

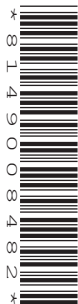
CANDIDATE  
NAME

CENTRE  
NUMBER

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**ENVIRONMENTAL MANAGEMENT**

**8291/23**

Paper 2 Hydrosphere and Biosphere

**May/June 2019**

**1 hour 30 minutes**

Additional Materials: Answer Booklet/Paper

**READ THESE INSTRUCTIONS FIRST**

Write your centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.  
**DO NOT WRITE IN ANY BARCODES.**

Electronic calculators may be used.  
You may lose marks if you do not show your working or if you do not use appropriate units.

**Section A**

Answer **all** questions in this section.  
Write your answers in the spaces provided on the question paper.

**Section B**

Answer **one** question from this section.  
Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the question number from Section B in the grid.

	For Examiner's Use
<b>Section A</b>	/
1	
2	
<b>Section B</b>	/
<b>Total</b>	

This document consists of **13** printed pages and **3** blank pages.

## Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Fig. 1.1 shows part of a local hydrological cycle before and after urban development.

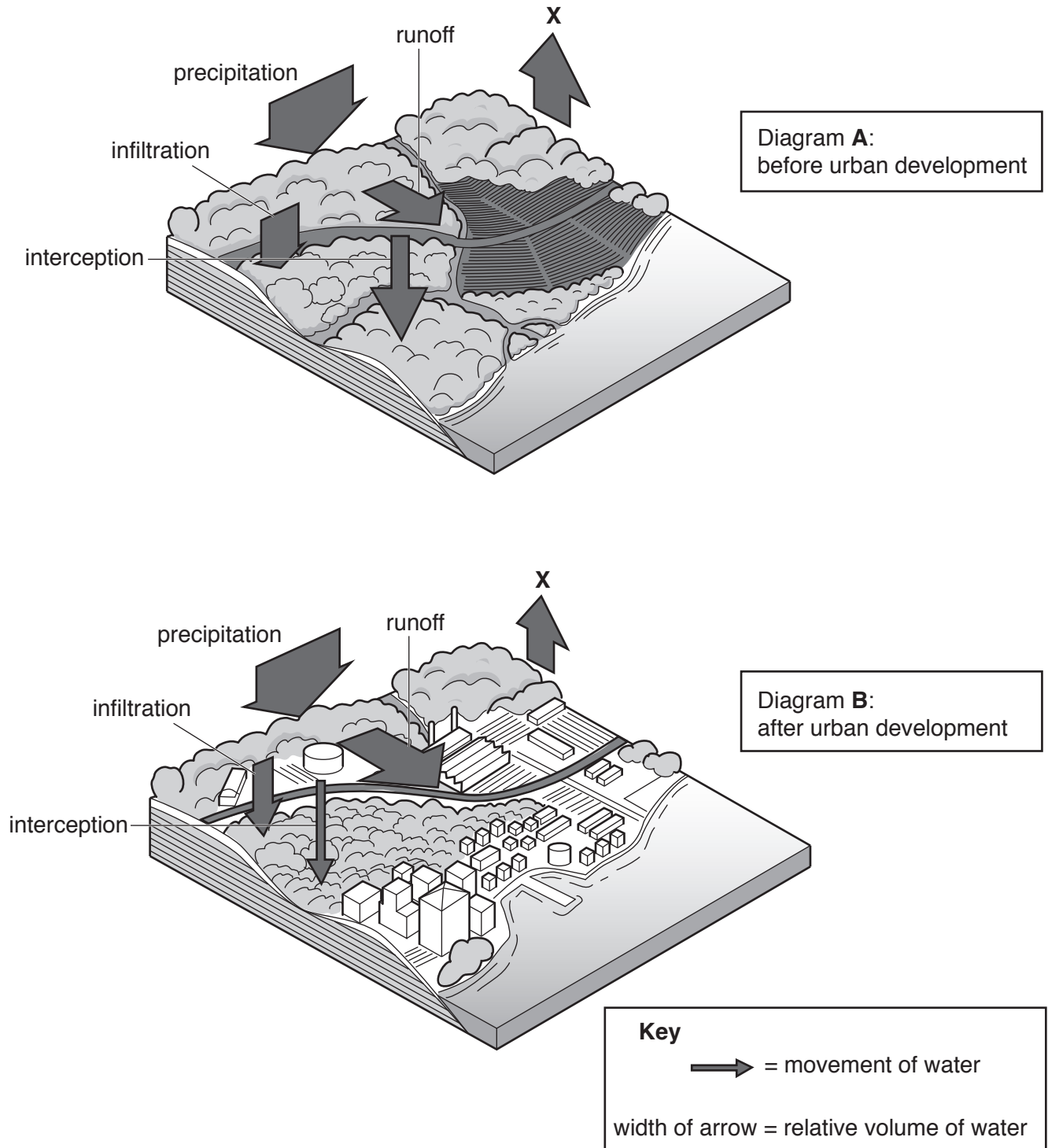


Fig. 1.1

(i) Name the process labelled **X** in Fig. 1.1.

..... [1]

(ii) Describe **two** changes in the movement of water after urban development shown in Fig. 1.1.

.....  
.....  
.....  
..... [2]

(iii) Explain how urban development may cause rivers to flood.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

(b) Fig. 1.2 shows the severity of drought in areas of the USA for two different years.

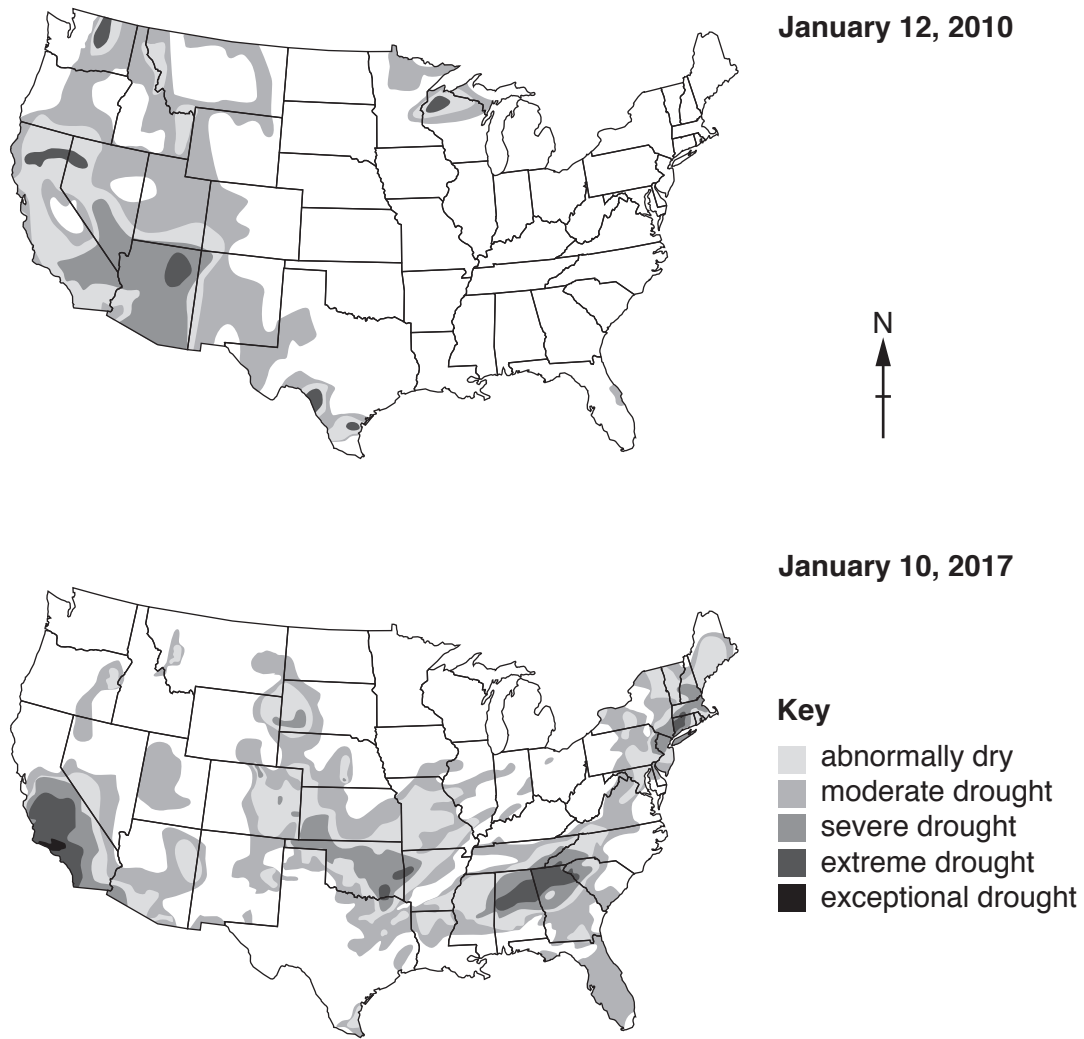


Fig. 1.2

(i) State **three** differences in the drought conditions in the USA between 2010 and 2017 shown in Fig. 1.2.

.....

.....

.....

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.....

.....

..... [3]



- 2 (a) The Great Barrier Reef is the world's largest coral reef ecosystem. Fig. 2.1 shows the areas of the Great Barrier Reef monitored for bleaching in 2016 and 2017.

Bleaching events turn the coral white due to the death of algae within coral.

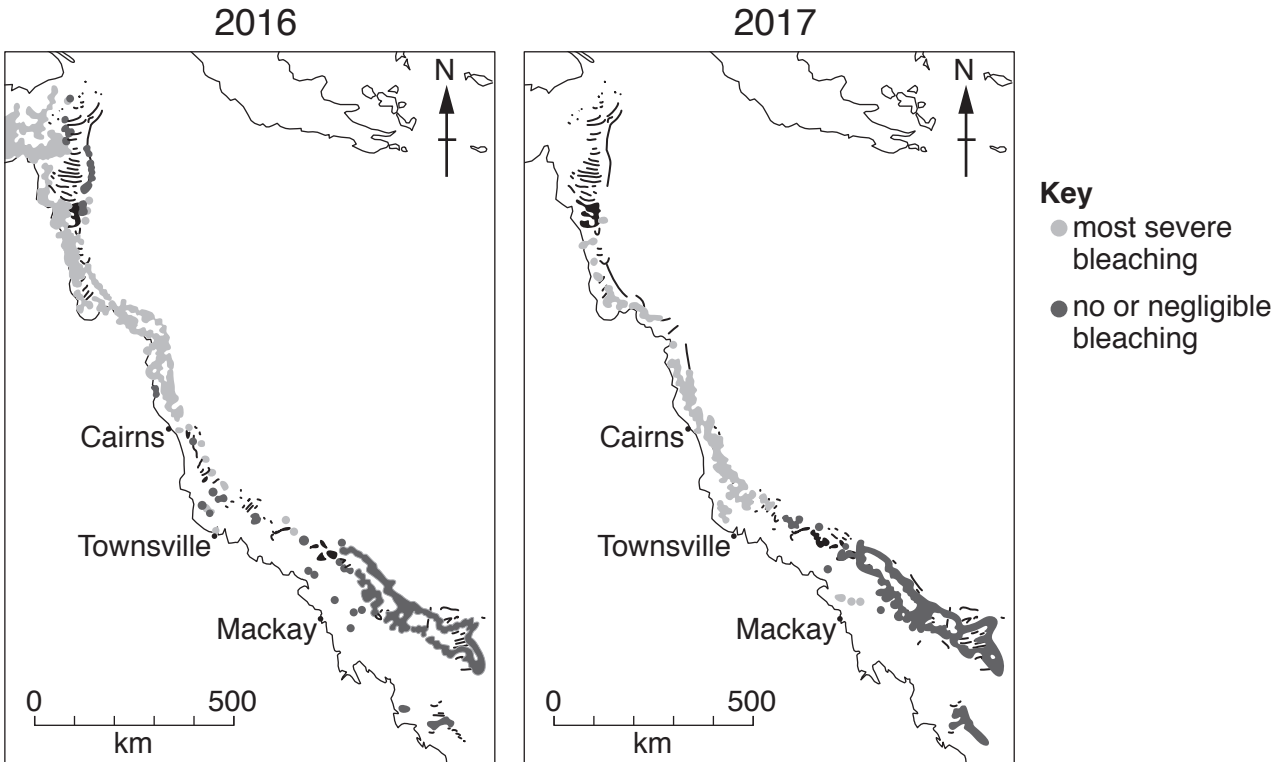


Fig. 2.1

- (i) Describe **two** differences in the coral bleaching in 2016 and 2017 shown in Fig. 2.1.

.....  
.....  
.....  
..... [2]

- (ii) Suggest **two** human activities which could directly cause damage to the coral.

.....  
.....  
.....  
..... [2]

(b) Fig. 2.2 is an extract from a report about coral bleaching of the Great Barrier Reef.

Aerial surveys have found that two severe bleaching events in 2016 and 2017 affected two-thirds of the Great Barrier Reef. This phenomenon is mainly caused by increases to the sea surface temperature.

Scientists using aerial surveys recorded bleaching at 800 individual coral reefs across 8,000 km.

The results show the two consecutive mass bleaching events have affected a 1,500 km stretch, leaving only the reef’s southern third undamaged.

The 2017 event spread further south, and was most intense in the middle section of the Great Barrier Reef. The 2017 mass bleaching, second in severity only to 2016, has occurred even in the absence of an El Niño event.

Mass coral bleaching has occurred on the reef four times in recorded history.

**Fig. 2.2**

(i) With reference to Fig. 2.2, explain what has led to the mass bleaching of the coral.

.....

.....

.....

..... [2]

(ii) Suggest **two** ways, other than aerial surveys, scientists monitor changes in the coral reef.

1 .....

.....

2 .....

..... [2]







**Section B**

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3** Fig. 3.1 is an extract report on the success of rewilding projects in the United Kingdom.

Rewilding is a conservation method which restores an area to its natural uncultivated state.

Examples of rewilding projects which have significantly reduced flood risk in the UK include:

- **Uplands replanting project:** moorland grasses, heathers and other plants were replanted to increase the retention of water in peat bogs.
- **Beaver reintroduction:** beavers (an animal that builds woody dams in small rivers) were reintroduced stimulating the revival of natural wet woodland. They have significantly increased water storage while slowing the flow of water downstream.

**Fig. 3.1**

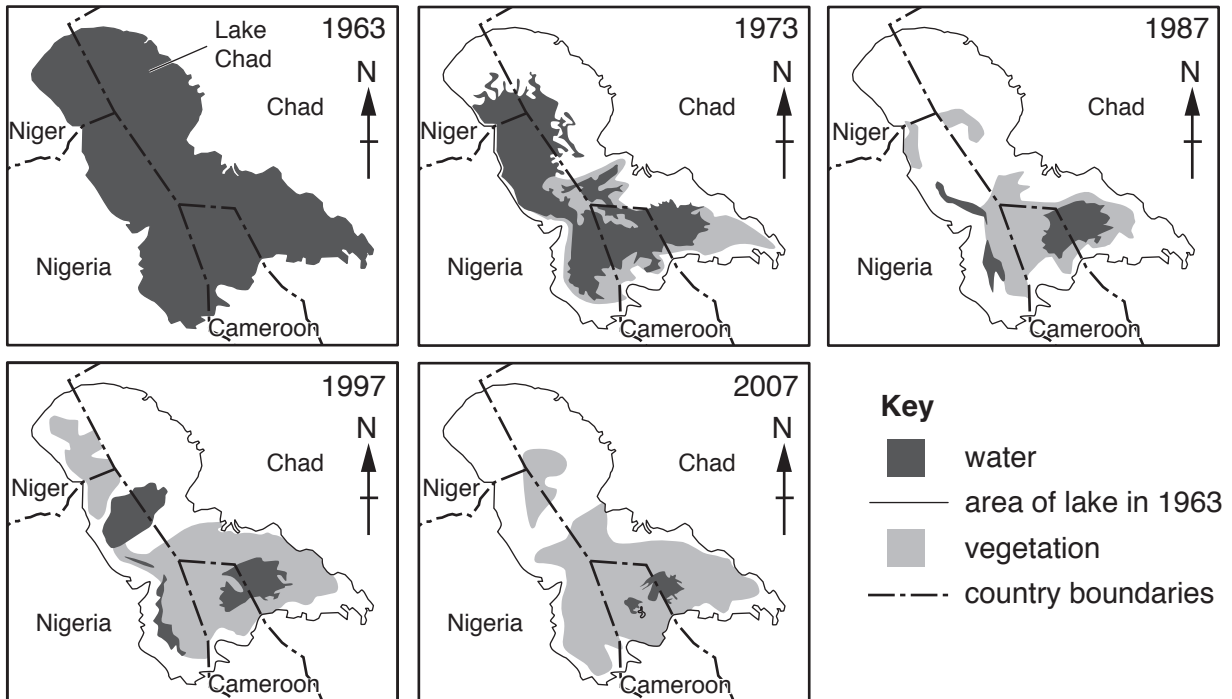
- (a) With reference to Fig. 3.1 suggest the advantages and disadvantages of these rewilding projects. [10]
- (b) Using examples, evaluate methods to protect areas and their ecosystems through the creation of national parks, conservation areas and similar schemes. [30]

[Total: 40]

- 4 Lake Chad is a large lake in northern central Africa that provides fresh water to around 30 million people in the countries of Chad, Cameroon, Niger and Nigeria.

In 1963, Lake Chad covered an area of approximately 25 000 square kilometres.

Fig. 4.1 shows changes to the area of Lake Chad from 1963 to 2007.

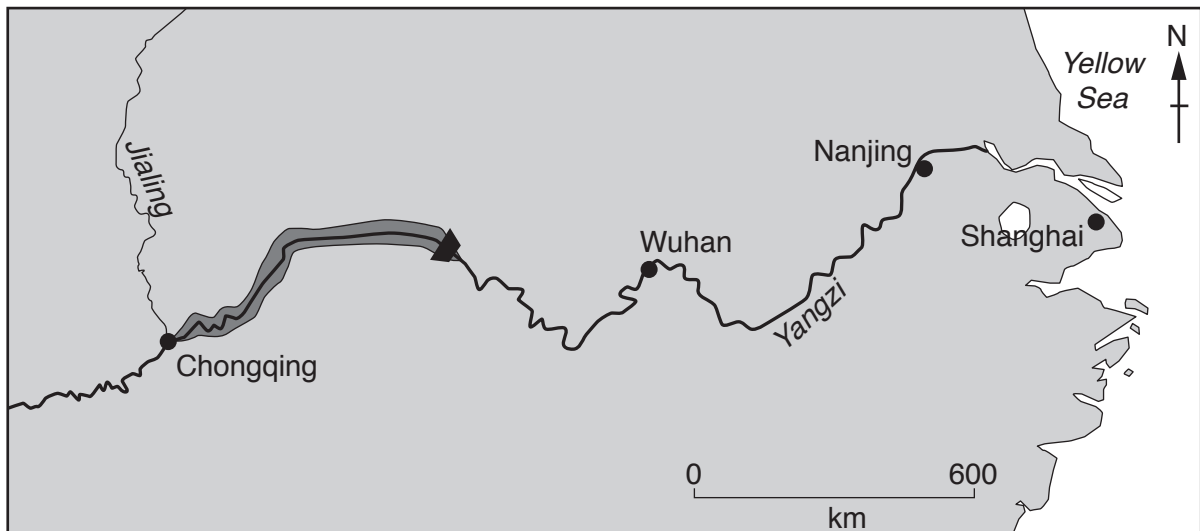


**Fig. 4.1**

- (a) Describe the change in Lake Chad shown in Fig. 4.1 and suggest the effects of this change on the human population living around Lake Chad. [10]
- (b) Outline factors which may cause diminishing water supplies. Using examples, assess strategies to manage the conservation of natural water resources. [30]

[Total: 40]

5 Fig. 5.1 shows a major hydroelectric dam, and a map of the location of this dam in China.



**Key**

▲ Three Gorges Dam Construction Site

■ area to be flooded

● city

~ Yangzi river

~ Jialing river

**Fig. 5.1**

- (a) With reference to Fig. 5.1 outline the advantages and disadvantages of generating power using a hydroelectric dam. [10]
- (b) Using examples, assess the problems of providing power through hydroelectric generation in countries at contrasting levels of economic development. [30]

[Total: 40]





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