

## Staff Guidance on National Interest Issues

### Soils of National Conservation Importance in Scotland – update 28 / 07/ 2016

#### Soil values – key principles

1. The following principles relate to the Biodiversity and Geodiversity section of the Key Natural Heritage Interests in Annex 1 of the guidance: a) Geodiversity interests of outstanding conservation importance; and b) Biodiversity and geodiversity interests of functional importance to ecosystem health. They address soil values as an expression of rarity of soil types and key services provided by soils especially regarding carbon storage, support to biodiversity and agricultural values.
2. It is important to emphasise that the value of a soil in a given location cannot just be based on the rarity of the soil series to which it belongs. Soils are valued both for their functional roles (e.g. support to habitats and species, provision of ecosystem services) and for the diversity and rarity of their intrinsic physical, chemical and biological features. Also implicit is the recognition that soils are by definition finite, non-renewable resources that are essential to life.
3. In the context of nature conservation, it is acknowledged that some soil types will be considered as having higher values based on generic criteria of conservation relevance or the intrinsic functionality of soil types. This includes, for example:
  - All soils with high organic content (peat and peaty soil types) – valued for the enhancement and protection of soil carbon stocks and control of greenhouse gas emissions from soils. The Scottish Planning Policy recognises carbon-rich soil, deep peat and priority peatland habitat as nationally-important resource.
  - All soils directly associated with a habitat of conservation value or priority species or a key geodiversity feature. This may include soil types develop on specific geological parent material, soil types with specific properties or soils type associated with specific landform or environmental processes. Table 1 provides some indication of the extent of these soil types within each local authorities. within the 21 Natural Heritage Futures Zones.

Examples of soils of potential high value develop on specific geological parent material (refer to as Soil Association):

- Links Soil Association - associated with machair and dunes systems;
- Fraserburgh Soil Association – associated with machairs;
- Leslie and Corriebeck Soil Associations - associated with calcareous, magnesian habitats.

Examples of soils type of potential high value for reason of intrinsic properties or functions:

- humus-iron podzols in semi-natural settings (e.g. mainly associated with native pinewood forest - whereas similar soils under farmland have been heavily disturbed by cultivation);
- saline gleys – associated with coastal habitats;
- alluvial soils – with links to river geomorphology;
- alpine and subalpine soils – highly sensitive to damage (physical disturbance, contamination);
- peat – peatland habitats or Quaternary geology features in SSSI and GCR sites (e.g. pollen records);

- 'rare' soil types in Scottish context – e.g. rendzinas, magnesian and calcareous soils.
    - Other aspects of soil functionality may be considered as being of high value in a broader context. For example, LCA classes 1, 2 and 3.1 of the Land Classification for Agriculture are derived from soil information and define prime agricultural land. However, as crop production in many parts of Scotland is limited by both soil and climate, the most versatile agriculture land may be in less favourable LCA 3.2 class.
4. The full assessment of the functional values and conservation importance of soils has to be based on site specific assessment. Desk study based on available information can help identify the likely natural heritage interests but this should always be verified by updated and more detailed field level assessment.

### Soil information – quick links

5. The main source of information on soils in Scotland is the Scotland's Soils website ([www.soils-scotland.gov.uk](http://www.soils-scotland.gov.uk)). It allows all users to visualise and download selected soil information. The site is under review and will become more interactive, more user-friendly and more in tune with what users of Scotland's soils information need. Information available from Scotland's soil website includes:
- Soil maps (with access to mean soil properties)
    - National scale soil map of Scotland
    - Soil map of Scotland (partial cover)
    - World Reference Base soil map
    - Scanned soil maps
  - Capability maps
    - National scale land capability for forestry
    - National scale land capability for agriculture
    - Land capability for agriculture (partial cover)
  - Thematic maps
    - Map of topsoil organic carbon concentration
    - Map of available water capacity
    - Map of soil texture in Nitrate Vulnerable Zones
    - Carbon and peatland 2016 map
  - Point data
    - National Soil Inventory of Scotland (NSIS 1978-88)
    - Parent material
    - Topsoil lead concentration
    - Topsoil zinc concentration
6. For SNH staff, access to a wider range of soil and soil derived information is provided using our corporate geographic information system Geo.View. This includes in addition to the above mentioned layers and links to selected external data including:
- Estimate of average peat depth (composite scale but reporting at 1:250,000 scale)
  - FCS main soil types (partial coverage of forest estate at a 1:10,000 scale)
  - BGS parental material (drift and solid material at 1:50,000 scale)
7. Other soil-derived maps have been produced to assess sensitivity of land to erosion, pollution (CEH/NERC critical load maps) or potential for specific use (woodland establishment, wind farm location). Potential risk maps are currently developed by

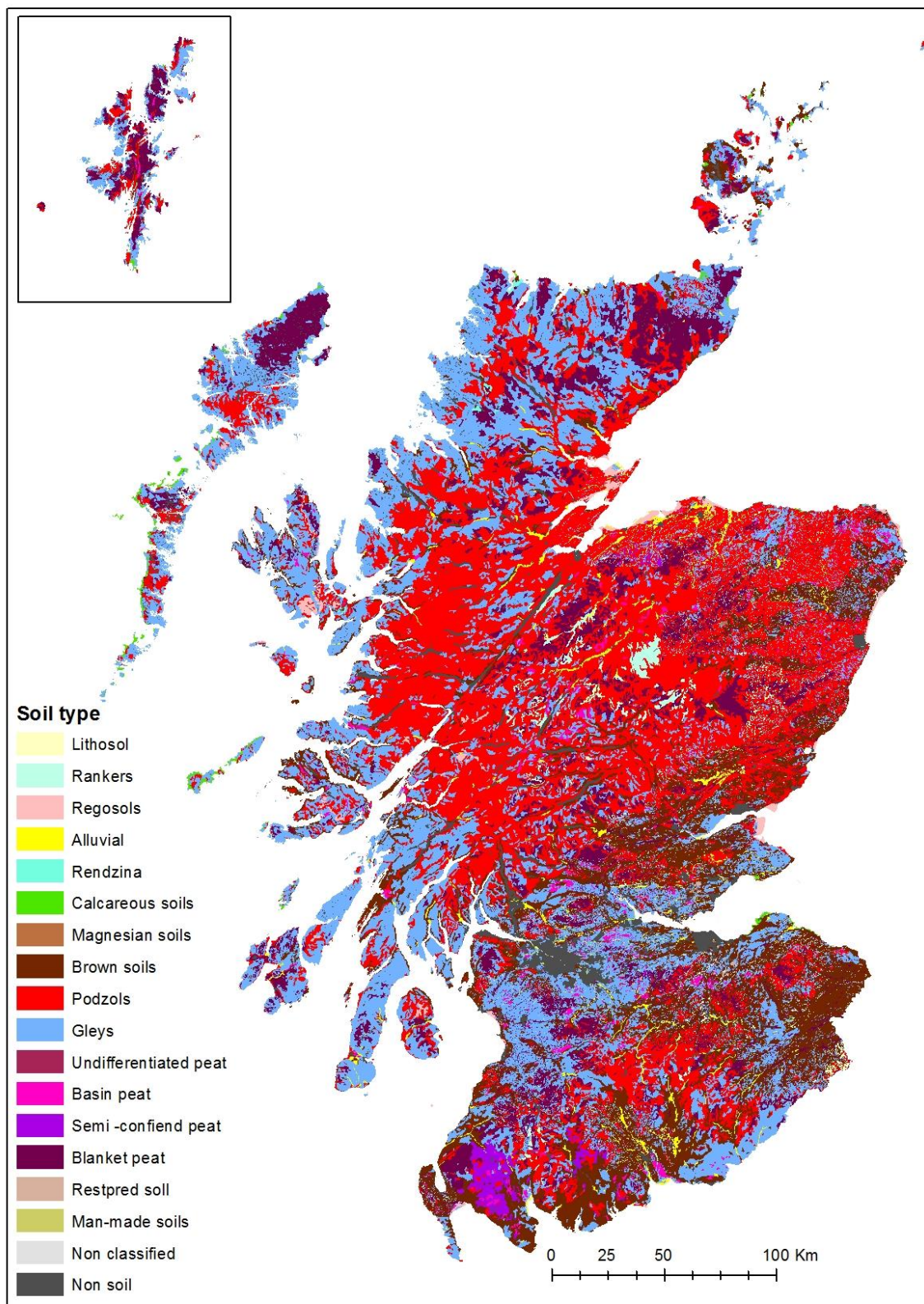
the James Hutton Institute at national level for erosion, leaching, runoff and both topsoil and subsoil compaction. The information is already available from some of SEPA priority catchment and a full coverage for Scotland will be released as a beta version on Scotland's soil website and Geoview in early 2017. Such data can be used to inform soil values beyond primary conservation interests.

8. It is also possible to find out about the properties associated certain soil types by interrogated soil map under Scotland's soil website or by using the following application.
  - The Soil Indicators For Scottish Soils (SIFSS) web portal provided access to summary information on key chemical and physical properties for all soil profiles surveyed in Scotland. An app of the portal is available to use on mobile devices. <http://sifss.hutton.ac.uk/>
  - SNH own version on SIFSS (for internal use only - [A1081743](#)). This will provide summary information by soil type (i.e. pH, carbon content, depth, nutrient level).
  
9. Other national and international soil data portal also provide information relevant to Scotland soil. However they operate at much coarser scale resolution, for example
  - The UK soil observatory (<http://www.ukso.org/mapViewer.html>) provided access to a range of UK wide soil information.
  - BGS soil data (soil being here defined as a geological construct) and data derived from the Countryside survey for Scotland (CIS handles a wide range of environmental data - including landscape features, vegetation habitats and topography for each one kilometre square of Great Britain).
  - The European soil portal is the soil data and information system managed by the Joint research centre providing information at national level scale. <http://eusoils.jrc.ec.europa.eu/data.html>.
  - Geonetwork is the FAO Interactive Maps, GIS datasets, Satellite Imagery and Related Applications portal, providing access to global soil and environmental data It is also possible to find out about the properties associated certain soil types by interrogated soil map under SSW or by using the following application (<http://www.fao.org/geonetwork/srv/en/main.home>)

Note all web links were checked on 22/09/2016.

**For further information**, please contact:

Patricia Bruneau  
Policy & Advice Officer: Soil Science  
Silvan House  
Edinburgh  
+44 (0) 131 316 2618  
[patricia.bruneau@snh.gov.uk](mailto:patricia.bruneau@snh.gov.uk)



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**Dominant soil type (estimated areas in ha) in each Council area. (derived from Carbon and Peatland 2016)**

Soil type	Aberdeen City	Angus	Aberdeenshire	Argyll and Bute	Clackmannanshire	East Lothian	City of Edinburgh	Dumfries and Galloway	West Dunbartonshire	Dundee City	East Ayrshire	East Dunbartonshire	East Renfrewshire	Falkirk
Lithosols	0	4324	4822	0	704	415	0	1009	0	0	225	52.3	0	10
Rankers	0	671	11104	198	33.0	47.4	468	6298	142	0	490	145	8.7	246
Regosols	322	1998	3598	3366	0	230	69.5	1260	0	0	0	0	0	0
Alluvial soils	2.3	2706	4604	6588	545	904	525	15364	320	0	639	934	0	985
Rendzinas	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcareous soil	0	0	391	4129	0	1791	16.0	27.5	0	0	0	0	0	3.0
Magnesian soils	0	0	1655	0	0	0	0	0	0	0	0	0	0	0
Brown soils	225	50047	113768	86316	3921	30696	7551	243089	4041	1242	13769	3115	4615	5525
Podzol	11570	110229	320938	172741	1751	5951	627	118923	1796	559	8265	803	974	600
Gleys	1581	14941	84117	366873	5040	19114	5311	144980	4327	231	61234	5464	6574	14476
Undifferentiated organic soil	0	0	0	0	0	0	0	0	0	0	29.0	11.5	0	0
Basin peats	155	579	10198	4693	158	83.3	71.9	14434	170	0	2639	321	327	1516
Semi-confined peats	0	0	0	0	0	0	0	41219	0	0	0	0	0	0
Blanket peat	1026	27770	61870	34637	2453	3973	578	47789	1084	222	34687	2066	2854	492
Restored soils	0	0	0	0	91.3	0.0	63.1	0	26.8	0	0	14.3	0	160
Man-made soils	0	34.3	0	0	1.0	0	0	11.1	0	0	0	0	0	0
unclassified	232	2400	11535	196	101	2527	172	1155	335	19.1	1042	92.8	77.5	277
non-soil	3476	2907	3182	19202	1123	2164	10880	8314	5501	3713	4016	4430	1994	5469
<b>Carbon and peatland class</b>														
1	21	13584	28086	58792	1290	0	22	27747	161	0	10882	808.5	1554	781
2	0	5541	9009	124156	337	0	0	5170	321	0	406	0.0	0	0
3	9	3699	6584	40070	633	372	256	54760	2115	0	9493	987.2	394	226
4	643	16097	57714	43837	246	3987	729	57433	1213	0	5424	588.6	436	1551
5	136	3354	19305	183048	501	1817	418	107874	1669	0	24132	1255.3	1220	1041
0	14305	173425	507900	226367	11792	59559	14027	382592	6755	2272	72697	9383.8	11826	20696
-1	0	0	0	196	0	0	0	0	0	0	0	0.0	0	0
-2	3476	2907	3182	22473	1123	2164	10882	8298	5509	3713	4000	4425.7	1994	5464

Soil type	Fife	Glasgow City	Highland	Inverclyde	Midlothian	Moray	North Ayrshire	North Lanarkshire	Orkney Islands	Perth and Kinross	Renfrewshire	Scottish Borders	Shetland Islands
Lithosols	307	0	2224	0	0	499	0	22.7	0	2301	0	7297	0
Rankers	453	45.7	28917	0	278	1857	0	283	0	8330	43.2	2457	0
Regosols	3475	0	27227	0	0	7033	2562	0	89.0	1588	0.0	0	266
Alluvial soils	3342	105	26219	145	29.1	10899	595	577	30.4	5622	527	4691	0
Rendzinas	0	0	4474	0	0	0	0	0	0	0	0	0	0
Calcareous soil	361	0	1619	0	0	0	0	0	1557.3	0	0	7	1040
Magnesian soils	0	0	0	0	0	47.0	0	0	0	9.1	0	0	0
Brown soils	51455	588	101335	3187	15924	4639	14693	3310	24400	126230	6110	214578	2920
Podzol	9982	0	1145133	3545	1923	121513	16576	433	18683	237511	2912	79969	28942
Glays	45115	1461	856817	3736	7912	25862	38465	21466	39344	77464	6521	102235	52555
Undifferentiated organic soil	0	0	0	0	5.0	0	0	306	0	0	0	0	0
Basin peats	1582	220	15948	2.6	1902	2381	843	2575	1191	7225	689	2820	2138
Semi-confined peats	0	0	2935	0	0	1885.8	0	0	0	0	0	0	0
Blanket peat	2756	79	317763	2288	1788	34712	11166	4418	11840	54490	1292	50502	54009
Restored soils	2079	167	0	0	706.1	0	0	348	0	8.4	4.1	62.8	0
Man-made soils	0	1.9	0	0	0	0	0	172	0	32.6	0	0	0
unclassified	1092	32.6	3825	101	2639	9329	843	482	0	2731	174	6133	0
non-soil	10495	14794	79012	3192	2422	3264	2696	12830	3644	15283	7927	3024	3853
<b>Carbon and peatland class</b>													
1	235	46	523770	2552	821	21646	11938	2507.0	9485.4	48836	987.6	12811	52757
2	0	0	576645	219	0	2219	140	0.0	0.0	40271	0.0	7	1
3	136	1	85887	979	989	2040	1737	411.2	1437.5	12300	443.3	26652	8446
4	1530	45	157945	1561	997	36349	9569	2310.9	20144.5	22975	512.2	36834	16157
5	1382	183	406814	1194	2100	18543	12899	4772.8	5224.6	35874	1597.7	32580	32362
0	118722	2431	768046	6498	28199	139861	47704	24405.1	60780.4	361798	14730.3	361867	31931
-1	0	0	86	0	0	0	0	0.0	0.0	0	0.0	0	0
-2	10489	14788	94253	3192	2422	3263	4453	12815.4	3705.6	16770	7926.6	3024	4068

Soil type	South Ayrshire	South Lanarkshire	Stirling	Na h-Eileanan Siar	West Lothian
Lithosols	337	112	858	0	0
Rankers	245	538	356	0	516
Regosols	649	0	412	1395	6
Alluvial soils	1405	5592	2729	213	427
Rendzinas	0	0	0	0	0
Calcareous soil	0	0	0	10234	3.9
Magnesian soils	0	0	0	0	0
Brown soils	36861	39076	42182	82.1	11461
Podzol	11448	36267	77167	52734	930
Gleys	43483	57544	59046	155487	17002
Undifferentiated organic soil	0	80	0	0	0
Basin peats	580	5787	4519	0	831
Semi-confined peats	9109	115	0	0	270
Blanket peat	29626	18850	28070	67577	5365
Restored soils	0	291	0	0	269
Man-made soils	0	80.3	2.1	0	0
unclassified	754	967	833	0	977
non-soil	2813	12103	9110	18252	4820
<b>Carbon and peatland class</b>					
1	235	46	523770	2552	821
2	0	0	576645	219	0
3	136	1	85887	979	989
4	1530	45	157945	1561	997
5	1382	183	406814	1194	2100
0	118722	2431	768046	6498	28199
-1	0	0	86	0	0
2	10489	14788	94253	3192	2422

