



SUMMARY

The aim is to produce a simplified geological map of the Ben Nevis/Glen Nevis area along with an explanatory booklet which also gives details of eight self-guided walks. No such material is currently available for the area.

PROJECT DESCRIPTION

Many thousands of people visit the Nevis area each year, but at present there is no accessible geological guide available to explain the main events which shaped the area's spectacular scenery. The provision of attractive and non-specialist information about how the landscape came about will help enhance the visitor experience.

The Earth heritage of the Lochaber area, including Ben Nevis, is of international importance. This was recognised when the Lochaber area was awarded European and UNESCO Global Geopark status in 2007. Although lack of funding meant that Lochaber Geopark had to withdraw from the European Geoparks Network in 2011 the exceptional quality of the area's Earth heritage is not in question. Lochaber Geopark is currently operating on a voluntary basis.

The story of how Ben Nevis was formed is fascinating but complex. The aim of the map & guide is to help those without a geological background appreciate some of the astonishing events which have helped to shape the Nevis area.

The geological map will be specially produced with attractive colours, topographic shading and less technical language than is usual on this sort of map. The eight walks will be shown on the geological map so that users can see the different rocks they will encounter on each outing.

The map will include a simplified stratigraphic column where the ages and descriptions of the main rocks in the area are listed. Half of the sheet containing the map will be given over to illustrations and explanatory text. The illustrations will include photographs of the local scenery as well as diagrams and cross-sections which help explain some of the key events involved in the creation of the landscape.

The accompanying booklet will start by giving an overview of the geological history of the area. By means of colourful illustrations and simplified explanations, the main events in the 700 million year history of the Nevis area will be related. The eight walks will then be described in detail, with numerous illustrations (both photographs and diagrams) showing the main features encountered on each outing. Key features to be given GPS references.

DELIVERABLE OUTPUTS

A geological map of Ben Nevis/Glen Nevis, along with an explanatory booklet which outlines the geological history of the area and describes eight walks. Both items will be offered for sale in a single, doublesleeved package.

The 48-page booklet will consist of:

Introduction – 10 pages
Walk Descriptions – 8 x 4 = 32 pages
Geological Glossary – 2 pages
Gaelic Glossary – 1 page
Travel & Tourist Information – 1 page
Acknowledgements – 1 page
Further Reading – 1 page

Delivery/development of local training modules (4)
Field trips for local schools (8)

OUTPUT INDICATORS & TARGETS

Map & guide to be published by April 2015.

OUTCOMES

Delivery of printed material about the local Earth heritage that is informative, accessible and stimulating.

Increased appreciation of the area's geodiversity.

Enriched visitor experience.

Young geologists from BGS will accompany Lochaber Geopark personnel on the walks where possible to learn about the Nevis area and gain appreciation of its rich geological heritage.

ACTIVITIES AND TIMETABLE

April-June 2014 Identify and follow the eight walks (describe, photograph and note GPS readings).

July-August 2014 'Test drive' the eight walks with draft descriptions.

September-December 2014 Finalise walk descriptions. Feedback amendments to draft map.

Prepare explanatory text and collate photographs. Identify diagrams required and arrange production.

January-February 2015 Critique all content. Finalise all material for map and booklet.

March 2015 – Arrange for printing of map & guide. Check proofs etc.

April 2015 – Map & Guide available for sale.

BGS hold the survey information required to create the geological map.

They are hugely experienced at creating geological maps and have excellent cartographic facilities. As a lead partner they can provide much input in kind.

Lochaber Geopark personnel have much geological experience and considerable knowledge of the local area. They also can make a large in kind contribution.

EVIDENCE, REVIEW & REPORTING

The text for the map & booklet initially produced by Lochaber Geopark will be checked/edited by British Geological Survey (BGS) staff.

'Friends of Nevis' (FON) and 'Nevis Visitor Centre' staff will also help check/'test drive' the walk descriptions.

HERITAGE CONSERVATION

The production of a popular geological guide for a lay audience, will increase appreciation of geodiversity and Earth heritage. The wide appeal of Ben Nevis and the tens of thousands of annual visitors means there is scope to reach a significant audience. Whilst no direct measure can be drawn, it is envisaged that this will lead to a greater sense of care and respect for the mountain environment and geodiversity.

BENEFICIARIES & COMMUNICATION

The map & guide material produced by this project should enable those with an interest in Earth heritage to appreciate some of the main events which have created the Nevis Landscape.

Users will be able to discover at first hand some of the distinctive rocks found in the area and learn what these tell us about the geological history of the Nevis region.

The material should be at a level which will appeal to anyone without a geological background that has an interest in landscape.

WIDER CONTEXT

The publication of a high quality geological guide for Ben Nevis and the surrounding landscape will bring many additional benefits to other projects. Particular value is added to the conservation work on the Ben Path, generating a much richer experience for visitors to the area, and increasing appreciation of the area's geodiversity.

In providing additional walks in the area, visitors will be encouraged to stay longer with tangible benefits for the local economy.

The information will also inform sections of the website, visitor interpretation and the film of Ben Nevis.

PROJECT BUY-IN

The two main partners involved in this project are BGS and Lochaber Geopark Association. BGS (then called the Geological Survey of Great Britain) first surveyed the Nevis area over a century ago. The data collected by the early survey geologists is recorded in numerous field notebooks, annual fieldwork reports and published memoirs held in BGS archives. The first detailed map of the Nevis & Glen Coe area was published in 1921. BGS has great expertise in supplying geological data and also in creating geological maps. However there has been no overview of the Nevis area since the second edition of the local memoir was published in 1960 – and that was highly

academic in nature. Several of the Directors of Lochaber Geopark are geologists with extensive knowledge of the Nevis area. They are well able to identify appropriate outings which highlight key aspects of Earth Heritage of the Nevis area. One of the objects of Lochaber Geopark is: "To raise awareness of Lochaber's outstanding geology and geomorphology, both locally and outwith the area."

PROJECT LEAD

Noel Williams
(Lochaber Geopark Director)
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Noel has extensive knowledge of the Nevis area stretching back over 40 years. He is a geologist, mountaineer and former teacher with a special interest in helping people appreciate the story behind the creation of the Nevis landscape.

PARTNERS /CONTRACTORS ETC

Lochaber Geopark
Select suitable walks.
Write descriptions.
Take photographs, GPS readings.
Write map and booklet text.
Identify diagrams/cross sections required.

British Geological Survey
Prepare geological map.
Create diagrams/ cross sections.
Edit final material. Oversee publication.

PROJECT DEVELOPMENT

From the original proposal, research, consultation and stakeholder meetings have clearly indicated that the nationally important geodiversity of the area is deserving of a higher quality publication and guide than originally conceived. The project budget has been appropriately increased to ensure a publication of greater depth, clarity, wider appeal and lasting benefit is created.

Budgets

Item	Details	Lead Partner	Unit Cost	No.	Total	In-kind element: BGS/LGA	Cash Cost
Map	Geological Survey (roughly A1). Some modification to colour scheme and minor adjustments to location of a few dykes/intrusions. Includes production of custom topography from OS, creating shading and map effects	BGS, but with input from LGA	£3,900	1	£3,900	£3,000	£900
Map	Stratigraphic Column and text.	BGS	£1,156	1	£1,156	£700	£456
Map	3D cutaway sections. Collating with Stratigraphic Column. Key Geological stages, in-line with LGA themes of: Mountain Building, Fire & Ice (more detail to come from LGA)	BGS – but with input from LGA.	£1,400	3	£4,200	£3,000	£1,200
Map	Photos: Geomorphology, points of interest and examples of landscape-scale processes within the area.	LGA to provide photos,	£30	8	£240	£240	£0
Map	Text: examples of Geomorphology & Landscape-scale processes within the area.	LGA to provide text	£60	8	£480	£480	£0
Map	Routes and key features located on map with data for GPS navigation	LGA to check and provide data	£45	16	£720	£720	£0
Map	Graphics for each route and key features on map	BGS	£330	16	£5,280	£4,000	£1,280
Map	(A0) Editing, design and layout of all map elements,	BGS	£4,105	1	£4,105	£3,000	£1,105
Book	Text: contents and geological introduction (10 pages) including background research, content, editing and formatting.	LGA to provide text	£300	10	£3,000		£3,000
Book	Geological illustrations/graphics:	LGA to provide 4	£300	4	£1,200	£1,200	£0

	Sequence of events creating Ben Nevis, mountain building, igneous intrusions, caldera collapse, metamorphic aureoles. Glaciation in the Highlands/Glen Nevis, Loch Lomond Stadial, nunataks etc.	BGS to provide 4	£450	4	£1,800	£1,000	£800
Book	Landscape-scale survey: identify, assess and prioritise potential walks and sites of interest	LGA	£400	4	£1,600	£1,600	£0
Book	Detailed survey and record of walks: identify and locate key features, assess safety and access issues, navigational info.	LGA	£400	8	£3,200	£3,200	£0
Book	Text for walks (4 x 8 = 32 pages): including, research and details of geological features, processes, views, navigation etc.	LGA	£350	8	£2,800		£2,800
Book	Photos of key features for each walk (6 per walk x 8 walks = 48)	LGA		48	£1,440	£1,440	£0
Book	Graphics/illustrations of geological feature/process (1 per walk)	BGS with input/examples provided by LGA.	£325	8	£2,600	£1,500	£1,100
Book	3D map/view of walking route – computer generated with mapping software.	BGS to produce, LGA to provide data.	£250	8	£2,000	£1,000	£1,000
Book	Pilot of route descriptions and orientation/navigation	NLP	£50	8	£400		£400
Book	Glossary, further reading, reference materials, etc. (6 pages)	LGA	£300	6	£1,800	£1,800	£0
Book	Gaelic translation	The Highland Council will provide services					
Book	Editing, design and layout for all book elements (48 pages)	BGS	£4,800	1	£4,800		£4,800
Printing	Map on water-resistant & tear-proof paper	BGS	£3	1000	£3,000		£3,000

Printing	Book and case	BGS	£6	1000	£6,000		£6,000
LGA in-kind						£10,680	
BGS in-kind						£17,200	
TOTAL Cash Costs							£27,841

Total Cash Costs = £27,841
In-kind contributions = £27,880
VAT = £4,328

PERMISSIONS & COMPLIANCE

Landowners will be contacted regarding the walking routes. The proposed walking routes will also be run past the Local Access Officer, as well as Scottish Natural Heritage (SNH).

LEGACY & MAINTENANCE

The map & guide will provide a clear summary of the main events which have helped create the Nevis Landscape. It should prove an informative educational resource for several years to come.

In the lifetime of the publication this is unlikely to change very much. It should be possible to incorporate any revisions needed, due to any changes in walks or updating of geological information, at the time of reprinting.

RISKS & RISK MITIGATION

Some of the walks described will go into mountainous areas. The Safety Officer of the Mountaineering Council of Scotland (MCoS) will be consulted regarding appropriate warnings regarding the level of difficulty involved in such outings and the appropriate clothing and equipment required.

BACKGROUND INFORMATION

The geological map & guide combination has already proved a very popular format for the Assynt area in the North-West Highlands. A map & guide for Fforest Fawr (Brecon Beacons) is also in production. Both of these publications were produced by BGS.

Technical Specifications

Map sheet: A0 size 4-colour water-resistant & tear-proof paper, with the map itself (A1) taking up half the area. The remainder of the sheet to be made up of scenic photographs, diagrams, cross sections and explanatory text.

Guide: A5 size, 48 pages 4-colour booklet. Card cover, sewn binding. 10 pages introduction & geological history, 32 pages describing the walks (8 x 4pp), 6 pages of glossary, Gaelic etc.

ADDITIONAL INFORMATION

The Nevis area is geologically important for two main reasons:

1. The rocks which were crumpled up (and metamorphosed) during the creation of the Caledonian Mountain chain some 450 million years ago were involved in such intense folding that the original rock layers were completely overturned.
2. At the end of this mountain building episode, a section of the Earth's crust in the Nevis area collapsed catastrophically into a large magma chamber. A massive crater called a caldera was created on the land surface and vast quantities of ash were ejected into the atmosphere. The early geologists called this process *cauldron subsidence*. The rocks forming the summit of Ben Nevis would have been eroded away a long time ago had they not collapsed over 2000ft and been preserved inside a body of granite.

Publications:

Geology of Ben Nevis and Glen Coe, Institute of Geological Sciences (2nd Edition, Edinburgh: HMSO, 1960).

Exploring the Landscape of Assynt – A walkers' guide and map showing the rocks and landscape of Assynt and Inverpolly, Earthwise, (Keyworth, Nottingham: British Geological Survey, 2004), ISBN 085272471-3.

Ben Nevis and Glen Coe – A Landscape Fashioned by Geology, Stephenson & Goodenough (SNH: 2007), ISBN 9781853975066.

Websites:

<<http://www.bgs.ac.uk/>>

<<http://www.lochabergeopark.org.uk/>>

<<http://www.snh.org.uk>>



Forestry Commission Scotland
Coimisean na Coilltearachd Alba



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The Nevis Partnership is a Charity registered in Scotland, No SCO33418