

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Egwyddorion cyffredinol Bil yr Amgylchedd (Cymru)	General principals of the Environment (Wales) Bill
Ymateb gan Geoconservation Cymru - Wales (GCW)	Response from Geoconservation Cymru - Wales (GCW)
EB 52	EB 52





Association of Welsh RIGS Groups (AWRG)

01865 - 278900 (switchboard)

kenneth.addison@spc.ox.ac.uk

Dr Ken Addison,
Current Acting Chair, AWRG
St Peter's College,
Oxford University,
Oxford OX1 2DL

Environment (Wales) Bill Welsh Government Consultation

15th June 2015

Response from Geoconservation Cymru – Wales (GCW), formerly the Association of Welsh RIGS Groups (AWRG)

Preamble This response to the *Environment (Wales) Bill* is made on behalf of the Association of Welsh RIGS Groups (AWRG) which is in the process of changing its name to Geoconservation Cymru – Wales (GCW). AWRG was established in April 1999, bringing together the RIGS¹ groups in Wales with geologists from the then Countryside Council for Wales and British Geological Survey with the aim of conserving and promoting Welsh geodiversity².

AWRG worked with the Welsh Government in a full Audit of Regionally Important Geodiversity Sites in Wales completed in 2012 and, around and since then, responded to the *A Living Wales* (2010), *Natural Resources Wales* (2012), *Sustaining a Living Wales Green Paper* (2012), *Nature Recovery Plan for Wales* (2014) and *Landfill Disposals Tax* (2015) Consultations.

We regard partnership and communication of geodiversity and geoconservation (including other conservation organisations in biodiversity, local government and the National Assembly for Wales and Welsh Government) as essential objectives in the holistic and sustainable management of the natural resources, landscapes and services of Wales. The relevant Aims & Objectives are set out in Appendix A, abstracted from the GCW Constitution (2015).

¹ RIGS were designated as Regionally Important Geological/Geomorphological Sites in the UK Nature Conservancy's *Earth science conservation in Great Britain : A strategy* (1990), being of a standard worthy of recognition and protection as non-statutory sites, to complement the SSSIs and NNRs under statutory protection. RIGS sites in Wales are now known as Regional Geodiversity Sites.

² Definitions collated from Scotland's *Geodiversity Charter* [Scottish Geodiversity Forum, 2012, in partnership with the Scottish Government, Scottish Natural Heritage and British Geological Survey; England's *Geodiversity Charter* [English Geodiversity Forum, 2014, in partnership with Natural England and the British Geological Survey]; the Association of Welsh RIGS Groups [supported by the Welsh Assembly Government] and GeoConservation UK [supported by Natural England *et al.*]. For fuller definitions, see Appendix B



Association of Welsh RIGS Groups (AWRG)

Our Response to the Environment (Wales) Bill

1. The essence of our response is that the Bill gives scant recognition to the significance of geology and soils in Part 1 : Sustainable Management of Natural Resources and none whatsoever to the role and importance of geoconservation and geodiversity - to the detriment not only of these key aspects of protection for the geological environment and character of Wales but therefore also for its role in sustainability and environmental services it provides.
2. Apart from the singular inclusion of *geological features and processes* in Part 1, Natural Resources 2(d), there is no further use of the terms 'geology' or 'geological environment' in the Bill even though geology controls or influences many aspects of air, water & soil; minerals; physiographical features; climatic features & processes listed in 2 (b) – (f) as well as biodiversity, ecosystems and habitats.
3. By comparison, there is extensive use of the term 'ecosystems', 'biodiversity' and 'habitat' in the elaboration of, and duties with regard to, 'natural resources' and the Natural Resources Body for Wales (NRW) in Part 1, especially in sections 3 (Sustainable management of natural resources), 4 (Principles of sustainable management of natural resources), 6 (Biodiversity and resilience of ecosystems duty) and 7 (Biodiversity lists *etc.*).
4. It is our case that this omission, and the consequential imbalance in the definitions and duties regarding natural resources and their sustainability, requires correction, without which these aspects of the Bill are flawed and its aims and objectives compromised.

The causes of omission, imbalance and ambiguity

5. In the broadest sense, the term 'Nature' in both scientific and general usage implies both the organic, living (bio-) and inorganic, 'non-living' (geo-) working together to create the physical environment. However, the terms biodiversity and bioconservation are frequently *narrowly* defined and restricted just to the living environment – and that equally important geodiversity and geoconservation are often excluded from recognition in environmental policy and funding for geoconservation.
6. This serious narrowing of the definition, recognition and application of geodiversity pervades public, private and governmental organisations *inter alia* and is bound to influence the nature and level of acceptance of geoconservation and geodiversity in this Bill and all other bills and Policies.
7. Moreover, the essential problem is compounded by all subsequent definitions, applications and policies when they rely - knowingly or unknowingly - on an initial, narrow definition. Those drafting application and policy without scientific knowledge simply repeat the flaw. Exclusion of the geological half of 'nature' is rarely deliberate and comes instead from this lack of understanding.



Association of Welsh RIGS Groups (AWRG)

8. Geoconservation and geodiversity have a good pedigree in the publications and policy of the UK's Statutory Conservation Agencies and other organisations but their continuity into downstream publications and policy – including this Bill – is inconsistent, unreliable and often subject to individual author's understanding. There is a frequent necessity to re-state the case for their recognition. Extended justification for the definition and use of the terms is provided in Appendix B.

Since the terms geoconservation and geodiversity underlie basic understanding and communications in this broad field, consistency and stability of the nomenclature across all uses is essential.

The case for specific inclusion of Geoconservation and Geodiversity in the Bill

9. Wales' geodiversity and its conservation and accessibility are an integral part of the scientific, historical, industrial, educational, cultural, aesthetic and recreational landscapes and heritage of Wales. With regard to benefits to the environment of Wales in general terms, geoconservation and geodiversity draw attention to a fundamental component of the physical landscape and control of its operating processes, the underpinning of biodiversity and a strong influence on the cultural and socio-economic environments developed over time.

10. This awareness is obscured – and therefore often ignored and uncomprehended – through its largely subsurface expression, which makes the occurrence of surface outcrops and exposures, and their conservation and opportunity for scientific study, informing national policies and strategies, public education and amenity all the more important. Active geoconservation also improves environmental quality.

11. With regard to benefits to biodiversity, geodiversity provides the fundamental underpinning of the biosphere, through the chemical and physical character of the rocks and, together with climate, is the principal determinant of the structure and composition of the plant communities. Many habitats and ecosystems – such as salt marsh, tidal and estuarine habitats, sand-dunes, limestone pavement, bogs & mosses, mountain rockwalls - are primarily 'geosystems' first and thence 'biogeomorphic' systems. For all these reasons, geodiversity is also a major determinant of human land use and provides a wide range of ecosystem and related services (see Appendix C). Geodiversity is not a sub-set of biodiversity – it *creates* biodiversity.

12. Geodiversity also carries both the record of past climate change as well as the principal evidence for modelling future climate change, and the sensitivity of active geomorphological and soil sites frequently provides an early signal of progressive anthropogenic climate change.



Association of Welsh RIGS Groups (AWRG)

13. The geodiversity of Wales has few peers for such a concentration of geological interest in a small nation and featured strongly in pioneer global geological research in the early-mid 19th Century. Major geological systems – the Cambrian, Ordovician and Silurian - recognised worldwide, retain their early Wales nomenclature. Its geodiversity therefore not only underpins much of Wales’ industrial and historical heritage but so too does its very scientific study.

14. Wales was also a very early (if not the first) centre for soil survey and mapping in the UK. Prof G W Robinson at Bangor University first published on Anglesey soils in 1917, with the first full time “soil surveyors” appointed in 1924 leading to soil maps in 1928. He also linked soils to the underlying geology when Greenly published his classic Anglesey geology map and memoir in 1919. Soils rarely feature in environmental policy and yet they underpin all biodiversity interest and the role of soils in mitigating a wide range of sustainable environmental issues, especially climate change, requires clear identification in the Bill.

15. Geoconservation is essential in the maintenance of geodiversity since the removal of any geological resource is final and cannot re-grow or be re-introduced, whereas biodiversity can recover or be restored through habitat-recreation and species re-introduction. Wales has 76 National Nature Reserves (NNR) many of which are iconic sites for their geodiversity – for example, the large-scale upland glaciated landscapes of Cwm Idwal, Yr Wyddfa and Cadair idris, the coastal sites at Morfa Dyffryn and Morfa Harlech, and the caves at Dan yr Ogof. All are NNRs whose geodiversity defines the landscape and underpins the biological interest. There are currently c. 400 Sites of Special Scientific Interest (SSSI), out of 1329 SSSIs, designated primarily or substantially on their geological importance in Wales, and a further 924 Regional Important Geodiversity Sites (RIGS) across Wales to which there is no reference in the Bill and which collectively underline the importance of Wales’ geodiversity to all of the issues covered by the Bill.

16. Finally, Wales outstanding geodiversity is recognised internationally, and provides huge opportunities for education, recreation and improving the health of the nation. The two Welsh UNESCO geoparks (GeoMôn and Fforest Fawr), for example, are demonstrating the key role that geodiversity can play in stimulating local tourism and generating sustainable economic development. Many country parks and designated walks in Wales, designed not only for public enjoyment but also activity linked with health and wellbeing, are established in former quarries and areas of land degradation and GCW is active in placing relevant geological information in the public domain including notice boards and trail guides in these and other locations.



Association of Welsh RIGS Groups (AWRG)

It is therefore our principal request that in order to avoid ambiguity and exclusion, the terms **geodiversity** and **geoconservation** be written into and given equal status with biodiversity in the Introduction and General Duties of the Environment (Wales) Bill, and that explicit reference is made to them thereafter and as appropriate, wherever the specific reports, policies and implementations warrant.

Yours sincerely,

Dr Ken Addison MA, DPhil, FGS, FR(Met), FRGS kenneth.addison@spc.ox.ac.uk

Geoconservation Cymru – Wales (GCW, formerly AWRG)
Executive Committee of GCW and former Chair of AWRG,
Inaugural Chair of Gwynedd & Môn RIGS, Inaugural Chair of UK RIGS
(now GeoConservation UK)



Association of Welsh RIGS Groups (AWRG)

APPENDIX A

The Title, Aims & Objectives of Geoconservation Cymru - Wales

1. The name of the organisation is Geoconservation Cymru - Wales (hereafter abbreviated as GCW) and formerly known as "The Association of Welsh RIGS Groups" (AWRG).
2. Subject to the matters set out below, GCW and its funds and any property shall be administered and managed in accordance with this constitution by the members of the Executive Committee, constituted by clause 7 of this Constitution.
3. The Aims of GCW shall be to encourage the identification, conservation, appreciation and promotion of what were first collectively known as Regionally Important Geological/Geomorphological Sites (RIGS) and are known currently as Regional Important Geodiversity Sites (RIGS) in Wales, for education and public benefit, through the following Objectives, by:
 - a. acting as the national coordinating organisation for the Geoconservation and Geodiversity movement in Wales, and regional Welsh Geoconservation (RIGS) Groups, hereafter abbreviated as WGG;
 - b. collaborating with the National Assembly of Wales, Statutory conservation and regional Geoconservation organisations in Wales, including Natural Resources Wales / Cyfoeth Naturiol Cymru, and the wider UK, towards common objectives;
 - c. focusing on common purposes and issues in meeting the needs of geoconservation at every level, including the protection of RIGS;
 - d. promoting and maintaining standards and systems of nomenclature, recording and documentation;
 - e. maintaining access to, and updating, a database of Welsh RIGS
 - f. identifying and working to secure resources to enable GCW and WGG to work effectively;
 - g. developing appropriate structures to enable GCW to promote and support the movement nationally;
 - h. advising and assisting in the implementation of relevant national policies and strategies;
 - i. maintaining a watching brief over the wellbeing and efficacy of WGG and representing the geoconservation interest in areas of Wales which, from time to time, may lack an active WGG;
 - j. working with other organisations, such as geological groups, educational institutions, Wildlife Trusts *etc.* and those caring for the historic environment (*e.g.* Cadw, the National Trust) to achieve common objectives;



Association of Welsh RIGS Groups (AWRG)

- k. representing the voluntary sector of geoconservation in Wales on the Executive Committee of Geoconservation UK and in the UKGAP;
- l. implementing a bilingual policy whenever possible with constraints of expertise and finance;
- m. reviewing these objects from time to time.

The Aims & Objectives of Regional Welsh Geoconservation Groups

- 4. The Aims and Objectives of each regional WGG in Wales shall be to:
 - a. identify, survey and document non-statutory sites of geological, geomorphological and related discipline interest in Wales, in discrete named Regions defined by current national and unitary boundaries, on criteria such as the use of sites for educational fieldwork, scientific study, historical, aesthetic, cultural, wildlife, recreational values and related aspects. These sites will be subject to appropriate scrutiny before proceeding to notification.
 - b. notify and promote the establishment and protection of such geodiversity sites for future generations with local planning/minerals/National Park authorities (including incorporation into Unitary Development Plans) and other relevant non-statutory organizations;
 - c. maintain an active policy with regard to the site assessment, long-term monitoring, protection and management of geoconservation sites.
 - d. promote an interest/awareness in geoconservation amongst the general public by whatever practical means deemed appropriate.
 - e. In all other respects, the Aims and Objectives of each regional WGG shall be to support and uphold the general Aims and Objectives of Geoconservation Cymru - Wales within its agreed regional boundaries.



Association of Welsh RIGS Groups (AWRG)

APPENDIX B : GEODIVERSITY

Geodiversity is defined as the variety of rocks, minerals, fossils, landforms and soils, together with the natural processes that shape them. Geodiversity is a foundation for life and our society. It provides the fundamental underpinning of the biosphere, through the geochemistry, structure and water/thermal conductivity of rocks and soils and is actively altered by surface geomorphological processes. Geodiversity influences landscape, habitats and species as well as our economy, historical and cultural heritage, education, health and wellbeing ².

² Collated from Scotland's *Geodiversity Charter* [Scottish Geodiversity Forum, 2012, in partnership with the Scottish Government, Scottish Natural Heritage and British Geological Survey; England's *Geodiversity Charter* [English Geodiversity Forum, 2014, in partnership with Natural England and the British Geological Survey]; the Association of Welsh RIGS Groups [supported by the Welsh Assembly Government] and GeoConservation UK [supported by Natural England].

Definition and Significance of Geodiversity

Geodiversity is defined as the variety of rocks, minerals, fossils, landforms and soils, together with the natural processes that shape them. Geodiversity is a foundation for life and our society. It provides the fundamental underpinning of the biosphere, through the geochemistry, structure and water/thermal conductivity of rocks and soils and is actively altered by surface geomorphological processes. Geodiversity influences landscape, habitats and species as well as our economy, historical and cultural heritage, education, health and wellbeing ².

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'. This is also an essential consideration in the application of the European Landscape Convention (2002). 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'. Geodiversity also provides a wide range of ecosystem and related services listed in Appendix C, abstracted from the AWRG response to the Living Wales Consultation of 2010.

Biodiversity is underpinned by **geodiversity**. Without the variety of rocks, landforms, soils, water and nutrients that support the locally, nationally and internationally valued habitats, species and ecosystems these could not exist. Unless the geodiversity is robust and conserved then the range of biodiversity will be diminished.

Geodiversity, like other aspects of the natural environment, is threatened. For example, poorly planned development can destroy geodiversity and irrevocably change natural processes. Similarly, lack of management and co-operation can lead to the progressive decline of geodiversity and loss of access to critical geodiversity sites. Careful management of geodiversity, and an understanding of its environmental value, has wide economic, social, cultural and educational benefits. In particular, integration of geodiversity into the 'ecosystem approach' will better inform robust adaptations to climate change, as well as supporting policy such as that described in the Government paper *The Natural Choice*. Lack of action will lead to loss of geodiversity and missed opportunities for science, education and society.



Association of Welsh RIGS Groups (AWRG)

APPENDIX A : GEODIVERSITY SERVICES

The following provides some examples of Services that Geodiversity provides, abstracted from the AWRG response on 8th December 2010 to the *Living Wales* Consultation.

Geodiversity in Regulating Services:

Atmospheric and oceanic processes
Dynamic circulation
Global heat regulation
Terrestrial processes
Rock, carbon & water cycles
Geomorphological processes e.g. landslides
Flood control – water infiltration in the landscape, run-off
Water quality, quantity and storage

Geodiversity in Supporting Services:

Bedrock – landscape, resource – stone, sand & gravel
Soil – growing medium, soil profile development, weathering,
Habitat provision – caves, cliffs, limestone pavements, ponds, valleys, moorland, salt marshes etc.
Land as a platform – buildings, airports, sport
Burial and storage – human, animal, waste including nuclear
Protection – coastal & flood defences

Geodiversity in Provisioning Services:

Mineral resources – Superficial and bedrock
Food and drink – soils for food plants, meat (sheep, cattle, pigs) water, beer, wine & whisky
Nutrients – minerals inc. salt, zinc

Fuels – coal, gas, oil, uranium etc.
Construction materials – stone, including limestone and sandstone, slate, shale, sand and gravel, cement, glass, copper
Industrial minerals – quartz, calcite etc
Ornamental – fossils and minerals, e.g. Welsh gold

Geodiversity in Cultural Services

Environment quality – landscape both local and national (Country parks, AONBs, National Parks, Geoparks)
Geotourism and leisure – landscape both local and national (Country parks, AONBs, National Parks, geoparks)



Association of Welsh RIGS Groups (AWRG)

Cultural, spiritual and historical meaning

Folklore, sacred sites, 'sense of place'

Artistic inspiration – art (Turner to Kyffin Williams), sculpture, literature, poetry

Social development – local geological societies, field visits, walks & talks

Geodiversity in Knowledge Services

Earth History – evolution and landform; major Welsh contribution to the understanding of the Earth and natural systems

Physical processes

Geoforensics

History of research – unconformities/geological time/mountain building/evolution

Environment monitoring – glacial retreat, sea-level change, acidification

Education and employment – field skills training, on & offshore exploration through the management of sites, areas and wider landscapes