

Worksheet 1: New Zealand's Biodiversity

This worksheet is intended to give you a good understanding of the uniqueness and importance of New Zealand's biodiversity and the impact of human arrival in New Zealand.

Use the questions below as a guide to your research. There is space later in this worksheet to record your findings.

Biodiversity

There are internationally recognised categories and criteria for classifying species according to their conservation status. The following are the World Conservation Union Red List categories:

extinct: *when exhaustive surveys have failed to locate an individual in known territories and there is no reasonable doubt that all are dead;*

extinct in the wild: *as above, but living specimens exist in captivity;*

critically endangered: *facing an extremely high risk of extinction in the wild;*

endangered: *facing a very high risk of extinction in the wild;*

vulnerable (threatened): *facing a high risk of extinction in the wild;*

near threatened: *likely to qualify for one of the above categories in the near future;*

least concern: *widespread and abundant.*

- Make sure you understand and can define the following terms: **endemic, native, self-introduced, and introduced.**
- Identify one New Zealand bird species for as many of the above conservation status categories as possible.
- For as many of the categories as possible, identify a New Zealand reptile, mammal, or invertebrate species.
- List the actual or estimated times of large-scale human migration to New Zealand.
- Identify the food sources that the main groups relied on and, in general terms, describe the environmental effects of their lifestyle, be it hunter-gatherer, agricultural, or industrial.
- Research the reasons why Māori and later settlers introduced exotic mammals, such as rats, mice, cats, dogs, pigs, goats, rabbits, stoats, ferrets, possums, deer, and hedgehogs. (Find as many examples as you can.)
- Describe how these mammals have negatively affected endemic bird populations, classifying the effects in terms of predation, competition, and habitat destruction.
- List the introduced species (including various waves of self-introduced humans)

Note: this worksheet has been adapted from 'Takahe – Back from the Brink'

Ministry of Education Teacher 'Applications' Series.

- Describe the connection between human settlement, the introduction of exotic species, and the extinction of endemic and native bird species.

Predator-Prey Relationships

- Identify the structural, behavioural, and physiological adaptations of introduced mammalian carnivores (and omnivores) that make them efficient predators. (Remember that humans can be classified as self-introduced, predatory omnivores.)
- Identify the structural, behavioural, and physiological adaptations of endemic carnivores, such as birds of prey, that make them efficient predators.
- What are the main similarities and differences between the adaptations of endemic and introduced predators?
- Choose an endemic land animal and list its special adaptations.
- Do any of these adaptations make the animal vulnerable to endemic predators?
- Do any of these adaptations make it vulnerable to non-endemic or introduced predators?

Flightlessness and the Impact of Humans

Geographical isolation is the key reason why the endemic species of New Zealand are so different of those from other regions in the world.

New Zealand has been isolated from other land masses for around 80-100 million years. This occurred as a result of movements in the Earth's crust known as Continental Drift and took place at a critical time in the history of living things as three major living groups were spreading out across the globe.

- What were these three major groups?
- What limitations would they have faced as the land masses separated?

The majority of today's plants and animals originated from ancestors which were present at the time when the Zealandia land mass separated from Gondwana (Southern land mass). A small number migrated over time with the greatest introduction of new plants and animals happening in the past thousand years with the arrival of humans.

- Find out which animal species were probably present before Zealandia's separation from Gondwanaland.

New Zealand is unusual because there is such a high proportion of flightless or poorly flighted bird species in its endemic fauna.

- List as many of these species as possible and flag them in terms of their classification status according to DOC's New Zealand Threat Classification System (NZTCS), for example endangered, threatened, or extinct. See <http://www.doc.govt.nz/about-us/science-publications/conservation-publications/nz-threat-classification-system/>
- Explain why so many endemic bird species evolved to become flightless.

- What special adaptations and behaviours are associated with their ground-dwelling lifestyle?
- What are the main threats to their survival?

Use the following pages for your note making at the ZEALANDIA Exhibition and your own research

Definitions for BIODIVERSITY:

Endemic

Native

Self-introduced

Introduced

Examples of New Zealand bird species

Endemic

Native

Self-introduced

Introduced

Examples of New Zealand reptile, mammal or invertebrate species

Endemic

Native

Self-introduced

Introduced

Time scale of human migrations (include utilisation of new food sources and environmental effects of habitation):

Negative impacts of introduced mammals (include predation, competition and habitat destruction)

List introduced species

Describe connection between human settlement, introduced species and extinction of endemic species in New Zealand

Predator-prey relationships

Adaptations of introduced mammalian predators

Adaptations of endemic carnivores

Similarities and differences between the adaptations of endemic and introduced predators

Endemic land animal and its special adaptations

Flightlessness and the impact of humans

Three major groups of living things found in Gondwana

Limitations

Animal species present before separation from Gondwana

Examples of flightless birds in New Zealand

Reasons for evolution of Flightlessness

Special adaptations and behaviour related to flightlessness

Main threats to survival

Additional notes: