



PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE



10.02.2022

*Physical Landscape and
Geosphere*



Lia Silva
Physical Landscape and
the Geosphere

FIELD REPORT ON BRACELET BAY, GOWER

TABLE OF CONTENTS

1. INTRODUCTION	III
2. GEOMORPHOLOGY: LANDFORM EVOLUTION	2
2.1. SLOPE PROFILE	2
3. GLACIOLOGY: GLACIERS AND ICE SHEETS	4
3.1. GEOLOGICAL PROCESSES AND SEDIMENTS	4
4. PEDOLOGY: SOIL	6
4.1. PHYSICAL AND CHEMICAL PROPERTIES	6
5. BIOGEOGRAPHY	8
5.1. ECOLOGICAL PROCESSES AND BIODIVERSITY	8
6. ENVIRONMENTAL MANAGEMENT	10
6.1. CONSERVATION	10
7. CONCLUSION	11
8. REFERENCES	12

Table of Figures

Figure 1:Google map location of the Bracelet Bay.	3
Figure 2: Map of Mumbles © Ordnance Survey County Series, 1913	3
Figure 3: Structure and closing viewing of the Bracelet Bay's rocks and limestone.	2
Figure 4: Bracelet Bay showing the shape the slope profile.	3
Figure 5: Rock Cave in Bracelet Bay.	4
Figure 6: Rocky Coast and pebbles of the Bay.	4
Figure 7: View from the top of the sediments in Bracelet Bay (right side).	5
Figure 8: Dunes and ripples at Bracelet Bay with view to the Lighthouse of Mumbles.	6
Figure 9: Haematite and calcite veins in Carboniferous limestone.	7
Figure 10: Bracelet Bay is considered if having a fertile and healthy soil.	8
Figure 11: Because of the diversity of flora, one finds beehive on top of some rocks at the Bay.	8
Figure 12: Ivy bees, which they are very active and form large aggregations.	8

Figure 13: The grazing patterns from molluscs.	9
Figure 14: <i>Laminaria hyperborea</i> , the start of the kelp beds at low tide at the Bracelet Bay.	9
Figure 15: Reef forming worms from the Sabellaridae family. Create a honeycomb substrate on the rock.	9

1. Introduction

Considered to be the first vast limestone bay in Swansea Bay, Bracelet Bay (figure 1). Bracelet Bay is in the south of the Gower Peninsula, just around Mumbles head, between latitudes 51°33' and 54.68' North and longitudes -3°58' and 40.62' west, it has many natural pools, many rocks supported by a bank of pebbles. Characterized by its strong currents, surrounded mostly by rocks than sand, becoming more visible and accessible when the tide is low, limestone cliffs and their creation of large waves when storms occur. These are some of the resources that may have contributed to the different physical processes and to the transformation of the landscape and shape of the bay (Samuels, 1979). The city of Swansea has undergone changes in the scale of space and time, that is, over the years the landscape has undergone changes, many from human interference.

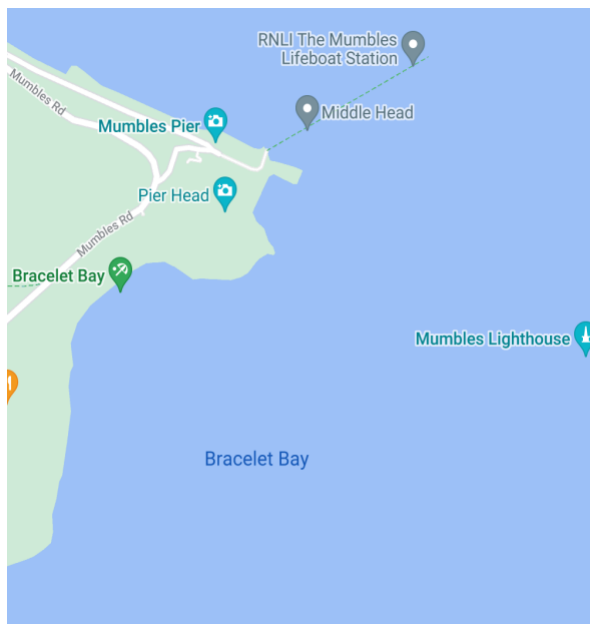


Figure 1: Google map location of the Bracelet Bay.



Figure 2: Map of Mumbles © Ordnance Survey County Series, 1913

2. Geomorphology: Landform evolution

2.1. Slope profile

The Gower Peninsula is known for its fantastic bays, dunes, beaches, caves, cliffs, among other features, in which it has a rich and distinct geomorphological batch that leads to the effects of environmental changes, along with fossil platforms and beaches, development of long-term, past, and present forms and processes as well as glacial and periglacial landforms and sediments (Shakesby, 2020).

The periodic renewal of our planet's surface in episodes of erosion and isostatic response are renewed thanks to geomorphological processes that are an essential part of crustal recycling. The land is progressively eroded due to the materials transported from the soil to the ocean that are driven by the sediment transport processes where everything occurs due to the weathering process when the water helps to break the rocks.

The lasting effects of the plantation combined with the rock structure and geology are especially



Figure 3: Structure and closing viewing of the Bracelet Bay's rocks and limestone.

responsible for the configuration and gross morphology of Gower. The coastal configuration and the topography of the interior was strongly influenced by the large-scale folding which is responsible for the distribution of rock types. Landscapes and geology show significant affinity at Gower (Owen, 2021). Some of the appearance of slopes around the world are largely related to the vegetation and soils of the slope (Allen, 1997).

Many years ago, a pumping station was built at the base of the limestone cliffs, the construction of which exposed new beds of mudstone. In particular, the carboniferous limestone headland at Swansea Bay at Mumbles is vulnerable to weathering along the mudstone divides.



Figure 4: Bracelet Bay showing the shape the slope profile.

During the subsequent earth movements, due to precipitation from several layers, many more calcite veins were seen, which resulted in the shedding of much of the coating. The presence of broken calcite blocks in layers testifies to several reactivation scenarios after they have fallen into the fissure and where they are lodged. With each bay divided by a minor fault, failures of the genus such as the Bracelet Bay occur between the outer and inner bays or between the bay and the mainland (GSL, n/a).

The shape of the bracelet bay is wide and open due to the folded nature of the rocks. The texture in a wide zone of the bracelet bay is weakened by the stretching and cracking of the limestone, whereas the bending did not bring softer strata into play (GSL, n/a). The alterations that occur in the landscape of the coast of Bracelet Bay, possibly occur through several factors, some contribute directly and others indirectly, for this should analyze the modifying agents, considering human action and the natural phenomena involved. For, landscapes also assume functional or dynamic states where periodic, cyclic, and rhythmic changes are distinguished.

3. Glaciology: Glaciers and Ice sheets

3.1. Geological processes and Sediments

One of the focuses of interest not only for researchers and students as well as scientific and cultural interest is the location of the peninsula and Gower which is on the last ice bed on the south bank, the use of caves for human occupation and their development.

Before the Gower region and other areas of Wales were intermittently inundated by the sea, many



Figure 5: Rock Cave in Bracelet Bay.

of the details of which remain speculative were followed by a period of uplift and weathering. Before the onset of ice ages during the last 2.6 million years, which is called the Quaternary period, a series of marine erosion platforms were carved out at some point during this period, as is seen in the current landscape of Gower. It was then that the influence and signs of human occupation became visible and dominant, with the development and occupation of caves on the southern coast of the peninsula, until the industrial period, at the beginning of the 18th century (George, 1933).

Around Sketty and Oystermouth can be found glaciofluvial ice contact deposits such as sand and gravel with isolated pockets of the same deposits scattered throughout other parts of Gower. One of the main objects of investigation is the relationship between the variation of sea level throughout the Pleistocene with the elevations of beaches, the deposits of caves and the erosive banks inside the cliffs (George, 1933).

With various models presented over the years, there continues to be a debate on how the ice shore was positioned during the last ice age.



Figure 6: Rocky Coast and pebbles of the Bay.

The formation of erosion landscapes is given to the transport of huge volumes of rock removed from regions such as horns, glacial valleys and alpine mountain ranges by ice and water and deposited in lower areas.

Derived almost entirely from within the confines of the South Wales syncline, a material consisting of a very coarsely quarried or chaotically piled gravel deposit was one of the glacial drifts demonstrated in the eastern portion of the Gower Peninsula, between Oxwich Bay and Head mumble. In other words, the transport occurred in a general direction to the south or southwest of the Brecon Beacons (George, 1933). Most of the snow-free landscapes are covered by sediments composed mainly of fragments derived from rocks, representing great part of the peninsula's area.



Figure 7: View from the top of the sediments in Bracelet Bay (right side).

Instead of the incorporation of talus derivatives, it is described as solution in a section that the anomalous nature of the sediments must be attributed to the type of action of ice and water that once occurs impure head. It is an easy hypothesis to explain due to the frequent presence of a lot of sand and loam on the head. In Bracelet Bay, there is a gravel drift in the form of a shallow pan, in the middle of the bay, but decreasing and disappearing towards the flanks (George, 1933). It is extremely essential to promote the

planning of the environmental use of Bracelet Bay, aiming at its conservation through the establishment of guidelines for land use, ordering of routes and specific conducts according to the level of environmental fragility.

4. Pedology: Soil

4.1. Physical and Chemical Properties

Soil is fundamental in the management and use of the environment, due to its biodiversity and humans, it is a very complex medium of study, formed by organic and inorganic materials, which are even subject to dynamic interactions and processes in various ways (Chapman, 2020). It can distinguish the amounts of particles and the soil by touch. How they can be managed and how they function in the ecosystem depend on the influences of existing physical properties.



Figure 8: Dunes and ripples at Bracelet Bay with view to the Lighthouse of Mumbles.

Although limited data and information are available for the outskirts of the urban area, it has been obtained from a map of the Soils of Wales that there is no concrete information on soil type in the main area of the city of Swansea (Soil Survey of England and Wales, 1983). Loamy soil was the characterization given to the Mumbles area, where well-drained it overlaps the sandstone.

In a nutshell, a mixture quite similar to sand, mud and clay soils, an adequate and healthier balance, in which it does not contain the problems that the particles obtain, is given the name of loamy soil. Making the plants have enough nutrients and the soil loose so that the roots have space and can grow strong. It is still very complex to determine or describe what really makes loamy soil, being reported as the best soil type for almost all plants (Andrew Cohen)

Each compound that clay soil has its composition, in the case of sand, it has the capacity to retain water and occupies most of the soil; clay allows water drainage and has very small particles; Sludge has the same compositions as clay and sand and is the second largest component of soil after sand (Steve Stakland, 2017).

Favourable conditions are necessary for the soil to become loamy, that is, with time. Unless maintenance is carried out in the area, such as the beginning of the use of composts such as manure, fertilizers, among others, which was not the case in Bracelet Bay, despite being affected by human activities.



Figure 9: Haematite and calcite veins in Carboniferous limestone.

The Swansea port area features a large container facility and high levels of Arsenic, Cadmium, Chromium and Cobalt which are related to chemical processing, oil and fuel. The introduction of tourism had the effect not only of increasing the value of land on the Bracelet Bay, but also contributing to increased speculation real estate, with conflicts over land use, increase in environmental degradation.

5. Biogeography

5.1. Ecological processes and Biodiversity

Bracelet Bay includes diverse sheltered sandy coves, high limestone cliffs, low altitude areas, thanks to the diversity of geology, the Gower Peninsula has a rich flora and fauna, having more than 700 species of wildflowers and wild animals. and marine. Although it was not possible to find resources and evidence, most of the Bracelet Bay is covered with rocks, there are several patterns of molluscs on the rocks. Kelp Beds of *Laminaria digitata* and *Laminaria hyperborea* can be seen at a very low tide, they're very essential as they serve as habitat and protection to a lot of species.



Figure 10: Bracelet Bay is considered if having a fertile and healthy soil.



Figure 11: Because of the diversity of flora, one finds beehive on top of some rocks at the Bay.



Figure 12: Ivy bees, which they are very active and form large aggregations.



Figure 13: The grazing patterns from mollusks.



Figure 14: Laminaria hyperborea, the start of the kelp beds at low tide at the Bracelet Bay.



Figure 15: Reef forming worms from the Sabellaridae family. Create a honeycomb substrate on the rock.

6. Environmental Management

6.1. Conservation

Designated an Area of Outstanding Natural Beauty (AONB), the vast areas of plain and plateau are of cultural and natural importance on the Gower Peninsula, with each of the 24 Gower Commons having a unique natural identity.

Over the century, management methods on the Gower Peninsula have changed, traditional management practices have created a huge variety of habitats including woodland, coast, heath, sand, mud, etc., practices such as controlled fire, grazing animals and Mechanical methods are one of the main practices performed today and remain fundamental to the agricultural economy of the Gower Peninsula area. In the same way, from a natural perspective, these spaces would constantly undergo changes, even if on a long time-space scale, due to natural dynamic effects. Although the natural dynamics are not so noticeable, or in most cases, not observed, it is possible to notice that there are dunes that, due to the action of the wind, change their place, and an alteration in the volume of the waves. These and other activities that nature itself exerts generate pressures on the coast and transform the space as much as the man himself.

The opportunities for public access today are due to the protection and conservation of our commons, the wealth of wildlife and the quality of diverse landscapes, agriculture, and recreation. It should be noted that more coherent and effective environmental monitoring depends on long time series of different parameters (abiotic and biotic). In addition to providing a unique and invaluable perspective on environmental changes, they make it possible to create a dynamic baseline, representing the natural range of variability of the environment.

The introduction of tourism had the effect not only of increasing the value of land on the Bracelet Bay, but also contributing to increased speculation real estate, with conflicts over land use, increase in environmental degradation. The number of restaurants and squares constructed around the Bay, moves the number of visitors on this stretch of coast, although it presents a of destruction, remains one of the most visited in the city.

7. Conclusion

The integrated management system is essential to achieve greater efficiency, delivery of this plan in the actions. The Bracelet Bay, despite being rich in fauna, flora, landscapes and even safety for the public, lacks conservation, management, study, frequented by the public mainly at the busiest time of year such as summer, pay attention to movement and presence of people is not monitored, although it is not as famous as the other bays on the peninsula, its beauty and location is to draw attention and expect everyone to join, on a beach where wildlife is very popular. The environmental diagnosis allowed the preliminary proposition of environmental quality indicators, aiming at the establishment of a monitoring program for the region under study.

The main challenge for information integration is coordinating data acquisition, assessing the adequacy of numerically comparable data, and establishing conceptual associations whenever possible. Despite little data of site atmosphere, an external influence due to long-range atmospheric transport is observed, as well as evidence of local business influence. Considering that the coastal zone is a fragile ecosystem, any constant pressure leads to negative impacts, which will be noticeable with the over the years.

8. References

Holden, J., 2018. *An Introduction to Physical Geography and the Environment*. 3rd ed. Harlow, United Kingdom: Pearson Education Canada.

Kolen, J., Renes, J. and Hermans, R. (2015) *Landscape biographies: geographical, historical, and archaeological perspectives on the production and transmission of landscapes*. Amsterdam, NLD: Amsterdam University Press. doi:10.1515/9789048517800.

www.webarchive.org.uk. (n.d.). Archived version of <http://www.goweruk.com/beach/3/bracelet-bay.aspx> from 2010. [online] Available at: <https://www.webarchive.org.uk/wayback/archive/20100320124323/http://www.goweruk.com/beach/3/bracelet-bay.aspx> [Accessed 23 Jan. 2022].

Pierzynski, Sims, J. T., & Vance, G. F. (2005). *Soils and environmental quality* (3rd ed.). Taylor & Francis.

Webarchive.org.uk. 2010. *UK Web Archive*. [online] Available at: <https://www.webarchive.org.uk/wayback/archive/20100320124323/http://www.goweruk.com/beach/3/bracelet-bay.aspx> [Accessed 10 January 2022].

Landscapes and Landforms of England and Wales, edited by Andrew Goudie, and Piotr Migoń, Springer International Publishing AG, 2020. *ProQuest Ebook Central*, <http://ebookcentral.proquest.com/lib/trinity/detail.action?docID=6195931>. Created from trinity on 2022-01-22.

The Geological Society of London - A stroll along the prom – Swansea Bay. [online] Available at: <https://stage.geolsoc.org.uk/Education-and-Careers/Resources/Field-Work-Resources/Gower-Field-Guide/The-structure-of-Gower-five-guided-tours/A-stroll-along-the-prom--Swansea-Bay> [Accessed 12 January 2022].

George, T. N. (1933) "The Glacial Deposits of Gower," *Geological Magazine*. Cambridge University Press,

Alamy Limited, n.d. *Mumbles Lighthouse on Mumbles Head as seen from the beach at Bracelet Bay with the sea in the background. Swansea, Gower, Wales, UK Stock Photo - Alamy*. [image] Available at: <https://www.alamy.com/mumbles-lighthouse-on-mumbles-head-as-seen-from-the-beach-at-bracelet-bay-with-the-sea-in-the-background-swansea-gower-wales-uk-image255886561.html> [Accessed 13 January 2022].

Plantlife. 2022. *Gower IPA*. [online] Available at: <https://www.plantlife.org.uk/uk/nature-reserves-important-plant-areas/important-plant-areas/gower> [Accessed 14 January 2022].

Landscape research. (1976). Manchester [Greater Manchester: Landscape Research Group.

Geochemical baseline data for the urban area of Swansea. [online] British Geological Survey. Available at: <http://nora.nerc.ac.uk/id/eprint/7019/1/IR01036.pdf> [Accessed 14 January 2022].

Garner, J., 2019. Bracelet Bay and Mumbles. [Blog] *Julia Garner1 Blogspot*, Available at: <http://juliagarner1.blogspot.com/2019/09/bracelet-bay-and-mumbles.html> [Accessed 14 January 2022].

Cohen, Andrew. "Types of Loam Soil" *sciencing.com*. Available at: <https://sciencing.com/types-of-loam-soil-12254290.html> [Accessed 14 January 2022].

Stakland, Steve. "Science Fair Projects on Difference Between Sand & Potting Soil Water Absorption" *sciencing.com*, <https://sciencing.com/science-potting-soil-water-absorption-8398308.html>. 14 February 2022.

Mills, E., 2016. *Bracelet Bay, Swansea, UK*. [online] Marine Mumbles - Rockpooling Identification from a Marine Biologist. Available at: <http://www.marinemumbles.com/bracelet-bay-swansea-uk/> [Accessed 20 January 2022].

Kolen, J., Renes, J. and Hermans, R. (2015) *Landscape biographies: geographical, historical, and archaeological perspectives on the production and transmission of landscapes*. Amsterdam, NLD: Amsterdam University Press. doi:10.1515/9789048517800.

Hiemstra, J.F. et al. (2009) 'Reinterpreting Rotherslade, Gower Peninsula: implications for Last Glacial ice limits and Quaternary stratigraphy of the British Isles', *Journal of quaternary science*, 24(4), pp. 399–410. doi:10.1002/jqs.123.

Pierzynski, G.M., Sims, J.T. and Vance, G.F. (2005) *Soils and environmental quality*. 3rd ed. Boca Raton, Fla: Taylor & Francis.