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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

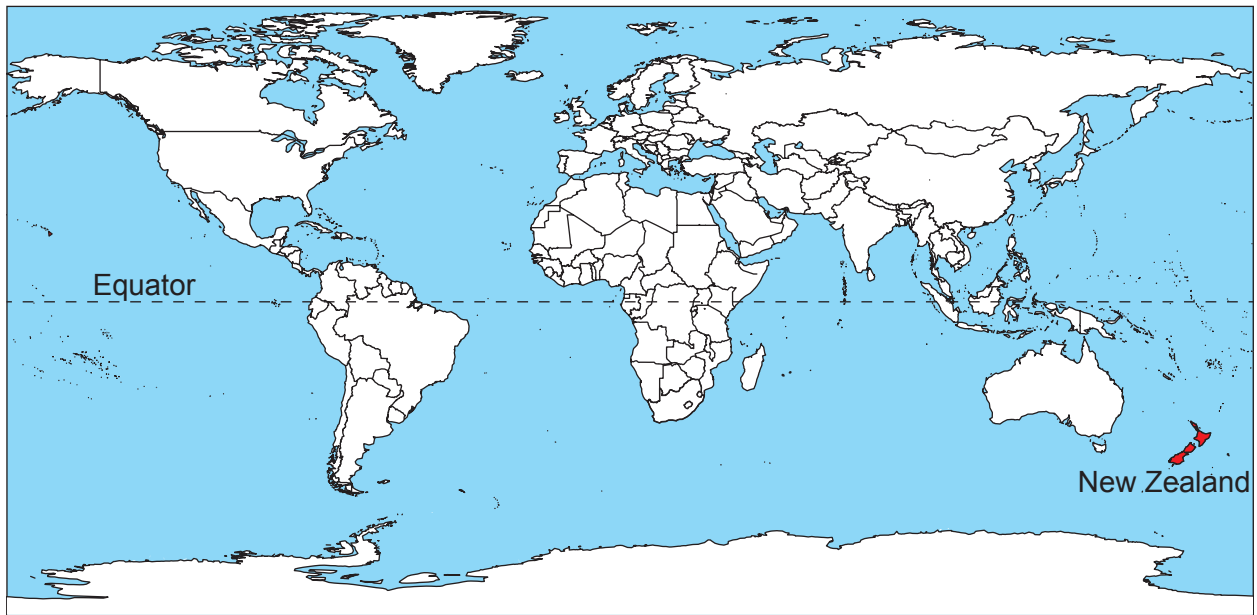
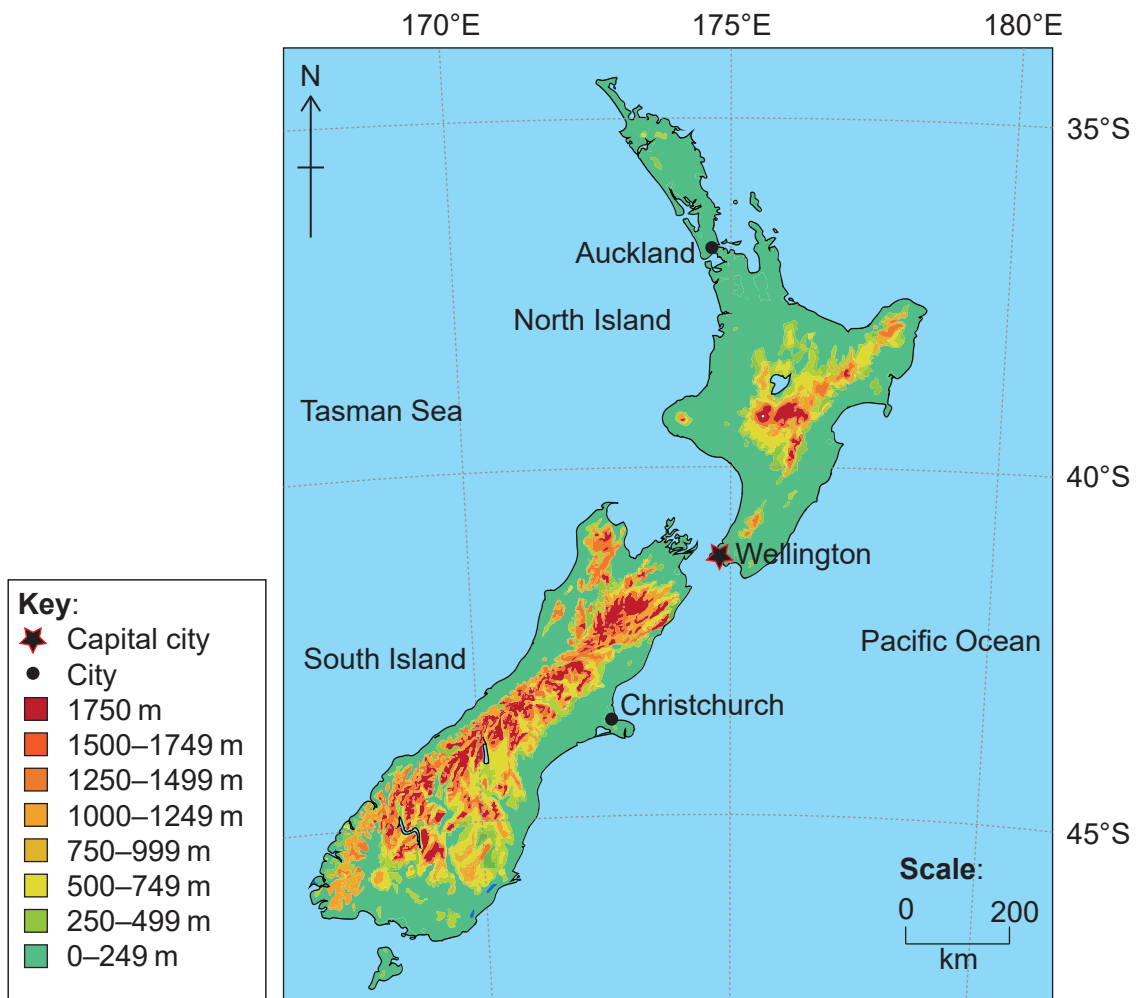
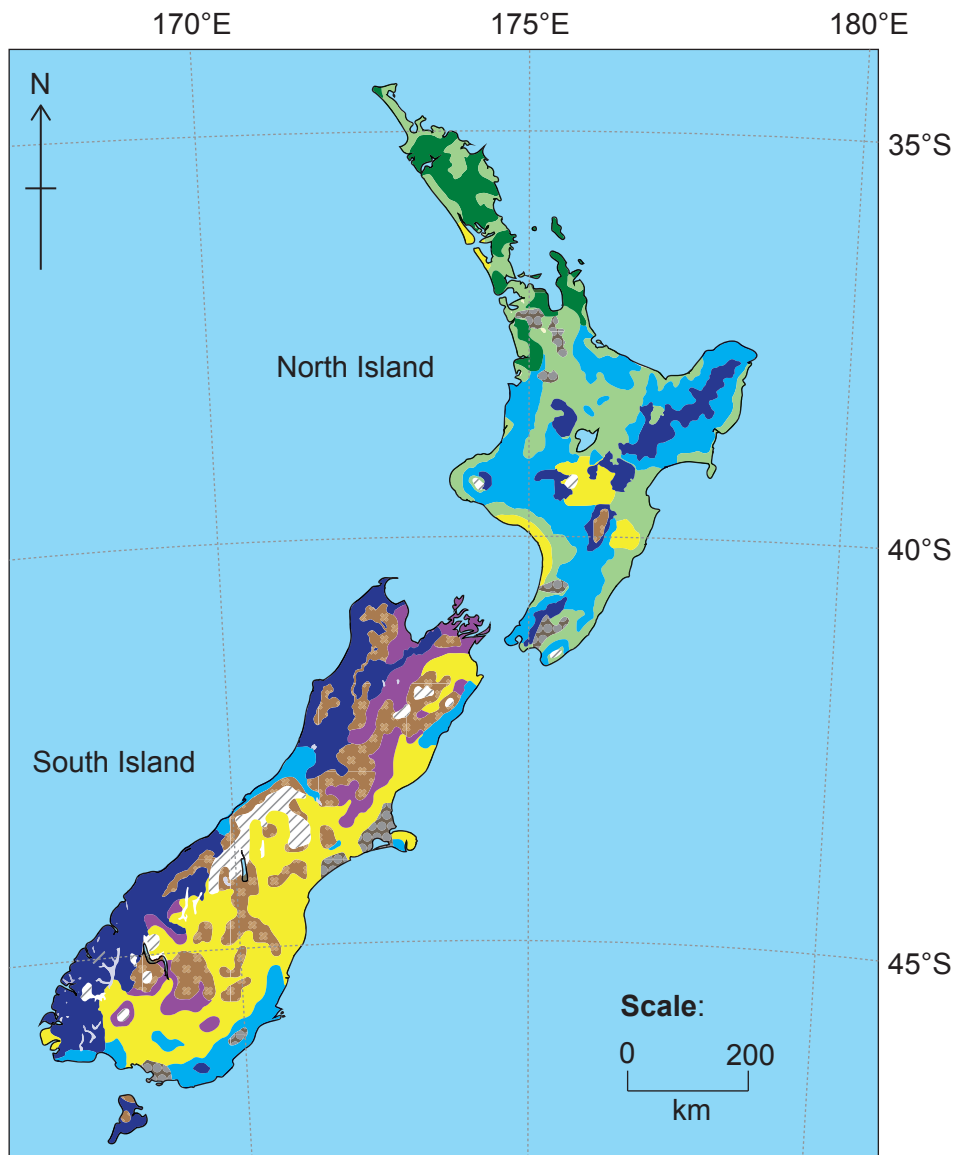


Figure 1(b): Topographic map of New Zealand



**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**

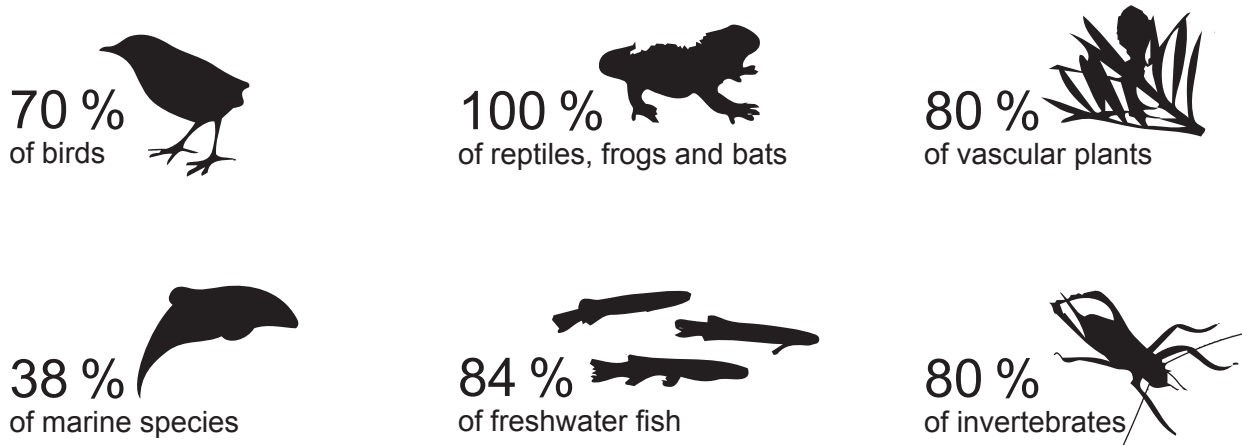
- Over a third of the land area is covered by forest.
- Over half the land area supports crops or livestock.
- Main exports include dairy products (eg, milk powder, butter, cheese), eggs, honey, meat, wool and wood.
- Main imports include vehicles, machinery, electrical goods and fuel oil.
- Car ownership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

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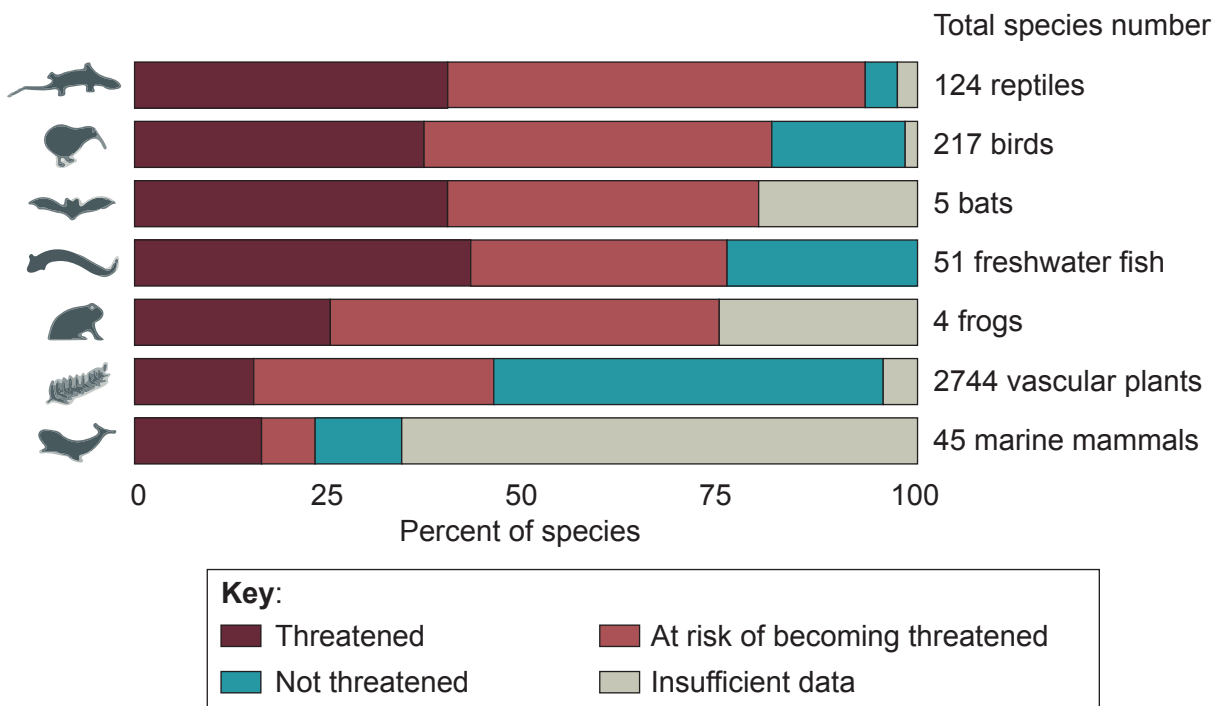
**Figure 2(a): Fact file on biodiversity in New Zealand**

- 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**



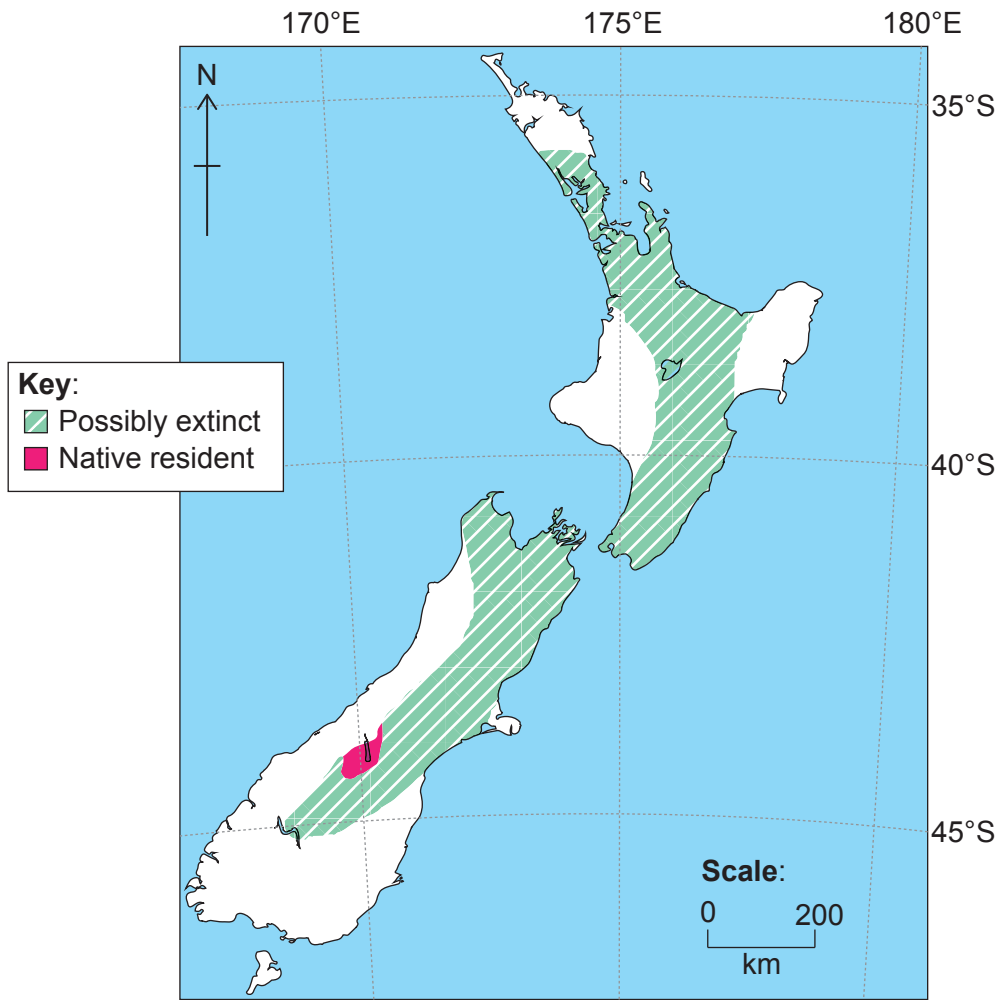
**Figure 3(a): Image of a Black stilt (*Himantopus novaezelandiae*)**



**Figure 3(b): Fact file on the Black stilt**

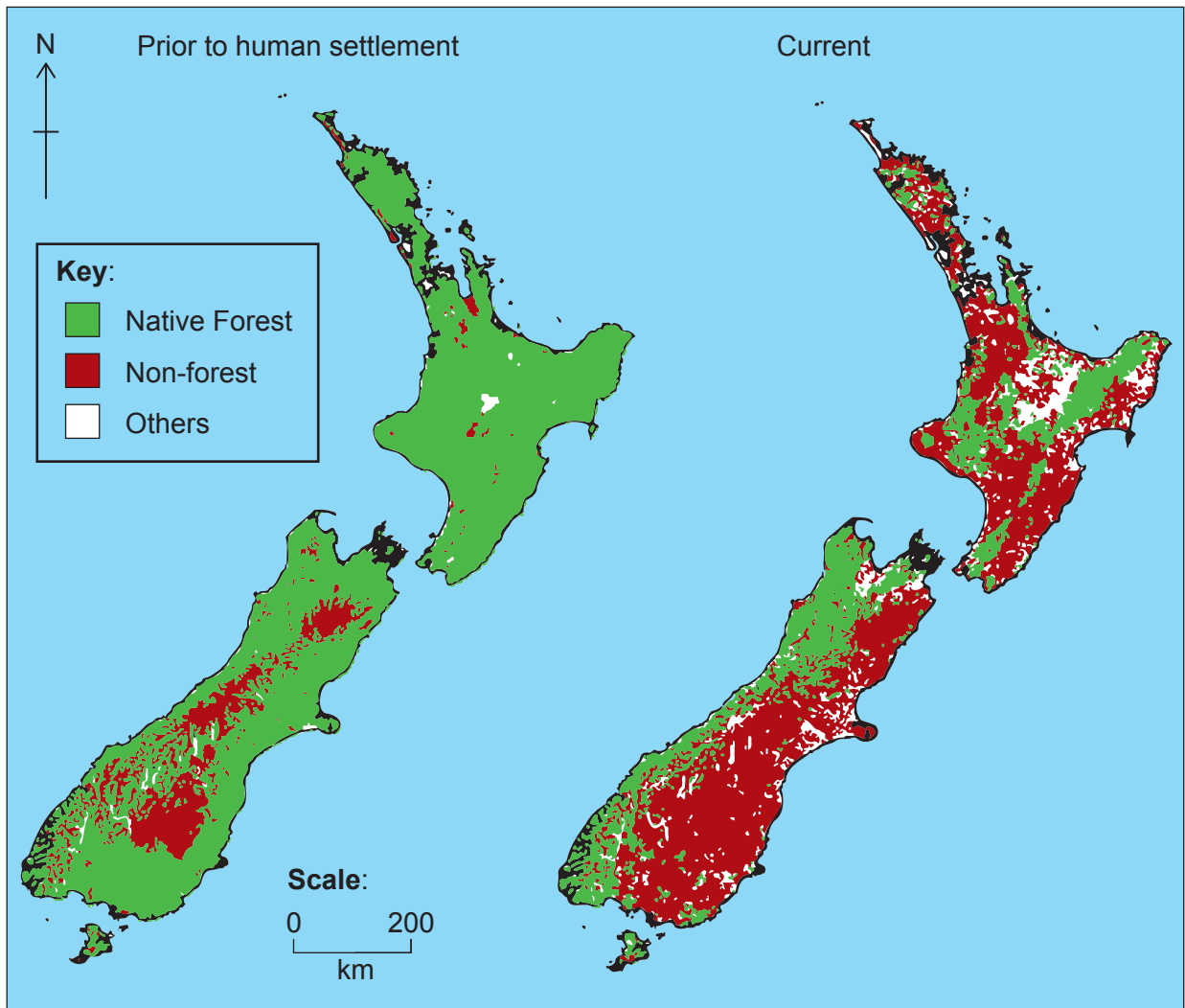
- They are wading birds that eat insects, molluscs, crustaceans, small fish *etc.*
- Categorised as ‘critically endangered’ on the IUCN Red List.
- They were previously found throughout the North and South Islands but are now limited to the rivers and wetlands in the Waitaki Valley, South Island.
- From 500–1000 birds in the 1940s, number declined to 23 birds in 1981.
- Following use of captive breeding programmes numbers have increased to 106 birds in 2017 and 156 birds in 2023.
- Threats include introduced predators (cats, ferrets, stoats, rats, hedgehogs), native predators (Australasian Harrier and Kelp Gull), loss of habitat and human disturbance.
- Habitats have been degraded by invasive weeds, drained for agriculture use and modified for hydroelectric power.
- Conservation management strategy includes:
  - aiming to create and maintain predator free habitats
  - habitat restoration of rivers and wetlands in the upper Waitaki Basin
  - collection of eggs from wild and captive birds, which are then hatched in captivity away from predators. When the birds are large enough to fend for themselves, they are released into the wild.

Figure 3(c): Distribution of the Black stilt

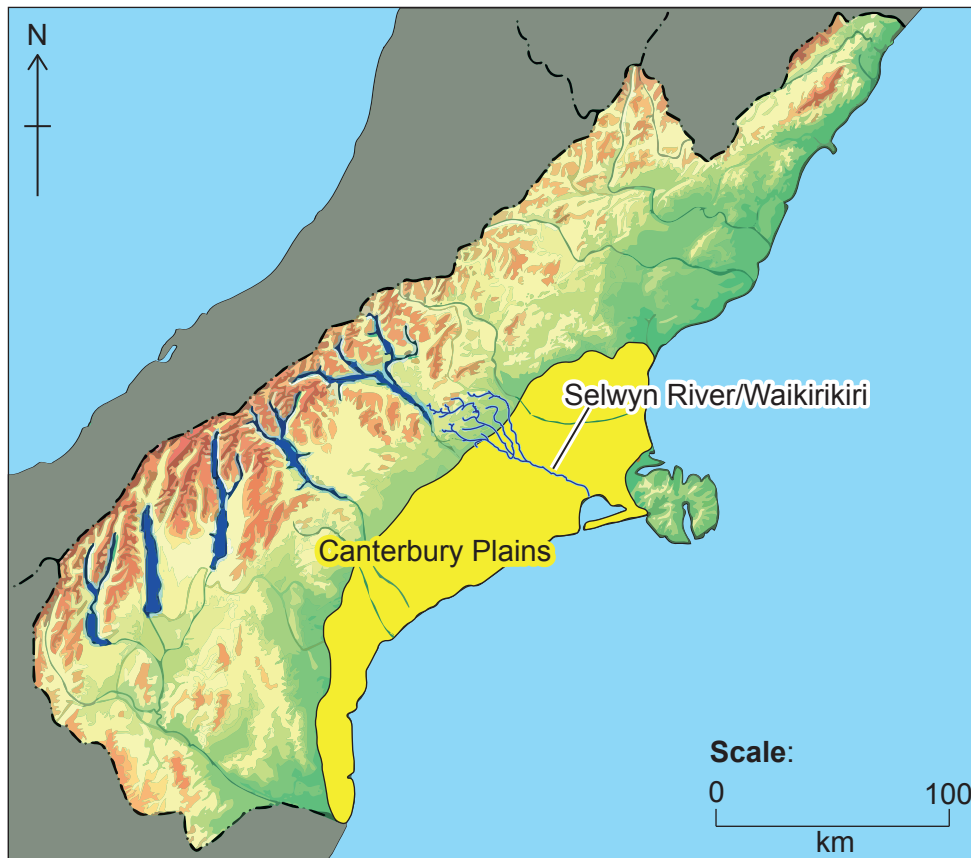


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Figure 4: Change in forest cover in New Zealand



**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

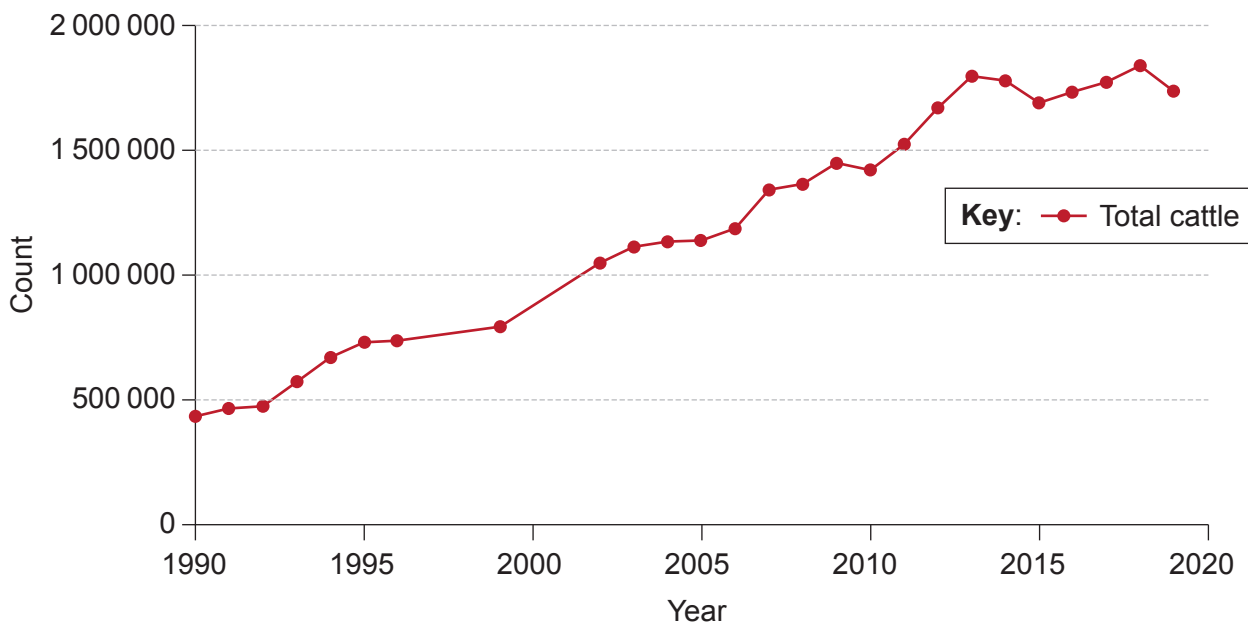
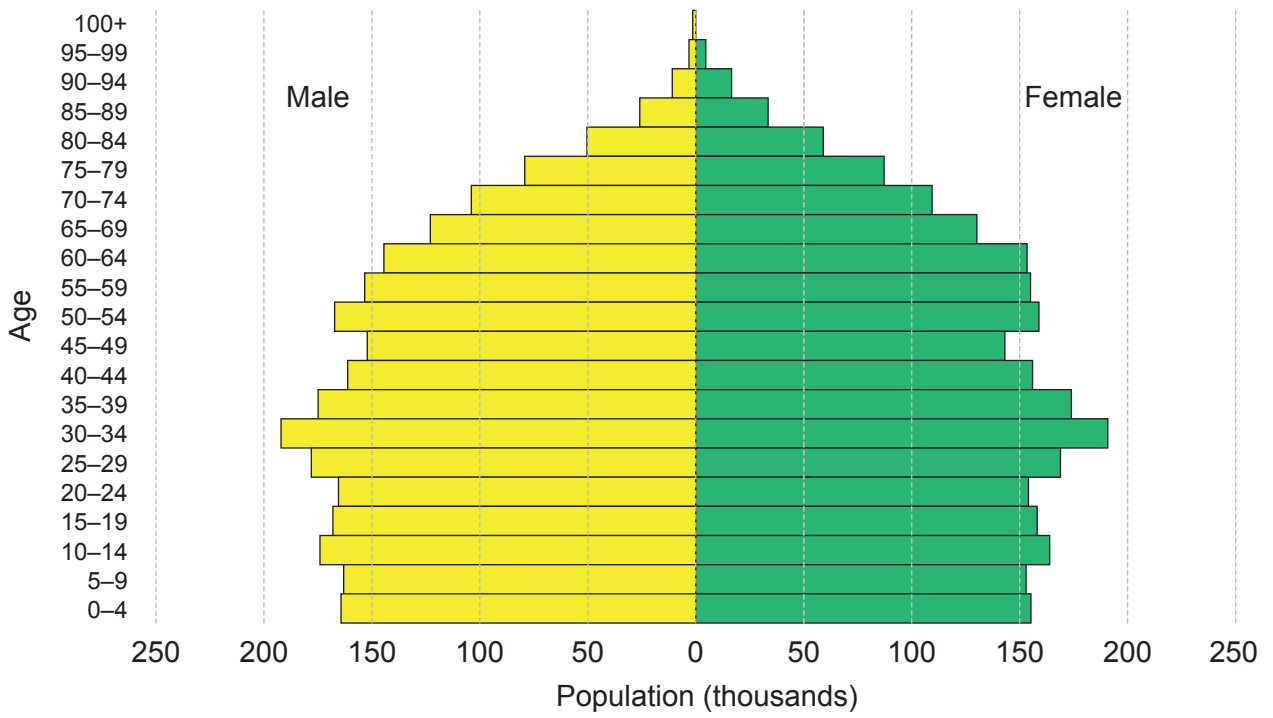
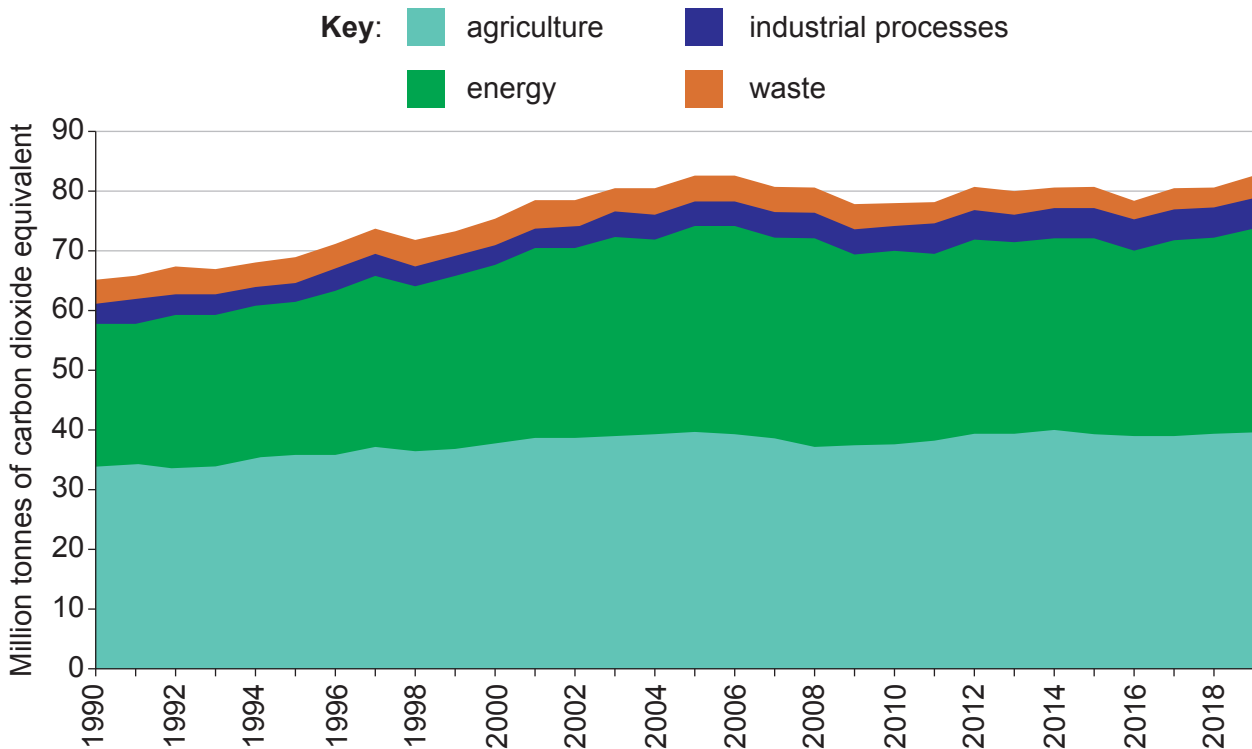


Figure 6: Age-gender pyramid for New Zealand, 2023



**Figure 7(a): Carbon dioxide equivalent emissions by sector in New Zealand, 1990–2019**



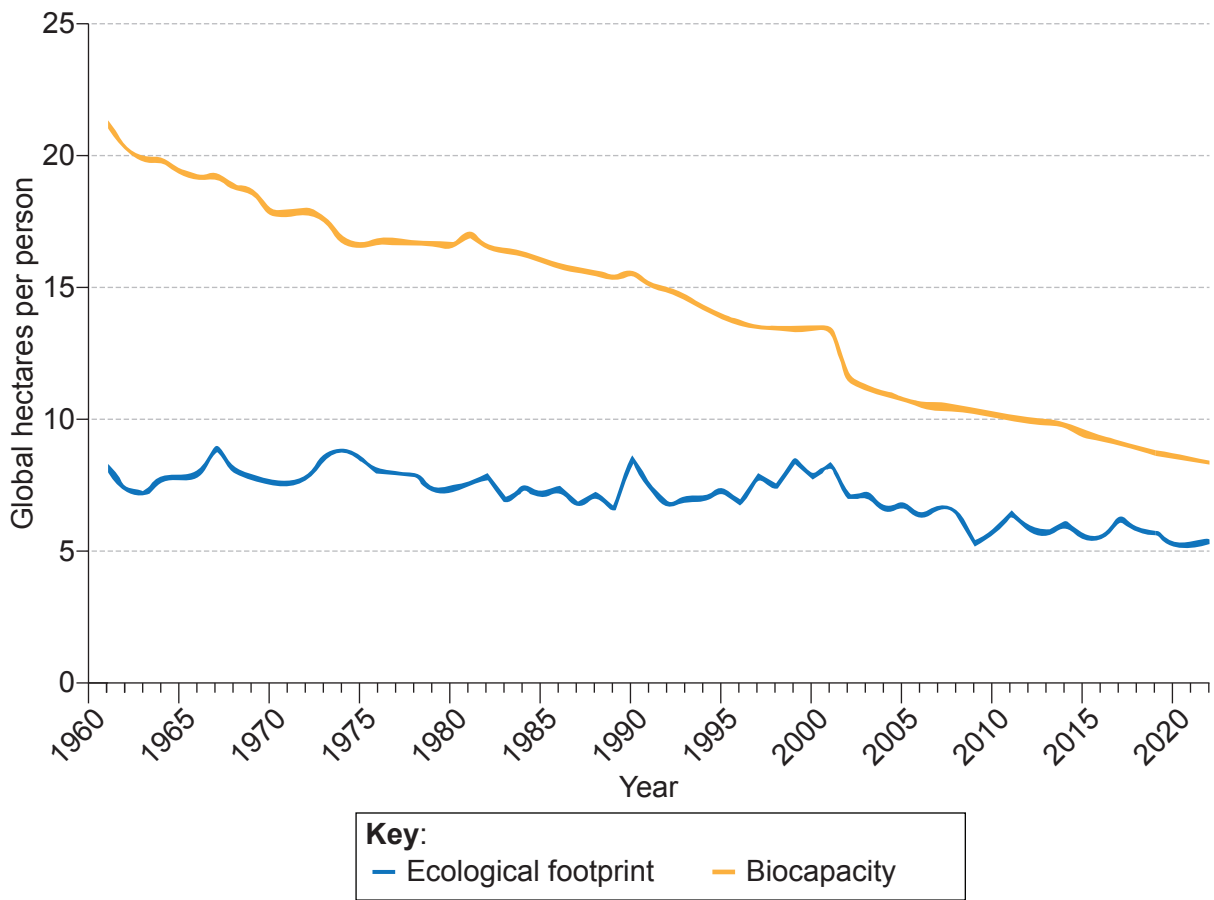
**Figure 7(b): Fact file on New Zealand’s response to climate change**

- They pledged to cut greenhouse gases (GHG) emissions by 30 % below 2005 levels by 2030 (Paris 2015 Agreement).
- They aim to reach net zero carbon emissions by 2050.

New Zealand aims to achieve this by:

- increasing renewable energy use
- producing all electricity from renewables
- improving energy efficiency
- using carbon emissions trading scheme (ETS) and having emission reduction goals
  - The total allowable emissions of carbon are limited by government and reduced periodically.
  - Industries that emit carbon need to pay per unit of emission.
  - Carbon emissions are traded in units.
  - Activities that have a net absorption of carbon (eg forestry) can gain credits that can be sold to emitters.
  - To offset their emissions, industries need to buy these units from the government or other businesses.

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



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

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**References:**

**Figure 1(c)** Fährtenleser. [https://commons.wikimedia.org/wiki/File:New\\_Zealand\\_Natural\\_Vegetation.png](https://commons.wikimedia.org/wiki/File:New_Zealand_Natural_Vegetation.png). Licensed under CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0/deed.en>. Image adapted.

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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 Tauranga 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.
- Figure 3(a)** Manakin, 2020. *Black stilt, rare and endangered bird of New Zealand*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/black-stilt-rare-and-endangered-bird-of-new-zealand-royalty-free-image/1216604253?phrase=black+stilt&adppopup=true> [Accessed 31 July 2023]. Source adapted.
- Figure 3(b)** BirdLife International (2016). Species factsheet: Black Stilt *Himantopus novaezelandiae*. Downloaded from <https://datazone.birdlife.org/species/factsheet/black-stilt-himantopus-novaezelandiae> on 13 October 2023.
- Figure 3(c)** BirdLife International (2016). Species factsheet: Black Stilt *Himantopus novaezelandiae*. Downloaded from <https://datazone.birdlife.org/species/factsheet/black-stilt-himantopus-novaezelandiae> on 13 October 2023.
- 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.
- CHellyar, 2009. *Harvesting wheat on Canterbury plains*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/harvesting-wheat-on-the-canterbury-plains-royalty-free-image/152515327?phrase=canterbury+plains+combine+harvester&adppopup=true> [Accessed 31 July 2024]. Source adapted.
- John\_Kasawa, 2014. *Sheep farmland in Canterbury region, New Zealand*. [online image] Available at: <https://www.gettyimages.co.uk/detail/photo/sheep-farmland-in-canterbury-region-new-zealand-royalty-free-image/498403435?phrase=agriculture%2Bcanterbury%2Bplains> [Accessed 31 July 2024]. Source adapted.
- 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.
- Figure 5(d)** This work is based on/includes Stats NZ's data, which are licensed by [Stats NZ](https://www.stats.govt.nz) (www.stats.govt.nz) for reuse under the [Creative Commons Attribution 4.0 International licence](https://creativecommons.org/licenses/by/4.0/deed.en) (<https://creativecommons.org/licenses/by/4.0/deed.en>).
- Figure 6** *The World Factbook 2024*. Washington, DC: Central Intelligence Agency, 2024. <https://www.cia.gov>. Public domain. Source adapted.
- Figure 7(a)** New Zealand Ministry for the Environment. Crown copyright ©. <https://environment.govt.nz/assets/Publications/Files/new-zealands-greenhouse-gas-inventory-1990-2018-snapshot.pdf>. Licensed under CC BY 4.0 <https://creativecommons.org/licenses/by/4.0/>. Source adapted.
- Figure 8** 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/>.