

A Functional Wetland Typology for Scotland

Field Survey Manual



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1. Introduction

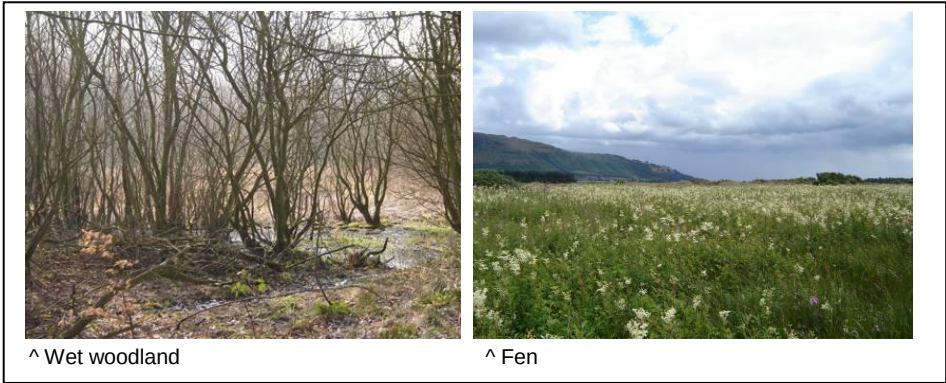
The purpose of this manual is to provide information about different types of wetlands, and how to identify them in the field. The manual describes a wetland ‘typology’, which covers all the types of wetland found in Scotland.

The typology is designed to enable a basic identification of wetlands in the field, by people who may not necessarily have ecological, hydrological or hydrogeological expertise. The divisions between “types” are therefore based on easily recognisable (visual) characteristics, including the landscape setting, hydrological features and vegetation found in the wetland. The typology is designed to be applied in the field, with no prior knowledge of the site required.

Where a wetland is identified in the field (guidance on identifying a wetland is provided below), field identification of the wetland type should be carried out using the wetland survey form, by the methodology described in this manual. Using the survey form in the field will help to ensure that all necessary information about the wetland is retained for future use.

2. What is a wetland?

A wetland is an area of land whose soil is saturated with moisture either permanently or seasonally. “Wetlands” can occur in a wide variety of settings and can contain many different types of vegetation that look quite different from one another. For example, coastal saltmarsh, wet “dune slacks” in sand dunes, reedbeds by rivers or lochs, small groundwater seepages on cliffs or slopes, and extensive upland peat bogs are all included within the definition of a wetland. Some examples are shown below.



^ Wet woodland

^ Fen



^ Transitional wetland – fen (left foreground), reedbed (centre), wet woodland (top)



^ Saltmarsh

In order to identify whether or not you are looking at a wetland, consider:

- Is it permanently open water? If so, this is not usually included in the definition of a wetland. However if there are areas of permanently or normally wet ground around the edge of a loch or adjacent to a stream, those areas are wetlands;
- Does standing water frequently occur, due to flooding from areas of open water or due to rainfall not being able to drain away? If so, the area could be a wetland;
- If there is no standing water, is the ground generally very wet? Does it feel squishy when you stand on it, or does water seep out around your boots? If this is a common occurrence, the area could be called a wetland;
- Is the soil type peat? Peat is a dark 'spongy' soil with high organic matter content, i.e. lots of plant material that has not completely broken down. This is found where there is a shallow water table, which is characteristic of a wetland. Wetlands can also be found on other soil types, but peat is the most likely to indicate the presence of a wetland.

It is best to avoid trying to identify wetlands immediately following heavy rain, because it may be difficult to distinguish the temporary effects of the rainfall from permanently wet areas.

Besides the wetness of the site and the soil type, the vegetation helps to define whether or not an area is a wetland. Wetlands have permanent vegetation that is not "submerged". Cultivated areas i.e. with crops, will not usually be included. Spatial changes in vegetation will help to define the extent of the wetland.

If you think an area might contain a wetland because it fits the descriptions above, record it and a more detailed judgement can be made later on. Applying the wetland typology will also help you to determine whether an area actually is a wetland: if none of the wetland type descriptions "fit" the area you are looking at, and you are not sure whether the points above apply, then it is likely not to be a wetland.

3. Overview of the Wetland Typology

The wetland typology is based on two characteristics:

- **Landscape setting**

The landscape setting describes the location of the wetland within the landscape and its proximity to surface waters (such as rivers, lochs or the sea). The range of landscape settings in which wetlands may be found are described in detail in Section 4.

- **Habitat Type**

The habitat type is identified by the kinds of vegetation and soil type that are present at the wetland. The vegetation and soil indicators are described in Section 5 and the habitat types are described in Section 6. In some cases the landscape setting will also help to define the wetland habitats, as some types are known to occur only in certain locations.

The landscape and the habitat can be combined to give an overall description of the wetland type. In some cases all that may be needed is the habitat type. However the landscape component is important particularly where it describes the location of a wetland in relation to surface water such as the coast, a river or a loch. The wetland type can then be described as:

(Landscape) Habitat e.g. (floodplain) fen or (montane) wet heath

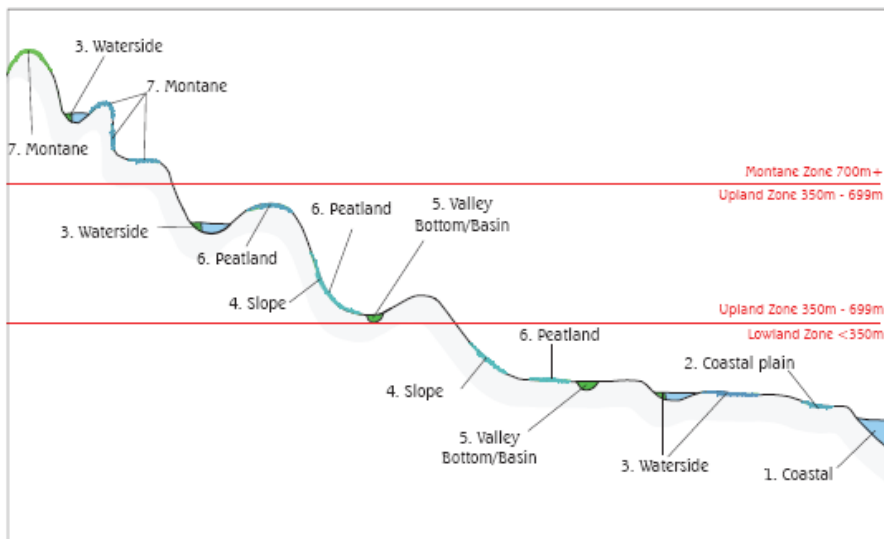
For example, the photo below shows swamp and wet woodland in a loch-side setting. The wetland types can therefore be described as (loch-side) swamp and (loch-side) wet woodland.



4. Landscape settings

This section describes the landscape settings you should look for in and around the wetland to help identify its type. The sketch below should provide you with an indication of the general landscape setting, and the table on pages 6 and 7 can be referred to for more detail. Information is also provided of the wetland habitats that are likely to be found in each landscape setting.

Likely setting of wetlands in the landscape



^ Examples of landscape settings. Left photo: flush on slope. Right photo: marshy grassland, fen, swamp and wet woodland in floodplain setting.

Landscape setting		Description	Habitat types likely to be found in this setting ¹
1	Coastal		
1a	Sand dunes	Sand dunes, and shallow slopes of sand grading in to flat inland plains.	10 dune slacks, 11 machair
1b	Inter-tidal or near-tidal	Coastal areas either within the tidal zone or on raised areas of mud interspersed within and on the landward edge of the tidal zone.	9 saltmarsh
2	Coastal plain	Flat, low-lying areas inland from the coast, beyond the range of coastal processes. These may extend for a significant distance inland but are at or close to sea level.	1b other wet woodland, 2a marshy grassland, 3 springs, flushes, seepages, 4 fen, 5 swamp, 6 reedbed, 7 wet heath, 8a peat bog, 11 machair
3	Waterside		
3a	Floodplain	The floodplain of a river, which can include flat areas some distance from the river but that floods at least occasionally during periods of high river flow. These are likely to be found in lowlands, in valleys or flat areas. (right photo on page 5 shows floodplain setting with marshy grassland, fen, swamp, and wet woodland)	1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp, 6 reedbed, 8b quaking bog
3b	Isolated floodplain	An area that used to form the floodplain of the river but is now prevented from flooding by the presence of flood defences. These are likely to be found in lowlands, in valleys or flat areas.	1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp, 6 reedbed, 8b quaking bog
3c	Stream-side	This term is used to describe wetlands located in the proximity of a river or stream but not on a floodplain. For example, wetlands on cliffs or slopes adjacent to mountain streams. These may be found in upland or lowland settings, in valleys or on hill- or mountain-sides.	1b other wet woodland, 2a marshy grassland, 7 wet heath

Landscape setting		Description	Habitat types likely to be found in this setting¹
3d	Loch-side	Located on the edge of a loch (photo on page 4 shows loch-side setting with swamp and wet woodland)	1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp, 6 reedbed, 7 wet heath, 8b quaking bog
4	Slope	A continually wet area on a slope or at the base of a slope. Springs may be clearly visible or there may be a more widespread area of wetness. These can be found in upland or lowland settings, although upland cliffs or rocky slopes/boulder/scree fields should be classed as montane. (left photo on page 5 shows a flush wetland on a slope)	3 Springs, flushes and seepages Other habitats may also occur on shallow slopes, e.g. 8a peat bog.
5	Valley bottom/basin	This may include hollows, valley heads or areas below the base of a hillslope, where water collects due to the low topography. This can include the headwaters of a stream, where the stream first emerges. These may be found in upland or lowland settings.	1a bog woodland, 1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp, 6 reedbed, 7 wet heath, 8a peat bog, 8b quaking bog
6	Peatland	Widespread peatland forms a distinctive landscape, often with peat hags and areas of bare soil between the peat hags. This is often difficult terrain to cross. Peatlands are found in lowland and upland settings on relatively flat land or shallow slopes. They can cover extensive areas.	8a peat bog, 8b quaking bog. Can also contain other types e.g. 3 seepages, flushes and springs.
7	Montane		
7a	Cliff ledges and boulder/scree fields	Cliff ledges, boulder or scree fields where seepages maintain wet areas and vegetation growth.	3a montane flushes
7b	Other montane	Continually wet areas in high mountain environments, on ridges, plateaux or summits.	2b montane grassland Peatlands may also extend in to mountain environments.

Table Note: ¹See Section 6 for descriptions of habitat types and reference codes

5. Field Indicators

This section describes the soil and vegetation indicators you should look for in and around the wetland to help identify its type. Descriptions and photos are provided of those indicators that may be difficult to identify. Hydrological indicators are not included, but any hydrological features (e.g. rivers, the sea, lochs) should also be recorded on the survey form (see Section 8).

To identify the soil type, it is not necessarily required to dig in to the ground. Look for signs of the soil type on the surface, for example on river banks, mole hills or areas of bare ground.

Soil indicators

Peat

A dark 'spongy' soil with high organic matter content, i.e. lots of plant material that has not completely broken down. Found where there is a shallow water table.

Likely to be found in: 1a bog woodland, 1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp, 6 reedbed, 7 wet heath, 8a peat bog, 8b quaking bog.



Peat hags and peat gullies

Broken hummocks of deep peat, may be up to 1-3m deep (*left photo*). Peat bog vegetation found on the top of the hags, often with bare soil in the depressions between hags. Flowing water through peat gullies (*right photo*).

Likely to be found in: 8a peat bog.



Tufa

Solidified deposits of calcium carbonate from groundwater discharging at the surface. White to cream gritty deposits covering stones and plants.

Likely to be found in: 3b tufa-forming springs.



Mineral soil

Soil with relatively little organic matter. Composed of granular (silt or sand) or clay material.

Likely to be found in: 1b other wet woodland, 2a marshy grassland, 2b montane grassland, 3 seepages, flushes and springs, 4 fen, 5 swamp, 6 reedbed.

Sand dunes

Blown sand deposits on the coast. *Likely to be found in:* 10 dune slacks, 11 machair.

Machair sands

Sand composed predominantly of shell fragments. *Likely to be found in:* 11 machair.

Bare rock

Exposed rock (outcrops/cliff ledges), and stone on slopes and boulder/scree fields.

Likely to be found in: 2b montane grassland, 3 seepages, flushes and springs.

Vegetation indicators



Willow (many species)

Deciduous tree/shrubs up to 20m, usually less. All with one type of catkin (a cylinder-like pod – the 'flowers') which are erect (not drooping down) (Mar/Apr). Leaves usually long and linear, always longer than wide, green or grey-green. Crusty bark on mature trees.

Likely to be found in: 1b other wet woodland, 3a montane flushes.



Birch (two main tree species; one shrub-like species)

Two main species are deciduous trees up to 20m. Branches angling upwards. Two different types of catkins (Apr/May) one of which droops down. Leaves green, diamond or triangular-shaped, broad, coming to a point at the tip and jagged at the leaf edges. Outer bark of mature trees is whitish, papery. Third species (dwarf birch) is shrub-like to 30cm tall, similar to willow but with broad, jagged leaves.

Likely to be found in: 1b other wet woodland, 3a montane flushes, 3d seepages/flushes, 8a peat bog.



Scots Pine (one species)

A coniferous tree that can reach up to 40m tall but is normally scrubby on bog. Bark is crusty and reddish particularly towards the top of the tree. Mature trees have a canopy that spreads sideways; young trees are conical (cone) shaped. Pine needles are dark green or bluish-green but usually distinctly twisted.

Likely to be found in: 1a bog woodland.



Alder (one species)

Deciduous trees up to around 20m or less. Two different types of catkins— one is small and rounded (Mar/Apr). Small dark cones (fruit) present all year round. Leaves green, broad, and rounded (no pointed tip). Outer bark of mature trees is very dark and crusty. Tree canopy has a purple 'hue' from a distance.

Likely to be found in: 1b other wet woodland.



Rushes (many species)

Distinguished from grasses by generally cylindrical (in cross section) stems which may or may not be hollow. Hairless stems. Leaves (when present) are always narrow (needle-like). Most commonly encountered plants usually a glossy green. Plant usually at knee height or below. Flowers (Apr to Jul) usually occur in a spreading arrangement and flower heads are small, green-brown or yellowish.

Likely to be found in: 2a marshy grassland, 3d seepages/flushes, 4 fen.



Small sedges (many species)

Distinguished from grasses by the presence of a solid (not entirely hollow) V-shaped (or triangular) stem. Plants stunted and usually below knee height, often at ankle height. Plant variable in colour – dark green, bluish green, bright green. Flowers (May to Jul) usually occur as compact clusters usually spikelets (catkin-like) closely attached to the stem. Leaves are usually grass-like (i.e. not needle-like). Small sedges are not robust and do not form tussocks.

Likely to be found in: 2b montane grassland, 3a montane flushes, 3d seepages/flushes, 4 fen, 7 wet heath, 8a peat bog, 8b quaking bog.



Broad-leaved sedges (several species)

V-shaped (or triangular) stem and more robust than small sedges with distinctly long and broad leaves. Some plants may be up to around a metre tall and the leaves may be several centimetres in width.

Likely to be found in: 1b other wet woodland, 3a montane flushes; 3d seepages/flushes, 4 fen, 5 swamp, 8b quaking bog, 10 dune slacks, 11 machair.



Tussock sedges (several species)

V-shaped (or triangular) stem and more robust than small sedge with a tightly clustered, hard, compact 'hump' at the base (a tussock – consisting of a raised area which may be dark brown in colour). Tussocks can be up to 1m tall.

Likely to be found in: 4 fen, 5 swamp.



Reeds

Tall, robust, coarse grass, with a hard cane-like structure persisting through the winter. Can be up to 4m tall and often forming extensive reedbeds. Leaves greyish green, smooth edges and may be up to 5cm across. Plant may be stunted where recent cutting has occurred. Distinguished from the larger sedges as it does not have a V-shaped stem. Distinguished from rushes as has large leaves. Flowering heads (Aug to Oct) are a dark purple.

Likely to be found in: 1b other wet woodland, 5 swamp, 6 reedbed.





Heather (several species)

Stunted shrubs usually knee height or below with small, leathery, narrow dark green/bluish green leaves arranged in a circular pattern around dark woody stems. Leaves stay all year round. Flowers (Jun to Oct) are typically small, purple/pink bell shaped occurring in clusters.

Likely to be found in: 1a bog woodland, 7 wet heath, 8a peat bog, 10 dune slacks.

Carpet-forming mosses (many species)

Very variable group of plants, many different colours including red, green, mustardy-yellow, dark brown. All are small, soft plants growing together in compact clumps and often form extensive 'carpets' in fens and bogs. Plants do not have proper roots. Leaves are small, simple and not segmented. Mosses do not 'flower' but produce a pod-like capsule on a thin wiry stem.

Likely to be found in: 2b montane grassland, 3 springs, flushes and seepages, 4 fen



Bog mosses (Sphagnum)

The bog-mosses (**Sphagnum** species) have a feathery appearance with a rounded head and there are 'branches' of leaves occurring along a long thin stem.

Likely to be found in: 1a bog woodland, 2b montane grassland, 3 springs, flushes and seepages, 4 fen, 8a peat bog, 8b quaking bog.



Cottongrass (several species)

Flowers are spike like and yellowy (Apr/May) whilst the distinctive white cottony 'fruiting' heads occur May to Jul. When viewed from a distance one species has a reddish tinge.

Likely to be found in: 8a peat bog, 8b quaking bog.



Flowering plants

Meadowsweet

Tall herb (up to 1m or more) with small white flowers from June to October.

Likely to be found in: 4 fen.



Marsh Orchid

Small plant (up to 25cm tall) with purple flowers in June and July.

Likely to be found in: 4 fen, 10 dune slacks.



Marsh Marigold

Marginal aquatic plant with large, scalloped, heart-shaped leaves. Yellow flowers in March to June.

Likely to be found in: 4 fen.



Other vegetation encountered may include;

Sundew

Insect-eating plants with usually round leaves secreting a sticky fluid.

Likely to be found in: 8a peat bog.



Marsh Pennywort

Creeping plant with small round leaves.

Likely to be found in: 4 fen, 1b other wet woodland.



Bogbean

Broad trefoil leaves. Flowers (May/July) white inside and pink outside.

Likely to be found in: 4 fen, 8a peat bog.



Bog Myrtle

Woody shrub (up to 1.5m) with grey-green leaves from May to October.

Likely to be found in: 8a peat bog.



Cranberry

Small creeping plant with tiny oblong leaves. Flowers in summer and produces fruit (bright red) in September.

Likely to be found in: 8a peat bog.



Water Horsetail (dark green) and Mares Tail

Tall (up to 50cm) vertical plants with or without branches.

Likely to be found in: 1b other wet woodland, 2a marshy grassland, 4 fen, 5 swamp.



6. The Wetland Habitat Typology

This section describes the wetland habitats found in Scotland, separated in to simple identifiable “types”. Brief descriptions of each type are provided, along with the useful indicators to look out for to help identify them. Extra descriptions have been provided to help distinguish between types that may appear similar.

1 Wet woodland

1a Bog woodland

Widely spaced, scattered Scots Pine trees on peat bog, often with stunted growth (*bottom left photo*). See Type 8a for more detail of other characteristics of peat bog.

This type of woodland contains only Scots Pine trees. If other trees (e.g. birch or willow) are present, the habitat type is most likely to be 1b. However birch may also be found on peat bog, in which case the type should be classified as 8a.

Vegetation indicators: Scots Pine, Sphagnum mosses (*bottom left and middle photos below*) and other plant species found on peat bog.

Soil indicator: peat.



1b Other wet woodland

Wet woodland varying from tall to scrubby. Likely to include willow and alder trees, sometimes with birch. Often found close to rivers, streams or lochs, but can also be found away from surface water in basins/depressions. May also be found in seepage/flush situations (Type 3d).

Vegetation indicators: Trees, including willow, alder and sometimes birch. Reeds and sedges grow beneath the trees.

Soil indicator: peat or mineral soil.



2 Wet grassland

2a Marshy grassland

Wet or marshy area consisting mostly of tussock forming grasses. Marshy grassland is sometimes confused with fen and swamp, but can be distinguished from both by the predominance of grasses and rushes. In addition, marshy grassland will not be found in permanently or frequently standing water (which swamp often is).

Vegetation indicators: vegetation up to around knee height, including tussock forming grasses (not tussock sedges) and rushes.

Soil indicator: peat or mineral soil.



2b Montane grassland

Wet areas of very short and dense vegetation, including grasses, carpets of moss, and often small flowering plants. Found in mountain environments.

Vegetation indicators: very short vegetation below ankle height. Small grasses and sedges with carpets of moss and small flowering plants.

Landscape indicators: montane environments.



3 Springs, flushes and seepages

3a Montane flushes

Water seeping/dripping down on a rocky cliff ledge. Tall flowering plants and/or short scrubby willow trees found in continually wet areas in rocky mountainous environments. Rare. Not easily accessible.

Vegetation indicators: short scrubby willow trees (sometimes dwarf birch), mosses and tall flowering plants up to waist height over montane grassland vegetation (as described above).

Soil indicator: bare rock (rocky cliff ledge).

Landscape indicators: montane environments.



3b Tufa-forming springs

Visible spring, with shallow flowing water and tufa deposits. May be found within fen.

Vegetation indicators: carpet of moss, aquatic (submerged) plant species.

Soil indicators: tufa, bare rock, mineral soil.



3c Other springs

Visible spring, with shallow flowing water over bare rock or mineral soil. May be found within fen.

Vegetation indicators: carpet of moss, aquatic (submerged) plant species.

Soil indicators: bare rock, mineral soil.



3d Seepages/ flushes

Variable vegetation associated with a diffuse spring on a hillslope. Groundwater cannot clearly be seen emerging, but the ground is consistently wet.

Vegetation indicators: variable vegetation which may include rushes, sedges, mosses, some grasses and some willow and birch trees. Change from 'drier' to "wet" vegetation (may be transition from dull to brighter green vegetation). Left photo shows seepage/flush vegetation downslope (on right of red dashed line).

Soil indicators: bare rock, mineral soil.

Hydrological indicator: permanently wet area on a slope.



4 Fen

“Tall herb” vegetation, including flowering plants, reeds, sedges and rushes. Some plants may approach shoulder height with the majority up to waist height. Found mainly on flat or gently sloping topography, or in a valley bottom/basin setting, and may contain springs (including tufa-forming springs). Fen is sometimes confused with marshy grassland and swamp. It can be distinguished from marshy grassland by the predominance of sedge and other “tall herb” species, reaching up to head height, as opposed to the knee-height grasses generally found in marshy grassland. Fen is generally more species-rich than swamp, and swamp is found in wetter situations where there is often standing water.

Vegetation indicators: tall (up to head height) flowering plants (e.g. meadowsweet (*bottom right photo*), yellow flag iris, marsh orchid (*bottom middle photo*)) or lower-growing (knee-height) rush and sedge.

Soil indicators: peat or mineral soil.



5 Swamp

Tall sedges and grasses, with generally little variation in the vegetation type, growing in shallow standing water or very wet ground. Swamp can sometimes be confused with other wetland types including marshy grassland, fen and reedbed. It can be distinguished from marshy grassland and fen by being found on usually very wet ground, often with standing water. Reedbed is also often found in standing water, but differs in being predominantly composed of reeds, while swamp may contain a variety of other species.

Vegetation indicators: vegetation (usually broad-leaved sedges, tussock sedges, tall grasses and some reeds) between knee and head height; generally little variation in vegetation.

Soil indicators: peat or mineral soil/mud.

Landscape indicators: water-side, valley bottom/basin.

Hydrological indicators: shallow standing water or very wet ground.



6 Reedbed

A dense stand of tall reeds, generally growing in shallow standing water. Reedbed is similar to swamp, but is distinguished by the predominance of tall reed.

Vegetation indicators: head-height reeds and little variation in vegetation.

Soil indicators: peat or mineral soil/mud.

Hydrological indicators: shallow standing water.

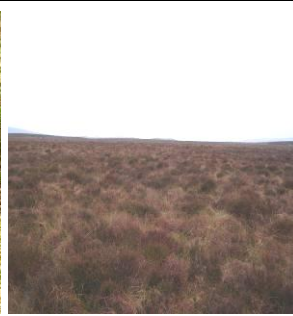


7 Wet heath

Vegetation dominated by heather, on either shallow peat (with a solid, continuous surface) or sandy mineral soil. Heath is not necessarily “wet”: wet heath can be distinguished by the presence of bog mosses and small sedges and grasses. When found on peat, wet heath may be confused with peat bog. In wet heath, heather dominates, whereas in peat bog the heather is likely to be found with a variety of other species including cottongrass and Sphagnum mosses. If the peat is thick (>0.5 m) and exposed in peat “hags”, the habitat type is more likely to be peat bog.

Vegetation indicators: knee-height (or lower) heather with mosses, small sedges and grasses.

Soil indicators: peat (generally <0.5m thick) or sandy mineral soil.



8 Peat bog

8a Peat bog

Areas of wet peat (thickness >0.5m) with heather, cottongrass and bog mosses growing. Peat may form a continuous surface or may be hummocky and broken up in to peat hags, with lower lying areas of bare soil in between. Peat bog can be confused with wet heath, but in addition to the heather found on wet heath, peat bog contains a variety of species including cottongrass, bog mosses, cranberry (*middle right photo*) and sundew (*bottom right photo*). The "lagg", which is the area of wetland vegetation around the edge of some peat bogs, may include areas of swamp, fen or wet woodland.

Where birch woodland is found on peat bog, it should be classed in this type (type 8a) rather than as bog woodland (type 1a).

Vegetation indicators: heather, cottongrass, bog mosses, small sedges. Lower than knee-height.

Soil indicators: peat, peat hags, bare soil between peat hags, peat gullies.



8b Quaking bog

Short (generally less than knee-height) vegetation growing on a peat or moss raft, floating over watery mud. The peat raft can be distinguished from solid ground by an unstable or bouncy feeling when walking across it. In some situations it can be difficult to distinguish “quaking” bogs from other types of bog. The clearest identifying factor is, as the name suggests, that the ground “quakes”, i.e. feels unstable. This feeling can generally be distinguished from springy heather. Peat hags and/or peat gullies will not be found in quaking bogs.

Vegetation indicators: short (less than knee-height) broadleaved sedges, cottongrass, bog mosses.

Soil and hydrological indicators: peat. Bouncy “quaking” feeling. Peat raft may break up to expose pools of water.

Landscape indicators: may be found around the edge of a lake or slow-flowing river, or in a valley bottom/basin.



9 Saltmarsh

Short vegetation growing on mud or sand in the inter-tidal or near-tidal zones.

Vegetation indicators: vegetation below knee height and often much lower (stunted growth).

Soil indicators: mud or sand.



Sea aster (*Aster tripolium*)



Glasswort (*Salicornia* sp.)

10 Dune slacks

Wet low-lying vegetated areas within sand dunes, which may contain permanent or seasonal ponds. Vegetation may be similar to fen, marshy grassland, or wet heath, but is distinguished by being located in sand dunes.

Vegetation indicators: variable vegetation that can include heather, willow scrub, small sedges, mosses, and marsh orchid (*middle right photo*).

Soil indicators: sand *Landscape indicators:* coastal setting with sand dunes.



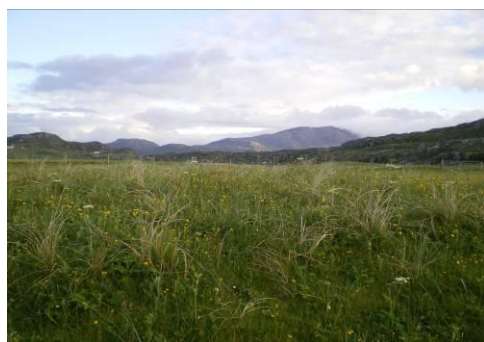
11 Machair

Coastal wet grassland, with impressive flowering in spring, found on the west coast and western isles of Scotland. Grows on shelly sand, normally inland of sand dunes. May appear similar to marshy grassland or fen but is distinguished by the predominance and variety of flowering plants.

Vegetation indicators: grasses, small sedges, flowering plants. Normally up to knee height. Many different species.

Soil indicator: machair sand (sand composed predominately of shell fragments), peaty soil

Landscape indicator: coastal settings, inland from or on the edge of sand dunes



7. Identifying Existing Pressures

The table below includes a variety of indicators that may suggest existing human influences on a wetland. These activities will not necessarily have a negative effect on the wetland but will provide additional information about management and external influences.

Existing activity or pressure	Indicator	Possible effect on wetland
Impoundment	Includes structures such as sluices, weirs and dams. Can be in the wetland or on a nearby river or loch.	Alteration of water levels; alteration of hydrological regime.
Flood defences	Includes structures such as flood walls and embankments. Can be on a river, loch or coastal area.	Alteration of water levels; alteration or prevention of natural flooding regime.
Drainage	Includes presence of artificial drainage channels/ditches or alteration of natural watercourses (e.g. to be made straighter/ deeper/ wider) to be more efficient at conveying water.	Alteration or lowering of water levels.
Nutrient enrichment	Can occur from a number of different pressures including discharges/ high livestock densities. In the wetland indicators include the presence of livestock dung, cowpats, nettles or willowherb. In nearby rivers or lochs, indicators include murky water, abundant algal growth and a green tinge to water.	Change to vegetation species composition; certain species become more dominant.
Over- grazing	Over-grazing from high livestock densities. Indicators include presence of livestock/ little or no tall vegetation/ patchy vegetation at various heights/ evidence of vegetation chewed off at the top.	Over-grazing can lead to loss of plant species. However grazing can be beneficial at the correct livestock density.
Poaching of ground	Erosion of the ground from heavy livestock/ human use. Indicators include presence of bare soil or evidence of livestock/people/vehicles.	Loss of vegetation.

Cutting of vegetation	Vegetation cut for various reasons, e.g. reeds for thatch roofing, amenity reasons or to encourage plant diversity. Indicators include vegetation at uniform height, storage/ piles of cut vegetation.	Can lead to loss of plant species. Can be beneficial at the right level.
Lack of management	Vegetation may be tall (above head height) and dense with few species, and with a significant build up of old vegetation on the ground surface ('litter'). However some wetlands such as reedbeds and wet woodland are naturally like this.	Can lead to loss of species – lower growing species become shaded out.
Peat cutting	Can be industrial peat extraction or small-scale cutting for local use. Indicators include sharp-edged peat hags, or drying cut peat in adjacent area.	Causes loss of habitat. Can cause lowering of water levels in the peat bog.
Invasive non-native plant species	Plant species include Himalayan Balsam, Giant Hogweed, Japanese Knotweed (see photos below), and Rhododendron.	Can cause loss or reduction in native species.
Other	Any other pressures e.g. fly tipping or other pollution.	Various



^ Himalayan Balsam



^ Giant Hogweed



^ Japanese Knotweed

8. The Field Survey

Overview

The aim of the field survey is to identify and describe wetlands. The survey form provided will guide you through recording the necessary information and identifying the wetland features.

In the field, all information about the wetland should be recorded so that even if it is not used directly in defining the wetland type, it can be used for further assessment of the wetland as necessary. The following features of the wetland and surrounding area should be considered:

- Define the local topography and landscape situation, e.g. in a basin, on a mountain plateau, or near the coast;
- Identify any water features nearby, and describe their proximity to the wetland. This may include the sea, rivers, streams, lochs or springs;
 - ▶ These two components can be used to identify **the landscape setting**.
- Identify the kinds of vegetation found in the wetland;
- If possible, identify the soil type;
 - ▶ These two components can be used to identify the **habitat type**.
- Identify any observable **existing pressures** or human influences on the wetland, for example drainage or signs of nutrient enrichment.

In the field, it may not be that easy to determine a wetland type from the typology by simply reading the descriptions themselves, for example if the description discusses plant species you do not recognise. The field survey sheet that accompanies this guidance manual can be used to help with identification in the field, as it describes a variety of “indicators”, (i.e. soil types and plants) and presents photographs to help you identify them. The indicators are also described in Section 5.

Outline of the Field Survey Sheet and Field Survey Form

A **field survey sheet** has been produced to assist with field identification and can be kept for repeat use. It contains key indicators and photographs of the wetland habitat types, and soil and vegetation indicators described in Sections 5 and 6 of this manual, for ease of reference in the field:

Pages 1 and 2 of the field sheet provide brief descriptions of each wetland type with an example photograph. The wetland types are also described in Section 6 of this manual.

Pages 2, 3 and 4 presents photographs and descriptions of the soil and vegetation field indicators. The field indicators are also described in Section 5 of this manual.

A **field survey form** allows information to be recorded in a standard format and should be filled in during the site visit.

Page 1 provides space for you to provide information about the date and timing of your visit and the wetland itself, including:

Location	The location should be described generally, for example proximity to the nearest road or other identifiable feature. A grid reference should be provided, which can be obtained from an Ordnance Survey map or using a GPS.
Weather	The current weather should be recorded. In addition to the current weather, it is useful to know the weather over the preceding weeks or even months (e.g. whether it has been generally wet/dry, hot/cold). It can be useful to ask the landowner if you do not know this information.
Photos	Photographs of the habitat and surrounding landscape are valuable for referring back to after the field visit, and for other people to look at to assist with the assessment. All useful photographs should be numbered and listed on the field survey form, with a brief description of what they are showing.
Landscape setting	Describe the landscape of the area surrounding the wetland, with reference to the table of landscape settings in Section 4. If you do not think any of the settings describes the area you are looking at, provide a description in the box underneath.
Hydrological features	Identify and briefly describe any hydrological features (e.g. lochs, streams, rivers, springs) within or adjacent to the wetland. If the hydrological feature is not in the list, include it in the box underneath.
Soil indicators	If you can see the soil or geology beneath the wetland (e.g. any exposed peat or rock), select the soil type here. If the soil does not fit with any types, provide a description in the box underneath.
Vegetation indicators	Identify the vegetation types in the wetland. If the vegetation is not in the list, include it in the box underneath and take a photograph.
Existing pressures	Identify any existing pressures or human influences on the wetland (these are discussed in more detail in Section 7). If the pressure is not in the list, include it in the box underneath and take a photograph.
Sketch	Draw a sketch map of the wetland and surrounding features. This should include all hydrological features (e.g. lakes, ponds or streams), an indication of topography (e.g. whether surrounding areas are higher or lower than the wetland), and any other identifying landmarks. The extent of each habitat type identified in the wetland should be outlined and labelled on the sketch. If you have access to Ordnance Survey maps or aerial photographs, you may find it useful to use this as the base of your sketch and draw over the top of it.

Page 2 holds a table with tick-boxes for each wetland type. Using the descriptions of wetland type in the Field Survey Sheet (pages 1 and 2) and the indicators you have ticked on page 1, select the most appropriate wetland types in this table. If you think there is more than one type, tick all relevant types and note next to them if there is a corresponding photo or an identifying number on the sketch. There is also space in each type to briefly describe the extent or any other information about the wetland habitat type.

As suggested above, it is possible that a wetland may contain more than one type. For example, a floodplain wetland may contain both swamp and wet woodland types. It is also possible that one type can occur within another, for example a tufa-forming spring (type 3b) within a fen (type 4). You should select all types that are present, and then note in the space below the table which are the dominant wetland types.

Glossary

Flush The wetland habitat associated with a seepage

Groundwater Water found in pore spaces in soil and rocks

Lagg Fen or wet woodland found around the edge of some peat bogs

Lowland Elevation less than 350m above sea level

Montane Elevation greater than 700m above sea level

Peat A dark 'spongy' soil with high organic matter content, found where there is a shallow water table

Peat hags Broken hummocks of deep peat, may be up to 1-3m deep. Peat bog vegetation found on the top of the hags, often with bare soil in the depressions between hags

Poaching Erosion of the ground from heavy livestock/ human use

Seepage Groundwater emerging at the ground surface across a diffuse area. Less clearly defined than a spring. Generally forms a permanently wet area on a slope.

Spring Groundwater emerging at the ground surface at a well-defined location, e.g. forming the head of a stream

Tufa Solidified deposits of calcium carbonate from groundwater discharging at the surface

Typology Classification according to characteristics

Upland Elevation between 350m and 750m above sea level

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