A-level
GEOGRAPHY

Paper 1 Physical geography

7037/1

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FIGURE 1a
Change in lake and river surface water temperature by global distribution between 1970 and 2010

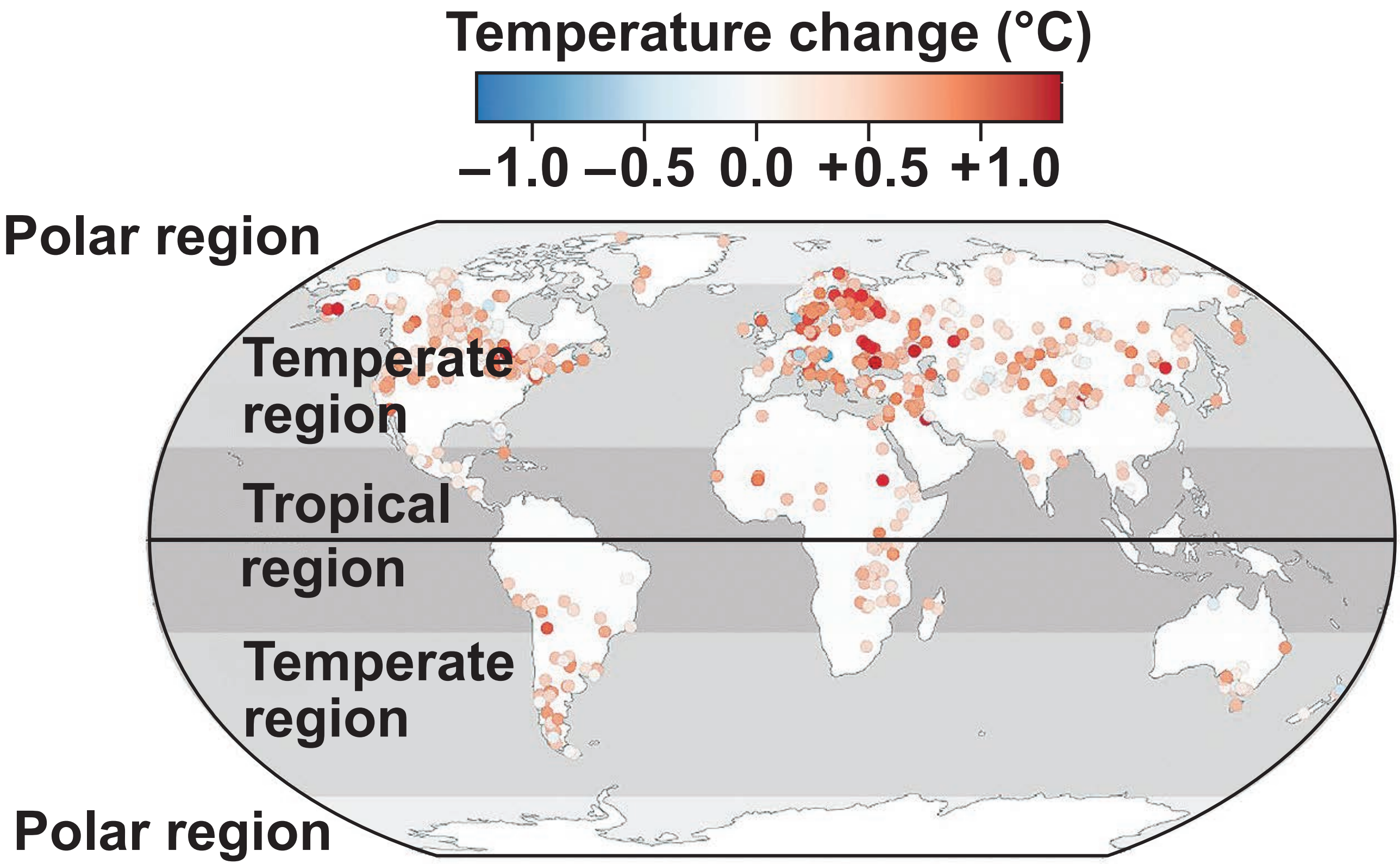

FIGURE 1b
Change in lake and surface water temperature by latitude between 1970 and 2010

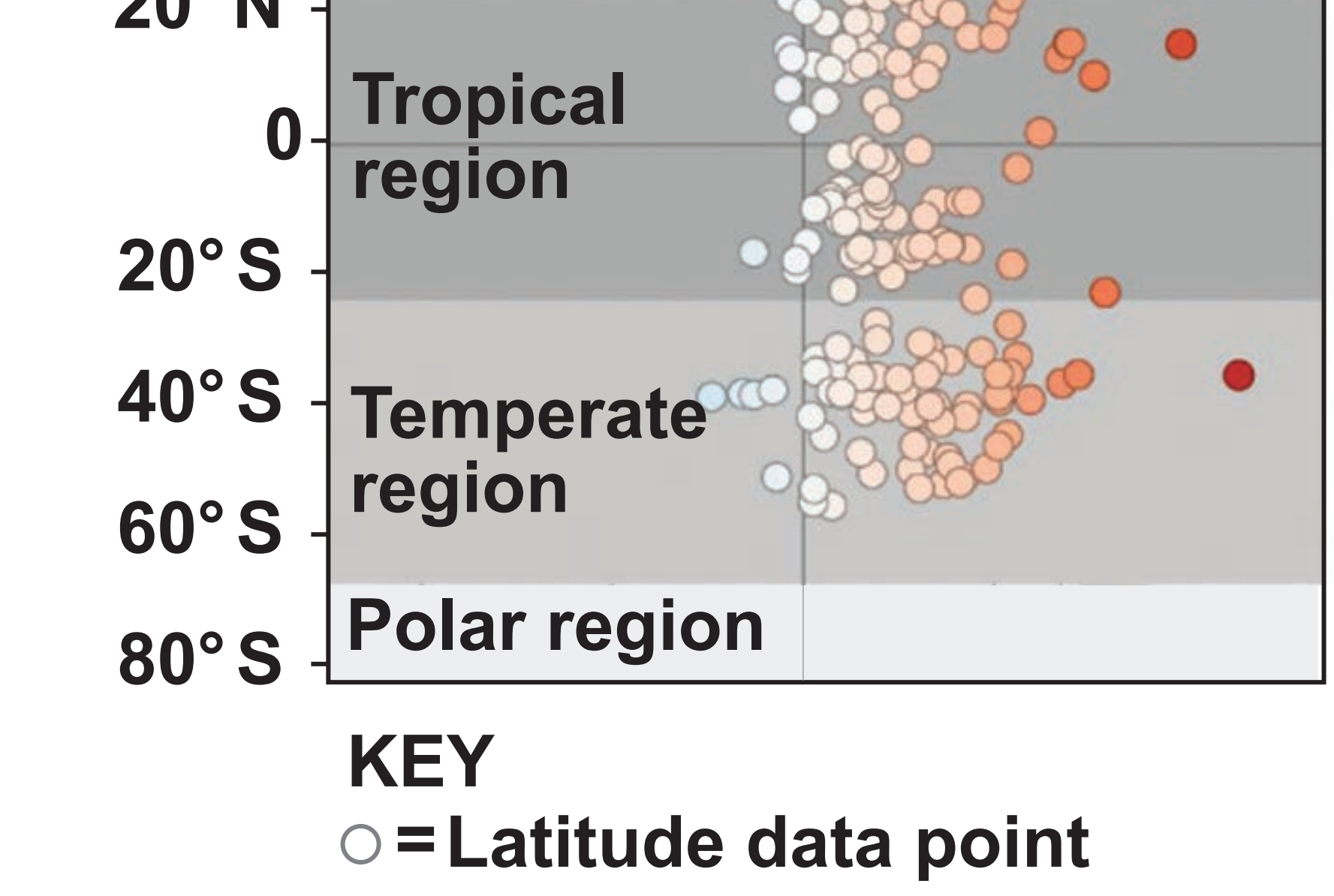

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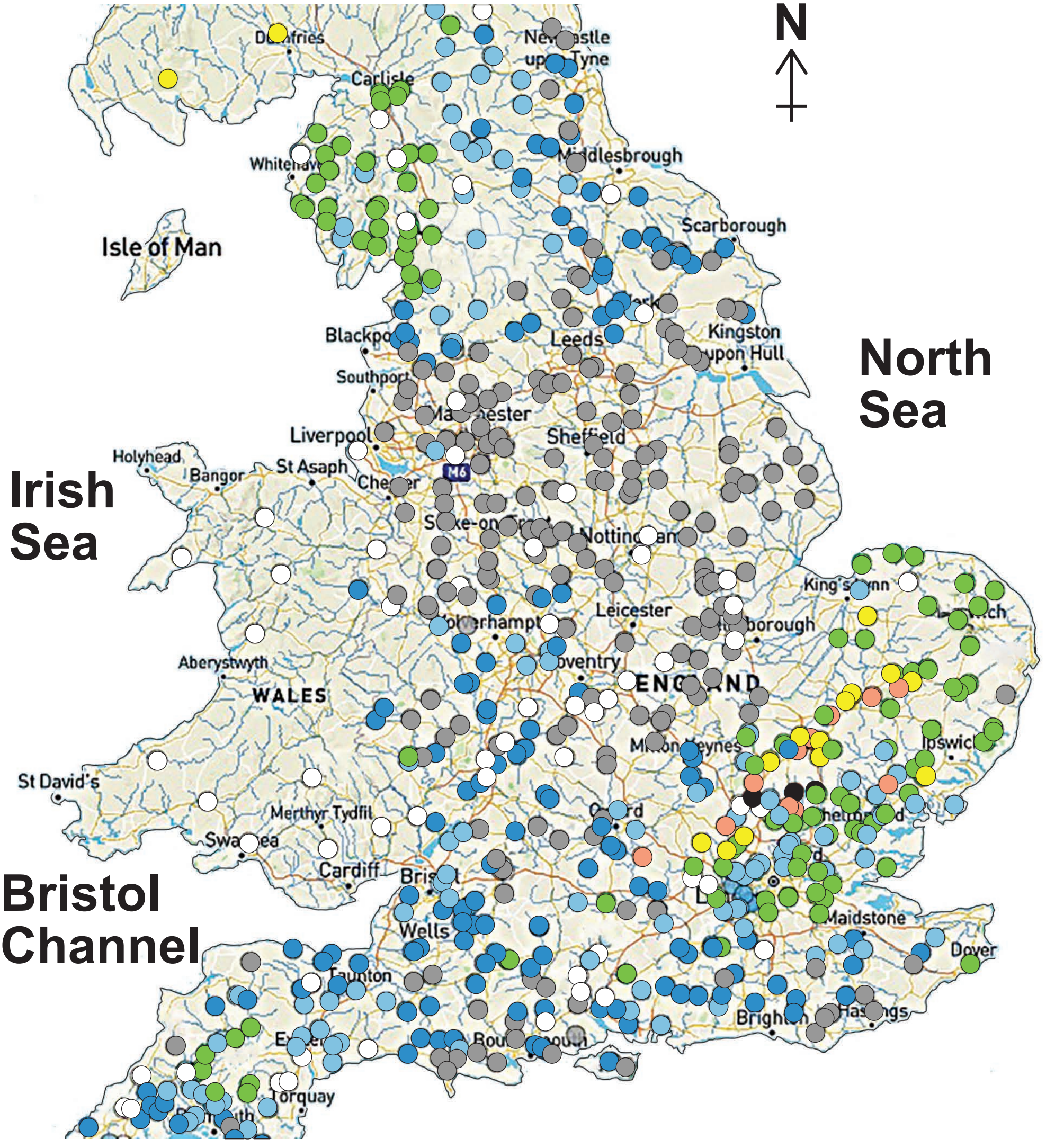
FIGURE 2
River flow data measured at various gauging stations across parts of the UK on 7 November 2019

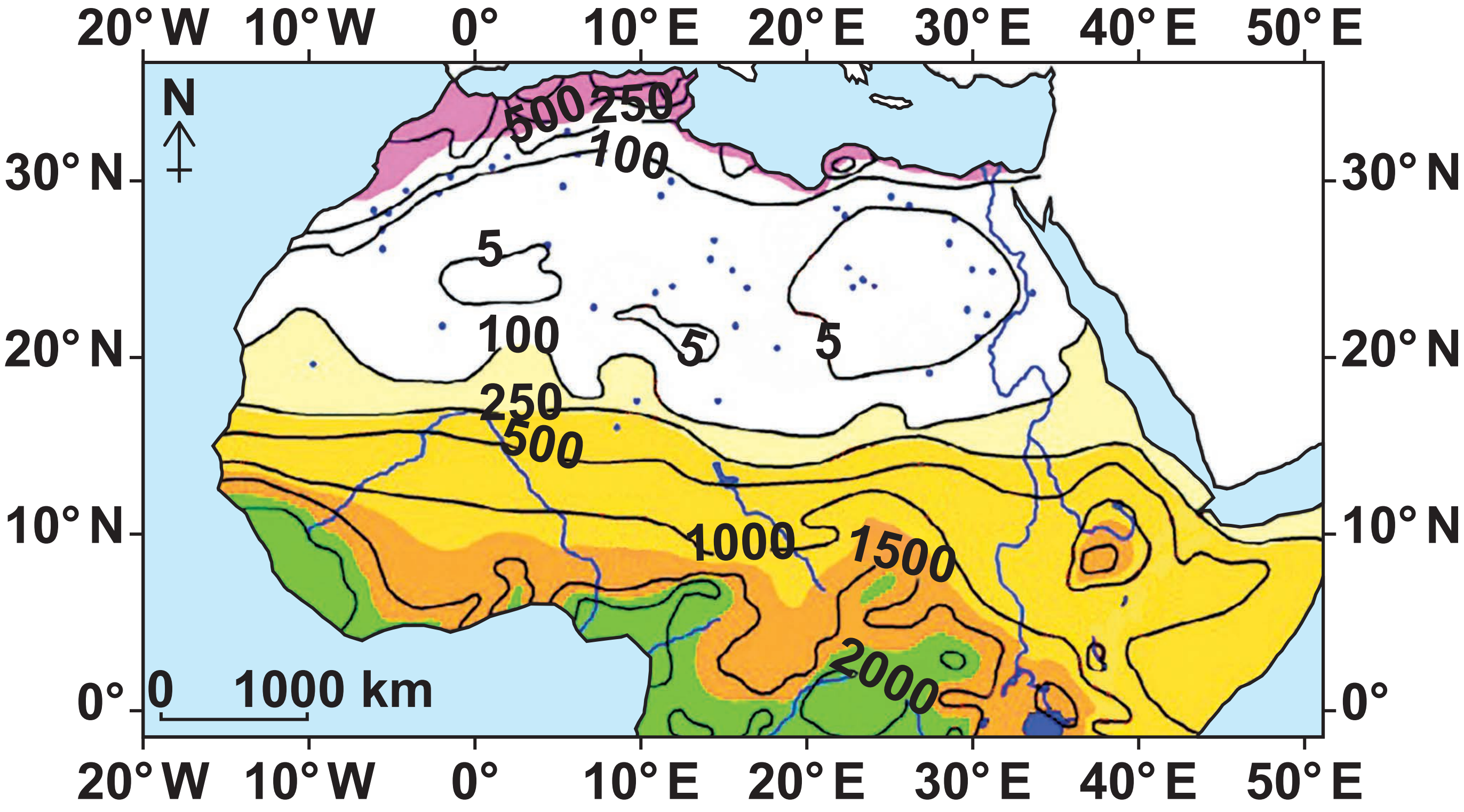


KEY

- Exceptionally high
- Notably high
- Above normal
- Normal
- Below normal
- Notably low
- Exceptionally low
- Unchecked value

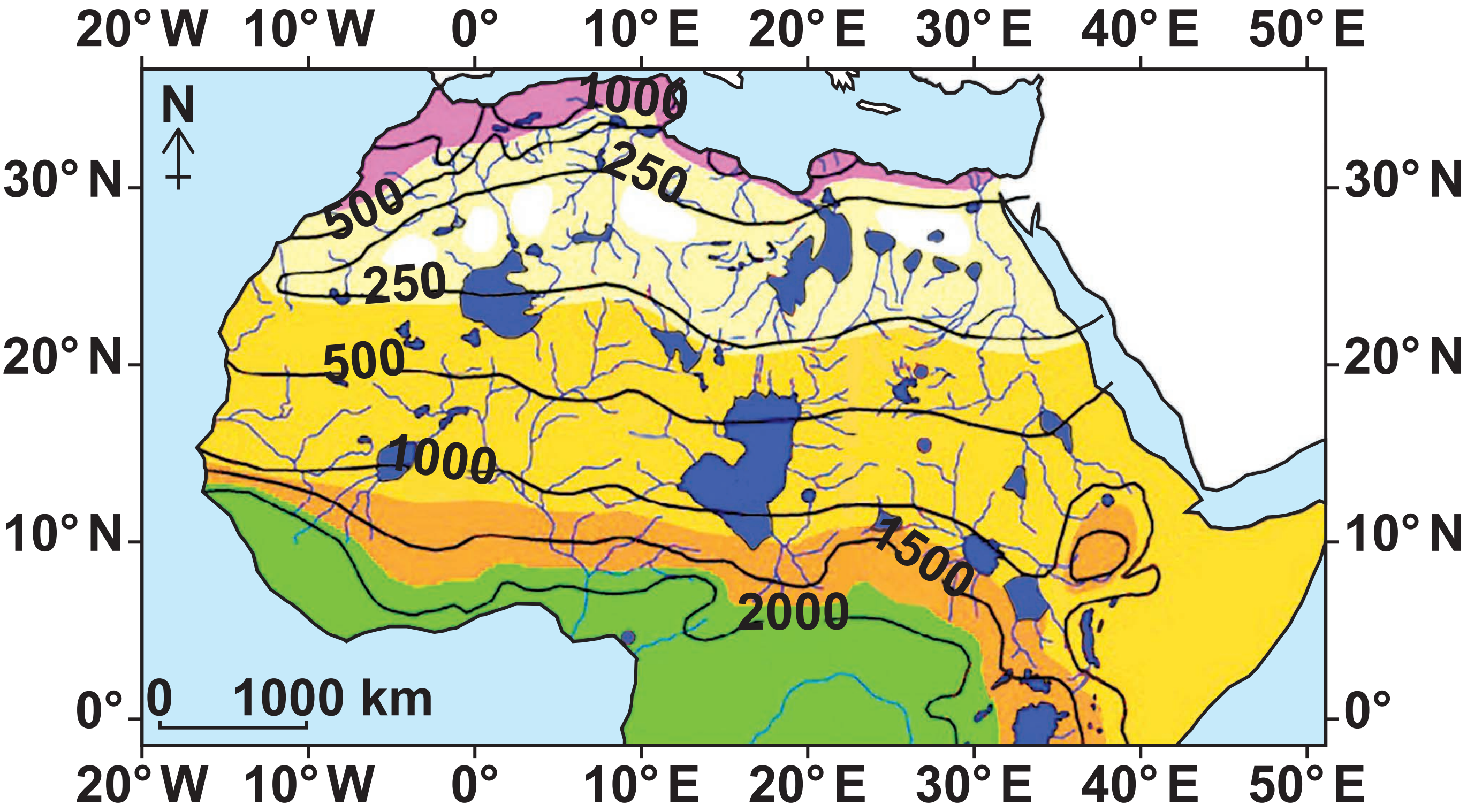
[Turn over]

FIGURE 3a
Average rainfall and current extent of the Sahara Desert and other vegetation types in central and north Africa



[Key is on page 9]

FIGURE 3b
Average rainfall and vegetation types in central and north Africa around 6000–10 000 years ago



[Turn over to page 9 for the Key]

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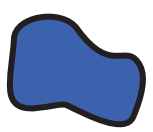
Key for FIGURE 3a and FIGURE 3b

KEY

- Mediterranean and sub-Mediterranean
- Desert
- Grassland (<10% woody cover)
- Wooded grassland (11–40% woody cover)
- Woodland (41–80% woody cover)
- Forest (>80% woody cover)

River



Lake/oasis

–500– Isohyet (mm/year)

Isohyet: a line joining places with the same annual rainfall

[Turn over]

FIGURE 4
Some of the factors causing desertification in selected locations

Transcript is on the opposite page.

01 In Africa's Sahel region, population growth has led to increased logging, illegal farming and land-clearing for housing.

02 In the regions of Uzbekistan and Kazakhstan, which surround the Aral Sea, overuse of water for irrigation has been one of the factors responsible for the shrinking of the sea, transforming it into a saline desert.

03 Fires and deforestation ravaging the Amazon rainforest of Brazil, directly or indirectly related to livestock farming, are creating an arid zone incapable of sustaining vegetation.

04 The effects of climate change, in the form of increased droughts, forest fires and over-farming, are desertifying large parts of the western and south-western USA.

05 In northern and western parts of Australia, it is due to the effects of overgrazing and overcultivation. Deforestation, lack of irrigation and increased drought are degrading the land.

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FIGURE 5a – Coastal zones of Vietnam

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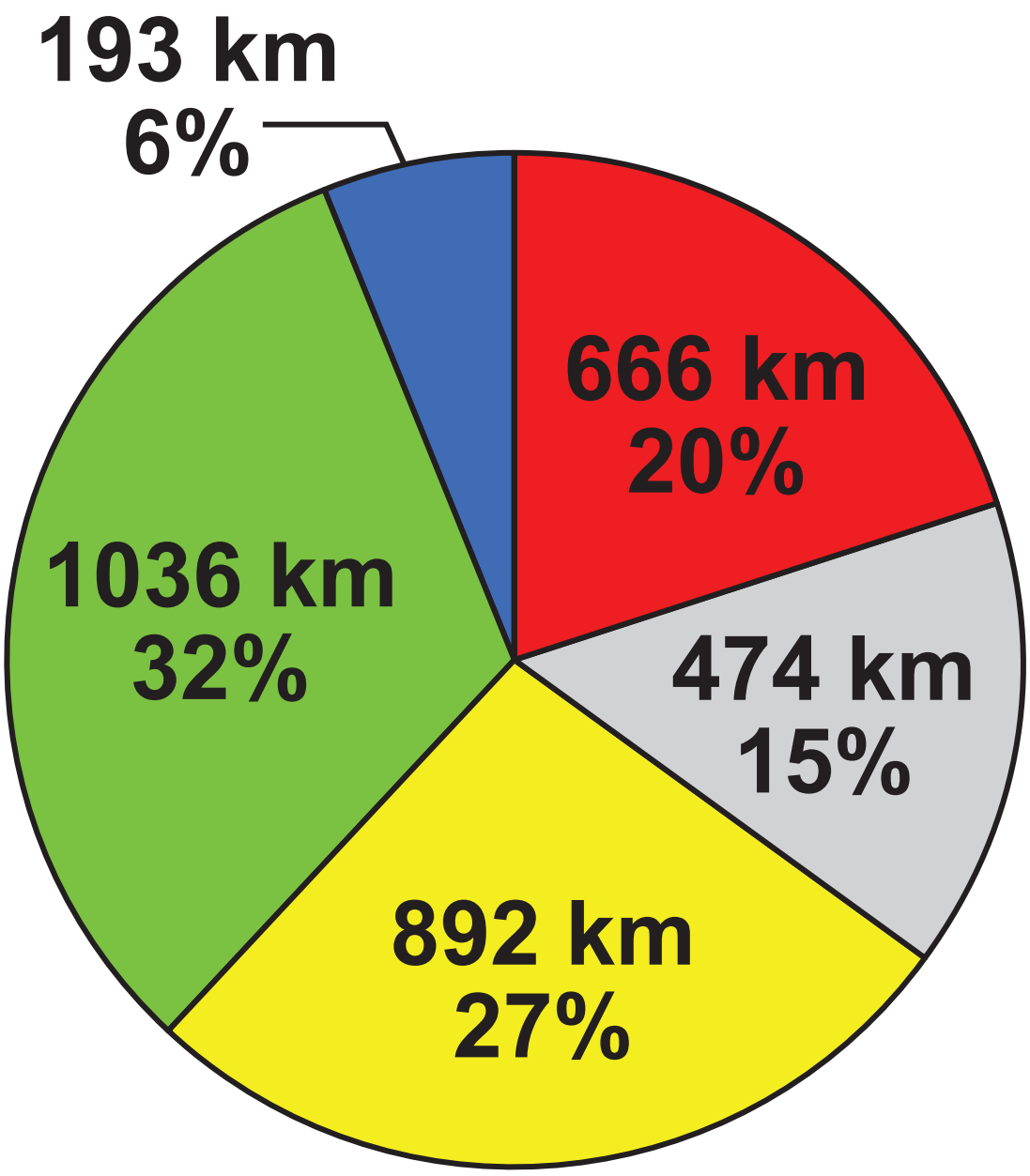
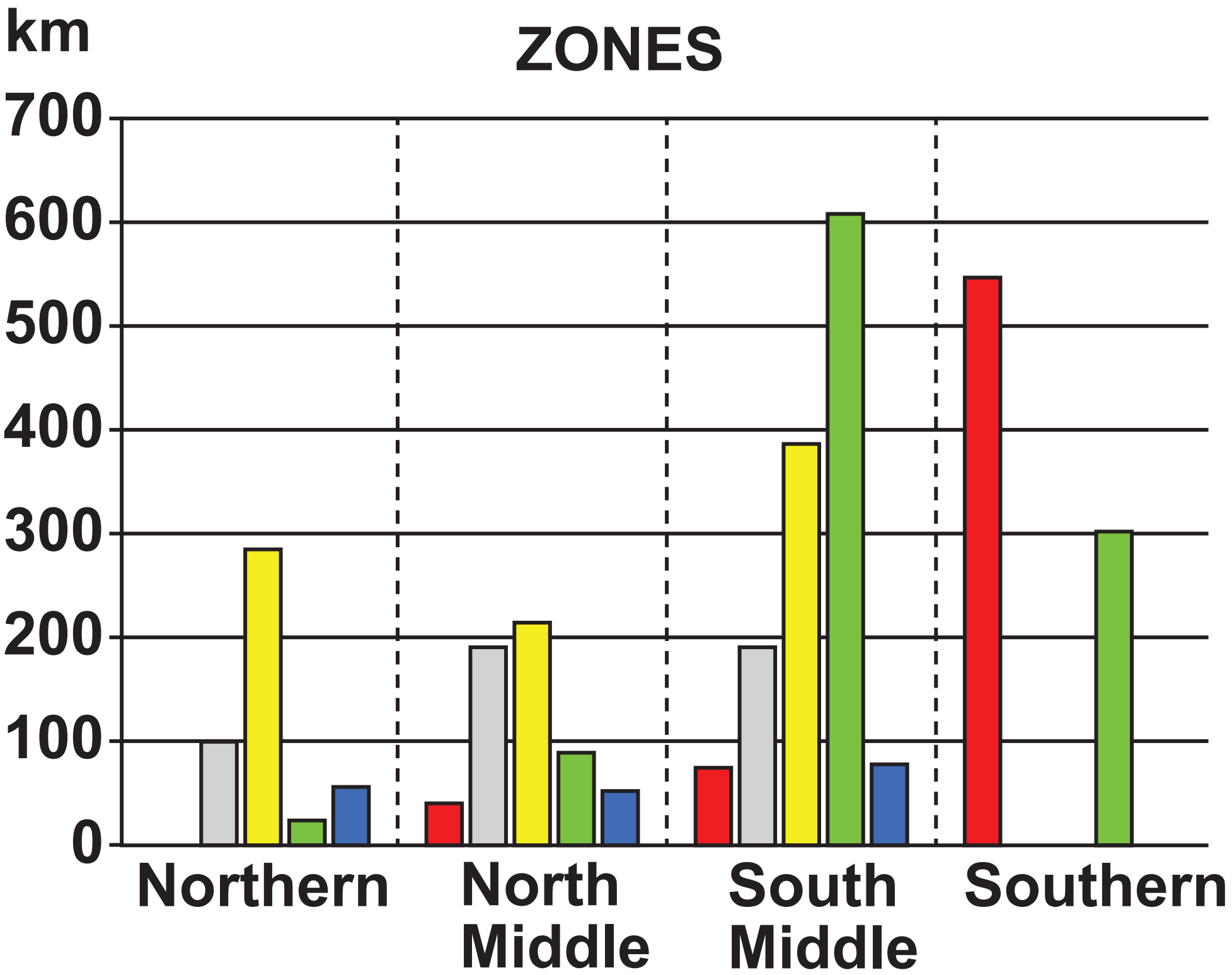
FIGURE 5b – Coastal vulnerability due to erosion in Vietnam as a whole and by coastal zone

VIETNAM





KEY

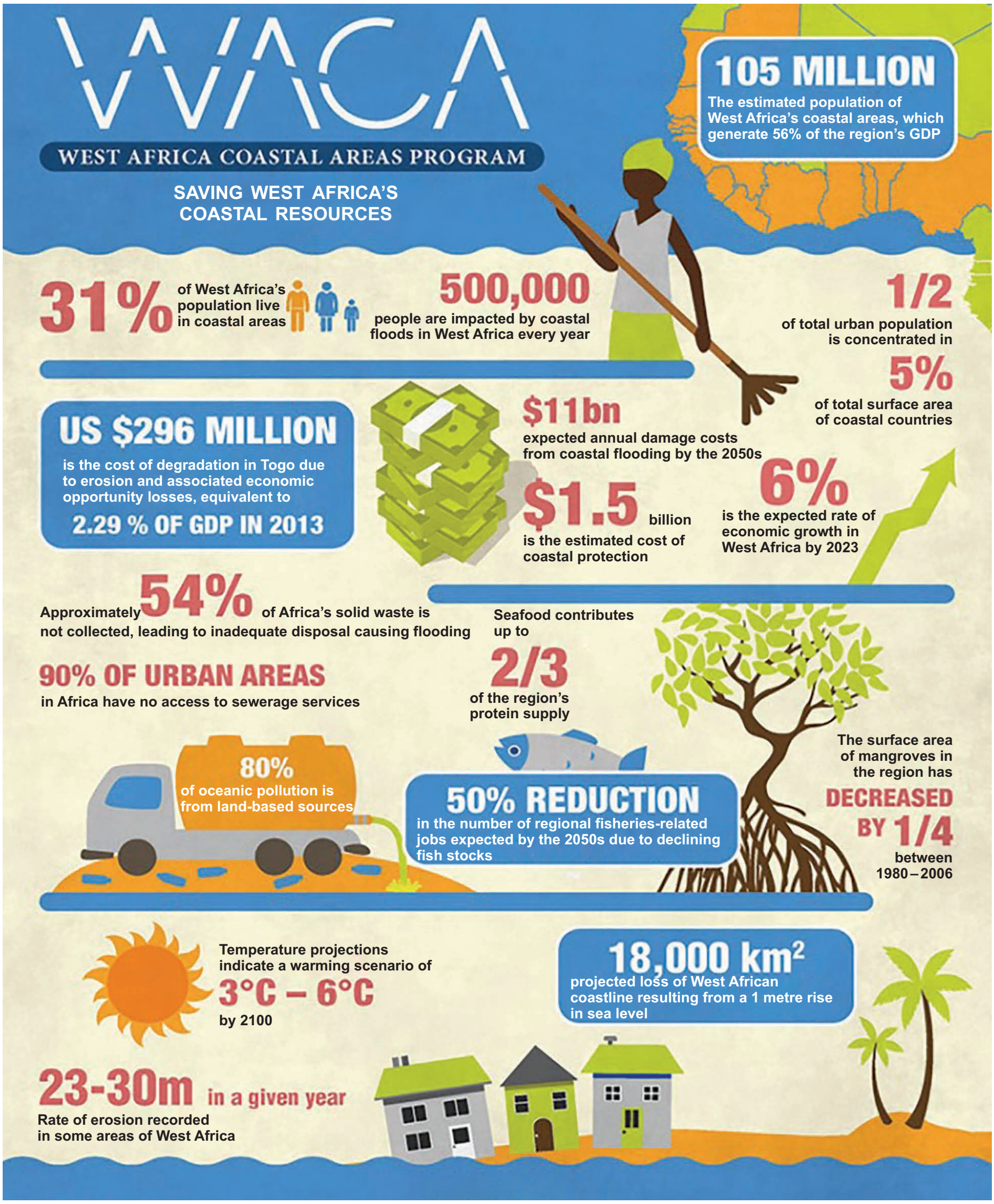
Coastal vulnerability index

- Very high vulnerability
- High vulnerability
- Medium vulnerability
- Low vulnerability
- No vulnerability

[Turn over]

FIGURE 6
Some challenges facing West Africa's coastal resources

Transcript is on pages 17 and 18.



WACA – West Africa Coastal Areas Program

Saving West Africa's Coastal Resouces

105 MILLION – The estimated population of West Africa's coastal area, which generate 56% of the region's GDP

31% of West Africa's population live in coastal areas

500,000 people are affected by coastal floods in West Africa every year

1/2 of total urban population is concentrated in 5% of total surface area of coastal countries

US $296 Million is the cost of degradation in Togo due to erosion and associated economic opportunity losses, equivalent to 2.29% of GDP in 2013

$11 bn expected annual damage costs from coastal flooding by the 2050s

$1.5 billion is the estimated cost of coastal protection

6% is the expected rate of economic growth in West Africa by 2023

[Turn over]

Approximately 54% of Africa's solid waste is not collected, leading to inadequate disposal causing flooding

90% of all urban areas in Africa have no access to sewerage services

Seafood contributes up to 2/3 of the region's protein supply

80% of oceanic pollution is from land-based sources

50% reduction in the number of regional fisheries-related jobs expected by the 2050s due to declining fish stocks

The surface area of mangroves in the region has decreased by 1/4 between 1980–2006

Temperature projections indicate a warming scenario of 3°C–6°C by 2100

23–30m in a given year – Rate of erosion recorded in some areas of West Africa

18,000 km^2 projected loss of West African coastline resulting from a 1 metre rise in sea level

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FIGURE 7a
Cumulative length change in selected Scandinavian glaciers, 1896–2016

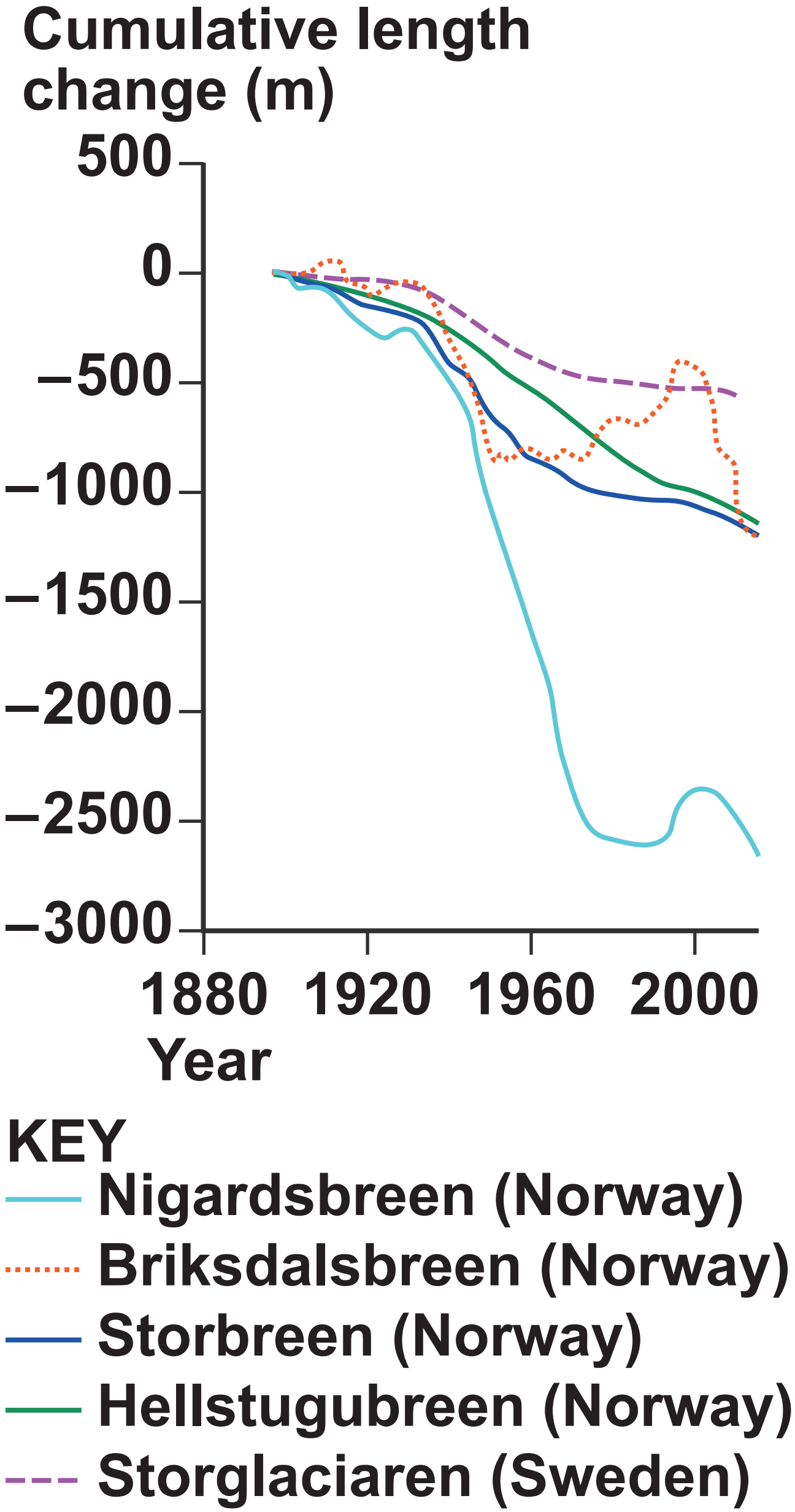
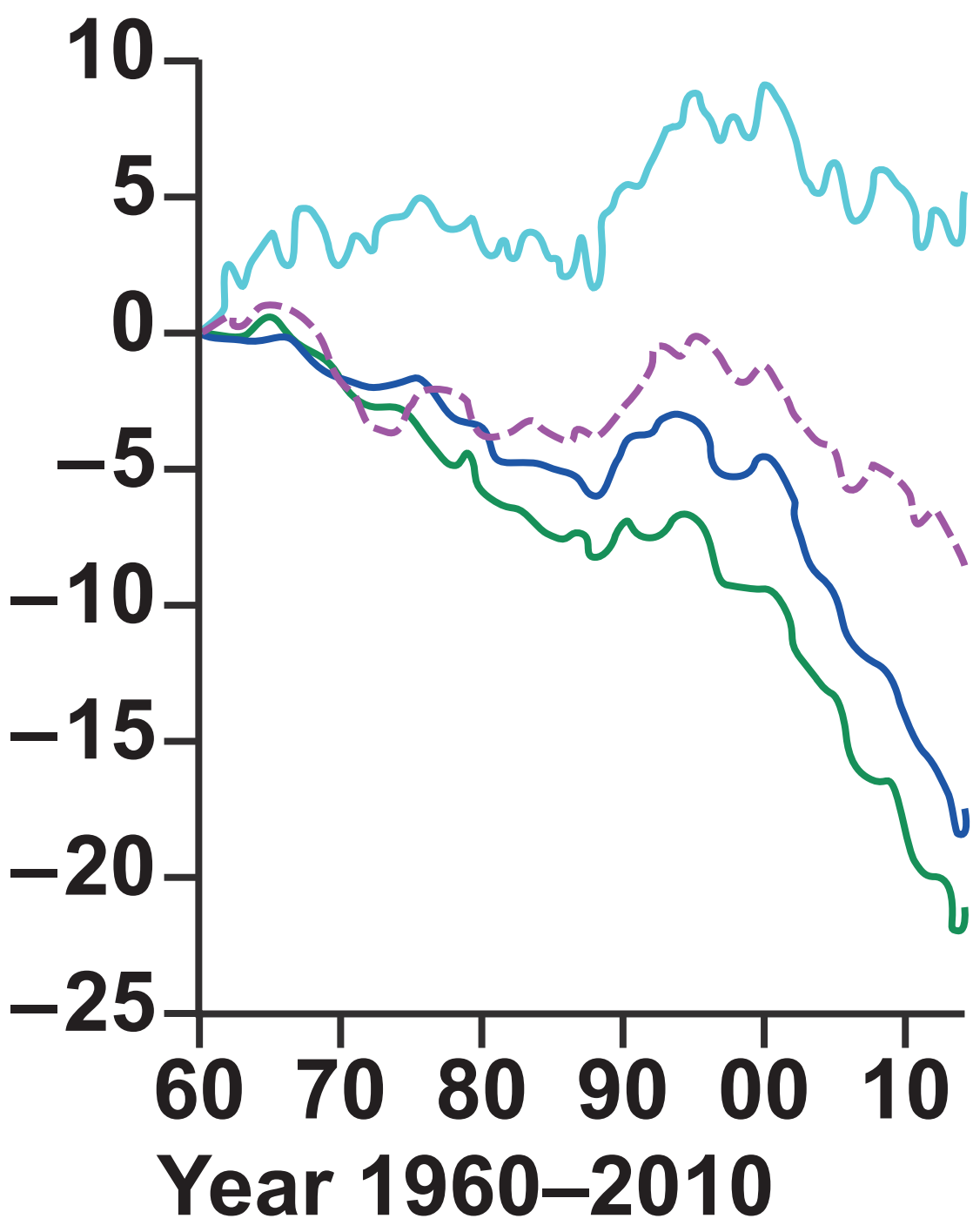


FIGURE 7b
Cumulative mass balance change in selected Scandinavian glaciers, 1960–2014



KEY

— Nigardsbreen (Norway)

— Storbreen (Norway)

— Hellstugubreen (Norway)

--- Storglaciaren (Sweden)

No data for Briksdalsbreen

[Turn over]

FIGURE 8
Future challenges and opportunities in the Alps as the climate changes

EFFECTS ON THE ENVIRONMENT

- Increased temperature
- Melting glaciers
- Increased rainfall
- Decreased snow cover
- Increased temperature in lakes
- Landslide danger
- More storms
- Animals and plants at a higher altitude
- More water in winter and less in summer in the rivers
- More mushrooms and parasites
- Early blooming

EFFECTS ON SOCIETY

- Artificial snow
- More summer tourism
- Less snow tourism
- Less woodland
- More water conflicts
- Early harvest
- Diseases caused by insects
- More floods
- Heat waves

[Turn over]

FIGURE 9
Data related to the changing frequency of tropical storms between 1980 and 2018

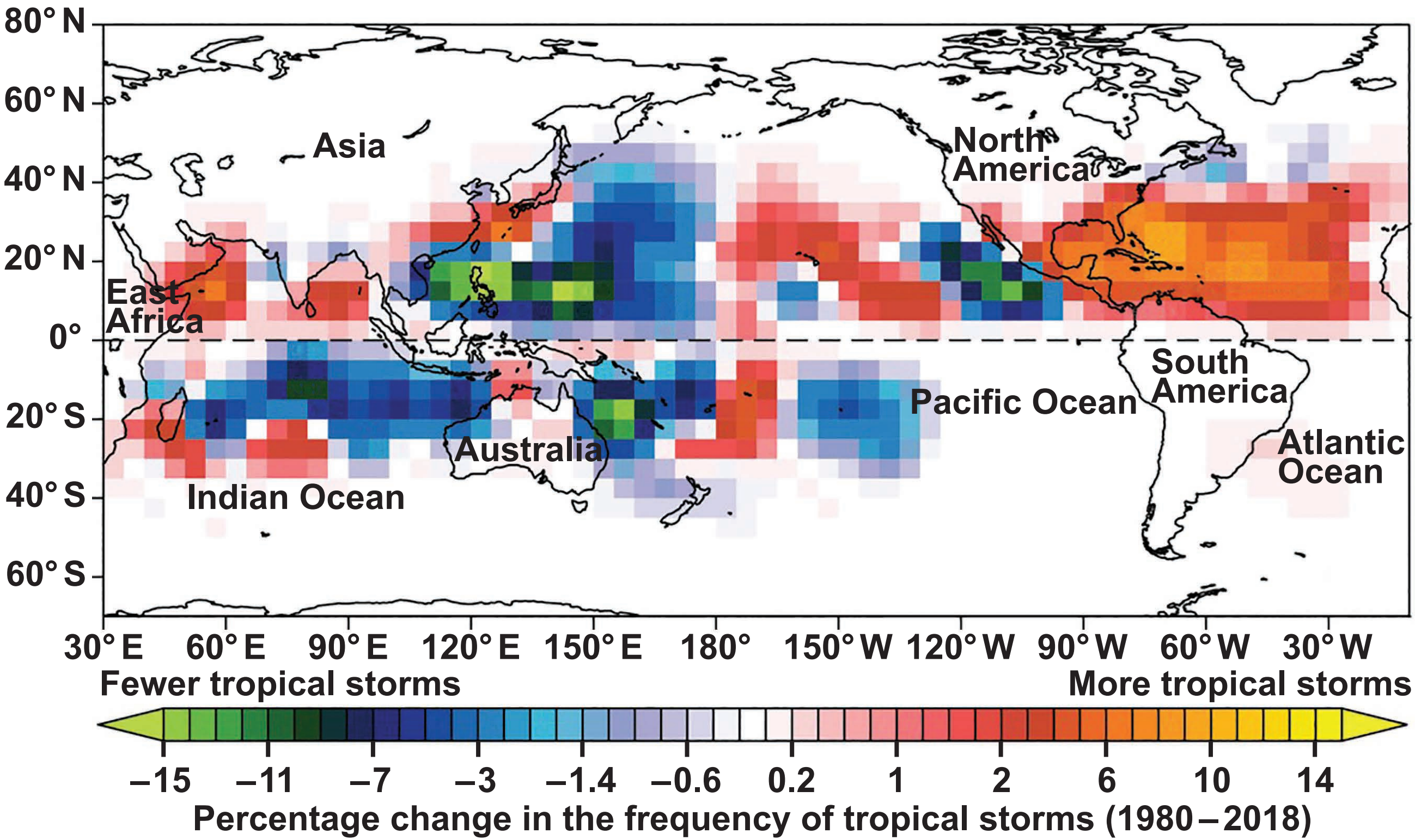


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FIGURE 10 – Data related to the Hunga Tonga–Hunga Ha'apai submarine volcanic eruption and tsunami on 14 January 2022

Humanitarian overview

As per the 2021 Census, Tonga has a population of 100 209.

74% of whom reside on the main island, Tongatapu.

85 000 people affected

84% population affected

36 000 children affected

4 deaths

14 people injured

5 cases of transmittable disease

2390 people displaced

Humanitarian needs and priorities

50 326 estimated people in need of drinking water

12 000 agricultural families affected

Environmental impact

saltwater invasion – contamination of coastline by sea water

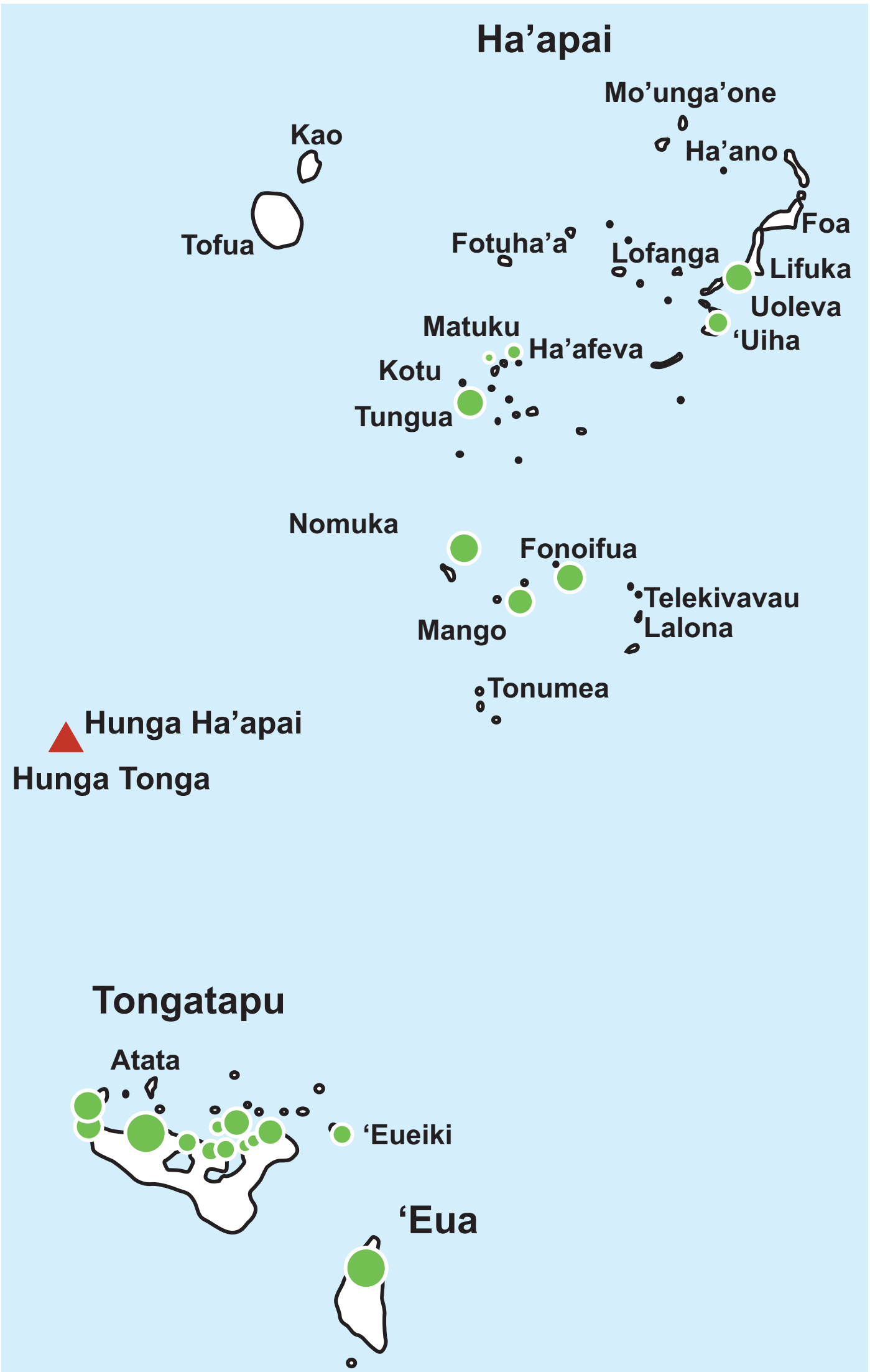
Damage to infrastructure

Based on information from preliminary assessment reports.

280 houses destroyed

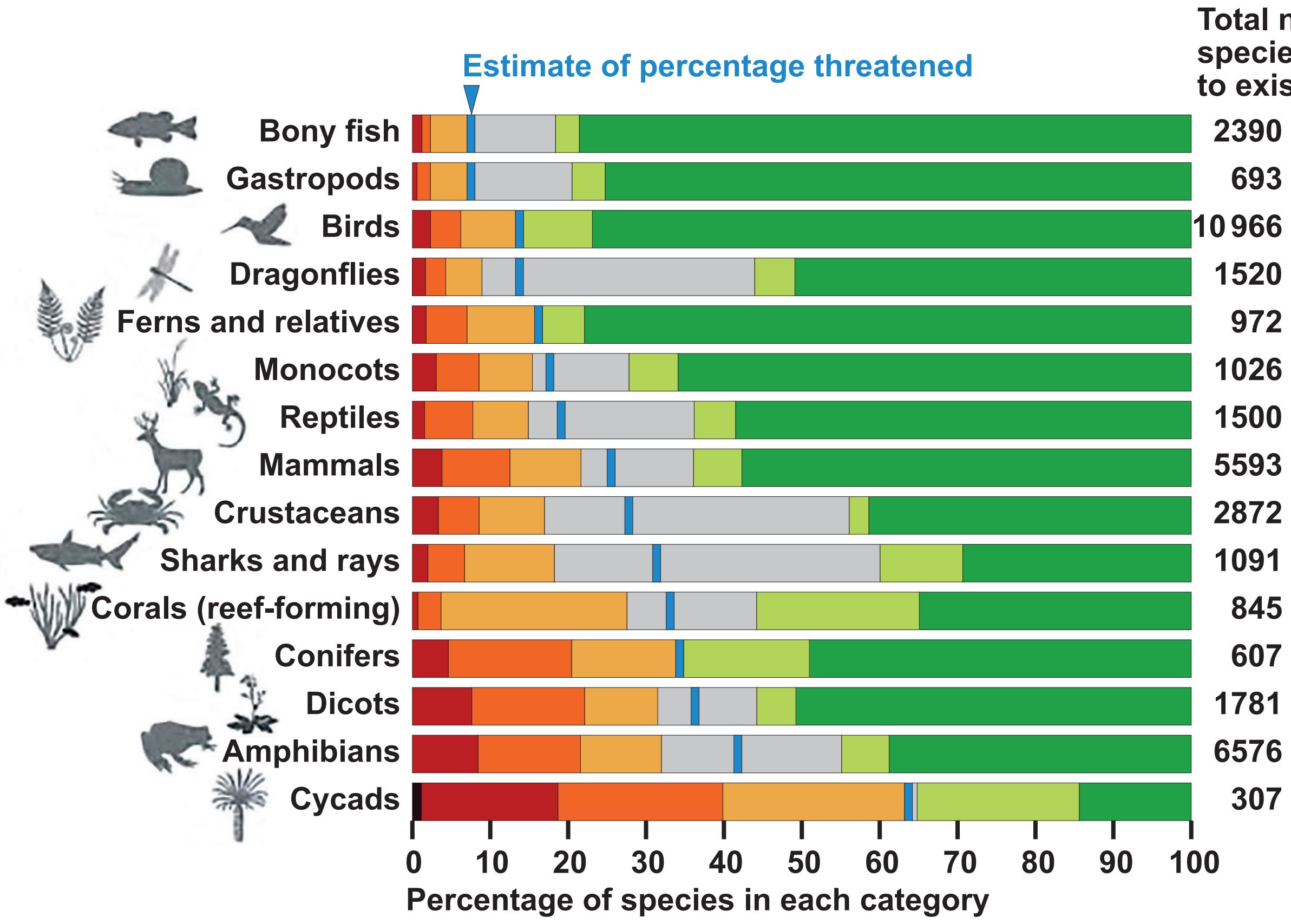
1 health centre destroyed

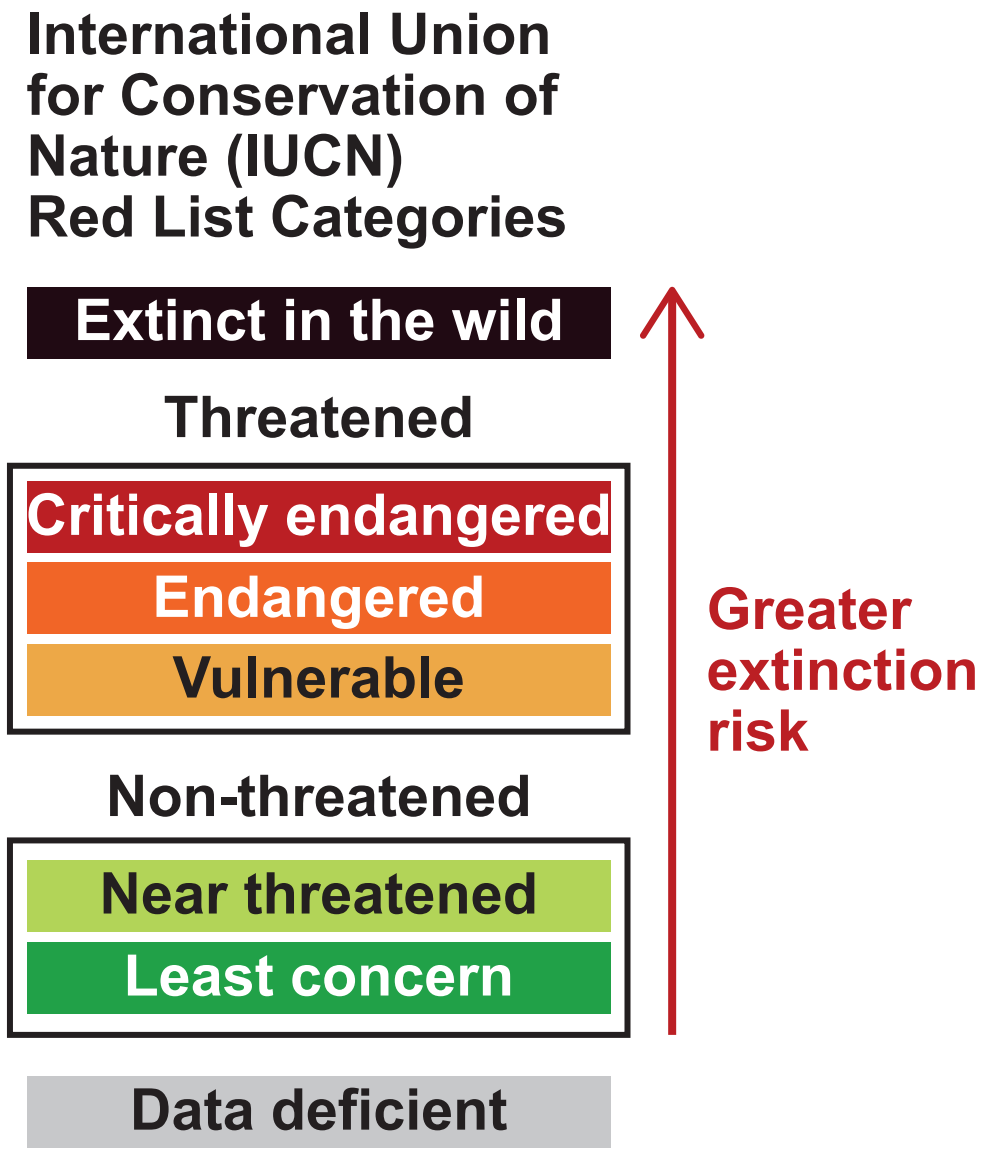
1 underwater communication cable damaged


Ha’apai
Mo’unga’one
Kao
Ha’ano
Foa
Tofua
Fotuha’a
Lofanga
Lifuka
Uoleva
Matuku
‘Uiha
Ha’afeva
Kotu
Tungua
Nomuka
Fonoifua
Telekivavau
Mango
Lalona
Tonumea
Hunga Ha’apai
Hunga Tonga
Tongatapu
Atata
‘Eueiki
‘Eua
KEY
Number of people displaced
500
100
50
Submarine volcano
0
20 km
N

[Turn over]

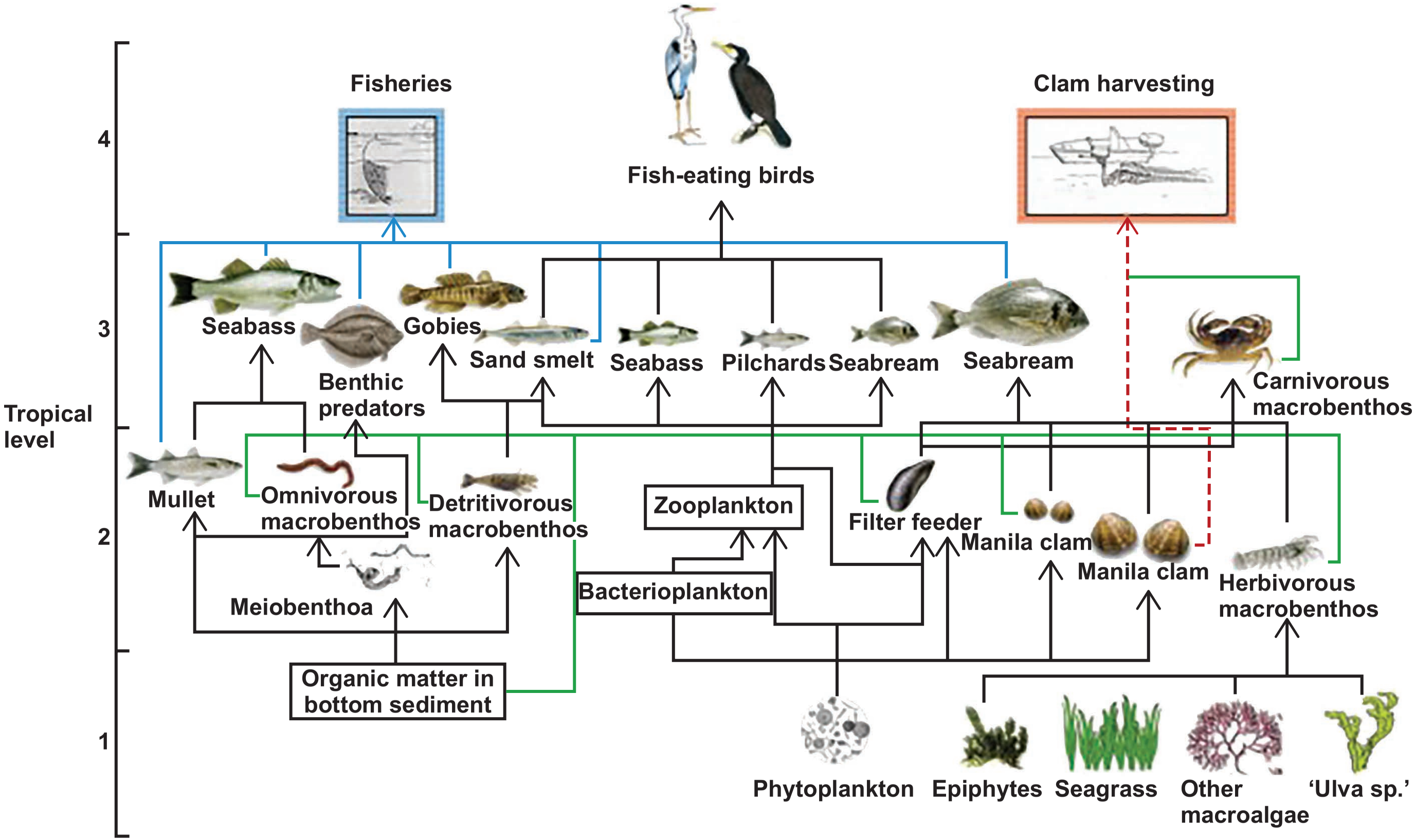
FIGURE 11
Information about global biodiversity by species category measured in 2019




International Union for Conservation of Nature (IUCN) Red List Categories
Extinct in the wild
Threatened
Critically endangered
Endangered
Vulnerable
Non-threatened
Near threatened
Least concern
Data deficient
Greater extinction risk

[Turn over]

FIGURE 12
Food web diagram of a coastal lagoon in Italy



KEY

→ **Links in food web**

→ **Species affected by fisheries**

⇢ **Species affected by clam harvesting**

→ **Species unintentionally affected by clam harvesting**

END OF RESOURCES

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