

Northern Ireland's Geodiversity Charter 2021–2024



A photograph of a cave interior. A path leads through the cave, flanked by a stream of water on the right. The cave walls are covered in stalactites and other rock formations. The lighting is dim, with some blue and white lights illuminating the path and water.

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“Geodiversity is
biodiversity’s
silent partner”

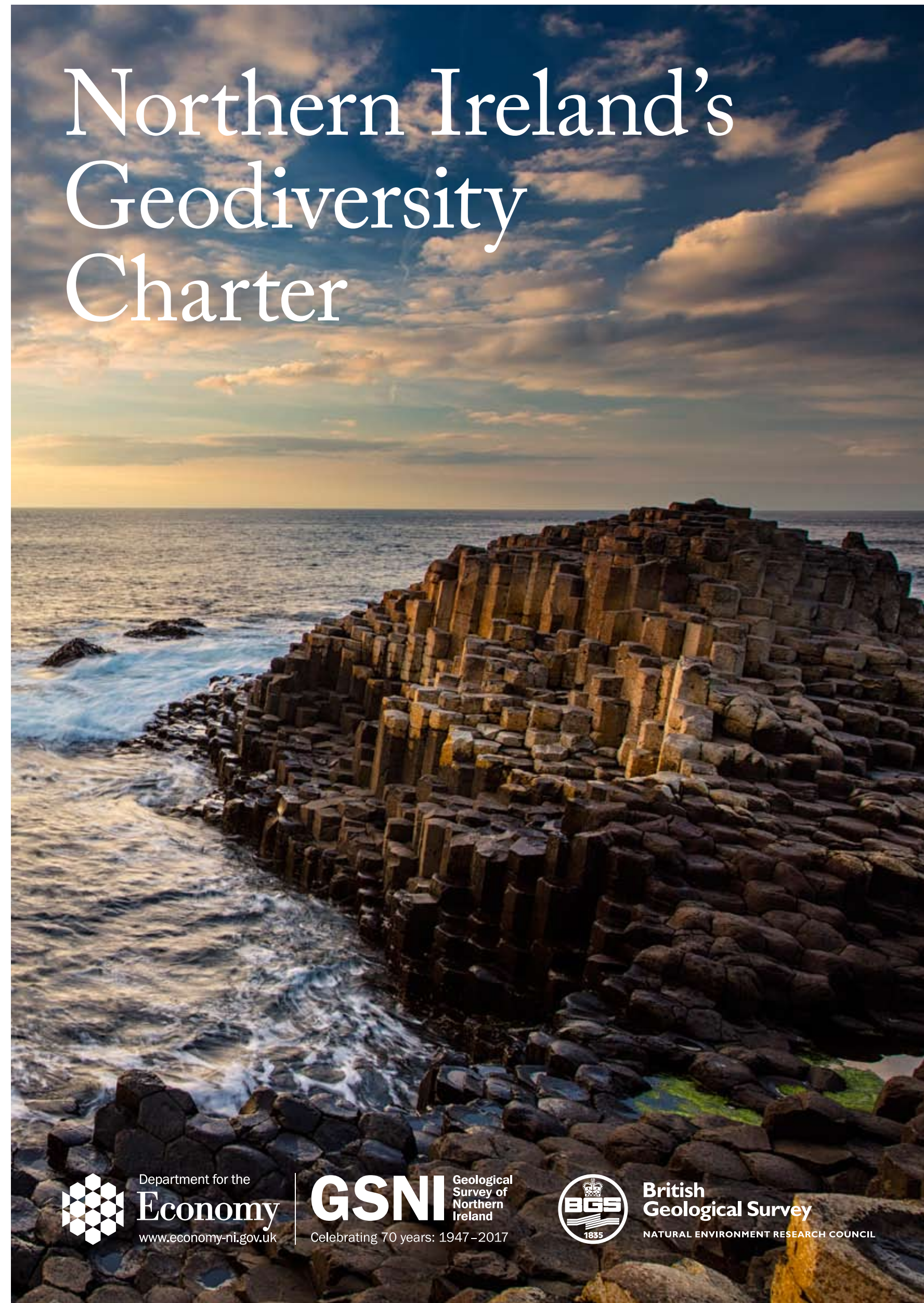
Professor Iain Stewart



INTRODUCTION

Northern Ireland for its size is one of the most geologically diverse places on Earth so it is perhaps not surprising to hear that this remarkable geodiversity has played a key role in shaping the very fabric of our daily lives. Geodiversity has not only shaped the natural and built environment, but its influence on our historical and cultural heritage, biodiversity, and its positive impacts on the economy and the environment as well as on our health and well-being means that it provides essential benefits for society.

Northern Ireland's Geodiversity Charter encourages promotion and management of our geodiversity and the integration of geodiversity into policy and decision-making. By creating a greater awareness and understanding of our geodiversity it will lead to better protection of our geological heritage and the ability to sustainably manage our natural resources, so that we can enjoy the full range of economic, social and environmental benefits it provides.



UPDATE ON NORTHERN IRELAND'S GEODIVERSITY CHARTER 2017–2020

Northern Ireland's Geodiversity Charter was launched in October 2017 and was produced by the Geological Survey of Northern Ireland with financial assistance from the Department of Agriculture, Environment and Rural Affairs through the Northern Ireland Environment Agency. When it was launched it was with the support of 25 organisations including those from government departments, local government, industry, academia, charities, NGOs and learned societies, not just from Northern Ireland, but from across the UK and Ireland.

The Charter focused on four main areas of activity: raising awareness, policy integration, conservation and research. Since it was produced there have been major successes in all of these areas, and it has been effective in augmenting the appreciation and understanding of geodiversity and its many impacts on society.

This is the first update since the Charter was published, and although all of the areas of focus are still relevant today, there is a need to provide new case studies. These not only demonstrate the varied and innovative projects and initiatives that have taken place since 2017, but it highlights the engagement and support that has been shown from across Northern Ireland.

IMPORTANCE AND VALUE OF NORTHERN IRELAND'S GEODIVERSITY CHARTER

Northern Ireland's geodiversity tells the story of nearly 1 billion years of geological history of a journey that began deep in the southern hemisphere before slowly moving northwards over time to the current position on the globe. A vast array of environments and climates, with dramatic sea-level changes, erosion and deposition, changing continents and oceans, mountain building, volcanic activity and icy wastelands, all make up the pages of this long and multifaceted story book that has led to the diversity of Northern Ireland's landscapes. It is the very foundation of our natural heritage so conservation of key aspects of this remarkable resource is important so that current and future generations can continue to enjoy its many and valued contributions to society.

An understanding of our past geological processes is critical in gaining a better understanding of the world today, as well as helping to predict what may happen in the future. These processes continue to shape the world we live in and make a significant contribution to sustainable development through its economic, social and environmental benefits for every citizen of Northern Ireland.

Geodiversity plays a critical role in Northern Ireland's economy providing vital natural resources including minerals, aggregates, and water. All of these have a critical role to play in economic development through the provision of essential infrastructure, job creation, commercial water resources, and renewable energy resources. Our geodiversity is responsible for soil formation that is essential for agriculture, and plays a vital part in Northern Ireland's booming tourism industry so it is essential that we understand and protect our geodiversity so that we can continue to manage our natural resources sustainably.

Geodiversity links people and places and nowhere is this more evident than in Northern Ireland. The landscape and the underpinning geodiversity has had a profound influence on our language and cultural heritage, has been a source of inspiration for poetry, music, art and literature. Geodiversity is fundamental in determining the character of our natural landscape and of the built environment, something that is a source of pride for our local communities and provides an important recreational resource, both locally and nationally. As part of our green infrastructure, Northern Ireland's landscapes are essential for our mental and physical well-being.

The rich tapestry of landforms, soils, nutrients and natural processes that support Northern Ireland's nationally and internationally important biodiversity will also benefit from a better understanding of geodiversity assisting with environmental management and protection and ultimately providing a safer and healthier place to

live. Northern Ireland's geodiversity also has an important role to play in climate change mitigation and adaptation including, contributing in no small part to helping the UK achieve net zero emissions by 2050.

CHALLENGE AND OPPORTUNITIES

Northern Ireland, as the rest of the world, is experiencing unprecedented change, at both the national and at the international level. As a result, there are a number of opportunities and challenges that are relevant to geodiversity in Northern Ireland.

COVID-19

At the time of writing, the Covid-19 pandemic was raging across Northern Ireland with restrictions on travel, working practices and on everyday life. This has had a huge impact on many of our industries in Northern Ireland, but on none more savagely than the hospitality and tourism industries with little to no international visitors for the entirety of 2020.

Although undoubtedly a challenge, the Covid-19 pandemic has presented an opportunity to highlight some of Northern Ireland's fantastic geodiversity through the promotion of recreational activities. With the desire for safe, outdoor space being more important than ever, and an increased demand for domestic tourism the immediate

opportunities for raising awareness of geodiversity through recreation are at an all-time high and could play an important part in the green recovery after Covid-19.

CLIMATE CHANGE

Undeniably, the biggest threat that Northern Ireland and indeed planet Earth is currently facing, is that of climate change. With rising sea-levels, increased surface temperature, more storm activity and more unpredictable rainfall just some of the impacts that we are already witnessing, climate change poses a fundamental threat to our landscapes and livelihoods.

In Northern Ireland, climate change will have significant implications for our geodiversity that may include changes in landscape character, flooding, river channel readjustments, coastal landform changes and an increased demand for geological hazard mitigation such as coastal protection. It will also have an impact on our soils with a warming climate that will influence the way we manage our land.

EU-EXIT

In January 2021, the UK officially left the European Union after a lengthy exit transition. This can be viewed as both a significant challenge but also an opportunity for geodiversity within Northern Ireland. Whilst it is currently not known exactly what the implications of the EU-Exit will be in the long-term, there are some indications of potential positive outcomes.

A renewed structure of legislation, particularly in areas such as farming and environmental management, could provide the opportunity for better integration of geodiversity within those, ensuring recognition and safeguarding. Another potential benefit is that Northern Ireland is uniquely placed in both an Irish and UK context to develop strong partnerships at a policy level but also from a research standpoint to ensure that geodiversity is considered on an all-Ireland as well as a UK-wide perspective.

ECONOMIC VALUE OF GEOSCIENCES

In 2018, the Department for the Economy commissioned the Ulster University Economic Policy Centre (UUEPC) “to

research the economic value and impact of the geosciences sector to the Northern Ireland economy and consider the potential of that sector to further benefit the Northern Ireland economy”.

The UUEPC report concluded that in 2018, the Northern Ireland geoscience sector incorporated 6,150 businesses, some 8.6% of all Northern Ireland businesses; 34 thousand jobs accounting for 4.6% of total Northern Ireland employment and generated a Gross Value Add of £2.1 billion to the local economy, some 5.8% of Northern Ireland total GVA.

In terms of Northern Ireland equivalents, geoscience employment is similar to the agriculture sector and the knowledge economy and the GVA total is close to that produced by construction. This data underlines the impact of the geoscience sector and presents an opportunity to provide some quantitative data to the direct benefits that geodiversity has for every Northern Ireland citizen.

NATIONAL AND INTERNATIONAL CONTEXT

There is now an international appreciation of the value of geodiversity as recognised by the International Union for the Conservation of Nature (IUCN). In addition, the IUCN also recognises the scientific, cultural, aesthetic, landscape, economic and intrinsic values of geodiversity and the relevance of geodiversity in underpinning biological, cultural and landscape diversity.

However, in addition to the direct recognition of geodiversity at an international level, it is useful to explore the various international and national governance documents that are relevant, whilst not explicitly focusing on geodiversity.

UN SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) are an ambitious set of 17 goals that aim to eradicate poverty, ensure universal access to basic services, tackle inequality, end unsustainable consumption patterns, and facilitate inclusive economic growth, social development and environmental protection. Whilst they are a set of global goals, they are relevant to every part of the world including Northern Ireland.

Achieving the SDGs by 2030 will require a concerted and sustained effort from many communities and sectors. This includes geological science, with understanding, monitoring, protecting, managing, and enhancing the natural environment central to many of the SDGs. Geodiversity plays a critical role in the delivery of the SDGs. This requires a knowledge of the Earth's structure, the processes by which it is shaped and of natural resources, together with the ability to translate this knowledge into tools to inform policy and practice.

NEW DECADE NEW APPROACH

The New Decade New Approach Deal was agreed in January 2020 upon the restoration of the Northern Ireland Assembly after a significant hiatus. All parties agreed on a way forward to begin the task of strengthening public services and to tackle immediate challenges in key areas such as growing the economy, health, education and housing.

Of particular relevance to Northern Ireland's Geodiversity Charter are those initiatives that require, or would benefit from geoscientific input:

- The delivery of essential infrastructure projects in order to build a Northern Ireland that is equipped for a prosperous shared future.
- Capital funding for infrastructure, regeneration and tourism projects.
- Invest urgently in wastewater infrastructure which is at or nearing capacity in many places across Northern Ireland.

- Tackle climate change head on with a strategy to address the immediate and longer term impacts of climate change
- Introduce legislation and targets for reducing carbon emissions in line with the Paris Climate Change Accord.

DRAFT PROGRAMME FOR GOVERNMENT FRAMEWORK

The Northern Ireland Draft Programme for Government Framework sets out the ambitions of the Northern Ireland Executive for our society. They are intended to address the big issues facing society and make a difference to the things that matter most to people. It focuses on the impact on our people rather than the actions taken within Government.

One of the defining elements of the Draft Programme for Government is a focus on outcomes – these are things with which people can identify such as living longer and healthier lives or getting good jobs – which are designed to stay in place for a generation rather than a single Assembly term and define if we are progressing as a society.

Those most relevant for the Northern Ireland Geodiversity Charter are as follows:

- Live and work sustainably, protecting the environment
- Having more people working in sustainable jobs
- Create a place where people want to live, work and visit
- Connect people and opportunities through our infrastructure
- Give our children and young people the best start in life
- Prosper through a strong, competitive economy

STRATEGIC PLANNING POLICY STATEMENT FOR NORTHERN IRELAND (SPPS)

The SPPS is a statement of the Department of the Environment (now DAERA) policy on important planning matters. It has a statutory basis under Part 1 of the Planning Act (Northern Ireland) 2011 which requires the Department to formulate and co-ordinate policy for securing the orderly and

consistent development of land and the planning of that development.

The overall objective of the Northern Ireland planning system is to further sustainable development and improve well-being for all citizens of Northern Ireland. It is aimed at unlocking development potential, supporting job creation and aiding economic recovery, but not at the expense of the environment.

LOCAL COUNCIL PLANS AND STRATEGIES

The SPPS includes a direct provision for the conservation of geodiversity as part of Natural Heritage including as part of Regional Strategic Objectives, as part of the Local Development Plan process, and as part of Regional Strategic Policy.

All 11 of Northern Ireland's local councils have produced comprehensive corporate plans or strategies. These set the strategic direction for the area, which will contribute to the economic, social and environmental well-being of everyone that lives there. The local council Corporate Plans or Strategies do not exist in isolation and are designed to sit within a regional framework that

together, contributes to well-being across Northern Ireland.

Whilst each local council Corporate Plan or Strategy is different and is dependent on needs and requirements locally, they all provide an opportunity to deliver aspects of Northern Ireland's Geodiversity Charter. This could be through the promotion of natural, built and cultural heritage, it could be in developing recreational opportunities, or it could be in developing local policies to encourage conservation or site enhancement, to name but a few.

Local councils represent a key channel for the delivery of Northern Ireland's Geodiversity Charter, which together can contribute to the provision of better economic, environmental and social outcomes for all.

The vision for Northern Ireland's Geodiversity Charter is that Northern Ireland's geodiversity is recognised as a vital part of our sustainable development, with benefits for the economy, for society and for the environment, and it should be managed appropriately and safeguarded for the benefit of current and future generations of Northern Ireland citizens.

Future action should address four main areas of activity:

POLICY INTEGRATION

Mainstreaming geodiversity into relevant policies, strategies, guidance and advice to ensure a sustainable and integrated approach to management of natural heritage for the wider benefit of Northern Ireland's economy, society and the environment.

RAISING AWARENESS

Raising awareness amongst all sectors of the value and importance of geodiversity and its wider links with the natural and built environment, and cultural heritage and instilling a sense of place and community empowerment through education and promotion at all levels.

CONSERVATION AND ENHANCEMENT

Encourage conservation, enhancement and careful management of our geological heritage, continue to develop and share good geoconservation practice.

RESEARCH

Support research that improves our understanding of geodiversity and its role in providing benefits to the economy, society and the environment, as well as addressing key knowledge gaps leading to better decision making especially in regard to key societal issues such as sustainable resource management, climate change and geological hazards.



Achieving the vision

Photo: Courtesy Tourism Ireland

Northern Ireland's Geodiversity Charter encourages determined and collective action from all sectors including but not limited to central government departments, local government, academia, industry, education, NGOs, and charities.

To ensure that our geodiversity is adequately recognised, managed and safeguarded, there are six key outcomes that should be achieved, and a number of underpinning targets, all of which align with the Northern Ireland Draft Programme for Government.

A number of case studies have been provided for each which provide clear examples of where these outcomes have already been achieved.

Outcome 1

We live and work sustainably – protecting the environment.

Outcome 2

Everyone can reach their potential.

Outcome 3

People want to live, work and visit here.

Outcome 4

Our children and young people have the best start in life.

Outcome 5

Our economy is globally competitive, regionally balanced and carbon-neutral.



**We live and work
sustainably – protecting
the environment.**

Geodiversity is the foundation of our natural environment, so protecting our geological heritage is protecting the environment. Everyone benefits from a healthy natural environment, and our economy, health and prosperity depend upon it so protecting our geodiversity is fundamental to a healthy and resilient society.

- Incorporate and advocate geodiversity in existing and future nature conservation policies and strategies.
- Encourage and enhance access to outdoor spaces with a specific geodiversity focus.
- Work to increase respect for the natural environment, especially those areas with significant geodiversity.
- Work with landowners and businesses to minimise environmental impact of their activities and the degradation of geodiversity.

CASE STUDY 1

Northern Ireland Environment Agency (NIEA) Environment Funds Grants

The Environment Fund (EF) is administered by the Department of Agriculture, Environment and Rural Affairs (DAERA), via the Northern Ireland Environment Agency (NIEA), and support projects that help deliver key environmental outcomes for Northern Ireland. It is funded through the carrier bag levy and supports environmental projects by not-for-profit organisations and councils.

The EF identifies four Environmental Impact Priorities for applications and this includes a priority for positive management of nationally and regionally important geodiversity (referred to as earth science)

sites and the Giant's Causeway and Causeway Coast World Heritage Site. It also highlights sustainable environmental management of Areas of Outstanding Natural Beauty (AONB), defined as areas whose character is the result of action and interaction of natural and/or human factors. If an application to the EF is successful and includes managing or improving geodiversity, a condition of award is that the actions and outcomes must be aligned with the Geodiversity Charter. In this way EF grants contribute directly to the achievement of the aims and objectives of the charter.



Photo: Northern Ireland Environment Agency

CASE STUDY 2

Area of Outstanding Natural Beauty (AONB) Management Plans

The finest areas of high landscape quality have been designated as Areas of Outstanding Natural Beauty (AONB) and there are eight in Northern Ireland. These recognise both the natural and cultural heritage of these areas. The natural beauty and character of these protected landscapes is in no small part down to their geodiversity. In fact, as a group they contain many ASSI designated either solely Earth Science features, or in combination with ecological features.

It is NIEA policy to encourage and where possible facilitate the development of management plans for our AONBs to ensure the heritage they represent is maintained. Management plans are developed through the collaboration of all stakeholders and

are intended to help preserve landscape character, natural, built and cultural heritage and also to promote and develop access both for people who live in the area and for visitors.

Six of the AONBs in Northern Ireland have management plans in place. The positive management and promotion of their landscapes, and by extension their geodiversity and biodiversity, is a key component to all of them with some plans and projects focusing in particular on geological heritage.



Photo: Courtesy Tourism Northern Ireland



CASE STUDY 3

CAAN Project on Cuilcagh Mountain

The CANN (Collaborative Action for the Natura Network) project is a cross-border environment project which aims to improve the condition of protected habitats and to support priority species found within Northern Ireland, the Border Region of Ireland and Scotland, allowing the region to meet key EU biodiversity targets and ensuring the future of these internationally important habitats and species.

With €9.4 million of funding from the INTERREG VA programme the CANN project team will produce Conservation Action Plans for a range of sites across the jurisdictions which are designated as Special Areas of Conservation (SACs).

In Autumn/Winter 2020, the Ulster Wildlife Trust worked with local landowners in the Cuilcagh Mountain SAC to restore precious blanket bog habitat as part of the CANN Project. Landowners were trained in specialist restoration techniques including peat hag reprofiling, gully blocking and coir log installation. Once they were skilled up they were able to stabilise and revegetate 17ha of eroding peat. This type of restoration is vital, not only to protect our native flora and fauna and in the fight against climate change but also to restore our landscapes to their natural state of equilibrium.

Photo: Courtesy Ulster Wildlife Trust



CASE STUDY 4

Groundwater monitoring at Magilligan Umbra

GSNI is working with the NIEA to monitor the groundwater conditions beneath the Magilligan Umbra in the northwest of Northern Ireland.

In 2017, the NIEA removed 6000 Corsican pine trees, along with some stands of sea buckthorn from the site. This was carried out to increase the groundwater levels and chemistry, thereby improving the conditions for the sensitive and protected flora and fauna that are found only at Magilligan.

Three rounds of groundwater sampling and retrieval of groundwater level data from 12 loggers in

piezometers were carried out. The samples were analysed by the BGS laboratories and the water level data processed in GSNI. The results show that improvements in groundwater conditions are slow to materialise, but the trends are already showing that groundwater levels have increased and that the way that groundwater is recharged at the site has also changed.

The preliminary results of this project are encouraging but ongoing monitoring is required to fully appreciate the impact of the conservation measures.

Everyone can reach their potential.

Northern Ireland's unique geodiversity provides the region with a wide range of natural resources including minerals, aggregates and groundwater. Developing our natural resources in a way sympathetic to wider community interests represents a means of getting more people better jobs.

- Work towards the more sustainable use of natural resources, considering the environmental, social and economic impacts of opportunities.
- Work with natural processes as far as possible and consider the future impact of natural processes when planning new developments.
- Support efforts to encourage public awareness of the need for natural resources and the role they play in addressing societal issues such as climate change.
- Facilitate access to geoheritage features, including temporary exposures, and make available records and samples as part of local and national geological record keeping.

CASE STUDY 1

Lough Neagh Sand Traders

The Lough Neagh Sand Traders (LNST) supply around one third of Northern Ireland's aggregate needs. The huge volume of sand and gravel in Lough Neagh are the tangible results of Northern Ireland's most recent Ice Age. These 'glaciofluvial' deposits were left behind by an actively retreating ice sheet that once covered the entire island of Ireland.

Sand and gravel aggregates are an essential component of the cement and concrete industry, representing grades that otherwise would need to be produced by rock crushing. Crushing is an energy intensive process, so the inclusion of glaciofluvial deposits in concrete production helps to reduce the overall carbon footprint.

In 2015, the Lough Neagh Sand Traders (LNST) was created to represent the companies involved in sand and gravel extraction from Lough Neagh, Northern Ireland's largest single deposit. A sand and gravel resource survey, commissioned by LNST as part of the environmental impact assessment for their operations, identified that there was enough sand and gravel to continue extraction for another twenty years. Careful consultation between LNST, local community groups and other users of the lake have enabled the continued extraction of this valuable resource, while allowing eel and fish habitats be maintained, supporting bird life and enable water-based leisure activities.



Photo: Courtesy Tourism Northern Ireland

CASE STUDY 2

Geological Survey of Northern Ireland Core Store

The Geological Survey of Northern Ireland (GSNI) curates Northern Ireland's archive of rock cores and geological specimens collected since 1947 through the work of the Survey and subsurface exploration. This archive includes in excess of 20 kilometres of drillcore and many thousands of rock and soil samples from geological mapping programmes, geochemical surveys, exploration activity and large infrastructure or engineering projects.

The archive is an invaluable resource for scientific research and education and provides invaluable subsurface data for future infrastructure projects. The GSNI core archive has been used to support post-primary and University-level geoscience teaching, training and skills development of future geoscientists. The collections support scientific

research projects that have recently included analysis of geothermal reservoirs; palaeoclimatic and palaeoceanographic research; understanding the structure and volcanic history of Northern Ireland; and age determination of rock units across Northern Ireland.

On occasion, the core store is opened for public events such as European Heritage Open Days or the Northern Ireland Science Festival, where the scientific collections and their importance are showcased to a wider audience, hoping to inspire the geoscientists of the future.



CASE STUDY 3

Irish Salt Mining and Exploration Ltd

Irish Salt Mining & Exploration Co. Ltd. (ISME) was established in 1965 and operate an underground salt mine on the north shore of Belfast Lough, near Carrickfergus.

They currently mine around half a million tonnes of salt per year which is mainly used as de-icing salt to help keep the roads throughout the UK and Ireland safe during winter weather. This production has been achieved over the years through the endeavours of 60 full time employees. The underground production crew is made up from specialist teams of Electricians, Mechanical Fitters, Surveyors, and mobile and fixed plant operators.

As working mines are not commonplace in Northern Ireland, when there is a vacant position in the mining department for plant operators, they do not receive many responses from applicants with the necessary training and experience. Instead, their criteria is centred more on a basic mechanical aptitude. The range of mining equipment underground is wide and varied and the aim is to train as many of our workforce on as much of this equipment as possible.

This this helps make for a more rewarding career for their underground team as well as assisting the flexibility on day-to-day operations. This is evidenced through the average length of service within the current workforce which is over fifteen years.



People want to live, work and visit here.

Northern Ireland's geodiversity is responsible for the shape and the appearance of our natural landscapes but it has also had a major influence on our social and cultural fabric. Our geodiversity can provide opportunities for people to take pride in where they are from, and in encouraging others to come to visit and explore.

- Enable visitors and tourists to appreciate the value and importance of Northern Ireland's geodiversity, and its benefits for sustainable tourism.
- Encourage local businesses to embrace sustainable geological tourism and develop innovative partnerships to enhance their existing business.
- Motivate local communities to establish ambassadors for local geodiversity, and work with others to celebrate, conserve and promote it.
- Promote responsible behaviour towards the natural environment amongst visitors and local communities alike.

CASE STUDY 1

Mourne Gullion Strangford Aspiring UNESCO Global Geopark

In 2017, Newry Mourne and Down District Council (NMDDC) published its tourism strategy that identified the development of a UNESCO Global Geopark as one of its catalyst projects for the region. As a critical economic driver, tourism and the development of a UNESCO Global Geopark in particular will help to create jobs and diversify the rural economy, whilst still maintaining the integrity of the landscape and celebrating the local cultural heritage.

Since then, NMDDC have been working with a number of stakeholders to prepare an application for UNESCO UNESCO Global Geopark status that will take in the three Areas of Outstanding Natural Beauty (AONB) within the district. This includes the Ring of Gullion, Mourne, and Strangford Lough and Lecale, all of which include internationally important geological heritage.

An extensive communication plan has been delivered with the primary aim of raising awareness and understanding of the UNESCO Global Geopark concept and what the benefits of this status will bring to the region. This has been complemented by a programme of site development, public and education events, development of information and interpretation leaflets and panels, and the establishment of a number of thematic working groups that include education, tourism and recreation.

NMDDC submitted their application to UNESCO to become a UNESCO Global Geopark in November 2019.



Photo: Courtesy Tourism Ireland



CASE STUDY 2

Celebrating Carnlough's Industrial Past

Mid and East Antrim Borough Council, with funding from the Heritage Lottery Fund, together with Carnlough Community Association volunteers created an award-winning visitor experience celebrating the area's industrial heritage centred around its geology.

Located in a former Victorian Town Hall an engaging exhibition explores the industrial heritage of the village and the wider Glens of Antrim with the space functioning both as a visitor and community hub. The Heritage Hub at Carnlough Town Hall celebrates Carnlough's industrial past, telling the story of the extraction of limestone from the local quarries and its transport by the 'hurry' railway line to the harbour.

Opening seasonally since 2018, the Heritage Hub at Carnlough Town Hall also highlights more broadly how the locality's natural landscape has been shaped and redefined over time through human intervention. The Hub acts as starting/end point for guided and self-guided tours and as a focal point for local volunteers. The Hub volunteers are heritage ambassadors, welcoming visitors and encouraging an appreciation of the natural environment by sharing their sense of pride of place and local knowledge.

For more information see: <http://www.thebraid.com/carlough-heritage-resource/>

Photo: Mid and East Antrim Borough Council

CASE STUDY 3

Heritage Champions

The Marble Arch Caves UNESCO Global Geopark has added to their existing Geopark Ambassador cohort by training 20 local community heritage enthusiasts to become Geopark 'Heritage Champions' in West Fermanagh.

Over the course of a 10-week programme, participants were given expert training in a variety of areas including UNESCO Global Geoparks, geology, geomorphology, archaeology, biodiversity, event management and tour guiding. Ongoing mentoring and support will be provided by the Geopark.

The Heritage Champions will act as an important conduit for meaningful community engagement within the Geopark. It provides an opportunity for new community-based sustainable tourism products and initiatives to develop and most significantly, ensures that local people have the skills, knowledge and expertise to ensure that the unique and special landscapes of the Geopark are understood, interpreted and celebrated by all for many generations to come.

Funding for the initiative was secured from the Heritage Lottery Fund through the Lough Erne Landscape Partnership.

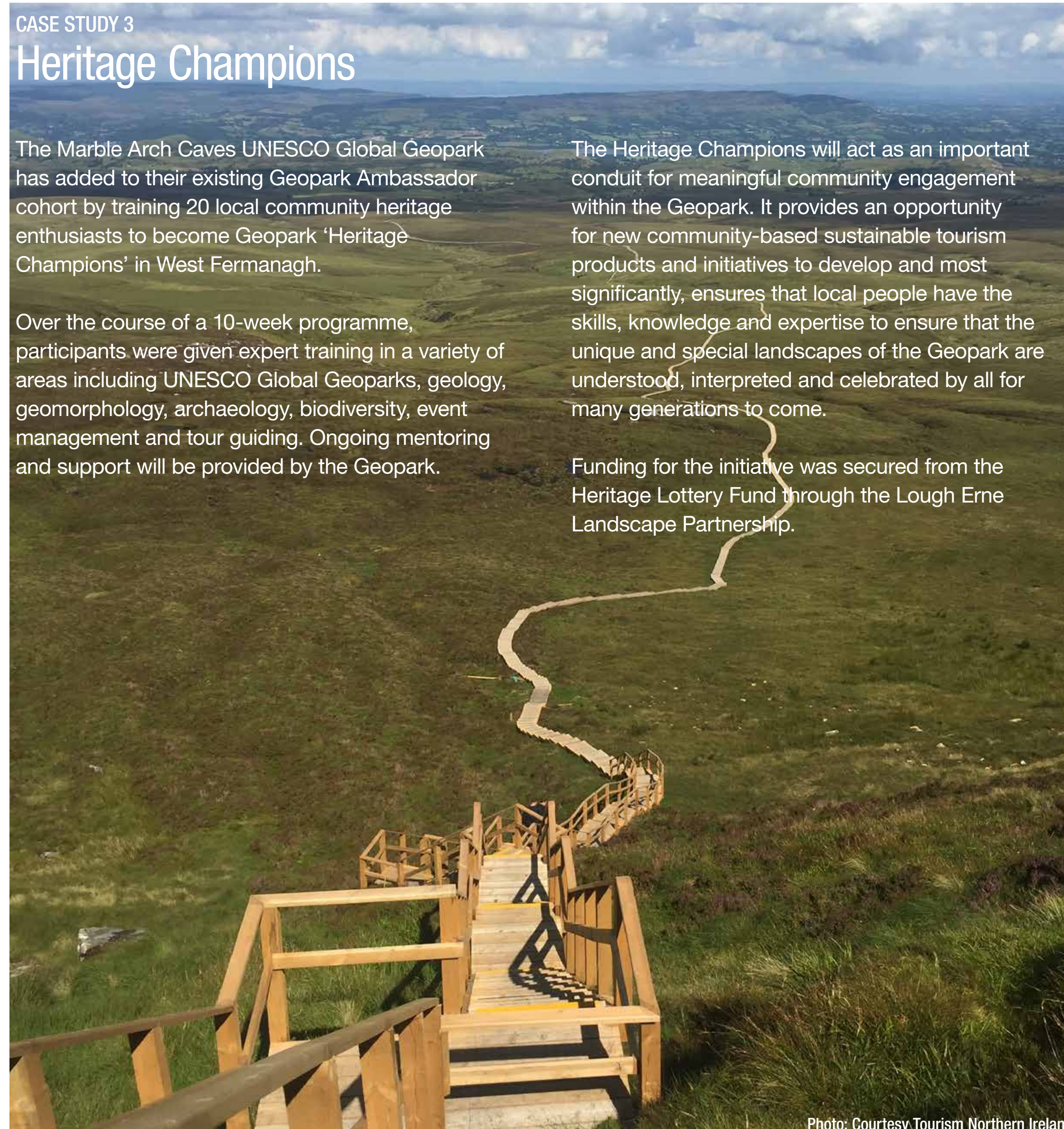


Photo: Courtesy Tourism Northern Ireland

CASE STUDY 4

World Heritage Site Management Plan

The Giant's Causeway and Causeway Coast World Heritage Site (WHS) is Northern Ireland's only UNESCO WHS, and was inscribed on the World Heritage List due to its outstanding geological features and contribution to science. The Giant's Causeway is internationally recognised and for many years has been the most visited tourist attraction, receiving over 1 million visitors in 2019. However, balancing the site's popularity with conserving the sensitive coastal environment is no easy task.

The World Heritage Site Steering Group have a significant part to play in this with the 2021-2027 WHS Management Plan and Action Plan being key tools for effective conservation management. The Vision aspires for the site to 'be recognised as the global leader in the responsible management

of dynamic natural sites...that demonstrates responsible conservation while providing an exceptional visitor experience...positively contributing to local and regional communities, while its special qualities...are safeguarded for present and future generations.

This Vision is supported by a comprehensive suite of Aims and Objectives which will guide efforts to address the challenges facing the site.

The Causeway Coast and Glens Heritage Trust (CCGHT) support and monitor delivery of the Plan. However, no single organisation is responsible for delivery of the Plan, and instead it requires collective action by a range of partners and stakeholders with integrated community engagement.

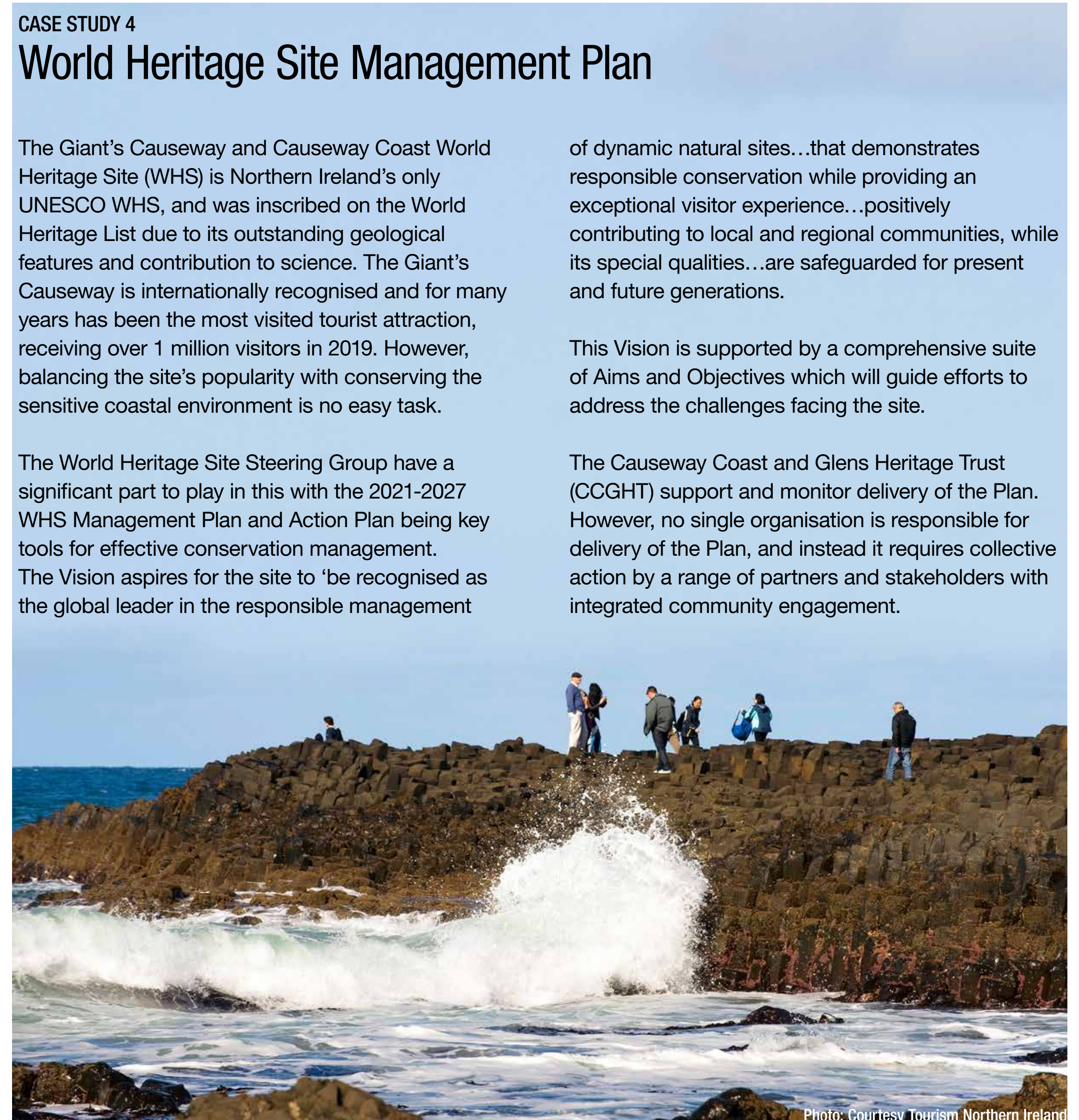


Photo: Courtesy Tourism Northern Ireland

Our children and young people have the best start in life.



Education on geodiversity-related issues in schools is limited in Northern Ireland. With increasing environmental change as a result of climate change, and a burgeoning need to find natural resources it is essential that we nurture the next generation of geoscientists to find solution to our societal challenges.

- Provide opportunities for teachers and pupils to include geodiversity within their classrooms and lesson plans.
- Raise the awareness of the geodiversity-related employment opportunities for our young people.
- Advocate a further and / or higher level qualification in geodiversity that will help to address our key societal challenges.
- Strengthen partnerships amongst the education community to develop a working group to promote geodiversity-related education across all levels.



CASE STUDY 1

Belfast Hills Partnership STEM EXPO

The Belfast Hills Partnership teamed up with a host of exhibitors to hold a STEM-Expo at Belfast Castle, to promote STEM (Science, Technology, Engineering and Maths) subjects to local schools. The Belfast Hills are the perfect place to demonstrate many aspects of STEM subjects including geology, and the EXPO was a great way to give young people the chance to experience some of these for the first time in a hands-on way.

By providing these opportunities, pupils were encouraged to think more about STEM subjects and how they directly relate to the world around them, not only at the present, but increasingly in the future, with key issues such as climate change

and geological hazards. Furthermore, it helped local pupils appreciate their environment, understand how it works, and inspire them to become the scientists and green ambassadors for the future.

Over the two days of the Expo 366 young people had the opportunity to engage in hands-on activities. These included: exploring earth processes; finding out what meteorites can tell us about the origin of the Solar System; discovering aquatic invertebrates as pollution indicators; learning how to program LEGO Mindstorms EV3 robots using sensors and motor and also; understanding the importance of predators in our ecosystems.

Photo: Courtesy Belfast Hills Partnership



CASE STUDY 2

Northern Ireland Science Festival

The Northern Ireland Science Festival (NISF) is an annual celebration of science that takes place in February all across Northern Ireland. With nearly 200 events, in a variety of venues and interactive platforms, the NISF is fast becoming one of the most popular public science events in the UK and Ireland. Known for its original and quirky methods of communicating science, the NISF is a great way to reach non-traditional audiences.

Over the past number of years there has been a steady increase in the number of events that include elements of geodiversity right across Northern Ireland. These include:

- The NISF Roadshow in towns right across the country where fossil-making workshops have been delivered.
- Dye-tracing experiments to explore the hydrogeology of the karst landscapes of Co. Fermanagh.
- Hands-on violent volcano workshops at Slieve Gullion Forest Park, Co. Armagh.
- Finding Planet B interactive natural resources workshop with Armagh Observatory and Planetarium.
- The Climate Change Challenge workshop exploring palaeoclimate evidence at the GSNi Core Store in Belfast.

Photo: Courtesy Northern Ireland Science Festival

CASE STUDY 3

Primary School Earth Science Workshops

The Mourne Gullion Strangford Aspiring UNESCO Global Geopark has been delivering a number of primary school Earth science workshops during National Science Week. These have been designed to offer a range of hands-on practical activities to primary school pupils that complement the World Around Us (WAU) element of the Northern Ireland primary curriculum.

Activities include making volcanoes, glacier racing, predicting earthquakes, exploring where raw materials come from, and understanding how rocks

form. All of the activities are made relevant to the geological heritage of the Geopark areas and local examples of where many of the rocks, landscapes and processes can be seen. Each activity can be easily replicated in the classroom and all schools are given follow-up activities that they can deliver in school.

Workshops have been delivered throughout the Geopark area in Delamont Country Park, Kilbroney Forest Park and Slieve Gullion Courtyard and since 2018 just under 1000 pupils have attended.



CASE STUDY 4

INQUA and IQUA – Quaternary education

The International Union for Quaternary Research (INQUA) congress is held every four years, taking place most recently in Dublin in July 2019. The week-long conference brings like-minded academics together to present and discuss their latest research in the areas of earth science that cover the most recent period of the Earth's history, the Quaternary; the last 2.5 million years.

The Dublin conference was organised by the Irish Quaternary Association (IQUA), who, as well as running the conference day-to-day, provided opportunities to explore the rich geology of the Irish landscape, via fieldtrips across the whole island.

Northern Ireland was visited by delegates on six different excursions. The trips not only provide a means of facilitating academic discussion, but also helped to entice people to return to Northern Ireland in the future, both to work and visit on holiday.

The Geological Survey of Northern Ireland (GSNI) sponsored an expo stand at the event, which allowed the All Ireland Quaternary Map to be included in every delegate conference pack. The All Ireland Quaternary map is an educational resource covering the whole island that provides information on soils and landforms formed during the period, like the last Ice Age, as well as more recent processes like peat formation and coastal erosion.



Our economy is globally competitive, regionally balanced and carbon-neutral.

Geodiversity plays a substantial role in the Northern Ireland economy. To continue to support, sustain and encourage geodiversity-related economic development, it is important to create a strong culture of innovation and research. This will help to deliver solutions to key societal issues such as the impacts of climate change, and develop a better understanding of the main opportunities and challenges that face Northern Ireland both now and in the future.

- Develop the scientific framework of geodiversity and identify and address key knowledge gaps, including the applications and wider significance of geodiversity
- Improve access to and encourage better use of existing geoscience data.
- Share research evidence to demonstrate the wider benefits, values and applications of geodiversity.
- Encourage innovative solutions to geodiversity-related societal challenges.
- Ensure appropriate consideration is given to geodiversity-related issues within the Northern Ireland planning process.

CASE STUDY 1 Quaternary 1:10k Mapping

Superficial deposits in Northern Ireland have been mapped at a 1:10,000 scale for almost the entire region by the Geological Survey of Northern Ireland (GSNI). This dataset, due for completion in 2022, encompasses natural deposits from the last 2.5 million years as well as man-made 'artificial' deposits.

This baseline map of the area's geology, now collected from start to finish using an all-digital workflow, uses the very latest digital surface model supplied by Land and Property Services, enabling a previously unmatched degree of mapping precision

and efficiency to be realised. These data provide information pertaining to the nature of geological deposits and landforms developed during and since the termination of the last Ice Age (approximately 15,000 years ago).

These deposits cover more than three-quarters of Northern Ireland and inform us not only about how they arrived there in the first place, but what the behaviour of their constituent materials is likely to be when they are interacted with, both by ground and surface water, and by farmers and civil engineers seeking to work with and enhance these landscapes.



Photo: Courtesy Tourism Northern Ireland

CASE STUDY 2 Unlocking the value of geospatial data

The Geospatial Commission was established as an independent expert committee by the Cabinet Office of the UK Government to unlock the value of geospatial data. The Commission comprises the 'Geo6'; British Geological Survey, Coal Authority, HM Land Registry, Ordnance Survey (GB), the UK Hydrographic Office and the Valuation Office. For the first time, Geospatial Data is at the heart of government and this is recognition of both the role spatial data has in everyday lives and how it contributes to a thriving economy.

Following consultation in 2018, the Commission launched an ambitious UK Geospatial Strategy 2020-2025 in June 2020 with four missions:

- Promote and safeguard the use of location data;
- Improve access to better location data;

- Enhance capabilities, skills and awareness and;
- Enable innovation.

Early work of the commission included projects on data discoverability and subsequent publications have provided guidance on improving access to data and adoption of standardised data licences. The Geospatial Commission have since commissioned reports on the UK's Geospatial Data Market and published a report on Enhancing the UK's Geospatial Ecosystem.

The work of the Geospatial Commission will assist the delivery of the Northern Ireland Geodiversity Charter by improving access, interoperability and quality of data as well as improving capability, skills and awareness of geospatial data and technologies.

Image: Geospatial Commission, OGL V3

CASE STUDY 3

Building Back Better – a future for geothermal energy

Building Back better – a Future for Geothermal in Northern Ireland was an online international conference held on 11 December 2020. Convened by GSNI and the Centre for Sustainability, Equality and Climate Action (SECA) at Queen's University Belfast, the conference was the first of a series of events planned to highlight and explore the potential that geothermal technologies can play in Northern Ireland in building back our economy in a better, fairer, greener, and more sustainable way after the Covid-19 pandemic. Over 300 delegates registered from across the UK and Ireland, Europe and the rest of the world and many different sectors were represented.

Although geothermal resources remain untapped in Northern Ireland, there is significant potential for geothermal to meet some of our heating and/or cooling needs going forward. Geothermal can

provide consistent, sustainable, low-carbon energy, which is cost-effective over long periods, and has been demonstrated in many European countries.

Future events will consider in more detail some of the technical aspects of how geothermal could work in Northern Ireland, green financing, and related policy and regulatory considerations. GSNI also plans to establish and chair meetings of a geothermal advisory committee, closely aligned to meet the needs of the Department for the Economy's Energy Strategy. This committee will bring together relevant stakeholders to start to identify gaps in Northern Ireland geothermal data and information and ways forward to overcome barriers and harness opportunities for geothermal in Northern Ireland, allowing geothermal to play its part towards net-zero.



Photo: Tommy Kwak on Unsplash

CASE STUDY 4

Standing advice for Earth Science and Geodiversity

DAERA is a statutory consultee in the planning process in Northern Ireland. Many planning proposals that may have an impact on conservation of the natural environment are assessed by the Natural Environment Division (NED) of NIEA. To aid the process NED has produced a range of standing advice relating to nature conservation. This explains what applicants must do to meet legal and policy requirements that are relevant to their application, so that the information NED needs to assess it is included from the beginning.

Standing advice can also help local authorities make decisions on planning matters. While DAERA has published such advice on many aspects of nature conservation, there was not any specifically for geodiversity. To address this, NED have recently drafted standing advice for earth science & geodiversity which is scheduled for publication in 2021. This will help ensure that the geological features important for conservation in Northern Ireland are properly considered, assessed and protected through the planning process in Northern Ireland.



Photo: Northern Ireland Environment Agency

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