

Red Kite



Mourne Cooley Gullion Geotourism Project Interpretation Plan



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Mourne Cooley Gullion Geotourism Interpretation Plan



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Foreword

Red Kite Environment, in partnership with Anglezarke Dixon Associates, were appointed by the Mourne Cooley Gullion Geotourism Project in 2014 to prepare this Interpretation Plan for the Mourne Cooley Gullion area. The plan is an essential document for the Geotourism Project, guiding the provision of interpretation materials for the remainder of the project.

This plan is a ‘toolkit’ of ideas to help people understand the geological processes that shaped the land. It proposes a main over-arching theme and five individual key themes for interpreting the geology of Mourne Cooley Gullion. It identifies the main stories about what happened in the past that caused the landscape to be what it is today and presents a ‘shopping list’ of activities that will convey the stories to visitors. It presents some ideas for marketing geotourism, which will help to raise the profile of the project and to deliver interpretation, and provides samples of interpretation materials, designed by Anglezarke Dixon Associates, that could be used in Mourne Cooley Gullion.

In preparing this plan we have benefitted from the advice and guidance of the staff of the Geotourism Project and from members of the partnership and others. We have visited all the sites that were recommended to us as suitable for interpretation, plus others that are popular visitor destinations. We have consulted many representatives of the partnership and other interests to ensure we have a broad understanding of the project’s aspirations and activities and those of members of the partnership.

We would like to thank John Devaney, Siobhan Power, Alison Henderson, Anne Kelly and Vanessa Ryan of the Geotourism Project for their advice, guidance, information and hospitality throughout the period of compiling this plan and also the many others who we have met or spoken with during the course of this commission.



Ring of Gullion

Summary

The elements of the story

The Mourne Cooley Gullion Geotourism area occupies the south-east region of Northern Ireland and the north-east part of the Republic of Ireland. It is a remarkable landscape of mountains, fertile valleys and low-lying coastal fringe. The region has seen major geological action for over 450 million years including significant sedimentation from oceans, dramatic upheavals of molten magma, the disappearance and creation of oceans and surface erosion through glaciation.

The underlying geology, and the geological processes that created it, have strongly influenced the character of the landscape and its use by people for the last 10,000 years. Geology has shaped agriculture, settlement patterns, architecture, culture and the character of local inhabitants. Those people have also shaped and exploited the landscape to suit their needs.

The role of interpretation

Interpretation is a form of communication that is ideally suited to explaining the significance of both natural and cultural heritage. Three principles lie at the heart of this Interpretation Plan. Interpretation must:

- Relate to people's experiences
- Reveal meaning a people or a place
- Provoke a response in the reader or consumer

Interpretation should also entertain, emphasise context and encourage conservation.

The Geotourism sites

The Geotourism Project provided a list of 12 sites – four sites in three areas – that represent the significant geological features of the area. These 12 sites are:

Mourne

- Slieve Croob
- Spelga Dam and Silent Valley
- Bloody Bridge
- Mourne Coast

Cooley

- Ravensdale
- Omeath to Windy Gap
- King John's Castle, Carlingford
- Whitestown to Templetown beach

Gullion

- Gap of the North
- Slieve Gullion
- Cam Lough Quarry
- Bernish and Ballymacdermot

The principle features of each of the 12 sites is summarised in the plan. The plan also includes additional sites which are suitable for interpretation.

Findings of consultation

Consultation was undertaken during the preparation of this plan with the Geotourism team, and partner and stakeholder organisations. Many points were raised during the consultations and a selection of the key points include:

- People living in and around Mourne, Cooley and Gullion have a strong sense of place and are keen to find out more about its geology and landscape.
- Geology is not currently a major feature in the interpretation of the area.
- Audiences for the Geotourism Project include local residents, visitors from the island of Ireland and overseas visitors.
- There are opportunities to market Mourne Cooley Gullion more widely to surrounding areas, including Co Louth, Belfast and Dublin.
- The key interpretation stories include water, Carlingford Lough, exploitation of granite, a 'Narnia' landscape, maritime links, borderlands and boundaries and the geology of the Ring of Gullion.
- The key school audiences are Reception to Key Stage 3 in Northern Ireland, and the 5th and 6th classes in primary schools in the Republic. There are many opportunities for demonstrating the geology of the area to other primary and secondary levels and many other educational groups.
- The project should leave behind a long-term Interpretation Strategy to be implemented over the next 3-5 years. Interpretation should be multi-layered and cater for a range of audiences.

Interpretive aim and objectives

We propose the overall aim of interpretation should be:

To encourage local people to widen and share their understanding and appreciation of geological processes in the Mourne Cooley Gullion area, to help foster a sense of pride in their surroundings and to welcome visitors to discover and enjoy their landscape and its communities.

This aim is supported by a series of interpretive objectives divided into three sections:

- Learning
- Behavioural
- Emotional

Themes and storylines

Interpretive themes divide a story into its principle components and provide a framework for interpretation. We propose one overarching theme and five individual themes.

The overarching theme is:

Rocks shape landscapes and lives. Geological processes in Mourne Cooley Gullion have moulded landforms, and influenced soils, habitats and the way people have settled, used and responded to the land.

The five individual key themes are:

- **This is a landscape forged by fire and carved by ice.**
- **The mountains and valleys were created by the constant shifting of the Earth's crust over vast periods of time.**
- **The underlying rocks form soils that determine the vegetation, influencing how people have settled and used the land over thousands of years and supporting a rich biodiversity.**
- **Local landforms and landscapes have inspired stories, myths and legends as well as stimulating academic research.**
- **Local landforms and landscapes have been created by geological processes and have influenced the location of social, cultural and political borders and boundaries.**

Each of these themes is supported by storylines that explain how geological processes have shaped the land and the people.

Delivering interpretation

We have proposed a range of media that will deliver the interpretation. Our proposals include off-site interpretation such as leaflets, website and digital downloads, as well as on-site media including interpretation panels and sculptural installations.

We have identified for each of the three groups of sites a '**main hub**' that will act as a small outdoor interpretation centre and '**mini hubs**' that provide interpretation about a site and its geological environs. We propose interpretation at a selection of the other original 12 recommended **sites**, as well as some additional sites that are already popular visitor destinations.

A detailed interpretation programme is provided that identifies priorities and indicative costs. A comprehensive description of the delivery at the sites is presented with key storylines and proposals for media.

Marketing strategy

Marketing for tourism has changed greatly in the last few years and skilled marketing has become essential in an increasingly crowded market place. Key guidelines for the market are:

- Small organisations should work with other tourism providers.
- Regional, national and international marketing should be handled by the regional, national and international tourism organisations.
- An effective and well-linked product-specific website is an essential starting point for marketing.
- There are numerous simple and low cost marketing ways that can be used effectively.

Key items for the marketing strategy include:

- Developing a new website to sell geotourism.
- Developing a brand name that is memorable and descriptive.
- Installing directional signposts.
- Deciding on selling points.
- Developing local partnerships.
- Producing bedside browsers and printed leaflets
- Developing media links.
- Developing a database.
- Organising targeted campaigns.

Monitoring and evaluation

Monitoring and evaluating interpretation is often overlooked, yet it is one of the most important mechanisms for checking whether interpretation really works. It helps to set targets and measures performance. We recommend four stages of monitoring and evaluation.

- Pre-testing of new interpretive media.
- Monitoring the use of media.
- Evaluating the use of media.
- Evaluating the interpretive approach as a whole.

Interpretation samples

A selection of sample designs is included at the end of the document to show the types of materials that could be produced for Mourne Cooley Gullion. The samples include leaflets, brochures, panels and orientation signs.



Reservoir at Spelga Dam

1 Introduction

This section provides a background to the Mourne Cooley Gullion Geotourism Project and the commissioning of the contract to prepare this interpretation plan.

1.1 Background

The Mourne Cooley Gullion Geotourism area occupies the south-east region of Northern Ireland and the north-east part the Republic of Ireland. It is locally acknowledged as 'one of the best kept secrets in Europe'. It is a unique place of striking landscapes comprising the Cooley Peninsula, Slieve Gullion and the Ring of Gullion, the Mourne Mountains and their low-lying coastal fringe, and Slieve Croob. The region owes much of its unique character, history and archaeology to the underlying geology.

The Geotourism Project has been established to celebrate and promote the unique geological aspects of the Mourne Cooley Gullion region. The project focuses on the upland areas of the Mourne Area of Outstanding Natural Beauty (AONB), located in Newry and Mourne, Down and Banbridge Districts, the Ring of Gullion AONB, and the Cooley peninsula and adjacent areas in County Louth. The project celebrates and promotes the unique aspects of the whole cross-border region and aims to introduce a wider audience of visitors to this most attractive part of the island of Ireland.

1.2 The contract

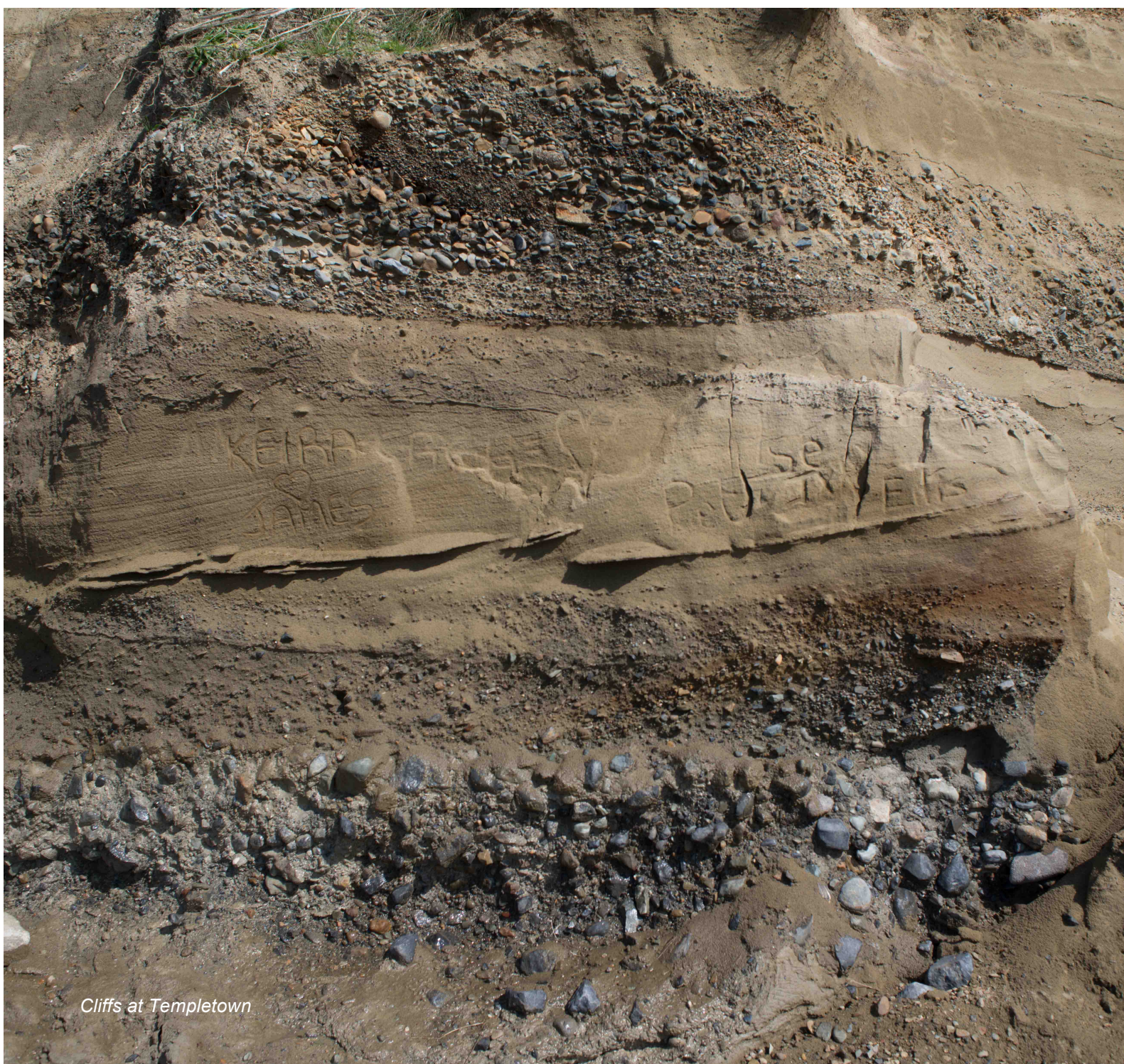
In April 2014 Red Kite Environment and Anglezarke Dixon were commissioned to prepare an Interpretation Plan for the Mourne Cooley Gullion Geotourism Project. The aim of the plan is to help the Geotourism Project 'engage people from across the region and visitors to the region to explore and enjoy the landscape, learn how it formed and find their place in it'¹. It will guide the provision of interpretation for the Geotourism Project and for any subsequent geological and related interpretation undertaken by the partner organisations.

In wider terms, the brief for the plan describes its aims as being "to develop a competitive, internationally recognised cross-border tourism destination within the East Border Region, taking advantage, in particular, of the prized landscape and related cultural heritage of the Mourne Cooley Gullion area, improving visitor infrastructure and services while raising awareness of and protecting this natural resource". The lead project partner is East Border Region Ltd., a cross border organization, established in 1976 to promote innovative, cross border economic

¹ Terms of Reference for Design and Development of a Geotourism Interpretation Plan, Mourne Cooley Gullion Geotourism, February 2014

development in the areas of agriculture, industry, commerce and tourism and to improve the living conditions and employment prospects of those living in the region.

This Interpretation Plan is the output of this contract. It provides a framework for interpreting the geological and related heritage of Mourne Cooley Gullion, identifying the stories that can be told about the area and the interpretive approaches to delivering these stories to residents and visitors alike, along with a review of the likely audiences for the interpretation and how to reach out to those audiences.



Cliffs at Templetown

2 Setting the Scene

Mourne Cooley Gullion has a rich geological history. This section summarises the key points of this history, explains the purposes of interpretation and what it can do, and describes twelve sites identified by the Geotourism Project as representing the geological processes and features of the area.

2.1 A rocky story

A restless earth

The Mourne Cooley Gullion region comprises the Cooley Peninsula, Slieve Gullion and the Ring of Gullion, the Mourne Mountains and their low-lying coastal fringe, and Slieve Croob. These remarkable landscapes of the region are the result of a combination of the underlying geological processes and surface erosion through glaciation and weathering that have sculpted these rocks over millions of years.

A complex geological jigsaw puzzle creates a fascinating picture of the gradual formation of the region's landscape. The oldest rocks in the area date from 430 million years ago when a large ocean – the Iapetus Ocean – covered this area, separating the land we now call Ireland into two parts. Sediments in this ocean settled as layers of mud and sand. The ancient ocean disappeared as the land on either side was pushed together, which changed the sediments into the harder metasediments that we see today.

Later, around 405 million years ago, intrusions of magma into these sedimentary rocks formed the Newry granite, or 'granodiorite'. This granite 'stitched' the two continents together to form one gigantic landmass.

The next major event was the creation of limestone from the shells of sea creatures that lived in warm shallow seas around 340 million years ago when this area was close to the equator. These limestones can be seen at the tip of the Cooley Peninsula.

The most recent activity was 60 – 56 million years ago. The huge continent that was formed after the closure of the Iapetus Ocean was ripped apart to form the North Atlantic Ocean. The stretching and rifting of the Earth's crust that led to the opening of the ocean caused large amounts of molten magma to be intruded into the metasediments of earlier times. The intrusions are mostly granite but there is also gabbro, dolerite and basalt. They formed the massif of the Mourne Mountains, the ring dyke at Slieve Gullion and the Carlingford complex on the Cooley Peninsula. A ring dyke is a magma intrusion that is circular in plan form.

The deep freeze

Over the past two million years, ice covered the region several times, carving the rocks into corries and U-shaped valleys, and depositing glacial sediment as moraines and drumlins. During the last glaciation (19,000 to 13,000 years ago) the ice flowed south-east from Lough Neagh, gouging out Carlingford Lough, and depositing sands

and gravels that can be seen along the Cooley peninsula coast and the marine plain in County Down.

The weight of the ice also pushed the Earth's crust downwards and the subsequent rebound of the crust after the ice melted led to the formation of raised beaches along the coastal areas of the region.

The first evidence of human settlement appears in this post-Ice Age period, called the Mesolithic (9000 to 6000 years ago). These early peoples lived in small dispersed settlements, often close to the shore, using stone implements. They would have been 'hunter-gatherers', collecting wild food, hunting wild animals and fishing in the rivers and the sea. Evidence consists of pieces of flint and middens in at Rockmarshall in Cooley.

By the Neolithic period (6000 to 4500 years ago) people had begun farming and domesticating animals, as well as developing new tools and weapons. They built impressive stone monuments in various styles, including court tombs, passage tombs, wedge tombs and portal tombs (dolmens). There are many examples of these tombs in Mourne Cooley Gullion, including the passage-tomb at Newgrange, the Ravensdale court and passage tombs and the dolmens at Kilfeaghan and Legannany.

In subsequent centuries up to early medieval times (400 to 1000 AD), settlement and then early Christian monastic expansion are recorded in numerous ring forts, crosses, towerhouses and castles. Ireland became during this period the most castellated country in Europe with between 3000 and 5000 towerhouses.

Legacy of the rocks

The Mourne Cooley Gullion region is, therefore, rich in sites of geological and archaeological interest, spanning 430 million years of Earth's history, which provide evidence of major events having taken place. The most obvious features of the region are the igneous rocks of the Mourne granites, Slieve Gullion and its associated ring dyke and the Carlingford complex in Cooley. Each area is distinctive in time and composition but all are related to the opening of the North Atlantic Ocean.

The underlying geology is important in itself, but also strongly influences the character of the landscape and how that landscape is used, determining the types and extent of agriculture, settlement patterns, architecture, modes of transport, location of transport routes, mythologies, folklore, literature, art and even the character of local inhabitants. In turn those people have shaped and exploited the landscape to suit their own needs.

In addition the unique geology of the area has played its part in global academic debate, stimulating ideas and promoting theories that are now an accepted part of geological science.

2.2 What is interpretation?

Interpretation is a form of communication that aims to explain the meaning of things. In a landscape such as Mourne Cooley Gullion it should explain the significance of the geological processes that helped to create it, and how they have influenced the natural and cultural heritage of the area. Interpretation should engage the interest and support of both residents and visitors, and should be regarded as an integral part of the management and portrayal of the area.

The principles of interpretation are that it should relate to people's personalities and experiences, that it should reveal meaning about people or a place, and it should provoke a response in the reader or consumer. We also believe strongly that interpretation should entertain, emphasise context and encourage understanding and conservation.

Creating interpretation that is successful in achieving these aims and satisfies both the client and the user should, therefore, have the following characteristics.

- **Clarity of purpose** – what the Interpretation Plan is designed to do and what the resultant interpretation is designed to do.
- **Simplicity of message** – what understanding, thoughts and knowledge the interpretation should leave in the minds of users and visitors.
- **Layering of content** – to provide in the interpretation for many levels of interest from the passing to the passionate.
- **Telling the story through the lives of “local” people** – because people are interested in other people, using real and generic characters associated with the Mourne Cooley Gullion area such as farmers, quarry workers, engineers and climbers to help tell the story in interpretive media.
- **Encouragement to explore** – ‘provoking’ both local people and visitors to explore their own and neighbouring areas – and promoting the use of appropriate websites.
- **Use of selected personalities and experts** – using impressions of, and / or opinions about, the Mourne Cooley Gullion area provided by personalities and experts.
- **Use of a variety of media** – encouraging and assisting understanding through discovery rather than imposition, using a range of graphic, tactile, printed and digital mechanisms, creative and performing arts, events and activities.
- **Targeting effective media** – selecting the type, style and content of media to address different target audiences with different learning needs and interests.
- **Integration of media** – ensuring that the content and presentation of stories is cohesive and shared across all interpretation both on- and off-site.
- **Encouragement to participate** – getting local people, including children, involved in the interpretation of their own surroundings.
- **Relating story to place** – ensuring that all interpretation provided on site has immediate relevance of content to its location and also links each site to others, whether complementary or contrasting.
- **Follow the story** – ensuring that each part of the story of an area links with others to create a coherent and integrated picture, encouraging people to explore other aspects of the story.

2.3 The geotourism sites

The region is divided into three areas: Mourne, Cooley and Gullion. In each area, the Geotourism Project selected four sites to illustrate significant geological features that help to tell the stories of how the landscape here was formed. Each site can easily be visited and their stories can be seen in the landscape around.

Mourne

The Mourne Mountains were formed during the last glaciation from 56 million year old granites. They comprise twelve peaks, each over 600m high. Valleys of varying width and depth dissect the mountains; the slopes descend to the sea and low-lying post-glacial drumlin topography to the west and north. The southern part of the Mourne area is low lying and covered in thick glacial deposits. The soil is well-drained, fertile and good for agriculture.

Slieve Croob

This is an agricultural area north of Castlewellan offering the best location to see two of the oldest rock types – Silurian metasediments and Devonian granodiorite – in contact together and also to see the relationship between geology, geomorphology and agriculture. Slieve Croob also has excellent views of the Mourne Mountains.

Windy Gap and Lighthouse Road viewing points give a good overview of the Mourne Mountains and the glacial deposits on the lower ground and they also offer views of the Cooley Mountains and Slieve Gullion. There is a car park with a viewpoint at Windy Gap.

There is a good example of a Neolithic portal tomb and an early medieval souterrain at Slieve Croob. Cut granite from the area was used in the construction of the Albert Memorial in London and Newry Cathedral.

Spelga Dam and Silent Valley

Although the Geotourism Project presents Spelga Dam and Silent Valley together as one site, they are three different and separate sites – Spelga Dam, Silent Valley and Binnian Tunnel. Spelga is situated on the eastern side of the Mourne Mountains in a glaciated valley, underlain by Silurian metasedimentary rocks dividing the eastern and western Mourne Mountains. The geomorphology here is different from the other Mourne geosites and is a natural point at which to tell the story of the origin of the granites and their impact on agriculture and water. There is a large car park, which could enable the site to be developed as a significant amenity area.

Silent Valley is a popular visitor site in the southern part of the Mourne Mountains, close to the highest peaks with a wealth of industrial and engineering heritage associated with the construction of the Silent Valley and Ben Crom Dams, and with the Binnian Tunnel cut through the granite heart of Slieve Binnian.

The Binnian Tunnel diverts water from the Annalong River to Silent Valley Reservoir. The tunnel and its construction are explained in the Silent Valley Visitor Centre Exhibition.

Bloody Bridge

Here a mountain river cuts through glacial deposits to expose granite and metasedimentary outcrops on the river bed. At Bloody Bridge the metasedimentary beds are dramatically vertical or sub-vertical. Granite boulders deposited during the last glaciation have subsequently been eroded by the river.

The contact and relationship between the 430 million year old sediments deposited at the closing of the Iapetus Ocean and the 56 million year old granite emplaced at the opening of the Atlantic Ocean is shown well along the Bloody Bridge river path.

A Bronze Age crannog located on an island in the river may have been built in response to changes in the climate.

There is a car park at the site providing good access to the Mourne. It is popular with walkers and with adventure companies that use the river for sport.

Mourne Coast

This location comprises 7.5 kilometres of coastline from the soft sediment cliffs in Ballymartin to the outcrop of metasediments at Annalong and Glassdrumman Pier. The section shows a good variety of past environments and rock types. A path is already developed along part of the section. There is a car park at Annalong by the harbour.

It is geologically significant because of the very good exposure of Silurian sediments deposited on the subducting margin of the Iapetus Ocean, showing original sedimentary structures superimposed by tectonic structures related to the intrusion of the Mourne granites approximately 56 million years ago. At Glasdrumman Pier it is possible to see the intrusion of the Mourne cone sheet, and at Ballymartin deposition of sediments in a glaciomarine environment are evident. Annalong Corn Mill is nearby.

Cooley

The geology of the Cooley peninsula is quite varied with good examples of all three rock types – igneous, sedimentary, and metamorphic. The ages of the rocks range from about 450 to 60 million years ago with more recent sediments dating between 15,000 and 5,000 years ago. The area records the ‘death’ of a previous ocean, and the ‘birth’ of the current one, with a period of tropical climate between those events.

Ravensdale

The site offers an excellent strategic location close to the international border and the Dublin/Belfast road, offering a sizeable car park and views. It is in the heart of the Mourne, Cooley, Gullion Geotourism region and is located on the youngest section of the Slieve Gullion ring dyke. There are some good outcrops of micro-granites and the A1/M1 road cutting shows evidence of the opening of the Atlantic Ocean with contact between the Palaeogene ring dyke and the Silurian metasediments. The hills afford views of Slieve Gullion and the rest of the ring dyke, the Mourne Mountains, Carlingford Lough, the plains of Meath and Dundalk Bay.

Omeath to Windy Gap

The greater Omeath area is of geological importance as it is part of the Carlingford Complex and close to the Slieve Gullion ring complex. It is a very good example of how the geological and geomorphological location affects the lives of people, historically isolating Omeath as an 'island' community located between Carlingford Lough and the mountains.

The 'gap' at Windy Gap is due to a fault zone running approximately along the line of the road, the fault line itself having provided a convenient passage through the hills. Movement along the fault has juxtaposed different rock types against one another: to the west is granite from the continental crust, and to the east, gabbro from the oceanic crust. There are also excellent views from here of the effect of geomorphology on land use, and the resulting landscape, with notable evidence of the terracing cut by families during the Irish Famine of 1845 – 53.

There is car parking at Omeath overlooking Carlingford Lough and at Windy Gap by the 'Long Woman's Grave'.

King John's Castle, Carlingford

The site comprises the ground north of the castle, the roadside and lay-by rock exposure and the shore from the castle to the marina. The castle and its setting is one of the best sites to see the relationship between geology and archaeology. Here the sedimentary rocks are re-enforced by the intrusion of later igneous rocks. This intrusion formed a promontory which acted as a strategic location for King John's castle. The 430 million year old rocks also show some well preserved sedimentary structures including ripple marks and large and small scale folding.

There is parking in the layby on the road where it is possible to see the metasedimentary layers with igneous intrusions and another parking area in the harbour giving access to the castle.

Whitestown to Templetown beach

These sites show the geological complexities of the region and the changes that take place over time with Carboniferous rocks deposited in shallow tropical seas and subsequently covered by ice-carried sands and gravels.

The fossil-rich 340 million year old Carboniferous limestone can be accessed on Whitestown beach and the soft cliffs along the coast show evidence of later glacial deposition including a boulder pavement deposited above marine muds but below the main sands and gravels. The cobbles on both beaches show various examples of rock types carried from further north by glaciers.

The church and graveyard site at Templetown is important due to its association with the Knights Templar and with prominent local families from Anglo-Norman times.

There are car parks at Whitestown and Templetown.

Gullion

This area is characterised by the undulating countryside known as the Ring of Gullion, a series of low-lying hills that encircle Slieve Gullion Mountain. Formed over 60 million years ago by volcanic forces, the ring of small hills surrounding Slieve Gullion is technically known as a ring-dyke. It was the first ring dyke in the world to be mapped, by the Geological Survey of Ireland in the 1870s.

Gap of the North

The site is a compelling combination of geology and archaeology. The 'gap' is formed by a glacially cut passage through the ring dyke creating access through the natural barrier of the mountains of Mourne, Cooley and Gullion. The associated archaeological sites span a thousand year period between the early and late Medieval and have ecclesiastical and geopolitical origins. There is no car park in the area and access is difficult.

Slieve Gullion

The site comprises the western side of Slieve Gullion from the summit to the lower car park on the forest drive, as well as the wider ring dyke complex. A popular location, prominent in local folklore, the site can be used to explain the science and history behind the myths. This site is well situated to view the physical representation of the ring dyke and to provide a clear explanation of the nature of the Slieve Gullion complex. At the summit there is a Neolithic passage grave that aligns with the setting sun at winter solstice.

Cam Lough Quarry

The abandoned quarry overlooks a ribbon lake occupying a glacial eroded valley between Slieve Gullion and Camlough Mountain. The quarry exposes the ring dyke and helps people to understand the relationship between the ring complex and the surrounding rocks with a clear illustration of contact between Silurian metasediments and granite.

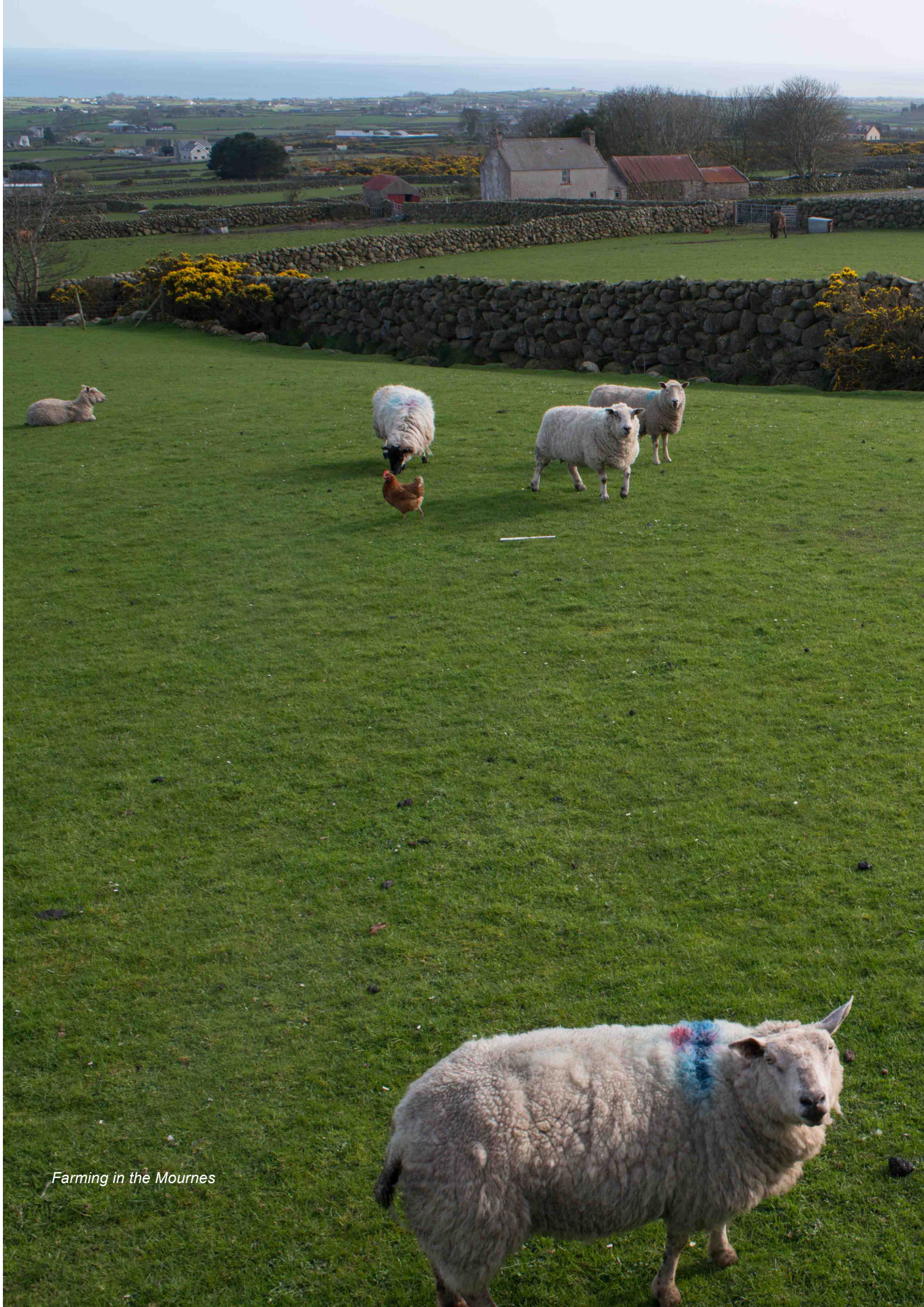
It is possible to park cars next to the quarry although parking is informal and the quarry is in private ownership. There is a large car park nearby at Cam Lough.

Bernish and Ballymacdermot

Bernish is a small site from where some of the bigger scientific ideas about the region can be interpreted. From here the story can be told of the generations of igneous rocks in the area and the process of the closing of the Iapetus Ocean and the opening of the Atlantic. Broader geomorphology issues are also evident including the opening of a passage from Lough Neagh to the Irish Sea by ice and the subsequent development of a canal, the railway and the Dublin-Belfast road.

Ballymacdermot has a well-preserved Neolithic court tomb which is aligned with another Neolithic monument above Ravensdale on Black Mountain, Co. Louth and is part of a network of similar monuments in the region.

There is a car park at Bernish and a lay-by suitable for about three cars at Ballymacdermot.



Farming in the Mourne

3 Findings of local consultations

Consultation is major part of the process for preparing an interpretation plan ensuring its local relevance, integration into local programmes and long-term sustainability of interpretive approaches.

3.1 The consultation approach

Consultation was undertaken during the preparation of this plan with the Geotourism team, with partner and stakeholder organisations, with selected contractors delivering aspects of the Geotourism work with local residents, visitors, schools and community and youth groups. Consultation was undertaken through face-to-face meetings, telephone interviews, email communication and a workshop held with key partner organisations.

Officers from the following organisations were consulted:

- Newry and Mourne District Council
- Down District Council
- Louth County Council
- Ring of Gullion AONB
- Southern Regional College
- Mourne Heritage Trust
- Banbridge District Council
- Professor Terry Barry

3.2 Results of consultation

General points

People living in and around the study area have a strong sense of place and are keen to find out more about its geology and its landscape. Once they grasp the basic concepts and geological processes they are very interested, particularly in the how and why features were formed. They are generally less interested, though, in the finer details of geology and landscape.

Interpretation of geology

Other than a series of panels in the Mourne area provided by the 'Uncovering the Past' project, and in websites, publications and panels produced for the Mourne mountains geology is not currently a major feature in the interpretation of the area. In existing interpretation the stories tend to be rather piecemeal and fragmented, and are not presented in any cohesive or consistent manner. People are interested, though, in finding out more about geology, and also about local legends, townlands and genealogy.

Audiences for geotourism

There was general agreement and consensus among consultees that the audiences for the Mourne, Cooley Gullion Geotourism Project include local residents, visitors from the island of Ireland and overseas visitors. These audiences are discussed in more detail in Chapters 4, 5 and 10, which consider audiences, product development and marketing strategies.

Marketing

There are opportunities to market the Mourne Cooley Gullion area within County Louth and to market it more widely to the surrounding areas, including Belfast and Dublin. The Mourne Mountains have a new brand and marketing campaign which is being well received and is successful. The maps produced as part of this campaign include the Ring of Gullion. The Mournes are being marketed as a place for outdoor adventure to increase its appeal to young adults.

Interpretation proposals

The key interpretive stories for Mourne Cooley Gullion include water, Carlingford Lough, exploitation of granite, a 'Narnia' landscape, maritime links, borderlands and boundaries, and the geology of the Ring of Gullion. Free events organised for the public by the Geotourism Project have been well attended, suggesting interpretive activities in the future could be popular. Interpretation could help to build the reputation of Mourne Cooley Gullion as a world-class landscape.

Educational materials

The key school audiences are Reception to Key Stage 3, years 3-6 in Northern Ireland, and the 5th and 6th classes in primary schools in the Republic. In Northern Ireland geology is taught as a stand-alone subject at only two secondary schools but aspects of geology are taught within other curricula at GCSE and A-Level. In the Republic, aspects of geology are taught within Primary and Junior Certificate Geography and geology is a core component of Leaving Certificate Geology. Educational activities delivered by the project during holiday periods have been very popular.

Legacy of the project

The project should leave behind a long-term Interpretation Strategy to be implemented over the next 3-5 years. Interpretation should be multi-layered and cater for a range of audiences, telling people where they can find out more information, such as through websites or other publications. It should be of high quality, characteristic of a Geopark, and should lead the way to making the three areas a single, integrated destination for geotourists.

A summary of responses is presented in Appendix 1.



Bloody Bridge

4 The audiences for interpretation

Understanding the audiences for interpretation is essential for its successful delivery and ensuring its market relevance and economic value. This section discusses the nature of audiences for geotourism and the potential for attracting new audiences to the area.

This Interpretation Plan is driven by three main motives:

- To engage people – both local people and visitors, to explore, enjoy, learn about and understand the history of the landscape.
- By so doing, to encourage them to appreciate and conserve that landscape.
- To encourage cross border economic development opportunities through increasing tourism revenues.

All these three motives require an understanding of the audiences and markets for geotourism in general, and especially for geotourism in the study area. They help set the scene for the product development proposals to follow: interpretation is a major potential tourism product. This section sets out some answers to questions about the types and locations of future audiences for geotourism.

4.1 The nature of geotourism audiences

Geotourism is a relatively new and little researched audience area. Most commentators note that it is a concept dating from the late 1990s. The global hub for research on geotourism lies in Australia, with the most prolific research authors being Professors David Newsome of Murdoch University, and Ross Dowling of Edith Cowan University (see Dowling & Newsome, 2010, and Newsome, Dowling & Leung, 2012 for instance). They have brought together active geotourism researchers on a worldwide basis, leading to the publication of a range of multi-authored papers and books on this subject. They have been consulted both personally and via the literature in the preparation of this document. Evidence of the financial benefits of Geoparks is provided in (see References on page 59).

The key findings from the literature consulted and the discussions held are:

- Visiting a small number of iconic geological sites has been important worldwide since the late nineteenth century.
- Ireland has a number of iconic sites, including the Giants Causeway (now a World Heritage Site), the Marble Arch Caves in Co. Fermanagh, The Cliffs of Moher and the Burren, and the Tetrapod Trackway on Valentia Island, Kerry.
- Worldwide, the major sites for geotourism are visually, and / or experientially very and clearly exciting.
- The major sites have been tourism attractions for many years; building up brand status in geotourism is an *extremely* long-term activity. Few reach iconic site status.

- Geotourism sites need careful and active planning and management to avoid physical damage to the sites and to their surroundings.
- Over the last ten or so years there has been a surge in interest in creating geoparks, driven in part by the need to establish conservation systems for fragile geological formations, and in part to widen the appeal of ecotourism / rural tourism areas.
- UNESCO estimates that the financial benefit of the Geopark network in the UK is £18.8m per year.
- The market for geotourism is closely linked to the market for rural tourism generally.
- Only well-known and iconic geotourism sites are capable of generating visitation as stand alone sites.
- Most geotourism sites are additional attractions to existing rural tourism destinations, helping to create longer stays, or some additional half-day visits.
- Interpretation is an important requirement for all geotourism sites if they are to attract tourists.
- That interpretation must be clear, simple and relatively non-technical, and should be layered to a variety of audiences.
- Landscape, culture and people are key, and lead attractions rather than geological features alone.
- Interpretation should incorporate 'conservation' and 'no damage' messages.
- Geotourism is a significant activity in the tourism strategies for both the Northern Ireland Tourist Board and Failte Ireland.

4.2 Potential audiences for Mourne Cooley Gullion geotourism

The literature does not record any published and detailed research about the size and exact nature of the audiences for geotourism, although it appears in most other parts of the world to be similar to some types of rural tourism, seeking:

- A Landscape experience
- A Discovery experience
- An Outdoor soft activity experience
- A Meeting people and persons experience

It has to be assumed, therefore, that the likely audiences for geotourism in the Mourne Cooley Gullion region would be similar to that for rural tourism generally (see Lane, 1995, 2009; Lane, Weston, Davies, Kastenholz, Lima & Majewski, 2013).

The main potential audiences are therefore:

- A very small niche market for visiting groups of professional and amateur geologists.
- A small, but identifiable and defined market of school and university groups studying geography and related subjects.

A much larger series of potential rural tourism visitors are:

- Walking groups.
- Families with young children, and couples of various ages, seeking to find short, 30-60 minute circular, off road routes, on signed footpath walks, with items of interest, which can include geological features *and* good landscape views.
- Car based older tourists, seeking purposeful, themed countryside visits, typically of half day / whole day duration, with easy access to refreshment facilities, and easy to follow signage.
- People visiting events in the countryside, which can include competitions, demonstrations, festivals and performances of various kinds.

Audiences can be broken down geographically into:

- The local market – comprising people living in the area. This group is typically quite small, but is important in that it can be very supportive of initiatives such as the creation of a geopark if it is felt to be included in the process of a park's creation.
- The existing tourism market, which is especially important in the Mourne Mountains, and could be persuaded to travel a little further and try something new. That market comprises both day visitors and overnight visitors.
- New day visitor markets. The typical day visitor market will not travel more than a 60-90 minutes drive time. That market would, therefore, include the Belfast and the Lagan Valley, and visitors from the Dublin area, notably from parts of north Dublin, Fingal County and County Meath. Emphasis should be placed on landscape, country walks and local hospitality provision, and of course, on the extra dimension of geotourism.
- New overnight visitor markets. The most important and easily accessible overnight markets would be the short break markets in Belfast and the wider Dublin region, with an emphasis on landscape, walking and the rural heritage experience, combined with the geological experience, within the short break.

4.3 International audiences

Is there an international audience? The short answer is that for all new rural destinations, international audiences are slow to build, unless there are compelling and fashionable attractions available. The Mourne Cooley Gullion region and its geotourism potential do not have that combination of attributes at the moment. Further, while Dublin has many international visitors who go on to visit other parts of Ireland, the Carlingford Lough region is not currently on their mental maps, and would need intensive and long term marketing activity to become known. There is a considerable day excursion market based on international visitors to Dublin, but that is dominated by the Wicklow Mountains, including Glendalough & Powerscourt, and the Boyne Valley, with its Brú na Bóinne Visitor Centre and surrounding World Heritage Site. Both the Wicklows and the Boyne Valley are less distant than Carlingford Lough, and internationally known.



Boulders at Bloody Bridge

5 Product development for the geotourism audience

Product development is closely linked to interpretation and also to the marketing of an area for tourism. This section discusses key products that could be developed and successfully marketed to make Mourne Cooley Gullion a geotourism destination.

To be successful in attracting additional visitors, landscape and geology must be seen and developed as a marketable and attractive product. Interpretation is part of the process of developing product, which means that the interpretation must fit the needs of the market, excite that market, and be innovative and varied.

Descriptive panels and boards are not enough! Interpretation should be strong and interesting enough to be a product in itself, perhaps the most important product the area could have, creating a Unique Selling Point compared to other regions of Ireland. Interpretation adds depth and meaning to the landscape product, and to both the natural and man-made heritage product. Product development valorises the conservation of natural and man-made heritage, and makes interpretation both a commercial and educational advantage for the area.

The need for attractively delivered interpretation also means that any new interpretation must be monitored and evaluated to check the response of the market to that interpretation. And product development must fit into, and be part of, a marketing strategy. Marketing is discussed later in this report, after the interpretation product has been presented.

5.1 The key products

A series of linked geotourism sites, at places that are easy of access and well signed, with wherever possible good landscape views, good story lines linked to other geotourism sites, and provided not just with interpretation panels, but smart phone or tablet access via Quick Response (QR) codes, including sound descriptions as well as written statements to create a unique experience.

The interpretation supplied at each site should be layered to cater for different types of audience, including children, experts and adult lay people. The sites should also have information about local hospitality and toilet provision. The sites should be grouped so that they can be visited as a series of perhaps three or four afternoon visits, to make a series of satisfying short experiences. Each site must have car parking provision, and each site should wherever possible be linked to a short, 30-60 minute easy circular walk. Each site should be accessible to people with disabilities wherever possible.

This core provision of sites fulfils two basic requirements of most geotourism developments – geological information closely linked to landscape appreciation, and both linked to active, but not demanding, countryside recreation.

A teachers and students pack for schools, and the camps noted in Chapter 3, explaining the geology and landscape of the area, using the geotourism sites, and with special reference to the sites which are accessible to minibuses and to larger coaches as well as any that have accessibility problems.

A similar pack with material for more specialised groups of geologists and geographers, at University, continuing education or professional level.

Events related to geology and to the use of geology in the landscape. Events, including courses, competitions, festivals, and performances, are a growth area in contemporary rural tourism, widening the experiences on offer, and encouraging new forms of visit. Short walling courses have been developed by numerous Dry Stone Walling Associations in the UK, Continental Europe and the USA & Canada. The EU's Leonardo project 2012-2014 has supported life-long learning programmes linked to stone walling across France, Italy, Spain and the UK. Wallers' competitions are also held. Festivals of rock can bring together the heritage of stone with that of popular music. Music theatre / boutique opera commissions as, for example, developed in Australia, can bring local choirs and local heritage into public festivals of music and story telling, celebrating skills development, landscapes and personalities. Stone Art can showcase local craft use of stone.

Events development adds an important element to the geotourism product, attracting a number of new markets to the area.

The Ambassador programme is an important product developed by the Mourne Cooley Gullion Geotourism project, bringing into play the research-proven liking of rural tourists for personal contact with local informed people. Working with local tourist accommodation providers, the Ambassador programme could offer trained guides to work with the proven concept of guided Country Village Weekend Breaks to offer guided packaged breaks illustrating the geological, historic, natural and farming heritage, of specific communities with sufficient small scale accommodation and local ambassadors. The concept has been tested in Ireland, Wales, England and Japan.

Linking a tangible and ongoing commercial activity to the product range should also help maintain and valorise the ambassador programme into the future, and allow and encourage it to grow to include other forms of regional heritage.

5.2 Other products

Should there be a geopark visitor centre as part of the product?

Visitor centres can be attractive propositions because they can embody the ethos and hopes of a project in very tangible form. However, for a start up operation that will have a relatively small budget in the early years, they can be a very expensive overhead cost, in terms of premises, fitting out and staff costs, with little guaranteed return from admission fees or from attracting more visitors to the region. The proposed circuit of interpretive hubs will act as decentralised on-site visitor centres. Some money could also be spent on providing displays within existing tourist information centres.

Is there a case for seeking Geopark status? Would that status become a product?

This issue is discussed later in this report under the section about marketing strategies. There is no researched evidence that Geopark status in itself adds to the attraction of a Geotourism project. However there are known potential political, marketing and practical advantages in obtaining geopark status.



View from Windy Gap, Omeath



Formations at King John's Castle, Carlingford

6 Existing interpretation

Many places and features in Mourne Cooley Gullion are already interpreted. This interpretation has been developed over many years by different organisations that have an interest in this area. It is important to ensure that new media complements rather than competes with, or duplicates, existing interpretation.

6.1 Interpretation audit

A survey of the current on-site interpretation carried out over two field visits revealed a wide disparity in provision, from a variety of organisations. We are aware that there is no on-site provision from the Geotourism Project – it is the purpose of this plan to guide that provision – though the project has produced other interpretation materials about the area. The purpose of this review is simply to assess what other interpretation is available for the area and how it can be complemented by the proposals in this plan.

A selection of interpretation materials includes:

Interpretation panels

No panels are provided by the Geotourism project but those found during site visits include:

- Templetown Beach on nesting birds
- Ravensdale Forest Recreation Area – trails and the Ring of Gullion Way
- Slieve Gullion – geology, mythology and landscape
- Bernish car park – geological history and Ballymacdermot Court Grave
- Spelga Dam – wildlife, engineering and the history of the dam
- Silent Valley – interpretive panels in the car park and a visitor centre
- Mourne Coastal Route – Bloody Bridge about the geology of the shore and coves, the river and the Smugglers' Trail
- Carlingford Lough and Castle
- Greencastle – history of the castle
- Windy Gap, Slieve Croob – geology, landscape and wildlife
- Binder's Cove Souterrain – about the settlement
- Camlough car park – geology, landscape and wildlife

Printed materials

- MCG Geo-News newsletter
- MCG Events Guide
- MCG geology posters
- MCG Brochure
- MCG Launch booklet
- MCG postcards
- Ring of Gullion Way brochure
- Ring of Gullion AONB Newsletter
- Ring of Gullion AONB leaflet
- Mourne Mountains and Ring of Gullion Visitor Guide

- Mourne Mountains and Ring of Gullion Visitor Map
- Mourne Mountains and Ring of Gullion Cycle Routes
- Mourne AONB Habitats and Wildlife brochure
- Newry and Mourne *Make your day* materials
- Selection of trail leaflets and other materials for sites within or near the geotourism area

Websites

- There is a Mourne Cooley Gullion website with sections on geology, geomorphology and Archaeology, as well as attractions to visit, activities and education materials.
- The website for Ring of Gullion AONB has a page on the Geotourism Project
- Mourne Heritage Trust website has information on geology of the Mourne Mountains and the Geotourism Project

Interpretation centre

- An interpretation exhibition is to be installed at Annalong Mill, a working corn mill owned by Newry and Mourne District Council. There is opportunity to include geological interpretation in the exhibition.

Interpretation within the Geotourism Project is provided by a wide range of organisations including the Geotourism Project, the two AONBs – Ring of Gullion and Mourne – councils and other organisations. There is no unifying motif to identify interpretation as belonging to a recognised Geotourism area and often a location will exhibit a selection of panels of varying ages, sizes, condition, quality and content.

The exception to this is a recent series of panels installed at Bloody Bridge, a site along the Mourne Coastal Route. The panels along the route demonstrate a strong uniformity of design, content and delivery along the whole route from Newry to Dundrum.

There is comprehensive programme of walks, talks, bus tours and events for adults, children and families provided by the Geotourism Project. A schools' educational programme is administered by the project Education Officer and 'A Geological Field Guide to Cooley, Gullion, Mourne and Slieve Croob' is available for Secondary Schools.

7 Interpretive aim and objectives

The aim and objectives for interpretation are the key principles on which the themes, stories and media are based. They determine what interpretation should achieve and what impact it will have on users, whether residents or visitors. This section proposes an aim and a series of objectives.

7.1 Interpretive aim

We propose that the overall aim of interpretation should be:

To encourage local people to widen and share their understanding and appreciation of geological processes in the Mourne Cooley Gullion area, to help foster a sense of pride in their surroundings and to welcome visitors to discover and enjoy their landscape and its communities.

7.2 Interpretive objectives

The interpretive objectives stem directly from the aim and are divided into three sections – learning, behavioural and emotional.

Learning objectives

Visitors to the Geotourism area will be able to understand and appreciate:

- how the Mourne Cooley Gullion landscape was formed and why its geology and geomorphology are so significant
- how geological processes underlie the landscape and influence its shape and character
- how geological processes influence the interaction between people and the landscape through agriculture, architecture, walling materials, transport routes and skills development
- how the landscape is changing and continues to change
- that geological processes occur over vast periods of time

Behavioural objectives

Those who visit the area will:

- wish to explore and enjoy it and discover more about its many characteristics and qualities and its often hidden depths of meaning

- use their understanding to better appreciate other landscapes and environments
- relate places and ideas to their own awareness and understanding
- apply their newly acquired geological knowledge to other places
- tell their friends and relatives about their experiences in the area
- be inspired to revisit the area

Emotional objectives

Those who visit the area will:

- feel drawn by the scale of geological time evident in the area
- be impressed by the breadth and variety of geological processes in the area
- develop a sense of connection and empathy with Mourne Cooley Gullion and with the places and communities within the area
- feel a sense of pride in what the local area has to offer, be they residents or visitors
- be moved by the beauty and grandeur of the scenery
- feel sufficiently attracted by the area to want to find out more about its natural and historic environment
- better relate to the wider heritage of the area



Cliff face at Templetown

8 The Interpretive Framework – themes and storylines

Interpretive themes provide a framework for the many stories that can be told about an area. Themes keep interpretation focused on defined topics and help to avoid a ‘scatter-gun’ approach to telling the main stories of the area. We have developed one overarching theme and five individual themes that follow key strands in the story of the geological processes of Mourne Cooley Gullion.

8.1 Overarching theme

We suggest that the overarching theme for Mourne Cooley Gullion should be:

Rocks shape landscapes and lives. Geological processes in Mourne Cooley Gullion have moulded landforms, and influenced soils, habitats and the way people have settled, used and responded to the land.

8.2 Supporting interpretive themes

This overarching theme is supported by five interpretive themes.

Theme 1

This is a landscape forged in fire and carved by ice.

Following the original sedimentation of sands and gravels the movements of the Earth’s crust here have been accompanied by extreme temperatures and also by underground injections and outpourings of molten magma. 12,000 years ago the landscape was eroded by successions of glaciers carving the valleys and loughs.

Potential storylines

The lost ocean The movements of the Earth’s crust that caused the closing of the Iapetus Ocean 430 million years ago compressed the sedimentary layers on the ocean floor. The resulting pressure metamorphosed the layers into metasedimentary rocks that we find in the area today. These are ‘subduction zone’ rocks, rather like the rocks now being formed in Japan and Chile. The Newry Granite (granodiorite) oozed up into these sediments around 405 million years ago.

Oozing magma Around 65 million years ago the opening of the North Atlantic Ocean, caused by stretching and rifting of the Earth’s crust, exerted enormous pressures which caused rocks to melt and move through the upper crust of older Silurian rocks.

The Two Volcanoes Remnants of two volcanoes are evidence of massive volcanic activity in Cooley and Gullion 60 million years ago. The Slieve Gullion ring dyke is all that remains of what may have been a very large and powerful volcano, eroded with time and now long gone. In Cooley there are exposures of a basalt-type rock, called gabbro, that are the remains of a second volcano. Both complexes were active at the same time and both would have been significant volcanoes.

The Age of Ice Between 19,000 and 13,000 years ago glaciers advanced across the region, eroding the bedrock, sculpting corries, cols and U-shaped valleys and leaving mixed glacial deposits and drumlins, with their characteristic grains ranging in size from fine clays to large boulders. These deposits of sand and gravel are now being quarried in several locations. As the ice melted the crust rebounded from the weight of the ice leaving raised beaches along the fringe of the region. These soft cliffs are now being eroded rapidly due to coastal erosion.

River of Ice The flow of ice and water from Lough Neagh to the sea gouged a huge valley that was flooded when the sea level rose, forming Carlingford Lough.

Theme 2

The mountains and valleys were created by the constant shifting of the Earth's crust over vast periods of time.

The Earth's crust is constantly moving, though very slowly. The enormous forces unleashed by this movement result in the birth of new continents and oceans and the shifting of land masses around the globe.

Potential storylines

Global changes on a local scale The earth is constantly moving and geological processes, including the movement of the Earth's tectonic plates, have shaped the land over vast periods of time. Many examples of this global geological history can be seen in the area, including the closing of the Iapetus Ocean 430 million years ago pushing up Silurian sediments that can be seen for example at Carlingford and Bloody Bridge.

Tropical Paradise 350 million years ago Ireland sat closer to the equator, in the tropics, and enjoyed a very different climate. The coral reefs that developed in the warm, shallow sea are now exposed in Cranfield, South Co Down, and South Cooley, Co Louth.

Sedimentary deposits from the shallow tropical sea that partly covered the land now reappear as fossil-rich Carboniferous rocks.

Theme 3

The underlying rocks bequeath minerals and form soils that determine the vegetation, influencing how people have settled and used the land over thousands of years and supporting a rich biodiversity.

The underlying rocks all have their own properties and when they are broken down on the surface by weathering and by the roots of plants they produce soils with particular characteristics. Granites have also been used extensively for building stone, road kerbs and sets, both locally and transported to many other places.

Potential storylines

Life of the land The underlying geology determines soils and relief, which influences micro-climate and therefore the type of vegetation that grows, such as oak, beech and ash forests, which in turn supports specific communities of animals. The whole area has a rich biodiversity that has supported local communities for millennia, and attracts visitors.

The Age of Man People have been living here since the first hunter-gatherers arrived some 9000 years ago. Since Neolithic times, people have been establishing settlements, castles, monasteries and townlands, and managing the land for agriculture and trade. There are records of Viking, Anglo-Norman and medieval settlements in the area. How they developed these settlements, the rocks they built their structures from and how they established transportation routes, was ultimately determined by the geology. Archaeology and geology are inextricably linked in the area. Geology can be seen in the walls of many local buildings, the materials used for field boundaries, and the local skills used for building and field boundary development.

Fertile farming The lowlands ‘downstream’ of the mountains, in terms of ice flow, are among the most fertile corn-growing, and more recently potato-growing, areas in Ireland. The corn was processed in local mills, which were powered by water which comes down from the mountains. Mills, such as those at Annalong and at Bessbrook, have millstones made of Mourne granite. The rich alluvial soils have attracted invaders and settlers for centuries.

Digging rocks Granite has been quarried from the Mourne Mountains for centuries. It is a high quality rock suitable for building and carving and has been used locally and transported for use overseas, for example to Liverpool and the Albert Memorial in London. Quarries in the Mourne Mountains have provided stone for Newgrange and Nendrum Tidal Mill and was used extensively for buildings in Belfast and Liverpool. Granite from the Dromara Hills was used to build Newry Cathedral.

Fair trade Greencastle, on the Mourne coast, and King John’s Castle on the Cooley Coast, on either side of Carlingford Lough, were major centres of trade in medieval times, due to their location and the rich fertile soils of the land around the Lough. There was a ferry between the two castles. Greencastle had one of the largest fairs in Ireland with people trading goods along the coast and across the Irish Sea. It was

one of four Ram Fairs in Ireland – only the Puck Fair in Killorglin still continues today. Carlingford Lough's geology determines the lines of the major route ways into this part of north central Ireland.

Quenching a thirst Man-made reservoirs help to provide water for expanding populations. The Mourne, with their tough granite and glacier gouged valleys, are an ideal place to build dams to hold back water. Spelga Dam and the Silent Valley reservoir were built in the 1920s and 1930s and the Binnian Tunnel built under Slieve Binnian in the 1940s to bring water in from the Annalong River.

Shaping the rock Stone has been used for many purposes – for buildings (including the Daniel O'Connell Memorial church in Cahirsiveen, County Kerry), kerbs and setts, for roadways, gravestones and memorials and, not least, millstones. Many important masons and sculptors have worked with rock from the area.

Theme 4

Local landforms and landscapes have inspired stories, myths and legends as well as stimulating academic research.

Our landscapes are the inspiration for the stories and legends that are fundamental to our culture. Many of these stories were created to explain how the landforms came into being. More recently, the land has also become the inspiration for those who study its creation and formations.

Potential storylines

Legend and landscape Before the advent of scientific enquiry, people developed stories and myths to explain the world around them. Significant features in this landscape have associated myths that helped make sense of early man's environment, such as the stories of Finn McCool, the Longwoman's Grave and the Cloughmore Stone. The names of the townlands also reveal stories from the past.

The Geologist's Job Geologists study types of rocks, how they were formed and how they have created the landscapes we see today. They are involved in many activities such as advising on water schemes and alternative energy generation.

Inspiration for geology This area has inspired some of the earliest geological studies. Slieve Gullion was the first Ring Dyke in the world to be mapped and its study informed the development of the '6' classification of granites in Mourne granite. The Carlingford complex contributed to the development of the igneous classification of rocks that is still used today.

Theme 5

Local landforms and landscapes have been created by geological processes and have influenced the location of social, cultural and political borders and boundaries.

The landscape has defined and divided people, cultures and administrative areas over the centuries. Historically, people on the Cooley peninsula were separated from the plain of Muirtheimhne to the south by the mountains and were almost 'islanders'. Ice-carved Carlingford Lough was a major trading route in medieval times and is now the border between Northern Ireland and the Republic.

Potential storylines

The waller's story Dry stone walls made with local stone are a characteristic landscape feature of parts of Mourne Cooley Gullion. The Mourne Wall marks the boundary of the Silent Valley reservoir catchment area. Field boundaries made with large round granite boulders are typical of the lower slopes of the Mourne Mountains and Cooley "banks" are a feature of the Cooley Peninsula. Historic and contemporary wallers are skilled workers using traditional and modern techniques.

Lines in the landscape Places where different rock types meet are often visible in the landscape. The fault at Omeath Windy Gap is a visible cleft with different rocks adjacent to each other. There is a marked difference between the topography of the granite and that of the limestone landscapes in the Cooley peninsula.

Political borders Geological and geographical features in the Mourne Cooley Gullion area have been used to mark the boundaries and borders of land for communities, lordships, constituencies and sovereignties over many centuries. Geological features such as the Gap of the North have allowed people to travel and trade across boundaries. Geological and archaeological features cross political borders, such as the Slieve Gullion Ring Dyke and Carlingford Lough.

Defending the land By the late medieval period Ireland had become the most castellated country in Europe with between 3000 and 5000 tower houses and castles, and Co Louth having more castles than any other county in Ireland. These served to defend the land from invasion by forces from other countries and also from elsewhere within Ireland.



Mourne Coastal Route

Bloody Bridge

Rocky Shore and Secret Coves

Rocky Shore and Secret Coves

Beneath this road lies another world. Here you can walk a rock formation as striking in its way as the Giant's Causeway, only instead of steps you can follow a spectacular series of upturned sea beds, whose origins lie in a long gone ocean 430 million years ago.

Formed of shale, one of the oldest rocks in Ireland, these beds tilted on their sides as the molten magma that created the granite of the Mourne Mountains pushed into them. When the granite cooled, cracks emerged where molten volcanic material solidified. In places where the volcanic rock was less resistant to erosion than the bedrock, the sea carved deep, narrow gullies.

The long, steep decline of the Bloody Bridge River gives it the power to erode a wider valley than seems appropriate to its 'usual' size. A few hundred yards north lies a deep chasm, Maggie's Leap. Chased by a man while carrying a basket of seagull eggs, Maggie survived a death-defying leap over it without breaking a single egg.

The remote coves along this shoreline were once used by smugglers, furtively bringing tobacco, brandy, salt and sugar ashore in the moonlight, to be packed on donkeys and led up along the Bloody Bridge River to the Brandy Pad, the smugglers' route across the Mournes.

The diverse habitats along this beautiful coastal walk produce a large range of wildflowers and plants, from the Purple Pimpernel and sweet smelling bog myrtle shrubs.

The ruins of the medieval St Mary's Chapel can also be seen on the south side of the bridge and a small section of the Coastal Path.



Annalong Marine Park & Cornmill

Bloody Bridge

Newcastle Harbour

Maggie's Leap

discovernorthernireland.com/mournes



Interpretation panel at Bloody Bridge

9 Delivering Interpretation

This section presents an interpretation programme for Mourne Cooley Gullion using the themes and storylines proposed in section 8 above and identifying both off-site and on-site media.

9.1 The interpretive approach for Geotourism

Geology is not an easy subject for most people to understand. Geological processes, that might involve major changes in land forms over millions of years, are even more difficult to comprehend. The land is how it is – how could it have been so different in the past?

Conveying the stories of how the Earth has changed over millions of years, in a way that most people can understand, is challenging. Often, the processes are described most comprehensively using technical terms that are used by academics and professional geologists but are incomprehensible to the layperson. Many of these processes can be described much more successfully, and much more understandably, through the use of graphics and animations, providing a visual expression of change over time. One key is to show how geology relates to tangible objects and places, and to the lives of local people and visitors. Another is to link geology to the enjoyment of visiting places, and driving and walking through landscapes. A third is to show how this region compares with other parts of the world at present.

Our approach to interpreting the geological processes that shaped, and continue to shape, Mourne Cooley Gullion involves extensive use of graphics and animations that can be accessed through digital media. Central to our proposed programme is a multimedia digital presentation that encapsulates the 400 million year story in a series of animations and 'comic strips' that clearly show how the landscape has evolved. The illustrations and graphics developed for this presentation will then be used throughout other interpretive materials that would include an interpretive map leaflet, interpretive panels, booklets and posters.

The twelve geological sites identified by the project, in the three project areas, represent some of the key geological stories of the region. For the purposes of planning interpretation media we have split Spelga and Silent Valley into three sites – Spelga Dam, Silent Valley and Binnian Tunnel. We have also split Whitestown to Templetown into two sites and added Clermont Cairn, which is within Ravensdale Forest Park. We have split the Omeath site into Omeath village waterfront and Omeath Windy Gap. In the Gullion area we have added Cam Lough car park as a site, as it has better accessibility for interpretation than the nearby Cam Lough Quarry. The Slieve Gullion site has been split into Slieve Gullion Courtyard and Slieve Gullion Forest Drive as there will be different types of interpretation in each. Bernish and Ballymacdermot are also regarded as separate sites.

In addition to the above we have proposed three other sites that could become important locations for interpretation. These are Castlewellan Forest Park and

Tollymore Forest Park in the Mourne area and Cam Lough Car Park in Gullion. These sites are popular visitor facilities and are close to some of the geological sites. Installing interpretation at these sites will help to introduce new audiences to geology in the area.

With all these divisions and additions there are now 22 sites for consideration for interpretation although we are not proposing interpretation to be installed at every site.

In 9.3 below we present our interpretive programme for Mourne Cooley Gullion. It consists of 24 interpretive projects that are prioritised for action. Many of these projects are then arranged as a sequence of activities in 9.4 that shows what visitors are able to experience **before** they visit, as they **arrive**, **during** their visit and **after** they have left. This is a useful structure to understand how interpretation can be used by visitors, and could provide a basis for future and broader visitor experience plans which have been employed successfully by the USA's National Park Service. Finally, we provide details in 9.5 on how interpretation can be provided at each site.

At the end of this plan we provide sample designs for leaflets, brochures, panels and orientation signs as examples of the type of materials that could be produced for Mourne Cooley Gullion.

9.2 Interpretive approach for geological sites

We have identified three different categories for on-site interpretation – 'main hubs', 'mini hubs' and individual geological sites. There are four '**main hub sites**' for each of the three areas – two for Mourne and one each for Cooley and Gullion – that will tell the main stories for that area and explain the location and nature of the other sites, and give information about other tourist facilities for the area. These sites have been chosen as they are already popular visitor attractions with a high footfall and act as the main 'gateways' to other sites in the area. The main hub sites will provide small outdoor interpretation centres for geotourism.

'**Mini hubs**' support the main hubs and tell some of the key stories. They are at Castlewellan Forest Park, Tollymore Forest Park, Templetown beach car park and Camlough car park. These are also popular destinations. Their purpose is to provide interpretation for the geology of the area, though at a smaller scale than the main hubs.

Sites are of local interest. Some, but not all, will have on-site interpretation. Interpretation is not proposed for sites that already have adequate interpretation, such as Bloody Bridge, or where there is poor public access, such as Cam Lough Quarry and Gap of the North.

The arrangement of the sites is summarised in the following tables.

Mourne

Silent Valley	Main hub
Spelga Dam	Main hub
Castlewellan Forest Park	Mini hub
Tollymore Forest Park and caravan park	Mini hub
Binnian Tunnel	Site
Slieve Croob, including Windy Gap, Dree Hill and Slievenaslat	Site
Bloody Bridge	Site
Mourne Coast including Greencastle, Annalong and Kilkeel	Site

Cooley

Carlingford King John's Castle or new TIC	Main hub
Templetown	Mini hub
Whitestown	Site
Ravensdale Forest	Site
Clermont Cairn	Site
Omeath Windy Gap	Site
Omeath village waterfront overlooking Carlingford Lough	Site

Gullion

Slieve Gullion Courtyard	Main hub
Cam Lough car park	Mini hub
Cam Lough Quarry	Site
Bernish	Site
Ballymacdermot	Site
Gap of the North	Site
Slieve Gullion Forest Drive	Site

9.3 Interpretation programme for Mourne Cooley Gullion

Our proposals for interpretive media are presented in the table below. Each item is briefly described and prioritised and an indicative cost is provided to give an indication of the likely budget required. We recommend that the proposals are regarded as a 'shopping list' of ideas from which items can be chosen for delivery as time and budgets allow. We would strongly recommend, though, that the priority 1 items are delivered as an integrated suite of interpretation as early as possible.

No	Media	Description	Priority	Indicative cost £
1	Website	Develop a more comprehensive website with simpler explanations of geology, geomorphology and archaeology, interactive pages suitable for children and young adults and the capacity for downloading digital guides and presentations. The website should include other media proposed below such as animations from the digital download, the short film and educational materials for teachers. The website will also include detailed tourist information links – see 10.2 below – as in other successful geoparks.	1	5000
2	Geology information 'cut and paste' paragraphs and panel text	Prepare a series of short explanatory paragraphs and images, including simple maps that can be updated easily, and that can be used by other organisations in their tourism, interpretive and marketing materials to explain the geology of the area. These paragraphs will be extremely valuable for all organisations wishing to include geology / geotourism in publicity and interpretation materials and want a clear and simple explanation of the significance of geological processes in this area. Panel text could also be provided for existing and new exhibitions such as a new panel for the Spelga Dam visitor centre exhibition and content for the Annalong Corn Mill exhibition currently being developed.	1	In-house
3	Face of Geology	Develop 'virtual ambassador' characters that will feature in interpretation materials including the interpretive map, the Geo-walks guide, the digital download and the Schools and Young People packs. These could	1	1500

		include a cartoon character for use in interpretation for children and one or two illustrations of geologists – maybe both male and female – for use with other interpretation.		
4	Social Media	Maintain and develop the Facebook page. Establish a Twitter feed to advertise events, Geo fact of the day/week etc. Cost calculated at around £50 per hour for 3 hours per week, per year.	1	7800 per year
5	Introductory leaflet / bedside browser	A simple 2 fold A4 leaflet to be used in local accommodation as a bedside browser, and as a simple introduction in information centres etc. Print publicity remains strong throughout Ireland. This leaflet is low cost and would give web site information etc and an introduction to geotourism and its local facilities. Print 10,000 in year one and then as necessary.	1	2500 in year one and then as necessary
6	Interpretive map for the whole area	Produce an A2 size interpretive map leaflet with introduction to geology of the area and a map that shows what's where. This will be the principle paper interpretive leaflet for the geotourism area, aimed at visitors of all ages. It will also be suitable for local people who are interested in their area. Print 10,000.	1	11,000
7	Hub-site interpretation	An 'interpretive pod', consisting of a set of linked interpretive panels providing a welcome and introduction to the Mourne Cooley Gullion area plus an orientation map showing the local area and the key geological sites. The panels should be mounted in an attractive sculptural frame that reflects the characteristic geological features, archaeological significance and landscape elements of the area. Each of the hub sites should also have a selection of large, "touchable" pieces of rock demonstrating the main rock types of the three areas arranged into a landscaped setting around each of the interpretive pods. <ul style="list-style-type: none"> • Silent Valley and Spelga Dam. One 'interpretation pod' at each site with explanations of the geology of the Mourne, local sites of geological and archaeological interest to visit and other places to see 	1	40,000

		<p>and things to do.</p> <ul style="list-style-type: none"> • Carlingford King John's Castle. One 'interpretation pod' in the 'green plateau' area next to the castle or by the newly converted Tourist Information Centre building, with explanation of the main geological processes of the Cooley area, the geological and archaeological sites of interest and other tourist facilities. • Slieve Gullion Courtyard. One 'interpretation pod' in the Courtyard car park with explanation of geological processes in the Slieve Gullion complex, the geological and archaeological sites in the Gullion area and other places to visit. 		
8	Interpretive panels	<p>We suggest a limited installation of interpretation panels at selected sites and where possible these panels could be set into picnic tables, boulders or other facilities, such as existing walls, to reduce their visual intrusion.</p> <p>Mourne</p> <ul style="list-style-type: none"> • Slieve Croob. A picnic table panel explaining geology of the area. • Binnian Tunnel. A standard panel at each end of the Binnian Tunnel explaining the geology of the valley, the creation of the dam and the function of the tunnel. • Castlewellan Forest Park. A standard panel with an introduction to the area and orientation map. • Tollymore Forest Park. A standard panel with an introduction to the area and orientation map. <p>Cooley</p> <ul style="list-style-type: none"> • Ravensdale Forest. A panorama panel explaining the geology and view from the car park. • Clermont Cairn. A panorama panel explaining the geology and the views of the Ring of Gullion from the top of the hill. • Omeath village waterfront. A standard interpretation panel explaining the creation of the Mourne Mountains and Carlingford Lough. 	1	<p>5 Picnic table panels 17,500 (£3500 each)</p> <p>12 standard panels 36,000 (£3000 each)</p>

		<ul style="list-style-type: none"> • Omeath Windy Gap. A standard panel in the car park to explain the geological processes that created the fissure here. • King John's Castle. A standard interpretation panel in the lay-by explaining intrusions into metasedimentary layers. • Templetown. A standard panel explaining limestone and glacial deposits, and the effects of erosion by the sea. <p>Gullion</p> <ul style="list-style-type: none"> • Ballymacdermot. A standard interpretation panel explaining geology and archaeology. • Bernish. A picnic table panel or sculptural panel explaining geology and geomorphology. • Cam Lough Car Park. A standard interpretation panel or picnic bench panel explaining quarry geology and other sites. • Slieve Gullion Forest Drive. A series of three panels on picnic tables explaining the geology of the Ring of Gullion. 		
9	Schools and young people's packs	<p>This action maintains and builds on the current schools' programme. Offer curriculum-linked materials and activities on the website, and classroom resources such as a geology poster. Include downloadable resources for teachers and pupils particularly Key Stage 2 in Northern Ireland and its equivalent in the Republic of Ireland.</p> <p>A significant element of the digital download resource should target children and young people with the Virtual Geo Ambassador fronting activities and Geo Games.</p> <p>Non digital provision could include a Letterbox style activity where participants collect Geo Stamps in a Geo Passport, Geo colouring sheets for younger children, Geo Sticker story book, Rock Star stickers and Rocky Roadshows at selected locations where children can become 'Rock Stars' and 'Rock Hounds'. Adapt the concept of Watch Groups to develop Rockwatch Groups.</p>	1	10,000
10	Activities and	A programme of events and activities led by the Geotourism project, the Geo-ambassadors or a legacy organisation, to build on events that have	1	20,000 per

	events	<p>already taken place. Activities and events should include:</p> <ul style="list-style-type: none"> • Guided walks and tours. • Talks at sites and village halls, community centres, etc. • Fun events for the family with geo-games, etc. • Coach tours. • 'Touch the Rock' event/activity for families, maybe at Cam Lough Quarry. • Geology trail on a stone wall, castle or church wall. • High res geology – see the rocks in close up. • A touring exhibition travelling around the area and more widely in Northern Ireland and the Republic of Ireland. 		year
11	Digital download	<p>A multi-layered digital presentation/programme with animations of the geological processes and interactive interpretation of archaeology, contemporary stories of the landscape, local people, themed trails, music, myths, kids activities, games, etc. The presentation would be usable on tablets, smartphones and Mac/pcs. The download could include Augmented Reality software to interpret the geology and geological processes of selected views. The download would feature:</p> <ul style="list-style-type: none"> • Maps and route guides. • Augmented Reality (AR) landscape images highlighting geological features and points of interest, including volcanoes ice sheets and mammoths. • Animations of geological processes such as intrusion and subduction. • Film clips where possible. • Archival material such as old photographs, newspaper articles/reports, interviews. • 'Rock Stars' - Interviews with those who work with/on rock. • Children's geology explorer activity featuring a cartoon geologist character. 	2	70,000

		<ul style="list-style-type: none"> • A cartoon graphic story of the geological processes that created the Mourne Cooley Gullion landscapes • Geology game based on geo-caching but geology-caching. • Audio of local myths/legends/stories. • Audio of a geologist explaining geological features and processes. • Audio – music/song. • Links to further information including academic papers, etc. • Themed tours – for walkers, cyclists and car-drivers. 		
12	Promotional film	A short promotional film showing the iconic sites of the Mourne Cooley Gullion area to encourage tourists to visit these sites. The film would be shown at Tourist Information Centres and also would be available through YouTube. The film would show images of the landscape of the area and specific geological and archaeological features and could also use some of the animations and film clips from the digital download above.	2	8000
13	Road signage	Not strictly an interpretation device, but an essential enabling mechanism for interpretation, and an important on site marketing tool. Price cannot be calculated without detailed survey, and knowledge of existing sign poles which could be used for additional signs.	1	To be advised
Total for Priority 1				£229,300
14	Geo-walks guide	An A5 walks guidebook with walks at a selection of geological sites. The guide and explanations should be concise and clear, with photographs and illustrations and include a short introduction to the geology of the area. The guide will use the virtual ambassador developed above. Print 2000.	2	8000
15	Geological Field Guide	A revised and up-dated and more accessible field guide to Cooley, Gullion, Mourne and Slieve Croob for use by schoolteachers and youth group leaders. Provide as a downloadable document on the website. Castle Roche could also be added to the guide.	2	3000

16	Geology Geo-caching activity	A purpose made exploration game similar to geo-caching where people use clues to find objects, or maybe geological features, in the landscape, with the help of GPS devices. The game can be as simple as providing self-guided 'treasure hunt' clues with a tick box and stamp for each feature or more complex that is linked in with the geo-cache websites.	2	5000
17	Posters, postcards and large scale graphic images	A series of posters with iconic images, maybe similar to traditional railway posters and possibly including a 'time-travelling family' looking at the creation of geological features. A limited series of postcards using the same images as used in the posters above. Simple high quality graphic images of the iconic sites within the area can also be produced for use in the Banbridge Outlet and other centres in Belfast, Dundalk and Dublin, Tourist Information Centres in the area and at other visitor attractions such as cafes, restaurants and hotels.	2	12,000
18	Geosite calendar	A calendar with images of 12 sites and brief explanations of their interest/importance. Print 1000.	2	4000
19	Mobile exhibition	A mobile pop-up banner, or series of banners, and a mobile exhibition would be extremely useful to accompany events, guided walks and tours and other activities. The banners should use high quality, high res photographs of the area with minimal accompanying text. They can be used at Tourist Information Centres, hotels and hub sites. The mobile exhibition can also be used in shopping centres, libraries and other places where people congregate. Suggest 5 panels.	2	7500
Total for Priority 2				£39,500
20	Sculptures and murals	<p>A range of geology themed interpretive sculptures and murals to be installed at selected sites, including:</p> <ul style="list-style-type: none"> • Slieve Croob. A panorama sculpture showing the distant landscape of the Mourne Mountains. • Silent Valley. A sculptural feature illustrating the valley and the dam. • Spelga Dam. A sculptural feature illustrating the dam and its location 	3	70,000

		<p>in the valley.</p> <ul style="list-style-type: none"> • Omeath Windy Gap. A sculptural feature at ground level showing the fault line. • King John's Castle. A castle model in stone in its original condition, and a panorama cut-out in metal showing the Mourne Mountains. • Whitestown to Templetown. A mural on the car park wall at Templetown illustrating life in Carboniferous times. • Slieve Gullion Courtyard. A sculpture of the ring dyke. <p>Sculptures and murals are proposed mostly for Cooley and Gullion as there are already a number of public art installations in Mourne.</p> <p>Murals and other installations could include skyline silhouettes at selected places, such as the view of the Mournes from Omeath waterfront and the view of Cooley from Rostrevor and Warrenpoint.</p>		
21	Play equipment	Install geologically themed play equipment in Slieve Gullion Courtyard and Silent Valley with accompanying explanations and fun activities aimed at young children.	3	Discuss with contractors
22	Geogarden	A landscaped garden illustrating geological processes and including sample rocks from the area. Suggested sites include Silent Valley, Slieve Gullion Courtyard, King John's Castle Carlingford and Castlewellan Forest Park.	3	7000 each
23	Visitor centre	There may be opportunity to develop a visitor centre at a suitable location – maybe at the Ring of Gullion – at a later stage if there is perceived demand for such a facility.	3	To be advised
Total for Priority 3				£77,000
		<p>Total indicative cost of interpretive and aspects of the marketing programme delivery, ex VAT</p> <p>This figure includes all items above, including lower priority items and one year of providing social media and events</p>		£345,800

9.4 The ‘flow’ of interpretation for the visitor

Visitors will use interpretation from different sources at different stages of their visit. These sources are likely to be:

Before

- Website linked to other relevant websites such as district and county Tourist Information Centres (TIC), Fáilte Ireland, touring sites, Lonely Planet, Expedia, etc, with downloads, etc.
- Introductory leaflet in bedroom browsers.
- Interpretive map leaflet – available from tourist information centres, airport, stations, ferry terminal, etc
- Digital download – downloadable at any time before, during and after their visit wherever there is an internet connection
- Social Media - Facebook page and Twitter feed with regularly updated information about events, activities and experiences.

Arrive

- Posters, introductory leaflet, interpretive map leaflet, posters, calendar, postcards, pop-up banners should be available at tourist information centres including Newcastle, Newry, Dundalk, Carlingford, Kilkeel, Banbridge, Warrenpoint, Newgrange, Titanic and Belfast Visitor and Convention Bureau.
- The interpretive map, interpretation pods and event/activity starting point at the main hub sites - Silent Valley and Spelga Dam, Slieve Gullion Courtyard and King John's Castle, Carlingford.
- Interpretive map leaflet available in a bedroom browser in all tourist accommodation rooms.

During

- Take part in an activity
 - Guided walk
 - Children's discovery pack activity
 - Guidance to viewpoint
 - Park up and visit
- At each hub site – take a walk, cycle, enjoy an activity, event or family day, read a panel, or meet an ambassador
- Use the downloaded material and Augmented Reality where appropriate
- Read the booklet about the geology of the area.

After

- Feedback through social media such as Facebook and sites such as Trip Adviser
- Provide opportunities for follow-up e.g. links to other websites, associated geological locations etc
- Provide facility for posting up pictures and accounts of experiences on the Geo website and/or Facebook page
- Offer a brief on-line questionnaire to encourage visitor feedback about their experiences, enjoyment and suggestions
- Postcards and other Geotourism souvenirs to take away

- Continue to use Digital Download

The interpretation programme, including stories and media, will be applied in the following way to each of the geological sites.

9.5 Interpretation at each site

In this sub-section we propose how interpretation can be presented at each of the geological sites.

Mourne

Slieve Croob

Main stories

- Magma intrusions into Silurian metasedimentary rocks from the closing of the Iapetus Ocean.
- Relationship between geology, geomorphology and agriculture.
- Archaeological remains of Neolithic portal tomb and a souterrain.
- Local granite used in construction of Albert Memorial, London, Newry Cathedral and Dundalk Courtyard.
- Slieve Croob is the source of the River Lagan.

Programme of interpretive media

- Augmented Reality (AR), animation and audio element in the digital download touring guide highlighting key features relevant to the Atlantic Ocean story and explaining geomorphology and land use.
- Review existing on-site interpretation at Windy Gap and investigate combining the current two panels into one piece of on-site interpretation supported by tablet download.
- Install an on-site interpretation panel at Lighthouse Road viewpoint on a picnic bench.
- Install a panorama sculpture showing the landscape of the Mourne Mountains.
- Stopping point on the geology geo-cache.

Spelga Dam and Silent Valley – Main hub site

Main stories

- Origin of the palaeogene granites and their impact on agriculture and water.
- The effect of glacial erosion in creating the valleys and exposing the underlying metasedimentary rocks.
- The Mourne Mountains, with the granite substrate and glacier cut valleys, are an ideal place to build dams and construct reservoirs. The construction of the Binnian Tunnel allowed water from the Analong River to flow into Silent Valley reservoir.

- Granite extraction has been a major industry for centuries. Granite from the Mourne was used in construction of the Albert Memorial, London, and Newry Cathedral.
- The work of the geologist in studying geological formations and contributing to major engineering works.

Programme of interpretive media

- Review current on-site interpretation at Spelga Dam, retaining historic bronze plaque commemorating the building of the dam.
- AR, animation and audio element in the downloadable touring guide highlighting key features including the origin of the granites, effects of glaciation and reasons for building a reservoir here.
- Install hub-site 'interpretation pods' at both Spelga and Silent Valley with interpretation of geology, landscape and tourism facilities.
- Install on-site standard interpretation panels at each end of Binnian Tunnel explaining the construction of the tunnel and its functions.
- Use archive material to interpret the construction of the Binnian Tunnel.
- Stopping point on the geology geo-cache.
- Include more geological interpretation in Northern Ireland Water's downloadable podcasts.

Castlewellan Forest Park and Tollymore Forest Park – Mini hubs

The two Forest Parks are popular visitor facilities on the north side of the Mourne Mountains. The forest parks should be 'mini-hubs' for geotourism, installing interpretation about the geology and archaeology of the Mourne and Slieve Croob.

Main stories

- Devonian magma intrusions into Silurian metasedimentary rocks from the closing of the Iapetus Ocean.
- Relationship between geology, geomorphology and agriculture.
- The effect of glacial erosion in creating the valleys and exposing the underlying metasediments.
- A range of enclosures, stone structures and tree rings provides evidence of human settlement in the Mourne.

Programme of interpretation media

- AR, animation and audio element in the digital download touring guide highlighting key features relevant to the Atlantic Ocean story and explaining geomorphology and land use.
- Install standard interpretation panels explaining geological processes, features of archaeological interest, the sites that can be visited in the Mourne area and other facilities for tourists.

Bloody Bridge

Main stories

- The intrusion of Palaeogene magma during the birth of the North Atlantic Ocean and the exposure of underlying Silurian metasediments on the coast.

- The formation of valleys during glaciation and the cutting of glacial deposits by the river, which can be clearly seen in river bank.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the closing and opening of the oceans and glaciation.
- No other on-site interpretation is proposed as this is already provided in existing panels.
- Stopping point on the geology geo-cache.

Mourne Coast

Main stories

- Silurian sediments from the Iapetus Ocean can be seen intruded by granites at the time of the opening of the Atlantic Ocean.
- This is a place where you can see rock formations created at different times over millions of years lying side-by-side.
- Ports and harbours along the Mourne coast were essential trading places from at least medieval times, allowing people to transport goods along the Irish coast and across the sea to Britain and the rest of Europe.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the opening of the Atlantic Ocean.
- Interpretation should be provided for the new exhibition at Annalong Corn Mill, in partnership with Mourne Heritage Trust, and could also be provided for Greencastle, in partnership with the Northern Ireland Environment Agency.

Cooley

Ravensdale and Clermont Cairn

Main stories

- The A1/M1 road cutting shows evidence of the opening of the North Atlantic Ocean with contact between the Silurian metasediments, the Devonian Granodiorite and Paleogene ring dyke.
- Views from Clermont Cairn of Slieve Gullion, the Mourne Mountains, Carlingford Lough, the plains of Meath and Dundalk Bay. Potential for graphic reconstruction of the formation of the ring dyke. It is also the site of the RTE transmitter mast.
- A Neolithic passage tomb on the summit of Black Mountain and its alignment with other Neolithic sites in the Ring of Gullion provides evidence of significant human settlement.
- The valley here was, and still is, a busy transport route, allowing trading between north and south.

Programme of interpretive media

Existing interpretation materials need review and rationalisation. On-site interpretation is possible in both the car park and at the viewpoint on the top of the hill.

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the opening of the Atlantic Ocean. This element should also incorporate images of views from the top for those who cannot access the footpaths.
- On-site geology panoramic panel at the viewpoint on Clermont Cairn showing geological features and the locations and significance of passage and court tombs in the Ravensdale and Gullion areas.
- On-site sculptural panorama of the view from Ravensdale car park.
- Stopping point on the geology geo-cache.

Omeath to Windy Gap

Main stories

- This area is a good example of how the geology and geomorphology affects the lives of people with grazing on the lower-fertile granite based soils on the hills and agriculture prominent on higher-fertile metasediments in the valley.
- The 'gap' of Windy Gap is a fault zone juxtaposing different rock types against one another.
- From Omeath waterfront the landscape of the Mourne Mountains is clearly evident with granite massif incised by glacial valleys.

Programme of interpretive media

Remove or rationalise the existing panel if possible.

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the fault zone, closing of the Iapetus Ocean and land use. Include audio stories of the Long Woman's Grave and the story of Maeve's army from the 'Tain Bo Cuailgne'.
- Re-design the sitting/picnic area with paving to illustrate the position of the fault zone.
- There is scope for an interpretation panel along the road to the north at Tulloghomeath where a narrow river exploits a wider ice-cut valley.
- Install an interpretation panel at Omeath village waterfront explaining the creation of the Mourne Mountains and Carlingford Lough.
- Stopping point on the geology geo-cache.

King John's Castle, Carlingford – Main hub site

Main stories

- Metasedimentary rocks intruded by igneous rocks following the opening of the Atlantic Ocean forming a promontory.
- The metasedimentary rocks here show ripple marks that formed as the sediments were laid down in the closing Iapetus Ocean.
- There is a close relationship here between geology and archaeology, where the promontory has provided a strategic location for the castle.

- King John's Castle was a crucial defensive settlement dating from the early years of the Anglo-Norman settlement.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting the key features relevant to the creation of the promontory.
- Install 'interpretation pod' in the green plateau beside the castle with interpretation of the geological sites in the Cooley area, other sites of interest and other facilities for tourists.
- Install a castle model in stone and a Mourne Mountains panorama in cut-out metal within the green plateau area, beside the pod.
- Install an interpretation panel in the lay-by, interpreting basalt intrusions into metasedimentary layers.
- Stopping point on the geology geo-cache.

Whitestown to Templetown – Mini hub site

Main stories

- Fossil-rich Carboniferous limestone laid down when Ireland was a tropical paradise.
- Glacial activity showing deposits of sands, gravels and ice-carried cobbles from further north.
- The association of the area with the Knights Templar and prominent Norman families illustrated by the church and graveyard.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the deposition of sedimentary rock and subsequent glacial activity.
- Templetown Beach is a mini-hub site. Install an interpretive panel explaining that Ireland had a tropical climate. Install a mural on the car park wall illustrating life in Carboniferous tropical seas and explaining the process of deposition. Moulded relief fossils could be incorporated into the mural to offer a tactile experience.
- Use Templetown as a hub for walks, activities and fossil hunting.
- Stopping point on the geology geo-cache.

Gullion

Gap of the North

Main stories

- Glacial cut passage through the ring dyke which created access through the natural barrier of the mountains of Mourne, Cooley and Gullion.
- Archaeological sites spanning a thousand year period.

Programme of interpretive media

This site lends itself to mobile interpretation as there are few convenient stopping places for on-site interpretation

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to glacial processes and the development of the gap as an access route.
- No other on-site interpretation is proposed here due to limited parking and poor access to the site.

Slieve Gullion – Main hub site

Main stories

- The nature of the Slieve Gullion complex including the effects of shearing and rifting of the Earth's crust during the early creation of the Atlantic Ocean.
- The creation of the ring dyke from the intrusion of magma and the evidence of the dyke today.
- The myths and legends of the region that explained the effects of the geological processes.

Programme of interpretive media

There is scope at Slieve Gullion to create more stopping points along the forest drive to incorporate viewing points, listening points or on-site interpretation.

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the creation of the ring dyke and the Finn MacCool legend.
- Install a main hub site 'interpretive pod' in the Courtyard car park with explanation of geological processes in the Slieve Gullion complex, the geological sites in the Gullion area and other places to visit.
- Install an interpretive sculpture of the ring dyke.
- Along the forest drive install a series of three interpretive panels in picnic tables, explaining the succession of geological processes here.
- Stopping point on the geology geo-cache.

Cam Lough Quarry – Mini hub site

Main stories

- The contact between Silurian metasediments and granite intrusions resulting from the movements of the Earth's crust that started the opening of the Atlantic Ocean.
- The creation of the Slieve Gullion complex ring dyke.

Programme of interpretive media

Due to the exposed nature of the site and uncertainties about its safety for visitors, no on-site interpretation is proposed. The visible geology is very obvious, clearly showing granite intrusions and these should be interpreted via a downloadable resource.

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the intrusion of granite and the opening of the Atlantic Ocean.

Cam Lough car park – Mini hub site

This car park is a popular feature and provides good views of the lough and the valley. It would be a fine location as a 'mini-hub' site for the Slieve Gullion complex, allowing visitors to learn about the geological processes that created the ring dyke and other features in this area.

Main stories

The main stories are the same as those for Cam Lough Quarry.

- The contact between Silurian metasediments and granite intrusions resulting from the movements of the Earth's crust that started the opening of the Atlantic Ocean.
- The creation of Cam Lough (crooked lake), formed originally as a fault line and then impacted by glacial activity.
- The creation of the Slieve Gullion complex ring dyke.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the intrusion of granite and the opening of the Atlantic Ocean.
- Install an interpretive panel, or picnic bench panel, explaining the geological processes that formed the ring dyke and the other mountains in the area.

Bernish and Ballymacdermot

Main stories

- At Bernish the story of the closing and opening of oceans can be told via the generations of igneous rocks.
- Glacial activity evident in the opening of a passage from Lough Neagh to the Irish Sea.
- Use of the passage as a transport link.
- Ballymacdermot has a well-preserved Neolithic court tomb which is aligned with a Neolithic monument on Black Mountain, Ravensdale, Co. Louth.

Programme of interpretive media

- AR, animation and audio element in the downloadable touring guide highlighting key features relevant to the opening and closing of the oceans and glacial activity.
- Review existing interpretation at Bernish and replace with a durable interpretation panel set into the existing granite picnic bench, or preferably one made of local stone.
- Replace picnic tables with local stone constructions.
- Stopping point on the geology geo-cache.
- Install an interpretation panel at Ballymacdermot about the Neolithic tomb and its location in the ring dyke landscape.



Gardens at The Courtyard, Slieve Gullion

10 A marketing strategy for geotourism

Tourism initiatives need marketing to bring products, people and places together. Having discussed, earlier in this plan, the size and characteristics of the market for geotourism in Mourne Cooley Gullion, and proposed a number of product development ideas, this section discusses the basic principles for marketing the several niche market products offered by geotourism development.

10.1 Guidelines for marketing

Marketing techniques for all forms of tourism have changed radically in recent years, and skilled marketing has become essential in an increasingly crowded market place. Print has declined in importance; internet use has grown; standards of presentation have improved; partnerships and linkages have become the norm.

The following overall guidelines should be considered:

- Small organizations and projects in local tourism should always, if possible, work with other local tourism providers, either through joint marketing arrangements, or by setting up web site linkages. They can thus gain economies of scale, and make valuable network connections.
- Regional, national and especially international marketing should be handled via the regional, national and international tourism organizations – in this case Tourism Ireland, Northern Ireland Tourism, Fáilte Ireland, and the Regional Tourism Authorities. Small organizations rarely have the skills, the contacts or the funds to work at national or international levels.
- An effective and well-linked product specific web site is, however, an essential starting point for marketing at all scales.
- There are numerous simple, often overlooked and low cost ways forward in marketing that can be used effectively.

10.2 A marketing strategy

Key items in a Marketing Strategy should be:

The Web site

The geotourism project currently has a web site:

<http://www.mournecooleygullion.com>

The possession of this site is a good beginning, but it is essentially a project website, and not a marketing web site. As it now stands it is rather academic, conveying technical information in a competent but dull manner. It has limited linkages. It is not a site which sells geotourism effectively. As this Interpretation Plan is implemented, it will need to change, to become more visitor orientated, to offer information on, and links to, accommodation, information on routes to and from the area, including detailed public transport information in order to fulfil the sustainable tourism remit etc.

Site descriptions need to be in more accessible English, and include items available to download with interpretation material. Three excellent geopark sites to look at for inspiration would be:

- Stonehammer Geopark, New Brunswick, Canada: the site of the 2014 Global Geopark Conference: www.stonehammergeopark.com
- The UK's Jurassic Coast site, a World Heritage Site in Dorset and East Devon: www.jurassiccoast.org
- Scotland's Lochaber Geopark: <http://www.lochabergeopark.org.uk>

The Brand Name

The site should change its name to use a memorable, descriptive brand name. Much depends on the future name chosen for the Geotourism area, or any Geopark that might be registered. That name must be easy to recall and use, and sound interesting. Note for example Waterford's Copper Coast. It ought to contain the words Geotourism region or Geopark if possible. And the name is much more important than any logo. The choice of name could be linked to a public competition, perhaps using local radio or press, in itself a useful marketing strategy, though choice of a knowledgeable and professionally experienced judging panel would be a crucial decision.

Sign Posts

The simplest and most often forgotten effective marketing tool is the signpost, drawing the passing trade's attention to an attraction, and its name, and steering customers safely in. A signing plan needs, therefore, urgent consideration as the interpretation points are established, in order to begin the consultations with public authorities that will be necessary to set up signs.

Deciding on Selling Points

Good marketing needs to use simple, clearly understood selling points throughout all materials, making it clear what customers will gain from visiting geotourism sites in general and particular. Those selling points will most probably be linked to far wider issues than knowledge of local geology, and include landscape appreciation, discovery of hidden treasures, finding the places that others do not know, and gaining enjoyment and satisfaction.

Local Partnerships

A key item within the marketing strategy should be close partnership working with other tourism providers and local authorities on a regular basis, to encourage cross linkages in web and other marketing materials, and to build working relationships, so that they understand what Geotourism is, and the geotourism team understands what tourism is about.

Bedside Browsers and print leaflets

Overnight visitors are known to spend time thinking about their next day's visits while in their beds – both late in the evening and early in the morning. A simple 2-fold A4 introductory leaflet to be left in local accommodation facilities provides the necessary

details, and can also act as print for Tourist Information Centres and as a form of visiting card if some are printed on heavier paper.

Media Links

Links should be made with local news sheets, local, regional and national newspapers, local and other radio and TV stations, should be set up to enable press releases to be sent regularly and instantly as developments take place. Most forms of media need stories – it should rarely be necessary to pay for coverage. The media links should include known names and general office addresses. They form part of a wider data base development – see below.

Data Base Development

Developing a database is vital for both the media links above and for lists of schools, walking groups, local geological and archaeological groups, etc

Targeted Campaigns

Campaigns should take place using media and data base contacts on a regular basis.

Further information about much of the above, along with some cost estimates, can be found in the table at section 9.3 earlier in this report.

10.3 Future marketing

All strategies need regular evaluation, and review. Contacts in tertiary colleges and universities, notably the College of Arts and Tourism at Dublin Institute of Technology, could help to arrange and carry out evaluation and review processes.

Geopark status should be sought when possible. It adds prestige to a project, and most critically, would allow Mourne Cooley Gullion to seek to establish a marketing, product development and purchasing group with the Copper Coast, the Marble Arch Caves, the Burren and Cliffs of Moher Geopark, and any aspiring Geotourism areas in the island of Ireland.

As the original Mourne Cooley Gullion geotourism project comes to an end, it will be essential to establish an exit strategy and residual body to maintain and update the interpretation works, and to continue product development and marketing.



Silent Valley

11 Monitoring and evaluation

Monitoring the effectiveness of interpretation materials and evaluating their impact are crucially important phases in providing interpretation. This section shows how monitoring and evaluation can be planned and carried out during and after an interpretation project.

11.1 Why monitor?

Monitoring and evaluating interpretation is extremely important for gauging how successful it is in achieving your objectives and improving its effectiveness in the future. This is especially true of this project, where marketing and interpretation are closely linked. As a precursor to monitoring and evaluation of interpretation, it is important to set targets and performance measures to give yardsticks against which to judge performance.

There are a number of challenges, though, for monitoring and evaluating the proposals in this Interpretation Plan, as many of them cannot easily be measured. For example:

- Many of the proposals involve a mix of aesthetic appreciation and perceptions principally by local people, but also by visitors, and neither of these reactions are easy to monitor, let alone measure, particularly when people are often not aware that they are reacting to, for example, a landscape of natural heritage importance or a historic landscape.
- References to responses to the landscape in informational and promotional material are likely to encourage people to consider visits to areas as well as specific sites most of which will have no formal admissions perimeter or visitor counts.
- It is notoriously difficult to determine the more personal thoughts and reactions of people (local and visiting) to the natural or semi-natural landscape, or to the impacts of geological processes in the past and, therefore, constructing a data base against which to measure future research will be problematic and expensive, as will the later research itself, although working with students could reap benefits for both sides – see section 10.4.
- The manner in which the various partners may implement all or parts of this plan is likely to be extremely varied. They will wish to target a mix of local and visiting markets and may well link their interpretation activities, or integrate them, with other activities which will make it largely impossible to undertake any monitoring and evaluation, in isolation, of the Plan's effectiveness.

It is possible, though, to judge success where new interpretive media are created and installed, whether in physical or digital form. Methods include.

- pre-testing of new interpretive media from graphic panels, installations, printed material, websites and digitally-downloaded material
- monitoring of the use of such interpretive media (including use by different audiences and those with accessibility challenges)

- evaluation of the use of different media
- evaluation of the interpretive approach as a whole.

There are many methods that can be used to undertake each of these activities and we identify a number of them below. The list is not exhaustive but indicates some of the methods that can be employed to take stock of different elements of the interpretive approach. Wherever possible, pre-change data should be obtained in order to provide for immediate comparisons and to establish base lines of 'graphs' for continued monitoring and evaluation.

11.2 Pre-testing

Pre-testing is something that many organisations fail to do because 'deadlines' are cited as the need to get things on the ground, or out in the public domain, digitally or otherwise. On the principle of 'getting it right, rather than getting it now', we advocate strongly that the Geotourism project, and / or individual partners or successor organisations in implementing this plan, test out new media before committing final expenditure and implementation work. A further benefit of this approach is in ensuring that the local community is given a chance to feed into the development process both by commenting and by participating.

In terms of printed and similar material, this process is simple and cheap with the availability of computer-derived artwork that can be produced inexpensively and, in the case of printed material, easily circulated. In the case of interpretive panels or similar media the artwork can be laminated to last for the brief period necessary to test reactions either from selected or random users / viewers, from 'focus groups' or otherwise chosen groups of people, or by other means, that ensure wide pre-implementation appraisal and approval.

Any digital materials, or downloads, should be tested by visitors and local people over a period to ensure, as far as possible, that they meet their expectations of a visit as well as meeting the aspirations of the Geotourism Project or individual partners. The same applies to websites, DVDs etc.

11.3 Monitoring

Once media are in place, then monitoring their use and / or success can be done in a variety of ways, often in conjunction with evaluation. For example, the following largely quantitative checks could be instituted:

- maintaining accurate records of questions asked as well as of material issued and advice given at information centres, public libraries, site admission points or any other place where information is sought and given
- maintaining accurate records of printed material distributed and replenished
- maintaining accurate records of publications issued, website 'hits' and material downloaded, audio / video tours / apps downloaded and comments made etc
- making observation of local people's and visitors' use, behaviour, time spent etc when viewing specific and installed media
- making observation of local people's visitors' use of printed material

- maintaining records of number of visitors to key sites and special events and activities of all kinds.

11.4 Evaluation

The more time-consuming and, therefore, more costly, aspects of the work of appraising success are those that involve qualitative research, which can include:

- face-to-face interviewing of local people and visitors at key sites who make use of interpretive media and / or attend events or guided walks / tours / trips or other activities
- distribution of questionnaires for self-completion
- use of focus groups, private and public meetings etc.
- analysis of questions asked and answered (or not) by local people and visitors at information centres and key sites
- analysis of unsolicited written communications by email, letter or otherwise

The depth of analysis of local people's and visitors' perceptions and reactions goes beyond any conventional tourism survey which seldom if ever cover interpretation, although many comments may have a bearing upon interpretation, or the lack of it. However, evaluation of this plan's implementation would make a suitable subject for a piece of more academic research as it is so bound up with local people's perceptions of their own areas.

Pre-testing, monitoring and evaluation will provide essential data and anecdotal material that will inform the development of the interpretive approach and guide it throughout its implementation over succeeding years. It is recommended that the Geotourism Project and / or its individual partners and successor organisations dedicate appropriate time and resources to the evaluation process in order to determine those initiatives that are successful in developing and maintaining the audience. This will help to ensure that resources can continue to be effectively targeted.

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Appendix 1

Summary results of consultation

The points raised during consultation are summarised below. They are not presented in any order of priority, but represent the responses received.

General points

- People living in and around Mourne, Cooley and Gullion have a strong sense of place.
- People are keen to get a general overview of the geology of their local area or an area that they are visiting, but are less interested in detailed information.
- Local people potentially have a much greater interest in the geology of their area than visitors. Once they grasp the basic concepts and geological processes, they are very interested.
- People are keen to get an understanding of the landscape, such as how and why features were formed. They are less interested in the detail or the chemistry or physics of their formation and structure.
- There is an underlying suspicion amongst local farmers, landowners and residents of any potential designation of landscape areas, stemming from serious concerns about earlier outline proposals for the Mourne Mountains to become a National Park.
- The withdrawal of funding for the Narrow Water Bridge reduces opportunities for joint, cross-border projects, although there are proposals for a ferry, which may bring other opportunities.
- The book, '*A Geological Field Guide to Cooley, Gullion, Mourne and Slieve Croob*', by Sadhbh Baxter is a key document for describing the geology of the area.

General points related to interpretation

- People are interested in simple answers to their questions, such as 'Why do those mountains stick up?'
- The '*Uncovering the Past – The Geology and Archaeological Heritage of South East Ulster*' project produced a series of panels on geology and archaeology in South and North Armagh and the Mournes. Other than the Uncovering the Past panels, geology is not a major feature in any of the current interpretation of the area, although it does feature in interpretation on websites and in publications and panels for the Mourne Mountains, Silent Valley, Spelga Dam and Bloody Bridge.
- The existing interpretation of the geology of the Mourne Cooley Gullion area is rather piecemeal and fragmented. The geological stories are not presented in a cohesive or consistent manner and there is considerable opportunity for new interpretation.
- Downpatrick has recently produced interpretation using Augmented Reality.

- There is an App. on the Mourne Heritage Trust website. Geological interpretation could be added to this.
- The experience of many partner organisations indicates that visitors are more interested in the local legends than local geology, although some walkers, especially those doing the Ring of Gullion Way are interested in landscape and geology. The Ring of Gullion Way is a 38 mile section of the 625 mile Ulster Way route.
- People are interested in Townlands, the smallest geographical division of land in Ireland, and a system that pre-dates the Norman invasion.
- Many overseas visitors are interested in genealogy, particularly visitors from the USA, Canada, Australia and New Zealand.
- There are good opportunities to interpret the geology through social media, but the experience of the key partner organisations is that this is very time-consuming and requires input on a daily basis from staff as social media need to be actively managed. This is difficult for a time-limited project such as the Mourne Cooley Gullion Geotoursim Project.
- Visitors and residents who have been involved in some way with the Geotourism Project should be able to recount their experiences using geological terms that are accurate and accessible.

Points relating to the audiences for geotourism

- There was general agreement and consensus among consultees that the audiences for the Mourne, Cooley Gullion Geotourism Project include local residents, visitors from the island of Ireland and overseas visitors. These audiences are discussed in more detail in Chapters 4, 5 and 10, which discuss audiences, product development and marketing strategies.

Points related to marketing for Mourne Cooley Gullion

- Destination marketing is the current approach to marketing by Banbridge, Down and Newry and Mourne District Councils.
- There is an aspiration for co-operation in cross-marketing the Mourne Cooley Gullion area with County Louth.
- There are opportunities to market the Mourne Cooley Gullion area at sites in the surrounding area including Belfast, Dublin and the Applegreen Services on the M1.
- The Mourne Mountains have a new brand and marketing campaign, *Make your day*, which is being very well received and is successful. There is a five-year Action Plan for the campaign. It is a comprehensive package with a Welcome Pack and a range of leaflets and other publications. The maps produced for this campaign include the Ring of Gullion as well as the Mourne Mountains.
- The Mournes are being marketed as an outdoor area for high-energy activities to increase its appeal to young adults who are interested in mountain biking, climbing and other adventure activities.
- Branding has also been successfully developed for Strangford Lough.

- The *Grow your horizons* programme is a green tourism project, which is helping local tourism businesses in the Mourne and Strangford Lough destinations develop international tourism markets.
- Mourne, Gullion and County Louth are not currently marketed as a joint area attraction by Fáilte Ireland.
- Tourism Ireland promotes the whole island.

Points relating to interpretation proposals for Mourne Cooley and Gullion

- The key interpretive stories for Mourne Cooley Gullion include water stories, Carlingford Lough, exploitation of granite, a Narnia-type landscape, maritime links, borderlands and boundaries and the Ring of Gullion being the first ring dyke in the world to be mapped in the 1870s.
- Interpretive hubs for the Mourne should include Silent Valley, Spelga Dam and Annalong Corn Mill. A new exhibition is going into the Corn Mill in summer 2014 and there may be opportunities to include geological information in the new exhibition material. There may also be opportunities for a secondary hub at Hilltown in a disused church.
- Interpretive hubs for Cooley should include Carlingford and Ravensdale.
- Carlingford is regarded as the 'Gastro Capital' of the Cooley peninsula and there are opportunities to link local food production and the geology of the area.
- Carlingford has the higher tourist footfall of Carlingford and Ravensdale and so should be the primary hub.
- Free events organised for the public have had a good take-up during the life of the geotourism project. Coach tours and Rock Camps have been fully booked. There has also been a good response for lectures and guided walks, with numbers varying from 15 to over 60 for individual events.
- The Expo 2014 event, organised by Mourne Cooley Gullion Geotourism attracted 100 people a day to Newry and its surrounding areas. It showcased the wealth of geological and archaeological features in the region and brought academics from as far afield as Sweden, re-igniting a passion for research in the area. Business interest in the event could signify greater cooperation in the future.
- It would be useful for tourism businesses in the Mourne Cooley Gullion area to have a simple geology manual about sites and features in their area.
- Public art can play a major role in the interpretation of the geology of the Mourne Cooley Gullion area.
- Interpretation can help to build the reputation of the Mourne Cooley Gullion area for world-class landscapes.

Consultation about educational materials for the Geotourism project

- The key audiences among schools are Reception to Key Stage 3, with the majority of effort concentrated on Key Stage 2 pupils, years 3-6 in primary schools in Northern Ireland and the 5th and 6th classes in primary schools in the Republic, as the demand is greatest from this age group.

- In the Republic of Ireland aspects of geology are taught within Primary and Junior Certificate Geography. Geology is a core component of Leaving Certificate Geology.
- In Northern Ireland, geology, as a stand-alone subject, is taught at only two secondary schools. Aspects of geology, though, are taught within the science and geography curricula at GCSE and A-level.
- The delivery of educational activities for the Mourne Cooley Gullion Geotourism Project is contracted out to Alison Lennon and Grace Trainor who are making contact with 70 primary schools in the project area. Each school is offered a 2 hour session covering geology and archaeology in their local area.
- Rock Camp is a week-long summer holiday activity for children aged between 7 and 13 years. It is delivered in each of the three areas of Mourne, Cooley and Gullion and ran for 4 weeks in summer 2013 and 4 weeks in 2014. It was a very successful programme, popular with children and their parents. Post camp evaluation has been very positive.
- A range of events was delivered during Science Weeks in Northern Ireland and in the Republic of Ireland. There was a good take-up from schools and positive feedback from teachers who brought their pupils to the events.
- Free Pop-up Rock events for children have been successfully delivered at W5Lite at The Outlet, Banbridge.
- Interactive educational events have had the most positive responses from children, teachers and parents.
- A Seismology in Schools programme has placed eight seismometers across the region, linking into national and global networks.
- Education programmes run by the project have been successful in engaging children in the geology, landscape and archaeology of their local areas. Their parents are now also taking an active interest in the region.

Points relating to the legacy of the Mourne Cooley Gullion Geotourism Project

- The project should leave behind a long-term Interpretation Strategy to be implemented over the next 3-5 years.
- The interpretation should be multi-layered, to cater for a range of audiences.
- Interpretation produced by the Geotourism Project should aim to introduce the geology of Mourne Cooley Gullion and tell users where they can find out more detailed information, such as through links to websites or to publications.
- The project should leave behind interpretation that is high quality and of a standard characteristic of a Geopark.
- It would be advantageous for the organisations working within the Mourne Cooley Gullion area to have access to staff with specialist geological knowledge so that this knowledge can be included in future interpretive media.
- Mourne Cooley Gullion Geotourism should lead the way in making the three areas a single, integrated destination for geotourists.

Interpretation and Orientation sign examples

These samples are intended to demonstrate the principles of good interpretive signage - based on a wide range of recent projects we have undertaken.

Welcome and orientation sign

Strong, positive welcome message.

Information arranged in visual hierarchies

Eye-catching headlines.

Design and colour palettes should all be carefully selected to be sympathetic to the locations and themes whilst being attractive to the intended audience.



Strong use of positive images. Images should attract visitors to the sign, reinforce key messages or help to explain complex concepts.

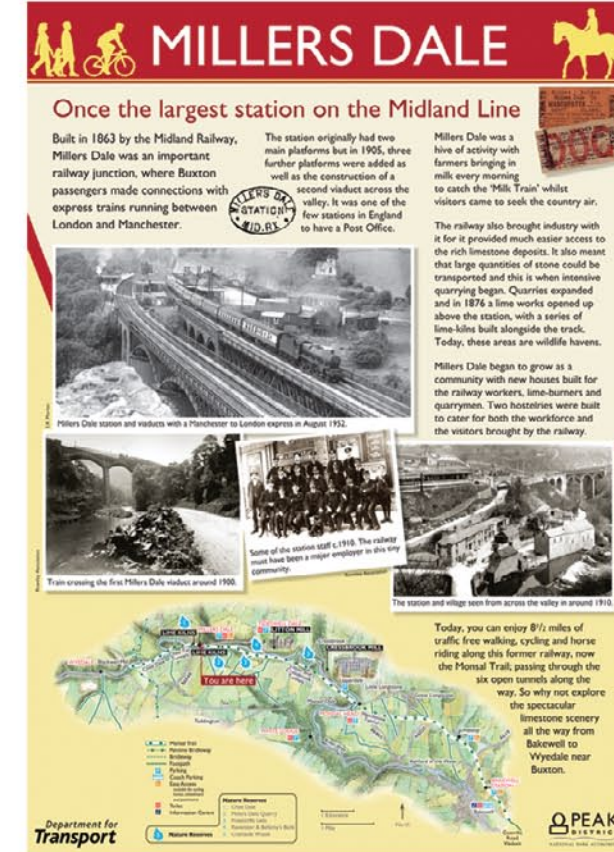
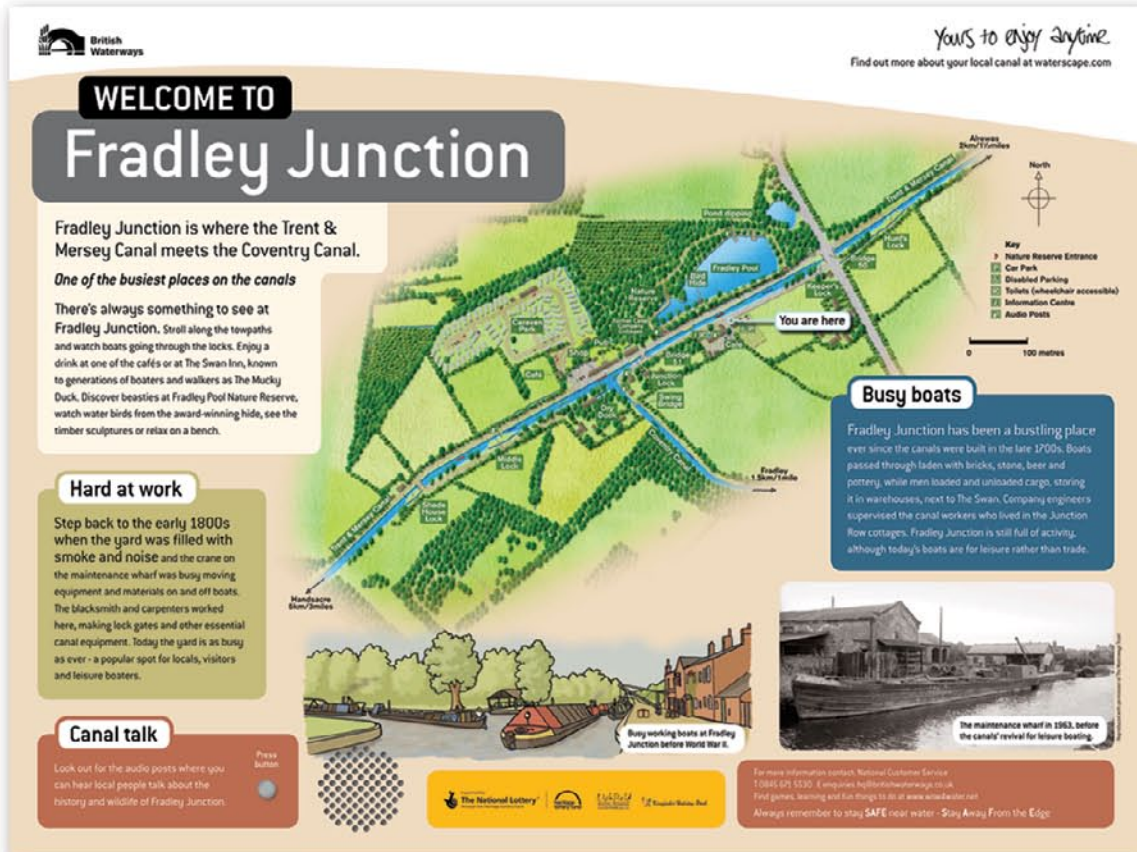
Small amounts of text tell the stories in a clear, concise and inspiring way.

Signage materials and construction should be selected to be durable and low maintenance.

User-friendly map - designed to be attractive, simple and easy to use. (Don't forget the 'you are here').

All interpretation should be designed to meet or exceed statutory requirements for equality, including making provision for a range of mobility and visual impairments.

Interpretation and Orientation sign examples



welcome to Stricklands Glen

action for
biodiversity
Water · Land · People

We aim to deliver a co-ordinated approach to conserving and promoting the biodiversity of our cross-border region

Follow the river through the glen

Bryan's Burn sparkles and tumbles through this wooded valley on its journey from Clandeboyne estate to the sea at Smelt Mill Bay. Great for a peaceful walk, this glen is also a wildlife larder and hunting ground. The trees and river are home to millions of insects, bugs and beetles, food for hungry birds and other animals.

Nifty movers

See if you can spot dippers hunting for insects around pebbles in the river. These chubby black and white birds splash around the rocks, dipping and diving into the water to catch their prey.

Harvesting trees

Hazel thrives in the Glen. Farmers used to cut it back regularly to produce a crop of long, thin and flexible sticks for stakes and hurdles. Then, as now, edible cob-nuts were a tasty bonus.

Do your bit for biodiversity:

Put up a bird box in your garden and see who moves in!

Nostalgic memories

Stricklands Glen was a popular spot back in the 1950s. See how tall the pine trees have grown in the last 60 years!

Visit these nearby wildlife sites

Glenlyon at Holywood
Whitespots Country Park at Newtonards.
Explore the North Down Coast Path at the bottom of the glen.

Find out more

Scan this QR code for more information about local wildlife and biodiversity or visit www.biodiversityni.com

European Union
European Regional Development Fund
Investing in your future

welcome to our Giant Bird Table

A flash of colour

We've planted this 'bird table' to encourage more birds to the Demesne. It's sown with oats, wheat, flax, sunflower and triticale, a cross between wheat and rye. They all produce grains or seeds, perfect for foraging birds. Watch for colourful goldfinches, tits and chaffinches. Blackbirds and thrushes snap up fallen seed and any lurking insects.

Goldfinch

Chaffinch

What's on the menu?

Crunchy oats	Tasty teasel
Juicy linseed	Tempting triticale
Succulent sunflower	

Do your bit for biodiversity:

Make your garden a giant bird table. Sow maize, sunflower, teasel and poppies for seed. Blackbirds love windfall apples.

**Bio = life.
diversity = variety.
Biodiversity:
our life support system.**

See more wildlife at:
Our Wildflower Meadow and the Pond,
here at the Demesne.

Find out more
Scan this QR code or visit
www.biodiversityni.com

European Union
European Regional
Development Fund
Investing in our future

Armagh
City and District Council



**Croeso i
Gastell
Conwy**

**Welcome to
Conwy
Castle**

 Cadw


Llywodraeth Cymru
Welsh Government

[illegible]

A wooden information board titled "Welcome to the Cressa" stands on a grassy hill. The board features a map of the Cressa area, a list of local businesses, and a list of local residents. The background shows a scenic view of the Cressa valley with a large hill in the distance.

Diarddel mynachod y Cymry wrth i fewnfudwyr feddiannu'r dref newydd

Treuliodd Edward amser a gwariodd arian i godi'r castell, y muriau a'r dref a'u llenwi â'i gydwladwyr – a hynny ar draul y Cymry lleol.

Cafodd Abaty Aberconwy, gorffwysfa frenhinol Tywysogion Gwynedd, ei anfon i'r de i Faenan a'r mynachod i'w ganlyn. Gallwch weld gweddillion eghwys yr abaty y tu ôl i'r adeilad brics coch ar eich ochr dde.

Y tu allan i'r muriau, y cyfan y gallai'r Cymry ei wneud oedd sylis i'n syn wrth i ddoddfa a siarerau wneud eu bywydau'n llawer mwy anodd.



Welsh monks moved on as legal immigrants occupy new-town

Edward spent time and money constructing the castle, walls and town and then filling it with his countrymen – at the expense of the locals.

Aberconwy Abbey, the royal resting place of the Princes of Gwynedd was shipped south to Maenan along with the monks. You can see what's left of the abbey church behind the red brick building on your right.

Outside the walls, the Welsh could only look on as laws and charters made their life a whole lot more difficult.

Follow the story

Conwy town walls – walk the best example of medieval defences in Europe.



Dilynwch y storïau

Muriau tref Conwy – dewch i droedfa'r enghraifft orau o amddiffynfa ganoloesol yn Ewrop.

Interpretation and Orientation sign examples

Welcome to The Bog

Discover Shropshire

Shropshire's lost mining village

Today The Bog is a peaceful rural hamlet but for nearly 200 years it was a busy mining village, home to dozens of families involved in mining lead ore from the rocks underground.

Standing here 150 years ago you'd have been in the middle of a working mine, surrounded by noisy steam-powered pumps, towering winding gear and ramshackle buildings. Gangs of miners would be heading to and from their shifts underground while carts were loaded with rock and ore. Lead was the most important mineral mined at The Bog, although barytes was also extracted at the beginning of the twentieth century.

When The Bog Mine closed in 1922, many of the buildings were abandoned and eventually demolished. Gradually nature has reclaimed the derelict landscape and The Bog has become a tranquil hamlet in the Shropshire countryside.

Exploring The Bog

The village school is now a Visitor Centre where you can discover more about The Bog's history and wildlife. You can also explore the area on two way-marked walks which start at this car park. Each walk is around 5 miles (8km) long. The Bog is part of the Shropshire Hills Area of Outstanding Natural Beauty.

To find out more about Shropshire's fascinating history and wildlife and how to explore it on foot, bike or horse go to: www.discovershropshire.co.uk

The Bog is part of the Shropshire Hills Area of Outstanding Natural Beauty.

The Bog is part of the Shropshire Hills Area of Outstanding Natural Beauty.

Rocks at The Bog

Shaping landscapes and lives

Mytton Flags and Stiperstones Quartzite are the two main kinds of rock found in The Bog area. Together these rocks have shaped the landscape and the lives of people who lived and worked here.

Rich pickings

The Bog owes its entire existence to lead ore and other minerals that are found in the rocks beneath your feet.

The mineral-bearing rocks, called Mytton Flags, are made of layers of silt and sands deposited at the edge of an ocean around 490 million years ago.

Earth movements caused the Mytton Flags to fold and crack.

Later the cracks filled with hot mineral-rich fluids from within the Earth. As the fluids cooled they formed veins of minerals including lead ore and barytes.

People first started lead mining at The Bog in the 1730s.

Building blocks

The Stiperstones is one of Shropshire's most distinctive landscapes - a long, high ridge topped with dramatic rocky tors silhouetted against the skyline. The 6 mile (10 km) ridge is made of Stiperstones Quartzite, a hard rock formed from white sand and pebbles. It's a tough material and was used for some of the buildings at The Bog, including the walls of the former Miner's Institute where you are now. The village school, now The Bog Visitor Centre, is also built of Stiperstones Quartzite.

Sample of lead ore, also known as galena. The lead-rich minerals were mined at The Bog, then taken away for smelting to make lead.

Mining at The Bog

Underground wealth

The Bog Mine is one of the oldest mines in the Stiperstones area. Commercial mining started here in the 1730s. Miners laboriously dug out tunnels along the veins of ore using picks and shovels. This was the start of almost 200 years of lead mining at The Bog, with several small mines operating between here and Snailbeach.

During the 1870s the Stiperstones area was one of Britain's main sources of lead. It was a highly prized metal, used for roofing and plumbing as well as paints and bullets.

The miners' work was gruelling and dangerous. A hard, wide-brimmed hat with a candle held in place with a 'gob of clay', were their only protection and source of light as they worked deep below ground.

Tunnels and engines

Three main vertical shafts. Weston's, Bunting's and Engine, were sunk to reach the mineral veins at The Bog. Horizontal tunnels or 'levels' were dug out from the shafts, as the lead ore was cut out and brought to the surface for processing.

Water was a constant problem in the mines, and the various mine owners spent enormous sums of money on machinery to pump water out of the mine and, at the same time, draw fresh air into it. Water from the mines was drained away via the Boat Level, an underground tunnel which emerged further downhill, near Stiperstones village.

Boom & bust

Although the veins were rich in lead ore, mining was not continuous; leases changed hands frequently and companies went bankrupt. Lead mining stopped at The Bog in the 1880s, but the mines were re-opened in the early 1900s to extract barytes, a mineral found with the lead ore. German prisoners of war constructed an overhead aerial ropeway to carry the barytes down to Malsheurt near Minsterley for processing. It was used in paint, paper, medicines and the chemical industry. However, mining for barytes at The Bog soon became uneconomic and production finally ceased in 1922.

CROESO I LANFA WATTON

WELCOME TO WATTON WHARF

Y rheilffordd hiraf yn y Byd!

The longest railway in the World!

In the early 19th century this was the bustling hub of a state of the art transport network, where the canal met the Hay tramway.

Although steam locomotives had already been invented they were slow to catch on, so the Hay tramway was built for horse power. In the following decades steam was perfected and slow, horse-drawn trams became obsolete.

The tramway is long gone but it represents a fascinating first step towards modern high-speed transport systems.

Beth sydd yn eich wagen chi?

Adolledwyd y gamlas a'r dramlloedd i garu myddau ar draws y wlad. Camlau a'u adeiladu oedd yn rhwyd y trwm. Roeddwn nhw'n talu tollau i gwmni'r dramlloedd a'r pris yn dilyn yr ar gyfnewid i bwyth a gha mor boll roddon nhw'n mynd. Dyna nai o'r pell myddau.

Glo ar gyfer gwas a choginio. Gallai'r gamlas a'r dramlloedd garu mwy o lawer na cheffylau pwn ac felly daeth y pris i lawer leded y tro.

What's in your wagon?

The canal and tramway were built to carry freight across country. The trams were operated by independent carriers. They paid tolls to the tramway company according to what they were carrying and how far they were going. Some of the main cargoes were:

Coal for heating and cooking. The canal and tramway could carry far more than packhorses and brought the price down throughout the area.

Limestone and lime. Limestone was burnt in limekilns to produce lime for fertiliser, whitewash and building mortar. Watton limekilns are still to be seen from the minor road behind you.

Farm produce, timber and barrels of beer were among the many other loads carried. Regular packet boats from Newport brought goods from Bristol and around the world.

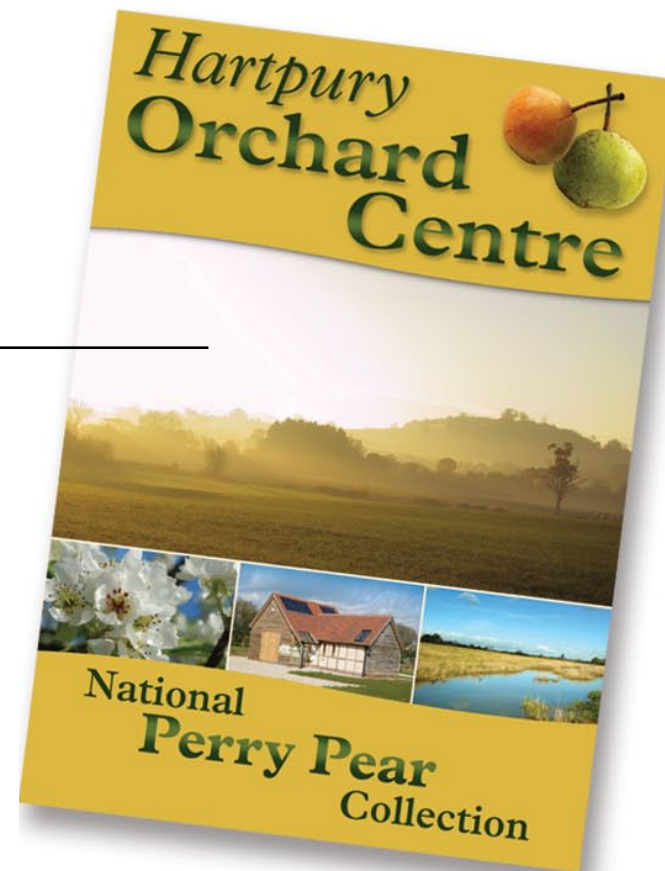
1799	1800	1812	1816	1860	1863	1865	1880	1915	1933	1966
Agar Canal & Fenny & Oswestry Canal open from Newport to Oswestry and Prestatyn.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.	Canal reaches Brecon.



Interpretive leaflet examples

These samples are intended to demonstrate the principles of good interpretive leaflets - based on a wide range of recent projects we have undertaken.

An attractive front cover is essential to encourage people to pick the leaflet up. A bold title at the top of the cover will ensure that it can be seen even when the leaflet is placed in a rack with others in front.



Information arranged in visual hierarchies



Small amounts of text tell the stories in a clear, concise and inspiring way.

User-friendly map - designed to be attractive, simple and easy to use.

All interpretation should be designed to meet or exceed statutory requirements for equality, including making provision for a range of mobility and visual impairments.

Interpretive leaflet examples

BRECON BEACONS NATIONAL PARK


Find out more

The Great Forest Geopark is within the Brecon Beacons National Park. For more information visit one of these centres:

Landowery Information Centre
This friendly centre has all the information you need about where to stay and what to do in the Geopark.
King Road Landowery, SA20 0HW. Tel: 01592 726693

The Mountain Centre, National Park Visitor Centre
Displays and friendly staff will help you to explore the area, or relax and enjoy the fantastic views and award winning tea rooms.
Llanon, Brecon, LD3 8ER. Tel: 01874 623346

Discover 500 million years of adventure!



PARC DAEAREGOL FFOREST FAWR

Craig-y-nos Country Park

Enjoy 40 acres of woodland, meadows and riverside walks in historic, landscaped grounds.
Pony-car, Upper Swansea Valley, SA5 1GL.
Tel: 01497 730935

www.breconbeacons.org
www.europeangeoparks.org
www.bgp.ac.uk



Exploring the Geopark

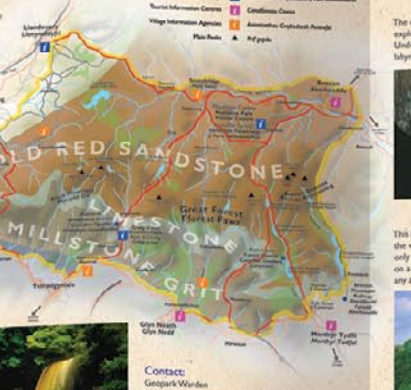
There are many ways to explore the Geopark. Visit cave networks, follow the experienced potter while the serious geologist will discover a paradise of text book features. Walkers can explore the spectacular scenery of the mountains and the waterfalls on anything from a gentle stroll to a challenging hike.

But you don't have to be adventurous or an expert to discover geology. You can see rocks everywhere, from roadside dry-stone walls to village churchyards, or even in the fireplace of a local pub!

Safety

Make sure you are properly equipped before setting off for a walk in the hills. Take care in waterwise areas. Water is often cold, deep and fast flowing and the ground is often rough and slippery.



Key

- National Park Information Centres
- Visitor Information Centres
- Village Information Agencies
- Play Areas
- Abbeys
- Cemeteries (including St. Elizabeth's)
- Cathedral Caves
- Archaeological Excavation Areas
- Religious Sites

Geopark Features

- Great Forest
- Millstone Grit
- Old Red Sandstone
- Waterfalls
- Caves
- Castles
- Monuments
- Religious Sites
- Archaeological Excavation Areas
- Religious Sites

Contact:
Geopark Warden
Brecon Beacons National Park Authority
Ply & Ffynnon, Cambrian Way
Brecon, LD3 7PW. Tel: 01874 624637
geopark@breconbeacons.org


National Geographic Centre for Wales

The caves at Dwyryd Cyn are the second way to explore the exciting world beneath the Geopark. Underground streams have created an amazing labyrinth of tunnels and caverns. Tel: 01439 735001

Carreg Cennen Castle


This is one of the most spectacular places to see the way that rocks have been used by people. Not only is the castle built from local stone, but it is built on a dramatic cliffing which would have daunted any attacker. Tel: 01558 822291.

Magnificent Mountains Wonderful Waterfalls Spectacular Caves



PARC CENEDLAETHOL BANNAU BRYCHEINIOW

Discover 500 million years of adventure!



PARC CENEDLAETHOL BANNAU BRYCHEINIOW



Magnificent Mountains
Wonderful Waterfalls
Spectacular Caves

What is a Geopark?
It includes some of the most exceptional sites in Europe. They are important for scientific, quality attractive landscapes, educational and historical or cultural interest.
Great Forest Geopark was established in 2005. The first European Geopark in Wales.

There is the Great Forest?

Great Forest, or "Flores Fawr" is the range of strata between the Black Mountain and the central Brecon Beacons. The Geopark includes the whole of the western half of the Brecon Beacons National Park.

Why is it a Geopark?

The wild mountains and hidden valleys of the Geopark are the result of nearly 500 million years of earth history. This special area contains evidence of ancient seas, mountain building and sea level and climate change scattered in a landscape that was shaped by the last ice age.

You'll find fantastic waterfalls, amazing caves and the highest mountains in southern Britain.

PARC DAEREGOL FOREST FAWR

GREAT FOREST GEOPARK

Geoparks

There are 3 main types of rock in the Geopark. They were formed at the bottom of rivers and seas, thousands of miles away and hundreds of millions of years ago. Earth's movements have gradually carried them to their present location and forced them up to form mountains.

Name: Old Red Sandstone

LOOKS like: Mostly reddish brown.

Made of: Sand and mud laid down in river beds and flood plains between 395 and 345 million years ago. Look closely and you will sometimes see sand ripples, like you see on the beach, fossilized into the rocks on some of our highest fanning slopes.

Landscape features: Flat topped mountains with steep north-facing cliffs. Some layers of Sandstone are harder than others. Soft layers have eroded away, but the hard layers are more resistant, resulting in the distinctive flat mountain tops.

Name: Limestone

LOOKS like: Grey Limestone fossil crinoids can be seen.

Made of: Accumulated remains of coral and sea shells deposited at the bottom of shallow seas between 359 and 338 million years ago.

Landscape features: Limestone is full of factories, and forms features known as limestone pavements. It also dissolves in water to reaminate and streams which trickle into the cracks have slowly created huge cave systems deep underground.

Name: Millstone Grit

LOOKS like: Similar to Limestone, but with rock and mineral bits instead of shells. Can range in colour from white to just about black.

Made of: Mud and sand that settled near the coastline and in the sea 328 to 315 million years ago.

Landscape features: The spectacular waterfalls around Ynysffawddur were formed where rivers drop off the edges of layers of Millstone Grit and have worn away soft rocks underneath.

The Icing on the Geopark

The landscape was carved into the shape we see today during the Ice Ages, from 2 million to 12,000 years ago. Glaciers carved out the valleys of the Ush, Nant, Teme, and Cwm. Rocks which were deposited along the glaciers were dropped along the sides and bottoms of valleys, or randomly scattered across the upland landscape.

Snow and ice collected on north-facing slopes.

Developed into glaciers...

...and groined away the rock's

...leaving the landscape we see today

Today

The Geopark is a treasure chest in every meaning landscape and historical significance.

1800-1900
Limestone gorges supplied water for the ironworks of South Wales.

1100-1500
Stone castles were powerful strongholds for knights, princes and warlords.

6th century BC - 1st century AD
Iron Age Celtic Salt Hills.

Around 1000BC
Bronze Age people created standing stones and stone circles.

Around 1000BC
Stone Age people began to settle in the area. They buried their dead in huge burial chambers.

2 million - 12,000 years ago
Ice glaciers carved the landscape into the shapes we see today.

500 million - 300 million years ago
The rocks that make up the Geopark were formed in tropical seas, rivers and floodplains.

The Great Forest with no trees!

In medieval times the word "Forest" meant a royal hunting ground. In places like Brecon Forest and the New Forest, they were full of trees and so the word has come to mean a wood. But the mountains of the Great Forest have been tree-less for thousands of years.

Much of the Geopark consists of rocks that were formed in shallow seas, rivers and beaches hundreds of millions of years ago.

Geopark Cross Section

Top layers of rock eroded away

North

Old Red Sandstone

Millstone Grit

Limestone

Coastal Masses

Most recent rock

Oldest rock

Rock layers covered by earth movements

South

The Black Mountain (Mynydd y Fawr)

HERIAN
HERITAGE INFORMATION

Discover the Story of Industrial South Wales

Wales, the first industrial nation

Imagine a rural landscape dotted with farmhouses and cottages, where just a few people live farming the land, and industry focuses on mountainous fells. Fast track 300 years. Something has happened in this small corner of a small country which will change the history of the world. Iron, coal and limestone have been discovered and the landscape now includes mines and quarries, iron roads and canals. Rows upon rows of terraced houses are built for the thousands of migrants who move here to work in the ironworks and coal mines, and an spectacular engineering projects connect the valleys and coastal towns.

Hamlets and villages become sprawling towns, and by 1830 Merthyr Tydfil is just the largest town in Wales, but also the iron capital of the world. For the first time anywhere on the planet the corner world shows that more people are employed in industry than in agriculture. Wales has become the first industrial nation.

Viewed from the air the topography of Southern Wales gives a clue to the mineral wealth and natural resources which made this industrial revolution happen: ironworks and coal workings close to the surface, easily flowing rivers provide power. Look closely and you can see the way the ironworks and mines, canals and railways connect to the landscape.

The great engineer Brunel gives railways, bridges and docks which span the deep valleys. Ingenious transport is invented to harness the life of the land and transport industrial goods. Canals dig the hillsides large fields feeding the ironworks and taking finished products to ports along the South Wales coast for export around the globe.

Industrialisation changes the landscape and changes lives. Towns and villages' new life, shape and growth tell stories of the collective struggle and pursuit of many. But the Industrial Revolution also brings wealth and power to South Wales, manifested in grand buildings such as Cardiff Castle, Caerphilly Castle and the Castell Coch, which continue to dominate the landscape today.

Buildings and structures stand as proud monuments to the industry of Welsh men, women and children - remarkable people who helped to transform one of the poorest areas of Western Europe into one of its richest during the 19th century.

Key

- Coal mining
- Ironworks
- Docks
- Other features
- Canals
- Railways
- HERIAN
- Historic Wales

1 National Woolen Plantation www.nationalwoolenplantation.co.uk

2 Gwent Railway www.gwentrailway.co.uk

3 Carmarthen & Gwent Railway www.carmarthenandgwentrailway.co.uk

4 Valley Industrial Museum www.valleyindustrialmuseum.co.uk

5 Port Talbot Lighthouse www.porttalbotlighthouse.co.uk

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Interpretive leaflet examples

Dulaish Valley HERITAGE TRAIL

TAITH DREFIADAETH Cwm Dulais

Discover over 2000 years of history in 20 kilometres
Cwch wrth dros 2000 o hysbysau a 20 cilomedr

Exploring The Stiperstones

Discover Shropshire

One of England's most dramatic landscapes

Shropshire County Council

Bargoed Woodland Park

Parc Coetir Bargoed

Countryside for free! Cefn gwlad am ddim!

Bargoed Woodland Park

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Interpretive leaflet examples



Prepared for the Mourne Cooley Gullion Geotourism Project by
Red Kite Environment and Anglezarke Dixon Associates

Red Kite



Red Kite Environment

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Tel: 01453 822013

Email: info@redkite-environment.co.uk

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Programme managed by the Special EU Programmes Body