



**Forestry Commission**

**Field Book 4**

# Land Capability for Forestry Western Scotland

**Produced by The Macaulay Land Use Research Institute**

# Land Capability for Forestry in Western Scotland

(including the Outer Hebrides)

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FRONT COVER: *Gleann a'Chaolais, Ballachulish (MLURI photo)*

# 1. The land capability classification for forestry

The land capability classification for forestry is based on an assessment of the degree of limitation imposed by the physical factors of soil, topography and climate on the growth of trees and on silvicultural practices. The principal tree species considered are those broadleaves and conifers commonly grown in Britain, and the classification assumes a skilled management level that will include cultivation, drainage, fertiliser application and weed control where these are necessary.

The principles on which the classification is based and the guidelines for assessing each type of limitation are described in *Land Capability Classification for Forestry in Britain* (Bibby *et al.* 1988).

## TYPES OF LIMITATION

The classification is based on seven types of limitation, these being climate, windthrow, nutrients, topography, droughtiness, wetness and soil.

### *Climate*

Climate is probably the most important factor that affects afforestation in Britain and it provides the framework of the classification. The two principal elements are accumulated temperature, measured in day-degrees above 5.6°C (Birse and Dry 1970, Birse 1971) and exposure, measured in mean annual wind speeds (Birse and Robertson 1970). Rainfall is of less importance, since in Britain it is sufficient for tree growth provided the soil is capable of storing the moisture it receives. Seasonal frosts can affect tree growth and species choice, but their occurrences depend very much on the local topography.

### *Windthrow*

The likelihood of windthrow in forests affects both forest management and timber production, since in areas of high risk, thinning is precluded and crop rotations shortened. Windthrow is likely to occur where soils with shallow rooting depths are found in combination with a high degree of exposure and high wind speeds. The assessment of risk, described by Miller (1985), is done on a point-scoring system which takes into account wind zone, elevation zone, topographic exposure and soil type. From the total score, the windthrow hazard class, of which there are six, is derived; low scores indicate a low hazard class and a low risk of windthrow.

### *Nutrients*

Although the application of fertilisers, principally phosphorus and potassium, is part of regular forest practice, the natural availability of nutrients in the soil determines very largely the choice of species that can be grown. In organic soils, nutrient availability, related to the total content of nitrogen, phosphorus and potassium, is low except where considerable surface flushing has taken place. Mineral soils are usually more fertile, particularly those that have been used regularly for arable rotations. Their nutrient availability is related to the volume of soil available for rooting and the chemical composition of the soil parent material, those derived from acid rocks such as quartzites and granites being poorest. However, on soils developed on materials derived from basic igneous rocks, problems of poor phosphorus availability can arise, and on ultrabasic rocks, growth problems associated with high magnesium or nickel are likely.

### *Topography*

Topography principally affects the mechanised operations necessary for the establishment and harvesting of the tree crop and the design and construction of forest roads. Slope is the major element. Two-way ploughing is generally only possible on slopes of less than 5° and trailed ploughs are mainly confined to slopes less than 18°. One-way ploughing with mounted plough reaches a limit at 35° on dry stable slopes but is less than this on wet slopes or where there is a danger of the soil layer parting

from the underlying rock and the tractor 'rafting' downhill. On irregular, rocky or bouldery topography these limits can be reduced considerably, and complete ploughing may be precluded.

### *Droughtiness*

Droughtiness affects forestry capability in areas where soils with very low water-holding capacity, such as dune sands, occur under low rainfall. Where water is in short supply to the root, a number of problems can occur, particularly at establishment, which are partly physiological and partly nutritional. High soil moisture deficits can result in reduced yields and restrict the choice of species.

### *Wetness*

Soil wetness is a physiological barrier to root growth and its implications for forestry are that it can lead to poor growth due to poor aeration, low soil temperatures and a restricted amount of soil exploitable for nutrients, as well as reducing tree stability and thus increasing windthrow risk, particularly in exposed upland areas. Seasonal saturation of the root zone occurs widely in surface-water gleys. Such soils, together with peats and peaty gleys, require drainage schemes. Sites which are subject to regular flooding are not suitable for afforestation.

### *Soil*

Soil is an important factor in most of the types of limitation so far described, but in some circumstances it can be the dominant one affecting forestry capability. Shallow soils, for example, have restricted rooting depths and can be difficult to plough; trafficking on them can result in topsoil destruction. In areas where soil patterns are complex, site preparation and treatments appropriate to each soil type may not be easy and compromises will have to be reached.

## THE CLASSES

### Class F1. *Land with excellent flexibility for the growth and management of tree crops*

The soils are deep and well supplied with moisture, and neither climate nor site factors seriously restrict the growth of the main tree species used in Britain. A wide range of broadleaved and coniferous species can be planted.

### Class F2. *Land with very good flexibility for the growth and management of tree crops*

The soils have no or only limited periods of seasonal waterlogging, but some mineral gleys may be included if, with drainage, the water-table can be controlled at depths which prevent serious waterlogging of the root system. Minor areas of shallower or wetter soils are acceptable but should not exceed 10% in total. Minor restrictions on cultivation and harvesting due to slopes or minor climatic restraints are also acceptable. Both broadleaved and coniferous species may be planted but choice is more restricted than in Class F1. In areas where available water is limited, those species with high water demand are unsuitable; in areas with water surplus soil drainage may be necessary.

### Class F3. *Land with good flexibility for the growth and management of tree crops*

The soil range extends to include mineral gleys with sandy or loamy textures and flushed gleys with humose topsoils. Drainage is necessary on gley soils. Windthrow risk is not high and land management is primarily concerned with limitations imposed by drainage, sloping land or patterns of variable soils. The land is suitable for a wide range of conifers and for a restricted range of broadleaved species.

### Class F4. *Land with moderate flexibility for the growth and management of tree crops*

The soils include the more fertile peaty soils and the problem mineral soils, e.g. gleys with clayey textures or soils with calcareous horizons.

Ploughing difficulty may be encountered due to stony or shallow soils but this should not be more than 20% of the area. There is a risk of small areas of windthrow which should not be sufficiently severe to reduce rotation lengths or influence management practices. The land is suitable for many coniferous species and in places for the less demanding broadleaves.

*Class F5. Land with limited flexibility for the growth and management of tree crops*

The soils are primarily podzols, peaty gleys and peat, but where limitations are sufficiently severe to limit species selection, other soils may be included. Ploughing is possible but may be more difficult than in the previous classes. Sites in which the risk of windthrow affects management by modifying the thinning practice fall within this class. In the uplands species choice is limited to conifers, such as spruces, larches and pines, and to birch, alder or other hardy broadleaves.

*Class F6. Land with very limited flexibility for the growth and management of tree crops*

The principal limitations are adverse climate and poor soil conditions. The soils include podzols, peaty gleys and peats, and soils affected by toxicities. Sites on which the risk of windthrow effectively prevents thinning and seriously curtails the rotation length, and sites with very severe surface terrain which imposes great difficulty in ploughing or extraction, fall within this class. Species choice is limited to lodgepole pine and Sitka spruce and to amenity broadleaves such as birch and alder.

*Class F7. Land unsuitable for producing tree crops*

Land is considered unplantable if its physical characteristics preclude the growth or establishment of tree crops by normal methods. These characters include extremes of climate (orohemiarctic and oroarctic climate zones over extremely exposed sites), wetness (flow-bog or flood sites), rockiness and extreme slopes.

## 2. The classes in Western Scotland and the Outer Hebrides

This handbook describes the classes shown on the 1:250 000 scale land capability for forestry map Sheet 4 (Western Scotland), and the accompanying inset of the Western Isles at a scale of 1:1 000 000. The area, amounting to 19746 sq km, includes the Outer Hebrides, most of the Inner Hebrides, the southern portion of the Northern Highlands, the Western Highlands and much of the south-western Grampians. A concise account of the general physical background, soils, vegetation and land capability for agriculture of the districts involved can be found in Bibby *et al.* (1982) and Hudson *et al.* (1982).

Western Scotland and the Outer Hebrides demonstrates a great diversity of soil types and topography. Sand dunes, machair plains, raised beach terraces, undulating till lowlands, peaty moorlands, ice-scoured rock knolls and precipitous mountains all occur extensively within the area. All seven land capability for forestry classes are present. Although local short-range variation of capability is common, particularly in response to changes in topography or soils or both, the overall pattern of class distribution is closely linked to climatic gradients, the principal elements being wind speed and atmospheric warmth. Two broad trends are evident: the first is the reduction in the proportion of land occupied by the better classes as conditions become increasingly exposed and cold towards the north and west, and the second is the zonation of classes of decreasing potential allied to the climatic deterioration with altitude. The planting limit towards the east and south occasionally exceeds 500 m, while many areas of the Atlantic seaboard are unplantable; intermediate limits are determined by local aspect and availability of topographic shelter as well as regional climate.



Within many individual map units, especially those of Classes F4 to F7, there are several component land types, and each one is affected by different limitations. Nevertheless, as all of the components have the same overall flexibility for forestry use, they can be represented as a single area belonging to one class.

Because the climate of west Scotland is generally cool and windy, the land of Classes F1, F2 and F3 is restricted mainly to the fertile cultivated soils of the sheltered valleys on the western mainland, and to the warmer lowlands in the north-east and south-east of the area. Class F4 land is most prominent on the freely drained steep slopes around the Great Glen, and on the wide-ranging soils of the coastal lowlands and lochsides of southern Argyll. Flushed peaty soils dominate Class 5 land, principally on undulating terrain and gentle hillslopes on Mull, south of Oban and around Fort William. Class F6 land, mainly with unflushed peaty soils, is common in the north and west at low elevations and also on the hillslopes of the south and east. Extensive tracts of rugged mountains consist exclusively of Class F7 land, and unplatable areas are predominant in the Western Isles because of extreme exposure and rockiness.

Apart from on the windswept Hebridean islands and neighbouring mainland, forestry is well established in the area below 500 m elevation. It covers many parts of south Argyll and the Fort William district, and occupies much of the eastern glens. Other land uses are chiefly deer-stalking, grouse-shooting, stock-rearing and sheep-farming, with a little arable farming in suitable localities with good soils.

*Class F1. Land with excellent flexibility for the growth and management of tree crops*

Area: 4 sq km

Class F1 land is confined to a few small sheltered areas around the south-west end of Loch Lochy and to the east of Beauly. The soils, mainly podzols and alluvial soils, are cultivated and freely drained, and are developed on terraces of fluvioglacial sand and loamy alluvium. There are no rooting restrictions, nutrient levels are high, and risk of windthrow is very low. All mechanised operations can be carried out easily and high yields are possible from a wide range of broadleaved and coniferous species.



*Plate 1. Highland glens can encompass a wide range of capability classes. Here, at Loch Duich, Kintail, the valley floor is Class F2, the hillsides are Classes F5 and F6, and the very steep slopes and mountain summits Class F7. (Photo: MLURI)*

*Plate 2. Class F3 on the cultivated land and Class F5 in the middle distance. In the background, classes range from F4 at the lochside to F7 on hilltops. Loch Awe, Argyll. (Photo: MLURI)*



**Class F2. *Land with very good flexibility for the growth and management of tree crops***

Area: 142 sq km

Most of the Class F2 land is located around Fort Augustus and Fort William, near Kilmartin (Argyll) and in Strath Glass and Strath Conon. The soils and topography are similar to those of Class F1 land and comprise cultivated podzols and alluvial soils on terraces of raised beach and fluvioglacial sands and gravels. However, the less favourable climate, mainly the lack of warmth, slightly restricts species choice. Nutrient supplies are adequate and risk of windthrow low. Mechanised operations are affected locally in wet hollows and on steep terrace edges. Smaller tracts of similar land occur throughout the region, with the exception of the far north and west, associated with sheltered lochsides, river mouths and low-lying valleys. Notable examples are present in Morvern, north Lorne, on Loch Fyneside and Loch Lomondside, and north-east of Strathpeffer.

A contrasting land type which has minor soil limitations in addition to a less favourable climate is found south-west of Beaully and east of Balmaha. It consists of undulating lowlands underlain by glacial tills. The principal soils are brown forest soils with gleying and gleys. Topsoils are usually loamy. As most of the land is farmed, agricultural drainage systems alleviate the problems associated with waterlogging. Slight restrictions on rooting remain, however, because of impermeable subsoils, but windthrow risk is low and nutrient supplies plentiful. Mechanised forestry operations are unlikely to be affected by the smooth non-rocky terrain.

**Class F3. *Land with good flexibility for the growth and management of tree crops***

Area: 177 sq km

The major limiting factors of Class F3 land are adverse climate and poor soil conditions. Land types are diverse and of widely scattered distribution.

In a few coastal areas with cultivated soils developed on alluvial, raised beach and fluvioglacial deposits, forestry capability is limited only

by climate — as for instance in Ardgour and Appin. Topography is level or subdued, nutrient levels are high and soils mainly podzols with some gleys. Though windthrow risk is not serious, the moderate exposure restricts the range of species which can be grown.

Alluvial floodplains near Contin and Garve, and in Strath Fillan and Strath Glass, have their potential limited by wetness and soil variability. The soils generally have high water-tables and are subject to infrequent flooding; textures range from gravels to loams. Nutrient supplies are plentiful as most of the land is farmed. Although the species planted have to be tolerant of waterlogging, windthrow risk is low in these sheltered valleys. Mechanised operations can be easily carried out, but a few wet hollows associated with old channels give locally poor ground conditions.

Land having soil limitations and occupying undulating slopes and lowlands underlain by till deposits has been identified within Class F3. Well-drained areas include shallow brown forest soils on the mid-slopes of Strath Conon, while brown forest soils and gleys having impeded drainage and restricted rooting occur at Bridgend (Lochgilphead) and around Newton and Furnace beside Loch Fyne. The soils are cultivated and thus provide adequate nutrients, and the non-rocky terrain with low gradients does not hinder mechanised operations. As wind speeds are moderate, windthrow risk is generally low, but on sites which are particularly exposed or wet the risk is higher.

One landform normally excluded from the class by complex soil and topography is that of moundy moraines; however, two areas, one on Loch Aweside at Ardnaiseig and one south of Loch Creran, have a higher potential as the hummocky terrain is more subdued and the soils less varied than usual. Soils comprise podzols and gleys, and long-established agricultural use and drainage ensures adequate nutrients.

*Class F4. Land with moderate flexibility for the growth and management of tree crops*

Area: 809 sq km

Class F4 land comprises a range of limitation types, of which adverse topography is the most widespread. At low altitudes in comparatively



*Plate 3. Class F4 with a complex soil and slope pattern on the hummocky lower ground, with Classes F5 and F6 on the afforested slopes, near Strachur, Argyll. (Photo: MLURI)*

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*Plate 4. Class F4 on the slopes above Loch Fyne, Argyll, where steepness of slope affects management. (Photo: MLURI)*





*Plate 5. Opportunities for afforestation in the open landscapes of the west are limited by climate, particularly exposure, and high risk of windthrow, Class F5 on the arable and inbye land, Class F6 beyond, and Class 7 on the cliffs, near Staffin, Skye. (Photo: MLURI)*

*Plate 6. Class F5 on hummocky fluvio-glacial materials near Tyndrum, Argyll. The hillslopes beyond range from Class F4 in the sheltered valley bottom to Class F7 at the top. (Photo: MLURI)*



sheltered areas this does not constrain species choice, and yields on favourable soils may be comparable with those of the preceding classes. The diversity of land types is the greatest of any of the classes which are suitable for tree crops.

The major land type consists of steep planar slopes having brown forest soils and humus-iron podzols with adequate nutrient levels. The slopes flanking the Great Glen and Glen Shira, and around Garve and Loch Duich are limited chiefly by steep gradients, though rock outcrops and shallow stony soils give additional problems locally for mechanised operations. Another land type with topographic limitations is moderately rocky and has brown forest soils with adequate nutrient levels. The landforms are variable and are exemplified by the terraced basalt country of Mull and Morvern, the knolly limestone island of Lismore, and the ridged slate areas of Luing. In these open western localities, windspeeds are high and thus reduce species choice. In the most exposed areas with very shallow soils there will be a high risk of windthrow.

Land having unfavourable soil conditions, mainly wetness or complex soil patterns, which restrict species choice is found in three land categories, all of which, however, have an adequate nutrient status and a low risk of windthrow. The first is land with wetness problems, occurring in broad, low-lying river valleys, such as those near Marybank in Strath Conon and in Strath Glass. As it has alluvial soils with marshy abandoned meander channels, is generally waterlogged, and subject to considerable risk of flooding, the land is difficult to drain. Secondly, in undulating till lowlands of south Argyll the land is dominated by gley soils, many of them humic or peaty. Loch Aweside and near Bridgend (Lochgilthead) are the principal areas. The third is land comprising moundy moraines and having complex soil and topographic patterns. Brown forest soils and humus-iron podzols are developed on hummocks and flushed humic gleys, peaty gleys and peat in hollows and on flats. The best examples are in Glen Dochart and Glen Aray, and near Dalmally and Applecross. Though these low-lying areas are usually non-rocky, concentrations of surface boulders sometimes reduce the amount of plantable land.

Local patches of land having favourable soil and site conditions are present on the west coast but forestry capability is restricted by climate.

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The worst effects of regional exposure are mitigated by the local topographic shelter provided by surrounding hills or offshore islands. Such land occurs at Eynort (Skye), Applecross, Glenelg, Benderloch and Kinloch (Rhum). Soils are mainly cultivated podzols and gleys on alluvial, fluvio-glacial and raised beach deposits. Species choice is limited by high wind speeds, and on wetter and more exposed sites there is a moderate risk of windthrow. Mechanised operations are unimpeded by the level or subdued non-rocky topography. Land with similar characteristics, but having low atmospheric warmth as the primary restriction on species choice occurs inland at Achallader (Loch Tulla), upper Strath Conon and Whitebridge (east of Loch Ness).

Class F5. *Land with limited flexibility for the growth and management of tree crops*

Area: 3291 sq km

Most of Class F5 land is dominated by peaty soils, mainly peaty podzols, peaty gleys and peat (> 50 cm deep). The principal limitation is low nutrient supply, in spite of some enrichment by flushing. In the more exposed locations there is also a high risk of windthrow. Drainage is necessary to alleviate wetness and the rupturing of impermeable iron pans and indurated layers may improve drainage. As heather (*Calluna vulgaris*) is frequently the dominant species, heather check to spruce can be a problem.

Three types of peaty land have been identified. The first and most extensive land type has rock-controlled topography with a wide range in morphology (ridged, terraced etc.), rockiness and proportions of soil components. Large areas of the Highlands and Islands belong to this category. By contrast deposits of moundy moraine and fluvio-glacial outwash constitute the second land type. It occupies many valley, corrie and foothill sites, and additional local problems to the low nutrient supply are steep slopes and bouldery patches which affect mechanised operations. The third land type consists of level valley floors with peat (>50 cm deep) and peaty alluvial soils. The advantages of flat topography are outweighed by the presence of stream and meander channels and the associated liability to flooding. As these areas largely occur at low





*Plate 7. Steep rocky slopes with shallow soils above Loch Eck, Argyll, typical of many West Highland glens. Class F6, afforested, and Class F7 on the higher rockier ground. (Photo: MLURI)*

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*Plate 8. Class F6 on unflushed peat in northern Skye, limited by low nutrient availability and high risk of windthrow to the less demanding conifers such as Sitka spruce and lodgepole pine. Class F7 on the distant hills. (Photo: MLURI)*



elevations in fairly warm and sheltered glens - Glen Etive and west of Loch Eil, for instance - growth of species tolerant of waterlogging is satisfactory.

Class F5 also includes land on which the limiting factor is adverse topography rather than nutrient deficiency. Irregular rugged terrain with outcropping rock predominates. It has mainly relatively fertile brown forest soils and humus-iron podzols, though some of these are shallow and stony. Ploughing and harvesting is difficult, but species choice is comparatively broad for Class 5 because of the drier soils. The largest tracts are found near Loch Carron and on the islands of Seil, Shuna and Luing south of Oban. In addition, land with similar ground conditions but generally steeper slopes is present near Fort Augustus and on the valley sides of many east-flowing rivers (*e.g.* in Glen Affric and Glen Cannich). Soils are chiefly humus-iron podzols, but locally peaty podzols will require nutrient supplementation.

The capability of land with cultivated gley soils in exposed localities such as at Staffin in northern Skye is limited by high windthrow risk and poor climate.

**Class F6. *Land with very limited flexibility for the growth and management of crops***

Area: 5476 sq km

Class F6 land is more extensive than the combined area of the other plantable classes. It is of widespread occurrence, particularly in Skye and many of the valleys and foothills of the Northern Highlands and Grampian Mountains, and a wide range of limitation types is represented. The soils are mainly peaty gleys, peaty podzols and peat (>50 cm deep), and as they are mostly unflushed, nutrient deficiencies are more acute than on similar land in Class F5. Action to prevent heather check to spruce is desirable in many areas. Drainage is normally required, and, in places, iron pans or indurated layers may need to be shattered.

On peaty land the predominant restriction is low nutrient levels, and to obtain acceptable yields from the limited number of plantable species fertiliser applications are essential. Land with no rock outcrops

encompasses three variants. The first consists of peat on terraces, such as those north of Oban (Achnacree Moss), at Fort William (Corpach Moss) and Acharacle (Claish Moss). The second variant, undulating hillslopes, occurs near Kinlochewe, around Loch Glascarnoch and in the mid-reaches of many east-trending valleys. The least extensive third variant comprises moundy morainic land such as that of upper Glen Moriston and Glen Garry.

Many of the steep rock slopes with peaty gleys and peaty rankers which fringe unplantable hill ground are limited by adverse climate and topography as well as lack of nutrients. Similarly affected are the slopes with peaty podzols north of Glen Moriston and east of Loch Lomond.

Towards the west and with increasing altitude, the forestry capability is influenced by very severe climatic conditions and the associated high windthrow risk. The soils are peaty, topography is varied and nutrients are in short supply. Many cool northerly and exposed westerly localities, such as those in Applecross, Wester Ross, Skye and Mull, and the relatively sheltered eastern lowlands and mountain valleys of the Outer Isles, are included in this land type. Other land at higher elevations, for example on the windswept hillslopes of Morvern, broad ridge crests near Cannich and the intermontane plateau of Rannoch Moor are similar, in most respects.

In moraine fields, rough ground conditions exert a major influence on forestry capability, though poor nutrient supply and adverse climate are also limiting. The main obstacles to mechanised operations are large surface boulders, steep slopes with incised gullies, and on more level valley floors, hagged peat. The deep U-shaped valleys and lower corries of Ardgour, the Arrochar Hills and Affric Forest have this type of land.

Though of restricted occurrence, some land with mineral soils is present in Class F6. In most instances the principal limitation is topographic, as the steep rugged slopes with rock outcrops hinder mechanised operations and soils are locally stony and shallow. However, nutrient shortages are unlikely on the brown forest soils, humus-iron podzols and flushed gleys. The steep slopes which border the fjord-like lochs of the south-west Grampians, Loch Eck and Loch Lomond, are the best examples of this land type. Since this terrain benefits from the high

degree of topographic shelter provided by the surrounding mountains and occupies mainly lower slopes, species choice is much wider than for the extensive peaty areas in Class F6. The favourable soil and topographic conditions of some land types are counterbalanced by severe exposure and windthrow risk. The farmed lowlands with poorly drained gleys on clayey tills in northern Skye and near Stornoway, and also the cultivated raised beach terraces of Colonsay, Iona, and near Opinan, Wester Ross, provide good examples of these types.

A contrasting land type confined to the Inner Hebrides and neighbouring coasts consists of small areas of dunes. These deposits are of stabilised windblown sand and examples are found on Colonsay, at Calgary (Mull) and Arisaig. The soils are coarse textured and excessively drained, and are therefore subject to drought in spite of high annual rainfall. They are also low in nutrients. The risks of erosion and windthrow are high and very few species can be successfully grown.

*Class F7. Land unsuitable for producing tree crops*

Area: 9817 sq km

Unplantable ground comprises land where the main limitations are very severe climate, very rugged topography, precipitous rocky slopes or extreme wetness. It occupies an area equivalent to the total of the other six classes. Planting limits extend to 500 m or so in the east, but decrease with westerly exposure until wind velocities at sea level are sufficient to preclude afforestation.

As the effects of the severe climate extend to low elevations, virtually all soil types are present on land of the class. Vast tracts of peaty land of varying rockiness and morphology are predominant in Lewis and Wester Ross. Smaller areas of cultivated land have podzols developed on sand and gravel raised beaches, raw soils on stabilised aeolian sands and gleys on clayey tills. Thus many croftlands of the Inner and Outer Hebrides and adjacent coasts are unable to sustain tree crops.

Most of the unplantable land is in the higher hills and mountains which are confined to the class by the harsh climate and adverse topography. The terrain comprises cliffs, screes, very steep slopes, hagged

peat and very bouldery deposits of moraine. These features are common throughout the Western and Northern Highlands and the Grampian Mountains, the best examples being in Torridon and in the Cuillin Hills of Skye. Between patches of rocky ground the soils are alpine and subalpine soils, and some peat. At lower altitudes, but generally subject to the same limitations, are glacially-scoured lowlands and plateaux. These 'knock and lochan' landscapes with extensive bare rock are typical of the Lewisian gneisses of the Outer Hebrides, and of the area between Loch Torridon and Loch Maree; similar terrain occurs on the Moine schists in Ardnamurchan and Moidart. The thin sparse soil cover is usually peaty.

Coastal salt marshes comprising saline gley soils and subject to inundation by spring tides will not support tree growth because of the wet and saline soil conditions. The topography is flat but dissected by many channels and pools. 'Saltings' are rarely large enough to delineate on the map but they commonly occur at the heads of sea-lochs. The main areas lie at the heads of Loch Duich and Loch Crinan.

The windswept eroding and active dunes of Coll, Tiree and the Atlantic coasts of the Outer Hebrides are unstable and liable to salt-spray and drought, and are thus unsuitable for forestry.

Peatland lying below the planting limit is of two types. Firstly, hagged and severely eroded peat has uneven gullied topography which precludes mechanised operations. This feature is well developed on exposed ridge crests and plateaux, particularly those east of Loch Lomond and north-west of Inverary. Secondly, very wet 'dubh lochan' peat where the bog surface is pitted by numerous small pools. This is found on parts of Claish Moss near Acharacle, west of Loch Morar, and locally amongst the extensive peat deposits of Lewis.

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LAND CAPABILITY FOR FORESTRY

## 4. Areas of land capability for forestry classes in Scotland by district and region (sq km)

	F1	F2	F3	F4	F5	F6	F7	built -up	total land	water
Shetland Islands	0	0	0	0	0	76	1352	5	1433	37
Orkney Islands	0	0	0	0	0	101	868	7	976	34
Western Isles	0	0	0	0	0	451	2444	3	2898	189
ISLANDS	0	0	0	0	0	628	4664	15	5307	260
Caithness	0	0	0	3	215	1303	247	8	1776	30
Sutherland	0	0	79	149	219	2923	2491	4	5865	212
Ross & Cromarty	34	242	250	206	298	1208	2724	14	4976	197
Skye & Lochalsh	0	7	7	96	426	1026	1127	2	2691	39
Lochaber	4	31	23	155	980	1110	2149	16	4468	180
Inverness	21	94	138	126	474	727	1194	15	2789	122
Badenoch & Strathspey	0	0	6	150	383	647	1131	0	2317	49
Nairn	11	28	88	60	73	120	38	4	422	3
HIGHLAND	70	402	591	945	3068	9064	11101	63	25304	832
Moray	24	123	337	365	491	519	336	36	2231	13
Banff & Buchan	0	0	12	817	572	105	8	14	1528	5
Gordon	0	0	48	1087	609	318	148	4	2214	7
City of Aberdeen	0	0	15	81	20	4	0	64	184	2
Kincardine & Deeside	3	24	168	606	435	469	840	5	2550	17
GRAMPIAN	27	147	580	2956	2127	1415	1332	123	8707	44
Angus	38	184	657	174	229	321	403	25	2031	14
City of Dundee	0	22	112	34	12	6	0	49	235	1
Perth & Kinross	264	480	685	591	622	1120	1447	27	5236	126
TAYSIDE	302	686	1454	799	863	1447	1850	101	7502	141
Kirkcaldy	0	101	79	21	1	0	0	46	248	3
North East Fife	21	212	329	129	38	17	1	11	758	3
Dunfermline	2	138	73	44	2	8	0	35	302	5
FIFE	23	451	481	194	41	25	1	92	1308	11
West Lothian	0	71	83	114	70	19	1	65	423	5
City of Edinburgh	0	80	21	19	17	8	1	115	261	3
Midlothian	7	18	81	74	81	57	11	29	358	3
East Lothian	29	258	125	96	105	67	7	27	714	3
LOTHIAN	36	427	310	303	273	151	20	236	1756	14

WESTERN SCOTLAND

	F1	F2	F3	F4	F5	F6	F7	built -up	total land	water
Tweeddale	0	6	16	118	278	348	128	5	899	5
Ettrick & Lauderdale	0	42	171	212	322	469	128	11	1355	11
Roxburgh	60	116	236	286	445	345	41	11	1540	8
Berwickshire	129	190	208	155	141	49	3	1	876	4
BORDERS	189	354	631	771	1186	1211	300	28	4670	28
Clackmannan	17	37	12	31	4	27	25	7	160	1
Stirling	13	273	192	363	315	535	464	21	2176	69
Falkirk	2	93	27	95	14	1	0	59	291	3
CENTRAL	32	403	231	489	333	563	489	87	2627	73
Argyll & Bute	2	97	204	733	2137	1989	1306	30	6498	116
Dumbarton	4	60	42	47	145	80	57	37	472	54
City of Glasgow	3	23	2	5	0	0	0	165	198	3
Clydebank	0	0	2	3	10	4	0	16	35	1
Bearsden & Milngavie	0	1	5	7	2	0	0	21	36	1
Strathkelvin	0	73	12	21	6	8	21	23	164	2
Cumbernauld & Kilsyth	0	18	14	32	11	10	5	13	103	2
Monklands	0	22	8	81	25	0	0	28	164	4
Motherwell	2	17	19	49	25	0	0	60	172	3
Hamilton	8	14	39	26	2	0	0	42	131	2
East Kilbride	0	14	30	111	21	85	0	24	285	1
Eastwood	0	14	18	23	26	18	0	16	115	3
Renfrew	0	58	43	67	26	16	9	89	308	6
Inverclyde	0	14	16	35	33	22	8	30	158	4
Clydesdale	4	21	124	265	420	403	66	19	1322	10
Cunninghame	0	27	114	202	192	116	163	64	878	7
Kilmarnock & Loudoun	4	45	96	115	24	66	0	23	373	2
Cumnock & Doon Valley	1	19	86	224	116	311	25	18	800	5
Kyle & Carrick	10	128	183	243	378	288	39	48	1317	21
STRATHCLYDE	38	665	1057	2289	3599	3416	1699	766	13529	245
Wigtown	0	89	227	403	712	219	52	11	1713	17
Stewartry	3	84	199	419	617	283	61	5	1671	20
Nithsdale	12	210	181	311	320	326	52	21	1433	9
Annandale & Eskdale	15	151	265	338	397	313	57	17	1553	9
DUMFRIES & GALLOWAY	30	534	872	1471	2046	1141	222	54	6370	55
SCOTLAND	747	4069	6207	10217	13536	19061	21678	1565	77080	1703



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