

**ORGANIZATION  
AND METHODS  
OF THE 1:250 000  
SOIL SURVEY  
OF SCOTLAND**

# **SOIL SURVEY OF SCOTLAND**

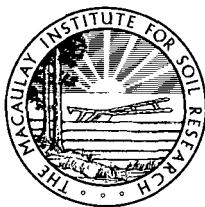
**Soil and Land Capability for Agriculture  
1:250 000 Survey**

## **ORGANIZATION AND METHODS**

The Macaulay Institute for Soil Research  
Aberdeen 1984

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## Preface

For any soil survey organization the date when the first complete cover of its territory is achieved is a milestone. The completion of the 1:250 000 soil survey of Scotland in a period of slightly less than five years from authorization to publication by a field staff which at no time exceeded twenty and a cartographic and administrative team of six represents a period of intense activity of which the Department of Soil Survey of the Macaulay Institute is understandably proud. In addition to achieving the programme aims, it almost brought to a conclusion the initial exploratory and semi-detailed phases of soil survey in Scotland and cleared the way for the detailed investigative work which can now follow. With a small number of staff working on a large project, much of which was carried out in terrain which was physically as well as mentally taxing, it is obvious that all had to engage in a variety of tasks. Those taking major roles in the survey and its organization are identified in Chapter 1, but this does not reduce the value of the contributions of the members of staff who are not mentioned by name. Without their dedication the project could not have been completed.

Each of the handbooks records the contributions made by a wide range of organizations and personnel, particularly in the consultative groups which led to the drafting of the land capability maps accompanying the soil maps. Their efforts too were indispensable.

The purpose of this volume is to chart the development of the 1:250 000 soil survey and subsequent land classification from inception, to describe the aims and give an explanation of how they were achieved, and to give some sources for the technical terms and methods employed. It contains information on applied techniques that would have involved unnecessary repetition had they been included in each of the handbooks. As with the survey itself, this handbook is a composite effort, most of the chapters being the result of an initial draft followed by extensive comment and amendment from many sources and a final compilation stage. Chapter 1 was compiled by R. Grant and J. S. Bibby, Chapter 2 by R. E. F. Heslop and D. W. Futty, Chapter 3 by J. H. Gauld, C. J. Bown and J. S. Bibby, Chapter 4 by J. S. Robertson and Chapter 5 by J. S. Bibby. Appendix II was compiled by A. J. Nolan with contributions from R. H. E. Inkson and K. W. M. Brown of the Department of Statistics. Editing was by D. W. Futty and R. E. F. Heslop.

JOHN S. BIBBY  
*Head of the Soil Survey of Scotland*

# 1 Introduction and Objectives

The systematic survey of the soils of Scotland was commenced in 1947 by staff of the Macaulay Institute for Soil Research, under the direction of Dr R. Glentworth. After initial work in the north-east of Scotland, the Soil Survey steadily expanded and was soon active in each of the regions served by the three Scottish Agricultural Colleges. The aim was to achieve an understanding of the distribution and characteristics of the soils of Scotland that would assist the main research task of the Institute. The Soil Survey became a fully fledged department of the Institute in 1959, its main effort being concentrated on the arable areas, although hill land was surveyed where it formed part of a particular map sheet. In 1966, in response to pressure on land created by the siting of new towns in the central lowlands, the department produced its first land use capability maps and these immediately became a regular part of its programme, appearing as a co-production with each new soil map.

Following a recommendation in the White Paper *Land Resource Use in Scotland: The Government's Observation on the Report of the Select Committee on Scottish Affairs* (1972), the Secretary of State for Scotland appointed a Standing Committee on Rural Land Use, comprising representatives of the Department of Agriculture and Fisheries for Scotland, the Scottish Development Department, the Scottish Economic Planning Department, the Forestry Commission, the Nature Conservancy Council and the Countryside Commission for Scotland. One of the first subjects considered by this group was the state of information on land use capability and the Committee reached the conclusion that the time was opportune to review classification and mapping in Scotland. It accordingly recommended that working parties be set up to examine and report on user needs in this field in (a) the lowlands and (b) the hill areas. Mr C. Mackay, Chief Agricultural Officer of the Department of Agriculture and Fisheries, was appointed chairman of both working parties.

The Lowground Working Party comprised representatives of the Department of Agriculture and Fisheries for Scotland, the Scottish Development Department, the Nature Conservancy Council, the Scottish Agricultural Development Council, the Council of Scottish Agricultural Colleges and the Macaulay Institute for Soil Research. It reported in 1975. The composition of the Hill Areas Working Party was the same, with the addition of

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*Table A*  
*Hill Areas Technical Group: summary of user requirements*

Organization	Purpose	Data	Interpretation	Scales
Countryside Commission	Countryside plans at (a) detailed (b) strategic levels Understanding likely land use changes	Geology Soils Vegetation	Landscape value Recreation	Various
Department of Agriculture for Scotland	Agricultural land grade how much where Decisions relative to encroachment of forestry on agricultural land Effects on agriculture of different forestry planting levels Potential for carrying (a) sheep (b) cattle	Climate Soils Vegetation Economic	Agricultural classification Forestry classification Combined agro-forestry	7 1:25 000 for detail 7 1:250 000 for strategic planning
Forestry Commission	Forest enterprise purposes: Acquisition Land management Forest authority purposes Future forest expansion Research and education	Climatic data, soil physiography etc. to determine plantable and unplantable	Maps of plantability Land classification for forestry	1:50 000 minimum 1:625 000 approximately
Hill Farming Research Organisation	Land improvement predication Change in use from agriculture to forestry	Soil Vegetation Slope Aspect Physiography Water supply Shelter Access	Plantable/non-plantable land	At least 1:50 000 (10-hectare areas)
Nature Conservancy	Significance of nature conservation graphically presented To identify geographically conservation and other use areas To specify different levels of management in different categories of protected area	Soil Climate Geomorphology Geology Vegetation Habitats Plant and animal distributions	Evaluation for (a) nature conservation (b) agriculture (c) forestry	1:25 000 1:50 000 1:250 000
Scottish Development Department	Overall land use planning at strategic and local levels	Soil Climate Physiography Species yield data Crop yield data	Agriculture Forestry Socio-economic overlays to basic maps	1:25 000 1:50 000 1:250 000

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Agricultural Colleges	Reclamation Hill land drainage Deficiencies Extrapolation of R & D findings Afforestation—agriculture decisions	Vegetation Soil type Landform	No interpretation needed	1:50 000 (20-hectare areas)
Red Deer Commission	National and local decisions regarding stocking and management Owner considerations	Vegetation with Soil Geology Climate O.S. topo. maps	Agriculture Forestry Grazing potential	1:50 000 (10-hectare areas) Land below 500 m surveyed more intensively than above 500 m
HIDB	Determine improvements to primary land use in terms of (a) biological factors affecting primary production and yield (b) factors affecting crop failure (c) feasibility and costs of improvement	Climate Physiography Soils Geology Diseases	Agriculture Forestry Grazing potential	1:250 000 1:25 000

representatives from the Countryside Commission for Scotland, the Forestry Commission, the Hill Farming Research Organisation, the Institute of Terrestrial Ecology and the Red Deer Commission; this Working Party reported in 1977.

Both working parties started by examining user requirements for mapped classifications in their respective areas (by means of invited papers from users) and, after examining current classifications and mapping systems, went on to advise on the choice of classification and any modifications that they felt were necessary for implementation in Scotland. In their report, the Lowground Working Party said that although, since 1944, it had been the policy of successive governments to protect agricultural land of high quality and that every development proposal was examined in detail, a published mapped land capability classification was needed by both central and local government planning agencies. They were of the opinion that top priority was for an agricultural land classification, but that this should not rule out the possibility of future developments of classifications to cover other interests. After examining systems operating in the United Kingdom in the light of users' requirements, they recommended that the future direction of land classification and mapping should be based on land capability classification (as operated by the Macaulay Institute) with some modifications. Of particular importance was the introduction of a method of giving more information within Class 3. It was possible to implement the recommendations fairly simply, as the Macaulay Institute had a considerable number of soil maps of lowland areas, and the backlog of land capability maps was being steadily reduced.

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The Hill Areas Working Party approached their task in a similar manner but were faced with a different problem. Soils information essential to the land capability system was available for only very limited areas of the Highlands, and although the Southern Uplands had more mapped cover, there were still parts unsurveyed. A Technical Group of the Working Party comprising organizations with experience of mapping throughout the United Kingdom was convened, under the chairmanship of J. S. Bibby (Soil Survey of Scotland). Members of the group were J. C. Clark (Department of Agriculture and Fisheries for Scotland), R. Grant (Soil Survey of Scotland), P. J. Howard (Institute of Terrestrial Ecology), D. Mackney (Soil Survey of England and Wales), J. S. Robertson (Soil Survey of Scotland), J. F. B. Tew (Land Service, Ministry of Agriculture) and R. Tolman (Site Survey Section, Forestry Commission). The Technical Group considered a number of options and recommended to the Working Party that a rapid soil survey of the Highlands and remaining areas of the Southern Uplands should be commissioned. This would enable the land capability system to be used throughout Scotland. It was also suggested that to cater for user requirements (Table A), division of Class 5 of the land capability system to provide guidance on the potential for reclamation of Scotland's considerable area of hill land, and of Class 6 to give indication of the value of its grazings, should be attempted. The users also indicated a requirement for two scales of map, 1:250 000 for strategic, general planning and overview purposes, and 1:25 000 for detailed work. No priority areas for the latter were proposed, however, and in view of staffing levels, time and cost, the Technical Group decided to recommend that the 1:250 000 scale map be constructed in the short term, with an option for more detailed work on selected areas in the future. These recommendations were adopted by the Working Party and, in due course, by the Standing Committee. A further recommendation that interpretations of the basic data to provide a land capability map for forestry was also accepted, but in the event was not commissioned.

The objective of the 1:250 000 survey was to provide a general inventory of the soils of the country. This inventory, when combined with information on climatic and site properties, would provide an overview that would be used to assist strategic and regional planning by a wide range of users and would identify areas for more detailed investigation. It would also guide the future investigations of the Soil Survey of Scotland and assist in determining the more effective use of research resources.

The publications would be soil maps and land capability for agriculture maps at 1:250 000 scale and an accompanying series of handbooks, one for each area.

The 1:250 000 survey was authorized in June 1978 and work on the project commenced immediately. The head of the Department of Soil Survey at the Macaulay Institute, R. Grant, was responsible for the overall co-ordination and control.

The officers given responsibility for each of the seven regions of Scotland were:

## INTRODUCTION AND OBJECTIVES

Sheet 1	Orkney and Shetland	F. T. Dry
2	The Outer Hebrides	G. Hudson
3	Northern Scotland	D. W. Futty
4	Western Scotland	J. S. Bibby
5	Eastern Scotland	A. D. Walker
6	South-West Scotland	C. J. Bown
7	South-East Scotland	

The National Soil Map Legend was compiled by B. M. Shipley from legends produced by each regional surveyor, and a map unit register to assist correlation within and between the regions was kept by D. Laing.

The system for describing plant communities was devised by E. L. Birse and amended for the 1:250 000 survey by J. S. Robertson, who in addition was responsible for the overall correlation of the botanical work and the compilation of the vegetation column of the soil map legend.

The assessments of land capability for agriculture were made according to the system *Land Capability Classification for Agriculture* (Bibby, Douglas, Thomasson and Robertson, 1982). This system, described briefly in Chapter 5, is an updated version of the earlier *Land Use Capability Classification* (Bibby and Mackney, 1969), amended to take into account the requirements of the users represented on the Working Parties. In particular this involved the definition of ranked divisions within classes. It should be noted that some changes have taken place in the classification of land in parts of the lowlands. These are due to changes in the guidelines which have emerged during the thirteen years since the publication of the initial classification. The series of published Land Use Capability (LUC) maps will be replaced by a series of maps entitled Land Capability for Agriculture (LCA) at a scale of 1:50 000.

In the Outer Hebrides, Orkney and Shetland, the assessments were made by the regional surveyors in consultation with the Department of Agriculture and College advisory officers, but in the other areas the regional surveyor was aided by a small committee comprising representatives of the Department of Agriculture and Fisheries (Lands Officers), the Colleges of Agriculture, and the National Farmers' Union of Scotland. National correlation was the responsibility of J. S. Bibby, and F. M. B. Houston represented the Department of Agriculture and Fisheries at all meetings of the regional committees.

The cartographic work was in the charge of W. S. Shirreffs. Handbooks to accompany the maps of each region were written by a small team (acknowledged individually in the handbooks); the editors of the handbook series were D. W. Futty and R. E. F. Heslop.

The following sections of this handbook describe in more detail the methods and criteria used during the survey. Soil Survey staff, at headquarters or regionally, will always be pleased to assist and more detailed but unpublished maps are often available for inspection.

## **2 Soil Survey Methods**

The primary aim of a soil survey is to describe and classify the soil types of an area and to map their distribution. In the course of a survey, soils are examined in small holes dug with a spade, in auger borings, and in natural or man-made exposures.

The number of inspections made per square kilometre varies according to the intended scale at which the maps are to be published. For 1:63 360 maps it lies somewhere between 5 and 15, but is considerably less, 0.5 to 3, for surveys at 1:250 000 scale. Observations of landscape and vegetation, and their likely relationships with the soils, are, however, made continually as the soil surveyor traverses the ground.

The object studied is the soil profile, a vertical section from the ground surface to a depth of about a metre, or less if hard bed-rock is present within this distance. Soils are classified according to the nature and arrangement of soil horizons present in the profile; the system of soil classification is described in Chapter 3.

### **THE SOIL MAP UNITS**

The Soil Survey viewed the compilation of the 1:250 000 soil maps as the conclusion of the first phase in their programme which had lasted for over thirty years. Previous mapping, therefore, formed an integral part of the project, and as much as possible of the soil classification and system of representation of the soil map units was retained to assist cross-referencing with previously published work.

The criteria used to separate the units shown on the 1:250 000 soil map are soils, soil associations and landforms. Although vegetation is described for each unit on the map legend it is not itself a criterion used to distinguish one unit from another.

The soil names are the major soil groups and subgroups of the system of soil classification described in Chapter 3. A few map units are characterized by one soil type only, but the majority are soil complexes of two or more dominant soils, often with one or more subsidiary soil or soils listed; only the dominant soils separate one map unit from another. The order in which the soils are listed is not significant, since the relative proportions of each component can vary from area to area. The number of component soils in a

## SOIL SURVEY METHODS

map unit gives an indication of the degree of complexity of the soil pattern on that particular area of land.

The soil association is a grouping of map units in which the soils are developed on similar parent materials. Most soil associations are separated on the basis of the rocks from which the soil parent materials have been derived; for example, soils developed on drifts derived from gabbros and allied igneous rocks are placed in the Insch Association, whereas those on drifts derived from quartzites and quartzose grits belong to the Durnhill Association. Nearly all the soil associations used in the 1:250 000 survey have appeared on earlier soil maps, although a few of the more closely related ones have, for this survey, been grouped together.

Slope and rockiness are the two elements of landform which have been used as criteria for separating the soil map units. Two slope categories distinguish land in which the slopes are mainly less than 15 degrees (gentle and strong slopes) from land with slopes of mainly more than 15 degrees (steep and very steep slopes). Four classes of rockiness separate land which is predominantly non-rocky, slightly rocky, moderately rocky or very rocky. Because of the limitations imposed by the scale of the map, some units have descriptions that include more than one slope or rock class. General terms such as lowlands, valleys and foothills, together with more specific terms like raised beach terraces and hummocky valley moraines, have also been used to describe the landforms.

The soil map units are grouped on the legend into soil associations which, following the Alluvial Soils and the Organic Soils, are arranged in alphabetical order. Within each association the order of the units is, in general, lowland units first, then upland units, and finally the units of the mountains; within each topographic division, non-rocky units appear before rocky units and the drier soils before the wetter ones. The map units are numbered consecutively according to their position in the national legend. The complete National 1:250 000 Soil Map Legend is reproduced in Appendix III.

## MAKING THE MAP

Existing information in the form of published 1:63 360 and 1:50 000 soil maps and unpublished survey, mainly at the scale of 1:25 000, was available for about half of Scotland. For these areas, agriculturally the most productive and important half of the country, most of the map units, mainly soil series, were amalgamated into units suitable for depicting at the 1:250 000 scale, although some retained their original identity, albeit with a simplified boundary.

The survey of the remaining area, some 40 000 square kilometres, most of which lay in the Highlands and in the Southern Uplands, was done largely as a reconnaissance survey in which extensive use was made of air photograph interpretation techniques. Maps at scale 1:50 000 were compiled.

Soil Survey staff were responsible for the preparation of 1:63 360 or 1:50 000 maps with edited soil lines which were reduced photographically and used to compile the 1:250 000 soil map. These edited maps were drawn on transparent plastic on which the base map was printed in blue. The minimum size of map unit for rounded shapes was taken to be between  $\frac{3}{4}$  and 1 square kilometre (75–100 hectares) and for shapes longer than about 2 kilometres the minimum width was about  $\frac{1}{3}$  kilometre.

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The photographic reduction, scribing and preparation of the colour model of each 1:250 000 soil map, and the typesetting of each legend, was done by the Department of Soil Survey's Cartographic Section, which also drew and compiled the base map using modified components from Ordnance Survey 1:250 000 topographic and administrative maps, and designed the format to cover Scotland in seven overlapping sheets.

The colours of the soil map units indicate the dominant soil of each unit and follow the conventions of other published Soil Survey of Scotland maps: brown colours indicate units in which brown forest soils are dominant; pink, orange and red are humus-iron podzols and peaty podzols; blues and greens represent gleys; purple for peats; greys for rankers, subalpine soils and alpine soils; and yellow for alluvial soils.

### **3 Soil Classification**

The system of soil classification used for the 1:250 000 survey is that developed by the Soil Survey of Scotland for the systematic survey of the country at 1:63 360 scale and described in the published memoirs. However, some soil groups and subgroups not covered in earlier publications are described here. The classification is based principally on morphological features recognizable by surveyors in the field and takes only limited cognizance of chemical characteristics. It relies on the recognition of central concepts of soil classes and comparison of soil profiles with them; it is therefore typological rather than definitional in character (Butler, 1980).

Although the present classification has developed on traditional lines, expanding as new soil types were identified, some studies are available which will allow comparison of Scottish soils with other classifications, notably those of Ragg and Clayden (1973) with reference to the comprehensive system of the United States (Soil Survey Staff, 1960), and Birse (1980) according to the classification of the Soil Map of the World (FAO-Unesco, 1974).

#### **HORIZON NOMENCLATURE SYMBOLS**

In order to compare and classify soil profiles, it is convenient to designate soil horizons by a letter notation, the same symbol being applied to similar horizons in profiles of similar type. The symbols used in this handbook are set out below and are those currently in use by the Soil Survey of Scotland.

#### **MASTER HORIZONS**

A master horizon is represented by one of nine capital letters: L, F, H, O, A, E, B, C or R. An Arabic figure following a letter indicates vertical subdivision (e.g. C1, C2). A transitional horizon with properties of two master horizons is shown by the combination of two capital letters (e.g. AE, EB, BC). In layered parent materials, an Arabic numeral is used as a symbol prefix when it is necessary to distinguish lithological or textural contrasts (e.g. 2C when the C horizon differs from the material in which the solum, i.e. A and B horizons, is presumed to have formed).

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- L Fresh annual litter, normally loose, original plant structures obvious.
- F Decomposed litter, only some of the original plant structures obvious.
- H Well-decomposed organic matter formed under aerobic conditions. Plant structures not visible. May be mixed with some mineral matter. (Mor humus).
- O Peaty material formed under wet, anaerobic conditions.
- A Mineral horizon formed at or near the surface that shows an accumulation and incorporation of organic matter, or which has a morphology acquired by soil formation but lacks the properties of E or B horizons.
- E Eluvial horizon underlying an H, O or A horizon from which it can normally be differentiated by a lower content of organic matter and lighter colour—particularly when dry. Usually shows a concentration of sand and silt fractions with a large component of resistant minerals resulting from a loss of clay, iron or aluminium.
- B Mineral horizon in which there is little or no obvious rock structure and having one or both of the following:
  - (i) alteration of the original material involving solution and removal of carbonates; formation, liberation or residual accumulation of silicate clays or oxides; formation of granular, crumbly, blocky or prismatic peds; or (normally) some combination of these;
  - (ii) illuvial concentration of silicate clay or iron, aluminium or humus.
- C Mineral layer of unconsolidated material from which the solum is presumed to have formed.
- R Underlying consolidated bed-rock sufficiently coherent when moist to make hand digging with a spade impracticable.

## SUBHORIZONS

A lower case letter may be added to the capital letter to qualify the master horizon designation. More than one letter can be used if necessary, e.g. Bhs<sub>1</sub> indicates the first of two B horizons enriched in humus and sesquioxidic material. Symbols may be bracketed if the feature development is weak.

- b Buried (e.g. Ab).
- f Sharply defined thin iron pan.
- g Horizon with gley features.
- h Accumulation of organic matter in a mineral horizon (e.g. Ah or Bh).
- m A cemented horizon, other than a thin iron pan. Often used in conjunction with another symbol (e.g. Bmh for a horizon cemented with organic matter).
- p Disturbed by ploughing.
- s Accumulation of sesquioxidic material.
- t Accumulation of illuvial clay.
- w Alteration *in situ* in accordance with section (i) of the description of the B horizon.
- x Indurated layer, compacted but not cemented.

These symbols have more precise significance when applied to specified major soil subgroups.

## SOIL CLASSIFICATION

*Table B Soil Classification*

Division	Major Soil Group	Major Soil Subgroup
1 Immature soils		
	1.1 Lithosols	Undifferentiated lithosols
	1.2 Regosols	1.2.1 Calcareous regosols 1.2.2 Noncalcareous regosols
	1.3 Alluvial soils	1.3.1 Saline alluvial soils 1.3.2 Mineral alluvial soils 1.3.3 Peaty alluvial soils
	1.4 Rankers	1.4.1 Brown rankers 1.4.2 Podzolic rankers 1.4.3 Gley rankers 1.4.4 Peaty rankers
2 Non-leached soils	2.1 Rendzinas 2.2 Calcareous soils	2.1.1 Brown rendzinas 2.2.1 Brown calcareous soils
3 Leached soils	3.1 Magnesian soils 3.2 Brown earths 3.3 Podzols	3.1.1 Brown magnesian soils 3.2.1 Brown forest soils 3.2.2 Brown forest soils with gleying 3.3.1 Humus podzols 3.3.2 Humus-iron podzols 3.3.3 Iron podzols 3.3.4 Peaty podzols 3.3.5 Subalpine podzols 3.3.6 Alpine podzols
4 Gleys	4.1 Surface-water gleys 4.2 Ground-water gleys	4.1.1 Saline gleys 4.1.2 Calcareous gleys 4.1.3 Magnesian gleys 4.1.4 Noncalcareous gleys 4.1.5 Humic gleys 4.1.6 Peaty gleys 4.2.1 Calcareous gleys 4.2.2 Noncalcareous gleys 4.2.3 Humic gleys 4.2.4 Peaty gleys 4.2.5 Subalpine gleys 4.2.6 Alpine gleys
5 Organic soils	5.1 Peats	5.1.1 Eutrophic flushed peat 5.1.2 Mesotrophic flushed peat 5.1.3 Dystrophic flushed peat 5.1.4 Dystrophic peat

## SYSTEM OF SOIL CLASSIFICATION

Profile classes are defined at four categorical levels termed division, major soil group, major soil subgroup and soil series. The highest category of the

classification is the division, in which soils are arranged according to the dominant soil-forming process. Soils formed by similar processes and at similar stages of development are placed in the same major soil group, which is in turn composed of subgroups, the soils of which have horizons and often subhorizons similar in their nature and arrangement. These three higher taxonomic categories are shown in Table B. The final classification category, the soil series, comprises soils with a similar type and arrangement of horizons developed on similar parent material. The 1:250 000 scale is, however, too small to permit the delineation of map units composed of single series. Soil names given on the map and used in the handbooks are primarily major soil subgroups.

The more important field properties of each division, major soil group and major soil subgroup are given below.

## 1. DIVISION OF IMMATURE SOILS

Immature soils are characterized by indistinct or weakly developed horizons, which are generally restricted to surface organic horizons or A horizons resting directly on little-altered parent material or rock.

### 1.1 Major soil group: lithosols

Lithosols are restricted in depth and have continuous, coherent and hard rock within 10 centimetres of the surface. Only an H, O or A horizon is likely to be present above rock.

#### 1.1.1 Subgroup: undifferentiated lithosols

Lithosols have not been further differentiated at subgroup level.

### 1.2 Major soil group: regosols

Regosols have a thin, weakly developed A horizon, which rests directly on unconsolidated material. The soils are formed generally on parent material of windblown sand.

#### 1.2.1 Subgroup: calcareous regosols

Calcareous regosols contain free calcium carbonate in the parent material, which is often shelly sand.

#### 1.2.2 Subgroup: noncalcareous regosols

Noncalcareous regosols lack free calcium carbonate in the parent material.

### 1.3 Major soil group: alluvial soils

Alluvial soils are developed on recently deposited freshwater, estuarine or marine alluvium and exhibit little profile differentiation or modification to the parent material. The presence of an A or an O horizon, together with some mottling and weak structure in the subsoil, are characteristic features.

#### 1.3.1 Subgroup: saline alluvial soils

Saline alluvial soils have high levels of exchangeable sodium and the effects of gleying are clearly evident. The soils are developed on marine or estuarine alluvium found between the normal high-water mark and the limit of highest spring tides.

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### 1.3.2 *Subgroup: mineral alluvial soils*

Mineral alluvial soils have an A horizon and the effects of gleying can be present. The soils are developed on freshwater alluvium.

### 1.3.3 *Subgroup: peaty alluvial soils*

In peaty alluvial soils the characteristic feature is an O horizon which usually occurs at the surface but can be interbedded with freshwater alluvial sediments. The soils may have a high water-table.

## 1.4 Major soil group: rankers

Rankers have H, O or A surface horizons more than 10 centimetres thick which rest directly on hard noncalcareous rock or rubble derived from such rock. Incipient E and B horizons can be present.

### 1.4.1 *Subgroup: brown rankers*

Brown rankers have a brown or dark brown A horizon.

### 1.4.2 *Subgroup: podzolic rankers*

Podzolic rankers have a raw humus surface horizon and an incipient grey or dark grey E horizon.

### 1.4.3 *Subgroup: gley rankers*

Gley rankers have prominent gley features in the Ag horizon.

### 1.4.4 *Subgroup: peaty rankers*

Peaty rankers have an O horizon up to 50 centimetres thick.

## 2. DIVISION OF NON-LEACHED SOILS

Non-leached soils are characterized by the presence of free lime and have a neutral or alkaline reaction. Their lower horizons may show some gleying.

## 2.1 Major soil group: rendzinas

Rendzinas are shallow soils that have an A/C or A/R horizon sequence; the A horizon rests on shattered limestone rubble or limestone rock and is more than 10 centimetres thick.

### 2.1.1 *Subgroup: brown rendzinas*

The characteristic features of the brown rendzinas are identical to those of the major soil group.

## 2.2 Major soil group: calcareous soils

Calcareous soils are freely drained soils containing free calcium carbonate within the profile.

### 2.2.1 *Subgroup: brown calcareous soils*

Brown calcareous soils contain carbonate materials in the form of rock or shell fragments. There is a gradual change between all horizons, the B horizons having a brighter colour than the A or C horizons but showing no morphological or chemical evidence of translocated sesquioxides.

### 3. DIVISION OF LEACHED SOILS

Leached soils are characterized by a uniformly coloured B horizon, by an absence of free lime and by an acid reaction in their A and B horizons. Their lower horizons may show some gleying.

#### 3.1 Major soil group: magnesian soils

Magnesian soils have a high magnesium content and an A horizon which often has a high organic-matter content and is dark-coloured. Only soils formed from parent materials derived wholly, or in part, from ultrabasic rocks are included in this soil group.

##### 3.1.1 Subgroup: brown magnesian soils

The characteristic features of the brown magnesian soils are identical to those of the major soil group.

#### 3.2 Major soil group: brown earths

Brown earths have a uniformly coloured B horizon, a mull or moder humus type and a moderately acid reaction; usually each horizon merges into the one below.

##### 3.2.1 Subgroup: brown forest soils

This subgroup contains freely drained soils which have the properties of the brown earth major soil group.

##### 3.2.2 Subgroup: brown forest soils with gleying

Brown forest soils with gleying show some evidence of gleying in the B and/or C horizons. They generally have a moderate base status and are often developed on parent materials of moderately fine and fine texture.

#### 3.3 Major soil group: podzols

Podzols have surface H or O horizons successively underlain by a grey, bleached E horizon and a more brightly coloured B horizon. They have a strongly acid reaction and their B horizons often contain illuviated sesquioxides of iron and aluminium and organic matter.

##### 3.3.1 Subgroup: humus podzols

Humus podzols have a pale grey E horizon and a thick, very dark brown or black Bh horizon. The Bh horizon shows evidence of translocated humus colloids which coat mineral grains and often produce a cemented horizon. The soils are frequently found on parent material of coarse texture.

##### 3.3.2 Subgroup: humus-iron podzols

Humus-iron podzols have surface L, F and H horizons. A thin Ah horizon, not always present, overlies a pale-coloured E horizon with a low organic-matter content. The B horizons include a dark-coloured, humus-enriched, upper layer (the Bh horizon) and a bright-coloured lower layer (the Bs horizon), the latter usually containing translocated iron and aluminium. Some variation in drainage status may be found.

### 3.3.3 Subgroup: iron podzols

Iron podzols have well-developed L and F horizons which rest directly on the light grey E horizon. The Bs horizon is bright-coloured and rich in sesquioxides.

### 3.3.4 Subgroup: peaty podzols

Peaty podzols have an O horizon up to 50 centimetres thick. The E horizon is generally gleyed. A horizon of humus accumulation may be present above the iron pan (Bf horizon) which is often continuous and forms a barrier to water or roots. Below the iron pan the Bs horizon is usually bright-coloured, but some variation in drainage status may be found.

### 3.3.5 Subgroup: subalpine podzols

Subalpine podzols have L, F and O horizons. Beneath the E horizon, which is often darkened by organic matter, the Bh horizon is often thick and very dark in colour with distinct organic coatings on small stones. The iron pan (Bf horizon) is generally weakly developed and discontinuous. Although brightly coloured, the Bs horizon is often thin and weakly developed, merging into the underlying unaltered parent material.

### 3.3.6 Subgroup: alpine podzols

Alpine podzols have either thin L, F and H horizons and an underlying E or A horizon, or a surface A horizon with bleached sand grains. The Bh horizon is black and sometimes thick, with small stones stained with colloidal humus; the lower part of the horizon often appears less organic-stained but retains a dark reddish brown colour. The soil fabric is characteristically loose and shows the effects of freeze-thaw processes which can be intense at high altitudes.

## 4. DIVISION OF GLEYS

Gleys develop under conditions of intermittent or permanent waterlogging. A pale-coloured Eg horizon is often prominent in the upper mineral horizons, beneath which the horizons are grey with greenish and bluish tinges and with ochreous mottling. These colours are of secondary origin and replace those inherited from the parent material.

### 4.1 Major soil group: surface-water gleys

Surface-water gleys display strongly gleyed sub-surface horizons, the intensity of gleying decreasing with depth. The colour inherited from the parent material is more apparent as gley phenomena decrease.

#### 4.1.1 Subgroup: saline gleys

Saline gleys have high contents of exchangeable sodium and magnesium. Below a thin O horizon or a greyish brown Ag horizon, a grey or brownish grey Eg horizon overlies a Bg horizon with a strongly developed prismatic or columnar structure. Organic staining is often present on ped faces.

#### 4.1.2 Subgroup: calcareous gleys

Calcareous gleys contain free calcium carbonate in the Bg and Cg horizons.

#### *4.1.3 Subgroup: magnesian gleys*

Magnesian gleys have high contents of magnesium and the surface horizon has a high organic-matter content and is dark-coloured.

#### *4.1.4 Subgroup: noncalcareous gleys*

Noncalcareous gleys have no free calcium carbonate in the upper horizons of the profile. An A horizon is often underlain by an Eg horizon which may be well defined in semi-natural soils. The soils are often developed on parent materials of moderately fine and fine texture.

#### *4.1.5 Subgroup: humic gleys*

Humic gleys have no free calcium carbonate in the upper mineral horizons and have a dark-coloured Ahg horizon.

#### *4.1.6 Subgroup: peaty gleys*

Peaty gleys have no free calcium carbonate in the upper mineral horizons of the profile. Beneath an O horizon up to 50 centimetres thick, organic staining of the Eg and Bg horizons is often present.

### **4.2 Major soil group: ground-water gleys**

Ground-water gleys develop under the influence of a high ground-water table. The effects of gleying increase with depth and the colour inherited from the parent material is not apparent in the lower soil horizons, which are often grey or bluish grey.

#### *4.2.1 Subgroup: calcareous gleys*

The subgroup calcareous gleys is the only one containing free calcium carbonate in the Bg horizon.

#### *4.2.2 Subgroup: noncalcareous gleys*

Noncalcareous gleys have a low organic-matter content in the surface horizon which overlies gleyed noncalcareous mineral horizons.

#### *4.2.3 Subgroup: humic gleys*

Humic gleys have a surface horizon consisting of a dark-coloured organically rich Ahg horizon, overlying gleyed mineral horizons. There is no free calcium carbonate in the upper mineral horizons.

#### *4.2.4 Subgroup: peaty gleys*

Peaty gleys have a surface O horizon up to 50 centimetres thick and do not contain free calcium carbonate in the upper mineral horizons. Below the Egh horizon, mineral horizons are intensely gleyed and often humus-stained.

#### *4.2.5 Subgroup: subalpine gleys*

All ground-water gleys which occur within the subalpine zone are included in this subgroup. Surface O horizons are often prominent and where intense flushing from springs is found, this horizon is often heavily mineralized.

#### *4.2.6 Subgroup: alpine gleys*

Alpine gleys have an organic-rich surface horizon which is often flushed from melting snow or from seasonal springs. Gley colours persist within the subsoil despite the possible drying-out of the substratum during late summer months. The surface horizons have a loose fabric due to frost action.

## 5. DIVISION OF ORGANIC SOILS

Organic soils are formed under waterlogged conditions and contain very high amounts of organic matter down to an arbitrary specified depth.

### 5.1 Major soil group: peat

Peat is an organic soil which contains more than 60 per cent of organic matter and exceeds 50 centimetres in thickness. It can develop in areas of moderate to high rainfall, low mean annual temperatures and high relative humidity and under the influence of ground-water in depressions or basins.

#### 5.1.1 Subgroup: eutrophic flushed peat

Eutrophic flushed peat is flushed by seepage waters rich in mineral plant-nutrients and usually supports a wide range of plant species, including reeds, tall sedges and flush alderwood where not reclaimed.

#### 5.1.2 Subgroup: mesotrophic flushed peat

Mesotrophic flushed peat is flushed by seepage waters moderately rich in mineral plant-nutrients and usually supports a natural cover of plant communities with a high proportion of grasses and herbs but can be dominated by *Juncus* species.

#### 5.1.3 Subgroup: dystrophic flushed peat

Dystrophic flushed peat is flushed by seepage waters poorly supplied with mineral plant-nutrients. The peat supports plant communities with heather, cotton-grass, deer-grass, flying bent, bog asphodel and bog mosses.

#### 5.1.4 Subgroup: dystrophic peat

Dystrophic peat is not affected by flushing. The peat supports plant communities dominated by dwarf shrubs, usually heather.

## 4 Vegetation Classification

The relationship between the field units used in the 1:250 000 survey and the phytosociological classification of Scottish plant communities as described by Birse and Robertson (1976) and Birse (1980, 1982) is given below. Field units were identified by the surveyors with the aid of a simple dichotomous key to the common plant communities of Scotland which was devised for that purpose (Robertson, 1984).

The common names used for the plant communities in the soil map legends are based on those of the Scottish classification but, because of the limited space available, these have been grouped in places into larger units such as 'swamp' or 'broadleaved woodland'. A full list of the elements of such groupings follows, together with a description of all the vegetation units quoted in the map legends and regional handbooks. Their phytosociological classification is given in brackets. There is a more detailed description of the units in terms of their morphology, site characteristics and floristics in the publications listed above.

In the account below, individual species names for vascular plants and the bulk of their common names follow those of Clapham, Tutin and Warburg (1962). Terminology of mosses is that of Smith (1978), and of lichens that of James (1965). In the classification, when a community is firmly established as an association, it is put in the Latin form ending in *-etum* (for example, *Caricetum hostiano-pulicaris*), but when there is some doubt as to the validity of the association, it is provisionally named by one or two plant species followed by the term 'Association' (for example, the *Plantago maritima-Erica cinerea* Association). When there are insufficient records to establish an association, the vegetation is again named by one or two plant species, but with the term 'Community' following (for example, the *Galium saxatile-Poa pratensis* Community). An association may be subdivided into subassociations, variants and facies. The abundance of individual plant species is rated on the scale:

- dominant — greater than 50 per cent cover
- abundant — 26 to 50 per cent cover
- frequent — 11 to 25 per cent cover
- occasional — 5–10 per cent cover or a number of scattered plants
- rare — less than 5 per cent cover or a few scattered plants

The distribution of plant communities is described as widespread, common or local and their areal cover as extensive, moderately extensive or confined. The physiographic divisions of lowland, foothill, low and high upland, and low, middle and high mountain follow those of Birse (1971).

## PLANT COMMUNITIES

### MARITIME COMMUNITIES

#### Foreshore

Foreshore or orache strand-line (the *Salsola kali-Atriplex glabriuscula* Association)—pioneer community of the foreshore on raw sand or gravel; widespread but confined; species-poor, open vegetation with oraches (*Atriplex* species) and sea rocket (*Cakile maritima*) the most abundant species.

#### Dunes—northern dunes

Foredune or northern sea couch-grass dune (Elymo-Agropyretum boreo-atlanticum)—on raw sand; widespread but confined; sand couch-grass (*Agropyron junceiforme*) is abundant or dominant and lyme-grass (*Elymus arenarius*) is present in places, occasionally dominant.

Lyme-grass dune (Potentillo-Elymetum arenariae)—pioneer community of slopes above the drift-line on raw sand; common and moderately extensive in Orkney, less so farther south; tall closed stands of lyme-grass (*Elymus arenarius*).

Yellow dune or northern marram grass dune (Elymo-Ammophiletum)—community of actively building/eroding dunes on raw sand; widespread and moderately extensive; marram grass (*Ammophila arenaria*) is dominant; hairy red fescue (*Festuca rubra arenaria*) and smooth meadow-grass (*Poa pratensis*) are often present and frequent or abundant.

—dune pasture (grey dune)

Eyebright-red fescue dune pasture (Euphrasio-Festucetum arenariae)—on immature sandy soils of fixed (grey) dunes or links; widespread and extensive in Orkney and Shetland and on northern and western coasts of Scotland; closed sward of grasses and forbs from which sheep's fescue (*Festuca ovina*) is absent; red fescue (*F. rubra*, including var. *arenaria*) is abundant or dominant; lady's bedstraw (*Galium verum*) and eyebrights (*Euphrasia* species) are frequent or abundant; smooth meadow-grass (*Poa pratensis*), white clover (*Trifolium repens*) and ribwort (*Plantago lanceolata*) are usually present.

Milk-vetch-red fescue dune pasture (Astragalo-Festucetum arenariae)—on immature sandy soils of fixed (grey) dunes or links; widespread and extensive on the east coast of Scotland; closed or nearly closed sward of grasses and forbs in which sheep's fescue (*Festuca ovina*) is usually present, often abundant; red fescue (*F. rubra*, including var. *arenaria*) is abundant or dominant; smooth meadow-grass (*Poa pratensis*) and birdsfoot-trefoil (*Lotus corniculatus*) are usually present along with either milk-vetch (*Astragalus danicus*) or common vetch (*Vicia sativa angustifolia*).

### Dune slacks

The variegated horse-tail community (the *Anagallis tenella-Equisetum variegatum* Association)—on calcareous gleys of depressions behind coastal dunes and on low raised beaches with high water-tables; local and confined to the Fife and East Lothian coasts; species-rich vegetation with variegated horse-tail (*Equisetum variegatum*), bog pimpernel (*Anagallis tenella*) and grass of Parnassus (*Parnassia palustris*).

Silverweed pasture (the *Potentilla anserina-Carex nigra* Community)—on calcareous sandy soils of depressions behind dunes and on low raised beaches with high water-tables; common, confined or moderately extensive; common sedge (*Carex nigra*) is abundant or dominant; carnation-grass (*C. flacca*) and silverweed (*Potentilla anserina*) are usually frequent or abundant.

### Salttings

Glasswort salt-marsh (*Salicornietum dolichostachyae*)—pioneer community on raw marine alluvium of estuaries; mainly southern; very open stands of glasswort (*Salicornia dolichostachya*).

Sea poa salt-marsh (*Puccinellietum maritimae*)—on saline alluvial soils of estuaries from below to slightly above high-water mark; widespread and moderately extensive; short turf dominated by sea poa (*Puccinellia maritima*) or by sea plantain (*Plantago maritima*) and sea pink (*Armeria maritima*).

Mud rush salt-marsh (*Juncetum gerardii*)—on saline alluvial soils of estuaries at levels slightly above those of the sea poa salt-marsh and on low cliffs influenced by sea-spray; widespread and moderately extensive; closed sward dominated by mud rush (*Juncus gerardii*), red fescue (*Festuca rubra*), fiorin (*Agrostis stolonifera*) or sea plantain (*Plantago maritima*).

Narrow club-rush (chestnut sedge) salt-marsh (*Blysmetum rufi*)—on saline alluvial soils of shallow channels and flats at the rear of salt-marshes; local and confined in the west; rare in the east; vegetation dominated by chestnut sedge (*Blysmus rufus*) and spike-rush (*Eleocharis uniglumis*).

Sea rush salt-marsh (*Oenanthe-Juncetum maritimi*)—on saline alluvial soils of higher levels of salt-marsh, often flushed with fresh water; local, mainly western; vegetation dominated by sea rush (*Juncus maritimus*); mud rush (*Juncus gerardii*) is often abundant.

Sea club-rush salt-marsh (*Scirpetum maritimae*)—on saline alluvial soils in channels and depressions to the rear of salt-marshes flushed with brackish water; common but confined; vegetation dominated by tall stands of sea club-rush (*Scirpus maritimus*).

### Splash zone

Plantain cliff-top pasture (the *Plantago coronopus* Community)—on very shallow soils of sea cliffs and rock ledges heavily saturated with sea-spray; mainly northern and western, confined; very short sward of buck's horn

plantain (*Plantago coronopus*), sea plantain (*Plantago maritima*), sea pink (*Armeria maritima*) and red fescue (*Festuca rubra*).

Maritime grassland (vernal squill maritime pasture)—(the *Scilla verna-Festuca rubra* Community)—on gleys and peat of cliffs and headlands exposed to sea-spray; extensive, from Shetland to the north coast of mainland Scotland and the west coasts of the Hebrides; short closed turf of sea plantain (*Plantago maritima*), carnation-grass (*Carex flacca*) and red fescue (*Festuca rubra*); vernal squill (*Scilla verna*) is often present.

### **Maritime heaths (see Moorland)**

Sea plantain–bell heather moor (the *Plantago maritima-Erica cinerea* Association).

Sea plantain–crowberry heath (the *Plantago maritima-Empetrum nigrum* Community).

Maritime Atlantic heather moor (part of *Carici binervis-Ericetum cinereae*).

## SWAMP

Bog moss water track (the *Juncus effusus-Sphagnum recurvum* Community)—on flushed peaty gleys and dystrophic peat associated with stream margins and channels in blanket peat; widespread but confined, mainly in the foothills throughout mainland Scotland and Shetland, rare in Orkney; species-poor vegetation with tussocks of soft rush (*Juncus effusus*) and a dense carpet of hair moss (*Polytrichum commune*) and bog moss (*Sphagnum recurvum*).

Reed-grass swamp (Phalaridetum arundinaceae)—on base-rich basin peat and alluvial soils (often submerged); margins of flowing or still water; widespread and moderately extensive in the lowlands and foothills; tall, dense stands of reed-grass (*Phalaris arundinaceae*).

Yellow flag swamp (the *Iris pseudacorus* Community)—on peaty gleys and base-rich basin peat of wet depressions and alongside water channels; widespread and moderately extensive in the lowlands of western Scotland and in Orkney and Shetland; yellow flag (*Iris pseudacorus*) is abundant or dominant, with frequent or abundant marsh marigold (*Caltha palustris*) and fiorin (*Agrostis stolonifera*).

Common spike-rush swamp (the *Eleocharis palustris* Community)—on alluvial soils or basin peat, usually subaqueous; margins of small lochs and wet depressions; widespread but confined in the lowlands; open stands of common spike-rush (*Eleocharis palustris*); marsh marigold (*Caltha palustris*) is often present.

Reed swamp (Phragmitetum communis)—base-rich peat and peaty alluvial soils, usually subaqueous; margins of lochs and ponds; widespread and moderately extensive, sometimes extensive, in lowlands and foothills; tall, dense stands of reed (*Phragmites communis*); thick understorey of meadow-sweet (*Filipendula ulmaria*).

#### ORGANIZATION AND METHODS

Marsh marigold meadow (the *Caltha palustris* Community)—on base-rich peat and peaty alluvial soils of gently sloping flushed sites; moderately extensive in Orkney, Shetland and western Scotland in the lowlands; marsh marigold (*Caltha palustris*) is abundant or dominant; marsh horsetail (*Equisetum palustre*) and fiorin (*Agrostis stolonifera*) are usually frequent or abundant.

Meadow-sweet meadow (Valeriano-Filipenduletum)—on base-rich peat, and mineral and peaty alluvial soils of level or gently sloping flushed sites; widespread and moderately extensive in the lowlands and foothills; dominated by meadow-sweet (*Filipendula ulmaria*); either valerian (*Valeriana officinalis*), tussock-grass (*Deschampsia cespitosa*) or soft rush (*Juncus effusus*) is abundant in places.

#### RUSH PASTURES

Soft rush pasture (the *Ranunculus repens-Juncus effusus* Community)—on gleys and peat of flushed alluvial flats and abandoned arable land; widespread and moderately extensive or extensive in the lowlands and foothills, becoming less common in the south; dense tussocks of soft rush (*Juncus effusus*) which persist over winter; creeping buttercup (*Ranunculus repens*) and broadleaved grasses such as creeping soft-grass (*Holcus mollis*) and smooth meadow-grass (*Poa pratensis*) are present.

Sharp-flowered rush pasture (Potentillo-Juncetum acutiflori)—on noncalcareous gleys, peaty gleys and peat of gentle flushed slopes; widespread and extensive in the lowlands and foothills of the west and south-west, local elsewhere; dense stands of sharp-flowered rush (*Juncus acutiflorus*) which die back over winter; Yorkshire fog (*Holcus lanatus*), sweet vernal (*Anthoxanthum odoratum*) and red fescue (*Festuca rubra*) are present.

A Species-poor (acid) sharp-flowered rush pasture (subassociation with *Festuca ovina*)—on peaty gleys and flushed peat; species-poor vegetation with sheep's fescue (*Festuca ovina*) and heath bedstraw (*Galium saxatile*).

B Species-rich (base-rich) sharp-flowered rush pasture (subassociation with *Epilobium palustre*)—on noncalcareous and humic gleys; species-rich vegetation with marsh willow-herb (*Epilobium palustre*), marsh bedstraw (*Galium palustre*), rough meadow-grass (*Poa trivialis*) and creeping buttercup (*Ranunculus repens*).

#### SEDGE MIRES

Star sedge mire (Caricetum echinato-paniceae)—on dystrophic peat and peaty gleys of flushed slopes and channels; widespread but generally confined from the lowlands to low mountains; star sedge (*Carex echinata*) is frequent; bog mosses (*Sphagnum* species) are present.

A Common star sedge mire (typical subassociation)—star sedge (*Carex echinata*), common sedge (*C. nigra*), carnation-grass (*C. panicea*) and common cotton-grass (*Eriophorum angustifolium*) share dominance.

B Star sedge mire with sharp-flowered rush (subassociation with *Juncus acutiflorus*)—sharp-flowered rush (*Juncus acutiflorus*) is abundant or dominant; flying bent (*Molina caerulea*) is present, usually frequent; widespread and moderately extensive in the west and south-west.

C Star sedge mire with bog myrtle (subassociation with *Juncus acutiflorus*—facies with *Myrica gale*)—bog myrtle (*Myrica gale*) is abundant or dominant.

Flea-sedge mire (*Caricetum hostiano-pulicaris*)—on noncalcareous gleys, peaty gleys and mesotrophic and eutrophic peat of flushed slopes and channels in the lowlands to low mountains; widespread but confined; flea-sedge (*Carex pulicaris*) is frequent; tawny sedge (*C. hostiana*) is usually present.

Bog-rush mire (the *Schoenus nigricans* Community)—on noncalcareous gleys, peaty gleys and mesotrophic and eutrophic peat of flushed slopes and flats in the lowlands; from Unst to the Solway Firth in the west, local in the east; confined or moderately extensive; tussocks of bog-rush (*Schoenus nigricans*) are abundant or dominant; flying bent (*Molinia caerulea*) is frequent.

Few-flowered spike-rush mire (*Carici dioeci-Eleocharitetum quinque-florae*)—on noncalcareous gleys, peaty gleys and mesotrophic and eutrophic peat at the bottom of flush channels and in association with springs from the lowlands to high uplands; widespread but confined; few-flowered spike-rush (*Eleocharis quinqueflora*) is frequent or abundant; dioecious sedge (*Carex dioica*) is usually present.

#### PERMANENT PASTURES

Rye-grass-crested dog's-tail pasture (*Lolio-Cynosuretum*)—on a wide range of cultivated soils; widespread and extensive in arable areas; pasture that was originally sown-out; white clover (*Trifolium repens*) is usually abundant and the grasses Yorkshire fog (*Holcus lanatus*), red fescue (*Festuca rubra*), crested dog's tail (*Cynosurus cristatus*), smooth meadow-grass (*Poa pratensis*) and perennial rye-grass (*Lolium perenne*) are usually present.

A Permanent and long ley pastures (subassociation with *Luzula campestris*)—field woodrush (*Luzula campestris*) and birdsfoot-trefoil (*Lotus corniculatus*) are usually present.

B Ley pasture (typical subassociation)—young pasture, newly sown-out or part of the arable rotation; creeping buttercup (*Ranunculus repens*) is usually abundant; the grasses timothy (*Phleum pratense*), annual meadow-grass (*Poa annua*) and rough meadow-grass (*P. trivialis*) are present.

C Wet pasture (variant with *Alopecurus geniculatus*)—on gleys, peaty gleys and peat of flats and depressions within areas of drier pasture; marsh foxtail (*Alopecurus geniculatus*) is present.

Timothy meadow (the *Festuca pratensis-Phleum pratense* Association)—on the fine-textured carse soils of the Midland Valley; hay meadows with timothy (*Phleum pratense*) abundant or dominant.

Meadow-grass-bent pasture (the *Galium saxatile-Poa pratensis* Community)—on brown forest soils in the lowlands and foothills; widespread and moderately extensive; community of broadleaved grasses derived from rough grassland by heavy grazing pressure and dunging or from rye-grass-crested dog's-tail pasture through loss of fertility and decrease in grazing pressure;

common bent (*Agrostis tenuis*) is usually the most abundant grass; sweet vernal (*Anthoxanthum odoratum*), smooth meadow-grass (*Poa pratensis*), red fescue (*Festuca rubra*), sheep's fescue (*F. ovina*), Yorkshire fog (*Holcus lanatus*) or creeping soft-grass (*H. mollis*) are usually present.

A Common meadow-grass-bent pasture—widespread.

B Meadow-grass-bent pasture with bracken—on imperfectly drained soils of valley slopes and moraines in the west and south-west, especially on Loch Lomond-side; dense stands of bracken (*Pteridium aquilinum*) with understorey of broadleaved grasses and heath bedstraw (*Galium saxatile*).

C Sweet vernal-Yorkshire fog pasture—on former crofting land where grazing pressure has been greatly reduced; Shetland; a tall sward of grasses dominated by sweet vernal (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*) and red fescue (*Festuca rubra*).

#### ROUGH GRASSLAND (acid grassland)

Bent-fescue grassland (*Achilleo-Festucetum tenuifoliae*)—on brown forest soils and, to a lesser extent, freely drained podzols on hill slopes from the lowlands to high uplands; widespread and extensive; dry grassland dominated by common bent (*Agrostis tenuis*), sweet vernal (*Anthoxanthum odoratum*), sheep's fescue (*Festuca ovina*) and red fescue (*F. rubra*).

A Herb-rich (rich) bent-fescue grassland (subassociation with *Thymus drucei*)—grassland of high base status brown forest soils, especially on steep valley slopes; wild thyme (*Thymus drucei*), ribwort (*Plantago lanceolata*) and spring sedge (*Carex caryophyllea*) are usually present.

B Upland bent-fescue grassland (variant with *Polygonum viviparum*)—species-rich grassland of corrie walls and upland slopes on flushed mineral soils; alpine bistort (*Polygonum viviparum*), alpine lady's mantle (*Alchemilla alpina*) and other species of lady's mantle (*A. glabra*, *A. xanthochlora*, etc.) are present; white bent (*Nardus stricta*) may be the most abundant grass.

C Common (acid) bent-fescue grassland (typical subassociation)—on low base status brown forest soils and podzols; the most widespread form of the association.

D Bent-fescue grassland with bracken (facies with *Pteridium aquilinum*)—on steep or rocky, uneven slopes where improvement is difficult; grassland dominated by bracken (*Pteridium aquilinum*), but never to the same extent as in meadow-grass-bent pasture; understorey usually dominated by fine-leaved grasses.

Heath rush-fescue grassland (*Junco squarroso-Festucetum tenuifoliae*)—usually on peaty podzols, peaty gleys and peat of hill slopes from the lowlands to high uplands, less commonly on a range of other soils; widespread and extensive; rough grassland dominated by white bent (*Nardus stricta*) or flying bent (*Molinia caerulea*); heath rush (*Juncus squarrosum*) is usually present.

A Heath grass-white bent grassland (subassociation with *Sieglungia decumbens*)—species-rich grassland of better base status brown forest soils, noncalcareous gleys, peaty gleys and peat on flushed slopes, mainly in the west; white bent (*Nardus stricta*) ranges in abundance from occasional to dominant; heath grass (*Sieglungia decumbens*), ribbed sedge (*Carex binervis*) and carnation-grass (*Carex panicea*) are present.

B Common white bent grassland (typical subassociation)—common acid grassland of the Southern Uplands and Central Scotland on peaty podzols, in

places on humus-iron podzols, peaty gleys or peat; white bent (*Nardus stricta*) is dominant; either heath rush (*Juncus squarrosum*), heath bedstraw (*Galium saxatile*) or common tormentil (*Potentilla erecta*) is abundant in places.

C Flying bent grassland (subassociation with *Molinia caerulea*)—wet acid grassland of peaty gleys and flushed dystrophic peat, less commonly on peaty podzols, mainly in the lowlands; widespread and extensive in the west but more local elsewhere; flying bent (*Molinia caerulea*) is dominant; deer-grass (*Trichophorum cespitosum*), white bent (*Nardus stricta*), heath bedstraw (*Galium saxatile*) and wavy hair-grass (*Deschampsia flexuosa*) are usually present.

*White bent grassland* Heath grass—white bent grassland and common white bent grassland.

*Rich rough grassland* Herb-rich bent-fescue grassland and heath grass—white bent grassland.

#### OTHER GRASSLAND COMMUNITIES

Carnation-grass pasture (the *Antennaria dioica-Carex pulicaris* Association)—on magnesian soils of flushed lowland slopes in Unst and Fetlar, Shetland; moderately extensive as a mosaic with sea plantain–bell heather moor (the *Plantago maritima-Erica cinerea* Association); carnation-grass (*Carex panicea*) is abundant or dominant, together with flea-sedge (*C. pulicaris*); vernal squill (*Scilla verna*), alpine meadow rue (*Thalictrum alpinum*) and lesser clubmoss (*Selaginella selaginoides*) are usually present.

Serpentine tussock-grass grassland (the *Helictotrichon pratense-Deschampsia cespitosa* Association)—on magnesian soils of gentle to steep flushed hill slopes; moderately extensive in the north-east Grampian Mountains; tussock-grass (*Deschampsia cespitosa*) is abundant; meadow oat (*Helictotrichon pratense*) and common vetch (*Vicia sativa angustifolia*) are present.

Tussock-grass pasture (the *Deschampsia cespitosa* Community)—on gleys and flushed peat of slopes and alluvial flats; confined or moderately extensive, mainly in the east and south lowlands; tussock-grass (*Deschampsia cespitosa*) is dominant and there are few other species present; occupies a similar habitat to that of soft rush pasture (the *Ranunculus repens-Juncus effusus* Community) with which it often merges.

Oat-grass wayside meadow (Centaureo-Arrhenatheretum)—on brown forest soils and made-up ground of roadsides and railway embankments; widespread but confined in the lowlands; tall sward dominated by grasses such as oat-grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis glomerata*), red fescue (*Festuca rubra*) and common bent (*Agrostis tenuis*); hardheads (*Centaurea nigra*) and hogweed (*Heracleum sphondylium*) are usually present.

Rockrose-fescue grassland (the *Galium sterneri-Helictotrichon pratense* Community)—on brown forest soils and brown calcareous soils associated with limestone outcrops; local and confined, on the hills of north-east Scotland; species-rich grassland with many base-loving plants such as

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common rockrose (*Helianthemum chamaecistus*), wild thyme (*Thymus drucei*), purging flax (*Linum catharticum*), slender bedstraw (*Galium sterneri*), lady's bedstraw (*G. verum*) and the grasses meadow oat (*Helictotrichon pratense*) and quaking grass (*Briza media*); alpine bistort (*Polygonum viviparum*) is usually present.

Crested hair-grass grassland (the *Galium verum-Koeleria cristata* Community)—on brown forest soils and brown calcareous soils of basic igneous and limestone outcrops in the lowlands; common and confined or moderately extensive, mainly in the north-east and east; dry, species-rich grassland with crested hair-grass (*Koeleria cristata*) and lady's bedstraw (*Galium verum*); floristically very similar to the red fescue dune pastures and herb-rich bent-fescue grassland.

White bent-tussock-grass grassland (the *Cirsium palustre-Nardus stricta* Community)—on low base status noncalcareous gleys and magnesian gleys of gentle flushed slopes from the lowlands to low uplands; local and moderately extensive, mainly in the north and north-east; white bent (*Nardus stricta*) is usually the most abundant species and clumps of tussock-grass (*Deschampsia cespitosa*) are frequent in most places; marsh thistle (*Cirsium palustre*) and the moss *Thuidium tamariscinum* are usually present.

#### MOORLAND

Atlantic heather moor (*Carici binervis-Ericetum cinereae*)—on brown forest soils, humus-iron podzols and peaty podzols of hill slopes, usually below 400 metres altitude; widespread and extensive, less so in the Grampian Mountains; dry and moist moorland dominated by heather (*Calluna vulgaris*); brown bent-grass (*Agrostis canina montana*), ribbed sedge (*Carex binervis*), white bent (*Nardus stricta*), bell heather (*Erica cinerea*) and common tormentil (*Potentilla erecta*) usually present.

A Herb-rich Atlantic heather moor (subassociation with *Viola riviniana*)—on brown forest soils and podzols, often flushed, of gentle to very steep slopes of mounds and valley sides; common and moderately extensive; slender St John's wort (*Hypericum pulchrum*) and common violet (*Viola riviniana*) are usually present; wild thyme (*Thymus drucei*) and birdsfoot-trefoil (*Lotus corniculatus*) may be present.

B Dry Atlantic heather moor (part of the typical subassociation)—on humus-iron podzols and peaty podzols of hill slopes; widespread and extensive.

C Moist Atlantic heather moor (part of the typical subassociation)—on peaty podzols and peaty gleys; widespread and extensive; flying bent (*Molinia caerulea*) is present with deer-grass (*Trichophorum cespitosum*) and/or bog heather (*Erica tetralix*).

D Northern Atlantic heather moor (subassociation with *Racomitrium lanuginosum*)—on humus-iron podzols, peaty podzols and, occasionally, peaty gleys of more exposed sites; widespread and extensive in Orkney and Shetland and in the north and west of Scotland; woolly fringe-moss (*Racomitrium lanuginosum*) is present, often abundant; the lichens *Cladonia arbuscula* and *C. impexa* are present.

E Maritime Atlantic heather moor (unclassified)—on immature links soils; local but moderately extensive, so far only recorded from Orkney,

Caithness and the Moray Firth; sand sedge (*Carex arenaria*) and birdsfoot-trefoil (*Lotus corniculatus*) are present.

Boreal heather moor (Vaccinio-Ericetum *cinereae*)—on brown forest soils, humus-iron podzols, peaty podzols and subalpine soils of hill slopes, usually over 300 metres altitude but descending to the lowlands in the north; widespread and extensive in the Grampian Mountains, local elsewhere; dry and moist moorland dominated by heather (*Calluna vulgaris*) with blaeberry (*Vaccinium myrtillus*) and cowberry (*V. vitis-idaea*); bearberry (*Arctostaphylos uva-ursi*), bell heather (*Erica cinerea*), crowberry (*Empetrum nigrum*) and black bearberry (*Arctous alpinus*) are present in places.

A Herb-rich boreal heather moor (subassociation with *Viola riviniana*)—on brown forest soils and brown magnesian soils, usually on steep slopes; common and moderately extensive in the eastern Highlands; common violet (*Viola canina*), bitter vetch (*Lathyrus montanus*) and heath bedstraw (*Galium saxatile*) are present.

B Dry boreal heather moor (part of the typical subassociation)—on humus-iron and peaty podzols; widespread and extensive.

C Moist boreal heather moor (part of the typical subassociation)—on peaty podzols and, occasionally, on peaty gleys; widespread and extensive; bog heather (*Erica tetralix*) and deer-grass (*Trichophorum cespitosum*) are present.

D Lichen-rich boreal heather moor (subassociation with *Cladonia arbuscula*)—on humus-iron podzols, peaty podzols and subalpine soils; widespread and moderately extensive from the Highlands northwards to Orkney and Shetland; the lichen *Cladonia arbuscula* is abundant; *C. uncialis* and woolly fringe-moss (*Racomitrium lanuginosum*) are present in places.

Sea plantain–bell heather moor (the *Plantago maritima-Erica cinerea* Association)—on brown forest soils and brown magnesian soils of Unst and Fetlar, Shetland; extensive, usually as a mosaic with carnation-grass pasture; species-rich heath with abundant heather (*Calluna vulgaris*) and bell heather (*Erica cinerea*); sea plantain (*Plantago maritima*), mountain everlasting (*Antennaria dioica*) and carnation-grass (*Carex panicea*) are present; vernal squill (*Scilla verna*) occurs in places.

Sea plantain–crowberry heath (the *Plantago maritima-Empetrum nigrum* Community)—on noncalcareous gleys, peaty gleys and, occasionally, peat influenced by sea-spray of cliff tops on the exposed seabords of the Hebrides, northern Scotland, Orkney and Shetland; local and moderately extensive; heather (*Calluna vulgaris*) and crowberry (*Empetrum nigrum*) are abundant; sea plantain (*Plantago maritima*) and carnation-grass (*Carex flacca*) are present; vernal squill (*Scilla verna*) occurs in places.

Blaeberry heath (the *Rhytidadelphus loreus-Vaccinium myrtillus* Community)—on a wide range of soils including brown forest soils, humus-iron podzols, peaty podzols and redistributed peat on dry mounds and the steep slopes of hill ridges, summits and corrie walls, especially on stabilized scree; widespread and moderately extensive or extensive from the low uplands to low mountains; dense stands of blaeberry (*Vaccinium myrtillus*) with scattered plants of wavy hair-grass (*Deschampsia flexuosa*), crowberry (*Empetrum nigrum*) and heath bedstraw (*Galium saxatile*); upland stands contain stiff sedge (*Carex bigelowii*).

Bog heather moor (*Narthecio-Ericetum tetralicis*)—on peaty podzols, peaty gleys and shallow peat; widespread and extensive from the lowlands to high uplands in north and west Scotland, Orkney and Shetland but local and confined to wet depressions in dry moorland and to the margins of peat bogs elsewhere; wet moorland dominated by heather (*Calluna vulgaris*), deer-grass (*Trichophorum cespitosum*) and bog heather (*Erica tetralix*), with the bog moss *Sphagnum compactum* often the most abundant moss of the ground layer; bog asphodel (*Narthecium ossifragum*) is usually frequent or abundant.

A Common bog heather moor (the typical subassociation)—the lowland or less exposed form of the association; widespread and moderately extensive.

B Northern bog heather moor (subassociation with *Cladonia uncialis*)—widespread and extensive in the north and west, especially on moraine fields; woolly fringe-moss (*Racomitrium lanuginosum*) is present with the lichens *Cladonia arbuscula* and *C. uncialis*.

Deer-grass bog (the *Trichophorum germanicum-Calluna vulgaris* Community)—on shallow blanket peat, peaty podzols and subalpine soils; widespread but extensive only in the north from the lowlands to low mountains; wet moorland with heather (*Calluna vulgaris*) or deer-grass (*Trichophorum cespitosum*) dominant; bog heather (*Erica tetralix*) is often abundant; bog asphodel (*Narthecium ossifragum*) is usually absent; derived from blanket bog or bog heather moor by persistent burning and grazing.

A Common deer-grass moor—the lowland or sheltered form of the community.

B Northern deer-grass moor—vegetation of northern, western or upland areas; woolly fringe-moss (*Racomitrium lanuginosum*) is present with the lichens *Cladonia arbuscula* and *C. uncialis*.

Blanket bog (Erico-Sphagnetum papilloosi)—on blanket peat and raised mosses; widespread and extensive in all but eastern Central Scotland; dominated by heather (*Calluna vulgaris*), bog heather (*Erica tetralix*), cotton-grasses (*Eriophorum* species) and deer-grass (*Trichophorum cespitosum*); bog mosses (*Sphagnum* species) dominate the ground layer.

I Unflushed blanket-bog—on dystrophic peat of flats and raised mosses; dominated by dwarf shrubs, mainly heather (*Calluna vulgaris*) and bog heather (*Erica tetralix*).

A Lowland blanket bog (typical subassociation, typical variant)—widespread in the south and east, more localized elsewhere.

B Northern blanket bog (typical subassociation, variant with *Cladonia uncialis*)—widespread and extensive in the west and north, local elsewhere; woolly fringe-moss (*Racomitrium lanuginosum*) is present with the lichens *Cladonia arbuscula* and *C. uncialis*.

C Terminal phase of blanket bog (typical subassociation, variant with *Cornicularia aculeata*)—on peat bogs with mounds and channels; widespread and confined or moderately extensive; lichens are abundant or dominant on the mounds, and bog mosses (*Sphagnum* species), when present, are abundant in the channels.

G Upland blanket bog (subassociation with *Rhytidiodelphus loreus*)—widespread and moderately extensive from the lowlands to high uplands in the north and west, extensive in Orkney and Shetland at lower altitudes;

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crowberry (*Empetrum nigrum*) and hooked moss (*Rhytidadelphus loreus*) are present; blaeberry (*Vaccinium myrtillus*), wavy hair-grass (*Deschampsia flexuosa*) and common sedge (*Carex nigra*) occur in places.

2 Flushed blanket bog—on dystrophic peat of slopes, basins and channels; widespread and extensive in the west, becoming confined in the east; vegetation dominated by flying bent (*Molinia caerulea*) or cotton-grass species (*Eriophorum*); common tormentil (*Potentilla erecta*) and common milkwort (*Polygala serpyllifolia*) are usually present.

D Flying bent bog (typical subassociation, variant with *Molinia caerulea*)—vegetation dominated by flying bent (*Molinia caerulea*); bog myrtle (*Myrica gale*) may be abundant or dominant on more flushed sites.

E Cotton-grass bog (part of the typical subassociation)—on more gently sloping sites; common and moderately extensive in the south-west and south; vegetation dominated by tussocks of cotton-grass (*Eriophorum vaginatum*).

F Common cotton-grass bog (unclassified)—confined to blanket peat on hills and cliffs exposed to sea-spray; so far only recorded from Orkney and Shetland; vegetation dominated by common cotton-grass (*Eriophorum angustifolium*); common tormentil (*Potentilla erecta*) is frequent or abundant.

Mountain blanket bog (*Rhytidadelpho-Sphagnetum fusci*)—see Mountain (Oroarctic) communities.

#### MOUNTAIN (Oroarctic)

##### Mountain grasslands

Stiff sedge-fescue grassland (the *Carex bigelowii-Festuca vivipara* Association)—on subalpine and alpine soils of the high uplands and low mountain regions; widespread and moderately extensive in the south and west, becoming local in the north; vegetation dominated by white bent (*Nardus stricta*), heath rush (*Juncus squarrosus*), stiff sedge (*Carex bigelowii*), viviparous fescue (*Festuca vivipara*) or tufted grass (*Deschampsia cespitosa*).

A Mountain white bent grassland (the *Nardus stricta* facies)—vegetation dominated by white bent (*Nardus stricta*).

B Mountain heath rush grassland (the *Juncus squarrosus* facies)—soils usually have a peaty surface horizon; vegetation dominated by heath rush (*Juncus squarrosus*).

C Stiff sedge grassland—vegetation dominated by stiff sedge (*Carex bigelowii*); woolly fringe-moss (*Racomitrium lanuginosum*) is absent or rare.

D Viviparous fescue grassland—mainly on smooth hill tops of the south and south-west on subalpine and alpine podzols; vegetation dominated by viviparous fescue (*Festuca vivipara*).

E Tussock-grass-stiff sedge flush (subassociation with *Agrostis tenuis*, variant with *Viola riviniana*)—on more poorly drained, flushed soils associated with springs and concave slopes; tufted grass (*Deschampsia cespitosa*) is frequent or abundant; marsh violet (*Viola palustris*) and stiff sedge (*Carex bigelowii*) are usually present.

Alpine clubmoss snow-bed (the *Lycopodium alpinum-Nardus stricta* Community)—local community of late snow-lie depressions and slopes on

subalpine and alpine soils which are seasonally waterlogged; vegetation is dominated by white bent (*Nardus stricta*); alpine clubmoss (*Lycopodium alpinum*) is frequent or abundant; stiff sedge (*Carex bigelowii*), wavy hair-grass (*Deschampsia flexuosa*) and woolly fringe-moss (*Racomitrium lanuginosum*) are present.

Dwarf cudweed snow-bed (the *Gnaphalium supinum-Nardus stricta* Community)—local community of late snow-lie depressions and slopes on subalpine and alpine soils which are seasonally waterlogged; vegetation usually dominated by white bent (*Nardus stricta*); dwarf cudweed (*Gnaphalium supinum*) is present.

### Mountain heaths

Mountain blanket bog (*Rhytidadelpho-Sphagnetum fuscum*)—on blanket peat of the uplands and mountains, mainly in eastern Scotland; widespread and sometimes extensive; vegetation dominated by heather (*Calluna vulgaris*), crowberry (*Empetrum nigrum* or *E. hermafroditum*), cotton-grass (*Eriophorum vaginatum*) and bog mosses (*Sphagnum* species); cloudberry (*Rubus chamaemorus*) and blaeberry (*Vaccinium myrtillus*) are usually present.

Fescue-woolly fringe-moss heath (*Festuco-Racomitrietum lanuginosi*)—on alpine podzols of hill summits and upper slopes; widespread and moderately extensive in the mountains of Scotland, mainly in the west, and in the foothills and uplands of Shetland; often forms a mosaic with alpine azalea-lichen heath where the distribution of the two communities overlaps; woolly fringe-moss (*Racomitrium lanuginosum*) is abundant or dominant and stiff sedge (*Carex bigelowii*) is abundant; least willow (*Salix herbacea*) is often present; heather (*Calluna vulgaris*) is absent or rare.

Alpine azalea-lichen heath (*Alectorio-Callunetum vulgaris*)—on alpine podzols of extremely exposed hill summits; widespread and moderately extensive from the foothills in Orkney and Shetland, the low uplands of the Northern Isles to the low mountains of mainland Scotland, mainly in the east; often forms a mosaic with fescue-woolly fringe-moss heath where the distribution of the two communities overlaps; vegetation dominated by severely wind-cut dwarf shrubs, usually heather (*Calluna vulgaris*); mountain azalea (*Loiseleuria procumbens*) and least willow (*Salix herbacea*) are present in places; ground layer dominated by woolly fringe-moss (*Racomitrium lanuginosum*) and lichens.

Three-leaved rush heath (*Cladonio-Juncetum trifidi*)—on alpine podzols of high mountain plateaux; local but extensive community of the Cairngorm Mountains, less extensive elsewhere; open sward of three-leaved rush (*Juncus trifidus*) with stiff sedge (*Carex bigelowii*) and wavy hair-grass (*Deschampsia flexuosa*); woolly fringe-moss (*Racomitrium lanuginosum*) and lichens are usually abundant.

Bog whortleberry heath (the *Racomitrium lanuginosum-Vaccinium uliginosum* Association)—on seasonally flushed alpine and subalpine podzols of late snow-lie slopes on mountains; common and moderately extensive;

vegetation dominated by bog whortleberry (*Vaccinium uliginosum*), blaeberry (*Vaccinium myrtillus*) and crowberry (*Empetrum hermaphroditum*); white bent (*Nardus stricta*) and deer-grass (*Trichophorum cespitosum*) are abundant in places.

### SCRUB

Blackthorn scrub (the *Primula vulgaris-Prunus spinosa* Association)—on brown forest soils of lowland and foothill slopes; widespread but confined in mainland Scotland and the Inner Hebrides ; dense stands of blackthorn (*Prunus spinosa*) with an understorey that includes bramble (*Rubus fruticosus*), raspberry (*R. idaeus*) and stinging nettle (*Urtica dioica*).

Bog myrtle scrub (Myricetum galis)—on peaty gleys and basin peat of flushed lowland and foothill slopes; widespread but confined or moderately extensive, mainly in the west and north; vegetation of clearings in willow or birch scrub; dominant bog myrtle (*Myrica gale*) over 1 metre high; flying bent (*Molinia caerulea*) is abundant and bog heather (*Erica tetralix*) is present.

Common sallow (willow) scrub (Sphagno-Salicetum atrocinereae)—on dystrophic basin peat, sometimes peaty gleys, of wet depressions in the lowlands and foothills; widespread, confined or moderately extensive; open to dense stands of common sallow (*Salix cinerea atrocinerea*), often with other willow species.

Broom and gorse scrub (formerly Sarothamnion scoparius, now the *Pteridium aquilinum-Ulex europaeus* Association)—on brown forest soils and modified humus-iron podzols of lowland and foothill slopes; widespread and sometimes extensive; dense scrub dominated by gorse (*Ulex europaeus*) or broom (*Sarothamnus scoparius*); the understorey is dominated by bracken (*Pteridium aquilinum*) or common bent-grass (*Agrostis tenuis*).

Boreal juniper scrub (Trientali-Juniperetum communis)—on brown forest soils and humus-iron podzols of upland slopes; widespread and moderately extensive or extensive in the eastern Highlands; dense stands of juniper (*Juniperus communis*), with blaeberry (*Vaccinium myrtillus*), heath bedstraw (*Galium saxatile*) and wood sorrel (*Oxalis acetosella*) present in the field layer; moschatel (*Adoxa moschatellina*), wood anemone (*Anemone nemorosa*) and greater stitchwort (*Stellaria holostea*) are present on the more fertile soils.

Hazel scrub or hazelwood—part of elmwood (*Querco-Ulmetum glabrae*) in the east or western ash-oakwood (*Primulo-Quercetum*).

Wet birchwood or common birch scrub (the *Sphagnum palustre-Betula pubescens* Community)—on dystrophic basin peat, sometimes on peaty gleys, of wet depressions, mainly in the lowlands; widespread and moderately extensive in the Highlands; open canopy of common birch (*Betula pubescens*); flying bent (*Molinia caerulea*) is frequent or abundant in the field layer; hair moss (*Polytrichum commune*) and bog moss (*Sphagnum palustre*) dominate the ground layer.

## WOODLAND

**Coniferous woodland**

Bell heather-Scots pine plantations (the *Erica cinerea-Pinus sylvestris* Community)—mainly on humus-iron podzols on level sites or gentle slopes in the lowlands to low uplands; widespread and extensive in the north-east; even-aged canopy of planted Scots pine (*Pinus sylvestris*), in places with other conifers; the underlying vegetation is very similar to that found in native pinewood, especially in older plantations.

Native pinewood (*Pinetum scoticae*)—on humus-iron podzols, peaty podzols and brown forest soils, occasionally on peaty gleys and shallow peat, from the foothills to high uplands in the east, descending to the lowlands in the west; local remnants, moderately extensive or extensive in the Central Highlands; Scots pine (*Pinus sylvestris*) canopy of very uneven age, usually with a heathy understorey; a shrub layer of juniper (*Juniperus communis*) is present, in places.

Pine plantations with broadleaved grasses or ferns abundant or dominant—part of southern oakwood (*Galio saxatilis-Quercetum*).

**Broadleaved woodland—oakwood and birchwood**

Western oakwood and birchwood (Atlantic oakwood, western highland birchwood and boreal birch scrub)—(*Blechno-Quercetum*)—on brown forest soils and humus-iron podzols of lowland and foothill slopes; widespread and extensive in western Scotland; canopy dominated by sessile oak (*Quercus petraea*) or common birch (*Betula pubescens odorata*) but is replaced by a secondary shrub layer of birch and hazel (*Corylus avellana*) in places; hard-fern (*Blechnum spicant*) is present in the field layer and mountain fern (*Thelypteris limbosperma*) occurs in places.

A Grassy Atlantic oakwood (variants with *Primula vulgaris* and typical variant)—on brown forest soils from Loch Maree southwards; canopy dominated by sessile oak (*Quercus petraea*); broadleaved grasses dominate the field layer; bracken (*Pteridium aquilinum*) and bluebell (*Endymion non-scriptus*) are present.

B Heathy Atlantic oakwood (typical subassociation, variant with *Vaccinium myrtillus*)—on humus-iron podzols from Loch Maree southwards; canopy dominated by sessile oak (*Quercus petraea*); blaeberry (*Vaccinium myrtillus*) is frequent or abundant in the field layer.

C Grassy western highland birchwood (variants with *Primula vulgaris* and typical variants)—on brown forest soils from Loch Maree northwards; canopy dominated by common birch (*Betula pubescens*) with hazel (*Corylus avellana*) present in places and co-dominant; broadleaved grasses dominate the field layer; bracken (*Pteridium aquilinum*) and bluebell (*Endymion non-scriptus*) are present.

D Heathy western highland birchwood (typical subassociation, variant with *Vaccinium myrtillus*)—on humus-iron podzols from Loch Maree northwards; canopy dominated by common birch (*Betula pubescens*); blaeberry (*Vaccinium myrtillus*) is frequent or abundant in the field layer.

E Boreal birch scrub (subassociation with *Luzula sylvatica*)—on humus-iron podzols and peaty podzols, sometimes on peaty gleys or peat, at the

upper altitudinal limits of the association from Loch Maree northwards; canopy dominated by common birch (*Betula pubescens*), greater woodrush (*Luzula sylvatica*) is present, often abundant, in the field layer and common cow-wheat (*Melampyrum pratense*) is usually present.

**E** Eastern highland oakwood and birchwood (Trientali-Betuletum pendulae)—on brown forest soils or, less commonly, humus-iron podzols of valley sides and hill slopes from the lowlands to low uplands; widespread and extensive in the eastern Grampian Mountains, extending to Glen Affric and Spinningdale; canopy dominated by oak (*Quercus petraea/robur*), silver birch (*Betula pendula*) or common birch (*B. pubescens*); hairy woodrush (*Luzula pilosa*) and chickweed wintergreen (*Trientalis europaea*) are usually present in the field layer.

**A** Eastern highland oakwood (typical subassociation)—canopy dominated by oak (*Quercus petraea/robur*) or, less commonly, by silver birch (*Betula pendula*); broadleaved grasses and bracken (*Pteridium aquilinum*) dominate the field layer.

**B** Eastern highland birchwood (subassociation with *Vaccinium vitis-idaea*)—canopy dominated by silver birch (*Betula pendula*) or common birch (*B. pubescens*); blaeberry (*Vaccinium myrtillus*) or heather (*Calluna vulgaris*) is abundant or dominant; cowberry (*V. vitis-idaea*) is usually present.

**S** Southern oakwood (Galio saxatilis-Quercetum)—on brown forest soils, occasionally on noncalcareous gleys, of lowland and foothill slopes; widespread and extensive in the south, extending westwards to the River Cree, northwards to the Cromarty Firth and down the Great Glen to Fort Augustus; canopy dominated by sessile oak (*Quercus petraea*) or by hybrids between this species and common oak (*Q. robur*); can be replaced by a secondary phase dominated by silver birch (*Betula pendula*); honeysuckle (*Lonicera periclymenum*) is present either as lianes or as part of the field layer.

**A** Southern oakwood with bluebell (subassociation with *Endymion non-scriptus*)—bluebell (*Endymion non-scriptus*) is present, often abundant, in the field layer.

**B** Grassy southern oakwood (part of the typical subassociation)—broad-leaved grasses and bracken (*Pteridium aquilinum*) dominate the field layer.

**C** Heathy southern oakwood (part of the typical subassociation)—blaeberry (*Vaccinium myrtillus*) or heather (*Calluna vulgaris*) is abundant or dominant in the field layer.

**D** Grassy southern birchwood (part of the typical subassociation)—broad-leaved grasses and bracken (*Pteridium aquilinum*) dominate the field layer.

**E** Heathy southern birchwood (part of the typical subassociation)—blaeberry (*Vaccinium myrtillus*) or heather (*Calluna vulgaris*) is abundant or dominant in the field layer.

In some cases, oak has been clear-felled and Scots pine (*Pinus sylvestris*) planted in its place. The underlying vegetation, however, remains that of southern oakwood for a considerable time. In other instances, pine has been planted on land that was formerly cultivated and again the vegetation that has developed shows affinities with southern oakwood. Both forms of plantation have therefore been included in this association.

**F** Fern-rich pine plantations—on former arable land; ferns other than bracken are abundant or dominant; bramble (*Rubus fruticosus*) and raspberry (*R. idaeus*) are present.

G Grassy pine plantations—on former oakwood sites; broadleaved grasses are abundant or dominant; bracken (*Pteridium aquilinum*) is often present.

### Other broadleaved woodland

Alderwood (flush alderwood)—(the *Crepis paludosa-Alnus glutinosa* Association)—on peaty alluvial soils, eutrophic flushed peat and peaty gleys on flats and slopes in the lowlands and foothills; widespread but confined; canopy usually dominated by alder (*Alnus glutinosa*), but can be replaced by common sallow (*Salix cinerea atrocinerea*) or common birch (*Betula pubescens*); the species-rich field layer includes marsh hawk's-beard (*Crepis paludosa*), creeping buttercup (*Ranunculus repens*), yellow pimpernel (*Lysimachia nemorum*) and meadowsweet (*Filipendula ulmaria*); remote sedge (*Carex remota*) is present and abundant in places.

Elmwood (Querco-Ulmetum *glabrae*)—on brown forest soils and occasionally on noncalcareous gleys of level ground to very steep slopes, mainly in the southern lowlands; widespread and moderately extensive; canopy is a mixture of elm (*Ulmus glabra*), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*) and, occasionally, oak (*Quercus robur/petraea* or birch (*Betula pendula/pubescens*); a shrub layer of hazel (*Corylus avellana*) is often present and dominates in places; dog's mercury (*Mercurialis perennis*), enchanter's nightshade (*Circaeа lutetiana*), herb bennet (*Geum urbanum*), ramsons (*Allium ursinum*) or bluebell (*Endymion non-scriptus*) usually dominate in the field layer.

A Elmwood with ramsons (subassociation with *Allium ursinum*)—ramsons (*Allium ursinum*) is abundant in the field layer although dog's mercury (*Mercurialis perennis*) can dominate.

B Typical elmwood (typical subassociation)—ramsons (*Allium ursinum*) is absent or rare only.

Ashwood (western ash-oakwood)—(Primulo-Quercetum)—on brown forest soils and brown calcareous soils on lowland slopes; widespread but confined or moderately extensive in the west; either a tree canopy dominated by ash (*Fraxinus excelsior*), sessile oak (*Quercus petraea*) or common birch (*Betula pubescens*) with an understorey of hazel (*Corylus avellana*) or a shrub phase dominated by hazel; primrose (*Primula vulgaris*), bluebell (*Endymion non-scriptus*) and slender false-brome (*Brachypodium sylvaticum*) are present in the field layer.

A Typical western ash-oakwood—canopy dominated by trees.

B Hazel scrub—trees absent or occasional only; shrub layer dominated by hazel (*Corylus avellana*).

Mixed woodland: coniferous and broadleaved woodland.

## **5 Land Evaluation**

Land evaluation is the assessment of the suitability of land for the many and varied needs of man from primary production to recreation. In developing countries, with virgin lands, the need for evaluation of land resources is clear. In the most highly developed countries, land evaluation is also assuming considerable importance due to increasing pressure on the land resource and to increasing production costs. The recognition of areas with high natural potential for production results in the most economic and effective use of land. The survey described in this series of handbooks arose from an awareness of these facts, as outlined in Chapter 1. The initial requirement of the Lowground Working Party referred to in that chapter was to classify the land resources of Scotland in terms of arable agriculture especially to identify prime land; wider connotations (for example grazing value and reclamation potential) were introduced by the Hill Areas Working Party. It was also recognized that the basic soil and vegetation data collected would have much wider applications however, and although in the various handbooks priority is given to the agricultural assessment of land, comments on potential for other uses are made.

To predict the successful use of land for any purpose incorporates not only the identification of the physical properties of land important to that use and their occurrence in the landscape, but also a recognition of man's inputs in technology, finance and labour. Since the latter are variable through time in a manner not accurately predictable, systems of assessing land capability usually include a statement of management and input levels which, in effect, standardize them. In understanding any land capability system it is important to keep in mind the level of this standardization. The reading of the maps and their accompanying accounts are subject to this: for example, high inputs and good management levels by a competent gardener can result in a wide range of vegetables being obtained from land which, on the farm production level, may be classed as only suited to grass and forage crops.

It is also worth stressing that land capability classifications are not recommendations for the particular use of a piece of land. They seek only to identify areas where that use may be carried out most easily. Only by carefully comparing all the alternatives and incorporating the economic and political judgements relative to that place and time can recommendations for actual land use be made.

## LAND CAPABILITY CLASSIFICATION FOR AGRICULTURE

Land classification calls for the integration of a wide range of information: climatic and site parameters, physical and chemical properties of land, suitability for cropping and management problems. As much of this information is only available through agricultural advisory and research organizations it is essential that these bodies, as well as farmers and users of the information, participate in the recognition of the categories. The establishment of small consultative groups for this purpose within each region and their membership are described in Chapter 1. The consultative committees played a significant part in applying the classification system, which itself had been thoroughly discussed by the authors with other experts in the Agricultural Development and Advisory Service Closed Conference of Advisory Soil Scientists' Land Capability Classification Working Party. This committee, although based in England, acted as liaison between England, Wales and Scotland. The classification used was therefore very broadly based.

Although owing much to the Land Capability Classification of the United States Department of Agriculture (Klingebiel and Montgomery, 1961) and to the Land Use Capability system of the Soil Surveys of England and Wales and of Scotland (Bibby and Mackney, 1969), the classification was extensively modified (for reasons described in Chapter 1) by the introduction of divisions into Classes 3 to 6. Subclasses were renamed limitation types and have not been used in the current 1:250 000 survey. The new classification, the Land Capability Classification for Agriculture (L.C.A.), is fully described in Bibby, Douglas, Thomasson and Robertson (1982). In addition, the opportunity was taken to introduce new guidelines on soil wetness which has resulted in some reclassification of land, particularly in Fife, the Lothians and the Merse of Berwickshire. Previously issued Land Use Capability (L.U.C.) maps at larger scales covering these areas will be revised and reissued on the new system as soon as possible. Maps of other areas will be reissued incorporating division designations in due course.

The Land Capability Classification for Agriculture has as its objective the integration of detailed information on soil, climate and relief in a form which will be of value to land use planners, agricultural advisers, farmers and others involved in optimizing the use of land resources. It is primarily a planning classification however. At the 1:250 000 scale it obviously provides an overview of the country's resources which is important for national and regional planning, and acts as a focus for more detailed work in critical areas. Its applications include the following:

- 1 Contributing to an inventory of the national land resource.
- 2 Providing a means of assessing the value to agriculture of land on a uniform basis as an input to planning decisions.
- 3 Defining major limitations to land use.
- 4 Assisting in environmental and amenity planning.

The classification comprises three main categories, the class, the division and the unit of which only the first two are utilized on the 1:250 000 maps. Land placed within any *class* or *division* has a similar overall degree of limitation: within any class or division there are different management requirements. In the handbooks, which accompany the 1:250 000 maps, the major limitations on agricultural production are described under the six headings (*limitation types*) of climate, gradient, soil, wetness, erosion and pattern.

Levels of limitation within each of these provide the guidelines by which the classes are defined: they are described in Bibby, Douglas, Thomasson and Robertson (1982).

Land in Classes 1 to 4 is suited to arable use and that in Classes 5 to 7 unsuited to arable use. There are no divisions in Classes 1, 2 and 7; two divisions in Classes 3 and 4; and three in Classes 5 and 6.

### **Land suited to arable cropping**

- Class 1** *Land capable of producing a very wide range of arable crops*  
 Cropping is highly flexible and includes the more exacting crops such as winter harvested vegetables. The levels of yield are consistently high.
- Class 2** *Land capable of producing a wide range of arable crops*  
 Cropping is very flexible and a wide range of crops may be grown but difficulties with winter vegetables may be encountered in some years. The level of yield is high but less consistently obtained than in Class 1.
- Class 3** *Land capable of producing a moderate range of crops*  
*Division 1* The land is capable of producing consistently high yields of a narrow range of crops (cereals and grass) or moderate yields of a wider range (potatoes, field beans and other vegetables and root crops). Grass leys of short duration are common.  
*Division 2* The land is capable of average production but high yields of grass, barley and oats are often obtained. Grass leys are common and longer than in Division 1.
- Class 4** *Land capable of producing a narrow range of crops*  
*Division 1* Long ley grassland is commonly encountered but the land is capable of producing forage crops and cereals for stock.  
*Division 2* The land is primarily grassland with some limited potential for other crops.

### **Land suited only to improved grassland and rough grazings**

- Class 5** *Land capable of use as improved grassland*  
*Division 1* Land well suited to reclamation and to use as improved grassland.  
*Division 2* Land moderately suited to reclamation and to use as improved grassland.  
*Division 3* Land marginally suited to reclamation and to use as improved grassland.
- Class 6** *Land capable only of use as rough grazing*  
*Division 1* Land with high grazing value.  
*Division 2* Land with moderate grazing value.  
*Division 3* Land with low grazing value.
- Class 7** *Land of very limited agricultural value.*

*Assumptions*

The following assumptions must be taken into account in using the classification:

- 1 The classification is designed to assess the value of land for agriculture.
- 2 Land is classified according to the degree to which its physical characteristics affect the flexibility of cropping and its ability to produce certain crops consistently.
- 3 The classification does not group land according to its most profitable use.
- 4 The standard of management adopted is the level of input and intensity of soil, crop and grassland management applied successfully by the reasonable and practical farmer within the relevant sector of the farming industry. Such management will maintain or improve the land resource.
- 5 Land which has limitations which may be removed or reduced at economic cost by the farmer or his contractors is classed on the severity of the remaining limitations.
- 6 Land with severe limitations is classified accordingly except where there is clear evidence that a major improvement project (e.g. arterial drainage) will be completed within the next 10 years. In such cases the land is classed as if the improvements had occurred.
- 7 Location, farm structure, standard of fixed equipment and access to markets do not influence the grading. They may, however, affect land use decisions.
- 8 The interpretations are an expression of current knowledge and revision will be necessary with new experience or technological innovations.

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## Appendix I Terminology

The standard terms used by the Soil Survey to describe soil profiles are listed and defined in Soil Survey memoirs, and are based largely on those in *Soil Survey Manual* (Soil Survey Staff, 1951). They cover features such as colour, texture, structure, consistence, mottling, stones, roots, and nature of boundaries between soil horizons. Detailed descriptions of soil profiles have not been included in this series of handbooks, so many of these standard terms have not been used, but in general descriptions of soils, full use has been made of the terminology for describing soil colour and texture.

The names and notations of the soil colours are those of the *Munsell Soil Color Charts* (Munsell Color Company, Inc., 1954).

Soil texture is a measure of the relative amounts of sand, silt and clay present in the mineral soil material of less than 2 millimetres in diameter. The textural class names are ascertained from the triangular diagram (Fig. 1) used in conjunction with the United States Department of Agriculture (U.S.D.A.) range of grain sizes (Soil Survey Staff, 1951): sand 50–2000 µm, silt 2–50 µm and clay less than 2 µm.

The terms describing slope classes (Table C) and rock classes (Table D) were modified for the 1:250 000 survey from previous definitions.

Terminology of the soil and vegetation classifications is explained respectively in Chapters 3 and 4.

Table C Slope classes

limits	slope class
0–7°	gentle
8–15°	strong
16–25°	steep
>25°	very steep

Table D Rockiness classes

non-rocky	rock outcrops are more than 100 metres apart
slightly rocky	rock outcrops are 36–100 metres apart
moderately rocky	rock outcrops are 3–35 metres apart
very rocky	rock outcrops are less than 3 metres apart

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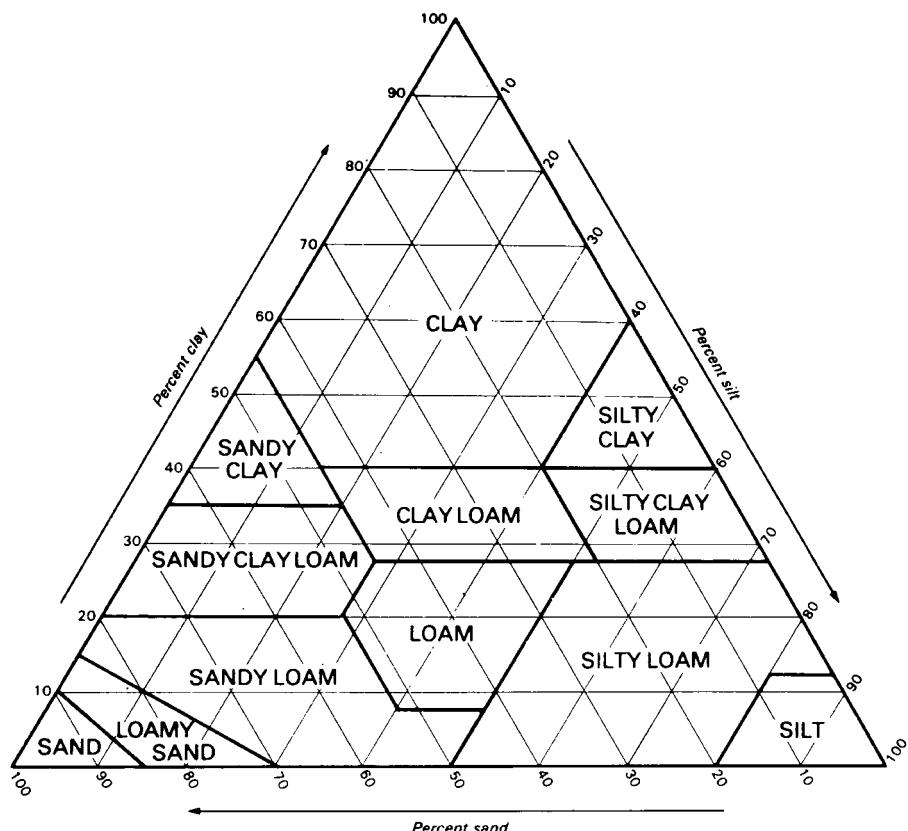


Figure 1. Percentages of clay ( $<2\mu\text{m}$ ), silt ( $2-50\mu\text{m}$ ) and sand ( $50-2\,000\mu\text{m}$ ) in the basic soil textural classes.

## **Appendix II Measurement of Map Unit Areas**

Measurement of map unit areas quoted in the Soil Survey of Scotland publications has in the past been made by hand planimetry. This method, though, is very time-consuming. The most accurate modern methods of area measurement are undoubtedly those using various techniques of automated cartography, but because of the lack of readily available equipment and finance, it was not possible to employ such methods. Hence, for the 1:250 000 survey a point-count method based on the one-kilometre intersects of the National Grid was used. Although this technique is relatively coarse, the results are sufficiently accurate for use in reconnaissance surveys.

### **A The method**

- 1 The 1:50 000 maps on blue transparent plastic, prepared for reduction to the 1:250 000 scale, were used and the number of times each map unit occurred at the one-kilometre intersects of the National Grid was recorded. Figures were noted for each 1:250 000 map sheet, but because of overlap between the maps, data for the overlap areas were noted separately so as to produce a complete set of figures for the whole country.
- 2 The land area of Scotland was provided by the Ordnance Survey, Southampton, from measurements using an automatic planimeter.
- 3 The results of both the point-count method and from the Ordnance Survey provided the following comparison—

Areas of Scotland (sq km)	Land	Inland water	Total
(i) by grid count	77 522	1351	78 873
(ii) Ordnance Survey	77 087	1693	78 780
	435	- 342	93

From the above data it can be seen that an overestimation of land area by the grid count had occurred. On checking areas of the grid count it was evident that small lochs and other areas of inland water had not been identified accurately from the blue transparencies. The discrepancy in the land area (435 square kilometres, 0.56 per cent) could almost certainly be substantially reduced, leaving a final discrepancy of 93 square kilometres (0.12 per cent).

- 4 The figures obtained by the point-count method were adjusted by a proportionate amount for each 1:250 000 map sheet, so the total figure for land area of Scotland (excluding inland water) corresponded with the national total obtained from the Ordnance Survey. These adjusted figures are the ones given in each handbook and with the complete 1:250 000 soil map legend (Appendix III) in this publication. Those quoted for built-up areas included only those major towns and cities shown separately on the 1:250 000 map. The smaller towns and villages shown only by a dot are not included in the total. The figure for built-up land is therefore most probably an underestimate.

## B Estimation of error

A statistical method was used to determine the most relevant levels of significance to quote. Systematic sampling, for example a grid count, can be expected to give a more precise estimate of areas than random sampling, but has the disadvantage that no valid estimate of error can be calculated from a single systematic sample. Insufficient time was available for checking on the basis of a number of systematic samples and grid spacings, but if the variance is calculated as for a random sample, it is likely to be overestimated; because of this and the further safeguard of the large numbers involved in some associations, it was thought that no major inaccuracies were likely to occur. Variance was calculated using the following method: if  $P$  = the probability of a sample being of a given map unit,  $Q = 1 - P$  and  $N$  the total sampled, then the variance of  $P$  is  $PQ/N$  and the standard error equals the square root of the variance.

### *Examples*

- 1 Arkaig Association (Sheet 5) 3275 sq km, 13.3 per cent of sheet area.  
 $P = 0.1330$ ,  $Q = 0.8670$ ,  $N = 24544$   
 The variance is  $PQ/N = 0.00000470$   
 Standard error is 0.00217 (= 1.6 per cent of  $P$ )  
 Proportion of Arkaig Association is  $0.133 \pm 0.0022$  or  $13.3 \pm 0.22$  per cent.
- 2 Braemore Association (Sheet 4) 6 sq km, 0.04 per cent of sheet area.  
 $P = 0.0004$ ,  $Q = 0.9996$ ,  $N = 16765$   
 The variance is  $PQ/N = 0.00000002$   
 Standard error is 0.00015 (= 38.6 per cent of  $P$ )  
 Proportion of Braemore Association is  $0.0004 \pm 0.00015$  or  $0.04 \pm 0.015$  per cent.

It is clear from the above examples that as the area of the association (or map unit) decreases, the standard error increases proportionally; this is also

## APPENDIX II

dependent on the total area of the sheet concerned. Map unit areas quoted as a percentage of Scotland will be determined more precisely than those quoted as a percentage of the sheet area or of the association. After due consideration of some of these relationships, it was decided to quote figures for the areas of associations and map units to the nearest 0.01 per cent of Scotland, to 0.1 per cent of sheet areas (except for Sheet 1, Orkney and Shetland, where the total in the sample was small and the areas are quoted to 0.3 per cent), to the nearest 1 per cent of large associations ( $N \geq 200$ ) and to the nearest 5 per cent of small associations ( $N < 200$ ).

The figures quoted in the handbooks are the first available for areas of various soil and land types on a national basis in Scotland. Those quoted for the classes and divisions in the land capability for agriculture section are a more accurate assessment of Scotland's agricultural resources than has previously been available. The future programme of the Soil Survey Department will enable further refinements to be made.

## **Appendix III The National 1:250 000 Soil Map Legend**

The National Soil Map legend is reproduced on the following pages, together with the addition of a column indicating the area, in square kilometres, of each map unit.

The descriptions of the parent materials, component soils and landforms are standard on all seven maps. There is, however, a regional variation in the vegetation descriptions of some map units, so for such units the plant communities listed are those given for the region where the unit mainly occurs.

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION	
ALLUVIAL SOILS (1260 sq. km., 1.63%)	Recent riverine and lacustrine alluvial deposits	1	1226	Alluvial soils	Flood plains, river terraces and former lake beds	Arable and permanent pastures Rush pastures and sedge mires Broad-leaved woodland	
	Marine alluvial deposits (saltings)	2	34	Saline gleys	Salttings	Sea poa salt-marsh Mud-rush salt-marsh Reed swamp	
ORGANIC SOILS (7660 sq. km., 9.94%)	d - Deep peat e - Eroded peat	Organic deposits	3	666	Basin and valley peats	Basins and valleys	Blanket and flying bent bog Swamp, sedge mires and rush pastures
			4	6994	Blanket peat	Uplands and northern lowlands with gentle and strong slopes	Blanket and flying bent bog Upland and mountain blanket bog Deer-grass bog, Sedge mires
ABERLOUR (271 sq. km., 0.35%)	Drifts derived from acid schists and granitic rocks	5	46	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Valley sides with concave and regular, gentle and strong slopes; non-rocky	Rush pastures and sedge mires Arable and permanent pastures Bog heather moor and blanket bog	
		6	60	Humus-iron podzols; some brown forest soils and gleys	Hills and valley sides with gentle and strong slopes; non-rocky	Arable and permanent pastures Dry boreal heather moor	
		7	33	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with strong and steep slopes; non-rocky	Moist boreal heather moor Blanket and upland blanket bog Bog heather moor	
		8	< 1	Brown forest soils, humus-iron podzols; some gleys and peat	Hummocky valley moraines	Dry boreal heather moor Arable and permanent pastures Rush pastures and sedge mires	
		9	24	Peaty podzols, peat, peaty gleys	Hummocky valley moraines	Moist boreal heather moor Heath rush - fescue grassland Bog heather moor and blanket bog	
		10	31	Peaty podzols, humus-iron podzols; some peaty gleys and rankers	Hills and valley sides with strong and steep slopes; moderately rocky	Dry and moist boreal heather moor Tufted grass - white bent grassland	
		11	20	Peaty gleys, peat; some peaty podzols and peaty rankers	Undulating hills with gentle and strong slopes; moderately rocky	Moist boreal heather moor Blanket and upland blanket bog Bog heather moor	
		12	24	Subalpine soils; some peat and rankers	Mountains with gentle to very steep slopes; non- to very rocky	Alpine lichen heath Lichen-rich boreal heather moor Mountain blanket bog	
		13	5	Peat, subalpine soils; some alpine soils	Mountains with gentle and strong slopes; non- to moderately rocky	Mountain blanket bog Alpine lichen heath Stiff sedge - fescue grassland	
		14	9	Alpine soils	Mountain summits with gentle and strong slopes; non- and slightly rocky	Alpine lichen heath Stiff sedge - fescue grassland Alpine clubmoss snow-bed	
		15	19	Rankers, lithosols; some alpine soils	Mountain summits with strong to very steep slopes; very rocky	Blueberry and bog whortleberry heath. Alpine lichen heath Stiff sedge - fescue grassland	
ARBIGLAND (4 sq. km., <0.01%)	Drifts derived from Lower Carboniferous sandstones & shales, with some greywackes and granites	16	4	Brown forest soils with gleying, noncalcareous gleys	Broad ridge with gentle and strong slopes	Arable and permanent pastures	
ARDVANIE (38 sq. km., 0.05%)	Morainic drifts derived from Old Red Sandstone strata and Moine Schists	17	38	Humus-iron podzols; some brown forest soils, peaty gleys and non-calcareous gleys	Undulating lowlands and hills with gentle and steep slopes	Arable and permanent pastures Dry Atlantic heather moor Rush pastures and sedge mires	

	18	29	Brown forest soils, humus-iron podzols; some brown rankers and noncalcareous gleys	Valley sides with gentle and strong slopes; slightly and moderately rocky	Bent-fescue grassland Herb-rich Atlantic heather moor Arable and permanent pastures
	19	150	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Hills and valley sides with gentle to strong slopes; non-rocky	Rush pastures and sedge mires Arable and permanent pastures
	20	412	Humus-iron podzols; some brown forest soils, noncalcareous gleys and peaty gleys	Undulating lowlands and valley sides with gentle and strong slopes; non-rocky	Arable and permanent pastures Dry boreal heather moor Acid bent-fescue grassland
	21	132	Peaty podzols; some humus-iron podzols, peaty gleys and peat	Hills and valley sides with gentle and strong slopes; non-rocky	Dry and moist boreal heather moor Bog heather moor Blanket and upland blanket bog
	22	413	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with strong slopes; non-rocky	Moist boreal heather moor Blanket and upland blanket bog
	23	2331	Peat, peaty gleys, peaty podzols	Undulating lowlands and uplands with gentle and strong slopes; non-rocky	Bog heather moor
	24	172	Peat, peaty gleys, peaty podzols	Hills and valley sides with steep and very steep slopes; non-rocky	Moist boreal heather moor White bent grassland
	25	116	Brown forest soils, humus-iron podzols; some gleys and peat	Hummocky valley moraines; often bouldery	Acid bent-fescue grassland Arable and permanent pastures Oak and birchwood
	26	2126	Peaty podzols, peat, peaty gleys	Hummocky valley and slope moraines; often bouldery	Moist Atlantic heather moor Blanket and flying bent bog
ARKAIG (12502 sq. km., 16.22%)	27	311	Brown forest soils, humus-iron podzols; some gleys and rankers	Hill and valley sides with steep and very steep slopes; moderately and very rocky	Bog heather and northern bog heather moor Oak and birchwood
	28	629	Peaty podzols, humus-iron podzols; some peaty gleys and rankers	Hills and undulating lowlands with gentle and strong slopes; moderately rocky	Acid bent-fescue grassland Rush pastures and sedge mires
	29	1582	Peaty gleys, peat; some peaty podzols and peaty rankers	Undulating hills with gentle and strong slopes; moderately rocky	Boreal and Atlantic heather moor Heath rush - rescue grassland
	30	261	Rankers, peaty podzols; some humus-iron podzols and peaty gleys	Rugged hills with strong and steep slopes; very rocky	Rich bent-fescue grassland Moist Atlantic heather moor
	31	807	Peaty gleys, peaty podzols, peaty rankers	Hill sides with steep and very steep slopes; moderately and very rocky	Blanket and northern blanket bog
	32	568	Peaty gleys, peaty rankers, peat	Rugged hills with gentle and strong slopes; very rocky	Dry and moist boreal heather moor Bog heather moor
	33	1590	Subalpine soils; some peat, rankers and alpine soils	Moutains with gentle to very steep slopes; non- to very rocky	Blaeberry heath Mountain heath communities
	34	502	Peat, subalpine soils; some alpine soils	Moutains with gentle and strong slopes; non- to moderately rocky	Upland bent-fescue grassland Blanket and flying bent bog
	35	182	Alpine soils	Mountain summits with gentle and strong slopes; non- and slightly rocky	Bog heather and northern bog heather moor Atlantic heather moor
	36	189	Rankers, lithosols; some alpine soils	Mountain summits with strong to very steep slopes; very rocky	White bent grassland Blaeberry and bog whortleberry heath. Alpine lichen heath
					Stiff sedge - fescue grassland Stiff sedge - rescue grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
ARRAN (95 sq. km., 0.12%)	Drifts derived from marls, cornstones and sandstones of Triassic age, often water-modified	37	40	Noncalcareous gleys; some humic gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures
		38	55	Peaty gleys; some peat	Undulating lowlands with gentle slopes	Moist Atlantic heather moor Bog heather moor Blanket and flying bent bog
ASHGROVE (137 sq. km., 0.18%)	Drifts derived mainly from shales of Carboniferous age	39	28	Brown forest soils with gleying; some noncalcareous gleys and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		40	109	Noncalcareous gleys; some peaty gleys, humic gleys and peat	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Flying bent bog
BALBROWNIE (1412 sq. km., 1.83%)	Drifts derived mainly from sandstones of Lower Old Red Sandstone age, often water-modified	41	1000	Brown forest soils with gleying; some brown forest soils and noncalcareous gleys	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Broad-leaved woodland Rush pastures and sedge mires
		42	129	Noncalcareous gleys; some peaty gleys and humic gleys	Undulating lowlands with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires Broad-leaved woodland
		43	83	Brown forest soils; some brown forest soils with gleying	Undulating lowlands with gentle and strong slopes; slightly rocky	Arable and permanent pastures Broad-leaved woodland
		44	57	Humus-iron podzols; some brown forest soils and peaty podzols	Undulating foothills and valley sides with gentle and strong slopes; non-rocky	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland
		45	26	Peaty podzols; some humus-iron podzols; peat and peaty gleys	Undulating uplands with gentle and strong slopes; non-rocky	Dry and moist Atlantic heather moor Bog heather moor Heath rush - fescue grassland
		46	37	Peaty gleys, peat; some peaty podzols	Undulating lowlands and uplands with gentle slopes; non-rocky	Moist Atlantic heather moor Bog heather moor Rush pastures and sedge mires
		47	17	Noncalcareous gleys; some humic gleys	Undulating lowlands with gentle and strong slopes; slightly rocky	Permanent pastures Rush pastures and sedge mires
		48	46	Peaty gleys; some peat	Undulating lowlands with gentle and strong slopes; slightly rocky	Moist Atlantic heather moor Bog heather moor and blanket bog Rush pastures and sedge mires
		49	6	Brown forest soils, humus-iron podzols	Hill sides with steep slopes; moderately rocky	Acid bent-fescue grassland Dry Atlantic heather moor
		50	11	Peaty gleys, peat; some peaty podzols	Gentle complex hill slopes and occasional flats; moderately rocky	Moist Atlantic heather moor Bog heather moor Blanket bog
BARGOUR (90 sq. km., 0.12%)	Drifts derived from Barren Red Sandstones of Carboniferous age	51	90	Brown forest soils with gleying; some noncalcareous and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
BARNCORKRIE (2 sq. km., < 0.01%)	Red brown clayey drifts with greywackes and some granites	52	2	Brown forest soils, brown forest soils with gleying	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures

		53	24	Brown forest soils	Hills with gentle and strong slopes	Acid bent-fescue grassland Arable and permanent pastures
BEMERSYDE (61 sq. km., 0.08%)	Drifts derived from intrusive rhyolites and trachytes	54	5	Brown forest soils; some humus-iron podzols and rankers	Hills with strong and steep slopes; slightly rocky	Acid bent-fescue grassland, locally herb-rich Dry Atlantic heather moor
		55	32	Peaty podzols	Hills with strong and steep slopes	Dry and moist Atlantic heather moor White bent grassland
		56	29	Brown forest soils	Hills and valley sides with simple and complex strong slopes	Arable and permanent pastures Rockrose - fescue grassland Rich bent-fescue grassland
BENAN (46 sq. km., 0.06%)	Drifts from Ordovician conglomerates derived mainly from basic igneous material	57	2	Brown forest soils; some noncalcareous gleys	Valley sides with simple and complex gentle and strong slopes	Rich bent-fescue grassland Permanent pastures Sharp-flowered rush pasture
		58	15	Noncalcareous gleys	Depressions and foothills with gentle slopes	Sharp-flowered rush pasture Sedge mires Permanent pastures
		59	66	Humus-iron podzols; some brown forest soils	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Acid bent-fescue grassland Dry Atlantic heather moor
[5]	Drifts derived from Middle Old Red Sandstone Barren Group sandstones and conglomerates	60	2	Noncalcareous gleys	Lowlands with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		61	176	Peaty podzols, peaty gleys, peat	Gently undulating to hilly with gentle and strong slopes; non-rocky	Moist Atlantic heather moor Bog heather and northern bog heather moor Blanket and northern blanket bog
		62	6	Peaty podzols, peat	Hummocky moraines	Moist Atlantic heather moor Bog heather and northern bog heather moor Blanket and northern blanket bog
		63	2	Brown forest soils, humus-iron podzols	Hills and valley sides with steep slopes; non-rocky	Acid bent-fescue grassland Dry Atlantic heather moor Dry birchwood
		64	19	Peaty podzols, peaty gleys, peat, peaty rankers	Hill sides with gentle and strong slopes; slightly and moderately rocky	Moist Atlantic heather moor Bog heather and northern bog heather moor Blanket and northern blanket bog
		65	22	Peaty podzols, peaty rankers; some peat	Hill sides and hills with steep and very steep slopes; moderately and very rocky	Atlantic heather moor Bog heather and northern bog heather moor
		66	6	Subalpine soils, lithosols, regosols	Mountains with gentle to very steep slopes; moderately and very rocky; bouldery	Alpine lichen heath Lichen-rich boreal heather moor
BERRIEDALE (304 sq. km., 0.39%)	Drifts derived from Middle Old Red Sandstone Barren Group sandstones and conglomerates	67	5	Subalpine soils, peat	Mountains with gentle and strong slopes; non- to moderately rocky	Alpine lichen heath Northern, upland and mountain blanket bog
		68	21	Brown forest soils with gleying, noncalcareous gleys	Valley and hill sides with gentle and strong slopes	Permanent pastures Sharp-flowered rush pasture Sedge mires
		69	33	Noncalcareous gleys, peaty gleys, peat	Undulating uplands with gentle and strong slopes	Sharp-flowered rush pasture Flying bent grassland Bog heather moor
BOGTON (10 sq. km., 0.01%)	Interglacial clays	70	10	Noncalcareous gleys, calcareous gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
BRAEMORE/ KINSTEARY (44 sq. km., 0.06%)	Drifts derived from Old Red Sandstone mudstones, shales and fine sandstones	71	7	Brown forest soils	Valley sides with gentle and strong slopes; non-rocky	Arable and permanent pastures Acid bent-fescue grassland
		72	1	Humus-iron podzols, humus podzolic rankers, humic gleys; some noncalcareous gleys	Undulating hill sides with gentle and strong slopes; moderately rocky	Dry Atlantic heather moor Acid bent-fescue grassland Rush pastures and sedge mires
		73	8	Noncalcareous gleys	Valley sides with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		74	16	Humus-iron podzols	Hills and undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Dry Atlantic heather moor Acid bent-fescue grassland
		75	12	Peaty gleys, peaty podzols, peat; some noncalcareous gleys	Hills and valley sides with gentle and strong slopes; non-rocky	Moist Atlantic heather moor Blanket bog Bog heather moor
BRIGHTMONY (21 sq. km., 0.03%)	Interbedded sorted sands & gravels derived from Old Red Sandstone sediments and acid schists	76	21	Humus-iron podzols; some gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
CAIRNCROSS (30 sq. km., 0.04%)	Drifts derived from Lower Old Red Sandstone grits, ash beds and sandstones	77	30	Brown forest soils, brown forest soils with gleying	Undulating lowlands with gentle slopes	Arable and permanent pastures
CANISBAY (297 sq. km., 0.39%)	Reddish brown drifts derived from Middle Old Red Sandstone sandstones and flagstones	78	9	Brown forest soils; some non-calcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
		79	223	Noncalcareous gleys, peaty gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Swamp and sedge mires
		80	18	Brown forest soils, noncalcareous gleys, peaty podzols, peaty gleys; some peaty rankers	Undulating lowlands with gentle and strong slopes and stepped hillsides with steep slopes; non- to moderately rocky	Arable and permanent pastures Atlantic heather moor Maritime heath and grassland
		81	30	Peaty podzols; some peaty gleys and peat	Undulating lowlands with gentle and strong slopes; non-rocky	Atlantic heather moor Arable and permanent pastures
		82	9	Peaty gleys; some peat	Undulating lowlands with gentle slopes; non-rocky	Dry and moist Atlantic heather moor
		83	8	Saline gleys	Lowlands with gentle slopes	Sea plantain - crowberry heath. Maritime grassland
CANONBIE (284 sq. km., 0.37%)	Drifts derived from Permian and Carboniferous sandstones and shales	84	40	Brown forest soils, brown forest soils with gleying	Undulating lowlands with gentle slopes	Arable and permanent pastures
		85	213	Brown forest soils with gleying, noncalcareous gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		86	3	Brown forest soils	Hill sides with strong and steep slopes	Arable and permanent pastures

CANONBIE (continued)		87	13	Peaty gleys; some noncalcareous gleys and peaty podzols	Hills and uplands with gentle slopes	Flying bent grassland Moist Atlantic heather moor Sharp-flowered rush pasture
		88	15	Peaty gleys, peat; some noncalcareous gleys	Depressions and hill sides with gentle slopes	Flying bent grassland Blanket bog Sharp-flowered rush pasture
CARPOW/PANBRIDE (0.21%)	Raised beach sands and gravels derived mainly from Old Red Sandstone sediments and lavas	89	164	Brown forest soils; some brown forest soils with gleying	Raised beach terraces with gentle slopes	Arable and permanent pastures Broad-leaved woodland
CARTER (309 sq. km., 0.40%)	Drifts derived from Lower Carboniferous sandstones of the Calciferous Sandstone Series	90	9	Brown forest soils, brown forest soils with gleying	Hill and valley sides with strong and steep slopes	Arable and permanent pastures Acid bent-fescue grassland
		91	104	Noncalcareous gleys, brown forest soils with gleying	Valley sides with gentle and strong slopes	Arable and permanent pastures Sharp-flowered rush pasture Tussock-grass pasture
		92	6	Brown forest soils, noncalcareous gleys; some rankers	Hill sides with steep complex slopes; moderately rocky	Acid bent-fescue grassland Sharp-flowered rush pasture Tussock-grass pasture
		93	36	Peaty podzols; some peaty gleys and peat	Hills with simple strong and steep slopes	Moist Atlantic heather moor Flying bent grassland Blanket and flying bent bog
		94	7	Noncalcareous gleys, peaty gleys; some peat	Depressions and hill sides with gentle and strong slopes	Sharp-flowered rush pasture Flying bent grassland Blanket bog
		95	147	Peaty gleys, peat	Undulating hill and upland with gentle and strong slopes	Bog heather moor Flying bent grassland Blanket and flying bent bog
		96	14	Brown forest soils; some humus-iron podzols and noncalcareous gleys	Mounds and terraces with gentle slopes	Arable and permanent pastures Bent-fescue grassland Oak and birchwood
		97	980	Humus-iron podzols; some gleys	Undulating lowlands, mounds and terraces with gentle slopes	Arable and permanent pastures Oak and birchwood Rush pastures and sedge mires
		98	578	Humus-iron podzols, alluvial soils	Valley floors, terraces and mounds with gentle and strong slopes	Arable and permanent pastures Oak and birchwood Rush pastures and sedge mires
		99	111	Humus-iron podzols; some humic gleys and alluvial soils	Valley floors and lowland with gentle slopes	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
CORBY/BOYNDIE/DINNET (2377 sq. km., 3.08%)	Fluvioglacial and raised beach sands and gravels derived from acid rocks	100	239	Humus-iron podzols; some peaty gleys and humic gleys	Mounds and ridges with gentle to steep slopes	Acid bent-fescue grassland Atlantic and boreal heather moor Rush pastures and sedge mires
		101	311	Peaty podzols; some humus-iron podzols and peat	Mounds, ridges and terraces with gentle to steep slopes	Atlantic and boreal heather moor Blanket bog Oak and birchwood
		102	10	Peaty podzols, peat, alluvial soils	Valley floors, mounds and terraces	Moist Atlantic heather moor Blanket bog Permanent and rush pastures
		103	39	Humus-iron podzols, peaty gleys; some humic gleys, alluvial soils and peat	Terraces with gentle slopes; slightly rocky	Arable and permanent pastures Rush pastures and sedge mires Atlantic heather moor
		104	17	Peaty gleys, peaty podzols; some peat	Terraces with gentle slopes; slightly rocky	Atlantic and bog heather moor Rush pastures and sedge mires Blanket and flying bent bog

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
CORBY/ BOYNDIE/ DINNET (continued)		105	71	Humus-iron podzols, peaty podzols; some peaty gleys and peat	Terraces with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires Blanket and flying bent bog
		106	7	Peaty gleys, peaty podzols; some peat and peaty alluvial soils	Terraces with gentle slopes; non-rocky	Moist Atlantic heather moor Bog heather moor and blanket bog Rush pastures and sedge mires
		107	<1	Brown magnesian soils; some magnesian gleys	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Rich bent-fescue grassland Herb-rich boreal heather moor Juniper scrub. Sedge mires
		108	1	Brown forest soils; some brown rankers	Hill sides with gentle to steep slopes; moderately and very rocky	Rich bent-fescue grassland Permanent pastures
CORRIEBRECK (34 sq. km., 0.04%)	Drifts derived from basic and ultra-basic igneous rocks	109	3	Peaty gleys, peaty podzols, peat	Hills with gentle and strong slopes; moderately rocky	Atlantic and bog heather moor Heath rush - fescue grassland Blanket and flying bent bog
		110	13	Peaty gleys, peaty podzols; some peat and rankers	Rugged hills with gentle and strong slopes; very rocky	Atlantic and bog heather moor Heath rush - fescue grassland Blanket and flying bent bog
		111	7	Peaty gleys, peat; some peaty podzols	Hummocky valley and slope moraines	Bog heather moor Blanket and flying bent bog Moist Atlantic heather moor
		112	10	Subalpine soils; some peat	Mountains with gentle to steep slopes; moderately and very rocky	Upland bent-fescue grassland Stiff sedge - fescue grassland Mountain blanket bog
		113	51	Brown forest soils; some brown rankers	Undulating lowland and foothills with gentle and strong slopes; non- and slightly rocky	Acid bent-fescue grassland Arable and permanent pastures
		114	57	Brown forest soils; some brown rankers	Hills with complex strong slopes; moderately rocky	Acid bent-fescue grassland Permanent pastures
		115	824	Humus-iron podzols; some brown forest soils and gleys	Undulating lowlands and hills with gentle and strong slopes; non- and slightly rocky	Arable and permanent pastures Dry boreal heather moor, locally Atlantic
COUNTESSWELLS/ DALBEATTIE/ PRIESTLAW (4435 sq. km., 5.75%)	Drifts derived from granites and granitic rocks	116	121	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Undulating lowlands and valley sides with gentle and strong slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires Bog heather moor and blanket bog
		117	359	Peaty podzols; some humus-iron podzols and gleys	Hills and valley sides with gentle to steep slopes; non-rocky	Boreal and Atlantic heather moor Bog heather moor Native pinewood
		118	289	Peaty podzols, peat; some peaty gleys	Undulating uplands with gentle and strong slopes; non-rocky	Moist Atlantic heather moor Blanket bog Bog heather moor
		119	168	Peaty gleys, peat; some peaty podzols	Undulating uplands and hills with gentle and strong slopes; non- and slightly rocky	Moist Atlantic heather moor Flying bent grassland Blanket and flying bent bog
		120	6	Peaty gleys, peat; some brown forest soils	Foothills with complex gentle and strong slopes	Flying bent grassland Blanket and flying bent bog Acid bent-fescue grassland
		121	38	Brown forest soils, humus-iron podzols, rankers; some peaty gleys and peat	Valley sides with gentle and strong slopes; slightly and moderately rocky	Acid bent-fescue grassland Dry Atlantic heather moor Arable and permanent pastures

COUNTESSWELLS/ DALBEATTIE/ PRIESTLAW (continued)	122	52	Humus-iron podzols, brown forest soils; some peaty gleys and peat	Hummocky valley moraines; often bouldery	Dry and moist Atlantic heather moor. Acid bent-fescue grassland. Rush pastures	
	123	646	Peaty podzols, peat, peaty gleys	Hummocky valley and slope moraines; often bouldery	Moist boreal and Atlantic heather moor. Flying bent grassland. Bog heather moor and blanket bog	
	124	20	Peat, peaty rankers	Broad valley bottoms and depressions with rock knolls	Blanket and flying bent bog. Moist Atlantic heather moor	
	125	45	Humus-iron podzols, brown forest soils; some gleys and rankers	Hill and valley sides with strong to very steep slopes; moderately rocky and bouldery	Oak and birchwood. Bent-fescue grassland. Dry Atlantic heather moor	
	126	174	Peaty podzols, humus-iron podzols; some peaty gleys and rankers	Hills and valley sides with strong to very steep slopes; moderately rocky	Dry and moist Atlantic heather moor. Flying bent grassland	
	127	369	Peaty gleys, peat; some peaty podzols and peaty rankers	Hills and undulating lowlands with gentle and strong slopes; moderately rocky	Moist boreal and Atlantic heather moor. Bog heather moor. Blanket and upland blanket bog	
	128	3	Brown rankers, brown forest soils; some humus-iron podzols	Rugged hills and valley sides with strong and steep slopes; very rocky with scree	Acid bent-fescue grassland. Dry Atlantic heather moor. Oak, birch and hazelwood	
	129	78	Rankers, peaty podzols; some humus-iron podzols and peaty gleys	Rugged hills with strong and steep slopes; very rocky, some scree	Boreal heather moor, locally Atlantic. Bog heather moor. Heath rush - fescue grassland	
	130	2	Peaty podzols, peaty gleys, peat	Hill sides with steep and very steep slopes; non-rocky	Moist Atlantic heather moor. Bog heather and northern bog heather moor	
	131	171	Peaty gleys, peaty podzols, peaty rankers	Hill sides with steep and very steep slopes; moderately and very rocky	Atlantic and boreal heather moor. Heath rush - fescue grassland	
	132	122	Peaty gleys, peat; some peaty rankers	Rugged hills with gentle to strong slopes; very rocky	Atlantic and boreal heather moor. Blanket and flying bent bog. Bog heather and northern bog heather moor	
	133	16	Peaty rankers	Very steep rock walls and stabilised scree	Dry and moist Atlantic heather moor, locally boreal	
	134	163	Subalpine soils; some peat and rankers	Mountains with gentle to very steep slopes; non- to very rocky	Mountain heath communities. Upland bent-fescue grassland. Stiff sedge - fescue grassland	
	135	263	Peat, subalpine soils; some alpine soils	Mountains with gentle and strong slopes; non- to moderately rocky	Mountain blanket bog. Alpine lichen heath. Stiff sedge - fescue grassland	
	136	230	Alpine soils	Mountain or hill summits with gentle and strong slopes; non- to very rocky, bouldery	Alpine lichen heath. Stiff sedge - fescue grassland. Three-leaved rush heath	
	137	168	Rankers, lithosols; some alpine soils	Mountain summits with strong to very steep slopes; very rocky	Blueberry and bog whortleberry heath. Alpine lichen heath. Alpine clubmoss snow-bed	
CRAIGDALE (17 sq. km., 0.02%)	Drifts derived from greywackes, shales and basic lavas		138	5	Brown forest soils, peaty podzols	Acid bent - fescue grassland. White bent grassland. Dry and moist Atlantic heather moor
			139	12	Noncalcareous gleys, peaty gleys	Sharp-flowered rush pasture. Flying bent grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
CRAIGELLACHIE/ POLFADEN (0.02%)	Fluvioglacial silts	140	12	Humus-iron podzols, gleys	Undulating lowlands and terraces with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
CRETOWN (38 sq. km., 0.05%)	Drifts derived from greywackes and granites	141	18	Brown forest soils	Hill and valley sides with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland
		142	8	Brown forest soils; some peaty gleys, peat and peaty podzols	Hill sides, often with mounds, terraces and depressions; gentle slopes	Acid bent-fescue grassland Moist Atlantic heather moor Flying bent bog, Rush pastures
		143	12	Noncalcareous gleys, peaty gleys; some brown forest soils	Depressions and footslopes	Sharp-flowered rush pasture Soft rush pasture Acid bent-fescue grassland
CROMARTY/ KINDEACE (242 sq. km., 0.31%)	Drifts derived from Old Red Sandstone strata, often with water-modified material	144	63	Humus-iron podzols; some gleys	Undulating lowlands and foothills with strong and gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		145	158	Humus-iron podzols; some gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Dry and moist Atlantic heather moor
		146	21	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Undulating lowlands and foothills with gentle and strong slopes	Dry and moist Atlantic heather moor Blanket bog Rush pastures and sedge mires
DARLEITH/ KIRKTONMOOR (2721 sq. km., 3.53%)	Drifts derived from basaltic rocks	147	295	Brown forest soils; some brown forest soils with gleying and gleys	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Acid bent-fescue grassland Broad-leaved woodland
		148	122	Brown forest soils with gleying	Undulating lowlands with gentle slopes	Arable and permanent pastures Rich bent-fescue grassland Rush pastures and sedge mires
		149	174	Noncalcareous gleys, humic gleys; some brown forest soils and peaty gleys	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		150	234	Brown forest soils; some brown forest soils with gleying	Undulating lowlands and hills with gentle and strong slopes; slightly rocky	Bent-fescue grassland Crested hair-grass grassland Heath grass - white bent grassland
		151	48	Humus-iron podzols; some brown forest soils, peaty podzols and gleys	Undulating lowlands and hills with gentle to steep slopes; slightly rocky	Dry and moist Atlantic heather moor. White bent grassland Acid bent-fescue grassland
		152	8	Peaty gleys, brown forest soils; some rankers	Hills with complex gentle to strong slopes; slightly to moderately rocky	Moist Atlantic heather moor Flying bent grassland Acid bent-fescue grassland
		153	53	Peaty podzols, humus-iron podzols; some peat and peaty gleys	Hills and valley sides with gentle and strong slopes; slightly rocky	White bent grassland Dry and moist Atlantic heather moor
		154	135	Peaty podzols, peaty gleys, peat; some rankers	Hills with gentle to strong slopes; slightly rocky	Dry and moist Atlantic heather moor. White bent grassland Bog heather moor
		155	126	Peaty gleys, peat; some humic gleys	Undulating hills with strong slopes; non-rocky	Moist Atlantic and bog heather moor. Flying bent grassland and bog. Rush pastures
		156	14	Brown forest soils, noncalcareous gleys, peaty gleys	Hummocky moraines	Permanent pastures Acid bent-fescue and white bent grassland. Rush pastures

DARLEITH/ KIRKTONMOOR (continued)		157	7	Peaty gleys, peat; some peaty podzols	Hummocky valley moraine; non-rocky	Bog heather moor and blanket bog Moist Atlantic heather moor Flying bent grassland and bog
		158	448	Brown forest soils; some brown rankers	Hills and valley sides, frequently terraced, with gentle and strong slopes; slightly rocky	Permanent pastures Bent-fescue grassland. Herb-rich Atlantic heather moor
		159	159	Peaty podzols, humus-iron podzols; some brown forest soils and peaty gleys	Strongly terraced hills with steep slopes; slightly rocky	Dry and moist Atlantic heather moor. Bog heather moor Bent-fescue grassland
		160	825	Peaty gleys, peat; some peaty podzols	Terraced hills with gentle and strong slopes; slightly to moderately rocky	Moist Atlantic and bog heather moor. Blanket and flying bent bog. Rush pastures
		161	27	Brown forest soils	Hill sides with very steep slopes; moderately rocky, with cliffs	Rich bent-fescue grassland Herb-rich Atlantic heather moor
		162	46	Subalpine soils, peat	Mountains with gentle to very steep slopes; moderately rocky	Stiff sedge - fescue grassland Upland bent-fescue grassland Upland and mountain blanket bog
DARVEL (357 sq. km., 0.46%)	Fluvioglacial sands and gravels derived mainly from Carboniferous rocks	163	208	Brown forest soils; some humus-iron podzols and gleys	Mounds and terraces with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland
		164	149	Brown forest soils, gleys, alluvial soils	Mounds and terraces with gentle and strong slopes	Arable and permanent pastures. Acid bent-fescue grassland Rush pastures and sedge mires
DEECastle (146 sq. km., 0.19%)	Drifts derived from Dalradian limestones and calc-silicate rocks	165	145	Brown forest soils; some brown rankers and noncalcareous gleys	Undulating lowlands and hills with gentle and strong slopes; slightly rocky to rocky	Rich bent-fescue grassland Rockrose - fescue grassland Arable and permanent pastures
		166	<1	Peaty podzols, brown forest soils; some peaty gleys and peat	Lowland with dry ridges and wet hollows with gentle and strong slopes; slightly rocky	Herb-rich Atlantic heather moor Blanket bog and bog heather moor
		167	1	Lithosols, brown forest soils; some humic gleys	Ridged lowland with gentle to steep slopes; very rocky	Herb-rich Atlantic heather moor Rich bent-fescue grassland Rush pastures and sedge mires
DOUNE (36 sq. km., 0.05%)	Fluvioglacial sands & gravels derived from acid schists and Lower Old Red Sandstone sediments and lavas	168	36	Brown forest soils; some humus-iron podzols and gleys	Mounds, terraces and undulating lowlands with gentle to steep slopes	Arable and permanent pastures Acid bent-fescue grassland Broad-leaved woodland
DREGHORN (184 sq. km., 0.24%)	Raised beach sands and gravels derived from Carboniferous rocks with some Old Red Sandstone material	169	162	Brown forest soils; some gleys	Raised beach terraces and mounds with gentle slopes	Arable and permanent pastures
		170	22	Brown forest soils with gleying; some noncalcareous gleys	Raised beach terraces and mounds with minor undulations and very gentle slopes	Arable and permanent pastures. Rush pastures and sedge mires
DRONGAN (53 sq. km., 0.07%)	Drifts derived mainly from Coal Measures marls	171	53	Brown forest soils with gleying; some noncalcareous and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
DULSIE (189 sq. km., 0.25%)	Partially sorted gravelly fine sands derived from acid schists and granites	172	79	Humus-iron podzols; some gleys and peaty podzols	Undulating lowlands and hills with gentle and strong slopes	Arable and permanent pastures Dry boreal heather moor
		173	16	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with strong and steep slopes	Dry and moist boreal heather moor. Blanket bog Bog heather moor

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
DULSIE (continued)		174	4	Peaty gleys, peat; some peaty podzols	Undulating lowlands and hills with gentle and steep slopes	Moist boreal heather moor Blanket and upland blanket bog Bog heather moor
		175	90	Peaty podzols, peat, peaty gleys; some humus-iron podzols	Hummocky valley moraines	Dry and moist boreal heather moor Blanket bog Bog heather moor
DUNNET (69 sq. km., 0.09%)	Drifts derived from sandstones of the Upper Old Red Sandstone	176	45	Peaty podzols; some peat and peaty rankers	Undulating lowlands and foothills with gentle and strong slopes, hummocky moraines; non- and slightly rocky	Atlantic heather moor, locally boreal. Blanket bog Permanent pastures
		177	15	Peaty podzols, peaty gleys; some peat, peaty rankers and lithosols	Hillsides with steep and very steep slopes; slightly to very rocky	Atlantic and bog heather moor Herb-rich gullies Willow scrub and dry birchwood
		178	9	Alpine soils	Hill summits with gentle and strong slopes; slightly rocky, bouldery	Alpine lichen heath Mountain white bent grassland Upland blanket bog
DURISDEER (15 sq. km., 0.02%)	Drifts derived from sandstones of Permian and Carboniferous age, greywackes and basic igneous rocks	179	11	Brown forest soils, brown forest soils with gleying	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures
		180	4	Noncalcareous gleys, brown forest soils with gleying	Depressions and gentle slopes	Sharp-flowered rush pasture Arable and permanent pastures
DURNHILL (1235 sq. km., 1.60%)	Drifts derived from quartzites and quartzose grits	181	8	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Permanent pastures Bog heather moor and blanket bog Rush pastures and sedge mires
		182	142	Peaty podzols; some humus-iron podzols and gleys	Hills and valley sides with gentle and strong slopes; non-rocky, some scree	Dry and moist boreal heather moor Rush pastures and sedge mires
		183	4	Peaty podzols, peat; some peaty gleys	Hills and valley sides with gentle and strong slopes; non-rocky, some scree	Dry and moist boreal heather moor Blanket and upland blanket bog Bog heather moor
		184	45	Peaty gleys, peat	Hill sides with gentle and strong slopes; non-rocky	Flying bent grassland Dry and moist Atlantic heather moor. Bog heather moor
		185	90	Peaty podzols, peat, peaty gleys	Hummocky valley moraines, often bouldery	Bog heather and northern bog heather moor Blanket and northern blanket bog Moist Atlantic heather moor
		186	12	Brown forest soils, humus-iron podzols; some peaty gleys and rankers	Valley sides with steep and very steep slopes; non- to moderately rocky	Acid bent-fescue grassland Oak and birchwood Rush pastures and sedge mires
		187	10	Peaty podzols, rankers; some peat	Hills and valley sides with strong to very steep slopes; moderately rocky with scree	Dry Atlantic and boreal heather moor. Blaeberry heath
		188	362	Peaty gleys, peat; some peaty rankers and peaty podzols	Hills and hill sides with gentle and strong slopes; moderately rocky	Flying bent grassland Atlantic and bog heather moor Blanket and flying bent bog
		189	4	Peaty rankers; some peaty podzols and peat	Rugged hills with steep and very steep slopes; very rocky with scree	Dry boreal heather moor Blaeberry heath Blanket and upland blanket bog
		190	123	Peaty gleys, peaty rankers; some peat and peaty podzols	Rugged hills with gentle and strong slopes; very rocky	Flying bent grassland. Moist Atlantic and bog heather moor Blanket and flying bent bog

<b>DURNHILL (continued)</b>	191	98	Peaty gleys, peaty podzols, peaty rankers; some peat	Hill sides, valley sides and hills with steep and very steep slopes; moderately and very rocky	Atlantic and boreal heather moor Blueberry heath
	192	201	Subalpine soils, alpine soils, peaty rankers; some peat	Mountain summits with gentle to steep slopes; moderately and very rocky with scree	Mountain heath communities Lichen-rich boreal heather moor
	193	58	Peat, subalpine soils; some alpine soils	Hill and mountain summits with gentle and strong slopes; slightly and moderately rocky	Alpine lichen heath Stiff sedge - fescue grassland Mountain blanket bog
	194	10	Alpine soils	Mountain summits with gentle to steep slopes; non- to very rocky with scree	Alpine lichen heath Stiff sedge - fescue grassland Bog whortleberry heath
	195	68	Rankers, lithosols; some alpine soils	Mountain summits with gentle to very steep slopes; very rocky with scree	Alpine lichen heath Stiff sedge - fescue grassland Blueberry heath
	196	118	Brown forest soils; some non-calcareous gleys, humic gleys	Mounds and terraces with gentle and strong slopes	Arable and permanent pastures Bent-fescue grassland Rush pastures and sedge mires
<b>ECKFORD/INNERWICK (308 sq. km., 0.40%)</b>	197	21	Brown forest soils, peat, peaty alluvial soils	Mounds and hollows with gentle slopes	Arable and permanent pastures Bent-fescue grassland Rush pastures and sedge mires
	198	72	Brown forest soils, alluvial soils	Terraces of fluvioglacial and riverine origin with gentle slopes	Arable and permanent pastures Soft rush pasture Tussock-grass pasture
	199	3	Noncalcareous gleys, peaty gleys, humic gleys	Mounds and undulating lowlands with gentle slopes	Rush pastures and sedge mires Arable and permanent pastures Flying bent grassland
	200	94	Humus-iron podzols; some gleys and alluvial soils	Mounds and undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
	201	4	Noncalcareous gleys, peaty gleys; some humic gleys	Undulating lowlands with gentle slopes	Permanent pastures Rush pastures and sedge mires Bog heather moor
	202	57	Humus-iron podzols; some gleys and peaty podzols	Undulating lowlands and hills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Oak and birchwood
<b>ELGIN (62 sq. km., 0.08%)</b>	203	1	Peaty podzols; some humus-iron podzols, gleys and peat	Hills and valley sides with gentle to steep slopes	Boreal and Atlantic heather moor Blanket bog Rush pastures and sedge mires
	204	16	Humus-iron podzols; some noncalcareous gleys and peaty gleys	Undulating lowlands and hills with strong slopes	Arable and permanent pastures Dry Atlantic heather moor Rush pastures and sedge mires
	205	9	Brown forest soils	Foothills and undulating lowlands with gentle and strong slopes	Arable and permanent pastures
	206	457	Brown forest soils; some brown forest soils with gleying	Foothills and undulating lowlands with gentle and strong slopes	Acid bent-fescue grassland Arable and permanent pastures
	207	318	Brown forest soils; some brown rankers	Lowlands with gentle and strong complex slopes; slightly to moderately rocky	Acid bent-fescue grassland Permanent pastures
	208	138	Brown forest soils; some brown rankers	Drumlins and complex gentle slopes; non- and moderately rocky	Acid bent-fescue grassland Arable and permanent pastures

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
ETTRICK (7141 sq. km., 9.26%)	Drifts derived from Lower Paleozoic greywackes and shales	209	451	Brown forest soils with gleying; some noncalcareous gleys*	Foothills and undulating lowlands with gentle and strong slopes	Arable and permanent pastures Sharp-flowered rush pasture
		210	338	Noncalcareous gleys; some brown forest soils with gleying	Foothills and depressions with gentle slopes	Sharp-flowered rush pasture Tussock-grass pasture Arable and permanent pastures
		211	177	Brown forest soils, peat	Drumlins with intervening simple and complex gentle slopes	Acid bent-fescue grassland Arable and permanent pastures Blanket and flying bent bog
		212	44	Peaty gleys, peat; some brown forest soils	Foothills and lowlands with simple and complex gentle and strong slopes	Flying bent grassland. Blanket and flying bent bog Acid bent-fescue grassland
		213	111	Peaty podzols, peaty gleys, peat	Drumlins with intervening simple and complex gentle slopes	Moist Atlantic heather moor Heath rush - fescue grassland Blanket and flying bent bog
		214	129	Peaty podzols, brown forest soils, peat, peaty gleys	Hummocky moraine	Moist Atlantic heather moor Blanket and flying bent bog Flying bent grassland
		215	189	Peat, peaty rankers	Valley floors and lowlands with rock knolls and moundy moraine; complex gentle slopes	Blanket and flying bent bog Moist Atlantic heather moor Bog heather moor
		216	79	Peaty podzols, peaty gleys, peat; some brown forest soils and rankers	Undulating uplands with complex and short gentle and strong slopes	Moist Atlantic heather moor Heath rush - fescue grassland Blanket bog
		217	4	Peaty podzols, peaty gleys; some rankers, peat and brown forest soils	Undulating uplands with complex gentle slopes; slightly to moderately rocky	Moist Atlantic heather moor Heath rush - fescue grassland Blanket bog
		218	356	Peaty podzols, peaty gleys, peat	Hills with gentle and strong slopes	Moist Atlantic heather moor Heath-rush - fescue grassland Blanket and flying bent bog
		219	51	Peaty gleys, peat	Depressions and undulating uplands with gentle slopes	Moist Atlantic heather moor Flying bent grassland Blanket and flying bent bog
		220	247	Peaty gleys, peat; some peaty podzols	Foothills and undulating uplands with gentle slopes	Moist Atlantic heather moor Heath-rush - fescue grassland Blanket and flying bent bog
		221	916	Brown forest soils	Hills and valley sides with steep and strong slopes	Acid bent-fescue grassland Dry Atlantic heather moor Oak and birchwood
		222	54	Brown forest soils; some brown rankers	Hills and lowlands with gentle to steep slopes; slightly and moderately rocky	Arable and permanent pastures Acid bent-fescue grassland
		223	357	Brown forest soils, brown rankers	Hills with strong and steep complex slopes; moderately to very rocky	Acid bent-fescue grassland Dry Atlantic heather moor
		224	71	Rankers, podzols, brown forest soils	Hills and valley sides with very steep slopes; some crags, scree and boulders	Dry Atlantic heather moor Rich bent-fescue grassland Oak and birchwood
		225	180	Brown forest soils, noncalcareous gleys	Hills and valleys with gentle to steep slopes	Acid bent-fescue grassland Sharp-flowered rush pasture

ETTRICK (continued)	226	292	Peaty podzols, brown forest soils	Hills with simple convex steep and strong slopes	Moist Atlantic heather moor White bent grassland Acid bent-fescue grassland
	227	171	Humus-iron podzols	Hills with simple convex strong and steep slopes	Dry and moist Atlantic heather moor, Acid bent-fescue grassland
	228	379	Peaty podzols; some humus-iron podzols	Hills with simple convex strong and steep slopes	Dry and moist Atlantic heather moor, locally boreal Whitē bent grassland
	229	560	Peaty podzols; some peaty gleys, peat	Hills with simple convex steep and strong slopes	Moist Atlantic heather moor Heath rush - fescue grassland Blanket and flying bent bog
	230	306	Peaty podzols, peaty gleys; some peat and rankers	Hills with complex strong and steep slopes; non-rocky	Moist Atlantic heather moor Heath rush - fescue grassland Blanket and flying bent bog
	231	227	Peaty podzols, peaty gleys; some rankers, peat and brown forest soils	Hills with complex strong and steep slopes; moderately to very rocky	Moist Atlantic heather moor Flying bent grassland Blanket bog, Acid grassland
	232	123	Noncalcareous gleys, brown forest soils	Hills and valley sides with generally concave, strong and steep slopes	Sharp-flowered rush pasture Tussock-grass pasture Acid bent-fescue grassland
	233	257	Peaty gleys, noncalcareous gleys	Valleys and depressions amongst hills and uplands with gentle slopes	Rush pastures and sedge mires Moist Atlantic heather moor Flying bent grassland
	234	28	Peat, peaty podzols, peaty gleys	Hill crests and ridges with gentle slopes	Upland and mountain blanket bog Moist Atlantic heather moor, locally boreal
	235	37	Rankers	Rock walls and scree	Dry and moist Atlantic heather moor Blaeberry heath
	236	85	Subalpine soils; some peat and peaty podzols	Mountain summits with gentle and strong slopes	Fescue - fringe-moss heath Stiff sedge - fescue grassland Mountain blanket bog
FORFAR (375 sq. km., 0.49%)	237	66	Brown forest soils; some humus-iron podzols and noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
	238	7	Noncalcareous gleys; some peaty gleys and humic gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
	239	302	Humus-iron podzols; some brown forest soils and gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
FOUDLAND (2508 sq. km., 3.25%)	240	20	Brown forest soils; some brown rankers and noncalcareous gleys	Undulating lowlands and hills with gentle to steep slopes; slightly to very rocky	Acid bent-fescue grassland Herb-rich boreal heather moor Juniper scrub
	241	137	Noncalcareous gleys, humic gleys; some peaty gleys and peat	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires Flying bent grassland
	242	181	Noncalcareous gleys, humic gleys; some gleayed rankers and brown forest soils	Ridged lowland with gentle and strong slopes; moderately rocky	Arable and permanent pastures Rush pastures and sedge mires Acid bent-fescue grassland
	243	879	Humus-iron podzols; some brown forest soils, gleys and peaty podzols	Hills and valley sides with gentle to steep slopes; non-rocky	Arable and permanent pastures Dry boreal heather moor Acid bent-fescue grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
FOULDLAND (2508 sq. km., 3.25%)	Drifts derived from slates, phyllites and other weakly metamorphosed argillaceous rocks	244	77	Peaty podzols; some humus-iron podzols, peat and gleys	Hills and valley sides with gentle to steep slopes; non-rocky	Dry boreal heather moor, locally Atlantic White bent grassland
		245	125	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with gentle and strong slopes; non-rocky	Boreal heather moor Blanket and upland blanket bog
		246	92	Peaty gleys, peat; some peaty podzols and humic gleys	Undulating lowland and lower hill slopes with gentle to strong slopes; non-rocky	Moist Atlantic heather moor Heath rush - fescue grassland Blanket and flying bent bog
		247	67	Peaty gleys, peat; some peaty podzols	Ridged lowland and hills with gentle and strong slopes; slightly rocky	Moist Atlantic heather moor Bog heather moor Flying bent bog. Sedge mires
		248	55	Humus-iron podzols, brown forest soils; some gleys and peat	Hummocky valley moraines	Permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
		249	124	Peaty gleys, peat; some peaty podzols	Hummocky valley and slope moraines	Moist Atlantic heather moor Flying bent bog. Sedge mires Heath rush - fescue grassland
		250	102	Humus-iron podzols, brown forest soils; some humic gleys and peaty podzols	Hill and valley sides with strong to very steep slopes; moderately rocky	Acid bent-fescue grassland Rush pastures and sedge mires Hazel, oak and birchwood
		251	54	Humus-iron podzols, brown forest soils; some humic gleys and peaty podzols	Hill sides with steep slopes; slightly rocky	Acid bent-fescue grassland Heath rush - fescue grassland Rush pastures and sedge mires
		252	52	Peaty podzols, humus-iron podzols; some peat and gleys	Hills and valley sides with strong and steep slopes; slightly and moderately rocky	Dry and moist Atlantic heather moor, White bent grassland Blanket and upland blanket bog
		253	333	Peaty gleys, peaty podzols; some peat and rankers	Hills with gentle to steep slopes; slightly rocky	Atlantic and bog heather moor Heath rush - fescue grassland Blanket and flying bent bog
		254	122	Peaty gleys, peaty podzols; some peaty rankers	Hills with steep slopes; moderately and very rocky	Heath rush - fescue grassland Rush pastures and sedge mires Atlantic and boreal heather moor
		255	47	Subalpine soils; some peaty rankers and peat	Mountains with gentle to very steep slopes; non- to very rocky	Fescue - fringe-moss heath Stiff sedge - fescue grassland Mountain blanket bog
		256	24	Peat, subalpine soils, some alpine soils	Mountain summits with gentle and strong slopes; non- to slightly rocky	Mountain blanket bog Alpine lichen heath Fescue - fringe-moss heath
		257	13	Alpine soils; some peat and subalpine soils	Mountain summits with gentle and strong slopes; non- and slightly rocky	Alpine lichen heath Stiff sedge - fescue grassland Mountain blanket bog
		258	4	Rankers, lithosols; some alpine soils	Mountain summits with strong to very steep slopes; moderately to very rocky	Fescue - fringe-moss heath Stiff sedge - fescue grassland Upland bent-fescue grassland
FRASERBURGH (265 sq. km., 0.34%)	Shelly sands	259	69	Brown calcareous soils, calcareous regosols	Raised beach terraces and undulating dunes (machair) with gentle and steep slopes; non-rocky	Northern dunes and dune pastures Arable and permanent pastures
		260	26	Brown calcareous soils, calcareous regosols	Raised beach terraces and undulating dunes (machair) with gentle slopes; moderately rocky	Northern dunes and dune pastures Arable and permanent pastures

FRASERBURGH (continued)	261	125	Calcareous regosols, brown calcareous soils, calcareous gleys	Dunes and slacks with wide slope range	Northern dunes and dune pastures Silverweed pasture and sedge mires. Permanent pastures		
	262	36	Calcareous gleys; some brown calcareous soils and regosols	Raised beach terraces and undulating dunes (machair) with gentle and steep slopes; non-rocky	Silverweed pasture, swamp and sedge mires. Arable and permanent pastures		
	263	9	Eutrophic flushed peat, peaty gleys	Elongated depressions	Silverweed pasture , swamp and sedge mires. Permanent pastures		
GLENALMOND/ MAYBOLE (293 sq. km., 0.38%)	264	15	Brown forest soils, brown forest soils with gleying; some gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures		
	265	138	Brown forest soils with gleying; some brown forest soils and gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures		
	266	27	Noncalcareous gleys, brown forest soils with gleying; some peaty gleys	Undulating lowlands and foothills with gentle and strong slopes	Sharp-flowered rush pasture Arable and permanent pastures		
	267	33	Brown forest soils; some peaty podzols	Foothills with gentle and strong slopes	Arable and permanent pastures Heath grass - white bent grassland		
	268	13	Peaty podzols; some peaty gleys, peat	Hills with simple convex strong slopes	Dry and moist Atlantic heather moor. Flying bent grassland Bog heather moor and blanket bog		
	269	5	Peaty gleys, peaty podzols, non-calcareous gleys, peat	Hills and valley sides with strong and steep slopes	Heath rush - fescue grassland Moist Atlantic heather moor Sharp-flowered rush pasture		
	270	52	Peaty gleys, peat; some non-calcareous gleys	Depressions and undulating uplands with gentle slopes	Flying bent grassland Flying bent bog Sharp-flowered rush pasture		
	271	9	Brown forest soils, humus-iron podzols; some gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland, locally herb-rich Moist Atlantic heather moor Flying bent grassland Blanket bog		
	272	1	Peaty podzols; some peaty gleys	Hummocky valley and slope moraine			
	Fluvioglacial sands and gravels derived from Old Red Sandstone sediments & lavas, and acid schists		273	157	Brown forest soils, humus-iron podzols; some gleys	Mounds and terraces with gentle and strong slopes	Arable and permanent pastures Dry Atlantic heather moor Grassy oakwood
GLENNEAGLES/ AUCHENBLAE/ COLLIESTON/ DARNAWAY (0.20%)			274	213	Brown forest soils, brown forest soils with gleying; some humus-iron podzols and gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Oak and birchwood
	Drifts derived from acid metamorphic rocks and Lower Old Red Sandstone sediments with igneous rocks		275	70	Noncalcareous gleys, peaty gleys; some brown forest soils with gleying and peat	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
			276	85	Humus-iron podzols; some brown forest soils, peaty podzols and gleys	Undulating foothills and uplands with gentle and strong slopes	Dry and moist Atlantic heather moor Acid bent-fescue grassland Heath rush - fescue grassland
			277	< 1	Peaty podzols, humus-iron podzols; some gleys and peat	Hills and valley sides with gentle to steep slopes	Dry and moist Atlantic heather moor Acid bent-fescue grassland Heath rush - fescue grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
GRULINE (30 sq. km., 0.04%)	Raised beach and fluvioglacial sands and gravels derived from basic and acid igneous rocks	278	7	Humus-iron podzols, brown forest soils; some alluvial soils	Lowland with gently sloping terraces	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
		279	18	Brown forest soils, peaty podzols, peaty gleys, peat	Lowland with gently sloping terraces	Arable and permanent pastures Rush pastures and sedge mires Blanket and flying bent bog
		280	5	Peaty gleys, peaty podzols, peat; some peaty alluvial soils	Raised beach platform; moderately rocky	Rush pastures and sedge mires Yellow flag swamp Blanket and flying bent bog
HATTON/ TOMINTOUL/ KESSOCK (237 sq. km., 0.31%)	Drifts derived from Middle and Lower Old Red Sandstone conglomerates	281	51	Noncalcareous gleys, peaty gleys; some humic gleys and peat	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		282	91	Humus-iron podzols; some brown forest soils and gleys	Undulating lowlands and hills with gentle to very steep slopes; non-rocky	Dry boreal and Atlantic heather moor. Arable and permanent pastures. Juniper scrub
		283	7	Peaty podzols; some humus-iron podzols, gleys and peat	Hills and valley sides with gentle and strong slopes; non-rocky	Dry and moist boreal heather moor Bog heather moor and blanket bog
		284	29	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with strong and steep slopes; non-rocky	Atlantic and boreal heather moor Bog heather moor and blanket bog
		285	30	Peaty and humus-iron podzols; some rankers and peaty gleys	Hills and valley sides with strong and steep slopes; moderately rocky	Dry and moist Atlantic heather moor Acid bent-fescue grassland
		286	29	Rankers, peaty podzols; some humus-iron podzols, gleys and subalpine podzols	Hills with strong to very steep slopes; very rocky	Dry and moist Atlantic heather moor. Acid bent-fescue grassland
HAYFIELD (28 sq. km., 0.04%)	Drifts derived from sediments of Carboniferous and Permian age	287	11	Brown forest soils, brown forest soils with gleying	Foothills and lowlands with gentle and strong slopes	Arable and permanent pastures
		288	6	Brown forest soils, noncalcareous gleys	Hummocky moraine and depressions	Arable and permanent pastures Rush pastures and sedge mires
		289	11	Brown forest soils with gleying, noncalcareous gleys	Foothills and lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		290	< 1	Peaty gleys, peaty podzols; some noncalcareous gleys	Foothill with gentle slopes	Rush pastures and sedge mires Moist Atlantic heather moor Arable and permanent pastures
HINDSWARD (183 sq. km., 0.24%)	Drifts derived from Carboniferous sediments and basic igneous rocks	291	78	Brown forest soils with gleying; some noncalcareous gleys and humic gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		292	55	Noncalcareous gleys; some brown forest soils with gleying and peaty gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures. Rush pastures and sedge mires
		293	50	Peaty gleys, peat	Undulating uplands with gentle slopes	Moist Atlantic heather moor Bog heather moor Blanket and flying bent bog
		294	< 1	Brown forest soils	Undulating lowlands with gentle slopes	Arable and permanent pastures Acid bent-fescue grassland

		295	16	Brown forest soils	Undulating lowlands with gentle slopes	Arable and permanent pastures. Broad-leaved woodland
		296	317	Brown forest soils; some non-calcareous and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
		297	67	Brown forest soils, noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland. Rush pastures and sedge mires
HOBKIRK (577 sq. km., 0.75%)	Drifts derived from sandstones and marls of Upper Old Red Sandstone age	298	16	Noncalcareous gleys; some brown forest soils with gleying and peaty gleys	Foothills and depressions, with gentle slopes	Rush pastures and sedge mires Tussock-grass pasture Acid bent-fescue grassland
		299	61	Peaty podzols, humus-iron podzols; some gleys and peat	Hills and undulating uplands with gentle to steep slopes	Dry and moist Atlantic heather moor. White bent grassland
		300	6	Peaty gleys, brown forest soils; some noncalcareous gleys and peat	Hills and depressions with gentle and strong slopes	Flying bent grassland
		301	49	Peaty gleys, peaty podzols; some noncalcareous gleys and brown forest soils	Hills and undulating uplands with gentle and strong slopes	Moist Atlantic heather moor Acid bent-fescue grassland
		302	45	Peaty gleys, peat	Undulating uplands with gentle slopes	Rush pastures and sedge mires
		303	51	Brown forest soils with gleying, brown forest soils	Undulating lowlands with gentle and strong slopes	Dry and moist Atlantic heather moor. Flying bent grassland.
		304	23	Brown forest soils with gleying, noncalcareous gleys	Foothills and depressions with gentle slopes	Rush pastures and sedge mires
HOLYWOOD (140 sq. km., 0.18%)	Drifts derived from sandstones and conglomerates of Permian age	305	64	Brown forest soils	Hills and valley sides and undulating lowlands with gentle to steep slopes	Blanket and flying bent bog
		306	2	Brown forest soils; some brown rankers	Hills with complex strong slopes; slightly to moderately rocky	Arable and permanent pastures
		307	34	Brown forest soils; humus-iron podzols; some humic gleys, rankers and alluvial soils	Hilly lowland with gentle and strong slopes; moderately rocky	Permanent pastures Acid bent-fescue grassland
		308	15	Humic gleys, noncalcareous gleys	Undulating lowlands and foothills with gentle and strong slopes; non-rocky	Rush pastures and sedge mires
		309	12	Humic gleys, noncalcareous gleys	Undulating lowlands and foothills with gentle to steep slopes; moderately rocky	Arable and permanent pastures
INCHKENNETH (126 sq. km., 0.16%)	Drifts derived from Mesozoic sandstones, shales and limestones	310	4	Peaty gleys, humic gleys; some shallow peat	Undulating lowlands with gentle slopes; non-rocky	Rush pastures and sedge mires
		311	10	Peaty gleys, humic gleys; some peat	Undulating foothills with gentle to steep slopes; moderately rocky	Heath rush - fescue grassland
		312	48	Peaty podzols, peaty gleys; some peat	Hill sides with gentle to steep slopes; moderately rocky	Rush pastures and sedge mires
		313	3	Brown forest soils; some peaty gleys and peat	Blanket and flying bent bog	Heath rush - fescue grassland
						Blanket and flying bent bog
						Atlantic heather moor
						Bog heather moor
						Blanket and flying bent bog
						Acid bent-fescue grassland
						Rush pastures and sedge mires
						Blanket and flying bent bog

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
INCHNADAMPH (67 sq. km., 0.09%)	Drifts derived from limestones of Cambrian and Ordovician age	314	23	Brown rendzinas, brown forest soils	Valley sides and undulating lowlands with gentle and strong slopes; moderately to very rocky	Rich bent-fescue grassland Arable and permanent pastures Hazel woodland
		315	44	Brown rendzinas, peaty podzols, peat	Undulating lowlands and hills with gentle and strong slopes; moderately rocky	Rich bent-fescue grassland Atlantic and boreal heather moor Bog heather moor and blanket bog
		316	257	Brown forest soils; some humus-iron podzols and gleys	Undulating lowlands with gentle slopes; non-rocky	Arable and permanent pastures Bent-fescue grassland Herb-rich boreal heather moor
		317	55	Noncalcareous gleys, peaty gleys; some brown forest soils with gleying	Undulating lowlands and foothills with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		318	76	Humus-iron podzols; some brown forest soils and gleys	Hills and valley sides with strong and steep slopes; non-rocky	Dry boreal heather moor Heath rush - fescue grassland Acid bent-fescue grassland
		319	1	Peaty podzols; some gleys and peat	Hills and valley sides with gentle to steep slopes; non-rocky	Dry and moist boreal heather moor. Bog heather moor Blanket and upland blanket bog
		320	9	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and lowlands with gentle to steep slopes; non-rocky	Dry and moist boreal heather moor. Bog heather moor Upland and mountain blanket bog Acid bent-fescue grassland
		321	3	Brown forest soils, humic gleys; some peaty gleys	Hummocky valley moraines; often bouldery	Health rush - fescue grassland Rush pastures and sedge mires
		322	9	Peaty podzols, peaty gleys, peat	Hummocky valley moraines; often bouldery	Atlantic heather moor. Bog heather and northern bog heather moor. Blanket and flying bent bog Herb-rich boreal heather moor
		323	14	Brown forest soils, brown rankers; some humus-iron podzols and gleys	Hill and valley sides with strong to very steep slopes; moderately rocky	Bent-fescue grassland Juniper scrub. Birchwood
INSCH (518 sq. km., 0.67%)	Drifts derived from gabbros and allied igneous rocks	324	1	Humus-iron podzols; some peaty gleys and rankers	Hills and valley sides with strong and steep slopes; moderately rocky	Dry and moist boreal heather moor White bent - tussock-grass grassland. Blaeberry heath
		325	34	Peaty gleys, peat; some peaty podzols	Hills with gentle to steep slopes; moderately rocky	Moist Atlantic heather moor. Bog heather and northern bog heather moor. Flying bent grassland and bog
		326	1	Rankers, humus-iron podzols; some brown forest soils and gleys	Rugged hills with strong and steep slopes; very rocky	Dry and herb-rich boreal heather moor. Blaeberry heath
		327	50	Peaty gleys, peat; some peaty rankers and peaty podzols	Hills with gentle to steep slopes; moderately to very rocky	Moist Atlantic heather moor. Bog heather and northern bog heather moor. Flying bent grassland and bog
		328	2	Subalpine soils, peaty podzols; some peat	Mountain summits with gentle and strong slopes; non- to slightly rocky	Dry boreal heather moor Mountain blanket bog Alpine lichen heath
		329	2	Peat, alpine soils, subalpine soils	Mountain summits with gentle and strong slopes; non-rocky	Alpine lichen heath Mountain blanket bog Stiff sedge - fescue grassland
		330	4	Alpine soils; some rankers, subalpine soils and peat	Hill and mountain summits with gentle to steep slopes; slightly rocky	Alpine lichen heath Stiff sedge - fescue grassland

<b>KILMARNOCK</b> (306 sq. km., 0.40%)	Drifts derived from igneous and sedimentary rocks of Carboniferous age	331	288	Brown forest soils with gleying; some noncalcareous and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		332	18	Noncalcareous gleys; some brown forest soils with gleying and humic gleys	Undulating lowlands with gentle slopes	Permanent pastures Rush pastures and sedge mires
<b>KINTYRE</b> (484 sq. km., 0.63%)	Drifts derived from Dalradian schists and red sandstones, often water-modified	333	89	Noncalcareous gleys, humic gleys; some brown forest soils and peaty gleys	Undulating lowlands with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
		334	97	Peaty gleys; some peat	Undulating foothills with gentle slopes; non-rocky	Flying bent grassland and bog Heath grass - white bent grassland. Rush pastures
		335	136	Noncalcareous gleys, humic gleys; some brown forest soils and peaty gleys	Undulating lowlands with gentle slopes; slightly rocky	Arable and permanent pastures Rush pastures and sedge mires
		336	162	Peaty gleys; some peat	Undulating foothills with gentle slopes; slightly rocky	Flying bent grassland and bog Heath grass - white bent grassland. Rush pastures
		337	118	Brown forest soils; some gleys	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Bent-fescue grassland Oak and birchwood
		338	54	Noncalcareous gleys; some brown forest soils with gleying and humic gleys	Undulating lowlands with gentle slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires
<b>KIPPEN/LARGS</b> (302 sq. km., 0.39%)	Drifts derived mainly from Upper Old Red Sandstone sandstones	339	56	Brown forest soils, humus-iron podzols	Lowlands and hillsides with strong and steep slopes; slightly rocky	Acid bent-fescue grassland Dry Atlantic heather moor Oak and birchwood
		340	7	Noncalcareous gleys, humic gleys; some humus-iron podzols	Undulating lowlands with gentle slopes; slightly rocky	Permanent pastures Rush pastures and sedge mires
		341	7	Humus-iron podzols; some brown forest soils and gleys	Hills and valley sides with strong and steep slopes; moderately rocky	Dry Atlantic heather moor White bent grassland Dry birchwood
		342	6	Peaty podzols; some humus-iron podzols and gleys	Hills and undulating uplands with gentle and strong slopes	Dry and moist Atlantic heather moor. White bent grassland
		343	14	Peaty podzols, peat; some peaty gleys	Hills and valley sides with gentle and strong slopes; slightly rocky	Dry and moist Atlantic heather moor. White bent grassland Bog heather moor and blanket bog
		344	33	Peaty gleys, peat; some peaty podzols	Undulating lowlands and foothills with gentle and strong slopes; non-rocky	Moist Atlantic and bog heather moor. Flying bent bog Permanent and rush pastures
		345	4	Peaty gleys, peat; some peaty podzols	Undulating lowlands with gentle and strong slopes; slightly rocky	Moist Atlantic and bog heather moor. Permanent pastures Rush pastures and sedge mires
		346	1	Peaty podzols, peaty gleys, peat	Hummocky moraine	Dry and moist Atlantic heather moor. Bog heather moor Blanket and flying bent bog
		347	2	Peaty podzols	Hills with strong and steep slopes; moderately rocky with boulders	Dry and moist Atlantic heather moor White bent grassland
<b>KIRKCOLM</b> (9 sq. km., 0.01%)	Raised beach sands and gravels derived from greywackes & shales	348	9	Brown forest soils	Raised beach terraces with gentle slopes	Arable and permanent pastures

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
KIRKWOOD (45 sq. km., 0.06%)	Drifts derived from sandstones of Carboniferous age, igneous rocks and greywackes	349	28	Brown forest soils, brown forest soils with gleying	Hill sides with gentle and strong slopes	Arable and permanent pastures
		350	17	Noncalcareous gleys, peaty gleys; some brown forest soils and podzols	Undulating hills and uplands with gentle and strong slopes	Sharp-flowered rush pasture Moist Atlantic heather moor Permanent pastures
		351	1	Noncalcareous gleys; some peaty gleys	Valleys and depressions with concave gentle slopes	Sharp-flowered rush pasture Flying bent bog
		352	12	Brown forest soils; some brown rankers	Lowlands with complex gentle and strong slopes; moderately rocky	Acid bent-fescue grassland Permanent pastures
		353	7	Humus-iron podzols; some gleys, peaty podzols	Hills with strong and steep slopes	Acid bent-fescue grassland White bent grassland Rush pastures and sedge mires
		354	2	Peaty podzols; some peaty gleys, peat	Hills with strong and steep slopes	Moist Atlantic heather moor White bent grassland
		355	2	Peaty gleys, peat, peaty podzols; some rankers	Depressions and undulating uplands with complex gentle slopes; moderately rocky	Moist Atlantic heather moor Blanket and flying bent bog Flying bent grassland
		356	7	Humus-iron podzols; some rankers	Undulating lowlands and hills with gentle to steep complex slopes; slightly to moderately rocky	Acid bent-fescue grassland Permanent pastures
		357	51	Peaty gleys, peaty podzols, peat	Hills with gentle to steep slopes; moderately rocky	Atlantic and boreal heather moor Blanket bog Bog heather moor
		358	7	Peaty gleys, peaty rankers; some peat	Hills with gentle to steep slopes; very rocky with boulders	Moist Atlantic heather moor Bog heather moor Blanket and flying bent bog
LANFINE (111 sq. km., 0.14%)	Drifts derived from basic igneous rocks and red sandstones of Permian and Old Red Sandstone age	359	92	Brown forest soils with gleying; some noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		360	13	Noncalcareous gleys; some brown forest soils with gleying, peaty gleys and humic gleys	Undulating lowlands with gentle slopes	Rush pastures and sedge mires Flying bent bog Permanent pastures
		361	6	Peaty podzols, humus-iron podzols; some gleys and peat	Undulating uplands with strong simple slopes	Dry Atlantic heather moor Bog heather moor Rush pastures and sedge mires
		362	107	Brown forest soils; some brown forest soils with gleying	Hills and valley sides with strong and steep slopes	Arable and permanent pastures Acid bent-fescue grassland
		363	4	Noncalcareous gleys	Foothills and depressions with gentle slopes	Arable and permanent pastures Sharp-flowered rush pasture Tussock-grass pasture
LAUDER (173 sq. km., 0.22%)	Drifts derived from sandstones and conglomerates of Upper Old Red Sandstone age	364	37	Humus-iron podzols, brown forest soils	Hills with strong and steep slopes	Dry and moist Atlantic heather moor. White bent grassland Acid bent-fescue grassland
		365	15	Peaty podzols, noncalcareous gleys, brown forest soils	Undulating uplands and depressions with gentle and strong slopes	Dry and moist Atlantic heather moor. Rush pastures Acid bent-fescue grassland

LAUDER (continued)	Drifts derived from Lower Old Red Sandstone marls and mudstones	366	3	Brown forest soils, peaty gleys	Undulating uplands and depressions with gentle and strong slopes	Acid bent-fescue grassland Bog heather moor Moist Atlantic heather moor Blanket and upland blanket bog Moist Atlantic heather moor Bog heather moor
		367	7	Peat, peaty gleys; some podzols	Uplands with gentle slopes	
LAURENCEKIRK (91 sq. km., 0.12%)	Drifts derived from Lower Old Red Sandstone marls and mudstones	368	91	Brown forest soils with gleying; some brown forest soils and non-calcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Broad-leaved woodland
		369	11	Brown magnesian soils; some magnesian gleys	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Arable and permanent pastures Rich bent-fescue grassland Juniper scrub, Sedge mires
LESLIE (89 sq. km., 0.12%)	Drifts derived from ultra-basic igneous rocks	370	28	Magnesian gleys; some brown magnesian soils	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Serpentine tussock-grass grassland Sedge mires, Juniper scrub Herb-rich boreal heather moor
		371	3	Brown magnesian soils; some magnesian gleys and rankers	Hills and valley sides with gentle to steep slopes; slightly to moderately rocky	Rich bent-fescue grassland Herb-rich boreal heather moor Sedge mires
		372	27	Magnesian gleys; some brown magnesian soils	Undulating lowlands with gentle and strong slopes; slightly to moderately rocky	Sea plantain - bell heather moor Rich rough grassland Permanent pastures, Sedge mires
		373	20	Magnesian gleys; some brown magnesian soils and gley rankers	Hill sides with strong and very steep slopes; very rocky, bouldery	Sea plantain - bell heather moor Rich rough grassland Sedge mires
		374	2	Brown forest soils	Foothills with strong and steep slopes	Bent-fescue grassland
		375	1	Noncalcareous gleys; some peaty gleys	Foothills and depressions with gentle slopes	Sharp-flowered rush pasture Flying bent grassland
LETHANS (17 sq. km., 0.02%)	Drifts from Lower Old Red Sandstone conglomerates derived from basic igneous material	376	1	Peaty podzols, brown forest soils	Hills with strong and steep slopes	Moist Atlantic heather moor Acid bent-fescue grassland White bent grassland
		377	13	Peaty podzols; some peat	Hills with strong and steep slopes	Moist Atlantic heather moor Blanket bog Heath rush - fescue grassland
		378	< 1	Peaty podzols; some brown forest soils	Hills with steep slopes; slightly to moderately rocky	Dry and moist Atlantic heather moor, White bent grassland Acid bent-fescue grassland
		379	3	Peaty podzols, peat; some brown forest soils	Hummocky moraine	Moist Atlantic heather moor Blanket bog Acid bent-fescue grassland
		380	175	Regosols; some gleys	Beaches and dunes with gentle and strong slopes	Northern dunes and dune pastures Maritime Atlantic heather moor Rush pastures and sedge mires
LINKS (219 sq. km., 0.28%)	Windblown sands	381	16	Humus-iron podzols, humic gleys; some peat and alluvial soils	Stabilized dunes and undulating raised beaches	Northern dunes and dune pastures Acid bent-fescue grassland Dry Atlantic heather moor Silverweed pasture
		382	23	Regosols, gleys	Beaches and dune slacks with minor dunes with gentle and strong slopes	Rush pastures and sedge mires Permanent pastures

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION	
LINKS (continued)	Drifts derived from Lewisian gneisses	383	3	Regosols	Gently sloping lowlands; slightly and moderately rocky	Northern dunes and dune pastures	
		384	2	Peaty gleys, peaty podzols; some peat	Dune slacks and undulating raised beaches	Moist Atlantic heather moor Blanket bog	
		385	22	Noncalcareous gleys, humic gleys; some humus-iron podzols	Undulating lowlands with gentle and strong slopes; non-rocky	Arable and permanent pastures Rush pastures and sedge mires	
		386	47	Brown forest soils, humus-iron podzols; some noncalcareous gleys, peaty gleys and rankers	Valley sides and undulating lowlands with gentle and strong slopes; slightly rocky	Arable and permanent pastures Rush pastures and sedge mires	
		387	22	Brown forest soils, brown rankers; some humus-iron podzols and peaty gleys	Hilly lowlands with gentle and strong slopes; slightly rocky	Acid bent-fescue grassland Arable and permanent pastures Rush pastures and sedge mires	
		388	43	Humus-iron podzols, noncalcareous gleys, humic gleys; some peaty gleys and peaty podzols	Hummocky moraines; often bouldery	Arable and permanent pastures Rush pastures and sedge mires	
		389	60	Brown forest soils, humus-iron podzols; some rankers and gleys	Valley sides with steep and very steep slopes; moderately and very rocky	Acid bent-fescue grassland Dry Atlantic heather moor Birchwood. Sedge mires	
		390	48	Peaty gleys, peat; some peaty podzols	Undulating lowlands with gentle and strong slopes; non-rocky	Bog heather and northern bog heather moor Northern Atlantic heather moor Northern blanket and flying bent bog	
		391	316	Peaty podzols, peat; some peaty gleys	Hummocky valley moraines; slightly to very bouldery	Bog heather and northern bog heather moor Northern Atlantic heather moor Northern blanket and flying bent bog	
		392	280	Peat, peaty gleys; some peaty podzols and humic gleys	Hill sides and undulating land with gentle and strong slopes; non-rocky	Bog heather and northern bog heather moor Atlantic heather moor	
LOCHINVER (3603 sq. km., 4.67%)		393	40	Brown forest soils, humic gleys; some noncalcareous gleys and rankers	Hill sides with steep and very steep regular slopes; moderately rocky	Acid bent-fescue grassland Rush pastures and sedge mires	
		394	1044	Peaty gleys, peat; some peaty podzols and peaty rankers	Dissected lowlands and hills with gentle and strong slopes; moderately rocky	Bog heather and northern bog heather moor Northern blanket and flying bent bog. Moist Atlantic heather moor	
		395	1289	Peaty gleys, peat, peaty rankers; some peaty podzols	Rugged dissected lowlands and hills with gentle and strong slopes; very rocky	Bog heather and northern bog heather moor Northern blanket and flying bent bog. Moist Atlantic heather moor	
		396	198	Peaty gleys, peaty podzols, peaty rankers	Hill sides with steep and very steep slopes; slightly to very rocky	Bog heather and northern bog heather moor Moist and northern Atlantic heather moor	
		397	68	Subalpine podzols, peat	Mountains with gentle and strong slopes; slightly and moderately rocky	Mountain heath communities Stiff sedge - fescue grassland Mountain blanket bog	
		398	126	Subalpine soils, alpine soils, lithosols, regosols	Mountains with gentle to very steep slopes; slightly to very rocky	Mountain heath communities Stiff sedge - fescue grassland	

LYNEDARDY (3 sq. km., <0.01%)	Drifts derived from flagstones and sandstones of Middle Old Red Sandstone age with some granites and schists	399	2	Peaty gleys, noncalcareous gleys	Undulating lowlands with gentle and strong slopes; non-rocky	Dry and moist Atlantic heather moor Arable and permanent pastures
		400	1	Peaty podzols, peaty gleys; some peaty rankers	Hill sides and undulating lowlands with strong and steep slopes; moderately rocky	Dry and moist Atlantic heather moor Arable and permanent pastures
MAUCHLINE/ AUCHINLECK (83 sq. km., 0.11%)	Drifts derived mainly from Permian sandstones	401	46	Brown forest soils with gleying; some noncalcareous and humic gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		402	13	Noncalcareous gleys; some humic gleys and peaty gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		403	9	Peaty gleys; some peat	Undulating lowlands with gentle slopes	Moist Atlantic and bog heather moor. Flying bent grassland Blanket bog. Rush pastures
		404	15	Humus-iron podzols, humic gleys; some peaty and brown rankers	Hill sides with steep slopes; slightly rocky	Bent-fescue grassland Permanent and rush pastures Atlantic heather moor
		405	12	Noncalcareous gleys; some peaty gleys and peat	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires Bog heather moor and blanket bog
MILLBUIE (199 sq. km., 0.26%)	Morainic drifts derived from sandstones of Middle Old Red Sandstone age	406	187	Humus-iron podzols; some noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures. Dry and moist Atlantic heather moor
MINTO (114 sq. km., 0.15%)	Drifts derived from Old Red Sandstone Silurian and Ordovician sediments	407	38	Brown forest soils with gleying	Hills and undulating lowlands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland
		408	21	Brown forest soil. with gleying, noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Sharp-flowered rush pasture
		409	22	Noncalcareous gleys	Depressions and foothills with gentle slopes	Sharp-flowered rush pasture Arable and permanent pastures
		410	15	Noncalcareous gleys, peaty gleys	Foothills and depressions with gentle slopes	Sharp-flowered rush pasture Moist Atlantic heather moor Flying bent grassland
		411	15	Peaty podzols, peaty gleys, peat	Hills with steep and strong slopes	Moist Atlantic heather moor Blanket and flying bent bog
		412	3	Peaty gleys; some peaty podzols	Foothills with gentle slopes	Moist Atlantic heather moor Flying bent grassland
		413	27	Brown forest soils	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
MOUNTBOY (302 sq. km., 0.40%)	Drifts derived from Old Red Sandstone lavas and sediments	414	245	Brown forest soils with gleying, brown forest soils; some gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		415	12	Noncalcareous gleys; some brown forest soils with gleying and peaty gleys	Undulating lowlands and foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Flying bent grassland
		416	5	Humus-iron podzols; some peaty podzols, brown forest soils and gleys	Foothills with strong slopes	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
MOUNTBOY (continued)		417	13	Peaty podzols; some humus-iron podzols, peat and gleys	Undulating uplands with strong and gentle slopes	Dry Atlantic heather moor White bent grassland Blanket bog. Rush pastures
		418	<1	Humus-iron podzols, peaty podzols; some peat and gleys	Hills and valley sides with strong and steep slopes; moderately rocky	White bent grassland Dry Atlantic heather moor Blueberry heath
		419	<1	Brown forest soils; some brown rankers and gleys	Hills with strong and steep slopes; moderately to very rocky	Acid bent-fescue grassland Rush pastures and sedge mires
NIGG/ PRESTON (175 sq. km., 0.23%)	Undifferentiated raised beach deposits	420	123	Humus-iron podzols, regosols; some gleys	Raised beach terraces with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		421	52	Noncalcareous gleys	Raised beach terraces with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
NOCHTY (10 sq. km., 0.01%)	Fluvioglacial gravels, sands and silts derived from basic rocks	422	10	Brown forest soils; some alluvial soils	Valley floors, terraces and mounds, with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Dry boreal heather moor
NORTH MORMOND/ ORTON (235 sq. km., 0.30%)	Drifts derived from Old Red Sandstone sediments and acid metamorphic rocks	423	21	Brown forest soils; some humus-iron podzols	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
		424	34	Noncalcareous gleys; some peaty and humic gleys	Undulating lowlands and foothills with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires Bog heather moor
		425	175	Humus-iron podzols; some peaty podzols and gleys	Undulating lowlands and foothills with strong slopes	Arable and permanent pastures Boreal and Atlantic heather moor Rush pastures and sedge mires
ORDLEY/ CUMINESTOWN (166 sq. km., 0.22%)	Drifts derived from Old Red Sandstone sediments and argillaceous schists	426	5	Peaty podzols, humus-iron podzols; some gleys and peat	Hills and valley sides with gentle to steep slopes	Dry boreal heather moor Acid bent-fescue grassland Rush pastures and sedge mires
		427	12	Noncalcareous gleys, peaty gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		428	154	Brown forest soils, humus-iron podzols; some noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
PETERHEAD (138 sq. km., 0.18%)	Drifts derived from Old Red Sandstone sediments with igneous and metamorphic rocks and conglomerate cobbles	429	71	Brown forest soils with gleying; some gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		430	67	Noncalcareous gleys; some peaty gleys and brown forest soils with gleying	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
RACKWICK (2 sq. km., <0.01%)	Fluvioglacial sands and gravels derived from Upper Old Red Sandstone sandstones	431	2	Peaty podzols, peat	Undulating lowlands with gentle and steep slopes	Dry Atlantic heather moor Blanket bog Soft rush pasture
REPOPOCH (132 sq. km., 0.17%)	Drifts derived from Downtonian sandstones and shales	432	31	Brown forest soils; some brown forest soils with gleying and gleys	Undulating uplands with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
		433	23	Noncalcareous gleys; some brown forest soils with gleying and peaty gleys	Undulating uplands with gentle and strong slopes	Sharp-flowered rush pasture Acid bent-fescue grassland Flying bent grassland

REPOPOCH (continued)	434	5	Peaty podzols, humus-iron podzols; some brown forest soils, gleys and peat	Undulating uplands with strong slopes	Dry Atlantic heather moor White bent grassland Rush pastures and sedge mires
	435	32	Peaty podzols, peaty gleys, peat	Hills with gentle and strong slopes; slightly rocky	Moist Atlantic heather moor Bog heather moor Flying bent bog
	436	41	Peaty gleys, peat; some peaty podzols	Depressions and foothills with gentle slopes; slightly rocky	Blanket and flying bent bog Moist Atlantic heather moor Flying bent grassland
RHINS (443 sq. km., 0.57%)	437	25	Brown forest soils	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
	438	177	Brown forest soils with gleying	Drumlins and undulating lowlands with gentle and strong slopes	Arable and permanent pastures
	439	144	Brown forest soils; some brown rankers and brown forest soils with gleying	Drumlins and undulating lowlands with simple and complex gentle and strong slopes; slightly rocky	Arable and permanent pastures Acid bent-fescue grassland Broad-leaved woodland
	440	73	Brown forest soils with gleying; some brown forest soils and brown rankers	Drumlins and undulating lowlands with simple and complex gentle and strong slopes; slightly rocky	Arable and permanent pastures Acid bent-fescue grassland
	441	6	Brown forest soils; some brown rankers	Undulating lowlands with complex strong slopes; moderately rocky	Acid bent-fescue grassland Permanent pastures
	442	17	Brown forest soils with gleying; some peaty podzols and peaty gleys	Drumlins and depressions with gentle and strong slopes; slightly rocky	Arable and permanent pastures Dry and moist Atlantic heather moor · Flying bent grassland
	443	1	Humus-iron podzols	Lowlands with gentle slopes	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland
	444	410	Brown forest soils with gleying; some brown forest soils	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
	445	1079	Brown forest soils with gleying; some noncalcareous gleys and humic gleys	Undulating lowlands and valley sides with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
ROWANHILL/ GIFFNOCK/ WINTON (2345 sq. km., 3.04%)	446	520	Noncalcareous gleys; some brown, forest soils with gleying and peaty gleys	Undulating lowlands with gentle and strong slopes	Rush pastures and sedge mires Arable and permanent pastures Broad-leaved woodland
	447	74	Brown forest soils	Mounds on valley sides with strong slopes	Acid bent-fescue grassland Permanent pastures Broad-leaved woodland
	448	29	Humus-iron podzols; some brown forest soils and gleys	Undulating foothills with gentle and strong slopes	Dry Atlantic heather moor Acid bent-fescue grassland Broad-leaved woodland
	449	< 1	Peaty podzols, peaty gleys	Hills with strong slopes	Dry and moist Atlantic heather moor, White bent grassland Bog heather moor
	450	232	Peaty gleys; some peat and non-calcareous gleys	Undulating foothills with gentle and strong slopes	Flying bent grassland and bog Blanket bog Moist Atlantic heather moor
	451	1	Peaty podzols, peaty gleys, non-calcareous gleys, brown forest soils	Hummocky moraine on valley sides	Heath rush - fescue grassland Rush pastures and sedge mires Acid bent-fescue grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
ROY (36 sq. km., 0.05%)	Interbedded glacio-lacustrine gravels, sands and silts	452	12	Humus-iron podzols, humic gleys; some alluvial soils	Lower valley sides and floors with gentle to steep slopes; often with landslips	Permanent pastures Rush pastures and sedge mires Acid bent-fescue grassland
		453	24	Peaty podzols, peaty gleys; some peat	Valley sides and floors with gentle to steep slopes; often with landslips	Heath rush - fescue grassland Atlantic and bog heather moor Rush pastures and sedge mires
SABHAIL/ MUNTEAGLE (206 sq. km., 0.27%)	Drifts derived from Lower and Middle Old Red Sandstone sandstones	454	119	Humus-iron podzols; some gleys and peaty podzols	Undulating lowlands and toothills with gentle and strong slopes; non- and slightly rocky	Arable and permanent pastures Rush pastures and sedge mires Atlantic heather moor
		455	51	Peaty podzols; some gleys and humus-iron podzols	Hills and valley sides with gentle and strong slopes; non-rocky	Dry Atlantic heather moor Rush pastures and sedge mires
		456	18	Peaty podzols, peat; some peaty gleys	Hills and valley sides with gentle to steep slopes; non-rocky	Dry and moist Atlantic heather moor Blanket and upland blanket bog Bog heather moor
		457	18	Humus-iron podzols, peaty podzols; some rankers and gleys	Hills with gentle to steep slopes; non- and slightly rocky	Dry and moist Atlantic heather moor Bog heather moor Permanent pastures
SHAWHILL (3 sq. km., <0.01%)	Morainic drifts derived from granites, greywackes and Carboniferous sandstones	458	3	Brown forest soils	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
SKELBERRY (61 sq. km., 0.08%)	Drifts derived from sandstones, flagstones and conglomerates of Middle and Upper Old Red Sandstone age	459	40	Peaty gleys, noncalcareous gleys; some peat and saline gleys	Undulating lowlands with gentle and strong slopes; slightly rocky	Northern Atlantic heather moor Arable and permanent pastures Swamp. Maritime communities
		460	12	Peaty gleys, peaty podzols; some peat	Undulating lowlands with gentle and strong slopes; non-rocky	Northern Atlantic heather moor Northern bog heather moor Northern blanket bog
		461	9	Peaty podzols, peaty rankers	Hill sides with steep and very steep slopes; moderately to very rocky	Dry and northern Atlantic heather moor. Heath grass - white bent grassland
SKELMUIR (20 sq. km., 0.03%)	Drifts with Cretaceous flints and quartzite cobbles	462	11	Noncalcareous gleys; some peaty gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		463	9	Peaty podzols; minor noncalcareous gleys	Hills and valley sides with strong and steep slopes	Arable and permanent pastures Rush pastures and sedge mires Atlantic heather moor
SMAILHOLM (35 sq. km., 0.05%)	Drifts derived from Lower Carboniferous basaltic lavas and Upper Old Red Sandstone sediments	464	35	Brown forest soils	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
		465	54	Brown forest soils, brown forest soils with gleying	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures
SORN/ HUMBIE/ BIEL (465 sq. km., 0.60%)	Drifts derived from Lower Carboniferous and Upper Old Red Sandstone sediments and lavas	466	204	Brown forest soils with gleying; some noncalcareous gleys and peaty gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Flying bent grassland
		467	147	Noncalcareous gleys; some brown forest soils with gleying, humic gleys and peaty gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Broad-leaved woodland
		468	2	Brown forest soils, noncalcareous gleys, peaty gleys, peaty podzols	Hills with strong slopes	Acid bent-fescue grassland Rush pastures and sedge mires Heath rush - fescue grassland

SORN/HUMBIE/ BIEL (continued)	469	2	Peaty podzols, peaty gleys	Hills with strong slopes	Heath rush - fescue grassland
	470	48	Peaty gleys, humic gleys; some peaty podzols and peat	Undulating lowlands and uplands with gentle and strong slopes	Moist Atlantic heather moor Rush pastures and sedge mires Blanket bog
	471	8	Brown forest soils, humic gleys	Hill sides with steep slopes; slightly rocky	Acid bent-fescue grassland Rush pastures and sedge mires
	472	405	Brown forest soils; some brown forest soils with gleying and gleys	Undulating lowlands and hills with strong slopes	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
	473	49	Noncalcareous gleys; some brown forest soils with gleying and peaty gleys	Undulating foothills with gentle slopes	Rush pastures and sedge mires Acid bent-fescue grassland Flying bent grassland
	474	247	Brown forest soils; some brown forest soils with gleying	Hills with strong and steep slopes; non- and slightly rocky	Arable and permanent pastures Rich bent-fescue grassland
	475	12	Humus-iron podzols; some brown forest soils, gleys and peaty podzols	Hills with gentle to strong slopes	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland
	476	109	Peaty podzols; some humus-iron podzols and peat	Hills and undulating uplands with strong and steep slopes	Dry Atlantic heather moor White bent grassland Blanket bog
SOURHOPE (1310 sq. km., 1.71%)	Drifts derived from Old Red Sandstone intermediate lavas	477	13	Peaty podzols, shallow peat; some gleys	Hills with gentle and strong slopes; slightly rocky
		478	32	Peaty gleys, peat; some peaty podzols	Undulating lowlands and hills with gentle and strong slopes; slightly rocky
		479	156	Brown forest soils; some brown rankers, humus-iron podzols and humic gleys	Lowlands and hill sides with gentle to very steep slopes; moderately rocky
		480	243	Peaty gleys, peat, peaty podzols	Terraced hills with gentle and strong slopes; moderately rocky
		481	<1	Brown forest soils; some brown rankers	Hill sides with strong and steep slopes; moderately rocky
		482	44	Podzolic rankers, brown rankers	Hills and valley sides with very steep slopes
		483	28	Noncalcareous gleys, humic gleys	Undulating lowlands with gentle slopes; non-rocky
STAFFIN (63 sq. km., 0.08%)	Drifts derived from Jurassic limestones and shales	484	7	Noncalcareous gleys, humic gleys	Arable and permanent pastures Swamp, rush pastures and sedge mires
		485	19	Peaty gleys, peat	Bog heather and northern bog heather moor Blanket and flying bent bog Moist Atlantic heather moor
		486	9	Peaty gleys, peat	Bog heather and northern bog heather moor Blanket and flying bent bog Moist Atlantic heather moor

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
STIRLING/ DUFFUS/ POW/ CARBROOK (416 sq. km., 0.54%)	Estuarine and lacustrine raised beach silts and clays	487	56	Brown forest soils with gleying; some noncalcareous gleys	Raised beach terraces with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		488	360	Noncalcareous gleys; some peaty gleys and peat	Raised beach terraces with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires Blanket bog
		489	1	Peaty gleys	Raised beach terraces with gentle slopes	Permanent pastures Rush pastures and sedge mires Bog heather moor and blanket bog
STONEHAVEN (253 sq. km., 0.33%)	Drifts derived from Lower Old Red Sandstone conglomerates and lavas	490	180	Brown forest soils; some humus-iron podzols and noncalcareous gleys	Undulating lowlands and foothills with gentle and strong slopes; non-rocky	Arable and permanent pastures Acid bent-fescue grassland Broad-leaved woodland
		491	10	Noncalcareous gleys, peaty gleys; some humic gleys	Undulating foothills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires
		492	26	Brown forest soils; some gleys and brown rankers	Undulating foothills with gentle and strong slopes; slightly rocky	Acid bent-fescue grassland Broad-leaved woodland Rush pastures and sedge mires
		493	29	Humus-iron podzols; some peaty podzols and gleys	Undulating lowlands and foothills with gentle and strong slopes; non-rocky	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland
		494	3	Peaty podzols; some humus-iron podzols and gleys	Hills and valley sides with strong and steep slopes; non-rocky	Dry and moist Atlantic heather moor Bog heather moor Heath rush - fescue grassland
		495	3	Brown forest soils; some humus-iron podzols, brown rankers and gleys	Hill and valley sides with strong and steep slopes; moderately rocky	Acid bent-fescue grassland Broad-leaved woodland Rush pastures and sedge mires
		496	2	Humus-iron podzols; some brown forest soils, rankers and gleys	Hills and valley sides with strong and steep slopes; moderately rocky	Dry Atlantic heather moor Acid bent-fescue grassland White bent grassland
STRICHEN (6151 sq. km., 7.98%)	Drifts derived from arenaceous schists and strongly metamorphosed argillaceous schists of the Dalradian Series	497	450	Noncalcareous gleys, humic gleys; some peaty gleys and humus-iron podzols	Undulating lowlands and valley sides with gentle and strong slopes; non-rocky	Rush pastures and sedge mires Arable and permanent pastures Acid bent-fescue grassland
		498	942	Humus-iron podzols; some brown forest soils and gleys	Undulating lowlands and hills with strong and steep slopes; non-rocky	Arable and permanent pastures Boreal and Atlantic heather moor Acid bent-fescue grassland
		499	453	Peaty podzols, humus-iron podzols; some gleys	Hills and valley sides with strong and steep slopes; non-rocky	Boreal and Atlantic heather moor Bog heather moor Blanket and upland blanket bog
		500	182	Peaty podzols, peat; some peaty gleys	Hills and valley sides with gentle to steep slopes; non-rocky	Boreal and Atlantic heather moor Blanket and upland blanket bog Bog heather moor
		501	113	Peat, peaty gleys; some peaty podzols	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Blanket and upland blanket bog Bog heather moor Boreal and Atlantic heather moor
		502	42	Peaty gleys, peat; some peaty podzols	Hill sides with steep slopes; non-rocky	Bog heather moor, Boreal heather moor, locally Atlantic Blanket and upland blanket bog
		503	451	Humus-iron podzols, brown forest soils; some gleys and peat	Hummocky valley moraines	Acid bent-fescue grassland Arable and permanent pastures Oak and birchwood

## STRICHEN (continued)

	504	554	Peaty podzols, peaty gleys, peat	Hummocky valley and slope moraines	Boreal and Atlantic heather moor Bog heather moor Blanket and upland blanket bog	
	505	401	Brown forest soils, humus-iron podzols, humic gleys	Hill and valley sides with strong to very steep slopes; slightly and moderately rocky	Bent-fescue grassland Broad-leaved woodland Rush pastures and sedge mires	
	506	546	Peaty podzols, humus-iron podzols; some peaty gleys and rankers	Hills and valley sides with strong to very steep slopes; moderately rocky	Boreal and Atlantic heather moor Heath rush - fescue grassland Bent-fescue grassland	
	507	820	Peaty gleys, peat; some peaty podzols and peaty rankers	Hill sides with gentle and strong slopes; moderately rocky	Bog heather moor and blanket bog Atlantic and boreal heather moor Heath rush - fescue grassland	
	508	64	Brown rankers, brown forest soils; some humus-iron podzols and gleys	Hills and valley sides with steep and very steep slopes; very rocky	Bent-fescue grassland Rush pastures and sedge mires Oak and birchwood	
	509	93	Rankers, peaty podzols; some humus-iron podzols and peaty gleys	Rugged hills with strong and steep slopes; very rocky	Boreal and bog heather moor Upland bent-fescue grassland Blueberry heath	
	510	291	Peaty gleys, peaty podzols, peaty rankers	Hill sides with strong to very steep slopes; moderately to very rocky	Atlantic and boreal heather moor Heath rush - fescue grassland	
	511	110	Peaty gleys, peaty rankers, peat; some peaty podzols	Rugged hills with gentle to strong slopes; very rocky	Atlantic, boreal and bog heather moor. Blanket bog Heath rush - fescue grassland Alpine lichen heath	
	512	344	Subalpine soils; some rankers and peat	Mountains with gentle to very steep slopes; non- to very rocky	Lichen-rich boreal heather moor Mountain blanket bog	
	513	229	Peat, subalpine soils; some alpine soils	Mountains with gentle and strong slopes; non- to moderately rocky	Mountain blanket bog Alpine lichen heath Stiff sedge - fescue grassland	
	514	57	Alpine soils	Mountain summits with gentle and strong slopes; non- and slightly rocky	Alpine lichen heath Stiff sedge - fescue grassland Alpine clubmoss snow-bed	
	515	9	Rankers, lithosols; some alpine soils	Mountain summits with strong to very steep slopes; very rocky	Blaeberry and bog whortleberry heath. Alpine lichen heath. Stiff sedge - fescue grassland	
SYMINGTON (29 sq. km., 0.04%)	Fluvioglacial sands and gravels derived mainly from andesites	516	29	Brown forest soils; some gleys	Moundy terraces with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
TARVES (1595 sq. km., 2.07%)	Drifts derived from intermediate rocks or mixed acid and basic rocks, both metamorphic and igneous	517	629	Brown forest soils; some humus-iron podzols, noncalcareous gleys and peaty gleys	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Arable and permanent pastures Acid bent-fescue grassland Dry boreal heather moor
		518	262	Noncalcareous gleys, peaty gleys; some brown forest soils with gleying	Undulating lowlands-with gentle slopes; non-rocky	Rush pastures and sedge mires White-bent - tussock-grass and white bent grassland
		519	77	Humic gleys, brown forest soils; some peaty podzols and peaty gleys	Ridged low hills with strong slopes; moderately rocky	Bent-fescue grassland Rush pastures and sedge mires Permanent pastures
		520	104	Humus-iron podzols; some brown forest soils and gleys	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Dry boreal heather moor Permanent and rush pastures Acid bent-fescue grassland
		521	79	Peaty podzols; some humus-iron podzols and gleys	Hills and valley sides with gentle and strong slopes; non-rocky	Dry boreal heather moor White bent grassland

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
TARVES (1595 sq. km., 2.07%) (continued)		522	60	Peaty podzols, peat; some peaty gleys and humus-iron podzols	Hills and valley sides with strong and steep slopes; non-rocky	Dry boreal heather moor Blanket and upland blanket bog White bent grassland
		523	13	Peat, peaty gleys; some peaty podzols and noncalcareous gleys	Undulating lowlands and hills with gentle and strong slopes; non-rocky	Blanket bog Bog heather moor Dry and moist boreal heather moor
		524	5	Peaty podzols, peaty gleys, peat	Hummocky moraines	Dry and moist boreal heather moor Bog heather moor Blanket bog
		525	34	Brown forest soils, humus-iron podzols; some humic gleys	Hill and valley sides with steep slopes; slightly to moderately rocky	Acid bent-fescue grassland Heath rush - fescue grassland Rush pastures and sedge mires
		526	52	Brown forest soils, humic gleys; some peaty gleys and peaty podzols	Ridged low hills with gentle to very steep slopes; very rocky	Bent-fescue grassland Rush pastures and sedge mires Atlantic heather moor
		527	11	Humus-iron podzols, peaty podzols; some gleys and rankers	Hills and valley sides with strong and steep slopes; moderately rocky	Dry boreal heather moor Heath; grass - white bent and bent-fescue grassland
		528	169	Peaty gleys, peat; some peaty podzols	Ridged hills with gentle to strong slopes; moderately rocky	Atlantic heather moor Bog heather moor Blanket and flying bent bog
		529	4	Brown rankers, brown forest soils; some gleys and humus-iron podzols	Rugged hills and valley sides with steep and very steep slopes; very rocky with scree	Bent-fescue grassland Dry boreal heather moor Crested hair-grass grassland
		530	9	Rankers, humus-iron podzols; some brown forest soils and peat	Rugged hills with strong and steep slopes; very rocky with scree	Dry boreal heather moor Bent-fescue grassland Blueberry heath
		531	14	Peaty gleys, peaty rankers; some peat	Ridged hills with gentle to strong slopes; very rocky	Atlantic heather moor Bog heather moor Blanket and flying bent bog
		532	28	Subalpine soils, peat; some rankers	Mountains with gentle to very steep slopes; non- to very rocky	Lichen-rich boreal heather moor Alpine lichen heath Mountain blanket bog
		533	40	Peat, alpine soils, subalpine soils	Mountains with gentle and strong slopes; non-rocky	Mountain blanket bog Stiff sedge - fescue grassland Alpine lichen heath
		534	5	Alpine soils	Mountain summits with gentle and strong slopes; non-rocky	Alpine lichen heath Stiff sedge - fescue grassland Mountain blanket bog
THURSO (1037 sq. km., 1.35%)	Greyish brown drifts derived from Middle Old Red Sandstone flagstones and sandstones	535	247	Brown forest soils, brown rankers; some noncalcareous gleys	Undulating lowlands with gentle and strong slopes	Arable and permanent pastures Sedge mires
		536	5	Noncalcareous gleys	Lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
		537	476	Noncalcareous gleys; some peaty gleys, brown forest soils and brown rankers	Undulating lowlands with gentle slopes	Arable and permanent pastures Swamp and sedge mires. White bent and bent-fescue grassland Sea plantain - crowberry heath Marlomite grassland. Mud-rush salt-marsh. Sedge mires
		538	22	Saline gleys; some gley rankers	Lowlands with gentle slopes	

THURSO (continued)	539	42	Brown forest soils; some non-calcareous gleys, peaty gleys and peat	Hummocky moraines	Arable and permanent pastures Swamp and sedge mires	
	540	1	Peaty podzols, peat	Hummocky moraines	Moist Atlantic heather moor Bog heather and northern bog heather moor Blanket and northern blanket bog	
	541	24	Peaty podzols	Undulating lowlands with gentle and strong slopes; non-rocky	Atlantic heather moor	
	542	59	Peaty gleys, peaty podzols, peaty rankers; some brown forest soils and noncalcareous gleys	Undulating lowlands and stepped hillsides with strong and very steep slopes; moderately rocky	Atlantic heather moor Bent-fescue grassland Arable and permanent pastures	
	543	90	Peaty gleys, peat; some peaty podzols	Undulating lowlands and foothills with gentle and strong slopes; non-rocky	Atlantic heather moor Blanket bog, Swamp, rush pastures and sedge mires	
	544	71	Peaty podzols, peat; some peaty gleys and rankers	Undulating lowlands and stepped hill sides with strong and very steep slopes; moderately rocky	Atlantic heather moor Blanket bog	
TIPPERTY/ CARDEN (51 sq. km., 0.07%)	Red lacustrine silts and clays derived from Old Red Sandstone sediments	545	51	Brown forest soils with gleying; some noncalcareous gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires
	546	28	Brown forest soils, brown rankers; some humic gleys and peaty gleys	Hillocky and weakly terraced land with gentle to strong slopes; moderately rocky	Acid bent-fescue grassland Arable and permanent pastures Rush pastures and sedge mires	
TOROSAY (551 sq. km., 0.71%)	Drifts derived from Tertiary acid, intermediate and basic igneous rocks	547	177	Peaty gleys, peat; some peaty podzols and peaty alluvial soils	Hummocky valley and slope moraines; slightly rocky, often bouldery	Bog heather moor Flying bent grassland and bog Moist Atlantic heather moor
		548	162	Peaty gleys, peat; some peaty rankers and peaty podzols	Weakly terraced hill sides with gentle to steep slopes; moderately rocky	Bog heather moor Flying bent grassland and bog Moist Atlantic heather moor
		549	88	Peaty podzols, humus-iron podzols; some peaty gleys and peaty rankers	Weakly terraced hill sides with steep and very steep slopes; moderately rocky	Heath rush - fescue grassland Acid bent-fescue grassland Atlantic heather moor
		550	31	Peaty gleys, peaty rankers, peat; some peaty podzols	Weakly terraced hill sides with steep and very steep slopes; very rocky	Bog heather moor Blanket and upland blanket bog Moist Atlantic heather moor
		551	65	Subalpine soils, peat	Mountains with gentle to very steep slopes; slightly to very rocky	Fescue - fringe-moss heath Stiff sedge - fescue grassland Mountain blanket bog
		552	11	Noncalcareous gleys, humic gleys; some peaty gleys	Gently undulating lowlands; occasionally slightly rocky	Arable and permanent pastures Rush pastures and sedge mires
		553	21	Humus-iron podzols, humic gleys	Lowlands with gentle and strong slopes; non- and slightly rocky	Arable and permanent pastures Rush pastures and sedge mires
		554	155	Peaty podzols, peat, peaty gleys	Hummocky valley and slope moraine; often bouldery	Bog heather and northern bog heather moor Blanket and northern blanket bog Moist Atlantic heather moor
TORRIDON (1735 sq. km., 2.25%)	Drifts derived from Torridonian sandstones and grits	555	37	Brown forest soils, brown rankers; some humic gleys and peaty podzols	Valley sides with strong to very steep slopes; moderately rocky	Acid bent-fescue grassland Hazel, oak and birchwood Rush pastures and sedge mires
		556	338	Peaty gleys, peat; some peaty podzols	Undulating lowlands and hill sides with gentle and strong slopes; non-rocky	Bog heather and northern bog heather moor Blanket and northern blanket bog Moist Atlantic heather moor

SOIL ASSOCIATIONS (sq. km. % Scotland)	PARENT MATERIALS	MAP UNIT	AREA (sq. km.)	COMPONENT SOILS	LANDFORMS	VEGETATION
TORRIDON (continued)		557	655	Peaty gleys, peat; some peaty podzols and peaty rankers	Undulating hills with gentle and strong slopes; moderately rocky	Bog heather and northern bog heather moor Blanket and northern blanket bog Moist Atlantic heather moor
		558	169	Peaty gleys, peat, peaty rankers; some peaty podzols	Rugged hills with gentle and strong slopes; very rocky	Bog heather and northern bog heather moor Blanket and northern blanket bog Moist Atlantic heather moor
		559	100	Peaty gleys, peaty podzols; some peaty rankers	Hill sides with steep and very steep slopes; moderately and very rocky	Bog heather and northern bog heather moor Moist and northern Atlantic heather moor
		560	8	Subalpine soils, deep peat	Mountains with gentle and strong slopes; non- to very rocky	Alpine lichen heath Northern, upland and mountain blanket bog
		561	241	Subalpine soils, alpine soils, lithosols, regosols	Mountains with gentle to very steep slopes; slightly to very rocky	Mountain heath communities Stiff sedge - fescue grassland Lichen-rich boreal heather moor
TYNEHEAD (56 sq. km., 0.07%)	Drifts derived from Carboniferous sandstones and Ordovician greywackes	562	32	Brown forest soils, brown forest soils with gleying	Foothills with gentle and strong slopes	Arable and permanent pastures Acid bent-fescue grassland Broad-leaved woodland
		563	22	Noncalcareous gleys; some brown forest soils with gleying and humic gleys	Foothills with gentle slopes	Permanent pastures Acid bent-fescue grassland Rush pastures and sedge mires
		564	2	Peaty podzols; some humus-iron podzols and gleys	Undulating uplands with gentle and strong slopes	Dry Atlantic heather moor White bent grassland Rush pastures and sedge mires
		565	2	Peaty, humic and noncalcareous gleys	Undulating lowlands with gentle slopes	Permanent pastures Rush pastures and sedge mires Bog heather moor
Tynet (45 sq. km., 0.06%)	Drifts derived from Middle Old Red Sandstone sandstones and conglomerates	566	30	Humus-iron podzols; some gleys and peaty podzols	Undulating lowlands and hills with gentle and strong slopes	Arable and permanent pastures Rush pastures and sedge mires Dry Atlantic heather moor
		567	13	Peaty podzols; some humus-iron podzols	Hills and valley sides with gentle to steep slopes	Boreal and Atlantic heather moor
		568	3	Peat; some peaty podzols	Undulating lowlands with gentle and strong slopes	Upland blanket bog. Atlantic heather moor
WALLS (103 sq. km., 0.13%)	Drifts derived from Middle Old Red Sandstone sandstones with acid schists and granites	569	24	Peaty gleys, noncalcareous gleys; some peat, peaty podzols and rankers	Undulating lowlands with gentle and strong slopes and hummocky moraines; non- to slightly rocky	Atlantic heather moor Arable and permanent pastures Swamp. Maritime grassland
		570	27	Peaty gleys; some peaty podzols, peat and rankers	Undulating lowlands with gentle and strong slopes; moderately rocky	Heath rush - fescue grassland Arable and permanent pastures Swamp and sedge mires
		571	24	Peaty gleys, peat; some peaty podzols and peaty rankers	Hills and undulating lowlands with gentle and strong slopes; moderately rocky	Atlantic heather moor Upland blanket bog. Swamp, rush pastures and sedge mires
		572	24	Peaty rankers, peaty podzols, brown rankers	Rugged hill sides with strong and steep slopes; very rocky	Atlantic heather moor White bent grassland Rich bent-fescue grassland
		573	1	Alpine soils	Hill summits with gentle slopes; slightly rocky, stony	Alpine lichen heath Stiff sedge - fescue grassland Upland blanket bog

WHITSOME (412 sq. km., 0.53%)	Drifts derived from Lower Carboniferous sediments and basic lavas, Upper Old Red Sandstone sandstones and Silurian greywackes	574	102	Brown forest soils with gleying, brown forest soils	Undulating lowlands with gentle slopes	Arable and permanent pastures	
		575	310	Brown forest soils with gleying; some noncalcareous gleys	Undulating lowlands with gentle slopes	Arable and permanent pastures Rush pastures and sedge mires	
YARROW/ FLEET (445 sq. km., 0.58%)	Fluvioglacial gravels and sands derived mainly from greywackes	576	201	Brown forest soils	Mounds and terraces with gentle slopes	Arable and permanent pastures Acid bent-fescue grassland	
		577	25	Brown forest soils	Terraces and mounds with gentle slopes	Arable and permanent pastures Acid bent-fescue grassland	
		578	93	Brown forest soils, peat, peaty alluvial soils	Mounds and discontinuous terraces with gentle slopes	Arable and permanent pastures Acid bent-fescue grassland Soft rush pasture	
		579	122	Brown forest soils, alluvial soils	Terraces of fluvioglacial and riverine origin with gentle slopes	Arable and permanent pastures Soft rush pasture	
		580	4	Humus-iron podzols, peat	Mounds and terraces with gentle slopes	Dry and moist Atlantic heather moor Blanket bog	
Bare rock, scree and cliffs (238 sq. km., 0.31%)		x	238	—	—	—	
Built-up areas (1229 sq. km. 1.59%)			1229	—	—	—	
<b>TOTAL</b>		<b>77087 sq. km.</b>					

# Handbooks of the Soil Survey of Scotland

- 1 Orkney and Shetland
- 2 The Outer Hebrides
- 3 Northern Scotland
- 4 Western Scotland
- 5 Eastern Scotland
- 6 South West Scotland
- 7 South East Scotland
- 8 Organization & Methods of the 1:250 000 Soil Survey

