

Northern Ireland's Geodiversity Charter



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GSNI

Geological
Survey of
Northern
Ireland

Celebrating 70 years: 1947–2017



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Foreword

Northern Ireland, despite its small size, contains some of the most diverse geology of anywhere in the United Kingdom and Ireland. Ranging from the oldest Precambrian rocks dating back almost one billion years, right up to soft Quaternary sediments from the end of the last glaciation 13,000 years ago, there is representation from all major geological time periods.

Geodiversity, or the variety of rocks, minerals, fossils, landforms and soils, is something that we all depend upon. This geodiversity is essential to support sustainable economic growth and quality of life. It is vital that there is a sufficient supply of raw materials and energy from our natural resources for manufacturing, construction, power generation, transportation and agriculture. The geodiversity of Northern Ireland has shaped our landscape, influences where we live, what we eat, and how we travel and also underpins economic development. It is therefore imperative that we understand the importance of geodiversity and put a mechanism in place to ensure that it is valued, available and protected/cherished for future generations.

Northern Ireland has a long history of geodiversity appreciation from the very first geological tourists visiting what is now the Giant's Causeway World Heritage Site in the 18th century, to the establishment of the first UNESCO Global Geopark in the UK at the Marble Arch Caves UNESCO Global Geopark in 2001. We also have a proven track record of understanding our geodiversity from the very first '*Report on the Geology of the Counties of Londonderry, and of parts of Tyrone and Fermanagh*' in 1845 by the Geological Branch of the Ordnance Survey of Ireland, right up to the award-winning Tellus and Tellus Border geophysical and geochemical surveys, led by the Geological Survey of Northern Ireland between 2004 and 2013.

Despite all this, there is still much work to be done and with increasing challenges to society from climate change, geological hazards, and increased demand for natural resources for energy, water and food, it has never been so important to work together to promote awareness of and a more integrated management of our geodiversity. Now in our 70th year, the Geological Survey of Northern Ireland is hoping to lead the way and encourage others to follow to sustain economic growth, protect the environment, improve health and well-being of citizens, and to develop better educational opportunities through the vision and actions outlined in Northern Ireland's Geodiversity Charter.

Dr Marie Cowan, Director, Geological Survey of Northern Ireland



Slieve Binnian, Mourne Mountains

Front Cover: Giant's Causeway

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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 phenomenal 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, education, the economy as well as on our health and well-being means that it provides essential benefits for society. The Northern Ireland Geodiversity Charter encourages people to work together to promote and manage Northern Ireland's geodiversity, and to integrate this into policy, practice and decision-making at both a national and local level. 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, educational and environmental benefits it provides.

The importance and value of Northern Ireland's geodiversity

Northern Ireland's astonishing geodiversity is a result of nearly 1 billion years of geological activity, taking us on a journey that began deep in the southern hemisphere, moving northwards over time to our current position. During that journey we experienced numerous climate and sea-level changes, erosion and deposition, moving continents and mountain building, volcanic activity and icy wastelands, all of which have shaped Northern Ireland's natural landscape.

Geodiversity plays a critical role in the economy of Northern Ireland. It is the vital foundation for the exploration and production of mineral resources, necessary for raw materials for construction, for energy, and for the minerals and metals that help to underpin our economy. It is an important source of geothermal energy, provides the diversity of soils essential for agriculture, plays a vital part in our tourism industry, and also controls much of our fresh water supply either through groundwater or from its influence on surface water flow. It is essential that we understand and protect our geodiversity so that we can continue to manage our natural resources sustainably.

Northern Ireland has played its part in the development of geology as a science and was the location of one of the most famous historical debates on the origin of igneous rocks, one that was resolved using an outcrop in Portrush, Co. Antrim. The Ring of Gullion in Co. Armagh and Co. Down was the first ring dyke to be mapped anywhere in the world and is still providing fuel for scientific debate between researchers across the globe. The geodiversity of Northern Ireland continues to provide a rich resource for education and research to this day.

Understanding and managing our geodiversity has a key role in mitigating climate change and for environmental protection. Our peats and soils have a huge part to play in the storage of carbon, an important element of climate change mitigation and an understanding of geomorphological processes is vital in managing geological hazards such as landslides, coastal change and flooding, all of which will undoubtedly increase due to climate change. The rich tapestry of landforms, soils, nutrients and natural processes that support Northern Ireland's nationally and internationally important habitats and species 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.

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, and is fundamental in determining the character of our natural landscape and of the built environment. Northern Ireland's geodiversity continues to influence and inspire and is now a key factor in attracting numerous film and television producers.

The essential role that Northern Ireland's geodiversity has to play in dealing with major societal challenges including sustainable economic development, changes in climate, loss of biodiversity and improving people's health and well-being should not be underestimated. This may be summarised through the provision of 'ecosystem services' that have been outlined below:

- Providing fresh water (surface and groundwater), mineral resources (including oil and gas) and renewable energy);
- Regulating climate change and moderation of geological hazards;
- Supporting soil formation, geomorphological processes and terrestrial and marine habitats;
- Promoting the landscape for its aesthetic and inspirational values, as a resource for recreation, and for tourism and education.

National and international context

In Northern Ireland, there is a range of national and international legislation, policy and guidance that provides support and context for geodiversity.

Geodiversity in Northern Ireland is currently only specifically protected through legislation contained within the Environment (Northern Ireland) Order 2002. This allows for the designation of Areas of Special Scientific Interest (ASSI) and is reserved for those sites that have been identified as being of the greatest importance for conservation value. There are currently around 250 sites that have



Ammonites at Portrush part of the Ramore Head and Skerries ASSI
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been designated as ASSIs due to their Earth science interest. There are a number of other designations such as Special Areas of Conservation, Special Protected Areas, Areas of Outstanding Natural Beauty and National Nature Reserves, that are all influenced by and dependent upon geodiversity, but their protection is a by-product of a much broader designation.

Geodiversity is internationally recognised by the Recommendation of the Committee of Ministers of the Council of Europe (2004) that states: 'geological heritage constitutes a natural heritage of scientific, cultural, aesthetic, landscape, economic and intrinsic values. Which needs to be preserved and handed down to future generations'. The International Union for Conservation of Nature (IUCN) Resolution 4.040 on 'Conservation of geodiversity and geological heritage' (2008) provides a benchmark statement of the wider role and relevance of geodiversity recognising that 'the conservation and management of geological heritage need to be integrated by governments into their national goals and programmes'.

UNESCO (the United Nations Education, Scientific and Cultural Organisation) promotes the importance of geodiversity through the World Heritage List and through UNESCO Global Geoparks. To be included on the World Heritage List, sites must be of outstanding universal value and meet at least one out of ten selection criteria, only one of which is Earth science related. There is currently one World Heritage Site in Northern Ireland, the Giant's Causeway and Causeway Coast, and it was inscribed under this criterion. To become a UNESCO Global Geopark, there is a much greater emphasis on the role of geodiversity. UNESCO Global Geoparks are defined as single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development. In 2004, Northern Ireland was the first place in the UK to achieve Geopark status, and in 2008 the Marble Arch Caves UNESCO Global Geopark went on to become the first cross-border Geopark in the world.

Finally, the UK Geodiversity Action Plan (UKGAP) was established to provide a shared context and direction for geodiversity across the UK. It has a common aim, themes, objectives and targets that link national and local activities and together with the Geodiversity Charters for England, Scotland and Wales, Northern Ireland's Geodiversity Charter will help contribute to the successful delivery of the UKGAP.





The need for action

Geodiversity is often overlooked despite the fact that it is an integral part of the natural environment. As a result, it is taken for granted and is constantly under threat. The loss of geodiversity is as a consequence of factors such as poorly planned developments, changing land use and climate change, but it is not just geodiversity itself that suffers as a result; threats to biodiversity, negative impact on economic activities, reduction in research and education opportunities, and an increase in environmental costs are all real possibilities.

By increasing the understanding of the true value of geodiversity, the economic, social, cultural and educational benefits will be realised. This can also be used to better inform decision making and support policy at a strategic level and allow for a much more holistic approach to the conservation management of geodiversity through the ecosystem services approach. By changing the attitude towards geodiversity it will be possible to achieve a better and more sustainable outcome for every person in Northern Ireland.

A vision for Northern Ireland's geodiversity

The Northern Ireland Geodiversity Charter recognises that geodiversity is an integral and vital part of our environment, economy, heritage and future sustainable development. It is necessary that our geodiversity is safeguarded and managed appropriately for current and future generations.

To maintain and enhance our geodiversity it is important to recognise its role in:

- our understanding of Northern Ireland's geological history;
- natural heritage, both terrestrial and marine, and valued landscapes;
- sustainable economic development;
- supporting habitats and species and the many essential benefits it provides for society;
- adaptation to climate change through sustainable management of land and water by working with natural processes on a landscape scale;
- historical and cultural development of our society;
- public health, quality of life, and well-being, connecting people with the natural environment;
- active promotion of geological tourism.

To achieve this vision, future action should address four main areas of activity:

- **Raising awareness:** raising awareness of the value and importance of geodiversity and its wider links with the natural and built environment, cultural heritage and sense of place, encouraging a sense of pride through education and promotion at all levels.
- **Policy integration:** Integrating geodiversity into relevant policies, guidance and advice to ensure a sustainable and integrated approach to management of natural heritage for the wider benefit of Northern Ireland's people, environment and economy.
- **Conservation:** Encourage conservation, enhancement and careful management of our geological heritage and continue to develop and share good geoconservation practice.
- **Research:** Continue to support research that improves our understanding of geodiversity and its role in providing benefits to ecosystems and people, as well as addressing key knowledge gaps leading to better decision making about the natural environment.





Guildhall and city walls, Londonderry
© Tourism Northern Ireland

What needs to be done?

The Northern Ireland Geodiversity Charter encourages determined action from all sectors - individuals and communities, landowners and managers of NGOs, the industry and business sector, local authorities and public agencies, education and research – to fulfil the vision set out previously. There are a number of actions that can be taken to achieve this, all of which are set out below as well as examples of what has already been achieved.

1. Individuals and communities

Experience and enjoy your local landscape and geodiversity and appreciate its value and importance.

Actions:

Visit and explore Northern Ireland's geodiversity to develop an appreciation and sense of ownership.

Behave responsibly and sustainably towards your natural environment, adhering to the relevant guidance and codes.

Act as an ambassador for your local geodiversity, and work with others to celebrate, conserve and promote it.



Lime kiln restoration at Gortakilly, Co. Londonderry
© Sperrins Gateway Landscape Partnership

Geoambassadors

Through the Mourne Cooley Gullion Geotourism Project a total of 77 Geoambassadors were trained in geology, geomorphology, archaeology, history and tour guiding. The aim of this initiative was to create a number of geodiversity 'champions' in the local community who have a knowledge of the area's special natural environment and can work to celebrate and promote it, as well as to provide a viable source of revenue through tour guiding.

Stone structure restoration

Led by the Sperrins Gateway Landscape Partnership, a number of stone structures were restored within the local community including limekilns and traditional gate pillars. This provided the opportunity to learn about the links between the landscape and built heritage as they used traditional lime products and techniques, and also allowing trainees to complete the practical units of the NVQ stone masonry (heritage skills) qualification.

Earth Science Ireland

Earth Science Ireland is a voluntary organisation established in 2000 to increase the public understanding of Earth Science throughout the island of Ireland. The organisation's key output is the biannual Earth Science Ireland magazine that is distributed to over 3,000 people including schools, heritage officers, visitor attractions, museums as well as a public membership of around 1,000 people.

Belfast Geologists Society

Founded in 1954, the Belfast Geologists Society encourages amateurs to take an interest in geology by organising lectures on current geological research during the winter months as well as fieldtrips to key geological sites in Northern Ireland throughout the summer months. With a membership of over 100 people they provide a mechanism for the public to find out more about Northern Ireland's geodiversity in a friendly and relaxed manner.



2. Landowners and managers of NGOs

Take into account the geodiversity of the land that you manage, try to work in sympathy with the natural processes and landforms and consider how the geodiversity can be appreciated and understood.

Actions:

As far as possible, work with the natural processes on your land.

Maintain the geodiversity of your land by seeking information and advice to help you understand what is there and what you can to conserve and enhance it.

Help local communities, schools and businesses to appreciate the connections between geodiversity, land use, history, archaeology and biodiversity by encouraging safe and responsible access to local sites.

Incorporate and advocate geodiversity in your existing nature conservation activities and policies.



World Heritage Site (WHS) Steering Group

The Giant's Causeway and Causeway Coast WHS Steering Group is a group of representatives who actively contribute to the stewardship of the site. Members include National Trust, Crown Estate, NIEA, Tourism NI, GSNI, Causeway Coast and Glens Heritage Trust (CCGHT), Causeway Coast and Glens District Council, private landowners, and Council for Nature Conservation and Countryside (CNCC). The remit of the group includes securing the resources to create and deliver a WHS management plan, and encourage development of policies and practices to sustain WHS status.

Ring of Gullion AONB

The Ring of Gullion Area of Outstanding Natural Beauty (AONB) is managed by NIEA and Newry and Mourne District Council. Through the AONB many public bodies, conservation organisations, communities and landowners work together to protect and provide for enjoyment of the geological landscapes found in the area. They have worked on numerous awareness raising projects including the installation of interpretation panels at key geological sites in the area.

Geodiversity Training and Teacher Packs

CCGHT, together with local teachers and GSNI, developed a training pack for teachers and an accompanying training course developed by the Magilligan Field Centre. The training pack and course encourages teachers to visit local geological sites, promotes geological conservation and safe and responsible access to sites, and allows students to learn about the connections between geodiversity and all other aspects of heritage.

Belfast Hills Partnership (BHP) quarry clearance

The BHP is working on a number of projects in the old limestone quarry in Cave Hill Country Park to actively clear the vegetation from a number of the quarry faces. Aside from exposing the geodiversity the project also aims to create a habitat for the common lizard and the solitary bee that are both found within the quarry as the south-facing white limestone faces create the perfect environment for them to warm up.

3. Industry and business sector

Endeavour to ensure that new industry and business opportunities take geodiversity into consideration and strive to meet best practice standards.

Actions:

Develop sustainable business opportunities based on geodiversity, including tourism, accommodation, guiding and local products.

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 and enjoyment of geodiversity.

Facilitate access to geoheritage features, including temporary exposures, and make available records and samples as part of local and national geological record keeping.



Causeway Coast boat tour
© Tourism Northern Ireland

Natural Stone Database for Northern Ireland

This database provides key information on building stone used on listed buildings and monuments throughout Northern Ireland and the quarries from which the stone was extracted. It provides a valuable tool to for those who have responsibility for the care of stone buildings and monuments to understand this intrinsically complex material so that they can be treated and managed effectively. The Natural Stone Database for Northern Ireland is the outcome of an Industry-Research Partnership between the Consarc Design Group and Queen's University Belfast.

Lough Neagh Sand Traders

The Lough Neagh Sand Traders (LNST) supply around one third of Northern Ireland's sand resources. LNST work with local community groups, NGOs and councils to promote the management and protection of the Lough's environment and biodiversity through sustainable joint usage of the UK's largest lake.

Quarry Products Association Virtual Quarry Project

Virtual Quarry helps teachers incorporate quarrying themes into science, geography, education for sustainable development and citizenship teaching. The activities and information help promote the economic importance of quarrying and contribution restored quarries make to the environment. It also covers issues relating to quarries and their impact on the environment.

Rockin' Boat Trips

The Causeway Lass offers commercial deep sea fishing trips from Portrush. In the off season, they have been working with CCGHT and GSNI to develop guided geology boat trips around the North Coast to provide a mechanism to diversify their business offering. Several of these have been delivered to date, all of which have been sold out, and their product has recently been Highly Commended in the Tourism Innovation category in the Northern Ireland Tourism Awards.



Guided visit at Carnmean quarry near Moneymore

4. Local authorities and public agencies

Ensure that due consideration, management, enhancement and promotion of geodiversity are an integral part of decision making and support action by local communities to achieve this.

Actions:

Acknowledge the value and importance of geodiversity in policy and guidance documents at a national and local level and seek advice from appropriate expert bodies in decision making where appropriate.

Promote Northern Ireland's geodiversity as a tourism asset that adds value to visitor experience and enjoyment.

Provide information for schools and the public, making known the importance of geodiversity sites on a local and national scale.



Land Use Management Strategy

The Sustainable Agricultural Land Management Strategy, compiled by the Department of Agriculture, Environment and Rural Affairs (DAERA), aims to improve agricultural productivity and environmental performance. This will take into account soil geochemistry and the shape of the land surface to allow for targeted nutrient management, reducing soil erosion and minimising the leaching of nutrients into rivers and groundwater.

Crawfordsburn Geological Garden

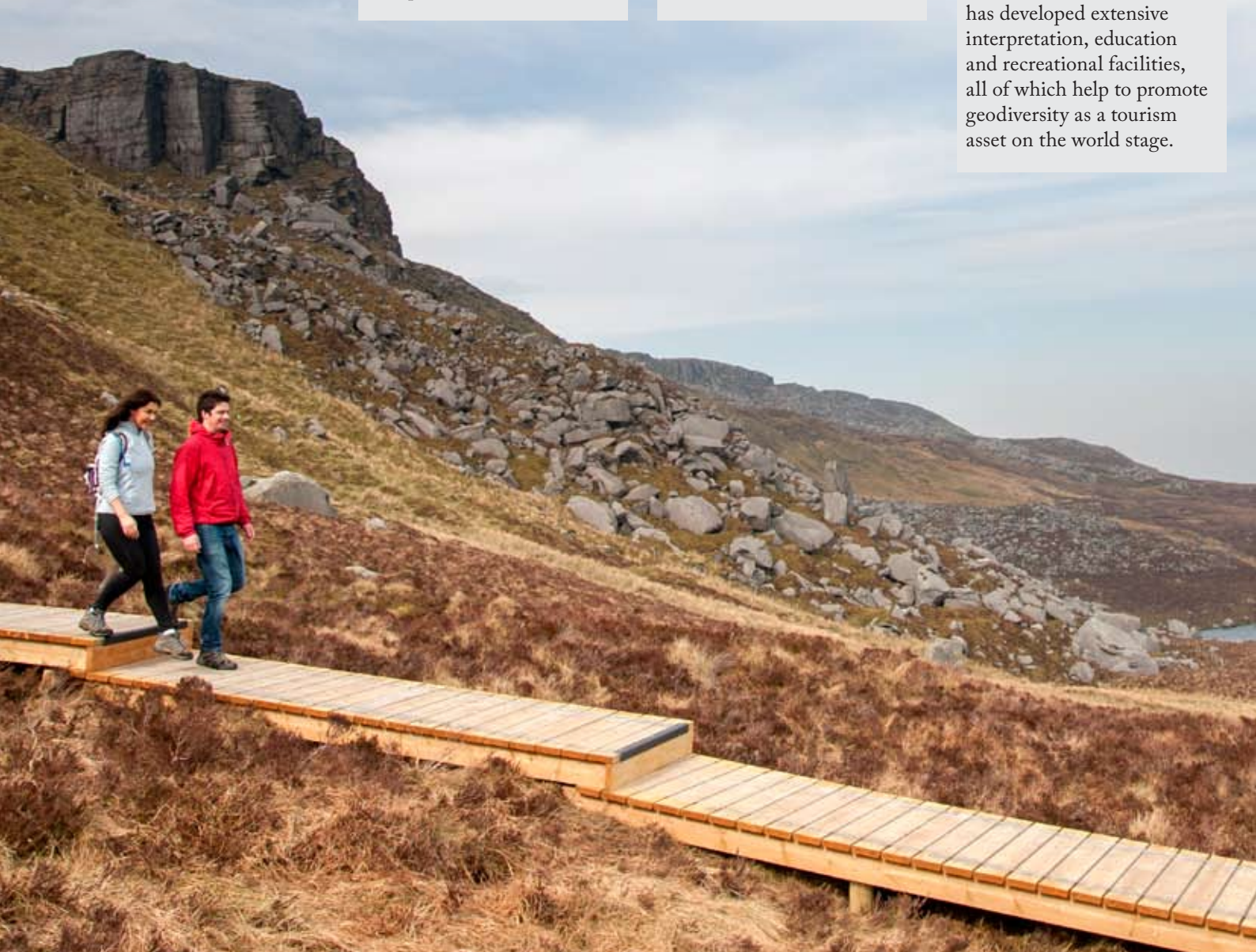
Developed by the Northern Ireland Environment Agency (NIEA) at Crawfordsburn Country Park, the Geological Garden promotes Northern Ireland's geodiversity through a 'time trail' at a key visitor attraction located within an area of high population density. This publicly accessible feature is a valuable educational tool and allows for an appreciation of the vast geodiversity through the accompanying interpretation.

International Appalachian Trail (IAT)

The IAT is a long distance walking route that focuses on the Appalachian Mountain belt that extends though North America and North-West Europe. The route celebrates the shared geological heritage of the entire trail and is managed by multiple local councils including Derry and Strabane District Council, Causeway Coast and Glens Borough Council and, Mid and East Antrim Borough Council.

Marble Arch Caves UNESCO Global Geopark

The first Geopark in the UK and the first cross-border Geopark in the world, the Marble Arch Caves UNESCO Global Geopark (MACUGG) is jointly managed by Fermanagh & Omagh District Council (Northern Ireland) and Cavan County Council (Republic of Ireland). Designated because of its internationally important geological heritage and its approach to sustainable tourism, MACUGG has developed extensive interpretation, education and recreational facilities, all of which help to promote geodiversity as a tourism asset on the world stage.



Cuilcagh Mountain boardwalk, Marble Arch Caves UNESCO Global Geopark
© Fermanagh and Omagh District Council

5. Education

Share and promote the values and applications of Northern Ireland's geodiversity through teaching at all levels.

Actions:

Inspire teachers and students at all levels about Northern Ireland's geodiversity and the links with biodiversity, our cultural and built heritage, and the economy.

Include geodiversity as a part of the wider STEM-agenda within schools.

Raise awareness of geodiversity at a senior government level to allow for a better understanding of its wider values and applications.

Provide information for the public on the wider values of geodiversity at key visitor locations.

Earth Science Outreach (ESO) Primary School Resources

A suite of primary school resources has been developed and distributed to all primary schools in Northern Ireland. These are aimed at addressing the lack of science and in particular Earth science in the primary curriculum and focus on key geological themes including general geological concepts, geohazards, resources, and climate change. These resources have been endorsed by the Council for Curriculum Examination and Assessment (CCEA).



Deep time exhibition at the Ulster Museum

Seismology in Schools Project

The Seismology in Schools project was developed by GSNI with help from the British Geological Survey and enables schools to detect signals from large earthquakes happening anywhere in the world, as well as smaller local ones. The project makes use of earthquakes and seismology to teach a range of basic science concepts as part of the wider STEM-agenda. There are three seismometers in post-primary schools around Northern Ireland as well as a further three in high footfall visitor attractions at the Marble Arch Caves, W5 and the Ulster Museum.

Science Week at Stormont

As part of British Science Week, the GSNI organises an annual day of activities for primary schools at Parliament Buildings. This event is fully interactive and is run in association with a range of stakeholders including CCGHT, BHP, Ring of Gullion AONB, QUB, the Ulster Museum, MACUGG, and SGLP, all of whom demonstrate their local geodiversity and more importantly the links with biodiversity, the economy as well as with our built and cultural heritage.

Deep Time at the Ulster Museum

The Ulster Museum has a number of exhibitions that provide information on geodiversity. The Elements exhibition provides an excellent example of the links between geology and everyday life and the Deep Time exhibition provides information on geodiversity across Northern Ireland as well as its links to the economy. With nearly 750,000 visitors every year this is a key location for disseminating geodiversity education.

NI Politician and Scientist Pairing Scheme

The MLA / Geoscientist pairing scheme brought together expert geoscientists with MLAs to facilitate exchange of knowledge, and allowed for engagement with elected representatives to better inform policy making. Geoscientists from government departments, business and universities were brought together with MLAs from a wide variety of backgrounds in this highly successful programme. The scheme was facilitated by the Northern Ireland Assembly Legislative Strengthening Trust (NIALST) in partnership with the GSNI, QUB and the Royal Irish Academy.



Schools seismology workshop at W5

6. Academia and Research

Continue to develop the geodiversity knowledge framework of Northern Ireland including its wider values and applications.

Actions:

Share research evidence to demonstrate the wider benefits, values and applications of geodiversity.

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 information and data.

Tellus and Tellus Border projects

The Tellus surveys were the most concentrated geological mapping projects ever undertaken in Northern Ireland and the border counties with the Republic of Ireland. The projects, managed by the GSNI have produced new geochemical and geophysical maps that extend and deepen the knowledge of the geology, soils, natural resources and the environment. This will support the exploration for, and development of, mineral and hydrocarbon resource, inform land-use planning and provide a country-wide environmental baseline.

InSAR risk to infrastructure project

The GSNI, together with the BGS and QUB have been using satellite radar interferometry (InSAR) techniques to remotely assess risk to infrastructure associated with ground movements in Northern Ireland. InSAR techniques have the capability to remotely monitor large areas which would enable a step change in techniques currently used by organisations such as Transport NI and Translink to analyse risk to their infrastructure network and allow for better planning to minimise disruption to the road and rail network.



All-Ireland Quaternary map

The Irish Quaternary Map, a joint project between GSNI and the Geological Survey Ireland, provides information on soils and landforms formed over the past 2.5 million years. These reflect the imprint of the last Ice Age, as well as more recent processes like peat formation and coastal erosion, occurring over the last ten thousand years.

Offshore Mapping Project

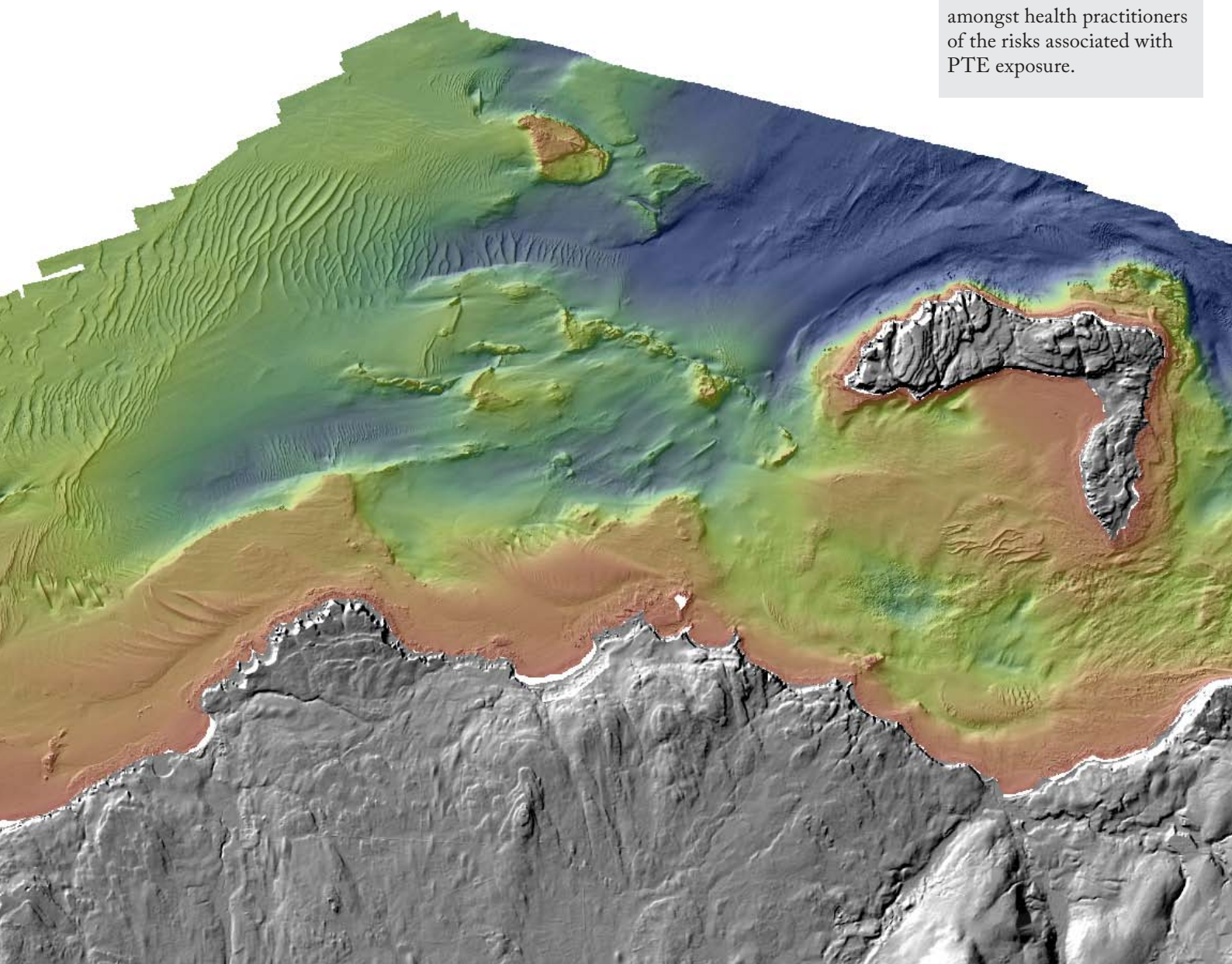
Ulster University has been using sonar data to investigate the seabed off the North Coast; essential for the mapping of rock and sediment on our seabed. This can be used to look at marine habitats and natural processes happening in this dynamic environment. It also reveals submerged landscapes occupied by Ireland's first settlers when sea level was lower than today's.

Historic buildings conservation

Queen's University of Belfast has been investigating the weathering response of sandstones used in historic buildings. This work, funded by Historic Environment Scotland and the NIEA, looks at the impact of different conservation surface treatments aimed at preserving architectural details, but in some cases actually accelerating degradation processes.

Soil geochemistry and health

Medical data and Tellus soil and stream geochemistry were used to look at the relationship between long-term exposure to potentially toxic elements (PTEs) in soil and water and potential risk of progressive diseases (e.g. cancer and kidney disease). The findings, delivered by a partnership between Queen's University, the Northern Ireland Cancer Registry and the nephrology research group, show that there is a need to increase awareness amongst health practitioners of the risks associated with PTE exposure.



Support for the Northern Ireland Geodiversity Charter

The following organisations support the Northern Ireland Geodiversity Charter and its vision and will work towards relevant actions:

Belfast Geologists Society
Belfast Hills Partnership
British Geological Survey
Causeway Coast and Glens Heritage Trust
Consarc Design Group
Earth Science Ireland
GeoConservationUK
Geological Society Regional Group NI
Geological Survey of Northern Ireland
Giants Causeway and Causeway Coast World Heritage Site Steering Group
Institute of Geologists of Ireland
Lough Neagh Sand Traders Association
Marble Arch Caves UNESCO Global Geopark
Mourne Heritage Trust
National Trust
Northern Ireland Environment Agency
Quarry Products Association Northern Ireland
Quaternary Research Association
Queen's University Belfast
Ring of Gullion AONB
Ring of Gullion Landscape Partnership
Sperrins Gateway Landscape Partnership
Ulster Museum
Ulster University
W5

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Slemish Mountain
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