Summary of Key Indicators: Annex 2c Mountains, Moorlands and Heath

Natural England's Natural Capital Indicators Project aims to identify key attributes for measuring change in natural capital in England, at a range of scales. Key indicators have been identified for the quantity, quality and location of ecosystems. We have not identified suitable repeated measures of value that could be used as indicators.

Summary of key indicators:

See table below for further detail and related data sets

1. **Extent of habitat:** blanket bog, dwarf shrub heath, upland flushes, fen & swamp, mountain heath & willow scrub and other habitats above the moorland line (woodland, semi-natural grassland, inland rock scree & pavement, lakes, rivers and reservoirs).

2. **Quality**
   - Hydrology & geomorphology: Naturalness of water levels, flows, flooding, aquifer function and extent of artificial drainage.
   - Nutrient/chemical status - atmospheric deposition.
   - Soil/sediment: carbon, peat depth.
   - Species composition: naturalness of biological assemblage (number of trophic levels and community composition in each).
   - Vegetation: ratio of vegetation to bare soil, plant growth rate (biomass), surface vegetation roughness, proportion of peat mass actively forming peat, vegetation structure/structural diversity.
   - Cultural: nature, landscape, culture and history, quietness, facilities, accessibility.
   - Geodiversity: active geomorphological processes; condition of designated geosites.

3. **Location of:**
   - Habitats intercepting water pollution (in relation to the source, pathway and receptor).
   - Habitats and boundary features mitigating soil erosion and landslip risk.
   - Flood mitigating land in relation to infrastructure & settlements.
   - Patch size for lowland heath.
   - % population who can access a minimum of 2ha accessible green space / blue space within 2 miles of home.

4. **Ecosystem service flows** (specific to individual services):

NATURAL ENGLAND

- Measurement of the service: number of reared animals, amount of clean water, carbon sequestered and greenhouse gases fixed, maintenance of wildlife habitats and species, regulation of flooding, stabilisation of soil/sediment, water quality. Practices that relate to experiential and physical, scientific and educational; aesthetic, spiritual and/or emblematic use.

The project also identifies and reviews datasets for measuring the attributes. Data sets are only included if they are regularly updated. Gaps in data are also identified, where appropriate data sets have not been found.

This note summarises the results of this project for the Broad Habitat of Mountains Moorlands and Heaths, for the key ecosystem services in the table below. Please also see the separate note on the method followed.

Natural Capital Indicators: Annex 2c Mountains, Moorlands and Heath

Mountains, moorlands & heaths: provisioning and regulating services			Ecosystem services							Data sources
Asset attribute	Indicator category	Indicator	Water supply ***	Reared animals & outputs	Water quality ***	Mass stabilisation	Flood protection ***	Maintenance of nursery pops & habs	Climate regulation	
Quantity	Extent	Blanket bog	X		X	X	X	X	X	Priority Habitat Inventory
Quantity	Extent	Dwarf shrub heath		X		X	X	X	X	Priority Habitat Inventory; Land Cover Map
Quantity	Extent	Inland rock, scree and pavement (above the moorland line)						X		Priority Habitat Inventory
Quantity	Extent	Lakes	X					X		CEH UK Lakes Portal
Quantity	Extent	Mountain heath and willow scrub						X	X	Priority Habitat Inventory
Quantity	Extent	Reservoirs	X							WFD
Quantity	Extent	Rivers	X					X		OS MasterMap Water Network Layer; EA River Catchment
Quantity	Extent	Semi-natural grassland (above moorland line)		X		X		X	X	Priority Habitat Inventory; Land Cover Map
Quantity	Extent	Upland flushes fens and swamps						X	X	Priority Habitat Inventory
Quantity	Extent	Woodland (above moorland line)			X	X	X	X	X	National Forest Inventory; Priority Habitat Inventory, National Tree Map
Quality	Hydrology & geomorphology	Extent of artificial drainage	X		X	X	X	X	X	None identifed
Quality	Hydrology & geomorphology	Natural aquifer function recharge & discharge	X							WFD; EA Groundwater Management Units
Quality	Hydrology & geomorphology	Naturalness of flooding regime					X			EA Flood Map for Planning
Quality	Hydrology & geomorphology	Naturalness of flow regime	X				X	X		WFD; CEH Hydrological Summary; CEH River Flow Archive; CSM
Quality	Hydrology & geomorphology	Naturalness of water level regime			X			X	X	None identifed
Quality	Nutrient (& chemical) status	Atmospheric deposition exceedance of critical loads						X		APIS; Heavy Metals Monitoring Network; ICP Vegetation; ICP Forests
Quality	Soil/sediment processes	Soil carbon/organic matter content			X	X		X	X	Countryside Survey; LANDIS; Geochemical Baseline Survey of the Environment;
Quality	Soil/sediment processes	Peat depth			X				X	None identifed
Quality	Species Composition	Naturalness of biological assemblage number of trophic levels & community composition in each level						X		None identifed
Quality	Vegetation	Plant growth rate		X						None identifed
Quality	Vegetation	Proportion of peat mass actively forming peat							X	None identifed
Quality	Vegetation	Surface/vegetation roughness				X	X			None identifed
Quality	Vegetation	Vegetation cover/bare soil	X		X	X	X	X	X	CSM (only for Sites of Special Scientific Interest)
Quality	Vegetation	Vegetation structure/structural diversity						X		CSM (only for Sites of Special Scientific Interest)
Spatial config.		Patch size (lowland heath)						X		None identifed
Spatial config.		Distribution of habitats, in relation to water quality source-pathway-receptor			X					None identifed
Spatial config.		Distribution of flood mitigating land in relation to infrastructure & settlements					X			None identifed
Spatial config.		Distribution of habitats, other vegetation and boundary features mitigating soil erosion and landslip risk.				X				None identifed
ES flow		Stabilisation of soils				X				None identifed
ES flow		Availability of water for abstraction	X							UK Governement: Water Abstraction Tables; Environment Agency: Groundwater Management Units water resource availability; CEH Hydrological Summary;
ES flow		Carbon sequestered & green house gases fixed, by soil/vegetation							X	None identifed
ES flow		Water quality (chemical & biological, including viral & bacterial)			X					Upland Water Monitoring Network; Countryside Survey; Acid Waters Monitoring Network; WFD
ES flow		Maintenance of sustainable ecosystems/life cycle stages						X		None identifed
ES flow		Number and type of reared animals		X						Agriculture in the UK; June Agricultural Survey
ES flow		Regulation of flow regime for peak events					X			CEH Hydrological Summary; Environment Agency: Risk of Flooding from Rivers and Sea; CEH National River Flow Archive

Mountains, Moorlands & Heaths: Cultural & Geodiversity Services			Cultural Services	Geodiversity services	Data Source
Asset attribute	Indicator category	Indicator			
Quantity	Extent	Blanket bog	X		Priority Habitat Inventory
Quantity	Extent	Dwarf shrub heath	X		Priority Habitat Inventory; Land Cover Map
Quantity	Extent	Inland rock, scree and pavement (above the moorland line)	X		Priority Habitat Inventory
Quantity	Extent	Lakes	X		CEH UK Lakes Portal
Quantity	Extent	Mountain heath and willow scrub	X		Priority Habitat Inventory
Quantity	Extent	Reservoirs	X		WFD
Quantity	Extent	Rivers	X		OS MasterMap Water Network Layer; EA River Catchment
Quantity	Extent	Semi-natural grassland (above moorland line)	X		Priority Habitat Inventory; Land Cover Map
Quantity	Extent	Upland flushes fens and swamps	X		Priority Habitat Inventory
Quantity	Extent	Woodland (above moorland line)	X		National Forest Inventory; Priority Habitat Inventory, National Tree Map
Quantity	Extent	Wood pasture	X		Priority Habitat Inventory
Quality	Landscape, seascape & urban green space	Uninterrupted views – absence of pylons, turbines	X		None identified
Quality	Nature	Habitat mosaics	X		None identified
Quality	Nature	Visibility of wildlife	X		None identified
Quality	Nature	Presence of flagship species	X		None identified
Quality	Nature	Presence of rare (red list) species	X		None identified
Quality	Nature	Species diversity	X		Countryside Survey; CSM (only for Sites of Special Scientific Interest)
Quality	Nature	Naturalness of watercourses	X		Water Framework Directive
Quality	Nature	Favourable condition of SSSIs	X		CSM (only for Sites of Special Scientific Interest)
Quality	Nature	Favourable condition of designated geosites	X	X	CSM (only for Sites of Special Scientific Interest)
Quality	Landscape, seascape & urban green space	Size of environmental space (ha)	X		None identified
Quality	Culture & history	Designated Historic Environment Assets (World Heritage Sites, Scheduled monuments (% at risk), Historic Parks & Gardens, Listed Buildings, Conservation Area, registered battlefields)	X		Historic Environment Record
Quality	Quietness	Tranquility	X		CPRE Tranquility mapping (needs updating)
Quality	Accessibility	Mean number of perimeter access points per km	X		None identified
Quality	Accessibility	Public Rights of Way / permissive paths; footpaths, bridleways, byway – length, density (km/ha)	X		OS master Map
Quality	Accessibility	Presence of paths accessible to all – e.g. wheelchairs, pushchairs - length, density (km/ha)	X		None identified
Quality	Formative geological processes	Active geomorphological processes; terrestrial, coastal & marine		X	None identified
Spatial Configuration		% population who can access 2ha of green space within 2 miles of home	X		None identified
ES flow	Experiential & physical use	Number of visits	X		MENE: Monitor of Engagement with the Natural Environment
ES flow	Experiential & physical use	Duration of visits	X		MENE: Monitor of Engagement with the Natural Environment
ES flow	Experiential & physical use	Range of activities undertaken (number of people carrying out each activity, frequency, time spent)	X		MENE: Monitor of Engagement with the Natural Environment
ES flow	Scientific/educational	Number of research projects; PhD / Masters projects	X		None identified
ES flow	Scientific/educational	Number of school visits	X		None identified