Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

ENVIRONMENTAL MANAGEMENT **8291/02**

Paper 2 Hydrosphere and Biosphere

May/June 2006

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 a soft pencil for any diagrams, graphs, table or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B
Answer **one** question from this section.
Answer the question 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 opposite.

For Examiner's Use	
Section A	
1	
2	
Section B	
TOTAL	

This document consists of **11** printed pages and **1** blank page.

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Study Fig. 1.1 which shows the Global Water Cycle. Values show the volumes of water (in 1000 km^3) transported per year.

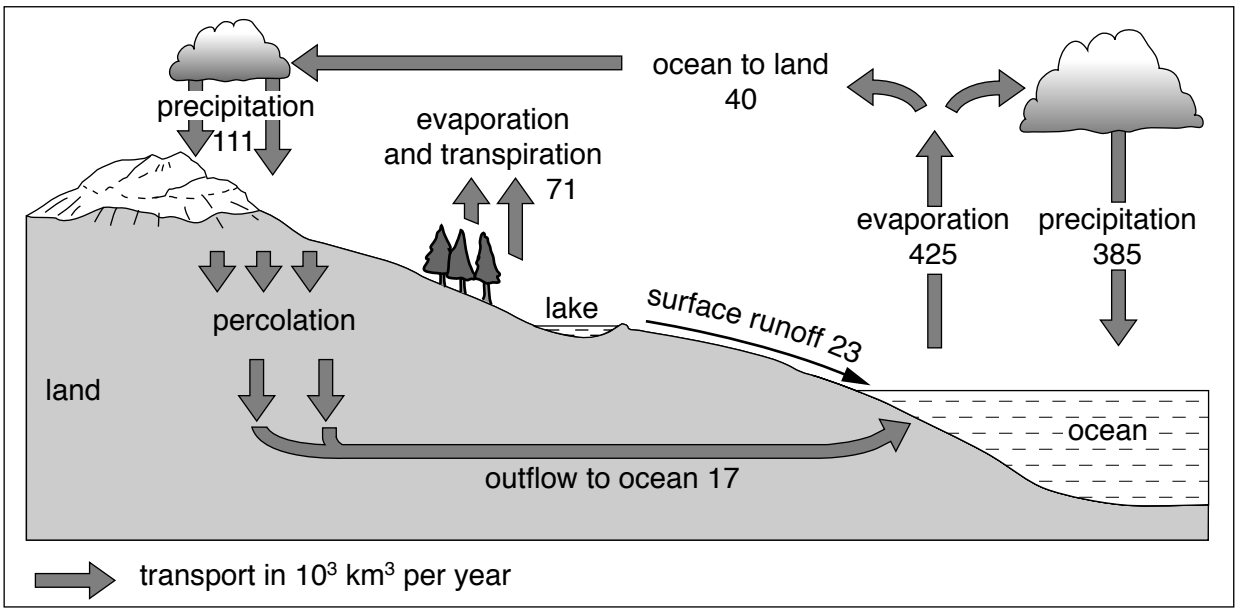

Fig. 1.1

(i) Explain the difference between the terms *evaporation* and *transpiration*.

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.....[2]

(ii) Calculate

1. the total volume of water transported by evaporation and transpiration,

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2. the total volume of water transported by precipitation.

.....[2]

(iii) Name **two** zones within the model in which water is stored.

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.....[2]

(iv) Describe **two** routes by which water is transferred from the land to the sea.

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.....[2]

(v) There is an overall flow of 40 000 km^3 from land to ocean. Explain why the overall flow of water from land to ocean is necessary to keep the global water cycle in balance.

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.....[2]

(b) Fig. 1.2 shows how the volume of global ice in the form of glaciers and ice sheets has changed over the past 700 000 years.

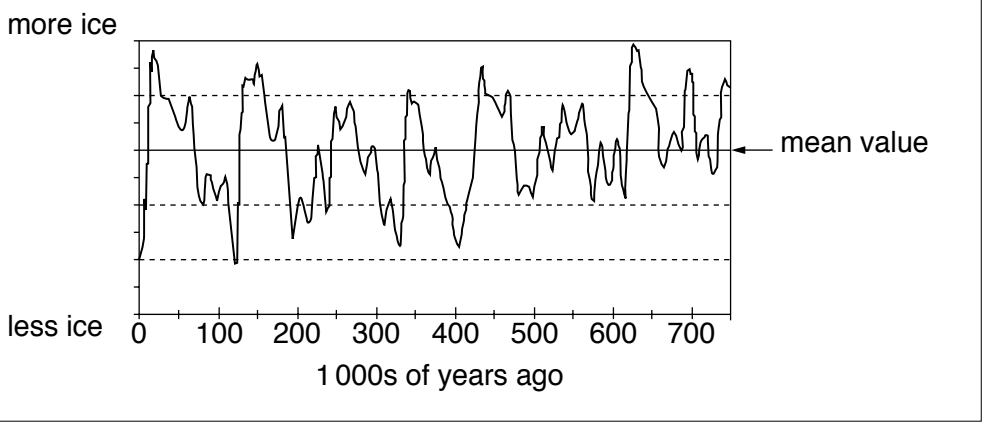

Fig. 1.2

(i) Describe the pattern of the graph shown in Fig. 1.2.

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.....[2]

(ii) What global climatic conditions would lead to the peaks and troughs shown in Fig. 1.2?

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.....[2]

(iii) What does Fig. 1.2 suggest will be the next event in the global climate?

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.....[1]

(c) Fig. 1.3 shows data derived from analysis of an ice core. It shows that atmospheric carbon dioxide concentrations are related to average global temperatures.

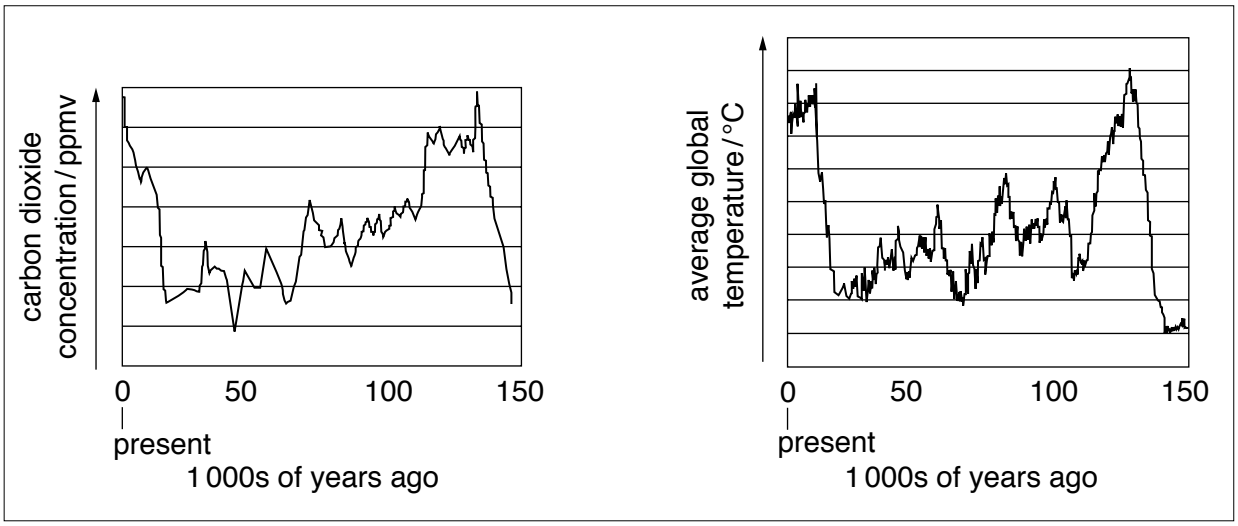

Fig. 1.3

Describe and explain the relationship shown in Fig. 1.3.

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[20 marks]

2 Fig. 2.1 shows the locations of five of the world's major biomes.

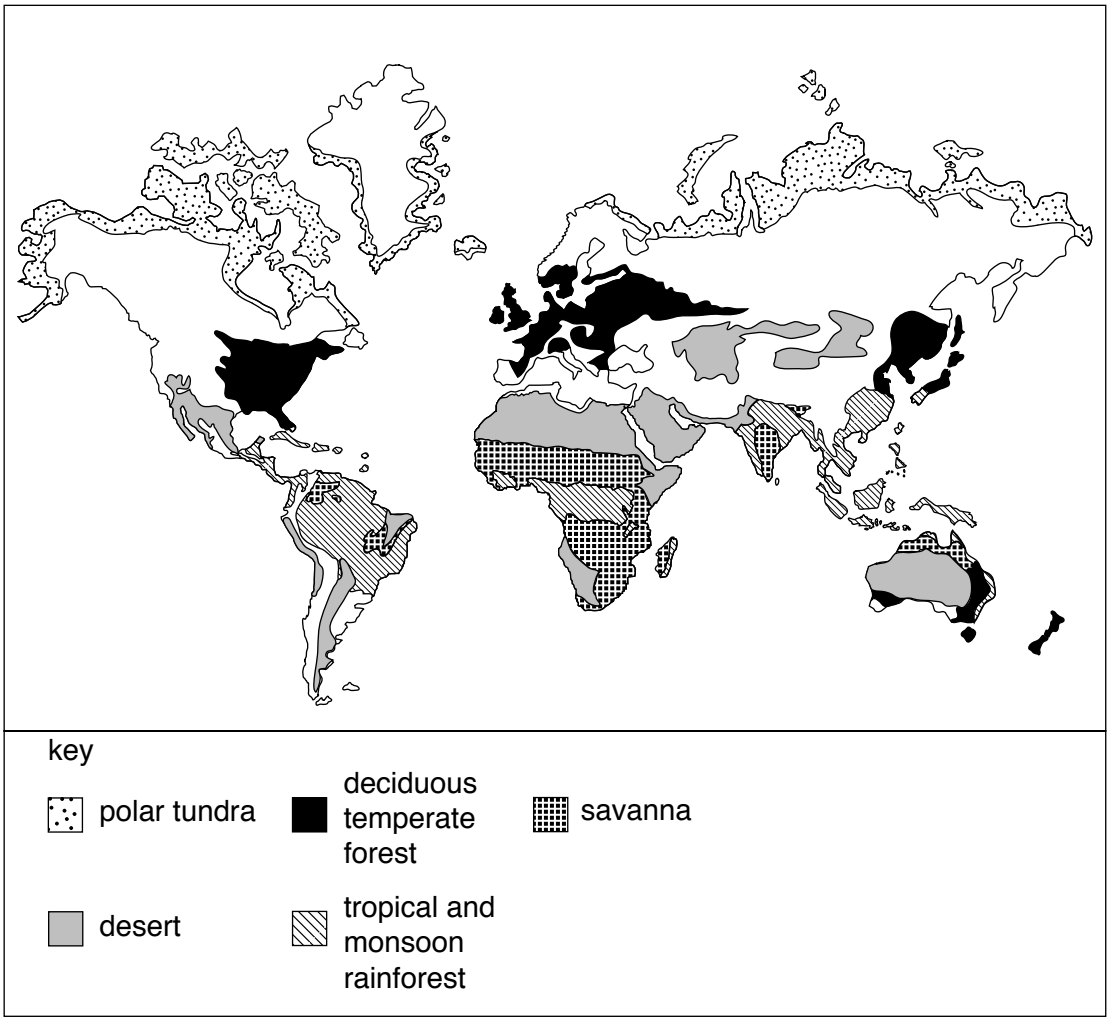

Fig. 2.1

(a) (i) What is the meaning of the term *biome*?

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.....[1]

(ii) Name one biome associated with each of the following climatic conditions

- hot and wet all year

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- warm summers, mild winters with rainfall in each month

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- cool short summers, very cold winters, small amount of summer rainfall.

.....[3]

(b) Table 2.1 contains information on net primary productivity (NPP).

Table 2.1

Ecosystem Type	Net Primary Productivity (kJ per m^2)
tropical rain forest	9000
estuary	9000
swamps and marshes	9000
savanna	3000
deciduous temperate forest	6000
boreal forest	3500
temperate grassland	2000
polar tundra	600
desert	< 200

(i) What is the meaning of the term *net primary productivity* (NPP)?

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.....[2]

(ii) With reference to Table 2.1 describe how net primary productivity depends upon:

1. water availability

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2. temperature.

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.....[4]

(iii) Describe and explain the characteristics of any **two** ecosystems listed in Table 2.1.

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.....[4]

(iv) Suggest how changes in net primary productivity could be used as an indicator of climatic change.

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(c) Fig. 2.2 shows how changes in light intensity and carbon dioxide concentration can affect the rate of photosynthesis.

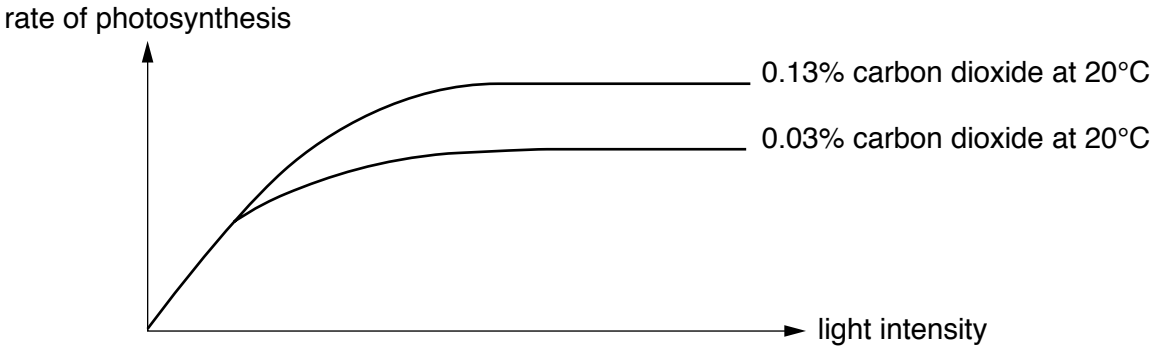

Fig. 2.2

Describe how the rate of photosynthesis is related to light intensity and carbon dioxide concentration.

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.....[3]

[20 marks]

Section B

Answer **one** question from this section.

Answers must be in continuous prose.

Write your answers on the separate answer paper provided.

3 **(a)** One crisis facing the Earth is that of global water shortage.
Briefly explain why this crisis is being blamed on mismanagement of the following factors: existing water resources, population growth and changing weather patterns. [10]

(b) Using examples, describe and explain why projects aimed at the supply of water for human and economic activity can be both advantageous and damaging. [30]

[40 marks]

4 **(a)** Use Fig. 4.1 to describe and explain how a food web functions. [10]

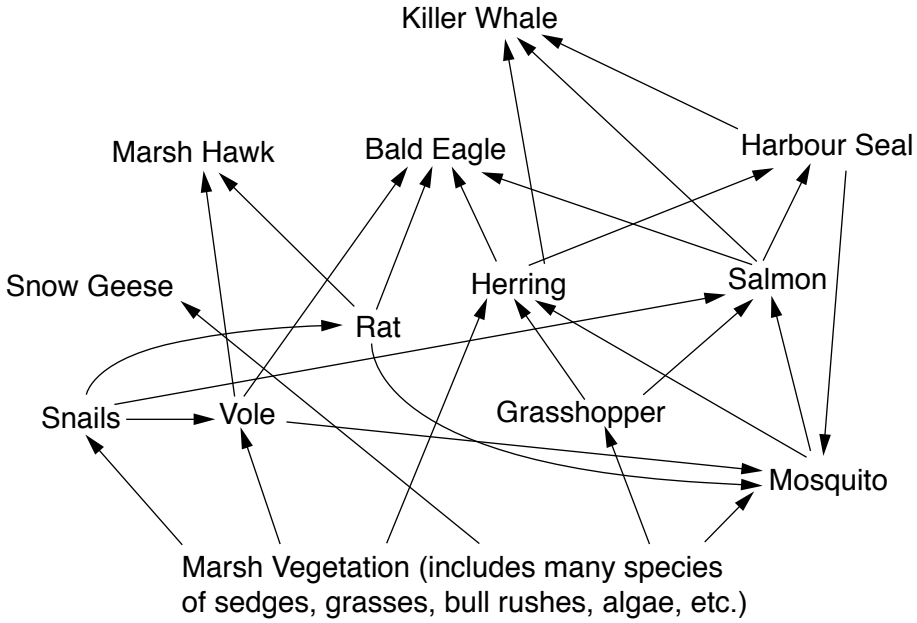

Fig. 4.1

(b) Describe and evaluate the impact of human activity upon **one** named ecosystem with which you are familiar. [30]

[40 marks]

5 **(a)** Study Fig. 5.1 for this question.
Describe the changes in levels of pollution in the River Rhine between 1975 and 1995 in each of the following regions.

- Region A
- Region B
- Region C

[10]

(b) With reference to examples with which you are familiar, describe and explain the possible impact of sewage disposal and industrial waste upon the health of rivers. Why is river pollution difficult to manage? [30]

[40 marks]

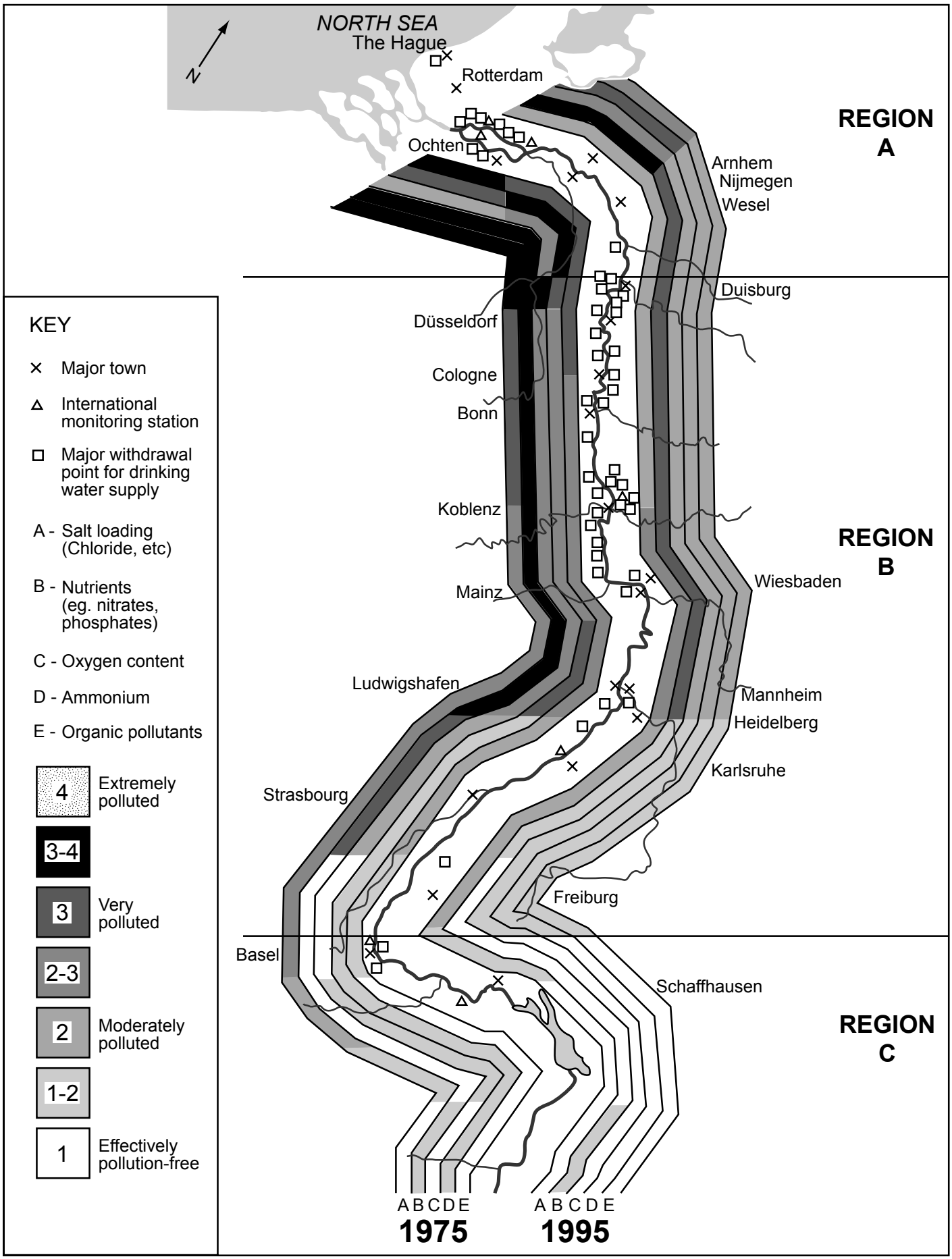

Fig. 5.1

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