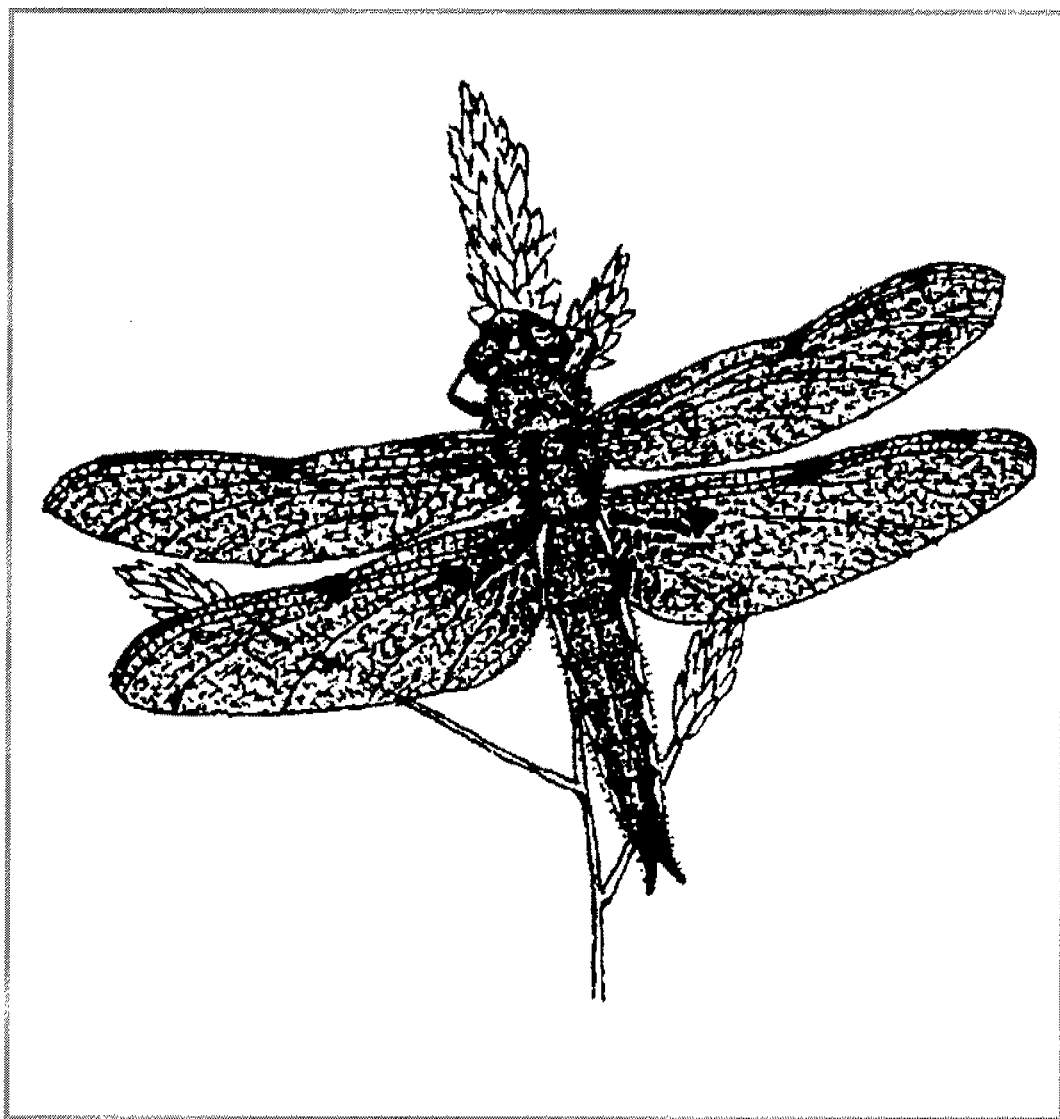


Freshwater wetlands in England

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Number 204

**Freshwater Wetlands in England:
A Natural Areas Approach**

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SUMMARY

English Nature has recently developed the use of biogeographical units known as Natural Areas to set priorities for nature conservation, reflecting greater ecological integrity than the administrative boundaries usually adopted. Core profiles have been developed by local team staff to describe the significant features, habitats and species associated with each Natural Area.

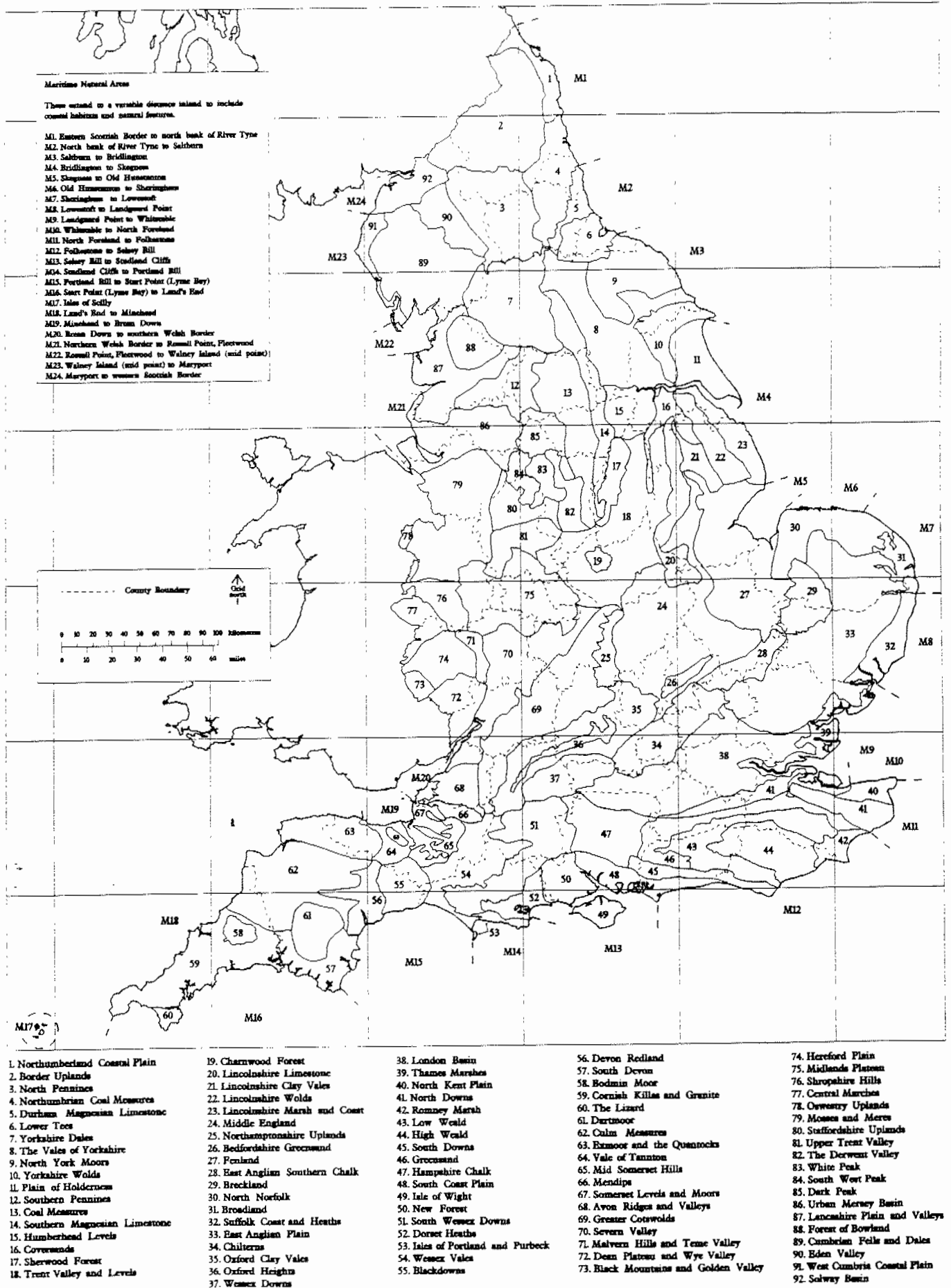
This report summarises the information collected pertaining to the freshwater wetland resource, supplemented by information from the wetland SSSI database and other sources. This information is presented in a series of wetland profiles for each Natural Area.

This has allowed a preliminary assessment to be made of the distribution of the wetland resource and the wetland significance of each Natural Area in a national context. The identification of important Natural Areas for habitats and species groups and the subsequent setting of objectives and targets is an evolving process. Therefore, the information contained within this report should be supplemented as the resource becomes better known.

ACKNOWLEDGEMENTS

Special thanks are due to English Nature's freshwater specialists, namely Mary Gibson, Chris Newbold, Charlie Rugeroni and David Withrington, who provided useful guidance throughout the project. The assistance of Marcus Polley in the production of maps and the use of MAPINFO was very much appreciated. Comments on different aspects of the project from Keith Porter, Richard Jefferson, Roger Meade, Rob Cooke and Gordon Hewston were very helpful.

Natural Areas



1. INTRODUCTION

Natural Areas have been developed by English Nature to describe the country in terms of biogeographical units. They will be used increasingly to deliver nature conservation objectives within England, reflecting greater ecological integrity than administrative boundaries. A total of 92 terrestrial Natural Areas and 24 marine Natural Areas have currently been identified and these form the basis of this report.

A parallel project by the Countryside Commission has taken a similar approach to draw up a Countryside Character Map, based on landscape and cultural units. These two approaches are being combined to produce *The Character of England: landscape, wildlife and natural features*, to be published in December 1996. There will be a total of 157 terrestrial and 24 marine Character Areas, all of which will be sub-sets of the revised Natural Area boundaries. Therefore, there will be some modifications to the boundaries used in this report, although the ecological character of most Natural Areas will remain unchanged (see Addendum for significant changes).

Core profiles have been produced for each Natural Area. These seek to identify the key habitats, species and geological features, their importance and the issues facing them. They will be used to define national and local objectives and meet the targets of Biodiversity Action Plans.

The aim of this report is to carry out a preliminary assessment of the extent, diversity and importance of freshwater wetland habitats within the currently defined Natural Areas. This will help in the refinement of core profiles, allow priorities to be set for wetland conservation and highlight gaps in the knowledge of the wetland resource. This approach is similar to that already undertaken for birds (Grice *et al.*, 1994), heathland (Michael, 1996), lowland grassland (Jefferson, 1996), earth science (King *et al.*, 1996) and woodland (Reid *et al.*, 1996). There is some overlap between this report and the lowland grassland, upland grassland (Manley & Drewitt, in preparation) and woodland reviews, relating to the wetland community types. Other overviews are planned for major habitats and species groups.

The first part of the analysis presents a national overview of wetland habitats and issues related to Natural Areas, largely based on the SSSI series (section 3). The majority of the report contains individual wetland profiles for each Natural Area (section 5). It is acknowledged that this is a preliminary assessment based on the existing data and that there will be a need for future refinement.

2. METHODOLOGY

2.1 DEFINITION OF FRESHWATER WETLANDS

The analysis in this report assesses all habitats with a freshwater influence. It includes brackish situations, such as ditches on coastal grazing marsh, but excludes totally saline features. Wet woodland is defined as the specifically wet NVC communities W1 - W7. Wet grassland includes NVC communities where there may be a permanently or seasonally high water table (i.e. M23, MG4, MG6, MG7, MG8, MG9, MG10, MG11, MG12, MG13). All the NVC swamp, dune slack, mire and aquatic communities are included as well as open and running water features.

2.2 SOURCES OF INFORMATION

The assessment of wetland significance was made using two principal sources of information, the wetland SSSI database and the Natural Area core profiles. These were validated and supplemented by the following sources.

- 1) *Scarce Plants In Britain and British Red Data Book 1: Vascular Plants* (Stewart *et al.*, 1994; Perring & Farrell, 1983)
- 2) *AA rivers database* - length of rivers in each natural area (Automobile Association, 1991)
- 3) *Lowland grassland in Natural Areas* (Jefferson, 1996)
- 4) *A preliminary assessment of woodland conservation in England by Natural Areas* (Reid *et al.*, 1996)
- 5) *BogBase 3.1* (Wheeler, 1996)

The wetland SSSI database was developed within English Nature's Environmental Impacts Team to provide information on the wetland component of the SSSI series. The original list of sites was identified from the Coredata database. Local team staff verified the series of sites and provided information relating to the wetland habitats present, the dominant habitats (wetland or otherwise), nutrient status, designations, and the pollution, water level and recreational issues affecting the sites. This is now being used to:

- 1) inform English Nature's Freshwater Agenda, which sets out a partnership approach to the sustainable management of the freshwater environment;
- 2) provide national or regional overviews of the wetland resource;
- 3) provide national or regional overviews of the key issues facing wetland SSSIs.

The core profiles were compiled within local teams during 1995. For each key nature conservation feature (a broad habitat type or geological formation) present within a Natural Area the Phase 1 category, size of feature where known, NVC communities/ GCR categories, significant species and species groups, character species, declining/ extinct species, designations and issues are listed together with an assessment of the significance of the feature. The core profiles will be subject to regular revision.

3. NATIONAL OVERVIEW

3.1 Introduction

The following maps provide an overview of the detailed information contained within the individual wetland profiles and highlight broad distributional patterns of the wetland resource related to Natural Areas. The maps were prepared using the MAPINFO mapping and analysis package, with much of the data derived from the wetlands database. The main purpose was to show whether different wetland habitats fit well to the Natural Areas approach. The area information presented (i.e. the SSSI area where a wetland habitat is dominant) represents relative importance of sites and should not be considered as absolute areas of different wetland habitats. However, this is intended to highlight the main concentrations of the most important examples of particular wetland types and can therefore be used in the targeting of resources and

management mechanisms to meet the objectives of the Biodiversity Action Plans and the Freshwater Agenda, for example. Information sources such as the one developed for raised mire sites (BogBase) can be used to further refine this distributional data as they become available.

3.2 Distribution of Wetland SSSIs, within Natural Areas

Figure 2 shows the distribution of all SSSIs identified as containing wetland habitats, with figures 3 and 4 showing the location of SSSIs where wetland habitats form a dominant component of the site. Larger Natural Areas will tend to contain a higher number of wetland SSSIs.

It is clear that wetland habitats *per se* are widely distributed throughout England. However, some clear concentrations are apparent associated with particular wetland features (e.g. Broadland, Solway Mosses, Somerset Levels), river valleys (e.g. Severn, Thames, Humberhead tributaries), spring-lines (e.g. boundary between Oxford Clay Vales and Oxford Heights) and geology (e.g. culm grasslands). There are situations where these concentrations of wetland sites correspond well to the Natural Area boundaries (e.g. Broadland, Solway Mosses, Mosses and Meres), but others where they appear to form a discrete component of the Natural Area (e.g. Norfolk Valley Fens within the East Anglian Plain, Border Mires within Border Uplands). In the latter case, the distribution may be better reflected by the Character Area approach, such as where a river valley forms a discrete topographical feature. There are other concentrations which appear to cross Natural Area boundaries (e.g. Forest of Bowland/ Yorkshire Dales).

The areas of the country with a naturally low number of wetland sites are associated with a chalk/limestone geology (e.g. Yorkshire and Lincolnshire Wolds, North and South Downs). However, these areas often have important communities associated with the calcareous river and stream systems and the fens and flushes which form along the spring-lines, explaining some of the concentrations along Natural Area boundaries. Loss of wetland habitats, particularly over the last 50 years, has been catastrophic such that the current extent of important sites does not necessarily reflect the natural situation. For example, 99.7% of lowland fens, valley and basin mires in the East Anglian Fenland were drained between the 17th century and the 1980s (NCC, 1984). This should be reflected in the Natural Areas approach, where objectives would be to consolidate the existing resource and then restore some of the former wetland interest wherever opportunities exist. However, this assessment appears to largely reflect the natural distribution of wetlands.

3.3 Distribution of Wetland Habitats, within Natural Areas

The SSSIs where a number of different wetland types are a dominant component of the site (lakes, gravel pits, reservoirs, raised mire, blanket mire, wet heath, fen and wet grassland) are shown to illustrate more specifically the distribution of the wetland resource (Figures 5 - 14). This is by no means exhaustive, and only includes the most important sites, except for raised mire.

It appears that some wetland habitat types correlate well with the Natural Areas approach and this can be used to prioritise and deliver wetland conservation measures in the most appropriate situations. For example, a strategy to address the problems of blanket mire would concentrate on the Border Uplands, Cumbrian Fells, Pennines and Dartmoor. This can be used to deliver targets identified by the Biodiversity Action Plan for blanket mire and implement or extend complementary management mechanisms (e.g. ESAs) to achieve the targets.

3.4 Key Issues facing Wetland Sites

The issues identified by local teams as affecting wetland key features are listed in Table 1 together with an assessment of the number of Natural Areas affected. Some of these issues, relating to certain key features have already been analysed (Hewston & Cooke, 1996).

The principal issues are associated with water quality, water quantity, agricultural improvement and a wide range of site management issues. It is noticeable the extent to which issues on surrounding land appear to have a high impact on wetland sites.

Table 1 Key Issues Affecting Wetland Key Features, within Natural Areas

Key Issue	% of NAs	Key Issue	% of NAs
Pollution/ water quality	74	Habitat restoration/ creation	26
Fisheries	27	Fish farming	9
River engineering	39	Air pollution	12
Recreation	67	Canal restoration	5
Water abstraction	62	Crayfish plague	10
Fish-eating birds	9	Succession	36
Grazing	64	Ditch/ stream management	12
Afforestation	23	Aggregate extraction	27
Drainage	49	Riparian management	20
Agricultural improvement	75	Angling	20
Military use	8	Reedbed management	11
River catchment management	16	Saline intrusion	5
Burning	23	Turf stripping	5
Eutrophication/ enrichment	34	Management mechanism implementation	25
Water level management	40	Pond loss	7
Alien species	17	Roads	9
Cutting/ mowing management	12	Habitat loss	8
Peat extraction	10	Horsiculture	9
Wind farms	8	Management of commons	10
Acidification	8	Management of adjacent land	8
Coastal protection	20	Tipping	11
Development	34	Quarrying	5
Dredging	16	Sewage	15
Lack of/ inappropriate management	42	Flood defence	17
Reclamation	13	Water quantity	24
Fragmentation	39	Siltation	8
Wet woodland management	18		

3.5 The Relationship between River Catchments and Natural Areas

It is important in the application of Natural Areas that they become integrated into the work of key partners. An obvious interplay is between the Catchment Management Plans (now replaced by Local Environment Action Plans) of the Environment Agency and the Natural Areas approach. Can the Environment Agency and English Nature integrate the two approaches, such that the objectives of both organisations are realised? Figure 15 illustrates the relationship between river catchments and Natural Areas in north-east England. This may well be better represented using the Character Areas, as they are sub-divisions of the Natural Areas which are more likely to take account of topographical features such as river basins. The following points could be used to explore this approach further.

- Catchments are likely to cut across two or more Natural Areas, particularly in large river systems. A Natural Area will tend to include the full extent of a moorland block, where the catchment boundary would be situated on the watershed. The coastal plain encompassing the lower reaches of a river system has an entirely different character to the upland headwaters. This allows Natural Areas to be used to describe catchments in more detail in terms of their distinctive components, including important habitats, species groups and hydrological regime. This can assist in the description of catchments, setting of priorities and focussing of restoration related to both nature conservation and water resource management.
- However, rivers can be characterised by flow as well as geology and therefore difficult to describe within the Natural Areas framework. Upland rivers running across plains are slow flowing and can have lowland floras surrounded by moorland. Upper reaches can intrude into lowland areas if the river is subject to regular spates. A geological intrusion, such as in the Wye valley, can produce a gorge with upland characteristics in a lowland Natural Area.
- One example of how this could be achieved is in the management of flood meadows. An objective for a particular Natural Area would identify the maintenance and enhancement of the internationally important flood-plain grasslands and the restoration of a more natural river hydrology. If integrated into the catchment management planning process this could assist the recharging of aquifers, a less costly approach to flood defences and a reduction in the possibility of the deleterious effects of flash floods. At the same time the benefits to nature conservation would be significant.
- This can also be used to identify priority areas where there is a particular need to address issues relating to water resources. This is especially pertinent to the issues of water supply and water quality, where there are parts of catchments where there is an urgent need to mitigate existing damaging operations, often surrounding sites of high interest.
- Conversely, catchments could be used to describe the character of a series of Natural Areas. This may prove a better way of describing river valley grasslands, for example (Figure 13).

3.6 The Evaluation of Wetland Significance related to Natural Areas

The overall evaluation of wetland significance by each Natural Area was based on a set of criteria developed for the purpose (Figure 16; Appendix 1). The intention was to use a form of simple objective appraisal, followed by verification from English Nature's wetland specialists. However,

it should be noted that this is a preliminary assessment, and caution should be exercised if using the data for other applications. Future assessments would:

1. complement this with assessments of species groups other than plants;
2. include assessments of characteristic species as well as rare/ scarce species;
3. provide an indication of which Natural Areas have a low score due to damage of the wetland resource and therefore high potential for amelioration of deleterious impacts and/ or restoration/ habitat creation.

4. EVALUATION OF NATURAL AREAS AND WETLAND CONSERVATION

It appears that Natural Areas can provide a useful tool for describing, evaluating and managing the wetland resource, although further work is required to assess the validity of the approach for river systems. There are examples where the Natural Area reflects very clearly the wetland character (e.g. Broadland, Somerset Levels and Moors). Other Natural Areas or groups of Natural Areas appear to correspond to the distribution of a particular wetland habitat or habitats (section 3). Further analysis may identify other associations between Natural Areas and wetlands that have not been highlighted within this report.

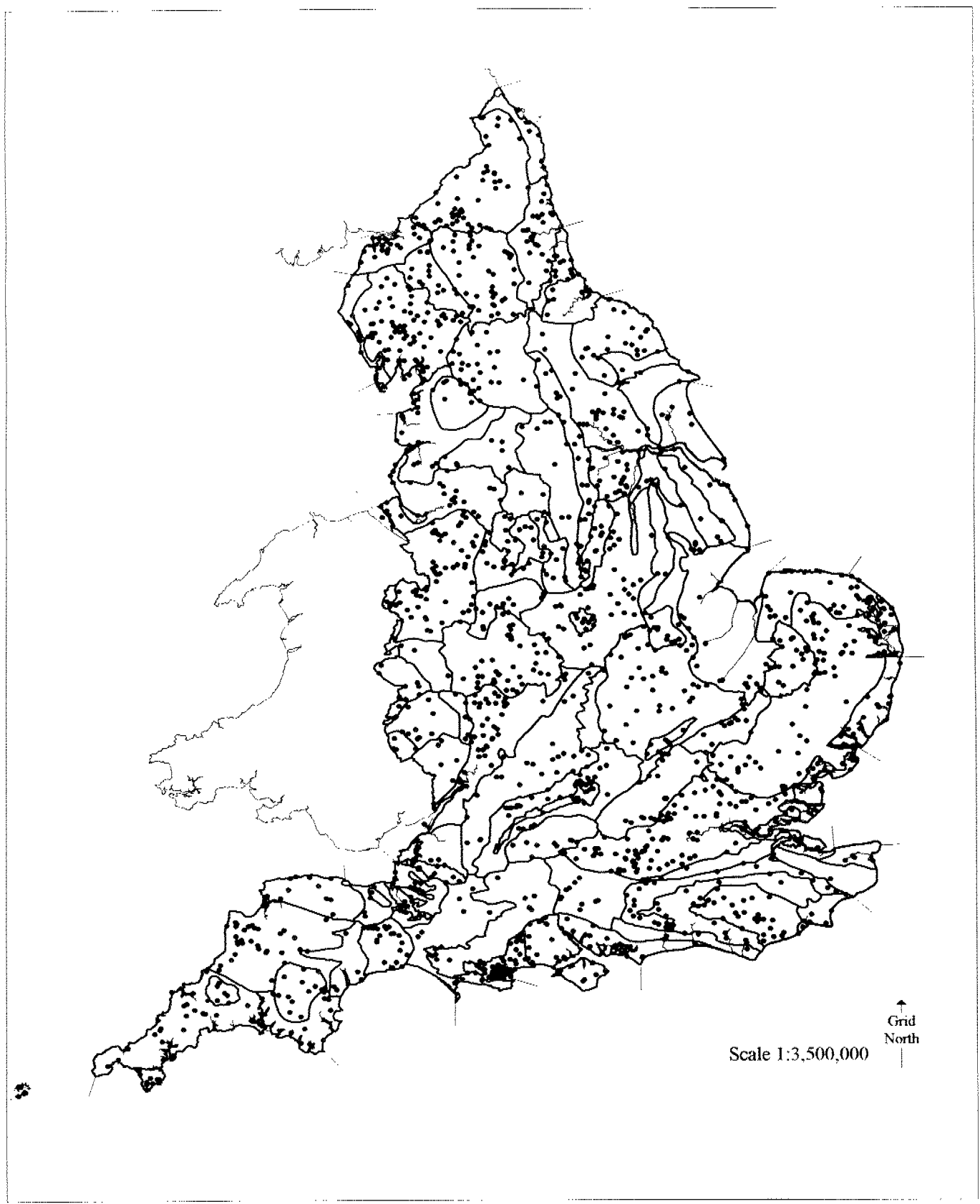
Future analysis could concentrate on:

1. integrating information on the area and importance of different wetland habitats, both on SSSIs and in the wider countryside. This would follow the approach used for raised mire sites in the production of the BogBase database.
2. evaluation of other wetland species groups (e.g. some invertebrate groups, fish, birds) to provide a more integrated approach to the assessment of Natural Area wetland significance. The "System for evaluating rivers for conservation" (SERCON) has acknowledged the need to adopt a more comprehensive approach to wetland evaluation based on a range of physical features and species groups (Boon *et al.*, 1996). This would complement the Natural Areas approach, for example, by using certain wetland "indicator" species/ species groups to add to the assessment within this report.
3. the application of a Natural Areas approach to river catchments could be explored in more detail, particularly looking at Character Areas to provide a better means of describing the different parts of catchments. The Environment Agency and the water companies are important partners in the conservation of the wetland environment. There is increased scope for the targeting of resources to meet the objectives of all parties. Natural Areas provide a framework by which English Nature's objectives can be used to address issues relating to the management of the different component parts of river catchments.

Natural Areas can be used as a framework for delivering wetland conservation. They can provide a national tool for implementing the targets of the Freshwater Agenda, Biodiversity Action Plans and other strategic policies. They can provide a local tool by placing wetland habitats into context, thereby supporting local initiatives. They can also be used to inform priorities between English Nature, the Environment Agency and other key partners.



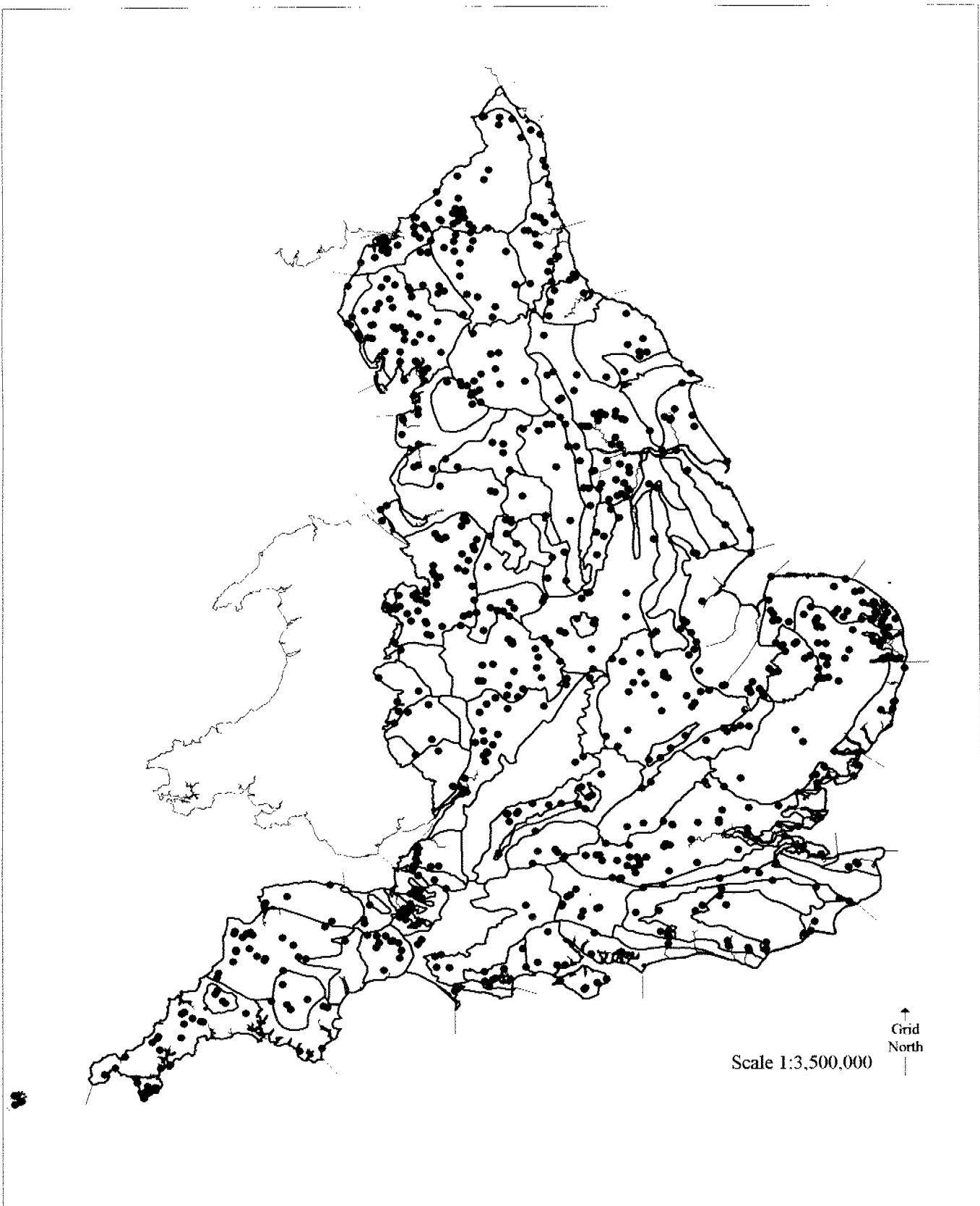
Distribution of SSSIs Containing Wetland Habitats, within Natural Areas



- Natural Area
- Marine Natural Area
- Wetland Site



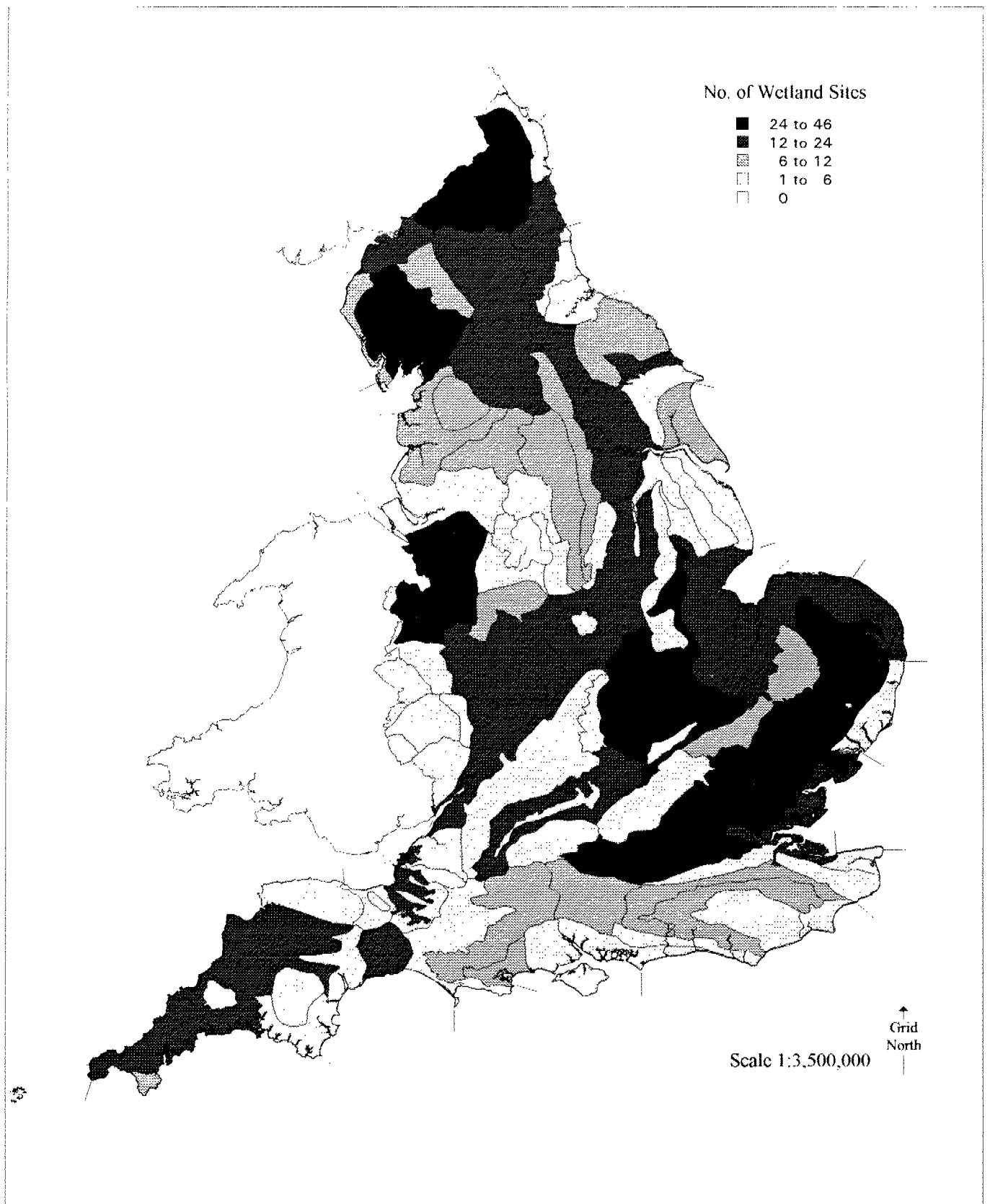
Distribution of SSSIs where Wetland Habitats are Dominant, within Natural Areas



- Natural Area
- Marine Natural Area
- SSSI where Wetland Dominant

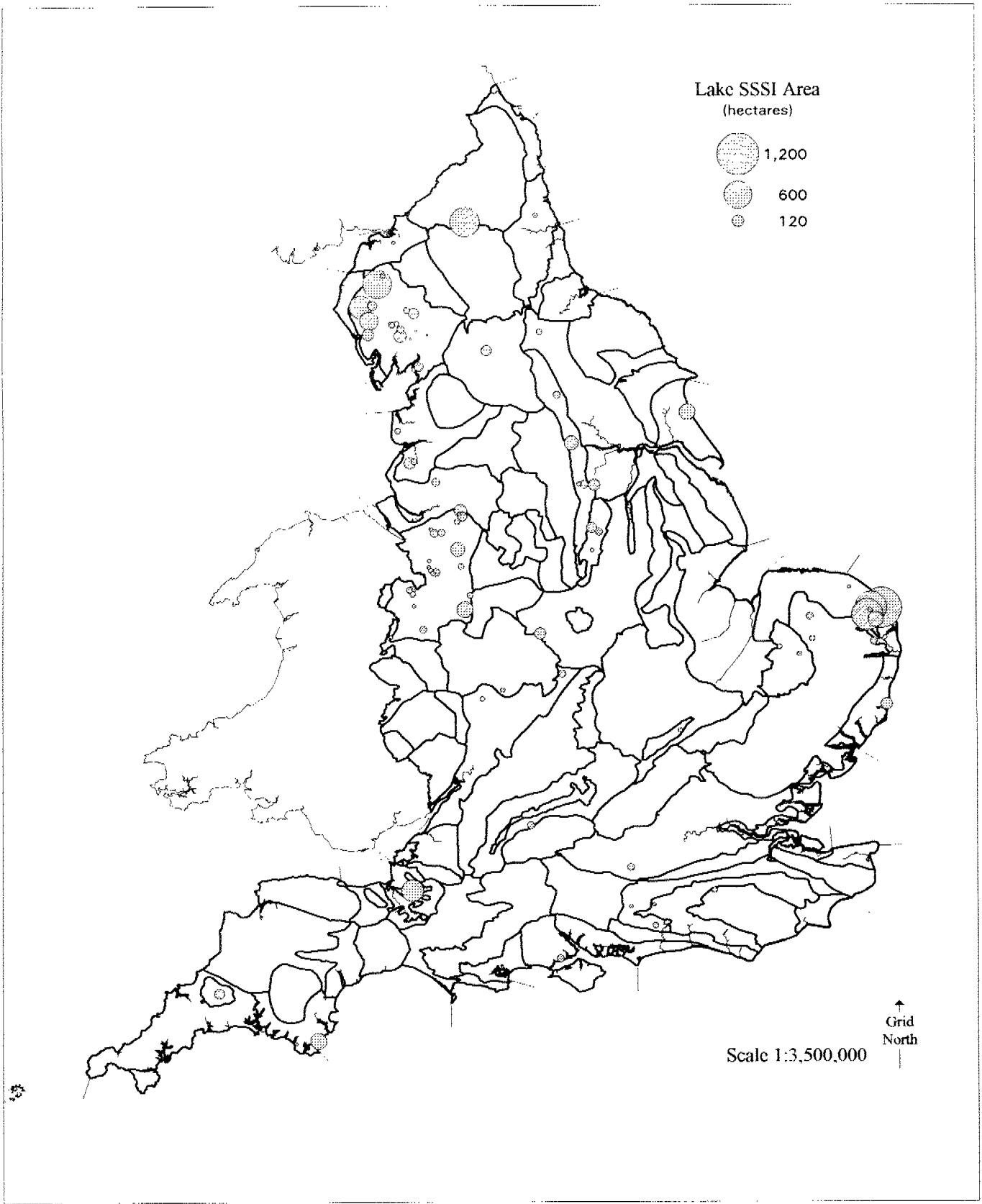
ENGLISH
NATURE

Number of SSSIs where Wetland Habitats are Dominant, within Natural Areas





Distribution of SSSIs where Lakes are Dominant, within Natural Areas

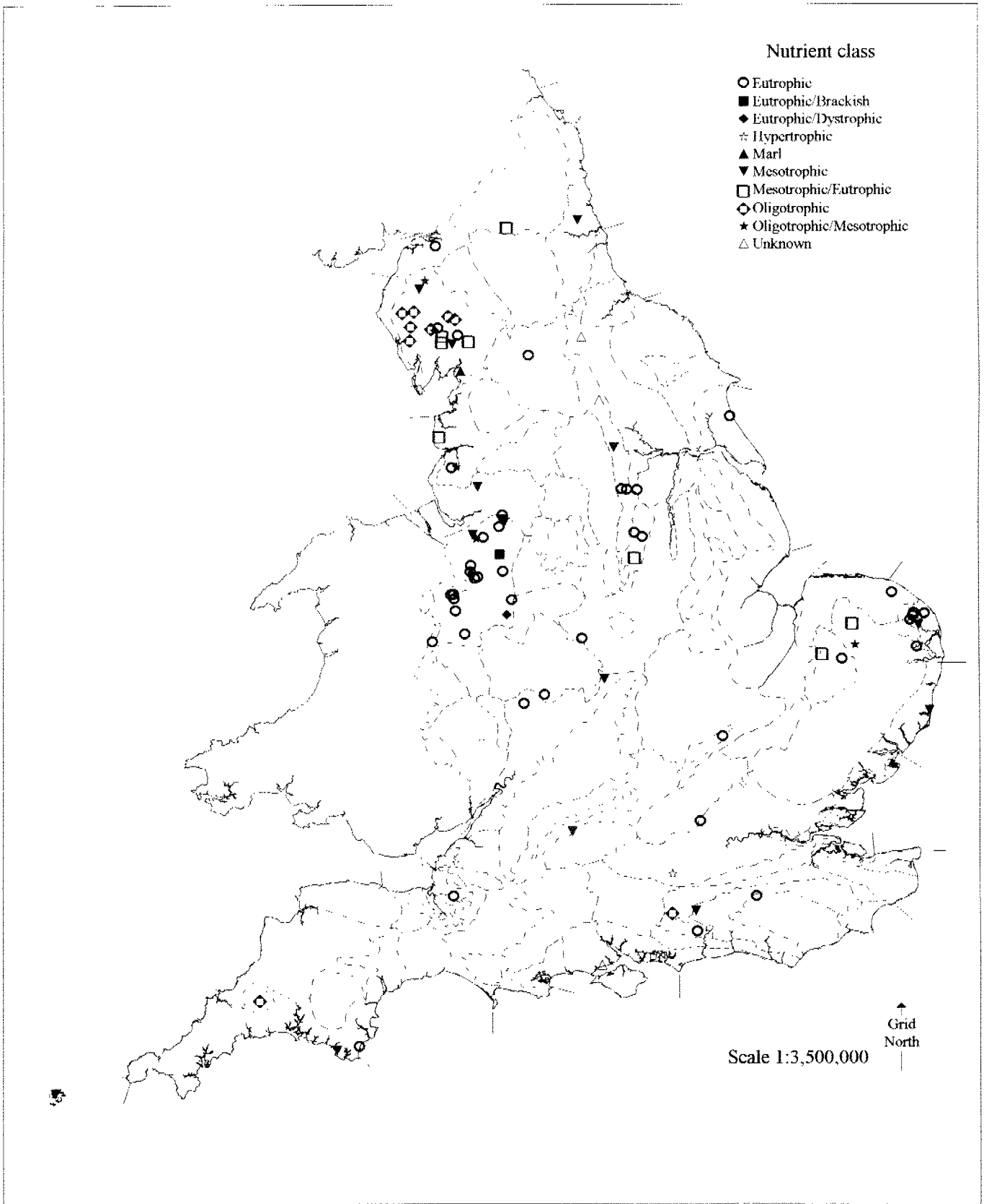


Marine Natural Area

— Natural Area



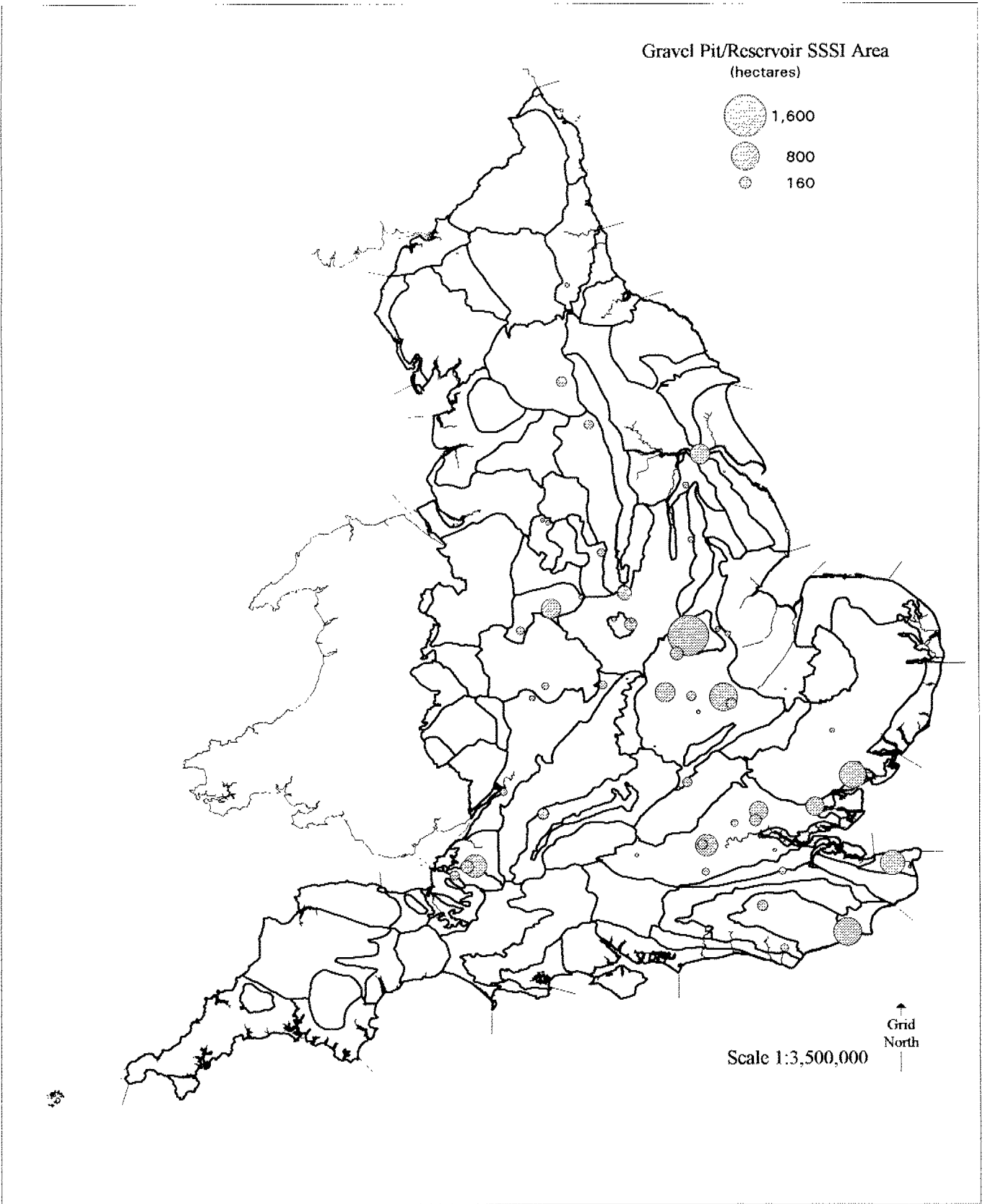
Nutrient Status of Lake SSSIs, within Natural Areas



—— Marine Natural Area
 - - - Natural Area



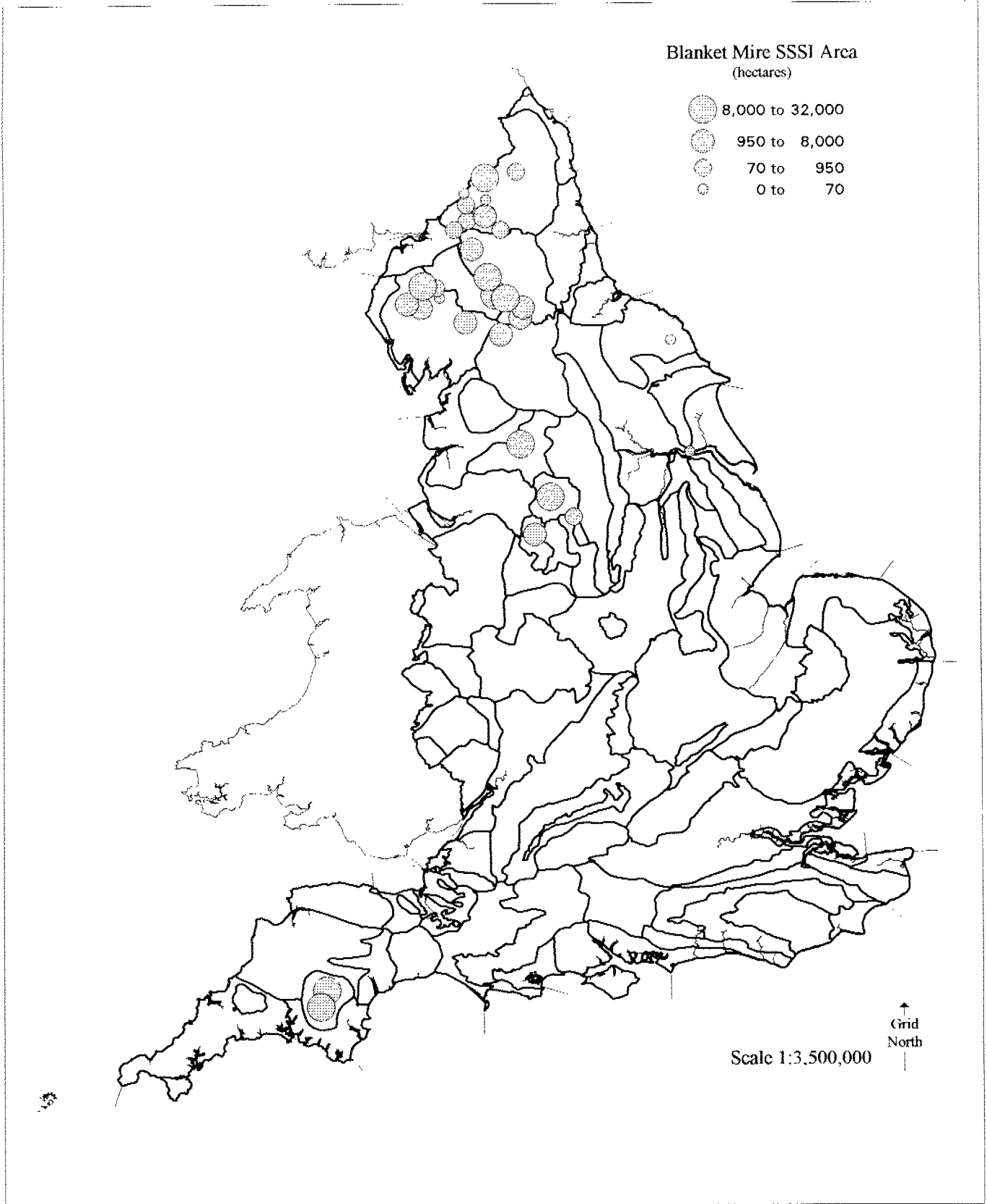
Distribution of SSSIs where Gravel Pits and Reservoirs are Dominant, within Natural Areas



— Marine Natural Area
— Natural Area



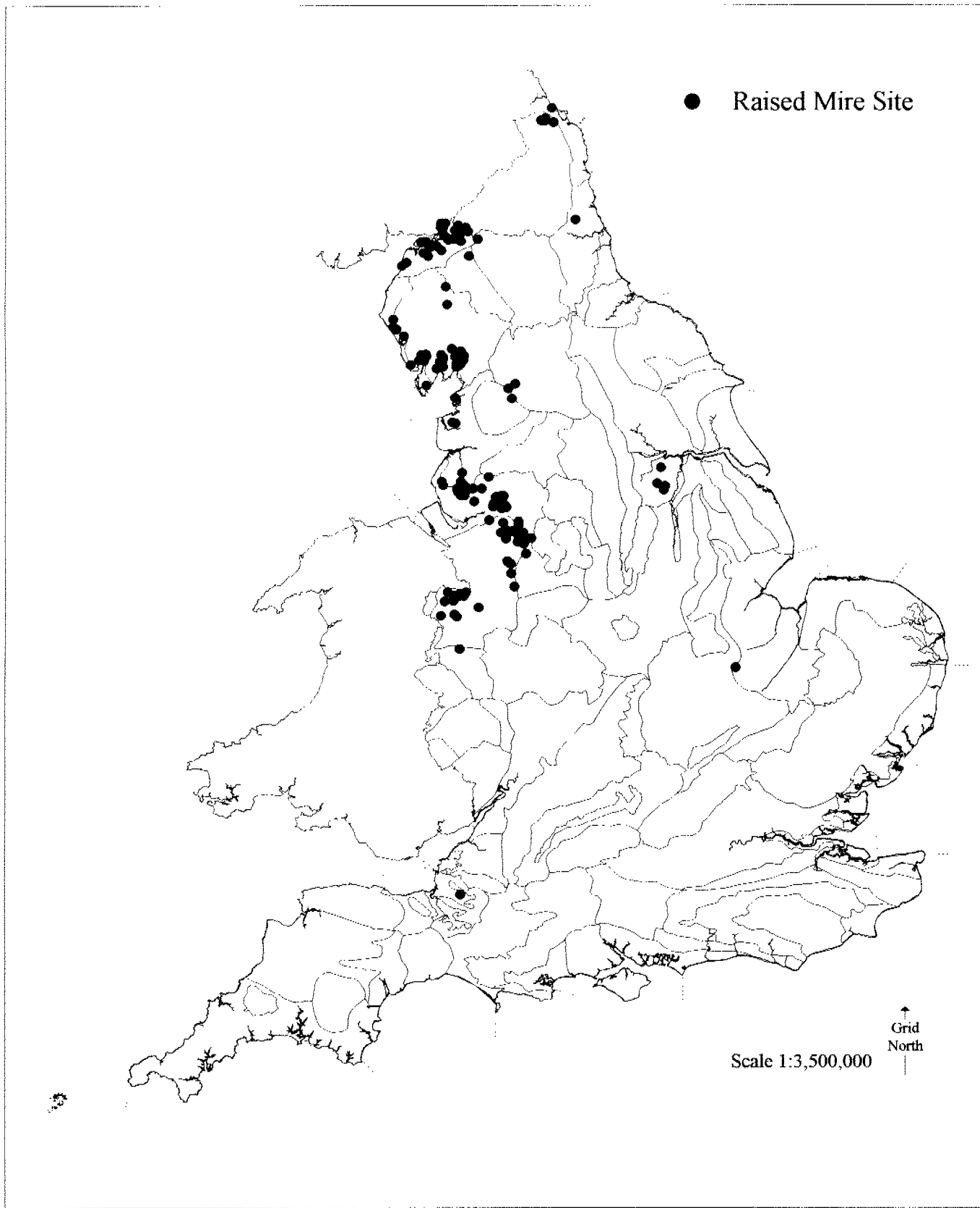
Distribution of SSSIs where Blanket Mire is Dominant, within Natural Areas



- Marine Natural Area
- Natural Area



Distribution of All Raised Mire Sites, within Natural Areas

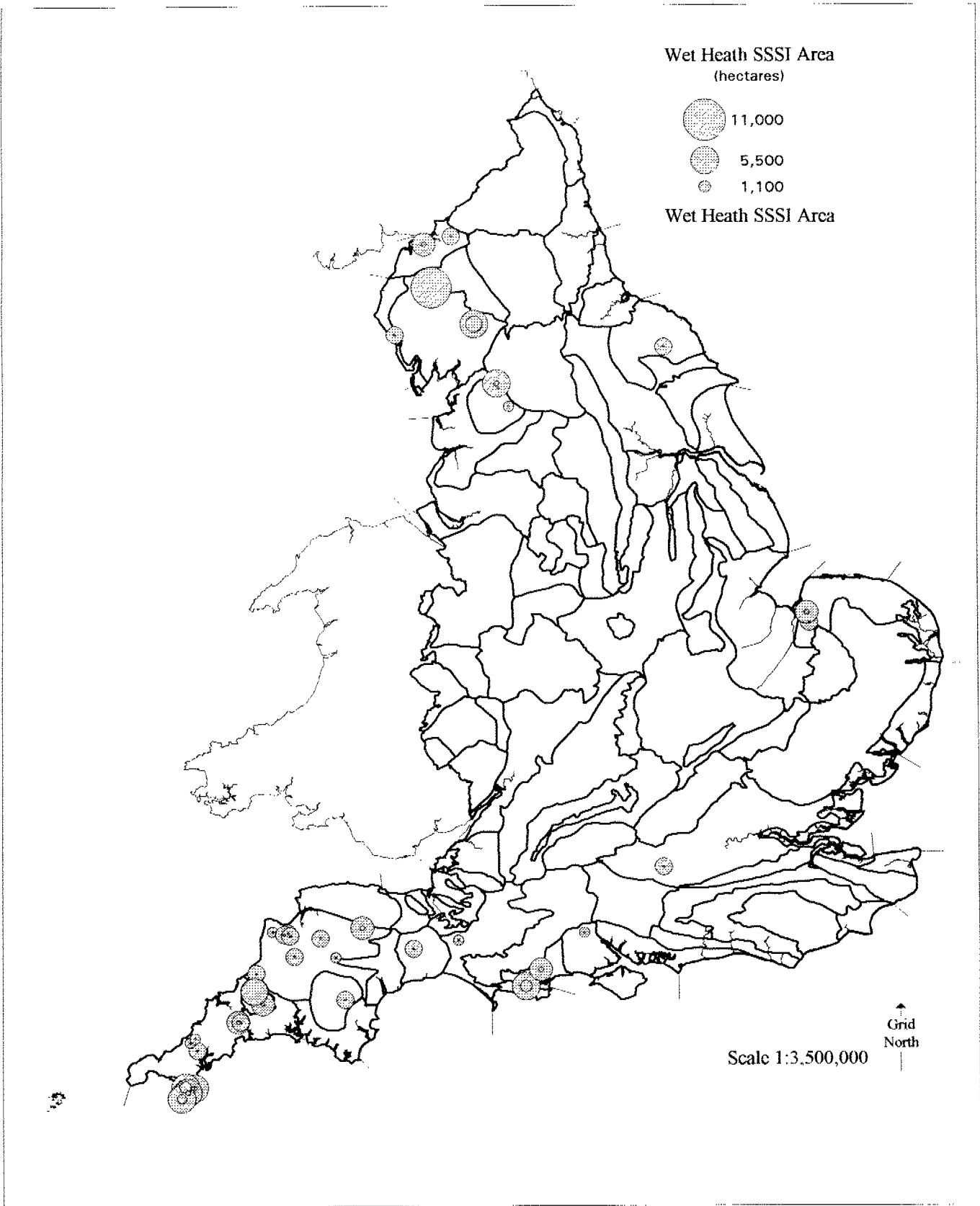


Marine Natural Area

— Natural Area



Distribution of SSSIs where Wet Heath is Dominant, within Natural Areas

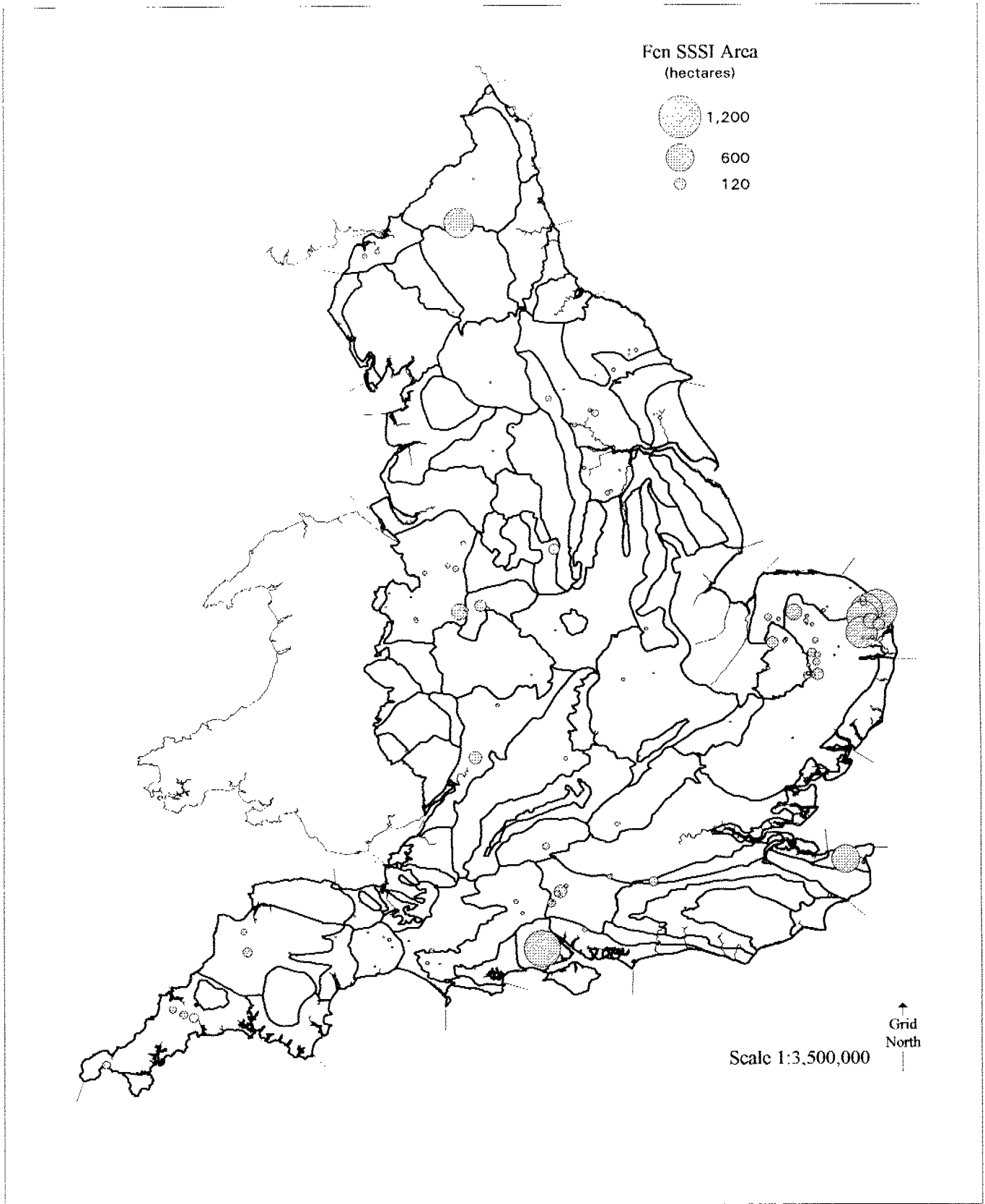


Marine Natural Area

Natural Area



Distribution of SSSIs where Fen Habitats are Dominant, within Natural Areas

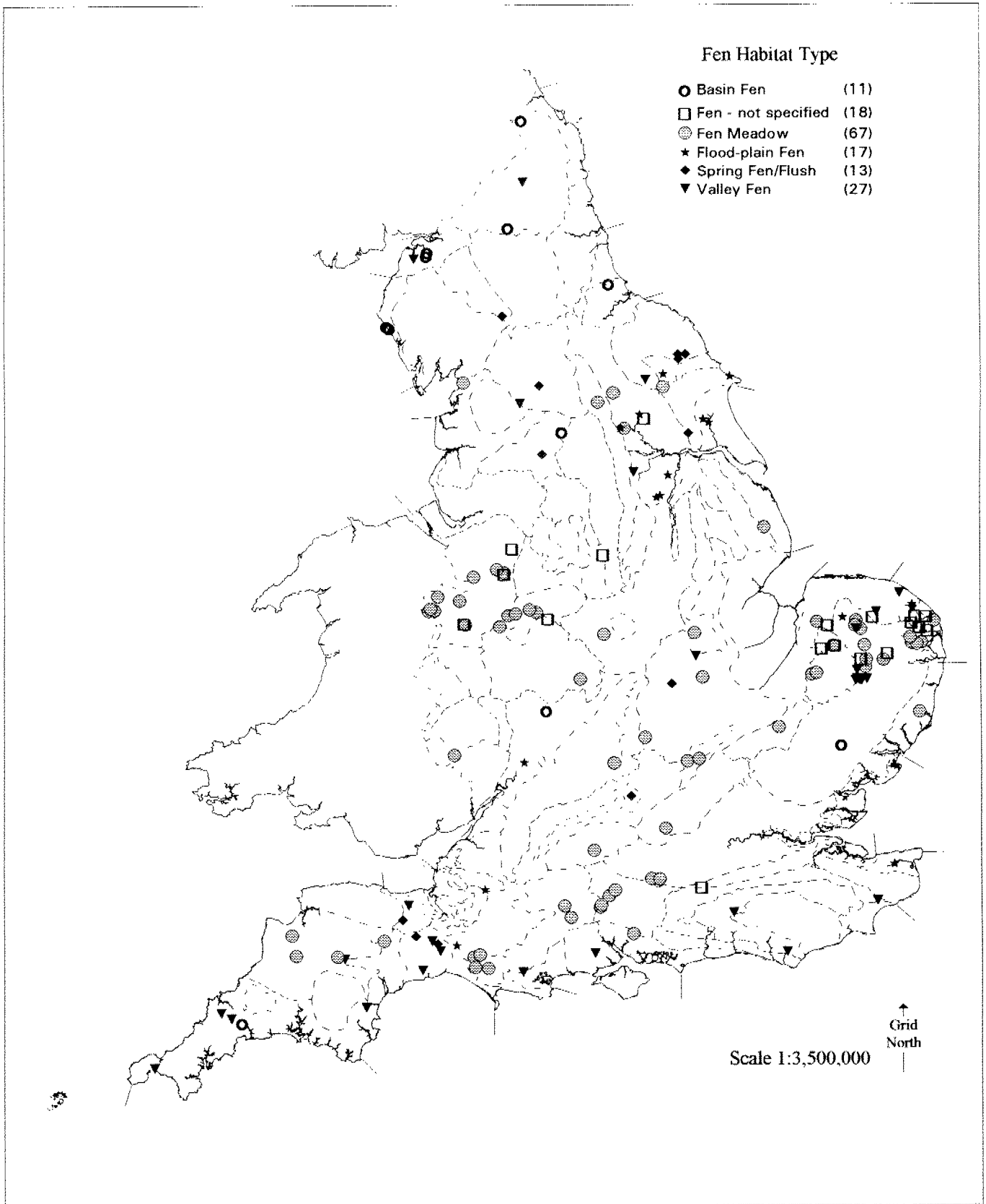


Marine Natural Area

— Natural Area



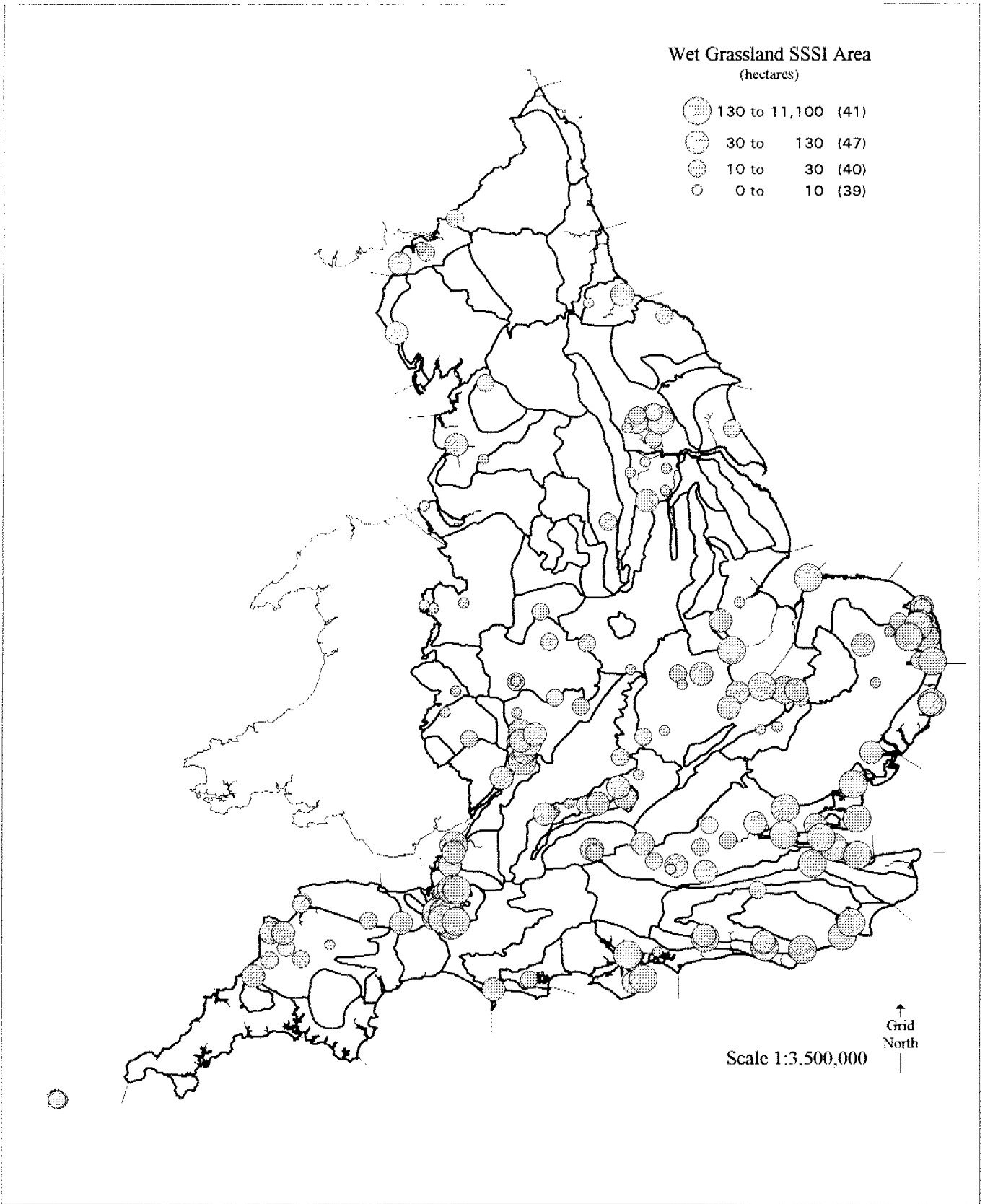
Distribution of SSSIs with Different Fen Habitats, within Natural Areas



— Marine Natural Area
 - - Natural Area



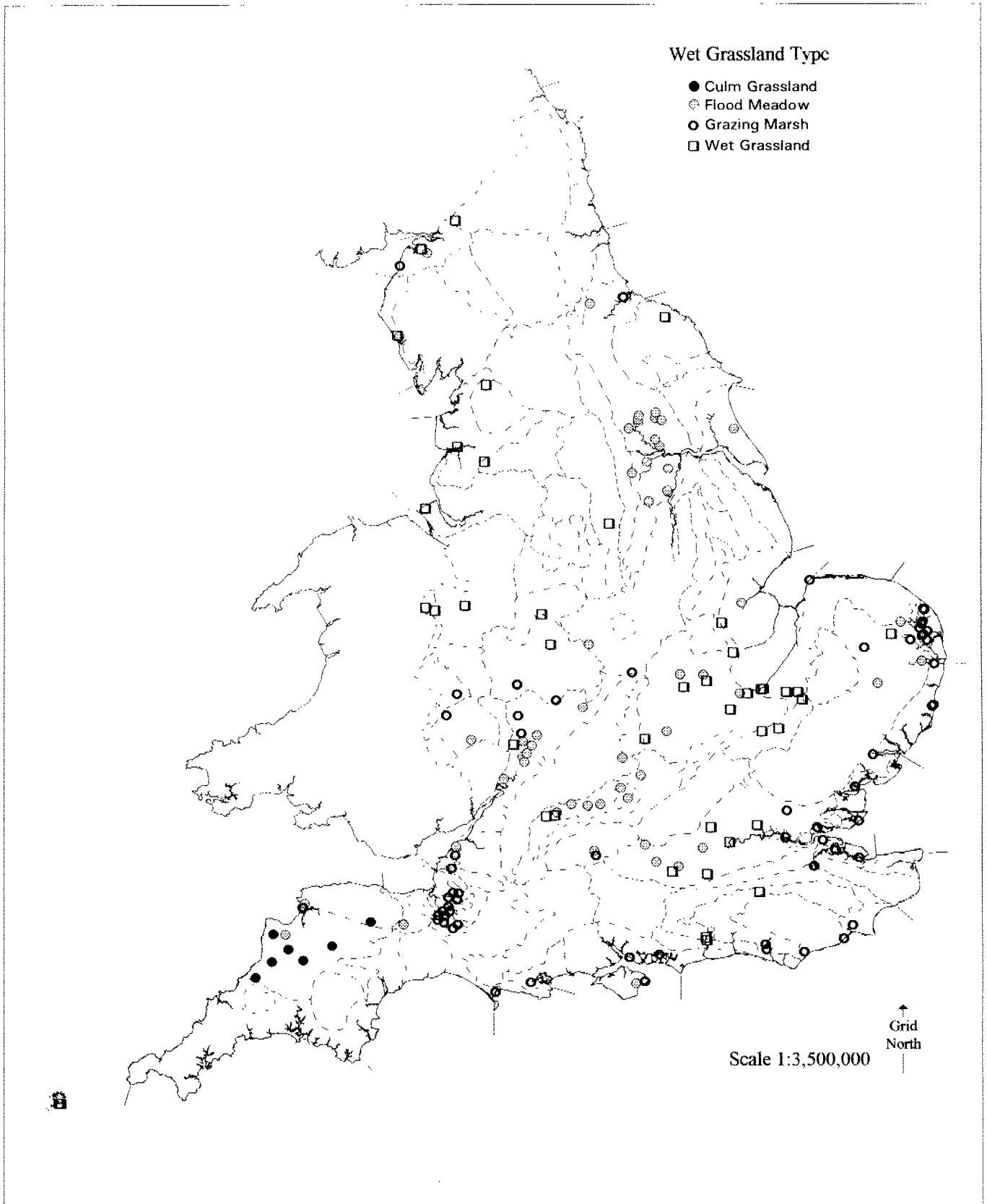
Distribution of SSSIs where Wet Grassland Habitats are Dominant, within Natural Areas



— Marine Natural Area
 — Natural Area

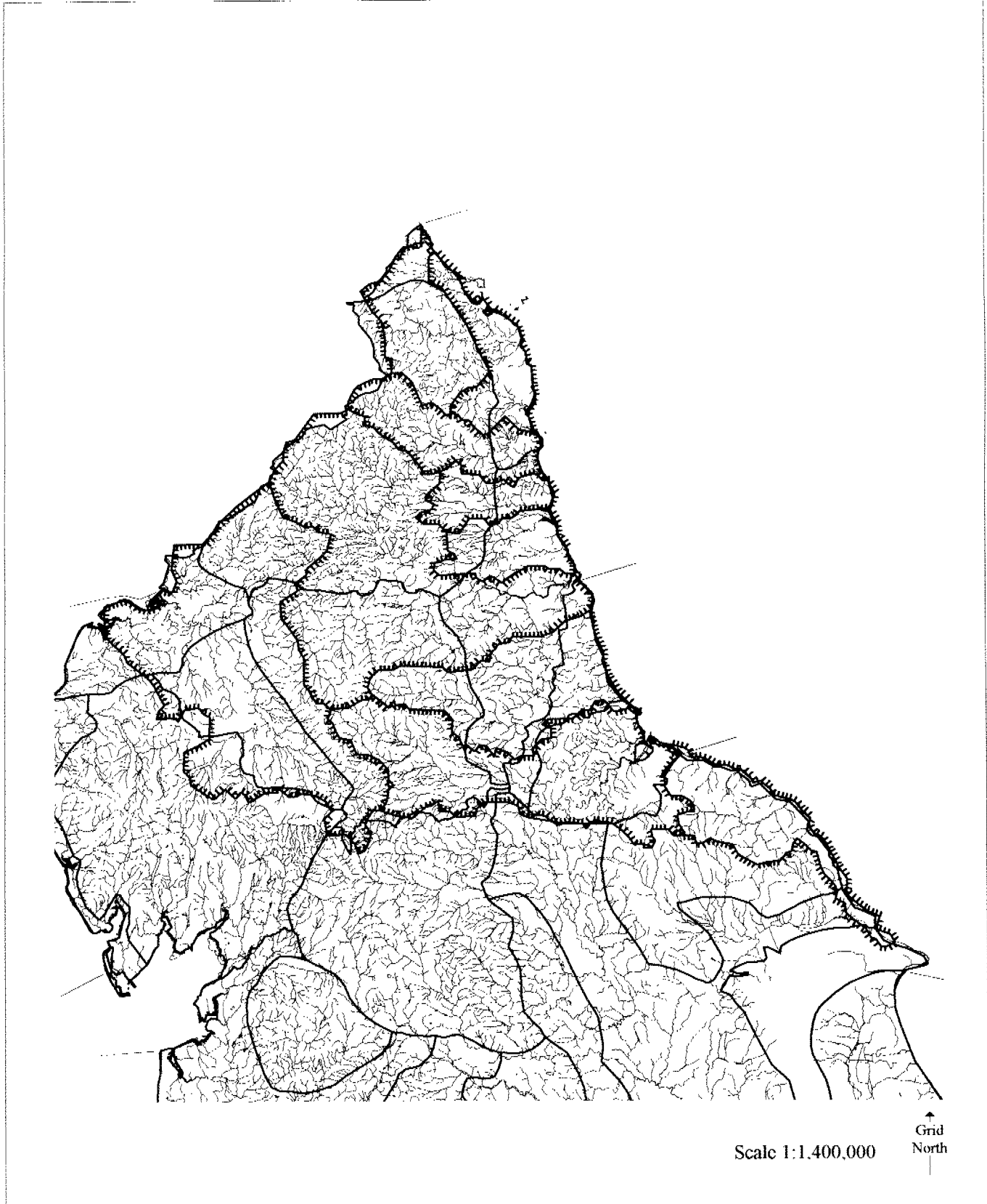





Distribution of SSSIs with Different Wet Grassland Habitats, within Natural Areas





River Catchments and Natural Areas in North-east England



-  Catchment Boundary
-  Marine Natural Area
-  Natural Area

Scale 1:1,400,000
↑ Grid North