GCE AS/A LEVEL

2110U10-1

TUESDAY, 14 MAY 2024 – AFTERNOON

GEOGRAPHY – AS UNIT 1
CHANGING LANDSCAPES

2 hours plus your additional time allowance

Surname

First name(s)

Centre Number

Candidate Number

2

ADDITIONAL MATERIALS

Resource Folder.
A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces on the previous page.

Write your answers in the spaces provided in this booklet.

In Section A, answer EITHER questions 1 and 2 OR questions 3 and 4.

Answer ALL questions in Section B.

If further space is required you should use the additional page(s) at the back of this booklet. The question number(s) should be clearly shown.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part-question; you are advised to divide your time accordingly.

THIS PAPER REQUIRES THAT YOU MAKE AS FULL USE AS POSSIBLE OF APPROPRIATE EXAMPLES AND REFERENCE TO DATA TO SUPPORT YOUR ANSWERS. SKETCH MAPS AND DIAGRAMS SHOULD BE INCLUDED WHERE RELEVANT.

A plain page is available near the back of the booklet for you to add any relevant sketch maps and diagrams you may wish to include. The question number(s) should be clearly shown.

SECTION A: CHANGING LANDSCAPES

Answer EITHER questions 1 and 2 OR questions 3 and 4 from your chosen landscape.

Make the fullest possible use of examples and data to support your answers.

EITHER: COASTAL LANDSCAPES

Answer questions 1 AND 2 if this is your chosen landscape.

1 (a)(i) Use FIGURE 1a opposite to state the six-figure grid reference of the Salt House (X). [1 mark]

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1 (a)(ii) Use FIGURE 1a and FIGURE 1b opposite to give the direction in which the camera was facing when the photograph was taken. [1 mark]

(a)(iii) Use FIGURE 1a and the RESOURCE FOLDER to describe the characteristics of Port Eynon Beach. [3 marks]

1 (a)(iv) Suggest ONE way in which the coastal landscape in FIGURES 1a AND 1b could have a positive impact on human activity. [3 marks]

1 (b) Examine the importance of cliff erosion in the supply of sediment to the coastal system. [8 marks]

Additional space for Question 1(b) only:

2 (a)(i) Use FIGURE 2a AND FIGURE 2b opposite to describe changes in the area shown. [5 marks]

2 (a)(ii) Suggest why groynes have been constructed in this area. [3 marks]

2 (b) Examine the role of geological factors in determining the rate of coastal erosion. [8 marks]

Additional space for Question 2(b) only:

OR: GLACIATED LANDSCAPES

Answer questions 3 AND 4 if this is your chosen landscape.

3 (a)(i) Use FIGURE 3a opposite to state the six-figure grid reference of the summit of Pen yr Ole Wen (X).

[1 mark]

(ii) Use FIGURE 3a AND FIGURE 3b opposite to give the direction in which the camera was facing when the photograph was taken.

[1 mark]

(iii) Use FIGURE 3a and the RESOURCE FOLDER to describe the characteristics of the cirque at Cwm Idwal.

[3 marks]

3 (a)(iv) Suggest ONE way in which the glaciated landscape in FIGURES 3a AND 3b could have a positive impact on human activity. [3 marks]

3 (b) Examine the importance of winter precipitation to mass balance in a glacier system. [8 marks]

Additional space for Question 3(b) only:

4 (a)(i) Use FIGURE 4a AND FIGURE 4b opposite to describe changes in the area shown. [5 marks]

4 (a)(ii) Suggest why rapid mass movement may occur in this area. [3 marks]

4 (b) Examine the role of freeze-thaw weathering in the formation of ONE OR MORE periglacial landforms.

[8 marks]

Additional space for Question 4(b) only:

SECTION B: TECTONIC HAZARDS

Answer ALL questions.

Make the fullest possible use of examples and data to support your answers.

5 (a) Use FIGURE 5a opposite to describe variations in the likelihood of liquefaction. [6 marks]

FIGURE 5b: A CHI-SQUARED TEST WAS USED TO SEE WHETHER SURFACE GEOLOGY IN CALIFORNIA SIGNIFICANTLY IMPACTS THE INTENSITY OF GROUND SHAKING.

The NULL HYPOTHESIS is: 'There is no significant difference in the intensity of ground shaking in areas of differing surface geology during earthquakes in California.'

	OBSERVED INCIDENCES OF INTENSE GROUND SHAKING (O)	EXPECTED INCIDENCES OF INTENSE GROUND SHAKING (E)	O–E	$(O–E)^2$	$\frac{(O–E)^2}{E}$
SOFT SEDIMENT	17	9	A	64	7.11
SOFT ROCK	7	9	-2	4	0.44
HARD ROCK	3	9	-6	B	4
				TOTAL	11.55

Chi-squared value = 11.55

Source: adapted from Seismological Society of America

(Turn over)

FIGURE 5c: CRITICAL VALUES FOR CHI-SQUARED TEST

SIGNIFICANCE (CONFIDENCE) LEVELS	95% (0.05)	99% (0.01)	99.9% (0.001)
CRITICAL VALUES	5.99	9.21	13.82

5 (b)(i) Give the values for A and B in FIGURE 5b on the previous page. [2 marks]

A _____

B _____

(ii) Use FIGURE 5b on the previous page AND FIGURE 5c above to comment on the nature and significance of the result of the Chi-squared test. [4 marks]

_____

_____

_____

_____

_____

5 (c) Outline the secondary effects of a named earthquake event. [8 marks]

Additional space for Question 5(c) only:

6 (a) Use FIGURE 6a opposite to describe the path of the 2002 lava flows from Mount Nyiragongo. [2 marks]

6 (b) Use FIGURE 6b opposite to describe the distribution of areas of HIGH social vulnerability to volcanic eruptions. [5 marks]

6 (c) Use FIGURE 6a opposite page 33 AND FIGURE 6c opposite to suggest PHYSICAL reasons why it is difficult to manage the risk from future eruptions of Mount Nyiragongo. [9 marks]

Additional space for Question 6(c) only:

6 (d) Use FIGURE 6b AND FIGURE 6c to examine different HUMAN factors affecting vulnerability to volcanic eruptions in Goma city. [10 marks]

Additional space for Question 6(d) only:

7 (a) Examine the effectiveness of prediction as a response to volcanic hazards. [8 marks]

Additional space for Question 7(a) only:

7 (b) Outline the tectonic processes operating at diverging plate margins. [10 marks]

Additional space for Question 7(b) only:

END OF PAPER

Question Number	Additional page, if required for diagrams. Write the question number(s) in the left-hand margin.

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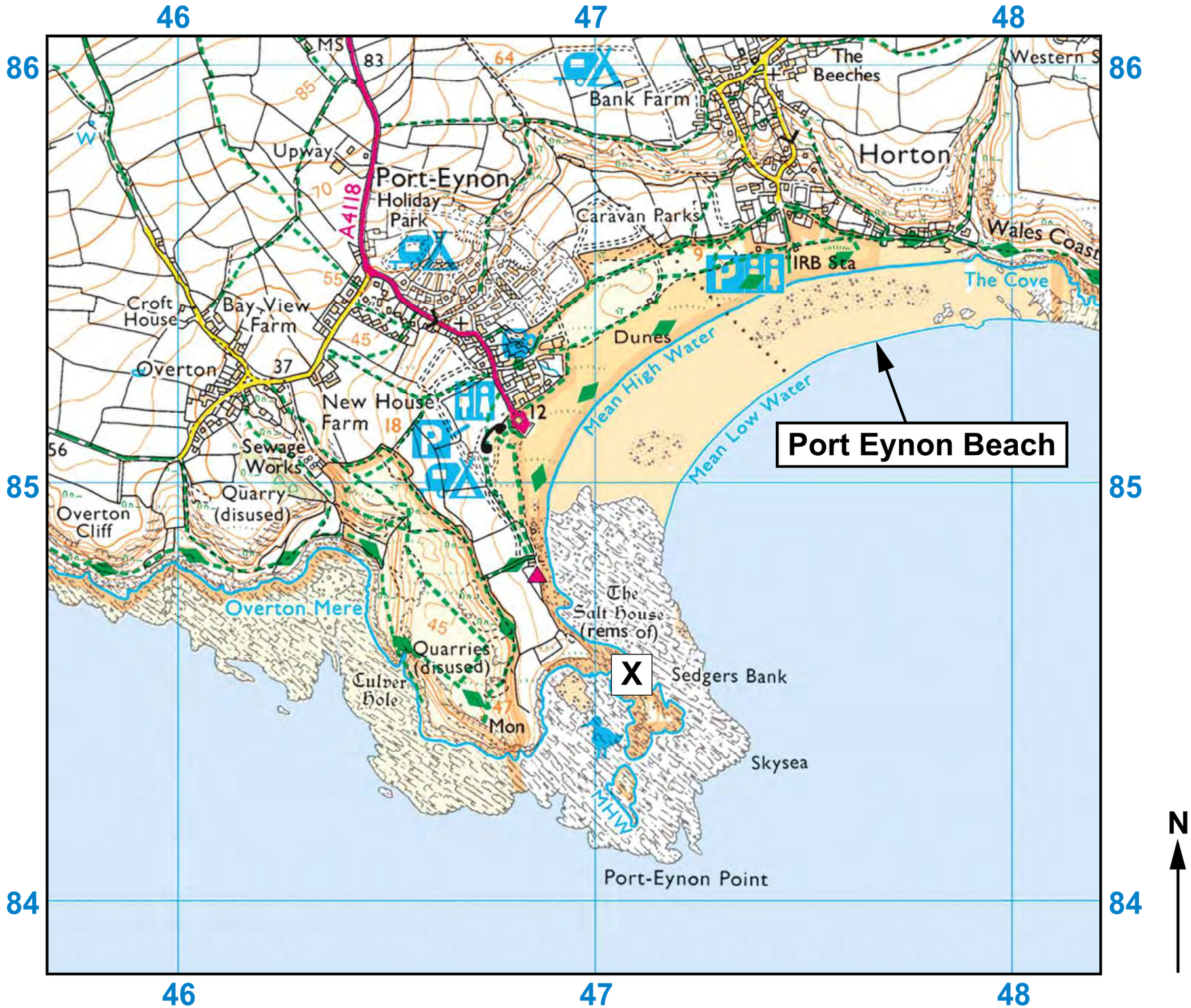
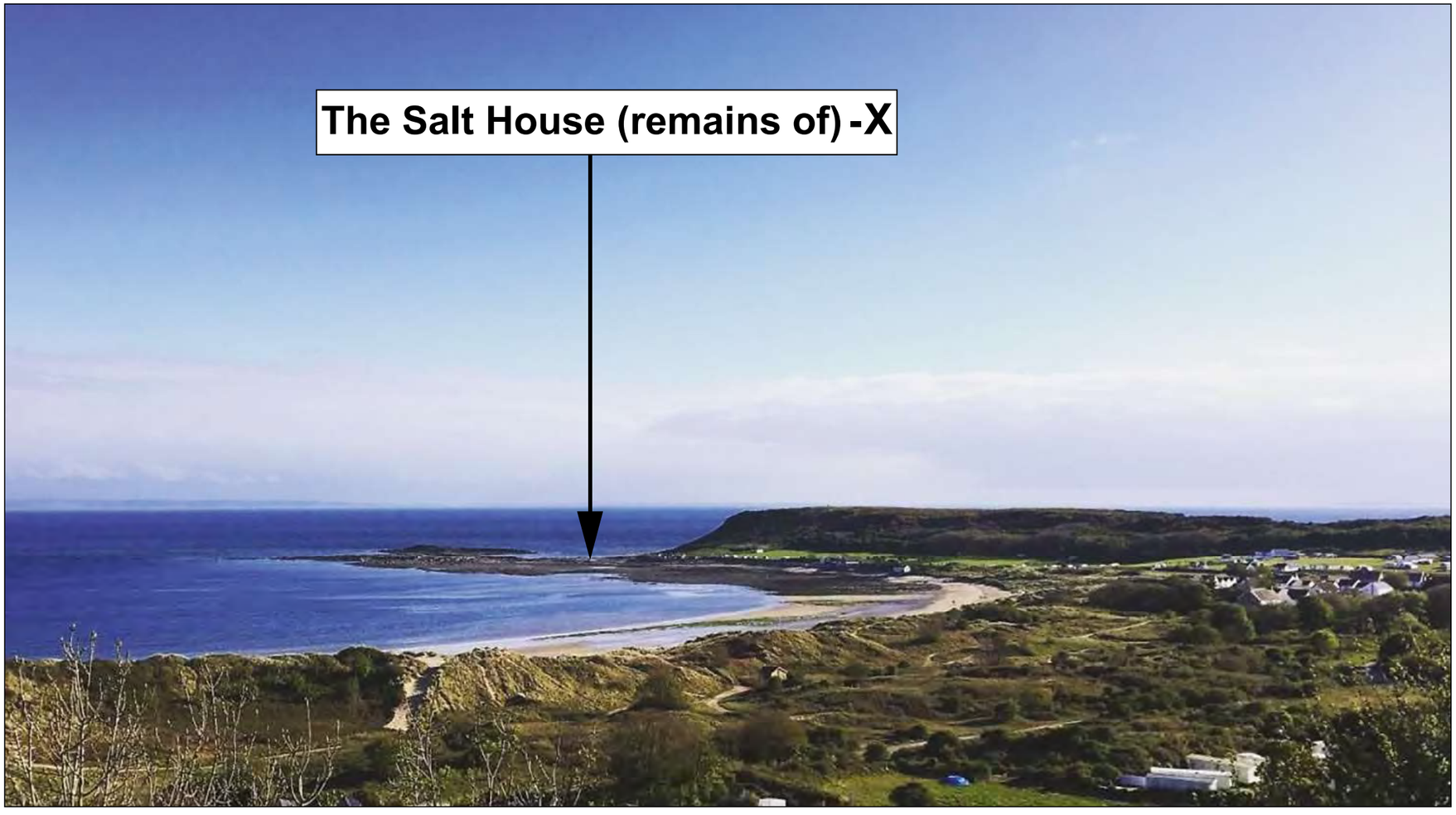
For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
Either 1 and 2 or 3 and 4	16	
	16	
	16	
	16	
5	20	
6	26	
7	18	
Total	96	

FIGURE 1a: OS 1:25 000 MAP OF PORT EYNON, GOWER PENINSULA



Source: Ordnance Survey

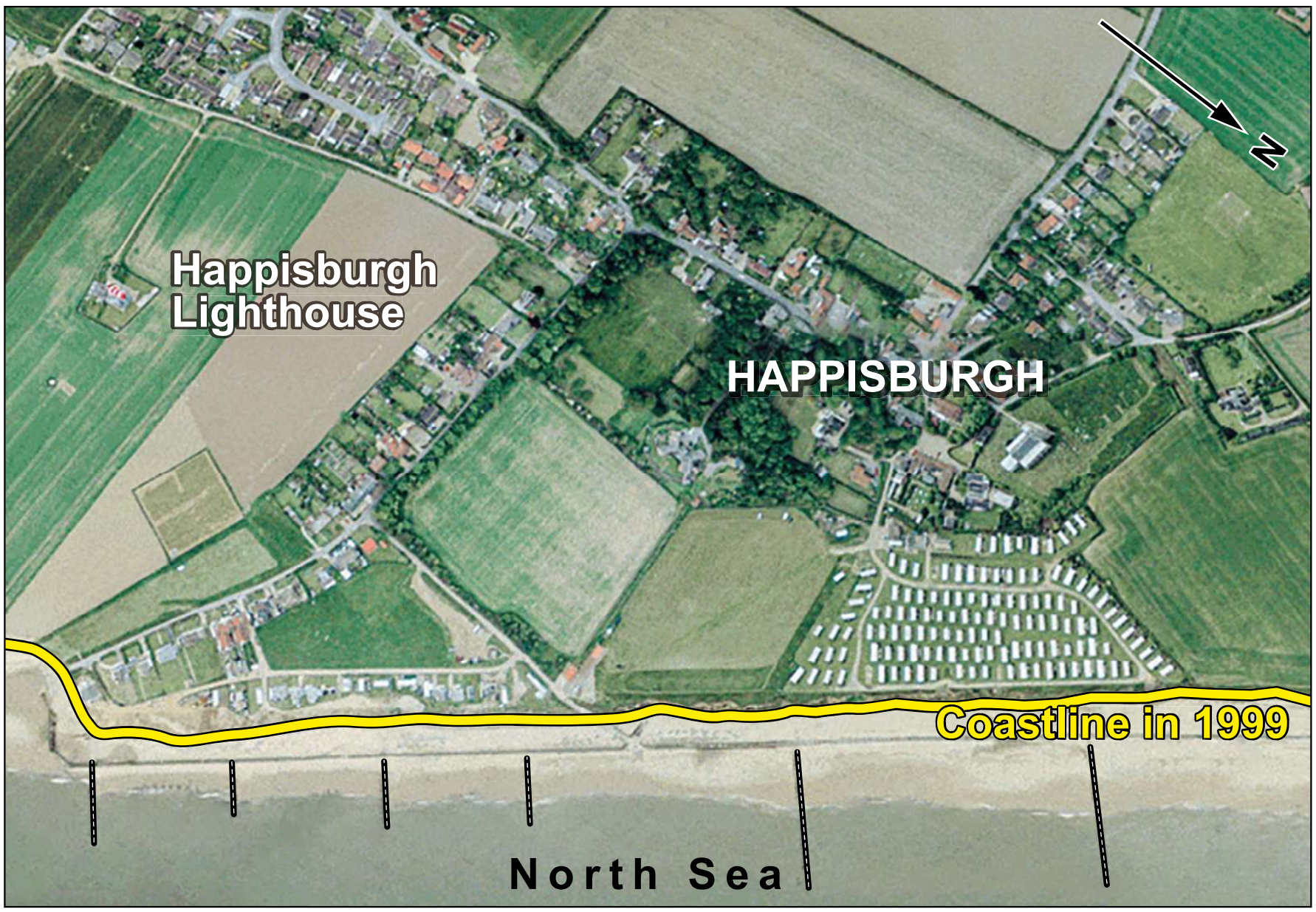
FIGURE 1b: VIEW OF PORT-EYNON POINT AND THE REMAINS OF THE SALT HOUSE



Source: https://westernside-cottage-horton-glamorgan.hotelmix.co.uk/

FIGURE 2: THE CHANGING COAST AT HAPPISBURGH, NORFOLK, 1999-2019

Figure 2a: 1999

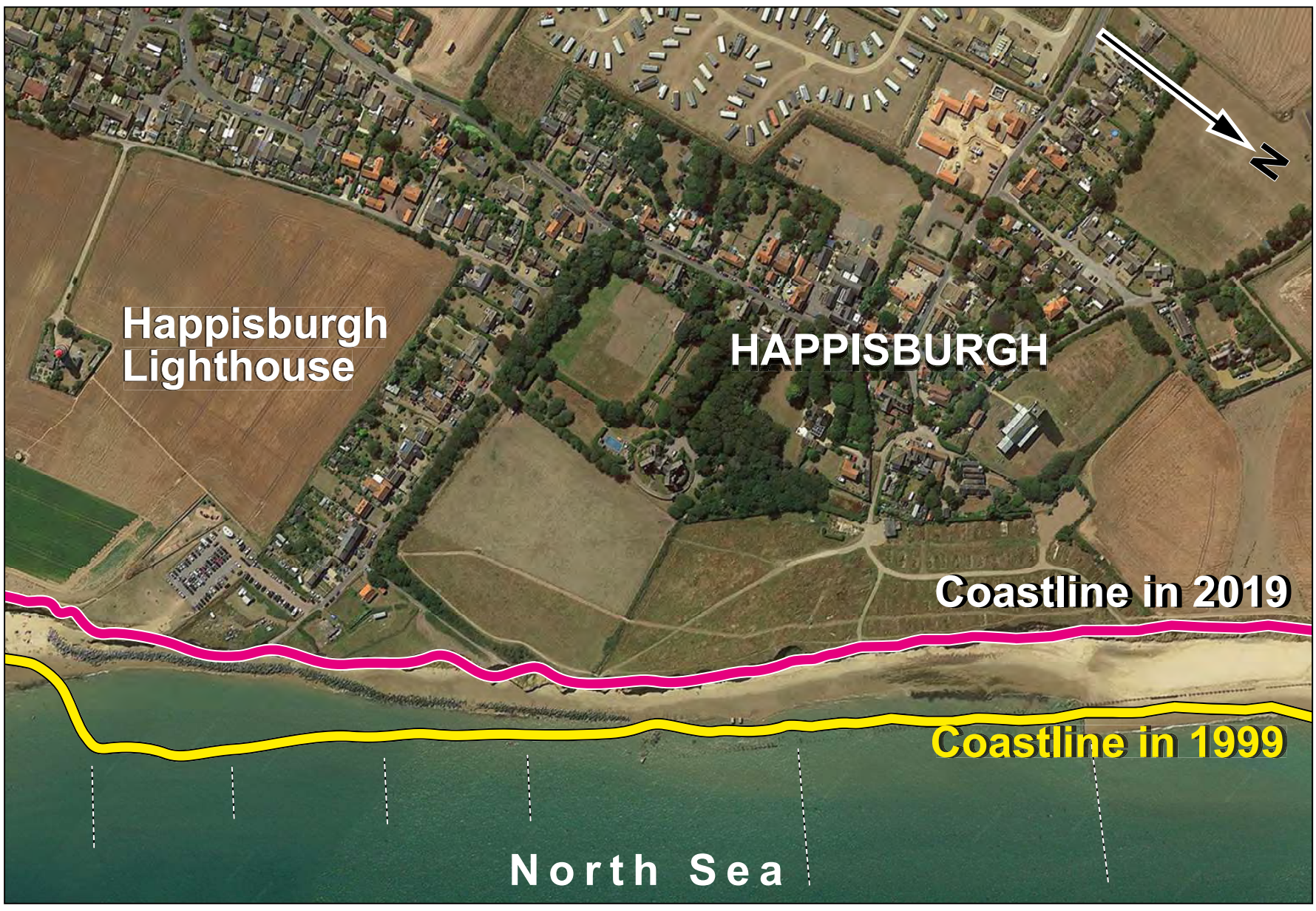


Key:

Coastal management strategy

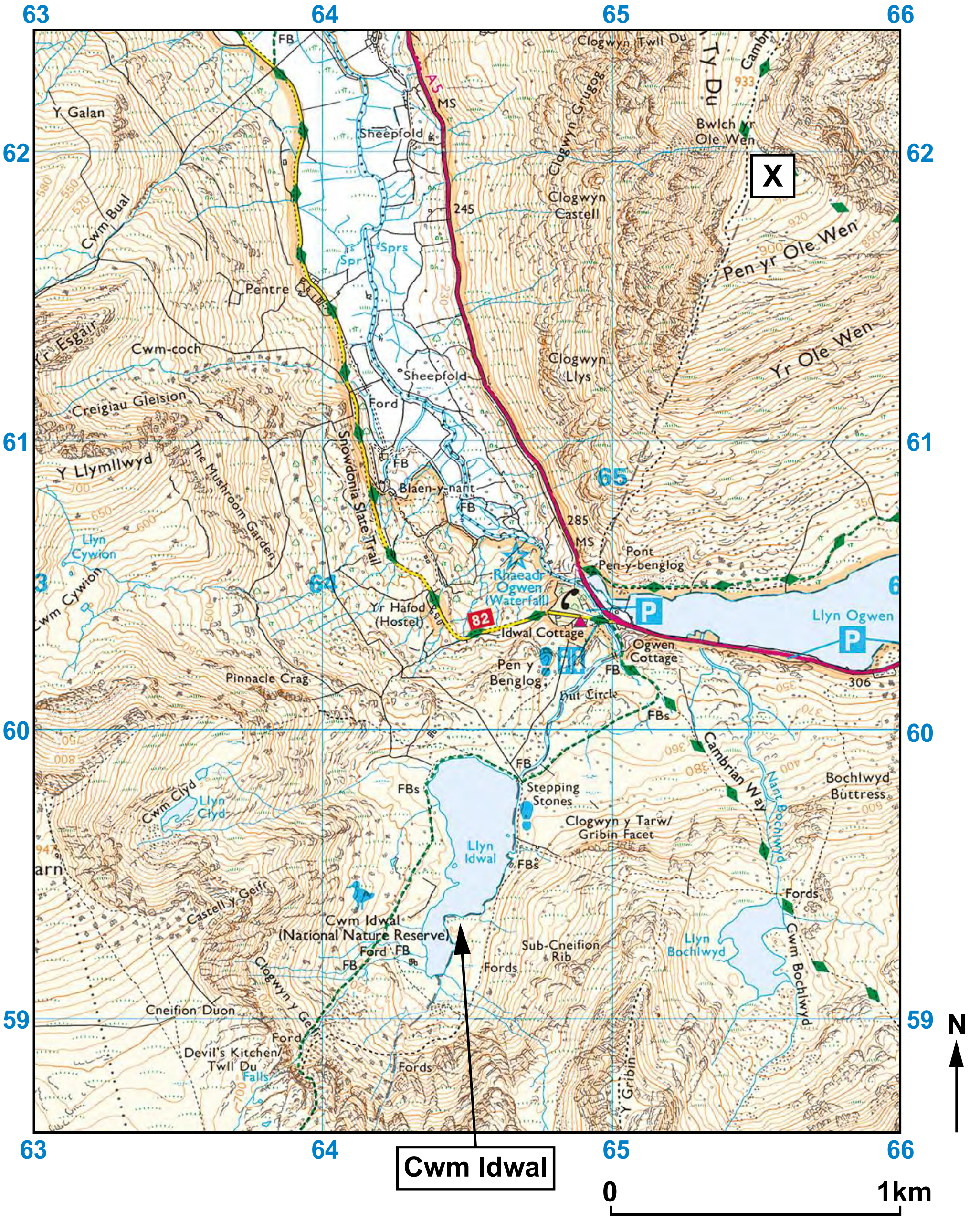
groynes

Figure 2b: 2019



Source: Financial Times

FIGURE 3a: OS 1:25 000 MAP OF CWM IDWAL AREA, ERYRI



Source: Ordnance Survey

FIGURE 3b: VIEW OF PEN YR OLE WEN

FIGURE 4: CHANGES IN THE TSCHIERVA GLACIER, SWITZERLAND, 1935-2022

Figure 4a: 1935

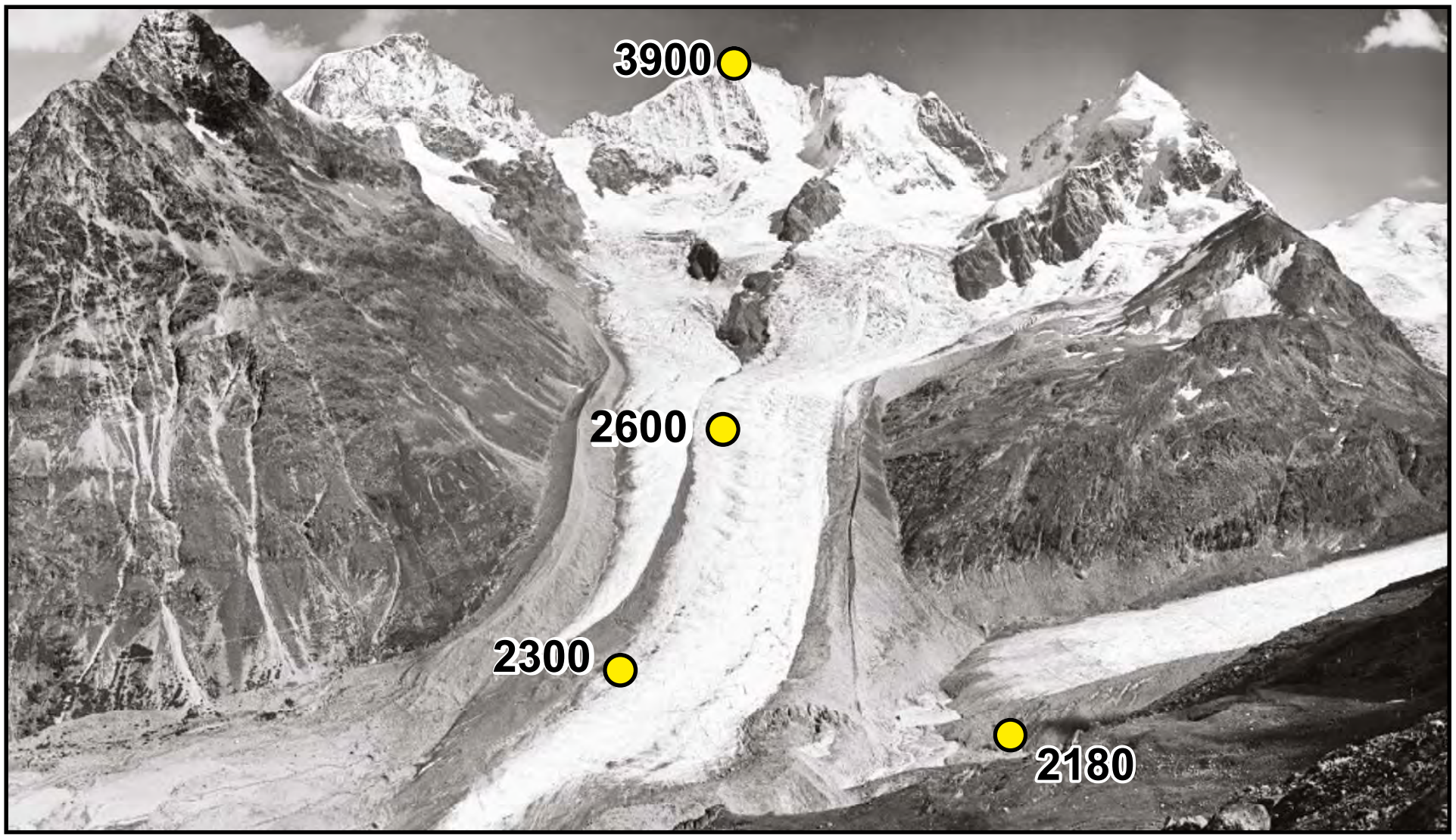
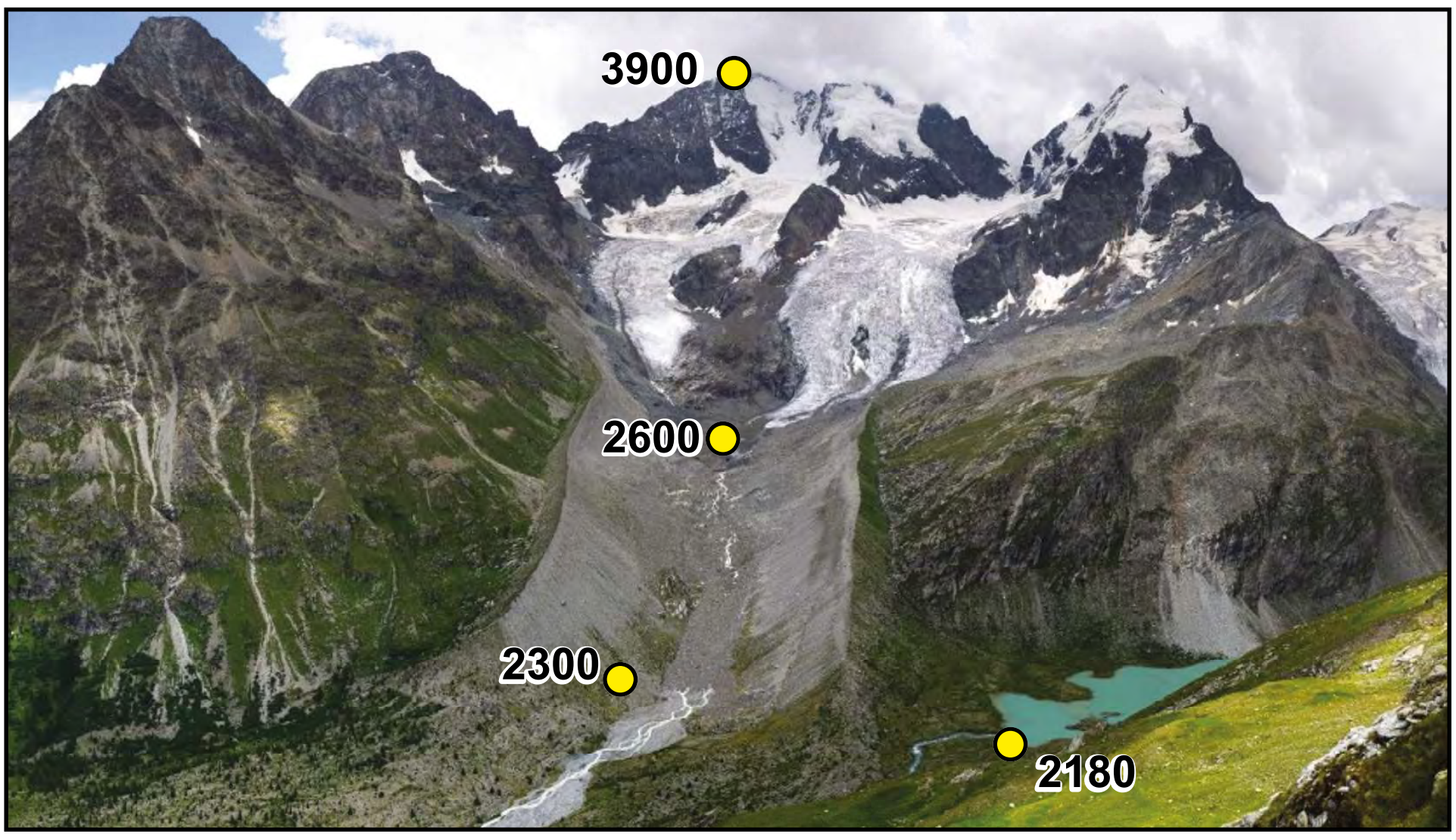


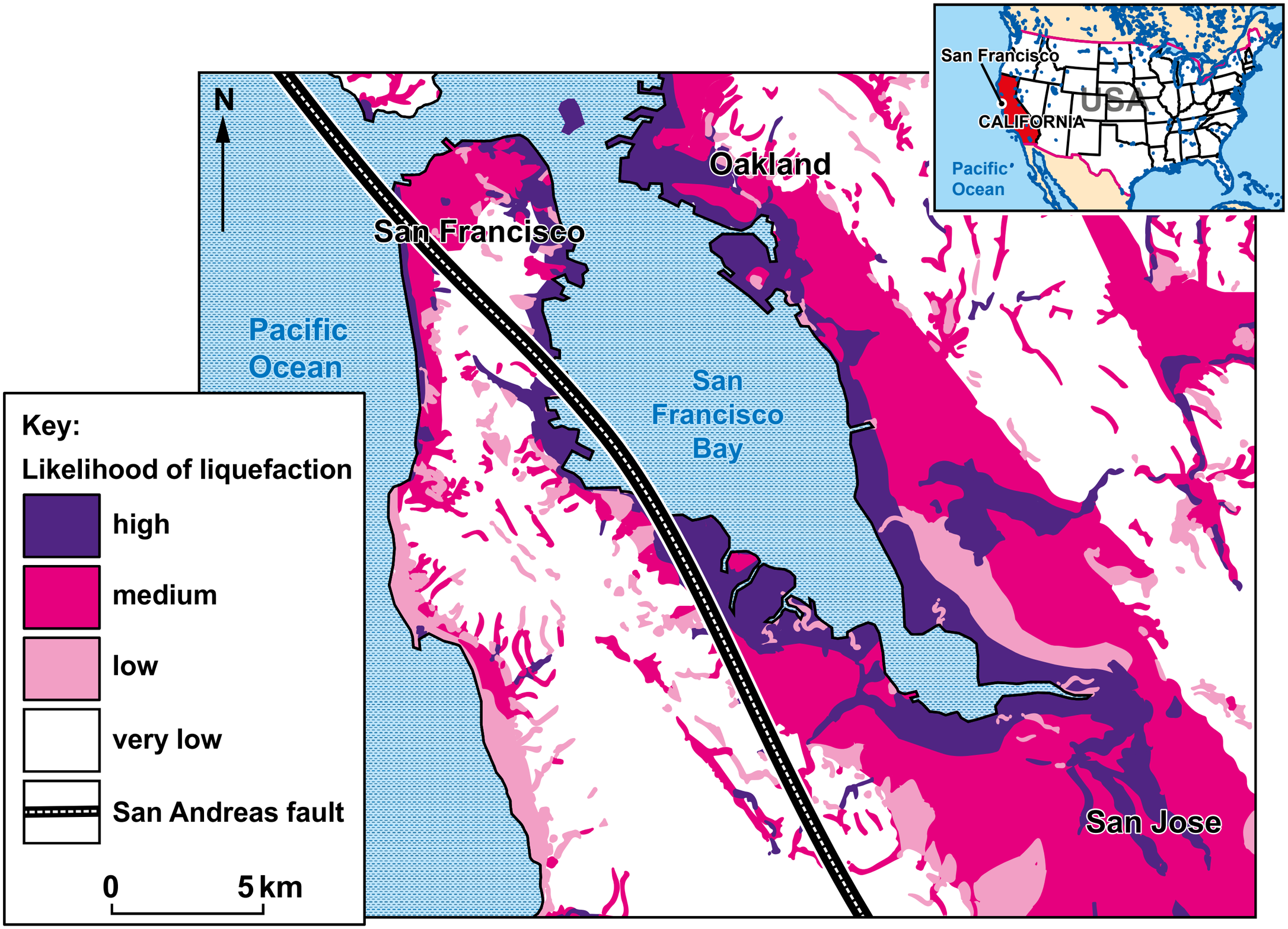
Figure 4b: 2022



Key: height above mean sea level (metres)

Source: https://english.kyodonews.net/news/2022/09/968feda2bb10-swiss-glaciers-shrink-by-half-since-1930s-melting-faster-study.html

FIGURE 5a: MAP SHOWING LIKELIHOOD OF LIQUEFACTION ACROSS THE SAN FRANCISCO AREA, CALIFORNIA



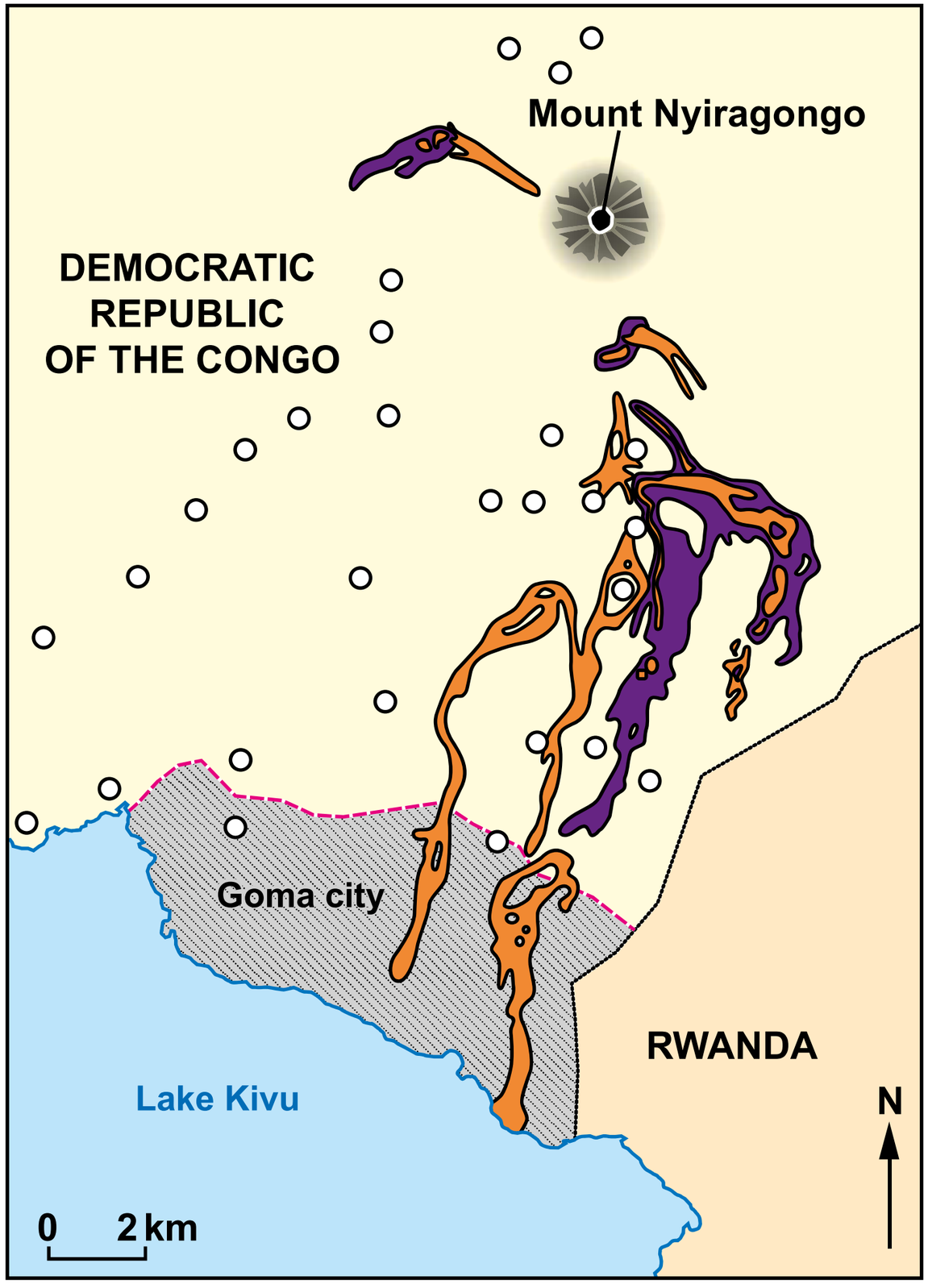
Source: USGS

FIGURE 6a: MAP SHOWING PATHS OF LAVA FLOWS FROM MOUNT NYIRAGONGO, 1977 AND 2002

Key:

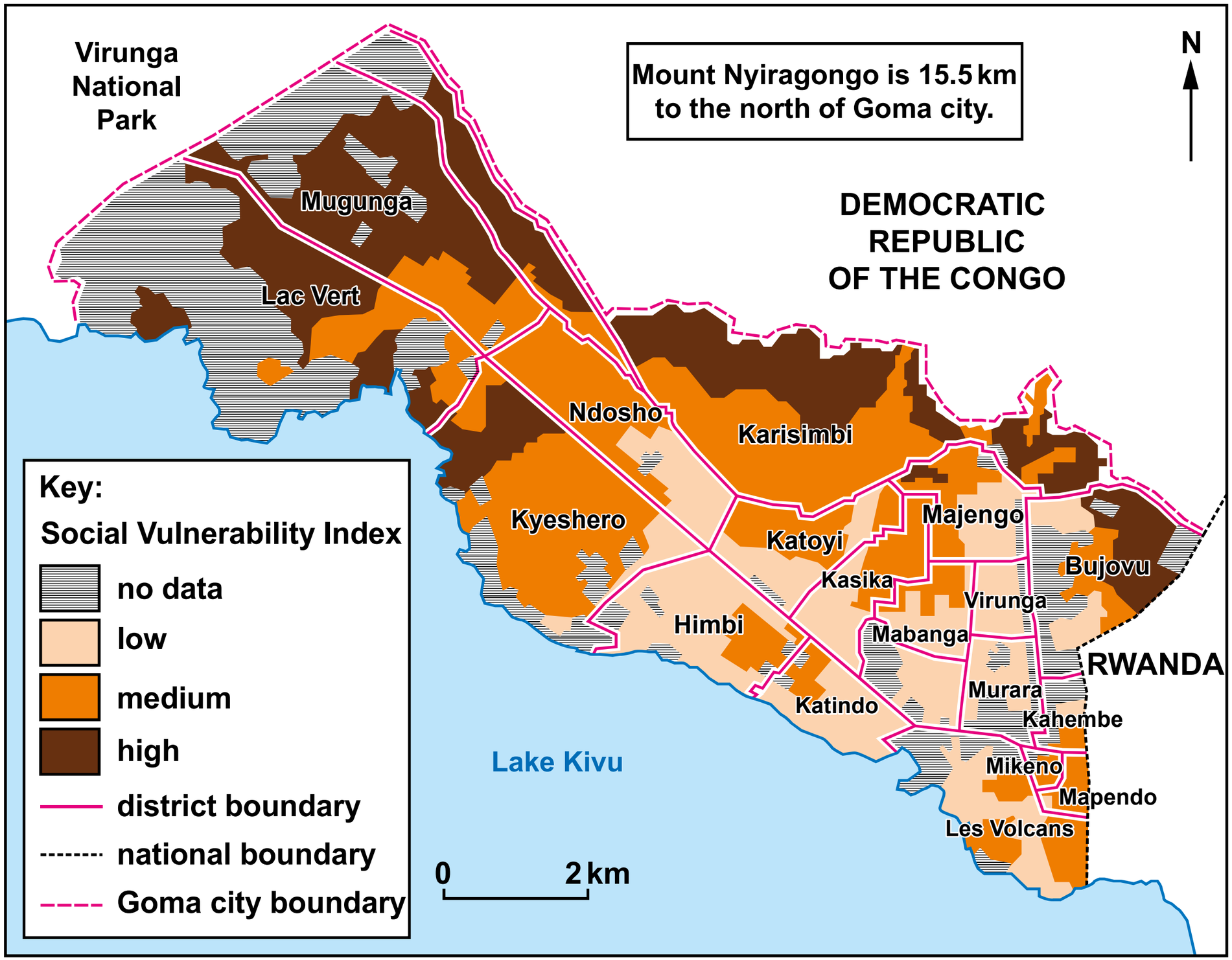
- path of lava flows from 1977 eruption
- path of lava flows from 2002 eruption
- volcanic cones
- Goma city boundary
- Rwanda border

Mount Nyiragongo is one of Africa's most dangerous volcanoes. There were significant eruptions in 1977, 2002 and 2021.



Source: www.sciencenews.org

FIGURE 6b: SOCIAL VULNERABILITY TO VOLCANIC ERUPTIONS IN GOMA CITY, DEMOCRATIC REPUBLIC OF THE CONGO



The SOCIAL VULNERABILITY INDEX is based on household income, levels of education and housing quality.

Source: Science direct

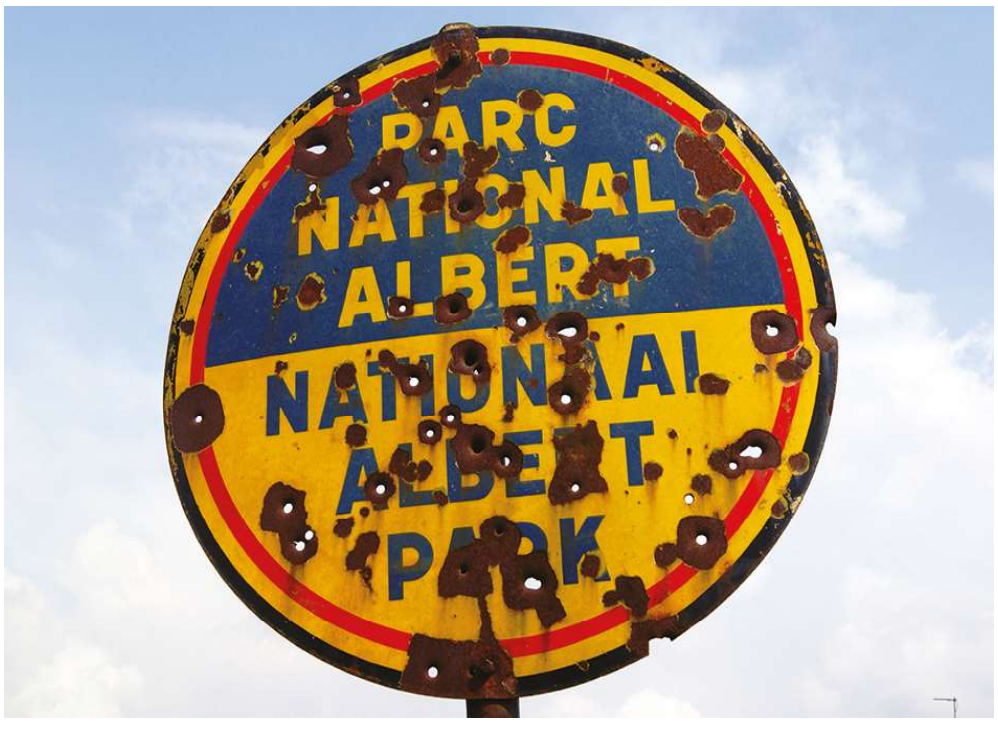
GDP per capita per year in DR Congo is $511.60. In Wales, GDP per capita per year is $31, 991.

FIGURE 6c: ISSUES AFFECTING HAZARD MANAGEMENT IN DEMOCRATIC REPUBLIC OF THE CONGO

Mount Nyiragongo has a permanent 200-metre-wide lava lake. In 2002, runny lava drained away in a few hours, flowing at 60 kmph. It was 2 metres deep in parts of Goma city. Toxic gases, such as carbon dioxide, were released from fissures and from the crater.

The eruption of 2021 was not predicted and the lava stopped less than 300 metres away from Goma city.

Since 2000, the at-risk population living in the shadow of the volcano has more than doubled to 1.5 million. Refugees from Rwanda added to the population from the mid-1990s.



Civil unrest in the area makes monitoring the volcano dangerous. In 2020, 13 park rangers were killed in an ambush in the nearby Virunga (Albert) National Park. Monitoring equipment has been vandalised or stolen.