



## Linking geodiversity and biodiversity in protected area management: developing a more integrated approach

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The ecosystem approach is now a key driver for conservation policy globally. By definition an ecosystem includes both abiotic and biotic components interacting as a functional unit. However, the role of geodiversity generally remains poorly recognised both at a policy level and in the practical management of protected areas. This presentation examines key links between geodiversity and biodiversity, and demonstrates the benefits of better integration both to enhance conservation of geoheritage and the role of geodiversity in ecosystem management.

Geodiversity contributes essentially to most of the ecosystem services recognised in the Millennium Ecosystem Assessment. It underpins biodiversity from micro- to macro-scales through the influence of factors such as lithology, topography, sediments, soils and hydrology. Most habitats and species depend on the abiotic 'stage' on which they exist. Active geological processes also help to determine the heterogeneity of the physical environment, creating mosaics of landforms, surface deposits and dynamic environments that support a range of biodiversity. In the face of climate change and other human pressures, maintaining and enhancing geodiversity should help to 'future-proof' biodiversity in the longer term. Learning from the past through palaeoenvironmental records can also enable better understanding of ecosystem dynamics.

As well as recognising the value of geoheritage in its own right, a more integrated approach to conservation in protected areas would benefit both biodiversity and geodiversity, incorporating the concept of 'conserving the stage' (Anderson & Ferree, 2010) and the maintenance of natural processes. As part of developing the scientific framework of geodiversity, this requires geoscience engagement in the ecosystem approach, including evidence-based interdisciplinary research on the functional links between geodiversity and biodiversity across a range of spatial and temporal scales both to inform policy and underpin practical management guidance. Knowledge exchange and geoscience education and training for protected area managers and staff are also essential.

Anderson, M.G., Ferree, C.E. (2010) Conserving the stage: climate change and the geophysical underpinnings of species diversity. *PLoS ONE* 5(7): e11554.doi:10.1371/journal.pone.0011554