Solent Waders and Brent Goose Strategy

Solent Waders and Brent Goose Strategy Steering Group
November 2010

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Acknowledgements

This Strategy has been produced by the Waders and Brent Geese Strategy Steering Group, a project group of the Solent Forum Nature Conservation Sub-Group, comprising the following organisations:

Chichester Harbour Conservancy
Environment Agency
Hampshire & Isle of Wight Wildlife Trust
Hampshire Ornithological Society
Isle of Wight Council
Natural England
The Royal Society for the Protection of Birds

The spatial data analysis has been carried out by Footprint Ecology.

The work has been funded by the Solent Forum, Natural England, the Environment Agency, RSPB, the Grainger Trust and the Partnership for Urban South Hampshire.

The text is based on the Brent Goose Strategy 2002 and the Solent Waders and Brent Goose Spatial Analysis Report by Footprint Ecology. Updates to the text have been written by Debbie King (HIWWT) with contributions from Carrie Temple (RSPB), Ed Rowsell (CHC), Tim Sykes (EA), Pauline Holmes, Catherine Rankin-Moore and Clive Chatters (HIWWT).

Maps and GIS layers produced by Footprint Ecology and Debbie King (HIWWT) and John Shillitoe (HOS) under licence from the Ordnance Survey (no. 100015632 and Ordnance Survey Opendata).

Artwork by Dan Powell

Published by:
Hampshire and Isle of Wight Wildlife Trust
Beechcroft House
Curdridge
Hampshire
SO32 2DP

A company Ltd by guarantee & registered in England No. 676313 Charity No. 201081

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Contents

Summary

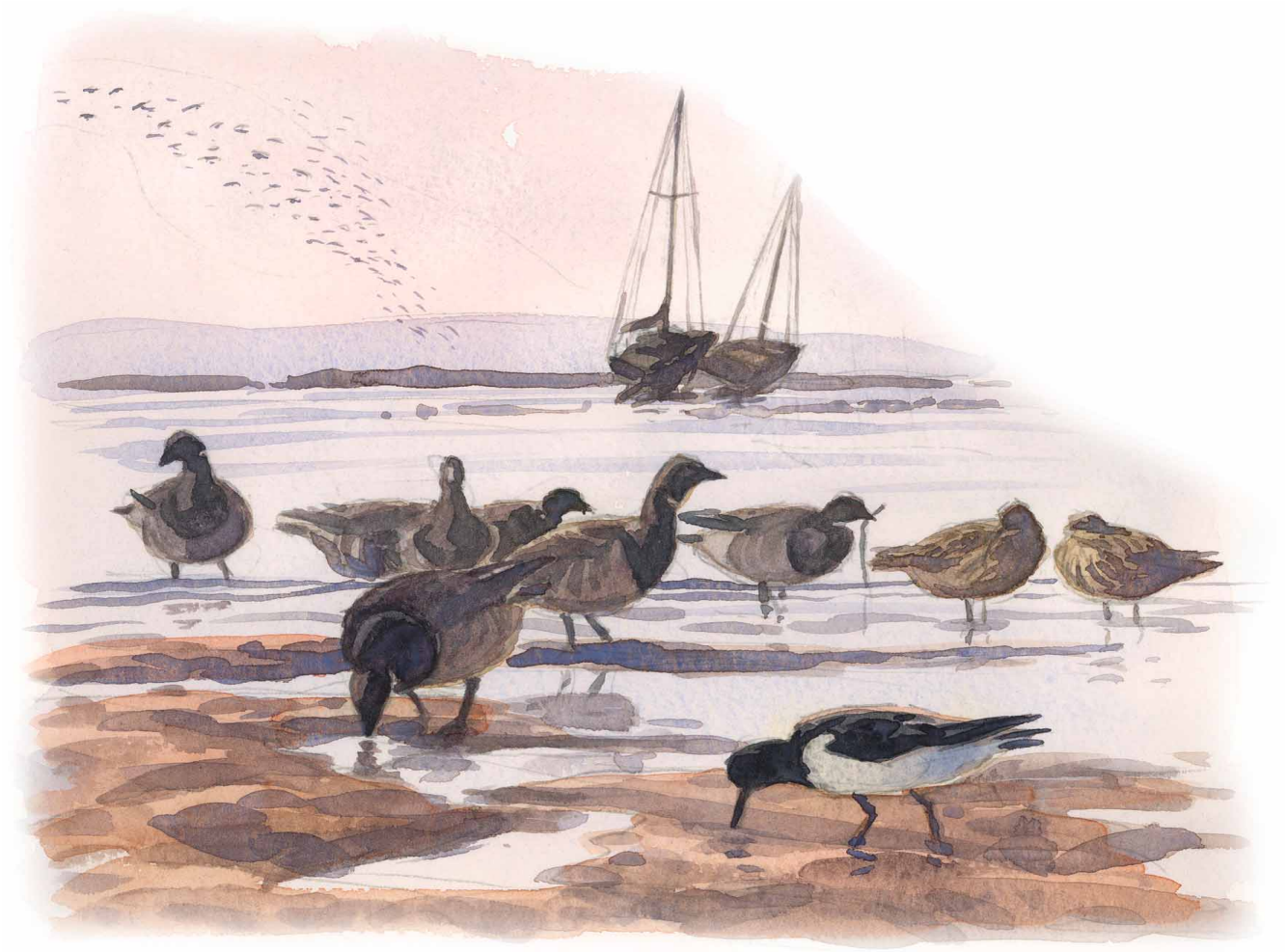
The Strategy is the report of the Solent Waders and Brent Goose Strategy Steering Group. This steering group comprises a partnership of statutory and non-statutory bodies.

The Strategy is a non-statutory document presenting evidence, analysis and recommendations to inform decisions relating to strategic planning as well as individual development proposals.

The Strategy relates to internationally important Brent Goose and wading bird populations within and around the Special Protection Areas and Ramsar wetlands of the Solent Coast (Hampshire, Isle of Wight and West Sussex). The underlying principle of the Strategy is to wherever possible conserve extant sites, and to create new sites, enhancing the quality and extent of the feeding and roosting resource.

The datasets informing the Strategy relate to over 1000 survey sites within the urban matrix and the countryside surrounding the Solent. Surveys were undertaken by over 100 surveyors, mostly volunteers, over the three winters 2006-2009. Analysis of the records revealed that 38% of the sites surveyed are currently used by Brent Geese and 55% by waders. A total of 20 different wading birds species were recorded, with Curlew, Oyster-catcher and Redshank being the most frequently recorded species, with over 1000 counts each. For Brent Geese, counts were recorded in excess of 3,000 individuals, the maximum count recorded at Farlington Marshes in Langstone Harbour. All of the sites identified in the Strategy as being currently used by waders and/or Brent Geese are considered to be “important” as they all form part of the ecological network of sites used by birds.

Recommendations are set out for planning policy makers, site owners and those involved in managing land within the Solent area in order to protect the integrity of this network of important sites. The report updates the Brent Goose Strategy of July 2002.



Part 1 – Background Information

1.1 Introduction

The natural and man-made environment of the Solent makes it one of the most important coastal zones in the UK. The diversity of habitats and species comprise an internationally important wildlife resource. In human and economic terms the area has a long history of principally port-related industries. Good communications with the rest of the UK and Europe have led to the development of other industrial sectors in recent years with the result that the area is very densely populated. In addition, the coastline provides an attractive recreational resource for local people and those from further afield.

Land-use planning and management for these diverse interests have become increasingly complex in recent years. It is perhaps inevitable that conflicts have arisen between the needs of wildlife and those of people. Such conflict is exemplified in the Solent by the pressures for development on grasslands used for foraging by Dark-bellied Brent Geese and as a roosting resource by wading birds, during the winter months.

Whilst there are statutory mechanisms in place to designate areas of special protection for important habitats and species, there is a mismatch between such sites and the needs of the particular species or habitats of interest. Brent Geese and wading birds are species of international importance generally protected under European legislation and specially protected within designated sites, called Special Protection Areas (SPAs); but birds are mobile species, they are also dependent on sites outside of formal designations and rely on the availability of a network of feeding and roosting resources over the winter period.

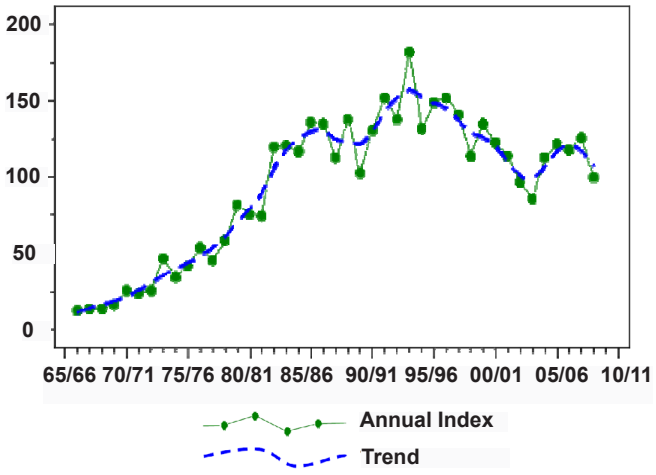
This Strategy is a practical attempt at addressing the issues surrounding these sites by providing information on the location of sites currently used by these birds, sites that are vulnerable to loss, and sites that have potential for future use by waders and/or Brent Geese, based on a spatial analysis of three years of field survey data.

1.2 Ecology of Waders and Brent Geese

1.2.1 Brent Geese

The Dark-bellied Brent Goose *Branta bernicla bernicla* is a winter visitor to the Solent from its breeding grounds in Siberia. Virtually the entire world population winters in north-western Europe. In nature conservation terms the species is of high international importance and is regarded as vulnerable because of the relatively small size of the world population, which has a highly variable breeding success. Numbers have fluctuated over time. After decades of low numbers following a major population crash in the 1930s, numbers have steadily increased but have again seen a general downward trend since 1993/94, possibly due to adverse conditions in their breeding grounds in Siberia (see figure 1).

Figure 1. The annual indices and smoothed population trends for Dark-bellied Brent Goose in England.



Source: Calbrade, N.A. *et al.* (2010). Waterbirds in the UK 2008/09: The Wetland Bird Survey. BTO/RSPB/JNCC in association with WWT, Thetford

Numbers of Brent Geese are largely controlled by predation pressure in the breeding season which is tied to the lemming cycle in the Arctic. In good years, predators such as Arctic Foxes concentrate on lemmings, leaving large numbers of young Brent Geese to survive to fledging. However, in poor lemming years the predators switch their diet to ground nesting birds, which can sometimes result in an almost complete breeding failure for Brent Geese.

At the most recent population estimate, the UK supports 98,100 Dark-bellied Brent Geese, primarily at coastal sites in southern and eastern England (Kershaw and Cranswick, 2003). The Solent harbours and coast are a particularly important area for Brent Geese. At their winter peaks, the population of Brent Geese in Chichester and Langstone Harbours in the last five winters represented about 13% of the national population and 6.5% of the international population. It is estimated that the Solent as a whole supports about 10-13% of the world population of Dark-bellied Brent Geese and about 30% of the UK population (Stillman *et al.*, 2009). Internationally important sites for Brent Geese include Portsmouth Harbour, Langstone and Chichester Harbours and the North West Solent; additional nationally important sites for Brent Geese in the Solent include Beaulieu Estuary, Southampton Water and Newtown Estuary (Calbrade *et al.,* 2010).

There are three races of Brent Geese, the dark-bellied *Branta bernicla bernicla*, the pale-bellied *Branta bernicla hrota* and the black *Branta bernicla nigrans*. Only the dark-bellied race occurs regularly in the Solent, therefore this strategy is concerned only with *Branta b. bernicla,* although for ease the text states simply Brent Geese.

Brent Geese arrive in the UK from mid September, but the majority arrive in October to early November with numbers reaching their peak in January. Birds usually depart from late February, but this can vary with season. Brent Geese traditionally winter on coastal mud flats, where they initially feed on eelgrass, *Zostera spp.* and later on various marine algae, particularly *Enteromorpha spp*., and Sea Lettuce *Ulva lactuca*. At any one site, the availability of food will be dependent on local factors such as the extent of the resource itself, die back in harsher winters and pollution. Availability is also dictated by the tidal regime which exposes the mudflats for varying periods.

In the 1930s it was believed that a fungal disease of eelgrass was a major factor in the 75% crash in Brent Goose numbers as the availability of this food source was largely wiped out. Since the 1950s, Brent Geese have diversified their feeding habits to include farmland with cereals and pasture, and amenity grasslands. This behaviour was first noted in the Solent in the 1970s. Terrestrial habitats, such as cereal fields and amenity grasslands, are of great importance as alternative feeding areas as the birds' nutritional requirements cannot be met by natural food sources. This is partly due to the reduction in natural inland habitat such as coastal grassland, lost to development and agriculture.

Brent Geese feed in daylight and the use of terrestrial feeding sites is greatest at high tide. In years with large numbers of juveniles (first winter birds), more use is made of terrestrial sites. This is partly due to competition for food on the intertidal from older, more efficient feeders, and partly because grass is more nutritious. Although families may choose to graze nutrient-rich grassland for their young, there is a trade-off with the increased risks associated with exposure to predators and disturbance compared to feeding on the intertidal. Harsh winters also cause an increased use of terrestrial sites as eelgrass dies back.

The suitability of sites for Brent Geese depends on distance from the coast, the size of the grazing area, the type of grassland management, visibility and disturbance. Brent Geese prefer large open sites where they have clear sight-lines and short, lush grass for grazing. They use a great deal of energy travelling between feeding areas, so tend to preferentially select sites adjacent to the coast. However, Brent Geese are often seen to fly over some apparently suitable sites to reach others, so there are undoubtedly more subtle factors controlling the desirability of sites.

Disturbance can have a marked effect on Brent Geese. When mildly alarmed, they raise their heads but quickly resume feeding. When levels of disturbance increase, they fly away and resettle when the cause of disturbance has passed, or look for another quieter site nearby. The effects of disturbance are currently being investigated as part of a wider Solent study, the Solent

Mitigation and Disturbance Project, which aims to measure the distribution of human activities and their effects on coastal birds and to determine the current and future impact of human disturbance on wintering bird populations of the Solent.

Brent Geese are long-lived animals with a life expectancy of up to 30 years, although most do not survive that long. Brent Geese exhibit faithfulness to their wintering grounds, with the same individuals having been recorded at the same site for over 20 years. The populations occurring in the Solent harbours appear to form discrete sub-populations; movement between and within sub-populations is an area in need of further research.

1.2.2 Waders

The Solent supports significant populations of wading birds of international importance, (including a number that are listed on Annex I of the EC Birds Directive) and a number of species that exceed the thresholds of national importance.

Many species of wading birds migrate thousands of miles to overwinter in the UK, whilst others remain to breed (albeit in small numbers in the Solent). Several waders are passage migrants travelling annually from as far afield as the Arctic and Siberia, refuelling in the UK to carry on further to the southern-most tip of Africa.

The Solent coastline provides an internationally important wintering area for these species and this is recognised by its almost complete coverage as SPA and Ramsar. The average wintering population of all waders in the Solent exceeds 90,000 annually (BTO WeBS Core Counts, 2001-2006).

The Solent's intertidal habitats, its mudflats, shingle and saltmarsh provide vital feeding and roosting grounds. Waders are specially adapted to feeding in wetlands, adopting a variety of tactics to feed on invertebrates such as worms and molluscs, and in some cases fish that occupy the mudflats of estuarine areas. Waders are gregarious species, feeding and roosting together in large numbers and in the case of Dunlin, in their tens of thousands.

The pattern of movement of wading bird communities is dependent on time of day, tidal water movements and weather conditions. Most species feed at low tide and roost at high tide. Natural roosting sites include saltmarsh areas, shingle banks and coastal grasslands. Waders are also known to roost on man-made structures such as boats, wharfs, jetties and piers. Roosting sites tend to be close the coast, perhaps no more than 100 metres from mean high water. They are usually situated away from sources of disturbance, such as housing and industry, and have good visibility. Like Brent Geese, particular preferences for certain sites are not yet fully understood.

Disturbance is thought to have a serious negative effect on wading bird populations as the cost of energy expended by birds flying away from a source of disturbance may impact on their survival rates. The Solent Disturbance and Mitigation Project should help improve understanding of the population-level impacts of disturbance on waders and other coastal wintering birds in the Solent.

Waders generally live for 10-18 years but some species/individuals can live much longer. They exhibit repeatable patterns of behaviour, for example in the case of migration, returning to the same sites year on year. Numbers have fluctuated significantly in the last 50 years, and some species have shown dramatic declines. The cause of the declines is not fully understood; however, hunting along migration routes, habitat change, shifts in distribution due to climatic factors and predation may be contributing factors.

1.3 The Solent's Current Site Designations

Much of the Solent coastline is recognised as being internationally important for birds and as a consequence is afforded high levels of protection. There are three SPAs: Solent & Southampton Water, Portsmouth Harbour

and Chichester & Langstone Harbours. These sites are additionally designated as 'Wetlands of International Importance' under the Ramsar Convention (commonly known as Ramsar sites).

Both designations include recognition of the international importance of the Solent harbours and estuaries for wintering waterbird assemblages, and/or individually important populations of one or more species. Together they support a total wintering population of around 150,000 birds (see Stillman *et al.,* 2009 for a review). The boundaries of these designated sites generally follow the landward extent of the key semi-natural habitats such as mudflat, saltmarsh or grazing marsh, which support the bird populations. However, they do not encompass all the surrounding land used by the birds for which the international sites have been notified.

Underpinning the international designations in the Solent are Sites of Special Scientific Interest (SSSIs). These are more extensive than the international site boundaries in some landward areas, but still do not protect all terrestrial sites used by the wintering waterbirds. Other features such as plant communities or invertebrate populations may also be cited on the SSSI and Ramsar designations.

Non-statutory sites designated at the local level include Local Nature Reserves and County Wildlife Sites, known as Sites of Importance for Nature Conservation (SINCs) in Hampshire and the Isle of Wight or Sites of Nature Conservation Importance (SNICs) in Sussex. These locally important sites contain habitats or species identified as a priority at a county level. There are over 3000 SINCs in Hampshire, over 250 in Sussex and over 300 on the Isle of Wight. The County Wildlife Sites programme is linked with the local planning system; once they have been identified they are usually included by the Local Authorities in the appropriate Development Plan Documents.

1.4 Need for the Waders and Brent Goose Strategy

While there has been considerable survey attention dedicated to intertidal areas through, for example, the Wetland Bird Survey (WeBS) counts, comparatively little attention has been given to the ecologically-linked inland sites, such as fields and grasslands used for feeding and roosting and the vital role of such sites in supporting the designated site populations. In order that decision-makers and land-owners/land-managers comply with the requirements of the European legislation protecting migratory coastal bird populations (see Part 5), there is a critical need for a clear understanding of which of these sites are important for wintering birds, the factors that make these sites important, and how their relative importance is likely to change in respect of predicted sea level rise and other coastal changes.

In 2002 the Brent Goose Strategy went a long way towards identifying important sites for feeding Brent Geese in the Solent Harbours of Portsmouth, Langstone and Chichester. The 2002 Strategy proved a very useful tool to both planners and conservationists. It was therefore proposed that this work be updated and expanded to cover the entire Solent and to include roosting sites for wading birds.

Current pressures from development, recreation, coastal re-alignment, climate change, sea level rise and coastal squeeze all highlight the urgent need to identify currently important sites and the potential changes in the usage of sites by birds over time. This updated Strategy aims to provide all those engaged with strategic planning and development management with a robust evidence base. This evidence will assist in assessing plans and projects which could impact on these sites. This is particularly important, given the relatively recent requirement for development plans, in addition to project-level proposals, to be assessed under the tests of The Habitats Regulations.

The principle aim of this Strategy is to inform decisions relating to strategic planning as well as individual development proposals, to ensure that sufficient feeding and roosting resources continue to be available and the integrity of the network of sites is restored and maintained, in order to ensure the survival of these coastal bird populations. The underlying principle is to, wherever possible, conserve extant sites and to create new sites, enhancing the quality and extent of the feeding and roosting resource.

A further aim of this Strategy is to enable decision-making to look across boundaries and view important wintering waterbird sites as part of a network of sites, rather than isolated features of the landscape. The information provided here can help with the assessment of any 'in-combination' effects that might impact on the integrity of the network of important feeding and roosting sites, and hence impact on the statutory designated sites themselves.

The Strategy also aims to quantify the factors that make a site suitable for birds which could be used to inform the creation of new or alternative feeding or roosting sites.

In doing so, the Strategy aims to help reduce the conflicts between the needs of wintering coastal birds, development and recreational pressures by promoting an integrated approach to land use and management, together with improved awareness and understanding.

Part 2 - The Survey

2.1 Aims

To provide the data necessary to develop this Strategy, survey work was undertaken with the following aims:

1. To document the locations of extant feeding sites for Brent Geese and high-water roost sites for wading birds, especially those outside the intertidal habitats of the Solent coastline.

2. To identify the network of currently used sites.

3. To characterise the features of high-water roosting sites and feeding sites in order to identify potential areas for creation of alternative roosting and feeding sites.

4. To identify sites vulnerable to sea level rise and explore the effects of development pressure and significant changes in coastal management on the current resource.

2.2 Methodology

Potential sites were identified by the Waders and Brent Goose Steering Group, using the knowledge of local bird experts and ecologists. All sites known to be used in the past or considered potentially suitable (due to their location or habitat) were mapped within a Geographical Information System (GIS). Site boundaries were defined using existing boundaries such as fields, seawalls or followed clear changes in habitat. A total of 1,090 sites across the Solent were digitised, see figure 2 below. Maps and GIS layers showing the location of the survey sites are also provided in the accompanying Strategy Mapping folder on the CD.

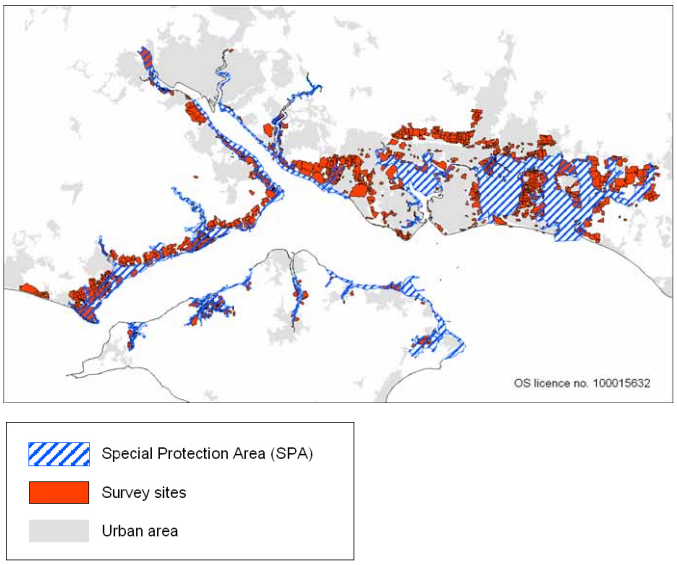


Figure 2. The survey project area, showing the extent of survey sites and the SPA.

The survey sites reflect land uses at the time the survey was designed. Since the survey commenced there have been a number of changes in land use, which will need to be considered when drawing on the data. Bird use was recorded within each site and does not identify whether the birds tended to use one part of the site more than another.

The survey was launched in the winter of 2006-2007. Sites were surveyed by expert surveyors including WeBS counters and trained volunteers. Over 100 surveyors took part. A full list of acknowledgements is given in Appendix III.

Surveyors were asked to count sites regularly, ideally every two weeks where possible. Counts took place over the winter period from October to March for three seasons: 2006-2007, 2007-2008 and 2008-2009. At each visit the date, the time of day, species present and species count were recorded. Additional optional information was also collected including weather conditions, disturbance, and feeding or roosting behaviour.

Surveyors were provided with standardised survey forms, and these were collated into two datasets, one for Brent Goose records and one for wader records (see Appendix III for an example survey form). Data was checked and filtered prior to analysis and

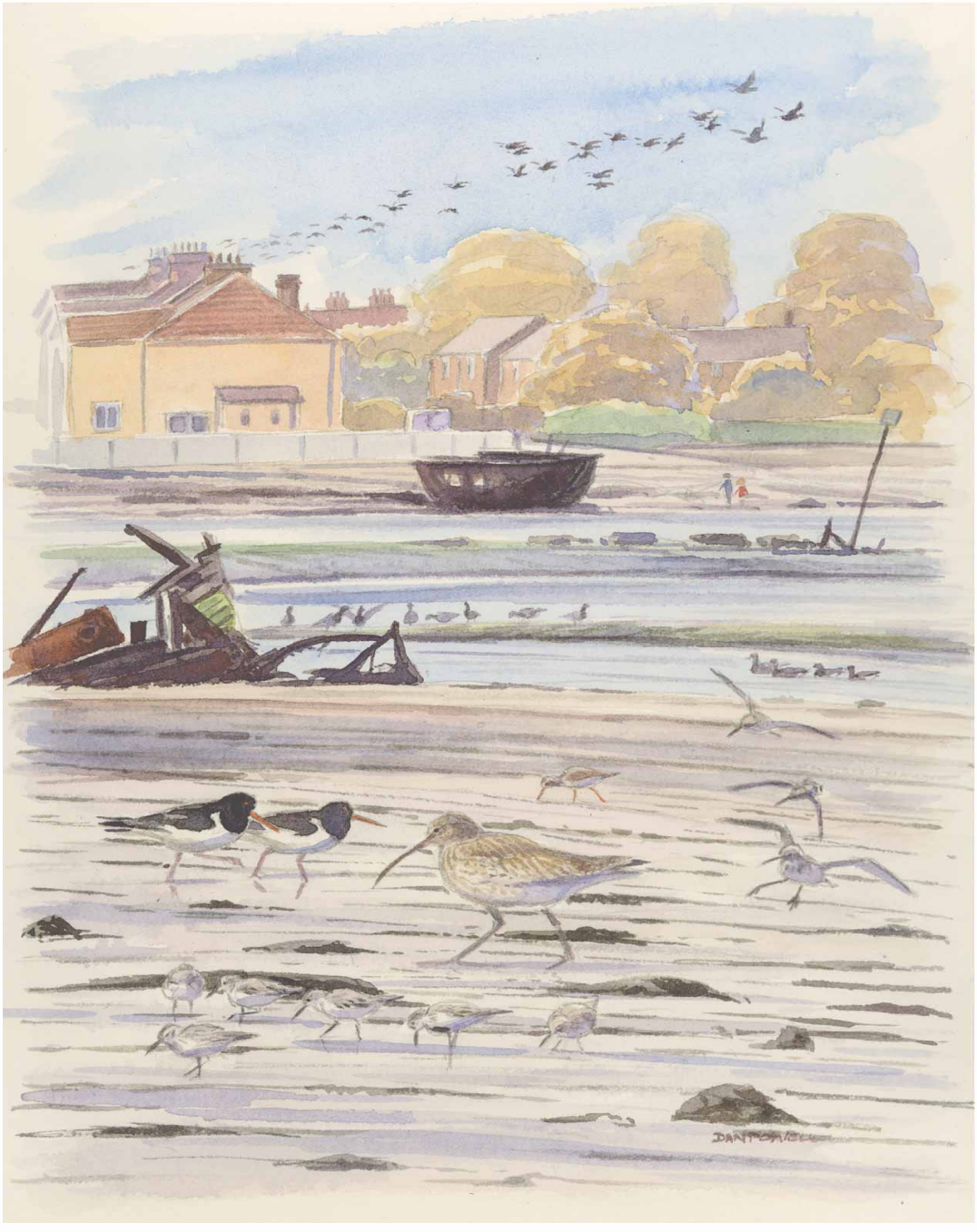
any duplicates and erroneous records were removed. For wading birds, only data within 2.5 hours of high-tide were used, identified retrospectively from tide data.

2.3 Summary of the Survey Results

Over 15,000 records were collected over the period 2006-7 to 2008-9 by 122 recorders. Of the 1,090 sites identified for survey, 544 sites had records for waders and 391 had records for Brent Geese.

A total of 20 different wading bird species were recorded, with Curlew, Oyster-catcher and Redshank being the most frequently recorded species, with over 1000 counts each. For Brent Geese, counts were recorded in excess of 3,000 individuals, the maximum count recorded at Farlington Marshes in Langstone Harbour.

Part 3 - Spatial Analysis - Current Use



3.1 Analysis of Site Use

All of the sites included in this part of the Strategy have been identified as being currently used by waders and/or Brent Geese and are therefore considered to be "important" as they all form part of the ecological network of sites used by birds. In some cases birds may use sites occasionally in high numbers, or regularly in low numbers, sometimes sites are favoured later in the year and some only under extreme weather conditions. We have attempted to capture all of these sites in the Strategy. Maps and GIS layers showing the location of the sites are provided in the accompanying Strategy Mapping folder on the CD.

The use of the sites has been further analysed in terms of species, counts and frequency of use. This analysis is presented below and the results and records on which it is based are provided in accompanying Strategy GIS and Bird Records folders on the CD.

3.1.1 Analysis of Use by Brent Geese

For each site the records were assessed for maximum counts and frequency of use criteria, following the same methodology as the Brent Goose Strategy 2002. An overall assessment figure, calculated by combining the assessment figures for maximum counts and frequency of use has been assigned to each site according to thresholds shown in table 1 below:

Table 1. Brent Goose Site Analysis

Maximum Counts for site	**Assessment**
2000+	8
981 - 1,999	6
196 - 980	4
20 - 195	2
Frequency (% records positive for site)	**Assessment**
60%+	4
40 - 59%	3
20 - 39%	2
1 - 20%	1

Maps and GIS layers showing the network of currently used Brent Goose sites are provided in the accompanying Strategy Mapping folder on the CD.

3.1.2 Analysis of Use by Wading Birds

For each site the records were assessed for the following criteria:

- The maximum count of waders (all species) observed on any one date;
- The significance for a single species according to recognised thresholds;
- The number of different species;
- The species incidence score and the site significance for each individual species. The species incidence scores highlight the frequency with which counts at a given site record each species; it is calculated as the percentage of total surveys conducted at a roost in which at least one individual of the species is present.

It was not possible to combine assessment figures for each site as the criteria used could be mutually exclusive. The individual assessments and thresholds for each of the criteria are shown in table 2 below:

Table 2. Wader Site Analysis

Maximum count	Assessment
>5,000	A
1,000 - 5,000	B
<1,000	C
Significance in a single species	**Assessment**
At least one count above international threshold for a single species	A
At least one count above national threshold for a single species	B
No count above national threshold for a single species	C
Number of different species	**Assessment**
10+	A
5 - 10	B
1 - 5	C
Species Incidence (% for at least one species)	**Assessment**
> 75%	A
50 - 75%	B
< 50%	C

Maps and GIS layers showing the network of important wader sites are provided in the accompanying Strategy Mapping folder on the CD.

3.1.3 Confidence

A method of scoring the confidence for the inclusion of both Brent Geese and wader sites was employed by setting a benchmark figure for regularity of survey for Brent Geese and additionally seasonal coverage by surveyors for waders. Sites that fell below the benchmarks were classified as "uncertain" to highlight them as needing further survey work to inform their assessment.

Surveyors also recorded when birds were not seen at a site, these observations are referred to as "negative counts". Where regular negative counts were recorded, and the confidence threshold was met, sites were classified as "no recorded use".

For Brent Geese 38% of sites were classified as important, 7% as no recorded use and 55% as uncertain. For waders, 21% of sites were classified as important, 6% as no recorded use and 73% as uncertain.

3.2 Update to the Brent Goose Strategy 2002

This strategy updates the Brent Goose Strategy 2002, but where up-to-date data does not exist in the 2010 update for sites identified as "important" in the 2002 Strategy, the 2002 Strategy remains the best available data source. It is recommended that those sites identified as important in 2002 but lacking updated data be considered as "uncertain" and warranting further investigation. Maps and GIS layers showing these sites are provided in the accompanying mapping folder on the CD.

3.3 Limitations of the Data

It is important to recognise several limitations of the data. The use of sites fluctuates with population size, which is dependent on breeding success at summer breeding grounds; usage can therefore change from year to year. Over the last three winters 2006 to 2009, the numbers of juvenile Brent Geese have been relatively low and therefore the survey may not be representative of sites used by these birds in more productive years.

The use of some sites will vary if the land use or management changes. For example, if a field is ploughed or allowed to scrub over, it will no longer be suitable to for use. The data therefore can only reflect the use of sites as dictated by their management regime during the study period.

The use of many sites is affected by disturbance from, for example, recreational activity, which can also vary considerably according to (i) day of the week, e.g. greater use of sports pitches at weekends and Wednesday afternoons (ii) weather, e.g. more dog walkers, golfers etc. may be present during dry weather. It is also likely that data collection by recorders has been biased

towards (i) weekends and (ii) dry weather, which may mean numbers have been under recorded, as these are the times when higher levels of disturbance are likely.

The complete use of sites under extreme weather conditions is also unlikely to have been captured over the three survey periods. For example, in extreme winters Brent Geese have been known to fly far inland to find suitable feeding sources, this was not observed in the three years covered by this study but may occur again in future years.

In addition, recorder effort has been unevenly distributed with the result that some sites have been counted more regularly than others. Ideally, sites should have been counted every two weeks. This is been addressed in part by applying confidence thresholds as described in Section 3.1.3.

Part 4 – Site Characterisation Analysis

The original Brent Goose Strategy 2002 identified a suite of factors likely to influence the use of sites by Brent Geese i.e. habitat, land management, size and shape. This update to the 2002 Strategy investigates this area further by carrying out a number of detailed statistical comparisons of site use, for both wader and Brent Goose sites, in relation to topographical and proximity factors.

Statistical correlations show that factors that describe how urban the area surrounding a site is, e.g. distance to road, area of buildings, relative distance of buildings and number of homes at different travel times, all significantly correlate with Brent Goose and wader site usage. Factors which describe the position and topography of the site, such as linear distance to high water, mean height and range in height (relative to sea level), also all significantly correlate with use.

Many of the factors were found to be interrelated i.e. large sites tended to have more uniform shapes, preferred habitats such as shingle banks tend to be long and thin, making it difficult to isolate the importance of particular factors. All the site factors and their relationship to use are listed in table 3 below.

Table 3. Site Factors - significant correlating factors and their effect on the suitability of sites for waders and Brent Geese.

	Waders		Brent Geese	
Factor	More suitable	Less suitable	More suitable	Less suitable
Area (ha)*	Larger	Smaller	Larger	Smaller
Shape - size/perimeter*	Irregular - long and thin	Regular - square	Regular - square	Irregular - long and thin
Area of buildings (m^2) within 50m zone*	No buildings in this zone	Buildings in this zone	Not significant	Not significant
Area of buildings (m^2) within 50-500m zone*	No buildings in this zone	Buildings in this zone	No buildings in this zone	Buildings in this zone
Area of buildings (m^2) within 500-2500m zone*	No buildings in this zone	Buildings in this zone	Not significant	Not significant
Homes within 15 mins*	No homes	Homes within	Not significant	Not significant
Homes within 30 mins*	No homes	Homes within	Not significant	Not significant
Mean height (m)*	Low lying	High ground	Low lying	High ground
Range in height (m)*	Flat	Uneven	Flat	Uneven
Distance to road (km)*	Further away	Closer	Not significant	Not significant
Distance to mean high water (km)*	Closer	Further away	Closer	Further away
Isolation index	More isolated from other sites	Closer to other sites	Close to other Brent sites	Further away from other Brent sites
Habitat*	Coastal and grassland, then agricultural	All other habitats	Coastal and grassland, then agricultural	All other habitats

* interrelated factor

Although most factors affect site suitability in predictable ways, the reasons for certain effects are less clear, for example for Brent Geese the significance of buildings within the different distance zones varies; the only significant zone to make a site less suitable is the middle distance: 50-500m. Perhaps this acts as a source of intermittent disturbance or possibly this area impacts on flight paths or sight-lines in some way. It is clear that more work would be needed in this area to explain these interactions. However, the analysis does provide a broad evidence base for identifying the factors which make a site suitable for waders and/or Brent Geese and as a result has a number of potential applications, for example:

- Firstly, the findings could be used to inform land management decisions to improve and maintain existing sites for birds e.g. grazing and cutting regimes for coastal grasslands or scrub control.

- Secondly they could be used to inform the acquisition of land for nature conservation purposes, to increase the current resource in the most suitable areas.

- Thirdly they could be used to inform the creation of new sites that may be necessary to offset any losses within the Solent due to any of the current pressures identified in Part 4.

Part 5 – Issues

5.1 Site Protection

Despite being species of international importance, many Brent Goose feeding sites and wader roost sites around the Solent fall outside of the statutory nature conservation site boundaries. The majority of Brent Goose feeding sites are amenity/ recreation grasslands with little intrinsic nature conservation interest, and therefore are easily overlooked and are vulnerable to loss or damage from development and other land use changes. Some sites may have a limited level of protection from development through open space or recreational policies or as County Wildlife Sites, however such designations do not fully reflect their importance in supporting the wintering bird populations within the statutory designated sites.

> The designation of the statutory national and international sites is intended to ensure the long-term distribution and abundance of priority species, and the distribution, structure and function of the habitats necessary to support them. Therefore, it must be recognised that the feeding and roosting sites supporting the Solent's designated wader and Brent Geese populations are functionally important for the integrity of the internationally important sites.

5.2 Development Pressure

The south of England has a number of densely populated urban areas and there are huge development pressures, particularly in South Hampshire. There are 1.7 million residential properties (equating to approximately three million residents) within 50km of the Solent shoreline (Stillman *et al.,* 2009). The Solent is a busy commercial, industrial and residential area. Other development types e.g. port improvements are also focused in the area. Pollution threats, development and recreation pressures are all listed under 4.3 of the Solent SPA documentation under "vulnerabilities" (see www.jncc.gov.uk/page-1401).

Planning authorities should consult with Natural England on the likely direct or indirect effect of potential developments around SSSIs, SPAs and SACs in the Solent. Although Natural England have issued Standing Advice for developers and local authorities to follow for cases relating to Brent Geese (see section 5.6.1) no equivalent advice currently exists for wading birds. Several Brent Goose feeding sites and wader roosts have already been lost to development around the Solent, and the cumulative impact or knock-on effect on other sites has not been taken into account by decision-makers.

It is intended that this Strategy be used as an evidence base to inform proposals and decisions, which may indirectly or directly impact on sites currently used by Brent Geese and wading birds. This evidence contributes to the baseline data for associated Habitat Regulation Assessments. This evidence will also inform the forward planning process. This Strategy is a non-statutory document although it seeks to inform such documents.

5.3 Disturbance Pressure

There is not only considerable pressure on existing land, both for housing and associated infrastructure, but also for access and recreation. The Solent coastline is an attractive location and draws people from a considerable distance for a range of recreational activities.

Many inland sites currently used by Brent Geese are also used for recreational, commercial, industrial or agricultural purposes, which on some occasions prevents or reduces usage by Brent Geese due to disturbance. Several sites used by waders at high tide are also vulnerable to disturbance, especially from recreational activities which would like-wise prevent them being used. Both waders and Brent Geese need a network of sites from which to choose and

fly between in order to cope with changing circumstances at individual sites.
The density of the human population around the Solent and the current plans to further increase this, alongside the pressure to identify more green space for multi-functional usage and increased access to the coast in general, highlights the need to maintain a robust network of roosting and feeding sites in the Solent.

5.4 Coastal Squeeze and Sea Level Rise

There is also pressure on existing sites from sea level rise and coastal squeeze. A large proportion of the most important coastal bird sites in the Solent are in flood risk areas as identified by the Environment Agency Flood Risk Zones. Sea level rise is currently predicted at rates of 4mm per annum until 2025 (Flood and Coastal Defence Appraisal Guidance, 2006) and climate change may also bring an increase in tidal surges and extreme weather events. This undoubtedly puts many important feeding and roosting sites identified in this Strategy at risk.

Coastal habitats are considered to be under threat from climate change. Predicted changes to existing intertidal habitat across the north Solent, regardless of defences or nature conservation designations, are estimated at an increase of 60 hectares (ha) for mudflat and at a loss of 812 ha for saltmarsh, over the next 100 years (Channel Coastal Observatory, 2008). Intertidal coastal squeeze resulting from maintenance of existing defences across the north Solent over the next 100 years is estimated to be approximately 5 ha of mudflat coastal squeeze and 495-595 ha of saltmarsh coastal squeeze.

These habitats are vital to wintering waterbirds and are key qualifying features of the Solent's national and international designations. Changes to them will have significant implications on site availability for coastal birds. It is therefore inevitable that inland sites will become even more important in the Solent in the future.

5.5 Land Management

Land management can be a crucial factor in site suitability for waders and Brent Geese. Changes in land management can prevent some potentially good sites from being used, all of which combined, increases the pressure on the total network of sites. For example, coastal grassland sites no longer under a suitable management regime can quickly become unsuitable for roosting waders or feeding Brent Geese as visibility decreases. Tree planting or other landscaping in and around amenity sites will also make these sites less suitable.

Ploughed fields, stubble and certain crop types are unsuitable for these birds and there are a few sites where Brent Geese are actively discouraged from feeding, particularly for crop protection on arable land through the use of gas guns and other bird scaring techniques. Changes in the types of crops grown on farmland will also affect the suitability of these sites for Brent Geese. Currently there are no options for Brent Geese or wader roosting habitat within agricultural stewardship schemes.

5.6 Decision-Making

Experience has shown the value of incorporating the requirements of Brent Geese and wading birds into the planning system. This evidence may inform a variety of local and strategic development plans together with coastal management plans and green infrastructure strategies.
Detailed guidance on how proposals affecting statutory designated sites, or the interest they support, should be treated can currently be found in Planning Policy Statement 9 Biodiversity and Geological Conservation (and its accompanying Government Circular [1]), and Managing Natura 2000 Sites (European Communities 2000). A short summary of the requirements set out in the relevant policy and legislation is given here, however this is purely intended as an overview and is not definitive.

5.6.1 The Conservation of Habitats and Species Regulations 2010

Migratory waterbirds are protected under European legislation[2] , translated into UK law by The Conservation of Habitats and Species Regulations 2010 (commonly known as 'The Habitats Regulations'). The Habitats Regulations ensure that wintering waterbirds, including Brent Geese and waders, are specially protected within the Solent's SPAs and Ramsar sites. However, these species are dependent on roosting and feeding sites that are outside of the designated site boundaries and, therefore, these essential supporting sites must also receive adequate protection to ensure achievement of favourable conservation status. Article 4(4) of the Birds Directive states that 'outside these protected areas (SPAs), Member States should 'strive to avoid pollution or deterioration of habitats'. Therefore, it is clear that it is not simply the SPA itself that is important, but the interest features that give rise to the designation.

Any impact on a wader roost or Brent Goose feeding site outside of the SPA/ Ramsar site boundaries may be considered to have an effect on the international site itself. Where impacts cannot be avoided or satisfactorily reduced/mitigated, the competent authority will need to ascertain that the plan or project will not have a negative impact on the designated populations, which would constitute an adverse effect on the integrity of the international site.

Development that could have an adverse effect on an international site's integrity may only be permitted if (a) there are no alternative solutions; and (b) there are imperative reasons of overriding public interest. Where these strict tests are met, the Secretary of State is responsible for ensuring that compensatory measures are secured to ensure the ecological coherence or the network of the international sites is protected.

There is a detailed process by which a plan or project affecting an SPA/Ramsar or other international site, including feeding or roosting grounds beyond the boundary of the designated site, should be considered. This is set out under Regulations 61, 62 and 66 for 'plans and projects', and Regulations 102-105 specifically for land use plans[3] of the Habitats Regulations and is further explained in Planning Policy Statement 9 and its accompanying Government Circular (see footnote 1).

The Brent Goose Strategy 2002 and the Solent Waders and Brent Goose Strategy 2010 grew out of the need to clarify and resolve potential site protection issues concerning off-site SPA features around the Solent. Documents such as this Strategy are an appropriate way forward in seeking to inform local decision-making. This Strategy therefore aims to inform the above process and, where possible, to ensure appropriate provisions are built in to policy and projects at an early stage of their development.

Further advice in respect of Brent Goose feeding sites is available in Natural England's Standing Advice of February 2010 (www.naturalengland.org.uk)

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[1] *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (ODPM 06/2005, Defra 01/2005)*

[2] *Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive'); and Directive 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive').*

[3] *The application of the Habitats Regulations to land use plans in the UK derives from an October 2005 European Court of Justice Ruling on the transposition of the Habitats Directive into UK law.*

5.6.2 Planning Policy Statements

In addition to the site protection regime required under the Habitats Regulations, Planning Policy Statement 9 (PPS9) states that Local Development Frameworks should:

"identify any areas or sites for restoration or creation of new priority habitats which contribute to regional targets, and support this restoration or creation through appropriate policies."[4]

Furthermore PPS9 advises that *"Local authorities should aim to maintain, and enhance, restore or add to biodiverstiy interests*[5] *....and to maintain networks by avoiding or repairing the fragmentation and isolation of natural habitats through policies in plans. Such networks should be protected from development, and, where possible, strengthened by or integrated within it."* [6]

This approach of establishing networks of natural habitats is a key principle of PPS9 where it states that sites of biodiversity importance can be linked to provide routes or "stepping stones" for the migration, dispersal and genetic exchange of species in the wider environment. This will become increasingly important in facilitating "species creep" in response to climate change.

Planning Policy Statement 12 - creating strong safe and prosperous communities through Local Spatial Planning (PPS12), further emphasises the importance of spatial planning in protecting environmental assets, stating that: "*Spatial planning provides a means of safeguarding the area's environmental assets, both for their intrinsic value and for their contribution to social and economic well being by:*

- *protection and enhancing designated sites, landscapes, habitats and protected species; and*
- *creating a positive framework for environmental enhancement more generally."* [7]

The environmental needs of the South East, as endorsed by the England Biodiversity Strategy and PPS9, include the reversal of biodiversity loss and habitat fragmentation.

In addition the Natural Environment and Rural Communities (NERC) Act 2006 also places a biodiversity duty on all public bodies, which is in addition to Local Authorities' existing duties under the Wildlife and Countryside Act to take steps to conserve and enhance SSSIs as part of their functions. This new duty extends to conserving biodiversity outside of designated sites.

Section 40, Part 3 of the NERC Act states:

"Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity."

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[4] Paragraph 5(ii) Planning Policy Statement 9 - Biodiversity and Geological Conservation.

[5] Paragraph 1(ii) Planning Policy Statement 9 - Biodiversity and Geological Conservation.

[6] Paragraph 12 Planning Policy Statement 9 - Biodiversity and Geological Conservation.

[7] Paragraph 2.6 Planning Policy Statement 12 - creating strong, safe and prosperous communities through Local Spatial Planning.

Part 6 – Spatial Analysis – Future Use

6.1 Potential Sites

The identification of sites of current importance should help to protect the known resource for waders and Brent Geese. However, the coast is a dynamic habitat and site-use patterns may change with time. Suitability of sites may also change with increases in development and disturbance affecting the suitability of sites. There is therefore a need to identify potentially important sites as an alternative resource to help direct efforts to enhance and extend the resource.

As the site characterisation analysis of Part 4 has shown, the factors that make a site suitable for use are complex and often interrelated. A site may become suitable for use by birds due to its size, shape and proximity to the coast but is unused because of its land management. It is likely that a number of the sites classified as "no recorded use" may have potential for use and that sites classified as "uncertain" may well be used but under-recorded.

Using the site characterisation analysis, a statistical modelling exercise was used to identify sites as being potentially suitable for Brent Geese or waders using the ranges for each factor that most strongly correlated with important sites (Footprint Ecology Spatial Analysis Report, 2010). The analysis identified 271 potential sites for Brent Geese and 68 potential sites for waders were identified. Testing and refining of the model showed that it identified sites as important to a high degree of accuracy. Potential use is expressed in the modelling as a probability. Sites are identified in the Strategy for which probability for being potentially suitable was greater than 0.5 (50%). All of these sites should be seen as warranting site-specific assessment and potential enhancement for the purpose of maintaining the integrity of the designated Solent wintering waterbird populations.

6.2 Vulnerable Sites

6.2.1 Effects of rising sea levels and increased coastal flooding

With rising sea-levels many sites will become vulnerable to temporary flooding with the potential risk of being lost completely. As this happens, sites that were once less important may become more important as they become closer to the coast; this is particularly significant for high tide wader roosts. In order to investigate which sites might change in importance and warrant particular attention, an analysis was carried out to find out which wader sites were most important during times of extreme high tide, a condition which might reveal where birds might go should more regularly used sites become unavailable permanently.

The wader data were filtered to select only those counts that were within 2.5 hours of high tide and where that high tide was particularly high i.e. the top 10% of high tides, in order to focus the analysis on sites used when low-lying sites were unavailable. The current use analysis was then repeated. Of the sites that were classified, a total of 31 (17%) scored lower on assessment and a total of 151 (83%) scored higher on assessment or stayed the same, indicating that the majority of high tide sites are used at times but a significant number will become even more used in the face of sea level rise. These sites are shown in map 45 in the Strategy Mapping Files.

All the survey sites were assessed to determine their vulnerability to sea level rise of above 1 metre. Contour data was extracted from Environment Agency LIDAR data and overlaid over the important sites for wading birds and Brent Geese identified in the current use analysis. It was found that 115 (62%) of the important Brent Goose sites and 78 (76%) of the important wader sites were vulnerable to sea level rise (i.e. more than 50% of their total area fell below 1 m relative to sea level). These sites are shown in map 46 in the accompanying Strategy Mapping folder on the CD.

The vulnerability of sites was further investigated using Environment Agency Flood Zone data. Tidal Flood Zones are mapped by the Environment Agency and generally comprise land that is lower than the estimated height of the extreme surge tide in the relevant event. Zone 2 comprises land assessed as having between a 1 in 100 and 1 in 1000 probability of river flooding or between a 1 in 200 and 1 in 1000 probability of sea flooding. Zone 3 comprises land assessed as having a 1 in 100 or greater probability of river flooding or a 1 in 200 or greater probability of sea flooding.

The Brent Goose and wader sites were queried to determine the number of important sites that fell within each flood zone. Not surprisingly, for both types of site a high proportion of sites are within areas identified as having a high risk of flooding, with for example 71% of Brent Goose sites and 52% of wader sites falling within Zone 2.

6.2.2 Effects of changes in coastal realignment

One of the most important but low-lying and consequently vulnerable sites for both waders and Brent Geese is Farlington Marshes, in Langstone Harbour. Farlington Marshes is a low-lying area of salt marsh, reedbed, grazing marsh and coastal grassland, surrounded by a seawall. It is used in significant numbers by both waders and Brent Geese. To the north are low-lying recreational fields, arable fields, a motorway and the urban areas of Portsmouth and Havant.

In a hypothetical scenario, the potential impact of managed retreat at Farlington Marshes was investigated as a case study into the effects of coastal realignment on a key coastal bird site. The study investigated whether there exists alternative low-lying feeding and roosting resource within the current known resource within the Harbour system, to replace Farlington Marshes' position within the important site network.

In this scenario, a managed retreat policy that would involve a breach of the seawall and a loss of 105 ha of land was proposed. As a result, it is assumed that a large majority of the sites that make up Farlington Marshes would be lost and thus unavailable to birds. The immediate effects on adjacent sites within Langstone Harbour would be a change to their distance to Mean High Water and a change to their site isolation index, which as established in the site characterisation analysis are significantly correlated to site suitability.

To investigate whether any of the currently identified sites could replace Farlington, the statistical model was re-run, applying the loss of sites and the site potential probabilities re-calculated (see Part 4).

The effect on site potential varied, with some sites becoming more suitable and some sites becoming less. Sites immediately behind Farlington showed the most marked change, becoming more potentially important by 6% but overall the changes were very small. It can therefore be concluded that mitigating for the loss of Farlington Marshes would be impossible within the existing resource within Langstone Harbour and alternative sites would need to be newly created or sought outside the local network.

6.2.3 Effects of increased development

Increased development is likely to have a significant effect on the suitability of sites not only in terms of increased proximity to urban areas but also in the increased recreational pressures associated with higher numbers of people living in and visiting the Solent. These issues are currently being investigated through the Solent Disturbance and Mitigation Project. This project is being managed by the Solent Forum on behalf of Local Authorities and other bodies with an expectation of reporting in 2011.

Many of the sites for both Brent Geese and waders are low-lying and close to the Mean High Water mark, and it is clear from this analysis that flooding and future sea level rise are likely to have significant impacts. Therefore, alternative sites must be actively secured and appropriately managed to buffer these effects in order to maintain the network of feeding and roosting sites necessary to support Brent Goose and wader populations in the Solent in the long-term.

An illustration of these issues may be made through a hypothetical scenario of doubling existing mapped urban development around the wader and Brent Goose sites.

To investigate the effects of increases in development the statistical model was re-run applying increases in development around the sites. This resulted in a decrease in predicted suitability across all wader and Brent Goose sites.

A doubling in the amount of existing developed area, around sites resulted in the number of the currently used sites falling from 83 to a predicted 49 for waders. In general the Brent Goose site network seemed more robust than the waders but an overall decrease of was still predicted.

Increases in development across the Solent are likely to significantly damage the integrity of the coastal bird site network. The 'in-combination' effects of increased proximity to housing, increased visitor pressure, recreational activity and habitat loss are likely to be even greater. This further highlights the need to buffer the existing site network through improved management and creation of alternative sites to secure the Solent's Brent Goose and wader populations into the future.

Habitat loss was also considered, alone and in combination with increased housing. It was found that the decrease in importance as a result of habitat loss in combination with increased development results in a greater predicted decrease in overall site suitability than either factor on their own.

Part 7 - Policies and Proposals

The Solent Waders and Brent Goose Project Steering Group recommend that this Strategy be treated as an agreed evidence base for considering all relevant planning proposals. The Group further recommends that, to help avoid potential development and site protection conflicts arising, Local Planning Authorities consider using this evidence base to inform future strategic plans including Devolopment Plan Documents and Supplementary Planning Documents. The following recommendations are phrased as policies which are commended to the relevant authorities.

7.1 Planning and Development

The Solent planning authorities of Havant Borough, Gosport Borough, Fareham Borough, Eastleigh Borough, Test Valley Borough, Southampton City, Portsmouth City, Winchester City, New Forest District, Chichester District, New Forest National Park Authority, Isle of Wight Council, Hampshire County Council and West Sussex County Council will need to take full account of wading birds and Brent Geese in all forward planning and development control decisions and in other activities which may have an effect on these sites (see section 6). This Strategy will enable planning authorities to seek the advice of Natural England and other advisers in the event that a proposal is likely to impact on an important site. The Strategy will also assist individual proposals to be assessed in combination with other plans and projects.

Policy W&BG1

> Planning Authorities will recognise the importance of the wading bird and Brent Goose sites outside of the statutory designated areas in the Solent and will use the Solent Waders and Brent Goose Strategy as a material consideration in the preparation of development plans and in the determination of planning applications.

It is strongly recommended that the relevant Local Biological Records Centre (LRC) (Hampshire Biodiversity Information Centre, Isle of Wight Local Records Centre, or Sussex Biodiversity Record Centre) and, where appropriate, the Chichester Harbour Conservancy be consulted for detailed information about individual sites. For partners and funders of the Solent Waders and Brent Goose Project Steering Group, there will be unlimited access to data and GIS layers via the LRCs, subject to a service level agreement where appropriate. For other parties, access to data will be managed in agreement with the relevant LRC and the Solent Waders and Brent Goose Project Steering Group and will be subject to standard terms, conditions and charging policies.

Policy W&BG2

> Planning Authorities will actively encourage the enhancement of existing and potential Brent Goose and wader sites, and where appropriate the creation of new sites through development control and forward planning functions.

In addition to protecting the existing feeding and roosting resource, it is imperative that Local Authorities seek all opportunities through their development control and forward planning functions to improve existing and potential sites (focusing on those identified in this strategy) or create new sites, in order to buffer the

network of sites from the indirect effects of development. Local Authorities should also strive to ensure that new development does not prejudice options for future enhancement or extension of the resource.

The enhancement of identified potential sites and the creation of new sites is also particularly important in response to sea level rise. Coastal protection must not compromise or preclude the ability to preserve the interest features of European sites, ensuring that opportunities and options for sustainable flood management and migration of habitats and species are actively promoted.

7.2 Site Protection

It is critical that sufficient feeding and roosting areas continue to be available each winter to ensure the survival of the wading bird and Brent Goose populations, both at their current levels and also taking into account natural fluctuations in populations. A fundamental principle is to ensure protection of the existing level of feeding and roosting resource, conserving the currently important sites through appropriate management and protection from development and damaging activities

The Conservation Objectives[8] for the relevant international sites recognise that populations of wintering and migratory birds may change as a reflection of national or international trends or events. The Objectives are aimed at maintaining habitat capable of supporting internationally important species and numbers irrespective of these trends or events. The Objectives also state the need to provide suitable feeding and roosting habitat to support cited species outside of the designated site.

Policy W&BG3

Member organisations of the Waders and Brent Goose Strategy Steering Group will continue to monitor and advise on suitable levels of feeding and roosting resource in the Solent necessary to ensure the long-term survival of the wading bird and Brent Goose populations, irrespective of natural fluctuations in population trends, in line with the Conservation Objectives for the European sites.

Policy W&BG4

Where appropriate, the important sites for wading birds and Brent Geese that fall outside the international and national designations should be considered for County Wildlife Site or Local Nature Reserves designation and given appropriate protection through Local Development Framework policies.

7.3 Mitigating/Compensatory Measures

Given the pressures for development in this densely populated area, there may be cases where loss or damage to an important wading bird or Brent Goose site outside the statutory protected areas cannot be avoided or impacts reduced/mitigated to such an extent that the impacts are *de minimus*. In such situations, the competent authority must carry out an Appropriate Assessment under the Habitats Regulations and, subject to meeting the tests of 'no alternatives' and 'imperative reasons of over-riding public interest', compensation must be secured to ensure no net loss of roosting or feeding resource whilst maintaining the ecological coherence of the network of statutory sites.

[8] *Conservation Objectives are drawn up by Natural England, as required by The Conservation of Habitats and Species Regulations 2010, for all SPAs and SACs. These specify a series of attributes which will be used to determine favourable condition of the habitats or species for which the sites were designated.*

Policy W&BG5

Development proposals which could affect important wading bird and Brent Goose sites outside of the statutory designated areas need to demonstrate levels of impact, alone and in combination with other proposals. Where a negative impact upon an important wading bird or Brent Goose site cannot be avoided or satisfactorily mitigated, and the tests of the Habitats Regulations are met as necessary, appropriate compensatory measures will be sought.

Avoidance and mitigation measures may include carrying out construction works outside of the core winter period (October-March inclusive), or enhancing the feeding or roosting site to increase its capacity through favourable management. Such measures may be subject to consultation between the relevant authority and Natural England.

Compensatory measures, by comparison, involve creating new feeding or roosting sites or refuges, and must be subject to meeting the tests of the Habitats Regulations. Given the right conditions (location, size, habitat and appropriate management), it is possible that coastal birds will exploit new sites or refuges. Potential sites for this purpose have been identified in Parts 4 and 5 of the Strategy. Advice must nevertheless be sought from Natural England as to the most appropriate course of action on a case-by-case basis.

Where appropriate, planning permissions will have conditions attached to ensure the provision of preventative measures, or a legal agreement sought to secure long-term appropriate management and monitoring of the site, or replacement of habitats or features lost.

7.4 Site Management

Site management for wading birds and Brent Geese can cover a range of measures such as (i) direct habitat manipulation, e.g. implementing a mowing regime to ensure the availability of suitable grass for grazing; scrub clearance to maintain an open habitat or (ii) control of factors causing disturbance e.g. restricting or zoning recreational activity on important sites between October and March. This will be particularly important on sites with multiple uses where efforts should be made to integrate the needs of wading birds and Brent Geese with those of people.

Many of the sites currently used by Brent Geese are managed as sports grounds or amenity grasslands, which happen to also provide ideal Brent Goose grazing. However, levels of disturbance at these sites are often high, resulting in Brent Geese being forced to find alternative grazing. Other sites could be managed to increase their capacity for Brent Geese to help reduce the conflicts between geese and people elsewhere. Local Authorities should explore opportunities to provide alternative Brent Goose feeding sites or enhance the existing site network to accommodate Brent Geese, particularly on sites under their own management.

In harsh winters, or seasons with high numbers of young Brent Geese, it may be necessary to provide 'refuge' sites in January (when food is at its scarcest and bird numbers are at their highest). Refuge sites have been proven to work, and opportunities to provide temporary refuges in January should be explored. Some farmland sites may be the most appropriate locations for such refuges.

Particular needs of wader roosting sites include close proximity to feeding areas, uninhibited access to roosting sites, minimisation of disturbance and provision of extreme weather refuges.

Policy W&BG6

Public and private land owners or occupiers will be actively encouraged to favourably manage important Brent Goose and wader sites, and to ensure continued provision of suitable habitat in light of sea level rise predictions and other pressures on existing sites.

Sea level rise and coastal change are likely to result in the loss of important sites in the future. Whilst it is difficult to predict the precise nature of this impact, Part 5 of the Strategy attempts to identify vulnerable sites and sites that may become more important for waders and Brent Geese in the future. Sufficient provision should be made to ensure that potential land is available as an alternative to sustain the populations into the foreseeable future.

7.5 Strategy Integration

It is important that new strategies and plans, and updates to existing strategies and plans, for example Shoreline Management Plans, Port Development Master Plans, Green Infrastructure Plans and Open Space Strategies that might impact on important sites for coastal birds across the network, integrate with this Strategy.

A strategic approach to spatial land use planning is required to ensure opportunities are secured to enhance existing and potential sites and create new sites, above and beyond what can be done through local site based protection and mitigation.

It is intended that the spatial and electronic nature of this Strategy, in combination with promotional activities undertaken by the Solent Waders and Brent Goose Steering Group, will help make this possible.

7.6 Awareness and Promotion

There is a great need to work with local people to raise awareness of wading bird and Brent Goose ecology and their significance in the Solent. The importance of the coastal bird populations should be appreciated, particularly since internationally important numbers of these birds inhabit such a densely urban region. The value of adjacent terrestrial feeding and roosting sites that support the Solent populations should be promoted and understood.

There is also a need to work with those owning and managing important wading bird and Brent Goose sites to ensure they appreciate the value of the sites and will continue favourable management, as well as be aware of the potential conflicts between the needs of the waders and Brent Geese and those of people, and attempt to minimise them.

Policy W&BG7

Local Authorities, agencies and nature conservation organisations will raise awareness of the issues and develop a greater understanding of the importance of wading birds and Brent Geese amongst landowners and the general public.

7.7 Monitoring and Strategy Review

This Strategy will be reviewed by the Solent Forum Nature Conservation Sub-Group after a five year period to take into account any changes in the distribution or numbers of wading birds and Brent Geese, or any changes in legislation or policy.

Policy W&BG8

The Solent Forum Nature Conservation Sub-Group will reconvene the Solent Waders and Brent Goose Strategy Project Steering Group as necessary, to ensure the implementation and review of this Strategy.

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Appendices

Appendix I - Mapping, GIS layers and Bird Records Datasets
Please see the Mapping Folder and Bird Records Folder on the accompanying CD for jpeg mapping images, GIS layers and record spreadsheets. The conditions of data supply and use are outlined in Appendix IV.

Appendix II – Acknowledgement of Bird Recorders

Agombar, David
Allan, Debbie
Allen, Colin
Allen, Mike
Alexander, Tom
Ash, Carolyn
Ash, Robyn
Baker, Alan
Ball, Dave
Barrett, Graham
Batho, George
Beckett, Alison
Berry, Bill
Bill, Dennis
Bills, Jonathan
Bell, Sheila
Budd, Philip
Calderwood, Ian
Campbell, John
Chapman, Bob
Cockburn, Chris
Combridge, Peter
Cooke, Ron
Cook, Jim
Cox, Alan
Cox, Pauline
Crook, Jason
Crisp, Kevin
Curtis, Colin
Darley, Judi
Dedman, John
Dixon. Malcolm
Dovey, Barbara
Durant, Carol
Etheridge, Peter
Facer, Roger
Field, Ashley
Foster, Chris
Fry, Darren
Gillingham, Martin
Gilbert, Geoff
Gloyn, James
Goodspeed, John
Gould, Terry
Graham, Christina
Green, R
Grindle, Rosemary
Grogan, R
Hankinson, Derek
Hankinson, Liz
Hastie, Philip
Hobby, Peter
Hobson, Jim
Hogan, Peter
Holden, Theresa
Horter, Nicky
Howard, Iain
Hubble, David
Hunnybun, David
Hurst, David
Jackson, Mark
Jackson, Steve
Johnson, Andy
Keatley, Bill
Kennedy, Verity
Kilby, Mark
King, Simon
Larter, Mark
Lockhart, Stephanie
Lover, Kevin
MacDonald, Jane
Maclean, Chris
Marcer, Ann
Marsh, Jamie
Marston, Keith
Metcalf, Keith
Miller, Mark
Mole, Simon
Minns, David
O'Sullivan, Katie
Norton, John
Nundy, John
Pape, Michaela
Phillips, Mark
de Potier, Anne
Price, David
Price, Kay
Probert, Lorraine
Parfitt, Andy
Pyatt, Wendy
Raby, Peter
Rathbone, Keith
Rhodes, Andy
Rouse, Hazel
Rothwell, Andy
Rowsell, Ed
Saunders, Chris
Shillitoe, John
Shrive, Debbie
Siddle, Georgie
Spraggs, George
Smith, Brian
Stevenson, David
Strangeman, Peter
Swales, Vicky
Tasker, Madeline
Thomas, Sue
Wallace, Jack
Ward, Marcus
Watts, Ian
Wheatley, Steve
Willmott, John
Wilson, Sue
Wiseman, Edward
Wiseman, F
Wiseman, P
Wooding, Steve
Wright, Simon
Young, Richard

Appendix III - Example Survey Form

Observer	Site	Date	Time on Site	Species	Count	Use	Disturbance	Comments
Bob Chapman	E11	15/10/2006	13.00	RK	50	Roosting	No	High-tide
Bob Chapman	H50C	15/10/2006	10.30	OO	0		Yes	Kite flying

Appendix IV - Data Release

The Strategy electronic datasets (GIS layers and bird records) are available on request from the following local records centres: Hampshire Biodiversity Information Centre, Isle of Wight Local Records Centre and Sussex Biodiversity Records Centre through their respective Data Request Services and are subject to their respective standard data charging and supply policies.

The datasets are also available to organisations and Local Authorities under the conditions of current Service Level Agreements or Data Exchange Agreements, with their Local Records Centres.

Contact Details:

Hampshire Biodiversity Information Centre
Capital House, 3rd Floor,
48-52 Andover Road, Winchester,
Hampshire, SO23 7BF.
Tel: 01962 832327 or 01962 832329
Email: enquiries.hbic@hants.gov.uk
Web: http://www3.hants.gov.uk/biodiversity/hbic.htm

Isle of Wight Local Records Centre
c/o Parks and Countryside Section
Isle of Wight Council
Enterprise House
Monks Brook
Newport
Isle of Wight, PO30 5WB
Tel: 01983 823893
Web: http://www.wildonwight.co.uk/lrc/

Sussex Biodiversity Record Centre
Woods Mill
Henfield
West Sussex, BN5 9SD
Tel: 01273 497553
Web: http://sxbrc.org.uk/