External assessment 2024

Multiple choice question book

Earth & Environmental Science

Paper 1

General instruction

- Work in this book will not be marked.

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

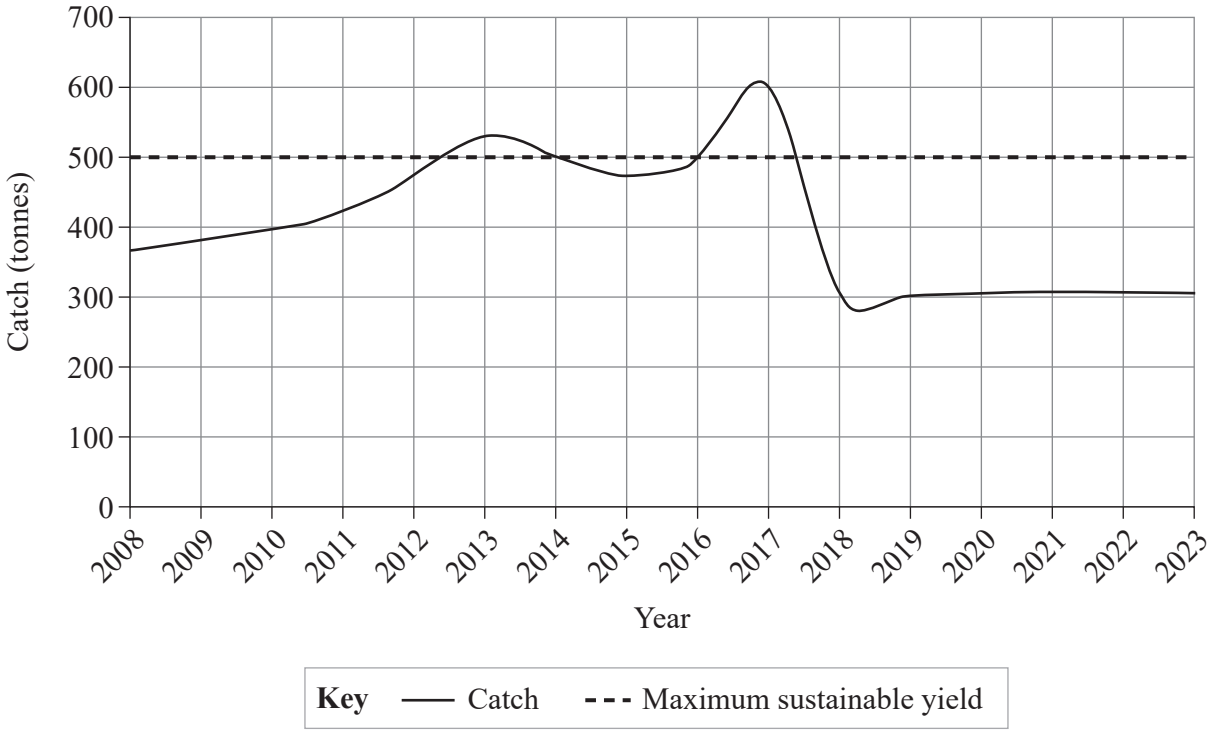
Section 1

Instruction

- Respond to these questions in the question and response book.

QUESTIONS 1–2

The graph shows the annual catch of greenlip abalone and maximum sustainable yield (tonnes/year) from 2008 to 2023.



QUESTION 1

When did the greenlip abalone catch first exceed the maximum sustainable yield?

(A) 2012–13

(B) 2013–14

(C) 2016–17

(D) 2017–18

QUESTION 2

When were greenlip abalone sustainably harvested?

(A) 2008–12

(B) 2012–16

(C) 2016–18

(D) 2019–23

QUESTIONS 3–4

The table shows potable (safe drinking) water quality guidelines and readings from four sites.

Parameter	Water quality guidelines	Site I	Site II	Site III	Site IV
Fluoride (mg/L)	< 1.50	0.89	1.05	0.90	1.30
Copper (mg/L)	< 2.00	1.60	2.00	1.30	1.90
Turbidity (NTU)	< 5.00	7.80	4.50	3.40	4.90
pH	6.5 < pH < 8.5	6.9	7.6	7.1	6.4

QUESTION 3

Which site has potable water?

(A) I

(B) II

(C) III

(D) IV

QUESTION 4

Predict the site where water quality would be most improved by revegetating to reduce erosion.

(A) I

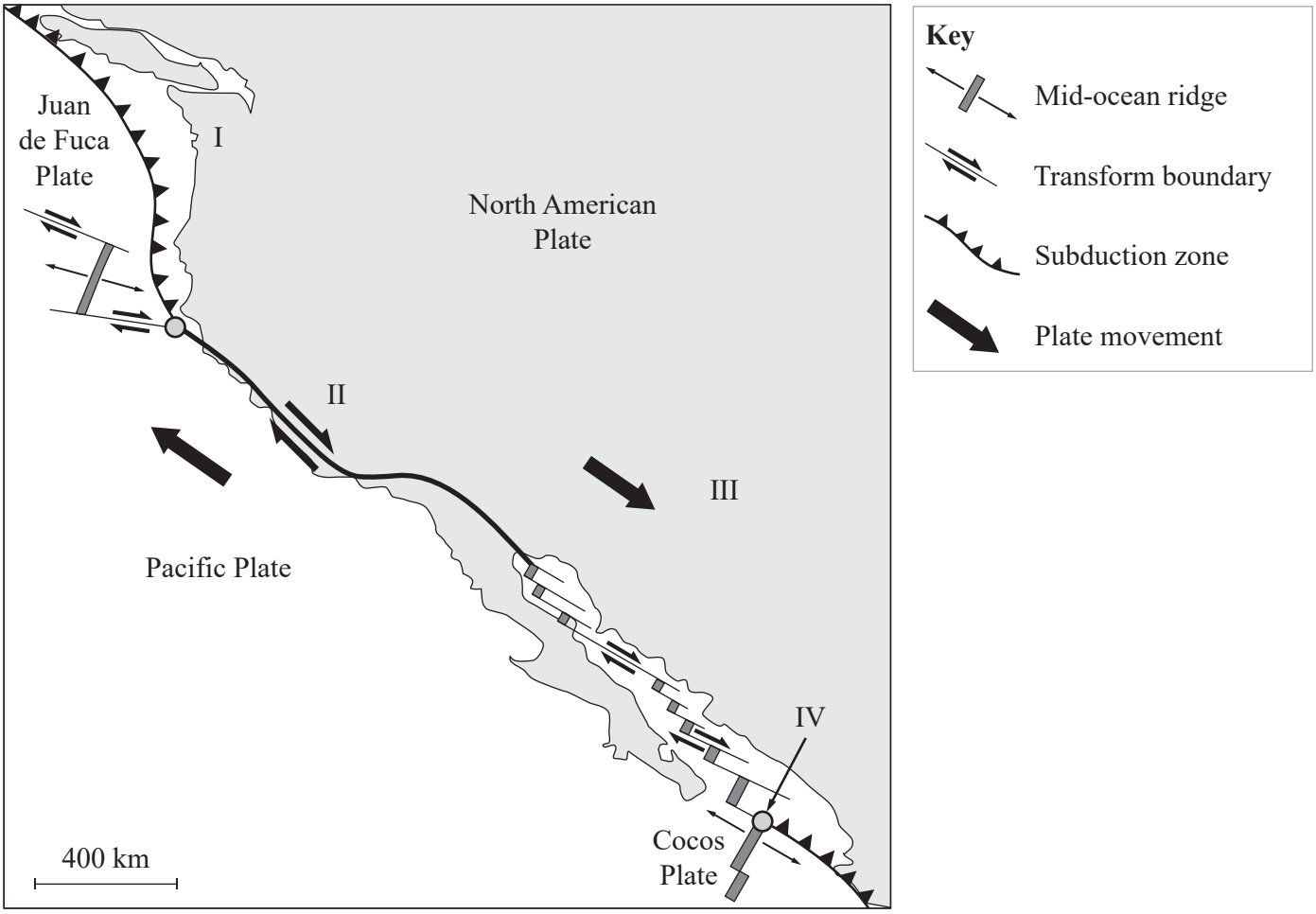
(B) II

(C) III

(D) IV

QUESTION 5

The map shows the tectonic boundaries between the North American and Pacific plates.



Which location is most likely to have frequent earthquakes but no volcanic activity?

(A) I

(B) II

(C) III

(D) IV

QUESTION 6

Identify the natural process that contributes to global climate change on a 200 to 1500-year timescale.

(A) oceanic circulation

(B) volcanic ash clouds

(C) changes to Earth's orbit

(D) El Niño – La Niña Southern Oscillation

QUESTION 7

Land clearing

(A) decreases albedo and increases globally averaged temperature.

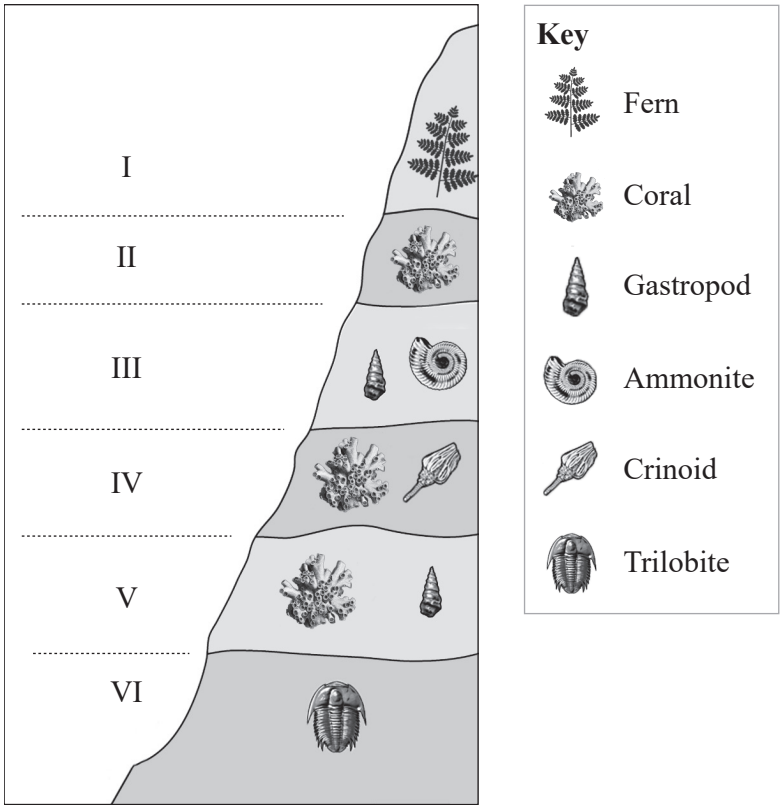
(B) increases albedo and increases globally averaged temperature.

(C) increases albedo and decreases globally averaged temperature.

(D) decreases albedo and decreases globally averaged temperature.

QUESTION 8

The diagram shows fossils in six strata of rock, labelled I (youngest layer) to VI (oldest layer).



A major change in climate occurred between which strata?

(A) I and II

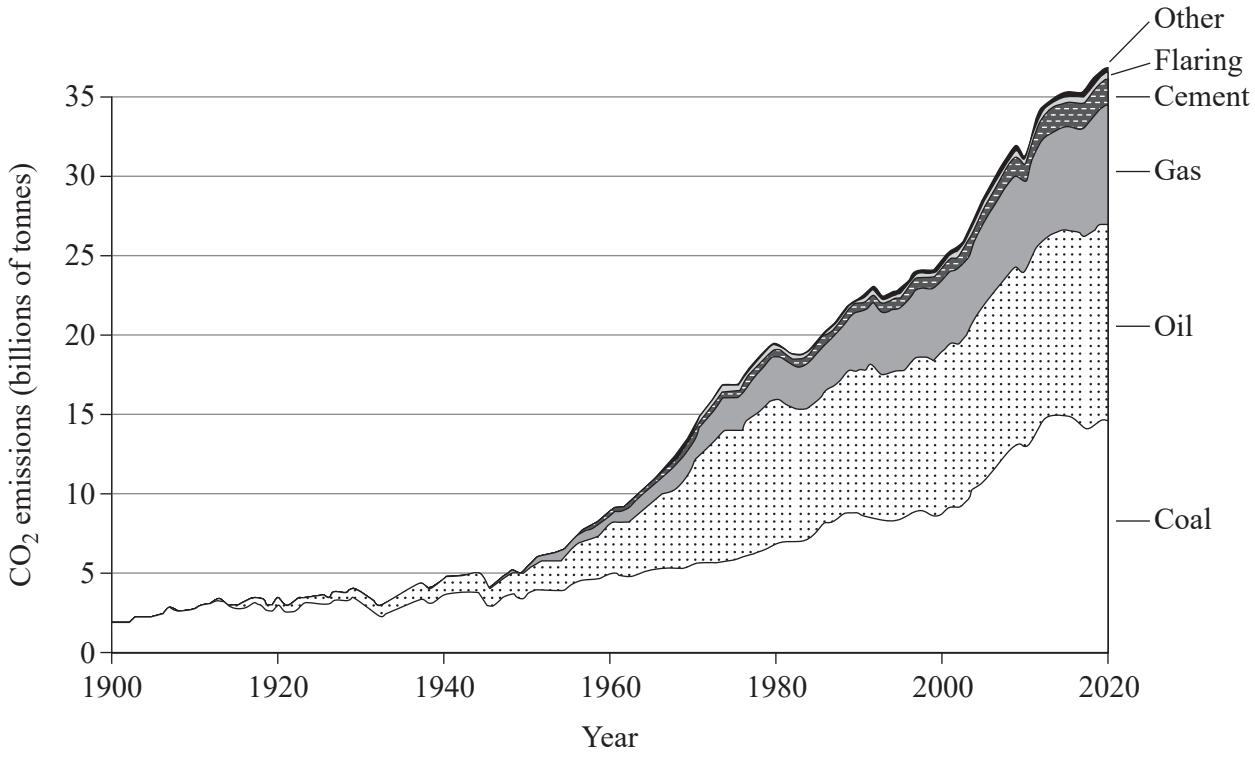
(B) II and III

(C) IV and V

(D) V and VI

QUESTIONS 9–10

The graph shows global carbon dioxide (CO_2) emissions by fuel or industry type from 1900 to 2020.



QUESTION 9

What was the largest source of CO_2 emissions in 2020?

(A) oil

(B) gas

(C) coal

(D) cement

QUESTION 10

Which 20-year time period experienced the greatest relative change in CO_2 emissions?

(A) 1940–1960

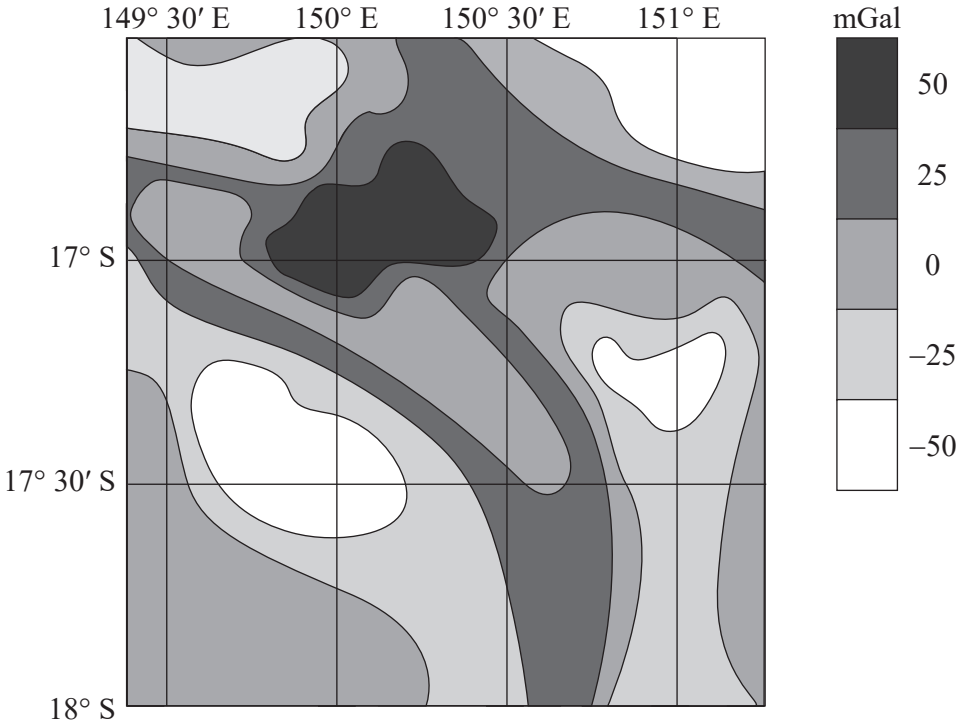
(B) 1960–1980

(C) 1980–2000

(D) 2000–2020

QUESTION 11

A gravity anomaly map is shown.

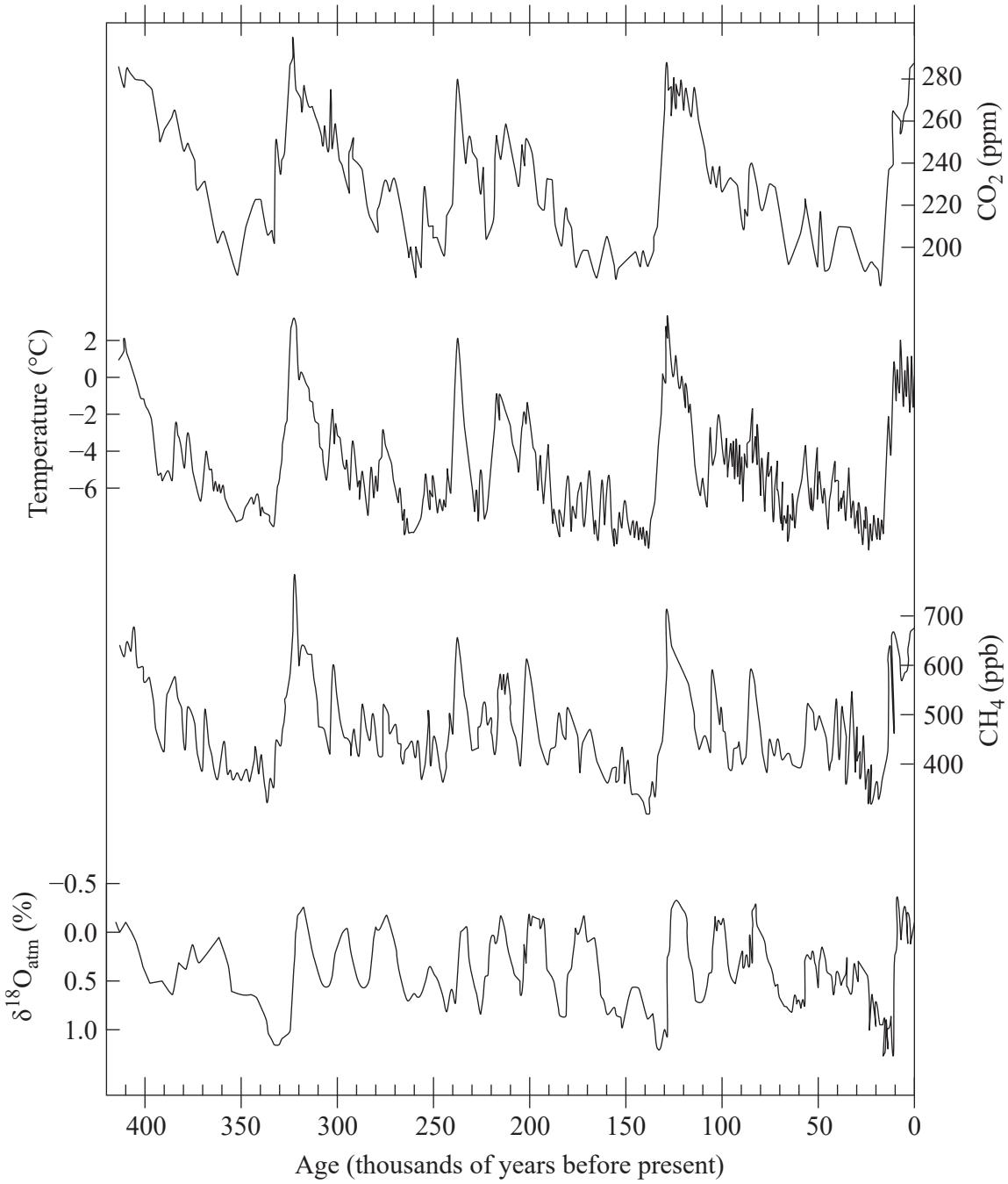


Identify the most likely location of an ore body.

	Latitude	Longitude
(A)	17° S	150° E
(B)	17° S	151° E
(C)	17° 30′ S	150° E
(D)	17° 30′ S	151° E

QUESTIONS 12–13

The graph shows 420 000 years of ice core data from Vostok, Antarctica.



QUESTION 12

According to the graph, the intervals between ice ages are characterised by low

(A) CO_2 levels.

(B) CH_4 levels.

(C) $\delta^{18}O$ levels.

(D) temperatures.

QUESTION 13

The 100 000-year cycles in CO_2 concentration are attributed to changes in

(A) temperature.

(B) solar radiation.

(C) the angle of the Earth's tilt.

(D) the shape of the Earth's orbit.

QUESTION 14

Identify a geophysical exploration technique used to locate ore bodies.

(A) core sampling

(B) magnetic surveys

(C) hydrology surveys

(D) vegetation sampling

QUESTION 15

Which method is used to extract crude oil deposits from underneath a freshwater lake?

(A) fracking

(B) dredging

(C) onshore drilling

(D) offshore drilling

QUESTION 16

Identify the underground mining method used when the surrounding rock is strong enough to support itself without collapsing.

(A) strip

(B) stoping

(C) open cut

(D) room and pillar

QUESTION 17

Which environmental factor is the most appropriate to monitor during resource extraction?

(A) wind direction

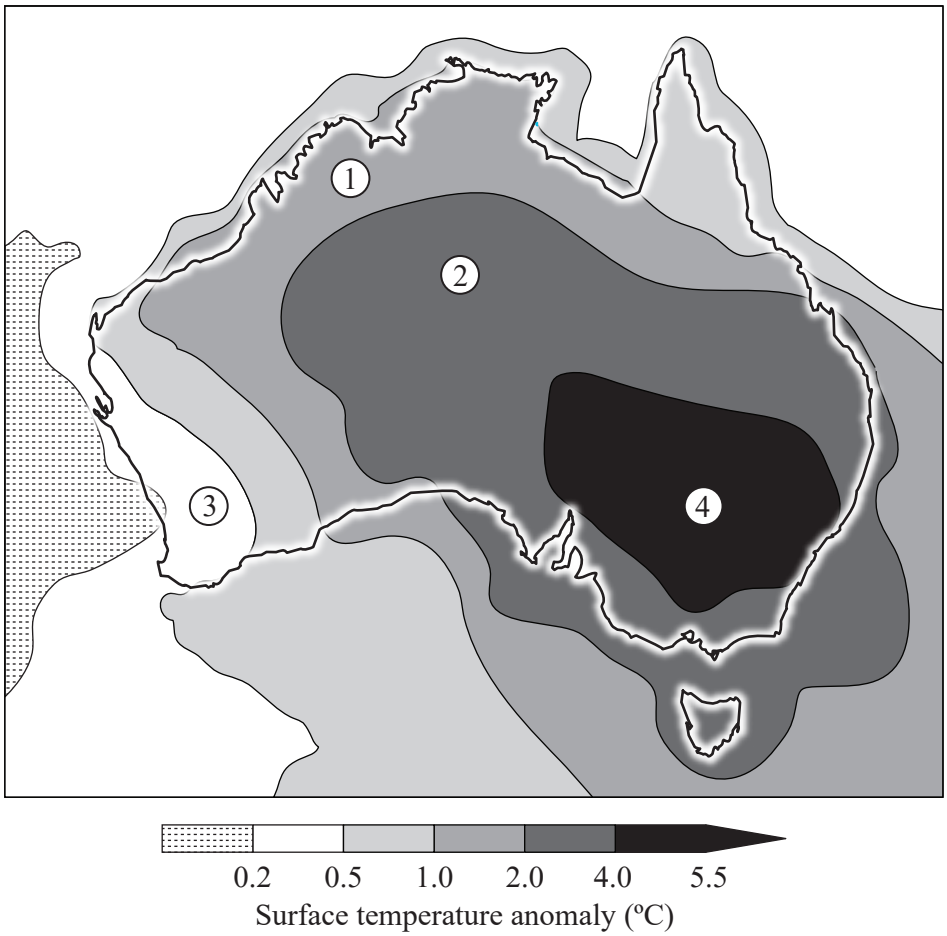
(B) air temperature

(C) local rainfall totals

(D) abundance of organisms

QUESTION 18

The diagram shows surface temperature anomaly in January 2019 compared to average surface temperature.



Which site was most likely experiencing the impacts of drought?

(A) 1

(B) 2

(C) 3

(D) 4

QUESTION 19

Which ecosystem services are necessary for the production of all other ecosystem services?

(A) cultural

(B) regulating

(C) supporting

(D) provisioning

QUESTION 20

An ecological footprint is commonly represented as the amount of

(A) natural resources the planet produces.

(B) carbon produced by the use of natural resources.

(C) land required to sustain the use of natural resources.

(D) time before the supply of natural resources has been exhausted.

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References

Questions 3 and 4

Water quality guidelines sourced from Seqwater 2023, 'What are we testing for?', *Seqwater,* Brisbane, https://www.seqwater.com.au/what-we-test.

Question 5

Map adapted from US National Parks Service's 'San Andreas Transform Plate Boundary', www.nps.gov/media/photo/gallery-item.htm?pg=6323516&id=7c979cd9-db8e-4d44-a3c5-2ff61669f470&gid=A83922BE-6F3D-45B7-889F-7051CD4FC3C9.

Question 8

Rosenkrantz, K 2009, *Fossils*, https://commons.wikimedia.org/wiki/File:Fossils.png, CC BY-SA 3.0

Questions 9 and 10

Figure adapted from Ritchie, H, Roser, M & Rosado, P 2020, 'CO_2 and greenhouse gas emissions', *OurWorldinData.org*, https://ourworldindata.org/co2-and-greenhouse-gas-emissions CC BY 4.0.

Question 11

Figure adapted from 'Nj cboug.jpg', *Wikipedia Commons*, public domain, https://commons.wikimedia.org/wiki/File:Nj_cboug.jpg.

Questions 12 and 13

Figure adapted from Davis, B 2020, 'Ice core basics', *Antarctic Glaciers.org*, CC BY-SA 3.0, https://www.antarcticglaciers.org/glaciers-and-climate/ice-cores/ice-core-basics/; https://commons.wikimedia.org/wiki/File:Vostok_420ky_4curves_insolation_to_2004.jpg.

Question 18

Diagram adapted from Goddard Institute for Space Studies 2023, 'GISS surface temperature analysis (v4)', *NASA*, https://data.giss.nasa.gov/gistemp/maps/.