Geodiversity Action Plan

Summary

Biodiversity is fundamentally linked to underlying geological features. The term ‘geodiversity’, or geological diversity, encompasses rocks, minerals, soils, sediments, landforms and processes; all of which are the foundation for habitats, niches, and ultimately biodiversity.

Great advances have been made in recognising how geodiversity (rocks, soils, landforms and related processes) supports biodiversity and underpins ecosystem services. To make progress with biodiversity, our understanding of geodiversity must increase in order to improve the management and care of nature.

Geodiversity is internationally recognised by the Recommendation of the Committee of Ministers of the Council of Europe (2004) that: *"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".* There are key gaps in our knowledge of geodiversity, including the functional links between geodiversity and biodiversity and research is required to improve our understanding of the role of geodiversity in providing benefits to ecosystems.

Habitat Profile

305–355-million-year-old Carboniferous rocks underlie North Lanarkshire with the oldest in the north in the Kilsyth Hills and eastern Campsie Fells. These hilly parts lie to the north of the large Campsie Fault and are mainly formed by lava flows and associated volcanic ashes of air fall and water lain origins. Locally beneath the volcanic rocks, mainly fluvial rocks are seen that were deposited when the climate was of monsoonal character with wet and dry seasons reflecting Scotland’s nearness to the Equator. Above the volcanic rocks and flooring most of North Lanarkshire south of the Campsie Fault is undulating land with key river valleys that are underlain by sedimentary rocks. These were laid in wet equatorial conditions, the tropical nature of the climate gave rise to peat swamps and raised bogs that provided the extensive deposits of coal (with associated ironstones) that were mined and dug to fuel the Industrial Revolution and 19th century urban growth. Opencast coal has been a major feedstock to power generation. The rocks also include mudstones and limestones laid down in tropical seas and lakes, deltaic and river sandstones, and wetland soils (‘fireclays’). These provided lime for agriculture and building, mudstone/fireclay for brick making, and sandstone as both a building stone and for glass and moulding sands. Intruded into the sedimentary rocks are thick igneous sheets (sills) and narrow vertical dykes that are the youngest rock in the area. These have provided materials used as aggregates in construction, with their extraction still an important element of the local economy.

During the last 2 million years, ice sheets have covered the area. The debris in the moving ice has both moulded the landscape by erosion (acting like sand paper), and then been laid down as ‘ground moraine’ or till (a mix of clay, sand, stones and boulders). The ice has also sculpted the till into hills known as drumlins. Till has been dug for brick making, fill for construction and as lining for modern landfill operations. Along the main valleys melt waters from the ice have laid down fluvial sand and

gravel that have been worked for aggregates. Extensive deposits of peat on higher moorland have been dug or cut for a variety of uses from fuel to horticulture.

Considered management of Scotland's geodiversity aligns with, and supports the Scottish Biodiversity Strategy, Scottish Soil Framework, Land Use Strategy and Scotland's Landscape Charter.

North Lanarkshire's geodiversity is chiefly revealed through rock exposures in river valleys and quarries. Geomorphological features including the lava flow "steps" of the Kilsyth Hills, the gorges and incised meanders of our rivers and burns, and glacial features including drumlins and moraines add to the diversity of our landscape. The Geodiversity Audit report gives a "Top Twenty" selection of sites which give a representative overview of North Lanarkshire's geoheritage.

Legal Status

Geodiversity is not covered by any legal protection.

Current Status

Sites of geodiversity importance can be protected through Sites of Special Scientific Interest (SSSI) protection. There is also the potential to designate a site at a local level as a Local Geodiversity Site (LGS). These sites may be proposed by voluntary geoconservation bodies, such as local Geodiversity groups.

Scotland's Geodiversity Charter addresses the benefits of recognising the value of geodiversity, outlining its wide relevance, and the benefits it delivers to biodiversity through support of habitats and ecosystems. The Charter aims to promote integration of geodiversity within the ecosystem approach, and for the importance of geodiversity to be acknowledged through policy and guidance documents at a national and local level, including Local Plans and guidance for biodiversity.

The Charter also recognises the value of partnership formation between local authorities and local geodiversity groups to: audit sites, develop geodiversity action plans and involve local communities in collating information about sites of geological interest.

Two Sites of Special Scientific Interest have been designated in North Lanarkshire for their geological features - Mollinsburn Road Cutting: Carboniferous-Permian Igneous (Igneous Petrology) and Corrie Burn: Lower Carboniferous (Stratigraphy).

Current Factors that could affect Geodiversity

- Development
- Changing land use
- Climate change
- Natural erosion or deterioration

Current Actions

Volunteers from Strathclyde Geoconservation, which is a specialist group of the Geological Society of Glasgow, have completed the following action during 2012-2018.

- visited 81 potential geodiversity sites in North Lanarkshire
- provided NLC with Geodiversity Audit Reports for each site
- provided NLC with a Geodiversity Action Plan in 2015
- provided NLC with a full Geodiversity Audit Report for North Lanarkshire in 2018

Volunteers from Friends of Kelvin Valley, which is a specialist group of the Kilsyth and Villages Community Forum, have completed the following actions 2012-2022.

- produced leaflets entitled 'Kelvin Valley Rocks!' and 'Cumbernauld Rocks' which have been distributed to the public via libraries and other popular locations
- given 15 slide shows and twenty displays on local geology and mining to local groups and schools

North Lanarkshire Council biodiversity team have:-

- incorporated our geodiversity site reports into their GIS data base for SINCs and flag sites up to Planning where required
- published our Geodiversity Action Plan as part of the NLC Biodiversity Action Plan 2015-2020
- published our full Geodiversity Audit Report on NLCs website

Proposed Objectives, Targets and Actions

Objectives

1. Identify and report on a representative range of geodiversity sites across North Lanarkshire (completed)
2. Protect these sites
3. Publicise North Lanarkshire's geodiversity

Action	Meets Objective Number	Action by	Target
Policy and Legislation			
1.1 Ensure all geodiversity sites that are also SINCs are fully incorporated into the SINC processes.	2	NLC	2025
1.2 Assess the handful of geodiversity sites that are not SINCs with a view to designating them SINCs.	2	NLC	2025
1.3 Ensure any remaining sites are also flagged up and treated as if they are SINCs.	2	NLC	2025
1.4 Add in any further potential geodiversity sites if these are identified.	2	Strathclyde GeoConservation, NLC	2027

Habitat management and protection			
2.1 Ensure geodiversity sites are highlighted throughout the planning system and specifically, through the SINC protection system.	2	NLC	Ongoing
Monitoring and Research			
3.1 Monitor geodiversity sites as part of SINC monitoring.	2	NLC	Ongoing
3.2 Encourage research by Universities and local groups.		NLC, Strathclyde GeoConservation	Ongoing
Communications and Publicity			
4.1 Publicise the 2018 Geodiversity Audit report on NLC website.	3	NLC	Ongoing
4.2 Produce and distribute a geodiversity leaflet for North Lanarkshire.		NLC, Strathclyde GeoConservation	2023
4.3 Add geodiversity information to other NLC publicity including information boards, social media, website and leaflets when possible.	3	NLC, Strathclyde GeoConservation	2025
4.4 Include geodiversity in Ranger led event where appropriate.	3	NLC, Friends of Kelvin Valley	Ongoing

References

Strathclyde Geoconservation Group 2012-2018.
North Lanarkshire Geodiversity Site Assessment Reports

Strathclyde Geoconservation Group. 2018.
North Lanarkshire Council. Geodiversity Audit Report

British Geological Survey 1996. Geology of the Airdrie District. Memoire for 1:50,000 Geology
Sheet 31W

British Geological Survey. 1:50,000 Geology Maps 1:50,000 scale- Sheet 31(W).
Solid and Drift editions

Authors:

Mike Browne and Paul Carter, Strathclyde GeoConservation Group.