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**Environmental systems and societies**  
**Standard level**  
**Paper 1 – resource booklet**

2 May 2025

**Zone A** afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour

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**Instructions to candidates**

- Do not open this booklet until instructed to do so.
- This booklet contains all the resources to answer paper 1.

Figure 1(a): World map showing the location of New Zealand

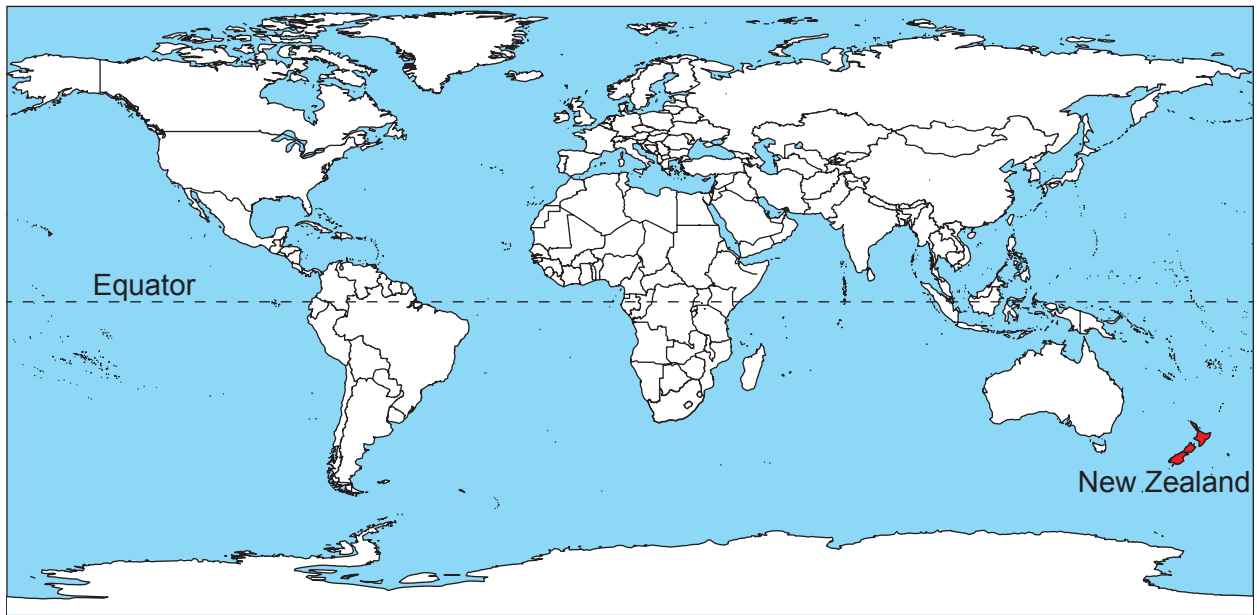
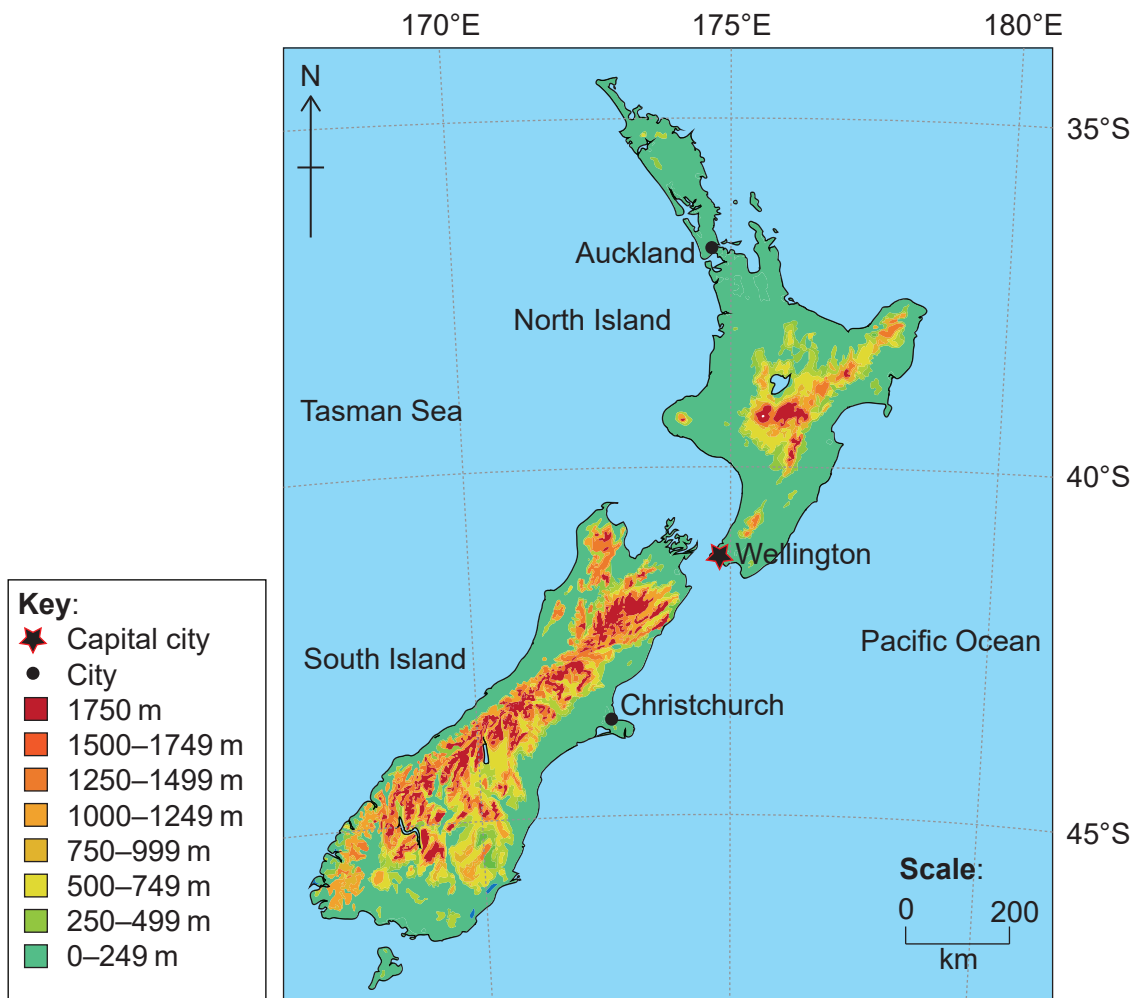
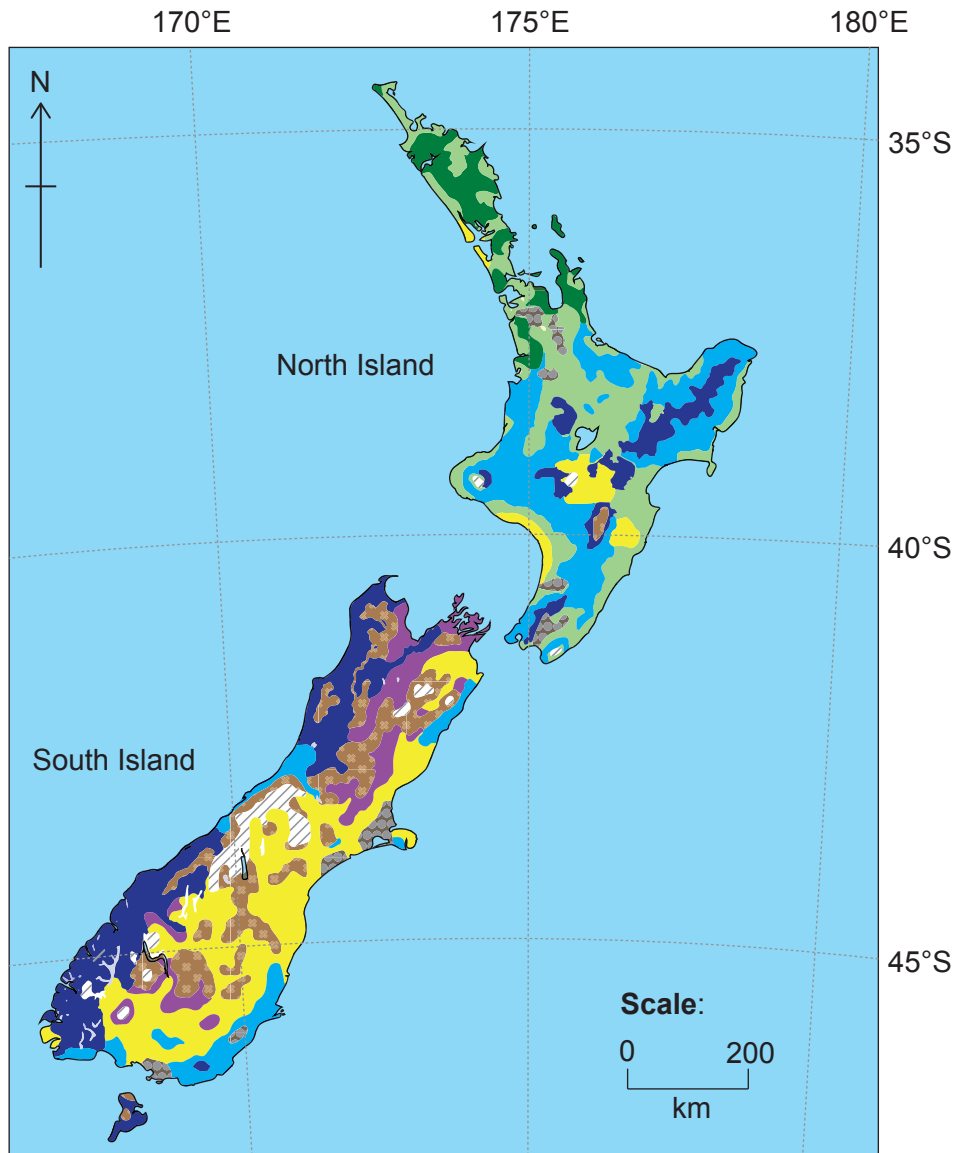


Figure 1(b): Topographic map of New Zealand



**Figure 1(c): Vegetation map of New Zealand**



**Key:**

- |                             |                              |                 |
|-----------------------------|------------------------------|-----------------|
| ■ Subtropical rainforest    | ■ Temperate broadleaf forest | ■ Shrub steppe  |
| ■ Subtropical laurel forest | ▨ Highland steppe            | ■ Grass steppe  |
| ■ Temperate rainforest      | ■ Alpine shrubland           | ■ Bog and swamp |

**Figure 1(d): Fact file on New Zealand**

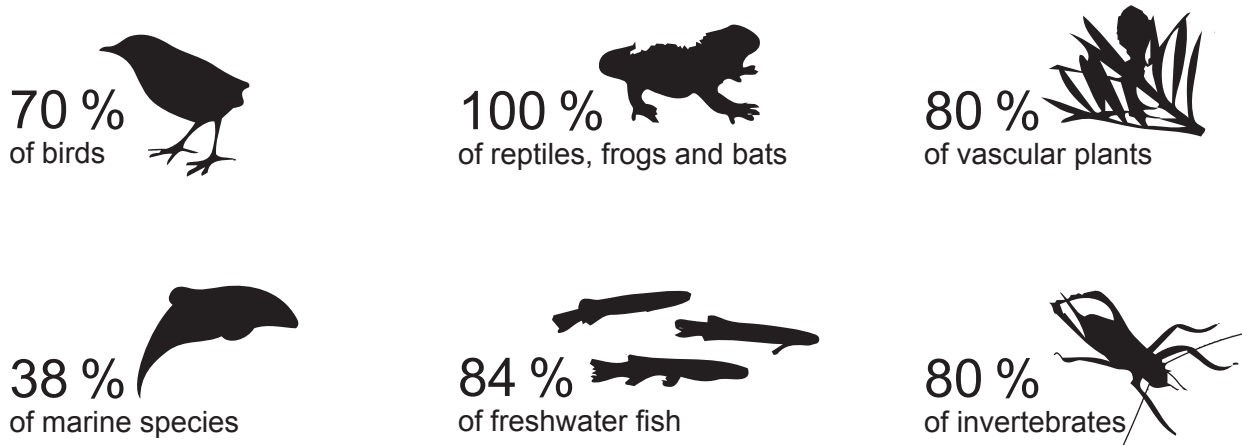
- Over a third of the land area is covered by forest.
- Over half the land area supports crops or livestock.
- Main exports include dairy products (eg, milk powder, butter, cheese), eggs, honey, meat, wool and wood.
- Main imports include vehicles, machinery, electrical goods and fuel oil.
- Car ownership levels are high and in 2021, there were 889 vehicles per 1000 people.

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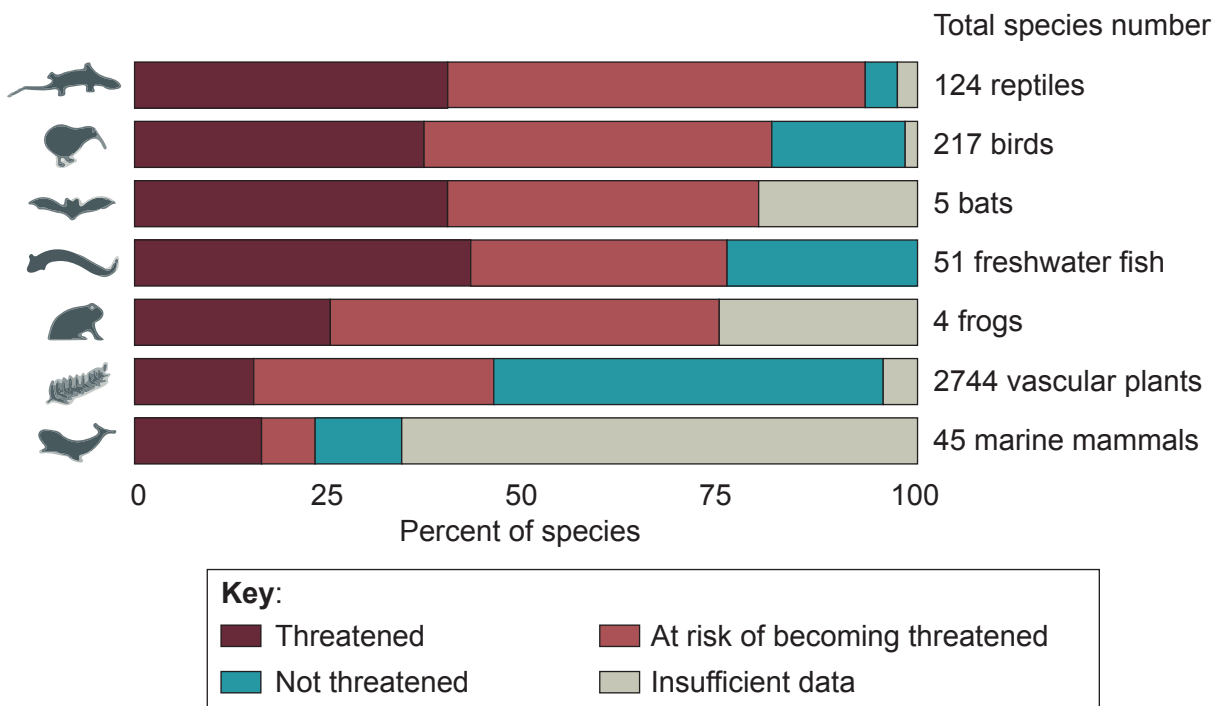
### Figure 2(a): Fact file on biodiversity in New Zealand

- New Zealand is a geographically isolated island system which became separated from the southern supercontinent 85 million years ago.
- New Zealand has many endemic species (found nowhere else). These include flightless birds (eg, Kiwi, Kākāpō and Takahē) which evolved in the absence of terrestrial ground predators.

### Figure 2(b): Proportion of New Zealand species that are endemic (found nowhere else)



### Figure 2(c): Percentage of New Zealand species by extinction threat categories



**Figure 3(a): Image of a Kākāpō (*Strigops habroptilus*)**



**Figure 3(b): Fact file on the Kākāpō**

- A flightless, nocturnal parrot only found in New Zealand.
- They are herbivores eating roots, leaves and fruit.
- Of important cultural, spiritual and traditional significance to the Māori (indigenous people of New Zealand).
- Reach sexual maturity at about 5 years old and breed once every 2–3 years. They have a life expectancy of up to 90 years.
- Prior to arrival of humans in New Zealand, Kākāpō lived throughout both the North Island and South Island.
- Threats include hunting, habitat loss and predation by introduced mammals (eg, rats, cats and stoats).
- Classified as critically endangered by the IUCN Red List.
- Between 1980 and 1987 due to the threats from predators and declining numbers, all remaining Kākāpōs were moved to three offshore islands on which predator eradication projects had begun.
- The Kākāpō Recovery program includes the Department of Conservation, independent experts, various Māori tribes and thousands of volunteers. It involves:
  - monitoring the birds and nesting sites
  - on-going surveillance and use of predator traps to ensure there are no predators on the islands
  - provision of supplementary food to encourage successful breeding and also when natural food supplies are low
  - artificial incubation and hand rearing when necessary
  - use of artificial insemination to increase the number of offspring (as fertility rates have been low).

Figure 3(c): Distribution of the Kākāpō

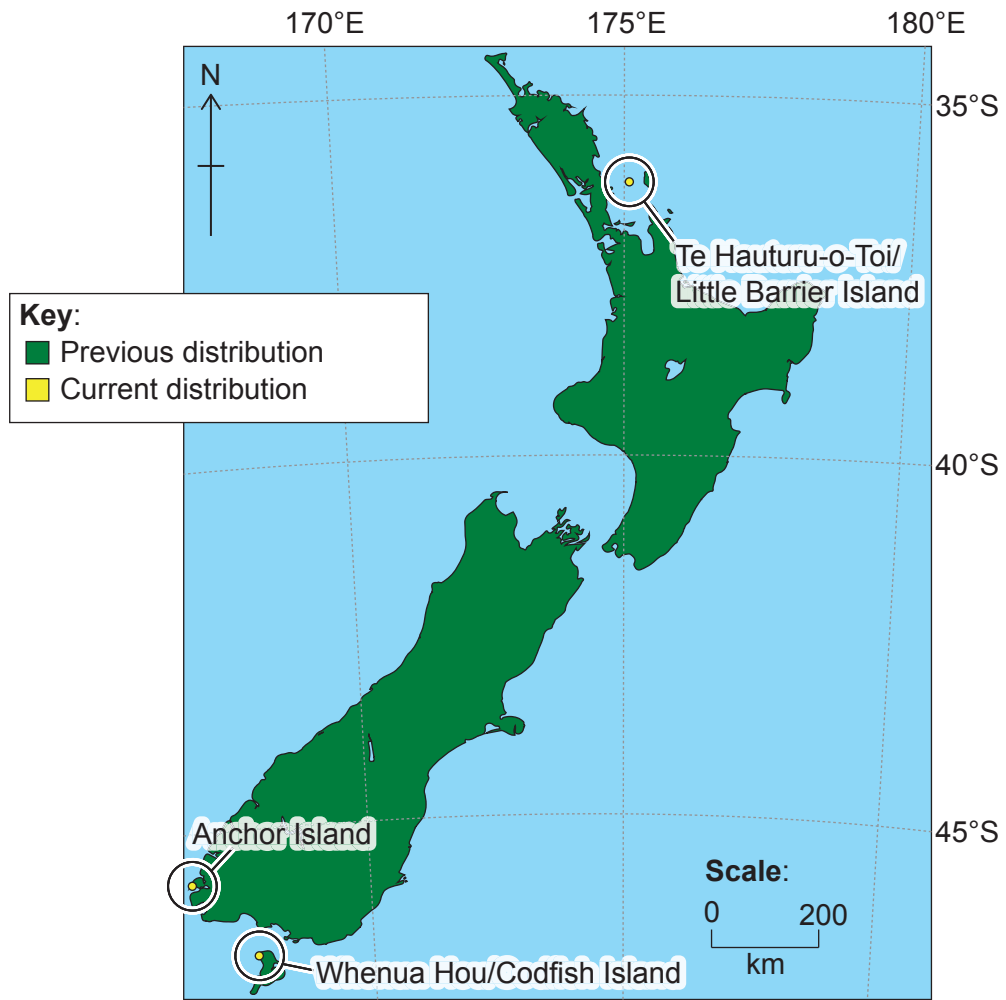
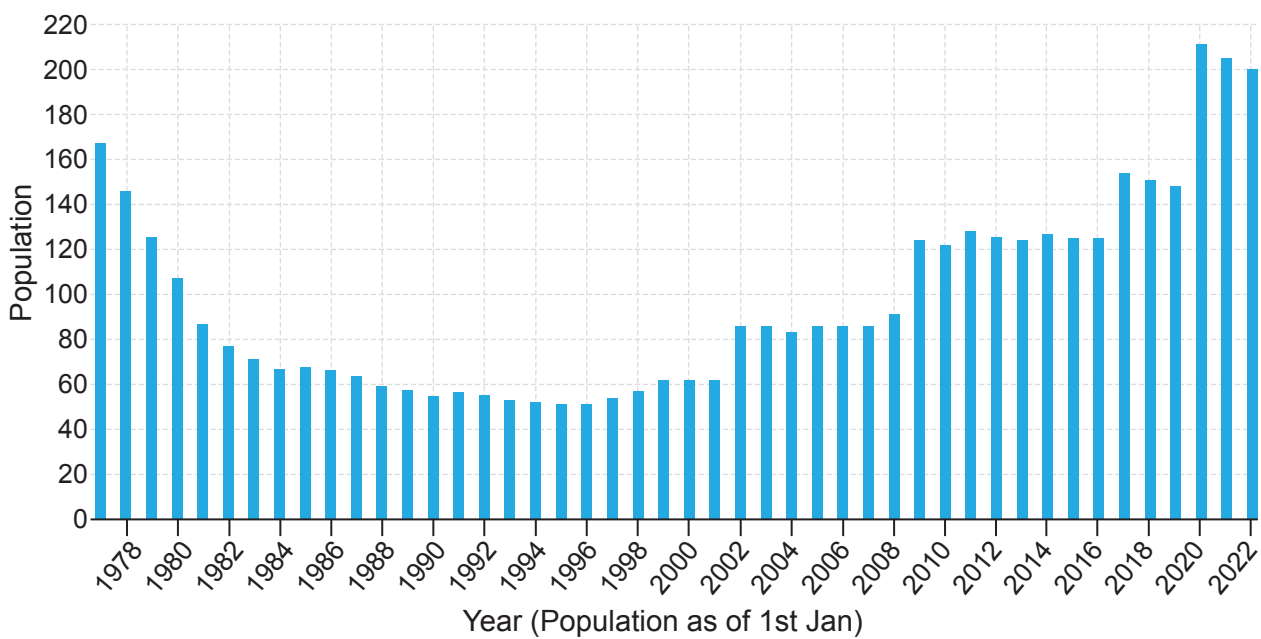
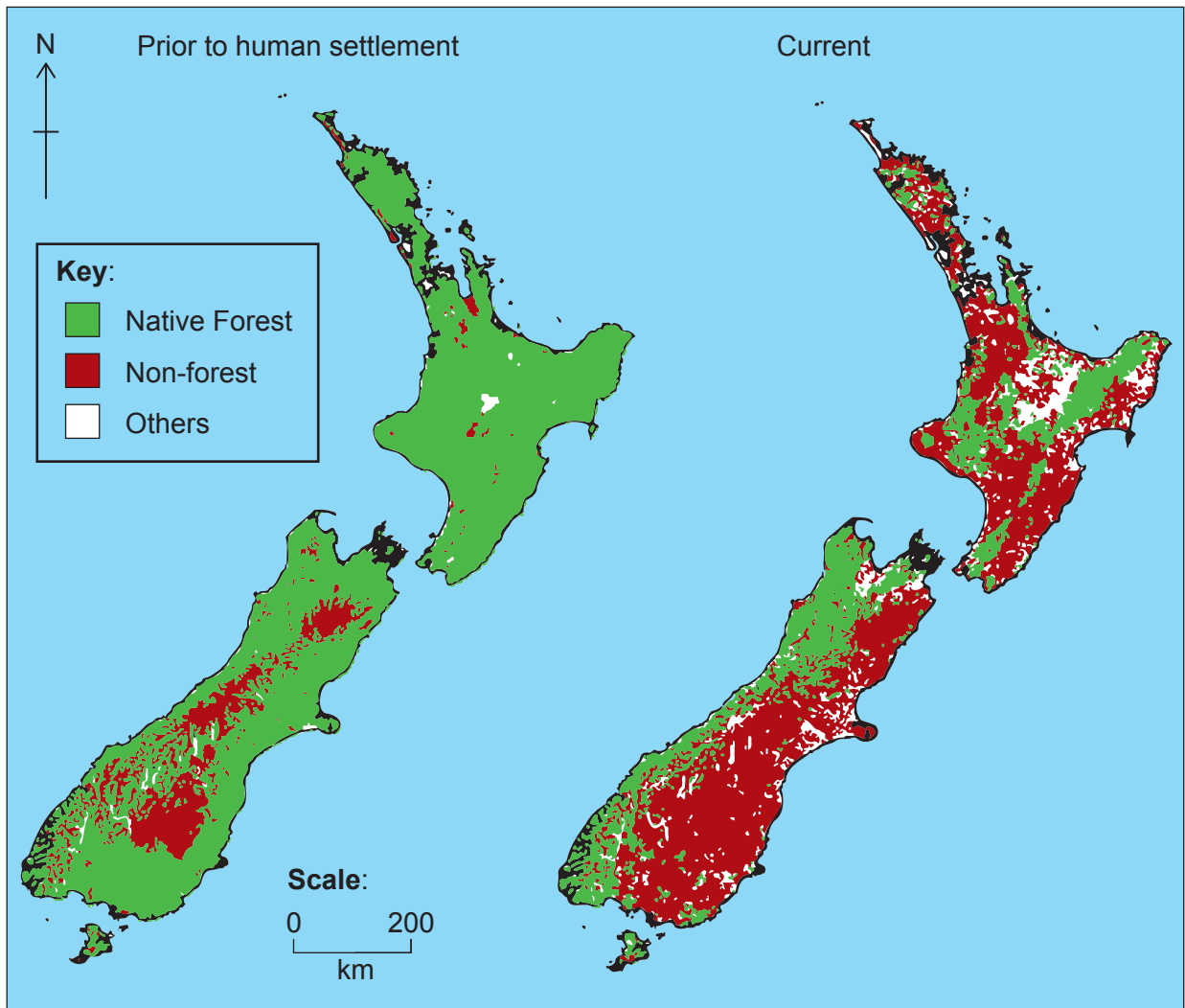


Figure 3(d): Kākāpō population, 1977 to 2022

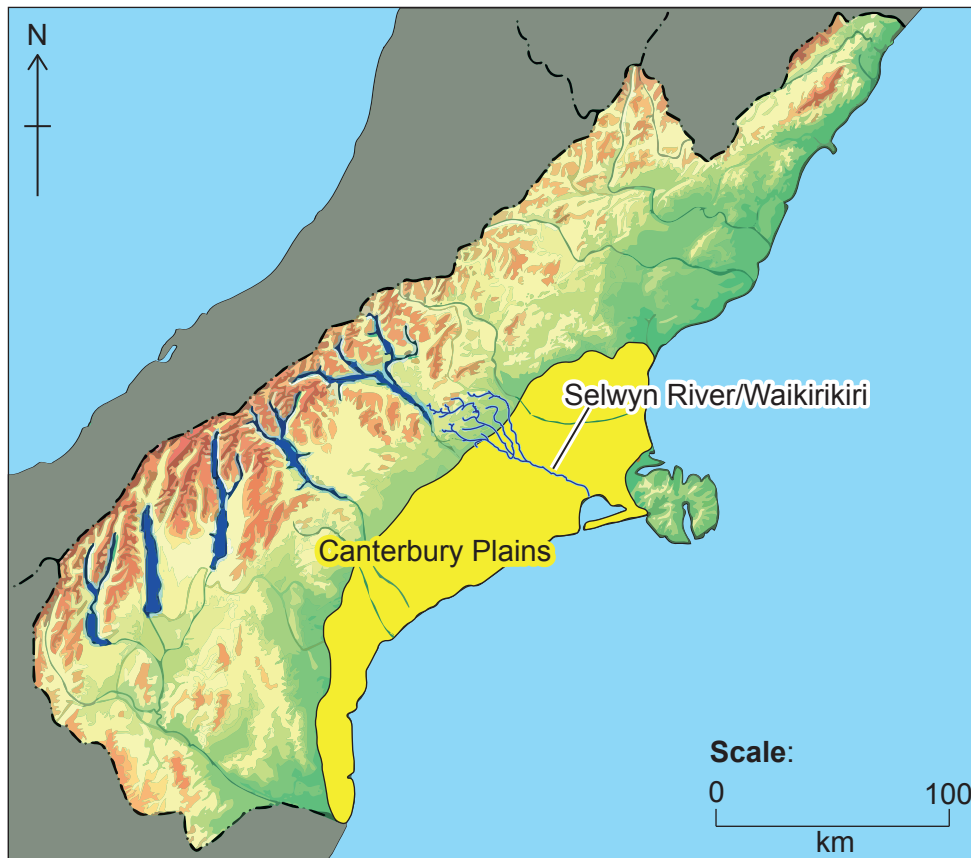


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Figure 4: Change in forest cover in New Zealand



**Figure 5(a): The Canterbury region on the South Island, New Zealand**



[Source: <https://www.freeworldmaps.net/oceania/new-zealand/canterbury/canterbury-blank-map.jpg>.]

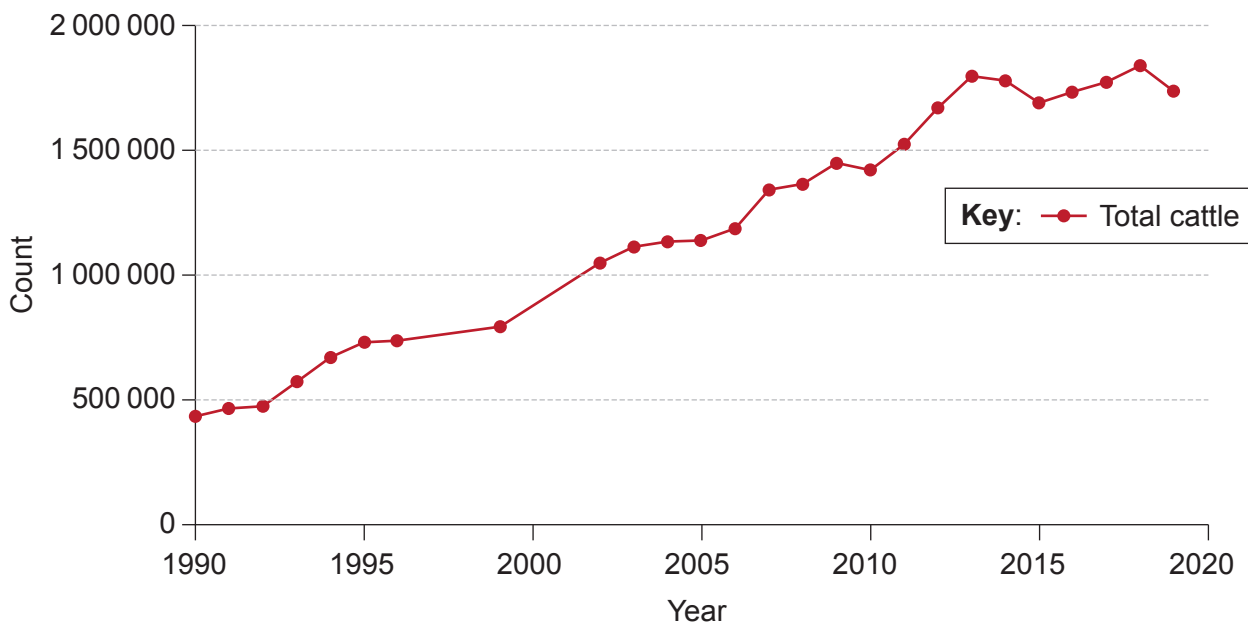
**Figure 5(b): Fact file on the Canterbury region**

- The largest region in the country by area.
- Includes the Canterbury Plains, New Zealand's largest area of flat land which:
  - is used for a mix of intensive farming activities ranging from growing wheat and barley to sheep and cattle (dairy and beef) farming
  - produces the majority of New Zealand's grains and crops.

Figure 5(c): Agriculture on the Canterbury Plains



Figure 5(d): Cattle numbers, the Canterbury region, New Zealand, 1990-2019



**Figure 6: Population statistics for New Zealand, 2023**

<b>Population</b>	5.11 million
<b>Total fertility rate</b>	1.86 children per woman
<b>Population growth rate</b>	1.06 %
<b>Life expectancy</b>	82.74 years

**Figure 7(a): Main sources of energy used in New Zealand, 2021**

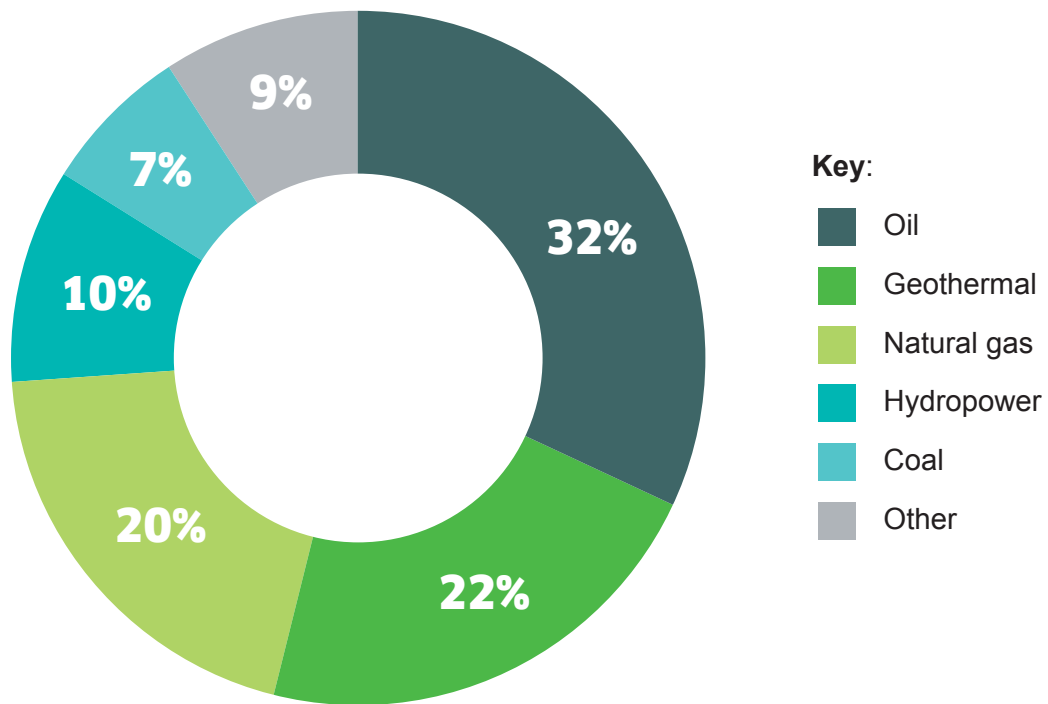


Figure 7(b): Electricity generation in Terawatt hour (TWh) by source in 2020 and projections for 2035 and 2050

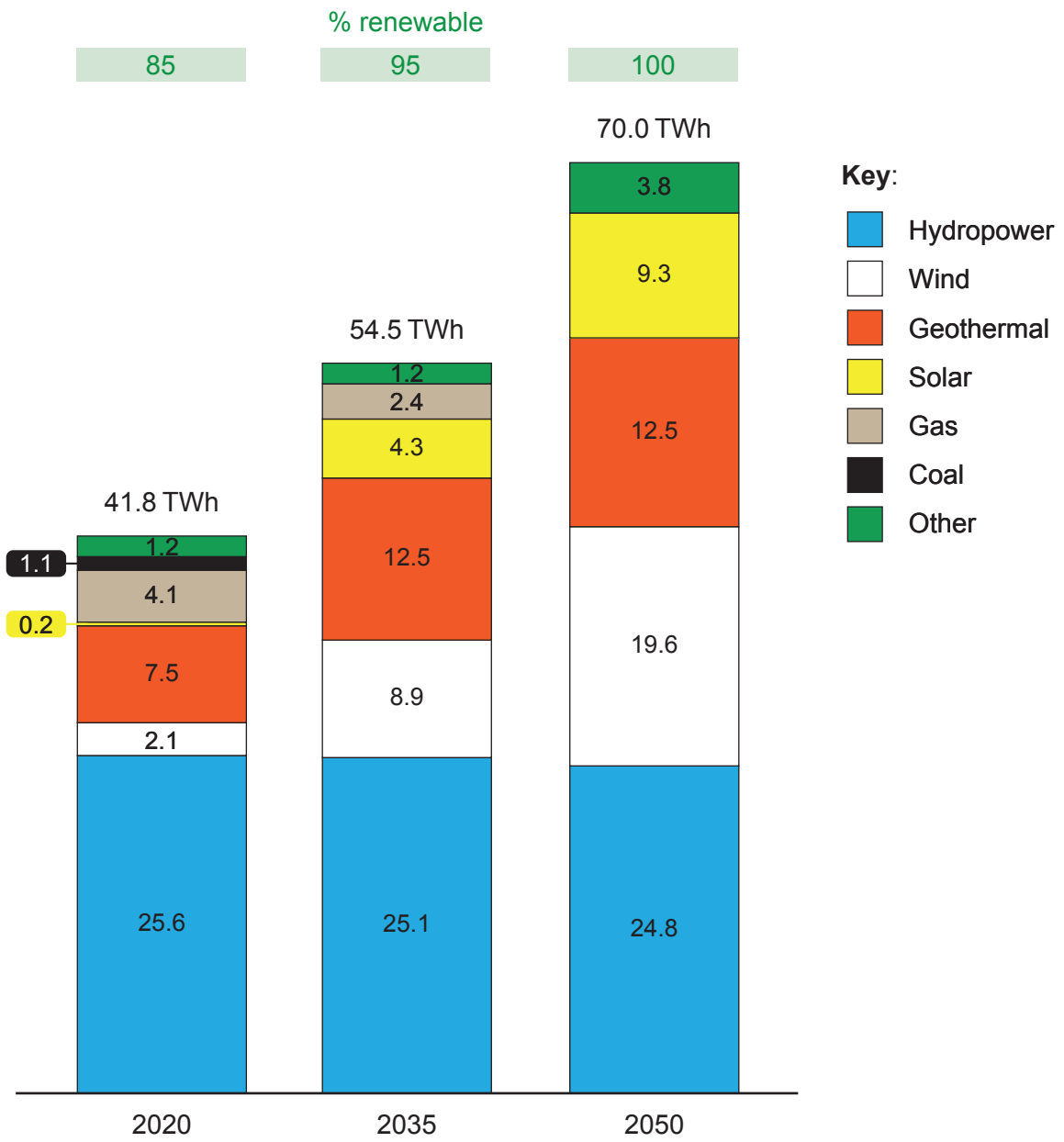
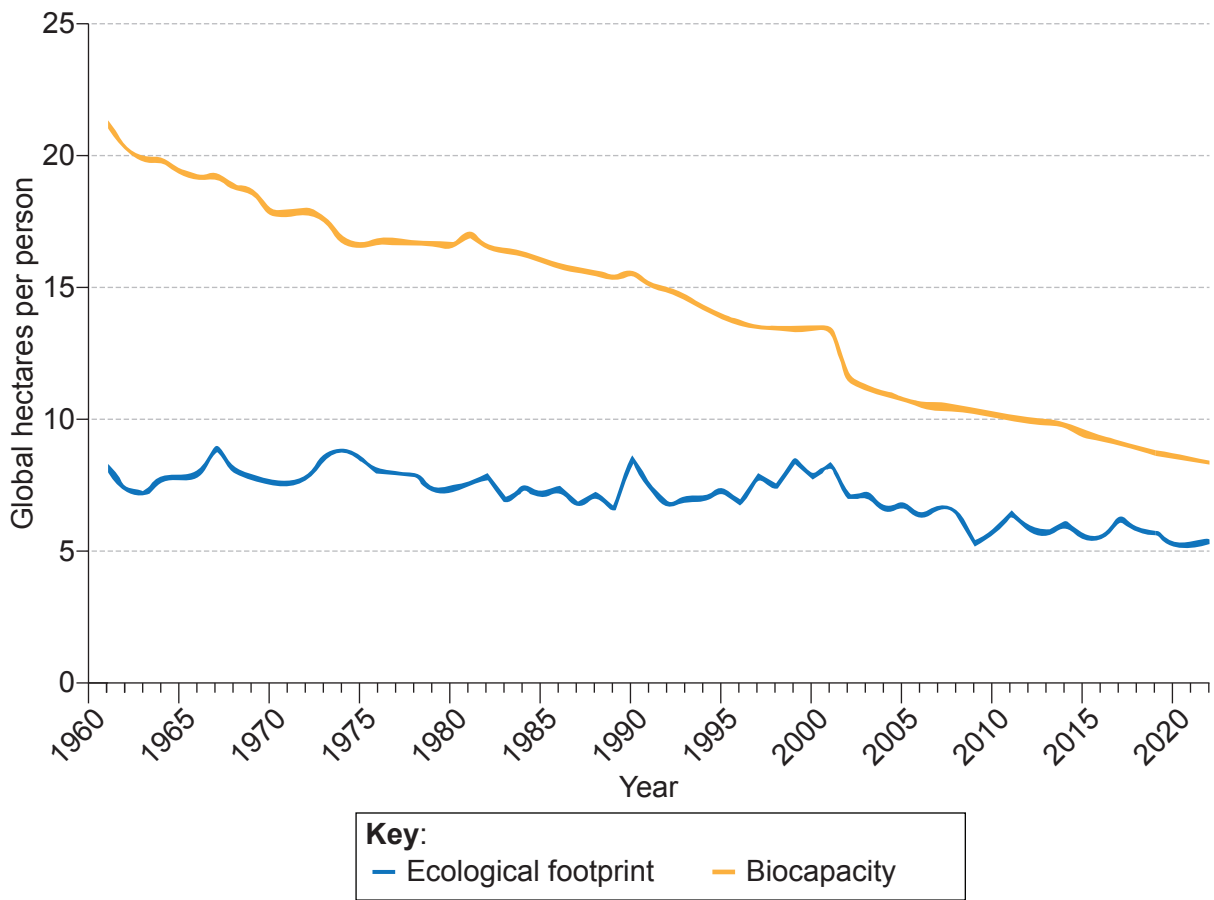
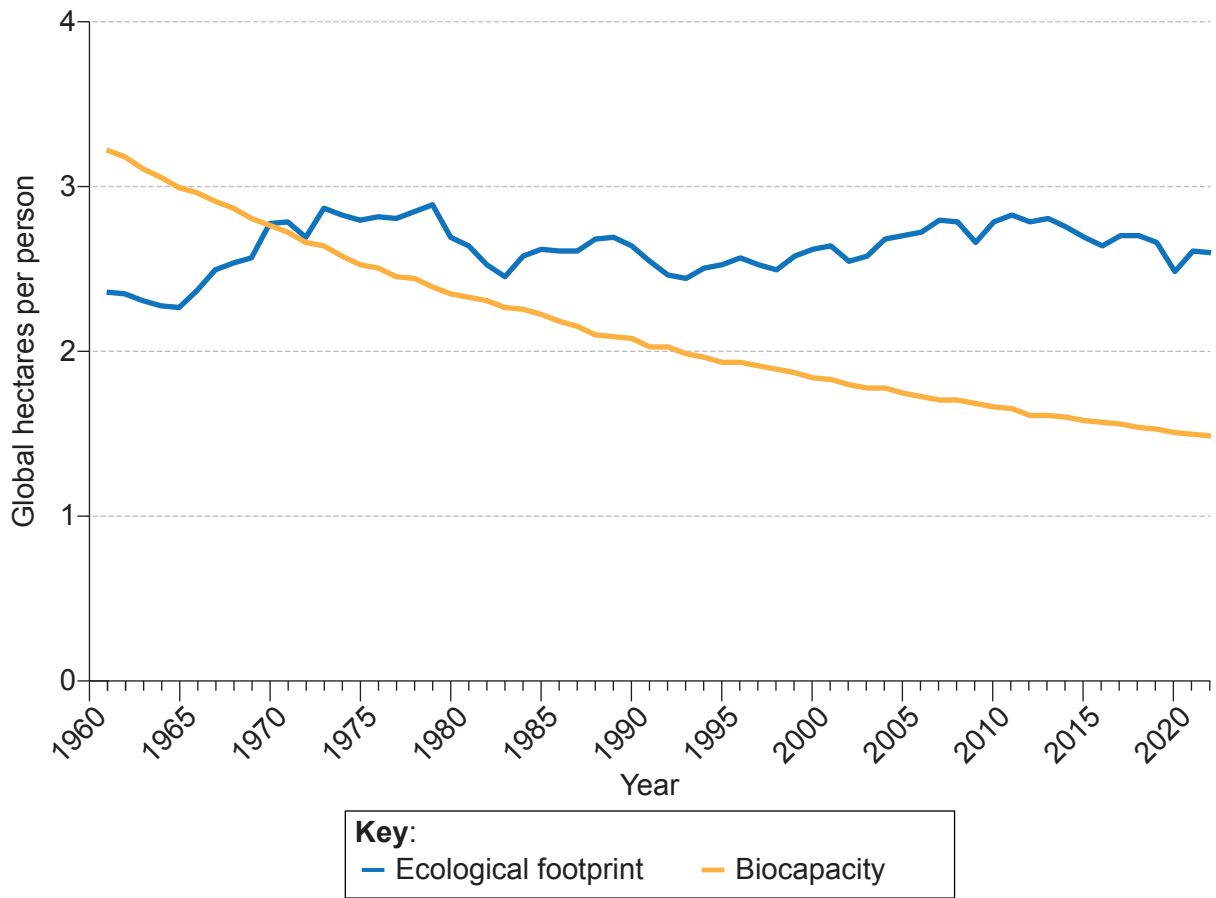


Figure 8(a): Ecological footprint and biocapacity for New Zealand (1961-2022)



Biocapacity is the amount of biological productive land, measured in hectares per person.

**Figure 8(b): Ecological footprint and biocapacity for the World (1961-2022)**



Biocapacity is the amount of biological productive land, measured in hectares per person.

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**References:**

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- Figure 2(b)** Department of Conservation (NZ). <https://www.doc.govt.nz/globalassets/documents/conservation/protecting-and-restoring/biodiversity-discussion-document.pdf> - Figure 1. Licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>. Image adapted.

- Figure 2(c)** Stats NZ Tatauranga Aotearoa. <https://www.stats.govt.nz/news/our-indigenous-species-are-at-risk-of-extinction/#percentage%20>. Licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/deed.en>. Image adapted.
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- Figure 3(c)** Department of Conservation (NZ). <https://www.doc.govt.nz/nature/native-animals/birds/birds-a-z/kakapo/>. Under Creative Commons license CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>. Source adapted.
- Figure 3(d)** Department of Conservation (NZ). <https://www.doc.govt.nz/our-work/kakapo-recovery/what-we-do/history/>. Under Creative Commons license CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>. Source adapted.
- Figure 4** Nomura M, Ohlemüller R, Lee WG, Lloyd KM, Anderson BJ (2019) Can we predict which species win when new habitat becomes available? PLoS ONE 14(9): e0213634. <https://doi.org/10.1371/journal.pone.0213634>. © 2019 Nomura et al. Open access article licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>. Source adapted (redrawn and simplified).
- Figure 5(a)** © www.freeworldmaps.net. <https://www.freeworldmaps.net/oceania/new-zealand/canterbury/canterbury-blank-map.jpg>. Source adapted.
- Figure 5(c)** simonbradfield, 2019. *High Above The Canterbury Plains, New Zealand*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/high-above-the-canterbury-plains-new-zealand-royalty-free-image/1173803326?phrase=agriculture+canterbury+plains&adppopup=true> [Accessed 31 July 2024]. Source adapted.
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- tsvibrav, 2015. *Grazing cows with Southern Alps in the background, New Zealand*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/grazing-cows-with-southern-alps-in-the-background-royalty-free-image/535110033> [Accessed 31 July 2024]. Source adapted.
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- Figure 6** *The World Factbook 2024*. Washington, DC: Central Intelligence Agency, 2024. <https://www.cia.gov>. Public domain. Source adapted.
- Figure 7(a)** Energy Resources Aotearoa, 2024. Our energy mix. [online] Available at: <https://www.energyresources.org.nz/oil-and-gas-new-zealand/our-energy-mix/#:~:text=In%20New%20Zealand%20we%20are,includes%20geothermal%2C%20hydro%20and%20wind.&text=Natural%20gas%20is%20piped%20throughout%20the%20North%20Island%20to%20homes%20and%20businesses> [Accessed 13 October 2023]. Source adapted.
- Energy figures from New Zealand Ministry for Business, Innovation and Employment: Energy in New Zealand 2021 (MBIE). <https://www.mbie.govt.nz/assets/energy-in-new-zealand-2021.pdf>. Crown Copyright ©. Licenced under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>.
- Figure 7(b)** Transpower, 2020. *Whakamana I Te Mauri Hiko: Empowering our Energy Future*. [pdf] New Zealand: Transpower. Available at: <https://tpow-corp-production.s3.ap-southeast-2.amazonaws.com/public/publications/resources/TP%20Whakamana%20i%20Te%20Mauri%20Hiko.pdf?VersionId=FljQmfxCk6MZ9mlvpNws63xFEBXwhX7f> [Accessed 13 October 2023]. Source adapted.
- Figure 8(a)** Footprint Data Foundation, York University Ecological Footprint Initiative, and Global Footprint Network: National Footprint and Biocapacity Accounts, 2023 edition. Downloaded 13 October 2023 from <https://data.footprintnetwork.org>. Licensed under CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0/>.
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