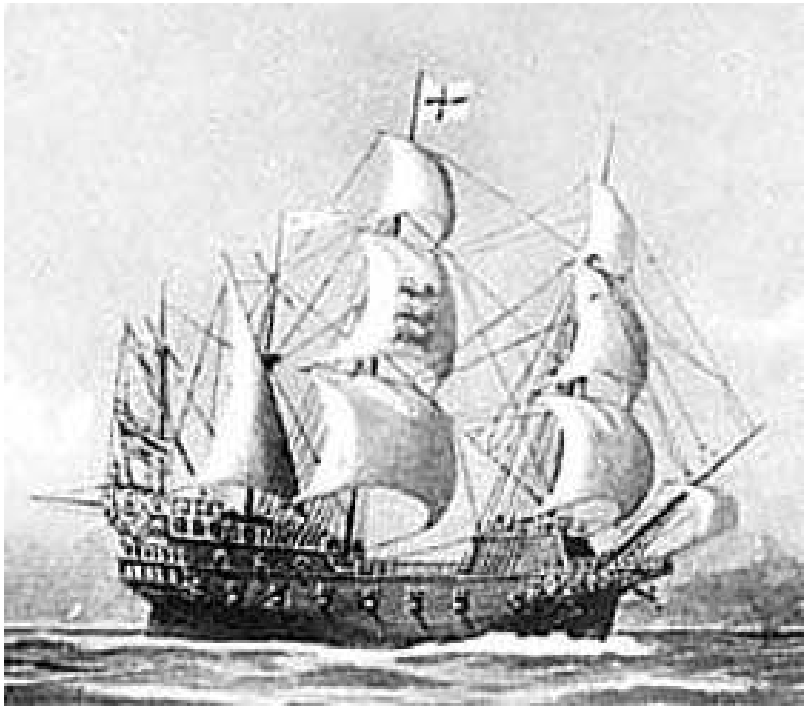
Dogs

Polynesian rats

Large flightless bird “ **Moa** ”

Extinction

Settled by European 200 years ago.



Over 80 species of vertebrates have been introduced, including 34 mammals.

Predatory mammals

stoats

cats

ship rats

They have caused extinction of 9 bird species.

Herbivorous mammals

goats

red deer

brushtail possums

They are altering the structure and composition of plant communities.

Large sectors of biota are now dominated by introduced species.

Table 15.1

Group	*Native species*	*Established alien species*
Dicots	1,591	1,199
Monocots	621	380
Conifers	24	24
Ferns and allies	113	20
Land mammals	2	34
Resident landbirds	77	33
Breeding seabirds	69	—
Reptiles	60	1
Amphibians	4	2
Freshwater fish	27	20
Insects	c. 18,500	c. 1,500

New Zealand Department of Conservation lists 403 taxa as threatened

Especially on bird species

Takahe

Kiwi

Kakapo

- No country has a higher proportion of its avifauna classed as threatened.

Land-Use Change and Invasive Species

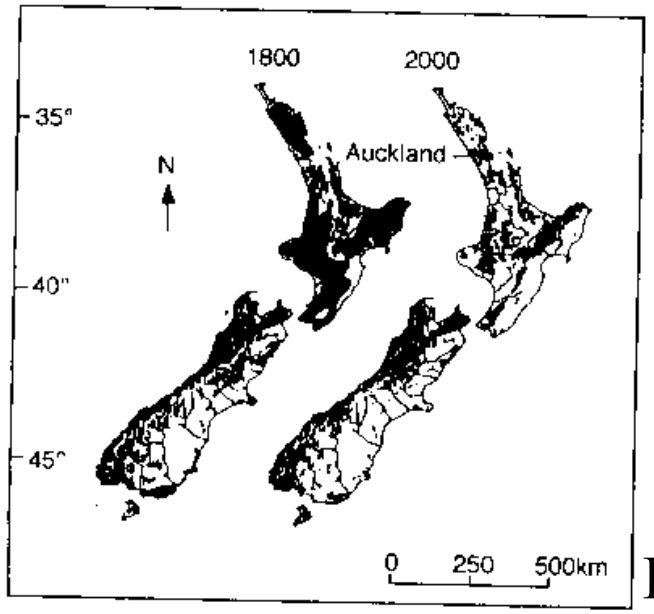


Fig.15.1

Forest cover reduced to

78% → 23%

by burning, clearing for farms.

Fragmentation of natural habitats

- Reducing in the effective population size of native species.

- An increase of danger to invasive species such as

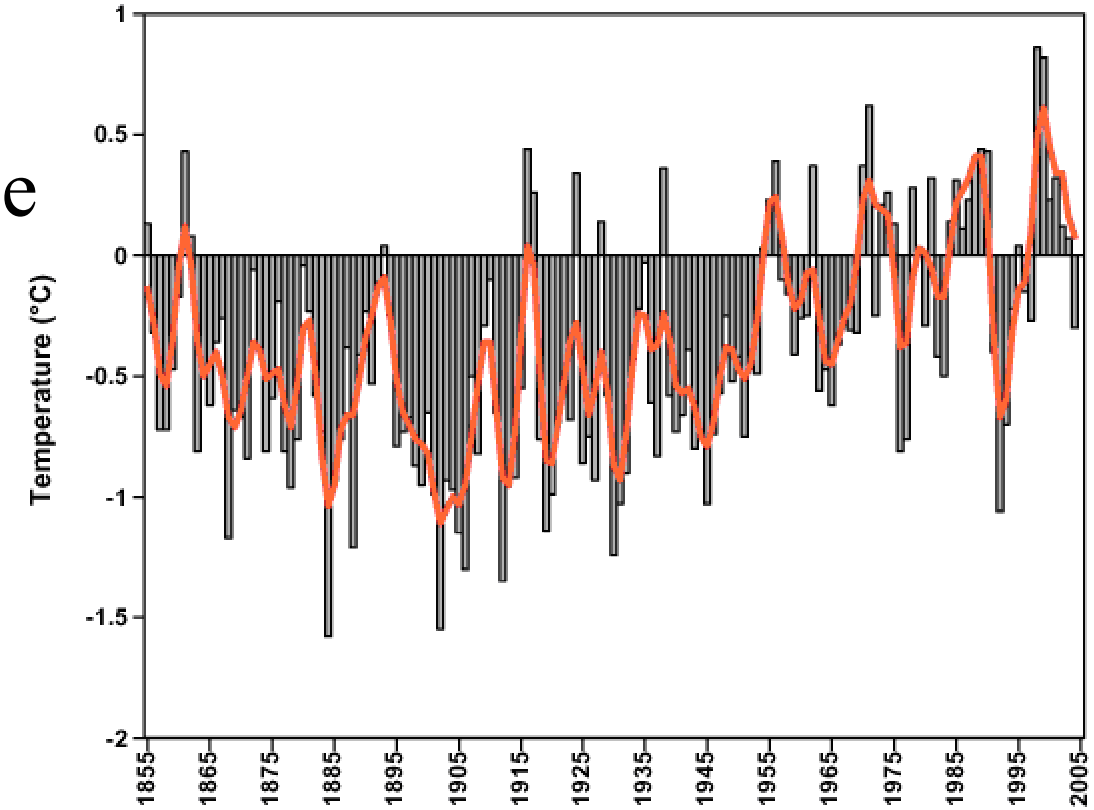
Asian paper wasp

Australasian harrier

Climate Change and Invasive Species

In 2070, 1 - 3°C mean temperatures rise is expected.

- Developed model shows 41 native tree species should change their distributions.



Potential invaders under scenarios of climate warming

Alligator weed

Mosquitoes

Disease-bearing mosquitoes

Introduced mammals may facilitate the establishment of some viruses.

Potential invaders under scenarios of climate warming

Indian myna

Social wasps

Warmer weather condition could help their nesting and wintering

Changing Approaches to

the Management of Invasive Species

Eradication or **Control**

Eradication

- Several successful eradication in New Zealand

Introduced mammals on several islands
by hunting, trapping, toxic baits.




Eradication

Eradication in mainland should be possible, if new invasions are detected early enough.

White-spotted tussock moth

The keys to successful eradication

- Public awareness
- Early detection
- Rapid response
- Retention of Public support
  by providing full information

Control

Biological control

- Introduction of predators or diseases

Spider mites

Seed weevil

Parasitic wasp

Gorse

Vespulid wasp

Control

Chemical control

- Scattering or setting of toxic bait

1080 poison

A new approach to control of invasive species

The concept of "**mainland islands**"

Natural habitat selected for permanent, intensive pest control and ecological restoration.

http://www.doc.govt.nz/

Problems of biological and chemical control

- Risk of non-target kills
- Environmental accumulation of toxins
- Risk of introducing more alien species

Conclusions

Necessities to conserve native biodiversity

- To raise public awareness of the threats posed by invasive species.
- To garner public support for action to detect and prevent further avoidable invasion.
- To improve current control practices to allow for sustainable management.
- To establish databases and targeted research programs.