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1

91007



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## Level 1 Geography 2020

### 91007 Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

2.00 p.m. Wednesday 18 November 2020

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate in-depth geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate comprehensive geographic understanding of environments that have been shaped by extreme natural event(s).

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL parts of the question in this booklet.**

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–10 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

Low Excellence

**TOTAL**

**07**

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## INSTRUCTIONS

Name ONE type of **extreme natural event** and an **environmental case study** (or studies) of this event, that you will use to answer BOTH parts of the question in this booklet.

Extreme natural event: 1931 Hawkes Bay Earthquake.

Environmental case study(ies):

In your answers, you should integrate case study evidence as well as geographic terminology and concepts.

Geographic concepts you may choose to use in your answers include:

### **Processes**

A sequence of actions that shape and change environments.

### **Environments**

May be natural and / or cultural. They have particular characteristics and features, which can be the result of natural and / or cultural processes.

### **Change**

Involves any alteration to the natural or cultural environment. Change can be spatial and / or temporal. Change is a normal process in both natural and cultural environments. It occurs at varying rates, at different times, and in different places.

### **Interaction**

Involves elements of an environment affecting each other and being linked together. Interaction incorporates movement, flows, connections, links, and interrelationships, which work together and may be one- or two-way interactions. Landscapes are the visible outcome of interactions. Interaction can bring about environmental change.

## QUESTION

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### (a) Processes

Processes involve a sequence of actions.

Fully explain the sequence of actions that produced the extreme natural event in your case study environment(s).

In your answer, include:

- geographic terminology
- a geographic concept from page 2
- integrated detailed supporting evidence from your case study (or studies).

On February 3<sup>rd</sup> 1931, a magnitude 7.9 earthquake struck at 10.47 am. The epicentre was 30 km NW of Napier and the focus was 17km below ground. This earthquake caused widespread damage throughout the Hawkes Bay and Napier area. The earthquake resulted in 256 deaths and damaged many homes and buildings. There were three processes which interacted to produce the 1931 Hawkes Bay earthquake and they were: Convection Currents, Subduction and Seismic Waves.

The first of the three processes that produced the 1931 Hawkes Bay earthquake is convection currents. Convection currents are the result of magma within the mantle being heated and rising before cooling near the crust and descending back towards the mantle. The earth is made up of four layers and they are the crust, the mantle, the outer core and the inner core. The crust is both oceanic (6-10 km thick) and continental crust (0-70 km thick). Below this is the mantle which is where convection currents occur and is 3700°C and 3000 km thick. Below this is the outer core which

heats the magma found in the mantle. The outer core is around  $4300^{\circ}\text{C}$  and 2000 km thick. Below this is the inner core which is the 'power house' of the earth and is thought to be made up of iron and nickel and solid. It is around  $6000^{\circ}\text{C}$  and 1000 km thick. These layers all participate to the action of convection currents and they happen beneath Napier. These currents move the 8 major plates of the earth including the Pacific and Indo-Australian plates. These convection currents are the start of the sequence of actions that caused the 1931 Hawkes Bay earthquake and they lead to subduction.

Subduction is the next process that produced the 1931 Hawkes Bay earthquake. Subduction is the process of a heavier, more dense oceanic plate being forced beneath a more buoyant continental plate. Great amounts of stress builds up at these places and 130km east of Napier at the Hikurangi Trench, this occurs. At the Hikurangi Trench, the denser Pacific Plate is forced beneath the more buoyant Indo-Australian plate at a rate of 55mm a year. At this point, immense amounts of stress is built up over a period of many years and when the pressure becomes greater than the friction, the continental plate (Indo-Australian) 'flicks' back to a natural position known as the 'elastic effect'. This releases huge amounts of energy which travel quickly along sub-surface fault lines. All of these actions took place 130km east of Napier on February 3<sup>rd</sup> 1931 and they led to the creation of seismic waves.

P.T.O to extra space →

(b) **Effects**

Effects of extreme natural events can occur to both the natural and cultural environment. They can also be positive and/or negative.

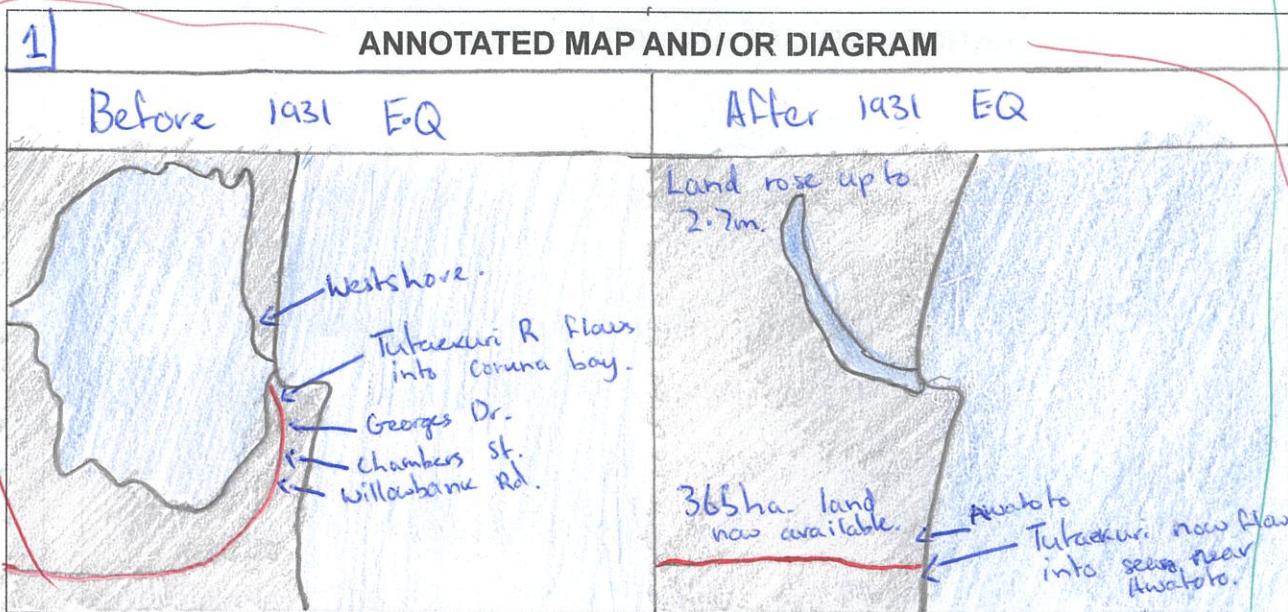
Fully explain ONE **natural** effect (on page 7) and ONE **cultural** effect (on page 8) that your chosen extreme natural event had on your case study environment(s).

You may answer in annotated map, diagram, and/or paragraph form.

In your answer, include:

- geographic terminology
- a geographic concept from page 2
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Natural effect:

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On 3<sup>rd</sup> February 1931, a magnitude 7.9 earthquake struck 30km NW of Napier at a depth of 17km. at 10.47am. This resulted in widespread damage throughout the Napier and Hawkes Bay areas causing buildings to collapse and 256 people to die. One effect this had on the natural environment was land uplift.

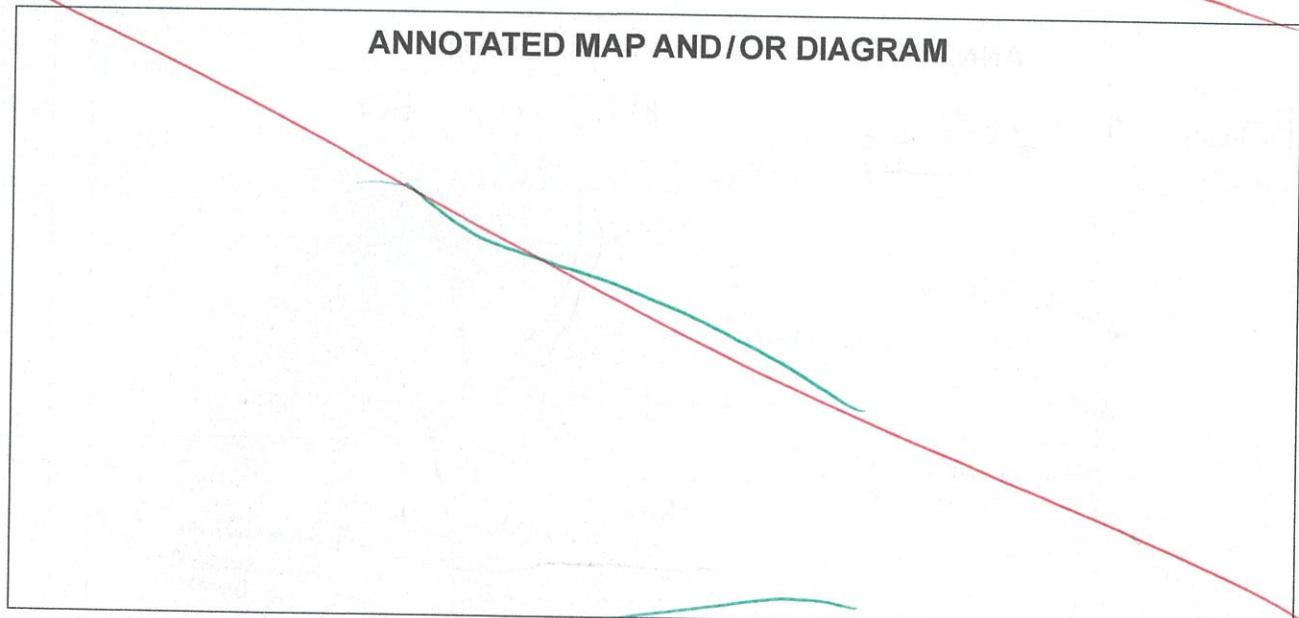
Referring to diagram 1, it is clear how much land had risen and how much change had occurred within the natural environment. Before the 1931 earthquake, much of inland Napier, inland of Westshore was ~~a~~ lagoon. This provided a bountiful source of seafood and much of Napier city was built on or around Napier Hill. The Tutaekuri River also flowed parallel to the coast along present day Willowbank Rd, Chambers St and Georges dr which is now in roading. This all changed dramatically after the earthquake. The lagoon drastically reduced in size as roughly 365ha of land was lifted 2.7m leaving more dry land for Napier to expand onto. The Tutaekuri also drastically changed flow after the land uplift to forced it to block where locals dug out the present

Please turn over ►

Cultural effect:

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## ANNOTATED MAP AND/OR DIAGRAM



The effect of the 1931 earthquake on the cultural environment was just as immense as the effect on the natural environment. One major effect on the cultural environment was the collapse of buildings causing loss of life, and prompted the introduction of building codes throughout NZ. Brick was a popular style at the time which didn't react well to shaking ground as it just crumbled. Decorative exteriors of buildings called facades were also popular but they simply crumbled as well as they weren't connected to buildings. These facades collapsed onto streets crushing people and blocking roadways. The Napier - Tech college was a brick building which crumbled and killed 9 people inside. These effects prompted the introduction of building codes throughout NZ and allowed Napier to rebuild in a popular Art Deco style. These building codes were a major effect on the cultural environment as it sought to prevent these issues in the long-term and the introduction of the Art Deco style allowed Napier to rebuild. Therefore, it is clear that the 1931 Hawkes Bay earthquake had an

E7  
E7

Extra space if required.  
Write the question number(s) if applicable.

(A)

Processes. //

The third and final process that produced the 1931 Earthquake was seismic waves. Seismic waves are the result of sudden releases of energy and can cause widespread damage and travel at a tremendous rate. On the 3<sup>rd</sup> February 1931, an earthquake struck 30 km NW of Napier and the focus was 17 km underground. This sent out a series of ~~ever-increasing~~  
~~new series~~ of waves that travel out in all directions in ever-increasing circles. There are three types of waves that are created. The first are P or primary waves and they travel fastest at 8 km per second and do little damage. The next type are S or secondary waves and they travel at roughly half the speed of P waves and do little damage. The third type are L waves which travel slowest and do the most damage. These waves can often be seen as ripples across the ground and they were the main cause of building collapse throughout Napier. It is clear how the three processes of Convection Currents, Subduction and Seismic Waves all occurred in sequence to cause the 1931 Hawkes Bay Earthquake.

(b)

\*introduction of an Art Deco style //

Cultural Effects. //

effect on the cultural environment //

Extra space if required.  
Write the question number(s) if applicable.

(b)

Natural Effects.

course where it now flows into the ocean just south of Awałdo. The dramatic change in ocean life habitats within the lagoon left tonnes of fish being left out of the water where locals had to bury the dead, decaying fish to prevent stench and disease. Therefore, ~~if~~ is clear the Earthquake of 1931 caused dramatic <sup>change</sup> within the natural environment.

## Low Excellence Exemplar 2020

<b>Subject</b>	Geography	<b>Standard</b>	91007	<b>Total score</b>	07
<b>Q</b>	<b>Grade score</b>	<b>Annotation</b>			
	E7	<p>The process aspect of the question is attempted to Excellence level, and the case study evidence is integrated throughout with appropriate use of terminology and relevant concepts selected, which showed a high level of understanding with some insight.</p> <p>The natural effects are explained with sufficient detail and show a clear understanding of the concept of change. There are elements of cultural effects or influences, but the student clearly knows the difference between the two effects. The diagram also adds to the explanations, showing an insightful understanding of the concepts.</p> <p>The cultural effect is clearly explained and includes the cultural impacts on the buildings and has specific case study information.</p>			

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High Excellence

**TOTAL**

**08**

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## INSTRUCTIONS

Name ONE type of **extreme natural event** and an **environmental case study** (or studies) of this event, that you will use to answer BOTH parts of the question in this booklet.

Extreme natural event:

Cyclone Yasi

Environmental case study(ies):

Queensland, Australia

In your answers, you should integrate case study evidence as well as geographic terminology and concepts.

Geographic concepts you may choose to use in your answers include:

### Processes

A sequence of actions that shape and change environments.

### Environments

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### Change

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**QUESTION**(a) **Processes**

Processes involve a sequence of actions.

Fully explain the sequence of actions that produced the extreme natural event in your case study environment(s).

In your answer, include:

- geographic terminology
- a geographic concept from page 2
- integrated detailed supporting evidence from your case study (or studies).

The process of Cyclone Yasi started on 28th February 2011 in the Pacific Ocean near Fiji.

The waters near Fiji were heated up to  $31^{\circ}$  C. This began the process as water began to evaporate, causing a low-pressure zone. The process reached an air pressure as low as 929 millibars. As the water evaporated, they cooled down and condensed to form cumulus clouds. This was all taking place as the process moved west towards Vanuatu and grew to a Category 2-3 storm. The cumulus clouds became thick and heavy during this time and released rain and latent heat energy.

The latent heat energy interacted with the process of Cyclone Yasi to strengthen it. As jet streams and the Coriolis force interacted with Cyclone Yasi, it continued to strengthen as it moved southwest towards Queensland, Australia. The latent heat energy caused the process of Cyclone Yasi to grow into a category 5 storm by 1st February 2011 when it hit Mission Beach, Queensland. During this time,

Cyclone Yasi's wind<sup>gusts</sup> reached 290 km/h and the air pressure at the centre reached 929 millibars.

Cyclone Yasi still travelled southwest over Australia until 3rd February 2011. The latent heat energy kept fuelling the process causing 9m high storm surges and regular winds of 250 km/h+. However, ~~after~~ this time, the process couldn't interact with the sea. This meant it couldn't keep getting stronger as it travelled further southwest across Australia. This lack of interaction caused Cyclone Yasi to weaken and dissipate. It reverted back down to a category 2 storm days after the 3rd February until it ~~finally~~<sup>2</sup> the process finally stopped after a week of time.

(b) **Effects**

Effects of extreme natural events can occur to both the natural and cultural environment. They can also be positive and/or negative.

Fully explain **ONE natural effect** (on page 7) and **ONE cultural effect** (on page 8) that your chosen extreme natural event had on your case study environment(s).

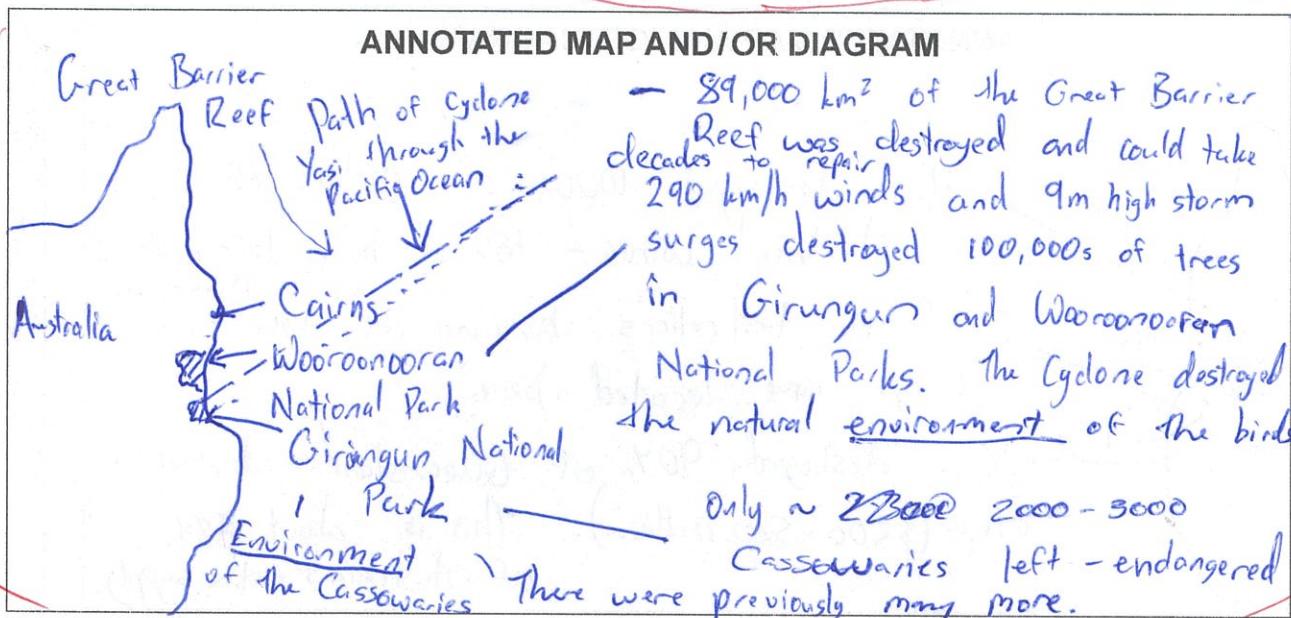
You may answer in annotated map, diagram, and/or paragraph form.

In your answer, include:

- geographic terminology
- a geographic concept from page 2
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Natural effect:

Destruction of ~~habitat of animals~~ habitats and food.



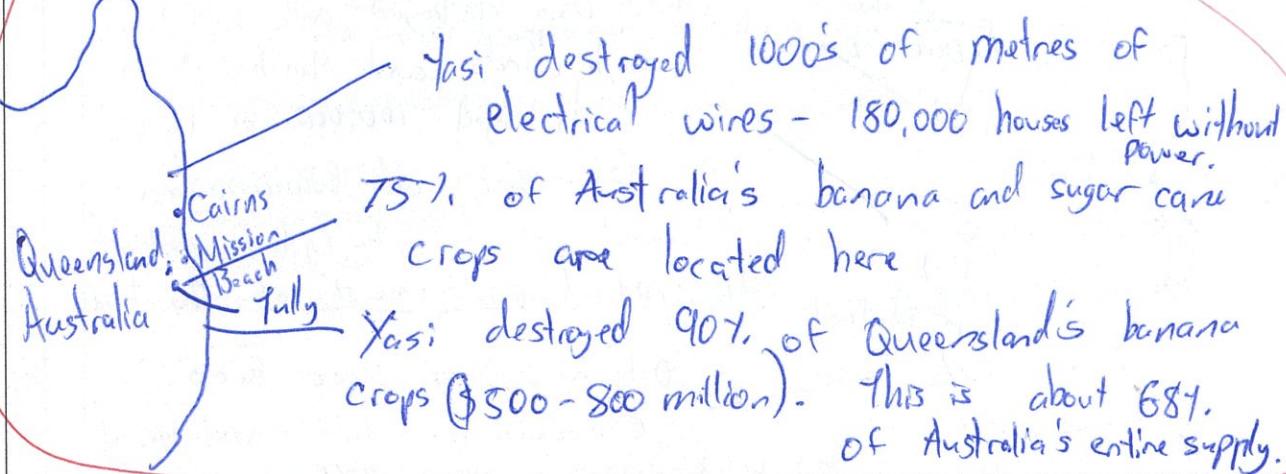
Cyclone Yasi majorly changed the natural environment of Queensland by destroying the habitats of different animal species. Yasi's ~ 290 km/h winds and 9m storm surges destroyed 1000's of acres of forest and grassland in Wooroonaoran and Girringun National Parks. These parks are the environment in which ~ 2000 ~~the~~ endangered southern cassowaries live. The wind gusts changed the environment by destroying over 100,000 trees and leaving humans to have to help feed the cassowaries as their food supplies were largely gone. Furthermore, Cyclone Yasi changed Queensland's natural environment by destroying 89,000 km<sup>2</sup> of the Great Barrier Reef. It is home to over 2000 species of fish and coral. The reef may take decades to grow back and recover. This was largely caused by the winds and storm surges.

Overall, Cyclone Yasi changed Queensland's natural environment by destroying the habitats of thousands of animals.

Please turn over ➔

Cultural effect: Economic impact on Queensland.

### ANNOTATED MAP AND/OR DIAGRAM



Cyclone Yasi changed the cultural environment of Queensland by causing large amounts of economic damage. Cyclone Yasi caused \$3.6 billion in damages. This included \$800 million in agriculture. Cyclone Yasi changed Australia's economy by destroying 90% of Queensland's banana crops or ~68% of Australia's entire banana crop supply. This caused banana prices to reach \$12 per kg. This changed the cultural environment as people who were affected by the disaster had to spend even more money just to get food. Furthermore, over \$2 billion of the \$3.6 billion was used on rebuilding houses and electric pylons after Cyclone Yasi left 180,000 houses without power. Overall, Cyclone Yasi changed the cultural environment of Queensland by causing \$3.6 billion of agricultural and industrial/residential damage due to flooding and strong wind gusts.

## High Excellence Exemplar 2020

<b>Subject</b>	Geography	<b>Standard</b>	91007	<b>Total score</b>	08
<b>Q</b>	<b>Grade score</b>	<b>Annotation</b>			
	E8	<p>This is an excellence response that is concise and clearly meets the requirements of the standard. The candidate demonstrates a comprehensive understanding of their chosen environment. There is clearly a sound level of understanding of the concept, which is used throughout the response with integrated case study examples. They include good explanations of how the winds rotate and how a storm occurs, with insight and relevant use of terminologies.</p> <p>The natural effects are fully explained, and the map and aboriginal names show in-depth understanding. The concepts are woven throughout and supported by case study examples in great detail. Cultural links are well integrated in the response.</p> <p>The cultural effect is well explained. The response is focused on change rather than the response to power and rebuilding houses. The candidate focuses on bananas in a clear sequence showing ONE effect comprehensively.</p>			