No. 17

The saltmarsh survey of Great Britain

An inventory of British saltmarshes

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Frontispiece: *Limonium vulgare* and *Armeria maritima*
(drawn by Susan House)

REPORT SUMMARY

This project is part of the overall research programme of the Coastal Ecology Branch within the NCC's Chief Scientist Directorate. One of the primary aims of the Coastal Ecology Branch is to describe the size, location and quality of the main coastal habitats in Great Britain, and disseminate this information by means of NCC publications. To this end the Saltmarsh Survey of Great Britain was set up in 1981 with the aim of describing the saltmarsh resource nationwide. This report is the culmination of the work of several people who have, over these 7 years, located all the saltmarsh sites and mapped these using a vegetation classification system specifically designed for this project.

The results of the work are presented in three ways:

1. Main report. The main report, published as one of the "Research and Survey in Nature Conservation" series, gives an account of the methods employed in the survey and subsequent data analysis, and attempts to summarise the national results and to assess trends in the geographical variation. The report includes the location of all the British saltmarshes, and the area of each, and describes patterns in the distribution of each of the vegetation communities. Finally, six geographical units with distinct saltmarsh types have been identified and described, and the extent of current protection of the saltmarsh within each unit is assessed.

2. Regional Supplements. In addition to this main report there are 15 Regional Supplements which contain more detailed information about the sites in each NCC region. These allow the individual sites to be put into the regional context, giving maps and figures for each county, summary statistics for the vegetation communities throughout the county and the region, and some of the more detailed site information.

3. County reports. The county reports contain much of the original data and vegetation maps, but only two copies of each have been produced, and these are therefore not generally available.

It should be noted that the Saltmarsh Survey does not attempt to make value judgements on individual sites, but does allow an informed assessment of the site to be made in relation to the rest of the British resource.

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1. INTRODUCTION

1.1 Saltmarshes in Great Britain

Saltmarshes in Great Britain represent one of a series of habitats confined largely to the coastline. They usually develop on intertidal land within the range of the normal spring tides, where colonisation by halophytic plants i.e. plants which are adapted to high salinities and able to withstand immersion in sea water, takes place.

Saltmarshes occur in a wide variety of situations, provided certain conditions are present which allow a net accumulation of sediment. This means that some shelter from strong wave action is necessary; thus saltmarshes may be found in estuaries, behind barrier islands or shingle spits or in areas where the wave energy is dissipated by the presence of shallow water offshore.

The extent of the marsh also depends on the amount of sediment available for deposition, together with a combination of other physical factors such as degree of exposure, tidal range, and the slope of the land (Chapman 1976). If the shore slopes steeply into the sea, even if the tidal range is high, the width of the band in which conditions are suitable for saltmarsh formation will be restricted and the marsh is likely to be narrow. If the slope is gradual the area available for saltmarsh formation may be extensive.

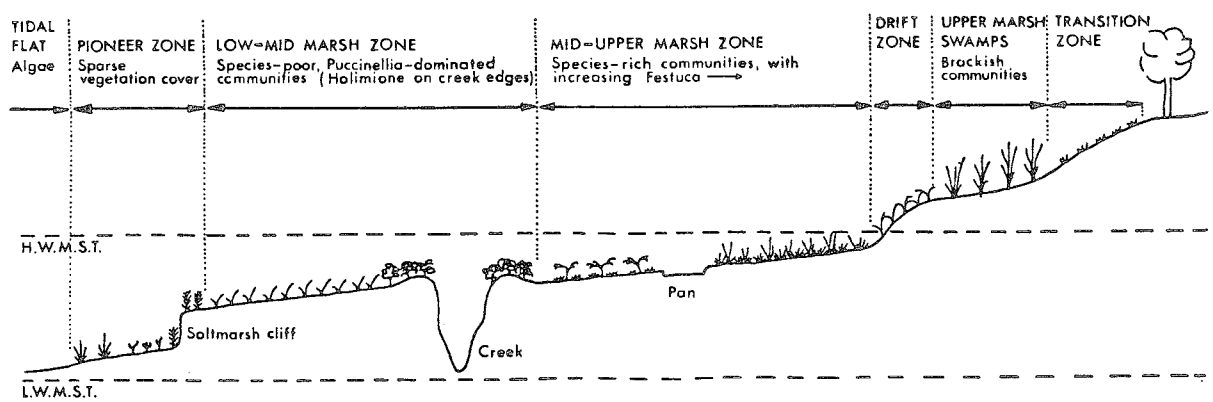
Saltmarshes begin to develop below the mean high water of neap tides (Long and Mason, 1983) where algae and species of *Zostera* may help to stabilise the sediments. However, true saltmarsh does not become established until the number of tidal inundations is such as to provide several days during neap tides when germinating seedlings are free from tidal influence (Ranwell 1972). This appears to occur at about the mean high water of neap tides.

Above this level, as sediment is trapped and/or the shoreline rises relative to Ordnance datum, submergence by the tide becomes less frequent. The lower salinities thus encountered allow a wider variety of plants to survive and more complex communities to develop. At the upper level of the marsh, where there are transitions to fresh-water or other habitats, the salt water influence is only minimal, with inundations of saline water only occurring a few times a year at the spring and autumn equinoxes (Ranwell 1972), and often diluted by inundations of freshwater, from rivers or rainfall. These conditions form the extremes between which the saltmarsh communities develop.

At the lower, pioneer, end of the range algae such as *Zostera* and *Enteromorpha* may initially colonise the bare mudflats. Above this, other pioneer species of *Spartina*, *Salicornia* and *Suaeda* may become established. These are replaced by more species-rich *Puccinellia* and *Festuca* communities as height above low water level increases, until brackish conditions are reached where *Phragmites* and *Scirpus* may occur. At the upper end of the marsh where saline influence is minimal the communities take on some of the features of the habitats present behind the marsh, for example sand dune or wetland, and effectively become transitional to these habitats.

The diagram below (adapted from Ranwell 1972) shows an idealised saltmarsh zonation, which gives an indication of the type of vegetation succession that might be expected, together with the sub- habitats that are available for colonisation in the saltmarsh ecosystem.

Figure 1. Generalised saltmarsh showing main vegetation zones. (Not to scale)



In a number of coastal areas shoreline sediments may be limited, although the regular tidal inundation allows saltmarsh communities to develop. This occurs particularly around the shores and heads of western Scottish lochs and on a number of rocky shores on the east coast. Whilst the area of saltmarsh is usually comparatively small the communities often show a typical, though foreshortened zonation. These areas may be extremely rich in species and include important transitions to other terrestrial habitats. Wherever possible these saltmarshes are included within the survey.

In addition to the normal occurrence of the saltmarsh habitat along the coast, saltmarsh communities may also be found associated with brine springs or saltworks inland, notably in Cheshire, Staffordshire and Worcestershire. These may be found at distances which are as much as 80 km from the nearest estuarine habitats (Lee 1975). Saltmarsh communities may also be found in splash zones along clifftops. However, these saltmarsh types are not included in this project.

1.2 Botanical survey within the Nature Conservancy Council

The Nature Conservancy Council was set up in 1973 as the Government Advisors on nature conservation (the conservation of flora, fauna and geological and physiographical features) and to increase the understanding and dissemination of information on conservation (The Nature Conservancy Council Act, 1973).

In 1949 the National Parks and Access to the Countryside Act required the Nature Conservancy to identify and protect the prime sites of value for nature conservation (these came to be known as Sites of Special Scientific Interest or SSSIs). After the Wildlife and Countryside Act in 1981 the procedure for notifying SSSIs was extended. In addition to notifying local planning authorities of the existence of an SSSI, as required by the 1949 Act, NCC also has a duty under the 1981 Act to notify all the owners and occupiers that they have an SSSI on their land. The information that must be specified on this notification is a) the location of the site (including a map); b) the nature of the special interest; and c) any operations that appear likely to damage that interest (Department of the Environment, 1982). Following the implementation of this Act it was also necessary to renotify all the sites which had previously been recognised under the 1949 Act.

In order to carry out the statutory functions concerned with the conservation of both species and habitats, the NCC needs to identify the extent of any resource, whether species, habitat or vegetation type. It is necessary to know where the resource occurs and how much exists in order to classify individual sites, and decide where and how they fit into the national context. Strictly speaking such resource information is a prerequisite to the application of criteria for selecting SSSIs, and as such is recognised as being vitally important. However, little has so far been systematically collected on the coast. This study therefore sets out to provide the basic minimum acceptable level of information on the saltmarsh habitat.

In attempting to provide a standardised procedure for survey of the grassland resource, Smith, Wells and Welsh (1985) gave a good account of the most frequent objectives of botanical survey work which are reproduced below:-

1. to produce an inventory of the plant communities present on a site or sites;

2. to produce a description of the vegetation present on a site or sites based on (1) and on examination of the component species of the plant communities;

3. to produce a map showing the distribution of the plant communities and/or individual plant species of interest within a site;

4. to examine the relationship between the distribution of the various plant communities and/or individual species and site factors;

5. to allow inter- and intra- site comparison and evaluation based on the above and hence identify sites of nature conservation importance, allowing steps to be taken to ensure their protection and

6. to provide a sound basis for management prescriptions (using 1 - 4) on reserves.

There are three levels of survey recognised within NCC, each of which fulfils different requirements (Smith, Wells and Welsh, 1985). These levels have come to be known as:

Phase 1 survey. This is a comprehensive survey of an administrative unit, usually on a county or district basis. This maps all the habitats within the unit on a 1:25,000 or 1:10,000 scale, using a simple colour code and standard habitat divisions. Additional information is recorded in the form of target notes.

Phase 2 survey. Following phase 1 survey selected sites within a habitat type are surveyed in more detail to allow evaluation of their importance for wildlife. The sites are surveyed to identify visually distinct vegetation types, each of which is sampled using representative quadrat records and species lists.

Phase 3 survey. The purpose of phase 3 survey is to collect detailed biological and ecological information for management purposes or to establish monitoring baselines, using intensive survey methods.

1.3 The aims of the Saltmarsh Survey

The Coastal Ecology Branch within the Chief Scientist's Directorate of NCC is producing inventories of sites and vegetation for each of the major coastal habitats in Great Britain (saltmarsh, sand dune, sea cliffs and shingle). These inventories form part of a general aim to describe the 'natural' coastline of Great Britain. At a later stage it is hoped to extend the work to cover strandlines, reclaimed land and maritime islands.

The information obtained from these coastal studies will provide the basis for a more thorough and logical selection of coastal sites both nationally and regionally using Policy and Procedure Guidelines on the Selection of Biological SSSI (2/79 and 83). In addition it will provide a framework within which to assess trends in saltmarsh development in relation to natural and man made changes.

Saltmarshes were selected for the first study in this series for two reasons: the habitat is rare and not well understood at present, and it is currently one of the most threatened of the coastal habitats. Consequently, the Saltmarsh Survey of Great Britain was set up in 1981, using funds from the NCC's Commissioned Research Budget, with the following objectives:

1. to review existing information on the distribution and abundance of saltmarsh in Great Britain,

2. to identify omissions in our knowledge of the resource as a whole and

3. to fill the gaps in order to increase our overall knowledge of the saltmarsh resource and therefore to produce as complete as possible a description of the resource to a minimum standard.

Because of the scale of the Survey, covering the whole of Great Britain, it was necessary to adopt a level of survey somewhat different from the three phases described in section 1.2. In fact the method employed falls between the Phase 1 and Phase 2 surveys, being more detailed than a phase 1 survey, in that vegetation types within the habitat were mapped, but not as detailed as phase 2, since no quadrat records were taken. Many of the problems and assumptions implied in this report arise from this rather broad methodology, which was, at the time, the minimum level which it was felt could provide meaningful data on a national scale.

It is important to note that:

1. This present report is concerned with national botanical survey rather than with establishing a basis for monitoring, although at a coarse level the survey may help with monitoring undertaken on saltmarshes in the future, in the form of repeat surveys.

2. The information contained within this report provides the background for site selection, and is not a selection in itself, though comment is made on the general importance of representation in geographical areas.

3. Physical and management information was also collected during fieldwork. However, this is provided at a relatively superficial level, giving a background to the type of vegetation recorded. It is intended that this information will provide the basis for further management studies, particularly into the relationships between grazing management, vegetation structure and species composition.

1.4 Limitations of the survey

Because of the overall aim of the study (to review saltmarshes throughout Great Britain) and the level of resources available, certain limitations were placed on the survey and these have been alluded to above. More specifically:

1. It was decided not to use the National Vegetation Classification methodology (see section 2.2).

2. The lower limits of the zonation were also excluded (see section 2.1). Therefore the communities dominated largely by *Zostera* represent a major area requiring further consideration for survey should funds become available.

3. In Scotland there are a large number of small scattered marshes. In a national context their size is not significant and it was decided to use 0.5 ha as a lower limit for survey over most of the area. The exception was Shetland where the majority of the sites were smaller than 0.5 ha and therefore the lower limit was taken as 0.1 ha.

2. METHODS

In the present survey the habitat 'saltmarsh' has been defined as those vegetation types described in the draft saltmarsh chapter of the National Vegetation Classification, and previously largely described by Adam 1981, as occurring within tidal limits, although excluding *Zostera* and *Ruppia*. This excludes inland saltmarshes, splash zones on cliffs, and all cliff, dune and shingle communities, but includes the transitions to some of these habitats, such as sand dune, grassland or shingle.

2.1 Definition of survey limits

The geographical area surveyed was not limited in any way, (although inland saltmarshes and clifftop splash zones were exluded) as the aim of the project was to cover the whole resource in Great Britain.

Before commencing the survey it was necessary to define precisely the upper and lower limits of a saltmarsh in order to standardise the procedure used by the surveyors. The seaward limit of the area surveyed may be identified as the lower limit of the higher plants (excluding *Zostera*), and is fairly easily defined, although there may be some seasonal problems. If the survey takes place early in the season the area of the marsh will appear less due to the annual nature of some of the pioneer species, such as *Salicornia*.

The major problem of definition occurs at the upper limits of the area. Any survey work obviously takes place at one specific point in time and it is not easy to judge how much of the area is within the tidal range and is therefore to be included under our definition of 'saltmarsh'. The tide-line may be indistinct or broken with little debris and the survey may take place some time from the extremes of the equinoctial spring tides.

These problems become more complex when transitions to other saline-influenced habitats, e.g. dunes and shingle, occur. Perhaps the most difficult transition occurs where communities may by "tidally" (periodically) flooded but the saline influence is minimal and freshwater conditions predominate, i.e. upstream along rivers. Each site has to be judged by the conditions present at the time of survey, but the "normal tidal limit" (NTL) shown on 1:25,000 Ordnance Survey maps is a useful guide. The inclusion of transitions in this survey, and the figures given for their area, are therefore open to different interpretations and should be treated with caution; hence figures for the transitional areas have been recorded separately.

Within these limits wherever possible the complete range of zonation was covered, from pioneer (excluding mudflats) through low-mid marsh, mid-upper marsh, drift line, and upper marsh swamp communities to the transition communities at the upper limit of tidal influence.

2.2 Plant Community Mapping Categories

Limitations in the original allocation of resources and the time available for survey meant that a detailed survey method was impracticable. This precluded the use of NVC communities as these are highly detailed and require a quadrat sampling method to be used for positive identification. The choice of classification system was influenced by that employed in other surveys, and the need to amalgamate NVC communities into blocks of vegetation which could be recognised easily in the field and which were capable of being drawn rapidly on sketch maps. The relationship between the mapping categories used in the Saltmarsh Survey and their equivalent NVC groups is shown in Table 1 and given in more detail in Appendix 8.1.

Table 1. Relationship between National Vegetation Classification communities and those of the Saltmarsh Survey.

Saltmarsh Survey community	NVC communities
1. Spartina	SM4 Spartina maritima SM5 Spartina alterniflora SM6 Spartina anglica
2a. Salicornia/Suaeda	SM7 Arthrocnemum perenne SM8 Annual Salicornia SM9 Suaeda maritima
2b. Aster	SM11 Aster tripolium var. discoideus SM12 Rayed Aster tripolium
3a. Puccinellia	SM10 Transitional low marsh vegetation SM13 Puccinellia maritima - P.maritima sub-comm.
3b. Halimione	SM14 Halimione portulacoides - H.portulacoides sub-comm. - Juncus maritimus sub-comm. - P.maritima sub-comm.
4a. Limonium/Armeria	SM13 Puccinellia maritima - Limonium/Armeria sub-comm.
4b. Puccinellia/Festuca	SM13 Puccinellia maritima - Glaux maritima sub-comm. - Plantago/Armeria sub-comm. - turf fucoid sub-comm. SM16 Festuca rubra - tall F.rubra sub-comm.
4c. Juncus gerardii	SM17 Artemisia maritima SM16 Festuca rubra - P.maritima sub-comm. - Juncus gerardii sub-comm. - Festuca/Glaux sub-comm. - Leontodon autumnalis sub-comm. - Carex flacca sub-comm.
4d. Juncus maritimus	SM15 Juncus maritimus/Triglochin maritima SM18 Juncus maritimus - J.maritimus/O.lachenalii sub-comm. - Festuca arundinacea sub-comm.
5a. Agropyron (Elymus)	SM24 Elymus pycnanthus SM28 Elymus repens
5b. Suaeda fruticosa	SM25 Suaeda vera drift line - E.pycnanthus sub-comm. - H.portulacoides sub-comm.
6. Upper Marsh Swamps	S4 Phragmites australis S19 Eleocharis palustris S20 Scirpus lacustris ssp. tabernaemontani S21 Scirpus maritimus

7i. Shingle/Dune transition	SM21 Suaeda vera/Limonium binervosum - typical sub-comm. - Frankenia laevis sub-comm. SM22 H.portulacoides/F.laevis
7ii. Freshwater transition	MG11 F.rubra/A.stolonifera/P.anserina - Lolium perenne sub-comm. - Atriplex hastata sub-comm. - Honkenya peploides sub-comm.
7iii. Grassland transition comm.	MG12 Coarse Festuca arundinacea - Lolium perenne/Holcus lanatus sub- - Oenanthe lachenalii sub-comm.

2.2.1 Description of communities employed in the Saltmarsh Survey of Great Britain.

The following communities are described in approximate successional order, starting at the seaward edge of the marsh (the pioneer communities), and proceeding to the upper levels of the marsh and the transitions to non-saline habitats.

Pioneer communities

1a) *Spartina*. There are several species of *Spartina* in Great Britain, the predominant species being *S. anglica*. The community usually occurs as monospecific pioneer stands, often very extensive, although occasionally found higher up the marsh in depressions or surrounding salt pans. *Spartina* may also be found intermingled with other pioneer communities such as *Salicornia/Suaeda* (2a). *Spartina* occurs only infrequently in southern Scotland and is absent altogether from the north of Scotland.

2a) *Salicornia/Suaeda*. This community forms an open vegetation cover of annual *Salicornia* spp. and/or *Suaeda maritima* occurring as pioneer stands, either at the seaward edge of the marsh or in depressions or pans within the marsh itself. It is often noted mingled with *Puccinellia* (3a) marsh in areas where the *Puccinellia* is somewhat sparse.

2b) *Aster*. *Aster tripolium* occurs as monospecific stands, usually above the 2a community, or along the sides of creeks where inundation is relatively frequent. Scattered *Aster* plants may also occur together with low-mid marsh communities such as *Puccinellia* (3a) or *Halimione* (3b), mingling closely with these dominant species.

In Scotland several species, such as *Suaeda maritima* and *Aster tripolium* are only infrequently found in pioneer positions, although still occurring elsewhere in the marsh.

Low-mid marsh communities

3a) *Puccinellia*. *Puccinellia maritima* is often the dominant plant on grazed saltmarshes, where it occurs in the lower zones, often forming a low, short turf. In other areas where grazing has ceased or never occurred, the community forms dense tall swards, often intermingled with scattered plants of *Aster* or *Limonium*. *Puccinellia* (3a) may also occur as co-dominant with *Halimione* 3b.

3b) *Halimione*. *Halimione portulacoides* may occur as monospecific stands forming a dense, even-topped bushy canopy, or in intimate mixtures with *Puccinellia* (3a). *Halimione* is usually associated with some degree of water movement, and is therefore often found on the levees at creek edges, forming extensive stands where creeks are abundant. *Artemisia maritima* is often found associated with this community. Like several other communities, notably 4a and 4d, *Halimione* does not occur north of the Solway Firth.

Mid-upper marsh communities

4a) *Limonium/Armeria*. This is a distinctive community, often forming open swards, and may be closely associated with numerous salt pans. Unlike the communities of the lower marsh, the mid-upper communities

are more species-rich, with *Glaux maritima* and *Triglochin maritima* often forming stands within the sward. The *Limonium* may be represented by either *L.vulgare* or *L. humile*, either of which may also occur lower down the marsh, scattered throughout the *Puccinellia* (3a) or the *Halimione* (3b). The 4a community does not occur north of the Solway Firth.

4b) *Puccinellia/Festuca*. As tidal inundation becomes less frequent, there is a move away from *Puccinellia*-dominated communities to *Festuca*. This may be found in both the 4b and 4c communities. 4b is a species-rich form of *Puccinellia* community with *Festuca rubra* as a co-dominant and in which *Glaux maritima*, *Plantago maritima*, and *Triglochin maritima* may also be constant. In Scotland the appearance of the community may be somewhat different, forming an open sward of short vegetation, where *Puccinellia* is dominant and often associated with *Armeria maritima*, abundant small plants of *Glaux* and many turf fucoids particularly associated with heavily sheep-grazed marshes.

4c) *Juncus gerardii*. *Festuca rubra* becomes still more abundant in this community, occuring closely with the *Juncus gerardii* and *Agrostis stolonifera*, often with an understorey of *Puccinellia maritima*, and occasionally with *Glaux*, *Plantago*, and *Triglochin*. It is often difficult to differentiate between this and the 4b community, unless *J. gerardii* is very abundant, as many of the constants are common to both communities, although 4c usually appears to be a more open community than 4b. In Scotland *Leontodon autumnalis* forms a sub-community, often in short, smooth swards with abundant *J. gerardii* and *A. stolonifera*.

4d) *Juncus maritimus*. Tall tussocks of *J. maritimus* dominate this community, often occurring with *Triglochin* and occasionally *Oenanthe lachenalii*. It should be noted that the *Juncus maritimus* community does not occur in Scotland, although scattered plants do occur in South West Scotland.

Drift line communities

5a) *Agropyron*. This community is composed of abundant, dominant *A. repens* (northern distribution) or *A. pungens* (southern distribution), occupying any ground which is raised slightly above the normal level of the upper marsh. The community may therefore occur on salt mounds, sea walls or embankments as well as on ridges in the marsh surface.

5b) *Suaeda fruticosa* forms extensive bushy stands along the drift line, often covering large areas in places where the drift zone slopes gradually.

Upper marsh swamps

6i) *Scirpus maritimus*.
6ii) *Phragmites communis*.
6iii) *Typha latifolia*.
6iv) *Schoenoplectus tabernaemontani*.

All these species form pure stands which may become extensive in the presence of correct conditions of salinity. They are usually found in standing or sluggish brackish water or rarely inundated upper marsh.

Transition communities

There are numerous types of community forming transitions to other habitats where the saline-influence is minimal, but four major types were recognised for the purpose of this survey.

7i) Shingle/Dune transitions often include species such as *Atriplex hastata* or *Honkenya peploides*, and some important, and very rare, communities such as *Limonium bellidifolium* with *Frankenia laevis*.

7ii) Freshwater transitions. Many different variations in species composition occur in this category, particularly in Scotland where the freshwater input from rainfall is greater than in England and Wales. Species such as *Oenanthe crocata*, *O. lachenalii*, *Iris pseudacorus*, *Phalaris arundinacea* and occasionally *Juncus inflexus* or *Glyceria maxima* occur in these transitions. In Scotland several additional species become frequent, including *Fillipendula ulmaria*, *Juncus effusus* and *J. acutiflorus*. The species composition changes with the different types of transition, for example to moorland and wet fen/marshy grassland.

7iii) Grassland transitions. Communities transitional to grassland habitats are often very species-rich. Many types of Gramineae may be represented, for example, *Festuca arundinacea*, *Holcus lanatus* and *Lolium perenne* which are among the most frequent. Species such as *Trifolium repens* and *Potentilla anserina* are often abundant, although in Scotland these glycophytic species may also be found within the main marsh (Chapman, 1976).

7iv) Woodland transitions. Woodland does not form a successional community although trees may occur at the edge of the marsh where there is a discrete step. In a very few localities scattered trees may occur on the upper saltmarsh but this is rare. The most common woodland species in these situations are *Alnus glutinosa* and *Salix* spp.

8a) Communities of wet depressions, gravel spreads and flushes. As shown in many of the above community descriptions, differences in the distribution or composition of communities often occur in Scotland. In addition there is one other type of community identified in Scotland which is not found in either England or Wales i.e. "Communities of wet depressions, gravel spreads and flushes" (8a). These are fairly widespread in Scotland, where topography and freshwater runoff largely determine the distribution and area of these communities. *Blysmus rufus* is often widespread in these communities, as is *Eleocharis palustris*.

2.3 Format of the project

To fulfill the aims set in section 1.3 the project was undertaken in three stages. Before commencing the vegetation survey, it was decided to incorporate information from existing surveys of saltmarsh areas, where these provided compatible data. The three stages were, therefore:

1. assessment of existing surveys of saltmarsh vegetation,

2. field survey work to cover unsurveyed areas and

3. analysis of data from stages 1 and 2.

2.4 Existing surveys

Several areas of saltmarsh had already been surveyed, often in order to assess the implications of threats to the areas, and in most cases the data was in a form compatible to the present survey.

There are three major reports, covering long stretches of coastline, and a number of minor works which cover individual sites. All the reports that were used as part of the survey are listed below and discussed in more detail in section 2.6.2.

2.4.1 Major Reports

-- ITE (1974)

Large areas of Kent and Suffolk and all of Essex were surveyed by ITE as part of an investigation to assess the threat from the proposal to site the third London Airport on Maplin Sands.

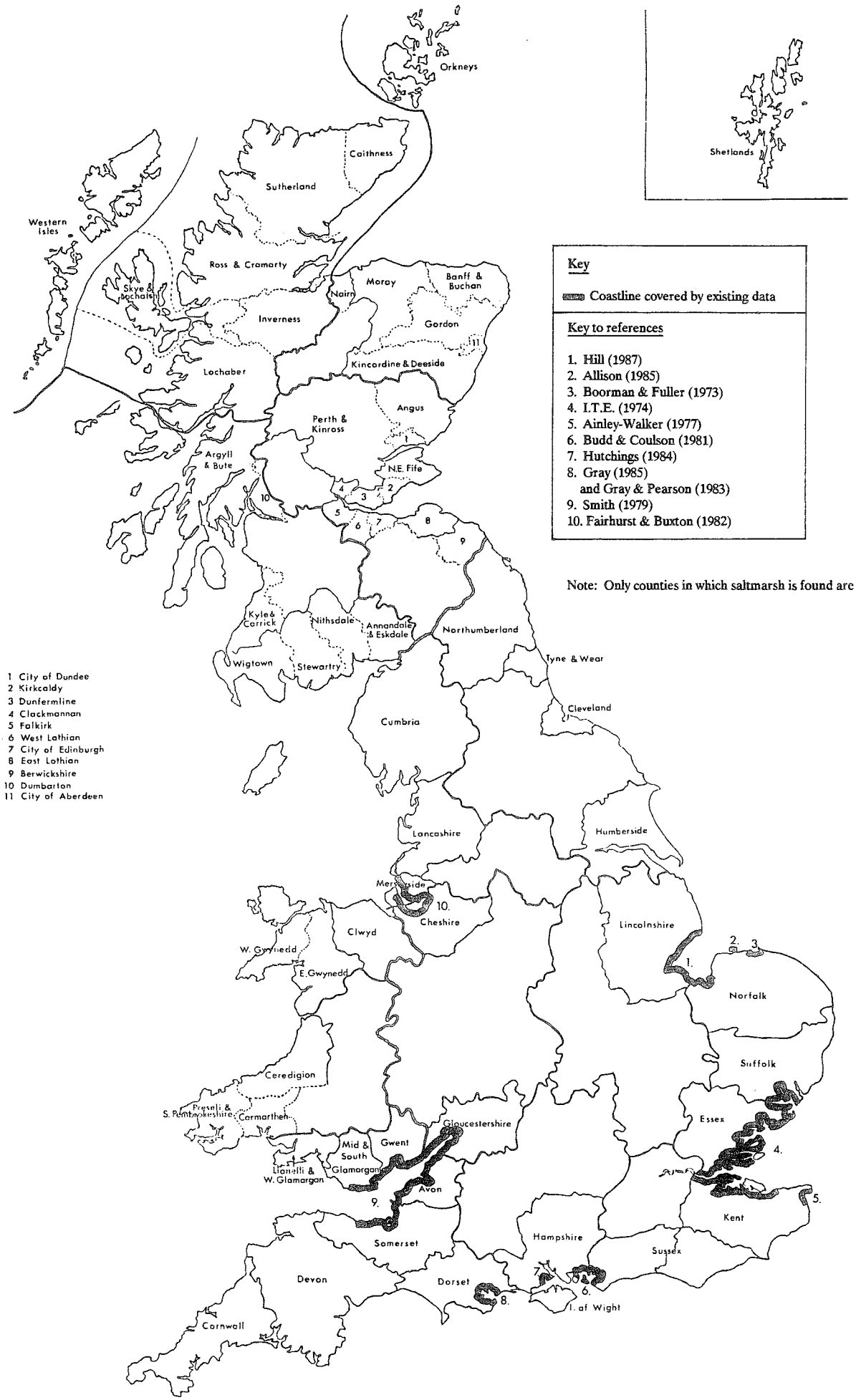
-- Smith (1979)

This was a survey of the Severn Estuary between Breaksea Point, Hinkley Point and Gloucester, commissioned by the Severn Estuary Conservation Group to assess the impact of a proposed barrage across the estuary.

-- Hill (1988)

This survey of the Wash (with the exception of the north part of Gibraltar Point) was commissioned by the NCC to assess the change in vegetation between 1971 and 1982.

Figure 2. Areas of coastline where existing surveys of saltmarshes were used



Note: Only counties in which saltmarsh is found are marked.

2.4.2 Smaller Reports

MERSEYSIDE: Mersey Estuary - Fairhurst and Buxton (1982)
DORSET: Poole Harbour - Holes Bay (Gray and Pearson, 1983)
- remainder of harbour (Gray, 1985)
HAMPSHIRE: River Beaulieu - Hutchings (1984)
Langstone and Chichester Harbours - Budd and Coulson (1981)
KENT: Pegwell Bay - Ainley-Walker (1977)
NORFOLK: Wells to Blakeney - Boorman and Fuller (Fuller 1973)
Scolt Head Island - Allison (1985)

See Figure 2 for a representation of the areas of coastline covered by these existing reports.

2.5 Field survey

2.5.1 Locating further saltmarsh areas

Figure 2 shows that there remained long stretches of coast for which no information was available. It was therefore necessary to locate all the marshes in these areas, before field survey work could commence. In many cases this could be achieved by a visit to the appropriate NCC Regional Office, where valuable regional knowledge about the location of known sites in the area could be provided.

In Scotland a preliminary map search at a scale of 1:10,000 was made and a list of saltmarsh sites drawn up. Sites were listed if they fulfilled one of three criteria:-

(i) if they bore the Ordnance Survey saltmarsh symbol (⩙)
(ii) if a tidal pool was marked
(iii) if topographical and hydrological conditions suggested that saltmarsh might be present.

2.5.2 Method of field survey

Throughout this report reference is made to saltmarsh sites. It is therefore necessary to give an approximate definition of the term 'site' as used in the context of the saltmarshes in this survey.

In general, a site was considered to be separate if it formed a discrete coastal unit, for example bordering a river, estuary or bay. Alternatively, along some of the longer, straight, stretches of coastline, such as the North Norfolk Coast, or around large bays such as Morecambe Bay, there were usually clear discontinuities in the marsh which were used as site boundaries in order to prevent the site units from becoming unmanageable for the interpretation of community data.

The Severn Estuary was also treated as a stretch of coastline with several discontinuous saltmarshes, as the size and diversity of the whole estuary would obscure the individual variations in community distribution. In the other two major estuaries, the Tay and Humber, however, the data was recorded as North Shore and South Shore, since the overall diversity was not as great and the areas concerned not as large as in the Severn.

England and Wales

The field survey itself was started in England and Wales, where the majority of large areas of saltmarsh are located. Having established the existence of survey reports by reference to NCC Regions, and once some indication of the location of the saltmarshes had been given by Regional staff, all potential and known sites which had not already been surveyed were visited. For each saltmarsh site the following information was collected:-

a) Sketch maps. For each site sketch maps were produced to cover the whole of the saltmarsh area, showing the distribution and extent of the plant communities. Where two or more closely intermingled communities could be identified, the proportional cover of each community was noted as a percentage in brackets. Also noted were monospecific stands which, though visually distinct in the field, did not constitute a plant community as defined for the survey, e.g. clumps of *Artemisia*.

The production of such maps entailed walking over much of the site, though in some cases suitable vantage points enabled large portions of the marsh to be mapped from a distance. However, even though some vegetation divisions recorded are identifiable visually from a distance, others rely on minor elements of the flora and therefore require closer examination. It was often necessary both to obtain a general overview of the marsh and to walk over substantial areas of the site.

It should be noted that these were only sketch maps, no attempt having been made to transfer their data to Ordnance Survey scale maps.

b) **Field Record Card** A field record card which records details of the vegetation, physical features etc. has been prepared for each site (see Appendix 8.2). The site information section of the standard record card was completed whilst on site, recording physical features of the site such as types of landward transition, substrate, whether creeks or pans were present, and whether there were signs of grazing or other types of management. Any evidence of *Spartina* invading or dying back was noted, as were signs of erosion or accretion of the saltmarsh. Comments on features of interest or any apparent threats were also recorded on the card. It should be noted that calculations of the areas of the vegetation types were not completed until the analysis stage.

It should also be noted that many features such as substrate, management and erosion/accretion were recorded as present or absent with no attempt to record any spatial variability within the site. This resulted in some problems at the data analysis stage in trying to assess causal factors for the vegetation community distribution. In addition, the status of *Spartina* (invading or dying back) was often uncertain and may in fact vary within a site.

c) Species record. A species list for plants was made, based on species recorded during the course of the survey (see reverse of site record card in Appendix 8.2). However, this did not included detailed quadrat records, and should not be regarded as a comprehensive list for the site.

Scotland

In Scotland the method adopted was slightly different from that employed in England and Wales. As it was apparent that one fieldworker (working alone) could not cover the whole of Scotland, it was decided to allocate individual contracts to cover specified geographical areas. As for England and Wales, the physical site details were recorded on the standard pro forma, although with a few modifications as a number of the communities on the original pro forma were not relevant to saltmarshes in Scotland, and some additional communities could be identified (see community descriptions in section 2.2.1).

The method of mapping the sites differed slightly from that employed in England and Wales. With a few exceptions the Scottish saltmarshes were mapped at a scale of 1:10,000 with a colour code to define the extent of each saltmarsh community. Additional information was recorded in the form of target notes. The data from these surveys were written up into unpublished internal reports, details of which can be found in Appendix 8.3.

The exceptions to this method were a few sites in South West Scotland which were surveyed some time after most of the other work in Scotland had been completed. For these sites the method of site mapping was similar to that employed in England and Wales where sketch maps were drawn. These were also drawn at 1:10,000 scales to make these sites compatible with the rest of Scotland.

2.6 Methods of data analysis

2.6.1 Analysing data from existing reports

Two stages were involved in the interpretation of data from the existing reports. First the communities already mapped had to be related to those defined in the Saltmarsh Survey, and secondly the community areas were calculated from the vegetation maps.

Vegetation community interpretation

In many cases, particularly from the more minor reports, previously defined plant communities were compatible with Saltmarsh Survey categories, with only a small degree of interpretation being necessary. Usually the

communities were described in some detail, often with a species list, and many of the communities, such as those from Boorman and Fuller (1973) and Ainley-Walker (1977), were sufficiently similar to be used directly.

WASH REPORT

The saltmarshes of the Wash were mapped and surveyed for the NCC by Margaret Hill (Hill 1988). Initially, the vegetation boundaries were mapped using 1982 aerial photographs at a scale of 1:15,000. These were backed-up and verified as far as possible by field observations, using National Vegetation Classification communities. The vegetation boundaries from the 1:15,000 photos were transferred to 1:10,000 maps, and areas of the various NVC communities were calculated.

Since NVC communities were used for the survey of the Wash, these could be related directly to those used in the Saltmarsh Survey (see Table 1 in section 2.2). Areas of the Saltmarsh Survey communities were calculated by combining the areas of the relevant NVC communities from the Wash report.

SEVERN ESTUARY REPORT

The aim of the Severn Estuary Report, compiled by Lynda Smith in 1979, was to provide a description of the location, extent and vegetation of the marshes along the Severn Estuary. A series of maps was produced showing the extent of the saltmarshes, with vegetation boundaries where discontinuities in the vegetation were apparent. The vegetation zones were described in terms of the dominant and constant species, but no attempt was made to standardise or classify the plant communities.

Some problems were therefore encountered with interpreting the results in the context of vegetation categories, as all the community lists describing the vegetation zones were somewhat different. However, using the descriptions and species lists that were provided, together with the 1:10,000 maps of the vegetation zones, it was possible to assign each individual area to a Saltmarsh Survey category on its own merits.

MAPLIN REPORT

The coasts of north Kent, Essex and parts of Sussex were surveyed by the Natural Environment Research Council, to assess the effects of siting a proposed airport and seaport at Maplin. This was a comprehensive study, covering the fauna and flora of the areas as well as collecting data on habitats. The coast between the Orwell in Suffolk and the Swale in Kent was mapped using aerial photographs and the extent and boundaries of the principal plant and animal habitats and communities were determined.

This report therefore provided information for many large areas of marsh within north Kent and Essex, and so it is worthwhile to consider the interpretation of this report in some detail.

The Maplin report employed categories, derived from the interpretation of aerial photographs, which in some cases were broader than the Saltmarsh Survey categories, as the range of habitats covered was greater. Though the communities were generally comparable with those of the Saltmarsh Survey, the following strategy was employed in order that the categories could be used to the full.

a. Some of the Maplin community types had to be amalgamated (see Table 2).

b. In some cases it was necessary to make assumptions about the community types. Of particular note are the vegetation types *Puccinellia* Grazed and Trampled. These types were considered to be representative of the *Puccinellia* community typical of the mid-upper marsh and therefore equivalent to the 4b relatively species-rich *Puccinellia* community type employed in the Saltmarsh Survey.

c. The species which comprised the "Reed" category identified in the Maplin report were not named. For simplicity this category is included in the *Phragmites* community type of the Saltmarsh Survey.

d. Recent field surveys by the region have shown that erosion has continued since 1973/74, when certain areas were identified as "eroding". These areas are therefore excluded from the present results.

A table, showing the relationship between mapping categories used in the Maplin report, the Saltmarsh Survey of Great Britain and the saltmarsh communities of the NVC, is given overleaf (Table 2).

Table 2. The relationship between vegetation mapping categories used in the Maplin Report and the communities of the Saltmarsh Survey

Saltmarsh communities in the Maplin Report		Saltmarsh communities used in the Saltmarsh Survey	
Zostera		Not Included	
Spartina	S*	1.	*Spartina*
Salicornia	S	2a.	*Salicornia/Suaeda*
Aster	A	2b.	*Aster*
Puccinellia	P		
Puccinellia Youthful	Py	3a.	*Puccinellia*
Puccinellia Wet	Pw		
Halimione	H	3b.	*Halimione*
Pucc. with *Limonium*	PL	4a.	*Limonium/Armeria*
Puccinellia Grazed	Pg		
Puccinellia Trampled	Pt	4b.	*Puccinellia/Festuca/Plantago*
Agropyron	G	5a.	*Agropyron*

Where a combination of species occurs, the first mentioned is taken as the dominant and assigned to the relevant category; eg Hp, Halimione dominant with Puccinellia sub-dominant, assigned to 3b Halimione

* Mapping symbols

OTHER CATEGORIES DISTINGUISHED

o (Oyster Pits)	Usually being recolonised but assigned to the surrounding vegetation type.
e (Eroded Marsh)	These areas were being eroded in 1973/74. Excluded from SMSGB
Poor vegetation	These areas are often located near holiday camps. Excluded from SMSGB.
Salt Pans	Species-rich areas, of either *Limonium* (4a) or *Salicornia* (2a) depending upon position in the marsh (respectively upper or lower marsh). Assigned to the vegetation type of the surrounding area.

Map interpretation

Maps from these reports were usually drawn to a true scale, most often 1:10,000. It was therefore a simple matter to measure the community areas directly from these maps, once the assessment of the plant communities had been made.

2.6.2 Analysing the field data

For all sites the information on the vegetation map and field record card formed the basis for determining the community type and area, although much of the actual community identification had already been carried out in the field. The sketch maps provided the raw data from which relative areas of the different saltmarsh vegetation community types were calculated. The method employed for these calculations is described below.

There were often several sketch maps for each site, so these were sequentially ordered, after having been redrawn neatly, and the relative areas were marked on a "key map" covering the whole site. The scale of this map usually depended on the overall size of the site; this was most often 1:25,000 but occasionally 1:50,000 was used.

The individual sketch maps were of different scales. It was necessary, therefore, to use the following procedure to derive a correction factor.

1. The total area of mapped saltmarsh was measured on each site sketch map using a dot grid.
2. The corresponding area on the 1:25,000/1:50,000 key map was measured, again using a dot grid.
3. The scale variation was calculated by dividing the area of saltmarsh on the key map by the area on the site sketch map. This variation in scale is thus represented by a correction factor.
4. The calculation of the relative areas of saltmarsh vegetation communities was obtained by multiplying their dot grid areas by the correction factor, thus giving "true areas".

The main problem with this method of area calculation arose from the nature of the maps themselves. These were only sketch maps, often drawn without close reference to an Ordnance Survey map, and were therefore not completely accurate in their representation of the shape of the saltmarsh. This probably creates some distortion of community areas when related to a true map. However, this is not considered to invalidate the results, given the scale of the survey, the communities employed and the relatively rapid changes which can occur in saltmarsh vegetation with time.

When recording the calculated areas, boundaries of administrative units were taken into account, since county and district boundaries are often located along rivers and estuaries, these being convenient dividing lines. It should therefore be noted that, in cases where the site falls within two or more administrative units, there is more than one record for that site.

2.6.3 Calculation of areas under statutory protection

It was considered important that the approximate extent of sites already protected, with statutory designation by NCC, be determined. Therefore, on each key map the boundaries of all existing SSSIs or NNRs (National Nature Reserves) were marked and labelled. The area of each community within the boundaries was calculated in the same way, giving the total protected area of each community on the site.

Some problems were encountered at this stage of the survey since renotification of SSSIs under the 1981 Act (HMSO 1981) was being carried out at the same time. This process of site renotification involved some alteration to the boundaries of the SSSIs, and although every attempt was made to use maps which were as up-to-date as possible, the coincidence of the projects meant that some site boundaries changed during the survey and some will change in the future.

The findings from this part of the project are described in section 3.3 and discussed in section 4.2.

2.6.4 Analysis using computers

When considering the large amount of data involved in a national survey of this sort, it is obvious that some degree of computer analysis was essential. In this case information about each site was stored on a microcomputer database. This was then used to handle and analyse the large amounts of data collected.

Saltmarsh database

Before the survey was started it was decided that a computer database would be used, and therefore the site record card was designed with this in mind. Data were collected and recorded on the card on site (see section 2.5.2), for inputting to computer at a later date, together with additional information on community areas.

An IBM-compatible microcomputer using the Cosmos REVELATION database package was used for storing data from the saltmarsh survey. The database was set up to follow the site record card as closely as possible for ease of data input. There are therefore three sections:

1. Index file - holds basic site index data including site name, grid reference, county, 10 km squares, site area and date of record.

   It should be noted that the grid references used in the database include a reference to the approximate centre of the site followed by the range, if appropriate, for example along estuaries or long stretches of coast. This is in the format (e.g.) TF 600250 (TF 530260 - TF 650308).

   10 km square data includes references to all the squares in which part of the site falls, even if only marginally. This occasionally makes an extensive list, especially if the site is linear.

2. Site information file - this contains data on landward transition, substrate, management, creek patterns, status of the site and name of SSSI(s), erosion/accretion, Spartina status, and any comments.

3. Plant community file - this is the most important part of the database, holding the plant community areas inside and outside the SSSI boundary, together with the community areas for each of the 10 km squares in which the site falls.

Each site was assigned a unique site code, a full list of which is given in Appendix 8.4. In NCC's central database (originally "Site Related Data Base", or SRDB, and now called COREDATA) each SSSI and NNR is also assigned a unique code (SRDB code). The saltmarsh database was set up to be compatible with COREDATA, so each saltmarsh site that falls within an SSSI or NNR is given the SRDB code(s) in addition to the saltmarsh site code.

Any site record may be accessed in the database by using either the site name or the site code. The use of the SRDB code allows saltmarsh SSSIs to be accessed semi-automatically by any user of COREDATA.

Using the database, calculations of total areas for each county, region or country are easily and accurately carried out. In addition, the database can list site names, grid references etc. of all sites fulfilling specified criteria. In this way data was passed to the next stage of the data analysis.

GB Distribution maps

Using the LIST procedure from the database, files of all the 10km squares from each record were built up and passed into a map plotting program written by Dr S.Ball at NCC Peterborough. This provided the basis for all the vegetation community distribution maps, and site feature maps given in this report.

2.7 Output from the survey

Limited copies of the data from this survey were originally produced in order that the information could be brought to the Regional level to be useful as quickly as possible, since both renotification and casework were running concurrently with the survey.

The initial output of the project was a series of reports based broadly on administrative units within the NCC. This took the form of county reports for England and Wales and, with the exception of North-West Scotland, Regional reports broken down into District data, for Scotland. In addition, separate reports were produced for the Orkney Islands, Shetland Islands and Western Isles.

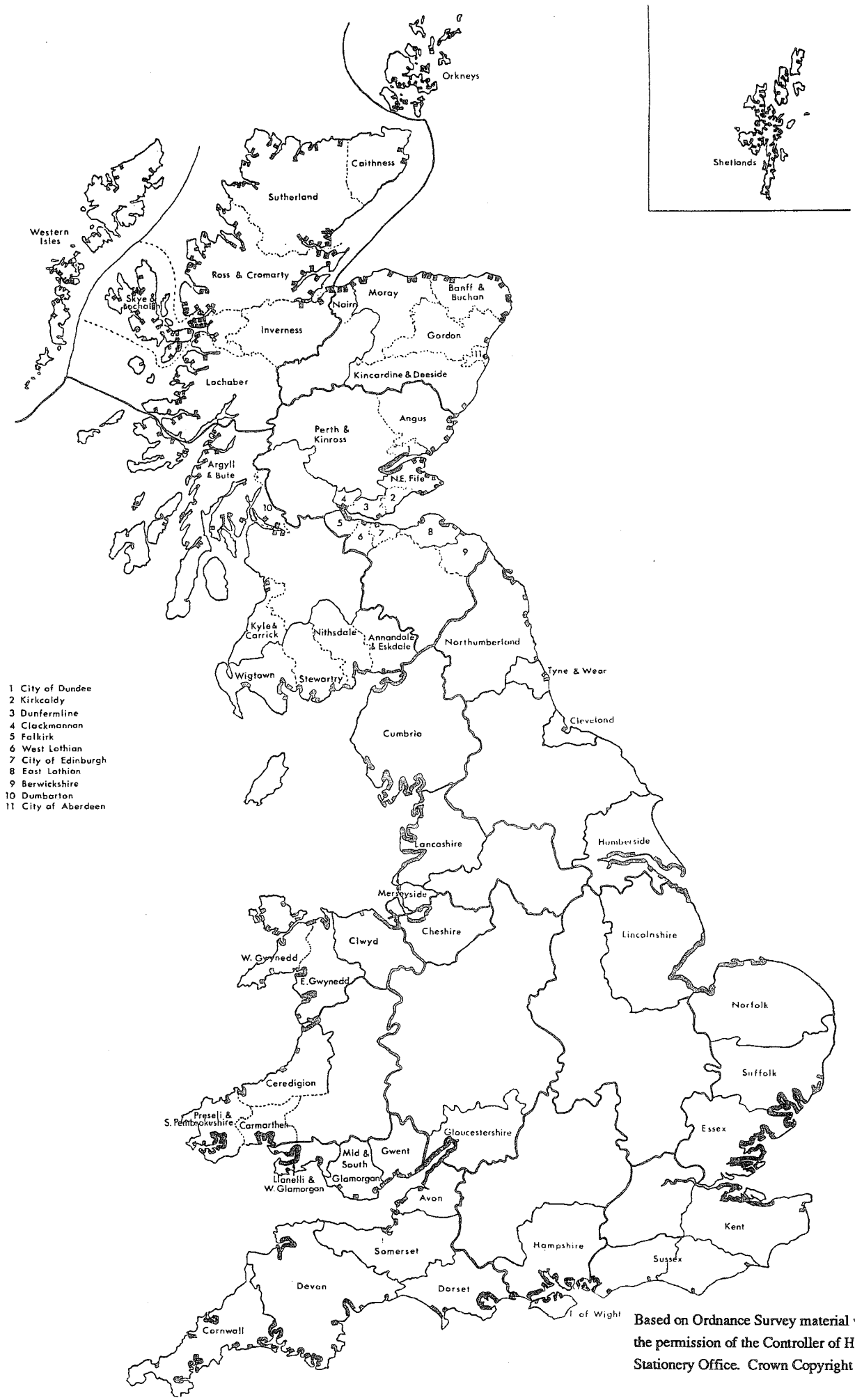
These detailed reports contain the sketch maps of the sites and information on the plant community areas both on a site and whole-county basis. Only two copies of these reports were produced, one being retained by the CSD Coastal Specialist at Peterborough, and the other being sent to the ARO covering the county. These county reports are available for consultation only (a list of all county reports is given in Appendix 8.3), which has to be either at the appropriate Regional Office or at CSD in Peterborough*.

A series of Regional Supplements has been produced in conjunction with this report in order to make site data more generally available, although not in as detailed a form as the county reports. These also allow individual sites to be placed into the context of the rest of the region. A full list of these supplements, which are available from NCC at Peterborough, is given in Appendix 8.5.

In addition to the present report, a comprehensive literature review was undertaken. This provides a full list of important references on saltmarshes, particularly in relation to their vegetation and conservation. This has been produced as a volume in the "Research and Survey in Nature Conservation" series to accompany the present report, and is available from NCC at Peterborough (Charman, Fojt and Penny, 1986)

* Footnote: Anyone interested in seeing this detailed information should contact the Coastal Ecologist at NCC, Northminster House, Peterborough, PE1 1UA.

Figure 3. General distribution of saltmarsh around the coastline of Great Britain



3. RESULTS

The results from the various documents referred to in section 2.7 have been combined to form the following summary of all data.

3.1 Distribution of saltmarsh

3.1.1 Location of saltmarsh sites

The survey located 557 sites (as defined in section 2.5.2) ranging from approx 0.5 ha to discrete units of up to 3,000 ha. Overall, the total area of saltmarsh in Great Britain amounted to 44,370 ha. A very small percentage of this area has not been surveyed (0.8 % of the total), either because the sites were missed at the time of the survey, or because access permission was denied.

The general distribution of saltmarsh throughout Great Britain is shown on Figure 3. This shows that England and Wales have very similar patterns of distribution, with large extents of saltmarsh to some extent confined to specific low-lying geographical areas - notably around the Wash, in Essex and North Kent, the Solent, the Severn Estuary, South Wales and the Liverpool Bay area. By comparison, Scotland has a scattered distribution of small isolated marshes, with the only large areas associated with the major estuaries of the Solway Firth.

The locations, and extent of the larger saltmarshes, are shown on a series of maps in Appendix 8.6. The maps also show the names and areas (in hectares) of each site. A key map is included in the Appendix to show the areas covered by each site location map.

3.1.2 Relative abundance

Overall, Essex has the largest total area of marsh of any administrative unit, with 4,637 ha, followed closely by Lincolnshire, Cumbria and Lancashire, all with over 4,000 ha. There is then a drop to the next counties - Norfolk with 2,900 ha and Llanelli/W.Glamorgan with 2,875 ha. Tables 3 - 5 on the following pages give lists of all the counties, regions and countries and their total areas of saltmarsh in decreasing order of size.

The sizes of the individual saltmarshes vary considerably from the large expanses in south east England, to the small fragmentary marshes, some as small as a few square metres, in northern Scotland. The largest single units occur around the Wash and in the Burry Inlet (Loughor Estuary) in South Wales. Appendix 8.7 lists all the saltmarsh sites from the smallest site, Carlingheugh Bay/Meg's Craig in Angus (0.01 ha*) to the largest i.e. The Wash. A rank order is given alongside each site where the largest is ranked 1 and the smallest, 557. It should be noted that large estuaries such as the Severn are represented by more than one "site" as defined by this study.

Table 3. Area of salt marsh (ha) in each administrative unit (ranked by area).
'Administrative unit' refers to counties in England and Wales and to districts in Scotland. (cont.d..)

1.	Essex	4636.98
2.	Lincolnshire	4222.79
3.	Cumbria	4161.11
4.	Lancashire	4038.88
5.	Norfolk	2903.45
6.	Llanelli and W.Glamorgan	2875.81
7.	Hampshire	2660.54
8.	Cheshire	1864.41
9.	Kent	1345.23
10.	Suffolk	1278.81
11.	Nithsdale	1078.56
12.	Clwyd	913.7

* Footnote: Marshes of this size have only been recorded in Shetland and South East Scotland where the sites are never large.

Table 3. ...continued...

13.	East Gwynedd	869.58
14.	Dorset	829.83
15.	Sussex	816.04
16.	Ross and Cromarty	718.33
17.	Humberside	647.86
18.	Wigtown	590.48
19.	Devon	549.94
20.	Somerset	498.74
21.	Merseyside and Gtr Manchester	492.79
22.	Ceredigion	477.83
23.	Cornwall	455.31
24.	Western Isles	449.3
25.	Argyll and Bute	448.9
26.	West Gwynedd	436.84
27.	Preseli and S.Pembrokeshire	396.32
28.	Carmarthen	395.89
29.	Perth and Kinross	359.19
30.	Avon	313.85
31.	Lochaber	290.529
32.	Northumberland	268.96
33.	Gwent	266.89
34.	Gloucestershire	257.75
35.	Sutherland	242.01
36.	Stewartry	240.97
37.	Skye and Lochalsh	236.67
38.	Isle of Wight	213.79
39.	Moray	202.55
40.	Nairn	201.02
41.	East Lothian	189.76
42.	North East Fife	138.232
43.	Annandale and Eskdale	132.39
44.	Mid and South Glamorgan	105.84
45.	Inverness	87.7
46.	Falkirk	84.572
47.	Orkney	76.49
48.	Angus	68.565
49.	Dumbarton	67.12
50.	Dundee	47.65
51.	Cleveland	34.16
52.	Kyle and Carrick	33.4
53.	Banff and Buchan	27.06
54.	Gordon	25.39
55.	Caithness	19.17
56.	Shetland	16.0
57.	Tyne and Wear	8.91
58.	Montgomery	8.87
59.	Clackmannan	7.99
60.	Kincardine and Deeside	4.0
61.	Dunfermline	3.04
62.	Aberdeen	0.51
63.	Kirkcaldy	0.262
64.	West Lothian	0.114
65.	Berwickshire	0.07
66.	Edinburgh	0.03

Table 4. Area of salt marsh (ha) in each NCC region (ranked by area)		
1.	East Anglia	8819.24
2.	North-West England	8692.78
3.	East Midlands	4222.79
4.	South Wales	3248.54
5.	South England	2874.33
6.	South-West England	2647.67
7.	South-West Scotland	2591.82
8.	North Wales	2220.12
9.	South-East England	2161.27
10.	West Midlands	2122.16
11.	North-West Scotland	2045.00
12.	Dyfed-Powys	1278.91
13.	North-East England	959.89
14.	South-East Scotland	899.48
15.	North-East Scotland	553.02

Table 5. Area of salt marsh (ha) in each country (ranked by area)		
1.	England	32500.13
2.	Wales	6747.57
3.	Scotland	6089.33

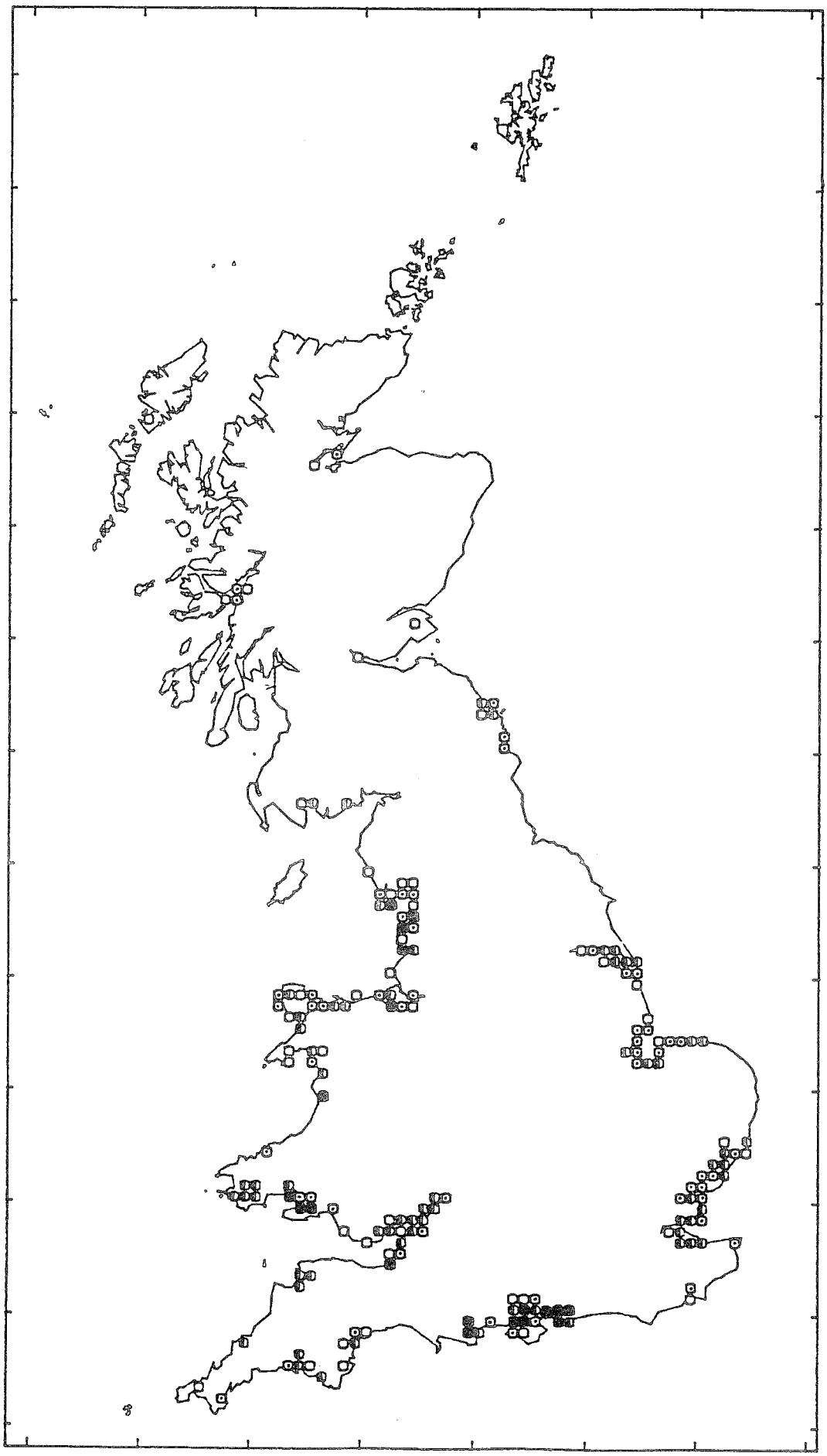
3.2 Distribution of plant communities

3.2.1 Trends in community distributions

The following pages show broadly the patterns of community distribution around the country, in the form of brief descriptions, maps and graphs. A note on the NVC communities incorporated within each type is also included. Further descriptions of the NVC communities may be found in Appendix 8.1.

Spartina (1a) per 10 km sq

Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◐ 10 - 100 ha
● > 100 ha



Pioneer communities

Spartina (1a)

Spartina 1a occurs extensively in many of the saltmarshes of England and Wales. Though the largest expanses occur in the south and south west of England, there are also large areas in much of the rest of western England and Wales.

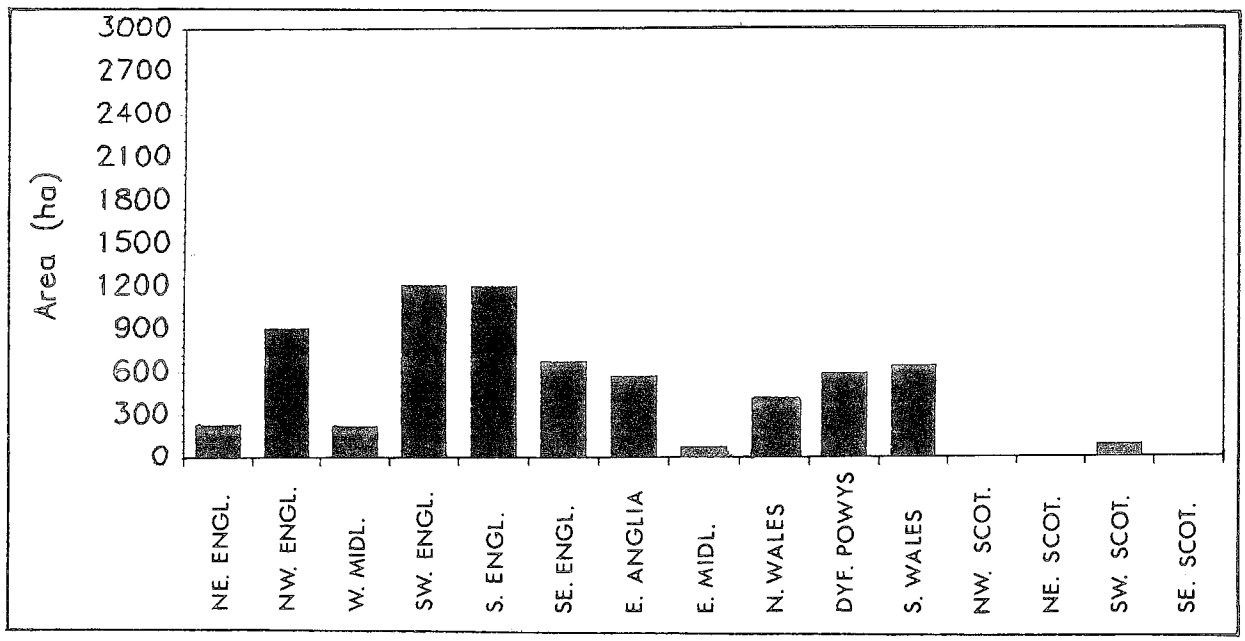
Although *Spartina* 1a does occur in Scotland these occurrences are scattered and only occupy small areas. Apart from one small isolated record in the Western Isles (Seilebost in South Harris) this community does not occur north of a line from Cromarty Firth to Loch Linnhe.

In addition to observations from this survey there is much evidence of extensive *Spartina* die-back along the south coast (the original source of colonisation) and in the Humber Estuary (Doody 1984). In contrast, the large areas of this community on the west coast would appear to be due to active *Spartina* invasion on young saltmarshes.

Relationship with NVC

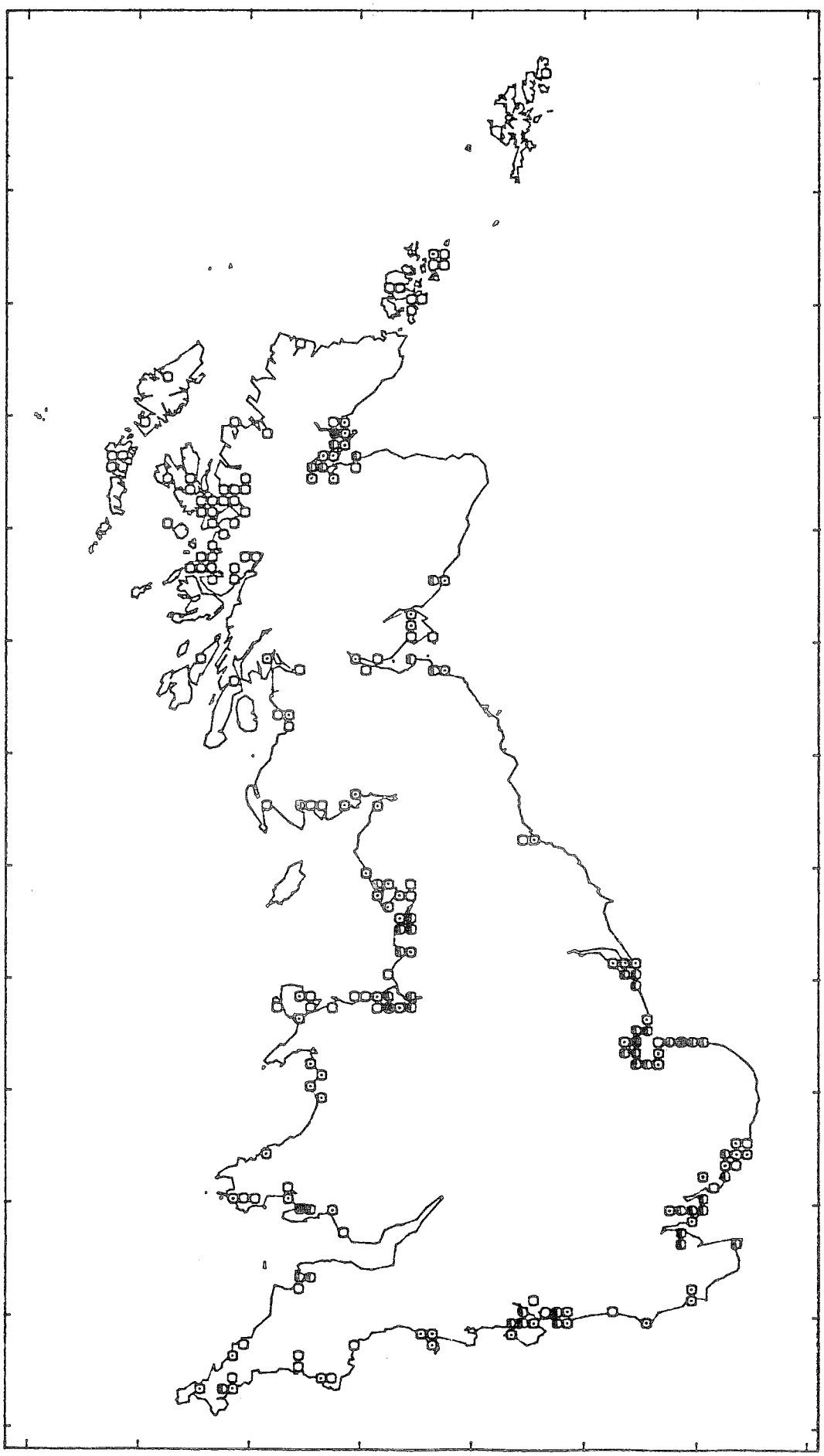
This community incorporates the NVC communities SM4 (*Spartina maritima*), SM5 (*S. alterniflora*) and SM6 (*S. anglica*).

Graph showing the area of *Spartina* (1a) in each NCC region.



Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◍ 10 - 100 ha
● > 100 ha

Salicornia/Sueda (2a) per 10 km sq



Pioneer communities

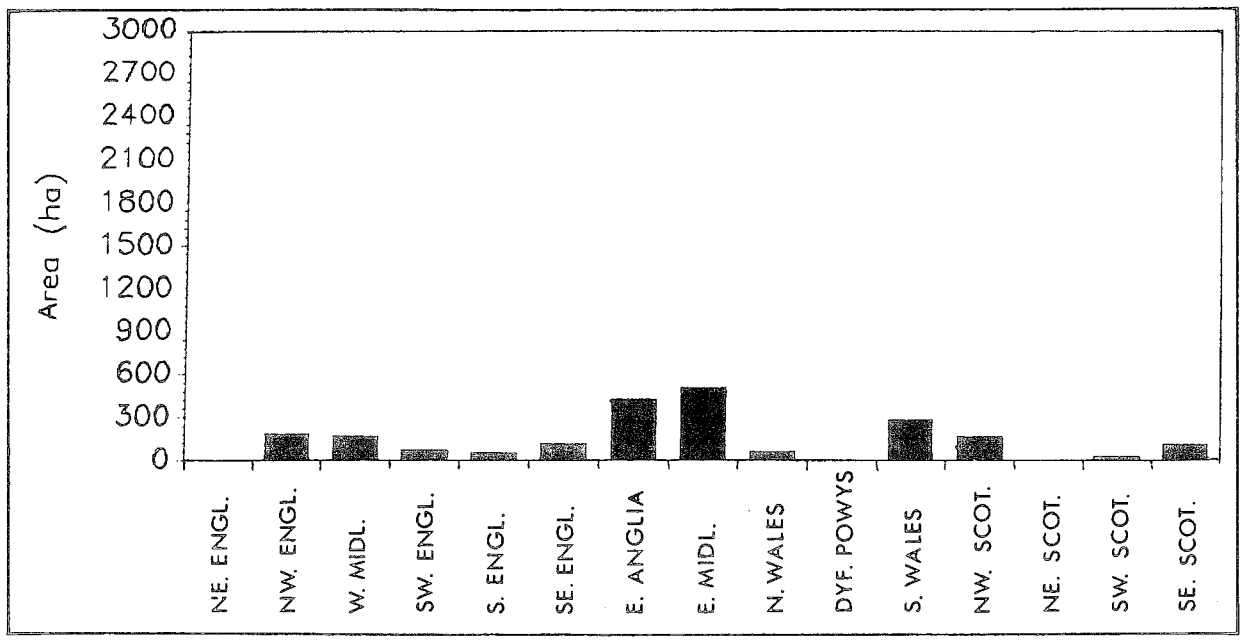
Salicornia/Suaeda (2a)

This pioneer community is widespread nationally although the areas are small, particularly in Scotland. Large areas of *Salicornia/Suaeda* occur on only five sites: North Norfolk, The Wash, Burry Inlet, Dee Estuary and Dornoch Firth. The largest total areas of the community are found on the east coast in East Anglia and the East Midlands.

Relationship with NVC

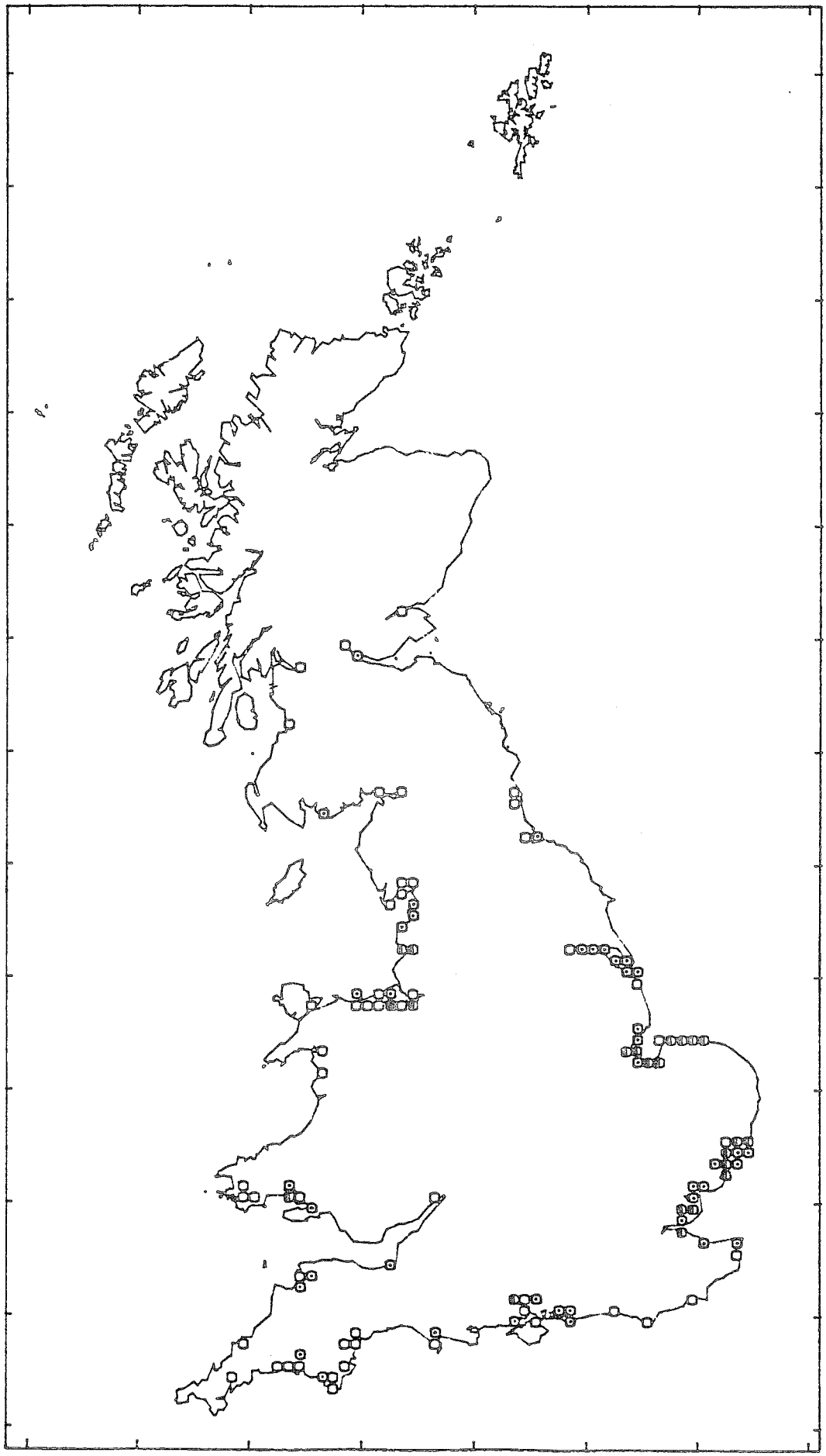
This community incorporates the NVC communities SM7 (*Arthrocnemum perenne*), SM8 (Annual *Salicornia*) and SM9 (*Suaeda maritima*).

Graph showing the area of *Salicornia/Suaeda* (2a) in each NCC region.



Aster (2b) per 10 km sq

Symbol: 10Km squares
Key:
- < 1 ha
- 1 - 10 ha
- 10 - 100 ha
- > 100 ha



Pioneer communities

Aster (2b)

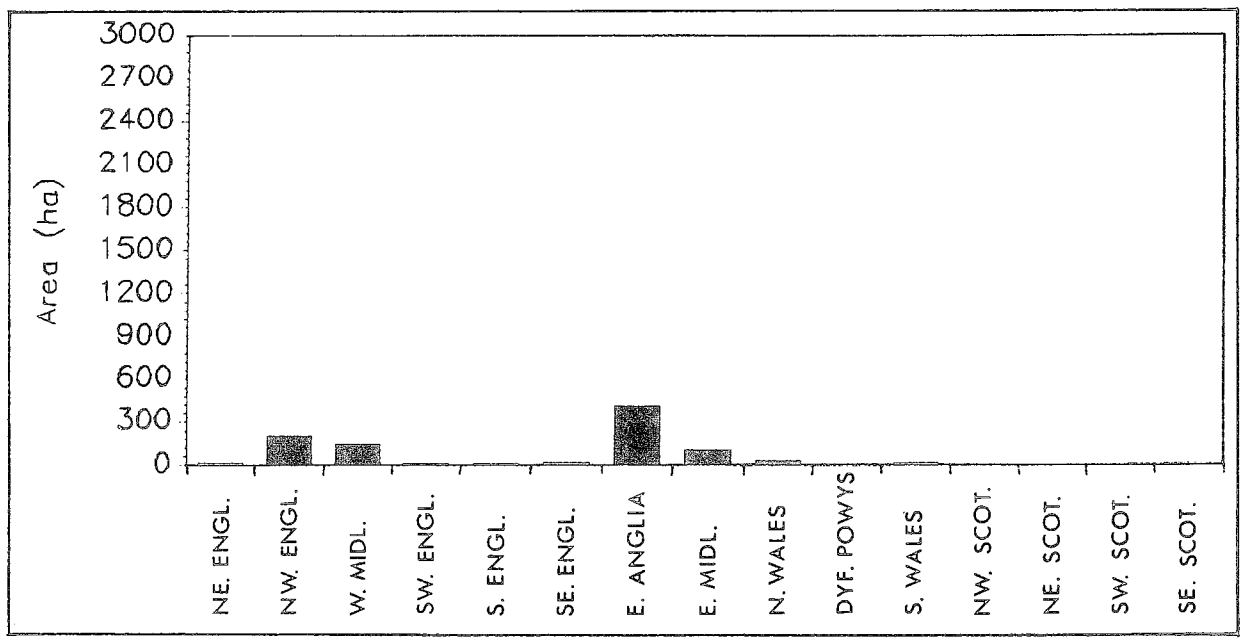
As a community, *Aster* 2b has a marked southern distribution, not occurring north of the Tay Estuary, although the species itself is widespread around the country (Perring and Walters 1976). This suggests that although the species occurs in Scotland, the levels of abundance are not sufficient to reach the status of a 'community'. In places where the *Aster* does occur without forming a community the species becomes a constituent of other communities such as the *Puccinellia* 3a.

In Scotland *Aster* occurs mainly at the upper end of the marsh rather than as a low marsh community as in England and Wales.

Relationship with NVC

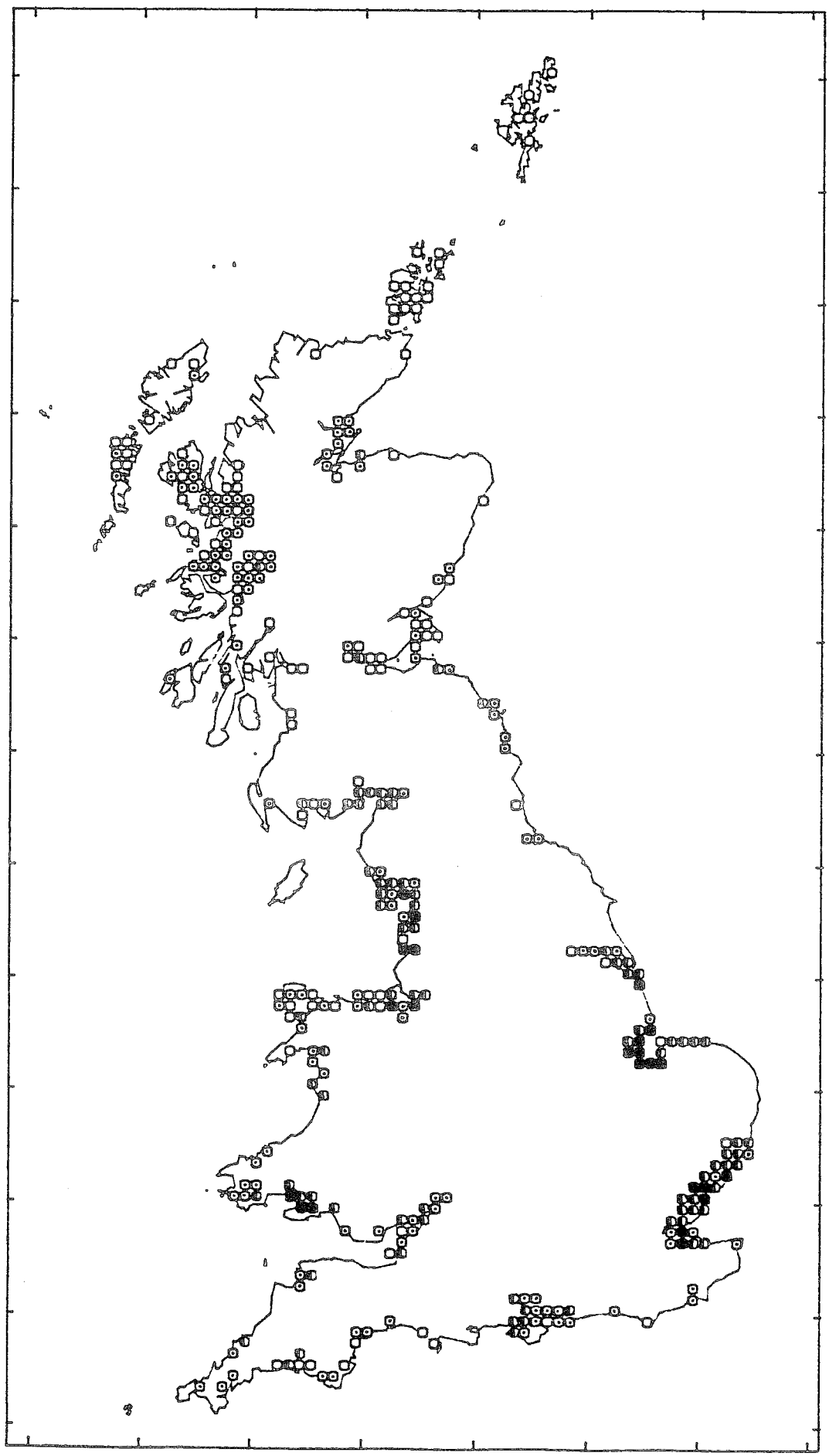
This community incorporates the NVC communities SM11 (*Aster tripolium* var *discoideus*) and SM12 (Rayed *Aster tripolium*).

Graph showing the area of *Aster* (2b) in each NCC region.



Puccinellia (3a) per 10 km sq

Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◐ 10 - 100 ha
● > 100 ha



Low-mid marsh communities

Puccinellia (3a)

This community has a widespread distribution with large areas present on some sites, often occupying high percentages of the total site area. The main areas where *Puccinellia* 3a is abundant are along the east coast of England, South Wales and North West England. Consistently large areas are found around the Wash where the extensive reclamation has restricted the marsh to pioneer and low marsh communities.

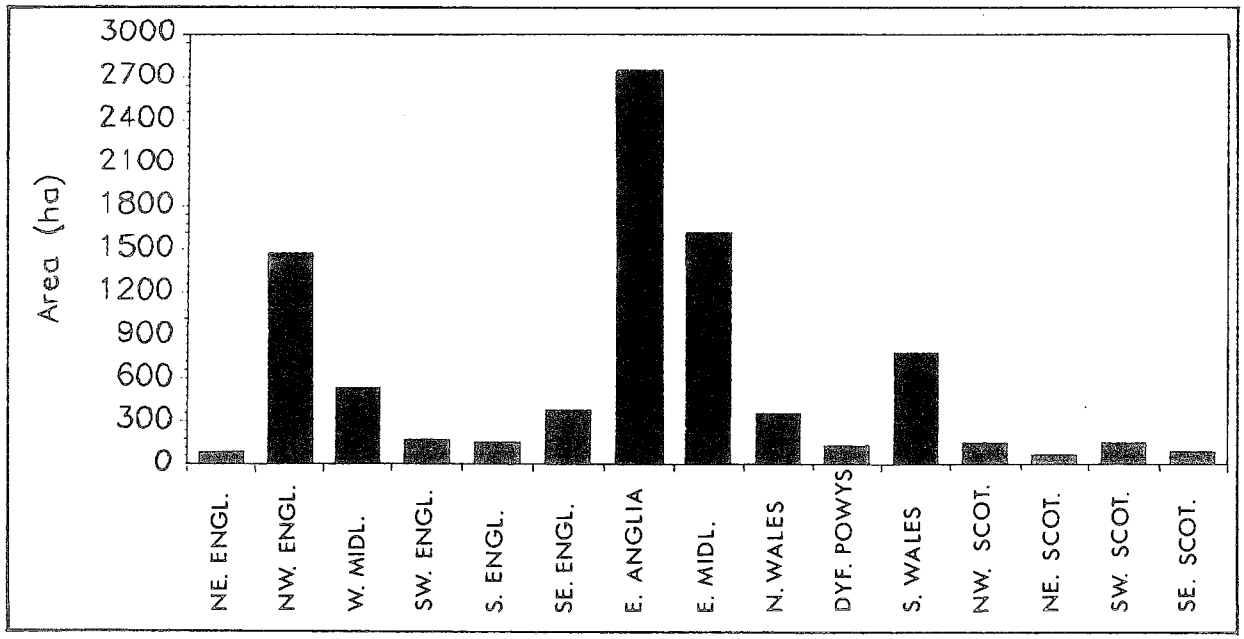
In general *Puccinellia* 3a replaces *Halimione* 3b where there is a high level of grazing. In the presence of grazing the long stolons of *Puccinellia* are replaced by a short mat-like growth form (Ranwell 1972). The presence of grazing on a site therefore only influences the growth form of *Puccinellia* and not its presence on the site.

In Scotland, the *Puccinellia* 3a appears less abundant, probably due to the small areas of the sites. In addition the community occurs more often as a pioneer than in England and Wales, where it occurs mainly in the low-mid marsh. Chapman (1941) suggested that higher levels of sand in the substrate were directly responsible for increasing amounts of *Puccinellia* in the vegetation of the pioneer marsh.

Relationship with NVC

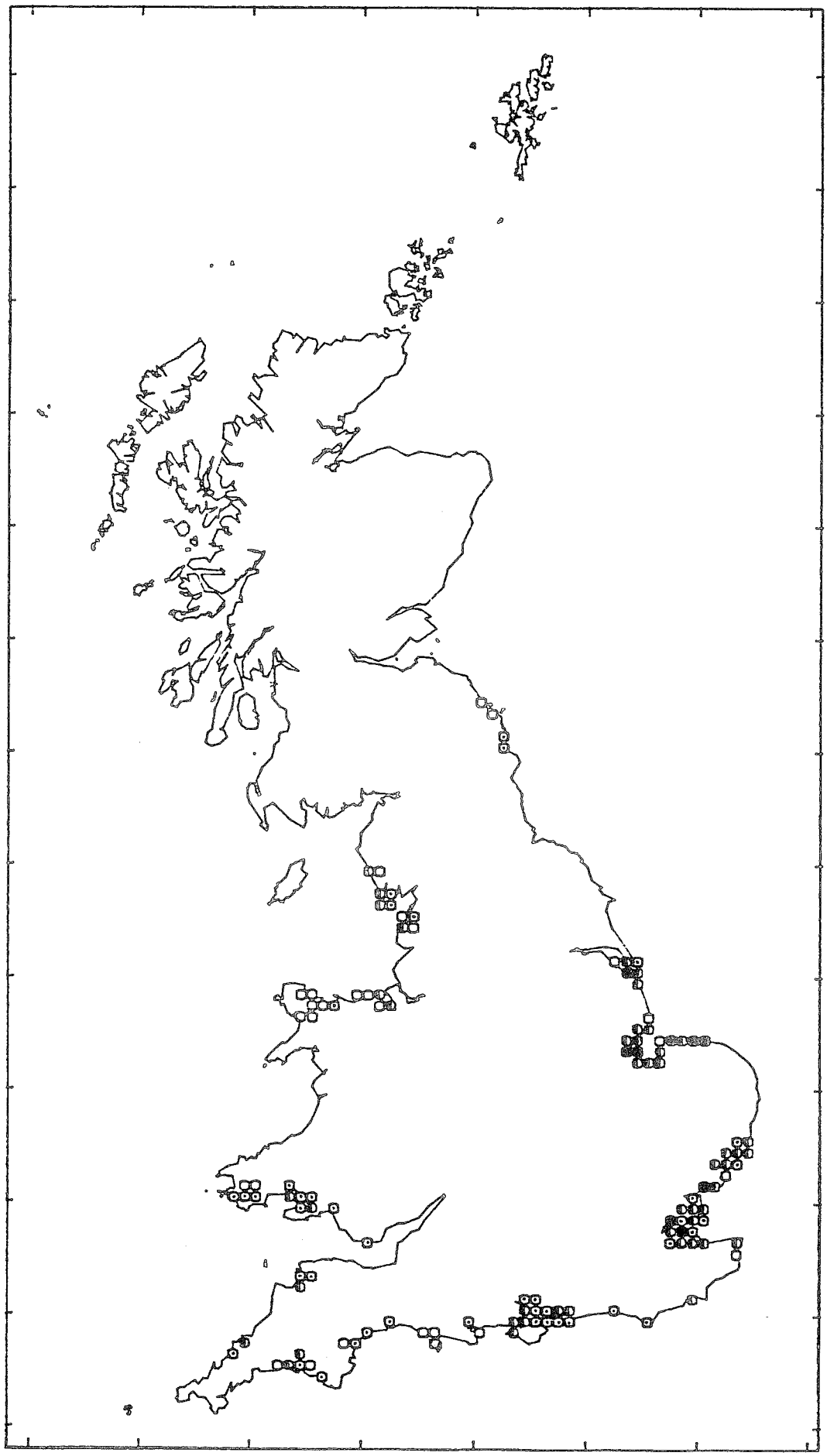
This community incorporates the NVC communities SM10 (Transitional low marsh with *Puccinellia maritima*, annual *Salicornia* species and *Suaeda maritima*) and SM13 (*Puccinellia maritima* saltmarsh, *Puccinellia maritima* dominated sub-community).

Graph showing the area of *Puccinellia* (3a) in each NCC region.



Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◐ 10 - 100 ha
● > 100 ha

Halimione (3b) per 10 km sq



Low-mid marsh communities

Halimione (3b)

This community has a southern distribution, not occurring north of Cumbria in the west, but extending up to Lindisfarne in the east. This confirms the distribution of the species given by Perring and Walters (1976). Chapman (1976) suggested that this distribution was correlated with the 60° F July isotherm.

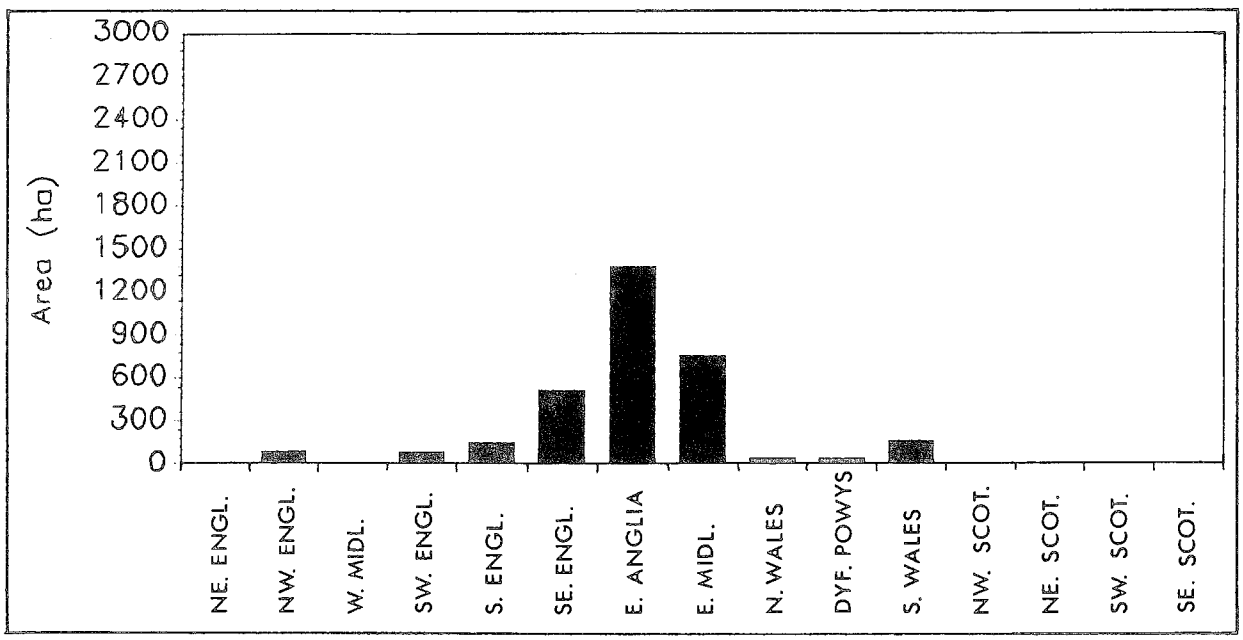
Halimione is very susceptible to grazing, possibly due to its brittle woody rootstock, which is common to many other mid marsh species such as *Armeria maritima* and *Limonium* sp. This is more vulnerable to trampling than the compact short rhizomatous growth of species such as *Festuca rubra, Juncus gerardii* and *Triglochin maritima* (Ranwell 1972).

The area occupied by the community is therefore reduced on the west coast where most of the sites are grazed, but is still fairly extensive on ungrazed sites in the east, particularly in East Anglia, South East England and the East Midlands. On heavily grazed sites such as the Wash the *Halimione* 3b is replaced by low marsh *Puccinellia* 3a.

Relationship with NVC

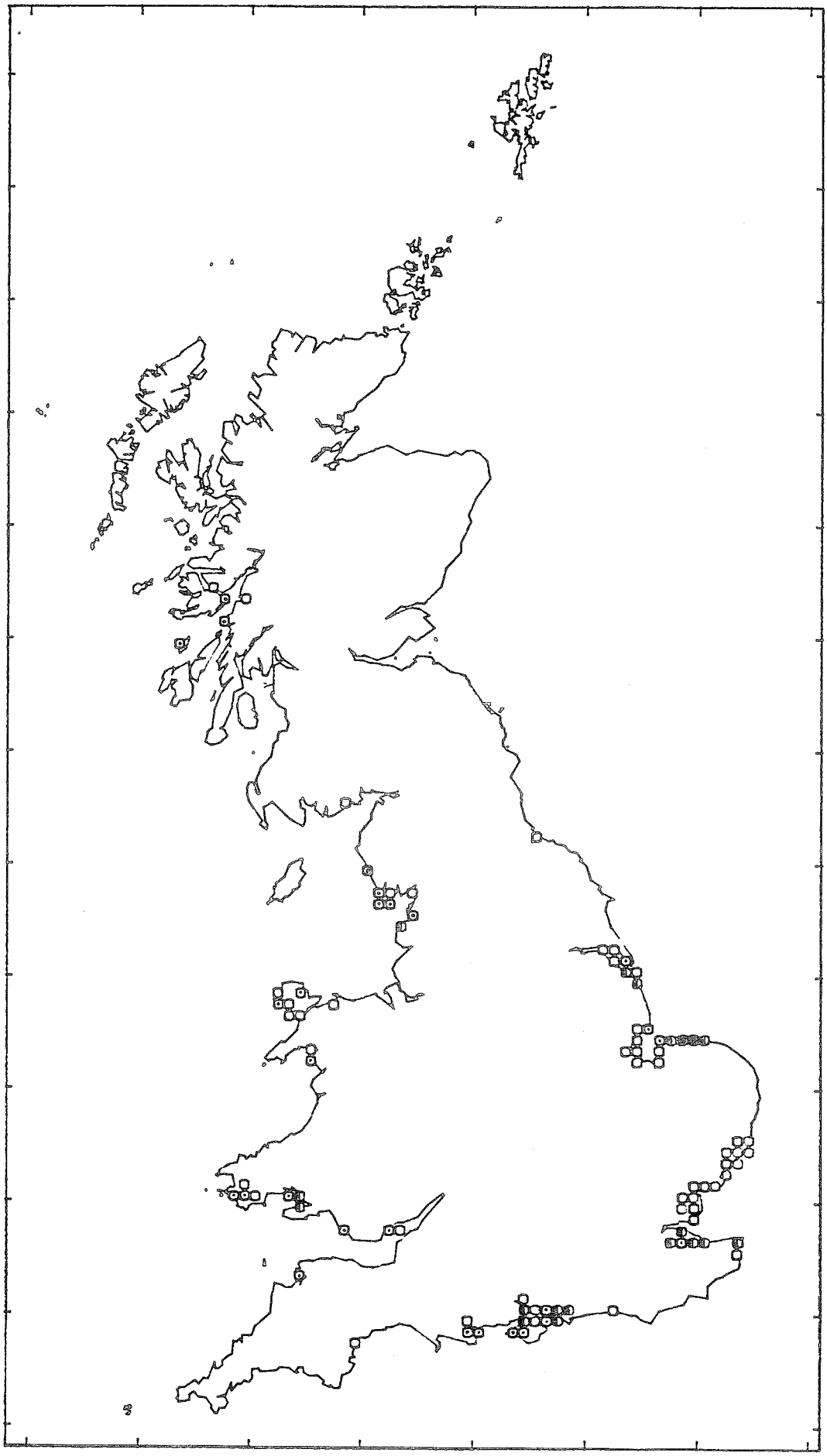
This community incorporates the NVC communities SM14 (*Halimione portulacoides* saltmarsh), including the following sub-communities: *Halimione portulacoides* sub-community; *Juncus maritimus* sub-community and *Puccinellia maritima* sub-community.

Graph showing the area of *Halimione* (3b) in each NCC region.



Limonium/Armeria (4a) per 10 Km sq

Symbol: 10Km squares
Key:
- < 1 ha
- 1 - 10 ha
- 10 - 100 ha
- > 100 ha



Mid-upper marsh communities

Limonium/Armeria (4a)

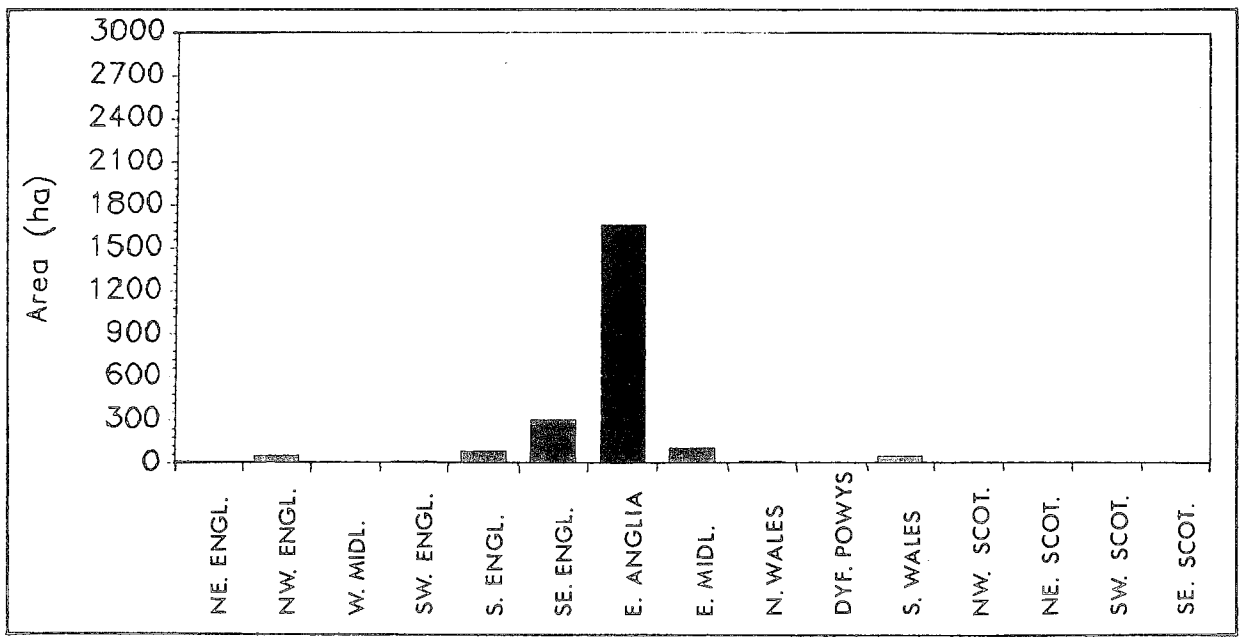
This community has a southern bias to its distribution, occurring most extensively in East Anglia. The community itself is not common, but does occur in large areas along the North Norfolk Coast and in Essex.

Some records of this community have been recorded in south west Scotland, but as *Limonium* itself does not occur north of the Solway Firth these have probably been recorded in places where *Armeria* alone is abundant.

Relationship with NVC

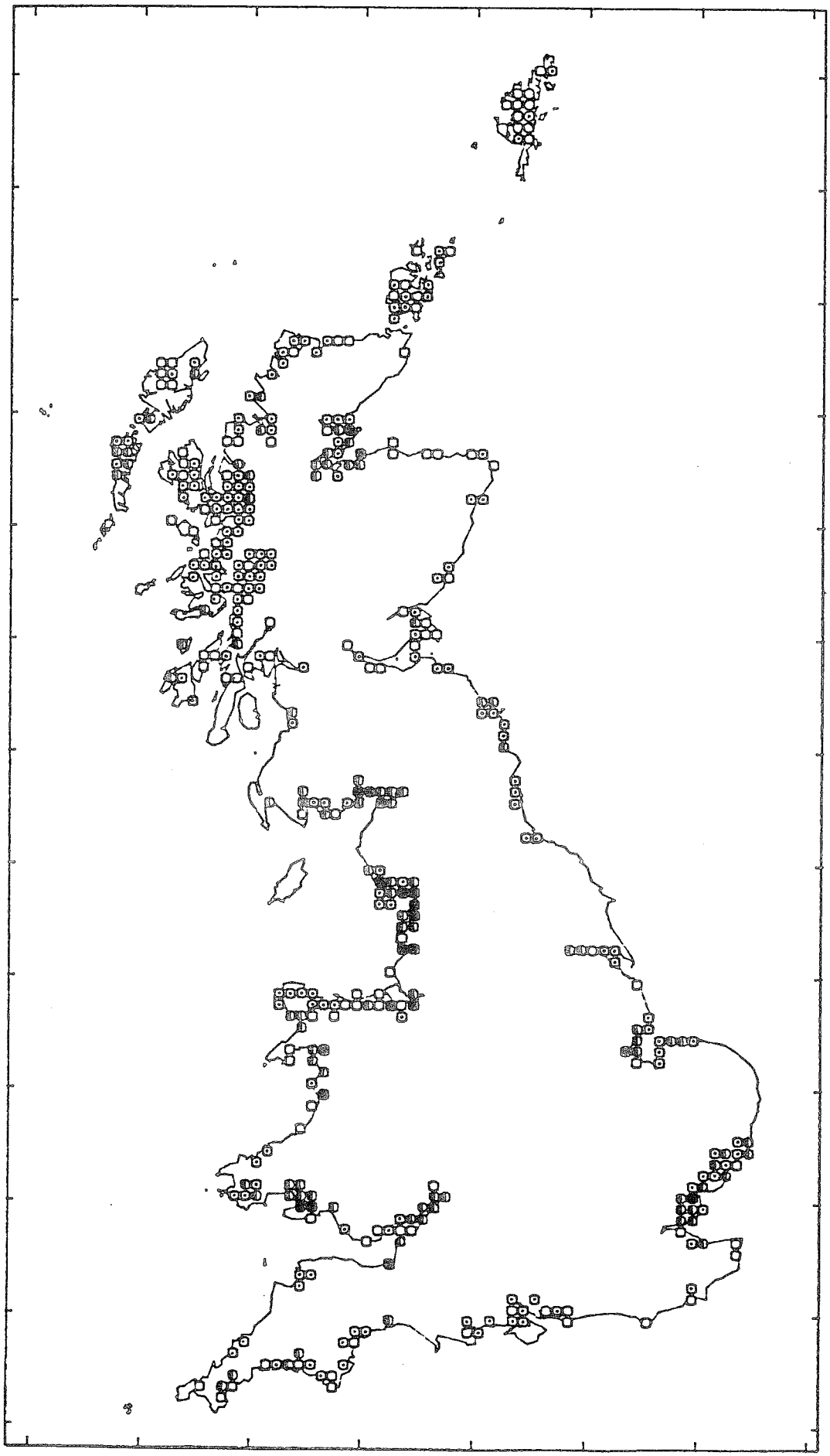
This community incorporates the NVC community SM13 (*Puccinellia maritima* saltmarsh) - *Limonium vulgare/Armeria maritima* sub-community

Graph showing the area of *Limonium/Armeria* (4a) in each NCC region.



Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◍ 10 - 100 ha
● > 100 ha

Puccinellia/Festuca (4b) per 10 km sq



Mid-upper marsh communities

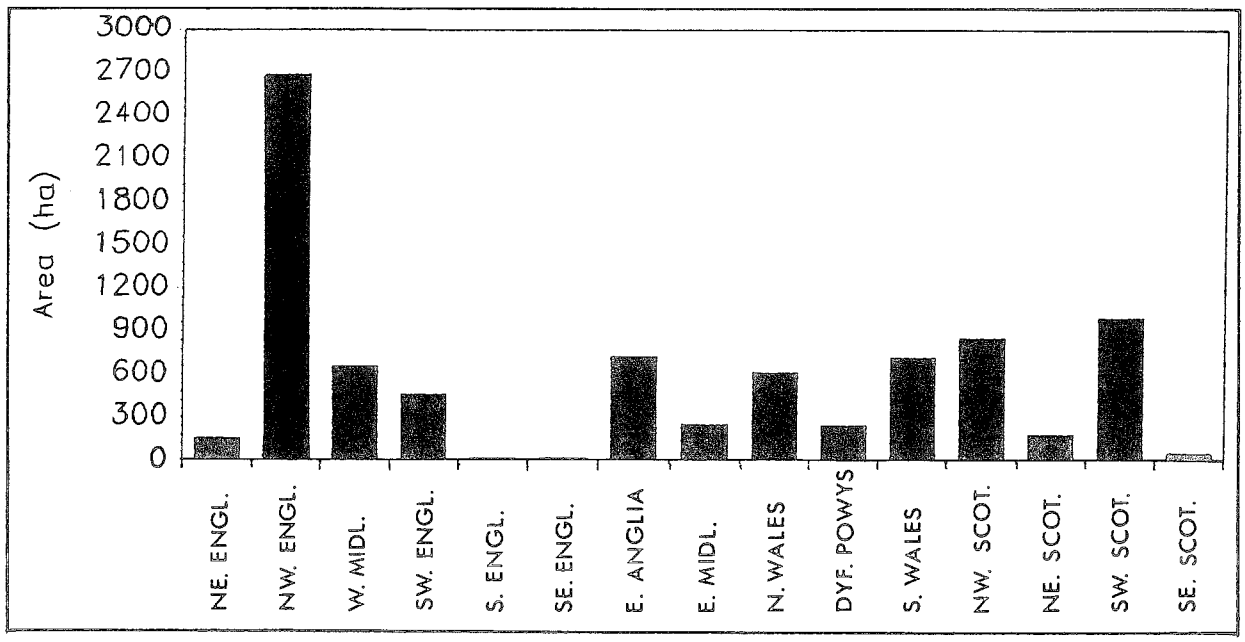
Puccinellia/Festuca (4b)

The *Puccinellia/Festuca* 4b community is the most widespread and most abundant community, often occupying very large proportions of the site areas. This is particularly the case in the west between the Solway and the Severn where the actual site areas involved are large, and on many of the north-west Scottish marshes where the sites may be entirely dominated by 4b.

Relationship with NVC

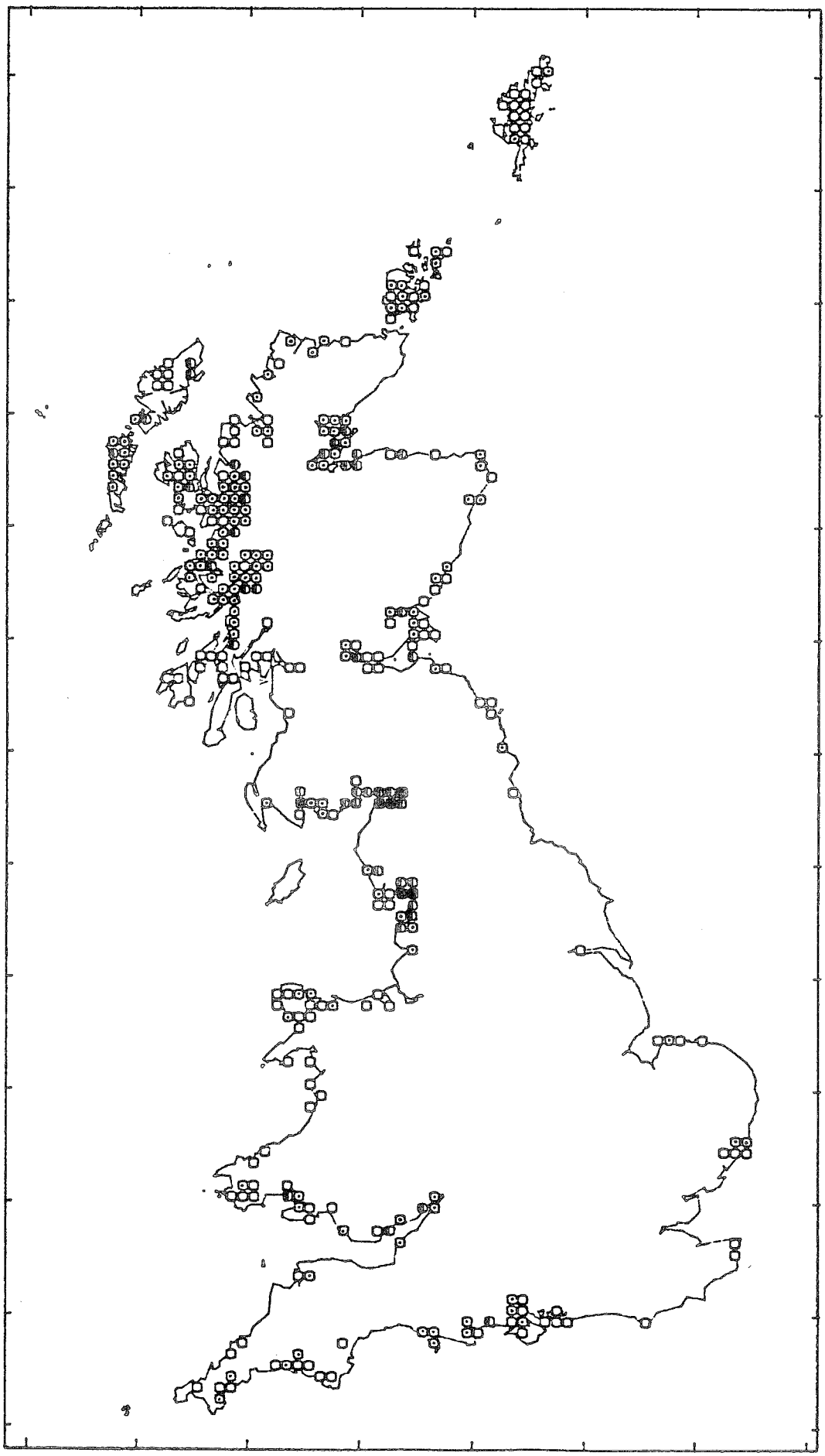
This community incorporates the NVC communities SM13 (*Puccinellia maritima* saltmarsh - *Glaux maritima* sub-community, *Plantago maritima/Armeria maritima* sub-community and turf fucoid sub-community); SM16 (*Festuca rubra* saltmarsh - sub-community with tall *Festuca rubra* dominant) and SM17 (*Artemisia maritima* saltmarsh)

Graph showing the area of *Puccinellia/Festuca* (4b) in each NCC region.



J.gerardii (4c) per 10 km sq

Symbol: 10Km squares
Key:
- ○ < 1 ha
- ⊙ 1 - 10 ha
- ◐ 10 - 100 ha
- ● > 100 ha



Mid-upper marsh communities

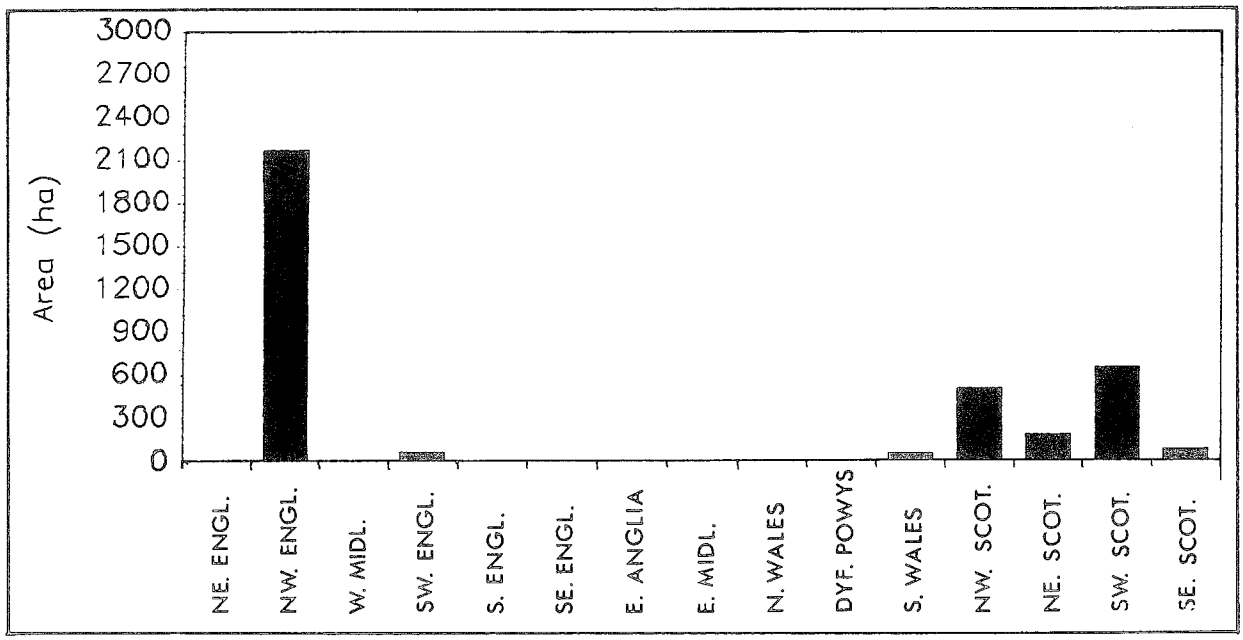
Juncus gerardii (4c)

This community has a predominantly western distribution with a bias towards the north. Like *Puccinellia/Festuca* (4b) this community occupies high percentages of the marsh areas in north-west Scotland in particular, although the marshes of the Solway and Morecambe Bay have the largest actual areas.

Relationship with NVC

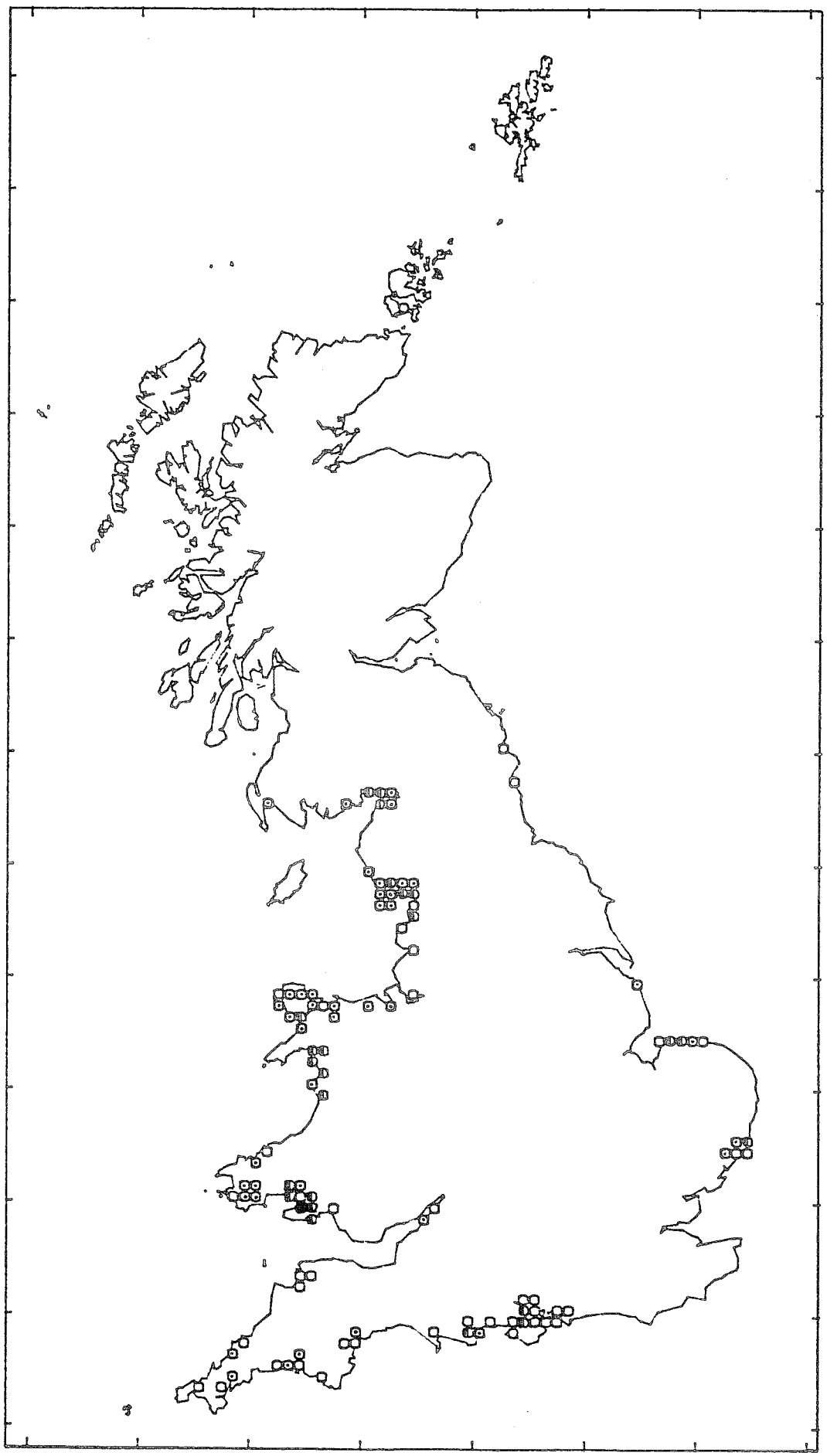
This community incorporates the NVC community SM16 (*Festuca rubra* saltmarsh) with the following sub-communities:
Puccinellia maritima sub-community, sub-community with *Juncus gerardii* dominant, *Festuca rubra/Glaux maritima* sub-community, *Leontodon autumnalis* sub-community and *Carex flacca* sub-community.

Graph showing the area of *Juncus gerardii* (4c) in each NCC region.



J. maritimus (4d) per 10 km sq

Symbol: 10Km squares
Key:
- ○ < 1 ha
- ⊙ 1 - 10 ha
- ◐ 10 - 100 ha
- ● > 100 ha



Mid-upper marsh communities

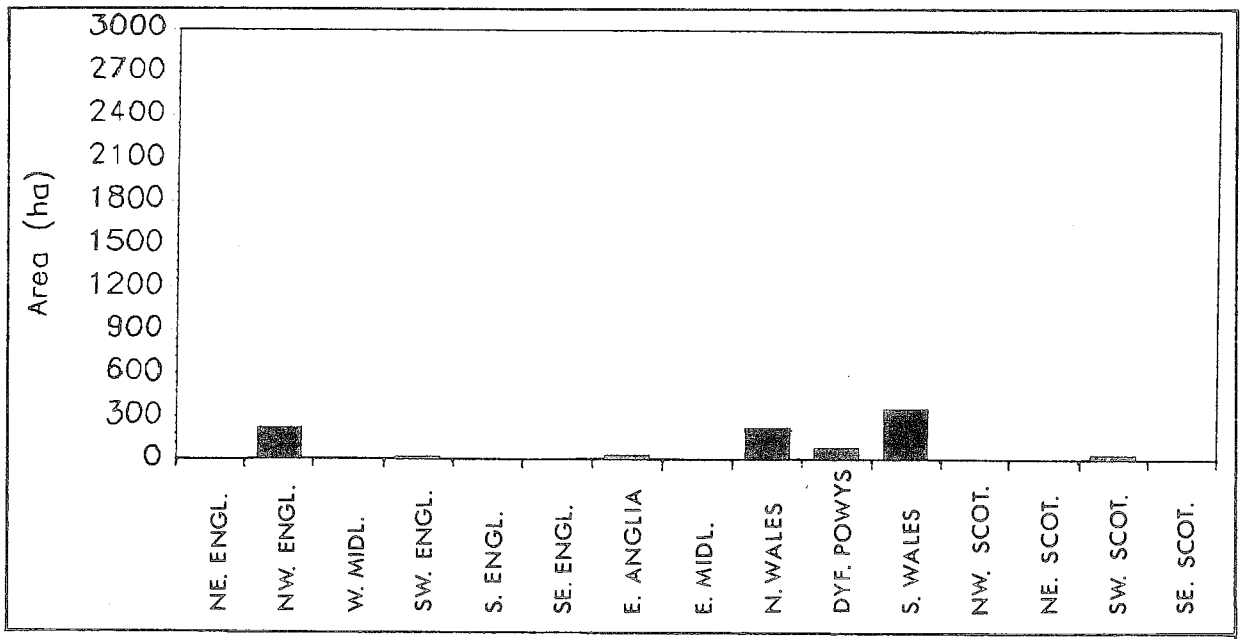
Juncus maritimus (4d)

Juncus maritimus 4d has a south-western distribution, mainly of small areas, the largest of which occurs in Burry Inlet. Although some occurrences of the community are recorded along the north shore of the Solway Firth, there are no records north of this.

Relationship with NVC

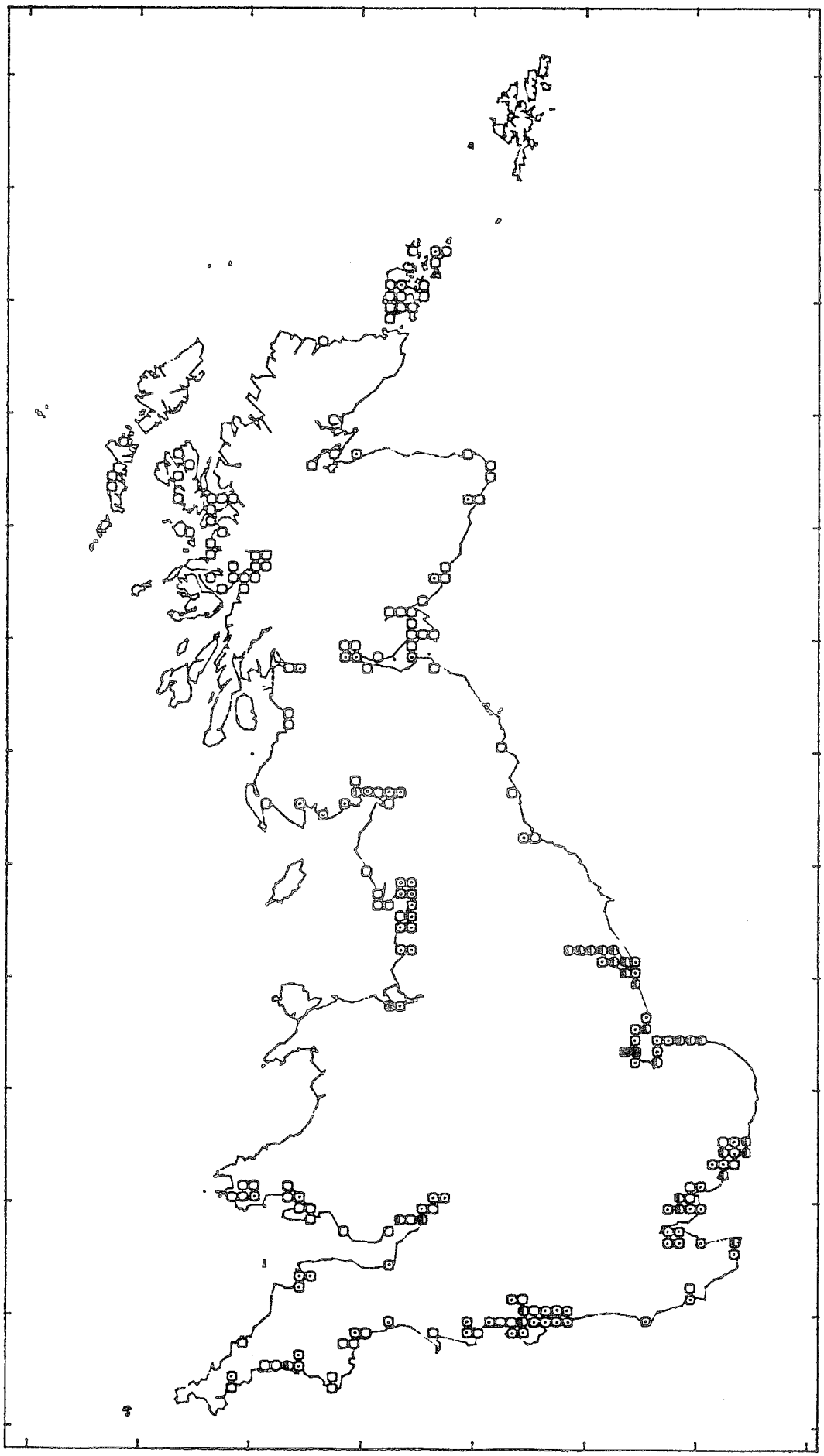
This community incorporates the NVC communities SM15 (*Juncus maritimus - Triglochin maritima* saltmarsh) and SM18 (*Juncus maritimus* saltmarsh, including the following sub-communities:
Plantago maritima sub-community, *Oenanthe lachenalii* sub-community and *Festuca arundinacea* sub-community).

Graph showing the area of *Juncus maritimus* (4d) in each NCC region.



Agropyron (5a) per 10 km sq

Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◐ 10 - 100 ha
● > 100 ha



Drift line communities

Agropyron (5a)

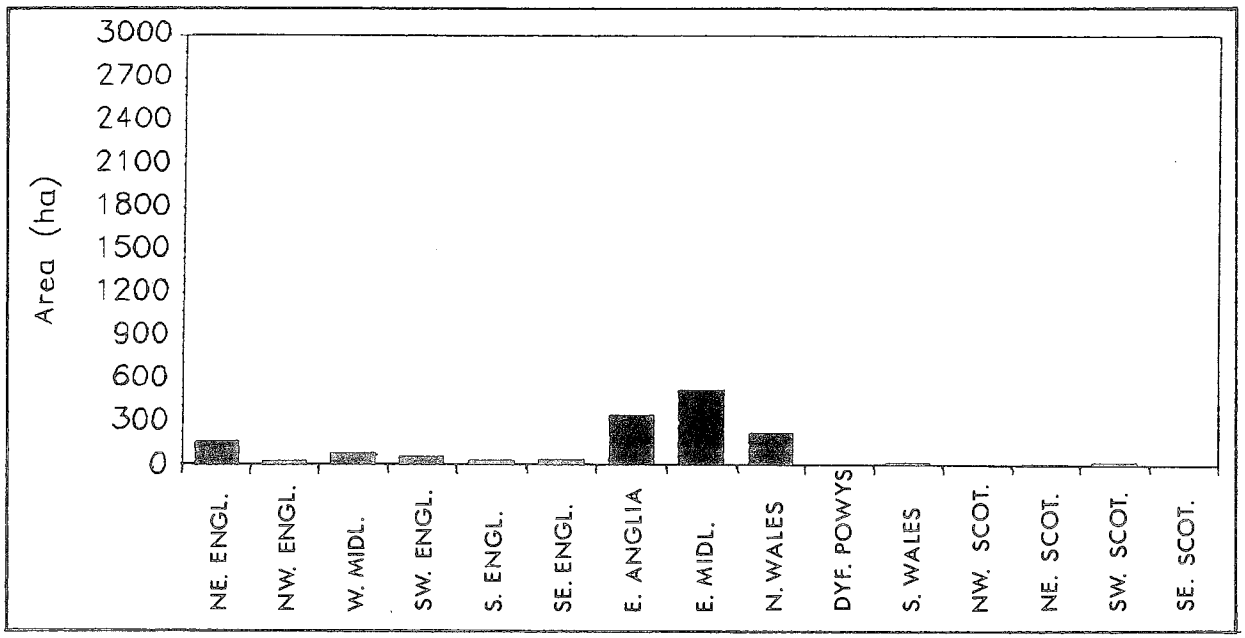
Agropyron 5a as a community is fairly widespread, although occurring significantly more abundantly in the south and east than in Scotland. However, it should be noted that this community does not differentiate between *A. repens* and *A. pungens*. The distributions of these two species are somewhat different; both species occur in England and Wales but *A. pungens* does not occur north of the Solway Firth (Perring and Walters 1976).

The fact that only one species is contributing to the distribution of the community in Scotland may partly account for the reduced levels of abundance here. Alternatively this reduction may be due to the fact that the niche *Agropyron* 5a often occupies, i.e. sea walls, occurs much less frequently in Scotland.

Relationship with NVC

This community incorporates the NVC communities SM24 (*Elymus pycnanthus*) and SM28 (*Elymus repens*).

Graph showing the area of *Agropyron* (5a) in each NCC region.



S. fruticosa (5b) per 10 km sq

Symbol: 10Km squares
Key: O < 1 ha
⊕ 10 - 100 ha

Drift line communities

Suaeda fruticosa (5b)

S. fruticosa 5b is very limited in extent, only occurring abundantly along the North Norfolk Coast, although there is a single record on the south coast at Chesil and The Fleet. Although this species has also been recorded on the coast of Essex and Suffolk (Perring and Walters, 1976) the method of mapping in this area (ITE 1974) did not differentiate this community, the areas of which were small and mainly found only along the edges of shingle ridges. Records from this stretch of coastline were therefore not mapped in the present survey.

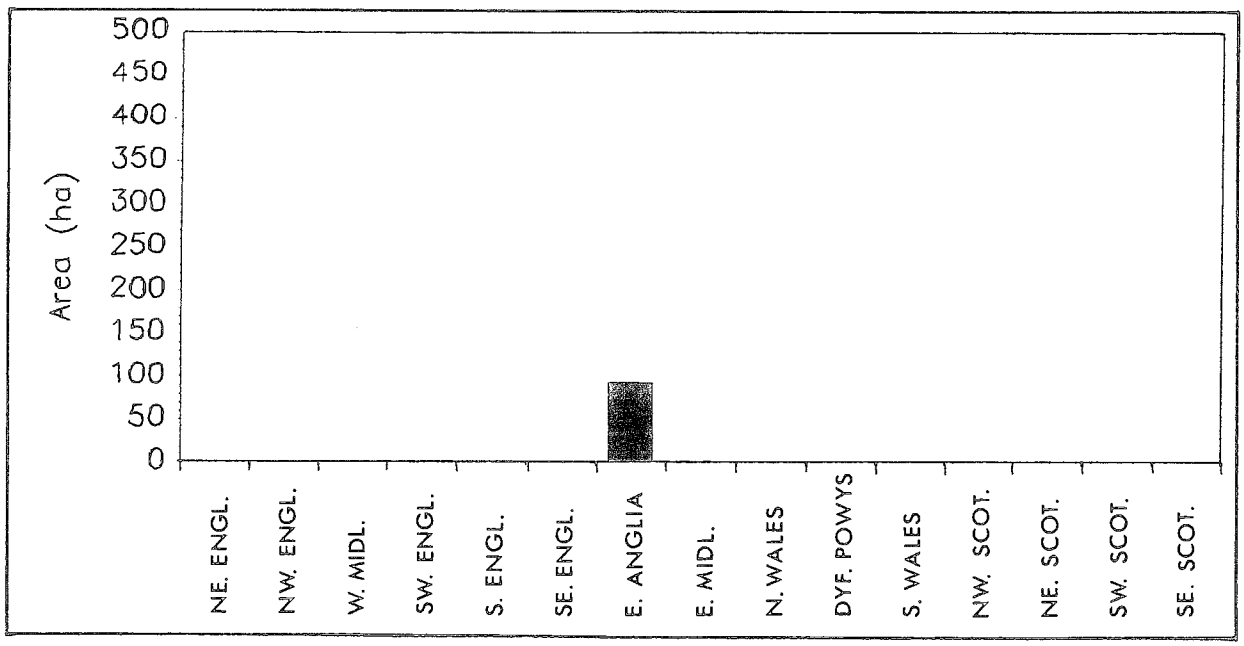
It is known that *S. fruticosa* is at the northern limit of its distribution on the North Norfolk Coast, the species itself being predominantly Mediterranean. Chapman (1976) correlated this northern limit with the 61° F isotherm for August.

Relationship with NVC

This community incorporates the NVC community SM25 (*Suaeda vera* drift line)

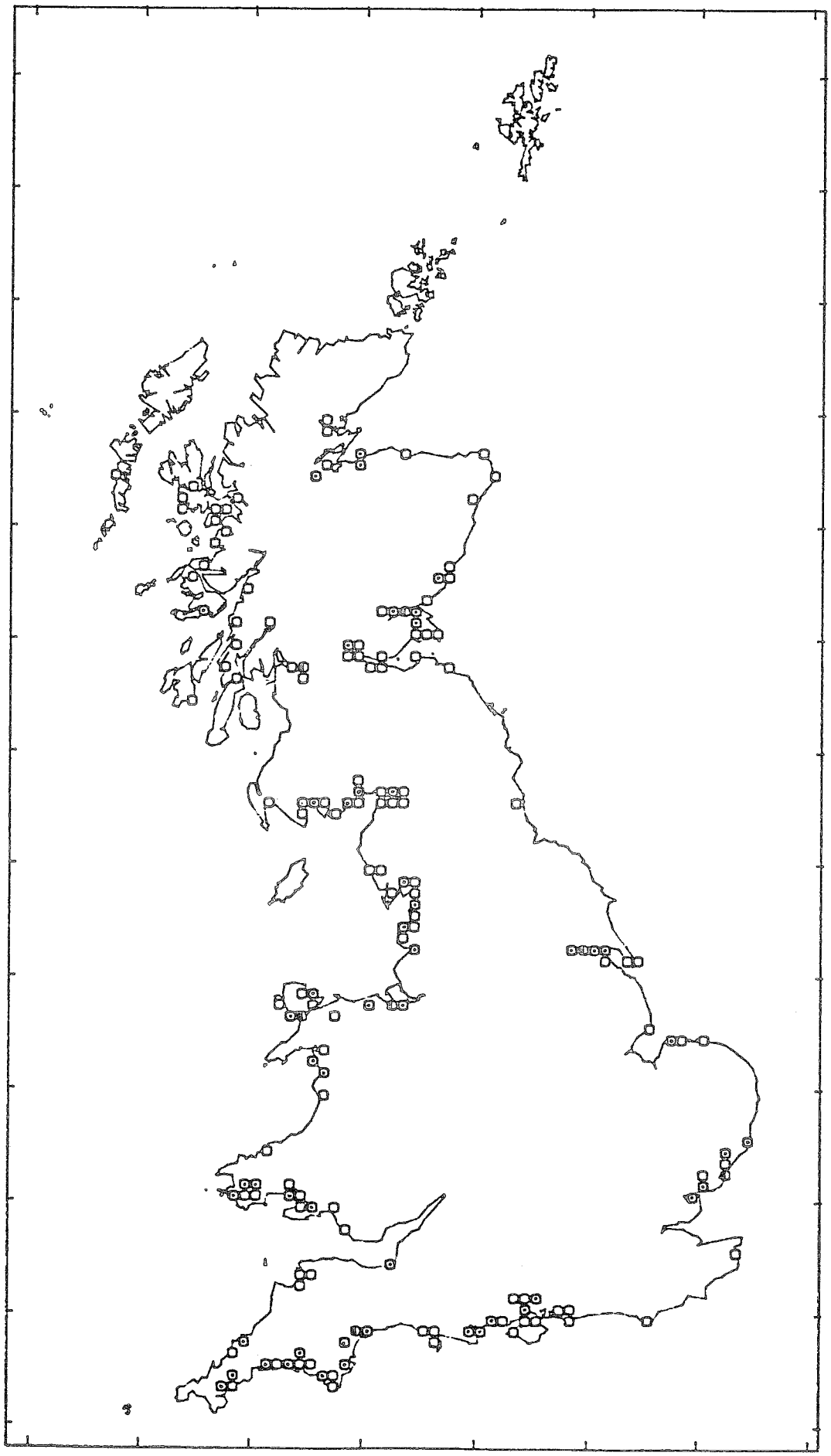
Graph showing the area of *Suaeda fruticosa* (5b) in each NCC region.

NB. The scale of the graphs has been changed from 0-3000 to 0-500 since the community areas involved are so small.



Scirpus (6i) per 10 km sq

Symbol: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
● 10 - 100 ha



Upper marsh swamps

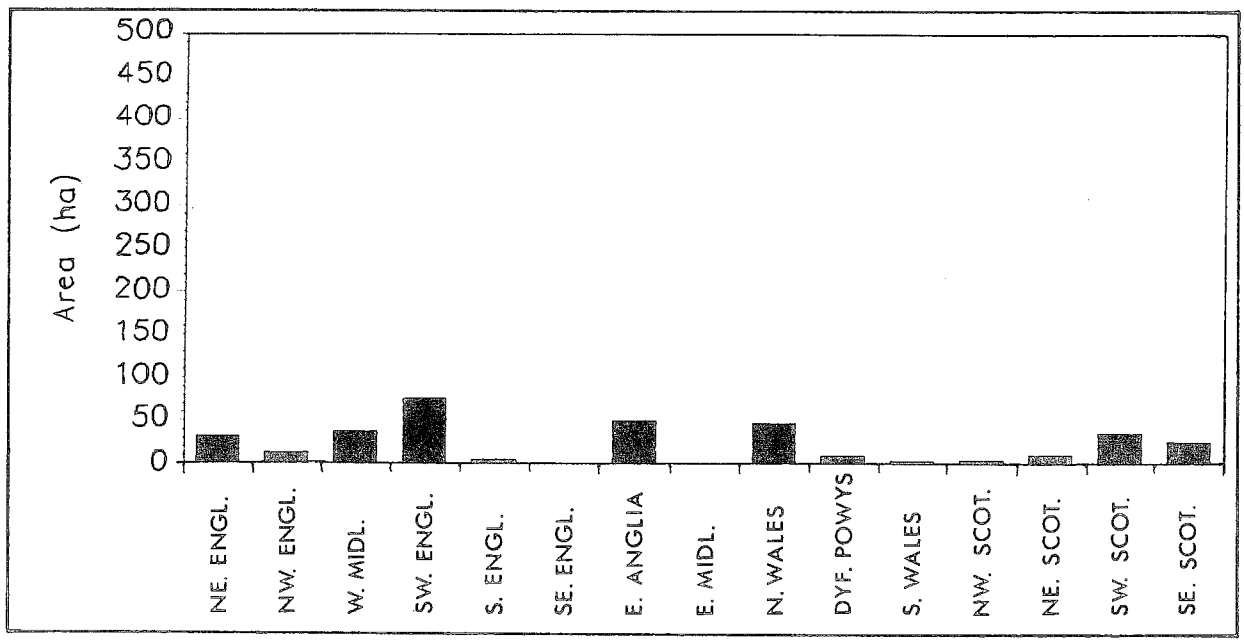
Scirpus (6i)

The areas occupied by this community are small, though widespread, occurring less frequently in north and west Scotland. *Scirpus* 6i occurs mainly on estuary-based sites with high freshwater input, or sites with a full range of transitions such as those in North Norfolk. A major anomaly is the Severn Estuary which has little or no *Scirpus* 6i, although it is possible that the saltwater input in this estuary is too high for this predominantly freshwater species..

Relationship with NVC

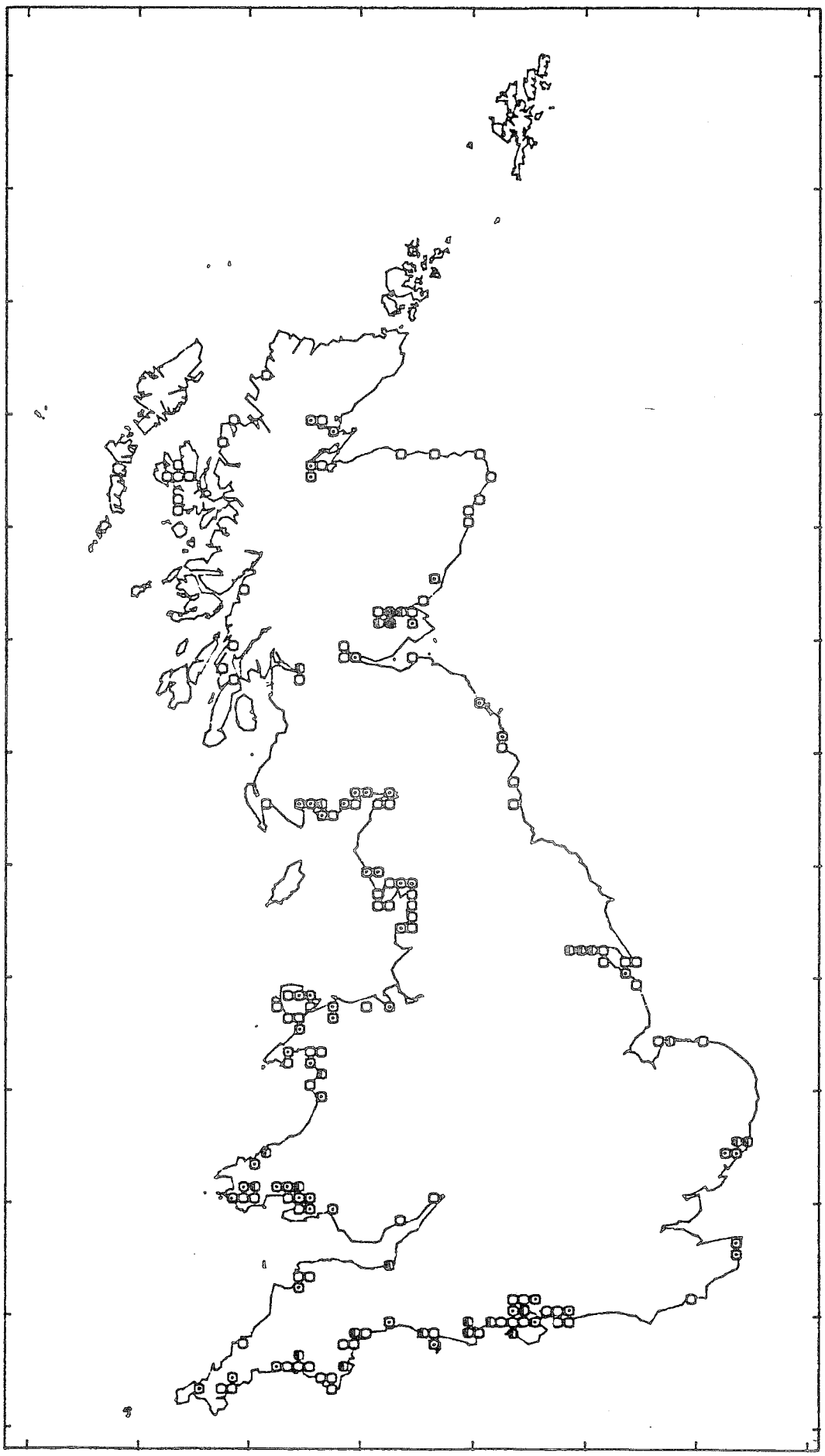
The upper marsh swamp communities are not found in the saltmarsh chapter of the NVC. Please refer to the chapter on Swamps and Tall Herb Fens where the relevant communities (S4, S19, S20 and S21) are described.

Graph showing the area of *Scirpus* (6i) in each NCC region.



Phragmites (6ii) per 10 km sq

Symbols 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
◐ 10 - 100 ha
● > 100 ha



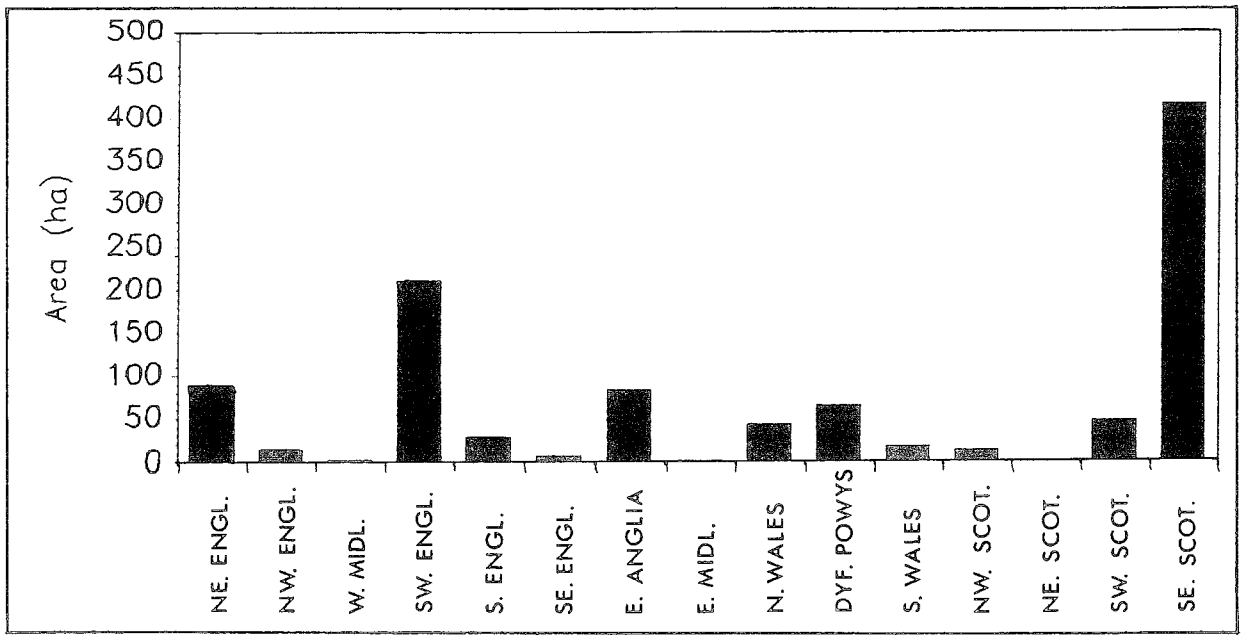
Upper marsh swamps

Phragmites (6ii)

By far the most significant area of *Phragmites* 6ii occurs in the Tay Estuary in South East Scotland, the largest single area of Phragmites reed beds in Britain. It may be significant that the Tay also has the largest freshwater discharge of any estuary in Britain (Ranwell 1972). However, the reed beds are not entirely natural, having been planted originally and now being managed for cutting.

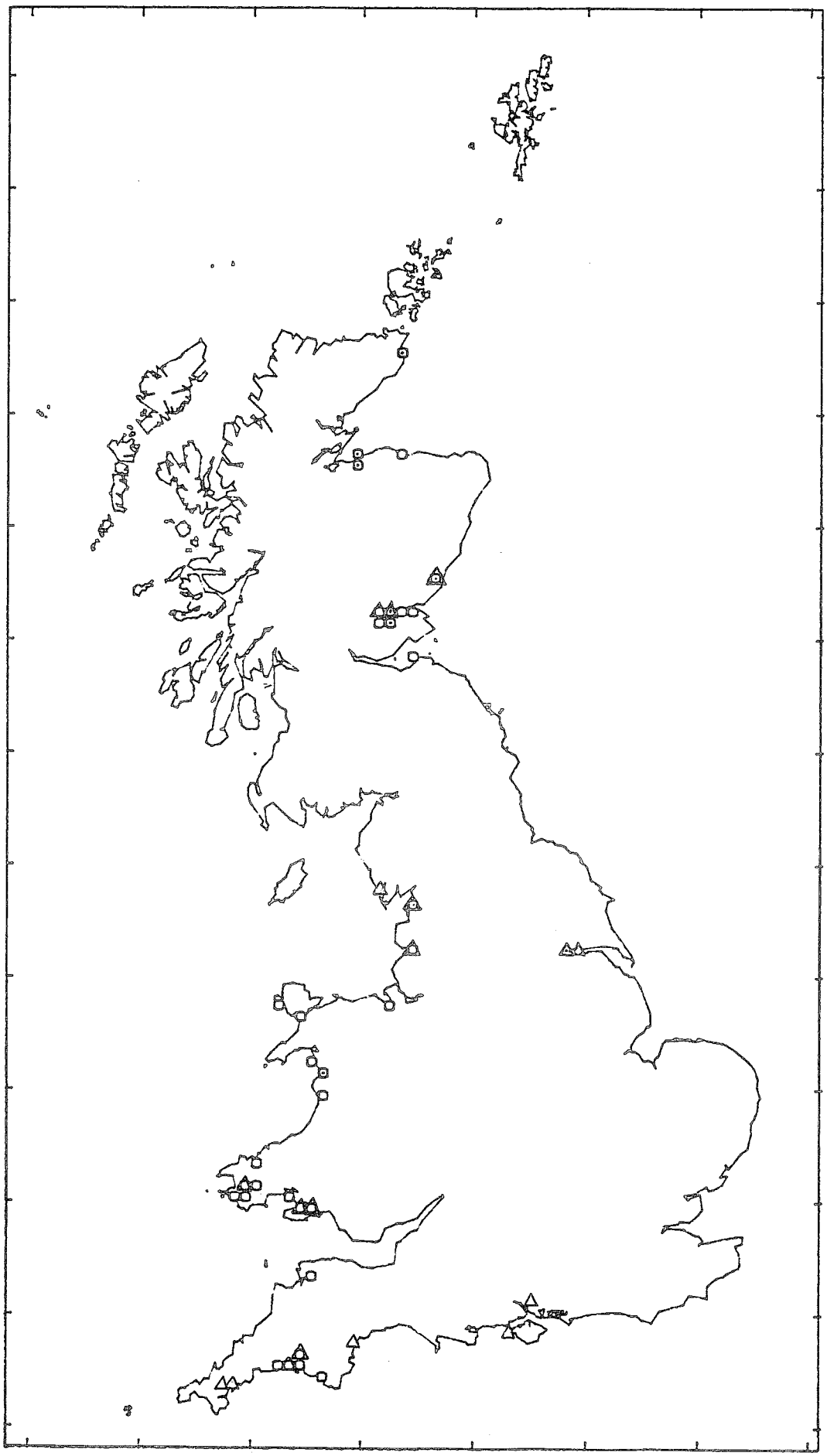
On a national scale this community is predominantly found along the west coast, with fewer smaller areas along the east coast. This is probably due to the extent of reclamation in the east.

Graph showing the area of *Phragmites* (6ii) in each NCC region.



Typha (6iii) and Schoenoplectus (6iv) per 10 km sq

Symbols: 10Km squares
Key: ○ < 1 ha
⊙ 1 - 10 ha
△ Typha



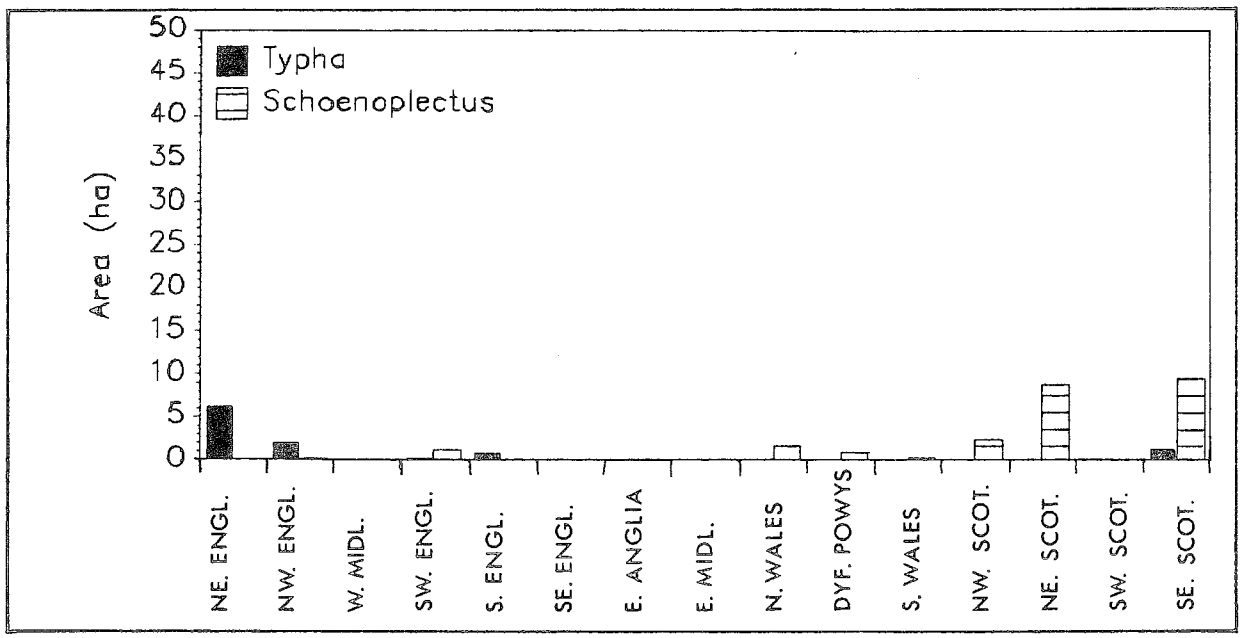
Upper marsh swamps

Typha (6iii) and *Schoenoplectus* (6iv)

Both these communities have very limited distributions and very small areas. *Typha* 6iii, particularly, only occurs at the upper ends of estuaries, being predominantly a freshwater species. *Schoenoplectus* 6iv occurs most abundantly in eastern Scotland.

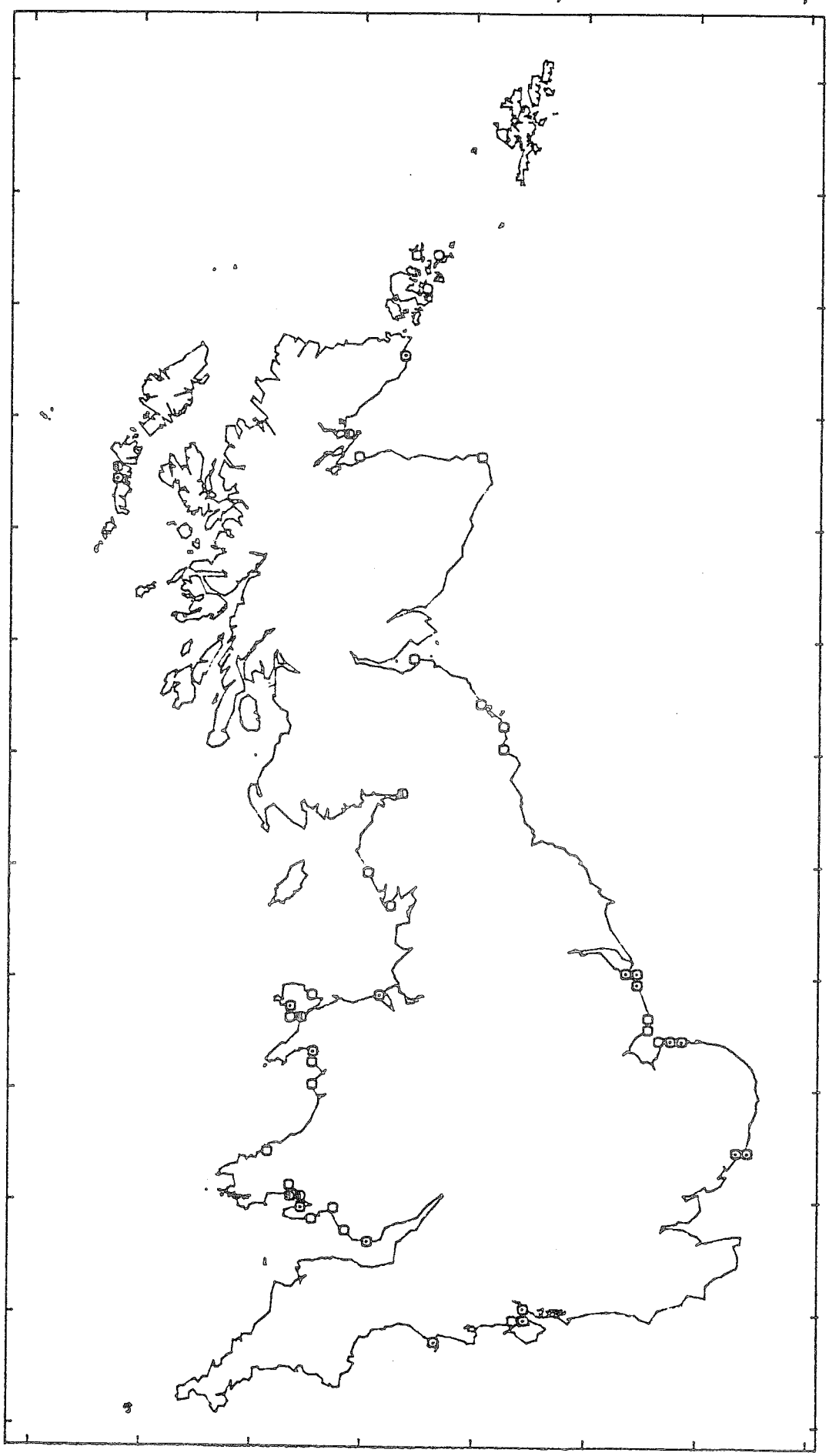
Graph showing the area of *Typha* (6iii) and *Schoenoplectus* (6iv) in each NCC region.

NB. For this graph only, the scale has been changed from 0-500 to 0-50.



Shingle/dune trans. (7i) per 10 km sq

Symbol: 10Km square
Key: ○ < 1 ha
⊙ 1 - 10 ha
◉ 10 - 100



Transition communities

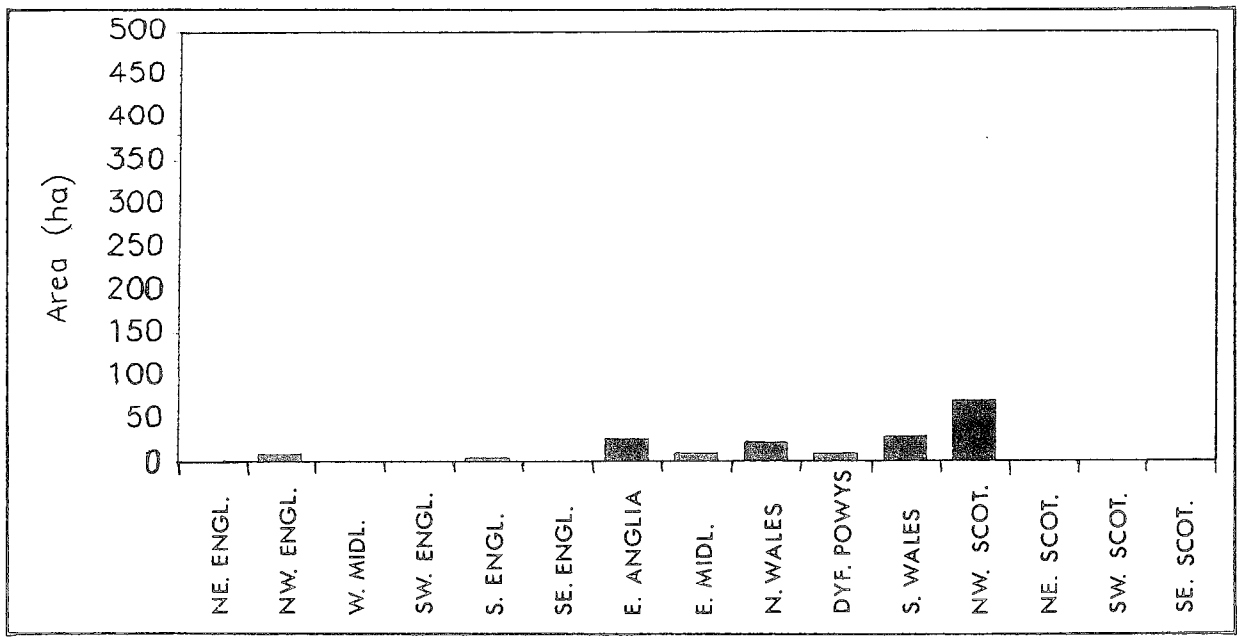
Shingle/Dune transitions (7i)

These transitions have a scattered distribution, depending mainly on the presence of conditions suitable for the adjacent habitat (i.e. shingle or dune). The presence of these transitions, in common with all transition communities, requires there to be no other limiting factors such as truncation by sea walls. The areas of these transitions are small, because of the linear nature of the community.

Relationship with NVC

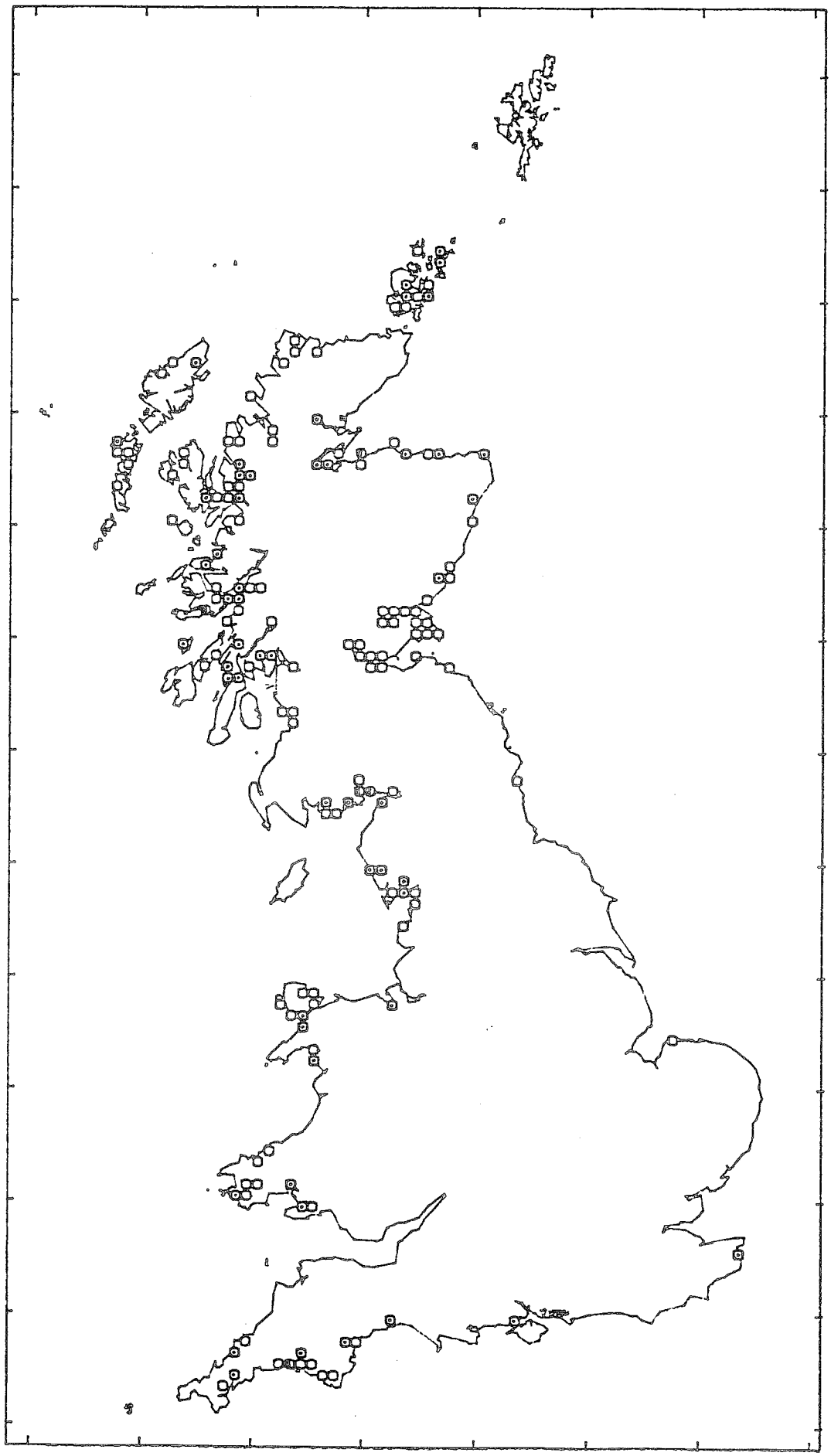
These communities incorporate the NVC communities SM21 (*Suaeda vera - Limonium binervosum* saltmarsh, including the typical sub-community and the *Frankenia laevis* sub-community) and SM22 (*Halimione portulacoides - Frankenia laevis* saltmarsh)

Graph showing the area of shingle/dune transitions in each NCC region.



Freshwater trans. (7ii) per 10 km sq

Symbol: 10Km square
Key: ○ < 1 ha
⊙ 1 - 10 ha
◍ 10 - 100 ha



Transition communities

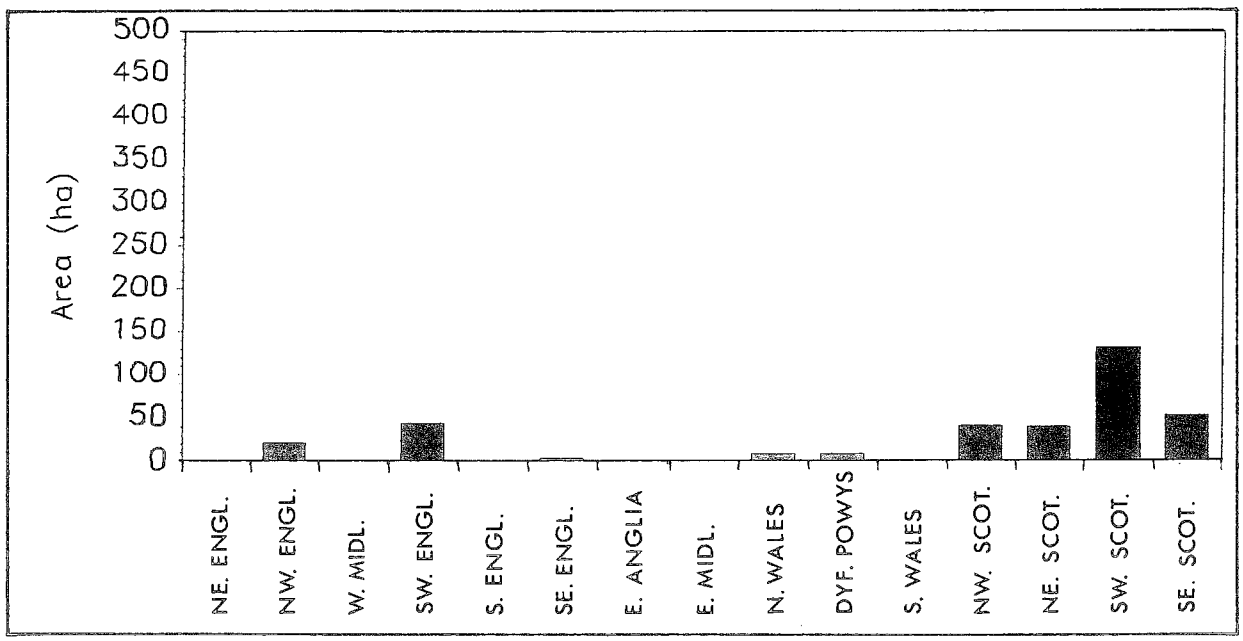
Freshwater transitions (7ii)

These transitions occur mainly in Scotland where the freshwater input from rainfall is considerably higher. Wales and Western England have some small areas of the community, usually situated at the upper ends of estuaries.

Relationship with NVC

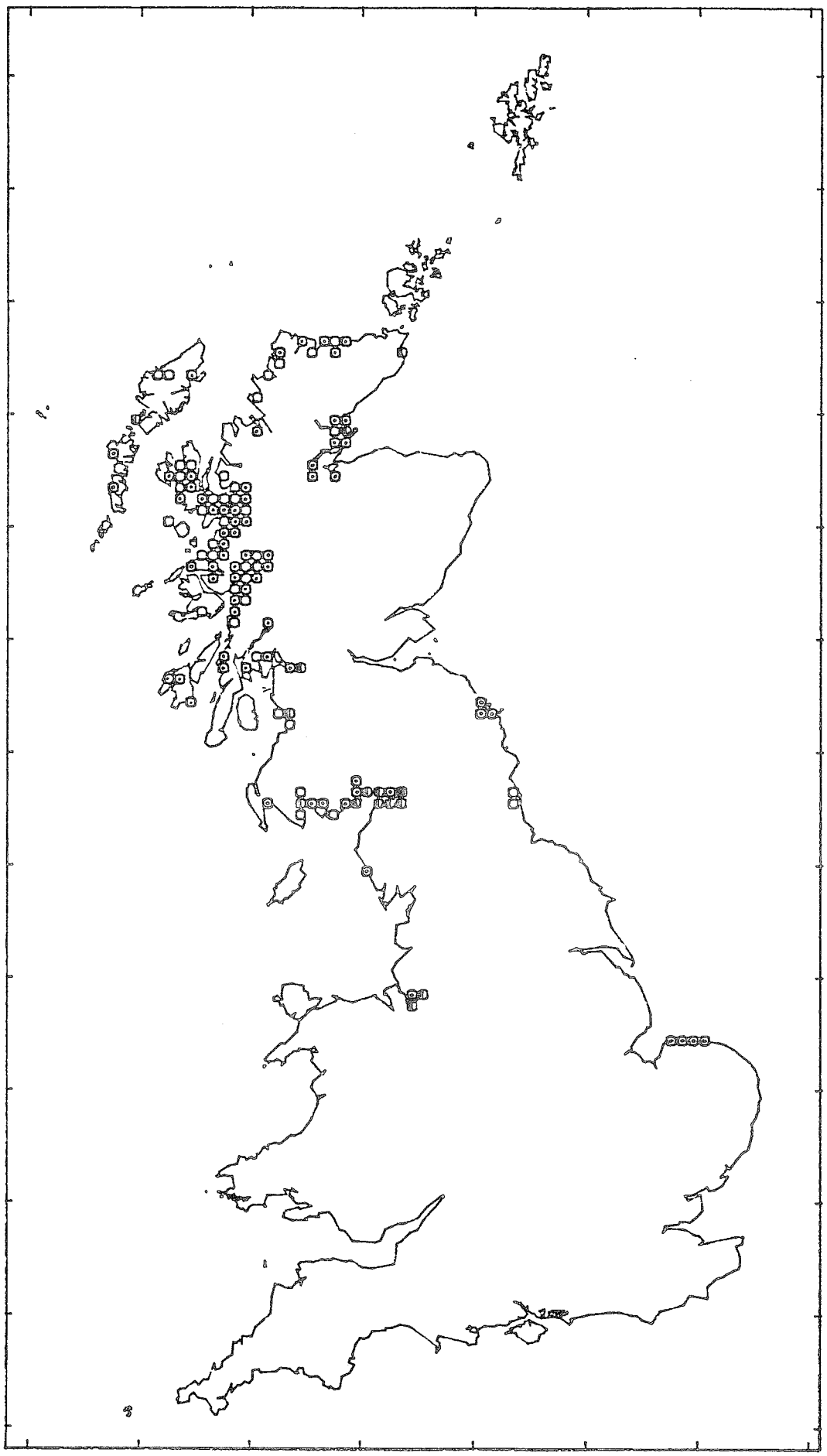
Like the upper marsh swamp communities, the freshwater and grassland transitions are not described in the saltmarsh chapter. Commuities comprising both these transitions (MG11, MG12 and MG13) are described in the chapter on Mesotrophic Grasslands.

Graph showing the area of freshwater transitions in each NCC region.



Symbol: 10Km square
Key: < 1 ha
1 - 10 ha
10 - 100 ha
> 100 ha

Grassland trans. (7iii) per 10 km sq

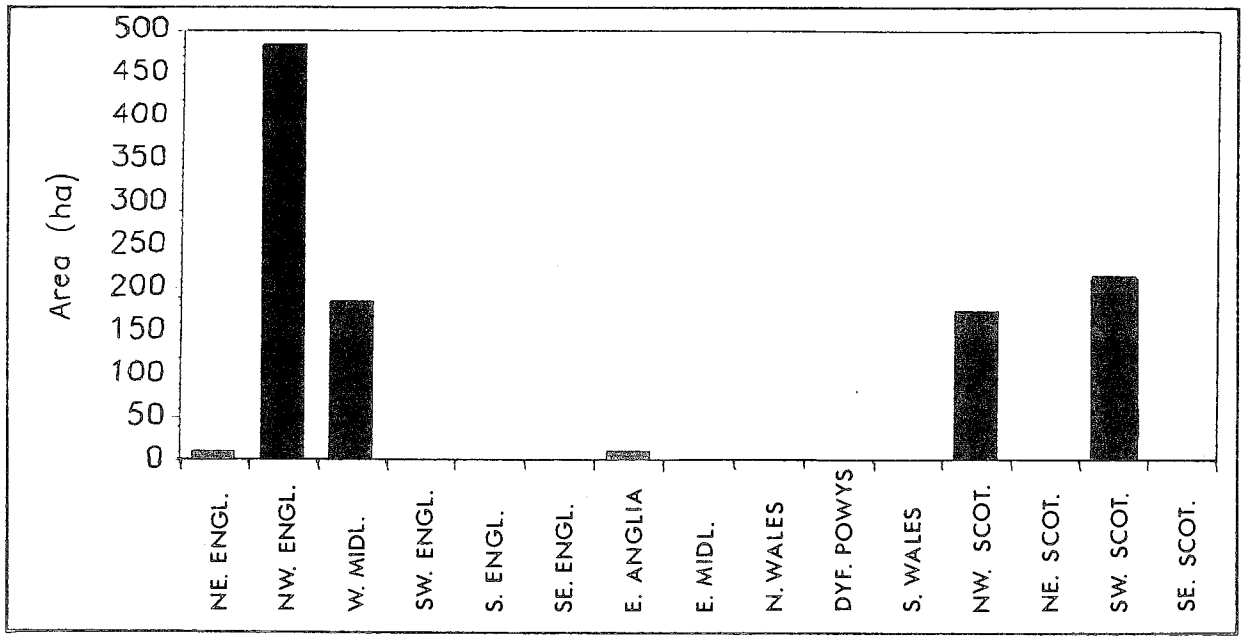


Transition communities

Grassland transitions (7iii)

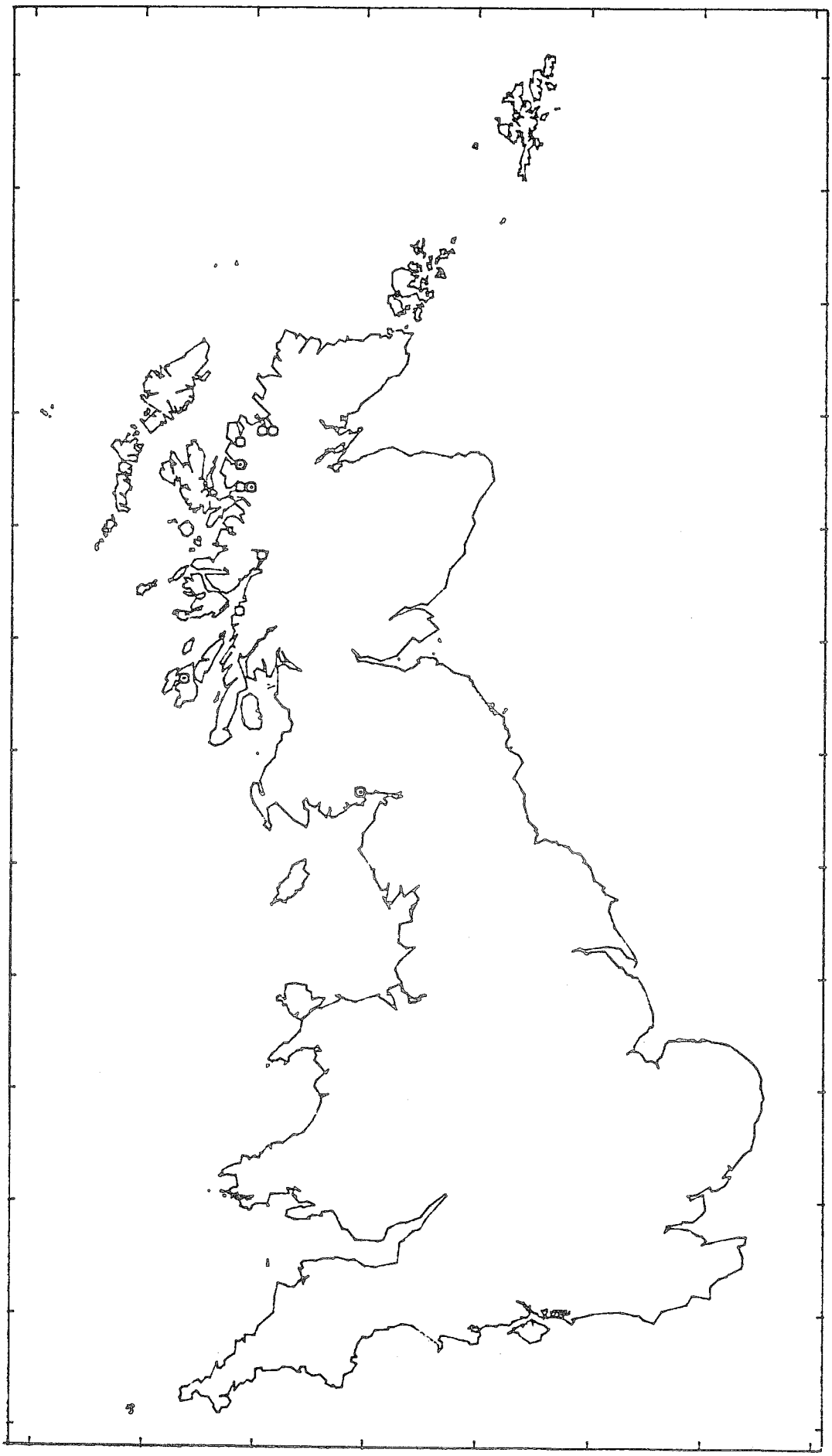
Grassland transition shows a definite trend in distribution towards the north-west, with the largest areas occurring in North West England, South West Scotland, West Midlands and North West Scotland.

Graph showing the area of grassland transitions in each NCC region.



Woodland trans. (7iv) per 10 km sq

Symbol: 10Km squares
Key: O < 1 ha
⊙ 1 - 10 ha

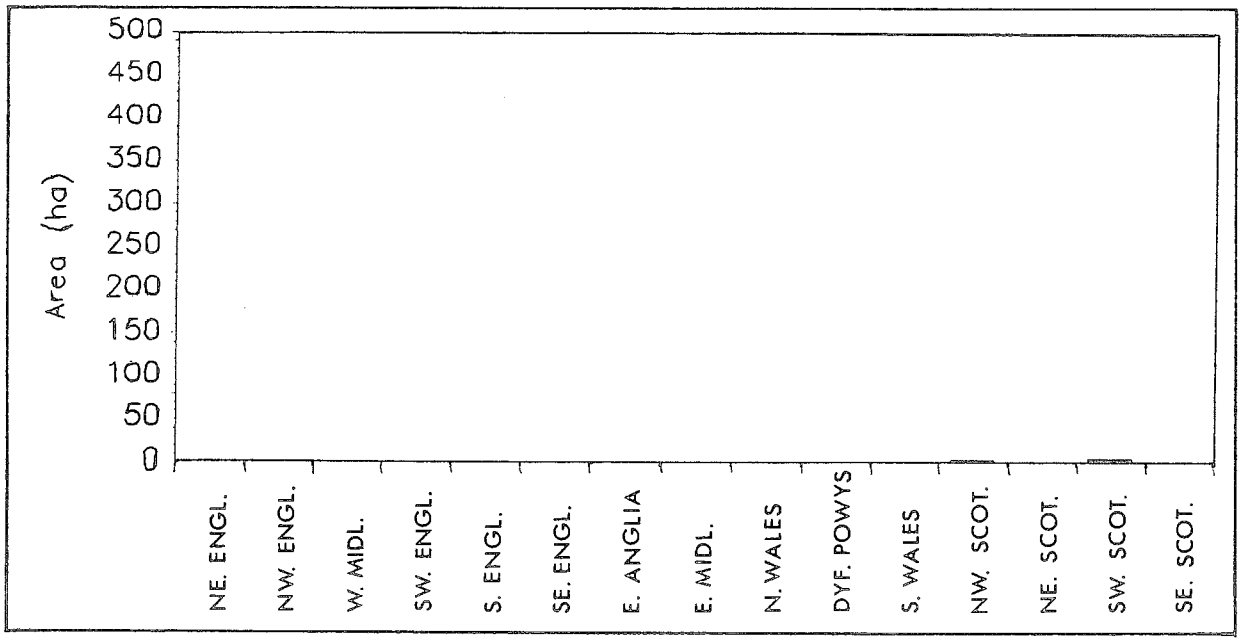


Transition communities

Woodland transitions (7iv)

Woodland transitions occur exclusively in Scotland, being restricted to those sites with no history of grazing. It is not known whether this limited distribution is reflecting the lack of coastal woodland habitat, or whether the transitions are truncated in other parts of the country, or simply because the habitat has not been properly recorded.

Graph showing the area of woodland transitions in each NCC region.



3.2.2 Regional distribution of communities

The following section describes the distribution of communities on a regional basis, in an attempt to show the combinations of communities which form the different saltmarsh types around the country.

Six geographical units have been identified which appear to represent the major divisions between the saltmarsh types found in this survey. To some extent they mirror those of Adam 1978 but provide a more detailed breakdown of the areas. Figure 4 shows the area included in each geographical unit.

For convenience within each geographical unit the communities are shown summarised by NCC regions in Figures 5 - 9. It should be noted that the scales of the graph axes on the Welsh and Scottish graphs are different from those of the England graphs as the areas involved are smaller. The data from which these graphs were produced are shown in Appendix 8.9. These data clearly show some general trends which are described below.

Geographical unit 1.

East and South-East England (see Figure 5)

East Anglia, East Midlands region and South East England all show somewhat similar patterns of vegetation distribution. In all these regions the pioneer and low-mid marsh communities are dominant; this is particularly evident in the counties of Lincolnshire, Suffolk, Norfolk and Essex where approximately 60 % of the saltmarsh area consists of these lower zones.

The largest proportion of the saltmarsh area in East Anglia and the East Midlands region is occupied by *Puccinellia* 3a. *Halimione* 3b is also an important constituent of these marshes, although the overall dominance of this community is reduced in East Anglia where *Limonium/Armeria* 4a is more abundant. The majority of the 4a community is located in Essex (over 1000 ha).

Although the low-mid marsh communities are dominant in these eastern regions, the pioneer communities are also important. In fact, *Spartina* is the dominant community overall in South East England where some of the marshes may bear a resemblance to those of the south coast. *Spartina* is also a major constituent in the marshes of the North East region, mainly around Lindisfarne.

Apart from the abundance of *Limonium/Armeria* in East Anglia and a fairly large proportion of *Puccinellia/Festuca* 4b in the small marshes of the North East region, the mid-upper marsh communities are not well represented in any of the south and east coast marshes. *J. gerardii* 4c and *J. maritimus* 4d are only present in very small amounts in all these regions.

Drift line communities, however, are well represented in all four of the regions, mainly contributed by *Agropyron* 5a although *S. fruticosa* 5b is abundant in East Anglia (Norfolk).

Upper marsh swamp communities are almost absent from East Midlands and South East England, and although some occurrences were recorded in East Anglia and North East England the areas are small, *Phragmites* 6ii being the only community of any significance. Transition communities are almost non-existent in all of these eastern marshes. (It should be noted that the areas of Unsurveyed marsh 8b in East Anglia and East Midlands are, in fact, borrow pits which occupy a considerable area alongside the sea wall of the Wash).

Figure 4. Map to show the approximate areas included in the "geographical units" 1-6 (see text)

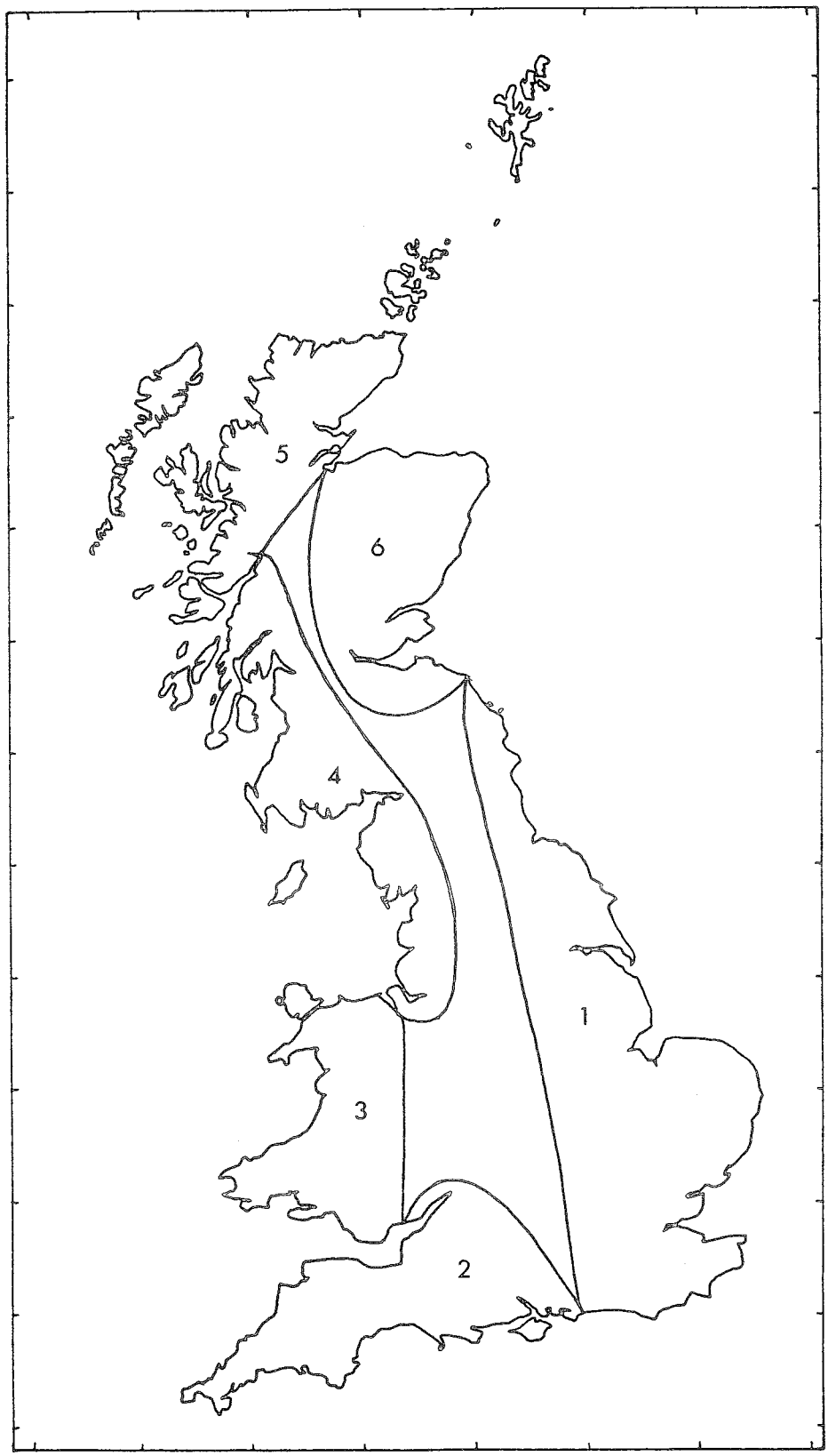
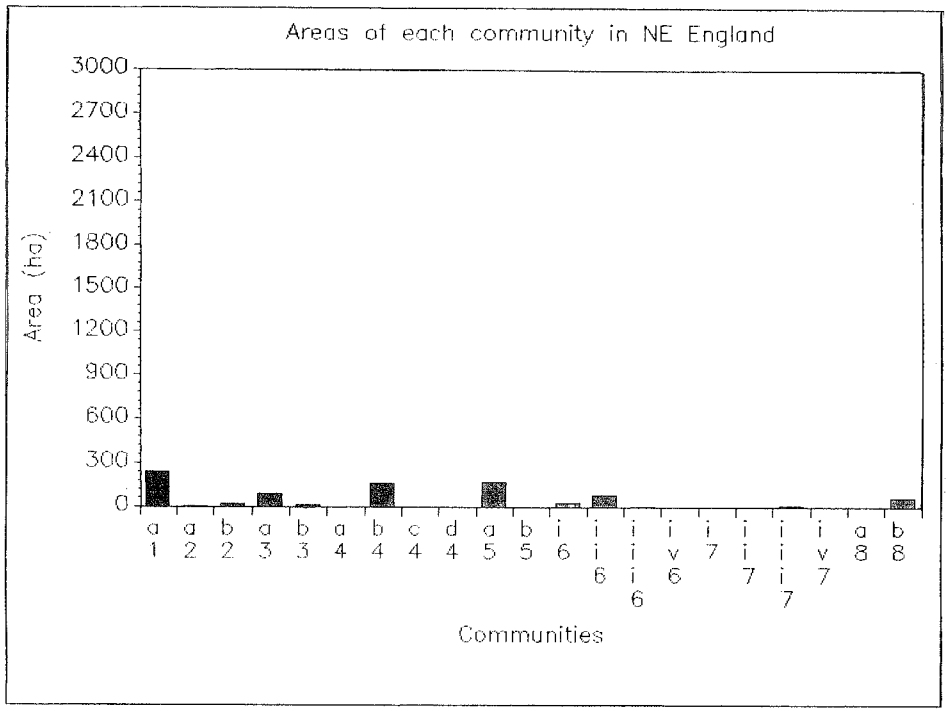
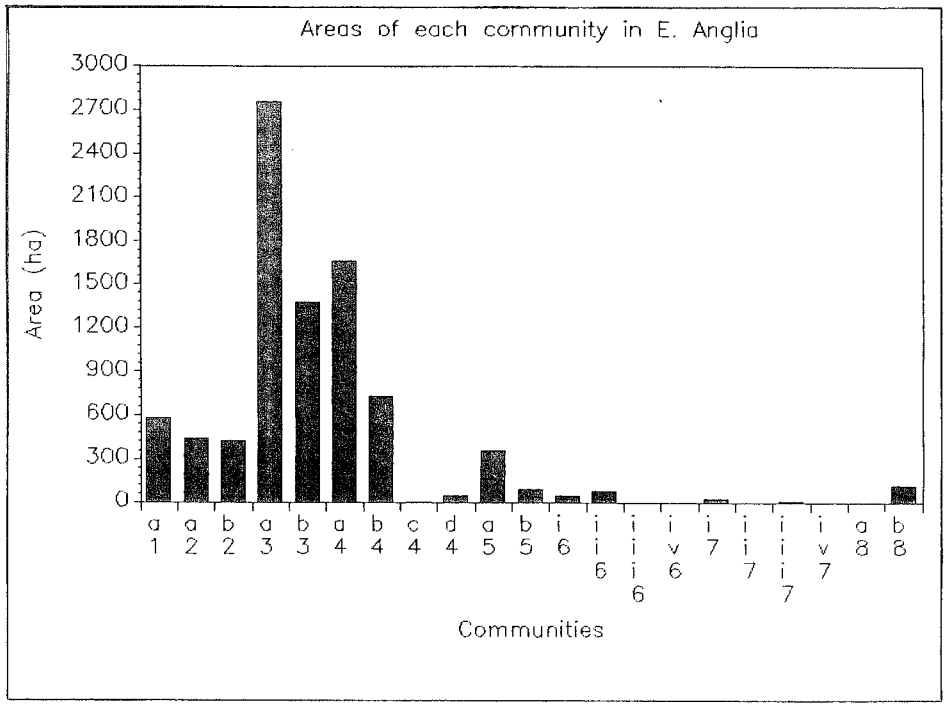
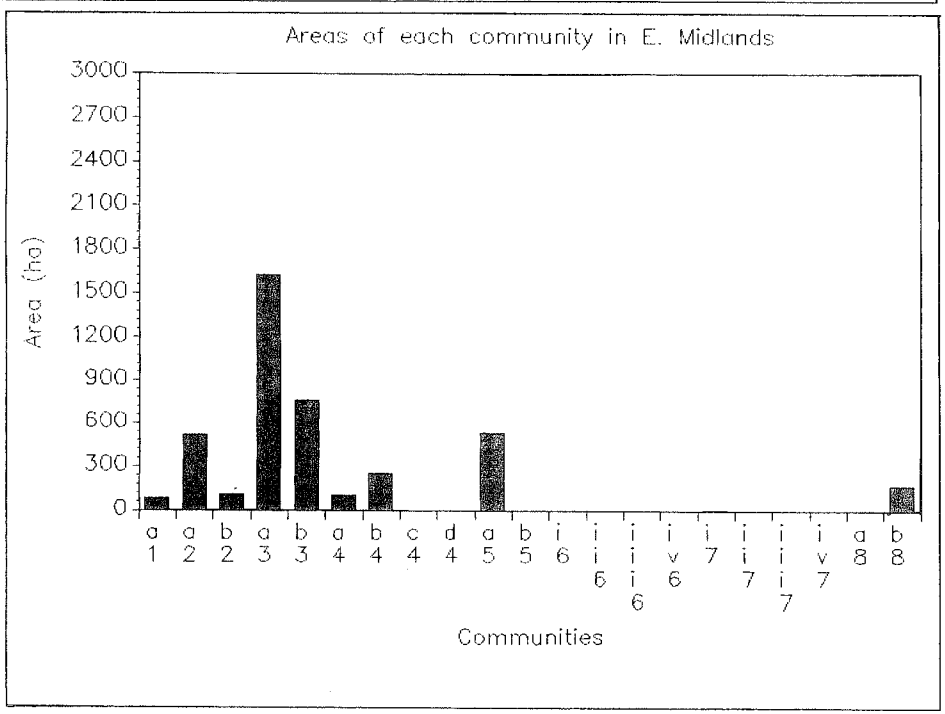


Figure 5. Area of each vegetation community in each of the NCC regions comprising geographical unit 1







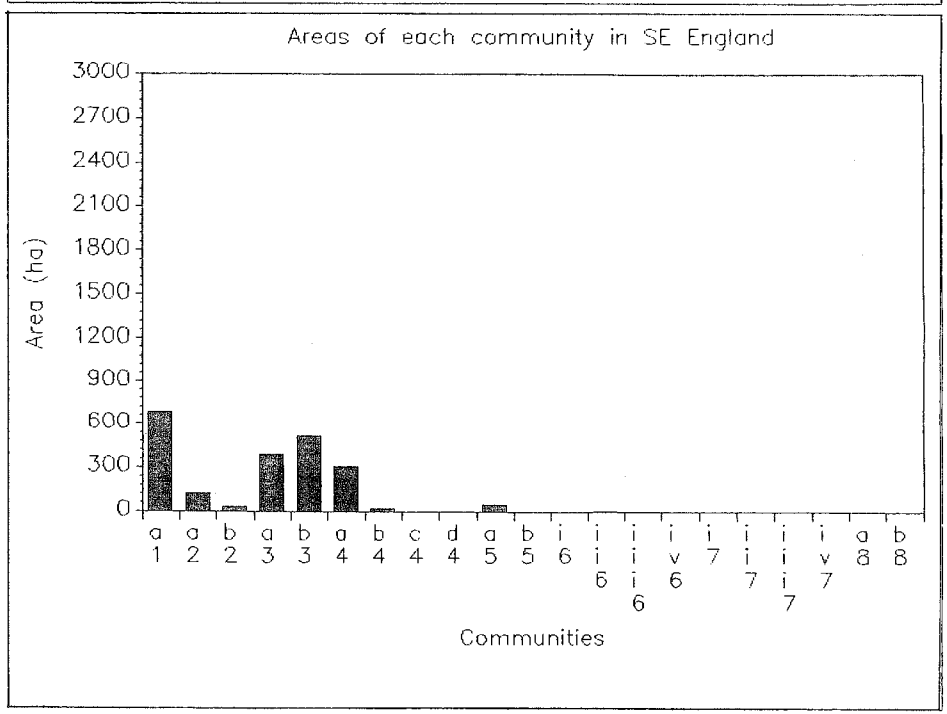
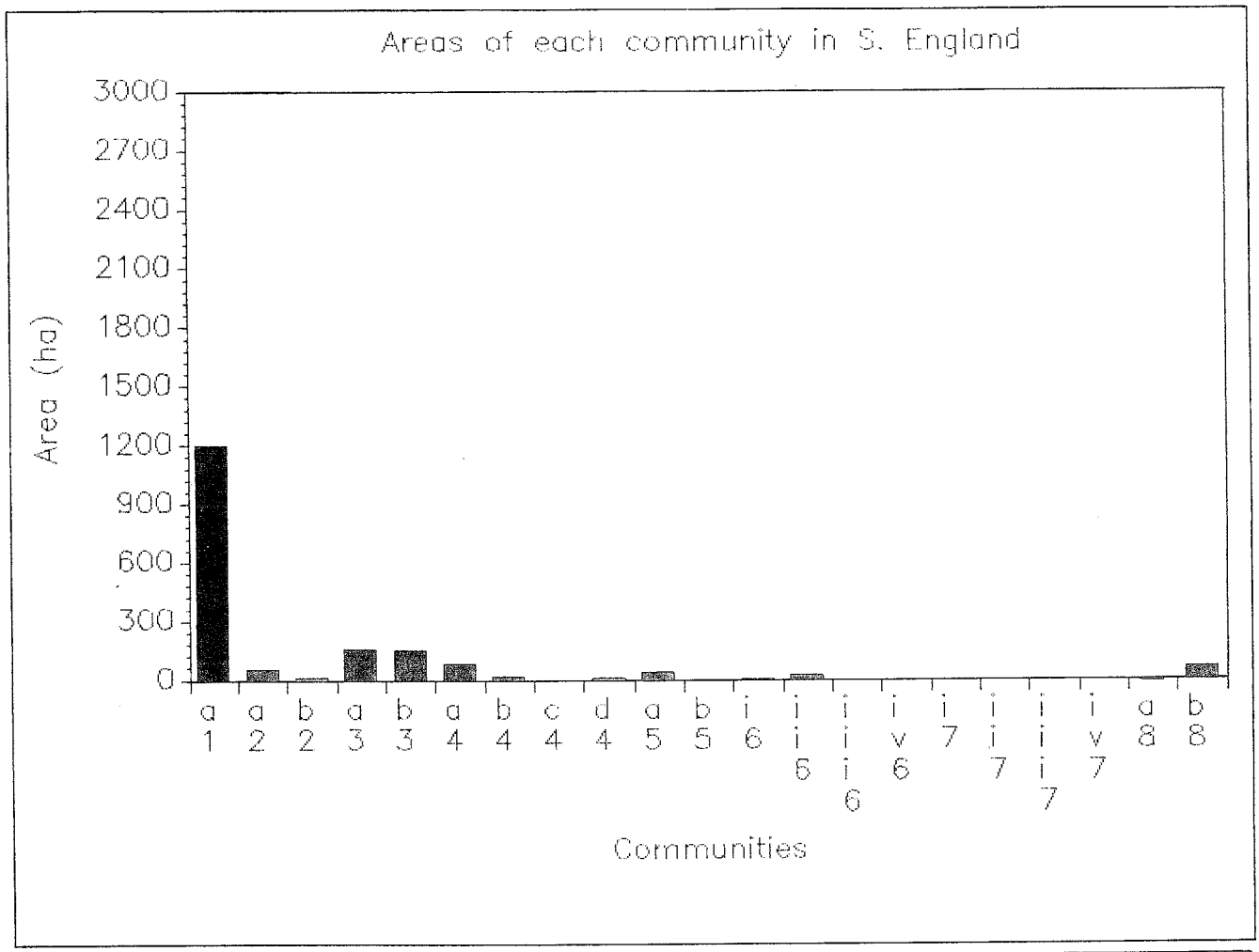
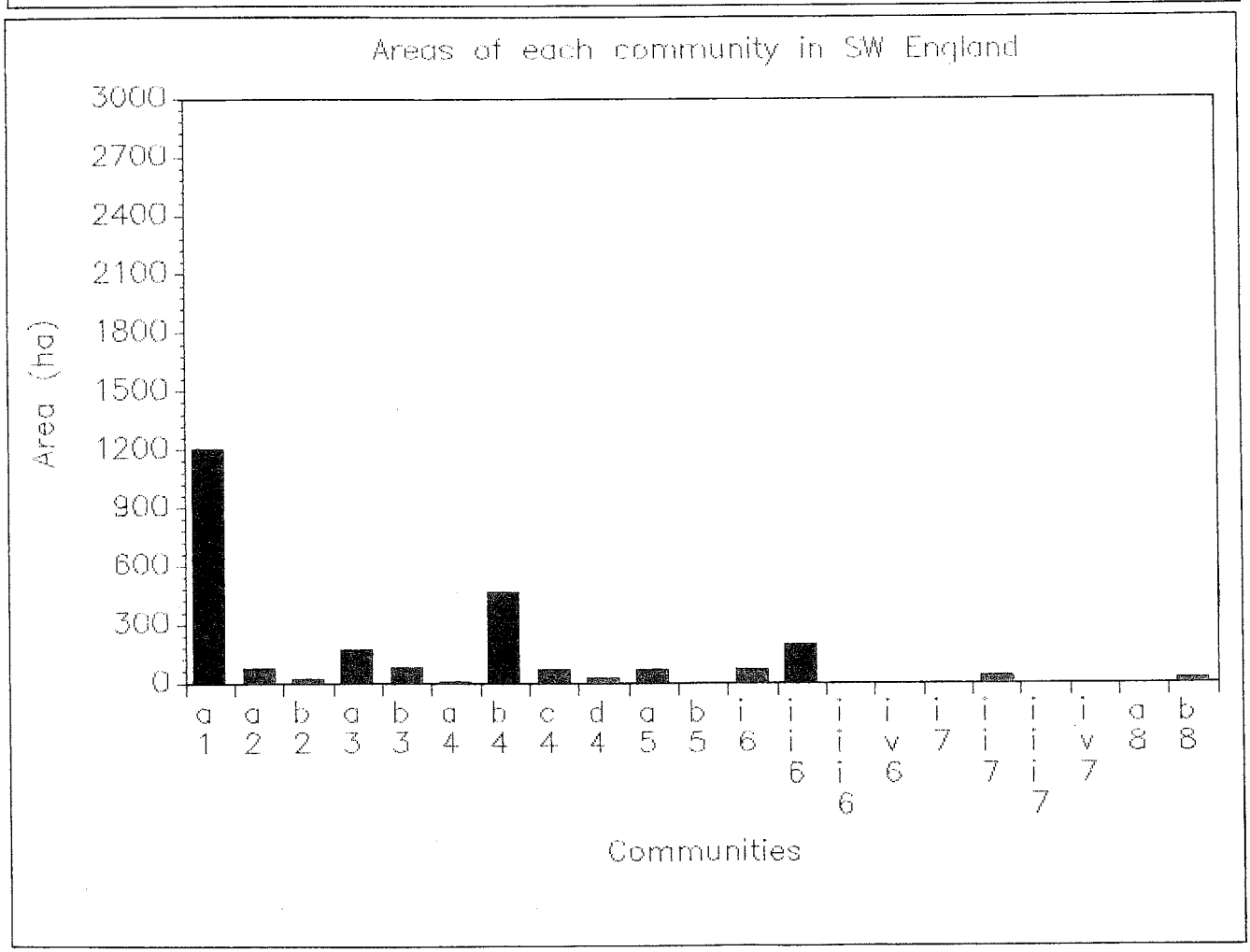


Figure 6. Area of each vegetation community in each of the NCC regions comprising geographical unit 2





Geographical unit 2.

South and South West England (see Figure 6)

The marshes of South and South West England are dominated by *Spartina* which occupies a large percentage of the marsh area in most of the counties, with the possible exceptions of Cornwall and the Isle of Wight. In fact, 63% of the total marsh in South England and 46% of the total in South West England is occupied by this community. The other pioneer communities, *Salicornia/Suaeda* 2a and *Aster* 2b, are relatively uncommon in these regions.

The areas of other communities in these two regions are small when compared with the area of *Spartina*. However, the overall ranges of communities present in the two regions are comparable, although there are differences when looking at particular community areas. For example, the two low-mid marsh communities, *Puccinellia* 3a and *Halimione* 3b, occupy significant proportions of the total area in South England and are somewhat less common in the South West region. Instead, *Puccinellia/Festuca* 4b is more common here, in all the counties except Dorset.

Upper marsh swamp communities are more common in the South and South West marshes than elsewhere in England, mainly occurring in the counties of Cornwall, Devon, Dorset and the Isle of Wight. *Phragmites* 6ii, particularly, is abundant in these counties. In Hampshire and Avon the swamp zone occurs less frequently.

Geographical unit 3.

Wales (see Figure 7)

The patterns of community structure of the three regions in Wales are all somewhat similar, with a trend towards a greater proportion of mid and upper marsh communities than is found in much of England. *Spartina* 1a and *Puccinellia/Festuca* 4b are the dominant communities in the three Welsh regions, both occupying 24 % of the total saltmarsh area. *Puccinellia* 3a is also abundant, occupying 19 % of the total.

Unlike in the majority of the English marshes, *Juncus maritimus* 4d contributes a sizable proportion of the marsh area. In the Welsh regions 4d occupies approximately 10 % of the marsh area. This is contrasted with North West England, the only region in England where any considerable area of *Juncus maritimus* occurs, where only 3 % of the total area is contributed by this community.

The areas of upper marsh swamp, mainly *Scirpus* 6i and *Phragmites* 6ii, are similar though small in the three regions and two of the transition communities (shingle/dune transitions and freshwater transitions) start to appear, with slightly larger areas than in the east and south English marshes.

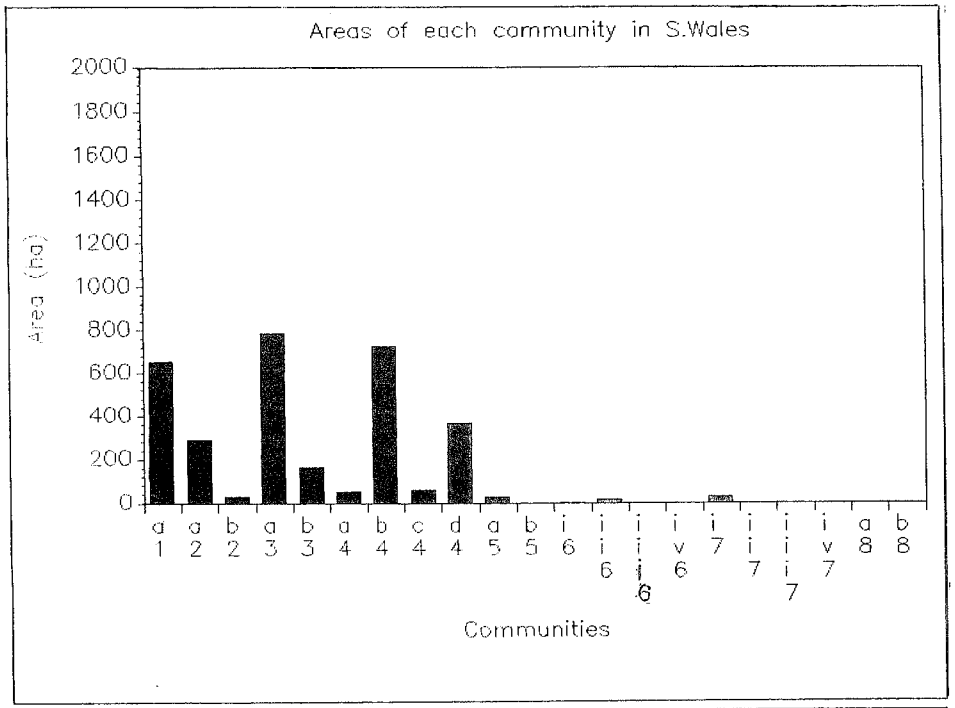
Geographical unit 4.

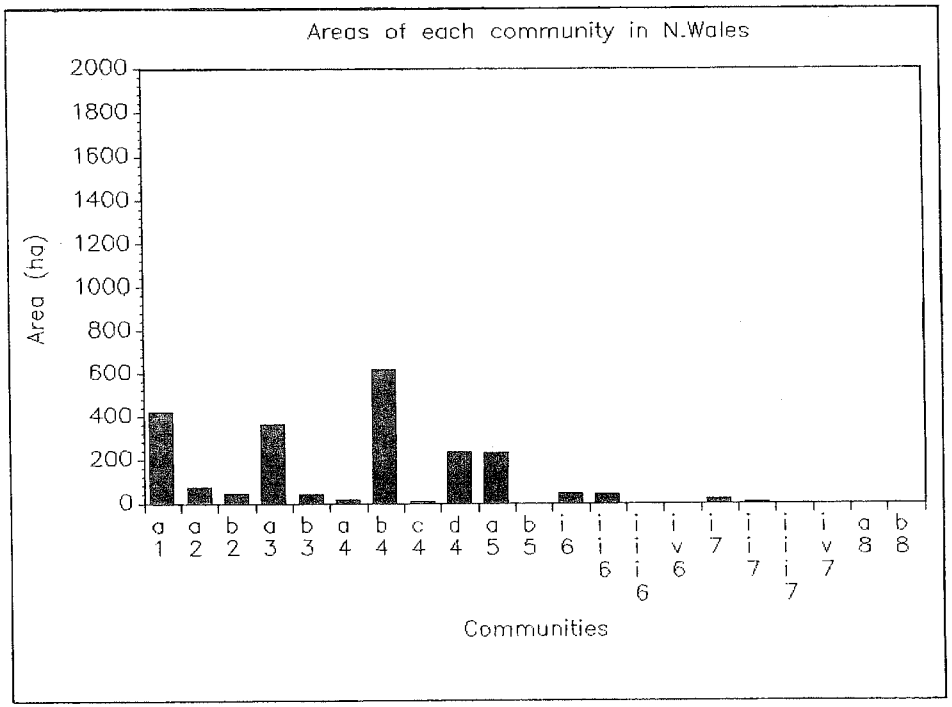
North West England and South West Scotland (see Figure 8)

There are probably equally valid reasons for combining South West Scotland with either North West England or North West Scotland. However, the Solway Firth is an important unit, both shores of which are more similar to the other North West England marshes than they are to the rest of Scotland. Therefore, although many of the smaller marshes towards the north of the region are more akin to those of North West Scotland, the importance of the Solway as a whole unit seemed to be an overriding factor.

The marshes of North West England and the Solway are extensive and largely dominated by *Puccinellia/Festuca* 4b and *Juncus gerardii* 4c communities, like the rest of South West Scotland. The main difference between the marshes of NW England and those of the rest of SW Scotland is the abundance of *Puccinellia* 3a and significant areas of *Spartina* 1a.

Figure 7. Area of each vegetation community in each of the NCC regions comprising geographical unit 3





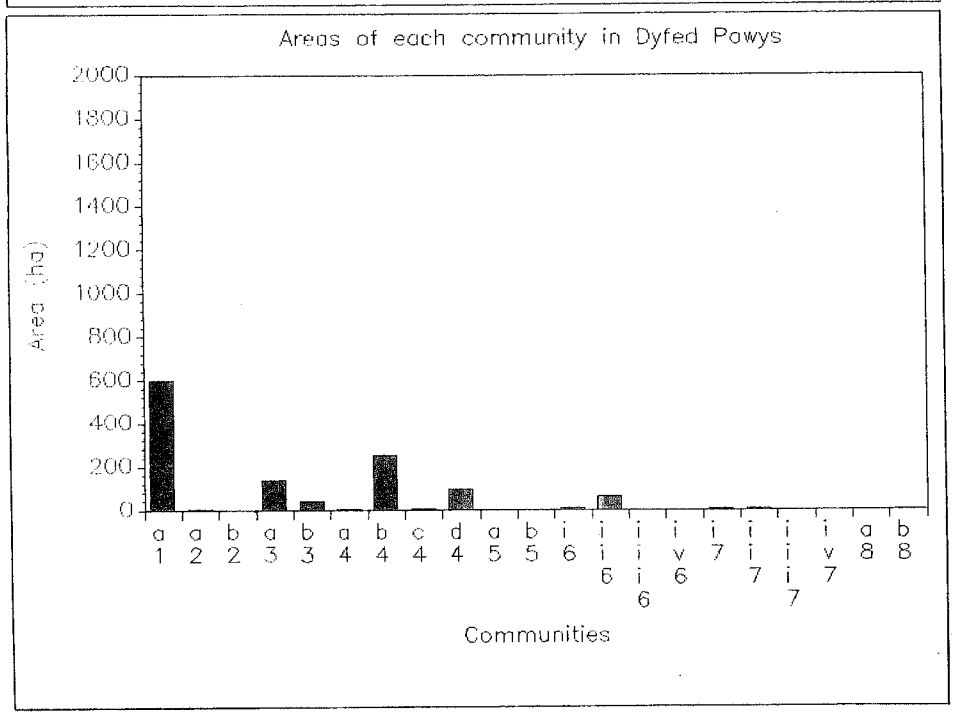
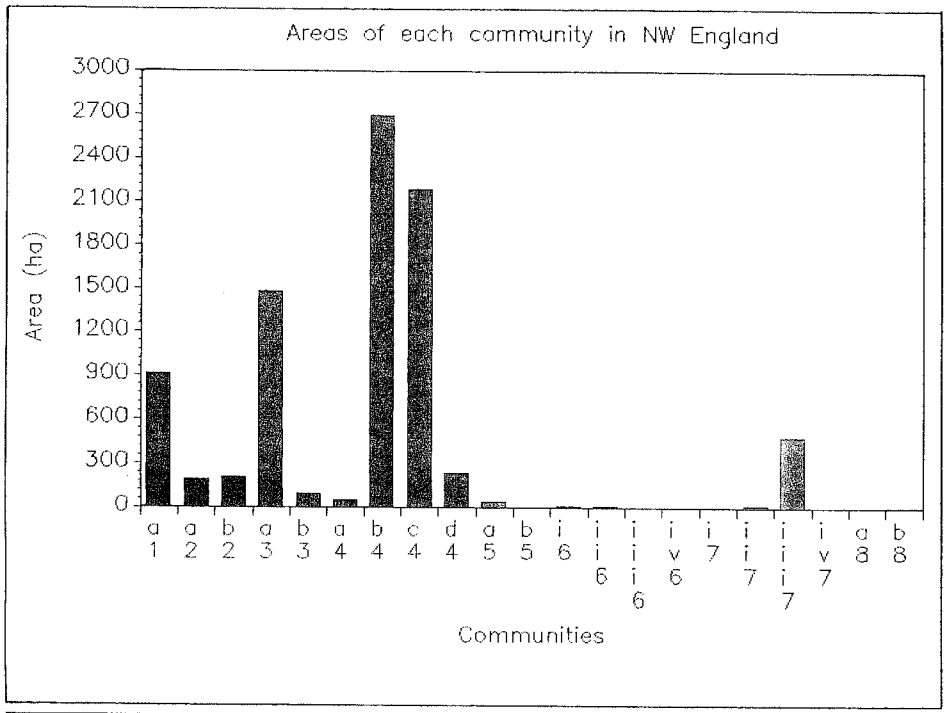
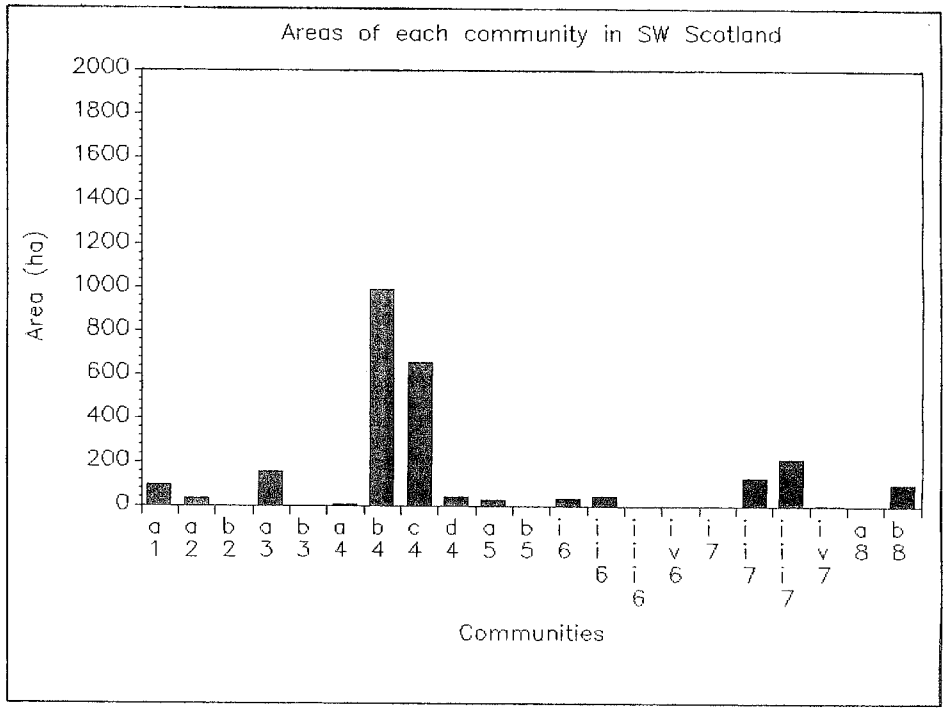


Figure 8. Area of each vegetation community in each of the NCC regions comprising geographical unit 4





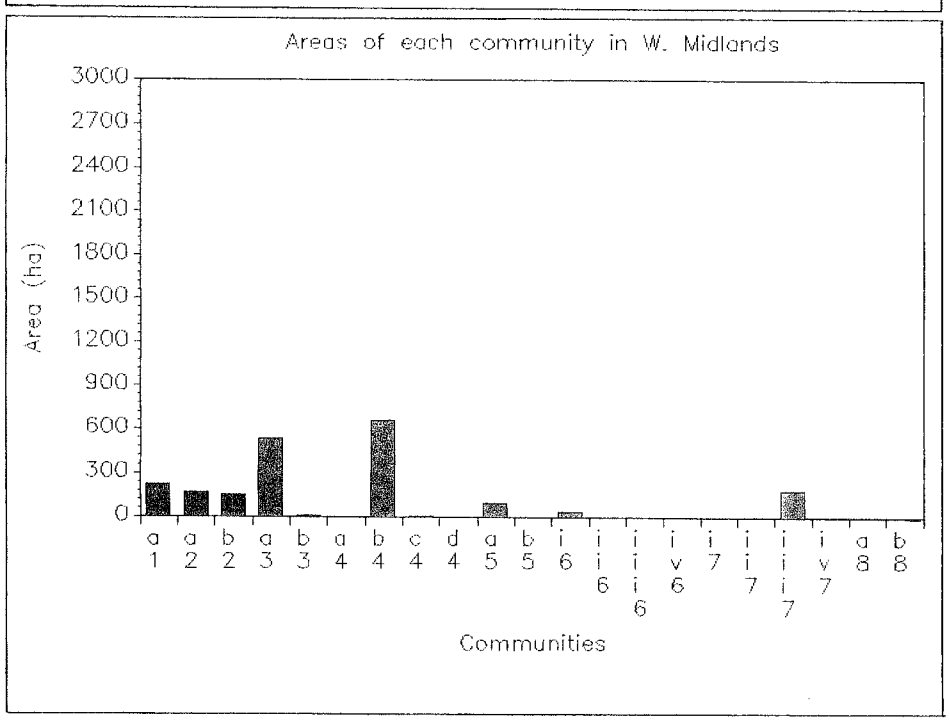
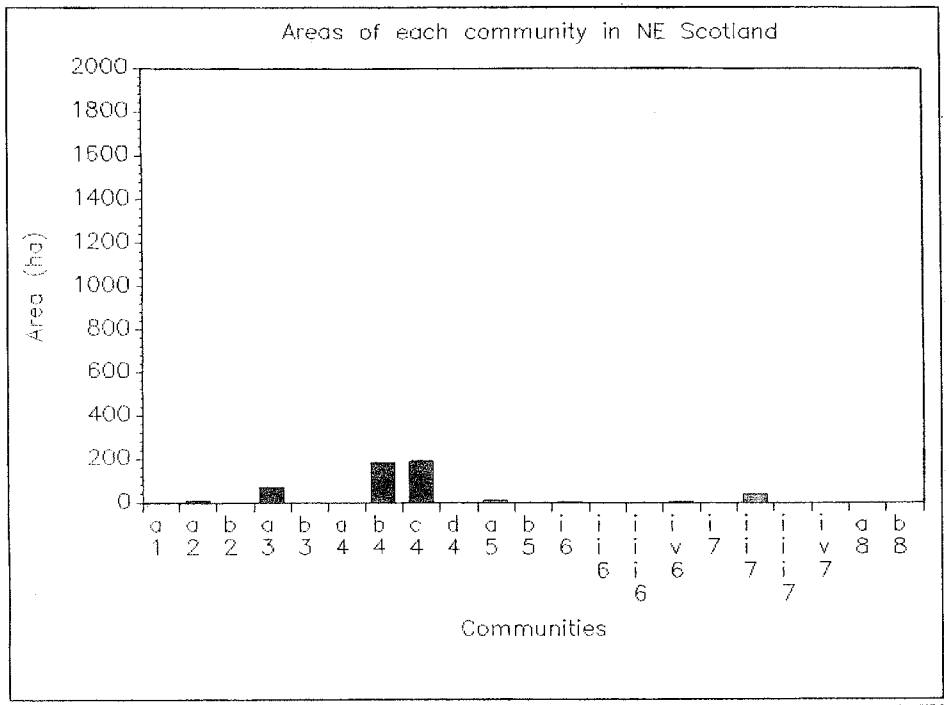
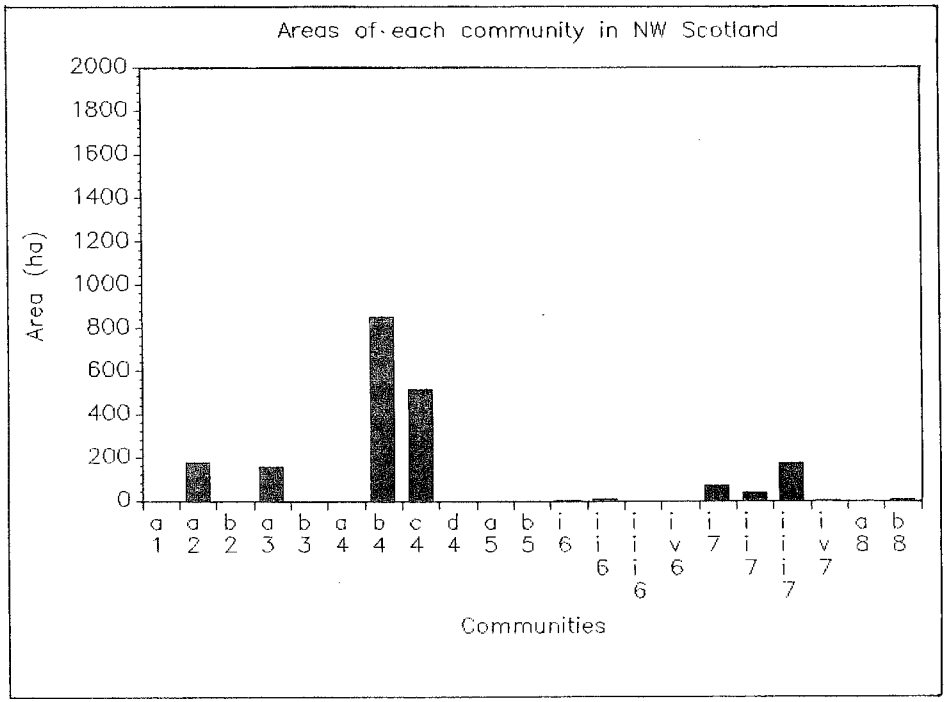
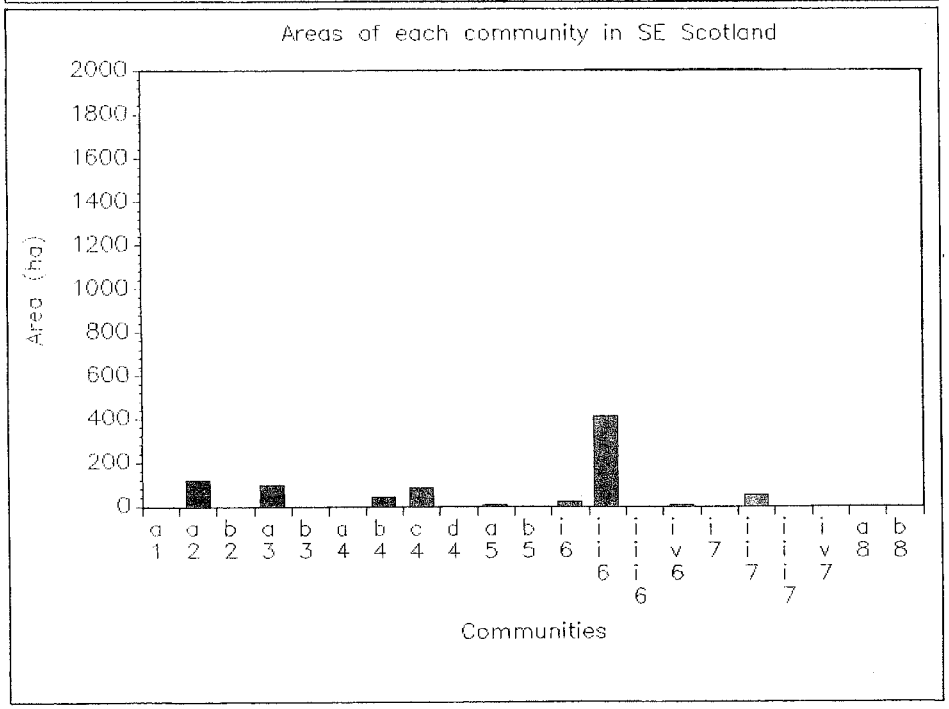


Figure 9. Area of each vegetation community in each of the NCC regions comprising geographical unit 5 & 6







In both regions, grassland transition communities are extensive, but in South West Scotland freshwater transitions are also abundant.

The saltmarshes of the West Midlands region cause something of an problem since geographically the region is split into two, with Gloucestershire being part of the South West England unit, and Cheshire part of North West England. However, in terms of the community structures, both counties fit moderately well with North West England, having high proportions of *Puccinellia/Festuca* 4b and *Puccinellia* 3a, similar quantities of 2a and 2b to NW England and much less *Spartina* than the southern counties.

Geographical unit 5.

West Scotland (see Figure 9)

The vegetation structure of the marshes of west Scotland is often fairly simple, being largely dominated by the *Puccinellia/Festuca* 4b community, often also with large areas of *Juncus gerardii* 4c.

In terms of the pioneer and low marsh communities *Salicornia/Suaeda* 2a occupies a fairly large area overall in these north-western marshes, as does *Puccinellia* 3a. There is no *Spartina* 1a, *Aster* 2a or *Halimione* 3b, however.

Scirpus and *Phragmites* are present on some of the sites but the areas are not large. There are, however, extensive areas of transition communities, grassland transitions being the most abundant overall.

Geographical unit 6.

East Scotland (see Figure 9)

In North East and South East Scotland four dominant communities occur in varying proportions: *Salicornia/Suaeda* 2a (although this is less abundant in the North East region), *Puccinellia* 3a, *Puccinellia/Festuca* 4b and *Juncus gerardii* 4c. *Phragmites* 6ii appears to be the most abundant community in South East Scotland, although this is largely contributed by the Tay Estuary.

3.3 Statutory protection of sites

The identification of the area of saltmarsh under statutory protection (Site of Special Scientific Interest or National Nature Reserve) was considered to be an important element of this project.

It was found from the calculation of site areas within SSSI and NNR boundaries that a large number of sites are wholly or partially protected: in England large proportions of the areas are protected in many of the counties, notably 100 % in Somerset, Tyne and Wear and Cleveland, and very high percentages in Merseyside, Dorset, Norfolk and the Isle of Wight. Some counties have considerably less protection, however, particularly Suffolk, Cornwall, Devon, Avon and Gloucestershire. Most of the other counties have a significant SSSI coverage.

By contrast, Wales has a much lower degree of protection, especially in Carmarthenshire where none of the sites was protected at the time of survey. Preseli and S.Pembrokeshire also are under-protected, although Gwent, Ceredigion and Clwyd are well covered.

The marshes in a few of the districts in Scotland, particularly eastern Scotland, have a high percentage of protected areas. For example 100 % of the marshes in Kincardine and Deeside, Dundee, Edinburgh, and Berwickshire, and high percentages of Moray, Banff and Buchan, Gordon, East Lothian and Kyle and Carrick are protected. However, the marshes in these districts are small and do not contribute much to the overall total of protected sites, and many other districts such as Orkney, Shetland, Aberdeen, Kirkcaldy, Dunfermline, Clackmannan, Falkirk and West Lothian had little or no protection at the time of the survey.

Figure 11. Map of Great Britain showing the area of saltmarsh in each country, and the proportion of that area which was protected by NCC statutory designation at the time of survey

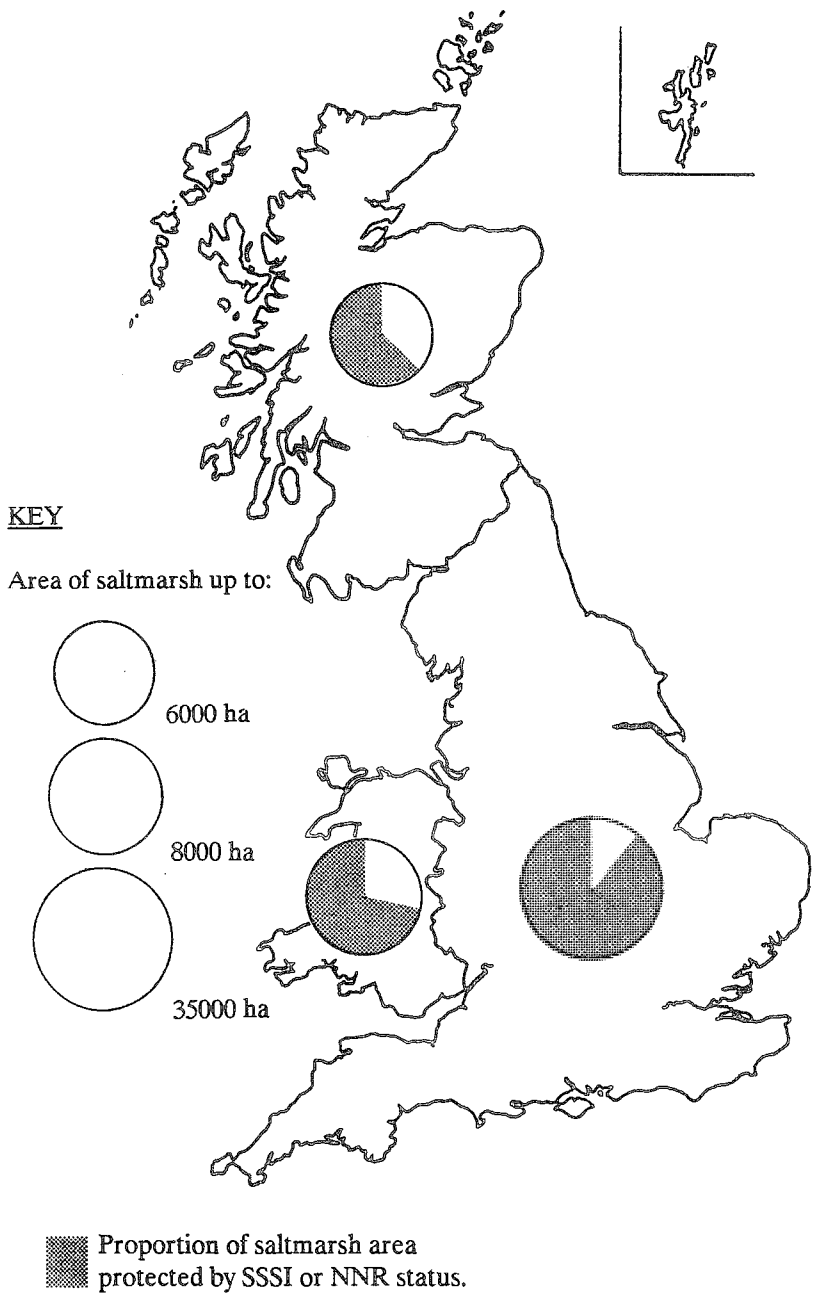
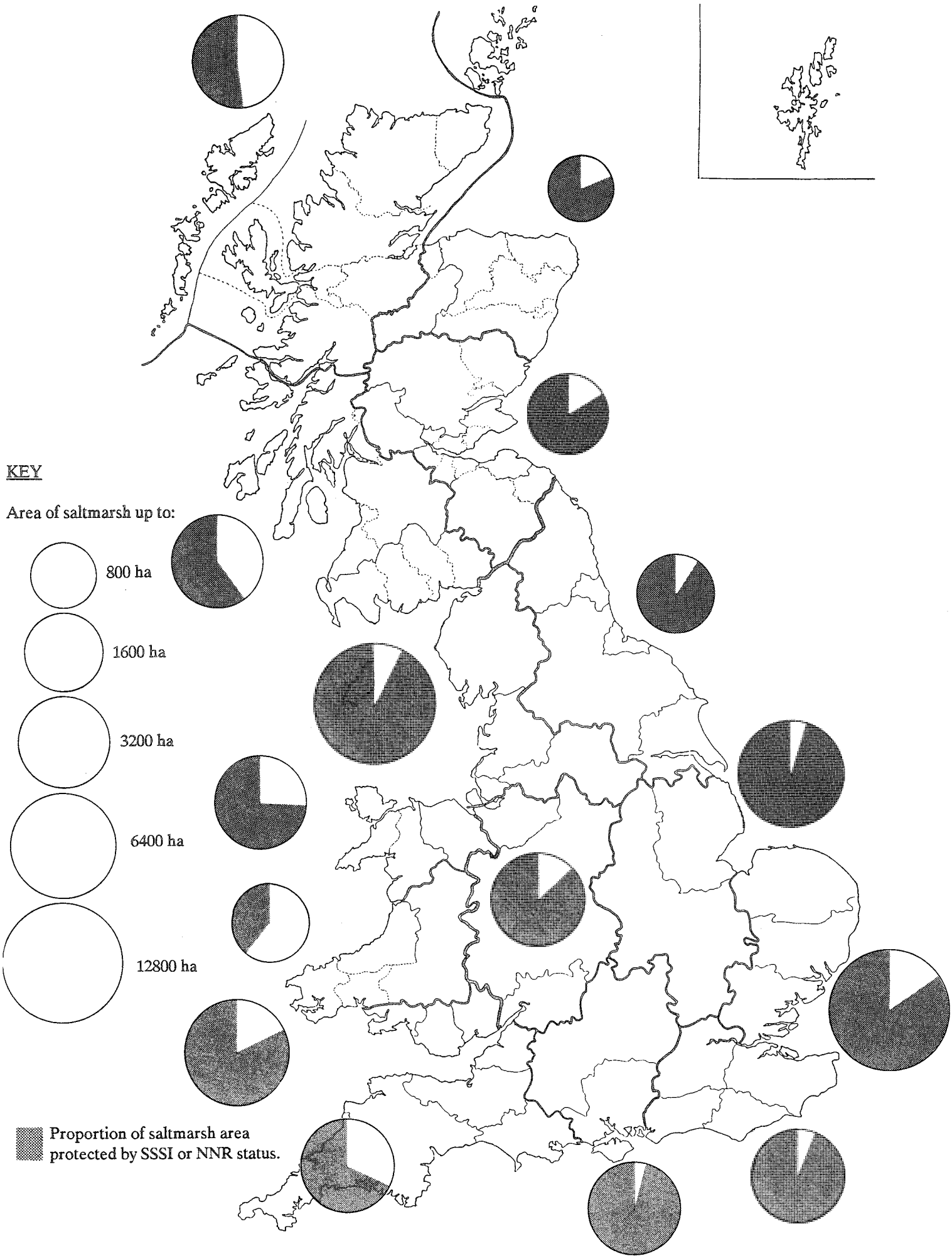


Figure 10. Map showing the area of saltmarsh in each NCC region, and the proportion of that area which was protected by SSSI or NNR status at the time of survey



In western Scotland the majority of the areas are under-represented in SSSIs, especially in Skye and Lochalsh, Lochaber, Argyll and Bute, Wigtown and Stewartry, where many of the marsh areas are large.

These observations are summarised in Figure 10 which shows how the proportion of statutory cover varies in each of the NCC regions (Figure 11 shows the difference between the three countries). Each circle on the maps represents a size class for the saltmarsh area in the region (or country); the proportion of the area which is protected is shown as shading within the circle.

Overall, these three diagrams show that a surprisingly large proportion of the saltmarsh area is already protected by statutory designation within the NCC. Overall, 82.8 % of the total saltmarsh area in Great Britain is covered by SSSI or NNR status at present, though this percentage is made up predominantly of the saltmarsh in England, which forms 71% of the total marsh area in Great Britain.

The implications of these findings are discussed in Section 4.3.

4. DISCUSSION

4.1 Patterns of geographic variation

The results of this survey show that there is a high degree of variation in the extent and vegetation types of the saltmarshes in Great Britain. Much of the variation in the size and type of saltmarsh, and the vegetation which is present today, has arisen as a result of the interaction of several factors, notably sediment type, climate, biotic factors and historical management (Adam 1978).

This survey was designed to provide a comprehensive overview of all the saltmarshes in Great Britain, and did not include collection of detailed information on physical factors. As a result it is not possible to correlate community distribution within a site with causal factors. However, it is possible to discuss the effects that some physical parameters may be having on the patterns of variation in overall saltmarsh size and the geographical distribution of the communities.

4.1.1 Variation in saltmarsh size

The patterns of saltmarsh distribution around the country are shown in the maps in Appendix 8.6 which give the location and area of each marsh. The majority of the largest sites, as might be expected, are located on the major rivers and estuaries of the south east coast of England, and on the north and west coast, notably in the Severn, Dee, Ribble Estuaries, Morecambe Bay and Solway Firth (see Site Maps 14, 16 and 18 in Appendix 8.6, and Tables 3 and 4).

The geographic pattern of variability in the size of saltmarshes is largely due to the difference in the occurrence of physical conditions suitable for saltmarsh formation, notably the presence of protection from wave action and the type and amount of available sediment (Ranwell 1972).

Hard rocks predominate north and west of a line from the Tees to the Exe; these form coarse sediment deposits, more often the building material of dunes. To the south and east of this line softer rocks are more common, in relatively low-lying country. These form finer sediments in a subdued topography more conducive to extensive saltmarsh formation (Ranwell 1972). There are three additional isolated areas on the west coast where soft rocks occur combined with the location of large inlets. These are the Severn, the Dee-Mersey area and the Solway, all areas in which extensive saltmarshes are found. The glacial offshore sediment sources around Liverpool Bay and the Dee Estuary also contribute to the sediment availability in these areas.

Within these low-lying, soft shore areas the optimum saltmarsh area is rarely present. Several factors have worked to reduce the potential saltmarsh area. The most important of these has been the practice of enclosing the upper marsh for reclamation for agriculture. This is a practice more common on the eastern marshes than those in the west, owing in part to the wetter climate and the sandy substrate along the west coast which make the conversion of saltmarsh to arable land more difficult (Doody 1982). Figure 12 shows how abundant the truncated successions are along the south east coast, and, although truncated marshes occur elsewhere, the total absence of transition communites in the south east shows how effectively these areas of saltmarsh have been enclosed.

The second major factor in reducing the size of the east coast marshes is the rate of erosion along this stretch of coastline. This could partly be due to the fact that the British Isles are tilting along a south west/north east axis, causing a rise in sea level relative to the land surface in the south east (Pirazzoli, 1986). This effect is augmented by a global rise in sea level (Robin, 1986). On a sinking coastline such as this, the marsh will only continue to extend if the rate of sedimentation exceeds the rate of sinking (Chapman 1976). The rate of erosion of the marshes in the south east suggests that there is insufficient sedimentation for marsh growth to occur. Other factors may be important, but at the moment sea level change seems to be the most likely cause.

In Scotland the coastal waters are deep, particularly in the north and west, with very little protection afforded by offshore sand banks, so there is little opportunity for extensive marshes to form. The hard rocks which comprise much of the geology of this area are resistant to erosion and provide very little sediment in the rivers of north and west Scotland (Ranwell 1972).

4.1.2 Variation in saltmarsh vegetation

Although the variation in saltmarsh vegetation is continuous within and between sites, it has been possible to recognise combinations of vegetation types which allow several distinct geographical units to be identified. Six of these units have been identified from the survey and their main features have been described in Section 3.2.3. The units identified are:-

Unit 1 - East and South East England
Unit 2 - South and South West England
Unit 3 - Wales
Unit 4 - North West England and South West Scotland
Unit 5 - North West Scotland
Unit 6 - East Scotland

Some of the possible reasons for the geographical differences in these vegetation types can be deduced from the nature of the vegetation itself.

In Unit 1, for example, the predominance of pioneer and low-marsh communities in the vegetation is largely due to the extensive construction of sea walls along these stretches of coastline, particularly in East Anglia. This effectively truncates the marsh, destroying the upper marsh and transition communities. In the more extreme examples, such as around The Wash, most of the mid-upper marsh communities are also enclosed behind the sea wall.

In southern England (Unit 2) the overall dominance of *Spartina* can be ascribed to the extensive spread along the south coast from the place of origin of *S. x townsendii* and *S.anglica* in Southampton Water (Tubbs 1984).

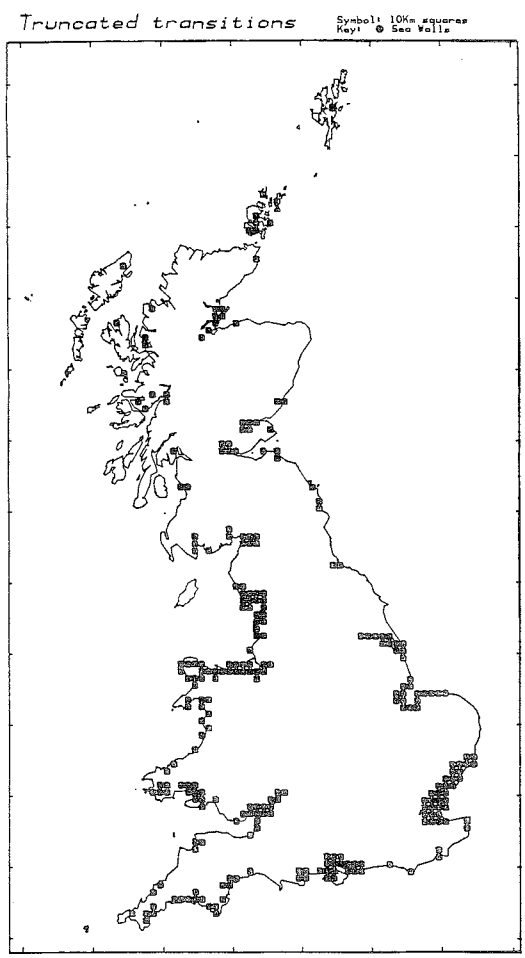
Along the west coast in both Wales (Unit 3), where *Spartina* is still abundant, and North West England (Unit 4), the mid-upper marsh communities are dominant and transition communities are more frequent. Although truncation of the marshes by sea walls has occurred in these units it is not as widespread as in Unit 1, so mid and upper marsh communities to are able to persist and develop into more extensive areas.

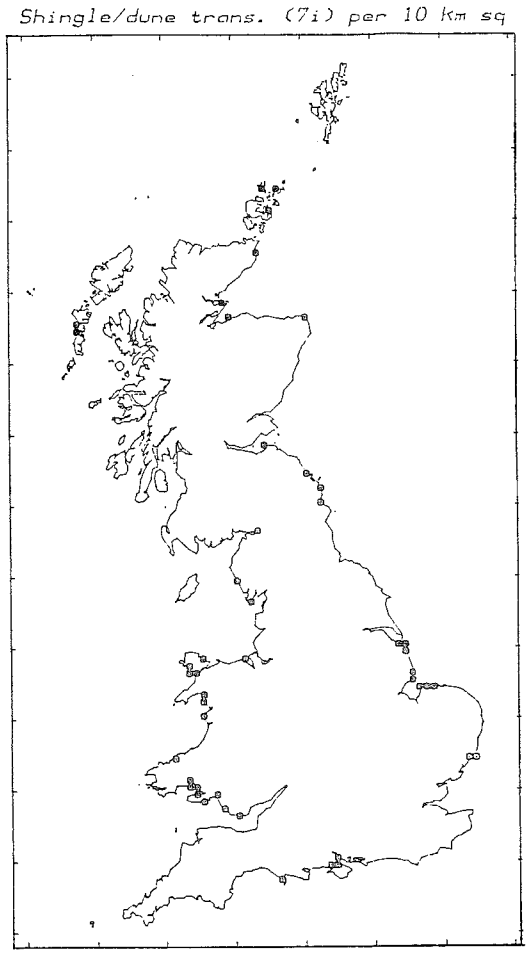
The abundance of freshwater transitions in western Scotland (Unit 5 and part of Unit 4), compared with the almost total absence of these communities in England and Wales, is largely attributable to the wetter, more oceanic climate which the north-west coastline experiences. In fact, Ranwell (1972) stated that "it is the incidence and amount of rainfall and not tidal influence which dominates salinity concentration in upper saltmarsh levels". Similarly, the more humid climate on the north-west coast enables more terrestrial species, such as *Armeria maritima* and *Glaux maritima*, to occur lower down the marsh, almost in pioneer conditions (Beeftink 1977).

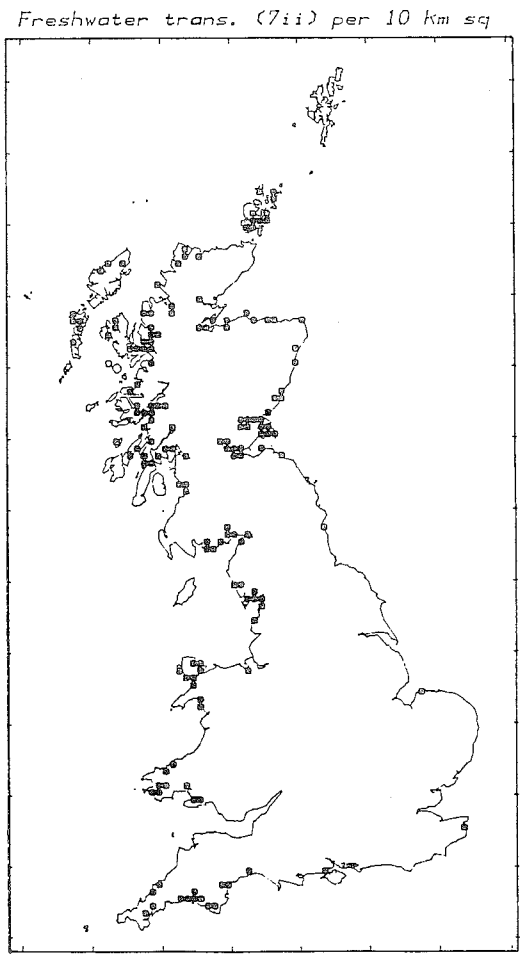
Westhoff and Schouten (1979) determined that geographical variation in saltmarsh communities in Europe was largely determined by differences in climatic conditions. In general terms they stated that, with increasing latitude and decreasing temperature, the floristic and phytosociological diversity of the marshes decreased. This could be used to explain, to some extent, the fact that many of the northern and western marshes of Scotland are small and dominated by only two communities, notably *Puccinellia/Festuca* 4b and *Juncus maritimus* 4c.

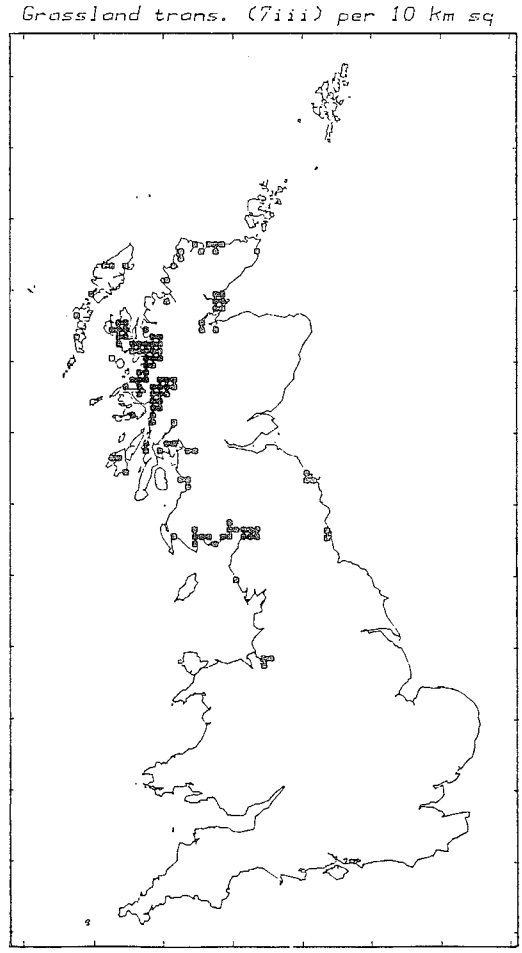
A watershed in the distribution of many species and communities on saltmarshes occurs at the level of the Solway Firth. The Solway is the northern limit for many species, such as *Halimione portulacoides*, *Artemisia maritima*, *Limonium vulgare*, *L.humile*, *Agropyron pungens*, and probably *Spartina anglica* (Adam 1978). In addition to the *Halimione* 3b community, *Juncus maritimus* 4d also reaches its northern limit along the Solway Firth. The abrupt disappearance of common species such as these suggests that their limits are controlled by climatic factors (Ranwell 1972), like many of the communities discussed above. (Some of the possible causal factors for the distribution of certain species are discussed in Section 3.2.1.)

Figure 12. Comparison of the distribution of transition communities with the distribution of truncated transitions









4.2 Physical features related to community distribution

Although detailed information on physical features on sites was not collected, a certain amount of general data was acquired (see Section 2.5.2). This allows some general conclusions to be made on the way these features relate to plant community distribution.

The influence of sea walls on transitional vegetation

When sea walls are built to enclose saltmarshes, as part of the process of 'reclamation' for agricultural use, they are often pushed out as far onto the marsh as is economically viable (and sometimes further). This has the inevitable effect of truncating the saltmarsh, occasionally affecting the marsh communities themselves, but more often destroying the areas of transition to other habitat types. The most recent of a succession of sea walls become in their turn the seaward coastal defences and their maintenance may itself cause further habitat loss. For example, on the Wash the upper saltmarsh is actually used as a source of material for the earth banks (Hill, 1987).

It should be noted that, although there are records of truncated transitions on several sites in Scotland, these are largely due to the construction of roads at the heads of sea lochs rather than sea walls reclaiming the saltmarsh.

When one looks at the maps of distribution of transition communities and compares them with the distribution of sea walls (Figure 12) it appears that all transitions are similarly affected by the truncation of the landward transition by sea wall. However, when more closely examined, using statistical tests to compare the number of sites having each transition community with the number of sites having sea walls, a slightly different picture emerges.

The transitions to dune, woodland and, particularly, grassland are significantly associated with the absence of sea walls on a site, as might be expected. However, there is no significant association with freshwater transitions. This is probably because in many cases the freshwater transitions, instead of occurring vertically across the marsh, in fact extend upstream along estuaries and rivers with the sea walls running alongside. Thus the sea walls themselves do not affect the upstream limit of the marsh, where normal dilution of seawater to brackish and then freshwater conditions can occur.

Substrate and community distribution

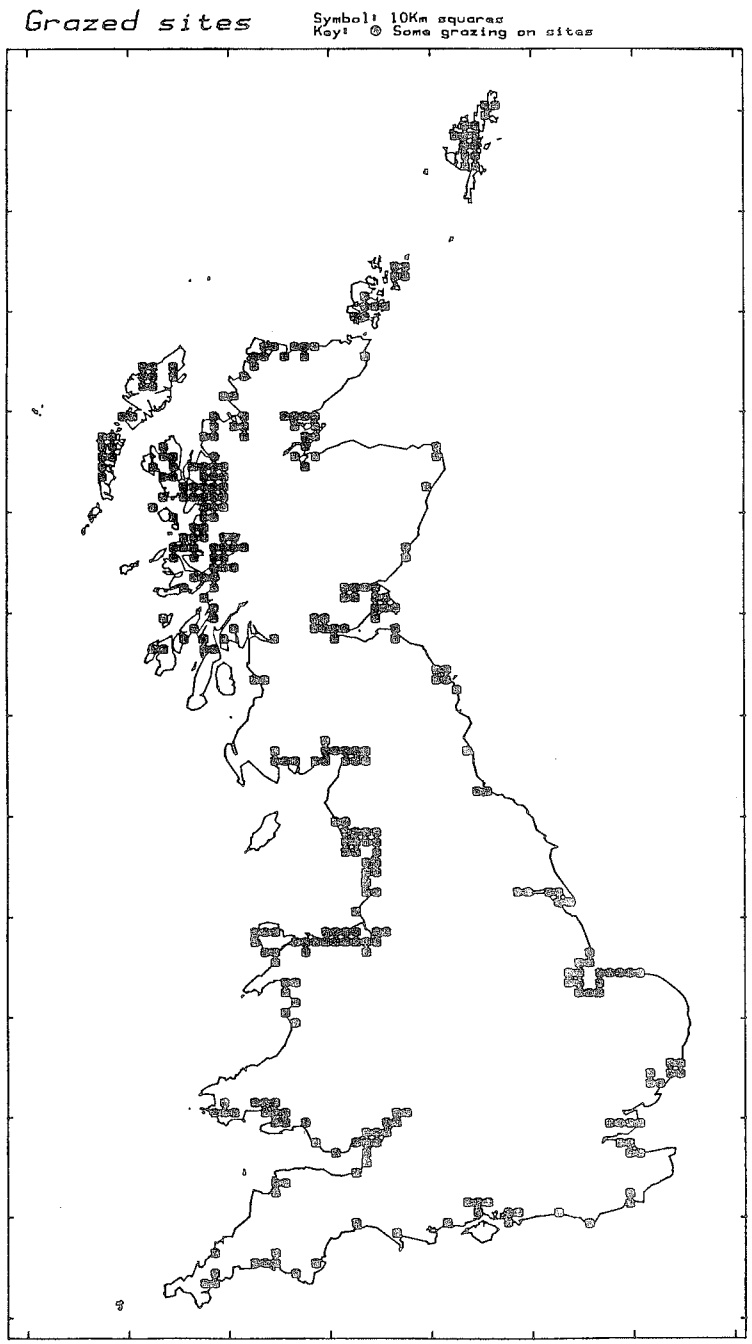
For this survey substrate was recorded only on a whole- site basis, i.e. if more than one substrate type was found on the site, the presence of each was noted, but not their spatial distributions. It is therefore not possible to relate substrate distribution to vegetation distribution in this survey.

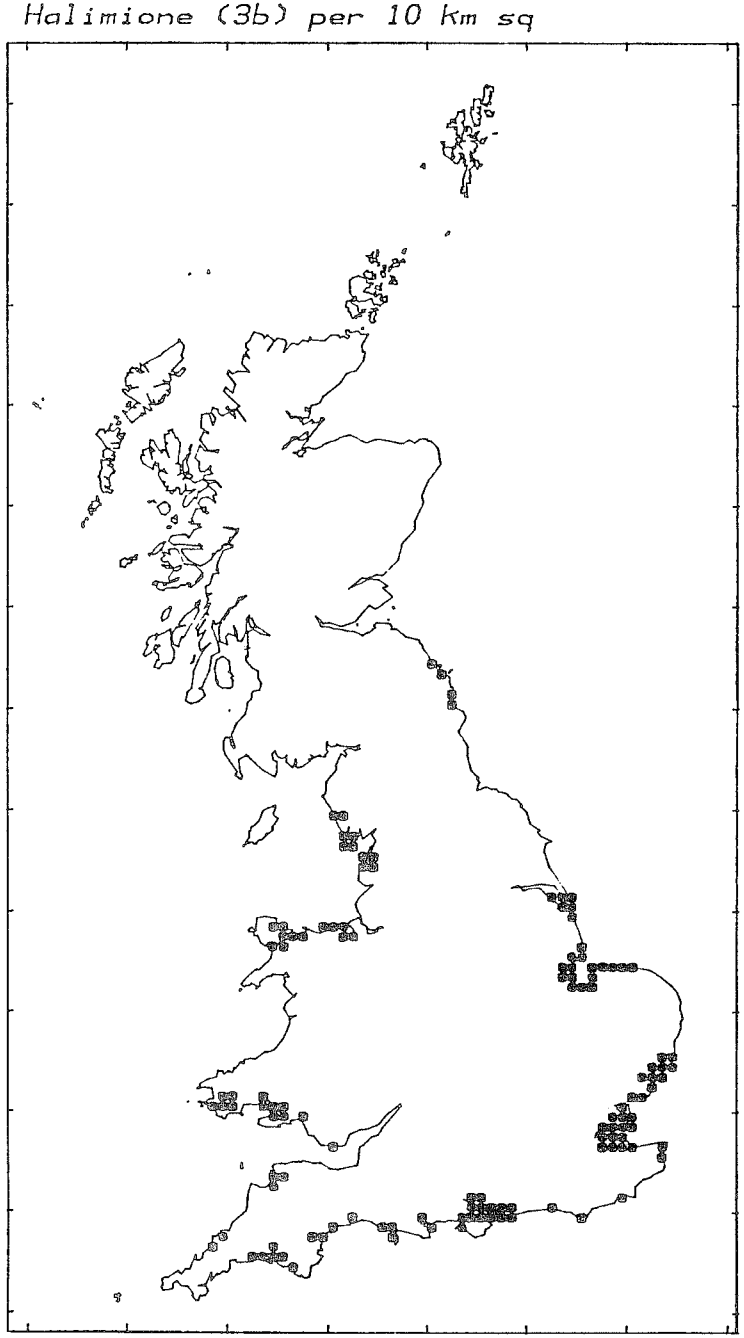
Grazed sites and grazing-sensitive species

The total number of 10 km squares containing grazed sites is significantly higher in the north and west regions than in the south. Between them, North West England, North Wales, South Wales, Dyfed Powys and North East England have an average of 77 % of the total number of 10 km squares containing some degree of grazing (with a range from 66 % to 100 %). In contrast, South East England, East Anglia, South West England and South England have an average of 53 % of 10 km squares containing some grazing (ranging from 38 % to 60 %).

The results suggest that there is a positive correlation between grazing and the absence of certain species, notably *Halimione* 3b (Figure 13), as an average of 41 % of 10km squares in the first group of regions contain this community (range 33 % to 60 %), whereas in the second, southern, group an average of 73 % (from 43 % to 93 %) of the squares have *Halimione* 3b. East Midlands does not fit into the pattern, in that 80 % of the squares there have some grazing and 100 % have *Halimione*. Scotland has been omitted from this analysis since *Halimione* as a species does not occur north of the Solway Firth.

Figure 13. Comparison of the distribution of grazed sites with that of *Halimione*





The level of grazing on a site would also appear to have an influence on other species such as *Limonium* sp. and *Artemisia maritima*, if the distribution of grazed sites is compared with the distribution of these species as shown in Perring and Walters (1976). All of *L.vulgare*, *L.humile* and *A.maritima* have a pronounced south-eastern distribution bias which could be attributed to the relative absence of grazing in these areas. This hypothesis is given weight when one considers those sites in NW England where the *Limonium/Armeria* (4a) community is found, for example on the River Wyre in Lancashire, where an extensive area of this community is located only on an ungrazed site.

Erosion/accretion and Spartina status

Figure 15 shows the distribution of 10 km squares in which some erosion and accretion were noted at the time of survey. The status of *Spartina* is also shown in this figure. On this basis, there would appear to be a good visual correlation between 10 km squares with "Invading *Spartina*" and those with some accretion. Similarly, 10 km
squares with *Spartina* dying back coincide with some of the squares with erosion, although this *Spartina* category may be somewhat suspect, as it is difficult to judge die-back when recorded at only one point in time.

It can be seen from the erosion/accretion maps that the Wash is unlike the rest of the east coast. In Essex and Kent the erosion is proceeding apace with very little compensatory accretion, whereas the Wash shows considerable accretion and very little erosion. To some extent, the growth of saltmarshes seems to be stimulated by the extensive building of sea walls around the Wash. In addition, the large amount of sediment present in the waters, and available for deposition (Evans & Collins, 1987), allows the growth of the marsh to keep pace with any rise in sea level which may be causing the erosion elsewhere.

There would also appear to be a correlation between the *Spartina* die-back and sea level rise. The areas where the *Spartina* had increased and is now reducing, i.e. the south and south east, are also the areas of maximum relative sea level rise. Conversely, the areas such as Morecambe Bay, Duddon Estuary (NW England) and North Wales, where the *Spartina* communities are now expanding, are along a rising coastline. In the Severn Estuary, however, *Spartina* invaded in the 1950s and is not showing signs of dying back. It is therefore possible that the *Spartina* has achieved a balance with respect to sea level rise. It should be noted, however, that although this is one of the explanations of the die-back phenomenon, there are several others, including the possibility of natural senescence.

The Solway Firth is an apparent anomaly in the relationship of erosion to sea level rise, since this is on a rising coastline. However, it is thought that the erosion here is, in fact, due to the changes in the position of the channel within the estuary.

Seepages and invertebrates

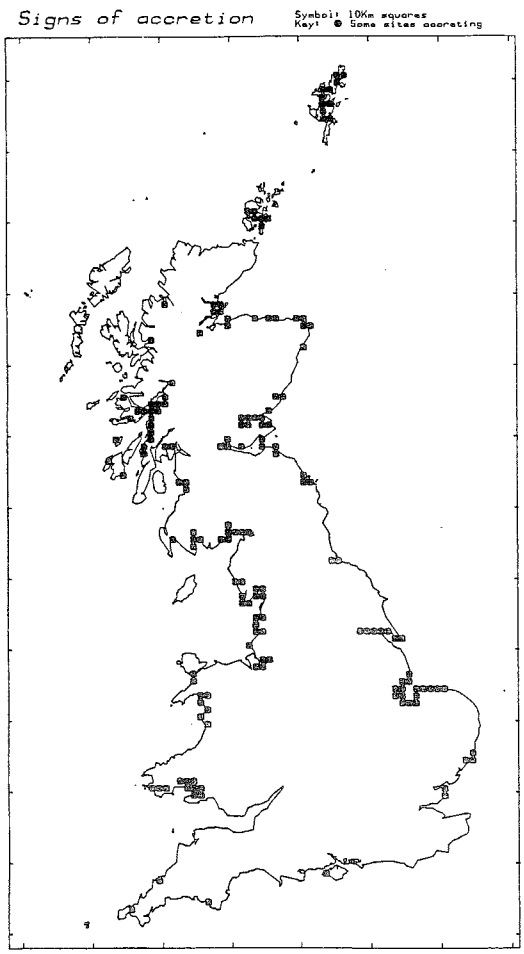
In Figure 16 10 km squares containing sites with seepages are shown together with maps of the distribution of *Scirpus* 6i and *Phragmites* 6ii.

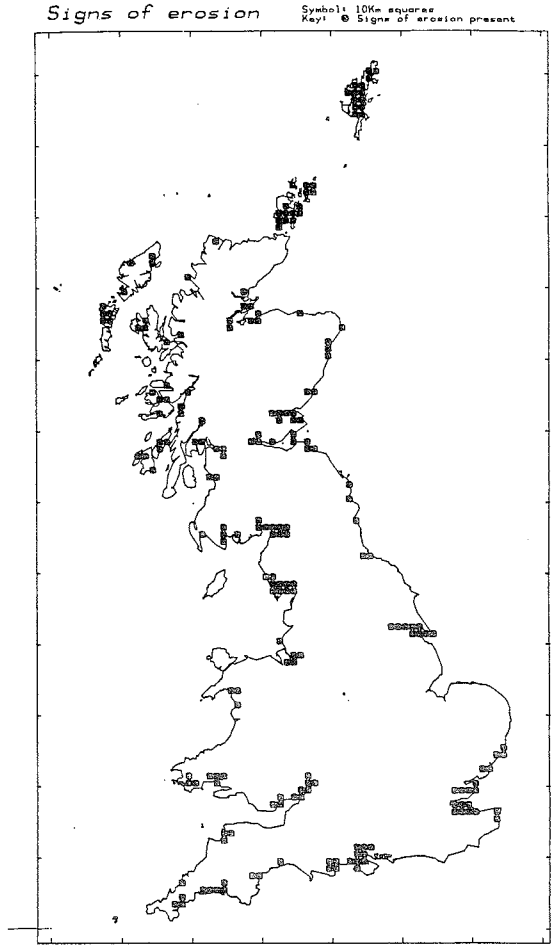
Sites with freshwater seepages are important from an entomological point of view. Where these seepages occur they supply a suitable habitat for freshwater species such as *Carex extensa*, *C. riparia*, *Oenanthe* spp and *Iris pseudacorus*. The presence of a seepage also creates a micro-habitat with a transition between freshwater and saline water in a small area. This, together with the increased floristic diversity caused by the seepage, provides a range of habitats for the invertebrates. Increased occurrence of *Scirpus* and *Phragmites* in these situations also contributes valuable shelter for the insects (Stubbs, 1979).

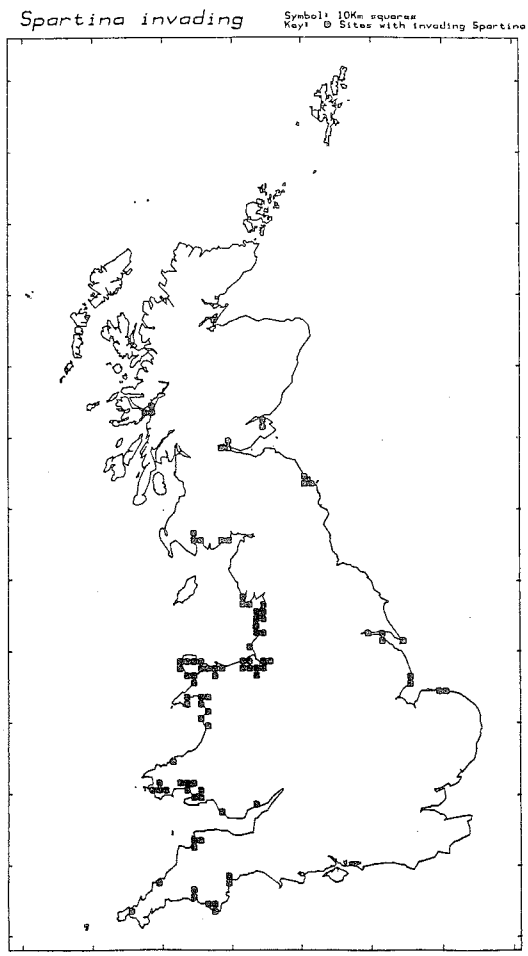
4.3 Threats to the saltmarsh habitat

One of the original reasons for surveying saltmarsh as the first in the series of coastal habitat surveys was that saltmarshes are relatively rare and highly threatened. As a result of the survey it is known that there are 44,370 ha of saltmarsh in Great Britain, compared to approximately 56,000 ha of sand dune and, although saltmarshes occupy larger areas than cliff habitats, the actual length of coastline is more restricted (less than 2000 km of

Figure 14. Comparison of the distribution of erosion/accretion and *Spartina* status







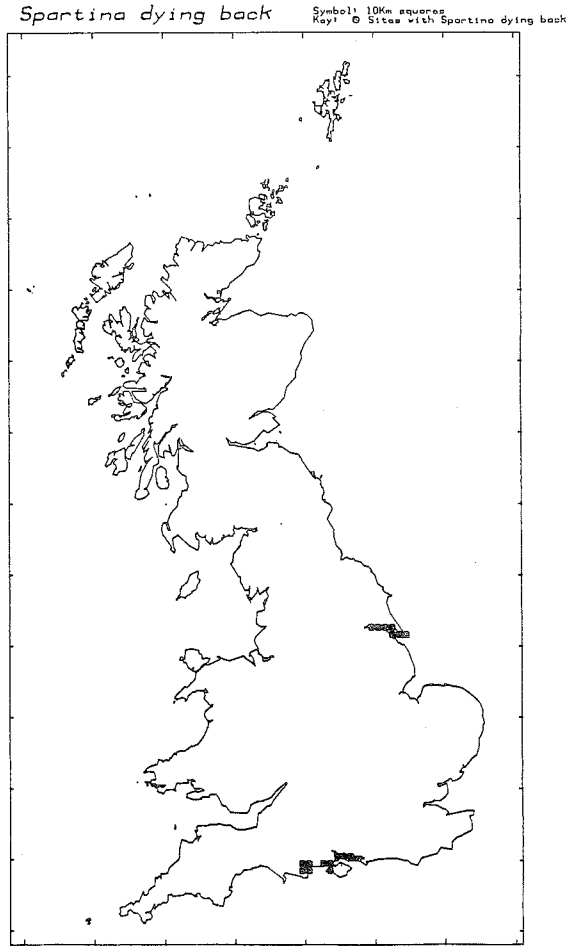
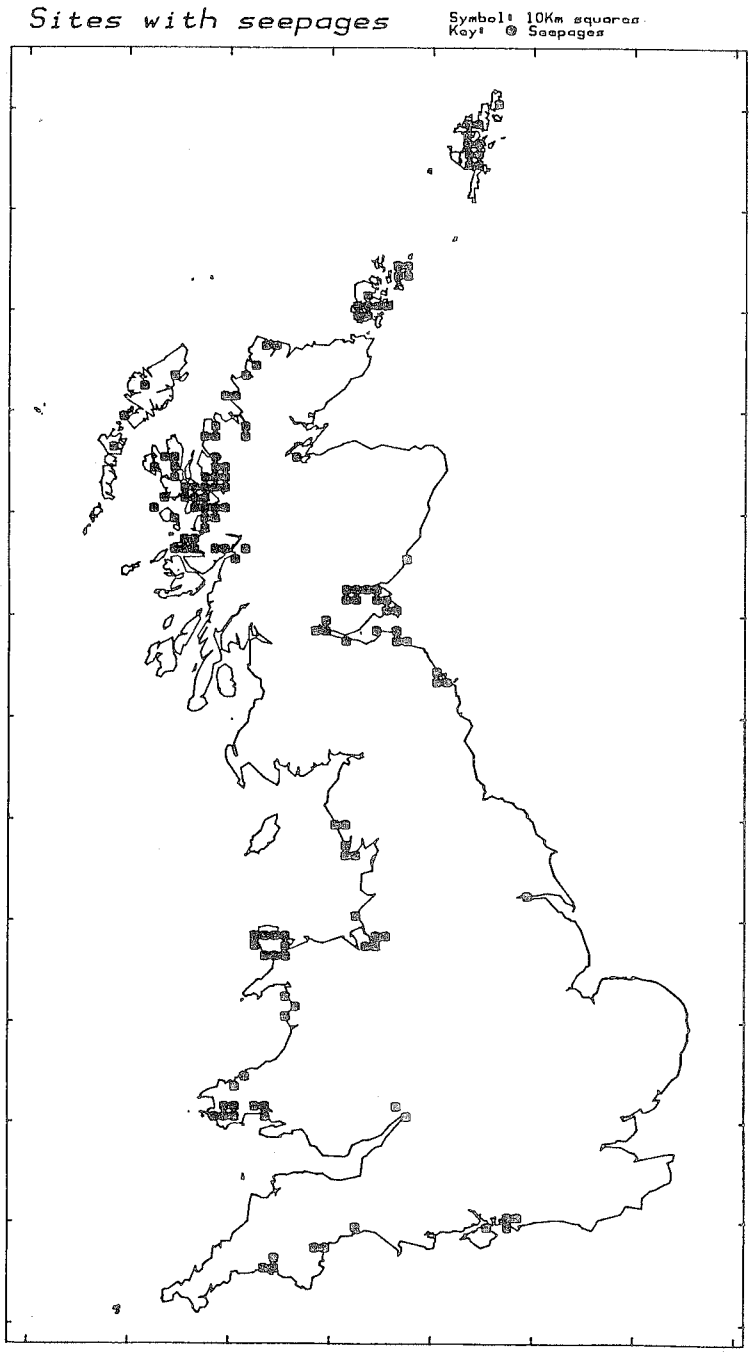
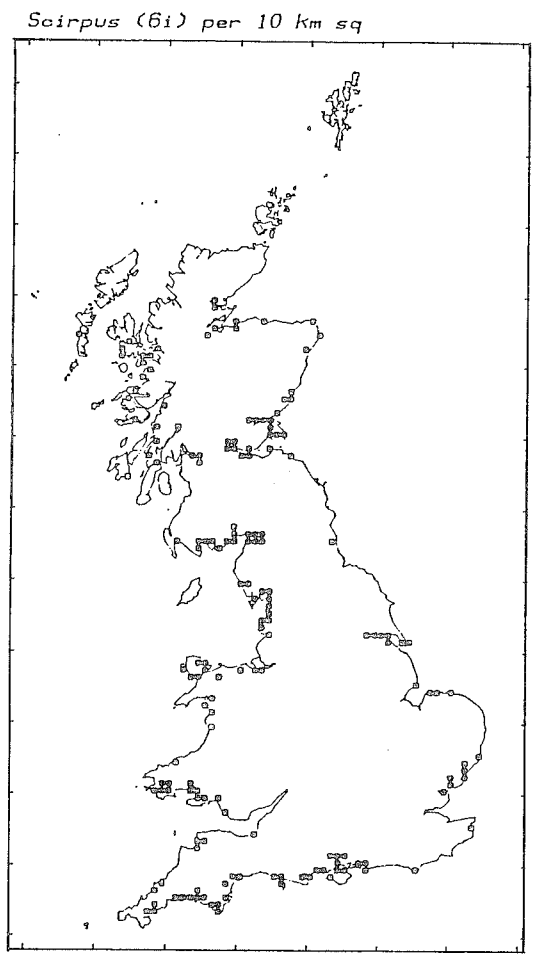
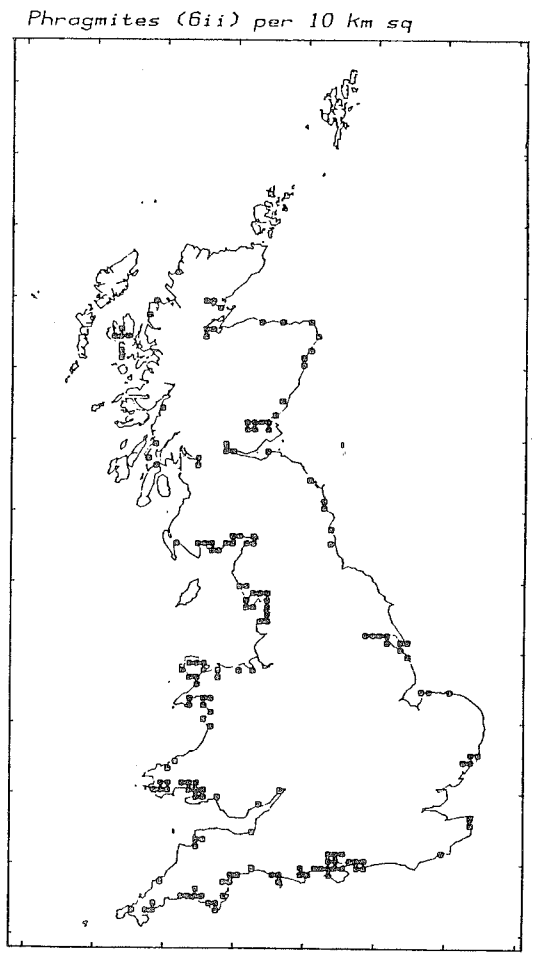


Figure 15. Comparison of the distribution of seepages with that of *Scirpus* and *Phragmites*







saltmarsh as opposed to over 4000 km of cliffed coastline). Of all the coastal habitats only vegetated shingle structures are less common than saltmarshes.

There are basically two main types of factor affecting the saltmarsh habitat: natural and man-induced.

4.3.1 Natural pressures

There are a number of natural phenomena which may cause significant changes in saltmarsh development. Notable amongst these are effects of changing river channels in large estuaries which cause local cycles of erosion and accretion.

On a large scale, a major natural pressure occurs when the sea level rises relative to the marsh at such a rate that the rise exceeds the rate of sedimentation and the marsh can no longer sustain its growth. This has happened world-wide in the past, but the rise seems to have been accelerating over the last 50 years because of increased levels of carbon dioxide in the atmosphere (Robin, 1986). This, combined with increased wave action (Carter and Draper, 1988) and less sediment availablity, may be causing the erosion of marshes in south east England, with the net effect being increased by the tilting of the British Isles, which is causing the south east coastline to sink (see section 4.1.1).

Another possible natural threat may arise as a result of change to the normal tidal regime in a habitat where the plants are already pushed to the limits of their tolerance. The saltmarsh habitat is inimical for plants which require adaptations to biological mechanisms to cope with a consistently high but very variable level of salinity. The plants within the saltmarsh are therefore zoned according to the range of their saline tolerance, and any change in the tidal regime, for example the inundation of parts of the marsh with an increased or decreased frequency, or with a greater velocity than normal, will adversely affect those plants that are at the limit of their tolerance.

4.3.2 Anthropogenic uses of saltmarshes

Historically, man has always used saltmarshes for his own purposes. Some of these uses, such as light grazing, have little effect, while others, such as enclosure for agriculture or other developments, cause major losses of habitat interest.

Man's historical use of the marsh for intensive grazing or extensive turf cutting has significant effects on the type of saltmarsh which develops over time. Grazing alone, particularly at high stocking levels, reduces species diversity on many marshes. Major components of the marsh are grazing-sensitive, thus a lower species-diversity is achieved. This is reflected in the absence of communities dominated by *Halimione* or *Limonium* spp. on grazed sites, notably in the north west where grazing is often intense.

Being near the sea (the traditional holiday haunt for many people), saltmarshes are also used extensively for recreational purposes, for example wildfowling, walking, rambling, picnicking, horseriding, and adjacent camping and caravanning. Although recreation in itself is probably not harmful to the marsh, excessive pressure can cause a certain amount of damage, for example erosion from trampling along pathways.

Other historical changes to the saltmarsh habitat have a more profound effect, for example land reclamation and agricultural improvement in the form of sea walls and drainage operations, which decrease the area of interest. Increasing pressure from industrial and urban developments also causes irreversible loss of saltmarsh habitat. Examples of these forms of threat are the salt-making industry, oyster-culture, harbour works, marina proposals, industrial and power plants and urban housing developments.

One of the major developments having serious implications for the integrity of saltmarsh systems, which, although not new, is now being proposed more extensively, is the building of tidal barrages or tidal sills across many of the major estuaries, either for energy production or for amenity use. At present two major proposals are being considered, for the Severn Estuary and the Mersey Estuary, and several smaller barrages are currently planned, for the Loughor Estuary (Burry Inlet), the Plym, Usk, Dee, the Taff at Cardiff and Portsmouth Harbour (NCC 1987).

The industrial and urban developments are also largely responsible for the problems of pollution which increasingly affect many areas of saltmarsh. Listed below are some of the more common forms of pollution currently threatening large areas of Britain's saltmarshes (Beeftink 1977):

- man-made detritus and litter
- chemical substances derived from
    - agricultural wastes
    - fertilizer outwash
    - urban sewage
    - industrial effluents e.g.
        - spillage of oil
        - heavy metals
        - radioactive waste
        - thermal pollution.

The effects of pollution on the saltmarsh vegetation are many and varied but so far little work has been done to identify the main areas of concern.

This brief outline of the many types of threat facing this relatively rare habitat shows how important it is that the saltmarshes be protected as far as possible. The following section details how much of the habitat is already protected.

4.4 Statutory protection of saltmarsh types

In the following discussion the term 'protected' is used to refer to those areas of saltmarsh which fall within existing SSSI or NNR boundaries (see Sections 2.6.3 and 3.3).

In addition to those areas which are protected by statutory designation within NCC, there are other types of protection, such as RSPB and County Trust reserves, which are not included in the data compiled by this present survey.

Since the vegetation types in the six geographical units are representative of the full range of community variation within the saltmarsh habitat, it is important to ascertain the extent to which representative communities are protected by SSSI or NNR status.

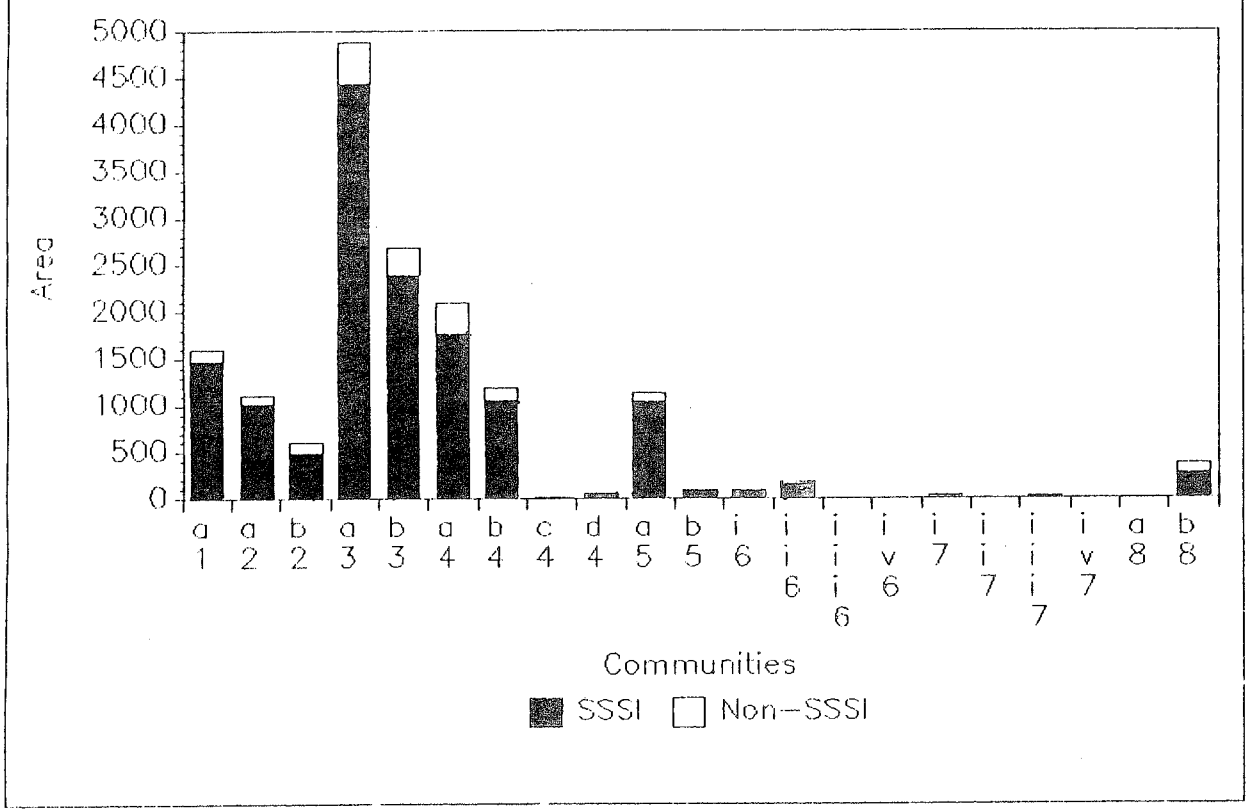
The Figures 16 - 21 on the following pages show how much of each community is protected within each geographical unit. (It is important to note that the graphs are scaled according to the maximum community area.)

Overall, 82.8 % of the total saltmarsh area in Great Britain was, at the time of the survey, protected by SSSI or NNR status.

It may be seen from these figures that approximately the same proportion of each community is protected by SSSI status within each geographical unit, although the different geographical units vary in their degrees of protection. For example, a smaller proportion of each of the communities is covered in Units 3,5 and 6 than in, especially, Unit 1 where between 80 and 90 % of all the communities are protected. This variation in the degree of protection extends to 100% cover in some individual counties.

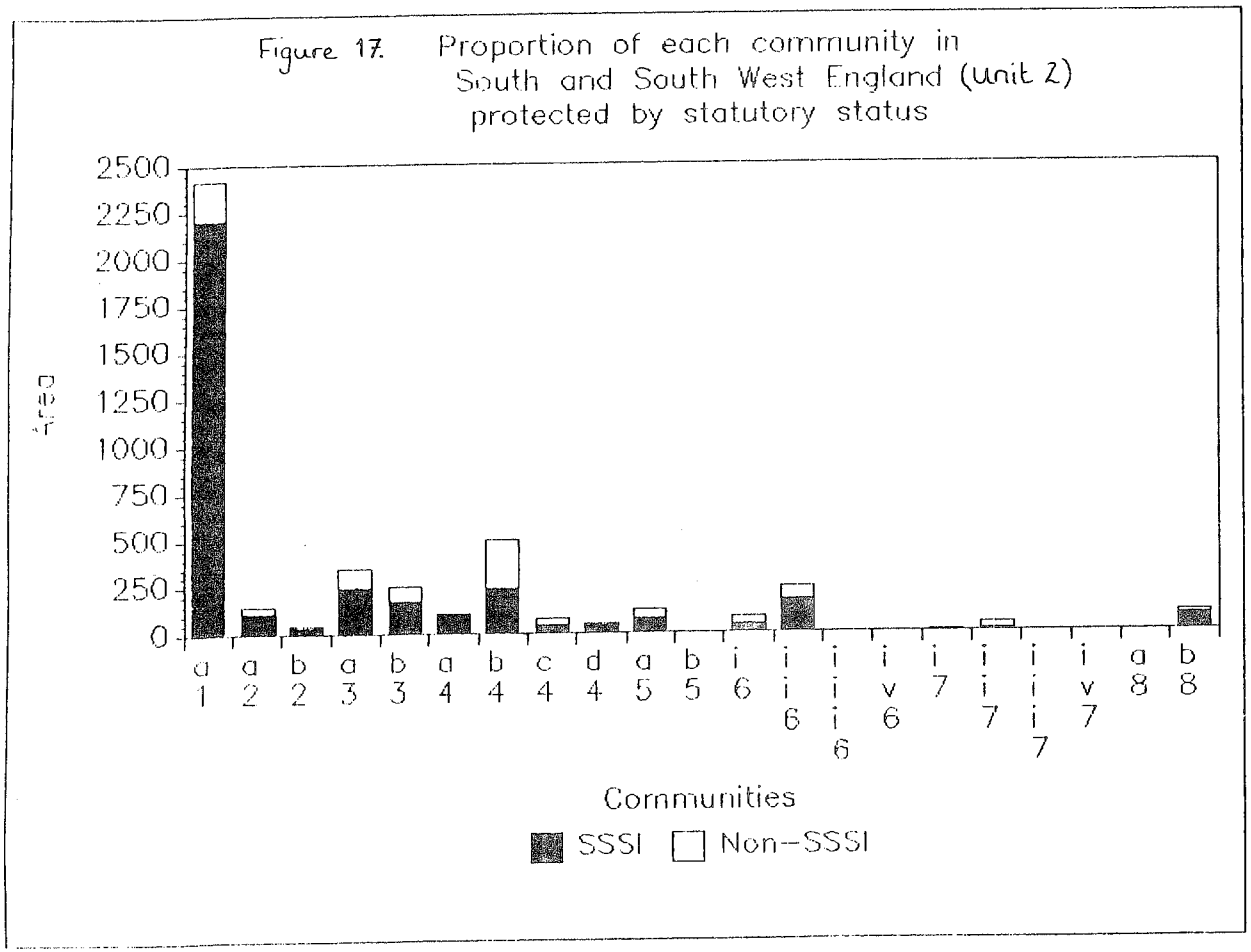
The justification for the large proportions of marshes being covered by statutory status is that the sites are scheduled for a variety of reasons. Saltmarshes may be included in SSSIs because they are representative of geographical variation or because they include rare or uncommon plant communities. In addition levels of community diversity are of great importance when considering how much of the marsh should be included.

Figure 16. Proportion of each community in East and South East England (Unit 1) protected by statutory status

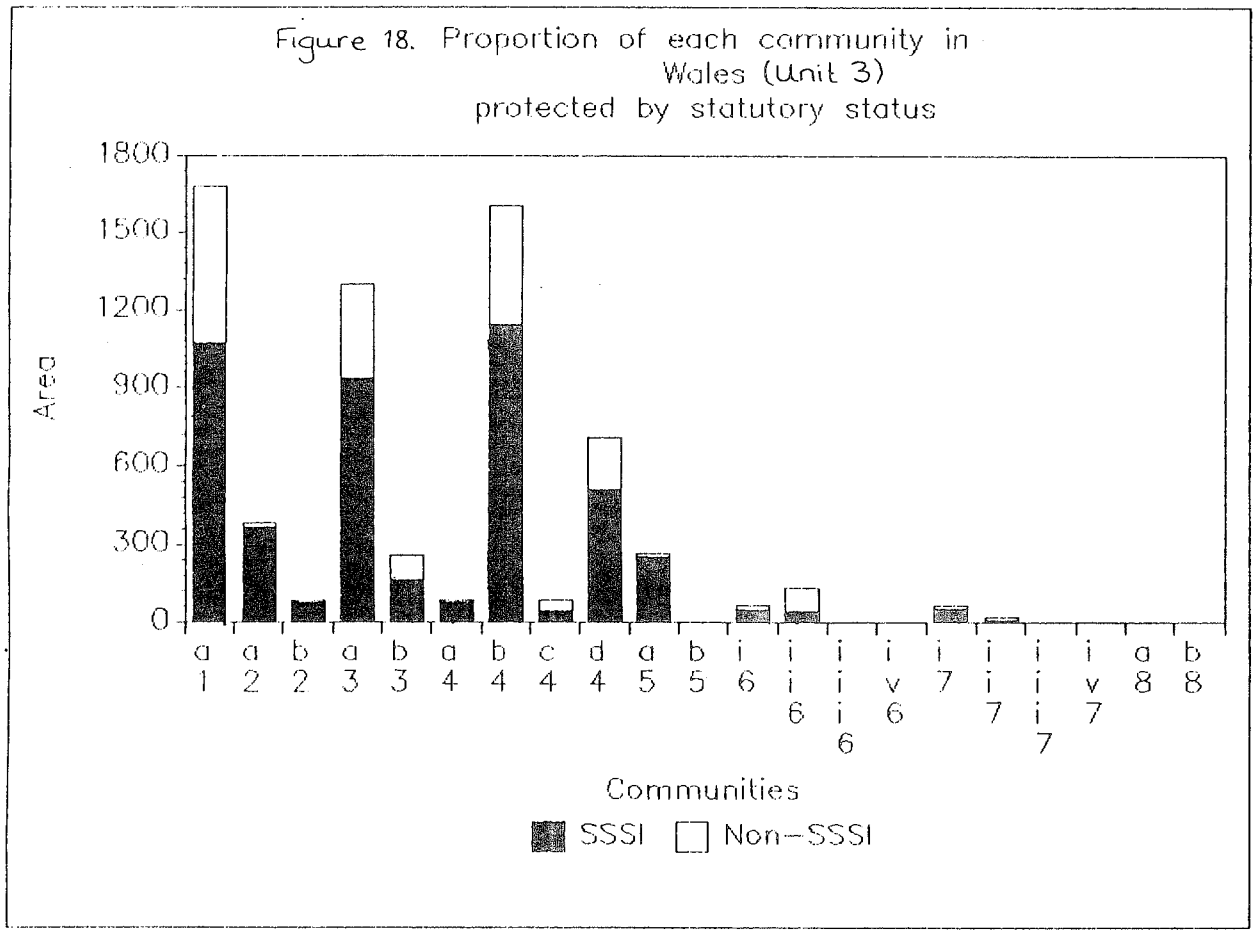


	East and South East England		
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	1,599.95	1,479.85	92.49
Salicornia/Suaeda	1,103.33	1,018.61	92.32
Aster	602.62	492.93	81.80
Puccinellia	4,877.47	4,440.80	91.05
Halimione	2,684.65	2,388.87	88.98
Limonium/Armeria	2,093.30	1,769.97	84.55
Puccinellia/Festuca	1,188.21	1,057.30	88.98
J.gerardii	14.76	14.22	96.34
J.maritimus	55.33	43.70	78.98
Agropyron	1,131.27	1,039.41	91.88
S.fruticosa	94.38	94.38	100.00
Scirpus	87.66	75.08	85.65
Phragmites	186.11	156.38	84.03
Typha	6.21	6.21	100.00
Schoenoplectus			
Shingle/Dune Trans.	40.69	40.69	100.00
Freshwater Trans.	4.67	4.41	94.43
Grassland Trans.	25.76	25.76	100.00
Woodland Trans.			
Comm. of Wet Depr.			
Unsurveyed	366.82	268.44	73.18
TOTAL incl. Trans.	16,163.19	14,417.01	89.20

Figure 17. Proportion of each community in South and South West England (unit 2) protected by statutory status

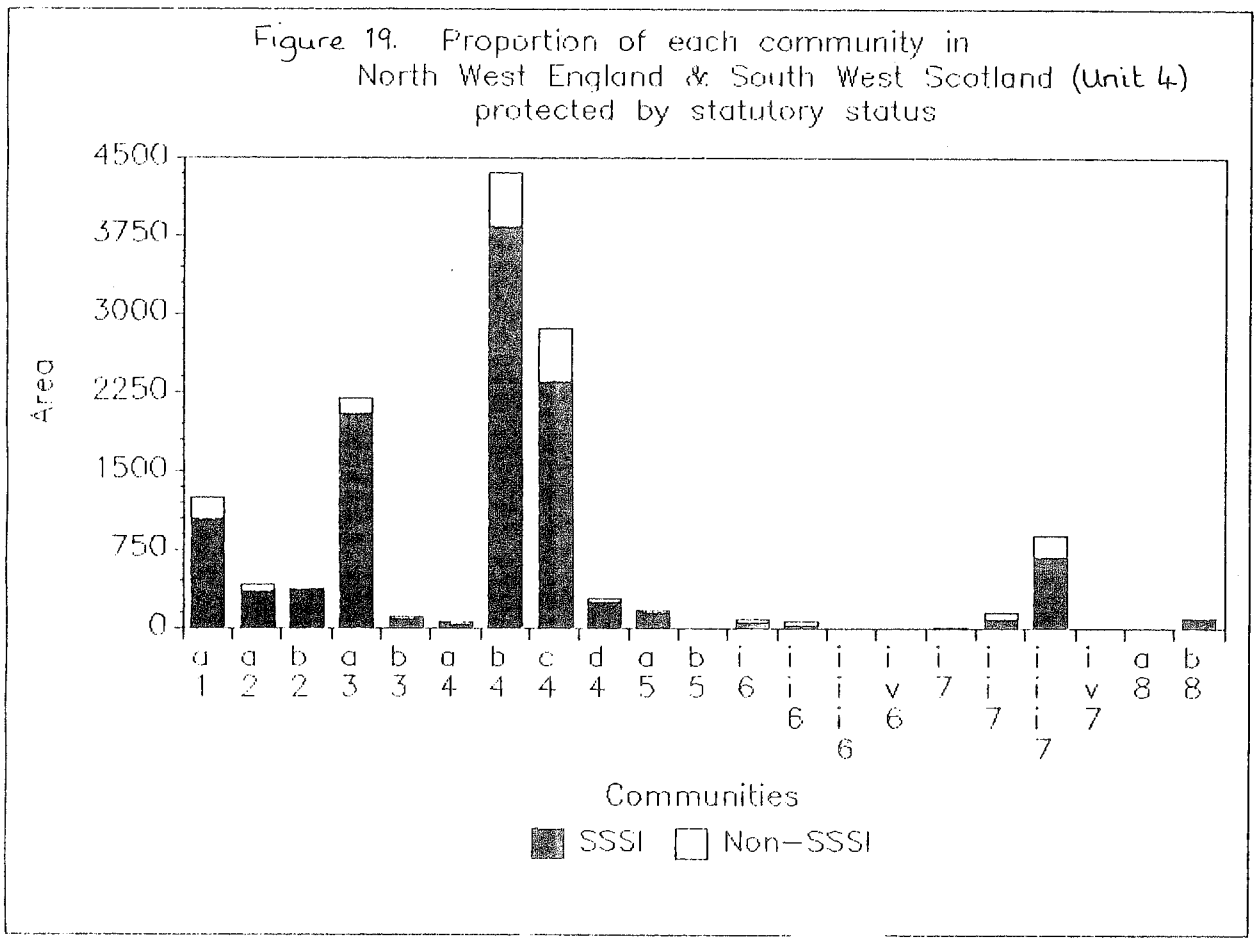


	South and South West England		
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	2,420.67	2,204.20	91.06
Salicornia/Suaeda	145.12	114.83	79.13
Aster	45.98	33.74	73.38
Puccinellia	348.90	246.24	70.58
Halimione	250.39	174.98	69.88
Limonium/Armeria	107.03	103.05	96.28
Puccinellia/Festuca	499.36	241.77	48.42
J.gerardii	79.72	44.63	55.98
J.maritimus	49.67	42.60	85.77
Agropyron	124.42	80.39	64.61
S.fruticosa	0.35	0.35	100.00
Scirpus	84.40	44.32	52.51
Phragmites	241.55	173.80	71.95
Typha	1.16	0.69	59.48
Schoenoplectus	1.14	0.47	41.23
Shingle/Dune Trans.	7.32	7.32	100.00
Freshwater Trans.	47.46	10.43	21.98
Grassland Trans.			
Woodland Trans.			
Comm. of Wet Depr.			
Unsurveyed	100.65	86.85	86.29
TOTAL incl. Trans.	4,555.29	3,610.66	79.26

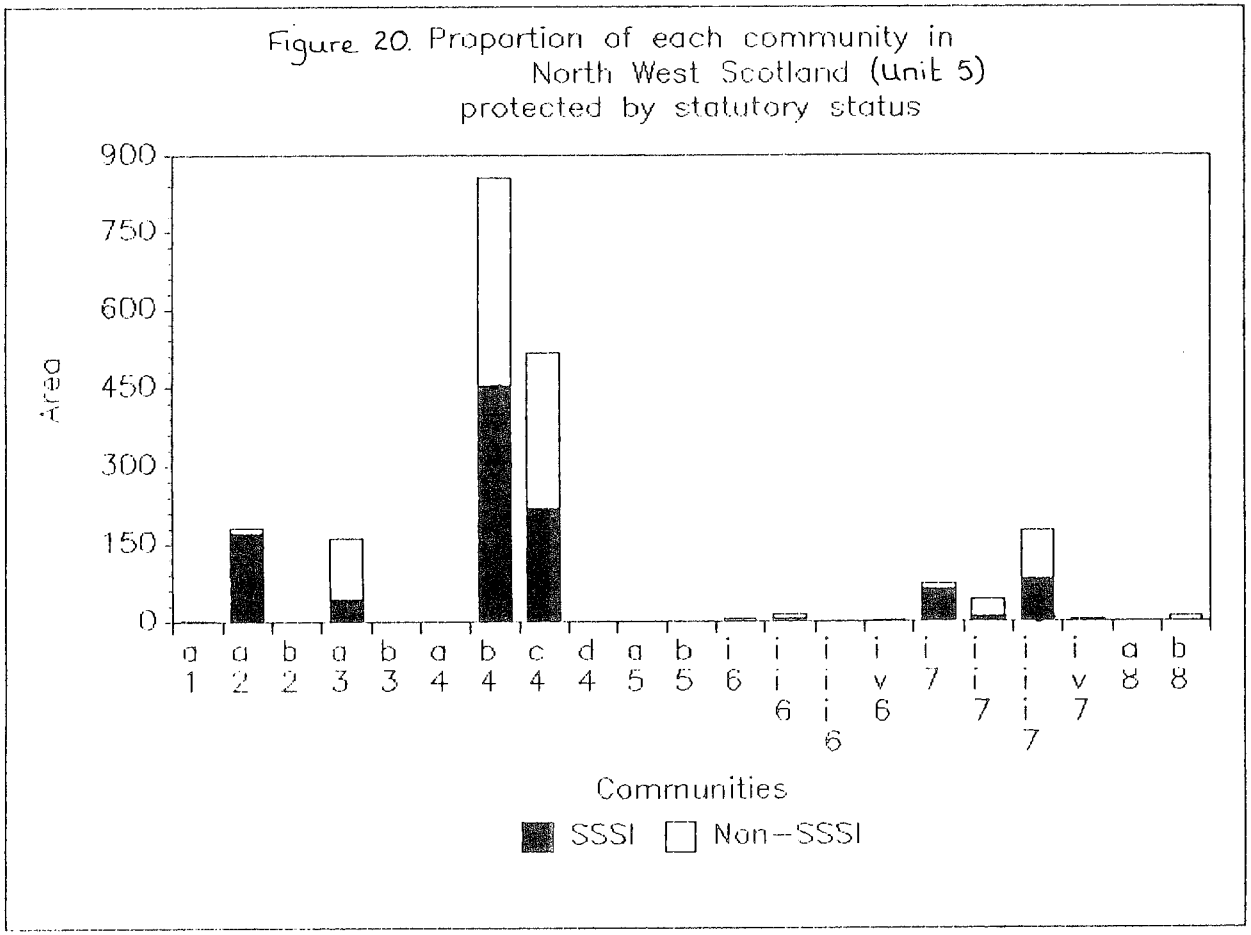


	Wales		
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	1,680.56	1,073.13	63.86
Salicornia/Suaeda	382.49	364.63	95.33
Aster	85.85	77.41	90.17
Puccinellia	1,297.96	935.79	72.10
Halimione	256.96	164.36	63.96
Limonium/Armeria	86.61	78.83	91.02
Puccinellia/Festuca	1,605.52	1,147.63	71.48
J.gerardii	85.79	46.73	54.47
J.maritimus	707.78	512.58	72.42
Agropyron	267.28	254.15	95.09
S.fruticosa			
Scirpus	65.38	47.90	73.26
Phragmites	133.36	45.60	34.19
Typha	0.28	0.10	35.71
Schoenoplectus	2.87	1.45	50.52
Shingle/Dune Trans.	66.56	52.94	79.54
Freshwater Trans.	22.32	8.82	39.52
Grassland Trans.			
Woodland Trans.			
Comm. of Wet Depr.			
Unsurveyed			
TOTAL incl. Trans.	6,747.57	4,812.05	71.32

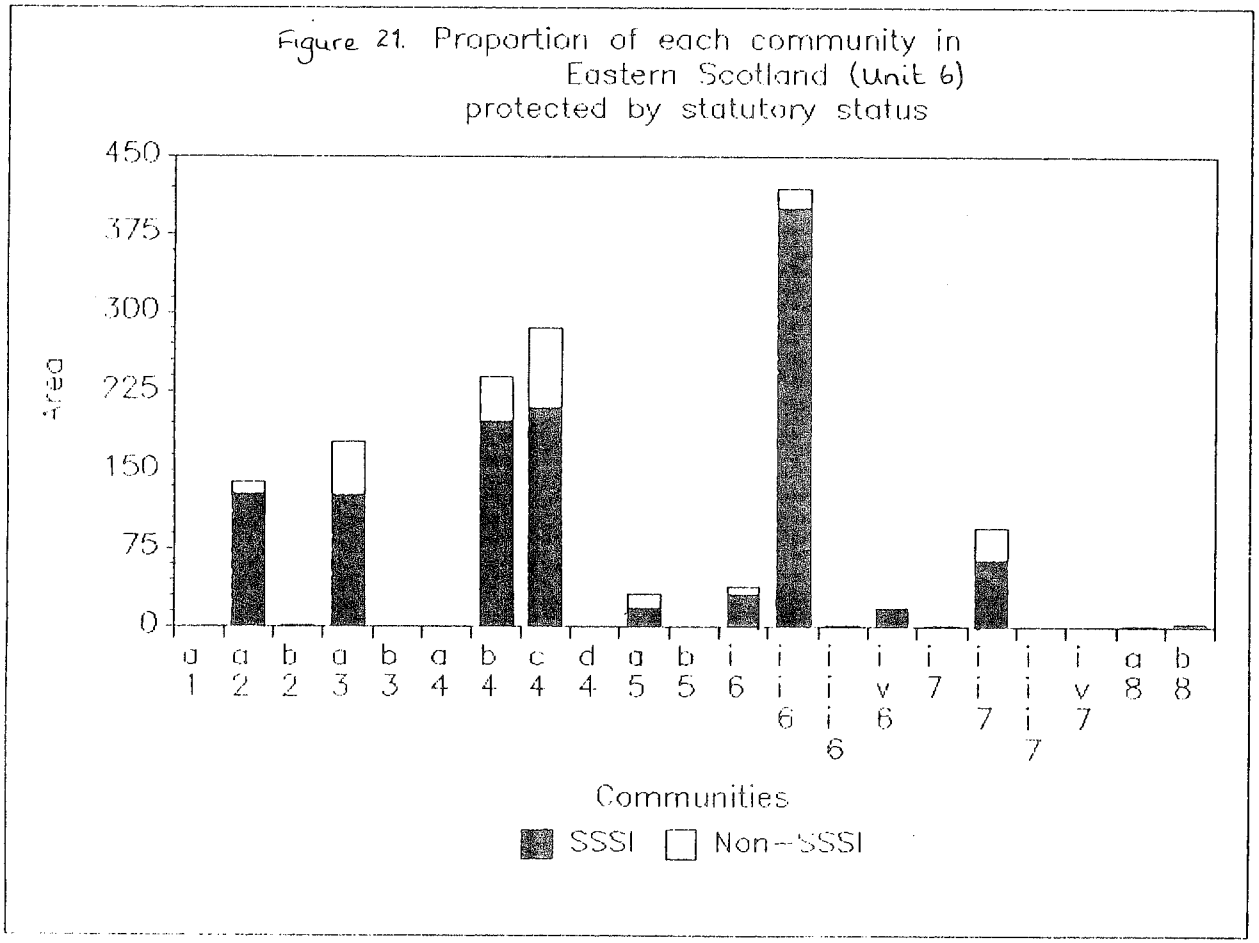
Figure 19. Proportion of each community in North West England & South West Scotland (Unit 4) protected by statutory status



	NW England and SW Scotland		
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	1,244.45	1,042.99	83.81
Salicornia/Suaeda	411.23	357.45	86.92
Aster	373.45	360.35	96.49
Puccinellia	2,188.61	2,054.61	93.88
Halimione	109.97	89.36	81.26
Limonium/Armeria	67.26	44.78	66.58
Puccinellia/Festuca	4,360.37	3,842.54	88.12
J.gerardii	2,859.08	2,356.84	82.43
J.maritimus	285.48	253.88	88.93
Agropyron	173.98	147.93	85.03
S.fruticosa			
Scirpus	92.34	63.01	68.24
Phragmites	70.30	31.52	44.84
Typha	2.15	0.05	2.33
Schoenoplectus	0.24	0.24	100.00
Shingle/Dune Trans.	11.50	11.50	100.00
Freshwater Trans.	154.94	87.88	56.72
Grassland Trans.	890.34	680.66	76.45
Woodland Trans.	6.32	3.64	57.59
Comm. of Wet Depr.	0.59		0.00
Unsurveyed	102.16	92.00	90.05
TOTAL incl. Trans.	13,404.76	11,521.23	85.95



	North West		Scotland
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	2.21	2.21	100.00
Salicornia/Suaeda	180.51	171.73	95.14
Aster			
Puccinellia	160.74	43.83	27.27
Halimione			
Limonium/Armeria			
Puccinellia/Festuca	855.33	455.17	53.22
J.gerardii	516.59	220.20	42.63
J.maritimus			
Agropyron	0.47	0.17	36.56
S.fruticosa			
Scirpus	5.84	1.53	26.20
Phragmites	14.84	5.51	37.13
Typha			
Schoenoplectus	2.40	2.40	100.00
Shingle/Dune Trans.	72.36	63.62	87.92
Freshwater Trans.	42.60	10.19	23.92
Grassland Trans.	176.10	83.48	47.40
Woodland Trans.	4.17		0.00
Comm. of Wet Depr.	0.12	0.12	100.00
Unsurveyed	10.72		0.00
TOTAL incl. Trans.	2,045.00	1,060.16	51.84



	Eastern		Scotland
	TOTAL AREA	SSSI AREA	% SSSI
Spartina	0.31	0.30	96.77
Salicornia/Suaeda	138.38	127.69	92.27
Aster	1.34	0.16	11.94
Puccinellia	177.21	126.65	71.47
Halimione			
Limonium/Armeria			
Puccinellia/Festuca	239.45	197.54	82.50
J.gerardii	285.58	210.32	73.65
J.maritimus	0.10		0.00
Agropyron	31.38	18.43	58.73
S.fruticosa			
Scirpus	38.27	30.89	80.71
Phragmites	419.11	400.79	95.63
Typha	1.35	0.01	0.74
Schoenoplectus	18.33	17.92	97.76
Shingle/Dune Trans.	1.54	1.02	66.23
Freshwater Trans.	94.99	64.74	68.16
Grassland Trans.			
Woodland Trans.			
Comm. of Wet Depr.	1.57	0.96	61.02
Unsurveyed	3.60	1.60	44.44
TOTAL incl. Trans.	1,452.50	1,199.02	82.55

In this report we have been concerned with the plant communities and the representation of these within the sites. However, the sites are chosen not only for their floristic or geographical importance, but also for their invertebrate interest, or for the presence of breeding birds, where the structure of the marsh is suitable. The site may also be of interest for the grazing herbivores, such as geese, which it supports.

In addition, the saltmarshes typically form a major component of many estuaries and mud and sand flat systems, which are important as overwintering areas or migration stopovers for numerous species of birds. These systems are often recognised as being of international importance for populations of ducks, geese and waders, and this justifies the inclusion of apparently impoverished areas of saltmarsh within protected estuarine sites to maintain the overall integrity of their systems.

Thus, there are many reasons why large areas of saltmarsh which, at first glance, may appear not to be of interest to nature conservation, should be protected by statute within NCC. This survey has shown that many are indeed already protected. It is important to note, however, that no attempt has been made in this report to assess the conservation significance of individual saltmarsh areas. This report is not concerned with making value judgements about the sites, but rather with describing the resource throughout Great Britain.

5. CONCLUSION

5.1 Assessment of survey method

At the end of this very extensive survey it is possible to assess the effectiveness of this type of broad survey method. Given the original limitations to the time available for the survey, and the original allocation of resources, the method adopted was undoubtedly the best to cover such an extensive remit.

The vegetation communities, although not being directly comparable with those of the National Vegetation Classification, are compatible with a degree of estimation, and may, therefore, allow comparison with other NVC-based work on saltmarshes. For the purposes of this survey the communities employed were highly suitable since they were readily recognisable even from a distance, and usually occupied areas large enough to be mapped easily.

Although this project serves as a background against which future work on saltmarshes can be placed, it is not recommended that the method be repeated or used as a baseline for monitoring. The method is useful to provide basic resource information but is not sufficiently detailed or accurate to allow the direct comparisons that are necessary for monitoring. The possibilities for observer error, when using a close-up sketching technique as employed on this survey, mean that it is not possible to compare temporally-spaced surveys with sufficient accuracy to assess how the vegetation has changed.

The broad method of collection of data on physical factors within a site was also somewhat limited; in fact, since no spatial locations of physical factors within the sites were recorded it is impossible to correlate features such as substrate, salinity or height above sea level with the present vegetation.

It should be noted that these main criticisms of the saltmarsh survey have been taken into account in the design of the later surveys of sand dune, cliff and shingle. The main conclusion from the initial view of these adapted survey methods is that the estimated timescale and required allocation of resources will preclude an entirely comprehensive survey of these habitats for the whole of Great Britain, although this still remains the ultimate aim. It is therefore likely that, in the first instance, only selected areas of these habitats will be surveyed, although as many areas as possible will be covered within the time available.

Therefore, despite the minor drawbacks of the method employed for the Saltmarsh Survey, the results are still important, since they are derived from the only complete survey of a coastal habitat, at least for some years to come.

5.2 Further saltmarsh survey work

Many studies have been carried out in the past to determine causal factors for vegetation distribution, both within and between sites (Adam 1978; Beeftink 1977; Chapman 1938, 1976; Long and Mason 1983; Ranwell 1972; Westhoff and Schouten 1979 and many others - see Saltmarsh Bibliography: Charman, Fojt and Penny 1986).

However, since very little detailed environmental information was collected by this present survey, it has not been possible to make any definitive statements regarding the factors which have caused the present distribution and vegetation status of Britain's saltmarshes. Nonetheless, using the past studies it has been possible to highlight certain general relationships between the broad vegetation distribution patterns and environmental factors, although care needs to be taken when applying the general data to specific areas, as local factors may largely override any generalised relationship that may exist.

This means that more information on the physical environment within individual marshes will need to be collected, in association with further vegetation studies, before the consequences of changes to the environment can be assessed in terms of effects on the vegetation of a site or its nature conservation interest.

In addition to detailed studies of the physical processes within the saltmarsh environment, it is necessary to carry out studies on the various methods of saltmarsh management, both historical and present. With this sort of data on existing management methods it is possible to assess how a change in the management regime will

affect the site vegetation. Several projects are proposed along these lines within NCC, including a review of saltmarsh management as it affects nature conservation importance.

Also within NCC, a project was set up in April 1988 to re-survey the areas of saltmarsh covered by the Maplin report (ITE 1974), in order to assess how the vegetation has changed between 1974 and 1988. This work is important in view of the rapid change in the structure and vegetation of the saltmarshes of Essex and Kent, which may be related to the changing sea level. In this case, the difference in methodology between the ITE report and the Saltmarsh Survey allows the 1974 data to be used as a baseline for this proposed survey (see section 2.6.2 for a description of the Maplin report).

5.3 The future of saltmarshes in Great Britain

Saltmarsh is an uncommon resource, the area of which is constantly decreasing with increasing land-use pressures and environmental pollution.

By comparing the present saltmarsh area with the areas of other natural or semi-natural habitats in Britain it is possible to show that the saltmarsh resource is relatively uncommon.

Peatland - c. 1,300,000 ha (R.Lindsay, pers.comm.)
Ancient, semi-natural woodland - c. 350,000 ha (K.Kirby, pers.comm.)
Heathland - c. 60,000 ha (L.Farrell, pers.comm.)
Sand dune - c. 56,000 ha (P.Doody, pers.comm.)

Saltmarsh - 44,370 ha

Chalk grassland - 43,546 ha (Blackwood & Tubbs, 1970)

Because there is now so little saltmarsh in Great Britain, especially when compared with other habitats (and indeed saltmarsh extends along only one tenth of the total length of Britain's coastline), it is essential that the majority of the resource be protected as far as possible by statutory designation within the NCC.

At the time of the survey this did appear to be the case, with over 82 % of the resource already protected, although this varied in the different countries, with 89% in England, 71% in Wales and only 63% protected in Scotland. However, the threats, such as agricultural improvements, industrial and urban developments, and lately, barrages and marinas, are continually increasing, even within areas that are deemed to be "protected". This is a rare habitat with specialist plants and animals and an overall importance to functional systems such as estuaries, so it is imperative that this level of protection be maintained or increased as necessary.

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Other contributors

Dr Kevin Charman initially set up the project with Dr Doody and completed the survey of the west coast of England and Wales between Cumbria and Dorset, together with Chichester Harbour and the North Lincolnshire Coast. Much of the rest of England was surveyed by Dr Wanda Fojt who took over the project from Dr Charman. This included the remainder of the south coast, and the parts of Kent, Essex and Suffolk which were omitted from the Maplin Report.

Many individuals were involved in the survey of the Scottish marshes; these were:

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North East Scotland -	Una Urquhart
	D.W. Shimwell (Orkneys)
	D.H. Dalby (Shetlands)
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	Susan Penn (Lochaber)
	David Law and Diana Gilbert (Western Isles)
South West Scotland -	Helen Bibby
	Jill Matthews (Jura)

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8. APPENDICES

8.1 Vegetation communities employed in the Saltmarsh Survey of Great Britain, related to the National Vegetation Classification

8.2 Sample of the Site Record Card used during the field survey, from which data was entered into the computer

8.3 List of detailed reports produced during the course of the Saltmarsh Survey

8.4 List of all sites in the Saltmarsh Survey database with their database codes

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8.7 List of all saltmarsh sites ordered by decreasing site area

8.8 Tables showing the distribution and area of saltmarsh communities in each country

8.9 Tables showing the distribution and area of saltmarsh communities in each NCC region

Appendix 8.1. Vegetation communities employed in the Saltmarsh Survey of Great Britain, related to the National Vegetation Classification.

SALTMARSH SURVEY (Mapping Units)	NVC Community Equivalents	Community Description
1. *Spartina*	SM6 *Spartina anglica* saltmarsh [Spartinetum townsendii (Tansley 1939) Corillion 1953]	*Spartina anglica* sometimes with *S. x townsendii* often in very extensive stands. Mainly England and Wales, extending into Scotland.
	SM4 *Spartina maritima* saltmarsh [Spartinetum maritimae (Emb.& Regn. 1926) Corillion 1953]	*Spartina maritima* in isolated clumps or as extensive stands; south and east England.
	SM5 *Spartina alterniflora* saltmarsh [Spartinetum alterniflorae Corillion 1953]	*Spartina alterniflora* in a dense cover with *S. anglica*, *Puccinellia maritima* and *Aster tripolium*. Only on the south coast.
2. Other Pioneer marsh		
a) *Salicornia/Suaeda* communities	SM8 Annual *Salicornia* saltmarsh [Salicornietum europoeae Warming 1906]	Annual *Salicornia* spp usually in open vegetation; mostly absent from Scotland except in the SW.
	SM9 *Suaeda maritima* saltmarsh [Suaedetum maritimae (Conrad 1935) Pignatti 1953]	*Suaeda maritima* usually in open vegetation and often in small stands; absent from most of Scotland.
	SM7 *Arthrocnemum perenne* stands	*Arthrocnemum perenne* in dense pure stands or as an open mosaic with *Halimione*, *Puccinellia* and *Suaeda*; SE England only.
b) *Aster* communities	SM11 *Aster tripolium* var *discoideus* saltmarsh [Asteretum tripolii Tansley 1959]	*Aster tripolium* var *discoideus* dominant; mainly SE England.
	SM12 Rayed *Aster tripolium* on saltmarshes	Rayed *Aster tripolium* dominant; mainly S and E England.
3. Low-mid marsh		
a) *Puccinellia* communities	SM10 Transitional low-marsh with *Puccinellia maritima*, annual *Salicornia* species and *Suaeda maritima*	Annual *Salicornia* spp. *Suaeda* and *Puccinellia* co-dominant in various proportions, often with *Aster tripolium*. Frequently occurs as a mosaic between SM8 and SM13, SM4 and especially in the SE England SM11 and SM14; mainly England and Wales.
	SM13 *Puccinellia maritima* saltmarsh [Puccinellietum maritima (Warming 1906) Christiansen 1927]	
	- *Puccinellia maritima* dominated sub-community.	*Puccinellia* in low, open or closed vegetation or occasionally in dense tall swards but with no extensive understorey of turf fucoids; extensive; widespread low-marsh community except in West Scotland.

b) *Halimione* communities	**SM14** *Halimione portulacoides* saltmarsh [Halimionetum portulacoidis (Kuhnkoltz-Lordat 1927) Des Abbayes & Corillion 1949]	
	- *Halimione portulacoides* dominated sub-community	*Halimione* as an even-topped bushy canopy or discrete hemispherical bushes in species poor vegetation, mainly south and east.
	- *Juncus maritimus* sub-community	*Halimione* with *J. maritimus* as scattered shoots or small dense patches; mainly SE England.
	- *Puccinellia maritima* sub-community	*Halimione* co-dominant with *Puccinellia maritima* in intimate mixtures in which shoots of the latter emerge through an open network of shoots of the former. *Festuca rubra* rare and never abundant; mainly south and east.
4. **Mid-Upper marsh**		
a) *Limonium/Armeria* communities	SM13 *Puccinellia maritima* saltmarsh	
	- *Limonium vulgare - Armeria maritima* sub-community	A visually diverse community because of the presence of *L. vulgare* (or locally *L. humile*). *Halimione portulacoides* and annual *Salicornia* spp present and sometimes abundant.
b) *Puccinellia/ Festuca/ Plantago* communities.	SM13 *Puccinellia maritima* saltmarsh	
	- *Glaux maritima* sub-community	*Puccinellia maritima* and *Glaux maritima* co-dominant in species-poor vegetation usually in small stands. Found in old turf cuttings etc and sandy upper marsh; common on the west coast.
	- *Plantago maritima - Armeria maritima* sub-community	*Glaux maritima* and rayed *Aster tripolium* constant and sometimes abundant with no *Limonium vulgare* and little *Halimione portulacoides*; widespread but local.
	- turf fucoid sub-community	*Puccinellia maritima* dominant or co-dominant with *Plantago maritima* and/or *Armeria maritima* with a conspicuous understorey of diminutive turf fucoids; characteristic of loch head marshes in Western Scotland where it replaces the *Puccinellia* dominated sub-community.
	SM16 *Festuca rubra* saltmarsh [Juncetum gerardii Warming 1906]	
	- sub-community with tall *Festuca rubra* dominant	*Festuca rubra* as a thick springy mattress of tall dense vegetation. Scattered England and Wales.
	SM17 *Artemisia maritima* saltmarsh [Artemisietum maritimae Hocquette 1927]	*Artemisia maritima* prominent in usually small stands of variable vegetation ranging from rank grassy patches with much *Festuca rubra* to open bushy canopy of *A. maritima* over low *Halimione portulacoides*; widespread in East Anglia and on South Coast.

c) *Juncus gerardii* communities	SM16 *Festuca rubra* saltmarsh	
	- *Puccinellia maritima* sub-community	Any of *Festuca rubra*, *Agrostis stolonifera* and *Juncus gerardii* present in more than a trace and often co-dominant with *Puccinellia maritima*.
	- Sub-community with *Juncus gerardii* dominant	*Juncus gerardii* as generally small and often roughly circular patches of sometimes tall vegetation; most frequently found in SE England.
	- *Festuca rubra* - *Glaux maritima* sub-community	Short swards of very variable composition but usually dominated by *Festuca rubra* and *Agrostis stolonifera* with some *Juncus gerardii*, *Glaux maritima*, *Triglochin maritima*, *Armeria maritima* and *Plantago maritima*. Other species absent or <10% cover; mainly western GB.
	- *Leontodon autumnalis* sub-community	Short smooth swards with *Festuca rubra*, *Agrostis stolonifera* and *Juncus gerardii* well represented. Includes species of non-maritime nature particularly *Leontodon* which can be frequent and particularly prominent on cattle grazed marshes; western Britain.
	- *Carex flacca* sub-community	*Carex flacca* constant and sometimes abundant, present at the upper limits of the marsh; western but most frequent in Scotland.
d) *Juncus maritimus* communities	SM15 *Juncus maritimus* - *Triglochin maritima* saltmarsh [Juncetum maritimi auct. angl.]	Tall tussocks with *Juncus maritimus* overwhelmingly dominant; widespread, except Scotland.
	SM18 *Juncus maritimus* saltmarsh [Juncetum maritimi, includes *Juncus maritimus* - *Oenanthe lachenalii* ass. R.Tx. 1937]	
	- *Plantago maritima* sub-community	Luxuriant vegetation with *Plantago maritima* and *Triglochin maritima*, *Oenanthe lachenalii* never abundant; mainly western.
	- *Oenanthe lachenalii* sub-community	*Oenanthe lachenalii* usually distinctive in this sub-community with *Triglochin maritima* and *Leontodon autumnalis*; widespread in west, particularly Wales.
	- *Festuca arundinacea* sub-community	*Festuca arundinacea* may be co-cominant, includes mesotrophic grassland species. Widespread in the west.
5. Drift line		
a)*Agropyron* (*Elymus*)	SM24 *Elymus pycnanthus* saltmarsh [Atriplici-Elymetum pycnanthi Beeftink and Westhoff 1962]	*Elymus pycnanthus* as stiff tussocks, usually without *Suaeda vera* or *Inula crithmoides*; most abundant in SE England.
	SM28 *Elymus repens* saltmarsh [Elymetum repentis maritimum Nordhagen 1940]	*Elymus repens* in a closed grassy sward; northern equivalent of SM24.
b) *Suaeda fruticosa* (*Suaeda vera*)	SM25 *Suaeda vera* drift-line [Elymo pycnanthi - Suaedetum verae (Arenes 1933) Gehu 1975]	
	- *Elymus pycnanthus* sub-community	*Elymus pycnanthus* and *Suaeda vera* co-dominant; North Norfolk only.
	- *Halimione portulacoides* sub-community	*Halimione portulacoides* and *Suaeda vera* co-dominant; North Norfolk only.

6. Upper Marsh Swamp communities	S4 *Phragmites australis* swamp [Phragmitetum australis (Gams 1927) Schmale 1939] S19 *Eleocharis palustris* swamp [Eleocharitetum palustris Schennikow 1919] S20 *Scirpus lacustris* ssp *tabernaemontani* swamp [Scirpetum tabernaemontani Passarge 1964] S21 *Scirpus maritimus* swamp [Scirpetum maritimi (Br.-Bl. 1931) R.Tx. 1937]	All are pure stands of helophytes or sub-communities with *Atriplex hastata*, *Agrostis stolonifera* and *Potentilla anserina* in standing or sluggish brackish water or rarely inundated upper marsh.
7. Transition communities		
a) Dune transition	SM21 *Suaeda vera - Limonium binervosum* saltmarsh.	
	- typical sub-community	Species-rich upper marsh and strandline, with *Festuca rubra*, *Plantago maritima* and *Artemisia maritima*; North Norfolk only, (scattered occurrences of a similar community occur in Wales, but without *Suaeda vera*)
	- *Frankenia laevis* sub-community	*Frankenia laevis* and *Limonium bellidifolium* are constant; only North Norfolk, rare.
	SM22 *Halimione portulacoides - Frankenia laevis* saltmarsh [Limonio vulgaris - Frankenietum laevis Gehu and Gehu - Franck 1975]	Short, uneven open sward dominated by *Halimione portulacoides* and *Frankenia laevis*; confined to the south coast of England and scattered sites in Wales.
b) Freshwater transition	MG11 *Festuca rubra - Agrostis stolonifera - Potentilla anserina* inundation grassland.	Variable, species-poor swards dominated by mixtures of *Festuca*, *Agrostis* and *Potentilla* with *Trifolium repens*.
	- *Lolium perenne* sub-community	*Lolium* often co-dominant in grassy reseeded and fertilised swards of reclaimed but periodically inundated marshes.
	- *Atriplex hastata* sub-community	Open and often disturbed vegetation of muddy drift-lines and upper-marsh stock refuges with *Atriplex*, *Matricaria maritima* and *Polygonum aviculare*.
	- *Honkenya peploides* sub-community	*Honkenya* frequent on sand and shingle drift-lines with freshwater seepage.
c) Grassland transition	MG12 *Festuca arundinacea* coarse grassland [Potentillo-Festucetum arundinaceae Nordhagen 1940]	*F.arundinacea* as large tussocks over sward of *Festuca rubra*, *Agrostis stolonifera*, *Holcus lanatus*, *Trifolium repens* and *Potentilla anserina*.
	- *Lolium perenne - Holcus lanatus* sub-community	*Lolium* frequent and sometimes abundant in small stands alongside brackish streams and over dyke embankments.
	- *Oenanthe lachenalii* sub-community	*Oenanthe*, *Juncus gerardii*, *Glaux maritima* and *Carex otrubae* constant in sometimes extensive swards.
	MG13 *Agrostis stolonifera - Alopecurus geniculatus* inundation grassland	Lush mixtures of *Agrostis* and *Alopecurus* in freshwater soakways.

8. Other communities

a) Wet communities in depressions on upper marsh.	SM19 *Blysmus rufus* saltmarsh [Blysmetum rufi (G.E. amd G.Du Rietz 1925) Gillner 1960]	Open community in upper marsh with *Blysmus rufus* dominant; mainly western Scotland where it can be very extensive.
	SM20 *Eleocharis uniglumis* saltmarsh [Eleocharetum uniglumis Nordhagen 1923]	Open community of the upper marsh with *Eleocharis uniglumis* dominant; mainly western Scotland where it can be extensive.

Communities not included in the Saltmarsh Survey mapping scheme.	SM1 *Zostera* communities [Zosterion Christiansen 1934]	Includes stands of *Zostera marina*, *Z. angustifolia* and *Z. noltii*.
	SM2 *Ruppia maritima* saltmarsh [Ruppietuan maritimae Hocquette 1927]	Submerged vegetation in brackish pools, in dried up pans or more rarely open mud-flats.
	SM3 *Eleocharis parvula* saltmarsh [Eleocharetum parvulae (Preuss 1911/12) Gillner 1960]	*Eleocharis parvula* in a diminutive sward, sometimes obscured by algae or freshly-deposited silt; south and west.
	SM23 *Spergularia marina - Puccinellia distans* saltmarsh. [Puccinellietum distantis Feekes (1934) 1945]	*Spergularia marina* on *Puccinellia distans* in often small stands of usually open vegetation; widespread but local.
	SM26 *Inula crithmoides* on saltmarshes	Sometimes *Inula crithmoides* in abundance with *Halimione* co-dominant; SE England
	SM27 Ephemeral saltmarsh vegetation with *Sagina maritima* [Saginion maritimae Westhoff, van Leeuwen and Adriani 1962]	*Sagina maritima* or *Plantago coronopus* in open or fragmentary vegetation in breaks within swards or other communities, especially the *Juncetum gerardii*.

NB. The saltmarsh communities (SM) and sub-communities are described in detail in the draft National Vegetation Classification, saltmarsh chapter, copies of which may be found in Regional Offices. (MG) refers to communities in the mesotrophic grassland chapter and (S) swamp communities.

Appendix 8.2. Sample of the Site Record Card used during field survey, from which data was entered into the computer.

SALTMARSH SURVEY OF GREAT BRITAIN [SITE RECORD CARD]

Site Name [Data Base Ref No]	Site Area (ha) Date of Record
Administrative Unit	NCC Region
Grid Reference	10 km square

Landward transition

- Natural ☐
- Un-natural ☐
- Sea wall ☐
- Sand dune ☐
- Shingle ☐
- Earth Cliff ☐
- Rock Cliff ☐
- Rocky shore ☐
- Grassland ☐
- Wetland ☐
- Peatland ☐
- Heathland ☐
- Woodland ☐
- Seepages ☐
- Other ☐

Creek Pattern

- Linear ☐
- Complex dendritic ☐
- Pans ☐

Substrate

- Mud ☐
- Sand ☐
- Shingle ☐
- Boulders ☐
- Rock ☐

Management

- Grazing ☐
- Other ☐

Status

- NNR ☐
- LNR ☐
- SSSI ☐
- NCR 1 ☐
- NCR 2 ☐
- CTN/RSPB resv. ☐

- Coast eroding ☐
- Coast accreting ☐
- Mud mounds present ☐

Spartina

- Invading ☐
- Dying back ☐

Communities	Area (ha)		Area by 10 km square			
	SSSI	Non SSSI				
1. Spartina						
2. Other Pioneer						
a. Salicornia/Sueda						
b. Aster						
3. Low-Mid Marsh						
a. Ungrazed Puccinellia						
b. Halimione						
4. Mid-Upper Marsh						
a. Limonium/Armeria						
b. Grazed Puccinellia and Festuca with Plantago/Armeria/Glaux						
c. Juncus gerardii, Agrostis, Festuca						
d. Juncus maritimus						
5. Drift line						
a. Agropyron						
b. Sueda fruticosa						
6. Upper Marsh Swamps (specify)						
i. Scirpus						
ii. Phragmites						
iii. Typha						
iv. Schoenoplectus						
7. Transition communities						
i. Dune transitions						
ii. Freshwater transitions						
iii. Grassland transition						
iv. Woodland transition						
8. Communities of wet depressions						
Unsurveyed						
TOTAL AREA						

Notes/Threats to site

Achil ptar
Agrop pung
repe
Agros tenu
stolo
Alope geni
Angel sylv
Anthox odora
Armer marit
Arrhen elat
Artem marit
Aster trip
Aster trip (rayed)
Aster trip vardix
Atrip hasta
Atrip littor
Blysmus rufus
Caltha palus
Cardam prate
Carex distan
Carex exten
Carex flacc
Carex nigra
Carex otrub
Cerast holos
Cirsi arven
Cirsi palus
Cirsi vulga
Cochl angli
Cochl dani
Cochl offic
Cynos crist
Dacty glome
Descha caesp
Eleoch palus
quin
unigl
Epilo palus
Equis palus
Festu arund
rubra
Filip ulmar
Frank laevi
Galiu apari
Galiu palus
Glaux marit
Halim portu
Herac sphon
Holcu lanat
Hydro vulga
Hypo radii
Iris pseud
Juncu acuti
Juncu artic
Juncu bufon
Juncu effus
Juncu gerar
Juncu marit
Leont autum
Limon belli
Limon biner
Limon vulga
Loliu peren
Lotus corni
Lotus pedun
Lychn flos-c
Lycop europ
Menth aquat
Myoso caesp
Odoni verna
Oenan croca
Oenan lache
Parap strig
Phala arund
Phragm comm
Plantago coron
lanc
marit
Poa prat
triv
Polygo hydro
Potent anser
erect
Puccin dista
Pucci marit
Ranunc acris
Ranun repen
Rumex aceto
Rumex congl
crisp
Sagin marit
procu
Salix agg.
peren
Salix repen
Samol valer
Schoe taber
Scirp marit
Scute galer
Silin marit
Siegl decum
Sonch arve
Spart angli
Spart marit
Sperg marin
Sperg media
Stach palus
Stell alsin
media
Sueda fruti
Sueda marit
Tarax sp.
Trifo prate
repen
Trigl marit
palus
Tripl marit
Typha latif
Ulex europ
Urtica dioica
Vicci cracc

Acroc cuspi
Ambly serpe
Eurhy prael
Rhyti squar
Tuf fucoids
Bostr scorp

Appendix 8.3 List of detailed reports produced during the course of the Saltmarsh Survey of Great Britain.

England

Saltmarsh Survey of Great Britain County Report:

Avon	(Burd 1986)
Cleveland/Tyne and Wear	(Burd 1987)
Cornwall	(Burd 1986)
Cumbria	(Burd 1986)
Devon	(Burd 1986)
Dorset	(Fojt 1985)
Essex	(Fojt 1985)
Gloucestershire	(Burd 1986)
Hampshire	(Fojt 1985)
Humberside	(Leggett and Pethick 1988)
Isle of Wight	(Fojt 1985)
Kent	(Fojt 1985)
Lancashire	(Burd 1986)
Lincolnshire	(Burd 1987)
Merseyside/Cheshire	(Burd 1986)
Norfolk	(Burd 1987)
Northumberland	(Burd 1986)
Somerset	(Burd 1986)
Suffolk	(Fojt 1985)
Sussex	(Fojt 1985)

Wales

Carmarthenshire	(Burd 1986)
Ceredigion	(Burd 1986)
Clwyd	(Burd 1986)
East Gwynedd	(Burd 1986)
Gwent	(Burd 1987)
Llanelli and W.Glamorgan	(Burd 1987)
Mid and S.Glamorgan	(Burd 1987)
Preseli and S.Pembrokeshire	(Burd 1986)
West Gwynedd	(Burd 1986)

Scotland

SW Scotland	(Fojt 1986, updated 1987)
SE Scotland	(Burd and Stace 1987)
NE Scotland - mainland	(Urquhart 1985)
Orkney	(Shimwell 1985)
Shetland	(Dalby 1986)
Western Isles	(Law and Gilbert 1986)
Caithness and Sutherland	(Scott and Law 1984)
Easter Ross and Inverness	(Scott 1984)
Lochaber	(Scott 1984)
Skye and Lochalsh	(Scott 1984)
Wester Ross	(Penn 1982)
(& summary of Highland region)	(Scott 1985)

Copies of these reports are available for inspection only. For other requirements please contact:
CSD Coastal Ecologist, NCC, Northminster House, Peterborough, PE1 1UA.

Appendix 8.4: List of all sites in the Saltmarsh Survey database, with their database codes.

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Aberdeen	DON MOUTH	23S80	NJ 948094
Angus	BARRY BURN	21S24	NO 559338
Angus	BODDIN POINT TO SCURDIE NESS	21S27/21WRV	NO 731555 (NO 713533-NO 731564)
Angus	BUDDON BURN	21S23/21WSX	NO 516321
Angus	CARLINGHEUGH BAY & MEG'S CRAIG	21S25/21WSR	NO 676431 & NO 682440
Angus	KINNABER LINKS	21S29	NO 736620
Angus	LUNAN BURN	21S26	NO 686514 (NO 679508-NO 688511)
Angus	MONTROSE BASIN	21S28/21WSK	NO 693577
Annandale & Eskdale	ANNAN (SOLWAY)	22S41/22WAD	NY 198648
Annandale & Eskdale	BROWHOUSES (SOLWAY)	22S43/22WAD	NY 281650
Annandale & Eskdale	DORNOCK (SOLWAY)	22S42/22WAD	NY 228654
Annandale & Eskdale	GRETNA - REDKIRK (SOLWAY)	22S66/22WAD	NY 311658 (NY 302651-NY 324664)
Annandale & Eskdale	MILNFIELD MERSE (SOLWAY)	22S45	NY 184657
Annandale & Eskdale	TORDUFF POINT (SOLWAY)	22S44/22WAD	NY 260642
Argyll and Bute	AN SEILEAN (LORN)	22S6	NM 895402
Argyll and Bute	ARDENTINY (LORN)	22S7	NM 888418
Argyll and Bute	ARDURA (MULL)	22S60	NM 690307
Argyll and Bute	AROS (MULL)	22S63	NM 557447
Argyll and Bute	AUCHALICK BAY (L.FYNE)	22S49	NR 913746
Argyll and Bute	BALURE OF SHIAN (LORN)	22S5	NM 902418
Argyll and Bute	BRIDGEND (ISLAY)	22S17/22WGR	NR 332623
Argyll and Bute	CRINAN (JURA SOUND)	22S13/22WKB	NR 804925
Argyll and Bute	DALRANNOCH (LORN)	22S4	NM 937410
Argyll and Bute	DERVAIG (MULL)	22S64	NM 429515
Argyll and Bute	DUNSTAFFNAGE (LORN)	22S8	NM 877338
Argyll and Bute	FISHNISH BAY (MULL)	22S62	NM 647416
Argyll and Bute	GARTNAGRENACH BAY (JURA SOUND)	22S51	NR 796603
Argyll and Bute	GLEANN AOISTAIL (JURA)	22S53	NR 597840
Argyll and Bute	GRUINART (ISLAY)	22S18/22WJC	NR 287672
Argyll and Bute	HEAD OF LOCH CRERAN (LORN)	22S2	NN 006452
Argyll and Bute	HOLY LOCH (FIRTH OF CLYDE)	22S22	NS 153817
Argyll and Bute	ISLAY SALTMARSHES (ISLAY)	22S16	NR 430470
Argyll and Bute	KILMARONAG ISLAND (LORN)	22S58	NM 934347
Argyll and Bute	KILNINVER (LORN)	22S10	NM 824222
Argyll and Bute	LAGG BAY (JURA)	22S55	NR 597784
Argyll and Bute	LINNE MHUIRICH (JURA SOUND)	22S14/22WJQ	NR 725846
Argyll and Bute	LOCH BEG (MULL)	22S59	NM 540287
Argyll and Bute	LOCH CAOLISPORT (JURA SOUND)	22S15	NR 766777
Argyll and Bute	LOCH CRAIGNISH (JURA SOUND)	22S12	NM 823054
Argyll and Bute	LOCH CRERAN (LORN)	22S3	NM 976441
Argyll and Bute	LOCH DON SALTMARSH (MULL)	22S61/22WGZ	NM 725323
Argyll and Bute	LOCH FEOCHAN (LORN)	22S9	NM 873245
Argyll and Bute	LOCH FYNE (L.FYNE)	22S19	NN 192126
Argyll and Bute	LOCH LAICH (LORN)	22S1	NM 928466
Argyll and Bute	LOCH MELFORT (JURA SOUND)	22S11	NM 844124
Argyll and Bute	LOCH STORNOWAY (JURA SOUND)	22S52	NR 738613
Argyll and Bute	LOCH STRIVEN (FIRTH OF CLYDE)	22S21	NS 055845
Argyll and Bute	RUEL ESTUARY (FIRTH OF CLYDE)	22S20/22WKG	NS 010811
Argyll and Bute	TARBERT BAY (JURA)	22S54	NR 609819
Argyll and Bute	THE STRAND (COLONSAY)	22S56	NR 372911
Argyll and Bute	TORSA (JURA SOUND)	22S57	NM 757126
Argyll and Bute	WHITEHOUSE BAY (JURA SOUND)	22S50	NR 818622

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Avon	AVONMOUTH	13S30	ST 514800 (ST 504789-ST 519807)
Avon	CHITTENING	13S31	ST 534820 (ST 525804-ST 538837)
Avon	CLEVEDON	13S32	ST 384687 (ST 368666-ST 392705)
Avon	LITTLETON	13S33	ST 589913 (ST 571900-ST 600927)
Avon	NORTHWICK	13S34	ST 557873 (ST 545865-ST 564893)
Avon	OLDBURY	13S35	ST 602937
Avon	PORTBURY WHARF	13S36	ST 487772
Avon	PORTISHEAD	13S37/13WJV	ST 462772
Avon	SAND BAY	13S38/13WJS	ST 327657
Avon	SHEPPERDINE	13S39	ST 622970 (ST 610957-ST 634979)
Avon	UPHILL	13S40/13XX7	ST 313578
Avon	WOODSPRING BAY	13S41	ST 356666
Banff and Buchan	DEVERON MOUTH	23S69	NJ 695637
Banff and Buchan	EAST HEAD, PORTSOY	23S67/23WEE	NJ 596664
Banff and Buchan	FRASERBURGH BAY	23S71	NK 022648
Banff and Buchan	LOGIE HEAD	23S66/23WEE	NJ 531677
Banff and Buchan	LUNDERTON	23S75	NK 116497
Banff and Buchan	PITTULLIE (ROSEHEARTY)	23S70	NJ 953678
Banff and Buchan	RATTRAY BAY	23S73	NK 106533
Banff and Buchan	RIVER UGIE	23S74	NK 116475
Banff and Buchan	STAKENESS	23S68/23WEE	NJ 645658
Banff and Buchan	STRATHBEG	23S72/23WEM	NK 070602
Berwickshire	REED POINT	21S1/21WAJ	NT 768721
Caithness	RIVER OF WESTER	24S146	ND 339577
Caithness	WICK RIVER	24S147/24WBX	ND 350514
Carmarthen	AFON TAF	32S19	SN 308107
Carmarthen	AFON TYWI	32S20	SN 375130
Carmarthen	TYWYN GWENDRAETH	32S21	SN 385065
Ceredigion	AFON AERON	32S4	SN 457628
Ceredigion	AFON DYFI	32S1/32WDF	SN 640955
Ceredigion	AFON TEIFI	32S5/32WCP	SN 166475
Ceredigion	AFON YSTWYTH AND RHEIDOL	32S3	SN 584814
Cheshire	DEE ESTUARY	15S8/31XHJ	SJ 220800
Cheshire	MERSEY ESTUARY	15S9/15WAE	SD 460780
Clackmannan	BLACK DEVON / CLACKMANNAN POW	21S13	NS 902909 (NS 895903-NS 898919)
Clackmannan	KENNETPANS	21S37	NS 919888
Cleveland	COWPEN MARSH	18S11/18WAF	NZ 500259
Clwyd	DEE ESTUARY	31S1/31WHJ	SJ 220800
Clwyd	RIVER CLWYD	31S2	SJ 002797
Cornwall	CAMEL ESTUARY	13S1	SW 945739
Cornwall	EAST AND WEST LOOE RIVERS	13S2	SX 252538
Cornwall	FAL ESTUARY COMPLEX	13S3/13WGC/13WFN	SW 850405
Cornwall	HAYLE ESTUARY	13S4/13WFS	SW 555375
Cornwall	HELFORD RIVER	13S5	SW 720258
Cornwall	LYNHER ESTUARY	13S6/13WGA	SX 400560
Cornwall	RIVER FOWEY	13S7	SX 115567
Cornwall	ST. JOHN'S LAKE	13S8/13WHD	SX 427540
Cornwall	TAMAR ESTUARY	13S10	SX 430650
Cornwall	THE GANNEL	13S9	SW 809607

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Cumbria	BURGH MARSH	19S15/19WGC	NY 300607 (NY 225629-NY 353618)
Cumbria	CARNFORTH	19S6/19WCR	SD 445762
Cumbria	DUDDON SANDS	19S12/19WJY	SD 200800
Cumbria	MORICAMBE BAY	19S14/19WGC	NY 185554 (NY 135566-NY 224629)
Cumbria	NORTH WALNEY	19S11/19WLC	SD 176722
Cumbria	RAMPSIDE	19S9/19WLR	SD 233658 & SD 269690
Cumbria	RAVENGLASS	19S13/19WJX	SD 084962 (SD 064983-SD 110963)
Cumbria	RIVER KENT	19S7/19WCR	SD 451792 (SD 390750-SD 478839)
Cumbria	RIVER LEVEN	19S8/19WCR	SD 331781 (SD 300741-SD 387743)
Cumbria	ROCKCLIFFE MARSH	19S16/19WGC	NY 322640
Cumbria	SOUTH WALNEY	19S10/19WLR	SD 200650 (SD 186689-SD 231624)
Cunninghame	BRODICK BAY	22S65	NS 013365
Devon	AXE ESTUARY	13S11	SY 254910
Devon	DART ESTUARY	13S12	SX 860558
Devon	ERME ESTUARY	13S13/13WPM	SX 622490
Devon	EXE ESTUARY	13S14/13WA6/13WB5	SX 980840
Devon	KINGSBRIDGE ESTUARY	13S15/13WRW	SX 746408
Devon	OTTER ESTUARY	13S16/13WRD	SY 075825
Devon	RIVER AVON	13S17	SX 678462
Devon	RIVER TAVY	13S18	SX 460625
Devon	RIVER YEALM COMPLEX	13S19	SX 540510 - SX 566510
Devon	TAMAR ESTUARY	13S20	SX 430650
Devon	TAW AND TORRIDGE ESTUARY	13S21/13WSP/13ONH	SS 470310
Devon	TEIGN ESTUARY	13S22	SX 905725
Dorset	CHESIL AND THE FLEET	13S23/13WAW	SY 620612 (SY 567841-SY 670753)
Dorset	CHRISTCHURCH HARBOUR	13S24/13WAY	SZ 175910
Dorset	LODMOOR	13S25/13WCA	SY 687813
Dorset	POOLE HARBOUR	13S26/13WCS	SZ 000880
Dumbarton	ARDMORE POINT (FIRTH OF CLYDE)	22S23/22WRJ	NS 322788
Dumbarton	RIVER CLYDE ,E. (FIRTH OF CLYDE)	22S25	NS 463723
Dumbarton	RIVER CLYDE ,W. (FIRTH OF CLYDE)	22S24/22WYF	NS 450736
Dundee	TAY ESTUARY (NORTH SHORE)	21S31/21WXC	NO 270227 (NO 154220-NO 351300)
Dunfermline	CULROSS SHORE	21S14	NS 991859 & NS 976857
East Gwynedd	AFON CONWY	31S9	SH 796765
East Gwynedd	AFON DYFI	31S3/31XDF	SN 640955
East Gwynedd	AFON MAWDDACH	31S5/31WPA	SH 652170
East Gwynedd	BROADWATER	31S4/31WMQ	SH 574025
East Gwynedd	MORFA DYFFRYN	31S6/31WNS	SH 563267
East Gwynedd	MORFA HARLECH AND TRAETH BACH	31S7/31WNT	SH 590365
East Gwynedd	TRAETH LAFAN	31S8/31WAZ	SH 630750
East Lothian	ABERLADY BAY	21S5/21WNH	NT 466805
East Lothian	BARNS NESS COAST	21S2/21WNL	NT 724770 & NT 697782
East Lothian	DUNBAR GOLF COURSE	21S3	NT 693784
East Lothian	TYNINGHAME SHORE	21S4/21WNS	NT 644797
Edinburgh	FORTH BRIDGE	21S6/21WMP	NT 152793
Essex	BLACKWATER	14S1/14OAQ	TL 940070 (TL 858075-TM 071154)
Essex	BRIDGEMARSH ISLAND	14S2/14WAV	TQ 895967
Essex	COLNE	14S3/14OBA	TM 075155
Essex	CROUCH	14S4/14WCJ/14WAV	TQ 900965 (TQ 785949-TQ 025963)
Essex	DENGIE	14S5/14OBE	TM 035040
Essex	HAMFORD WATER	14S6/14OBV	TM 230255
Essex	ROACH & FOULNESS	14S7/14WBH	TQ 966905
Essex	STOUR SOUTH	14S8/14WCQ	TM 180324 (TM 109320-TM 255319)
Essex	THAMES NORTH	14S10/14OAP/14WCL	TQ 770855 (TQ 735875-TQ 836856)

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Falkirk	BLACK NESS	21S9	NT 055801
Falkirk	GRANGE BURN	21S11	NS 946826 (NS 956834-NS 930928)
Falkirk	GRANGEMOUTH TO ALLOA	21S12	NS 913876 (NS 931879-NS 862911)
Falkirk	RIVER AVON	21S10	NS 955805 (NS 957811-NS 947797)
Gloucestershire	ARLINGHAM	15S1	SO 705099 (SO 717096-SO 694106)
Gloucestershire	AWRE TO PURTON	15S2/15WXC	SO 702070 (SO 700093-SO 671046)
Gloucestershire	BEACHLEY	15S3	ST 547904 (ST 553906-ST 546913)
Gloucestershire	BERKELEY	15S4	SO 663002 (ST 633977-SO 668028)
Gloucestershire	HINTON	15S5	SO 682039 (SO 670031-SO 692046)
Gloucestershire	LYDNEY TO SEDBURY	15S6	ST 609993 (SO 670041-ST 551914)
Gloucestershire	SLIMBRIDGE	15S7/15WXC	SO 720056 (SO 692046-SO 729090)
Gordon	BALMEDIE	23S79	NJ 982192
Gordon	SANDS OF FORVIE & FOVERAN BURN	23S78/23WGN	NK 004270 & NK 003255
Gordon	SLEEK OF TARTY	23S77/23WGN	NJ 995276
Gordon	YTHAN	23S76/23WGN	NK 007284
Gwent	CALDICOT TO MAGOR	33S12/33WGX	ST 450857 (ST 502872-ST 432843)
Gwent	GOLDCLIFF	33S13/33WGX	ST 387826
Gwent	PETERSTONE GREAT WHARF	33S15/33WGX	ST 265795
Gwent	RUMNEY GREAT WHARF	33S16/33WGX	ST 244782
Gwent	THORNWELL TO PORTSKEWETT	33S11/33WGX	ST 531900 (ST 546917-ST 514882)
Gwent	USKMOUTH	33S14/33WGX	ST 325831 (ST 365823-ST 300816)
Hampshire	CHICHESTER HARBOUR	12S1/12XAA	SU 760000
Hampshire	ELING AND BURY MARSHES	12S2/12WGS	SU 373122 (SU 367134-SU 387115)
Hampshire	HYTHE - CALSHOT	12S3/12WHH	SU 440064 & SU 479029
Hampshire	KEYHAVEN - LYMINGTON	12S4/12WHG	SZ 335938
Hampshire	LANGSTONE HARBOUR	12S5/12WHQ	SU 700030
Hampshire	PORTSMOUTH HARBOUR	12S6/12WJL	SU 620035
Hampshire	RIVER BEAULIEU	12S7/12OFL	SZ 416998
Hampshire	RIVER HAMBLE	12S8/12WHS	SU 495101 (SU 520121-SU 490062)
Humberside	HUMBER ESTUARY - NORTH SHORE	18S8/18WTD/18WCZ	TA 130280 (SE 835255-TA 410115)
Humberside	HUMBER ESTUARY - SOUTH SHORE	18S9/18WTB/18WBW/18W	TA 075240 (SE 865210-TA 270110)
Inverness	BEAULY FIRTH	24S149/24WED	NH 570470
Inverness	CASTLE STUART BAY	24S150	NH 738496
Inverness	WHITENESS HEAD	24S151	NH 825573
Isle of Wight	KING'S QUAY	12S9/12WLC	SZ 537938 (SZ 537942-SZ 536935)
Isle of Wight	MEDINA ESTUARY	12S10/12WLD	SZ 508923 (SZ 500964-SZ 503986)
Isle of Wight	NEWTOWN HARBOUR	12S11/12WKM	SZ 420910
Isle of Wight	YAR ESTUARY	12S12/12WLT	SZ 352885 (SZ 353897-SZ 348872)
Kent	MEDWAY	11S1/11WKR	TQ 850710
Kent	PEGWELL BAY	11S2/11WLJ	TR 345636 (TR 339620-TR 356643)
Kent	RIVER STOUR	11S3/11WLJ	TR 337606 (TR 335581-TR 351620)
Kent	SWALE	11S4/11OLT	TQ 960665 (TQ 895725-TR 052679)
Kent	THAMES SOUTH	11S5/11WJX/11WJW/11W	TQ 795789 (TQ 700760-TQ 865785)
Kincardine & Deeside	ST. CYRUS	23S81/23WKH	NO 744635
Kirkcaldy	DALGETY BAY	21S15	NT 169834
Kyle and Carrick	IRVINE (AYR)	22S26/22WQG	NS 318389
Kyle and Carrick	POW BURN (AYR)	22S27/22WWV	NS 342278
Lancashire	CARNFORTH	19S1/19WCR	SD 470725 (SD 438766-SD 463660)
Lancashire	COCKERHAM AND PILLING	19S2/19WCL	SD 415497 (SD 347486-SD 425540)
Lancashire	RIVER LUNE	19S3/19WCL	SD 452588 (SD 420557-SD 482632)
Lancashire	RIVER RIBBLE	19S4/19OCY	SD 408254 (SD 340240-SD 493290)
Lancashire	RIVER WYRE	19S5/19WBS/19WBT	SD 360419 (SD 343473-SD 422409)

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Lincolnshire	GIBRALTAR POINT	17S3/17WKX	TF 566590 (TF 557579-TF 566609)
Lincolnshire	NORTH LINCOLNSHIRE COAST	17S2/17WMZ	TA 420001 (TA 338049-TF 478908)
Lincolnshire	THE WASH	17S1/17WPS	TF 360360 (TF 561576-TF 530260)
Llanelli/W.Glamorgan	BURRY INLET	33S3/33WWL	SS 500965
Llanelli/W.Glamorgan	CRYMLYN BURROWS AND NEATH ESTUARY	33S5/33WAT	SS 733942
Llanelli/W.Glamorgan	OXWICH	33S4/33WXA	SS 510878
Llanelli/W.Glamorgan	PEMBREY BURROWS	33S2/33WCB	SS 425999
Llanelli/W.Glamorgan	TYWYN GWENDRAETH	33S1/33WCB	SN 385065
Lochaber	ARISAIG (S.MORAR)	24S10	NM 660862
Lochaber	BUN NATHRACH (L.LINNHE)	24S37	NN 168620
Lochaber	BUNACAIMB (S.MORAR)	24S9	NM 548772
Lochaber	CAMAS NA CROISE (L.LINNHE)	24S27	NM 865526
Lochaber	CAMUSRORY (L.NEVIS)	24S6	NM 862957
Lochaber	CANNA HARBOUR (CANNA)	24S1/24WGQ	NG 268048
Lochaber	CAOL SPIT (L.LINNHE)	24S35	NN 107750
Lochaber	CUIL BAY (L.LINNHE)	24S40	NM 978545
Lochaber	E. KENTRA BAY (MOIDART)	24S17/24WHJ	NM 651686
Lochaber	EILEAN UAINE (MOIDART)	24S14	NM 658716
Lochaber	FASSFERN (L.LINNHE)	24S34	NN 023783
Lochaber	FINISKAIG (L.NEVIS)	24S7	NM 868947
Lochaber	GARVAN (L.LINNHE)	24S32	NM 980780
Lochaber	GLENCOE (L.LINNHE)	24S39	NN 097588
Lochaber	GLENCRIPESDALE (L.SUNART)	24S23	NM 660593
Lochaber	GLENLUIG (MOIDART)	24S12	NM 672773
Lochaber	GLENMORE (L.SUNART)	24S20/24WGF	NM 588620
Lochaber	INVERIE BAY (L.NEVIS)	24S5	NM 771988
Lochaber	INVERSANDA (L.LINNHE)	24S28	NM 943595
Lochaber	INVERSCADDLE BAY (L.LINNHE)	24S30	NN 025685
Lochaber	KILCHOAN (L.SUNART)	24S19	NM 484635
Lochaber	KINLOCHEIL (L.LINNHE)	24S33	NM 967790
Lochaber	KINLOCHHOURN (L.HOURN)	24S3	NG 948067
Lochaber	KINLOCHLEVEN (L.LINNHE)	24S38	NN 180621
Lochaber	KINLOCHMOIDART (MOIDART)	24S13/24WHR	NM 707722
Lochaber	KINLOCHTEACUIS (L.SUNART)	24S24	NM 653545
Lochaber	KYLESMORAR (L.NEVIS)	24S8	NM 805932
Lochaber	LOCH A'CHOIRE (L.LINNHE)	24S26	NM 838525
Lochaber	LOCH ALINE	24S25	NM 701474
Lochaber	LOCH SCRESORT (RHUM)	24S2/24WJK	NM 403996
Lochaber	LOCH SUNART HEAD (L.SUNART)	24S22	NM 835605
Lochaber	LOCHAILORT	24S11	NM 763820
Lochaber	N. KENTRA BAY (MOIDART)	24S16/24WHJ	NM 647697
Lochaber	NEWTON OF ARDTOE (MOIDART)	24S15	NM 644708
Lochaber	RUBHA RAONUILL (L.NEVIS)	24S4	NM 729999
Lochaber	S. KENTRA BAY (MOIDART)	24S18/24WHJ	NM 642678
Lochaber	SALLACHAN POINT (L.LINNHE)	24S29	NM 988619
Lochaber	STRONCHREGGAN (L.LINNHE)	24S31	NN 075722
Lochaber	STRONTIAN (L.SUNART)	24S21	NM 813613
Lochaber	THREE MILE WATER (L.LINNHE)	24S36	NN 064691
Merseyside/Gtr Manch.	DEE ESTUARY	19S17/31XHJ	SJ 220800
Merseyside/Gtr Manch.	MERSEY ESTUARY	19S18/15XAE	SJ 449818 & SD 295035
Merseyside/Gtr Manch.	RIVER RIBBLE	19S19/19OCY	SD 365216

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Mid & S.Glamorgan	CARDIFF	33S8/33WVK	ST 187742
Mid & S.Glamorgan	EAST ABERTHAW	33S7/33WTY	ST 042660
Mid & S.Glamorgan	LAMBY	33S9	ST 219777
Mid & S.Glamorgan	RIVER OGMORE	33S6/33WLW	SS 870751
Mid & S.Glamorgan	RUMNEY GREAT WHARF	33S10/33WGX	ST 244782
Montgomery	AFON DYFI	32S2/32WDF	SN 640955
Moray	CULBIN	23S62B/23WMF	NH 950612
Moray	FINDHORN BAY	23S63/23WMF	NJ 035618
Moray	LOSSIEMOUTH	23S64	NJ 245695
Moray	SPEY BAY	23S65/23WMZ	NJ 344653
Nairn	CULBIN	23S62A/23WMF	NH 950612
Nairn	NAIRN E.	23S61	NH 910580
Nairn	WHITENESS HEAD	23S60/24WPH	NH 825573
Nithsdale	CAERLAVEROCK (SOLWAY)	22S39/22WBC/22WAK	NY 045647
Nithsdale	CARSE BAY (SOLWAY)	22S36/22WBE	NX 985604
Nithsdale	GREENMERSE & KELTON (SOLWAY)	22S67/22WBK	NX 982712
Nithsdale	KIRKCONNELL MERSE (SOLWAY)	22S46/22WBK	NX 987683 (NX 993662-NX 984707)
Nithsdale	NITH (SOLWAY)	22S37/22WBK	NX 987708
Nithsdale	PRIESTSIDE BANK (SOLWAY)	22S40/22WAK	NY 110653
Nithsdale	SOUTHWICK (SOLWAY)	22S38/22WBQ	NX 916557
Norfolk	BLAKENEY POINT	14S24/14WTP	TG 020460 (TG 047453-TF 999459)
Norfolk	HOLME TO GUN HILL	14S21/14WTP	TF 776445 (TF 696440-TF 856457)
Norfolk	SCOLT HEAD ISLAND	14S22/14WTP	TF 820463 (TF 792465-TF 845458)
Norfolk	THE WASH	14S20/17XHN	TF 600250 (TF 530260-TF 650308)
Norfolk	WELLS TO BLAKENEY	14S23/14WTP	TF 980445 (TF 918447-TG 040453)
North East Fife	BALMERINO SHORE	21S22/21WKN	NO 357249
North East Fife	CHAPEL NESS	21S17/21WBK	NT 479993
North East Fife	COCKLEMILL BAY	21S16	NO 459099
North East Fife	CRAIL TO ANSTRUTHER	21S19/21WKQ	NO 602059 & NO 584048
North East Fife	EDEN ESTUARY	21S33/21WLB	NO 470195
North East Fife	ELIE NESS	21S18/21WBK	NT 497993
North East Fife	FIFE NESS	21S20/21WLD	NO 633089 & NO 636099
North East Fife	KINKELL HARBOUR TO CRAIG HARTLE	21S34/21WLT	NO 561152 (NO 540154-NO 578147)
North East Fife	ST. ANDREW'S HARBOUR	21S21	NO 517164
North East Fife	TAY ESTUARY (SOUTH SHORE)	21S35/21WXC	NO 232191 (NO 190191-NO 300219)
North East Fife	TAYPORT	21S32/21WLY	NO 470278
Northumberland	ALNMOUTH	18S1/18WYP	NU 243102
Northumberland	BUDLE BAY	18S2/18OLF	NU 144352
Northumberland	HOLY ISLAND	18S3/18OLF	NU 107433
Northumberland	LINDISFARNE MAINLAND	18S4/18OLF	NU 087412 (NU 074436-NU 130406)
Northumberland	LONG NANNY	18S5/18WEP	NU 227269
Northumberland	SEATON SLUICE	18S6	NZ 334763
Northumberland	WARKWORTH	18S7/18WHL	NU 258057
Orkney	BAY OF SUCKQUOY (MAINLAND)	23S38	HY 523043
Orkney	BAY OF TUQUOY (WESTRAY)	23S41	HY 452451
Orkney	BLACK ROCK MARSH, OTTERS WICK (SANDAY)	23S43	HY 697423
Orkney	BRIDGE OF WAITHE/CUMMINESS (MAINLAND)	23S40	HY 282113 - HY 283105
Orkney	CATA SAND (SANDAY)	23S33	HY 698413
Orkney	CLESTRAIN STRAND , MOOTAING (MAINLAND)	23S49	HY 293062 (HY 290068-HY 296052)
Orkney	LAMA NESS OYCE (SANDAY)	23S42	HY 681438
Orkney	LITTLE AYRE (HOY)	23S56	ND 305919
Orkney	LITTLE SEA (SANDAY)	23S34	HY 671396
Orkney	LYRAWA BAY (HOY)	23S59	ND 291997
Orkney	MILL BAY (HOY)	23S58	ND 300954 & ND 301951

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Orkney	MILL SAND (MAINLAND)	23S46	HY 515084 & HY 515074
Orkney	MYRE BAY (S.WALLS, HOY)	23S51	ND 331912
Orkney	ORE BAY (HOY)	23S57	ND 305939
Orkney	OYCE OF ISBISTER (MAINLAND)	23S44	HY 392184
Orkney	OYCE OF QUINDRY (S.RONALDSAY)	23S50	ND 435925
Orkney	OYCE OF RENNIBISTER (MAINLAND)	23S45	HY 396123 & HY 388127
Orkney	QUOYS (HOY)	23S55	ND 293912 (ND 283912-ND 301917)
Orkney	SALTNESS (HOY)	23S54	ND 275898
Orkney	SANDI SAND (MAINLAND)	23S47/23WRK	HY 545035 & HY 551038
Orkney	SWANBISTER BAY (MAINLAND)	23S48	HY 357042 (HY 364054-HY 356044)
Orkney	SWARSQUOY (MAINLAND)	23S37/23WTB	HY 500094
Orkney	THE AYRE , NORTH BAY (HOY)	23S53	ND 286892 & ND 295898
Orkney	THE OUSE , FINSTOWN (MAINLAND)	23S36	HY 356143
Orkney	THE OUSE , VEANTROW BAY (SHAPINSAY)	23S35	HY 506187
Orkney	TOR NESS & QUIVALS CREEK (SANDAY)	23S32	HY 674424 & HY 668422
Orkney	WAULKMILL BAY (MAINLAND)	23S39/23WTE	HY 376065
Orkney	WYNG STRAND (S.WALLS, HOY)	23S52	ND 320912
Perth and Kinross	TAY ESTUARY (NORTH SHORE)	21S30/21WXC	NO 270227 (NO 154220-NO 351300)
Perth and Kinross	TAY ESTUARY (SOUTH SHORE)	21S36/21WXC	NO 232191 (NO 190191-NO 300219)
Preseli and S.Pembs	AFON TEIFI	32S6	SN 166475
Preseli and S.Pembs	ANGLE BAY	32S18	SM 870028
Preseli and S.Pembs	CAREW AND CRESSWELL	32S14	SN 023062
Preseli and S.Pembs	COSHESTON PILL	32S15	SM 990036
Preseli and S.Pembs	CRABHALL SALTINGS	32S8/32WSN	SM 813070
Preseli and S.Pembs	DAUGLEDDAU	32S13	SN 000090
Preseli and S.Pembs	EASTERN CLEDDAU	32S12/32WGD	SN 030137
Preseli and S.Pembs	MARTIN'S HAVEN	32S17	SM 923032
Preseli and S.Pembs	MILFORD HAVEN, NEYLAND, WESTFIELD	32S10	SM 916061, SM 958051, SM 967063
Preseli and S.Pembs	NEWPORT SALTINGS	32S7	SN 058397
Preseli and S.Pembs	PEMBROKE RIVER	32S16	SM 950020
Preseli and S.Pembs	SANDY HAVEN PILL	32S9	SM 857080
Preseli and S.Pembs	WESTERN CLEDDAU	32S11	SM 980120
Ross and Cromarty	ACHNAHAIRD BAY (RUBHA COIGEACH)	24S84	NC 020127
Ross and Cromarty	ALNESS - DALMORE (CROMARTY FIRTH)	24S114/24WLT	NH 660682
Ross and Cromarty	AN CRUINN-LEUM (L.GAIRLOCH)	24S97	NG 683489
Ross and Cromarty	APPLECROSS BAY (APPLECROSS)	24S102	NG 714455
Ross and Cromarty	ATTADALE (L.CARRON)	24S109	NG 924391
Ross and Cromarty	AULTBEA (L.EWE)	24S91	NG 873889
Ross and Cromarty	BADACHRO (L.GAIRLOCH)	24S98	NG 780738
Ross and Cromarty	BALCONIE POINT (CROMARTY FIRTH)	24S115/24WLT	NH 629663
Ross and Cromarty	BEAULY FIRTH	24S148/24WED	NH 570470
Ross and Cromarty	CHARLESTON (L.GAIRLOCH)	24S95	NG 811751
Ross and Cromarty	CONON ISLANDS (CROMARTY FIRTH)	24S117/24WLT/24WLP	NH 555573
Ross and Cromarty	CULDUIE (APPLECROSS)	24S103	NG 714398
Ross and Cromarty	DINGWALL BAY (CROMARTY FIRTH)	24S116/24WLT	NH 556591
Ross and Cromarty	DORNOCH FIRTH - SOUTH (DORNOCH FIRTH)	24S110/24WMP	NH 735845
Ross and Cromarty	GAIRLOCH SANDS (L.GAIRLOCH)	24S94	NG 755785
Ross and Cromarty	INVERASDALE (L.EWE)	24S93	NG 847821
Ross and Cromarty	KISHORN (L.KISHORN)	24S105	NG 833418
Ross and Cromarty	LITTLE LOCH BROOM	24S89	NH 087885
Ross and Cromarty	LOCH BROOM (L.BROOM)	24S88	NH 175854
Ross and Cromarty	LOCH CARRON (L.CARRON)	24S108	NG 931418
Ross and Cromarty	MORRICH MORE (DORNOCH FIRTH)	24S112/24WMT	NH 855835
Ross and Cromarty	MUNLOCHY BAY (MORAY FIRTH)	24S119/24WMV	NH 675528

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Ross and Cromarty	NIGG BAY (CROMARTY FIRTH)	24S113/24WLT	NH 800737
Ross and Cromarty	OPINAN	24S90	NG 884970
Ross and Cromarty	POOLEWE (L.EWE)	24S92	NG 862816
Ross and Cromarty	REIFF (RUBHA COIGEACH)	24S85	NB 964147
Ross and Cromarty	RERAIG BAY (L.KISHORN)	24S106	NG 836362
Ross and Cromarty	RIVER KERRY (L.GAIRLOCH)	24S96	NG 813738
Ross and Cromarty	SHIELDAIG LODGE HOTEL (L.GAIRLOCH)	24S99	NG 806726
Ross and Cromarty	SLUMBAY (L.CARRON)	24S107	NG 895390
Ross and Cromarty	STRATHKANAIRD (L.BROOM)	24S86	NC 120005
Ross and Cromarty	TAIN GOLF COURSE (DORNOCH FIRTH)	24S111	NH 786824
Ross and Cromarty	TORRIDON (UPPER L.TORRIDON)	24S100	NG 896553
Ross and Cromarty	TORRIDON HOUSE (UPPER L.TORRIDON)	24S101	NG 872571
Ross and Cromarty	TOSCAIG (APPLECROSS)	24S104	NG 712381
Ross and Cromarty	UDALE BAY (CROMARTY FIRTH)	24S118/24WLT	NH 709653
Ross and Cromarty	ULLAPOOL (L.BROOM)	24S87	NH 124947
Shetland	AITH, AITH VOE (MAINLAND)	23S21	HU 347578
Shetland	BALTASOUND (UNST)	23S1	HP 629085
Shetland	BOATSROMM VOE, LUNNA NESS (MAINLAND)	23S16	HU 497709
Shetland	BRAE (MAINLAND)	23S14	HU 357680
Shetland	BRIDGE OF TWATT, BIXTER VOE (MAINLAND)	23S26	HU 322527
Shetland	BURRAVOE, BUSTA VOE (MAINLAND)	23S13	HU 362668
Shetland	CULLIVOE (YELL)	23S2	HP 543024
Shetland	DALES VOE, DELTING (MAINLAND)	23S15	HU 408686
Shetland	DALES VOE, LERWICK (MAINLAND)	23S31	HU 435432
Shetland	DURY VOE (MAINLAND)	23S19	HU 460602
Shetland	EAST BURRAFIRTH, AITH VOE (MAINLAND)	23S22	HU 364578
Shetland	EAST OF NESS OF BIXTER (MAINLAND)	23S27	HU 342519
Shetland	EFFIRTH, BIXTER VOE (MAINLAND)	23S25	HU 314523
Shetland	FOULA WICK, OLNA FIRTH (MAINLAND)	23S12	HU 369650
Shetland	GARDERHOUSE, SELI VOE (MAINLAND)	23S24	HU 335483
Shetland	GLUSS VOE (MAINLAND)	23S8	HU 355774
Shetland	GUTCHER (YELL)	23S3	HU 547992
Shetland	HAGGRISTER (MAINLAND)	23S11	HU 347700
Shetland	HAMNA VOE (YELL)	23S4	HU 495802
Shetland	HEAD OF WEISDALE VOE (MAINLAND)	23S29	HU 392521
Shetland	HOUB, FUGLA NESS (MAINLAND)	23S9	HU 360748
Shetland	HOUB, SULLOM (MAINLAND)	23S10	HU 355729
Shetland	HOUSETTER (MAINLAND)	23S5	HU 366843
Shetland	LAXO, DURY VOE (MAINLAND)	23S18	HU 448633
Shetland	LEON, LOCH OF QUEYFIRTH (MAINLAND)	23S6	HU 351817
Shetland	MAIN AYRE, L.OF QUEYFIRTH (MAINLAND)	23S7	HU 281768
Shetland	SOUTH VOXTER, GON FIRTH (MAINLAND)	23S23	HU 366612
Shetland	TRESTA (MAINLAND)	23S28	HU 360508
Shetland	TROWIE LOCH, GARTH (MAINLAND)	23S20	HU 470538
Shetland	VADILL, HD OF WHITENESS VOE (MAINLAND)	23S30/23WXH	HU 393460
Shetland	VIDLIN (MAINLAND)	23S17	HU 480653
Skye and Lochalsh	ARDELVE (L.ALSH)	24S47	NG 870267
Skye and Lochalsh	ARDVASAR (SLEAT)	24S59	NG 634036
Skye and Lochalsh	BALMACARA (L.ALSH)	24S50	NG 801256
Skye and Lochalsh	BARRISDALE BAY (L.HOURN)	24S41	NG 867047
Skye and Lochalsh	BROADFORD BAY (SLIGACHAN-BROADFORD)	24S82	NG 656233
Skye and Lochalsh	CAMAS NA SGIANADIN (SLIG.-BROADFORD)	24S81	NG 627255
Skye and Lochalsh	CAMASCROSS (SLEAT)	24S58	NG 699115
Skye and Lochalsh	CROE BRIDGE (L.DUICH)	24S45	NG 951210

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Skye and Lochalsh	DUIRINISH (L.ALSH)	24S52	NG 790322
Skye and Lochalsh	EILANREACH (GLENELG)	24S42	NG 804181
Skye and Lochalsh	ERBUSAIG (L.ALSH)	24S51	NG 791298
Skye and Lochalsh	FERNAIG (L.ALSH)	24S54	NG 843338
Skye and Lochalsh	GLENELG (GLENELG)	24S43	NG 812201
Skye and Lochalsh	ISLEORNSAY (SLEAT)	24S57	NG 699124
Skye and Lochalsh	KIRKTON (L.ALSH)	24S49	NG 831269
Skye and Lochalsh	KYLE (L.ALSH)	24S55	NG 745261
Skye and Lochalsh	LOCH AINORT (SLIGACHAN-BROADFORD)	24S80	NG 538272
Skye and Lochalsh	LOCH BEAG (L.BRACADALE)	24S66	NG 363388
Skye and Lochalsh	LOCH CAROY (L.BRACADALE)	24S68	NG 302437
Skye and Lochalsh	LOCH DUNVEGAN (L.DUNVEGAN)	24S71	NG 249462 & NG 254472
Skye and Lochalsh	LOCH EISHORT (EISHORT/SLAPIN)	24S61	NG 682174
Skye and Lochalsh	LOCH ERGHALLAN (L.DUNVEGAN)	24S70	NG 227475
Skye and Lochalsh	LOCH EYNORT	24S64	NG 380262
Skye and Lochalsh	LOCH EYRE (L.SNIZORT)	24S75	NG 417518
Skye and Lochalsh	LOCH GRESHORNISH (L.SNIZORT)	24S72	NG 344510
Skye and Lochalsh	LOCH HARPORT (L.BRACADALE)	24S65	NG 405314
Skye and Lochalsh	LOCH NA DAL (SLEAT)	24S56	NG 702159
Skye and Lochalsh	LOCH NA H'AIRDE	24S63	NG 394161
Skye and Lochalsh	LOCH PORTREE (PORTREE)	24S78	NG 478412
Skye and Lochalsh	LOCH SLAPIN (EISHORT/SLAPIN)	24S62	NG 565224
Skye and Lochalsh	LOCH SLIGACHAN (SLIGACHAN-BROADFORD)	24S79	NG 492308
Skye and Lochalsh	LOCH SNIZORT HEAD (L.SNIZORT)	24S74	NG 413490
Skye and Lochalsh	LOCH TREASLANE (L.SNIZORT)	24S73	NG 398517
Skye and Lochalsh	NONACH (L.ALSH)	24S46	NG 928305
Skye and Lochalsh	NOSTIE (L.ALSH)	24S48	NG 855268
Skye and Lochalsh	OSE (L.BRACADALE)	24S67	NG 314408
Skye and Lochalsh	PLOCKTON (L.ALSH)	24S53	NG 806336
Skye and Lochalsh	POOL ROAG (L.BRACADALE)	24S69	NG 275448
Skye and Lochalsh	PORTREE (PORTREE)	24S77	NG 480434
Skye and Lochalsh	RUBHA ARDNISH (SLIGACHAN-BROADFORD)	24S83/24WQB	NG 668240
Skye and Lochalsh	SHIEL BRIDGE (L.DUICH)	24S44	NG 932189
Skye and Lochalsh	TOKAVAIG (EISHORT/SLAPIN)	24S60	NG 598118
Skye and Lochalsh	UIG (L.SNIZORT)	24S76	NG 393639
Somerset	BERROW DUNES	13S28/13WKH	ST 294521
Somerset	BREAN DOWN AND UPHILL CLIFF	13S27/13XX7	ST 305585
Somerset	BRIDGWATER BAY	13S29/13OBB	ST 281485
Stewartry	AUCHENCAIRN , ORCHARDTON (SOLWAY)	22S34/22WCH	NX 810520
Stewartry	FLEET BAY (SOLWAY)	22S32	NX 578545
Stewartry	MANXMAN'S LAKE (SOLWAY)	22S48	NX 680490
Stewartry	MULLOCK BAY (SOLWAY)	22S47/22WCJ	NX 711439
Stewartry	RIVER DEE (SOLWAY)	22S33	NX 684513
Stewartry	ROUGH FIRTH (SOLWAY)	22S35	NX 835557
Suffolk	BUTLEY RIVER	14S12/14OMP	TM 388518 - TM 402472
Suffolk	HAVERGATE ISLAND	14S13/14OMP	TM 415475
Suffolk	ORFORDNESS	14S14/14OMP	TM 464551 - TM 385435
Suffolk	RIVER ALDE	14S15/14WMT	TM 392576 - TM 460554
Suffolk	RIVER DEBEN	14S16	TM 288503 - TM 310378
Suffolk	RIVER ORE	14S17/14OMP	TM 491553 - TM 367440
Suffolk	RIVER ORWELL	14S18/14WSP	TM 163420 - TM 265340
Suffolk	STOUR NORTH	14S19/14XCQ	TM 175347 (TM 103325-TM 236341)

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Sussex	CHICHESTER HARBOUR	11S7/11WAA	SU 760000
Sussex	PAGHAM HARBOUR	11S9/11WGQ	SZ 870970
Sussex	RIVER ADUR	11S10	TQ 206059 (TQ 204073-TQ 214047)
Sussex	RIVER CUCKMERE	11S11/11WDP	TV 516990 (TQ 512000-TV 516978)
Sussex	RYE HARBOUR	11S12/11WDL/11WEV	TQ 934195 (TQ 925205-TQ 948184)
Sutherland	BALBLAIR (L.FLEET)	24S135/24WTS	NH 803974
Sutherland	BONAR BRIDGE (DORNOCH FIRTH)	24S144	NH 607911
Sutherland	BORGIE MOUTH (TORRISDALE BAY)	24S132/24WTL	NC 681614
Sutherland	CAMBUSMORE (L.FLEET)	24S138	NH 768973
Sutherland	COUL LINKS (L.FLEET)	24S140/24WTS	NH 810953
Sutherland	CREAG BHEAG (L.FLEET)	24S136/24WTS	NH 785980
Sutherland	DORNOCH POINT (DORNOCH FIRTH)	24S141/24WMP	NH 803878
Sutherland	EILEAN DUBH (L.ERIBOLL)	24S128	NC 435613
Sutherland	INVERAN - CARBISDALE (DORNOCH FIRTH)	24S145	NH 573959
Sutherland	INVERNAVER (TORRISDALE BAY)	24S133	NC 708604
Sutherland	KYLE OF DURNESS	24S127	NC 355630
Sutherland	KYLE OF TONGUE (KYLE OF TONGUE)	24S130	NC 554536
Sutherland	LOCH ARDBHAIR (EDDRACHILLIS BAY)	24S122	NC 166333
Sutherland	LOCH ERIBOLL (L.ERIBOLL)	24S129	NC 395541
Sutherland	LOCH NEDD (EDDRACHILLIS BAY)	24S121	NC 146315
Sutherland	LOCH SHEIGRA (L.INCHARD)	24S126	NC 245552
Sutherland	LOCHAN NA LEOBAIG (EDDRACHILLIS BAY)	24S120	NC 102333
Sutherland	MELVICH	24S134	NC 890645
Sutherland	RHIAN BURN (KYLE OF TONGUE)	24S131	NC 588565
Sutherland	RHICONICH (L.INCHARD)	24S125	NC 253523
Sutherland	SKELBO (L.FLEET)	24S139/24WTS	NH 795953
Sutherland	SKIBO (DORNOCH FIRTH)	24S142/24WMP	NH 732885
Sutherland	SPINNINGDALE (DORNOCH FIRTH)	24S143	NH 675895
Sutherland	THE MOUND (L.FLEET)	24S137	NH 768984
Sutherland	TRAIGH BAD NA BAIGHE (L.LAXFORD)	24S123/24W??	NC 221475
Sutherland	WEAVER'S BAY (L.LAXFORD)	24S124/24W??	NC 209478
Tyne and Wear	CASTLETOWN MARSHES	18S12/18WBM	NZ 360576 (NZ 351571-NZ 370583)
Tyne and Wear	WILLINGTON GUT	18S10/18W??	NZ 313668
West Gwynedd	ABERSOCH	31S12	SH 313282
West Gwynedd	AFON FFRAW	31S17/31WCG	SH 354685
West Gwynedd	BEDDMANARCH TO CYMYRAN	31S19/31WYB	SH 275787 (SH 315821-SH 299755
West Gwynedd	FORYD BAY	31S13/31WBG	SH 450600
West Gwynedd	MALLTRAETH SANDS	31S16/31WZP	SH 400675
West Gwynedd	MENAI STRAITS	31S22/31WBM	SH 524690 (SH 478651-SH 561725
West Gwynedd	MORFA HARLECH AND TRAETH BACH	31S10	SH 590365
West Gwynedd	PWLLHELI	31S11	SH 377346
West Gwynedd	RHOSNEIGR	31S18	SH 322743
West Gwynedd	TRAETH COCH	31S21	SH 540804
West Gwynedd	TRAETH DULAS	31S20/31WYM	SH 480883
West Gwynedd	TRAETH LAFAN	31S14/31WAZ	SH 630750
West Gwynedd	TRAETH MELYNOG	31S15/31WZP	SH 436630
West Lothian	BLACK BURN	21S8	NT 055798
West Lothian	BLACK BURN TO ABERCORN BURN	21S7	NT 058795 & NT 075793
Western Isles	ARDHEISKER / HORISARY (N.UIST)	24S168	NF 763673
Western Isles	BACK SALTINGS (LEWIS)	24S153/24WXH	NB 485415
Western Isles	BALGARVA (S.UIST)	24S183	NF 765465
Western Isles	BARRAGLOM (LEWIS)	24S157	NB 166346
Western Isles	BAYHEAD (N.UIST)	24S167	NF 750683
Western Isles	BENBECULA AERODROME (BENBECULA)	24S178	NF 797564

Admin. Unit.....	Site Name.....	Site Code.....	Grid Reference.....
Western Isles	CARINISH (N.UIST)	24S173	NF 822603
Western Isles	CEANN A'BAIGH (S.VALLAY STRAND)	24S164	NF 770740
Western Isles	CEANN NAN CLACHAN (S.VALLAY STRAND)	24S165	NF 789730
Western Isles	CLETT-FEORA (N.UIST)	24S174	NF 840600
Western Isles	EAST SEILEBOST (S.HARRIS)	24S159/24WYA	NG 084967
Western Isles	EILEAN CUITHE NAM FAIDH (S.UIST)	24S181	NF 785471
Western Isles	GRAMSDALE / UACHDAR (BENBECULA)	24S177	NF 809559
Western Isles	GRENITOTE (N.UIST)	24S162	NF 819756
Western Isles	GUALAN (S.UIST)	24S180	NF 779486
Western Isles	HOWBEG (S.UIST)	24S184/24WXK	NF 756357
Western Isles	ILLERAY (BALESHARE)	24S170/24WXL	NF 785632
Western Isles	KNOCK-CUIEN (N.UIST)	24S175	NF 848601
Western Isles	LAG GORM (BALESHARE)	24S171/24WXL	NF 775625
Western Isles	LANGASS (N.UIST)	24S169	NF 834649
Western Isles	LINICLATE (BENBECULA)	24S179	NF 784495
Western Isles	LITTLE LOCH ROAG (LEWIS)	24S158	NB 138240
Western Isles	LOCH CARLOWAY (LEWIS)	24S154	NB 202426
Western Isles	LOCH GEALAVAT , CALLANISH (LEWIS)	24S155	NB 216337
Western Isles	LOCH GRIMERSTA (LEWIS)	24S156	NB 216298
Western Isles	LOCH PAIBLE (N.UIST)	24S166/24WXD	NF 724684
Western Isles	NORTHTON (S.HARRIS)	24S161/24WYE	NF 990910
Western Isles	SEANNABHAILE / GEARRADUBH (GRIMSAY)	24S176	NF 862579
Western Isles	TONG / MELBOST SANDS (LEWIS)	24S152/24WYL	NB 442355
Western Isles	TRAIGH EACHKAMISH (BALESHARE)	24S172/24WXL	NF 795607
Western Isles	UIG SANDS	24S185	NB 052335
Western Isles	VALLAY (VALLAY)	24S163	NF 777763
Western Isles	WEST SEILEBOST (S.HARRIS)	24S160/24WYA	NG 066973
Wigtown	GARLIESTONE (SOLWAY)	22S30	NX 482471
Wigtown	GLEN LUCE (SOLWAY)	22S29/22WFC	NX 195558
Wigtown	RINGDOO SANDS (SOLWAY)	22S28/22WFC	NX 165564
Wigtown	WIGTOWN BAY (SOLWAY)	22S31/22WEG	NX 458581

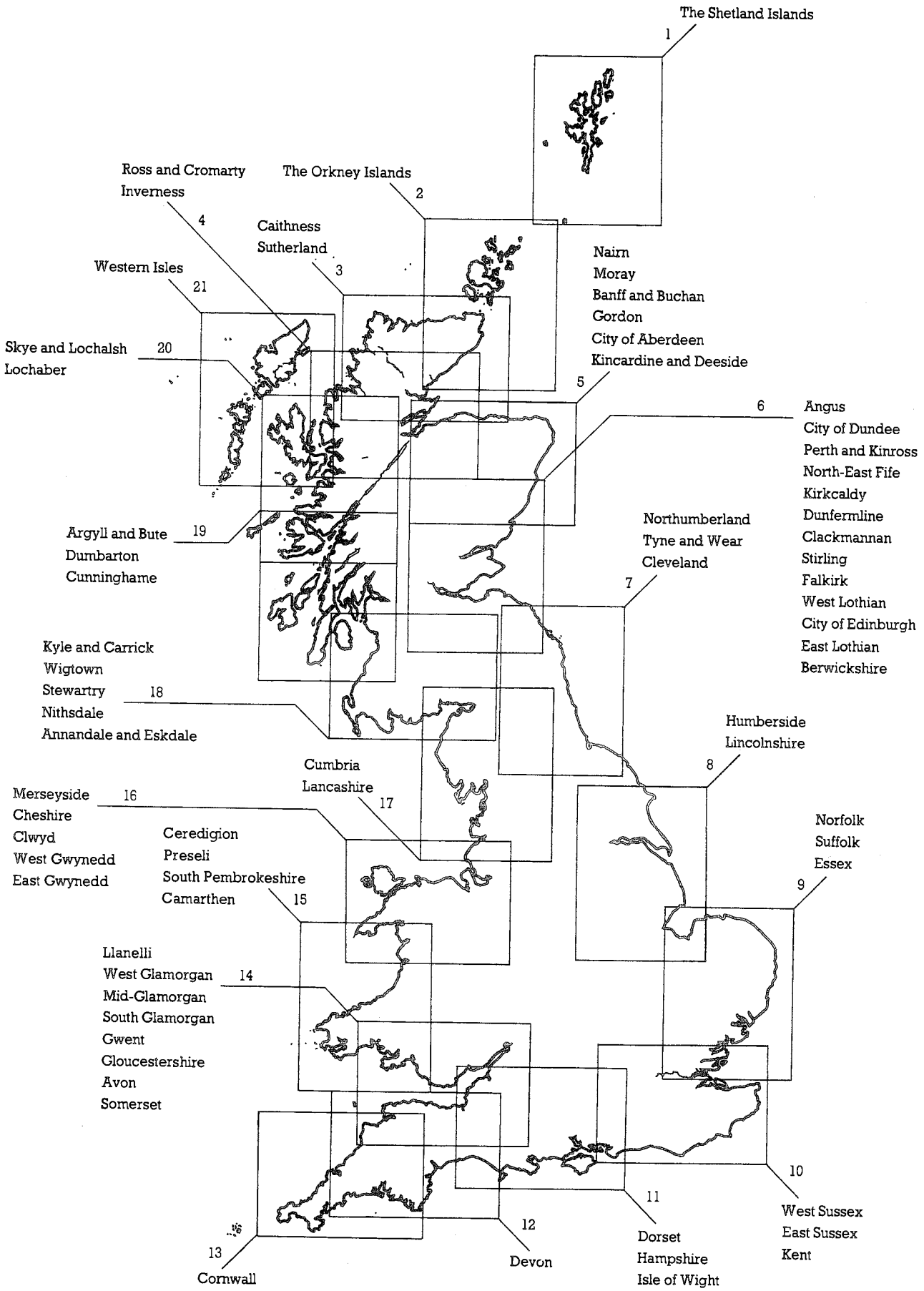
557 Records Processed

Appendix 8.5 List of Regional Supplements available to accompany this main report

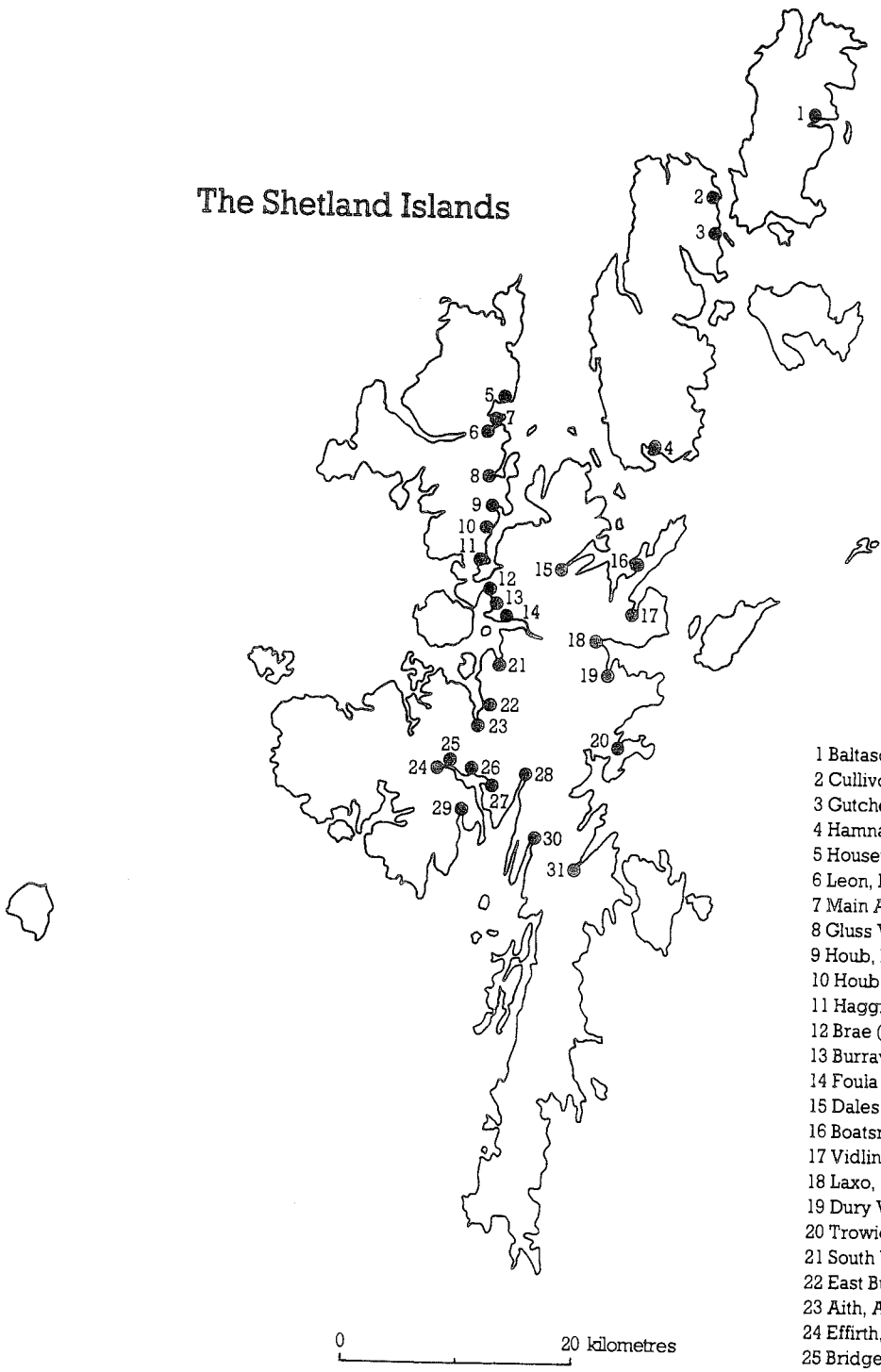
Supplement	No. 1	North West England
	No. 2	West Midlands
	No. 3	South West England
	No. 4	South England
	No. 5	South East England
	No. 6	East Anglia
	No. 7	East Midlands
	No. 8	North East England
Supplement	No. 9	North Wales
	No. 10	Dyfed Powys
	No. 11	South Wales
Supplement	No. 12	South West Scotland
	No. 13	North West Scotland
	No. 14	North East Scotland
	No. 15	South East Scotland

Appendix 8.6. Site location maps.

This first map provides a key to the area covered by each site location map.

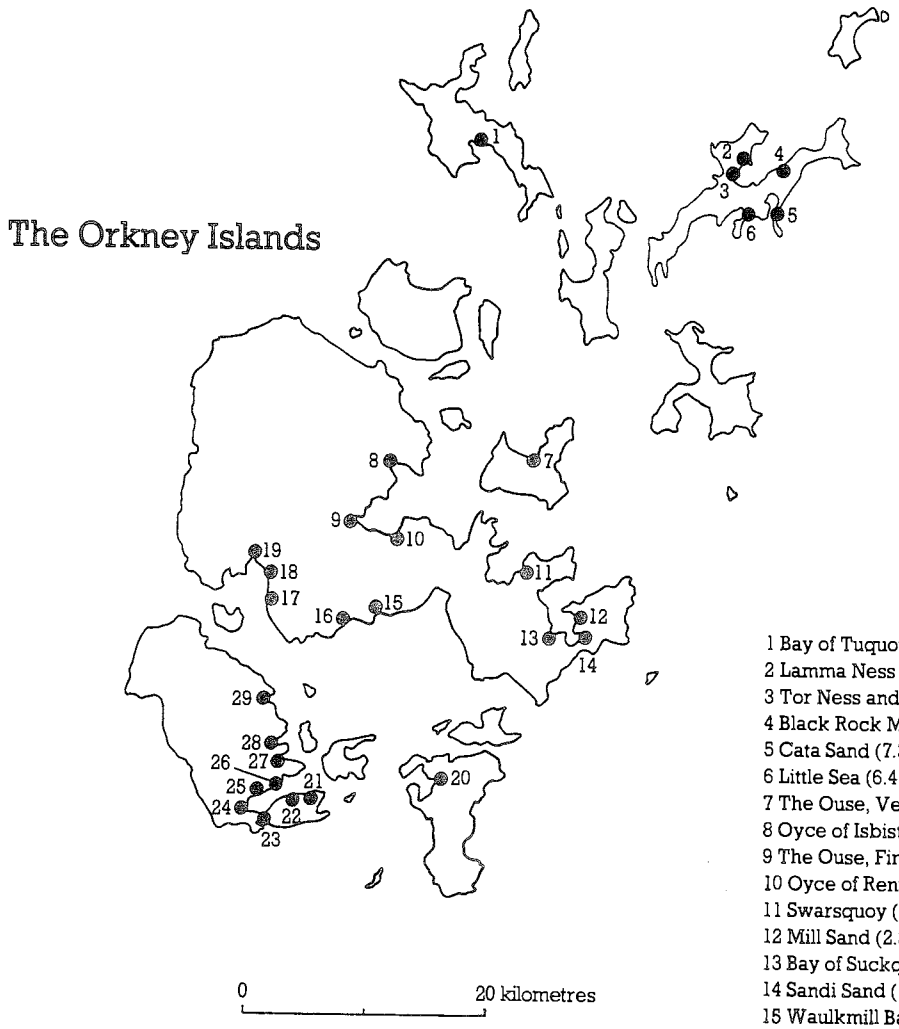


Site Map 1. NCC Region: North East Scotland



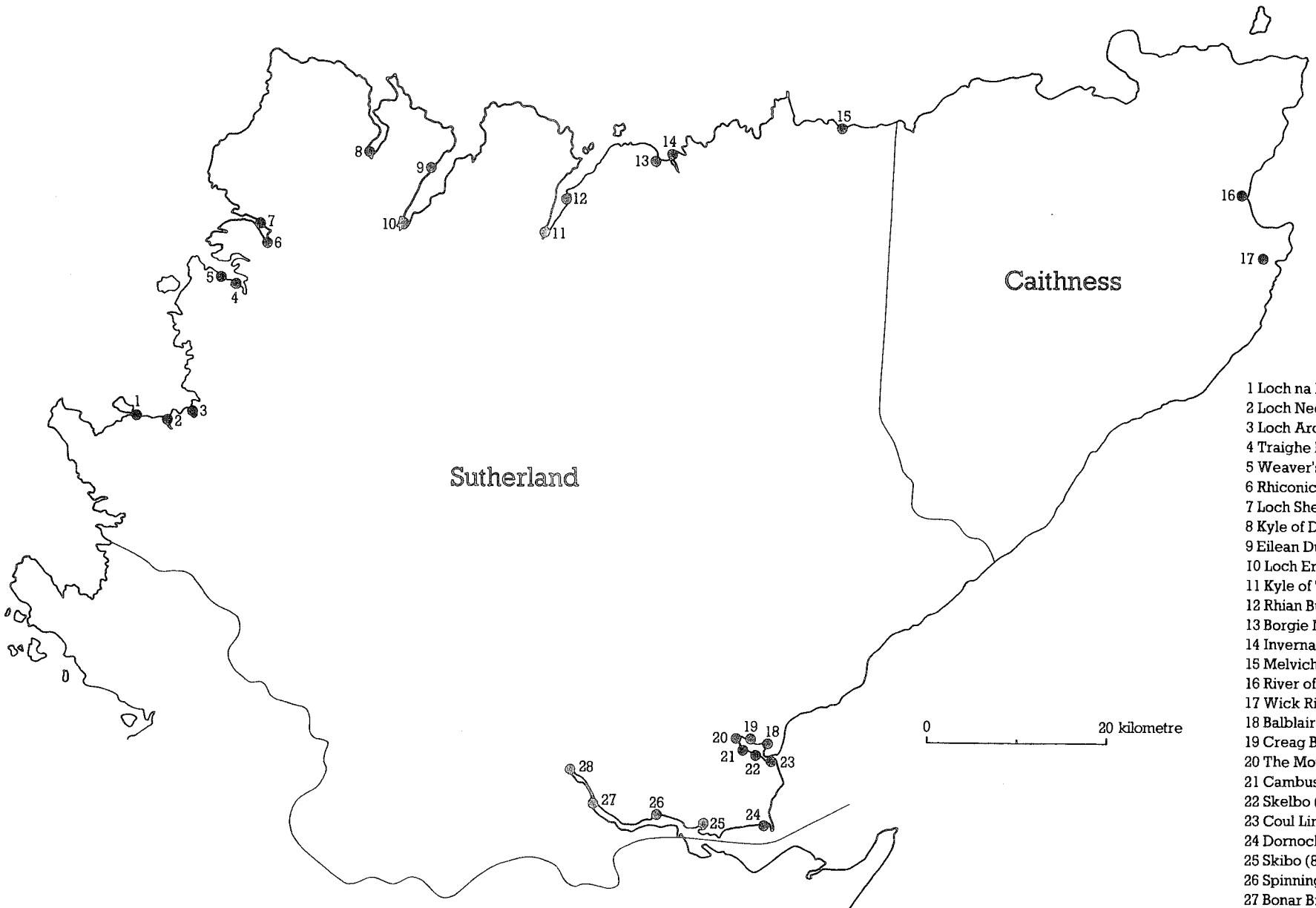
1 Baltasound (4.1ha)
2 Cullivoe (0.12ha)
3 Gutcher (0.11ha)
4 Hamna Voe (0.33ha)
5 Housetter (0.38ha)
6 Leon, Loch of Queyfirth (0.33ha)
7 Main Ayre, Loch of Queyfirth (0.2ha)
8 Gluss Voe (0.37ha)
9 Houb, Fugla Ness (0.11ha)
10 Houb, Sullom (0.12ha)
11 Haggrister (0.31ha)
12 Brae (0.4ha)
13 Burravoe, Busta Voe (0.4ha)
14 Foula Wick, Olna Firth (0.3ha)
15 Dales Voe, Delting (1.59ha)
16 Boatsroom Voe, Lunna Ness (0.35ha)
17 Vidlin (0.19ha)
18 Laxo, Dury Voe (0.19ha)
19 Dury Voe (0.85ha)
20 Trowie Loch, Garth (0.4ha)
21 South Voxter, Gon Firth (0.17ha)
22 East Burrafirth, Aith Voe (0.2ha)
23 Aith, Aith Voe (0.15ha)
24 Effirth, Bixter Voe (0.37ha)
25 Bridge of Twatt, Bixter Voe (0.13ha)
26 East of Ness of Bixter (0.35ha)
27 Tresta (0.1ha)
28 Head of Weisdale Voe (0.13ha)
29 Garderhouse, Seli Voe (1.68ha)
30 Vadill, Head of Whiteness Voe (1.0ha)
31 Dales Voe, Lerwick (0.58ha)

Site Map 2. NCC Region: North East Scotland



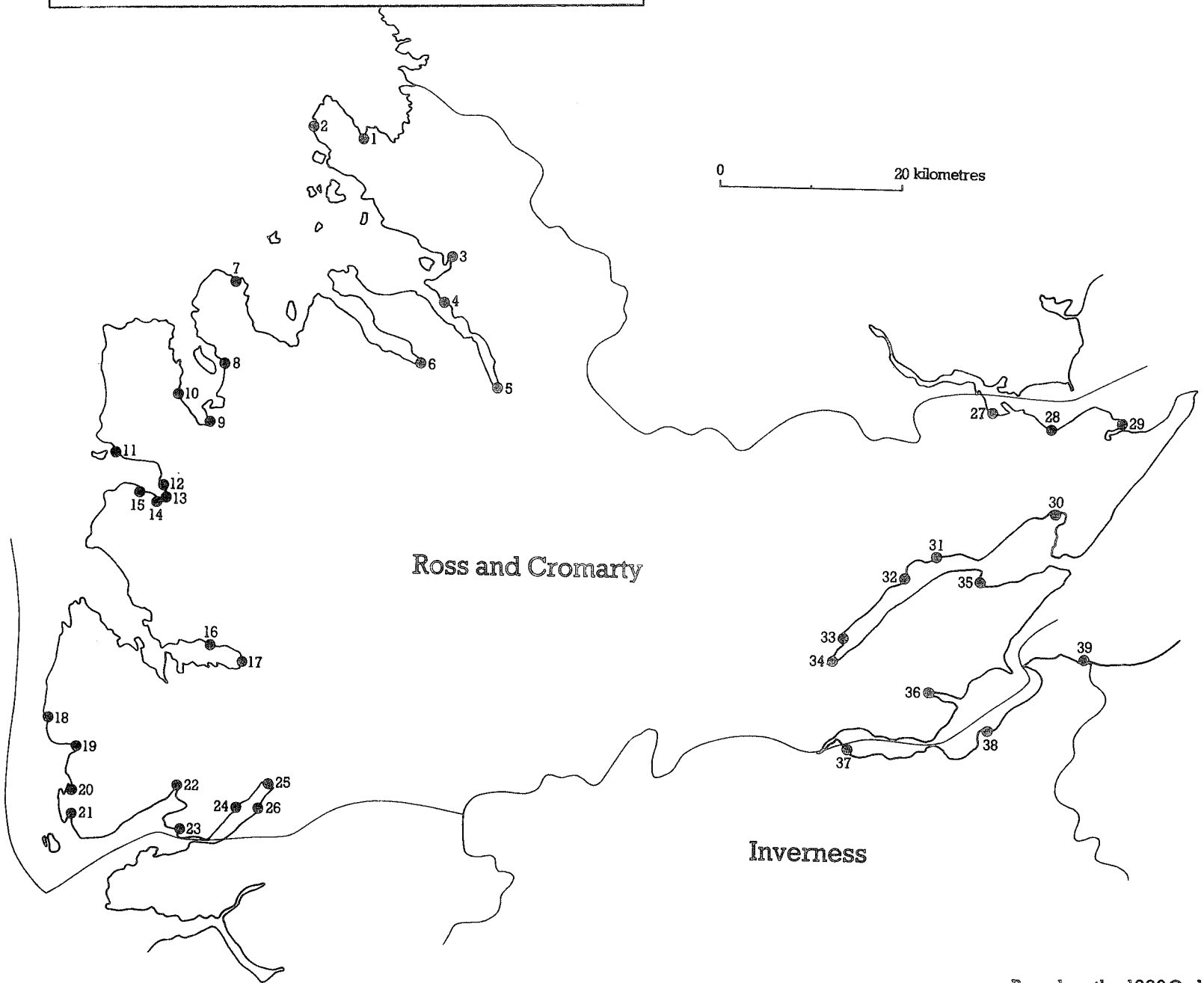
1 Bay of Tuquoy (1.7ha)
2 Lamma Ness Oyce (3.0ha)
3 Tor Ness and Quivals Creek (2.65ha)
4 Black Rock Marsh, Otters Wick (1.3ha)
5 Cata Sand (7.3ha)
6 Little Sea (6.4ha)
7 The Ouse, Veantrow Bay (3.0ha)
8 Oyce of Isbister (2.6ha)
9 The Ouse, Finstown (1.91ha)
10 Oyce of Rennibister (1.0ha)
11 Swarsquoy (2.73ha)
12 Mill Sand (2.36ha)
13 Bay of Suckquoy (4.07ha)
14 Sandi Sand (1.0ha)
15 Waulkmill Bay (9.0ha)
16 Swanbister Bay (1.81ha)
17 Clestrain Strand (0.98ha)
18/19 Bridge of Waithe and Cumminess (4.87ha)
20 Oyce of Quindry (3.2ha)
21 Myre Bay (2.0ha)
22 Wyng Strand (1.35ha)
23 The Ayre (1.75ha)
24 Saltness, North Bay (1.7ha)
25 Quoys (3.4ha)
26 Little Ayre (2.6ha)
27 Ore Bay (0.75ha)
28 Mill Bay (2.3ha)
29 Lyrawa Bay (0.63ha)

Site Map 3. NCC Region: North West Scotland



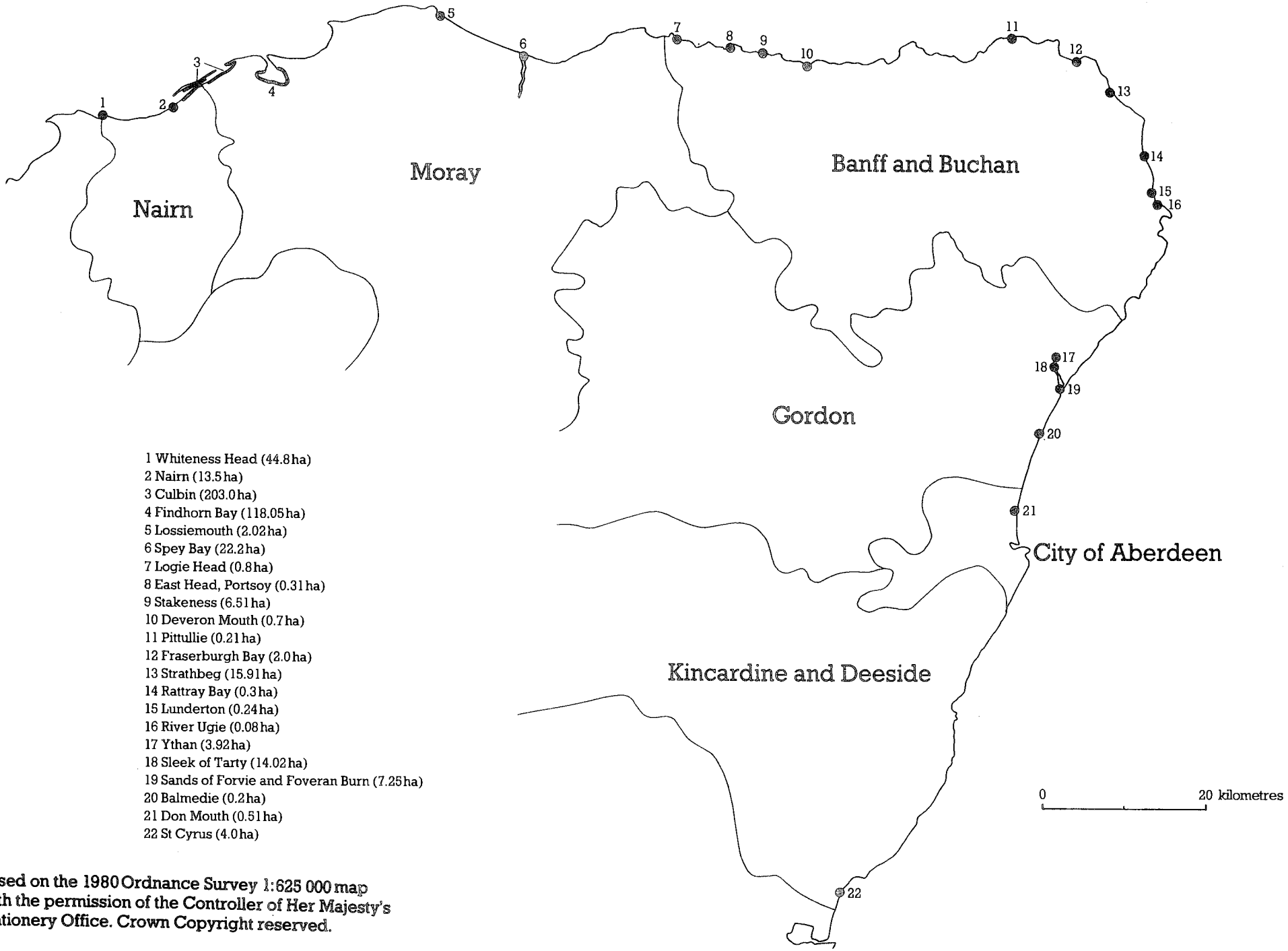
1 Loch na Leobaig (2.76ha)
2 Loch Nedd (0.75ha)
3 Loch Ardbhair (1.25ha)
4 Traighe bad na Baighe (5.0ha)
5 Weaver's Bay (0.5ha)
6 Rhiconich (2.0ha)
7 Loch Sheigra (3.0ha)
8 Kyle of Durness (5.68ha)
9 Eilean Dubh (4.25ha)
10 Loch Eriboll (0.45ha)
11 Kyle of Tongue (7.64ha)
12 Rhian Burn (0.5ha)
13 Borgie Mouth (7.25ha)
14 Invernaver (3.5ha)
15 Melvich (3.5ha)
16 River of Wester (8.25ha)
17 Wick River (10.92ha)
18 Balblair (14.72ha)
19 Creag Beag (2.5ha)
20 The Mound (6.04ha)
21 Cambusmore (6.92ha)
22 Skelbo (7.25ha)
23 Coul Links (4.0ha)
24 Dornoch Point (50.5ha)
25 Skibo (80.0ha)
26 Spinningdale (0.25ha)
27 Bonar Bridge (10.8ha)
28 Inveran – Carbisdale (11.0ha)

Site Map 4. NCC Region: North West Scotland



1 Achnahaird Bay (13.48ha)
2 Reiff (2.32ha)
3 Strathkanaird (4.2ha)
4 Ullapool (2.28ha)
5 Loch Broom (9.04ha)
6 Little Loch Broom (16.96ha)
7 Opinan (4.72ha)
8 Aultbea (0.2ha)
9 Poolewe (1.92ha)
10 Inverasdale (0.36ha)
11 Gairloch Sands (0.76ha)
12 Charlestown (0.56ha)
13 River Kerry (0.44ha)
14 Shieldaig Lodge Hotel (0.72ha)
15 Badachro (1.56ha)
16 Torridon House (4.44ha)
17 Torridon Main (24.68ha)
18 An Cruinn-Leum (0.72ha)
19 Applecross Bay (1.6ha)
20 Culduie (0.68ha)
21 Toscaig (2.72ha)
22 Kishorn (15.2ha)
23 Reraig (1.96ha)
24 Slumbay (5.48ha)
25 Loch Carron (73.32ha)
26 Attadale (5.16ha)
27 Dornoch Firth – south (43.79ha)
28 Tain Golf Course (2.7ha)
29 Morrich More (200.5ha)
30 Nigg Bay (84.25ha)
31 Alness – Dalmore (30.04ha)
32 Balconie Point (30.0ha)
33 Dingwall Bay (33.08ha)
34 Conon Islands (36.77ha)
35 Udale Bay (13.02ha)
36 Munlochy Bay (18.2ha)
37 Beauly Firth (Ross and Cromarty 30.05ha)
Beauly Firth (Inverness 75.5ha)
38 Castle Stuart Bay (8.0ha)
39 Whiteness Head (4.2ha)

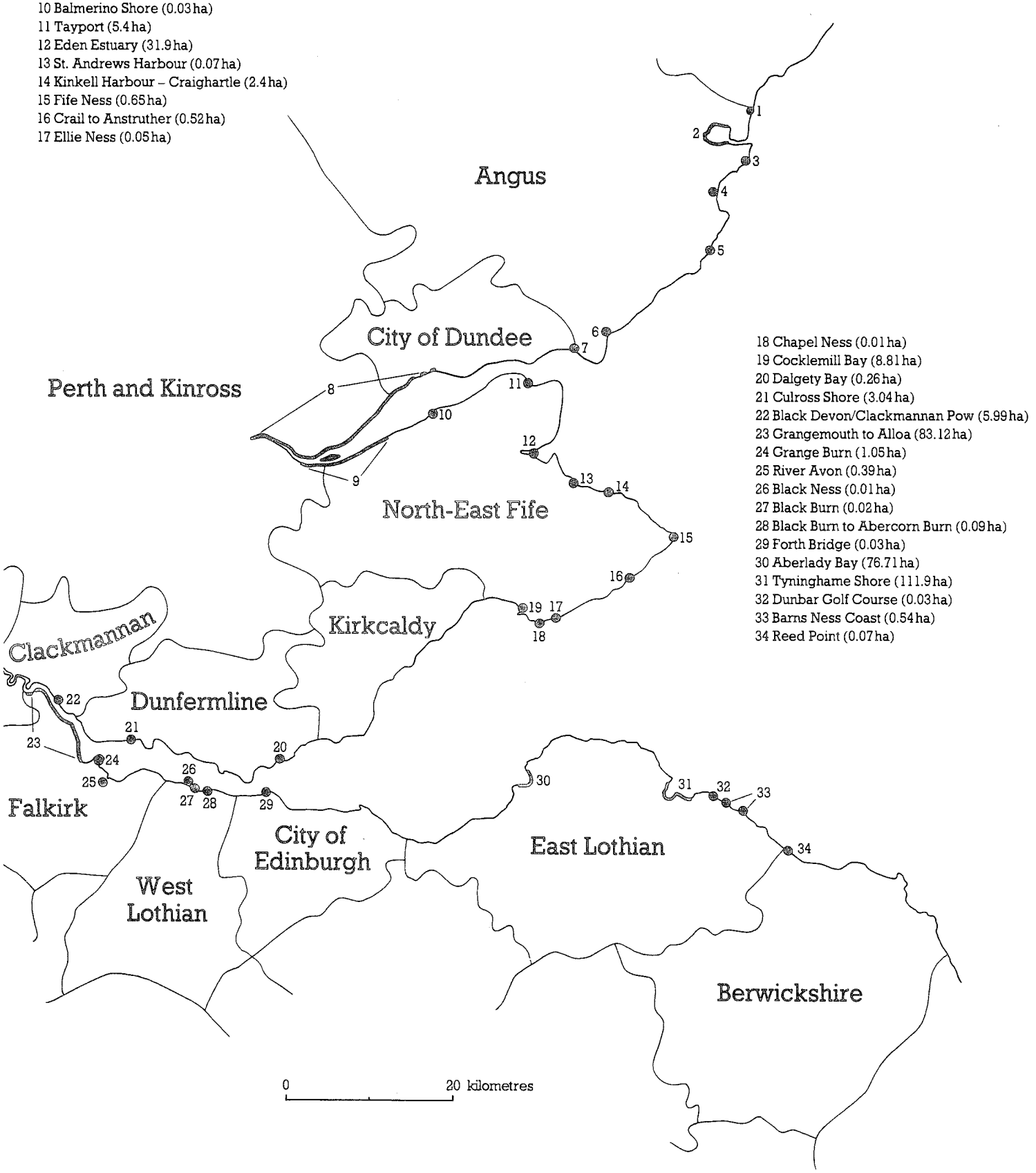
Site Map 5. NCC Region: North East Scotland



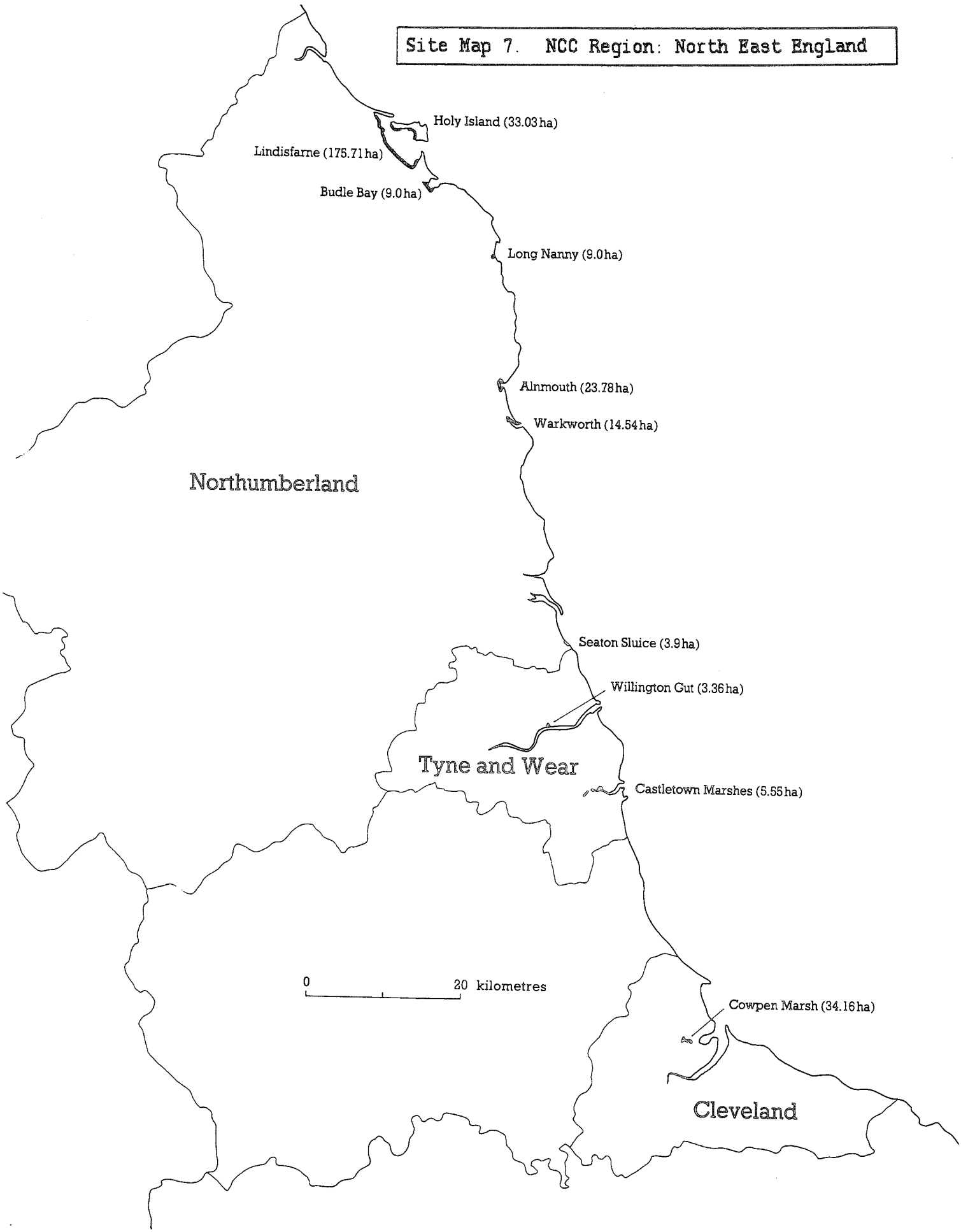
1 Whiteness Head (44.8ha)
2 Nairn (13.5ha)
3 Culbin (203.0ha)
4 Findhorn Bay (118.05ha)
5 Lossiemouth (2.02ha)
6 Spey Bay (22.2ha)
7 Logie Head (0.8ha)
8 East Head, Portsoy (0.31ha)
9 Stakeness (6.51ha)
10 Deveron Mouth (0.7ha)
11 Pittullie (0.21ha)
12 Fraserburgh Bay (2.0ha)
13 Strathbeg (15.91ha)
14 Rattray Bay (0.3ha)
15 Lunderton (0.24ha)
16 River Ugie (0.08ha)
17 Ythan (3.92ha)
18 Sleek of Tarty (14.02ha)
19 Sands of Forvie and Foveran Burn (7.25ha)
20 Balmedie (0.2ha)
21 Don Mouth (0.51ha)
22 St Cyrus (4.0ha)

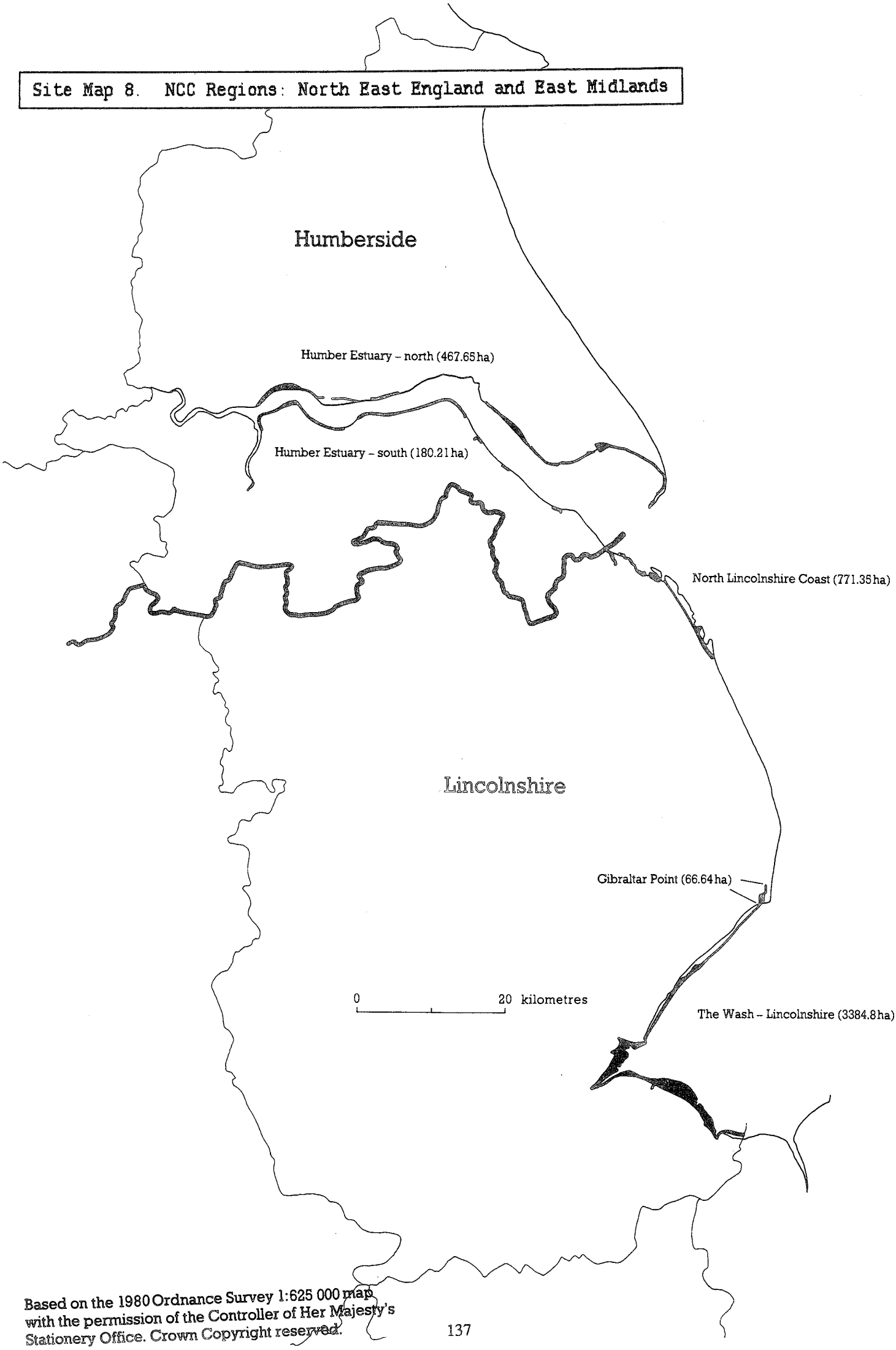
Site Map 6. NCC Region: South East Scotland

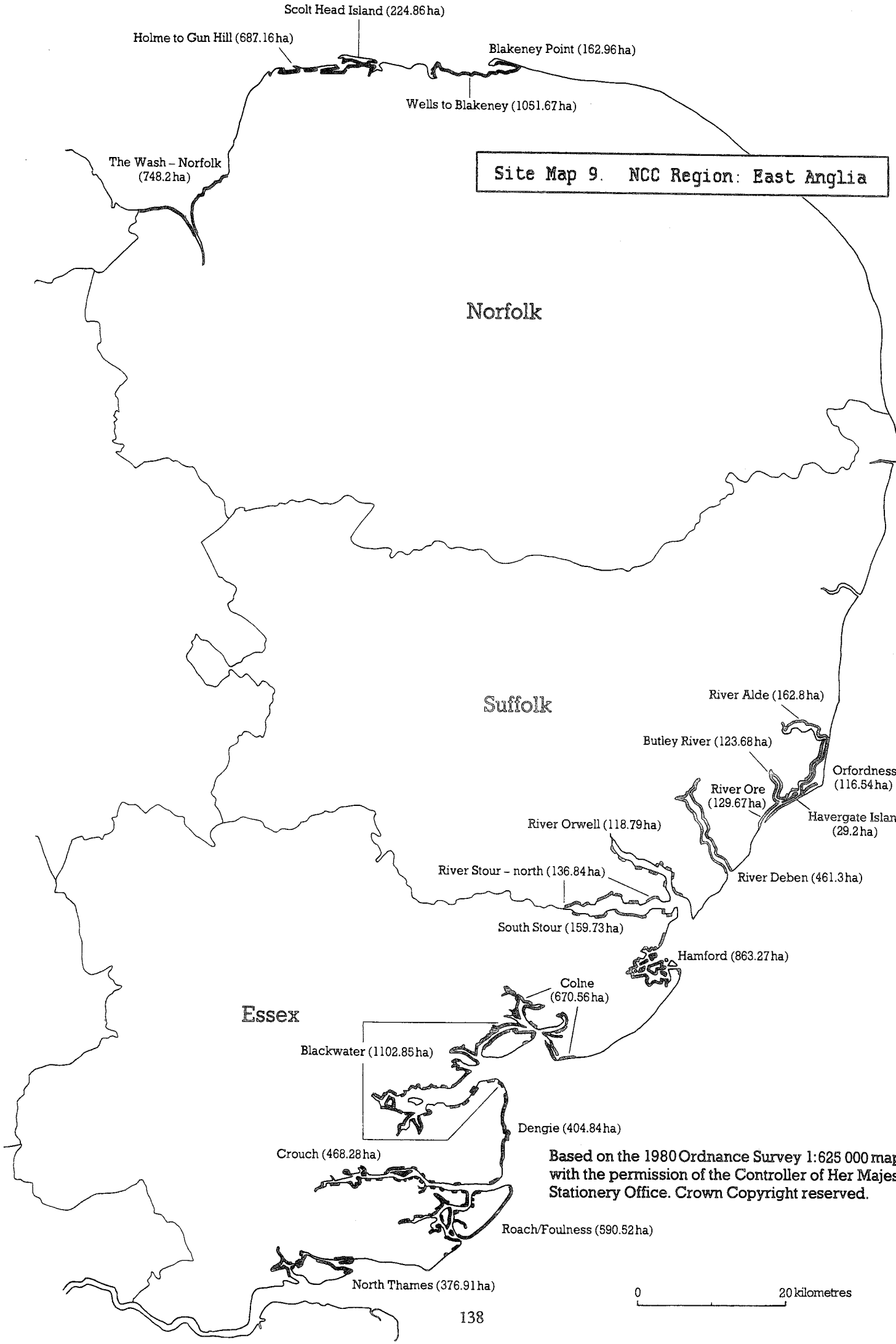
1 Kinnaber Links (4.23 ha)
2 Montrose Basin (58.01 ha)
3 Boddin Point – Scurdie Ness (1.05 ha)
4 Lunan Burn (3.9 ha)
5 Carlingheugh Bay and Meg's Craig (0.01 ha)
6 Barry Burn (0.52 ha)
7 Buddon Burn (0.84 ha)
8 Tay Estuary – north shore (Perth + Kinross 325.87 ha) (Angus + Dundee 47.65 ha)
9 Tay Estuary – south shore (Fife 86.76 ha) (Perth + Kinross 32.72 ha)
10 Balmerino Shore (0.03 ha)
11 Tayport (5.4 ha)
12 Eden Estuary (31.9 ha)
13 St. Andrews Harbour (0.07 ha)
14 Kinkell Harbour – Craighartle (2.4 ha)
15 Fife Ness (0.65 ha)
16 Crail to Anstruther (0.52 ha)
17 Ellie Ness (0.05 ha)



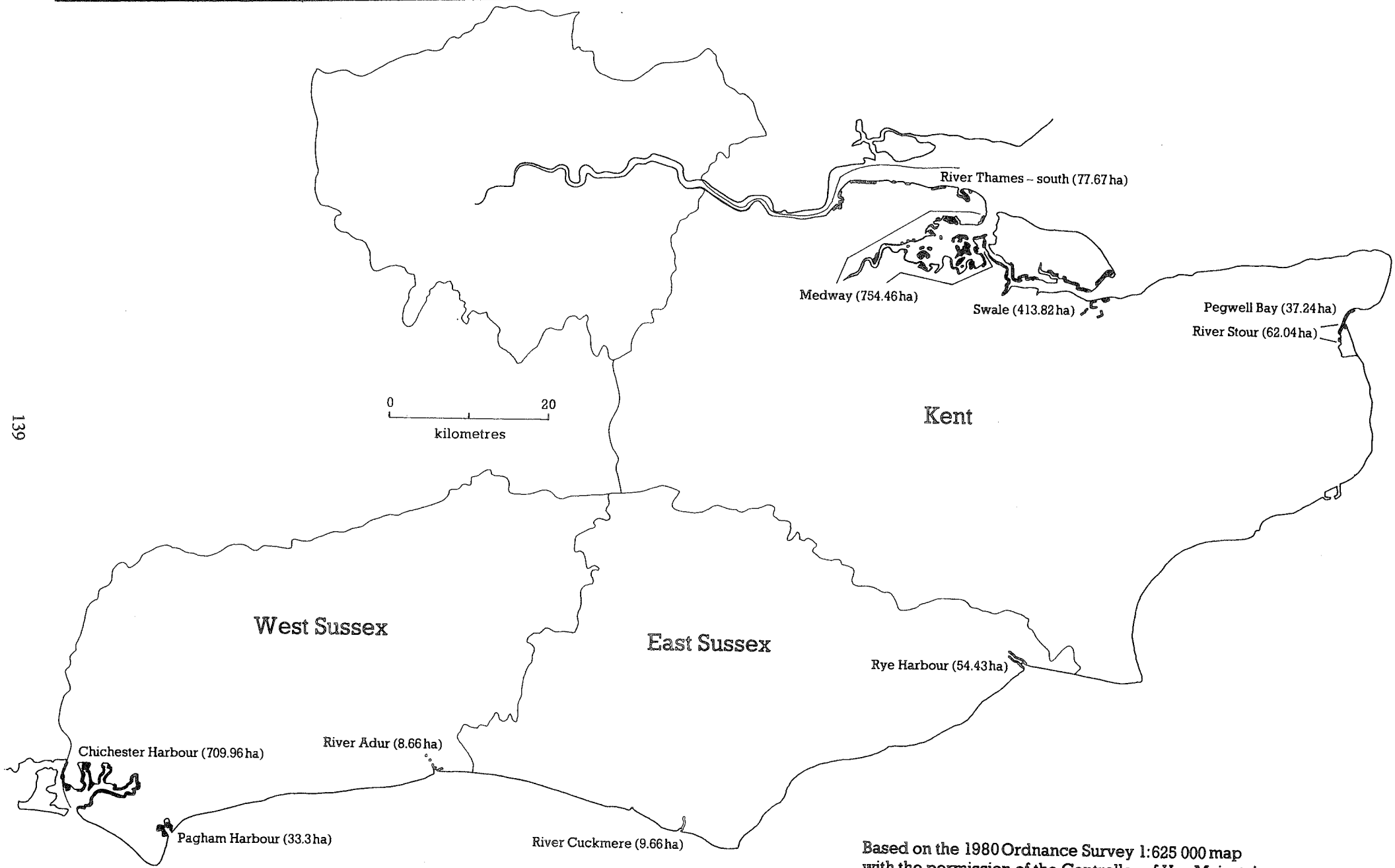
18 Chapel Ness (0.01 ha)
19 Cocklemill Bay (8.81 ha)
20 Dalgety Bay (0.26 ha)
21 Culross Shore (3.04 ha)
22 Black Devon/Clackmannan Pow (5.99 ha)
23 Grangemouth to Alloa (83.12 ha)
24 Grange Burn (1.05 ha)
25 River Avon (0.39 ha)
26 Black Ness (0.01 ha)
27 Black Burn (0.02 ha)
28 Black Burn to Abercorn Burn (0.09 ha)
29 Forth Bridge (0.03 ha)
30 Aberlady Bay (76.71 ha)
31 Tyninghame Shore (111.9 ha)
32 Dunbar Golf Course (0.03 ha)
33 Barns Ness Coast (0.54 ha)
34 Reed Point (0.07 ha)



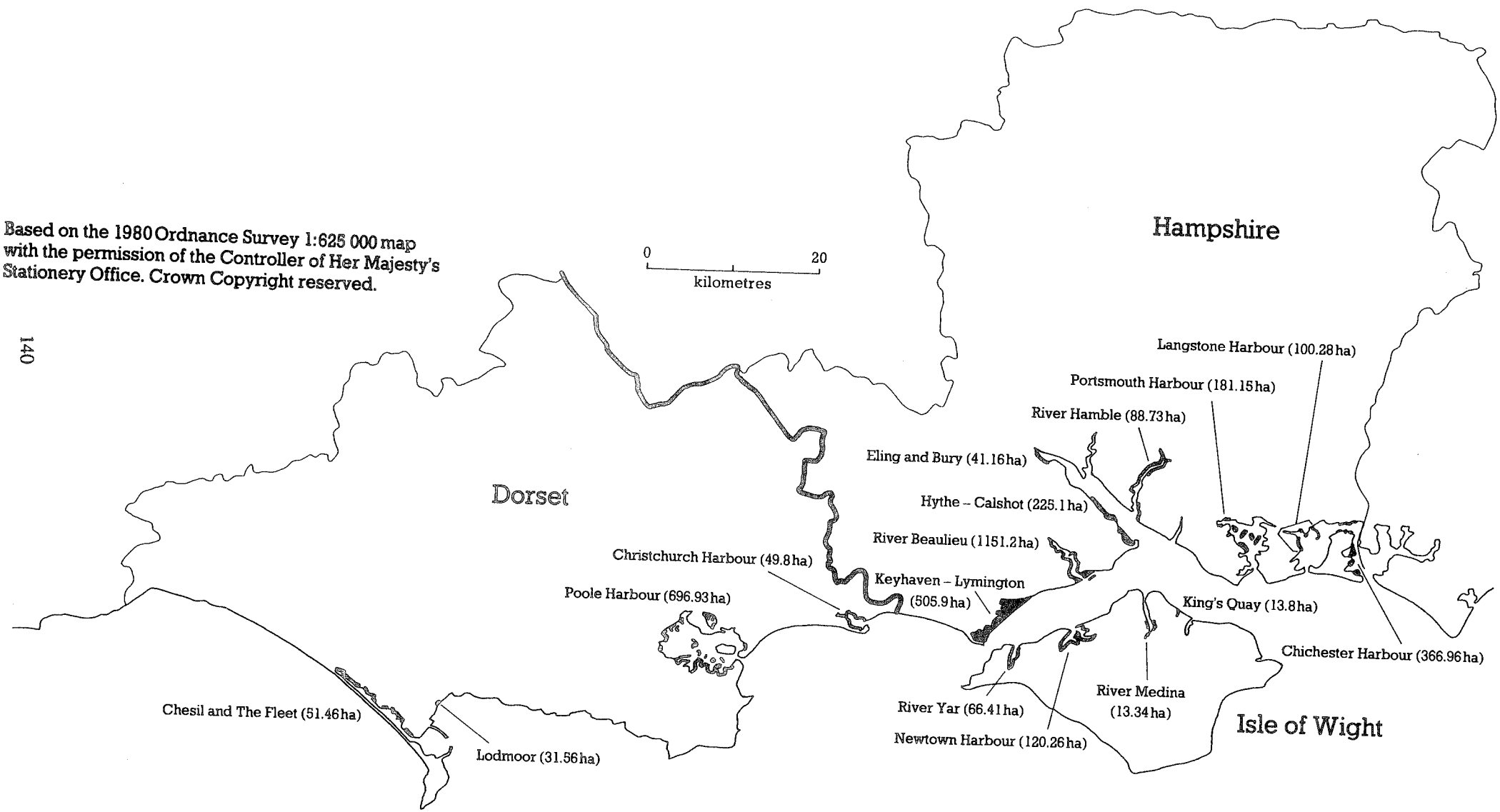




Site Map 10. NCC Region: South East England

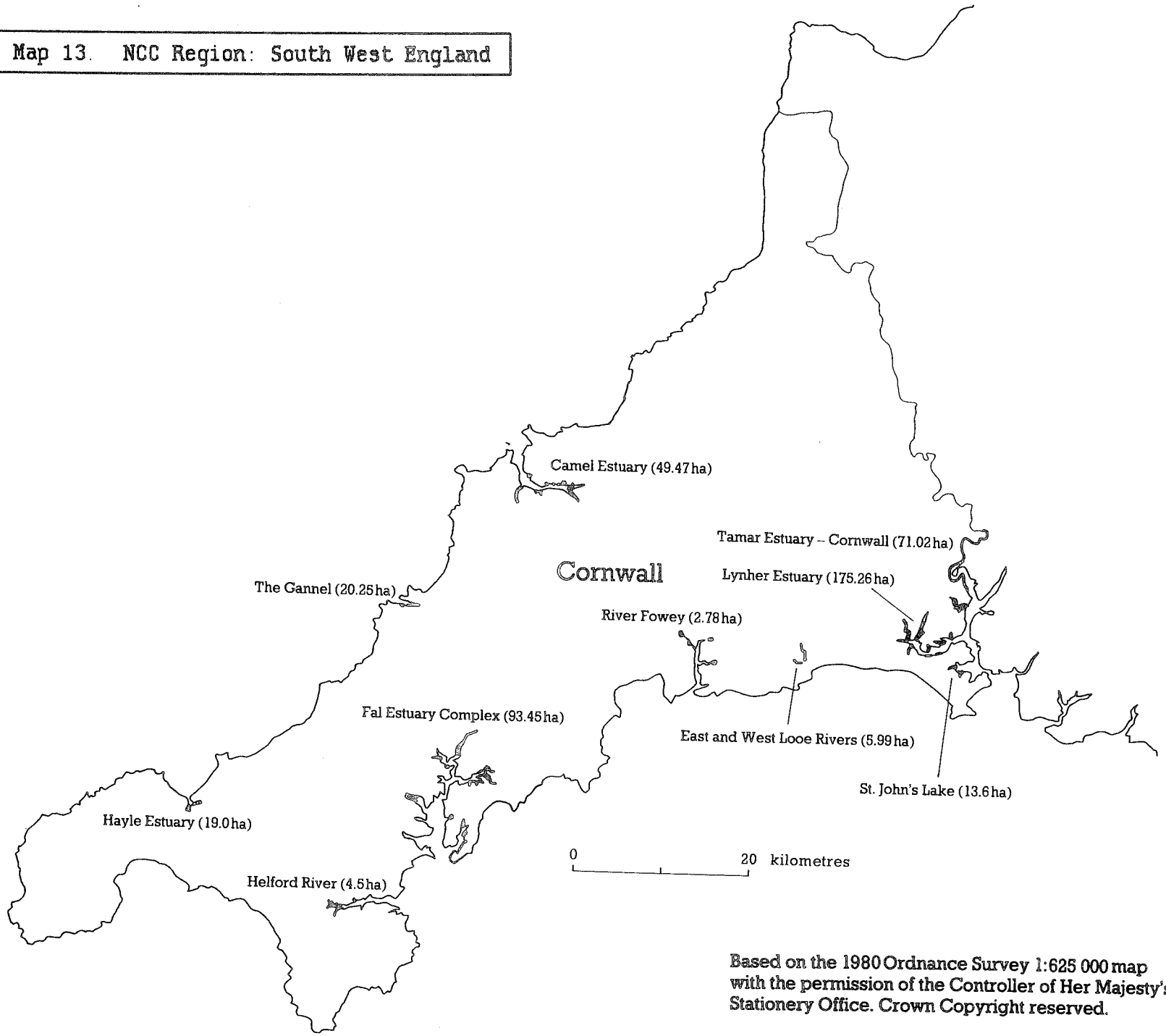


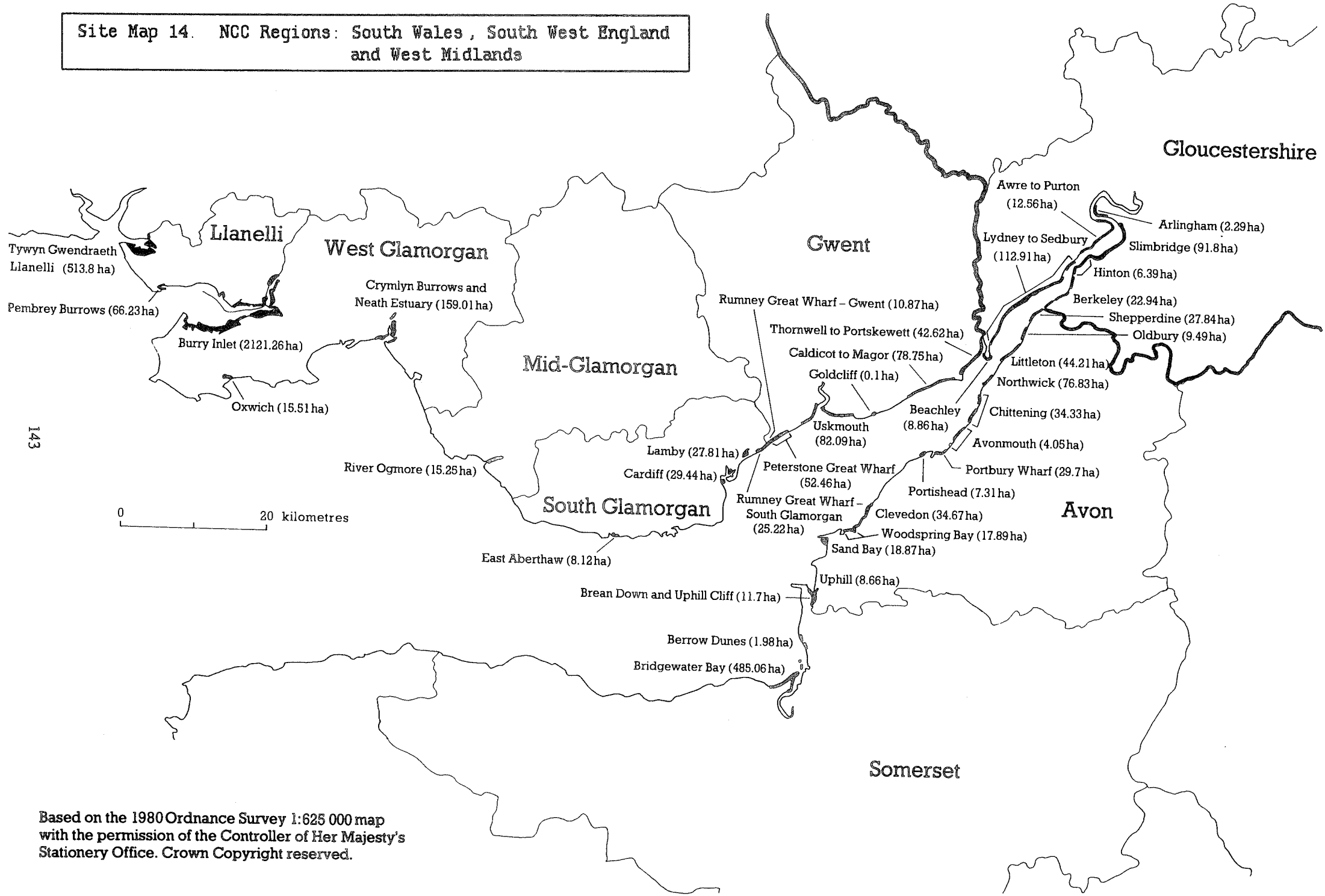
Site Map 11. NCC Regions: South England and South West England



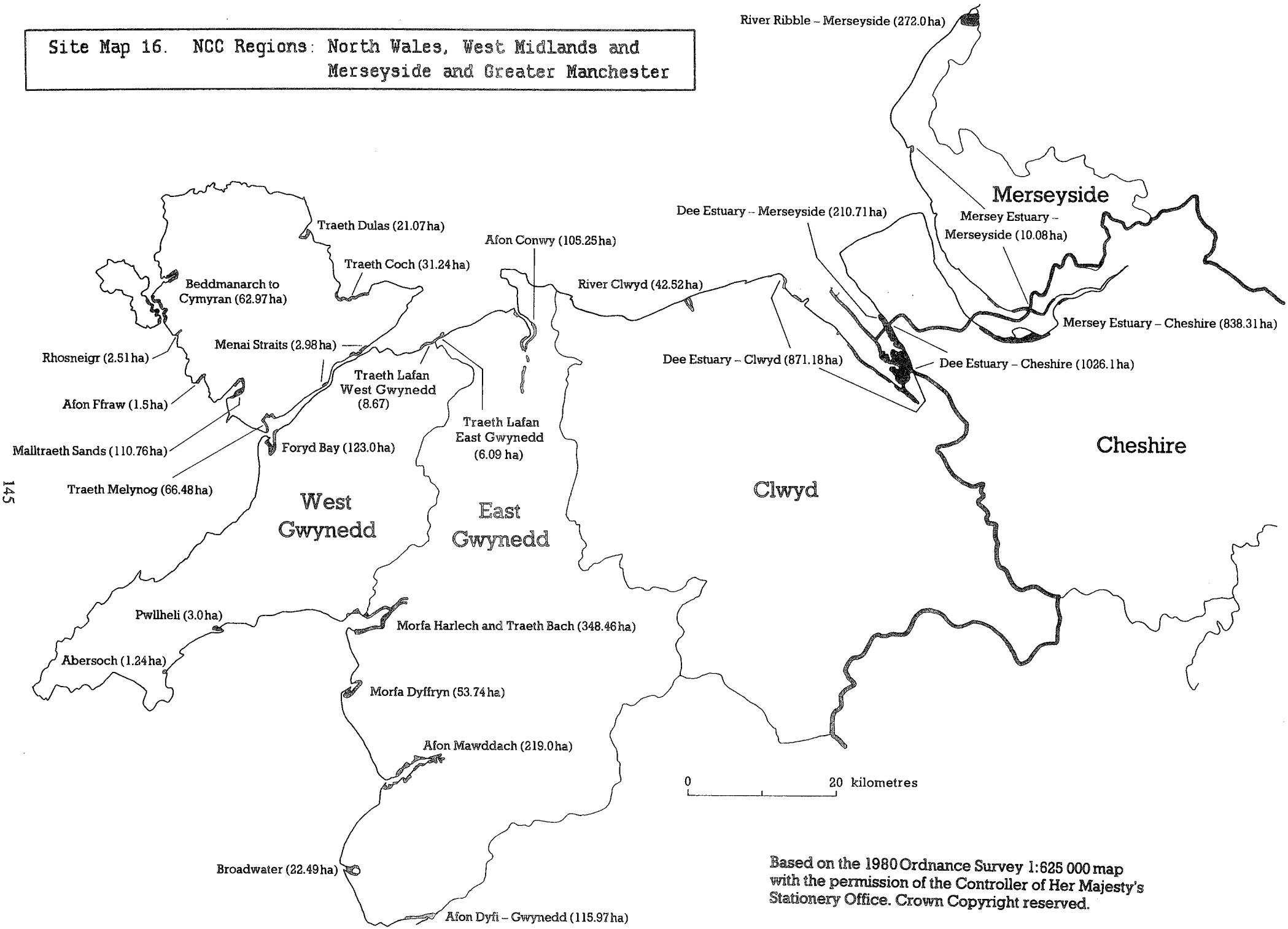
Site Map 12. NCC Region: South West England

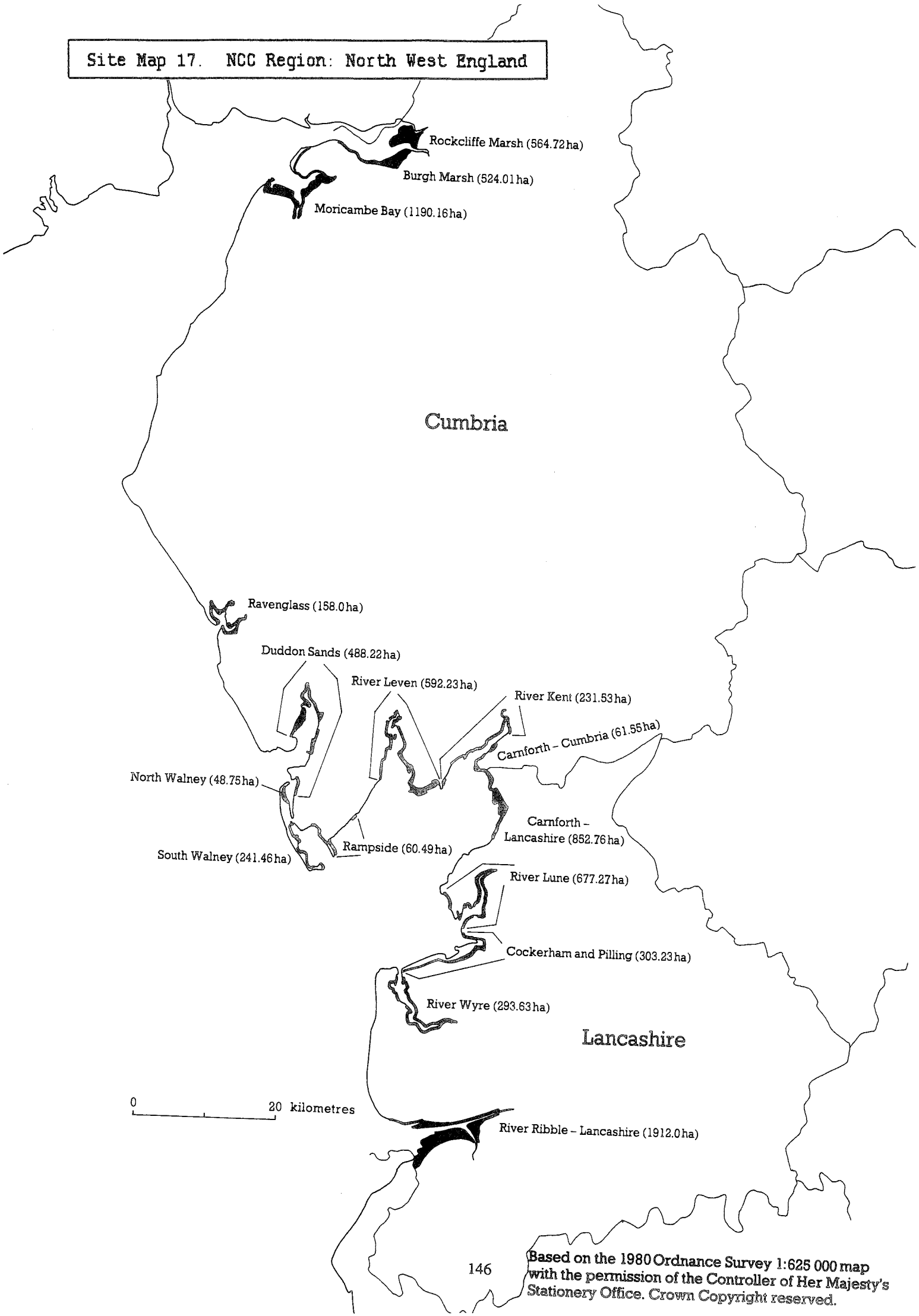
Site Map 13. NCC Region: South West England





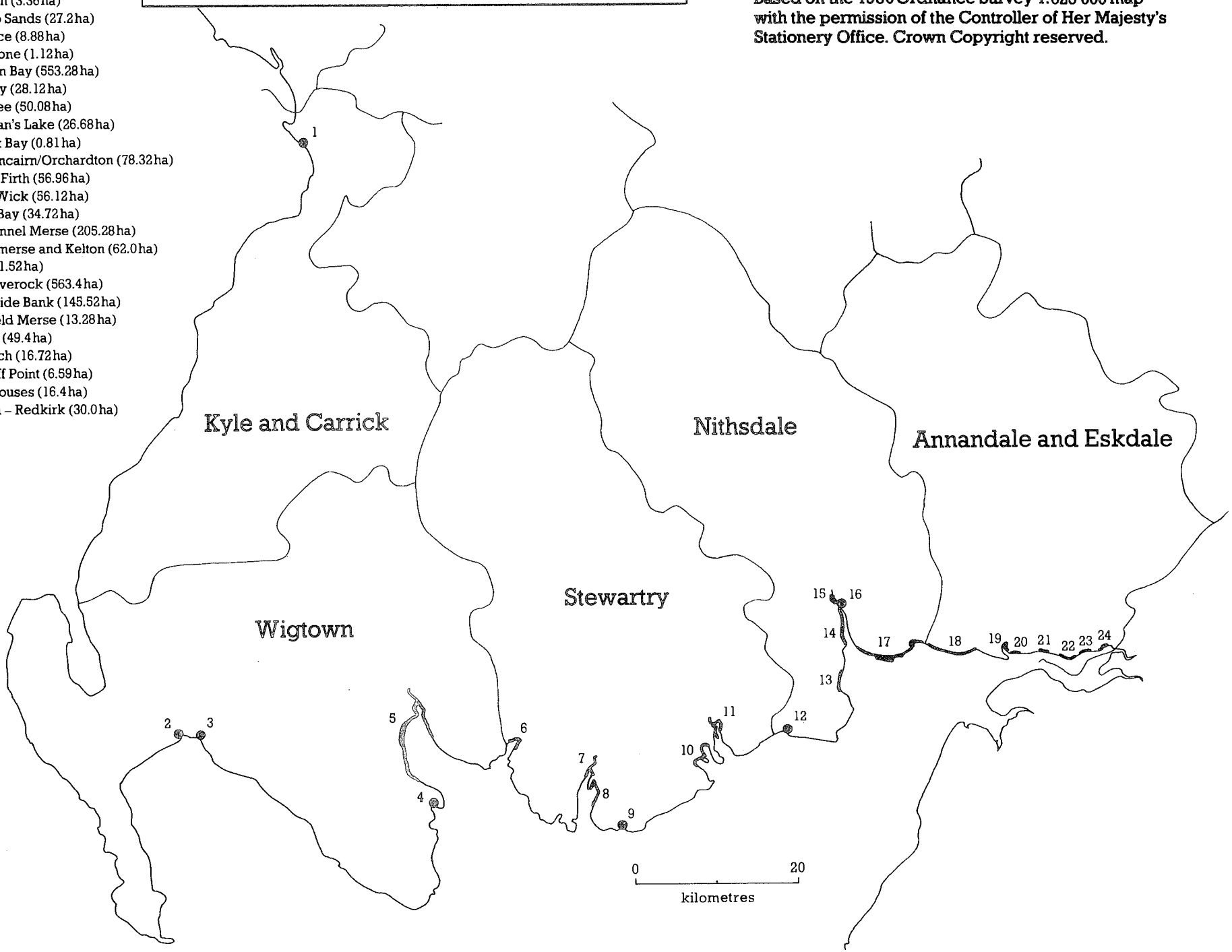
Site Map 15. NCC Region: Dyfed Powys



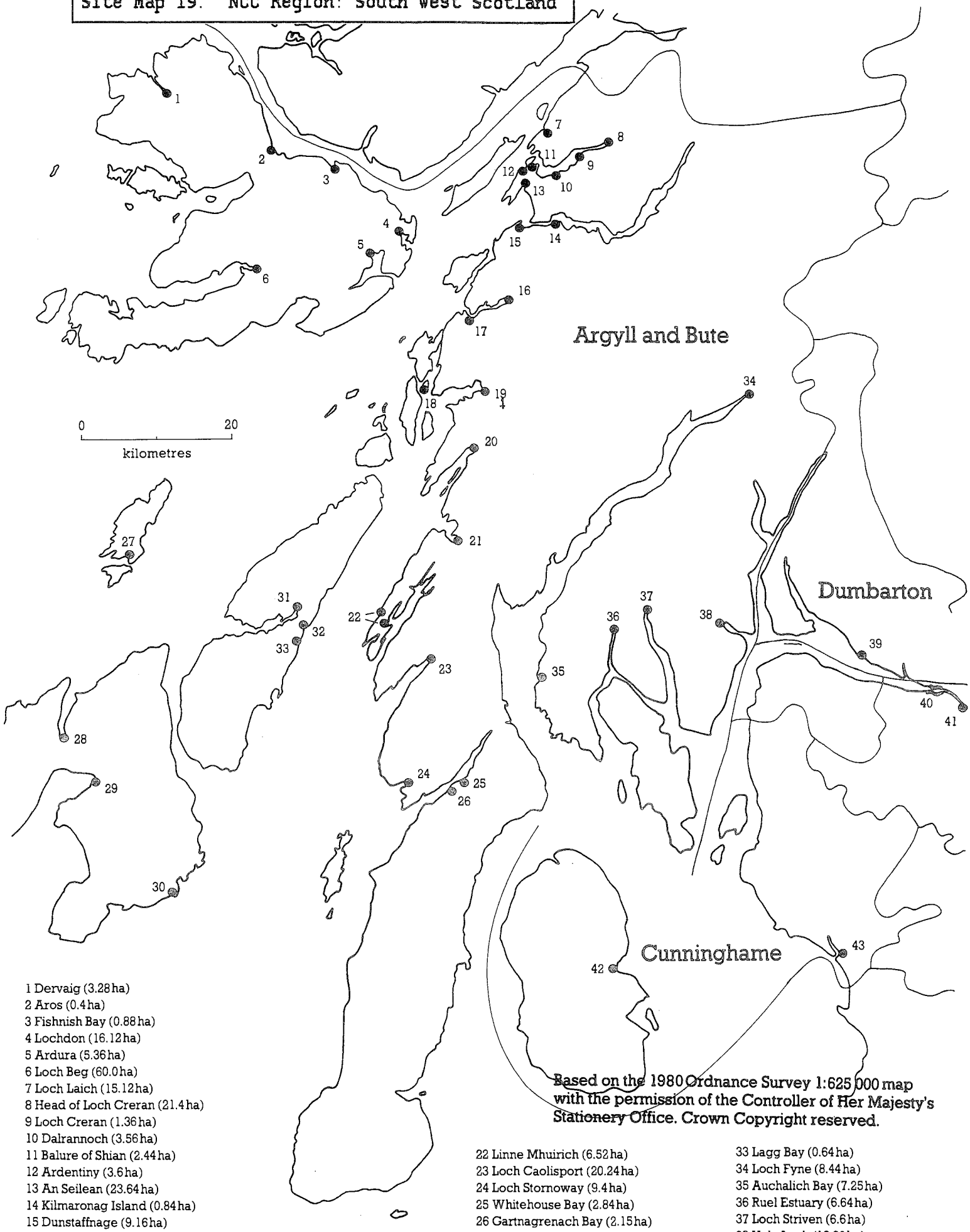


Site Map 18. NCC Region: South West Scotland

1 Pow Burn (3.36ha)
2 Ringdoo Sands (27.2ha)
3 Glen Luce (8.88ha)
4 Garliestone (1.12ha)
5 Wigtown Bay (553.28ha)
6 Fleet Bay (28.12ha)
7 River Dee (50.08ha)
8 Manxman's Lake (26.68ha)
9 Mullock Bay (0.81ha)
10 Auchencairn/Orchardton (78.32ha)
11 Rough Firth (56.96ha)
12 South Wick (56.12ha)
13 Carse Bay (34.72ha)
14 Kirkconnel Merse (205.28ha)
15 Greenmerse and Kelton (62.0ha)
16 Nith (11.52ha)
17 Caerlaverock (563.4ha)
18 Priestside Bank (145.52ha)
19 Milnfield Merse (13.28ha)
20 Annan (49.4ha)
21 Dornoch (16.72ha)
22 Torduff Point (6.59ha)
23 Browhouses (16.4ha)
24 Gretna – Redkirk (30.0ha)

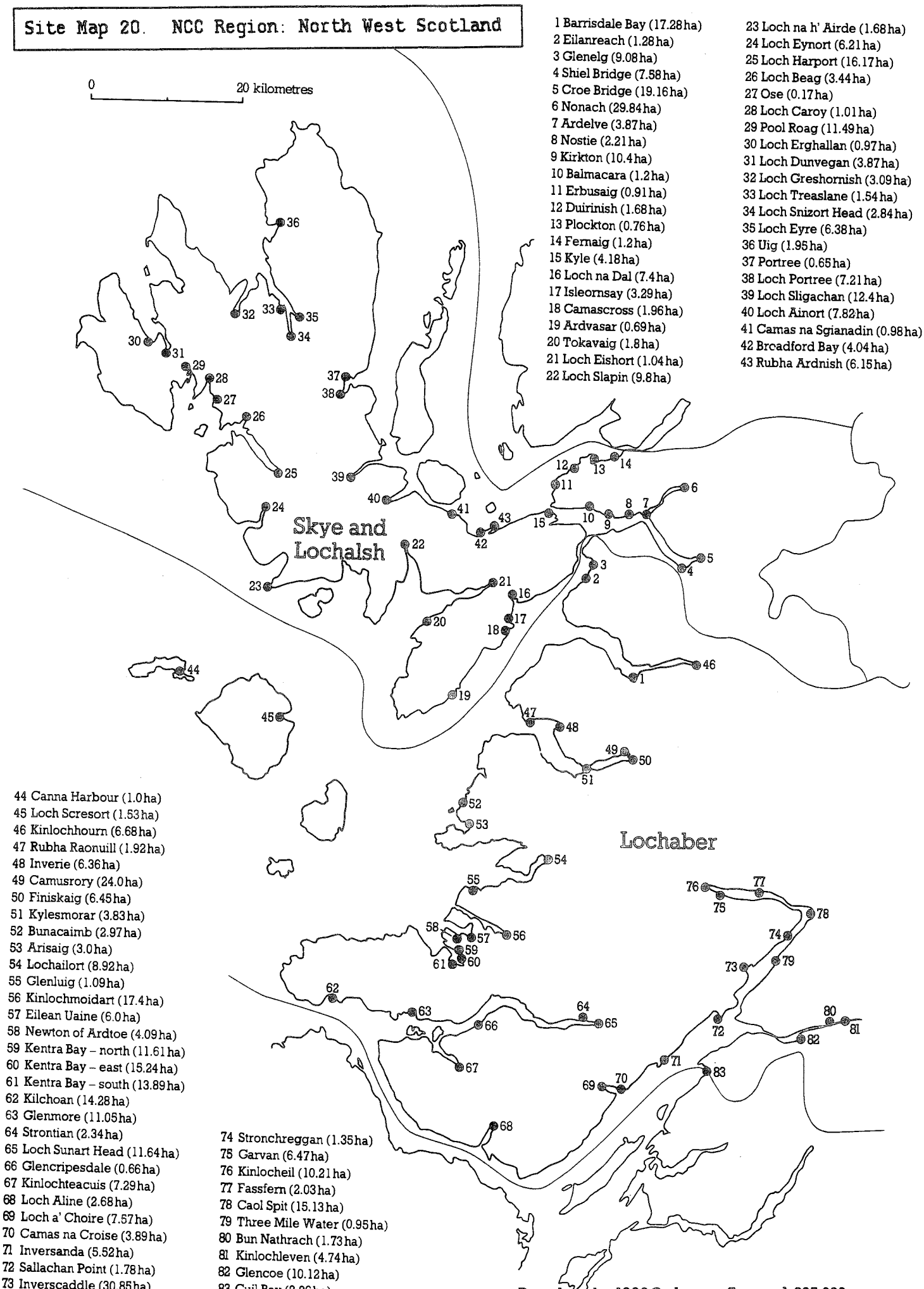


Site Map 19. NCC Region: South West Scotland



1 Dervaig (3.28ha)
2 Aros (0.4ha)
3 Fishnish Bay (0.88ha)
4 Lochdon (16.12ha)
5 Ardura (5.36ha)
6 Loch Beg (60.0ha)
7 Loch Laich (15.12ha)
8 Head of Loch Creran (21.4ha)
9 Loch Creran (1.36ha)
10 Dalrannoch (3.56ha)
11 Balure of Shian (2.44ha)
12 Ardentiny (3.6ha)
13 An Seilean (23.64ha)
14 Kilmaronag Island (0.84ha)
15 Dunstaffnage (9.16ha)
16 Loch Feochan (20.12ha)
17 Kilninver (3.68ha)
18 Torsa (1.8ha)
19 Loch Melfort (7.36ha)
20 Loch Craignish (3.44ha)
21 Crinan (47.28ha)
22 Linne Mhuirich (6.52ha)
23 Loch Caolisport (20.24ha)
24 Loch Stornoway (9.4ha)
25 Whitehouse Bay (2.84ha)
26 Gartnagrenach Bay (2.15ha)
27 The Strand, Colonsay (6.68ha)
28 Gruinart (50.56ha)
29 Bridgend (40.4ha)
30 Loch an t- Sailein (6.96ha)
31 Gleann Aoistail (3.6ha)
32 Tarbert Bay (0.5ha)
33 Lagg Bay (0.64ha)
34 Loch Fyne (8.44ha)
35 Auchalich Bay (7.25ha)
36 Ruel Estuary (6.64ha)
37 Loch Striven (6.6ha)
38 Holy Loch (16.32ha)
39 Ardmore Point (4.56ha)
40 River Clyde – west (44.08ha)
41 River Clyde – east (18.48ha)
42 Brodick Bay, Arran (2.0ha)
43 Irvine (30.04ha)

Site Map 20. NCC Region: North West Scotland

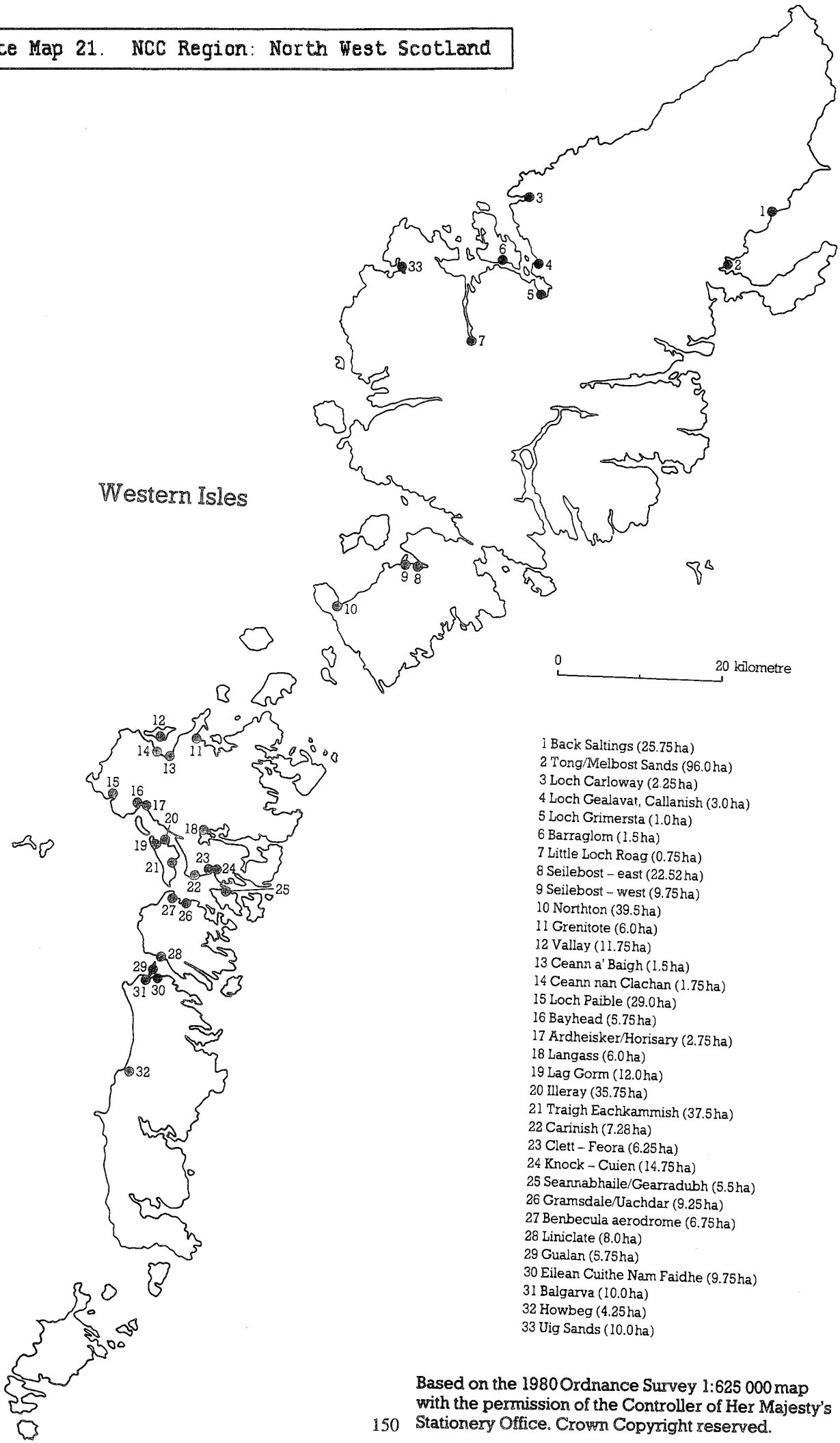


1 Barrisdale Bay (17.28ha)
2 Eilanreach (1.28ha)
3 Glenelg (9.08ha)
4 Shiel Bridge (7.58ha)
5 Croe Bridge (19.16ha)
6 Nonach (29.84ha)
7 Ardelve (3.87ha)
8 Nostie (2.21ha)
9 Kirkton (10.4ha)
10 Balmacara (1.2ha)
11 Erbusaig (0.91ha)
12 Duirinish (1.68ha)
13 Plockton (0.76ha)
14 Fernaig (1.2ha)
15 Kyle (4.18ha)
16 Loch na Dal (7.4ha)
17 Isleornsay (3.29ha)
18 Camascross (1.96ha)
19 Ardvasar (0.69ha)
20 Tokavaig (1.8ha)
21 Loch Eishort (1.04ha)
22 Loch Slapin (9.8ha)
23 Loch na h' Airde (1.68ha)
24 Loch Eynort (6.21ha)
25 Loch Harport (16.17ha)
26 Loch Beag (3.44ha)
27 Ose (0.17ha)
28 Loch Caroy (1.01ha)
29 Pool Roag (11.49ha)
30 Loch Erghallan (0.97ha)
31 Loch Dunvegan (3.87ha)
32 Loch Greshornish (3.09ha)
33 Loch Treaslane (1.54ha)
34 Loch Snizort Head (2.84ha)
35 Loch Eyre (6.38ha)
36 Uig (1.95ha)
37 Portree (0.65ha)
38 Loch Portree (7.21ha)
39 Loch Sligachan (12.4ha)
40 Loch Ainort (7.82ha)
41 Camas na Sgianadin (0.98ha)
42 Broadford Bay (4.04ha)
43 Rubha Ardnish (6.15ha)

44 Canna Harbour (1.0ha)
45 Loch Scresort (1.53ha)
46 Kinlochhourn (6.68ha)
47 Rubha Raonuill (1.92ha)
48 Inverie (6.36ha)
49 Camusrory (24.0ha)
50 Finiskaig (6.45ha)
51 Kylesmorar (3.83ha)
52 Bunacaimb (2.97ha)
53 Arisaig (3.0ha)
54 Lochailort (8.92ha)
55 Glenluig (1.09ha)
56 Kinlochmoidart (17.4ha)
57 Eilean Uaine (6.0ha)
58 Newton of Ardtoe (4.09ha)
59 Kentra Bay – north (11.61ha)
60 Kentra Bay – east (15.24ha)
61 Kentra Bay – south (13.89ha)
62 Kilchoan (14.28ha)
63 Glenmore (11.05ha)
64 Strontian (2.34ha)
65 Loch Sunart Head (11.64ha)
66 Glencripesdale (0.66ha)
67 Kinlochteacuis (7.29ha)
68 Loch Aline (2.68ha)
69 Loch a' Choire (7.57ha)
70 Camas na Croise (3.89ha)
71 Inversanda (5.52ha)
72 Sallachan Point (1.78ha)
73 Inverscaddle (30.85ha)

74 Stronchreggan (1.35ha)
75 Garvan (6.47ha)
76 Kinlocheil (10.21ha)
77 Fassfern (2.03ha)
78 Caol Spit (15.13ha)
79 Three Mile Water (0.95ha)
80 Bun Nathrach (1.73ha)
81 Kinlochleven (4.74ha)
82 Glencoe (10.12ha)
83 Cuil Bay (2.26ha)

Site Map 21. NCC Region: North West Scotland



1 Back Saltings (25.75ha)
2 Tong/Melbost Sands (96.0ha)
3 Loch Carloway (2.25ha)
4 Loch Gealavat, Callanish (3.0ha)
5 Loch Grimersta (1.0ha)
6 Barraglom (1.5ha)
7 Little Loch Roag (0.75ha)
8 Seilebost – east (22.52ha)
9 Seilebost – west (9.75ha)
10 Northton (39.5ha)
11 Grenitote (6.0ha)
12 Vallay (11.75ha)
13 Ceann a' Baigh (1.5ha)
14 Ceann nan Clachan (1.75ha)
15 Loch Paible (29.0ha)
16 Bayhead (5.75ha)
17 Ardheisker/Horisary (2.75ha)
18 Langass (6.0ha)
19 Lag Gorm (12.0ha)
20 Illeray (35.75ha)
21 Traigh Eachkammish (37.5ha)
22 Carinish (7.28ha)
23 Clett – Feora (6.25ha)
24 Knock – Cuien (14.75ha)
25 Seannabhaile/Gearradubh (5.5ha)
26 Gramsdale/Uachdar (9.25ha)
27 Benbecula aerodrome (6.75ha)
28 Liniclate (8.0ha)
29 Gualan (5.75ha)
30 Eilean Cuithe Nam Faidhe (9.75ha)
31 Balgarva (10.0ha)
32 Howbeg (4.25ha)
33 Uig Sands (10.0ha)

Appendix 8.7 List of all saltmarsh sites ordered by decreasing site area.

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
1	17S1/17WPS	THE WASH	Lincolnshire	3384.8
2	33S3/33WWL	BURRY INLET	Llanelli and W.Glamo	2121.26
3	19S4/19OCY	RIVER RIBBLE	Lancashire	1912.0
4	19S14/19WGC	MORICAMBE BAY	Cumbria	1190.16
5	14S1/14OAQ	BLACKWATER	Essex	1102.85
6	14S23/14WTP	WELLS TO BLAKENEY	Norfolk	1051.67
7	15S8/31XHJ	DEE ESTUARY	Cheshire	1026.1
8	31S1/31WHJ	DEE ESTUARY	Clwyd	871.18
9	14S6/14OBV	HAMFORD WATER	Essex	863.27
10	19S1/19WCR	CARNFORTH	Lancashire	852.75
11	15S9/15WAE	MERSEY ESTUARY	Cheshire	838.31
12	14S20/17XHN	THE WASH	Norfolk	776.8
13	17S2/17WMZ	NORTH LINCOLNSHIRE COAST	Lincolnshire	771.35
14	11S1/11WKR	MEDWAY	Kent	754.46
15	11S7/11WAA	CHICHESTER HARBOUR	Sussex	709.93
16	13S26/13WCS	POOLE HARBOUR	Dorset	696.93
17	14S21/14WTP	HOLME TO GUN HILL	Norfolk	687.16
18	19S3/19WCL	RIVER LUNE	Lancashire	676.85
19	14S3/14OBA	COLNE	Essex	670.56
20	19S8/19WCR	RIVER LEVEN	Cumbria	592.23
21	14S7/14WBH	ROACH & FOULNESS	Essex	590.52
22	19S16/19WGC	ROCKCLIFFE MARSH	Cumbria	564.72
23	22S39/22WBC/22WAK	CAERLAVEROCK (SOLWAY)	Nithsdale	563.4
24	22S31/22WEG	WIGTOWN BAY (SOLWAY)	Wigtown	553.28
25	19S15/19WGC	BURGH MARSH	Cumbria	524.01
26	33S1/33WCB	TYWYN GWENDRAETH	Llanelli and W.Glamo	513.8
27	12S4/12WHG	KEYHAVEN - LYMINGTON	Hampshire	505.9
28	19S12/19WJY	DUDDON SANDS	Cumbria	488.22
29	13S29/13OBB	BRIDGWATER BAY	Somerset	485.06
30	18S8/18WTD/18WCZ	HUMBER ESTUARY - NORTH SHORE	Humberside	467.66
31	14S16	RIVER DEBEN	Suffolk	461.3
32	32S1/32WDF	AFON DYFI	Ceredigion	430.89
33	11S4/11OLT	SWALE	Kent	413.82
34	14S5/14OBE	DENGIE	Essex	404.84
35	14S10/14OAP/14WCL	THAMES NORTH	Essex	376.91
36	12S1/12XAA	CHICHESTER HARBOUR	Hampshire	366.9
37	31S7/31WNT	MORFA HARLECH AND TRAETH BACH	East Gwynedd	347.04
38	21S30/21WXC	TAY ESTUARY (NORTH SHORE)	Perth and Kinross	326.47
39	19S2/19WCL	COCKERHAM AND PILLING	Lancashire	303.23
40	19S5/19WBS/19WBT	RIVER WYRE	Lancashire	293.63
41	14S4/14WCJ/14WAV	CROUCH	Essex	292.38
42	19S19/19OCY	RIVER RIBBLE	Merseyside and Great	272.0
43	19S10/19WLR	SOUTH WALNEY	Cumbria	241.46
44	13S21/13WSP/13ONH	TAW AND TORRIDGE ESTUARY	Devon	239.0
45	32S19	AFON TAF	Carmarthen	238.23
46	19S7/19WCR	RIVER KENT	Cumbria	231.53
47	12S3/12WHH	HYTHE - CALSHOT	Hampshire	225.1
48	14S22/14WTP	SCOLT HEAD ISLAND	Norfolk	224.86
49	31S5/31WPA	AFON MAWDDACH	East Gwynedd	219.0
50	19S17/31XHJ	DEE ESTUARY	Merseyside and Great	210.71
51	22S46/22WBK	KIRKCONNELL MERSE (SOLWAY)	Nithsdale	205.28
52	24S112/24WMT	MORRICH MORE (DORNOCH FIRTH)	Ross and Cromarty	200.5
53	12S7/12OFL	RIVER BEAULIEU	Hampshire	184.56
54	12S6/12WJL	PORTSMOUTH HARBOUR	Hampshire	181.2

NB. Some sites are split between two or more administrative units on this list.

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
55	18S9/18WTB/18WBW/18W	HUMBER ESTUARY - SOUTH SHORE	Humberside	180.2
56	14S2/14WAV	BRIDGEMARSH ISLAND	Essex	175.9
57	18S4/18OLF	LINDISFARNE MAINLAND	Northumberland	175.71
58	13S6/13WGA	LYNHER ESTUARY	Cornwall	175.26
59	14S24/14WTP	BLAKENEY POINT	Norfolk	162.96
60	14S15/14WMT	RIVER ALDE	Suffolk	162.8
61	14S8/14WCQ	STOUR SOUTH	Essex	159.73
62	33S5/33WAT	CRYMLYN BURROWS AND NEATH ESTUARY	Llanelli and W.Glamo	159.01
63	19S13/19WJX	RAVENGLASS	Cumbria	158.0
64	32S20	AFON TYWI	Carmarthen	146.73
65	22S40/22WAK	PRIESTSIDE BANK (SOLWAY)	Nithsdale	145.52
66	23S62A/23WMF	CULBIN	Nairn	142.72
67	14S19/14XCQ	STOUR NORTH	Suffolk	136.84
68	14S17/14OMP	RIVER ORE	Suffolk	129.7
69	14S12/14OMP	BUTLEY RIVER	Suffolk	124.0
70	31S13/31WBG	FORYD BAY	West Gwynedd	123.0
71	32S14	CAREW AND CRESSWELL	Preseli and S.Pembro	122.02
72	12S11/12WKM	NEWTOWN HARBOUR	Isle of Wight	120.0
73	14S18/14WSP	RIVER ORWELL	Suffolk	118.79
74	23S63/23WMF	FINDHORN BAY	Moray	118.05
75	14S14/14OMP	ORFORDNESS	Suffolk	116.5
76	31S3/31XDF	AFON DYFI	East Gwynedd	115.97
77	15S6	LYDNEY TO SEDBURY	Gloucestershire	112.91
78	21S4/21WNS	TYNINGHAME SHORE	East Lothian	112.1
79	31S16/31WZP	MALLTRAETH SANDS	West Gwynedd	110.76
80	31S9	AFON CONWY	East Gwynedd	105.25
81	12S5/12WHQ	LANGSTONE HARBOUR	Hampshire	100.2
82	24S152/24WYL	TONG / MELBOST SANDS (LEWIS)	Western Isles	96.0
83	13S3/13WGC/13WFN	FAL ESTUARY COMPLEX	Cornwall	93.45
84	15S7/15WXC	SLIMBRIDGE	Gloucestershire	91.8
85	12S8/12WHS	RIVER HAMBLE	Hampshire	88.73
86	21S35/21WXC	TAY ESTUARY (SOUTH SHORE)	North East Fife	86.76
87	24S113/24WLT	NIGG BAY (CROMARTY FIRTH)	Ross and Cromarty	84.25
88	21S12	GRANGEMOUTH TO ALLOA	Falkirk	83.12
89	33S14/33WGX	USKMOUTH	Gwent	82.09
90	24S142/24WMP	SKIBO (DORNOCH FIRTH)	Sutherland	80.0
91	33S12/33WGX	CALDICOT TO MAGOR	Gwent	78.75
92	22S34/22WCH	AUCHENCAIRN , ORCHARDTON (SOLWAY)	Stewartry	78.32
93	11S5/11WJX/11WJW/11W	THAMES SOUTH	Kent	77.67
94	21S5/21WNH	ABERLADY BAY	East Lothian	77.08
95	13S34	NORTHWICK	Avon	76.83
96	24S149/24WED	BEAULY FIRTH	Inverness	75.5
97	24S108	LOCH CARRON (L.CARRON)	Ross and Cromarty	73.32
98	13S10	TAMAR ESTUARY	Cornwall	71.02
99	17S3/17WKX	GIBRALTAR POINT	Lincolnshire	66.64
100	13S14/13WA6/13WB5	EXE ESTUARY	Devon	66.52
101	31S15/31WZP	TRAETH MELYNOG	West Gwynedd	66.48
102	12S12/12WLT	YAR ESTUARY	Isle of Wight	66.42
103	33S2/33WCB	PEMBREY BURROWS	Llanelli and W.Glamo	66.23
104	13S20	TAMAR ESTUARY	Devon	64.74
105	31S19/31WYB	BEDDMANARCH TO CYMYRAN	West Gwynedd	62.97
106	22S67/22WBK	GREENMERSE & KELTON (SOLWAY)	Nithsdale	62.0
107	11S3/11WLJ	RIVER STOUR	Kent	62.0
108	32S12/32WGD	EASTERN CLEDDAU	Preseli and S.Pembro	61.77
109	19S6/19WCR	CARNFORTH	Cumbria	61.55
110	19S9/19WLR	RAMPSIDE	Cumbria	60.49

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
111	23S62B/23WMF	CULBIN	Moray	60.28
112	32S11	WESTERN CLEDDAU	Preseli and S.Pembro	60.25
113	22S59	LOCH BEG (MULL)	Argyll and Bute	60.0
114	21S28/21WSK	MONTROSE BASIN	Angus	58.011
115	22S35	ROUGH FIRTH (SOLWAY)	Stewartry	56.96
116	22S38/22WBQ	SOUTHWICK (SOLWAY)	Nithsdale	56.12
117	11S12/11WDL/11WEV	RYE HARBOUR	Sussex	54.4
118	31S6/31WNS	MORFA DYFFRYN	East Gwynedd	53.74
119	33S15/33WGX	PETERSTONE GREAT WHARF	Gwent	52.46
120	13S23/13WAW	CHESIL AND THE FLEET	Dorset	51.46
121	22S18/22WJC	GRUINART (ISLAY)	Argyll and Bute	50.56
122	24S141/24WMP	DORNOCH POINT (DORNOCH FIRTH)	Sutherland	50.5
123	22S33	RIVER DEE (SOLWAY)	Stewartry	50.08
124	13S24/13WAY	CHRISTCHURCH HARBOUR	Dorset	49.8
125	13S1	CAMEL ESTUARY	Cornwall	49.47
126	22S41/22WAD	ANNAN (SOLWAY)	Annandale and Eskdal	49.4
127	19S11/19WLC	NORTH WALNEY	Cumbria	48.75
128	21S31/21WXC	TAY ESTUARY (NORTH SHORE)	Dundee	47.65
129	22S13/22WKB	CRINAN (JURA SOUND)	Argyll and Bute	47.28
130	32S5/32WCP	AFON TEIFI	Ceredigion	45.44
131	23S60/24WPH	WHITENESS HEAD	Nairn	44.8
132	13S33	LITTLETON	Avon	44.21
133	22S24/22WYF	RIVER CLYDE ,W. (FIRTH OF CLYDE)	Dumbarton	44.08
134	24S110/24WMP	DORNOCH FIRTH - SOUTH (DORNOCH FIRTH)	Ross and Cromarty	43.79
135	33S11/33WGX	THORNWELL TO PORTSKEWETT	Gwent	42.62
136	31S2	RIVER CLWYD	Clwyd	42.52
137	12S2/12WGS	ELING AND BURY MARSHES	Hampshire	41.16
138	22S17/22WGR	BRIDGEND (ISLAY)	Argyll and Bute	40.4
139	24S161/24WYE	NORTHTON (S.HARRIS)	Western Isles	39.5
140	24S172/24WXL	TRAIGH EACHKAMISH (BALESHARE)	Western Isles	37.5
141	32S16	PEMBROKE RIVER	Preseli and S.Pembro	37.49
142	11S2/11WLJ	PEGWELL BAY	Kent	37.2
143	24S117/24WLT/24WLP	CONON ISLANDS (CROMARTY FIRTH)	Ross and Cromarty	36.77
144	24S170/24WXL	ILLERAY (BALESHARE)	Western Isles	35.75
145	13S18	RIVER TAVY	Devon	35.0
146	22S36/22WBE	CARSE BAY (SOLWAY)	Nithsdale	34.72
147	13S32	CLEVEDON	Avon	34.67
148	13S31	CHITTENING	Avon	34.33
149	13S11	AXE ESTUARY	Devon	34.25
150	18S11/18WAF	COWPEN MARSH	Cleveland	34.16
151	11S9/11WGQ	PAGHAM HARBOUR	Sussex	33.3
152	24S116/24WLT	DINGWALL BAY (CROMARTY FIRTH)	Ross and Cromarty	33.08
153	18S3/18OLF	HOLY ISLAND	Northumberland	33.03
154	21S36/21WXC	TAY ESTUARY (SOUTH SHORE)	Perth and Kinross	32.72
155	21S33/21WLB	EDEN ESTUARY	North East Fife	31.91
156	13S25/13WCA	LODMOOR	Dorset	31.56
157	32S8/32WSN	CRABHALL SALTINGS	Preseli and S.Pembro	31.49
158	31S21	TRAETH COCH	West Gwynedd	31.25
159	24S30	INVERSCADDLE BAY (L.LINNHE)	Lochaber	30.85
160	24S148/24WED	BEAULY FIRTH	Ross and Cromarty	30.5
161	22S26/22WQG	IRVINE (AYR)	Kyle and Carrick	30.04
162	24S114/24WLT	ALNESS - DALMORE (CROMARTY FIRTH)	Ross and Cromarty	30.04
163	22S66/22WAD	GRETNA - REDKIRK (SOLWAY)	Annandale and Eskdal	30.0
164	24S115/24WLT	BALCONIE POINT (CROMARTY FIRTH)	Ross and Cromarty	30.0
165	24S46	NONACH (L.ALSH)	Skye and Lochalsh	29.84
166	13S36	PORTBURY WHARF	Avon	29.7

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
167	33S8/33WVK	CARDIFF	Mid and South Glamor	29.44
168	32S13	DAUGLEDDAU	Preseli and S.Pembro	29.26
169	14S13/14OMP	HAVERGATE ISLAND	Suffolk	29.2
170	24S166/24WXD	LOCH PAIBLE (N.UIST)	Western Isles	29.0
171	22S32	FLEET BAY (SOLWAY)	Stewartry	28.12
172	13S39	SHEPPERDINE	Avon	27.84
173	33S9	LAMBY	Mid and South Glamor	27.81
174	22S28/22WFC	RINGDOO SANDS (SOLWAY)	Wigtown	27.2
175	22S48	MANXMAN'S LAKE (SOLWAY)	Stewartry	26.68
176	24S153/24WXH	BACK SALTINGS (LEWIS)	Western Isles	25.75
177	13S17	RIVER AVON	Devon	25.53
178	33S10/33WGX	RUMNEY GREAT WHARF	Mid and South Glamor	25.22
179	13S12	DART ESTUARY	Devon	25.0
180	24S100	TORRIDON (UPPER L.TORRIDON)	Ross and Cromarty	24.68
181	24S6	CAMUSRORY (L.NEVIS)	Lochaber	24.0
182	18S1/18WYP	ALNMOUTH	Northumberland	23.78
183	22S6	AN SEILEAN (LORN)	Argyll and Bute	23.64
184	15S4	BERKELEY	Gloucestershire	22.94
185	24S159/24WYA	EAST SEILEBOST (S.HARRIS)	Western Isles	22.52
186	31S4/31WMQ	BROADWATER	East Gwynedd	22.49
187	23S65/23WMZ	SPEY BAY	Moray	22.2
188	22S2	HEAD OF LOCH CRERAN (LORN)	Argyll and Bute	21.4
189	31S20/31WYM	TRAETH DULAS	West Gwynedd	21.23
190	13S13/13WPM	ERME ESTUARY	Devon	20.75
191	13S9	THE GANNEL	Cornwall	20.25
192	22S15	LOCH CAOLISPORT (JURA SOUND)	Argyll and Bute	20.24
193	22S9	LOCH FEOCHAN (LORN)	Argyll and Bute	20.12
194	32S15	COSHESTON PILL	Preseli and S.Pembro	20.02
195	13S16/13WRD	OTTER ESTUARY	Devon	19.25
196	24S45	CROE BRIDGE (L.DUICH)	Skye and Lochalsh	19.16
197	13S4/13WFS	HAYLE ESTUARY	Cornwall	19.0
198	13S38/13WJS	SAND BAY	Avon	18.87
199	22S25	RIVER CLYDE ,E. (FIRTH OF CLYDE)	Dumbarton	18.48
200	24S119/24WMV	MUNLOCHY BAY (MORAY FIRTH)	Ross and Cromarty	18.2
201	13S41	WOODSPRING BAY	Avon	17.89
202	24S13/24WHR	KINLOCHMOIDART (MOIDART)	Lochaber	17.4
203	24S41	BARRISDALE BAY (L.HOURN)	Skye and Lochalsh	17.28
204	24S89	LITTLE LOCH BROOM	Ross and Cromarty	16.96
205	22S42/22WAD	DORNOCK (SOLWAY)	Annandale and Eskdal	16.72
206	22S43/22WAD	BROWHOUSES (SOLWAY)	Annandale and Eskdal	16.4
207	22S22	HOLY LOCH (FIRTH OF CLYDE)	Argyll and Bute	16.32
208	24S65	LOCH HARPORT (L.BRACADALE)	Skye and Lochalsh	16.17
209	22S61/22WGZ	LOCH DON SALTMARSH (MULL)	Argyll and Bute	16.12
210	23S72/23WEM	STRATHBEG	Banff and Buchan	15.91
211	33S4/33WXA	OXWICH	Llanelli and W.Glamo	15.51
212	33S6/33WLW	RIVER OGMORE	Mid and South Glamor	15.25
213	24S17/24WHJ	E. KENTRA BAY (MOIDART)	Lochaber	15.24
214	24S105	KISHORN (L.KISHORN)	Ross and Cromarty	15.2
215	24S35	CAOL SPIT (L.LINNHE)	Lochaber	15.13
216	22S1	LOCH LAICH (LORN)	Argyll and Bute	15.12
217	24S175	KNOCK-CUIEN (N.UIST)	Western Isles	14.75
218	24S135/24WTS	BALBLAIR (L.FLEET)	Sutherland	14.72
219	18S7/18WHL	WARKWORTH	Northumberland	14.54
220	32S9	SANDY HAVEN PILL	Preseli and S.Pembro	14.5
221	24S19	KILCHOAN (L.SUNART)	Lochaber	14.28
222	23S77/23WGN	SLEEK OF TARTY	Gordon	14.02

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
223	24S18/24WHJ	S. KENTRA BAY (MOIDART)	Lochaber	13.89
224	12S9/12WLC	KING'S QUAY	Isle of Wight	13.8
225	13S8/13WHD	ST. JOHN'S LAKE	Cornwall	13.6
226	12S10/12WLD	MEDINA ESTUARY	Isle of Wight	13.56
227	23S61	NAIRN E.	Nairn	13.5
228	24S84	ACHNAHAIRD BAY (RUBHA COIGEACH)	Ross and Cromarty	13.48
229	22S45	MILNFIELD MERSE (SOLWAY)	Annandale and Eskdal	13.28
230	24S118/24WLT	UDALE BAY (CROMARTY FIRTH)	Ross and Cromarty	13.02
231	13S22	TEIGN ESTUARY	Devon	13.0
232	15S2/15WXC	AWRE TO PURTON	Gloucestershire	12.56
233	24S79	LOCH SLIGACHAN (SLIGACHAN-BROADFORD)	Skye and Lochalsh	12.4
234	24S171/24WXL	LAG GORM (BALESHARE)	Western Isles	12.0
235	24S163	VALLAY (VALLAY)	Western Isles	11.75
236	13S27/13XX7	BREAN DOWN AND UPHILL CLIFF	Somerset	11.7
237	24S22	LOCH SUNART HEAD (L.SUNART)	Lochaber	11.64
238	24S16/24WHJ	N. KENTRA BAY (MOIDART)	Lochaber	11.61
239	22S37/22WBK	NITH (SOLWAY)	Nithsdale	11.52
240	24S69	POOL ROAG (L.BRACADALE)	Skye and Lochalsh	11.49
241	24S20/24WGF	GLENMORE (L.SUNART)	Lochaber	11.05
242	24S145	INVERAN - CARBISDALE (DORNOCH FIRTH)	Sutherland	11.0
243	32S21	TYWYN GWENDRAETH	Carmarthen	10.93
244	24S147/24WBX	WICK RIVER	Caithness	10.92
245	33S16/33WGX	RUMNEY GREAT WHARF	Gwent	10.87
246	24S144	BONAR BRIDGE (DORNOCH FIRTH)	Sutherland	10.8
247	24S49	KIRKTON (L.ALSH)	Skye and Lochalsh	10.4
248	24S33	KINLOCHEIL (L.LINNHE)	Lochaber	10.21
249	32S7	NEWPORT SALTINGS	Preseli and S.Pembro	10.19
250	24S39	GLENCOE (L.LINNHE)	Lochaber	10.12
251	19S18/15XAE	MERSEY ESTUARY	Merseyside and Great	10.08
252	24S183	BALGARVA (S.UIST)	Western Isles	10.0
253	24S62	LOCH SLAPIN (EISHORT/SLAPIN)	Skye and Lochalsh	9.8
254	24S160/24WYA	WEST SEILEBOST (S.HARRIS)	Western Isles	9.75
255	24S181	EILEAN CUITHE NAM FAIDH (S.UIST)	Western Isles	9.75
256	11S11/11WDP	RIVER CUCKMERE	Sussex	9.65
257	11S10	RIVER ADUR	Sussex	9.65
258	13S35	OLDBURY	Avon	9.49
259	22S52	LOCH STORNOWAY (JURA SOUND)	Argyll and Bute	9.4
260	24S177	GRAMSDALE / UACHDAR (BENBECULA)	Western Isles	9.25
261	22S8	DUNSTAFFNAGE (LORN)	Argyll and Bute	9.16
262	24S43	GLENELG (GLENELG)	Skye and Lochalsh	9.08
263	24S88	LOCH BROOM (L.BROOM)	Ross and Cromarty	9.04
264	18S5/18WEP	LONG NANNY	Northumberland	9.0
265	23S39/23WTE	WAULKMILL BAY (MAINLAND)	Orkney	9.0
266	18S2/18OLF	BUDLE BAY	Northumberland	9.0
267	24S11	LOCHAILORT	Lochaber	8.92
268	22S29/22WFC	GLEN LUCE (SOLWAY)	Wigtown	8.88
269	32S2/32WDF	AFON DYFI	Montgomery	8.87
270	15S3	BEACHLEY	Gloucestershire	8.86
271	21S16	COCKLEMILL BAY	North East Fife	8.82
272	31S14/31WAZ	TRAETH LAFAN	West Gwynedd	8.67
273	13S40/13XX7	UPHILL	Avon	8.66
274	22S19	LOCH FYNE (L.FYNE)	Argyll and Bute	8.44
275	24S146	RIVER OF WESTER	Caithness	8.25
276	33S7/33WTY	EAST ABERTHAW	Mid and South Glamor	8.12
277	24S150	CASTLE STUART BAY	Inverness	8.0
278	24S179	LINICLATE (BENBECULA)	Western Isles	8.0

Rank Order	Site Code	Site Name	Admin. Unit	Area
279	24S80	LOCH AINORT (SLIGACHAN-BROADFORD)	Skye and Lochalsh	7.82
280	24S130	KYLE OF TONGUE (KYLE OF TONGUE)	Sutherland	7.64
281	24S44	SHIEL BRIDGE (L.DUICH)	Skye and Lochalsh	7.58
282	24S26	LOCH A'CHOIRE (L.LINNHE)	Lochaber	7.57
283	24S56	LOCH NA DAL (SLEAT)	Skye and Lochalsh	7.4
284	22S11	LOCH MELFORT (JURA SOUND)	Argyll and Bute	7.36
285	13S37/13WJV	PORTISHEAD	Avon	7.31
286	23S33	CATA SAND (SANDAY)	Orkney	7.3
287	24S24	KINLOCHTEACUIS (L.SUNART)	Lochaber	7.29
288	24S173	CARINISH (N.UIST)	Western Isles	7.28
289	24S139/24WTS	SKELBO (L.FLEET)	Sutherland	7.25
290	24S132/24WTL	BORGIE MOUTH (TORRISDALE BAY)	Sutherland	7.25
291	23S78/23WGN	SANDS OF FORVIE & FOVERAN BURN	Gordon	7.25
292	22S49	AUCHALICK BAY (L.FYNE)	Argyll and Bute	7.25
293	24S78	LOCH PORTREE (PORTREE)	Skye and Lochalsh	7.21
294	21S32/21WLY	TAYPORT	North East Fife	7.0
295	22S16	ISLAY SALTMARSHES (ISLAY)	Argyll and Bute	6.96
296	24S138	CAMBUSMORE (L.FLEET)	Sutherland	6.92
297	24S178	BENBECULA AERODROME (BENBECULA)	Western Isles	6.75
298	22S56	THE STRAND (COLONSAY)	Argyll and Bute	6.68
299	24S3	KINLOCHHOURN (L.HOURN)	Lochaber	6.68
300	22S20/22WKG	RUEL ESTUARY (FIRTH OF CLYDE)	Argyll and Bute	6.64
301	22S21	LOCH STRIVEN (FIRTH OF CLYDE)	Argyll and Bute	6.6
302	22S44/22WAD	TORDUFF POINT (SOLWAY)	Annandale and Eskdal	6.59
303	22S14/22WJQ	LINNE MHUIRICH (JURA SOUND)	Argyll and Bute	6.52
304	23S68/23WEE	STAKENESS	Banff and Buchan	6.51
305	24S32	GARVAN (L.LINNHE)	Lochaber	6.47
306	24S7	FINISKAIG (L.NEVIS)	Lochaber	6.45
307	23S34	LITTLE SEA (SANDAY)	Orkney	6.4
308	15S5	HINTON	Gloucestershire	6.39
309	24S75	LOCH EYRE (L.SNIZORT)	Skye and Lochalsh	6.38
310	24S5	INVERIE BAY (L.NEVIS)	Lochaber	6.36
311	24S174	CLETT-FEORA (N.UIST)	Western Isles	6.25
312	24S64	LOCH EYNORT	Skye and Lochalsh	6.21
313	24S83/24WQB	RUBHA ARDNISH (SLIGACHAN-BROADFORD)	Skye and Lochalsh	6.15
314	31S8/31WAZ	TRAETH LAFAN	East Gwynedd	6.09
315	24S137	THE MOUND (L.FLEET)	Sutherland	6.04
316	24S169	LANGASS (N.UIST)	Western Isles	6.0
317	24S162	GRENITOTE (N.UIST)	Western Isles	6.0
318	24S14	EILEAN UAINE (MOIDART)	Lochaber	6.0
319	13S2	EAST AND WEST LOOE RIVERS	Cornwall	5.99
320	21S13	BLACK DEVON / CLACKMANNAN POW	Clackmannan	5.99
321	24S180	GUALAN (S.UIST)	Western Isles	5.75
322	24S167	BAYHEAD (N.UIST)	Western Isles	5.75
323	24S127	KYLE OF DURNESS	Sutherland	5.68
324	18S12/18WBM	CASTLETOWN MARSHES	Tyne and Wear	5.55
325	24S28	INVERSANDA (L.LINNHE)	Lochaber	5.52
326	24S176	SEANNABHAILE / GEARRADUBH (GRIMSAY)	Western Isles	5.5
327	24S107	SLUMBAY (L.CARRON)	Ross and Cromarty	5.48
328	22S60	ARDURA (MULL)	Argyll and Bute	5.36
329	24S109	ATTADALE (L.CARRON)	Ross and Cromarty	5.16
330	24S123/24W??	TRAIGH BAD NA BAIGHE (L.LAXFORD)	Sutherland	5.0
331	23S40	BRIDGE OF WAITHE & CUMMINESS (MAINLAND)	Orkney	4.87
332	24S38	KINLOCHLEVEN (L.LINNHE)	Lochaber	4.74
333	24S90	OPINAN	Ross and Cromarty	4.72
334	22S23/22WRJ	ARDMORE POINT (FIRTH OF CLYDE)	Dumbarton	4.56

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
335	13S5	HELFORD RIVER	Cornwall	4.5
336	13S15/13WRW	KINGSBRIDGE ESTUARY	Devon	4.5
337	24S101	TORRIDON HOUSE (UPPER L.TORRIDON)	Ross and Cromarty	4.44
338	24S184/24WXK	HOWBEG (S.UIST)	Western Isles	4.25
339	24S128	EILEAN DUBH (L.ERIBOLL)	Sutherland	4.25
340	21S29	KINNABER LINKS	Angus	4.23
341	24S86	STRATHKANAIRD (L.BROOM)	Ross and Cromarty	4.2
342	24S151	WHITENESS HEAD	Inverness	4.2
343	24S55	KYLE (L.ALSH)	Skye and Lochalsh	4.18
344	23S1	BALTASOUND (UNST)	Shetland	4.1
345	24S15	NEWTON OF ARDTOE (MOIDART)	Lochaber	4.09
346	23S38	BAY OF SUCKQUOY (MAINLAND)	Orkney	4.07
347	13S30	AVONMOUTH	Avon	4.05
348	24S82	BROADFORD BAY (SLIGACHAN-BROADFORD)	Skye and Lochalsh	4.04
349	24S140/24WTS	COUL LINKS (L.FLEET)	Sutherland	4.0
350	23S81/23WKH	ST. CYRUS	Kincardine and Deesi	4.0
351	23S76/23WGN	YTHAN	Gordon	3.92
352	21S26	LUNAN BURN	Angus	3.9
353	18S6	SEATON SLUICE	Northumberland	3.9
354	24S27	CAMAS NA CROISE (L.LINNHE)	Lochaber	3.89
355	24S47	ARDELVE (L.ALSH)	Skye and Lochalsh	3.87
356	24S71	LOCH DUNVEGAN (L.DUNVEGAN)	Skye and Lochalsh	3.87
357	24S8	KYLESMORAR (L.NEVIS)	Lochaber	3.83
358	32S10	MILFORD HAVEN, NEYLAND, WESTFIELD	Preseli and S.Pembro	3.75
359	22S10	KILNINVER (LORN)	Argyll and Bute	3.68
360	22S53	GLEANN AOISTAIL (JURA)	Argyll and Bute	3.6
361	22S7	ARDENTINY (LORN)	Argyll and Bute	3.6
362	22S4	DALRANNOCH (LORN)	Argyll and Bute	3.56
363	24S133	INVERNAVER (TORRISDALE BAY)	Sutherland	3.5
364	24S134	MELVICH	Sutherland	3.5
365	22S12	LOCH CRAIGNISH (JURA SOUND)	Argyll and Bute	3.44
366	24S66	LOCH BEAG (L.BRACADALE)	Skye and Lochalsh	3.44
367	23S55	QUOYS (HOY)	Orkney	3.4
368	18S10/18W??	WILLINGTON GUT	Tyne and Wear	3.36
369	22S27/22WWV	POW BURN (AYR)	Kyle and Carrick	3.36
370	24S57	ISLEORNSAY (SLEAT)	Skye and Lochalsh	3.29
371	22S64	DERVAIG (MULL)	Argyll and Bute	3.28
372	23S50	OYCE OF QUINDRY (S.RONALDSAY)	Orkney	3.2
373	24S72	LOCH GRESHORNISH (L.SNIZORT)	Skye and Lochalsh	3.09
374	21S14	CULROSS SHORE	Dunfermline	3.04
375	23S42	LAMA NESS OYCE (SANDAY)	Orkney	3.0
376	31S11	PWLLHELI	West Gwynedd	3.0
377	23S35	THE OUSE , VEANTROW BAY (SHAPINSAY)	Orkney	3.0
378	24S126	LOCH SHEIGRA (L.INCHARD)	Sutherland	3.0
379	24S155	LOCH GEALAVAT , CALLANISH (LEWIS)	Western Isles	3.0
380	24S10	ARISAIG (S.MORAR)	Lochaber	3.0
381	31S22/31WBM	MENAI STRAITS	West Gwynedd	2.98
382	24S9	BUNACAIMB (S.MORAR)	Lochaber	2.97
383	24S74	LOCH SNIZORT HEAD (L.SNIZORT)	Skye and Lochalsh	2.84
384	22S50	WHITEHOUSE BAY (JURA SOUND)	Argyll and Bute	2.84
385	13S7	RIVER FOWEY	Cornwall	2.78
386	24S120	LOCHAN NA LEOBAIG (EDDRACHILLIS BAY)	Sutherland	2.76
387	24S168	ARDHEISKER / HORISARY (N.UIST)	Western Isles	2.75
388	23S37/23WTB	SWARSQUOY (MAINLAND)	Orkney	2.73
389	24S104	TOSCAIG (APPLECROSS)	Ross and Cromarty	2.72
390	24S111	TAIN GOLF COURSE (DORNOCH FIRTH)	Ross and Cromarty	2.7

Rank Order	Site Code	Site Name	Admin. Unit	Area
391	24S25	LOCH ALINE	Lochaber	2.68
392	23S32	TOR NESS & QUIVALS CREEK (SANDAY)	Orkney	2.65
393	23S44	OYCE OF ISBISTER (MAINLAND)	Orkney	2.6
394	23S56	LITTLE AYRE (HOY)	Orkney	2.6
395	31S18	RHOSNEIGR	West Gwynedd	2.51
396	24S136/24WTS	CREAG BHEAG (L.FLEET)	Sutherland	2.5
397	32S17	MARTIN'S HAVEN	Preseli and S.Pembro	2.5
398	13S19	RIVER YEALM COMPLEX	Devon	2.46
399	22S5	BALURE OF SHIAN (LORN)	Argyll and Bute	2.44
400	21S34/21WLT	KINKELL HARBOUR TO CRAIG HARTLE	North East Fife	2.4
401	23S46	MILL SAND (MAINLAND)	Orkney	2.36
402	24S21	STRONTIAN (L.SUNART)	Lochaber	2.34
403	24S85	REIFF (RUBHA COIGEACH)	Ross and Cromarty	2.32
404	23S58	MILL BAY (HOY)	Orkney	2.3
405	15S1	ARLINGHAM	Gloucestershire	2.29
406	24S87	ULLAPOOL (L.BROOM)	Ross and Cromarty	2.28
407	24S40	CUIL BAY (L.LINNHE)	Lochaber	2.26
408	32S18	ANGLE BAY	Preseli and S.Pembro	2.25
409	24S154	LOCH CARLOWAY (LEWIS)	Western Isles	2.25
410	24S48	NOSTIE (L.ALSH)	Skye and Lochalsh	2.21
411	21S37	KENNETPANS	Clackmannan	2
412	22S65	BRODICK BAY	Cunninghome	2
413	22S51	GARTNAGRENACH BAY (JURA SOUND)	Argyll and Bute	2.15
414	24S34	FASSFERN (L.LINNHE)	Lochaber	2.03
415	23S64	LOSSIEMOUTH	Moray	2.02
416	24S125	RHICONICH (L.INCHARD)	Sutherland	2.0
417	23S71	FRASERBURGH BAY	Banff and Buchan	2.0
418	23S51	MYRE BAY (S.WALLS, HOY)	Orkney	2.0
419	13S28/13WKH	BERROW DUNES	Somerset	1.98
420	24S106	RERAIG BAY (L.KISHORN)	Ross and Cromarty	1.96
421	24S58	CAMASCROSS (SLEAT)	Skye and Lochalsh	1.96
422	24S76	UIG (L.SNIZORT)	Skye and Lochalsh	1.95
423	24S4	RUBHA RAONUILL (L.NEVIS)	Lochaber	1.92
424	24S92	POOLEWE (L.EWE)	Ross and Cromarty	1.92
425	23S36	THE OUSE , FINSTOWN (MAINLAND)	Orkney	1.91
426	23S48	SWANBISTER BAY (MAINLAND)	Orkney	1.81
427	24S60	TOKAVAIG (EISHORT/SLAPIN)	Skye and Lochalsh	1.8
428	22S57	TORSA (JURA SOUND)	Argyll and Bute	1.8
429	24S29	SALLACHAN POINT (L.LINNHE)	Lochaber	1.78
430	23S53	THE AYRE , NORTH BAY (HOY)	Orkney	1.75
431	24S165	CEANN NAN CLACHAN (S.VALLAY STRAND)	Western Isles	1.75
432	24S37	BUN NATHRACH (L.LINNHE)	Lochaber	1.73
433	23S41	BAY OF TUQUOY (WESTRAY)	Orkney	1.7
434	23S54	SALTNESS (HOY)	Orkney	1.7
435	24S63	LOCH NA H'AIRDE	Skye and Lochalsh	1.68
436	24S52	DUIRINISH (L.ALSH)	Skye and Lochalsh	1.68
437	23S24	GARDERHOUSE, SELI VOE (MAINLAND)	Shetland	1.68
438	24S102	APPLECROSS BAY (APPLECROSS)	Ross and Cromarty	1.6
439	23S15	DALES VOE, DELTING (MAINLAND)	Shetland	1.59
440	24S98	BADACHRO (L.GAIRLOCH)	Ross and Cromarty	1.56
441	24S73	LOCH TREASLANE (L.SNIZORT)	Skye and Lochalsh	1.54
442	24S2/24WJK	LOCH SCRESORT (RHUM)	Lochaber	1.53
443	31S17/31WCG	AFON FFRAW	West Gwynedd	1.5
444	24S164	CEANN A'BAIGH (S.VALLAY STRAND)	Western Isles	1.5
445	24S157	BARRAGLOM (LEWIS)	Western Isles	1.5
446	31S10	MORFA HARLECH AND TRAETH BACH	West Gwynedd	1.42

Rank Order	Site Code	Site Name	Admin. Unit	Area
447	22S3	LOCH CRERAN (LORN)	Argyll and Bute	1.36
448	24S31	STRONCHREGGAN (L.LINNHE)	Lochaber	1.35
449	23S52	WYNG STRAND (S.WALLS, HOY)	Orkney	1.35
450	23S43	BLACK ROCK MARSH , OTTERS WICK (SANDAY)	Orkney	1.3
451	24S42	EILANREACH (GLENELG)	Skye and Lochalsh	1.28
452	24S122	LOCH ARDBHAIR (EDDRACHILLIS BAY)	Sutherland	1.25
453	32S3	AFON YSTWYTH AND RHEIDOL	Ceredigion	1.25
454	31S12	ABERSOCH	West Gwynedd	1.24
455	24S54	FERNAIG (L.ALSH)	Skye and Lochalsh	1.2
456	24S50	BALMACARA (L.ALSH)	Skye and Lochalsh	1.2
457	22S30	GARLIESTONE (SOLWAY)	Wigtown	1.12
458	24S185	UIG SANDS	Western Isles	10
459	24S12	GLENLUIG (MOIDART)	Lochaber	1.09
460	21S27/21WRV	BODDIN POINT TO SCURDIE NESS	Angus	1.053
461	21S11	GRANGE BURN	Falkirk	1.05
462	24S61	LOCH EISHORT (EISHORT/SLAPIN)	Skye and Lochalsh	1.04
463	24S68	LOCH CAROY (L.BRACADALE)	Skye and Lochalsh	1.01
464	23S30/23WXH	VADILL, HEAD OF WHITENESS VOE (MAINLAND)	Shetland	1.0
465	23S47/23WRK	SANDI SAND (MAINLAND)	Orkney	1.0
466	24S1/24WGQ	CANNA HARBOUR (CANNA)	Lochaber	1.00
467	24S156	LOCH GRIMERSTA (LEWIS)	Western Isles	1.0
468	23S45	OYCE OF RENNIBISTER (MAINLAND)	Orkney	1.0
469	24S81	CAMAS NA SGIANADIN (SLIGACHAN-BROADFORD)	Skye and Lochalsh	0.98
470	23S49	CLESTRAIN STRAND , MOOTAING (MAINLAND)	Orkney	0.98
471	24S70	LOCH ERGHALLAN (L.DUNVEGAN)	Skye and Lochalsh	0.97
472	24S36	THREE MILE WATER (L.LINNHE)	Lochaber	0.95
473	24S51	ERBUSAIG (L.ALSH)	Skye and Lochalsh	0.91
474	22S62	FISHNISH BAY (MULL)	Argyll and Bute	0.88
475	23S19	DURY VOE (MAINLAND)	Shetland	0.85
476	21S23/21WSX	BUDDON BURN	Angus	0.841
477	22S58	KILMARONAG ISLAND (LORN)	Argyll and Bute	0.84
478	32S6	AFON TEIFI	Preseli and S.Pembro	0.83
479	22S47/22WCJ	MULLOCK BAY (SOLWAY)	Stewartry	0.81
480	23S66/23WEE	LOGIE HEAD	Banff and Buchan	0.8
481	24S94	GAIRLOCH SANDS (L.GAIRLOCH)	Ross and Cromarty	0.76
482	24S53	PLOCKTON (L.ALSH)	Skye and Lochalsh	0.76
483	24S121	LOCH NEDD (EDDRACHILLIS BAY)	Sutherland	0.75
484	24S158	LITTLE LOCH ROAG (LEWIS)	Western Isles	0.75
485	23S57	ORE BAY (HOY)	Orkney	0.75
486	24S97	AN CRUINN-LEUM (L.GAIRLOCH)	Ross and Cromarty	0.72
487	24S99	SHIELDAIG LODGE HOTEL (L.GAIRLOCH)	Ross and Cromarty	0.72
488	23S69	DEVERON MOUTH	Banff and Buchan	0.7
489	24S59	ARDVASAR (SLEAT)	Skye and Lochalsh	0.69
490	24S103	CULDUIE (APPLECROSS)	Ross and Cromarty	0.68
491	24S23	GLENCRIPESDALE (L.SUNART)	Lochaber	0.66
492	21S20/21WLD	FIFE NESS	North East Fife	0.653
493	24S77	PORTREE (PORTREE)	Skye and Lochalsh	0.65
494	22S55	LAGG BAY (JURA)	Argyll and Bute	0.64
495	23S59	LYRAWA BAY (HOY)	Orkney	0.63
496	23S31	DALES VOE, LERWICK (MAINLAND)	Shetland	0.58
497	24S95	CHARLESTON (L.GAIRLOCH)	Ross and Cromarty	0.56
498	21S2/21WNL	BARNS NESS COAST	East Lothian	0.55
499	21S19/21WKQ	CRAIL TO ANSTRUTHER	North East Fife	0.533
500	21S24	BARRY BURN	Angus	0.52
501	23S80	DON MOUTH	Aberdeen	0.51
502	22S54	TARBERT BAY (JURA)	Argyll and Bute	0.5

Rank Order	Site Code.....	Site Name.....	Admin. Unit.....	Area....
503	24S124/24W??	WEAVER'S BAY (L.LAXFORD)	Sutherland	0.5
504	24S131	RHIAN BURN (KYLE OF TONGUE)	Sutherland	0.5
505	24S129	LOCH ERIBOLL (L.ERIBOLL)	Sutherland	0.45
506	24S96	RIVER KERRY (L.GAIRLOCH)	Ross and Cromarty	0.44
507	23S13	BURRAVOE, BUSTA VOE (MAINLAND)	Shetland	0.4
508	23S14	BRAE (MAINLAND)	Shetland	0.4
509	22S63	AROS (MULL)	Argyll and Bute	0.4
510	23S20	TROWIE LOCH, GARTH (MAINLAND)	Shetland	0.4
511	21S10	RIVER AVON	Falkirk	0.39
512	23S5	HOUSETTER (MAINLAND)	Shetland	0.38
513	23S25	EFFIRTH, BIXTER VOE (MAINLAND)	Shetland	0.37
514	23S8	GLUSS VOE (MAINLAND)	Shetland	0.37
515	24S93	INVERASDALE (L.EWE)	Ross and Cromarty	0.36
516	23S16	BOATSROMM VOE, LUNNA NESS (MAINLAND)	Shetland	0.35
517	23S27	EAST OF NESS OF BIXTER (MAINLAND)	Shetland	0.35
518	23S6	LEON, LOCH OF QUEYFIRTH (MAINLAND)	Shetland	0.33
519	23S4	HAMNA VOE (YELL)	Shetland	0.33
520	23S67/23WEE	EAST HEAD, PORTSOY	Banff and Buchan	0.31
521	23S11	HAGGRISTER (MAINLAND)	Shetland	0.31
522	23S12	FOULA WICK, OLNA FIRTH (MAINLAND)	Shetland	0.3
523	23S73	RATTRAY BAY	Banff and Buchan	0.3
524	21S15	DALGETY BAY	Kirkcaldy	0.263
525	24S143	SPINNINGDALE (DORNOCH FIRTH)	Sutherland	0.25
526	32S4	AFON AERON	Ceredigion	0.25
527	23S75	LUNDERTON	Banff and Buchan	0.24
528	23S70	PITTULLIE (ROSEHEARTY)	Banff and Buchan	0.21
529	23S79	BALMEDIE	Gordon	0.2
530	23S22	EAST BURRAFIRTH, AITH VOE (MAINLAND)	Shetland	0.2
531	23S7	MAIN AYRE, LOCH OF QUEYFIRTH (MAINLAND)	Shetland	0.2
532	24S91	AULTBEA (L.EWE)	Ross and Cromarty	0.2
533	23S17	VIDLIN (MAINLAND)	Shetland	0.19
534	23S18	LAXO, DURY VOE (MAINLAND)	Shetland	0.19
535	24S67	OSE (L.BRACADALE)	Skye and Lochalsh	0.17
536	23S23	SOUTH VOXTER, GON FIRTH (MAINLAND)	Shetland	0.17
537	23S21	AITH, AITH VOE (MAINLAND)	Shetland	0.15
538	23S29	HEAD OF WEISDALE VOE (MAINLAND)	Shetland	0.13
539	23S26	BRIDGE OF TWATT, BIXTER VOE (MAINLAND)	Shetland	0.13
540	23S2	CULLIVOE (YELL)	Shetland	0.12
541	23S10	HOUB, SULLOM (MAINLAND)	Shetland	0.12
542	23S9	HOUB, FUGLA NESS (MAINLAND)	Shetland	0.11
543	23S3	GUTCHER (YELL)	Shetland	0.11
544	33S13/33WGX	GOLDCLIFF	Gwent	0.1
545	23S28	TRESTA (MAINLAND)	Shetland	0.1
546	21S7	BLACK BURN TO ABERCORN BURN	West Lothian	0.094
547	23S74	RIVER UGIE	Banff and Buchan	0.08
548	21S1/21WAJ	REED POINT	Berwickshire	0.07
549	21S21	ST. ANDREW'S HARBOUR	North East Fife	0.07
550	21S18/21WBK	ELIE NESS	North East Fife	0.05
551	21S6/21WMP	FORTH BRIDGE	Edinburgh	0.032
552	21S3	DUNBAR GOLF COURSE	East Lothian	0.03
553	21S22/21WKN	BALMERINO SHORE	North East Fife	0.025
554	21S8	BLACK BURN	West Lothian	0.02
555	21S9	BLACK NESS	Falkirk	0.012
556	21S17/21WBK	CHAPEL NESS	North East Fife	0.011
557	21S25/21WSR	CARLINGHEUGH BAY & MEG'S CRAIG	Angus	0.01

APPENDIX 8.8

Tables showing the distribution and area of saltmarsh communities in each country as follows:-

a) England
b) Scotland
c) Wales

Table a.

The distribution and area (ha) of saltmarsh vegetation communities in each region in England

	NE Engl.	NW Engl.	W Midl.	SW Engl.	S Engl.	SE Engl.	E Anglia	E Midl.	TOTAL AREA	%
Spartina	243.15	918.31	227.14	1212.68	1207.99	686.48	582.69	87.63	5166.07	16.38
Salicornia/Sueda	8.45	195.16	177.56	83.74	61.38	128.67	442.63	523.58	1621.17	5.14
Aster	24.29	212.84	158.00	29.02	16.96	34.10	426.31	117.92	1019.44	3.23
Puccinellia	96.13	1484.89	542.74	182.21	166.69	387.43	2764.07	1629.84	7254.00	23.00
Halimione	19.12	97.81	12.16	90.35	160.04	519.18	1380.48	765.87	3045.01	9.66
Limonium/Armeria	2.61	59.38		16.03	91.00	308.07	1672.57	110.05	2259.71	7.17
Puccinellia/Festuca	167.75	2699.33	665.46	474.06	25.30	25.71	732.47	262.28	5052.36	16.02
J.gerardii	4.76	2188.44	9.31	76.28	3.44	1.27	8.73		2292.23	7.27
J.maritimus	0.21	238.63	0.29	36.14	13.53	0.39	49.94	4.79	343.92	1.09
Agropyron	180.60	44.46	98.17	79.20	45.22	54.47	362.66	513.54	1398.32	4.43
S.fruticosa				0.35			94.35	0.03	94.73	0.30
Scirpus	33.88	15.00	39.65	77.29	7.11	1.31	51.96	0.51	226.71	0.72
Phragmites	87.94	16.14	4.68	210.03	31.52	9.65	86.00	2.52	448.48	1.42
Typha	6.21	2.15		0.27	0.89				9.52	0.03
Schoenoplectus		0.24		1.14					1.38	+
Shingle/Dune Trans.	1.01	11.50		1.23	6.09		28.25	11.43	59.51	0.19
Freshwater Trans.	0.26	22.09		46.09	1.37	3.68	0.73		74.22	0.24
Grassland Trans.	13.03	486.41	187.00				12.73		699.17	2.22
Woodland Trans.										
Comm. of Wet Depr.										
Unsurveyed	70.49			31.56	69.09	0.86	122.67	172.80	467.47	1.48
TOTAL AREA	959.89	8692.78	2122.16	2647.67	1907.62	2161.27	8819.24	4222.79	31533.42	

Table b.

The distribution and area (ha) of saltmarsh vegetation communities in each region in Scotland.

	South-West Scotland	North-West Scotland	North-East Scotland	South-East Scotland	TOTAL AREA	%
Spartina	99.0	2.21		0.31	101.52	1.7
Salicornia/Sueda	38.51	180.51	13.34	125.04	357.4	5.97
Aster	2.61			1.34	3.95	0.07
Puccinellia Halimione	160.98	160.74	75.09	102.12	498.93	8.34
Limonium/Armeria	7.88				7.88	0.13
Puccinellia/Festuca	995.58	855.33	189.34	50.11	2090.36	34.94
J.gerardii	661.33	516.59	192.45	93.13	1463.50	24.46
J.maritimus	46.56		0.1		46.66	0.78
Agropyron S.fruticosa	31.35	0.47	18.29	13.09	63.2	1.06
Scirpus	37.69	5.84	10.96	27.31	81.8	1.37
Phragmites	49.48	14.84	2.2	416.91	483.43	8.08
Typha				1.35	1.35	0.02
Schoenoplectus		2.4	8.8	9.53	20.73	0.35
Shingle/Dune Trans.		72.36	1.53	0.01	73.9	1.24
Freshwater Trans.	132.85	42.6	40.57	54.42	270.44	4.52
Grassland Trans.	216.93	176.1			393.03	6.57
Woodland Trans.	6.32	4.17			10.49	0.18
Comm. of Wet Depr.	0.59	0.12	0.35	1.22	2.28	0.04
Unsurveyed	104.16	10.72		3.6	118.48	0.21
TOTAL AREA	2591.82	2045.0	553.02	899.49	6089.33	

Table c.

The distribution and area (ha) of saltmarsh vegetation communities in each region in Wales

	North Wales	Dyfed Powys	South Wales	TOTAL AREA	%
Spartina	425.56	604.27	650.73	1680.56	24.91
Salicornia/Sueda	77.71	10.07	294.71	382.49	5.67
Aster	49.22	2.38	34.25	85.85	1.27
Puccinellia	366.73	141.57	789.66	1297.96	19.24
Halimione	44.02	44.32	168.62	256.96	3.81
Limonium/Armeria	20.23	9.58	56.8	86.61	1.28
Puccinellia/Festuca	620.88	255.09	729.55	1605.52	23.79
J.gerardii	11.77	9.87	64.15	85.79	1.27
J.maritimus	239.53	98.62	369.63	707.78	10.49
Agropyron S.fruticosa	233.76	1.88	31.64	267.28	3.96
Scirpus	49.41	11.82	4.15	65.38	0.97
Phragmites	45.92	66.98	20.46	133.36	1.98
Typha		0.18	0.1	0.28	0.01
Schoenoplectus	1.6	0.91	0.36	2.87	0.04
Shingle/Dune Trans.	23.94	11.1	31.52	66.56	0.99
Freshwater Trans.	9.84	10.27	2.21	22.32	0.33
Grassland Trans.					
Woodland Trans.					
Comm. of Wet Depr.					
Unsurveyed					
TOTAL AREA	2220.12	1278.91	3248.54	6747.57	

APPENDIX 8.9

Tables showing the distribution and area of saltmarsh communities in each NCC region; ordered as follows:-

a) East Anglia
b) East Midlands
c) North East England
d) North West England
e) South England
f) South East England
g) South West England
h) West Midlands

i) Dyfed Powys
j) North Wales
k) South Wales

l) North East Scotland
m) North West Scotland
n) South East Scotland
o) South West Scotland

Table 9. The distribution and area (ha) of salt marsh vegetation communities, East Anglia

		Essex	Norfolk	Suffolk	Total Area	%
Spartina	1	210.81	215.98	155.9	582.69	6.60
Salicornia/Sueda	2a	146.59	255.02	41.02	442.63	5.01
Aster	2b	195.58	116.55	114.18	426.31	4.83
Puccinellia	3a	1865.68	583.99	314.4	2764.07	31.34
Halimione	3b	502.66	698.83	178.99	1380.48	15.65
Limonium/Armeria	4a	1065.99	467.3	139.28	1672.57	18.96
Puccinellia/Festuca	4b	504.71	142.61	85.15	732.47	8.30
J.gerardii	4c		2.74	5.99	8.73	0.09
J.maritimus	4d		27.46	22.48	49.94	0.56
Agropyron	5a	103.87	202.9	55.89	362.66	4.11
S.fruticosa	5b		94.35		94.35	1.06
Scirpus	6	41.09	2.00	8.87	51.96	0.58
Phragmites	6		36.58	49.42	86.00	0.97
Typha	6					
Schoenoplectus	6					
Shingle/Dune transition	7		15.08	13.17	28.25	0.32
Freshwater transition	7		0.73		0.73	
Grassland transition	7		12.73		12.73	0.14
Woodland transition	7					
Communities of Wet Depr.	8					
Unsurveyed			28.6	94.07	122.67	1.39
Total area incl. transitions		4636.98	2903.45	1278.81	8819.24	100.00
Total area excl. transitions		4636.98	2846.31	1171.57	8654.86	98.13

Table 6. The distribution and area (ha) of salt marsh vegetation communities, East Midlands

		Lincolnshire	Total Area	%
Spartina	1	87.63	87.63	2.07
Salicornia/Sueda	2a	523.58	523.58	12.39
Aster	2b	117.92	117.92	2.79
Puccinellia	3a	1629.84	1629.84	38.59
Halimione	3b	765.87	765.87	18.13
Limonium/Armeria	4a	110.05	110.05	2.60
Puccinellia/Festuca	4b	262.28	262.28	6.21
J.gerardii	4c			
J.maritimus	4d	4.79	4.79	0.11
Agropyron	5a	533.54	533.54	12.63
S.fruticosa	5b	.03	.03	
Scirpus	6	.51	.51	0.01
Phragmites	6	2.52	2.52	0.05
Typha	6			
Schoenoplectus	6			
Shingle/Dune transition	7	11.43	11.43	0.27
Freshwater transition	7			
Grassland transition	7			
Woodland transition	7			
Communities of Wet Depr.	8			
Unsurveyed		172.8	172.8	4.09
Total area incl. transitions		4222.79	4222.79	100.00
Total area excl. transitions		4038.56	4038.56	95.63

Table C. The distribution and area (ha) of salt marsh vegetation communities, North East England

		Cleveland	Humberside	Northumberland	Tyne and Wear	Total Area	%
Spartina	1		107.57	135.58		243.15	25.33
Salicornia/Sueda	2a	2.88	5.57			8.45	0.88
Aster	2b	3.00	20.5		0.79	24.29	2.53
Puccinellia	3a	14.12	57.01	24.07	0.93	96.13	10.01
Halimione	3b		14.52	4.6		19.12	1.99
Limonium/Armeria	4a	.24	2.37			2.61	0.27
Puccinellia/Festuca	4b	5.68	75.46	81.99	4.62	167.75	17.47
J.gerardii	4c		0.35	4.28	0.13	4.76	0.49
J.maritimus	4d			0.21		0.21	0.02
Agropyron	5a	8.24	171.21	0.85	0.3	180.6	18.81
S.fruticosa	5b						
Scirpus	6		33.76		0.12	33.88	3.52
Phragmites	6		82.84	4.53	0.57	87.94	9.16
Typha	6		6.21			6.21	0.64
Schoenoplectus	6						
Shingle/Dune transition	7			1.01		1.01	0.10
Freshwater transition	7			0.26		0.26	0.02
Grassland transition	7			11.58	1.45	13.03	1.35
Woodland transition	7						
Communities of Wet Depr.	8						
Unsurveyed			70.49			70.49	7.34
Total area incl. transitions		34.16	647.86	268.96	8.91	959.89	100.00
Total area excl. transitions		34.16	577.37	256.11	7.46	875.1	91.16

Table d. The distribution and area (ha) of salt marsh vegetation communities, North West England

		Cumbria	Lancashire	Merseyside	Total Area	%
Spartina	1	222.69	546.86	148.76	918.31	10.56
Salicornia/Sueda	2a	57.72	75.14	62.3	195.16	2.24
Aster	2b	2.18	171.01	39.65	212.84	2.44
Puccinellia	3a	617.34	745.12	122.43	1484.89	17.08
Halimione	3b	67.27	30.54		97.81	1.12
Limonium/Armeria	4a	13.42	45.96		59.38	0.68
Puccinellia/Festuca	4b	871.27	1711.61	116.45	2699.33	31.05
J.gerardii	4c	1578.1	610.34		2188.44	25.17
J.maritimus	4d	172.66	65.81	0.16	238.63	2.74
Agropyron	5a	22.75	19.97	1.74	44.46	0.51
S.fruticosa	5b					
Scirpus	6	5.59	8.11	1.3	15.00	0.17
Phragmites	6	11.36	4.78		16.14	0.18
Typha	6	0.01	2.14		2.15	0.02
Schoenoplectus	6		0.24		0.24	
Shingle/Dune transition	7	11.5			11.5	0.13
Freshwater transition	7	20.84	1.25		22.09	0.25
Grassland transition	7	486.41			486.41	5.59
Woodland transition	7					
Communities of Wet Depr.	8					
Unsurveyed						
Total area incl. transitions		4161.11	4038.88	492.79	8692.78	100.00
Total area excl. transitions		3642.36	4037.63	492.79	8172.78	94.01

Table 6. The distribution and area (ha) of salt marsh vegetation communities, South England

		Hampshire	Isle of Wight	Total Area	%
Spartina	1	1177.03	30.96	1207.99	63.32
Salicornia/Sueda	2a	52.41	8.97	61.38	3.21
Aster	2b	16.87	0.09	16.96	0.88
Puccinellia	3a	112.72	53.97	166.69	8.73
Halimione	3b	146.02	14.02	160.04	8.38
Limonium/Armeria	4a	28.63	62.37	91.00	4.77
Puccinellia/Festuca	4b	22.62	2.68	25.3	1.32
J.gerardii	4c	2.73	0.71	3.44	0.18
J.maritimus	4d	13.32	0.21	13.53	0.70
Agropyron	5a	25.67	19.55	45.22	2.37
S.fruticosa	5b				
Scirpus	6	5.87	1.24	7.11	0.37
Phragmites	6	13.11	18.41	31.52	1.65
Typha	6	0.28	0.61	0.89	0.04
Schoenoplectus	6				
Shingle/Dune transition	7	6.09		6.09	0.31
Freshwater transition	7	1.37		1.37	0.07
Grassland transition	7				
Woodland transition	7				
Communities of Wet Depr.	8				
Unsurveyed		69.09		69.09	3.62
Total area incl. transitions		1693.83	213.79	1907.62	100.00
Total area excl. transitions		1617.28	213.79	1831.07	95.98

Table f. The distribution and area (ha) of salt marsh vegetation communities, South East England

		Kent	Sussex	Total Area	%
Spartina	1	194.95	491.53	686.48	31.76
Salicornia/Sueda	2a	78.77	49.9	128.67	5.95
Aster	2b	23.63	10.47	34.1	1.57
Puccinellia	3a	349.52	37.91	387.43	17.92
Halimione	3b	441.24	77.94	519.18	24.02
Limonium/Armeria	4a	193.01	115.06	308.07	14.25
Puccinellia/Festuca	4b	21.23	4.48	25.71	1.18
J.gerardii	4c	0.54	0.73	1.27	.05
J.maritimus	4d		0.39	0.39	.01
Agropyron	5a	31.51	22.96	54.47	2.52
S.fruticosa	5b				
Scirpus	6	0.11	1.2	1.31	0.06
Phragmites	6	7.04	2.61	9.65	0.44
Typha	6				
Schoenoplectus	6				
Shingle/Dune transition	7				
Freshwater transition	7	3.68		3.68	0.17
Grassland transition	7				
Woodland transition	7				
Communities of Wet Depr.	8				
Unsurveyed			0.86	0.86	0.03
Total area incl. transitions		1345.23	816.04	2161.27	100.00
Total area excl. transitions		1341.55	815.18	2156.73	99.78

Table 9. The distribution and area (ha) of salt marsh vegetation communities, South West England

		Avon	Cornwall	Devon	Dorset	Somerset	Total Area	%
Spartina	1	158.97	53.12	100.99	559.31	340.29	1212.68	45.80
Salicornia/Sueda	2a		26.92	47.06	9.76		83.74	3.16
Aster	2b		2.46	19.45	1.48	5.63	29.02	1.09
Puccinellia	3a	32.38	38.98	102.52	0.7	7.63	182.21	6.88
Halimione	3b		46.66	38.13	5.56		90.35	3.41
Limonium/Armeria	4a	0.2		5.07	10.76		16.03	0.60
Puccinellia/Festuca	4b	89.88	154.69	95.26	10.9	123.33	474.06	17.90
J.gerardii	4c	18.17	18.15	9.77	30.19		76.28	2.88
J.maritimus	4d		9.44	4.52	22.18		36.14	1.36
Agropyron	5a	14.25	20.41	20.2	18.33	6.01	79.2	2.99
S.fruticosa	5b				0.35		0.35	0.01
Scirpus	6		27.1	39.96	8.98	1.25	77.29	2.91
Phragmites	6		26.84	50.13	118.46	14.6	210.03	7.93
Typha	6		0.09	0.18			0.27	0.01
Schoenoplectus	6		0.26	0.8	0.08		1.14	0.04
Shingle/Dune transition	7				1.23		1.23	0.04
Freshwater transition	7		30.19	15.9			46.09	1.74
Grassland transition	7							
Woodland transition	7							
Communities of Wet Depr.	8							
Unsurveyed					31.56		31.56	1.19
Total area incl. transitions		313.85	455.31	549.94	829.83	498.74	2647.67	100.00
Total area excl. transitions		313.85	425.12	534.04	797.04	498.74	2568.79	97.02

Table h. The distribution and area (ha) of salt marsh vegetation communities, West Midlands

		Cheshire	Gloucestershire	Total Area	%
Spartina	1	198.85	28.29	227.14	10.70
Salicornia/Sueda	2a	177.56		177.56	8.36
Aster	2b	157.37	0.63	158.00	7.44
Puccinellia	3a	522.26	20.48	542.74	25.57
Halimione	3b	12.16		12.16	0.57
Limonium/Armeria	4a				
Puccinellia/Festuca	4b	479.4	186.06	665.46	31.35
J.gerardii	4c		9.31	9.31	0.43
J.maritimus	4d		0.29	0.29	0.01
Agropyron	5a	86.33	11.84	98.17	4.62
S.fruticosa	5b				
Scirpus	6	39.65		39.65	1.86
Phragmites	6	3.83	0.85	4.68	0.22
Typha	6				
Schoenoplectus	6				
Shingle/Dune transition	7				
Freshwater transition	7				
Grassland transition	7	187.00		187.00	8.81
Woodland transition	7				
Communities of Wet Depr.	8				
Unsurveyed					
Total area incl. transitions		1864.41	257.75	2122.16	100.00
Total area excl. transitions		1677.41	257.75	1935.16	91.18

Table 1. The distribution and area (ha) of salt marsh vegetation communities, Dyfed Powys

		Carmarthen	Ceredigion	Montgomery	Preseli and S.Pemb.	Total Area	%
Spartina	1	121.58	284.99		197.7	604.27	47.24
Salicornia/Sueda	2a	1.62	5.87		2.58	10.07	0.78
Aster	2b	2.31			0.07	2.38	0.18
Puccinellia	3a	58.82	55.76		26.99	141.57	11.06
Halimione	3b	27.17			17.15	44.32	3.46
Limonium/Armeria	4a				9.58	9.58	0.74
Puccinellia/Festuca	4b	110.63	83.05		61.41	255.09	19.94
J.gerardii	4c	1.67	1.56		6.64	9.87	0.77
J.maritimus	4d	39.22	26.24	8.87	24.29	98.62	7.71
Agropyron	5a	0.11			1.77	1.88	0.14
S.fruticosa	5b						
Scirpus	6	1.06	0.85		9.91	11.82	0.92
Phragmites	6	14.93	18.76		33.29	66.98	5.23
Typha	6				0.18	0.18	0.01
Schoenoplectus	6	0.01	0.05		0.85	0.91	0.07
Shingle/Dune transition	7	10.45	0.65			11.1	0.86
Freshwater transition	7	6.31	0.05		3.91	10.27	0.80
Grassland transition	7						
Woodland transition	7						
Communities of Wet Depr.	8						
Unsurveyed							
Total area incl. transitions		395.89	477.83	8.87	396.32	1278.91	100.00
Total area excl. transitions		379.13	477.13	8.87	392.41	1257.54	98.32

Table j. The distribution and area (ha) of salt marsh vegetation communities, North Wales

		Clwyd	East Gwynedd	West Gwynedd	Total Area	%
Spartina	1	83.29	214.86	127.41	425.56	19.16
Salicornia/Sueda	2a	54.87	10.04	12.8	77.71	3.50
Aster	2b	48.98	0.18	0.06	49.22	2.21
Puccinellia	3a	288.4	43.05	35.28	366.73	16.51
Halimione	3b	38.73	3.24	2.05	44.02	1.98
Limonium/Armeria	4a		7.57	12.66	20.23	0.91
Puccinellia/Festuca	4b	123.11	380.79	116.98	620.88	27.96
J.gerardii	4c	1.38	2.39	8.00	11.77	0.53
J.maritimus	4d	2.79	165.27	71.47	239.53	10.78
Agropyron	5a	233.76			233.76	10.52
S.fruticosa	5b					
Scirpus	6	32.39	3.17	13.85	49.41	2.22
Phragmites	6	0.75	34.57	10.6	45.92	2.06
Typha	6					
Schoenoplectus	6	0.06	1.06	0.48	1.6	0.07
Shingle/Dune transition	7	1.06	1.79	21.09	23.94	1.07
Freshwater transition	7	4.13	1.6	4.11	9.84	0.44
Grassland transition	7					
Woodland transition	7					
Communities of Wet Depr.	8					
Unsurveyed						
Total area incl. transitions		913.7	869.58	436.84	2220.12	100.00
Total area excl. transitions		908.51	866.19	411.64	2186.34	98.47

Table k. The distribution and area (ha) of salt marsh vegetation communities, South Wales

		Gwent	Llanelli and W.Glamorgan	Mid and South Glamorgan	Total Area	%
Spartina	1	155.24	459.52	35.97	650.73	20.03
Salicornia/Sueda	2a		294.69	0.02	294.71	9.07
Aster	2b		34.25		34.25	1.05
Puccinellia	3a	28.38	753.24	8.04	789.66	24.30
Halimione	3b		164.86	3.76	168.62	5.19
Limonium/Armeria	4a		53.26	3.54	56.8	1.74
Puccinellia/Festuca	4b	49.66	670.32	9.57	729.55	22.45
J.gerardii	4c	2.43	21.41	40.31	64.15	1.97
J.maritimus	4d	2.92	366.71		369.63	11.37
Agropyron	5a	27.92	3.67	0.05	31.64	0.97
S.fruticosa	5b					
Scirpus	6		4.11	0.04	4.15	0.12
Phragmites	6	0.34	20.12		20.46	0.62
Typha	6		0.1		0.1	
Schoenoplectus	6		0.36		0.36	0.01
Shingle/Dune transition	7		26.98	4.54	31.52	0.97
Freshwater transition	7		2.21		2.21	0.06
Grassland transition	7					
Woodland transition	7					
Communities of Wet Depr.	8					
Unsurveyed						
Total area incl. transitions		266.89	2875.81	105.84	3248.54	100.00
Total area excl. transitions		266.89	2846.62	101.3	3214.81	98.96

Table 1. The distribution and area (ha) of salt marsh vegetation communities, North East Scotland

		Aberdeen	Banff and Buchan	Gordon	Kincardine and Deeside	Moray	Nairn	Orkney	Shetland	Total Area	%
Spartina	1										
Salicornia/Sueda	2a					6.6	4.4	2.26	0.08	13.34	2.41
Aster	2b										
Puccinellia	3a			0.05	2.2	49.29	17.72	5.69	0.14	75.09	13.57
Halimione	3b										
Limonium/Armeria	4a										
Puccinellia/Festuca	4b		4.11	3.41	0.4	59.88	89.16	23.75	8.63	189.34	34.23
J.gerardii	4c		13.54	16.3	0.9	51.00	76.76	27.03	6.92	192.45	34.79
J.maritimus	4d							0.1		0.1	0.01
Agropyron	5a		0.25	2.71	0.2	7.56	0.44	7.13		18.29	3.30
S.fruticosa	5b										
Scirpus	6		0.44	0.02	0.3	3.82	6.38			10.96	1.98
Phragmites	6	0.5	0.6	0.4		0.2		0.5		2.2	0.39
Typha	6										
Schoenoplectus	6					5.22	3.58			8.8	1.59
Shingle/Dune transition	7		0.01				1.00	0.52		1.53	0.27
Freshwater transition	7	0.01	8.11	2.5		18.93	1.58	9.44		40.57	7.33
Grassland transition	7										
Woodland transition	7										
Communities of Wet Depr.	8					0.05		0.07	0.23	0.35	0.06
Unsurveyed											
Total area incl. transitions		0.51	27.06	25.39	4.00	202.55	201.02	76.49	16.00	553.02	100.00
Total area excl. transitions		0.5	18.94	22.89	4.00	183.57	98.44	66.46	15.77	510.57	92.32

Table m. The distribution and area (ha) of salt marsh vegetation communities, North West Scotland

		Caithness	Inverness	Lochaber	Ross and Cromarty	Skye and Lochalsh	Sutherland	Western Isles	Total Area	%
Spartina	1				2.2			0.01	2.21	0.10
Salicornia/Sueda	2a		5.00	0.188	100.08	0.7	73.96	0.58	180.508	8.82
Aster	2b									
Puccinellia	3a	0.52	0.8	70.111	20.48	49.18	8.56	11.09	160.741	7.86
Halimione	3b									
Limonium/Armeria	4a									
Puccinellia/Festuca	4b	0.25	67.96	74.66	339.32	64.61	87.27	221.26	855.33	41.82
J.gerardii	4c		1.44	105.8	147.41	87.6	36.02	138.32	516.59	25.26
J.maritimus	4d									
Agropyron	5a			0.105	0.04	0.17	0.1	0.05	0.465	0.02
S.fruticosa	5b									
Scirpus	6		1.00	0.012	2.62	1.79	0.37	0.05	5.842	0.28
Phragmites	6		2.00		4.01	1.42	7.41		14.84	0.72
Typha	6									
Schoenoplectus	6	2.4							2.4	0.11
Shingle/Dune transition	7	2.04			51.25		0.62	18.45	72.36	3.53
Freshwater transition	7			3.101	13.00	7.44	6.93	12.13	42.601	2.08
Grassland transition	7	13.96	9.5	36.422	33.04	23.76	20.77	38.65	176.102	8.61
Woodland transition	7			0.01	4.16				4.17	0.20
Communities of Wet Depr.	8			0.12					0.12	+
Unsurveyed					0.72			10.00	10.72	0.52
Total area incl. transitions		19.17	87.7	290.529	718.33	236.67	242.01	450.59	2044.999	100.00
Total area excl. transitions		3.17	78.2	250.876	616.16	205.47	213.69	371.36	1738.926	85.03

Table 6. The distribution and area (ha) of salt marsh vegetation communities, South East Scotland

		Angus	Berwickshire	Clackmannan	Dundee	Dunfermline	East Lothian	Edinburgh	Falkirk	Kirkcaldy	N.E. Fife	Perth & Kinross	West Lothian	Total Area	%
Spartina	1								0.01		0.3			0.31	0.03
Salicornia/Sueda	2a	25.48				0.9	88.16		7.43	0.01	3.05		0.01	125.04	13.93
Aster	2b			0.08	0.16	0.86			0.24					1.34	0.15
Puccinellia	3a	2.02		1.88	0.16		53.47	0.001	40.801	0.05	3.722		0.011	102.115	11.38
Halimione	3b														
Limonium/Armeria	4a														
Puccinellia/Festuca	4b	7.2	0.01	0.48		0.02	15.86	0.01	7.3		19.181		0.05	50.111	5.58
H.gerardii	4c	13.29	0.05	2.19	15.48	0.1	24.56	0.01	22.361	0.04	14.24	0.8	0.011	93.132	10.38
H.maritimus	4d														
Agropyron	5a	4.021		0.25		0.3	3.08		4.2	0.14	1.091		0.01	13.092	1.46
S.fruticosa	5b														
Scirpus	6	4.971		0.73	11.32		0.57	0.001	0.8	0.02	5.803	3.09	0.001	27.306	3.04
Phragmites	6	2.98		0.24	19.2	0.85	0.66		0.21		78.13	314.64		416.91	46.45
Typha	6	1.14										0.21		1.35	0.15
Schoenoplectus	6	0.96			0.12		0.03				3.49	4.93		9.53	1.06
Shingle/Dune transition	7						0.01							0.01	+
Freshwater transition	7	6.501	0.01	0.14	1.21	0.01	2.78	0.01	1.22	0.002	7.592	34.92	0.021	54.416	6.06
Grassland transition	7														
Woodland transition	7														
Communities of Wet Depr.	8	0.002					0.58				0.033	0.6		1.215	0.14
Unsurveyed				2.00							1.6			3.6	0.4
Total area incl. transitions		68.565	0.07	5.99	47.65	3.04	189.76	0.032	84.572	0.262	138.232	359.19	0.114	897.477	100.00
Total area excl. transitions		62.062	0.06	5.85	46.44	3.03	186.39	0.022	83.352	0.26	129.007	323.67	0.093	840.236	93.62

Table o. The distribution and area (ha) of salt marsh vegetation communities, South West Scotland

		Annandale and Eskdale	Argyll and Bute	Dumbarton	Kyle and Carrick	Nithsdale	Stewartry	Wigtown	Total Area	%
Spartina	1		10.08				87.92	1.00	99.00	3.82
Salicornia/Sueda	2a		1.87	0.24	2.36	2.28	2.64	29.12	38.51	1.48
Aster	2b	0.21		0.72	0.24		1.44		2.61	0.10
Puccinellia	3a	18.68	20.14	0.6	0.96	61.32	28.56	30.72	160.98	6.21
Halimione	3b									
Limonium/Armeria	4a		7.28				0.6		7.88	0.30
Puccinellia/Festuca	4b	23.45	116.05	3.76	12.36	615.68	29.64	194.64	995.58	38.44
J.gerardii	4c	36.87	160.72	2.36	3.28	123.76	27.66	306.68	661.33	25.53
J.maritimus	4d					41.88	2.08	2.6	46.56	1.79
Agropyron	5a	6.79	0.16	2.24	1.28	14.32	4.36	2.2	31.35	1.21
S.fruticosa	5b									
Scirpus	6	3.07	12.21	13.6		4.64	2.73	1.44	37.69	1.45
Phragmites	6	4.19	0.95	17.64		5.6	18.7	2.4	49.48	1.91
Typha	6									
Schoenoplectus	6									
Shingle/Dune transition	7									
Freshwater transition	7	0.45	61.22	0.24	1.32	57.00	12.62		132.85	5.12
Grassland transition	7	8.48	53.15	25.72	11.6	86.44	11.86	19.68	216.93	8.37
Woodland transition	7		2.68			3.64			6.32	0.24
Communities of Wet Depr.	8	0.2	0.39						0.59	0.02
Unsurveyed		30.00				62.00	10.16		102.16	3.94
Total area incl. transitions		132.39	446.9	67.12	33.4	1078.56	240.97	590.48	2589.82	100.00
Total area excl. transitions		93.26	329.46	41.16	20.48	869.48	206.33	570.8	2130.97	82.28