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WeBS Alerts 1998/99: Changes in numbers of wintering waterbirds in the United Kingdom at national, country and Special Protection Area (SPA) scales

Authors

Philip W. Atkinson, Graham E. Austin, Niall H.K. Burton, Andrew J. Musgrove, Mark Pollitt & Mark M. Rehfisch

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The National Centre for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU
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Executive Summary

1. The Wetland Bird Survey (WeBS) is a nation-wide scheme that aims to monitor non-breeding waterbirds. It is a joint scheme of the British Trust for Ornithology (BTO), The Wildfowl and Wetlands Trust (WWT), the Royal Society for the Protection of Birds (RSPB), and the Joint Nature Conservation Committee (JNCC - on behalf of the Countryside Council for Wales, English Nature, the Environment and Heritage Service in Northern Ireland and Scottish Natural Heritage). WeBS is an amalgamation of two previous long running monitoring schemes, the Birds of Estuaries Enquiry (BoEE) and the National Waterfowl Counts (NWC).

2. The principal aims of WeBS are to identify important sites and to determine changes in the numbers and distribution of divers, grebes, Cormorant, herons, wildfowl, rails, waders, gulls, terns and Kingfisher in the United Kingdom. Core Counts are made at around 2,000 wetland sites of all habitats although estuaries and large still waters predominate. Volunteers carry out monthly co-ordinated counts, principally from September to March with fewer observations in the summer months. Approximately 250,000 records are collected annually.

3. One of the aims of WeBS is to monitor population change and highlight large changes in populations. This requirement led to the development of an 'Alert' system for waterbirds (Atkinson & Rehfisch 2000; Underhill 2000) through which population change can be assessed across a range of spatial scales and for a variety of species. The aim of the system is to take data from the monthly waterbird counts and remove the year-to-year variation in the counts by smoothing the data to reveal the underlying trend in that species' population. The smoothed index is then used to calculate population changes over 5, 10 and 25 year periods and also over the entire time period that the species was counted for. Species which have undergone major population changes are flagged by issuing an Alert if the population has changed (either increased or decreased) by more than 25% (Medium Alert) and a higher level of Alert (High Alert) if the population has changed by over 50%. This method allows interpretation of the annual indices in terms of short-, medium- and long-term change in the population. For this first implementation, two different methods were used and evaluated. The first is based around a running mean of Underhill indices and in the second, smoothing is performed using General Additive Models (GAMs).

4. This report constitutes the first implementation of the Alert system to WeBS data. Population change was calculated for thirty-seven species of waterbird at UK and country (England, Northern Ireland, Scotland and Wales) scales. For those populations which reached national, or international, importance change was also calculated at 70 Special Protected Areas (SPAs) or proposed Special Protected Areas (pSPAs). Forty-eight of these sites were in England, 6 in Northern Ireland, 14 in Scotland and 2 in Wales. In total, data were available for 623 out of the 967 possible species/site combinations.

5. At the UK scale, most species were stable or increasing over all time periods. Four species raised an Alert. Medium Alerts were raised for Mallard over 10 years, European White-fronted Goose over 10 and all years, Knot over all years and Turnstone over 10 years. A similar situation was found for England but more Alerts were raised in other countries. In Northern Ireland 9 Medium and 3 High Alerts were

raised, in Scotland 5 Medium and 5 High Alerts and in Wales 10 Medium and 7 High Alerts were raised.

6. Site Alerts were performed for 623 species/site combinations. Coverage varied between countries. Coverage in Wales was high at 95% but this was mostly due to the small number SPAs. Coverage in England and Northern Ireland was broadly similar at 70 and 68% but low in Scotland at 39%. The low coverage in Scotland was due to large numbers of WeBS species which are not currently covered by the WeBS Alert System.

7. An index of change across all species was developed for each site to identify sites where there are general declines in waterbirds. Over 25 years, most SPAs have shown a general increase in nationally or internationally important waterbird populations. Lindisfarne was the notable in that it has shown consistent declines in waterbirds. Over 10 and five year periods the following SPAs were identified as showing short-term declines in waterbirds: the Blackwater Estuary, Chichester and Langstone Harbours, Medway Estuary, Severn Estuary, the Wash, Belfast Lough, Loughs Neagh & Beg, the Inner Moray Firth and the Burry Inlet.

8. Further development work is recommended. SPA boundaries should be matched as closely as possible to WeBS boundaries as currently some WeBS sites incorporate more than one SPA and vice versa.

9. There is also a need to refine the analysis of population change of all species on each site to identify sites where general declines are occurring across all species. At present the change index is crude and each species has equal weighting in determining (a) the change index and (b) average inter-annual population change for all species. Weighting the inter-annual change by the total flyway population size for that species may be a more effective way of determining where large or widespread declines are taking place.

1. INTRODUCTION

1.1 Introduction

Wetland sites support the vast majority of the internationally important bird populations that occur in Britain and Ireland and, as such, are one of the most important habitats for birds in an international context. Since the winter of 1966/67 the majority of the nationally and internationally important sites in England, Scotland and Wales have been counted for wildfowl, extending to waders in 1969/70, Coot and Great Crested Grebe in 1983/83, Little Grebe in 1985/86 and Cormorant in 1986/87. Sites in Northern Ireland were counted for waders from 1970/71 and other waterbirds were added in the winter of 1986/87.

These counts are routinely reported on under the Wetland Bird Survey (WeBS) monitoring scheme (e.g. Cranswick *et al.* 1999). The annual WeBS reports provide wader and wildfowl indices for Britain and Ireland combined (waders) or separately (wildfowl & other waterbirds) but do not specifically assess population change either at a national or country level. To effectively monitor population change of important bird populations, data need to be readily available at different scales to examine changes at an individual country, region or site level.

This requirement led to the development of an 'alert' system for waterbirds (Atkinson & Rehfisch 2000; Underhill 2000) through which population change can be assessed across a range of spatial scales and for a variety of species. The aim of the system is to take data from the monthly waterbird counts and remove the year-to-year variation in the counts by smoothing the data to reveal the underlying trend in that species' population. The smoothed index is used to calculate population changes over 5, 10 and 25 year periods and also over the entire time period that the species was counted for. Species which have undergone major population changes are flagged by issuing an Alert if the population has changed (either increased or decreased) by more than 25% and a higher level of Alert if the population has changed by over 50%. This method allows interpretation of the annual indices in terms of short-, medium- and long-term change in the population.

This system was tested and applied to waterbird data in a previous report (Atkinson & Rehfisch 2000) and full details of the rationale behind alerts are contained there. Two methods were tested (the Underhill method and the General Additive Model method) and both are presented here. The use of General Additive Models (GAMs) is preferable for statistical reasons but they are extremely computer intensive. Both methods were run concurrently for this report but it is envisaged that one or other method will be used in future years.

This report presents the first implementation of the WeBS Alert system and presents population change on a national level, a country level (England, Northern Ireland, Scotland and Wales) and also a site level. The sites were current or proposed Special Protection Areas (SPAs) and the change was calculated for all species that are currently cited or proposed as newly qualifying.

1.2 The Wetland Bird Survey (WeBS)

The Wetland Bird Survey (WeBS) aims to monitor non-breeding waterbirds in the UK and is a joint scheme of the British Trust for Ornithology (BTO), The Wildfowl and Wetlands Trust (WWT), the Royal Society for the Protection of Birds (RSPB), and the Joint Nature

Conservation Committee (JNCC - on behalf of the Countryside Council for Wales, English Nature, the Environment and Heritage Service in Northern Ireland and Scottish Natural Heritage). WeBS is an amalgamation of two previous long running monitoring schemes, the Birds of Estuaries Enquiry (BoEE) and the National Waterfowl Counts (NWC).

The principal aims of WeBS are to identify important sites and to determine changes in the numbers and distribution of divers, grebes, Cormorant, herons, wildfowl, rails, waders, gulls, terns and Kingfisher in the United Kingdom. Core Counts are made at around 2,000 wetland sites of all habitats although estuaries and large still waters predominate. Volunteers carry out monthly co-ordinated counts, principally from September to March with fewer observations in the summer months. Approximately 250,000 records are collected annually.

Only a small proportion of those species recorded as part of the Wetland Bird Survey are regularly indexed. Of the 125 species recorded in the 1996-97 WeBS report (Waters *et al.* 1998), only 12 waders and 29 wildfowl species or populations are either sufficiently common or have a sufficiently large proportion of their populations on WeBS sites to be indexed (Table 1.1). Currently the normal method of indexing these species is by the method described by Underhill & Prys-Jones (1994) which uses a log-linear Poisson generalised linear model as its base. The counts are modelled as a function of site, year and month factors and the year factor is used as a base for the index which is scaled to a value of 100 in either the first or last year. For each species certain months are used to index the population. These are chosen to be the months in which the population of that species is most stable. For waders this is December through to February but varies with different species of wildfowl (Table 1.2).

1.3 The Alert Process

The overall aim of the WeBS Alert system is to devise a method whereby it is possible to flag up large changes in waterbird abundance at national, regional and site level. The coverage of the WeBS survey is an important consideration when assessing population change. For these changes to be relied on, it is essential that the survey covers a representative sample of sites. For strictly estuarine species, this can be accepted as a valid assumption because over 95% of estuaries in Great Britain are counted annually. However, for some of the more widespread wildfowl such as Mallard, much of the population occurs inland. The counting of inland sites follows no formal sampling pattern and therefore it is unclear as to whether these are a representative sample. For these species, it is important that a stratified sample of estuaries, lakes and rivers of varying sizes is used for indexing. This is something that needs to be addressed in the future but, for the purposes of this report, all Core WeBS sites are used for waterbirds other than waders. For waders, the traditional set of estuaries that are used to produce annual indices are used.

The UK holds internationally important populations of waterbirds and there is a statutory duty on government to monitor these populations. National and regional indexing using the Underhill method allows inter-annual variation in counts to be described but, due to sampling error and natural annual fluctuations, there can be a great deal of variation between counts. For statutory monitoring it is therefore essential to differentiate between these natural population fluctuations and medium to long-term population changes. For this, a new way of calculating indices which smoothes the annual fluctuations is useful. Population change over various time periods can then be calculated and trends identified.

The Alert system provides a framework in which short-, medium- and long-term population changes in waterbird populations can be evaluated. If population change over a given time period exceeds a certain limit, then an alert is issued which acts as a warning as to the possibility of large changes in that population. These alerts would then be issued to WeBS partners and the wider conservation community. Alerts can be set both for populations that are increasing or declining. Predetermined limits need to be set initially but would have to come under review as the scheme progresses. For waterbirds, the suggested time periods over which change could be calculated are 5, 10 and 25 year periods. Alerts would be raised if population change exceeded 25% (a 25% Alert or 'Low Alert') or 50% (a 50% Alert or 'High Alert') over each given time period. For site-based Alerts, variation in the numbers of waterbirds is often more extreme that at a larger scale and so only changes of 50% trigger an Alert at the site level. In this analysis, we only report on the negative Alerts (i.e. declines) in any detail.

Species that show large year to year fluctuations will be more likely to trigger alerts. A high degree of smoothing applied to the indices will remove much of these fluctuations but it is likely that highly variable species will trigger a series of five year Alerts, either positive or negative. Alerts should therefore be advisory and the particular species ecology and population dynamics are extremely important in interpreting the alerts once they have been triggered. This is likely to be more of a problem for passerine species such as Wren *Troglodytes troglodytes*, which show annual fluctuation orders of magnitude higher than most wader and wildfowl species.

1.4 Methods

1.4.1 Coverage of species and sites

The WeBS Alert system is suitable for most species whose populations are regularly indexed by WeBS, given the caveat about coverage discussed previously. Thirty-six such common waterbird species were run through the process. Species such as Pink-footed Goose, Barnacle Goose, Icelandic Greylag Goose and Greenland White-fronted Goose are not fully covered by WeBS and numbers are regularly censused using co-ordinated goose counts, rather than regular WeBS counts. It may be possible to incorporate these data into an Alert system in future. Of the waders, Lapwing, Golden Plover and Purple Sandpiper are common species but not regularly indexed, as WeBS covers only a small part of their population. Most Lapwing and Golden Plover occur inland and are not censused well by WeBS although data from some sites of international importance are collected and could be included in the future. Purple Sandpiper tend to occur on rocky rather than estuarine shores and, again, the numbers sampled through WeBS are not representative of the whole population. Although these data were not available for this report, they could be included in any future waterbird alert system if the data could be made readily available.

The coverage of counts also varies between countries (Table 1.3). The main difference is that although for waders UK indices can be calculated, wildfowl counts only started in 1986 in Northern Ireland. For the purposes of this report, therefore, when we refer to the UK for wildfowl this includes just England, Scotland and Wales. Northern Ireland is treated separately.

Over 90% of estuaries are counted each month and for strictly estuarine species one can expect a near 100% coverage. For species which also occur on non-estuarine coasts, such as Turnstone, Ringed Plover, Sanderling and Curlew the coverage will be lower and the alerts

generated should be thought of as an alert for the proportion that use WeBS sites rather than for the population as a whole.

1.4.2 Calculation of Underhill indices

For each species, there are a recommended series of months which are used to index that population (Cranswick *et al.* 1998). These are December, January and February for waders but different months are used for wildfowl, ranging between one to seven months for each species (Table 1.2). Indices are calculated by summing the number of 'bird months' and scaling the last year to 100. Missing counts are inevitable with this kind of data and these are estimated using the Underhill method (Underhill & Prys-Jones 1994). At the base of this method is a General Linear Model (GLM) with a Poisson error distribution and log link function, which fits a model with site, year and months factors. Where missing counts occur, they are estimated using the parameters calculated in the GLM. At the site level it may be more appropriate to use different periods of months but for this first analysis, standard Underhill months have been used.

1.4.3 Smoothing indices using GAMs

The development of an alert system for waterbird species recommended smoothing the monthly counts using General Additive Models rather than other methods which use a running mean (Gregory et al. 2000). Data were extracted from the WeBS database and the Fortran program GAIM used to smooth the count data. The amount of smoothing is determined by the number of degrees of freedom associated with the year parameter. Minimum degrees of freedom constrains the fit to a linear line and maximum (number of years minus 1) fits an unconstrained model similar to a log-linear Poisson regression which is used in the Underhill method. For the purposes of WeBS data, a moderate degree of smoothing of 0.3 times the number of years was tested and found to provide an acceptable degree of smoothing (Atkinson & Rehfisch 2000).

1.4.4 Assessment of change and calculation of Alerts

Alerts are generated by assessing the percentage change in the population over several different time periods. In this report we calculate change over 5, 10 & 25 year periods. We also calculate change over the entire time period for which data are available. Alerts are triggered if the change exceeds 25% (a positive or negative 25% Alert) or 50% (a positive or negative 50% Alert.). It is important to note both large increases (positive Alerts) as well as large decreases (negative Alerts) but in this report we only report in any detail on declining species.

The percentage change is calculated in two different ways. In the Underhill method, a smoothed 3-year mean is used to assess change over the different time periods. This is illustrated with a worked example in Box 1.1. The GAM method is slightly more straightforward in that the percentage change in the population is simply the change in the smoothed index between years; see worked example in Box 1.2.

For this report we present Alerts calculated using both methods. Whilst we only report on the GAMs, we note where differences occur. For the first year of implementation, it was agreed by the Alerts Technical Panel to run Alerts using both methods. It is envisaged that in future years only one method will be used.

The term 5-year change can be misleading. In this report we define this as the change over five separate time periods, e.g. the change from the index for the winter of 1993/94 to the winter of 1998/99. This includes six winters worth of data but five separate time periods.

For country and national alerts, bootstrapped confidence intervals can be calculated. To obtain 95% confidence intervals the program GAIM can bootstrap the count data many times to produce many different smoothed trajectories. Confidence intervals can then be placed around the smoothed trajectory. Five, ten and 25 year changes can be calculated from all of these, and 95% confidence intervals calculated. For an Alert to be significant, then the upper 95% CI would have to be below zero indicating a significant negative change over that time period.

However, for WeBS data it is unclear as to exactly what the intervals relating to the smoothed trajectory relate to. If the sample of WeBS sites was a truly random sample then these intervals would indeed indicate the confidence limits around the changes in the population.. However, as in the case of strictly estuarine waders, the WeBS counts do not represent a random sample, rather an almost-complete census. In this case, the 95% intervals represent 'Consistency Intervals' (Underhill & Prys Jones 1994). These indicate how patchily distributed the population is. For example, if the same numbers of birds were recorded at each site at the start of the time period, and they varied from year to year in the same way, the consistency interval would be zero indicating that the population was evenly spread, and changed at the same rate across all sites. If, however the bulk of the population occurred on a small number of sites and the majority of sites held zero or low numbers of birds then the consistency interval would be high. These intervals would not tell you anything about the confidence in population trajectory itself as, with 100% coverage in your survey, you have sampled the entire population and any changes calculated would be absolute. To understand the confidence in the counts then some attempt to estimate error in counting (e.g. observer or site specific errors) would have to be made.

Inevitably, WeBS counts fall somewhere in the middle. For estuarine species, a near 100% coverage is achieved but for rocky shore species this will be less. For inland species we have little idea as to how representative WeBS is, but most of the major sites of importance are covered.

In this report, we have bootstrapped change measures using 199 bootstraps. For each of the country chapters we note where these confidence/consistency intervals indicate that the change is not significantly below zero; for others assume it is significant. However, for countries with relatively few WeBS sites, such as Northern Ireland and Wales, these 95% intervals may, especially for highly variable species, be large and not significantly below zero. This may not invalidate the Alerts, is as discussed above if the majority of important sites for that species are covered. Therefore intervals should be advisory and interpreted with knowledge of the species and sites concerned. They should not necessarily be taken to mean that the Alert is not significant.

1.4.5 SPA Site Alerts – species and site coverage

In this report we assess population change and raise alerts for species which occur in nationally or internationally important numbers on SPAs in each country. The complete list of SPAs was supplied by JNCC (on behalf of country agencies) and includes many non-WeBS species as well as sites which are not covered by the WeBS scheme. Where possible, data for each site were extracted, smoothed using the GAM method and population and Alerts calculated in the usual manner. No bootstrapping is possible in this case.

The sites used in these analyses are those that are currently used to calculate the national waterbird indices. These 'core' sites are those which have been counted on more then 50% of available occasions. If a site was not counted on more than 50% of occasions we did not perform any analysis because of the amount of time needed to extract the data from the WeBS database. This will hopefully be remedied in the future with the new database and sites which have been counted on less than 50% of occasions can be included. A measure of coverage was calculated for each country using the number of species/site combinations which were successfully run through the Alert System.

Several caveats need to be borne in mind when interpreting these analyses. WeBS sites tend to be made up from counts taken from a number of sectors which are amalgamated to form a total count for that site. For this analysis we did not have access to the site boundaries for the SPAs and so had to make a 'best guess' attempt to match up SPAs and WeBS sites. This worked reasonably well so far as we know for most sites but there are a few known problems:

- There may be no WeBS data for a particular SPA
- WeBS sites may not match up exactly with SPA boundaries.
- Birds which use SPAs may roost outside the SPA boundaries where they are counted by WeBS. For example, on the Wash many waders roost in fields behind the sea-wall which are not part of the SPA. Most of the WeBS counts therefore technically include birds not in the SPA, but which obviously made use of it at low tide
- Some WeBS sites may cover more than one SPA, e.g. the Wash WeBS area covers both the Wash and Gibraltar Point SPAs and with the current amalgamation of data can not be separated.

The full extent of the coverage of sites and species in each country are given in the relevant country chapters.

For English and Scottish SPAs we have attempted to show how consistent population change is between species within a site. This will identify those sites where there is a general decrease or increase in waterbird populations and also allow a comparison to be made between sites. As an initial approach to this we scored a 50% negative Alert as –2, a 25% negative Alert as –1, a 25% positive Alert as +1, a 50% positive Alert as +2. Where no Alert scored zero. These were added together for each site to form an index of change for a site.

A negative value indicates that there is a general decline across species on that site, a zero value that either species are stable or that an equal number are going up as well as down and a positive value indicates that there is a general increase in the waterbird population.

1.5 Interpretation of Numbers and Alerts

1.5.1 Units of abundance

Two units of abundance are used in the WeBS scheme and it is important to distinguish between them. In the WeBS reports, indices are traditionally calculated by totalling up the number of 'bird months' and scaling the resulting data so that the first or last year is equal to 100. This is termed the *index of abundance*.

When considering whether a site is nationally or internationally important or not for a particular species, yearly maxima are traditionally presented in the WeBS report for all sites where the 5-yearly mean of the maxima exceeds the relevant national or international total.

In this report we do not use changes in count maxima to evaluate site, country or national Alerts, rather we use the *average number of birds recorded per month*. This is calculated in a similar way to the Underhill index but instead of scaling the total number of bird months so that either the first or last year equals 100, this figure is divided through by the number of months over which the species is traditionally recorded.

Example 1: Calculating the average number of birds per month

Coot are traditionally indexed over 7 months in NI – September to March

	Sep	Oct	Nov	Dec	Feb	Mar	April	TOTAL
Actual	1,800	4,950	3,450	-	550	343	103	
Imputed				1,250				8,996

The example above shows a series of counts of Coot at a site. The December count is missing and so the count is imputed using the standard Underhill method.

The total number of bird months is the sum of all counts for that year. These are added together for all sites and this, when scaled so that the last year equals 100, is used as the basis of the national index. This value equals 8,996 so the average number of birds per month is this figure divided by 7 (the number of months). This equals 1,285 birds. It is this figure, rather than the maximum of 4,950 birds in October, that is used when considering changes in the population and raising alerts for the site.

Clearly, this may lead to some apparent discrepancy between SPA citations which are based on maxima and the average number of birds present per month. If a species occurs in large numbers on a site for one month only, the average of the five yearly maxima, which are used to determine national or international site importance, may indicate a site is important whereas the average numbers of birds per month may be very small. This is especially true for species such as Bewick's and Whooper Swan which can appear in large numbers on some sites (e.g. the Wash) for one or two months in a five-year period. This has resulted in them being cited for this SPA even though the site does not hold a regular wintering population of any importance. The Alert system is not suitable for this situation.

1.5.2 Interpretation of Alerts

Alerts are raised when the percentage change in a population exceeds certain limits. Here we use 25 and 50% changes over 5, 10, 25 and all years for which counts are available. This allows change in the population to be classified according to the criteria in the table below. Thus a change of –34% over a 10 year period would be classed as a moderate decline over the medium term etc. These terms are used throughout this report.

Type of Alert	50%	25%	25%	50%
When used	Decline greater than 50%	Decline between 25% and 50%	Increase of between 25 and 50%	Increase of greater than 50%
Direction	Negative	Negative	Positive	Positive
Code used in this report	--	-	+	++
Description of change	large decline or HIGH ALERT	moderate decline or MEDIUM ALERT	moderate increase	large increase

Time Period	5 year	10 year	25 year	All years
Description	short-term	medium-term	long-term	all years

The Alerts are presented in a similar manner to the example for Little Grebe below. Data are presented from left to right starting with the codes for the 5,10, 25 and all year Alerts. The figures following are the actual percentage change in the population over similar time periods. The next two figures are presented for site alerts only and correspond to the first and last years that counts took place. For national and country alerts these are stated in Table 1.3. The species name and site then follow.

5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Start	End	Species
++	++	N/A	++	155	381	N/A	294	85	97	Little Grebe

In some cases, the Alert over all years should also be treated with caution as count quality and coverage may have been poor in the early years of the precursors to WeBS.

Two codes are used in the Alert tables:

n/a — this refers to Alerts where data are not available for a particular year and so it is not possible to calculate that Alert. In the example above, Little Grebe were not counted until 1985/96 in Great Britain and so a 25 year Alert is not possible.

>1000 — this refers to percentage changes that were calculated to be over 1,000%. This is a result of either an infinite change (i.e. a change from zero birds to at least 1 bird) or a very large change which is generated by the GAIM or Underhill programs allocating a very small value (e.g. 0.00001) to a zero value. If the number of birds were to increase from this value then the apparent change would be very large. In most cases this does not make sense and so all changes greater than this have been coded '>1000'.

Table 1.1 Wader and wildfowl species or populations which are regularly indexed as part of the Wetland Bird Survey and to which an alert system can be applied. Countries refer to the countries for which data are available. E = England, S= Scotland, W= Wales, NI= Northern Ireland. Species which have no country code allocated are those which are regularly indexed, but using co-ordinated goose counts rather than regular WeBS counts. These currently fall outside the Alert system.

Species		Countries
Little Grebe	*Tachybaptus ruficollis*	E,S,W,NI
Great Crested Grebe	*Podiceps cristatus*	E,S,W,NI
Cormorant	*Phalacrocorax carbo*	E,S,W,NI
Mute Swan	*Cygnus olor*	E,S,W,NI
Bewick's Swan	*Cygnus columbianus*	E,S,W,NI
Whooper Swan	*Cygnus cygnus*	E,S,W,NI
Pink-footed Goose	*Anser brachyrhynchus*	
European White-fronted Goose	*Anser albifrons albifrons*	E,S,W
Greenland White-fronted Goose	*Anser albifrons flavirostris*	
Greylag Goose - Icelandic	*Anser anser*	
Greylag Goose - naturalised	*Anser anser*	E,S,W
Canada Goose	*Branta canadensis*	E,S,W
Barnacle Goose - Svalbard	*Branta leucopsis*	NI
Dark-bellied Brent Goose	*Branta bernicla bernicla*	E,S,W,NI
Light-bellied Brent Goose - Canadian	*Branta bernicla hrota*	NI
Shelduck	*Tadorna tadorna*	E,S,W,NI
Wigeon	*Anas penelope*	E,S,W,NI
Gadwall	*Anas strepera*	E,S,W,NI
Teal	*Anas crecca*	E,S,W,NI
Mallard	*Anas platyrhynchos*	E,S,W,NI
Pintail	*Anas acuta*	E,S,W,NI
Shoveler	*Anas clypeata*	E,S,W,NI
Pochard	*Aythya ferina*	E,S,W,NI
Tufted Duck	*Aythya fuligula*	E,S,W,NI
Goldeneye	*Bucephala clangula*	E,S,W,NI
Red-breasted Merganser	*Mergus serrator*	E,S,W,NI
Goosander	*Mergus merganser*	E,S,W
Ruddy Duck	*Oxyura jamaicensis*	E,S,W
Coot	*Fulica atra*	E,S,W,NI

Species		Countries
Oystercatcher	*Haematopus ostralegus*	E,S,W,NI
Avocet	*Recurvirostra avosetta*	E,S,W,NI
Ringed Plover	*Charadrius hiaticula*	E,S,W,NI
Grey Plover	*Pluvialis squatarola*	E,S,W,NI
Knot	*Calidris canutus*	E,S,W,NI
Sanderling	*Calidris alba*	E,S,W,NI
Dunlin	*Calidris alpina*	E,S,W,NI
Black-tailed Godwit	*Limosa limosa*	E,S,W,NI
Bar-tailed Godwit	*Limosa lapponica*	E,S,W,NI
Curlew	*Numenius arquata*	E,S,W,NI
Redshank	*Tringa totanus*	E,S,W,NI
Turnstone	*Arenaria interpres*	E,S,W,NI

Table 1.1 Continued.

Table 1.2 Species to which the WeBS Alert system has been applied to and the months used in calculating indices for wildfowl species in Great Britain and Northern Ireland (indicated using the first letters of the months September to March).

Species	GB	NI
Little Grebe	SO	SON
Great Crested Grebe	SON	SONDJFM
Cormorant	SONDJFM	SOND
Mute Swan	SONDJFM	SONDJ
Bewick`s Swan	JF	NDJF
Whooper Swan	ND	ONDJFM
European White-fronted Goose	JF	
Feral Greylag Goose	S	
Canada Goose	S	
Dark-bellied Brent Goose	DJF	
Light-bellied Brent Goose		SONDJFM
Shelduck	JF	DJFM
Wigeon	J	SONDJFM
Gadwall	SONDJFM	SONDJ
Teal	DJF	DJ
Mallard	DJF	SO
Pintail	ONDJ	ONDJFM
Shoveler	SO	SONDJFM
Pochard	NDJ	NDJF
Tufted Duck	NDJF	ONDJFM
Goldeneye	F	DJFM
Red-breasted Merganser	ONDJFM	SONDJFM
Goosander	DJF	
Ruddy Duck	SONDJFM	
Coot	SONDJ	SONDJFM
Oystercatcher	DJF	DJF
Avocet	DJF	DJF
Ringed Plover	DJF	DJF
Grey Plover	DJF	DJF
Knot	DJF	DJF
Sanderling	DJF	DJF
Dunlin	DJF	DJF
Black-tailed Godwit	DJF	DJF
Bar-tailed Godwit	DJF	DJF
Curlew	DJF	DJF
Redshank	DJF	DJF
Turnstone	DJF	DJF

Table 1.3 Table describing the first winter in which waterbird counts occurred for species, or groups of species in each country.

Area	Waders	Wildfowl	Cormorant	Little Grebe	Great Crested Grebe	Coot
England, Scotland & Wales	1969/70	1966/67	1986/87	1985/86	1982/83	1982/83
Northern Ireland	1970/71	1986/87	1986/87	1986/87	1986/87	1986/87

Box 1.1 Worked example of raising alerts using the Underhill Alert process

Process:

1. Run Underhill program and extract yearly indices
2. Work out 3-year averages for the index from current year as in 97/98 example below for current time period, 5, 10 and 25 years ago.
3. Work out percentage change over each time period and use this as your 'alert' figure.

Alert type	Year	Index	3-year average
	1970	100	
	1971	86.5	
25 year	**1972**	**72.4**	**86.3**
	1973	129.6	
	1974	82.4	
	1975	79.6	
	1976	185.4	
	1977	193.2	
	1978	499.6	
	1979	350	
	1980	246.3	
	1981	238.2	
	1982	213.3	
	1983	168	
	1984	232.7	
	1985	288.9	
	1986	350.4	
10 year	**1987**	**305.1**	**314.8**
	1988	223.2	
	1989	293.3	
	1990	427.7	
	1991	300.3	
5 year	**1992**	**332.2**	**353.4**
	1993	210.5	
	1994	288.3	
	1995	418.5	
	1996	520.8	
Current year	**1997**	**472.5**	**470.6**

Therefore a 5-year alert will be:

(470.6 – 353.4) / 353.4 = 33.2% 25% POSITIVE ALERT TRIGGERED

Box 1.2 Worked example of raising alerts using the General Additive Model (GAM) process

Process:

1. Smooth WeBS data using the program GAIM
2. Take value for current year and also those for 5, 10 and 25 years ago and calculate change. This is the 'population change' which is used to raise 25% or 50% alerts.

Alert type	Year	Index	Index value
	1970	100	
	1971	101	
25 year	**1972**	**105**	**105**
	1973	113	
	1974	127	
	1975	153	
	1976	199	
	1977	262	
	1978	322	
	1979	342	
	1980	327	
	1981	302	
	1982	283	
	1983	282	
	1984	300	
	1985	326	
	1986	348	
10 year	**1987**	**351**	**351**
	1988	348	
	1989	359	
	1990	370	
	1991	357	
5 year	**1992**	**333**	**333**
	1993	322	
	1994	354	
	1995	423	
	1996	511	
	1997	**590**	**590**

5- YEAR ALERT: (590 – 333) / 333 = 77% 50% ALERT TRIGGERED

2. UNITED KINGDOM – WATERBIRD POPULATION CHANGES AND ALERTS

2.1 Population Change and Alerts

Figure 2.1 shows the change in numbers of all regularly indexed wader species in the United Kingdom and wildfowl in England, Scotland and Wales combined.

Table 2.1 shows the percentage population change over 5, 10, 25 and all year periods and the Alerts generated using both GAM and Underhill methods.

- No species have generated a negative 50% Alert using the GAM method.
- European White-fronted Goose, Mallard, Knot and Turnstone have generated a negative 25% Alert using the GAM method.
- Using the Underhill technique, no other species triggered Alerts.
- All other species are stable or increasing (mostly increasing).

2.2 Species Generating a 50% Alert Using GAMs

At a national level, no waterbird species that are regularly indexed using the WeBS scheme have generated a negative 50% Alert.

2.3 Species Generating a 25% Alert Using GAMs

European White-fronted Goose
This species generated a 25% Alert over all years and a 25% Alert over the last 10 year period, indicating a moderate decline over the medium and long-term. These birds are restricted to England and Wales and numbers have shown an increase followed by a decrease.

In 1966/67, approximately 4,000 birds were recorded in the UK, 800 of which were in Wales. The number of birds in Wales almost doubled in size to 1,500 and this together with an even larger increase in England increased the total number of birds in the UK to over 10,000 in 1969/70. After this winter a large decline took place and by the mid-1970s numbers had returned to their former levels. The English population has been approximately 5,000 birds ever since and is now stable or declining slightly. The Welsh population, concentrated around the Dryslwyn area of the River Tywi continued to decline and by the late 1980s this population went to extinction.

Mallard
Mallard raised a 25% Alert over the past 10 years indicating a moderate, medium-term decline. Mallard are one of the most widespread ducks in the United Kingdom and it is not known how representative WeBS sites are for this species. Many are also released every year by wildfowling interests. Nevertheless, Mallard are one of the few ducks that are declining. Numbers on WeBS sites increased slightly from 110,000 birds at the start of counts in 1966/67 to 150,000 birds in the mid-1980s but then declined. Since 1987/88, there has been a highly significant decline at the rate of *c*4,800 birds per year although the graph suggests that the rate of decline is slowing.

Knot
Knot raised a 25% Alert when considering change over all years indicating a moderate decline (41%) since the start of the WeBS counts. The graph for Knot, shows a decline in numbers from *c*350,000 birds at the start of counts to *c*200,000 birds in the mid-1970s followed by a period of stability which has continued to the present day. The reasons for the large decline are probably due, in part, to increased spring mortality of adult Knot returning to their Greenland breeding areas in the early 1970s (Boyd 1992). The springs and summers of 1972, 1974 and 1979 were particularly cold and caused many adult deaths. This coupled with poor breeding success, in 1972 and 1974 are believed to have caused a large population decline. The wintering population does not seem to have recovered since, but is now apparently stable.

Turnstone
Turnstone triggered a 25% Alert over the past 10 years indicating a moderate, medium-term decline. Numbers increased in the UK from 1960/70 to a peak of 20,000 in the mid-1980s. Since then, there has been a steady

decline in numbers to slightly under 15,000 birds. The rate of decline has been lower in the last four winters of counts.

Table 2.1 Percentage change and Alerts over 5,10, 25 and all years of counts. For interpretation of symbols see section 1.6. Population size refers to the average number of birds per month recorded on the WeBS sites used.

ALERTS CALCULATED USING GAMS				**UNITED KINGDOM**				ALERTS CALCULATED USING UNDERHILL METHOD								
5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Species	5yr	10yr	25yr	All	5yr	10yr	25yr	All	Average Pop size 1998
	++	n/a	++	11	98	n/a	411	Little Grebe	33	144	n/a	314	+	++	n/a	++	2,500
		n/a	++	-2	20	n/a	55	Great Crested Grebe	-1	32	n/a	40		+	n/a	+	8,500
	+	n/a	++	-8	35	n/a	141	Cormorant	4	78	n/a	78		++	n/a	++	12,000
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Mute Swan	20	48	90	92		+	++	++	13,000
		++	++	4	-3	221	300	Bewick`s Swan	-6	2	249	306			++	++	5,500
+		++	++	34	7	105	147	Whooper Swan	32	15	98	163	+		++	++	3,500
	-		-	-5	-36	7	-30	European White-fronted Goose	-5	-34	5	-43		-		-	3,000
++	++	++	++	52	120	>1000	>1000	Feral Greylag Goose	61	120	>1000	>1000	++	++	++	++	74,500
		++	++	14	16	300	683	Canada Goose	13	13	302	585			++	++	30,000
		++	++	-24	-17	149	393	Dark-bellied Brent Goose	-23	-8	203	488			++	++	71,500
		+	++	-15	-13	28	85	Shelduck	-9	-5	44	100			+	++	56,500
	+	++	++	5	31	94	91	Wigeon	14	29	98	98		+	++	++	310,500
+	++	++	++	46	81	788	>1000	Gadwall	54	83	783	>1000	++	++	++	++	8,000
		++	++	10	19	150	371	Teal	9	36	163	339		+	++	++	110,000
	-			-12	-29	-15	-23	Mallard	-16	-33	-14	-20		-			101,500
			++	10	-10	21	321	Pintail	3	-5	39	225			+	++	21,500
		+	++	-1	1	34	99	Shoveler	9	15	38	83			+	++	6,000
				-3	-2	-19	-8	Pochard	-2	-8	-15	0					33,000
			++	7	7	2	57	Tufted Duck	6	2	5	52				++	43,000
			++	2	22	24	105	Goldeneye	10	32	35	106		+	+	++	6,500
		++	++	-8	7	134	318	Red-breasted Merganser	8	2	174	238			++	++	2,500
		++	++	15	-7	56	172	Goosander	46	0	98	198	+		++	++	2,500
++	++	++	++	53	70	>1000	>1000	Ruddy Duck	46	65	>1000	>1000	+	++	++	++	3,000
		n/a		5	10	n/a	18	Coot	9	11	n/a	13			n/a		92,000
		+	+	0	-12	26	33	Oystercatcher	2	-7	39	39			+	+	233,500
++	++	++	++	69	322	>1000	>1000	Avocet	68	397	>1000	>1000	++	++	++	++	3,500
				-13	-23	-20	20	Ringed Plover	-13	-19	-8	8					8,500
		++	++	-6	14	259	596	Grey Plover	11	34	361	470		+	++	++	40,500
			-	-6	-13	-21	-41	Knot	-5	-6	-27	-33			-	-	211,500
+			+	28	16	0	47	Sanderling	26	15	9	29	+				7,000
			+	-4	6	-23	31	Dunlin	4	27	-11	17		+			449,000
+	++	++	++	37	91	221	832	Black-tailed Godwit	45	119	263	551	+	++	++	++	11,500
				14	0	7	-11	Bar-tailed Godwit	28	6	15	7	+				47,000
			++	1	9	22	104	Curlew	-1	8	30	57			+	++	74,000
			++	5	-2	2	71	Redshank	4	-1	5	34				+	79,500
	-			-17	-32	-7	11	Turnstone	-21	-31	-6	1		-			14,000

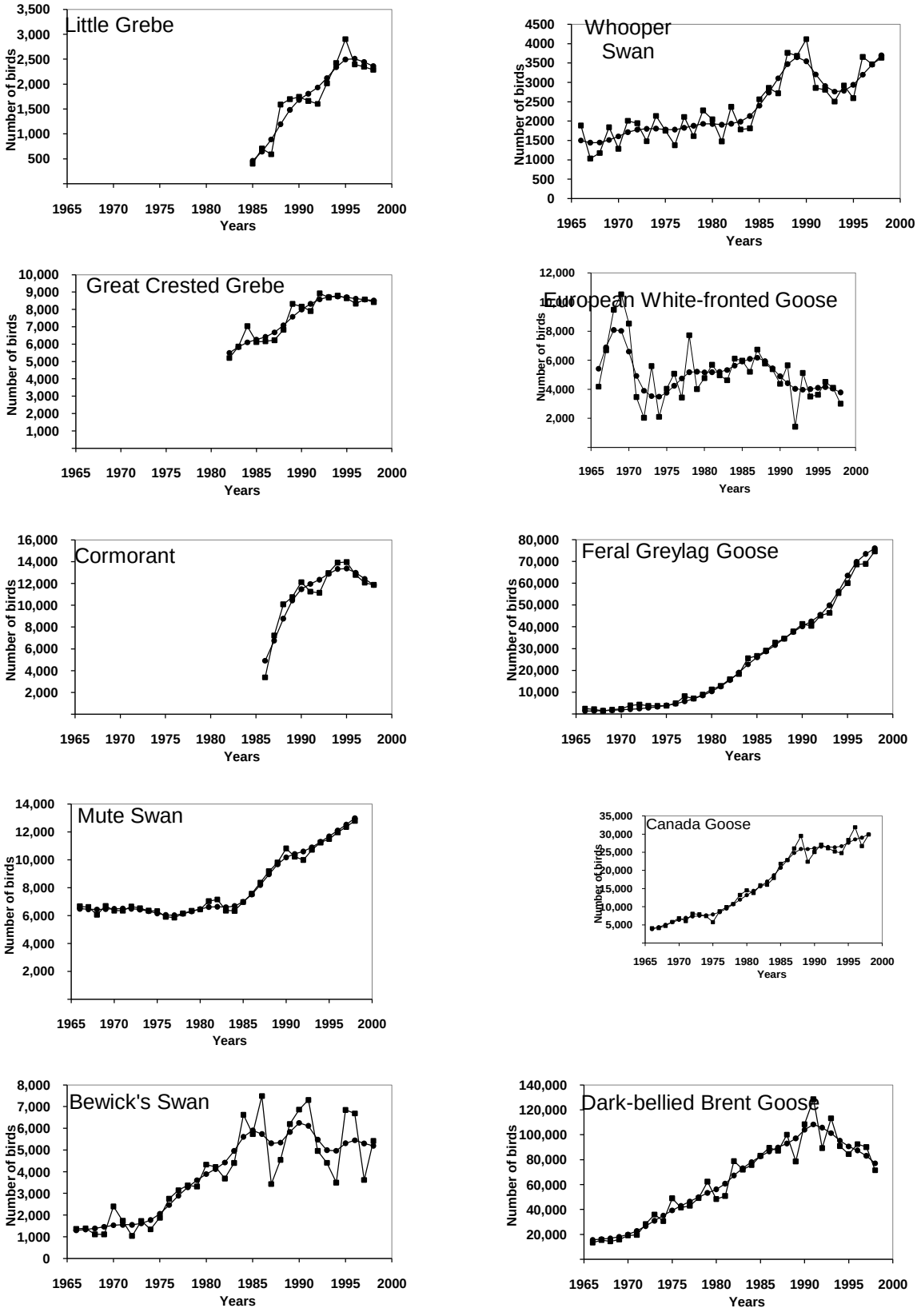
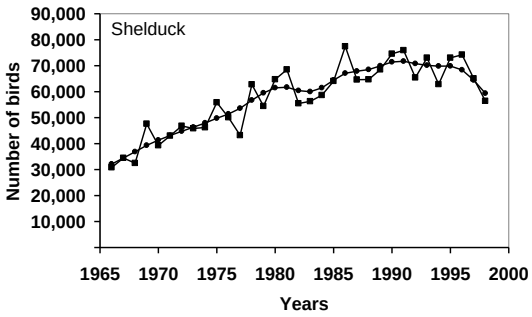
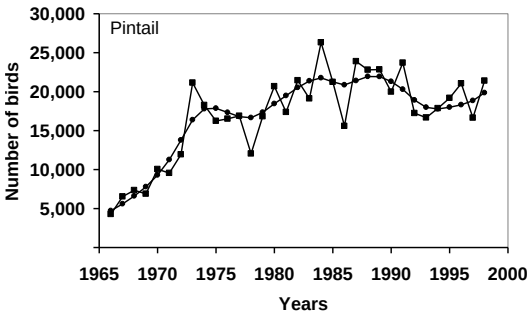
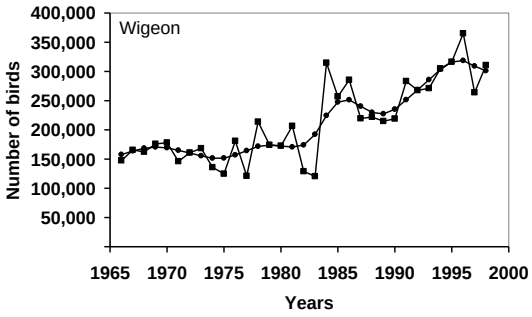
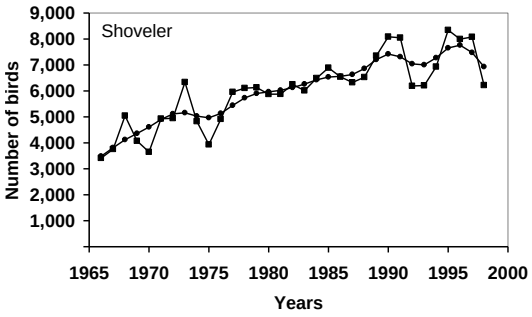


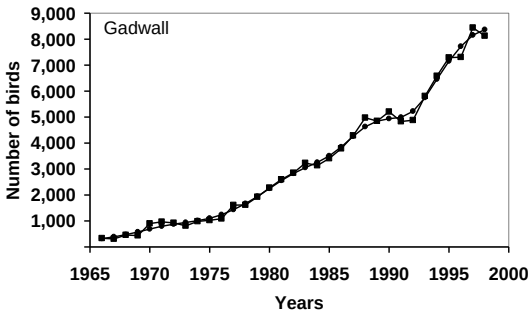
Figure 2.1 United Kingdom waterbird Underhill and smoothed GAM counts for regularly indexed wildfowl species. Units refer to the average number of birds counted per standard index month (see Table 1.2 for standard months).

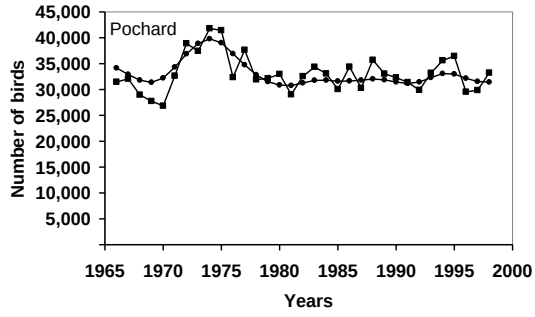


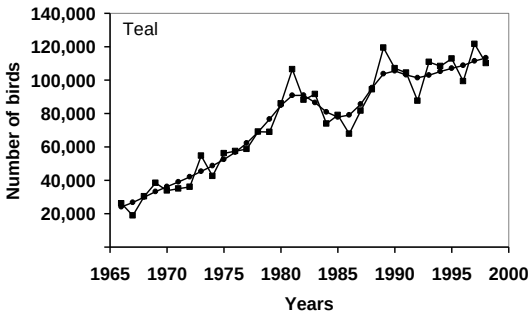


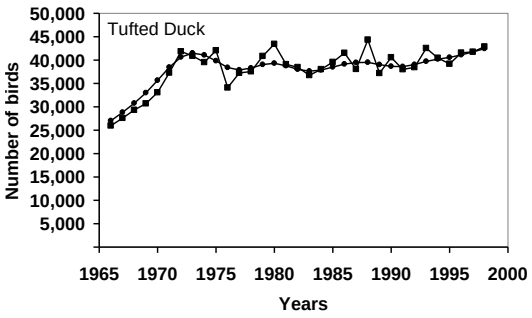


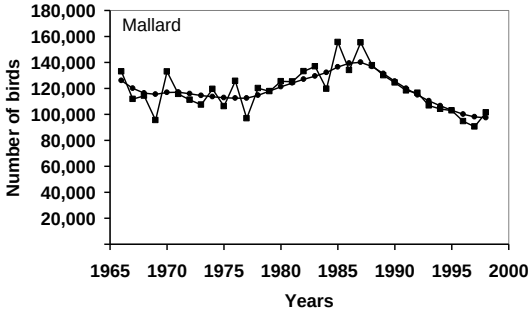


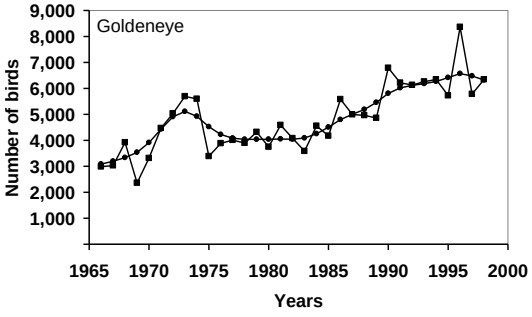












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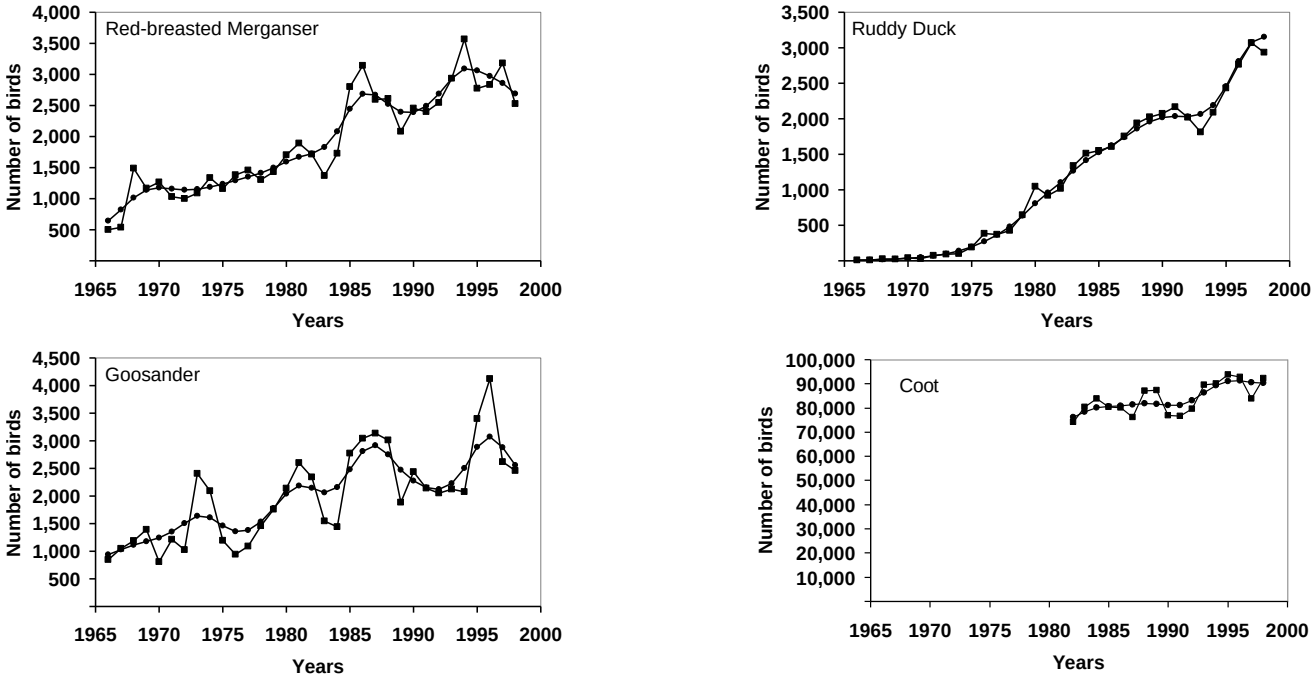

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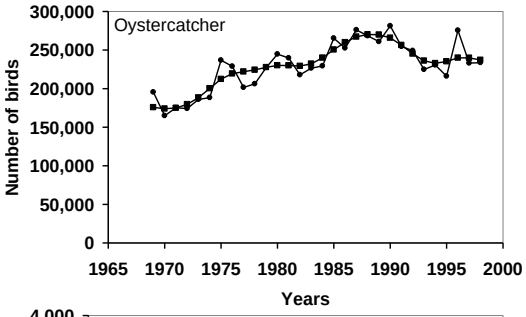
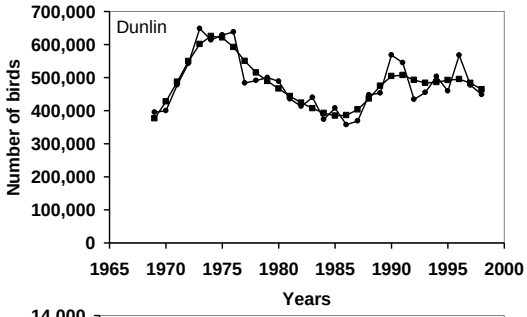
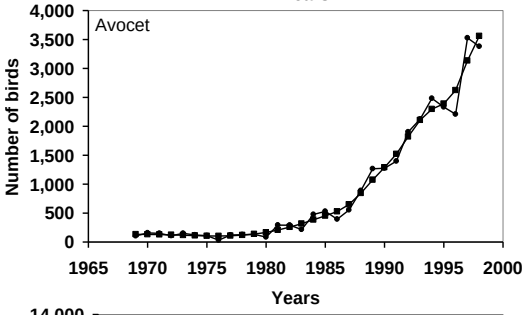
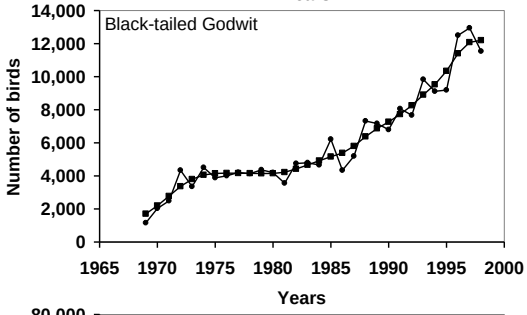
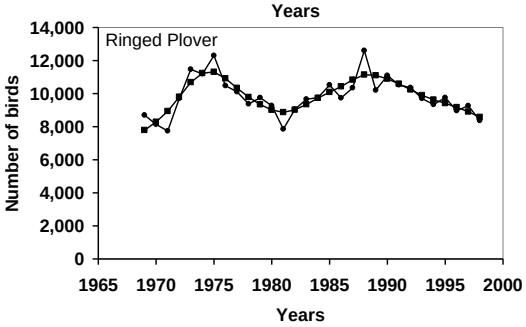
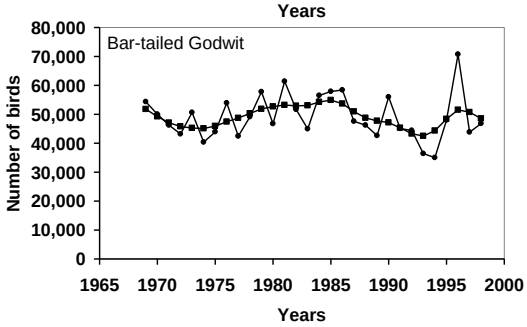


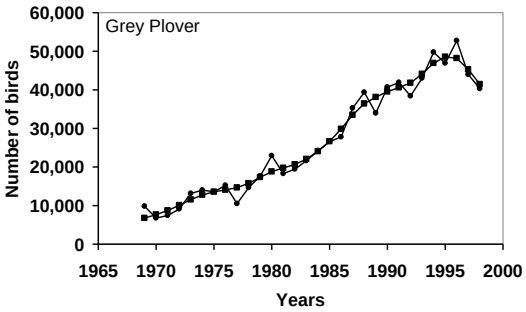


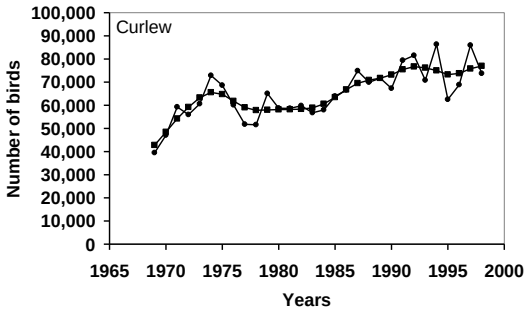


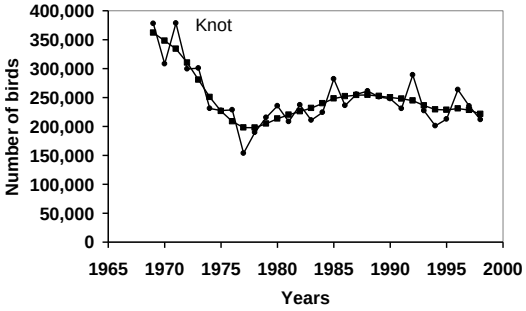


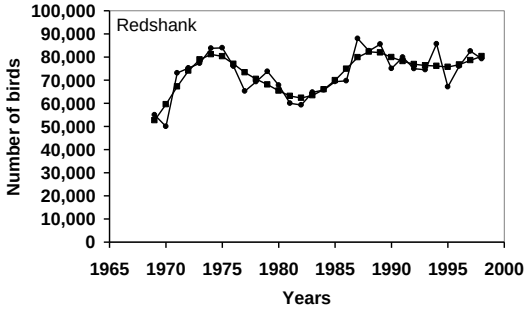


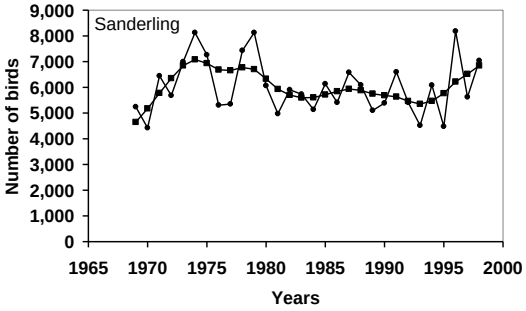












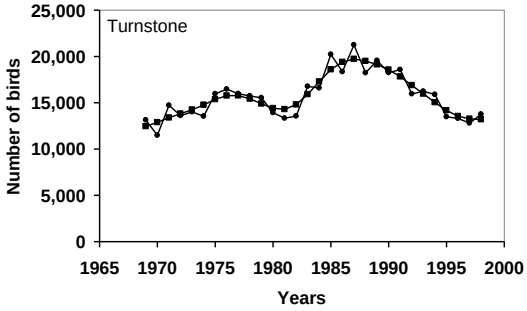


Figure 2.1 Continued.

3. ENGLAND

3.1 Population Change and Alerts

Figure 3.1 shows the change in numbers of all regularly indexed waterbird species in England.

Table 3.1 shows Alerts and population change calculated using both Underhill and GAM methods for all of these species over 5, 10, 25 and all years.

Figures 3.2 (a-c) shows the cumulative change in individual sites over 5, 10 and 25 year periods.

- No species have generated a negative 50% Alert using the GAM method.
- European White-fronted Goose, Mallard, Knot and Turnstone generated a negative 25% Alert using the GAM method. Using 199 bootstraps, the change was significantly below zero for all Alerts.
- Using the Underhill technique the following differences occurred: the Alert for European White-fronted Goose was elevated to a 50% Alert and Shelduck and Dark-bellied Brent Goose generated a 25% Alert.
- All other species are stable or increasing (mostly increasing).

3.2 Coverage of SPAs in England by the Waterbird Alert System

In England, coverage of SPAs is reasonably high. For the species for which data were potentially available (i.e. regularly indexed species), 461 of the 530 relevant species/site citations (85%) are covered by the Waterbird Alert System (Tables 3.2 & 3.3). For the remaining 15%, it may be possible to run Alerts in future as, currently, sites such as Old Hall Marshes and Gibraltar Point are included in the Blackwater and Wash WeBS sites respectively. Further development work would be required to determine which of the sectors of the WeBS sites correspond to each SPA.

Some SPAs such as Broadland and the Lower Derwent Valley are covered by more than one WeBS site and further development work would be required to decide which sites are representative of the SPA and therefore should be included in the Alert system.

Other sites which are currently included in WeBS may not be included in the set of counts used to produce the national index and it may be possible to include them in the site alert system, but on a shorter term basis (i.e. 5 or 10 year periods).

A further 128 species/site combinations of SPA citations were requested but data were not available (Table 3.3) as these were species which are not regularly indexed by WeBS. However, many of the sites involved are regularly counted and so the count data would be contained in the overall WeBS database. If they were to be included in the Waterbird Alert System in future a mechanism would have to be devised to readily extract these data in an accessible form. Overall, coverage was 70% of all species/site combinations.

3.3 Species Generating a 50% Alert using GAMs

In England, no waterbird species that are regularly indexed using the WeBS scheme have generated a 50% Alert.

3.4 Species Generating a 25% Alert using GAMs

European White-fronted Goose **GB Situation: Stable**

The White-fronted Goose triggered a 25% Alert over a 10 year period indicating a moderate, medium-term decline. Numbers decreased from the late 1960s to the early 1970s, followed by an increase to the late 1980s and then decreased to the current count in 1998/99. The recent decline, which has been ongoing since 1987/88 triggered a 10 year 25% Alert.

Mallard GB Situation: Slight recent decrease

Mallard triggered a 25% Alert over a 10 year period indicating a moderate medium-term decline. The smoothed Mallard trajectory increased slightly from 86,000 at the start of counts to 110,000 birds in 1987/88. Thereafter, numbers have declined consistently to the current level of 76,000 birds which represents the lowest smooth count. The decline over the last 10 years has been sufficient to trigger a 25% 10 year Alert. A similar pattern of change has occurred in Scotland.

Knot UK Situation: Decrease followed by Stability

Knot triggered a 25% Alert over all years considered indicating a moderate dlong-term decline. Numbers underwent a sharp decline in the early 1970s which has been attributed to increased mortality in the breeding areas. Numbers have not recovered since (although now stable), thus triggering an Alert over all years. See UK account for further details.

Turnstone National Situation: Increase followed by decrease

Turnstone have undergone a recent decline in England, after a slight increase, thus triggering a 25% Alert over 10 years indicating a moderate medium-term decline. The changes, which are closely mirrored by the Scottish population, increased from 8,000 birds at the start of counts to a peak of 12,000 birds in the mid 1980s. Since then there was a decline to 8,500 in 1995/96 and numbers have remained at this level over the following three winters.

3.5 Site Alerts – SPAs in England

For Site Alerts, only 50% negative Alerts using the GAM method are discussed. Cited species refer only to those species which are currently treated under the current Waterbird Alert System. The Alerts for all years should be treated with caution as, at the start of waterbird counts, coverage at some sites may have been poor.

Abberton Reservoir

Cited species: Great Crested Grebe, Cormorant, Mute Swan, Wigeon, Gadwall, Teal, Pintail, Shoveler, Pochard, Tufted Duck, Goldeneye and Coot

50% Alerts: Wigeon and Coot

Wigeon numbers at Abberton Reservoir peaked in 1978/79 at 11,500 birds and were around 10,000 birds in the winters of 1985/86 and 1986/87. Ten and 25 year Alerts have been triggered due to the decline in numbers since 1980, although in the final five years, numbers have stabilised. It should be noted that recent numbers are not appreciably lower than those in the twelve winters prior to 1978/79. Numbers are currently in the order of 1,500-2,000 birds.

Coot numbers have fluctuated greatly between years at Abberton. Five and 10 year Alerts occurred due to recent declines since very large peaks in 1988/89 and 1993/94, when over 10,000 and 9,500 birds were recorded respectively. Current counts are in the order of 2,000-4,000 birds and not appreciably different from the counts at the start of counts.

All other species cited have increased or were stable over the years considered.

Alde-Ore Estuary

Cited species: European White-fronted Goose, Shelduck, Wigeon, Teal, Shoveler, Avocet, Dunlin, Black-tailed Godwit and Redshank

50% Alert: Shoveler

Shoveler were in long-term decline on the Alde-Ore estuary from an average of 60 birds in the early 1970s to less than 5 in 1994/95. There has been a recovery to 30-40 birds in the last 3 winters. Numbers have fluctuated over the count period with a peak of 131 birds in 1987/88 but these inter-annual variations di not mask this overall long term trend.

Numbers of all other species cited have increased in the years considered.

Alt Estuary

Cited species: Knot, Sanderling, Bar-tailed Godwit

50% Alert: Knot

The Knot recorded by WeBS counts on the Alt Estuary are part of a large population that also uses the Dee Estuary. Thus, many of those recorded at high tide on the Alt feed at low tide on the North Wirral Shore. Numbers recorded on the Alt peaked at over 40,000 in the winters of 1985/86 and 1988/89 and a 10 year alert was triggered by the decline in the period since then. Numbers are still higher than those in the 1970s, however, and overall the species has shown a significant increase. This is in contrast to the situation on the Dee where the species has been in long-term decline.

Both Bar-tailed Godwit and Sanderling have also shown high increases since the 1960s, the former despite a large drop in numbers in the early 1990s. The increase in Bar-tailed Godwit numbers coincides with a long-term decrease on the neighbouring Dee Estuary.

Benfleet and Southend Marshes

Cited species: Oystercatcher, Ringed Plover, Grey Plover, Knot and Dunlin

No Alert species

Numbers of all species cited on the Benfleet and Southend Marshes have increased by over 50% since counts began in 1973/74. Dunlin and Oystercatcher have shown particularly high increases in the last 10 years.

Blackwater Estuary (Mid-Essex Coast Phase 4)

Cited species: Little Grebe, Great Crested Grebe, Cormorant, Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Goldeneye, Red-breasted Merganser, Avocet, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit, Curlew and Redshank

50% Alerts: Pintail, Shoveler, Goldeneye, Avocet and Curlew

Taking into consideration all cited species, there the has been a long term increase in most species (Figure 3.2c). Only two species, Curlew and Wigeon have shown a decrease over all years. However in the last five years there has been at least a 25% decrease in most species (10 out of 16 species over 5 years) and scores the lowest change index of any of the English SPAs under consideration (Figure 3.2a), indicating a general decrease across all waterbird populations.

Pintail numbers on the Blackwater peaked at over 200 birds in 1993/94 after a steady increase over the preceding 17 years. Although there has been a decline since then (triggering a five year Alert) to numbers similar to those in the 1970s and 1980s, the trend for the entire period is still an increasing one. However, given the decline of other species, this might be indicative of a more general problem on the Blackwater.

Shoveler have fluctuated greatly in number since 1966/67, with peaks of over 75 birds in 1983/84, 1987/88 and 1992/93. As with Pintail there has been an overall increase since counts began, despite a decrease of over 50% in the last five years.

Goldeneye numbers on the Blackwater Estuary rose from the start of counts in 1966/67, peaked at over 600 birds in 1984/85 and over 500 in 1989/90, but have declined since, thus triggering alerts for the species. Present numbers are similar to those in the late 1960s and early 1970s.

Avocet have been recorded on the Blackwater Estuary in only two winters, with a mean of just one in 1993/94 and 11 in 1994/95. An alert was triggered due to the absence of birds in the subsequent four winters. From

investigation of the WeBS data, Avocet appear on this site in late summer rather than winter. By November most birds have moved on to other wintering areas. This Alert should be ignored as the current set of indexing months are not relevant.

Curlew numbers were stable at 500-1,500 birds during the 1970s and first half of the 1980s. From the mid-1980s they underwent a large increase to a peak of over 2,200 birds in 1993/94. This was followed by a large recent decrease to 1,000 birds currently. There has also been a slight overall decline in numbers since the first wader counts in 1970/71. Sudden declines are not unprecedented as numbers have fluctuated widely from year to year and were below 500 in the winters of 1980/81 and 1985/86. However, this decline must be assessed together along with other declines in other species.

Numbers of Little Grebe, Great Crested Grebe, Cormorant, Dark-bellied Brent Goose, Red-breasted Merganser, Ringed Plover, Grey Plover, Dunlin and Black-tailed Godwit have all shown high long-term increases over the years considered, although most have suffered recent declines.

Breydon Water

Cited species: Cormorant, Bewick's Swan, European White-fronted Goose, Wigeon, Shoveler, Avocet, Dunlin and Black-tailed Godwit

No Alert species

All species cited have shown significant increases at Breydon Water in the last 10 years and all but European White-fronted Goose and Dunlin have increased by over 50% since counts began.

Chew Valley Lake

Cited species: Shoveler

No Alert species

Shoveler have increased in number at Chew Valley Lake since the 1960s and, in spite of a slight recent decline, counts remain greater than those recorded prior to 1980.

Chichester and Langstone Harbours

Cited species: Little Grebe, Cormorant, Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Red-breasted Merganser, Oystercatcher, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank and Turnstone

50% Alerts: Shelduck, Shoveler, Knot, Sanderling and Black-tailed Godwit

Chichester and Langstone Harbours have shown a large declines across most waterbird species in the past 5 and 10 years (Figures 3.2 a,b). This is particularly marked amongst the waders. Most species have shown an increase over 25 years.

Shelduck numbers at Chichester and Langstone have been in consistent long-term decline. They peaked at over 9,000 birds in 1969/70 and, except for a short-term recovery in numbers in the early 1980s, have been in long-term decline since and are currently the order of 1,000 birds. Drops of over 50% have been noted in the last 10 and 25 year periods and over the entire set of years considered.

Shoveler initially underwent a large increase at Chichester and Langstone followed by a recent decrease. Numbers rose from *c*10 birds during the late 1960s and early 1970s to between 50-90 during the 1980s. The decline started in the late 1980s and currently fewer than 20 birds winter on the site. Counts remained higher than those in the 1960s and early 1970s, however, when the species was uncommon at the site. There has thus been an overall upward trend over the years considered.

Knot numbers initially increased from less than 500 birds in the early 1970s to over 3,000 in the early 1990s but have declined to *c*1,000 birds in the last five years since peak counts of over 3,000 in the winters of 1987/88, 1990/91 and 1992/93. In spite of this, there has been an upward trend since the first low counts in the early 1970s.

Sanderling numbers have fluctuated between 50 and 200 birds over the entire time period and there has been no significant upward or downward trend.

Black-tailed Godwit have undergone a consistent decline over the past 30 years. Counts peaked at over 1,300 in 1971/72 after lows in 1969/70 and 1970/71 (count quality may be suspect in the first few years). Since then there has been a decline from 1,300 to the current level of 400-600 birds. This is atypical compared to the national picture and is one of only two estuaries where Black-tailed Godwit have shown a long-term decline (see Appendix 1).

Numbers of all other cited species, but Dunlin, have risen over the years considered.

Colne Estuary (Mid-Essex Coast Phase 2)

Cited species: Great Crested Grebe, Cormorant, Dark-bellied Brent Goose, Shelduck, Avocet, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit and Redshank

50% Alerts: Great Crested Grebe, Cormorant, Black-tailed Godwit and Redshank

The Colne Estuary is situated immediately north of the Blackwater Estuary and Dengie and is thus important for many of the same species. Trends for three of four species for which alerts are reported - Great Crested Grebe, Cormorant and Black-tailed Godwit - are similar to those at Dengie.

Great Crested Grebe were not recorded on the Colne before 1987/88, but peaked at over 30 in that year and in 1991/92 and 1995/96. Numbers have fallen in the last three years triggering a short-term alert.

Counts of Cormorant display a similar pattern to the species above. None were recorded in 1986/87, but numbers rose to a peak in 1992/93. A significant decline has occurred in the five years since then.

Numbers of Black-tailed Godwit on the Colne Estuary, in common with those on many other estuaries in south-east England, have increased since WeBS counts began. None were recorded prior to 1983/84, but counts rose to just over 1,000 in 1988/89. An alert has been triggered due to a decline to less than 100 birds in the 10 years since then. This is atypical compared to the national picture.

Redshank numbers initially underwent a dramatic decrease from 3,000 birds in the early 1970s to less than 500 in the winter of 1981/82. Numbers have recovered since and the trend is continuing upwards and is currently at just over 1,000, but still nowhere near former levels. In 1994/95, numbers temporarily rose to over 2,750.

Numbers of all other cited species but Dunlin have risen over the years considered.

Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)

Cited species: Dark-bellied Brent Goose, Shelduck and Black-tailed Godwit

50% Alert: Shelduck

The Crouch and Roach Estuaries lie just south of Dengie on the Essex coast, but are important for fewer species.

Shelduck numbers on the Crouch and Roach Estuaries have shown a fluctuating pattern since WeBS counts began. Counts initially rose to over 1,500 in the early 1970s before dropping to less than 200 by the end of the decade. There was then a steady increase up until 1995/96, after which numbers dropped again, triggering a short-term alert.

Both Dark-bellied Brent Goose and Black-tailed Godwit have increased over the years considered.

Deben Estuary

Cited species: Dark-bellied Brent Goose and Avocet

No Alert species

Neither Dark-bellied Brent Goose nor Avocet were recorded on the Deben Estuary prior to the early 1980s, but since then their numbers have increased dramatically. The former reached over 2,300 in 1993/94 and Avocet have numbered over 100 in two of the last five years.

Dengie (Mid-Essex Coast Phase 1)
Cited species: Great Crested Grebe, Cormorant, Dark-bellied Brent Goose, Oystercatcher, Grey Plover, Knot, Dunlin, Black-tailed Godwit and Bar-tailed Godwit

50% Alerts: Great Crested Grebe, Cormorant and Black-tailed Godwit

Numbers of Great Crested Grebes at Dengie have followed a similar pattern to those on the neighbouring Colne Estuary. None were recorded until the late 1980s and, after peaks of over 30 in 1988/89 and 1989/90, there has been a decline which triggered a short-term alert.

Cormorant numbers likewise rose from zero in 1986/87 to a peak of 85 in 1992/93. A decline to between 10 and 50 birds since then has resulted in a short-term alert.

Black-tailed Godwit are usually an uncommon species at Dengie, but peaked at a mean of 130 birds in 1992/93. Only occasional birds have been recorded on the estuary since, thus triggering a short term Alert.

Numbers of all other species cited have increased at Dengie, as they also have on those neighbouring estuaries (the Blackwater, Colne, Crouch and Roach) where they were considered important.

Derwent Ings

Cited species: Bewick's Swan, Wigeon and Teal

50% Alert: Bewick's Swan

Numbers of Bewick's Swans on the Derwent Ings have fluctuated greatly over the years considered (0-160 birds), but when modelled indicate a short- and long-term decline of over 50%. Numbers peaked at 160 in 1979/80, but have been below 90 since the winter of 1986/87.

Wigeon and Teal have both increased greatly since counts began.

Duddon Estuary

Cited species: Shelduck, Pintail, Red-breasted Merganser, Oystercatcher, Knot, Sanderling, Dunlin, Curlew and Redshank

50% Alerts: Shelduck, Pintail and Knot

Numbers of cited waterbirds on the Duddon have shown a slight decrease over the last five and ten years (Figure 3.2a,b).

Shelduck have regularly fluctuated widely in numbers on the Duddon Estuary from 300 to 1,100 birds. The counts indicate a decrease from 500-800 birds in the early 1970s to *c*300 birds in the early 1980s. Numbers then rose to a peak of over 1,100 in 1993/94 but have steadily fallen to half that level in the five years since, thus triggering a short-term Alert. Numbers are also currently lower than at the start of counts. Shelduck numbers have increased nationally.

In contrast, Pintail numbers have shown a long-term increase on the Duddon. Numbers rose to nearly 2,000 in 1988/89 but had declined to approximately 500 by the last two winters.

Knot numbers on the Duddon Estuary have shown a fluctuating pattern since WeBS counts began. None were recorded in four out of five winters between 1976/77 and 1980/81, but reached around 4,000 in four winters between 1986/87 and 1994/95. There has been a decline to numbers of less than 1,000 since then, resulting in a short-term alert.

Numbers of Red-breasted Merganser, Dunlin and Curlew on the Duddon have increased by over 50% over the years considered, whilst those of Oystercatcher, Sanderling and Redshank have shown less significant changes.

Exe Estuary

Cited species: Cormorant, Dark-bellied Brent Goose, Wigeon, Red-breasted Merganser, Oystercatcher, Avocet, Grey Plover, Dunlin and Black-tailed Godwit

50% Alert: Wigeon

Wigeon numbers fluctuated between 3,000 and 5,000 birds during the late 1960s and the first half of the 1970s. After this numbers dropped sharply to less than 1,000 birds by 1982/83. Numbers have been at a lower level since this, resulting in a 25-year alert, although they have risen slowly in the last 10 years to over 1,600 birds.

Numbers of Cormorant, Dark-bellied Brent Goose, Red-breasted Merganser, Oystercatcher, Avocet and Black-tailed Godwit have increased by over 50% on the Exe over the years considered, whilst those of Grey Plover and Dunlin have shown less significant changes.

Foulness (Mid-Essex Coast Phase 5)

Cited species: Little Grebe, Dark-bellied Brent Goose, Shelduck, Wigeon, Oystercatcher, Avocet, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew and Redshank

No Alert species

Numbers of all but one species cited have increased by over 50% at Foulness over the last 25 years. The exception, Curlew, has shown no appreciable trend in its numbers.

Hamford Water

Cited species: Little Grebe, Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Avocet, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit and Redshank

50% Alert: Black-tailed Godwit

Numbers of Black-tailed Godwit at Hamford Water have fluctuated markedly since counts began in 1972/73. Overall there has been an upward trend, numbers having increased by over 50% over the 27 years. Since peaks of over 800 birds in the winters of 1990/91 and 1994/95, however, numbers have fallen to just over 100, thus triggering a five-year alert.

Numbers of all other species but Wigeon and Teal have also shown increases of over 50% over the years considered.

Hornsea Mere

Cited species: Gadwall

No Alert species

Numbers of Gadwall have increased markedly at Hornsea Mere since counts began and in the last 12 years have reached over 150 birds in three winters.

Humber Flats, Marshes and Coast (Phase 1)

Cited species: Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Mallard, Pochard, Goldeneye, Oystercatcher, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Bar-tailed Godwit, Curlew, Redshank and Turnstone

50% Alerts: Mallard, Pochard, Sanderling

Numbers of Mallard on this large estuary have fluctuated greatly between years, with only 700 in 1972/73, but peaks of nearly 8,000 in 1974/75 and 10,000 in 1987/88. Overall, since that second peak in the early 1970s there has been a consistent long-tern decline to less than 2,000 in the last three winters. This has resulted in a downward trend over the entire period of counts and thus triggered both short-term and long-term alerts.

Few Pochard were recorded on the Humber prior to 1975/76. Since this date, numbers have increased greatly, peaking at over 1,000 birds in 1993/94. A decline to less than 200 birds in the last two winters has triggered a five-year alert, although overall the trend is still an upward one.

Sanderling triggered a 50% Alert over five years. Numbers increased from 100 birds in the early 1980s to over 500 birds by 1994. Numbers have since dropped to 200 birds currently thus triggering an Alert.

All other cited species on the Humber have shown upward trends over the years concerned, except for Teal, which have shown long-term fluctuations around a population level of around 1,000 birds.

Lindisfarne

Cited species: Whooper Swan, Shelduck, Wigeon, Red-breasted Merganser, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Bar-tailed Godwit and Redshank

50% Alerts: Whooper Swan, Wigeon, Red-breasted Merganser, Ringed Plover, Knot, Dunlin and Redshank

Lindisfarne, along with the Solway Estuary, has shown a long term decrease in waterbird numbers (Figure 3.2c). Numbers have also declined in the medium and short term (Figure 3.2a,b)

Whooper Swans have shown a long-term decline at Lindisfarne, falling from a population level of 400 birds in 1969/70 to around 20 throughout the 1990s.

Wigeon have shown a similar pattern. Numbers have dropped from 10,000-12,000 in the late 1960s to a fluctuating population of between 200 and 3,000 birds since 1983/84.

No Red-breasted Merganser were recorded at Lindisfarne in the first two winters of counts, but numbers rose to nearly 60 in 1974/75. Since then the population has declined to less than 20, triggering both short and long-term alerts.

Ringed Plover numbers at Lindisfarne increased to nearly 450 birds by 1985/86, but since have declined to less than 100. This has resulted in a downward trend over the entire period of counts and both short-term and long-term alerts.

Knot numbers have shown a long-term decline from around 10,000 birds in the early 1970s to a low of around 1,000 in the 1980s. Numbers have recovered slightly since to 2,000-3,000 birds.

Dunlin underwent a large increase in the early 1970s followed by a large decrease in the early 1980s. Since 1985 numbers have been stable. Initially numbers increased from 5,000 birds in 1970/71 to 30,000-32,000 in the winters of 1979/80 and 1980/81. Since then the population has fallen to a more stable level of around 6,000 birds and this has resulted in a 25-year alert. The decline of this species has been linked to the spread of *Spartina* sp. on the Lindisfarne mudflats.

Redshank increased at Lindisfarne from less than 1,000 birds to over 3,000 by the late 1980s. Numbers fell sharply after this to less than 500 in 1993/94. Numbers have recovered slightly to 1,000 birds in the past five winters resulting in a 10-year alert.

Numbers of Shelduck and Grey Plover have increased by over 50% at Lindisfarne over the years considered, whilst those of Bar-tailed Godwit have been stable.

Martin Mere

Cited species: Bewick's Swan, Whooper Swan, Wigeon, Teal, Mallard, Pintail and Pochard

50% Alerts: Bewick's Swan, Wigeon, Teal and Pintail

No Bewick's Swans were recorded at Martin Mere until the mid-1970s, after which the population rose sharply to almost 800 in 1990/91. There has been a steep decline since then, however, and none were recorded in 1998/99.

Wigeon numbers at Martin Mere were stable at 1,000 to 2,000 birds through the 1970s but rose to a peak of 15,500 birds in 1988/89. Since then, numbers have returned to their previous levels. Counts of between 300 and 2,400 have been recorded in the last four years. This decline has resulted in both five-year and 10-year Alerts.

Teal numbers have shown a fluctuating but long-term decline at Martin Mere from 5,000 birds in 1977/78 to less than 1,000 in two of the last three winters. It should be noted, however, that only 200 were recorded in 1974/75 but, as this was the first count for this site, count quality may have been poor.

Pintail numbers at Martin Mere follow a similar pattern. Although none were recorded in 1966/67, there were over 4,000 in 1973/74 due mostly to an exceptional count of 4,500 in November 1972. By January 1973 only one bird was counted! The more usual count in the 1970s was in the region of 500-1,500 birds and there has been a long-term decline since to a population of between 100 and 200 in the last six winters.

Numbers of the other three species cited have all shown long-term increase of over 50% at the site.

Medway Estuary and Marshes

Cited species: Little Grebe, Great Crested Grebe, Cormorant, Bewick's Swan, Dark-bellied Brent Goose, Shelduck, Wigeon, Teal, Mallard, Pintail, Shoveler, Pochard, Oystercatcher, Avocet, Ringed Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Curlew, Redshank and Turnstone

50% Alerts: Little Grebe, Great Crested Grebe, Wigeon, Pintail, Shoveler, Pochard, Ringed Plover, Dunlin and Turnstone

Although the trend has been for a general long-term increase in waterbird numbers on the Medway, over the last five and 10 years there has been a general decline in waterbird numbers (Figure 3.2 a-c).

No Little Grebes were recorded on the Medway prior to 1988/89, after which the population rose to peaks of over 30 in 1990/91 and 1995/96. Since then numbers have declined to less than 10 in the last two winters, triggering a short-term alert.

Great Crested Grebe numbers have shown a similar pattern, increasing to over 100 by 1989/90, but falling after 1995/96 to numbers of less than 50, this also resulting in a short-term alert.

Numbers of Wigeon on the Medway fell from 8,000-9,000 in the early 1970s to less than 1,000 in the early 1980s. Although numbers subsequently recovered to over 5,000, there has been an underlying downward trend and a drop of over 50% over the years considered.

Pintail numbers were low during the first years of WeBS counts but rose to over 800 by the winter of 1975/76. Subsequently numbers of the species have shown a similar pattern to those of Wigeon, with a sharp decline in the early 1990s, followed by a period of partial recovery. Over the last 25 years, however, there has been an overall decline of over 50%.

Shoveler numbers rose in the initial years of counts, reaching a population level of over 130 by 1971/72. Since then there has been a long-term decline with only a brief recovery in the late 1980s.

Pochard numbers have fluctuated more, with peaks of 170 in 1974/75, 110 in 1976/77, over 40 in 1986/87 and over 120 in 1996/97 being separated by years when the species was rare or absent. The underlying trend over the last 25 years is downward, however, with a drop of over 50%.

Ringed Plover numbers on the Medway increased from less than 100 in the early 1970s to 1,000 in 1994/95. A decline to numbers of around 200 in the four years since has triggered a short-term alert, but has not masked the overall upward trend.

Dunlin numbers have followed a very similar pattern to the above species. They rose from an initial level of around 2,000 to over 30,000 in the winter of 1994/95, before also declining in the four years since. As with Ringed Plover, this recent decline has not hidden the underlying long-term upward trend.

Turnstone numbers have also followed this pattern. From an initial population of less than 50, numbers rose to 550 by 1993/94, before declining in the five years since. This decline has resulted in a short-term alert, but again has not hidden the overall upward trend.

Numbers of all other species cited have shown long-term (25 and all year) increases on the Medway.

Mersey Estuary

Cited species: Great Crested Grebe, Shelduck, Wigeon, Teal, Pintail, Grey Plover, Dunlin, Black-tailed Godwit, Curlew and Redshank

50% Alerts: Great Crested Grebe and Pintail

Great Crested Grebe numbers on the Mersey rose from less than 20 in the early 1980s to 120 in the winter of 1992/93. Numbers had dropped back to less than 10 by 1998/99, triggering a short-term alert.

Pintail numbers on the Mersey initially rose from around 500 in the late 1960s to between 5,000 and 12,000 in the late 1970s and early 1980s. Numbers have since shown a steady decline, and had fallen back to 500 by 1998/99. This has resulted in both five-year and 10-year alerts.

Numbers of all other cited species have risen by over 50% over the years considered.

Minsmere - Walberswick

Cited species: European White-fronted Goose, Gadwall and Shoveler

No Alert species

Numbers of all three species cited have increased at the site over the years considered.

Morecambe Bay

Cited species: Oystercatcher, Grey Plover, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank and Turnstone

50% Alerts: Bar-tailed Godwit

In spite of a large rise in 1998/99, there has also been an overall downward trend in the numbers of Bar-tailed Godwit at Morecambe Bay. Counts fell from over 9,000 in 1971/72 to a level of around 2,000 at the start of the 1990s.

Numbers of Grey Plover, Black-tailed Godwit, Sanderling and Curlew have shown long-term increases of over 50% at Morecambe Bay, whilst those of Oystercatcher, Knot, Dunlin, Redshank and Turnstone have been more stable.

North Norfolk Coast

Cited species: Little Grebe, Cormorant, European White-fronted Goose, Dark-bellied Brent Goose, Shelduck, Wigeon, Gadwall, Teal, Pintail, Shoveler, Oystercatcher, Avocet, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Bar-tailed Godwit and Redshank

No Alert species

Numbers of all cited species on the North Norfolk Coast, except for Oystercatcher, Knot and Dunlin, have increased by over 50% over the years concerned.

Orfordness – Havergate (part of Alde-Ore Estuary)

Cited Species: Avocet, Redshank

No Alert species.

Both Avocet and Redshank have undergone large increases.

Ouse Washes

Cite Species: Bewick's Swan, Black-tailed Godwit, Coot, Cormorant, Gadwall, Mallard, Pintail, Pochard, Shoveler, Teal, Tufted Duck, Whooper Swan, Wigeon

50% Alert: Cormorant, Wigeon, Shoveler

No data were available for Black-tailed Godwit, as the wader data for this analysis only covered estuarine sites.

Cormorant numbers initially increased from 100 birds to a peak of 200-250 birds in 1993/94 before dropping back to levels recorded at the start of counts, triggering a 5 year Alert. There is no obvious long-term trend in numbers and there is too much variation in the counts to

draw any firm conclusions as to the current trend.

The Ouse Washes is a key site for Wigeon in the UK. After 3 initial low counts, numbers reached a peak of 30,000-35,000 birds in the early 1970s before dropping to 20,000 birds during the 1980s. Numbers then increased again in the late 1980s / early 1990s to 30,000 birds but the last two years of counts have been abnormally small at *c*15,000 birds. The recent drop in numbers triggered a 5 and 10 year 50% Alert indicating a recent decline in numbers. The past two winters have been a 'blip' and more data would be required to determine whether this is indicative of a long term decline in Wigeon numbers.

Shoveler have triggered a 50% Alert over all years. Inspection of the numbers of birds recorded indicates that in October 1968, 1,200 birds were counted causing a large increase in the smoothed index at the beginning of the time series. Since that date approximately 100 birds per month have been recorded and numbers have been stable since. This Alert is not indicative of any long term decline.

Pagham Harbour

Cited Species: Dark-bellied Brent Goose, Pintail

50% Alert: Dark-bellied Brent Goose

As with most other south and east coast estuaries, Brent Geese have undergone a large increase since the start of counts. However, in Pagham Harbour, this increase ceased in 1980 and the population became stable at 1,500-2,500 birds. However, in the last two winters numbers dropped to *c*1,000 birds and triggered the five and 10 year Alerts. These last two winters are atypical and it remains to be seen whether this is the start of a longer term trend.

Poole Harbour

Cited Species: Cormorant, Dark-bellied Brent Goose, Shelduck, Shoveler, Pochard, Goldeneye, Red-breasted Merganser, Avocet, Dunlin, Black-tailed Godwit, Curlew, Redshank

50% Alert: Pochard

Most species have undergone large increases in Poole Harbour. Pochard, however, raised a 10 year Alert. The number of Pochard rose steadily from zero at the start of counts in 1966/67 to approximately 300 birds in 1980/81. Numbers then fluctuated from 300 to 700 birds throughout the mid 1980s and first half of the 1990s, peaking at over 800 in 1996/97. The number of birds in the following two winters crashed to less than 200, thus triggering a 10 year Alert. However, the large fluctuations that have been characteristic of this species at this site, do not indicate any declining trend.

Portsmouth Harbour

Cited Species: Dark-bellied Brent Goose

No Alert species.

As at many other sites in southern and eastern England, numbers of Dark-bellied Brent Geese have risen over the last 25 years at Portsmouth Harbour. A slight recent decline matches that at neighbouring Chichester and Langstone Harbours.

Ribble and Alt Estuaries (Phase 2)

Bar-tailed Godwit, Bewick's Swan, Black-tailed Godwit, Cormorant, Curlew, Dunlin, Grey Plover, Knot, Oystercatcher, Pintail, Redshank, Sanderling, Shelduck, Teal, Whooper Swan, Wigeon

50% Alert: Whooper Swan, Knot

As with many sites, the number of Whooper Swans on the Ribble and Alt vary enormously with between 0 and 400 birds per year. The last 3 winters have seen relatively few birds wintering on this SPA, thus triggering the 10 year Alert, but this is not indicative of any long-term trend in numbers. There is also likely to be much interchange with Martin Mere.

Knot numbers vary greatly between years on this SPA. The general long-term pattern is of an increase from 10,000-30,000 the start of counts in 1969/70 to a peak of 70,000 birds per month in the late 1980s. From that date there has been a consistent decline in numbers to under 20,000 birds currently. The counts in 1997/98 and 1998/99 were low, thus triggering Alerts over all time periods. There is no obvious overall long-term trend.

Ribble Estuary

Cited Species: Bar-tailed Godwit, Bewick's Swan, Black-tailed Godwit, Dunlin, Knot, Oystercatcher, Sanderling, Shelduck, Wigeon

50% Alert: Knot, Dunlin, Bar-tailed Godwit, Sanderling

Knot numbers have undergone a decline on the Ribble, triggering 50% Alerts over 5, 10, 25 and all years. See above (Ribble & Alt) for details.

Dunlin did not trigger an Alert when considering the Ribble and Alt together. However when the Ribble is treated separately, they trigger a 25 year 50% Alert. This is due to very large counts of 50,000+ Dunlin in the early 1970s which were followed by a large decline to under 10,000 birds in the late 1980s. Since then there has been a consistent increase in numbers which was sufficient to trigger a 50% Positive Alert over 10 years.

Bar-tailed Godwit increased from c3,000 birds in the early 1970s to over 10,000 birds in the early 1990s. However, since 1994/95 there has been a large decline which triggered the 5 and 10 year Alerts. Over this period, numbers fell to between 2,000 and 8,000 birds.

Sanderling have undergone a long-term decline from 1,500 to 2,500 in the early 1970s to 500-1,000 birds currently. They did not however trigger an Alert when considering the Ribble and Alt together.

Rutland Water

Cited Species: Coot, Cormorant, Gadwall, Goldeneye, Great Crested Grebe, Little Grebe, Pochard, Shoveler, Teal, Tufted Duck, Wigeon

50% Alert: Cormorant

Cormorants at Rutland Water underwent an increase from the start of counts to a peak over 500 birds in 1994/95 but have declined in numbers to less than 200 currently. This is similar to the national picture.

Severn Estuary

Cited Species: Bewick's Swan, Curlew, Dunlin, Gadwall, Grey Plover, Mallard, Pintail, Pochard, Redshank, Shelduck, Shoveler, Teal, Tufted Duck, White-fronted Goose, Wigeon

50% Alerts: Grey Plover, Dunlin and Curlew

The Severn Estuary is divided into five sub-sites in WeBS analyses, one on the Welsh shore and four on the English. Trends are investigated for the site as a whole, which includes the Upper Severn SPA in Gloucestershire. However, English sections have shown a general increase in waterbirds over the last 25 years (Figure 3.2c).

Grey Plover numbers on the Severn Estuary peaked in 1979/80 at 2,300 birds, but subsequently returned to previous levels of less than 500. A rise in numbers at the end of the 1980s as been followed by a shallow decline in numbers resulting in both five- and 10-year alerts. This is atypical to the national which has shown a dramatic increase.

Numbers of Curlew on the Severn Estuary rose to levels of over 1,500 birds in the five winters between 1985/86 and 1994/95. A sharp decline since then to numbers similar to those in the 1970s has resulted in a five-year alert.

Dunlin have fluctuated widely in number on the Severn Estuary over the years considered. Numbers reached over 20,000 in three winters between 1981/82 and 1990/91, but in the last three years have averaged 5,000. Overall, there has been an underlying downward trend and a drop of over 50% over the years considered.

Solent and Southampton Water

Cited species: Little Grebe, Great Crested Grebe, Cormorant, Dark-bellied Brent Goose, Shelduck, Wigeon, Gadwall, Teal, Pintail, Shoveler, Red-breasted Merganser, Ringed Plover, Grey Plover, Dunlin, Black-tailed Godwit, Curlew, Redshank

50% Alert Species: Shoveler, Ringed Plover, Black-tailed Godwit

Several species in the Solent and Southampton Water have recently undergone declines during the past 5 years (Figure 3.2a). Shoveler, Ringed Plover, Black-tailed Godwit, Grey Plover have all undergone dramatic declines in the Solent in 1996/97. These are all species which had been increasing in the past.

Redshank are in a consistent long-term decline but have not reached the 50% decline threshold, although if they continue to decline at a similar rate an alert will be issued in the near-future.

Shoveler have shown a long term increase on the Solent since the start of counts but have shown a recent decline which has triggered a 50% Alert over the last 5 years. There were initially no birds wintering on the Solent and Southampton Water WeBS sites in 1970/71 but steadily increased to an average count of 90 birds per month in 1995/96. The following winter the number of Shoveler dropped to an average of less than 40 birds per month and remained low to the last year of counts.

Since the start of counts numbers of Ringed Plover on the Solent and Southampton rose from between 100-200 birds to between 300 and 400 birds. The average number of birds counted per month peaked in 1995/96 at an average of over 600 birds and then dropped by two-thirds to 200 birds per month the following year, thus triggering the 50% Alert over 5 years.

Black-tailed Godwits are a species that have increased across much of southern Britain since 1969 but, as with several other estuaries in the south and south-east, numbers have decreased in the Solent and Southampton Water over the last five years and a 50% Alert was issued indicating a short-term decline in numbers.

Stodmarsh

Cited species: European White-fronted Goose, Wigeon, Gadwall, Mallard, Shoveler, Pochard, Tufted Duck

50% Alert: Mallard

Mallard have triggered a 50% Alert over 5, 25, and all years. There is no apparent long term trend and the Alerts have been caused by widely fluctuating numbers between years. In most years between 100 and 200 were counted in January which is the month in which Mallard are indexed nationally. However in some years over 1,000 birds are counted and in 1981/82 3,500 birds were counted. These large counts increased the average number of birds wintering on the site in the 1970s and 1980s and a recent run of low counts over the last six winters have triggered the alerts.

Stour and Orwell Estuaries

Cited Species: Great Crested Grebe, Cormorant, Mute Swan, Dark-bellied Brent Goose, Shelduck, Wigeon, Pintail, Goldeneye, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Curlew, Redshank, Turnstone

50% Alert: Mute Swan, Wigeon, Ringed Plover

Mute Swan triggers a 50% Alert when considering change over all years. They were at their peak of *c*800 birds on the Stour and Orwell estuaries at the start of counts in 1969/70 but fell in number to an average of between 150-300 birds in the winter months. Numbers have remained stable at this level since 1975/76.

Wigeon numbers dropped from an average of over 9,000 birds in 1966/67 to 2,000 two winters later. Since then there has been an upward trend and numbers now average around 4,000. Even though the current trend is upward, the trend for all years combined remains downward and represents a drop of over 50%.

Ringed Plover increased in number from 100 birds in 1971/72 to a peak of 700-800 birds in 1988/89 but have fallen since. Numbers have fluctuated widely from year to year but the last two counts on 1997/98 and 1998/99 have been exceptionally low, thus triggering the Alerts over 5 and 10 years. These counts were equivalent to those in the early 1970s.

Tamar Estuaries Complex

Cited Species: Avocet

No Alerts raised.

Despite fluctuating numbers, Avocet have increased on the Tamar since the start of counts in 1969/70 to the current level of 100-300 birds per month.

Teesmouth and Cleveland Coast

Cited Species: Shelduck, Shoveler, Knot, Redshank

50% Alert: Shelduck, Knot

Shelduck have declined from 1,500-2,500 birds to the current level of 1,000 birds. However the number of birds recorded in 1988/99 was only five. The reasons for this are unknown but count quality may be an issue here.

Knot numbers have shown a consistent decline in numbers since the start of counts in 1969/70. Numbers initially underwent rapid decline from 10,000 birds at the start to less than 2,000 in 1974/75 before increasing and fluctuating between 4,000-6,000 birds in the late 1970s and early 1980s. Numbers then declined and by 1987/88 numbers reached their current level of 1,000 to 2,000 birds.

Thames Estuary and Marshes

Cited Species: Little Grebe, European White-fronted Goose, Shelduck, Gadwall, Pintail, Shoveler, Avocet, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Redshank

50% Alerts: European White-fronted Goose, Pintail

European White-fronted Goose triggered 10, 25 and all years Alerts indicating a long-term decline, followed by recent stability as the local population has gone almost to extinction. Although numbers varied widely on the Thames (0-1,300 birds per month) there has been a long-term declining trend in numbers and the population reached zero in 1994/954 and 1995/96. Since 1996/97 and the following 2 years small numbers (averaging *c*50 birds per month) have wintered on the Thames.

Pintail numbers tend to fluctuate widely on estuaries in the UK. On the Thames, numbers remained stable at less than 50 birds until the late 1970s when they increased to over 200 birds counted per month in 1987/88 and 1988/89. Numbers have declined consistently since, thus triggering the 5 and 10 year 50% Alerts. The number of birds is currently less than 50.

Thanet Coast and Sandwich Bay

Cited Species: Turnstone

50% Alert: Turnstone

Turnstone numbers on the Thanet Coast and at Sandwich Bay have shown great fluctuations from year to year, but prior to 1995/96, when numbers peaked at 130, had shown an upward trend. Numbers have dropped sharply since and this has resulted in both five-year and 10-year alerts. The WeBS site that covers this SPA is Pegwell Bay and this only includes the estuarine part. It is likely that most Turnstone will be on the rocky shore parts of the SPA land. It is not know if this site is representative of the Turnstone population as a whole.

The Dee Estuary

Cited Species: Cormorant, Shelduck, Wigeon, Teal, Pintail, Oystercatcher, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone

50% Alert: Knot, Bar-tailed Godwit

This included both Welsh and English parts of The Dee.

Both species have shown very large declines in number since large counts in the early 1970s. This is due, in part, to the fact that more now roost on the Alt, due to disturbance of roosts on the Dee. Many still feed on the North Wirral shore.

Numbers of Knot on the Dee have undergone a large decrease since the start of counting in 1970/71 and have raised 50% Alerts over all four time periods. Apart from Bar-tailed Godwit, this is in direct contrast to other

waders on the Dee which are stable or increasing in number. Knot numbers have fallen by over 30,000 over the whole time period. Numbers declined from 20,000-40,000 birds in the early 1970s to the latest count of an average of *c*2,500 birds per month currently.

Bar-tailed Godwit numbers fell from 4,000-7,000 birds in the early 1970s to 100-200 birds in the early 1980s. Numbers remained stable until the early 1990s and have recovered slightly since, fluctuating from less than 100 to just over 1,000 birds.

Both declines have coincided with increases on the neighbouring Alt estuary.

The Swale

Cited Species: Little Grebe, Cormorant, European White-fronted Goose, Dark-bellied Brent Goose, Shelduck, Wigeon, Gadwall, Teal, Pintail, Shoveler, Oystercatcher, Avocet, Ringed Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank

50% Alert: European White-fronted Goose, Pintail

Numbers of White-fronted Geese fluctuate widely from year to year in the Swale and it is difficult to detect any consistent long term trend. Numbers increased from 200-600 birds per month to 800-1,600 birds from the 1970s to the late 1980s but have been erratic since. The last four winter's counts have been low (600-1,000), thus triggering the Alert.

Few Pintail were counted on the Swale prior to 1980/81 after which the population rose rapidly to a peak of over 600 in the mid-1990s. A drop to less than 300 in the winters since then has resulted in a five-year alert.

The Wash

Little Grebe, Cormorant, Bewick's Swan, Whooper Swan, European White-fronted Goose, Dark-bellied Brent Goose, Shelduck, Wigeon, Gadwall, Mallard, Pintail, Goldeneye, Oystercatcher, Avocet, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone

50% Alert: Little Grebe, Bewick's Swan, Whooper Swan, European White-fronted Goose, Wigeon, Pintail, Goldeneye, Oystercatcher

Despite an overall increase in waterbirds, there has been a worrying fall in a number of species of wildfowl on the Wash over the past five to 10 years (Figure 3.2 a,b). This has coincided with crashes in shellfish stocks (Atkinson *et al*. 2000).

Little Grebe numbers have fallen to around 20 since previously rising to a peak of over 80 in 1995/96. Present numbers are similar to those in the late 1980s and early 1990s.

Numbers of Bewick's Swans have fluctuated greatly on the Wash, reaching over 80 in four winters between the 1980s and early 1990s. Numbers have fallen to less than 20 in the last five years, however, triggering both five- and 10-year alerts. Present numbers are similar to those prior to 1976/77. Both this species and Whooper Swans have never used the Wash regularly and non-zero counts tend to occur in only a few months.
Numbers of Whooper Swans were initially somewhat less erratic, rising to a peak of over 25 in the early 1980s, before declining to previous levels. Two subsequent peaks of over 50 in 1991/92 and 1994/95 have been followed by a drop to numbers of less than 15, resulting in a five-year alert.

European White-fronted Geese numbered less than 10 on the Wash during the first years of WeBS counts but rose to over 30 by the winter of 1973/74. Since then there has been a long-term decline, and many years with zero counts, with only a brief recovery in 1996/97.

Wigeon numbers have shown great fluctuations from year to year. Peaks of between 5,000 and 7,600 were reached in four winters between 1978/79 and 1985/86, but there has been a subsequent downward trend to current numbers of less than 2,000.

Pintail were rare on the Wash prior to the 1980s, but rose in number to 3,600 by the winter of 1988/89. There has been a sharp decline since to numbers of less than 150 in the last five winters. This has triggered both five- and 10-year Alerts.

A peak of 500 Goldeneye was recorded on the Wash in the winter of 1973/74. Although numbers have been erratic since, there has been a clear downward trend over the past five-, 10- and 25-year periods.

Numbers of Oystercatcher on the Wash rose steadily from the start of counts to 20,000 birds by the late 1970s before rising again to 40,000 by 1988/89. A decline since to around 10,000 birds has triggered a 10-year alert. This is due, in part, to declines in shellfish stocks on the Wash.

Numbers of all other cited species on the Wash have shown long-term increases of over 50% over the years concerned, except for those of Knot, Dunlin, Curlew, Redshank and Turnstone which have been more stable.

Upper Solway Flats and Marshes

Great Crested Grebe, Cormorant, Whooper Swan, Shelduck, Teal, Mallard, Pintail, Shoveler, Goldeneye, Oystercatcher, Ringed Plover, Grey Plover, Knot, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Turnstone

50% Alert: Whooper Swan, Shoveler, Goldeneye, Ringed Plover, Knot, Sanderling, Black-tailed Godwit, Bar-tailed Godwit, Turnstone

This SPA includes areas of the Solway Firth in both England and Scotland.

Numbers of Whooper Swan on the Solway increased from less than 20 in the 1960s to a maximum of 250 in 1988/89. Declines of over 50% have since occurred over both the past five and ten years, but have not masked an overall upward trend.

Shoveler numbers rose to almost 1,000 in the winter of 1971/72, but afterwards returned to levels of less than 100. An increase to 120 in 1987/88 has been followed by a steady decline to numbers of less than 20 in all but one of the past seven years and this has triggered a 10-year alert.

Numbers of Goldeneye on the Solway have shown a similar pattern to those of Whooper Swan, rising from levels of less than 10 during most of the 1970s to a peak of 500 in 1990/91. Declines of over 50% have occurred over both the past five and ten years, but have not hidden the general upward trend.

Ringed Plover numbers peaked at over 3,000 in 1973/74 but dropped sharply afterwards to their current level of between 100 and 500. An alert has been triggered for the drop over the past 25 years.

Numbers of Knot have shown a similar pattern. After a peak of over 40,000 in 1973/74, numbers fell to less than 10,000 during the 1980s. Although a brief recovery occurred during the early 1990s, there has still been a general downward trend and a drop of over 50% over the last 25 years.

Sanderling numbers have fluctuated more widely from year to year with peaks of over 300 in 1973/74 and 1985/86 and 220 in 1988/89 being separated by years when the species was rare or absent. The 25 year Alert was triggered by an exceptionally large count in 1974/75 and is not indicative of any long-term trend.

Prior to an unprecedented count of 200 birds in 1996/97, numbers of Black-tailed Godwit in winter on the Solway typically averaged less than 35. In spite of this peak, there has been a downward trend over the past 25 years and a drop of over 50%.

Numbers of Bar-tailed Godwit on the Solway have shown a fluctuating but long-term decline from a peak of 11,000 birds in 1973/74 to less than 2,000 during most of the 1990s. An Alert has thus been triggered for a drop of over 50% over the past 25 years.

Turnstone numbers have fluctuated on the Solway, peaking at over 600 in 1972/73, 1985/86 and 1987/88. There has been an overall downward trend over the last 25 years, however, and a drop of over 50%.

Walmore Common

Cited Species: Bewick's Swan

No Alert Species.

Numbers of Bewick's Swans have fluctuated greatly at Walmore Common, but have shown an upward trend and a rise of over 50% over all the years considered.

Table 3.1 Percentage change and Alerts over 5,10, 25 and all years of counts. For interpretation of symbols see section 1.6. Population size refers to the average number of birds per month recorded on the WeBS sites used.

ALERTS CALCULATED USING GAMS				**ENGLAND**					ALERTS CALCULATED USING UNDERHILLMETHOD							
5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Species	5yr	10yr	25yr	All	5yr	10yr	25yr	All	Pop size 1998
	++		++	9	94		453	Little Grebe	29	58		332	+	++		++	2,000
			++	-1	22		54	Great Crested Grebe	2	25		41		+		+	8,000
			++	13	13		175	Cormorant	8	47		90		+		++	10,000
	++	++	++	22	54	122	137	Mute Swan	29	38	124	123	+	+	++	++	10,500
		++	++	4	-3	227	302	Bewick`s Swan	4	-3	227	302			++	++	5,000
++	++	++	++	73	123	253	534	Whooper Swan	73	123	253	534	++	++	++	++	2,500
	-			-9	-39	18	-25	European White-fronted Goose	-25	-91	-1	-50	-	--		--	3,000
++	++	++	++	53	132	2,957	5,456	Feral Greylag Goose	73	59	2,020	3,822	++	++	++	++	74,000
		++	++	13	13	293	671	Canada Goose	13	10	303	577			++	++	28,500
		++	++	-24	-17	147	388	Dark-bellied Brent Goose	-35	-30	153	391	-	-	++	++	70,500
		+	++	-17	-15	26	76	Shelduck	-23	-25	21	65		-		++	47,000
	+	++	++	6	40	112	123	Wigeon	16	28	115	122		+	++	++	257,000
+	++	++	++	47	82	828	2,655	Gadwall	59	47	872	2,169	++	+	++	++	8,000
		++	++	7	18	139	352	Teal	4	26	153	329		+	++	++	90,000
	-			-13	-31	-16	-14	Mallard	-14	-47	-11	-9		-			76,000
			++	4	-17	7	395	Pintail	1	-4	34	291			+	++	17,000
		+	++	1	3	41	136	Shoveler	-7	0	27	80			+	++	6,000
				6	8	19	18	Pochard	19	11	36	43			+	+	31,000
			++	13	13	12	85	Tufted Duck	13	7	19	81				++	36,000
		++	++	4	20	95	160	Goldeneye	8	20	107	156			++	++	3,000
	+	++	++	15	31	157	748	Red-breasted Merganser	11	21	182	606			++	++	1,500
+	++	++	++	35	75	206	255	Goosander	32	34	161	203	+	+	++	++	2,000
++	++	++	++	51	64	2,975	33,233	Ruddy Duck	45	38	4,155	19,900	+	+	++	++	3,000
				7	12	N/A	19	Coot	16	14		18					84,500
			+	0	-14	19	38	Oystercatcher	-1	-7	39	39			+	+	128,000
++	++	++	++	69	322	2,915	2,591	Avocet	68	396	2,134	2,107	++	++	++	++	3,500
			+	-13	-23	-17	31	Ringed Plover	-9	-17	1	28				+	5,500
		++	++	-6	17	276	563	Grey Plover	12	38	384	510		+	++	++	37,000
			-	-6	-16	-2	-34	Knot	-6	-12	-12	-26				-	179,500
+			+	26	14	-3	46	Sanderling	26	15	12	29	+			+	6,000
			+	-8	3	-21	28	Dunlin	2	27	-5	24		+		+	345,500
+	++	++	++	42	91	266	864	Black-tailed Godwit	47	107	324	718	+	++	++	++	10,000
		+		21	3	47	10	Bar-tailed Godwit	37	9	58	32	+		++	+	37,000
			++	-6	6	19	77	Curlew	-3	7	34	57			+	++	43,000
			++	4	4	9	55	Redshank	7	8	10	38				++	48,500
	-			-18	-28	-4	2	Turnstone	-22	-27	-2	-2		-			9,000

Table 3.2 Species/site combinations which are cited/proposed for English SPAs and are currently covered by the Waterbird Alert System.

SITE NAME	Avocet	Bar-tailed Godwit	Bewick's Swan	Black-tailed Godwit	Coot	Cormorant	Curlew	Dark-bellied Brent Goose	Dunlin	Gadwall	Goldeneye	Goosander	Great Crested Grebe	Grey Plover	Greylag Goose	Knot	Little Grebe	Mallard	Mute Swan	Oystercatcher	Pintail	Pochard	Red-breasted Merganser	Redshank	Ringed Plover	Sanderling	Shelduck	Shoveler	Teal	Tufted Duck	Turnstone	White-fronted Goose	Whooper Swan	Wigeon
Abberton Reservoir					●	●				●	●		●						●		●	●					●	●	●					●
Alde-Ore Estuary	●			●					●															●			●	●	●			●		●
Alt Estuary		●														●										●								
Benfleet and Southend Marshes									●					●		●				●					●									
Blackwater Estuary (Mid-Essex Coast Phase 4)	●			●		●	●	●	●		●		●	●			●				●		●	●	●		●	●	●					●
Breydon Water	●		●	●		●			●																			●			●		●
Chew Valley Lake																												●						
Chichester and Langstone Harbours		●		●		●	●	●	●					●		●	●			●	●		●	●	●	●	●	●	●		●			●
Colne Estuary (Mid-Essex Coast Phase 2)	●			●		●		●	●				●	●										●	●		●							
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)				●				●																			●							
Deben Estuary	●							●																										
Dengie (Mid-Essex Coast Phase 1)		●		●		●		●	●				●	●		●				●													
Derwent Ings (part of Lower Derwent Valley)			●																									●					●
Duddon Estuary							●		●							●				●	●		●	●		●	●							
Exe Estuary	●			●		●		●	●					●						●			●										●
Foulness (Mid-Essex Coast Phase 5)	●	●		●			●	●	●					●		●	●			●				●			●						●
Hamford Water	●			●				●	●					●			●							●	●		●		●				●
Holburn Lake and Moss															●																		
Hornsea Mere										●																							
Humber Flats, Marshes and Coast (Phase 1)		●					●	●	●		●			●		●		●		●		●		●	●	●	●		●		●			●
Lindisfarne		●							●					●		●							●	●	●	●	●						●	●
Martin Mere			●															●			●	●							●				●	●
Medway Estuary and Marshes	●		●	●		●	●	●	●				●	●		●	●	●		●	●	●		●	●		●	●	●		●			●
Mersey Estuary				●			●		●				●	●							●			●			●		●					●
Minsmere - Walberswick										●																		●			●			
Morecambe Bay		●		●			●		●					●		●				●				●		●					●			
North Norfolk Coast	●	●				●		●	●	●				●		●	●			●	●			●	●	●	●	●	●		●			●
Orfordness-Havergate (part of Alde-Ore Estuary)	●																							●										
Ouse Washes				●		●	●				●							●	●		●	●						●	●	●			●	●
Pagham Harbour								●													●													
Poole Harbour	●			●		●	●	●	●		●											●	●	●			●	●						
Portsmouth Harbour								●																										
Ribble and Alt Estuaries (Phase 2)		●	●	●		●	●		●					●		●				●	●			●		●	●		●				●	●
Ribble Estuary		●	●	●					●							●				●						●	●							●
Rutland Water					●	●				●	●	●	●				●		●		●							●	●	●				●
Severn Estuary-ENGLAND				●						●								●			●	●					●	●	●		●			●
Solent and Southampton Water				●		●	●	●	●	●			●	●			●				●		●	●	●		●	●	●						●
Stodmarsh										●								●				●						●		●		●			●
Stour and Orwell Estuaries				●		●	●	●	●		●		●	●		●			●	●	●			●	●		●				●				●
Tamar Estuaries Complex	●																																	
Teesmouth and Cleveland Coast																●								●			●	●						
Thames Estuary and Marshes	●			●					●	●				●		●	●				●			●			●	●				●		
Thanet Coast and Sandwich Bay																															●			
The Dee Estuary		●		●		●	●		●					●		●				●	●			●			●		●		●			●
The Swale	●	●		●		●	●	●	●	●				●		●	●			●	●			●	●		●	●	●			●		●
The Wash	●	●	●	●		●	●	●	●	●	●			●		●	●	●		●	●			●	●	●	●				●	●	●	●
Upper Solway Flats and Marshes		●		●		●	●		●		●		●	●		●				●	●			●	●	●	●	●					●	
Walmore Common			●																															

Table 3.3 Species/site combinations which are cited/proposed for English SPAs and are not currently covered by the Waterbird Alert System.

Site	Bewick`s Swan	Cormorant	Dark-bellied Brent Goose	Gadwall	Goldeneye	Great Crested Grebe	Light-bellied Brent Goose	Little Grebe	Mallard	Pintail	Pochard	Shelduck	Shoveler	Teal	Whooper Swan	Wigeon	Bar-tailed Godwit	Black-tailed Godwit	Curlew	Dunlin	Grey Plover	Knot	Oystercatcher	Redshank	Ringed Plover	Sanderling	Turnstone
Country	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Abberton Reservoir																		●									
Chesil Beach and The Fleet			●																								
Isles of Scilly																											●
Lindisfarne							●																				
Ouse Washes																		●									
Avon Valley	●			●																							
Lea Valley				●									●														
South-West London Water Bodies				●									●														
Upper Severn Estuary (part of Severn Estuary)	●															●											
Mersey Narrows																					●			●			●
Morecambe Bay										●		●		●													
Arun Valley	●												●	●		●											
Broadland	●			●									●		●	●											
Gibraltar Point																	●				●	●	●			●	
Lower Derwent Valley	●								●		●		●	●		●											
Somerset Levels and Moors	●			●						●			●	●		●											
Nene Washes	●			●						●	●		●	●		●		●									
Old Hall Marshes (part of Blackwater Estuary)			●		●							●		●					●	●	●				●		
Dungeness to Pett Level	●	●		●		●		●			●		●			●										●	

Table 3.4 Waterbird species which are cited/proposed for individual English SPAs but which are not regularly indexed by WeBS and therefore not currently treated under the Waterbird Alert System.

	Country	Barnacle Goose	Bean Goose	Bittern	Common Scoter	Eider	Golden Plover	Greenshank	Greylag Goose	Lapwing	Little Egret	Long-tailed duck	Pink-footed Goose	Red-throated Diver	Ruff	Scaup	Slavonian Grebe	Snipe	Spotted Redshank	Velvet Scoter	Water Rail	White-fronted Goose
Abberton Reservoir	E						●			●												
Alde-Ore Estuary	E									●					●				●			
Alt Estuary	E												●									
Benacre to Easton Bavents	E			●																		
Blackwater Estuary (Mid-Essex Coast Phase 4)	E						●	●		●					●				●			
Breydon Water	E		●				●			●					●				●			
Broadland	E		●	●											●							
Chichester and Langstone Harbours	E							●		●	●								●			
Colne Estuary (Mid-Essex Coast Phase 2)	E						●			●												
Dengie (Mid-Essex Coast Phase 1)	E									●												
Dungeness to Pett Level	E									●												●
Exe Estuary	E							●		●							●		●			
Foulness (Mid-Essex Coast Phase 5)	E						●	●		●									●			
Hamford Water	E						●			●					●				●			
Humber Flats, Marshes and Coast (Phase 1)	E						●			●					●	●			●			
Lea Valley	E			●																		
Leighton Moss	E			●																		
Lindisfarne	E				●	●	●		●			●										
Lower Derwent Valley	E			●			●			●					●							
Marazion Marsh	E			●																		
Martin Mere	E												●						●			
Medway Estuary and Marshes	E									●				●					●			
Mersey Estuary	E						●			●												
Minsmere - Walberswick	E			●																		
Morecambe Bay	E												●									
Nene Washes	E									●					●							
North Norfolk Coast	E			●	●		●			●			●		●				●	●		
Northumbria Coast	E						●															
Orfordness-Havergate (part of Alde-Ore Estuary)	E														●							
Ouse Washes	E		●							●					●							
Pagham Harbour	E														●							
Poole Harbour	E							●		●	●								●			
Ribble and Alt Estuaries (Phase 2)	E				●		●			●			●									
Ribble Estuary	E												●									
Rockcliffe Marsh (part of Upper Solway Flats and Marshes)	E	●											●									
Rutland Water	E									●												
Severn Estuary	EW																					
Solent and Southampton Water	E							●		●									●			
Somerset Levels and Moors	E						●			●								●				
Stodmarsh	E			●						●								●			●	
Stour and Orwell Estuaries	E						●			●						●						
Tamar Estuaries Complex	E										●											
Teesmouth and Cleveland Coast	E									●												
Thames Estuary and Marshes	E									●									●			
Thanet Coast and Sandwich Bay	E						●															
The Dee Estuary	ES									●									●			
The Swale	E						●			●									●			
The Wash	E		●		●		●			●			●									

Table 3.5 Site Alerts and population change (%) for waterbirds on SPAs in England over 5, 10, 25 and all years. (++ / -- = 50% Alert, + / - = 25% Alert).

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
		n/a		29	11	n/a	8	82	98	Great Crested Grebe	Abberton Reservoir
	n/a	n/a	++	-2	n/a	n/a	156	86	98	Cormorant	Abberton Reservoir
		++	++	-2	5	316	>1000	66	98	Mute Swan	Abberton Reservoir
n/a	--	--		n/a	-75	-50	17	66	98	Wigeon	Abberton Reservoir
	-	++	++	-7	-46	247	>1000	66	98	Gadwall	Abberton Reservoir
++	++	++	++	94	75	705	333	66	98	Teal	Abberton Reservoir
	+		++	8	29	-19	>1000	66	98	Pintail	Abberton Reservoir
			++	-11	5	2	68	66	98	Shoveler	Abberton Reservoir
+	++	++	++	35	174	72	94	66	98	Pochard	Abberton Reservoir
-	-	-	++	-30	-49	-48	145	66	98	Tufted Duck	Abberton Reservoir
n/a		++	++	n/a	19	56	56	66	98	Goldeneye	Abberton Reservoir
--	--	n/a	-	-52	-57	n/a	-26	82	98	Coot	Abberton Reservoir
++	+	++	++	>1000	38	>1000	>1000	66	97	European White-fronted Goose	Alde-Ore Estuary
+	+	++	++	50	47	486	>1000	66	97	Shelduck	Alde-Ore Estuary
++	++	++	++	124	72	448	333	66	97	Wigeon	Alde-Ore Estuary
		++	++	-8	16	428	152	66	97	Teal	Alde-Ore Estuary
++	-	-	--	217	-35	-30	-69	66	97	Shoveler	Alde-Ore Estuary
++	++	++	++	60	123	>1000	>1000	69	97	Avocet	Alde-Ore Estuary
	++	++	++	21	113	85	96	69	97	Dunlin	Alde-Ore Estuary
++	++	++	++	58	>1000	>1000	>1000	69	97	Black-tailed Godwit	Alde-Ore Estuary
++	++	++	++	169	430	449	782	69	97	Redshank	Alde-Ore Estuary
++	--	++	++	71	-74	177	82	69	98	Knot	Alt Estuary
++	++	++	++	271	234	196	302	69	98	Sanderling	Alt Estuary
++		++	++	304	5	>1000	>1000	69	98	Bar-tailed Godwit	Alt Estuary
n/a	++	++	n/a	n/a	201	>1000	n/a	73	98	Oystercatcher	Benfleet and Southend Marshes
n/a		++	n/a	n/a	-12	81	n/a	73	98	Ringed Plover	Benfleet and Southend Marshes
n/a	-	++	n/a	n/a	-35	495	n/a	73	98	Grey Plover	Benfleet and Southend Marshes
n/a		++	n/a	n/a	19	444	n/a	73	98	Knot	Benfleet and Southend Marshes
n/a	++	++	n/a	n/a	124	74	n/a	73	98	Dunlin	Benfleet and Southend Marshes

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
+	++	n/a	++	31	188	n/a	>1000	85	98	Little Grebe	Blackwater Estuary (Mid-Essex Coast Phase 4)
-		n/a	++	-40	-8	n/a	>1000	82	98	Great Crested Grebe	Blackwater Estuary (Mid-Essex Coast Phase 4)
-		n/a	++	-31	-1	n/a	154	86	98	Cormorant	Blackwater Estuary (Mid-Essex Coast Phase 4)
-	-	+	++	-43	-25	36	124	66	98	Dark-bellied Brent Goose	Blackwater Estuary (Mid-Essex Coast Phase 4)
-				-42	-11	3	-25	66	98	Shelduck	Blackwater Estuary (Mid-Essex Coast Phase 4)
	++	++	-	-21	217	78	-26	66	98	Wigeon	Blackwater Estuary (Mid-Essex Coast Phase 4)
		++	++	-14	-10	568	996	66	98	Teal	Blackwater Estuary (Mid-Essex Coast Phase 4)
--	-		++	-66	-29	-15	132	66	98	Pintail	Blackwater Estuary (Mid-Essex Coast Phase 4)
--	-	++	++	-75	-45	98	>1000	66	98	Shoveler	Blackwater Estuary (Mid-Essex Coast Phase 4)
--	--	-	+	-62	-70	-36	26	66	98	Goldeneye	Blackwater Estuary (Mid-Essex Coast Phase 4)
			++	18	14	-11	64	66	98	Red-breasted Merganser	Blackwater Estuary (Mid-Essex Coast Phase 4)
--	++	++	++	-92	>1000	>1000	>1000	70	98	Avocet	Blackwater Estuary (Mid-Essex Coast Phase 4)
+	-		++	46	-42	9	52	70	98	Ringed Plover	Blackwater Estuary (Mid-Essex Coast Phase 4)
-	++	++	++	-40	167	571	448	70	98	Grey Plover	Blackwater Estuary (Mid-Essex Coast Phase 4)
-		+	++	-38	-7	37	74	70	98	Dunlin	Blackwater Estuary (Mid-Essex Coast Phase 4)
	++	++	++	-9	165	>1000	>1000	70	98	Black-tailed Godwit	Blackwater Estuary (Mid-Essex Coast Phase 4)
--			-	-58	-17	-18	-45	70	98	Curlew	Blackwater Estuary (Mid-Essex Coast Phase 4)
	++	+		-6	103	44	9	70	98	Redshank	Blackwater Estuary (Mid-Essex Coast Phase 4)
	n/a	n/a	++	-6	n/a	n/a	54	86	95	Cormorant	Breydon Water
++	++	++	++	81	298	>1000	>1000	66	95	Bewick's Swan	Breydon Water
++	++	-	-	77	636	-43	-29	66	95	European White-fronted Goose	Breydon Water
++	+	++	++	167	36	396	481	66	95	Wigeon	Breydon Water
++	++	++	++	223	777	327	>1000	66	95	Shoveler	Breydon Water
++	++	n/a	++	>1000	>1000	n/a	>1000	72	95	Avocet	Breydon Water
++	++	n/a	+	193	286	n/a	41	72	95	Dunlin	Breydon Water
++	++	n/a	++	>1000	>1000	n/a	>1000	72	95	Black-tailed Godwit	Breydon Water

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
	-	++	++	-8	-40	163	>1000	66	98	Shoveler	Chew Valley Lake
++	++	n/a	++	75	318	n/a	555	85	98	Little Grebe	Chichester and Langstone Harbours
-	-	n/a	+	-38	-48	n/a	46	86	98	Cormorant	Chichester and Langstone Harbours
-			++	-25	-20	18	353	66	98	Dark-bellied Brent Goose	Chichester and Langstone Harbours
-	--	--	--	-35	-60	-63	-63	66	98	Shelduck	Chichester and Langstone Harbours
		+	++	-4	-14	29	70	66	98	Wigeon	Chichester and Langstone Harbours
+	+	++	++	35	49	89	543	66	98	Teal	Chichester and Langstone Harbours
	-	++	++	-2	-30	112	595	66	98	Pintail	Chichester and Langstone Harbours
-	--	++	++	-29	-69	200	308	66	98	Shoveler	Chichester and Langstone Harbours
		++	++	21	7	376	642	66	98	Red-breasted Merganser	Chichester and Langstone Harbours
		++	++	15	-2	67	186	69	98	Oystercatcher	Chichester and Langstone Harbours
-	-	++	++	-37	-48	60	131	69	98	Ringed Plover	Chichester and Langstone Harbours
-		++	++	-28	-6	74	524	69	98	Grey Plover	Chichester and Langstone Harbours
--	-		++	-64	-49	-9	220	69	98	Knot	Chichester and Langstone Harbours
	-		--	-11	-37	12	-66	69	98	Sanderling	Chichester and Langstone Harbours
-	-	-		-36	-42	-49	22	69	98	Dunlin	Chichester and Langstone Harbours
	-	--	++	-12	-32	-57	73	69	98	Black-tailed Godwit	Chichester and Langstone Harbours
-			++	-36	-24	-22	131	69	98	Bar-tailed Godwit	Chichester and Langstone Harbours
	+		++	11	27	11	184	69	98	Curlew	Chichester and Langstone Harbours
			+	14	16	14	25	69	98	Redshank	Chichester and Langstone Harbours
-	-	++	++	-30	-35	81	80	69	98	Turnstone	Chichester and Langstone Harbours
--	--	n/a	++	-75	-82	n/a	>1000	82	98	Great Crested Grebe	Colne Estuary (Mid-Essex Coast Phase 2)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
--	--	n/a	+	-76	-56	n/a	38	86	98	Cormorant	Colne Estuary (Mid-Essex Coast Phase 2)
-	-	++	++	-38	-45	102	447	66	98	Dark-bellied Brent Goose	Colne Estuary (Mid-Essex Coast Phase 2)
-		-	+	-46	-20	-39	44	66	98	Shelduck	Colne Estuary (Mid-Essex Coast Phase 2)
n/a	++	++	++	n/a	>1000	>1000	>1000	71	98	Avocet	Colne Estuary (Mid-Essex Coast Phase 2)
++	++	++	++	111	98	324	392	71	97	Ringed Plover	Colne Estuary (Mid-Essex Coast Phase 2)
n/a		++	++	n/a	15	565	485	71	98	Grey Plover	Colne Estuary (Mid-Essex Coast Phase 2)
n/a	-			n/a	-28	14	-1	71	98	Dunlin	Colne Estuary (Mid-Essex Coast Phase 2)
n/a	--	++	++	n/a	-86	>1000	>1000	71	98	Black-tailed Godwit	Colne Estuary (Mid-Essex Coast Phase 2)
n/a	+	-	--	n/a	26	-33	-61	71	98	Redshank	Colne Estuary (Mid-Essex Coast Phase 2)
		++	++	-19	-25	818	>1000	68	98	Dark-bellied Brent Goose	Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)
--			++	-51	-7	11	89	68	98	Shelduck	Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)
++	++	++	++	131	>1000	>1000	>1000	71	98	Black-tailed Godwit	Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)
-		++	++	-36	22	>1000	>1000	70	98	Dark-bellied Brent Goose	Deben Estuary
++	++	++	++	54	>1000	>1000	>1000	69	98	Avocet	Deben Estuary
-	--	n/a	++	-29	-87	n/a	>1000	82	98	Great Crested Grebe	Dengie (Mid-Essex Coast Phase 1)
--		n/a	++	-74	-15	n/a	124	86	98	Cormorant	Dengie (Mid-Essex Coast Phase 1)
+	+	++	++	28	39	55	199	66	98	Dark-bellied Brent Goose	Dengie (Mid-Essex Coast Phase 1)
	+	++	++	23	25	84	54	71	98	Oystercatcher	Dengie (Mid-Essex Coast Phase 1)
+	++	++	++	27	154	277	308	71	97	Grey Plover	Dengie (Mid-Essex Coast Phase 1)
++	+	++	++	78	46	95	100	71	98	Knot	Dengie (Mid-Essex Coast Phase 1)
	+	++	++	20	31	113	181	71	97	Dunlin	Dengie (Mid-Essex Coast Phase 1)
--	++	++	++	-53	>1000	436	645	71	98	Black-tailed Godwit	Dengie (Mid-Essex Coast Phase 1)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
++	++	++	++	89	271	411	735	71	98	Bar-tailed Godwit	Dengie (Mid-Essex Coast Phase 1)
-		-	--	-28	-12	-29	-51	66	98	Bewick's Swan	Derwent Ings (part of Lower Derwent Valley)
	++	++	++	1	64	427	>1000	66	97	Wigeon	Derwent Ings (part of Lower Derwent Valley)
n/a	++	++	++	.	169	>1000	>1000	66	98	Teal	Derwent Ings (part of Lower Derwent Valley)
--	n/a	--	--	-73	.	-62	-60	67	98	Shelduck	Duddon Estuary
--	--	++	++	-63	-54	127	66	67	98	Pintail	Duddon Estuary
++		++	++	51	12	817	>1000	67	98	Red-breasted Merganser	Duddon Estuary
+			-	49	13	7	-37	71	98	Oystercatcher	Duddon Estuary
--	--	--	--	-88	-82	-71	-75	71	98	Knot	Duddon Estuary
-	-	++	++	-42	-26	194	395	71	98	Sanderling	Duddon Estuary
		+	++	-16	16	35	101	71	98	Dunlin	Duddon Estuary
		++	++	7	19	173	139	71	98	Curlew	Duddon Estuary
				5	19	19	-6	71	98	Redshank	Duddon Estuary
	++	n/a	++	14	51	.	278	86	98	Cormorant	Exe Estuary
-	-	++	++	-40	-30	96	816	66	98	Dark-bellied Brent Goose	Exe Estuary
++	++	--	-	94	152	-63	-30	66	98	Wigeon	Exe Estuary
			++	-10	23	25	100	66	98	Red-breasted Merganser	Exe Estuary
-	-	+	++	-27	-30	36	52	72	98	Oystercatcher	Exe Estuary
-		++	++	-32	10	>1000	>1000	72	98	Avocet	Exe Estuary
	++	+		5	69	26	19	72	98	Grey Plover	Exe Estuary
				-5	-2	-22	-11	72	98	Dunlin	Exe Estuary
++	+	++	++	51	45	63	75	72	98	Black-tailed Godwit	Exe Estuary
++	++	n/a	++	155	381	.	294	85	97	Little Grebe	Foulness (Mid-Essex Coast Phase 5)
		++	++	-10	20	95	109	66	97	Dark-bellied Brent Goose	Foulness (Mid-Essex Coast Phase 5)
	++	++	++	14	73	186	475	66	97	Shelduck	Foulness (Mid-Essex Coast Phase 5)
	++	++		6	54	126	-12	66	97	Wigeon	Foulness (Mid-Essex Coast Phase 5)
		++	++	-9	9	84	117	72	98	Oystercatcher	Foulness (Mid-Essex Coast Phase 5)
++	++	++	++	83	>1000	>1000	>1000	72	98	Avocet	Foulness (Mid-Essex Coast Phase 5)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-		++	++	-25	1	510	633	72	98	Grey Plover	Foulness (Mid-Essex Coast Phase 5)
-		++	++	-30	18	197	177	72	98	Knot	Foulness (Mid-Essex Coast Phase 5)
+	+	++	++	43	28	51	80	72	98	Dunlin	Foulness (Mid-Essex Coast Phase 5)
++	++	++	++	264	>1000	>1000	>1000	72	98	Black-tailed Godwit	Foulness (Mid-Essex Coast Phase 5)
	+	++	++	4	35	86	90	72	98	Bar-tailed Godwit	Foulness (Mid-Essex Coast Phase 5)
	-			-9	-27	-16	-19	72	98	Curlew	Foulness (Mid-Essex Coast Phase 5)
+		++	++	50	20	82	86	72	98	Redshank	Foulness (Mid-Essex Coast Phase 5)
++	++	n/a	++	96	497	.	749	85	98	Little Grebe	Hamford Water
-	-		++	-40	-26	14	401	66	98	Dark-bellied Brent Goose	Hamford Water
+	++	++	++	25	190	58	109	66	98	Shelduck	Hamford Water
+	++	++	-	32	310	494	-48	66	98	Wigeon	Hamford Water
		++	++	9	16	860	>1000	66	98	Teal	Hamford Water
	++	++	++	20	768	>1000	>1000	72	98	Avocet	Hamford Water
+	++	++	++	44	63	72	179	72	98	Ringed Plover	Hamford Water
+	++	++	++	43	260	310	486	72	98	Grey Plover	Hamford Water
	++	-	-	19	100	-41	-29	72	98	Dunlin	Hamford Water
--	--	+	++	-68	-73	41	122	72	98	Black-tailed Godwit	Hamford Water
++	++	++	++	87	261	101	205	72	98	Redshank	Hamford Water
n/a	++	n/a	++	.	88	.	1,801	66	98	Gadwall	Hornsea Mere
	++	++	++	24	92	>1000	>1000	66	98	Dark-bellied Brent Goose	Humber Flats, Marshes and Coast (Phase 1)
++		++	++	72	12	741	>1000	66	98	Shelduck	Humber Flats, Marshes and Coast (Phase 1)
+	++	++	++	28	85	181	200	66	98	Wigeon	Humber Flats, Marshes and Coast (Phase 1)
-	-	++	-	-39	-47	184	-31	66	98	Teal	Humber Flats, Marshes and Coast (Phase 1)
--	--	--	--	-61	-80	-64	-67	66	98	Mallard	Humber Flats, Marshes and Coast (Phase 1)
--	-	++	++	-86	-38	>1000	>1000	66	98	Pochard	Humber Flats, Marshes and Coast (Phase 1)
	++	++	++	-25	360	868	>1000	66	98	Goldeneye	Humber Flats, Marshes and Coast (Phase 1)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-	-	++	++	-44	-33	51	475	69	98	Oystercatcher	Humber Flats, Marshes and Coast (Phase 1)
		++	++	17	0	264	737	69	98	Ringed Plover	Humber Flats, Marshes and Coast (Phase 1)
	++	++	++	15	55	697	>1000	69	98	Grey Plover	Humber Flats, Marshes and Coast (Phase 1)
	-		++	-20	-27	3	53	69	98	Knot	Humber Flats, Marshes and Coast (Phase 1)
--	-			-53	-45	-18	16	69	98	Sanderling	Humber Flats, Marshes and Coast (Phase 1)
+	+		++	48	49	22	51	69	98	Dunlin	Humber Flats, Marshes and Coast (Phase 1)
++	+	++	++	53	43	480	>1000	69	98	Bar-tailed Godwit	Humber Flats, Marshes and Coast (Phase 1)
++	+	++	++	74	34	81	228	69	98	Curlew	Humber Flats, Marshes and Coast (Phase 1)
		++	++	19	21	62	397	69	98	Redshank	Humber Flats, Marshes and Coast (Phase 1)
+	+	++	++	29	45	149	230	69	98	Turnstone	Humber Flats, Marshes and Coast (Phase 1)
	--	--	--	-22	-80	-95	-92	66	98	Whooper Swan	Lindisfarne
		+	++	3	2	46	163	66	98	Shelduck	Lindisfarne
		--	--	0	-13	-63	-81	66	98	Wigeon	Lindisfarne
-	--	--	++	-31	-50	-74	>1000	66	98	Red-breasted Merganser	Lindisfarne
--	--	--		-53	-87	-65	-9	70	98	Ringed Plover	Lindisfarne
		++	++	18	-3	694	>1000	70	98	Grey Plover	Lindisfarne
	++	--	--	-19	54	-73	-77	70	98	Knot	Lindisfarne
			++	-18	-21	-15	99	70	98	Sanderling	Lindisfarne
	+	--	+	9	29	-58	29	70	98	Dunlin	Lindisfarne
	-	-		-1	-46	-32	2	70	98	Bar-tailed Godwit	Lindisfarne
+	--		+	30	-64	-2	32	70	98	Redshank	Lindisfarne
--	--	++	++	-92	-95	>1000	>1000	66	98	Bewick's Swan	Martin Mere
++	++	++	n/a	80	75	>1000	n/a	73	98	Whooper Swan	Martin Mere
--	--	++	++	-86	-92	138	>1000	66	98	Wigeon	Martin Mere
--	-	n/a	+	-62	-48	n/a	35	74	98	Teal	Martin Mere
	-	n/a	++	-21	-33	n/a	>1000	74	98	Mallard	Martin Mere
--	--	--	-	-55	-75	-94	-46	66	98	Pintail	Martin Mere
++	++	++	++	50	>1000	>1000	>1000	66	98	Pochard	Martin Mere
--		n/a	++	-72	-18	n/a	>1000	85	98	Little Grebe	Medway Estuary and Marshes

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-	--	n/a	++	-43	-66	n/a	71	82	98	Great Crested Grebe	Medway Estuary and Marshes
	-	n/a	++	-20	-45	n/a	83	86	98	Cormorant	Medway Estuary and Marshes
++	++	++	++	>1000	>1000	>1000	>1000	66	98	Bewick's Swan	Medway Estuary and Marshes
-	-	++	++	-37	-32	235	>1000	66	98	Dark-bellied Brent Goose	Medway Estuary and Marshes
-	-		++	-40	-35	16	156	66	98	Shelduck	Medway Estuary and Marshes
	-	--		20	-33	-58	-25	66	98	Wigeon	Medway Estuary and Marshes
	-	n/a	++	-5	-44	n/a	55	66	98	Teal	Medway Estuary and Marshes
	-	n/a	++	-21	-38	n/a	92	66	98	Mallard	Medway Estuary and Marshes
	-	--	++	-14	-47	-54	176	66	98	Pintail	Medway Estuary and Marshes
--	--	n/a	--	-57	-90	.	-52	66	98	Shoveler	Medway Estuary and Marshes
++	+	--	++	208	37	-88	239	66	98	Pochard	Medway Estuary and Marshes
	n/a	++	++	22	n/a	346	>1000	70	98	Oystercatcher	Medway Estuary and Marshes
++	n/a	++	++	247	n/a	>1000	>1000	70	98	Avocet	Medway Estuary and Marshes
--	n/a	+	++	-69	n/a	40	323	70	98	Ringed Plover	Medway Estuary and Marshes
	n/a	++	++	-9	n/a	194	>1000	70	98	Grey Plover	Medway Estuary and Marshes
++	n/a	-	++	320	n/a	-31	787	70	98	Knot	Medway Estuary and Marshes
--	n/a		++	-61	n/a	20	251	70	98	Dunlin	Medway Estuary and Marshes
-	n/a	++		-43	n/a	262	11	70	98	Black-tailed Godwit	Medway Estuary and Marshes
-	n/a	+	++	-28	n/a	42	171	70	98	Curlew	Medway Estuary and Marshes
-	n/a		++	-41	n/a	7	187	70	98	Redshank	Medway Estuary and Marshes
--	n/a	++	++	-57	n/a	161	949	70	98	Turnstone	Medway Estuary and Marshes
--		n/a	++	-62	-23	n/a	233	82	98	Great Crested Grebe	Mersey Estuary
	+	++	++	7	48	73	>1000	66	98	Shelduck	Mersey Estuary
	++	++	++	2	114	260	>1000	66	98	Wigeon	Mersey Estuary
		+	++	-11	-3	29	856	66	98	Teal	Mersey Estuary
--	--	--	-	-65	-88	-94	-37	66	98	Pintail	Mersey Estuary
	++	++	++	-17	179	>1000	>1000	70	98	Grey Plover	Mersey Estuary
	++	+	++	15	96	47	269	70	98	Dunlin	Mersey Estuary
++	++	++	++	>1000	>1000	>1000	>1000	70	98	Black-tailed Godwit	Mersey Estuary
		+	++	4	-10	38	85	70	98	Curlew	Mersey Estuary
		++	++	7	22	291	596	70	98	Redshank	Mersey Estuary
++		++	++	112	-14	5,219	992	66	98	European White-fronted Goose	Minsmere - Walberswick
+	++	++	++	28	54	58	126	66	98	Gadwall	Minsmere - Walberswick
+	++	+	+	28	72	26	39	66	98	Shoveler	Minsmere - Walberswick
				4	-16	7	20	69	98	Oystercatcher	Morecambe Bay

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-		++	++	-32	-15	671	894	69	98	Grey Plover	Morecambe Bay
++	++			159	231	4	0	69	98	Knot	Morecambe Bay
++	+	++	++	59	47	268	166	69	98	Sanderling	Morecambe Bay
		-		-13	-5	-26	-17	69	98	Dunlin	Morecambe Bay
++	++	++	++	713	627	>1000	>1000	69	98	Black-tailed Godwit	Morecambe Bay
++	++	--	--	110	185	-52	-53	69	98	Bar-tailed Godwit	Morecambe Bay
			++	-13	11	25	76	69	98	Curlew	Morecambe Bay
				-2	-4	-24	15	69	98	Redshank	Morecambe Bay
	-	-		-25	-37	-37	-24	69	98	Turnstone	Morecambe Bay
++	++	n/a	++	169	6,272	n/a	>1000	85	98	Little Grebe	North Norfolk Coast
-	++	n/a	++	-37	179	n/a	317	86	98	Cormorant	North Norfolk Coast
	-	++	++	0	-27	>1000	>1000	67	98	European White-fronted Goose	North Norfolk Coast
		++	++	-25	-14	640	>1000	67	98	Dark-bellied Brent Goose	North Norfolk Coast
		++	++	-8	-4	55	127	67	98	Shelduck	North Norfolk Coast
	++	++	++	-7	183	408	>1000	68	98	Wigeon	North Norfolk Coast
+	++	++	++	46	239	995	>1000	66	98	Gadwall	North Norfolk Coast
	+	++	++	24	32	899	>1000	67	98	Teal	North Norfolk Coast
	++	++	++	25	99	>1000	>1000	66	98	Pintail	North Norfolk Coast
	++	++	++	-19	165	118	>1000	67	98	Shoveler	North Norfolk Coast
+		n/a		33	-21	n/a	15	84	98	Oystercatcher	North Norfolk Coast
++	++	n/a	++	>1000	>1000	n/a	>1000	84	98	Avocet	North Norfolk Coast
++	++	n/a	++	80	138	n/a	101	84	98	Ringed Plover	North Norfolk Coast
+	++	n/a	++	39	176	n/a	329	84	98	Grey Plover	North Norfolk Coast
		n/a	-	21	9	n/a	-29	84	98	Knot	North Norfolk Coast
++	++	n/a	++	128	585	.	1,260	84	98	Sanderling	North Norfolk Coast
	++	n/a	+	24	52	n/a	44	84	98	Dunlin	North Norfolk Coast
++	++	n/a	++	107	143	n/a	204	84	98	Bar-tailed Godwit	North Norfolk Coast
++	++	n/a	++	150	208	n/a	219	84	98	Redshank	North Norfolk Coast
++	++	++	++	275	121	>1000	>1000	69	97	Avocet	Orfordness-Havergate (part of Alde-Ore Estuary)
++	++	++	++	>1000	>1000	>1000	>1000	69	97	Redshank	Orfordness-Havergate (part of Alde-Ore Estuary)
--	-	n/a	-	-60	-43	.	-26	86	98	Cormorant	Ouse Washes
		++	+	-18	4	94	31	66	98	Mute Swan	Ouse Washes
		++	++	24	18	367	490	66	98	Bewick's Swan	Ouse Washes

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
+	++	++	++	29	125	>1000	>1000	66	98	Whooper Swan	Ouse Washes
-	--	--	+	-47	-56	-55	36	66	98	Wigeon	Ouse Washes
+	++	++	++	27	77	620	492	66	98	Gadwall	Ouse Washes
++		+	++	54	-16	31	336	66	98	Teal	Ouse Washes
-	-	-	-	-45	-41	-32	-41	66	98	Mallard	Ouse Washes
+	+		+	28	30	4	40	66	98	Pintail	Ouse Washes
	+		--	0	29	-1	-50	66	98	Shoveler	Ouse Washes
++	++	++	++	133	315	>1000	193	66	98	Pochard	Ouse Washes
	++	++	++	16	129	384	116	66	98	Tufted Duck	Ouse Washes
-	+	n/a	-	-28	48	.	-35	82	98	Coot	Ouse Washes
--	--	++	++	-54	-52	219	>1000	66	98	Dark-bellied Brent Goose	Pagham Harbour
++	++	++	++	60	277	>1000	>1000	66	98	Pintail	Pagham Harbour
		n/a		-4	-16	n/a	-15	86	98	Cormorant	Poole Harbour
	++	++	++	-9	156	>1000	>1000	66	98	Dark-bellied Brent Goose	Poole Harbour
			++	-24	7	2	73	66	98	Shelduck	Poole Harbour
	+	-		-6	25	-27	2	66	98	Shoveler	Poole Harbour
-	--	++	++	-43	-55	284	553	66	98	Pochard	Poole Harbour
+	++	++	++	44	54	144	482	66	98	Goldeneye	Poole Harbour
		++	++	-1	23	182	>1000	66	98	Red-breasted Merganser	Poole Harbour
+	++	++	++	39	838	>1000	>1000	69	98	Avocet	Poole Harbour
	++	++	++	22	87	158	199	69	98	Dunlin	Poole Harbour
	++	++	++	23	85	235	904	69	98	Black-tailed Godwit	Poole Harbour
	+	++	++	-9	30	121	105	69	98	Curlew	Poole Harbour
			+	-13	-6	1	41	69	98	Redshank	Poole Harbour
-		++	++	-28	-6	676	12,621	68	98	Dark-bellied Brent Goose	Portsmouth Harbour
+	++	n/a	++	33	108	.	433	86	98	Cormorant	Ribble and Alt Estuaries (Phase 2)
	+	++	++	16	29	800	>1000	66	98	Bewick's Swan	Ribble and Alt Estuaries (Phase 2)
--	--	++	++	-82	-59	>1000	>1000	66	98	Whooper Swan	Ribble and Alt Estuaries (Phase 2)
		++	++	-7	-23	63	451	66	98	Shelduck	Ribble and Alt Estuaries (Phase 2)
+	++	++	++	30	83	>1000	>1000	66	98	Wigeon	Ribble and Alt Estuaries (Phase 2)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
		++	++	-11	0	620	>1000	66	98	Teal	Ribble and Alt Estuaries (Phase 2)
	++		++	23	306	-17	>1000	66	98	Pintail	Ribble and Alt Estuaries (Phase 2)
		++	++	15	17	334	>1000	69	98	Oystercatcher	Ribble and Alt Estuaries (Phase 2)
++	++	++	++	91	60	936	908	69	98	Grey Plover	Ribble and Alt Estuaries (Phase 2)
-	--	-	-	-40	-71	-38	-28	69	98	Knot	Ribble and Alt Estuaries (Phase 2)
+			++	30	-5	-19	83	69	98	Sanderling	Ribble and Alt Estuaries (Phase 2)
	++	-	++	0	117	-47	53	69	98	Dunlin	Ribble and Alt Estuaries (Phase 2)
	-	++	++	1	-37	>1000	>1000	69	98	Black-tailed Godwit	Ribble and Alt Estuaries (Phase 2)
	-	++	++	-15	-38	137	170	69	98	Bar-tailed Godwit	Ribble and Alt Estuaries (Phase 2)
	++	++	++	11	91	115	141	69	98	Curlew	Ribble and Alt Estuaries (Phase 2)
-			++	-35	-9	18	121	69	98	Redshank	Ribble and Alt Estuaries (Phase 2)
	+	++	++	16	29	800	>1000	66	98	Bewick's Swan	Ribble Estuary
		++	++	-7	-22	62	468	66	98	Shelduck	Ribble Estuary
+	++	++	++	30	84	>1000	>1000	66	98	Wigeon	Ribble Estuary
		++	++	12	3	268	867	70	98	Oystercatcher	Ribble Estuary
--	--	--	--	-67	-65	-67	-67	70	98	Knot	Ribble Estuary
-	-	--		-26	-47	-55	-10	70	98	Sanderling	Ribble Estuary
	++	--		-8	155	-50	1	70	98	Dunlin	Ribble Estuary
	-	++	++	2	-38	>1000	in	70	98	Black-tailed Godwit	Ribble Estuary
--	--			-63	-61	0	-3	70	98	Bar-tailed Godwit	Ribble Estuary
+	+	n/a	++	46	35	n/a	849	85	98	Little Grebe	Rutland Water
	+	n/a	++	-2	25	n/a	105	82	98	Great Crested Grebe	Rutland Water
--	+	n/a	++	-67	47	n/a	664	86	98	Cormorant	Rutland Water
+	+	n/a	++	26	29	n/a	>1000	75	98	Mute Swan	Rutland Water
		n/a	++	1	-10	n/a	133	75	98	Wigeon	Rutland Water
	-	n/a	++	0	-30	n/a	>1000	75	98	Gadwall	Rutland Water
+	++	n/a	++	36	65	n/a	139	75	98	Teal	Rutland Water
		n/a	++	-2	-6	n/a	134	75	98	Shoveler	Rutland Water
	+	n/a		13	48	n/a	-7	75	98	Pochard	Rutland Water

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
+		n/a	++	30	-9	n/a	337	75	98	Tufted Duck	Rutland Water
		n/a	++	-7	22	n/a	>1000	75	98	Goldeneye	Rutland Water
		n/a	++	17	19	n/a	>1000	75	98	Goosander	Rutland Water
		n/a		10	1	n/a	-5	82	98	Coot	Rutland Water
-		++		-25	-14	52	0	66	98	Bewick's Swan	Severn Estuary - England & Wales
	-		-	-8	-41	-3	-41	66	98	European White-fronted Goose	Severn Estuary - England & Wales
	+	++	++	-15	26	132	252	66	98	Shelduck	Severn Estuary - England & Wales
		++		24	-3	59	-10	66	98	Wigeon	Severn Estuary - England & Wales
	-	++	++	-22	-34	263	211	66	98	Gadwall	Severn Estuary - England & Wales
+	++	++	++	36	107	219	217	66	98	Teal	Severn Estuary - England & Wales
-	-	-	-	-32	-43	-31	-47	66	98	Mallard	Severn Estuary - England & Wales
		++	++	-15	15	108	51	66	98	Pintail	Severn Estuary - England & Wales
+	++	++		36	99	305	-1	66	98	Shoveler	Severn Estuary - England & Wales
	-	++	++	-18	-34	>1000	>1000	66	98	Pochard	Severn Estuary - England & Wales
-		++	++	-30	-23	963	>1000	66	98	Tufted Duck	Severn Estuary - England & Wales
--	--	-	++	-56	-52	-27	131	69	98	Grey Plover	Severn Estuary - England & Wales
-	-	--		-31	-35	-52	-25	69	98	Dunlin	Severn Estuary - England & Wales
				8	-17	-5	25	69	98	Redshank	Severn Estuary - England & Wales
-		++		-25	-14	52	0	66	98	Bewick's Swan	Severn Estuary - England only
	-		-	-8	-41	-3	-41	66	98	European White-fronted Goose	Severn Estuary - England only
	++	++	++	-12	96	65	258	66	98	Shelduck	Severn Estuary - England only
+		++		31	5	60	-10	66	98	Wigeon	Severn Estuary - England only
	-	++	++	-22	-34	263	211	66	98	Gadwall	Severn Estuary - England only
++	++	++	++	102	220	246	326	66	98	Teal	Severn Estuary - England only
-	-	-	-	-32	-41	-40	-49	66	98	Mallard	Severn Estuary - England only
	++	+		-1	51	28	3	66	98	Pintail	Severn Estuary - England only
+	++	++		43	113	594	9	66	98	Shoveler	Severn Estuary - England only
		++	++	-4	-21	>1000	>1000	66	98	Pochard	Severn Estuary - England only

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
	+	++	++	-1	26	562	>1000	66	98	Tufted Duck	Severn Estuary - England only
--	-	++	++	-58	-35	133	242	69	98	Grey Plover	Severn Estuary - England only
	-	-		12	-27	-49	-3	69	98	Dunlin	Severn Estuary - England only
++	+		++	85	45	-4	75	69	98	Redshank	Severn Estuary - England only
	++	n/a	++	1	130	n/a	>1000	85	98	Little Grebe	Solent and Southampton Water
-		n/a	++	-35	14	n/a	85	82	98	Great Crested Grebe	Solent and Southampton Water
		n/a	++	-13	22	n/a	279	86	98	Cormorant	Solent and Southampton Water
-		++	++	-27	-4	>1000	>1000	66	98	Dark-bellied Brent Goose	Solent and Southampton Water
			++	-4	-10	-24	>1000	66	98	Shelduck	Solent and Southampton Water
++	++	++	++	95	118	469	293	66	98	Wigeon	Solent and Southampton Water
	+	++	++	-5	46	>1000	>1000	66	98	Gadwall	Solent and Southampton Water
			++	2	-7	8	560	66	98	Teal	Solent and Southampton Water
	+	++	++	-8	40	404	>1000	66	98	Pintail	Solent and Southampton Water
--	-	++	++	-64	-50	427	>1000	66	98	Shoveler	Solent and Southampton Water
		++	++	-19	13	107	>1000	66	98	Red-breasted Merganser	Solent and Southampton Water
--	--	-		-52	-55	-35	6	69	98	Ringed Plover	Solent and Southampton Water
		++	++	-23	22	120	405	69	98	Grey Plover	Solent and Southampton Water
		-	++	-16	7	-37	112	69	98	Dunlin	Solent and Southampton Water
--	-	+	++	-68	-30	36	207	69	98	Black-tailed Godwit	Solent and Southampton Water
			++	4	11	16	157	69	98	Curlew	Solent and Southampton Water
	-	-	++	-14	-29	-49	60	69	98	Redshank	Solent and Southampton Water
++	n/a	++	++	97	n/a	>1000	>1000	66	98	European White-fronted Goose	Stodmarsh
++	n/a	++	++	158	n/a	>1000	>1000	66	98	Wigeon	Stodmarsh
++	n/a	++	++	274	n/a	>1000	>1000]	66	98	Gadwall	Stodmarsh
--	n/a	--	--	-64	n/a	-59	-80	66	98	Mallard	Stodmarsh
++	n/a	++	++	124	n/a	366	>1000	66	98	Shoveler	Stodmarsh
	n/a		++	-11	n/a	2	594	66	98	Pochard	Stodmarsh
	n/a	++	++	15	n/a	152	>1000	66	98	Tufted Duck	Stodmarsh
	+	n/a	++	-14	36	n/a	195	82	98	Great Crested Grebe	Stour and Orwell Estuaries
	-	n/a		-18	-36	n/a	-17	86	98	Cormorant	Stour and Orwell Estuaries
+		-	--	29	10	-39	-65	66	98	Mute Swan	Stour and Orwell Estuaries
		++	++	-8	12	406	449	66	98	Dark-bellied Brent Goose	Stour and Orwell Estuaries
-		-		-38	-3	-29	-17	66	98	Shelduck	Stour and Orwell Estuaries
	+	++	--	-21	35	74	-60	66	98	Wigeon	Stour and Orwell Estuaries
-		-		-30	3	-27	11	66	98	Pintail	Stour and Orwell Estuaries

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
+		++	++	28	24	128	96	66	98	Goldeneye	Stour and Orwell Estuaries
	++	++	++	20	53	572	>1000	70	98	Oystercatcher	Stour and Orwell Estuaries
--	--		-	-66	-68	7	-29	70	98	Ringed Plover	Stour and Orwell Estuaries
-		++	++	-34	19	433	>1000	70	98	Grey Plover	Stour and Orwell Estuaries
+	++	++	++	25	115	513	>1000	70	98	Knot	Stour and Orwell Estuaries
-				-28	-17	-6	14	70	98	Dunlin	Stour and Orwell Estuaries
	++	++	++	11	82	271	>1000	70	98	Black-tailed Godwit	Stour and Orwell Estuaries
		++	++	-2	23	93	107	70	98	Curlew	Stour and Orwell Estuaries
	+	-	+	-6	48	-28	45	70	98	Redshank	Stour and Orwell Estuaries
		++	++	23	10	142	529	70	98	Turnstone	Stour and Orwell Estuaries
++	++	++	++	105	98	107	132	69	98	Avocet	Tamar Estuaries Complex
--	--	--	--	-70	-70	-69	-84	66	98	Shelduck	Teesmouth and Cleveland Coast
		++	++	-4	-4	>1000	>1000	66	98	Shoveler	Teesmouth and Cleveland Coast
		--	--	-12	-4	-54	-77	69	98	Knot	Teesmouth and Cleveland Coast
+	+	++	+	48	26	136	27	69	98	Redshank	Teesmouth and Cleveland Coast
	++	n/a	++	-22	93	.	722	85	98	Little Grebe	Thames Estuary and Marshes
	--	--	--	-20	-81	-82	-93	66	98	European White-fronted Goose	Thames Estuary and Marshes
		+		-24	-20	46	-24	66	98	Shelduck	Thames Estuary and Marshes
++	++	++	++	68	196	>1000	>1000	66	98	Gadwall	Thames Estuary and Marshes
--	--	+		-76	-85	34	-9	66	98	Pintail	Thames Estuary and Marshes
+	-	++	++	46	-30	268	235	66	98	Shoveler	Thames Estuary and Marshes
++	++	++	++	102	>1000	>1000	>1000	72	98	Avocet	Thames Estuary and Marshes
-		++	++	-36	-19	451	508	72	98	Grey Plover	Thames Estuary and Marshes
-		++	++	-28	19	226	220	72	98	Knot	Thames Estuary and Marshes
+	++			38	64	15	5	72	98	Dunlin	Thames Estuary and Marshes
-	++	++	++	-35	257	>1000	>1000	72	98	Black-tailed Godwit	Thames Estuary and Marshes
	-	-	-	-23	-44	-39	-39	72	98	Redshank	Thames Estuary and Marshes
--	--		+	-90	-72	-13	37	69	98	Turnstone	Thanet Coast and Sandwich Bay
+	++	n/a	++	42	57	.	331	86	98	Cormorant	The Dee Estuary
++		++	++	53	4	87	90	66	98	Shelduck	The Dee Estuary
++	++	++	++	146	166	840	>1000	66	98	Wigeon	The Dee Estuary
-	-	++	++	-27	-43	436	>1000	66	98	Teal	The Dee Estuary

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
	-	++	++	6	-34	178	713	66	98	Pintail	The Dee Estuary
	-	++	++	-22	-41	74	228	70	98	Oystercatcher	The Dee Estuary
-	-	++	++	-34	-35	177	344	70	98	Grey Plover	The Dee Estuary
--	--	--	--	-55	-56	-83	-81	70	98	Knot	The Dee Estuary
++	++			52	96	-23	-16	70	98	Dunlin	The Dee Estuary
	++	++	++	-11	68	54	91	70	98	Black-tailed Godwit	The Dee Estuary
	++	--	--	16	161	-92	-90	70	98	Bar-tailed Godwit	The Dee Estuary
+	++	++	++	30	56	137	236	70	98	Curlew	The Dee Estuary
	-	++	++	-22	-39	96	221	70	98	Redshank	The Dee Estuary
++		++	++	64	-23	297	329	70	98	Turnstone	The Dee Estuary
++	++	n/a	++	61	>1000	n/a	>1000	85	98	Little Grebe	The Swale
	-	n/a	-	-13	-46	n/a	-27	86	98	Cormorant	The Swale
-	--	++	++	-29	-50	79	75	66	98	European White-fronted Goose	The Swale
++		++	++	63	5	268	>1000	66	98	Dark-bellied Brent Goose	The Swale
	++	++	++	3	83	91	>1000	66	98	Shelduck	The Swale
+	++	++	++	28	129	497	425	66	98	Wigeon	The Swale
++	++	++	++	82	101	>1000	>1000	66	98	Gadwall	The Swale
-	+	++	++	-28	50	733	>1000	66	98	Teal	The Swale
--		++	++	-54	2	>1000	>1000	66	98	Pintail	The Swale
	-	++	++	23	-31	662	>1000	66	98	Shoveler	The Swale
	n/a			1	n/a	22	-4	69	98	Oystercatcher	The Swale
++	n/a	++	++	83	n/a	>1000	>1000	69	98	Avocet	The Swale
++	n/a	++		58	n/a	208	-4	69	98	Ringed Plover	The Swale
++	n/a	++	++	71	n/a	379	185	69	98	Grey Plover	The Swale
-	n/a		-	-45	n/a	-9	-42	69	98	Knot	The Swale
	n/a	+	++	1	n/a	42	94	69	98	Dunlin	The Swale
	n/a	++	++	0	n/a	>1000	>1000	69	98	Black-tailed Godwit	The Swale
	n/a		-	2	n/a	-14	-43	69	98	Bar-tailed Godwit	The Swale
	n/a	+	-	-19	n/a	42	-36	69	98	Curlew	The Swale
	n/a	+	++	22	n/a	36	70	69	98	Redshank	The Swale
--		n/a		-69	-12	n/a	21	85	98	Little Grebe	The Wash
		n/a	++	0	18	n/a	77	86	98	Cormorant	The Wash
--	--	-	-	-92	-89	-32	-34	66	98	Bewick's Swan	The Wash
--	-		-	-88	-50	9	-41	66	98	Whooper Swan	The Wash
-	++	--	-	-44	92	-95	-36	66	98	European White-fronted Goose	The Wash
		++	++	-24	-24	440	>1000	66	98	Dark-bellied Brent Goose	The Wash

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-	-	+	++	-30	-46	36	414	66	98	Shelduck	The Wash
-	-	--		-46	-26	-58	-12	66	98	Wigeon	The Wash
		++	++	9	13	>1000	>1000	66	98	Gadwall	The Wash
	-		++	-14	-43	0	84	68	98	Mallard	The Wash
--	--	++	++	-59	-98	297	317	66	98	Pintail	The Wash
-	--	--	++	-32	-54	-73	706	68	98	Goldeneye	The Wash
-	--			-36	-66	-21	-6	70	98	Oystercatcher	The Wash
	++	++	++	-3	>1000	>1000	>1000	70	98	Avocet	The Wash
++	++	++	++	173	417	599	573	70	98	Ringed Plover	The Wash
		++	++	-17	-21	136	284	70	98	Grey Plover	The Wash
-	-		-	-34	-49	-11	-46	70	98	Knot	The Wash
	-		-	4	-40	-17	-28	70	98	Sanderling	The Wash
	-	-		4	-36	-26	-11	70	98	Dunlin	The Wash
++	++	++	++	168	>1000	>1000	>1000	70	98	Black-tailed Godwit	The Wash
+		++	++	29	24	280	338	70	98	Bar-tailed Godwit	The Wash
				13	15	19	0	70	98	Curlew	The Wash
	-			14	-36	17	7	70	98	Redshank	The Wash
	-			-1	-46	-18	-3	70	98	Turnstone	The Wash
	++	n/a	++	10	212	n/a	>1000	82	98	Great Crested Grebe	Upper Solway Flats and Marshes
+		n/a	+	32	18	n/a	25	86	98	Cormorant	Upper Solway Flats and Marshes
--	--	++	++	-57	-76	89	>1000	66	98	Whooper Swan	Upper Solway Flats and Marshes
+		++	++	29	9	101	204	66	98	Shelduck	Upper Solway Flats and Marshes
++	++	++	++	301	120	737	>1000	66	98	Teal	Upper Solway Flats and Marshes
		++	++	4	10	98	186	66	98	Mallard	Upper Solway Flats and Marshes
++	++	++	++	106	241	353	305	66	98	Pintail	Upper Solway Flats and Marshes
+	--	--		47	-78	-65	-21	66	98	Shoveler	Upper Solway Flats and Marshes
--	--	++	-	-63	-67	293	-36	66	98	Goldeneye	Upper Solway Flats and Marshes
+	+		++	27	33	13	98	69	98	Oystercatcher	Upper Solway Flats and Marshes
++	++	--	-	53	63	-81	-36	69	98	Ringed Plover	Upper Solway Flats and Marshes
-	+	++	++	-29	31	638	>1000	69	98	Grey Plover	Upper Solway Flats and Marshes
-	+	--	-	-45	31	-70	-47	69	98	Knot	Upper Solway Flats and Marshes
-	-	--	++	-26	-28	-57	254	69	98	Sanderling	Upper Solway Flats and Marshes
		-	++	-9	19	-27	143	69	98	Dunlin	Upper Solway Flats and Marshes
+	++	--	-	40	354	-57	-46	69	98	Black-tailed Godwit	Upper Solway Flats and Marshes
	-	--	-	11	-36	-69	-45	69	98	Bar-tailed Godwit	Upper Solway Flats and Marshes
			++	-1	13	-24	129	69	98	Curlew	Upper Solway Flats and Marshes
	+	-	+	19	46	-33	29	69	98	Redshank	Upper Solway Flats and Marshes

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
-	-	--		-27	-46	-61	-7	69	98	Turnstone	Upper Solway Flats and Marshes
-		n/a	++	-28	-23	.	79	67	98	Bewick's Swan	Walmore Common

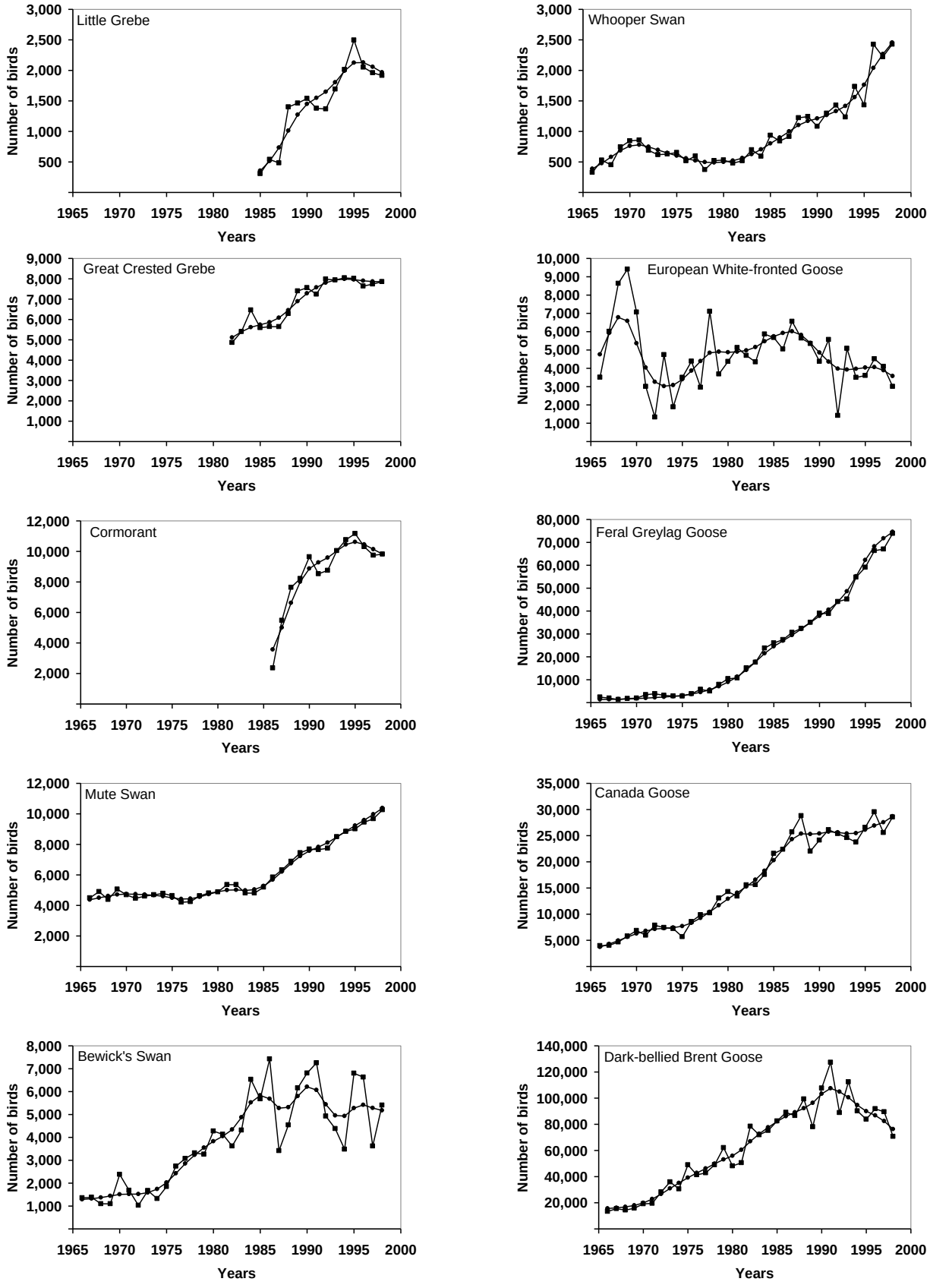


Figure 3.1 English waterbird Underhill and smoothed GAM indices for regularly indexed wildfowl species.

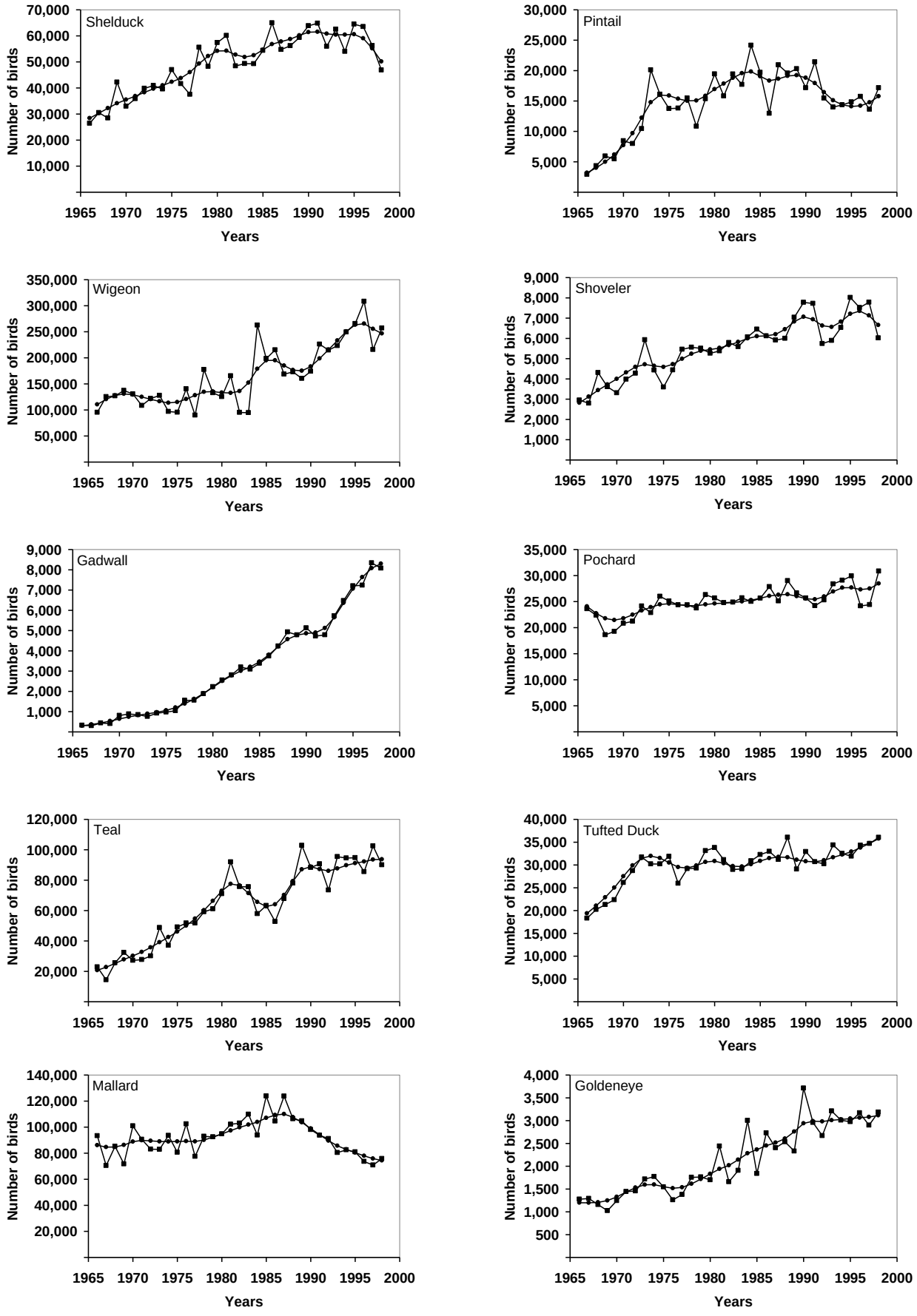


Figure 3.1 Continued.

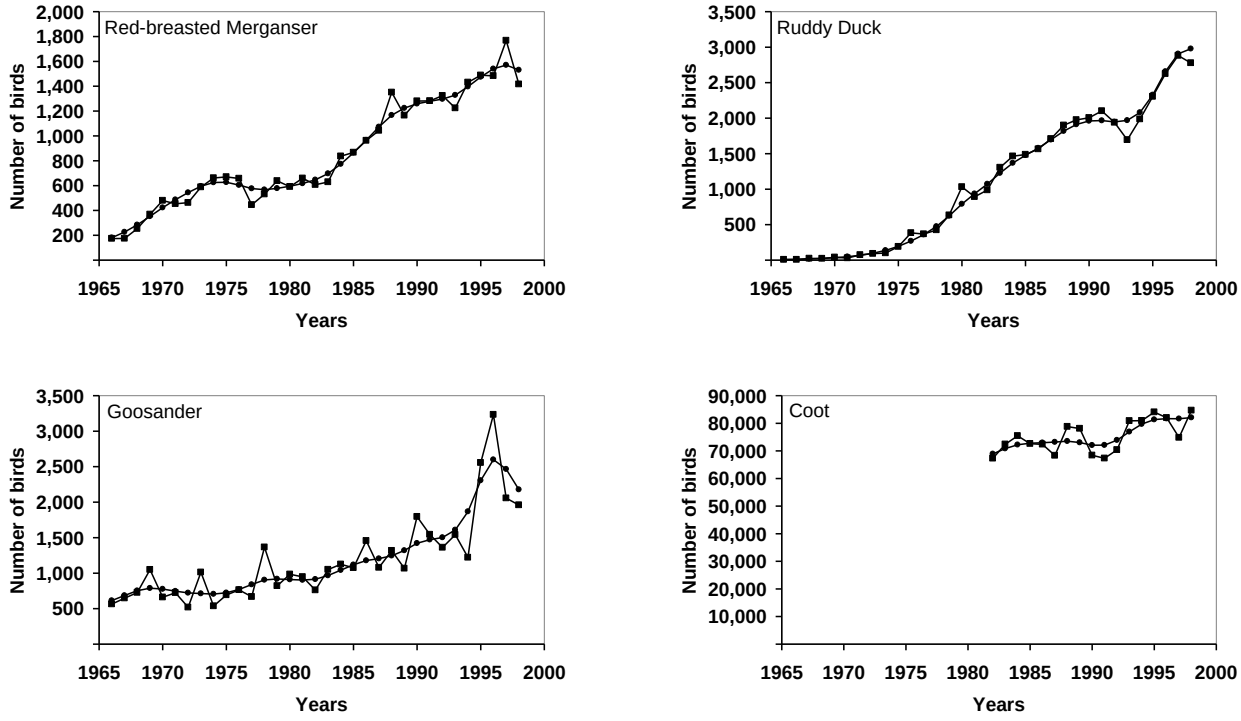
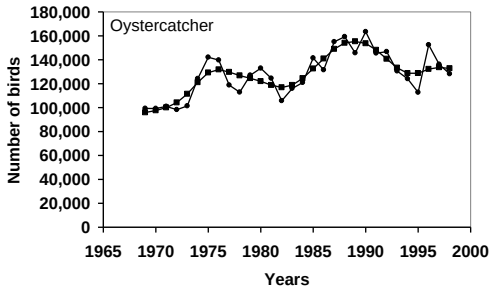
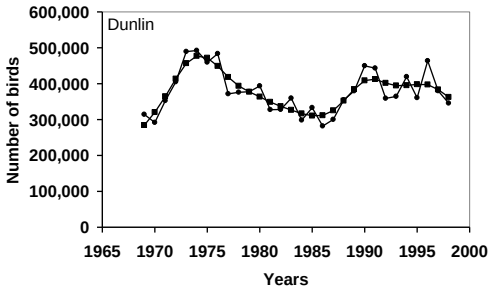
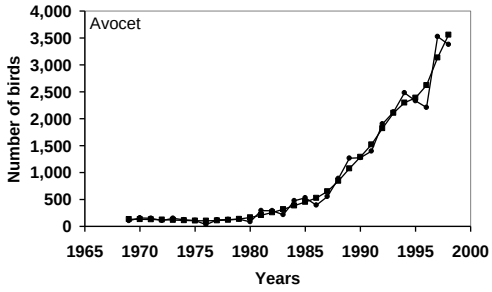
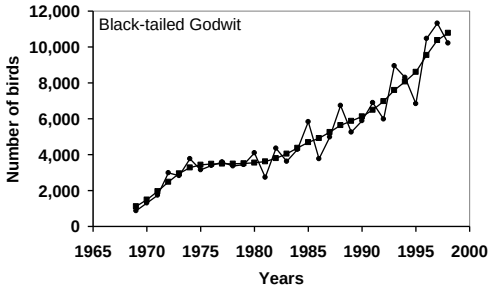


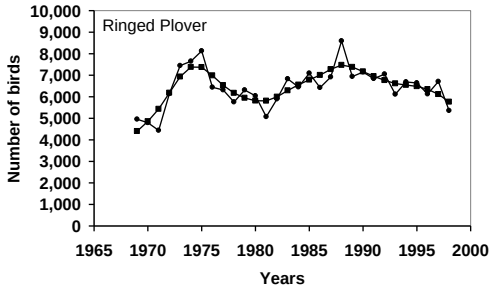
Figure 3.1 Continued.

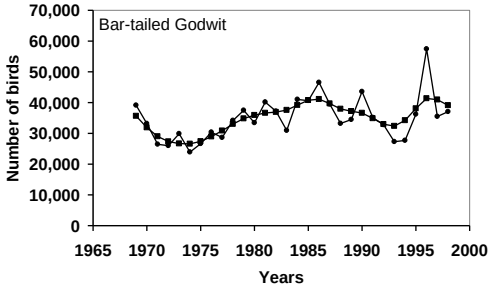


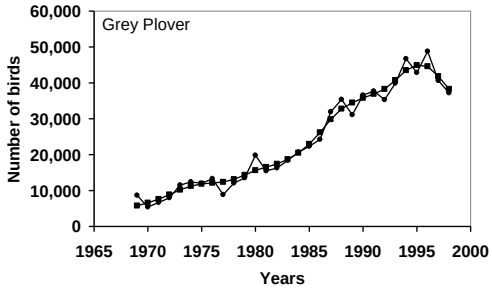


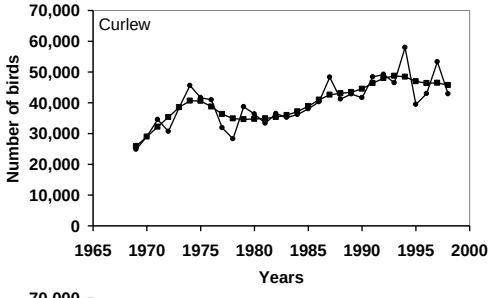


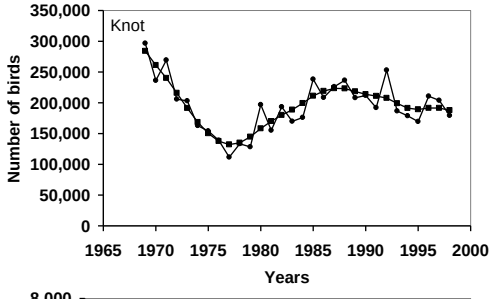


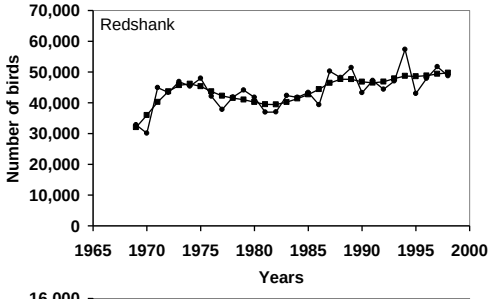


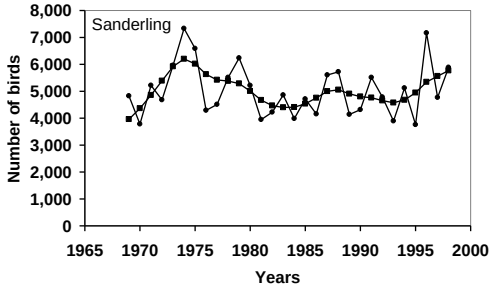












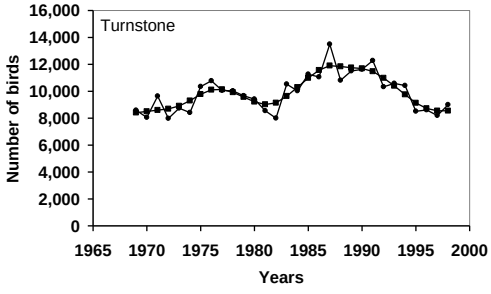
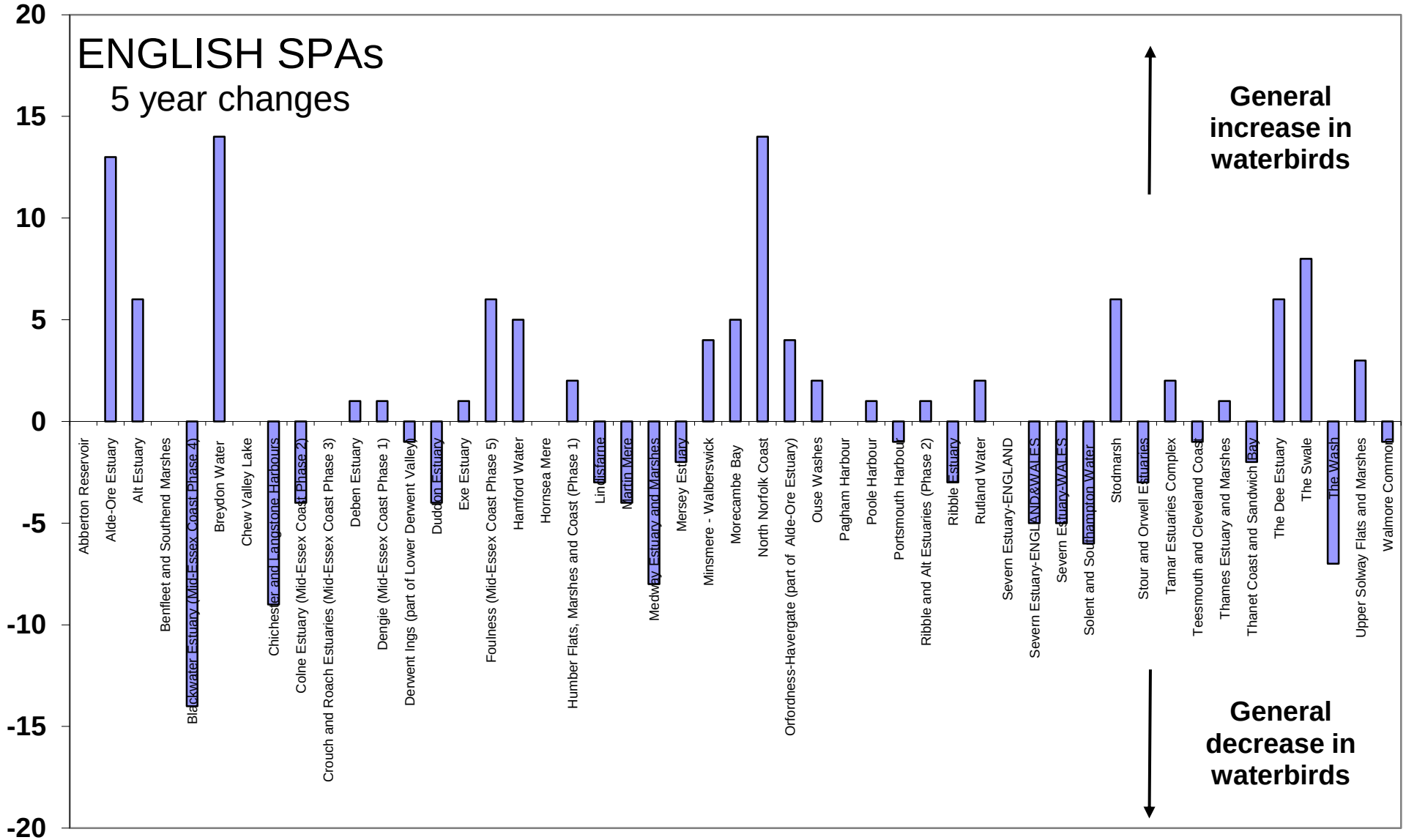


Figure 3.1 Continued.

Figure 3.2 (a-c) Changes in the numbers of waterbirds across English SPAs over 5,10 and 25 years. The change index is calculated by summing the Alerts for all species in an SPA, where a 50% negative Alert is given a value of –2, a 25% negative Alert –1, a 25% positive Alert +1 and a 50% Alert +2. The index indicates direction of trends and so, if an SPA has 10 species, all of which are increasing, the index would have a large positive value and vice versa. If some were going up and some going down an index value of close to zero would be expected. The size of the index also indicates to some extent important SPAs (those with larger numbers of cited species). A large negative value indicates that the SPA supports large numbers of internationally important birds and that there is a general decline across species



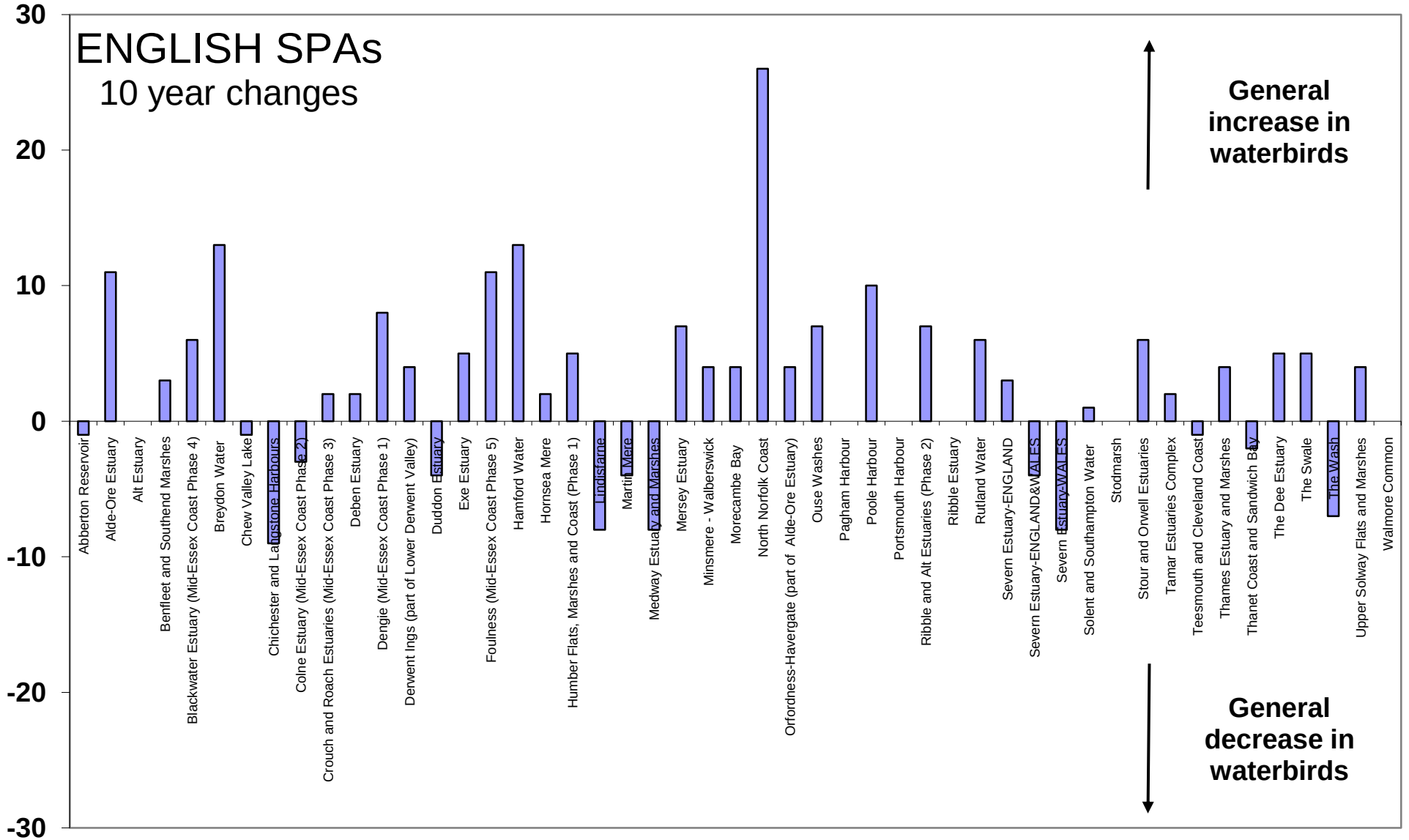
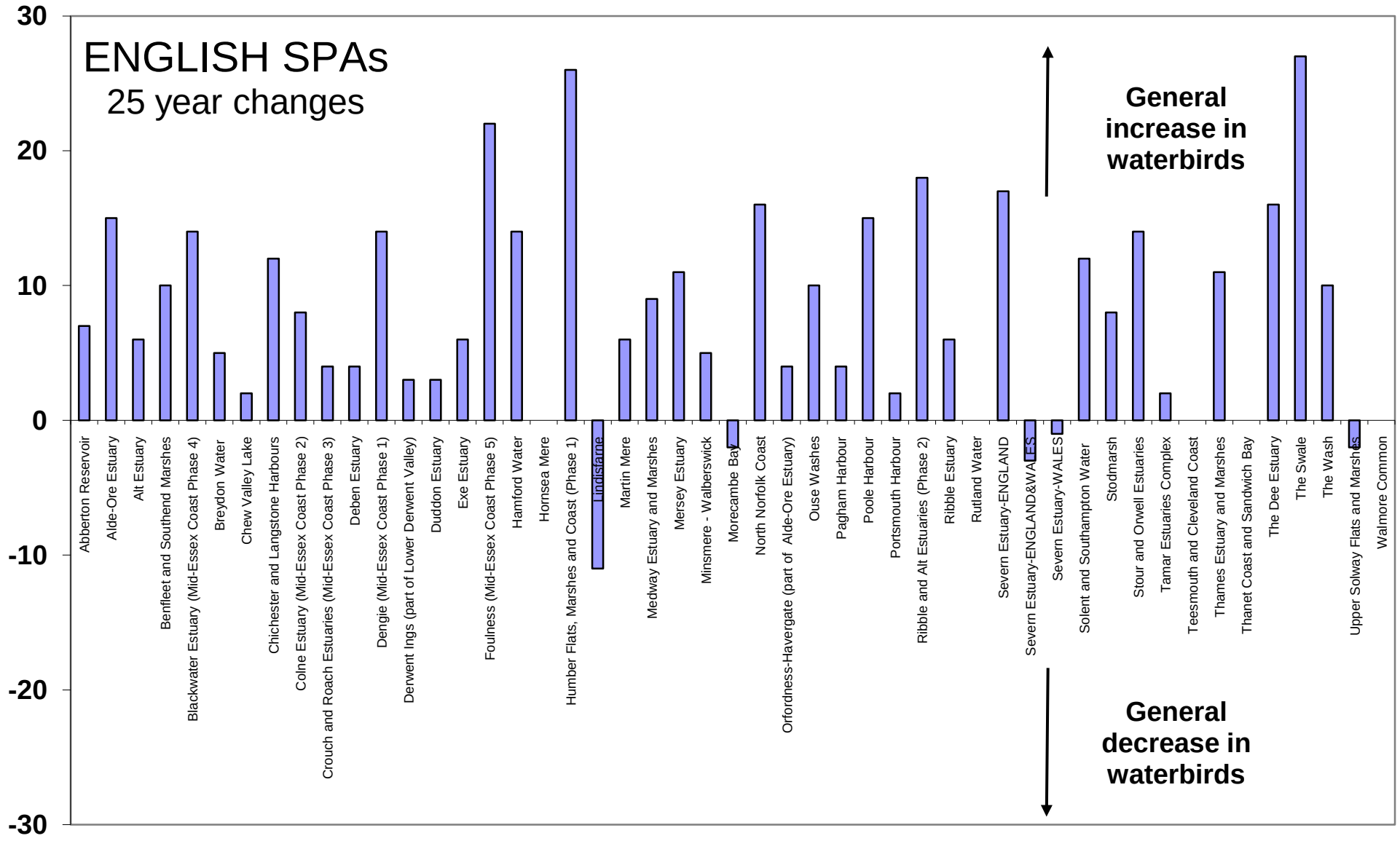


Figure 3.2 (a-c) Continued.

(c)


ENGLISH SPAs
25 year changes
General increase in waterbirds
General decrease in waterbirds
30
20
10
0
-10
-20
-30
Abberton Reservoir
Alde-Ore Estuary
Alt Estuary
Benfleet and Southend Marshes
Blackwater Estuary (Mid-Essex Coast Phase 4)
Breydon Water
Chew Valley Lake
Chichester and Langstone Harbours
Colne Estuary (Mid-Essex Coast Phase 2)
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3)
Deben Estuary
Dengie (Mid-Essex Coast Phase 1)
Derwent Ings (part of Lower Derwent Valley)
Duddon Estuary
Exe Estuary
Foulness (Mid-Essex Coast Phase 5)
Hamford Water
Hornsea Mere
Humber Flats, Marshes and Coast (Phase 1)
Lindisfarne
Martin Mere
Medway Estuary and Marshes
Mersey Estuary
Minsmere - Walberswick
Morecambe Bay
North Norfolk Coast
Orfordness-Havergate (part of Alde-Ore Estuary)
Ouse Washes
Pagham Harbour
Poole Harbour
Portsmouth Harbour
Ribble and Alt Estuaries (Phase 2)
Ribble Estuary
Rutland Water
Severn Estuary-ENGLAND
Severn Estuary-ENGLAND&WALES
Severn Estuary-WALES
Solent and Southampton Water
Stodmarsh
Stour and Orwell Estuaries
Tamar Estuaries Complex
Teesmouth and Cleveland Coast
Thames Estuary and Marshes
Thanet Coast and Sandwich Bay
The Dee Estuary
The Swale
The Wash
Upper Solway Flats and Marshes
Walmore Common

4. NORTHERN IRELAND

4.1 Population Change and Alerts

Figure 4.1 shows the changes in number of all regularly indexed waterbird species in Northern Ireland.

Table 4.1 shows the 5, 10, 25 and all year Alerts (see Chapter 1 for details).

Figure 4.2 shows the cumulative change in individual sites over 5 and 10 years.

Three species have triggered negative 50% Alerts, nine more species generated negative 25% Alerts using GAMs. The remaining species are either stable or increasing.

- Bewick's Swan, Knot and Bar-tailed Godwit generated a 50% Alert using the GAM method.
- Little Grebe, Whooper Swan, Gadwall, Shoveler, Pochard, Goldeneye, Ringed Plover, Sanderling, and Turnstone have generated a 25% Alert using the GAM method.
- With 199 bootstraps, the change measures for Little Grebe, Gadwall, Shoveler, Goldeneye, Knot, Bar-tailed Godwit and Ringed Plover were not significantly below zero.
- Using the Underhill technique the following differences occurred: the Alert for Goldeneye was elevated to a 50% Alert and, in contrast, Gadwall and Pochard did not trigger an Alert.
- All other species are stable or increasing (mostly increasing).

4.2 Coverage of SPAs by the Waterbird Alert System

For those species that are regularly indexed by WeBS, the coverage of SPAs in Northern Ireland is reasonable, with the exception of waders in Belfast Lough (Tables 4.2 & 4.3). This site is not currently included in the list of regularly indexed UK sites but, in future, it may be possible to include this site in the Waterbird Alert System. Overall, there were 96 species/site combinations that required Alerts (Tables 4.2 & 4.3). Of these, 20 (19%) were for species not regularly indexed by WeBS and data were unavailable for 11 out of the remaining 76 potential combinations (these were mostly for Belfast Lough). Overall, the coverage in Northern Ireland was 65 (68%) out of 96 combinations.

Only two SPAs in Northern Ireland are not covered. These are Carlingford Lough and Killough Harbour, both of which are designated for Light-bellied Brent Goose.

Other species such as Scaup, Eider, Golden Plover, Greenshank, Greylag Goose, Lapwing and Purple Sandpiper are listed for sites which are regularly counted. It should be possible to include some of these species/site combinations in future waterbird alert analyses.

4.3 Species Generating a 50% Alert Using GAMs

The All Ireland situation for Alert species was taken from I-WeBS.

Bewick's Swan **All Ireland Situation: Increase**

On the WeBS sites used for this analysis, Bewick's Swans have shown a very large decline, decreasing from an average of 400-500 birds per month in the late 1980s and early 1990s to less than 50 birds in 1998/99. Numbers have declined on Lough Neagh & Lough Beg and Lough Foyle, two of the main sites in Northern Ireland for this species (see site alerts). There is no evidence of a recovery.

Knot

All Ireland Situation: Moderate Increase

From the start of counts in 1970/71 there was a steady decline in the number of wintering Knot from 10,000-15,000 birds to less than 2,000 in the late 1980s. Numbers then recovered with a very large peak of 30,000 birds in 1995/96 before declining to 5,000-7,000 birds. The 25 year Alert reflects the pattern of long-term decline from the start of the counts.

Bar-tailed Godwit **All Ireland Situation: Moderate Increase**

Bar-tailed Godwits triggered a 50% Alert over the whole period of counting. There has been a consistent decline in numbers over this period from *c*5,000 birds in 1970/71 to 2,500 birds in 1997/98. In an All Ireland context, Belfast Lough is also an important site for Bar-tailed Godwit but is not currently included in the Waterbird Alert System. The decline which took place throughout the 1970s and 1980s has now ceased and numbers were relatively stable in the 1990s although there has been no sign of any recovery.

4.4 Species Triggering a 25% Alert Using GAMs

Little Grebe **All Ireland Situation: Moderate Fluctuation**

Little Grebe have increased since the start of counting but numbers in Northern Ireland have been low in the last three years of counts, thus triggering a 5 year 25% Alert. There is, however, no long-term downward trend in numbers.

Whooper Swan **All Ireland Situation: Large Fluctuations**

Whooper Swans have shown a consistent decline in numbers from *c*1,500 birds at the start of counts in 1986/87 to 1,000 birds in 1998/99. This decline has triggered Alerts over 10 and all years. The Waterbird Alert System covers two of the three SPAs cited for Whooper Swan (Lough Foyle and Lough Neagh & Lough Beg) but does not cover Upper Lough Erne. However, these former two sites hold most birds in Northern Ireland (I-WeBS) and the change is still likely to be significant across the country.

Wigeon **All Ireland Situation: Slight Fluctuation**

Wigeon triggered a 25% Alert over the last 10 year period indicating a moderate medium-term decline. Numbers were highest at the start of counts but declined throughout the late 1980s from 7,000-9,000 birds to the current level of 5,000-6,000 birds. Lough Foyle supports the majority of birds in Northern Ireland and numbers at this site have undergone a large decline. This change is largely responsible for triggering the Alert. The numbers peaked there at 7,000 birds in 1988/98 but declined to the current level of 2,000 birds. Numbers at Strangford Lough (average of 1,140 birds over all years counted) and Lough Neagh & Lough Beg (averaging 1,550 birds over all years counted) have remained stable.

Gadwall **All Ireland Situation: Large Increase**

Two sites, Lough Neagh & Lough Beg and Strangford Lough are important for Gadwall in Northern Ireland, although none support an average population larger than the international importance threshold of 300 birds. Numbers of Gadwall increased from the start of counts to a peak of *c*200 birds per month in 1994/95. Numbers have since dropped, triggering a 25%

Alert over the past five years and over all years. The population at Strangford Lough has remained relatively stable but has declined on Lough Neagh & Lough Beg.

Shoveler **All Ireland Situation : Moderate Increase**

Only two sites in Northern Ireland (Strangford Lough & Lough Neagh and Lough Beg) pass the All Ireland importance level of 65 birds. There has been a consistent decline over the whole period of counts and an all year 25% Alert was triggered due to the decline in numbers since 1986/87.

Pochard **All Ireland Situation: Large Fluctuations**

Counts of Pochard have been characterised by an increase in numbers followed by a decrease to a similar numbers of birds as at the start of counts. Counts have been low in the past two years, thus triggering an alert over a 10 year period. Although a longer series of data would be needed to be confident, there does seem to be have been a downward trend in numbers from 1991/92 to 1998/99. Lough Neagh and Lough Beg are the most important site in the UK for this species, holding between 20,000 and 25,000 birds and decline there will have contributed most to the change in the Northern Irish total. In comparison, Abberton Reservoir, the next most important UK site, only supports 2,000-3,000 birds.

Goldeneye **All Ireland Situation: Large Fluctuations**

Northern Ireland supports a high proportion of the UK total of Goldeneye. The main wintering site for Goldeneye in the UK is the Lough Neagh and Lough Beg SPA and this has supported an average of *c*7,000-8,000 birds over the whole period of counts. However total numbers have dropped from approximately 10,000 birds in the mid- and late 1980s to *c*7,500 in 1998/99 causing 25% Alerts to be triggered over 5, 10 and all years.

Ringed Plover All Ireland Situation: Slight Decline

Although very variable from year-to year, Ringed Plover numbers increased from the 500-600 birds at the start of counts to a peak of over 900 in 1984/95. Numbers then declined to the current level of 400-600 birds, thus triggering a 10 year 25% Alert.

Sanderling All Ireland Situation: Moderate Increase

On the WeBS sites covered for this report, Sanderling are a rare species. Numbers increased from zero to between 60 and 80 birds between the start of counts and the late 1970s. From then there was a quick decline and by the mid-1980s numbers fell to the current level of 10 to 20 birds.

Turnstone **All Ireland Situation: Moderate Increase**

Turnstone numbers have changed in line with the national index. Numbers fell from 1,500 to 1,000 birds from the start of counts to the mid-1970s before rising to a peak of 2,000-2,500 birds in the mid- to late-1990s. Numbers fell from 1990/91 to around 1,000 birds, half the previous peak level.

4.5 Site Alerts – Special Protection Areas (SPAs) in Northern Ireland

Table 4.4 shows the Alerts and percentage population change over 5, 10 and all years for each species/site combination. For waterbirds, other than waders, counts began in 1986/87. For waders counts began in 1970/71.

All Alerts are calculated using the GAM method. As there is a great deal of variation in counts on individual sites, only 50% Alerts are discussed.

Larne Lough

Cited Species: Light-bellied Brent Goose

No Alert species.

Light-bellied Brent Goose have shown a steady increase in numbers.

Outer Ards

Cited Species: Light-bellied Brent Goose, Ringed Plover, Turnstone

50% Alert: Light-bellied Brent Goose, Ringed Plover

Numbers of Light-bellied Brent Geese at Outer Ards have undergone a large decline since 1994/95, thus triggering a 50% five year Alert. From the start of counts numbers rose from 40-60 birds to a peak of an average of just over 120 birds per month before falling to less than 20 in 1997/98. Numbers then recovered to an average of 60 in 1998/99.

This is a prime example of where averaging counts across months (in this case September to March, 7 months) reduces the number of birds recorded to below the international threshold. The WeBS reports, which use maxima to identify the importance of a site, will identify more sites as internationally important.

Ringed Plover numbers have declined dramatically from 500-600 birds in the mid 1980s to *c*200 birds currently. The decline was continuous until the last two winters when numbers seem to have stabilised. More years data would be needed to determine whether the decline has slowed down.

Belfast Lough

Cited Species: Bar-tailed Godwit*, Black-tailed Godwit*, Cormorant, Curlew*, Dunlin*, Goldeneye, Great Crested Grebe, Knot*, Mallard, Oystercatcher, Red-breasted Merganser, Redshank*, Ringed Plover*, Shelduck, Turnstone*

Belfast Lough is not a site that is regularly used to index waders, and so count data were not available to run Alerts.

50% Alert: Goldeneye, Mallard, Shelduck

Belfast Lough has shown declines across a number of waterbird species (Figure 4.2).

The 50% Alert for Goldeneye has been largely caused by very low counts in the last two years (the two lowest counts for this site on record). Numbers have fluctuated between 300 and 600 birds since the start of counts, but in 1997/98 there were 200 and in 1998/99, 100 birds. More years data would be required to determine if there was a long term decline in numbers.

Mallard numbers rose from *c*300 birds a the start of counts in 1986/87 to 700 birds in 1992/93 but have since declined to their initial level of *c*300 birds. The decline over the last five years was sufficient to trigger a 50% Alert.

Shelduck have triggered a 5 year 50% Alert indicating a short-term decline. Numbers varied between 200-400 birds from the start of counts to 1993/94. In the following two years a large increase to 700 birds took place but then numbers have returned to their previous level by 1997/98. The last three winters have seen a decline in birds and the last counting year,

1998/99, was the lowest ever for the site. If the trend continues, this would be worrying, but more data would be needed to determine if this was the case.

All other species have been stable or are increasing. Belfast Lough is one of the most important sites in the UK for Great Crested Grebe and numbers have steadily increased from 200 to over 1,200 birds over the count period.

Lough Foyle

Cited species: Bar-tailed Godwit, Bewick's Swan, Cormorant, Curlew, Dunlin, Great Crested Grebe, Knot, Light-bellied Brent Goose, Mallard, Oystercatcher, Red-breasted Merganser, Redshank, Shelduck, Teal, Whooper Swan, Wigeon

50% Alert: Great Crested Grebe, Bewick's Swan, Wigeon, Bar-tailed Godwit

Great Crested Grebe numbers have fluctuated between 20 and 80 birds throughout the time period. However, an exceptionally large mean count of 140 birds in 1987/88 (the second year of counts) caused the smoothed index to be initially high. This, coupled with the counts for 1998/99 being the second lowest ever triggered the 10 and all year Alerts. There is no long-term trend.

Bewick's Swan numbers have declined from between 20-180 birds per month to less than 10 birds in the last two years, thus triggering a 50% Alert over all time periods.

Wigeon have declined from an average of *c*5,000 birds between 1986/87 and 1991/91 to between 1,000-3,000 birds over the past 5 years, thus triggering a 10-year Alert. Numbers have been stable over the past five years and there is no long term trend.

Bar-tailed Godwit numbers have, despite inter-annual fluctuations, undergone a steady decline in numbers from 2,000-3,500 birds in the 1970s and early 1980s to the current levels of 1,500 birds.

Lough Neagh & Lough Beg

Cited Species: Bewick's Swan, Coot, Cormorant, Gadwall, Goldeneye, Great Crested Grebe, Mallard, Pochard, Shelduck, Shoveler, Teal, Tufted Duck, Whooper Swan, Wigeon

50% Alert: Bewick's Swan, Great Crested Grebe, Red-breasted Merganser, Shoveler

Loughs Neagh and Beg support very large internationally important populations of wildfowl and are outstanding, in UK terms, for their populations of Great Crested Grebe, Whooper Swan, Pochard, Tufted Duck, Scaup and Goldeneye. There has been a recent (5 year) decline across a range of waterbird species (Figure 4.2, Table 4.4).

Lough Neagh & Lough Beg are the most important site for Bewick's Swan in Northern Ireland. Numbers increased from 100 birds to a peak of 350 in 1990/91 but there has since been a large decline and by 1998/99 an average of less than 10 birds per month were recorded.

Great Crested Grebe triggered a 50% Alert over 10 and all years. Lough Neagh & Lough Beg, along with Belfast Lough, are the most important sites for Great Crested Grebe in the UK, holding more than twice the number of any other site. Numbers have declined from an average of 600-700 birds per month to less than 300 birds per month. These figures are much

lower than the maxima of 1,000 to 2,000 birds reported in the annual WeBS reports but this is due to the fact that this species is indexed over seven months and the alerts figures are expressed as an average number of birds per month.

There has been a consistent decline in the number of Shoveler wintering on Loughs Neagh & Beg. Numbers fell from 50 to 80 birds per year at the start of counts to 30 to 40 birds at the end.

Strangford Lough

Cited Species: Coot, Cormorant, Curlew, Dunlin, Gadwall, Goldeneye, Great Crested Grebe, Grey Plover, Knot, Light-bellied Brent Goose, Mallard, Oystercatcher, Pintail, Red-breasted Merganser, Redshank, Ringed Plover, Shoveler, Teal, Turnstone, Wigeon

50% Alert: Coot, Goldeneye, Knot, Turnstone

Coot numbers have undergone a consistent decline since the start of counts. Numbers have fallen from an average of 500-600 birds to the current level of 200-300 birds. Since this large decline, numbers appear to have stabilised over the last four winters.

Goldeneye numbers were initially high in the first winter of counts at an average of over 500 birds. In the following years numbers have fluctuated between 100 and 300 birds and there has been no consistent long-term change in numbers. A 50% Alert was triggered by the initially high counts.

Knot have undergone a large decline on Strangford Lough. Numbers have fluctuated annually but have fallen from 10,000-18,000 birds to the current level of 2,000-6,000 birds. In the past five years the decline seems to have levelled off and the population has remained stable at this lower level. A 50% Alert was triggered for the decline across all years considered.

Turnstone numbers remained steady at between 150 and 200 birds from the start of counts in 1970 until 1983/84 when the population approximately doubled to over 350 birds. The population remained at this level until 1990/91 when it halved and returned to its previous size, thus triggering a 10 year Alert. Numbers have remained stable since.

Table 4.1 Percentage change and Alerts over 5,10, 25 and all years of counts. For interpretation of symbols see Section 1.6. Population size refers to the average number of birds per month recorded on the WeBS sites used.

ALERTS CALCULATED USING GAMS				**NORTHERN IRELAND**					ALERTS CALCULATED USING UNDERHILL METHOD								
5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Species	5yr	10yr	25yr	All	5yr	10yr	25yr	All	Pop size 1998
-		n/a	++	-25	21	n/a	123	Little Grebe	-8	64	n/a	64		++	n/a	++	450
	+	n/a	++	16	39	n/a	56	Great Crested Grebe	46	47	n/a	47	+	+	n/a	+	1,500
++	++	n/a	++	89	134	n/a	534	Cormorant	59	173	n/a	173	++	++	n/a	++	2,500
	+	n/a	++	18	37	n/a	62	Mute Swan	14	37	n/a	37		+	n/a	+	2,000
--	--	n/a	--	-73	-87	n/a	-78	Bewick`s Swan	-57	-65	n/a	-65	--	--	n/a	--	15
	-	n/a	-	-20	-37	n/a	-30	Whooper Swan	-12	-29	n/a	-29		-	n/a	-	794
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	European White-fronted Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Feral Greylag Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Canada Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
+	+	n/a	++	29	20	n/a	50	Light-bellied Brent Goose	15	39	n/a	39		+	n/a	+	8,000
+	+	n/a	+	36	27	n/a	43	Shelduck	40	21	n/a	21	+		n/a		3,500
	-	n/a		1	-29	n/a	-23	Wigeon	-7	-27	n/a	-27		-	n/a	-	5,000
-		n/a	+	-29	-5	n/a	31	Gadwall	-23	18	n/a	18			n/a		155
+	+	n/a	+	37	-4	n/a	27	Teal	21	4	n/a	4			n/a		4,500
		n/a		-5	1	n/a	4	Mallard	-1	2	n/a	2			n/a		9,000
+	+	n/a	++	46	41	n/a	75	Pintail	4	38	n/a	38		++	n/a	++	221
		n/a	-	-22	-22	n/a	-36	Shoveler	-17	-29	n/a	-29		-	n/a	-	120
	-	n/a		-17	-32	n/a	-13	Pochard	-21	-22	n/a	-22			n/a		14,000
		n/a	+	-23	-9	n/a	32	Tufted Duck	-15	13	n/a	13			n/a		10,500
-	-	n/a	-	-25	-35	n/a	-36	Goldeneye	-35	-37	n/a	-37	-	--	n/a	--	7,500
		n/a		-3	-8	n/a	21	Red-breasted Merganser	1	1	n/a	1			n/a		439
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Goosander	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ruddy Duck	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
		n/a		-5	1	n/a	23	Coot	2	16	n/a	16			n/a		4,000
++	+	++	++	80	43	268	239	Oystercatcher	46	22	249	202	+		++	++	13,500
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Avocet	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
	-			2	-31	7	-1	Ringed Plover	-22	-36	-1	-13		-			675
+	++	++		40	113	310	5	Grey Plover	76	71	188	9	++	++	++		350
	++	--	-	50	129	-51	-48	Knot	121	254	3	-26	++	++		-	6,000
++	++	++	++	76	163	89	1,440	Sanderling	20	114	757	757		++	++	++	32
++	++	++	++	63	58	101	75	Dunlin	56	51	103	74	++	++	++	++	16,500
++	++	++	++	422	107	258	60	Black-tailed Godwit	282	84	299	92	++	++	++	++	156
		-	--	-3	1	-49	-58	Bar-tailed Godwit	-3	-4	-51	-58			--	--	2,500
++				70	9	-2	-23	Curlew	23	0	-18	-25				-	6,000
++		++	++	64	18	84	88	Redshank	38	3	44	73	+	++	++	++	6,000
	-			3	-47	0	-13	Turnstone	-14	-47	-16	-17					1,500

Table 4.2 Species which are cited/proposed for SPAs in Northern Ireland and are covered by the Waterbird Alert System.

SITE NAME	Bar-tailed Godwit	Bewick`s Swan	Coot	Cormorant	Curlew	Dunlin	Gadwall	Goldeneye	Great Crested Grebe	Grey Plover	Knot	Light-bellied Brent Goose	Little Grebe	Mallard	Mute Swan	Oystercatcher	Pintail	Pochard	Red-breasted Merganser	Redshank	Ringed Plover	Shelduck	Shoveler	Teal	Tufted Duck	Turnstone	Whooper Swan	Wigeon
Larne Lough												●																
Outer Ards												●									●					●		
Belfast Lough				●				●	●					●					●			●						
Lough Foyle	●	●		●	●	●			●		●	●		●		●			●	●		●		●			●	●
Lough Neagh and Lough Beg		●	●	●			●	●	●				●	●	●			●	●			●	●	●	●		●	●
Strangford Lough	●		●	●	●	●	●	●	●	●	●	●		●		●	●		●	●	●	●	●	●		●		●

Table 4.3 Species which are cited for SPAs in Northern Ireland that are not currently covered by the Waterbird Alert System.

	COVERED BY WeBS											NOT COVERED BY WeBS						
Species / Site	Bar-tailed Godwit	Black-tailed Godwit	Curlew	Dunlin	Knot	Light-bellied Brent Goose	Oystercatcher	Redshank	Ringed Plover	Turnstone	Whooper Swan	Scaup	Eider	Golden Plover	Greenshank	Greylag Goose	Lapwing	Purple Sandpiper
Belfast Lough	●	●	●	●	●		●	●	●	●		●	●				●	●
Carlingford Lough						●												
Killough Harbour						●												
Lough Foyle													●	●	●	●	●	
Lough Neagh and Lough Beg												●		●		●	●	
Outer Ards														●				
Strangford Lough													●	●	●	●	●	
Upper Lough Erne											●							

Table 4.4 Population change (%) and Site Alerts for waterbirds on SPAs in Northern Ireland over 5, 10, 25 and all years. (++ / -- = 50% Alert, + / - = 25% Alert).

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
++	++		++	57	243	N/A	535	86	98	Great Crested Grebe	Belfast Lough
	++		++	-2	139	N/A	542	86	98	Cormorant	Belfast Lough
--	-			-55	-28	N/A	-16	86	98	Shelduck	Belfast Lough
--				-53	-20	N/A	5	86	98	Mallard	Belfast Lough
--	--		--	-65	-63	N/A	-72	86	98	Goldeneye	Belfast Lough
-	-			-27	-25	N/A	3	86	98	Red-breasted Merganser	Belfast Lough
	++		+	2	64	.	43	86	98	Light-bellied Brent Goose	Larne Lough
--	--		--	-54	-64	N/A	-62	86	98	Great Crested Grebe	Lough Foyle
	+		++	-8	47	N/A	394	86	98	Cormorant	Lough Foyle
--	--		--	-81	-89	N/A	-83	86	98	Bewick`s Swan	Lough Foyle
	-		-	-15	-38	N/A	-30	86	98	Whooper Swan	Lough Foyle
+			++	33	8	N/A	128	86	98	Light-bellied Brent Goose	Lough Foyle
++	++		++	90	67	N/A	75	86	98	Shelduck	Lough Foyle
	--		-	15	-52	N/A	-28	86	98	Wigeon	Lough Foyle
	-		+	-19	-37	N/A	34	86	98	Teal	Lough Foyle
			-	-10	-22	N/A	-35	86	98	Mallard	Lough Foyle
				-14	-14	N/A	-1	86	98	Red-breasted Merganser	Lough Foyle
++	+		++	210	31	N/A	80	75	98	Oystercatcher	Lough Foyle
n/a	-		++	inf	-49	N/A	52	75	98	Knot	Lough Foyle
++	++		++	181	258	N/A	491	75	98	Dunlin	Lough Foyle
n/a			--	inf	-12	N/A	-52	75	98	Bar-tailed Godwit	Lough Foyle
++			++	165	18	N/A	55	75	98	Curlew	Lough Foyle
++				186	17	N/A	-11	75	98	Redshank	Lough Foyle
-			++	-34	13	N/A	117	86	98	Little Grebe	Lough Neagh and Lough Beg
-	--		--	-41	-52	N/A	-59	86	98	Great Crested Grebe	Lough Neagh and Lough Beg
++	++		++	168	339	N/A	2,133	86	98	Cormorant	Lough Neagh and Lough Beg
	++		++	24	66	N/A	89	86	98	Mute Swan	Lough Neagh and Lough Beg

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
--	--		--	-71	-90	N/A	-81	86	98	Bewick`s Swan	Lough Neagh and Lough Beg
-	-		-	-27	-36	N/A	-30	86	98	Whooper Swan	Lough Neagh and Lough Beg
+				33	-2	N/A	-20	86	98	Shelduck	Lough Neagh and Lough Beg
				-7	1	N/A	-18	86	98	Wigeon	Lough Neagh and Lough Beg
-			++	-26	22	N/A	53	86	98	Gadwall	Lough Neagh and Lough Beg
+				25	-16	N/A	13	86	98	Teal	Lough Neagh and Lough Beg
				2	15	N/A	22	86	98	Mallard	Lough Neagh and Lough Beg
-	-		--	-32	-41	N/A	-54	86	98	Shoveler	Lough Neagh and Lough Beg
	-			-17	-31	N/A	-12	86	98	Pochard	Lough Neagh and Lough Beg
			+	-23	-8	N/A	32	86	98	Tufted Duck	Lough Neagh and Lough Beg
-	-		-	-26	-37	N/A	-37	86	98	Goldeneye	Lough Neagh and Lough Beg
--	++		++	-61	931	N/A	3,538	86	98	Red-breasted Merganser	Lough Neagh and Lough Beg
			+	-5	8	N/A	31	86	98	Coot	Lough Neagh and Lough Beg
--				-54	-18	N/A	-8	86	98	Light-bellied Brent Goose	Outer Ards
n/a	--		-	.	-53	N/A	-49	85	98	Ringed Plover	Outer Ards
n/a	-		-	.	-47	N/A	-46	85	98	Turnstone	Outer Ards
				0	13	N/A	-2	87	98	Great Crested Grebe	Strangford Lough
++			-	58	-23	N/A	-36	87	98	Cormorant	Strangford Lough
+				31	21	N/A	19	87	98	Light-bellied Brent Goose	Strangford Lough
++	+		+	57	31	N/A	42	87	98	Shelduck	Strangford Lough
				1	19	N/A	12	87	98	Wigeon	Strangford Lough
-				-33	-19	N/A	1	87	98	Gadwall	Strangford Lough
++	+		+	91	40	N/A	36	87	98	Teal	Strangford Lough
				-17	-23	N/A	-20	87	98	Mallard	Strangford Lough
++	++		++	60	59	N/A	62	87	98	Pintail	Strangford Lough
-			-	-26	-22	N/A	-26	87	98	Shoveler	Strangford Lough
	-		--	-5	-32	N/A	-55	87	98	Goldeneye	Strangford Lough
				-11	-19	N/A	-14	87	98	Red-breasted Merganser	Strangford Lough
	-		--	-5	-47	N/A	-59	87	98	Coot	Strangford Lough
+	++		++	42	70	N/A	221	70	98	Oystercatcher	Strangford Lough
	++		++	13	53	N/A	51	70	98	Ringed Plover	Strangford Lough

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
++	++		+	80	339	N/A	32	70	98	Grey Plover	Strangford Lough
+	++		--	37	108	N/A	-54	70	98	Knot	Strangford Lough
+	++		+	37	65	N/A	30	70	98	Dunlin	Strangford Lough
+	++			46	139	N/A	-25	70	98	Bar-tailed Godwit	Strangford Lough
			-	8	-6	N/A	-38	70	98	Curlew	Strangford Lough
			++	10	3	N/A	91	70	98	Redshank	Strangford Lough
	--			-18	-55	N/A	-21	70	98	Turnstone	Strangford Lough

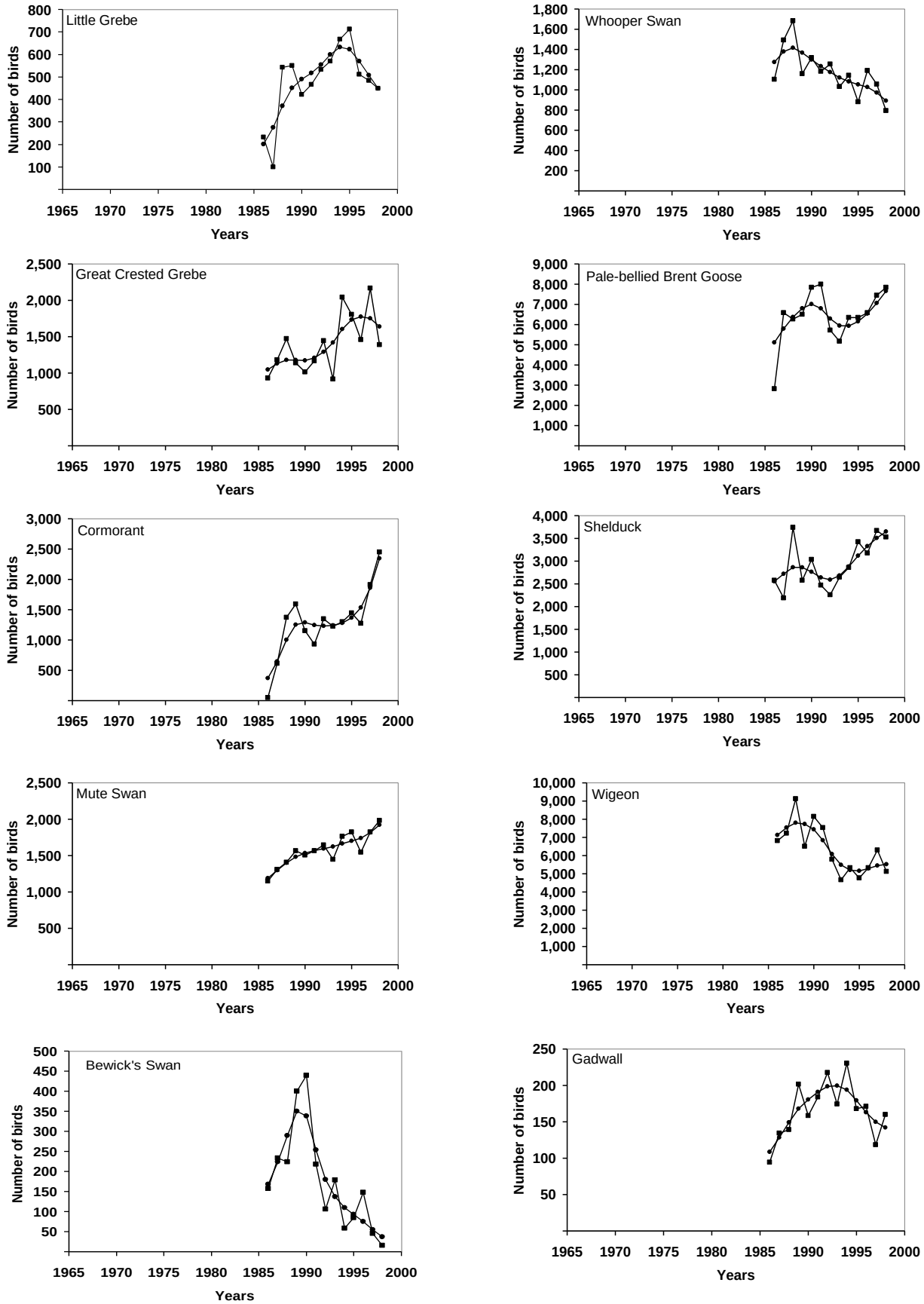


Figure 4.1 Changes in numbers of regularly indexed waterbirds in Northern Ireland (Underhill and smoothed).

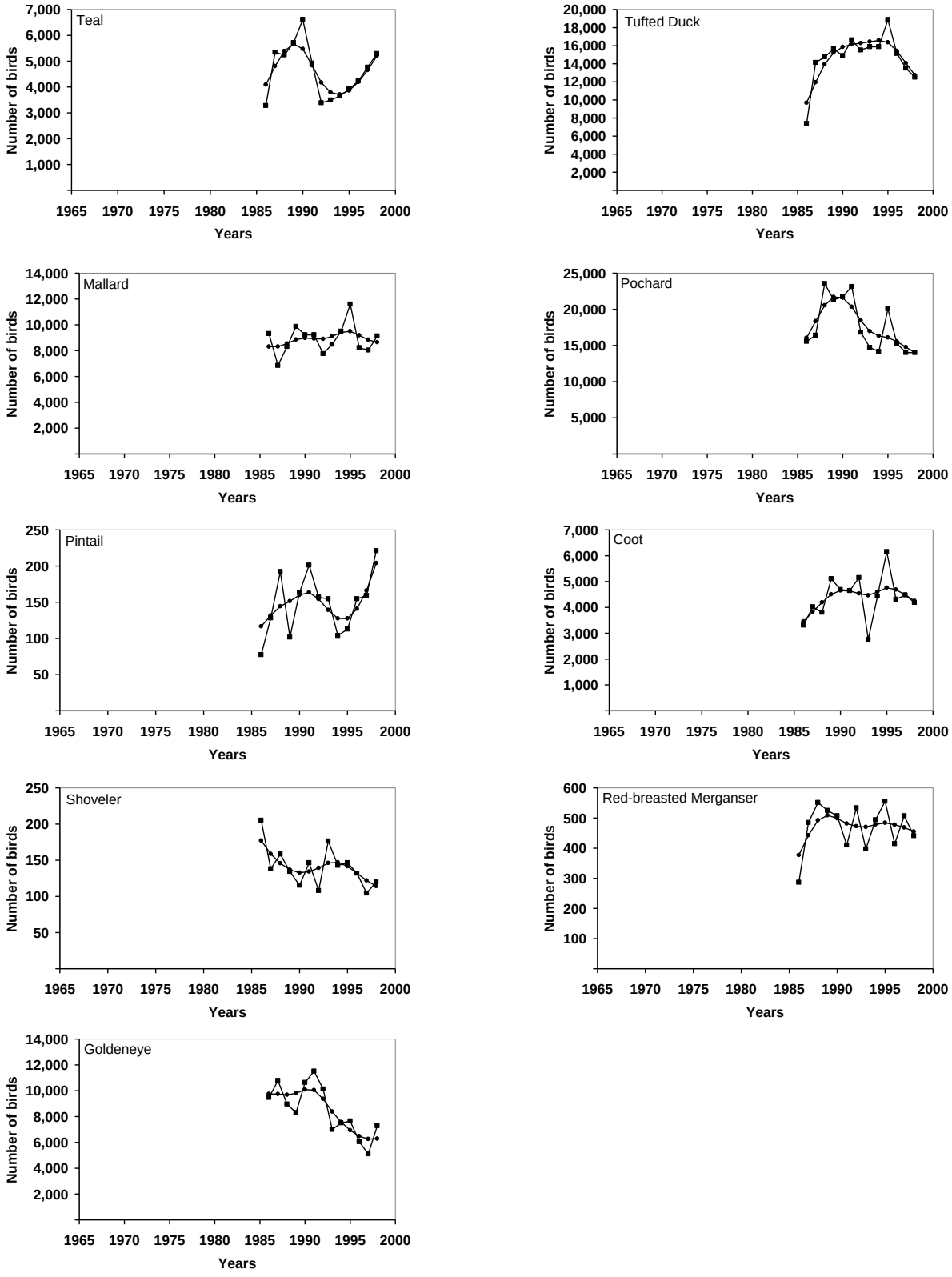


Figure 4.1 Continued.

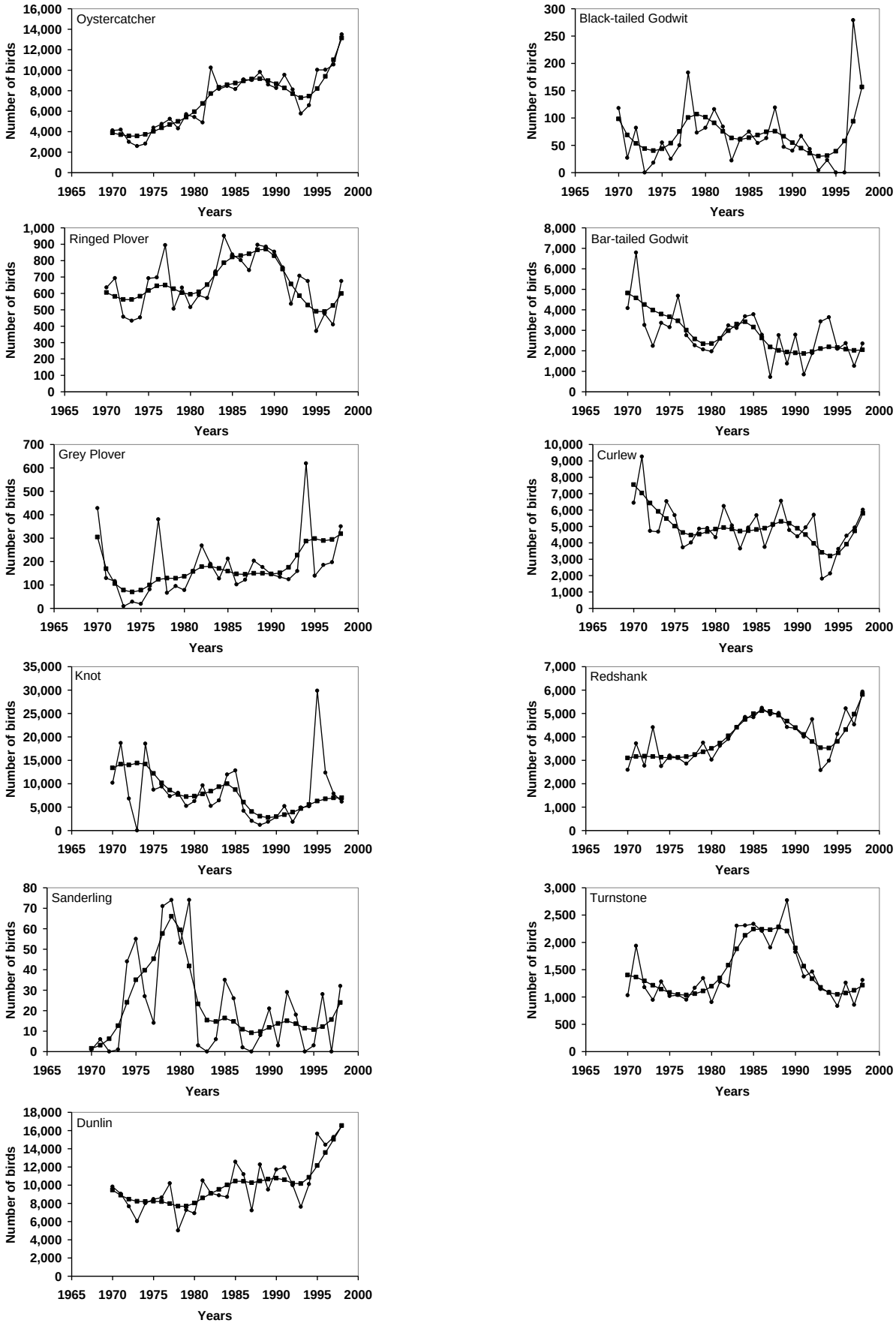


Figure 4.1 Continued.

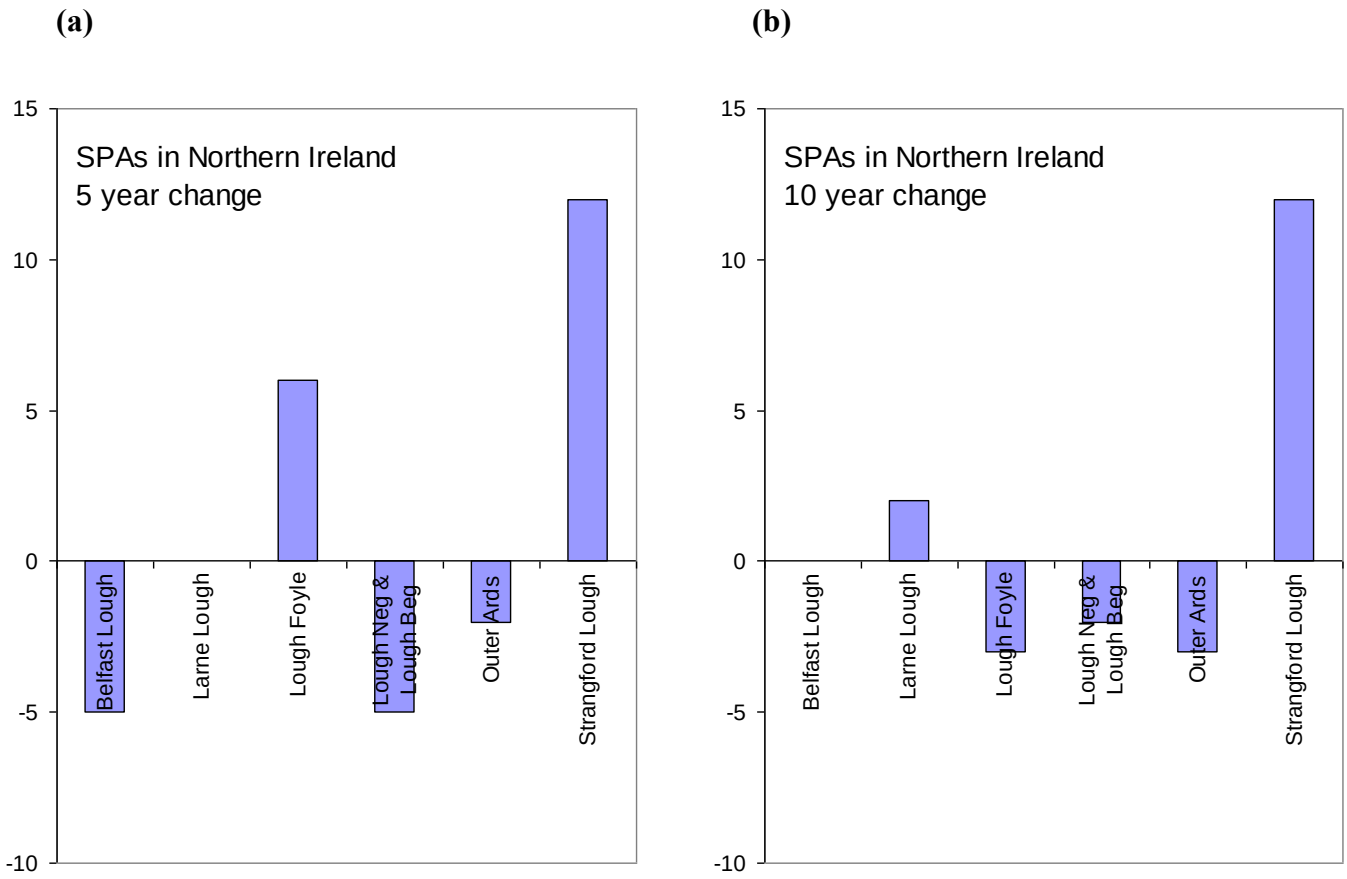


Figure 4.2 (a-b) Changes in the numbers of waterbirds across SPAs in Northern Ireland over 5,10 and 25 years. The change index is calculated by summing the Alerts for all species in an SPA, where a 50% negative Alert is given a value of –2, a 25% negative Alert –1 a 25% positive Alert +1 and a positive 50% Alert +2. The index indicates direction of trends and so, if an SPA, has 10 species which are all increasing, the index would be a large positive value and vice versa. If some were going up and some going down an index value of close to zero would be expected. The size of the index also indicates to some extent important SPAs (those with larger numbers of cited species). A large negative value indicates that the SPA supports large numbers of internationally important birds and that there is a general decline across species.

5. SCOTLAND

5.1 Population Change and Country Alerts

Figure 5.1 shows the Underhill indices and smoothed GAM estimates of the population size of each regularly indexed species of waterbird in Scotland.

Table 5.1 details population change using both Underhill and GAM methods and raises country alerts for those species showing changes in their population of ± 25% (a 25% Alert) or ± 50% (a 50% Alert).

Figure 5.2 shows the mean change index for all cited species in each SPA.

Five species triggered a 50% Alert and five triggered a 25% Alert. All other species are stable or generally increasing.

- Bewick's Swan, Whooper Swan, Shoveler, Pochard and Goosander triggered a 50% Alert under the GAM method.
- Cormorant, Tufted Duck, Mallard, Red-breasted Merganser, Knot and Turnstone triggered a 25% Alert using GAMs.
- Gadwall raised a 25% Alert but the main site, Loch Leven, was not included in the analysis and so should be ignored.
- Using 199 bootstraps, all change measures for Goosander and Red-breasted Merganser were not significantly below zero.
- Using the Underhill technique the Alert for Red-breasted Merganser was elevated to a 50% Alert and Great Crested Grebe, Coot, Dunlin and Bar-tailed Godwit triggered 25% Alerts.
- All other species are stable or increasing (mostly increasing).

5.2 Coverage of SPAs in Scotland by the Waterbird Alert System

For wintering waterbirds on Scottish SPAs there are 181 species/site combinations. Of these, 85 (47%) are of species that are not regularly indexed by WeBS and so are not currently included in the waterbird site alert system. Of the remaining 96 combinations, there are sufficient data for 70 (73%) species/site combinations. Overall, this represents a coverage of 39%.

This coverage is much lower than for any other country in the UK, and is due mostly to the larger number of species in Scotland that are not regularly included in WeBS indices. Many of these combinations refer to sites that are regularly counted and so in future it may be possible to include these if the data can be readily extracted from the database.

5.3 Species Generating a 50% Alert

Four species, Whooper Swan, Bewick's Swan, Pochard and Goosander have shown large declines in Scotland.

Goosander **GB Situation: Increasing**

Goosander raised an alert due to a decline in the population since the 1987/88 winter. Prior to that this species underwent an increase from 300 birds to 1,750 birds in 1987/88. Goosander numbers fluctuate widely between years but the general trend was of an increase in the population on Scottish WeBS sites. Since 1988/89, numbers have remained steady at 500-1,000 birds.

Pochard **GB Situation: Stable**

Pochard numbers have shown a very large decline in numbers since the early 1970s. At their peak in 1974/75, approximately 14,000 birds wintered in Scotland but this number declined rapidly to the present level of *c*5,000 birds in only 5-6 years. Since then there have been small between-year fluctuations, but currently the trend is of a stable, if lower, population.

Whooper Swan **GB Situation: Increasing**

Whooper Swans have undergone a decline over the past 10 years. From 1966/67 onwards there was a steady increase in the number of birds on Scottish WeBS sites to the mid-1980s. A rapid increase ensued to a peak of 3,000 birds in 1990/91, followed by a rapid decrease to current levels of *c*1,000 birds which is a similar to previous levels.

Bewick's Swan **GB Situation: Increased then Stable**

Bewick's Swans are not a species that are usually associated with Scotland. However, from the early 1970s an increasing number of Bewick's Swans wintered on the Solway, peaking at approximately 50-60 birds in the early 1980s. From this time, numbers have declined to less than 5 birds in the past 5 years.

5.4 Species Generating a 25% Alert

Cormorant GB Situation: Increasing

Cormorant numbers in Scotland have undergone an increase followed by a decrease, thus generating a 25% five year Alert. Numbers rose from an average of 1,000 birds per month to bewtween 2,000 and 2,500 in the early 1990s before declining to 1,500 to 2,500 in the last few years of counts. A longer series of data would be needed to determine whether this was indicative of a long-term trend.

(Gadwall) GB Situation: Increasing

Gadwall raised a 50% Alert. However, the data available for this species did not include Loch Leven which is the main wintering site in Scotland for this species. As the data are clearly not representative of the Scottish population, this alert should be ignored.

Tufted Duck GB Situation: Stable

Tufted Duck numbers increased slightly in Scotland over the first 10 year of counts and then underwent a slow steady decrease, thus triggering the 25 year 25% Alert. Numbers have fallen from 8,000-9,000 birds in the early- to mid-1970s to 5,000-6,000 birds currently. The decline has not been consistent between years but has been characterised by periods of stability interspersed by periods of decline.

Mallard **GB Situation: Stable/Recent Decrease**

Mallard numbers have remained stable over the past 25 years. However at the beginning of counts in 1966/67 it was estimated that 35,000-40,000 birds per month wintered in Scotland. However the following 3 winters saw a decline in birds to approximately 25,000 birds.

Numbers have remained reasonably stable since, although there has been a downward trend in the past 10 winters, mirroring the national trend.

Red-breasted Merganser GB Situation: Increasing

Mergansers have triggered a 25% five year Alert. Sea duck are notoriously difficult to count and the numbers on WeBS counts often fluctuate widely between years. In Scotland, as with the national picture, numbers have been characterised by peaks and troughs in counts. In the last few years of counting, numbers were in a trough, thus triggering a 5 year Alert. Overall, the trend of Red-breasted Mergansers in Scotland is upwards as indicated by the 50% positive Alert triggered over 25 years.

Knot UK: Decrease/Stable

Knot showed a consistent decline in numbers from 1969/70 to the mid-1980s followed by a period of stability or slight increase which has continued to this day. The 25 and all year 25% Alerts were triggered by this initial decline. The decline is significant in terms of the number of birds as numbers fell from a peak of 40,000 birds to the current level of *c*20,000 birds. These changes closely mirror the national trend.

Turnstone UK: Increase followed by decrease

The changes in numbers of Turnstone in Scotland closely follow those seen in the national trends. Numbers increased from 1969/70 to 1990/91 and thereafter have declined, thus triggering a 5 and 10 year Alert. This trend has not been consistent as the last 2 two winters have seen increases, but number are not showing any return to 1990 levels.

5.5 Site Alerts – Special Protection Areas in Scotland

Table 5.4 shows the Alerts and percentage population change over 5, 10, 25 and all years for each species/site combination.

All Alerts are calculated using the GAM method. As there is a great deal of variation in counts on individual sites only 50% Alerts are discussed.

Cromarty Firth

Cited species: Whooper Swan, Wigeon, Pintail, Red-breasted Merganser, Oystercatcher, Knot, Dunlin, Bar-tailed Godwit, Curlew, Redshank

50% Alerts: Whooper Swan and Wigeon

The WeBS data for Whooper Swan is misleading as the numbers recorded on the Cromarty Firth are very variable and can range from several hundred birds to zero. However there does seem to have been a long-term decline in the number of birds recorded and only once in the past 10 winters has more than 100 birds been recorded. The Alert System is not suited to these type of data.

Wigeon numbers were initially high at the start of counts at 9,500 birds in 1967/68 and since then numbers remained stable at approximately 4,000 birds. The alerts have been triggered due to the sudden decrease in the number of birds in 1997/98 and 1998/99 to approximately half the previous level. These two runs of years have been sufficient to trigger the alerts but, given that numbers have occasionally dropped to a similar level in the winters of 1990/91 and 1991/92 and subsequently recovered, this may be a short-term decline.

Other species have remained stable or showed a moderate increase over the entire time period.

Dornoch Firth and Loch Fleet
Cited species: Wigeon, Teal, Oystercatcher, Dunlin, Bar-tailed Godwit and Curlew

No Alert species.

All cited species have shown moderate to high increases.

Firth of Forth

Cited species: Great Crested Grebe, Cormorant, Shelduck, Wigeon, Mallard, Goldeneye, Red-breasted Merganser, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin, Bar-tailed Godwit, Curlew, Redshank and Turnstone.

50% Alerts: Knot and Mallard

Knot have declined from 15,000 birds during the early 1970s to the current level of 5,000-6,000 birds. This decline was steady and consistent until 1985/86 when the downward trend levelled out and numbers have remained stable since, varying between 4,000 to 10,000 birds.

Mallard show a pattern of steady increase followed by a sudden recent decline. Apart from 1966/76 and 1967/68 when counts were in the region of 2,500 birds the pattern for Mallard numbers was of a steady increase from *c*500 birds in 1970/71 to 1,000-1,500 birds in 1993/94. After this, there was a sudden decrease and the number of birds has remained at 600-800 birds over the past 5 winters.

As the Firth of Forth is one of the two sites in the UK that is internationally important for Goldeneye, it should be noted that this species almost triggered an Alert over 25 years. Numbers on the Forth fell from 3,000-3,500 birds in the 1970s to 500 in the mid-1980s. Numbers have recovered from this data and are still on an upward trend at 2,000-2,500 currently.

Firth of Tay and Eden Estuary

Cited species: Cormorant, Shelduck, Goldeneye, Red-breasted Merganser, Oystercatcher, Grey Plover, Sanderling, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Redshank.

50% Alerts: Shelduck, Red-breasted Merganser, Redshank

Shelduck have been in a steady long-term decline in the Firth of Tay and Eden Estuary. Numbers have dropped from 1,000-1,750 birds to the current average of 500-750 birds. The rate of decline appears to have increased over time.

Red-breasted Mergansers have shown an odd pattern of occurrence on this site. The average number of birds recorded on this site during the first 15 years of counts was less than 30. Throughout the 1980s, an average of up to 350 birds per month were recorded and then from 1990/91 number returned to their former levels of less than 50 birds. This sudden increase and then decrease triggered a 10 year Alert. This sudden increase of birds tended to occur in the early part of the count period. Large number of birds tended to occur in October each year and then disappear after a month or two. The set of months over which Red-breasted

Mergansers are indexed in Great Britain begins in October and it is likely that these large post-breeding flocks would have been there in September.

Although count quality was poor initially there does seem to have been a decline in the number of Redshank wintering in this site from *c*2,000 birds at the start of counts to 1,000 currently.

Inner Clyde Estuary

Cited species: Redshank

50% Alert: Redshank

Redshank underwent a large decline from a peak of 7,000 birds to *c*2,000 birds in 1981/82. Since 1981/82 numbers continued to decline, albeit at a much slower rate, to *c*1,000 birds. However, the count in 1998/99 of 2,085 birds was the highest since 1984/85.

Inner Moray Firth

Cited species: Cormorant, Wigeon, Teal, Goldeneye, Red-breasted Merganser, Oystercatcher, Bar-tailed Godwit, Curlew & Redshank.

50% Alert: Cormorant, Red-breasted Merganser, Bar-tailed Godwit

Counts of Cormorant fluctuate widely, ranging from less than ten to over 400 birds and there is no consistent pattern. The Alerts were triggered by a series of low counts over the past 3 winters (1996/97 to 1998/96) but these low counts are not unprecedented at this site and no consistent trend can be identified.

Red-breasted Merganser numbers regularly vary between less than 10 over 1,000 birds per year. These large peaks tend to occur in December, January and February. There is no overall long-term trend indicated in the data.

Bar-tailed Godwit numbers fluctuate from year to year but the underlying trend is of an increase from 500 birds at the start of counts to a peak of 2,000 to 2,500 birds in the mid-1980s. Numbers remained at this level until the last two counts which have been of less than 1,000 birds, thus triggering a five year 50% Alert.

Loch Eye / Cromarty Firth

Cited species: Whooper Swan

50% Alert: Whooper Swan

Whooper Swan numbers are generally very low on this site during the months over which the index is calculated. Apart from *c*700 birds which were recorded in 1990/91, 503 in 1979/80 and 185 in 1972/73 numbers remained low and the Alerts system is not a good method to determine any long term trend. The population level of 213 birds listed for the SPA is based not only on WeBS data but also additional counts outside the WeBS scheme.

Loch of Boardhouse

Cited species: Pochard

50% Alert: Pochard

Pochard numbers have varied widely at this site. From the start of counts in 1966/67 counts were generally in the order of 500 birds although in four winters more than 1,000 birds were recorded. From 1986-1994, approximately 1,000 birds occurred on site and since then numbers have plummeted and the last winters counts averaged only 84 birds per month, triggering 50% Alerts. The apparent increase over the whole time period is triggered by the fact that the smoothed index overestimates the final years count which means there is an apparent increase on the 100 birds recorded for 1966.

Loch of Skene

Cited species: Whooper Swan, Goldeneye, Goosander.

50% alert: Whooper Swan, Goosander

Whooper Swan numbers were traditionally very low (<10) at this site until 1989/90. For that winter and the three following winters between 183 and 360 birds were recorded at the site. In 1993/94 numbers reverted to less than 10 birds and this has continued to 1998/99.

Goosander numbers were low (averaging approximately 10 birds) from 1966/67 to the early 1980s. Numbers increased to *c*20-80 birds per year to 1995/96 (hence the positive alerts) and, after a missing count the following year, numbers dropped to less than 20 birds in 1997/98 and 1998/99, thus triggering the five-year alert.

Loch of Strathbeg

Cited species: Whooper Swan, Teal, Goldeneye

No Alert Species

Lochs of Spiggie and Brow

Cited species: Whooper Swan

No Alert species

No major changes have taken place in the population which ranges between 20 and 230 birds.

Montrose Basin

Cited species: Oystercatcher, Knot, Dunlin, Redshank, Shelduck, Wigeon

50% Alert: Wigeon

The Montrose Basin has not been counted on a regular basis until the mid 1980s and so any long term analysis of long-term population change needs to be treated with caution. Since 1993/94 the population of Wigeon has remained stable at *c*2,000 birds. However from 1980/81 to 1992/93 counts regularly fluctuated within the region of 3,000-6,000 birds causing the 10 year alert to be triggered. The decline was sudden and does not currently form a consistent long-term trend.

River Spey - Insh Marshes

Cited species: Whooper Swan

No Alert species

As with other sites cited for Whooper Swan, the number of birds recorded on WeBS counts vary widely. For this site, counts range from between 3 to 105 birds per year.

Ythan Estuary, Sands of Forvie and Meikle Loch

Cited species: Redshank

No Alert species

Redshank showed a steady increase from 400 birds in 1969/70 to 800 birds in 1997/98. The estimated count of 1,820 in 1998/89 was unprecedented.

Table 5.1 Percentage population change and Alerts over 5,10, 25 and all years of counts. For interpretation of symbols see section 1.6. Population size refers to the average number of birds per month recorded on the- WeBS sites used in this analysis during the winter of 1998/99.

ALERTS CALCULATED USING GAMS				**SCOTLAND**				ALERTS CALCULATED USING UNDERHILL METHOD								
5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Species	5yr	10yr	25yr	All	5yr	10yr	25yr	All	Pop size 1998
	++	n/a	++	22	120	n/a	280	Little Grebe	26	59	n/a	206	+	++	n/a	++	259
		n/a	++	-17	6	n/a	56	Great Crested Grebe	-34	4	n/a	14	-		n/a		419
-		n/a	++	-26	-1	n/a	56	Cormorant	-28	13	n/a	15	-		n/a		1,500
		+	+	7	14	45	27	Mute Swan	7	19	32	40			+	+	2,500
--	--	--	--	-95	-96	-96	-91	Bewick`s Swan	-98	-97	-97	-95	--	--	--	--	0
	--			-22	-60	-10	-15	Whooper Swan	-27	-55	-7	4	-	--			950
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	European White-fronted Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Feral Greylag Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
+	++	++	++	49	109	429	>1,000	Canada Goose	50	60	334	>1,000	++	++	++	++	818
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Dark-bellied Brent Goose	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
			++	-5	5	5	113	Shelduck	-9	8	13	94				++	5,000
		++		9	12	54	7	Wigeon	4	16	59	26			++	+	42,500
-	+		++	-45	40	-14	248	Gadwall	-35	15	-58	65	-		--	++	19
+	+	++	++	31	38	226	414	Teal	35	33	202	327	+	+	++	++	14,000
			-	-3	-18	-7	-47	Mallard	2	-17	1	-33				-	22,500
+	++	++	++	32	97	120	133	Pintail	88	47	206	112	++	+	++	++	2,500
-	-	-	--	-47	-30	-41	-63	Shoveler	-55	-109	-72	-73	--	--	--	--	150
-	-	--	--	-38	-38	-78	-62	Pochard	-54	-130	-83	-74	--	--	--	--	2,000
		-		-17	-14	-31	-9	Tufted Duck	-13	-11	-31	-9			-		6,000
	+		++	3	28	-7	75	Goldeneye	0	19	-10	53				++	3,000
-		++	++	-33	-19	103	130	Red-breasted Merganser	-22	-60	109	53		--	++	++	969
-	--	--	+	-27	-71	-52	30	Goosander	-24	-279	-39	20		--	-		458
++	++	++	++	103	>1,000	>1,000	>1,000	Ruddy Duck	218	97	>1,000	>1,000	++	++	++	++	45
		n/a		-23	-12	n/a	5	Coot	-29	-14	n/a	-12	-		n/a		5,000
		+	++	7	10	34	65	Oystercatcher	6	9	39	48			+	+	59,000
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Avocet	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
		+	++	3	9	31	77	Ringed Plover	-10	6	35	58			+	++	2,000
	+	++	++	0	47	404	>1000	Grey Plover	21	52	585	887		+	++	++	2,000
	+	-	-	-1	36	-38	-41	Knot	-1	49	-49	-41		+	-	-	22,500
+		++		39	14	61	24	Sanderling	29	-7	33	-30	+		+	-	341
	+		+	1	33	-22	43	Dunlin	8	51	-8	28		++		+	37,000
++	++	++	++	214	358	390	>1,000	Black-tailed Godwit	329	380	424	>1,000	++	++	++	++	571
				-5	-11	-11	12	Bar-tailed Godwit	-10	-12	-15	33				+	7,500
	+	+	++	8	33	35	166	Curlew	-5	27	42	110		+	+	++	13,500
			++	13	6	-21	59	Redshank	0	4	-13	27				+	18,500
-	-		+	-27	-32	-13	44	Turnstone	-29	-28	-11	30	-	-		+	2,500

Table 5.2 Species which are cited/proposed for SPAs in Scotland which are currently covered by the Waterbird Alert System.

	Bar-tailed Godwit	Black-tailed Godwit	Cormorant	Curlew	Dunlin	Goldeneye	Goosander	Great Crested Grebe	Grey Plover	Knot	Mallard	Oystercatcher	Pintail	Pochard	Red-breasted Merganser	Redshank	Ringed Plover	Sanderling	Shelduck	Teal	Turnstone	Whooper Swan	Wigeon
Cromarty Firth	●			●	●					●		●	●		●	●						●	●
Dornoch Firth and Loch Fleet	●			●	●							●								●			●
Firth of Forth	●		●	●	●	●		●	●	●	●	●			●	●	●		●		●		●
Firth of Tay and Eden Estuary	●	●	●		●	●			●			●			●	●		●	●				
Inner Clyde Estuary																●							
Inner Moray Firth	●		●	●		●						●			●	●				●			●
Loch Eye																						●	
Loch of Boardhouse														●									
Loch of Skene						●	●															●	
Loch of Strathbeg						●														●		●	
Lochs of Spiggie and Brow																						●	
Montrose Basin					●					●		●				●			●				●
River Spey - Insh Marshes																						●	
Ythan Estuary, Sands of Forvie and Meikle Loch																●							

Table 5.3 Species which are cited for Scottish SPAs but which are not currently covered by the Waterbird Alert System.

	SPECIES WHICH ARE REGULARLY INDEXED BY WeBS																	SPECIES WHICH ARE NOT REGULARLY INDEXED BY WeBS																
	Cormorant	Gadwall	Goldeneye	Light-bellied Brent Goose	Pochard	Red-breasted Merganser	Shoveler	Teal	Tufted Duck	Whooper Swan	Wigeon	Bar-tailed Godwit	Dunlin	Oystercatcher	Ringed Plover	Sanderling	Turnstone	Barnacle Goose	Bean Goose	Common Scoter	Eider	Golden Plover	Greenland White-fronted Goose	Greylag Goose	Lapwing	Long-tailed duck	Pink-footed Goose	Purple Sandpiper	Red-necked Grebe	Red-throated Diver	Scaup	Slavonian Grebe	Velvet Scoter
Black Cart										●																							
Bridgend Flats, Islay																		●															
Caithness Lochs										●													●	●									
Cameron Reservoir																										●							
Castle Loch, Lochmaben																										●							
Coll																		●					●										
Cromarty Firth																								●		●					●		
Din Moss - Hoselaw Loch																								●		●							
Dornoch Firth and Loch Fleet																								●									
East Sanday Coast												●					●										●						
Eilean na Muice Duibhe/Duich Moss, Islay																							●										
Fala Flow																										●							
Feur Lochain (part of Rinns of Islay)																							●										
Firth of Forth																				●	●	●			●	●		●	●	●	●	●	
Firth of Tay and Eden Estuary																				●	●			●		●							●
Glac na Criche (part of Rinns of Islay)																							●										
Gladhouse Reservoir																										●							
Greenlaw Moor																										●							
Gruinart Flats, Islay				●														●					●										
Inner Moray Firth																								●									
Kintyre Goose Roosts																							●										
Laggan, Islay																		●					●										
Loch Eye																								●		●							
Loch Ken and River Dee Marshes																							●	●									
Loch Leven	●	●	●		●		●	●	●	●																●							
Loch Lomond																							●										
Loch of Inch and Torrs Warren																							●										
Loch of Kinnordy																								●		●							
Loch of Lintrathen																								●									
Loch of Skene																								●									
Loch of Strathbeg				●														●						●		●							
Loch Spynie																								●									
Lochs Druidibeg, a` Machair															●																		
Monach Isles																		●															
Montrose Basin																					●			●		●							
Moray and Nairn Coast						●					●	●	●	●						●				●		●	●						●
Muir of Dinnet																								●									
North Sutherland Coastal Islands																		●															
North Uist Machair and Islands Phase 1															●		●	●									●						
Rinns of Islay																		●					●										
Shiant Isles																		●															
Slamannan Plateau																			●														
South Tayside Goose Roosts																								●		●							
South Uist Machair and Lochs															●	●																	
Switha																		●															
Tiree Wetlands															●		●	●					●										
Treshnish Isles																		●															
Westwater																										●							
Ythan Estuary, Sands of Forvie and Meikle Loch																					●				●	●							

Table 5.4 Population change (%) and Site Alerts for waterbirds on SPAs in Scotland over 5, 10, 25 and all years. (++ / -- = 50% Alert, + / - = 25% Alert).

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
		--	--	21	1	-71	-68	72	98	Redshank	Inner Clyde Estuary
		n/a	++	3	-24	n/a	175	70	98	Oystercatcher	Montrose Basin
	+	n/a		18	50	n/a	-21	70	98	Knot	Montrose Basin
		n/a	++	24	-20	n/a	83	70	98	Dunlin	Montrose Basin
		n/a		-9	-1	n/a	8	70	98	Redshank	Montrose Basin
++	++	++	++	52	136	121	971	66	98	Shelduck	Montrose Basin
	--		+	-21	-50	-23	31	67	98	Wigeon	Montrose Basin
--	n/a	--	--	-100	n/a	-100	-100	66	98	Whooper Swan	Loch of Skene
++	n/a	++	++	71	n/a	75	1,654	68	98	Goldeneye	Loch of Skene
--	n/a		++	-75	n/a	-2	974	67	98	Goosander	Loch of Skene
++	+	++	++	102	42	54	394	66	98	Whooper Swan	Loch of Strathbeg
++	++	++	++	455	111	11,787	4,360	66	98	Teal	Loch of Strathbeg
++	+	++	-	114	33	81	-44	66	98	Goldeneye	Loch of Strathbeg
++	++	++	++	87	148	249	359	69	98	Redshank	Ythan Estuary, Sands of Forvie and Meikle Loch
	++	n/a	++	11	58	n/a	117	72	96	Whooper Swan	River Spey - Insh Marshes
++	n/a		++	75	n/a	-22	16,128	67	98	Whooper Swan	Loch Eye
--	--	--	--	-84	-92	-90	-98	66	98	Whooper Swan	Cromarty Firth
-	-	-	--	-33	-33	-37	-70	66	98	Wigeon	Cromarty Firth
	++	-	+	-9	59	-30	29	66	98	Pintail	Cromarty Firth
		++	++	7	-16	186	1,009	66	98	Red-breasted Merganser	Cromarty Firth
++	++	+	++	62	63	32	71	70	98	Oystercatcher	Cromarty Firth

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
	++	++		23	316	166	-9	70	98	Knot	Cromarty Firth
	+		++	-11	40	-11	54	70	98	Dunlin	Cromarty Firth
++	++	++	++	74	117	70	131	70	98	Bar-tailed Godwit	Cromarty Firth
+	++	+	++	26	50	34	84	70	98	Curlew	Cromarty Firth
+		-		34	-18	-45	-7	70	98	Redshank	Cromarty Firth
--	--	--	++	-84	-81	-81	73	66	98	Pochard	Loch of Boardhouse
+		++	++	33	1	125	123	66	98	Wigeon	Dornoch Firth and Loch Fleet
	+	++	++	10	48	642	1,193	66	98	Teal	Dornoch Firth and Loch Fleet
		+	++	-21	-16	39	82	70	98	Oystercatcher	Dornoch Firth and Loch Fleet
	+	++	++	-3	43	275	830	70	98	Dunlin	Dornoch Firth and Loch Fleet
	+	++	++	9	50	215	641	70	98	Bar-tailed Godwit	Dornoch Firth and Loch Fleet
	+	++	++	9	43	151	167	70	98	Curlew	Dornoch Firth and Loch Fleet
		n/a	-	-11	-3	n/a	-46	86	98	Cormorant	Firth of Tay and Eden Estuary
-	-	--	++	-40	-33	-54	92	66	98	Shelduck	Firth of Tay and Eden Estuary
			++	9	1	2	87	66	98	Goldeneye	Firth of Tay and Eden Estuary
-	--		++	-27	-82	22	641	66	98	Red-breasted Merganser	Firth of Tay and Eden Estuary
	-			-8	-26	-22	-8	70	98	Oystercatcher	Firth of Tay and Eden Estuary
	++	++	++	-1	60	279	579	70	98	Grey Plover	Firth of Tay and Eden Estuary
				23	-23	-20	-18	69	98	Sanderling	Firth of Tay and Eden Estuary
		-	-	-14	15	-33	-34	70	98	Dunlin	Firth of Tay and Eden Estuary
++	++	++	++	61	117	129	312	70	98	Black-tailed Godwit	Firth of Tay and Eden Estuary
		-	-	5	0	-35	-37	70	98	Bar-tailed Godwit	Firth of Tay and Eden Estuary
		-	--	15	-7	-31	-57	70	98	Redshank	Firth of Tay and Eden Estuary
-		n/a	++	-26	17	n/a	55	82	98	Great Crested Grebe	Firth of Forth
	++	n/a	++	-9	95	n/a	480	86	98	Cormorant	Firth of Forth
				20	-18	-11	-21	66	98	Shelduck	Firth of Forth
	+	++	-	24	47	63	-39	66	98	Wigeon	Firth of Forth
--	-		--	-51	-40	16	-77	66	98	Mallard	Firth of Forth
	++	-	++	6	102	-48	62	66	98	Goldeneye	Firth of Forth
	++	++	++	-1	79	259	509	66	98	Red-breasted Merganser	Firth of Forth
			++	-7	5	19	148	69	98	Oystercatcher	Firth of Forth
		+	++	12	-10	45	114	69	98	Ringed Plover	Firth of Forth
	+	++	++	-8	35	698	2,582	69	98	Grey Plover	Firth of Forth

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Species	Site
		--	--	-2	-10	-61	-56	69	98	Knot	Firth of Forth
	++	-		20	81	-34	22	69	98	Dunlin	Firth of Forth
			+	5	-24	-13	38	69	98	Bar-tailed Godwit	Firth of Forth
	+		++	5	27	11	195	69	98	Curlew	Firth of Forth
		+	++	14	16	44	240	69	98	Redshank	Firth of Forth
-	-		++	-34	-46	19	133	69	98	Turnstone	Firth of Forth

--	--	n/a	--	-91	-90	n/a	-93	86	98	Cormorant	Inner Moray Firth
		++	++	22	11	240	79	66	98	Wigeon	Inner Moray Firth
+	++	++	++	42	71	686	728	66	98	Teal	Inner Moray Firth
		++	++	22	0	369	14,397	66	98	Goldeneye	Inner Moray Firth
--	--	++	++	-84	-73	66	169	66	98	Red-breasted Merganser	Inner Moray Firth
		++	++	12	15	75	219	70	98	Oystercatcher	Inner Moray Firth
--	-	-		-55	-48	-36	-15	70	98	Bar-tailed Godwit	Inner Moray Firth
		++	++	-2	15	119	171	70	98	Curlew	Inner Moray Firth
		+	+	-8	-15	27	48	70	98	Redshank	Inner Moray Firth

n/a				n/a	9	25	-5	68	95	Whooper Swan	Lochs of Spiggie and Brow

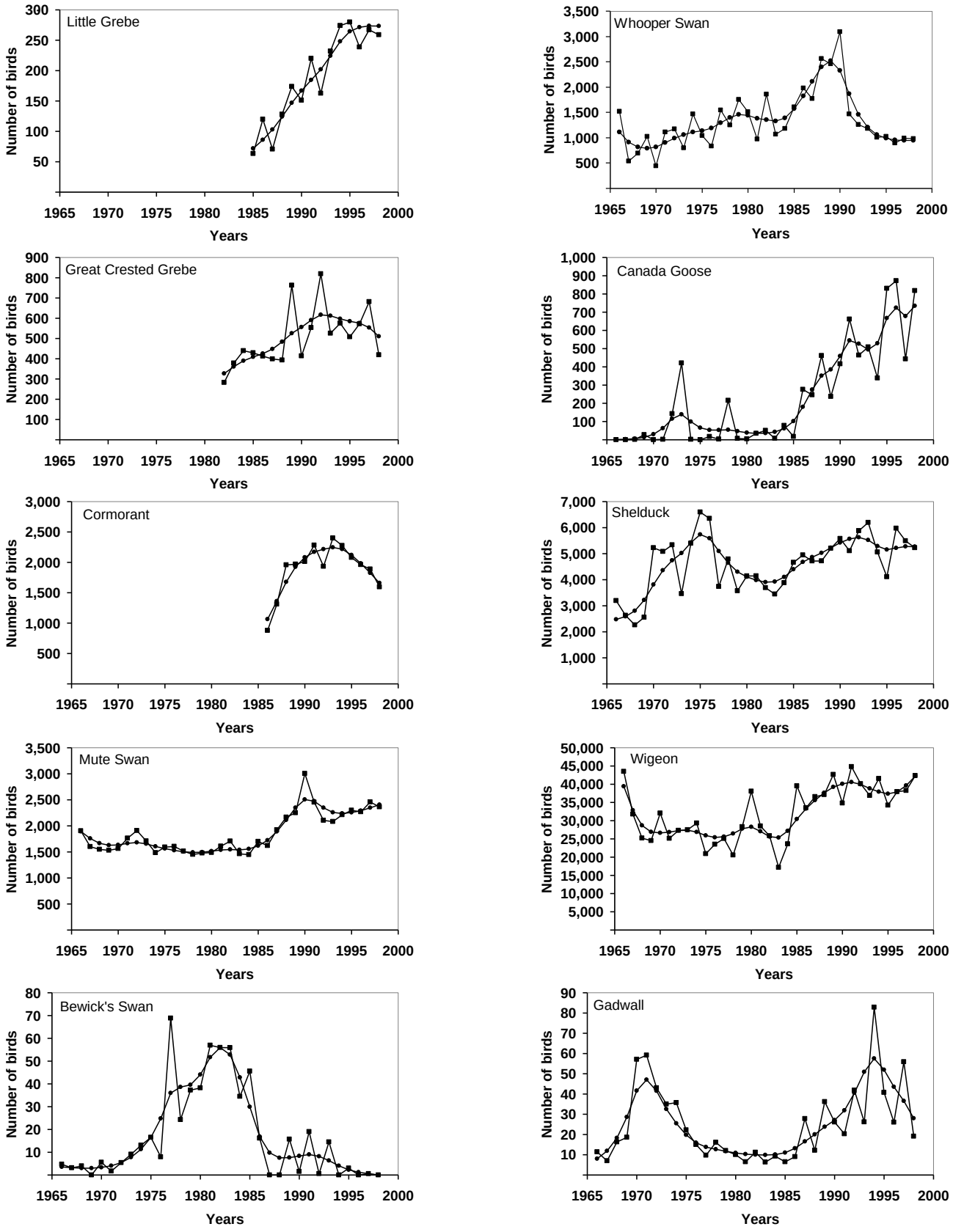


Figure 5.1 Changes in the average number of birds recorded per month on WeBS sites in Scotland (Underhill & smoothed GAM).

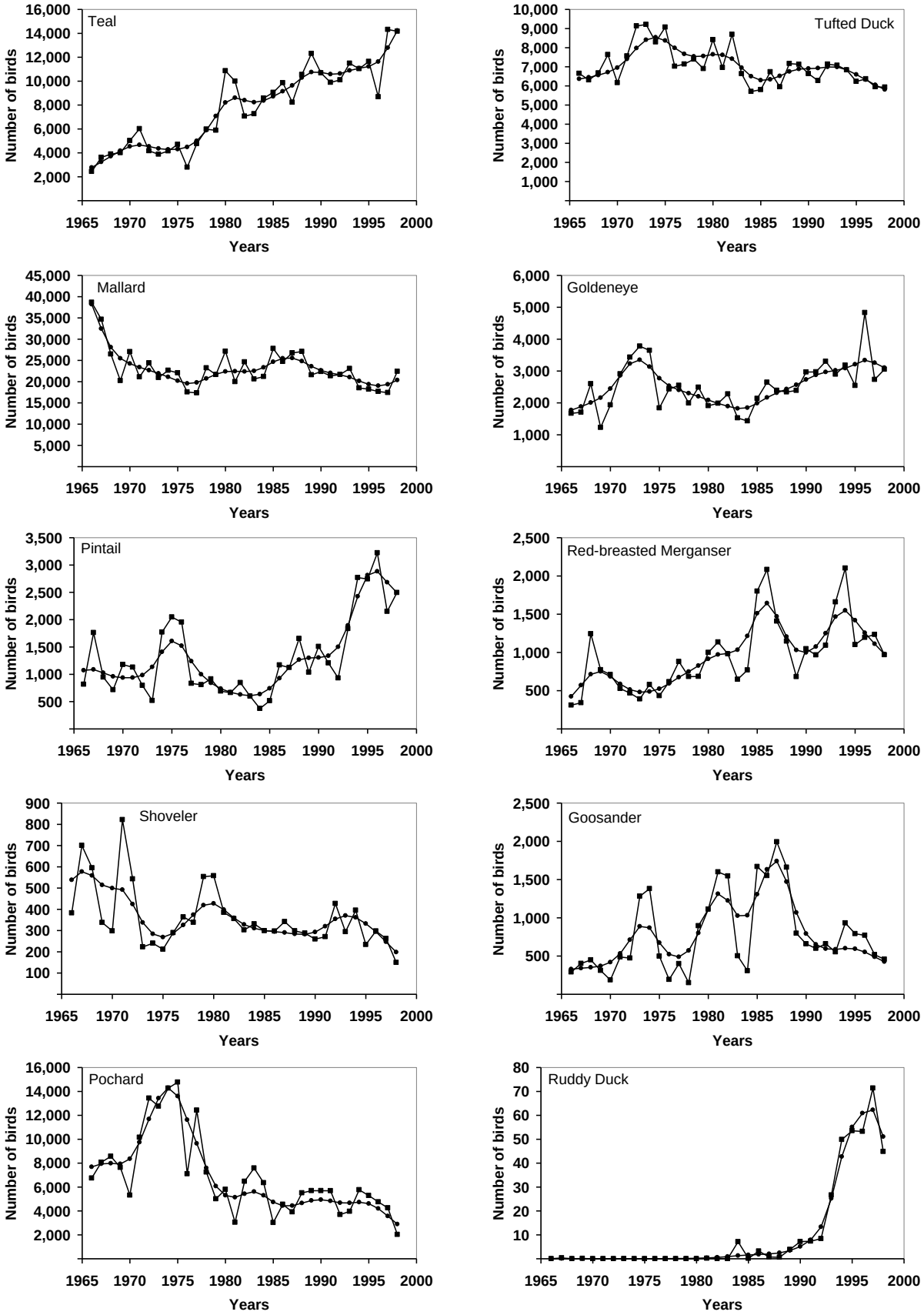
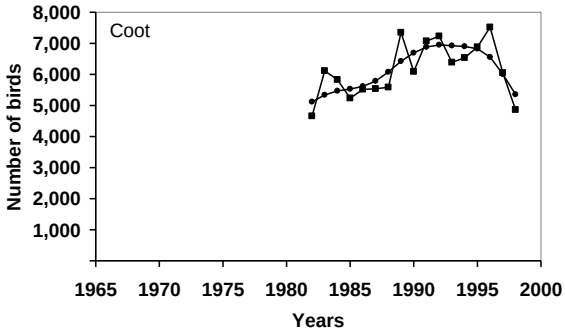
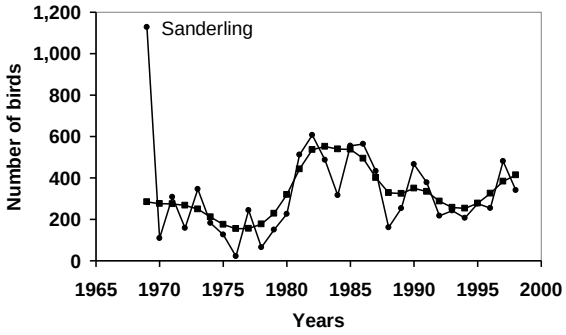
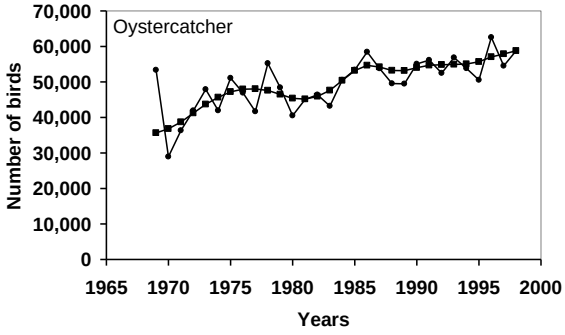
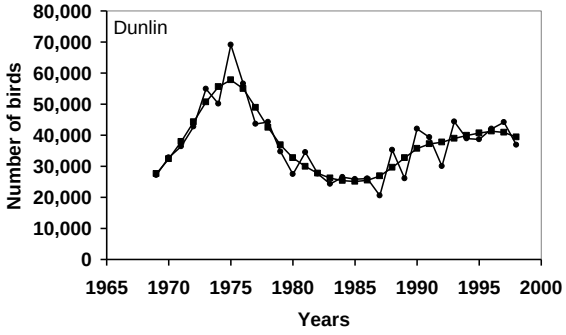


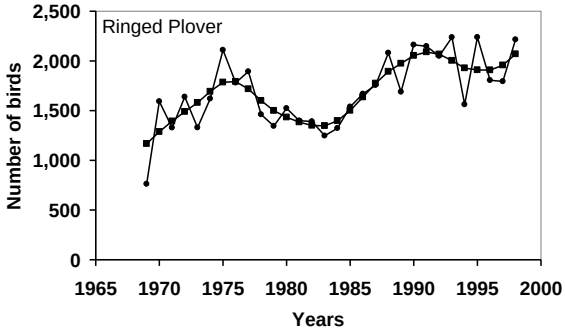
Figure 5.1 Continued.

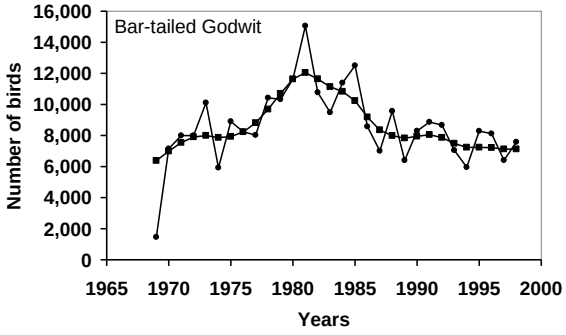


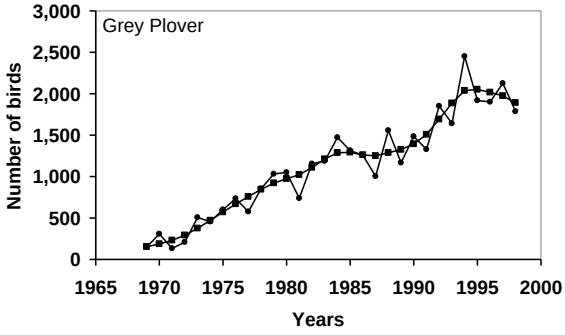


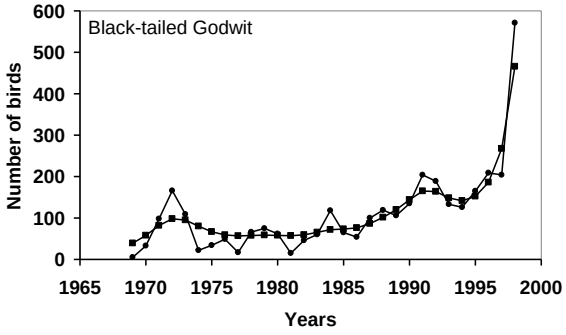


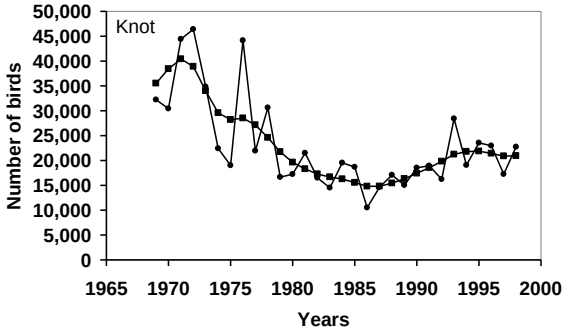












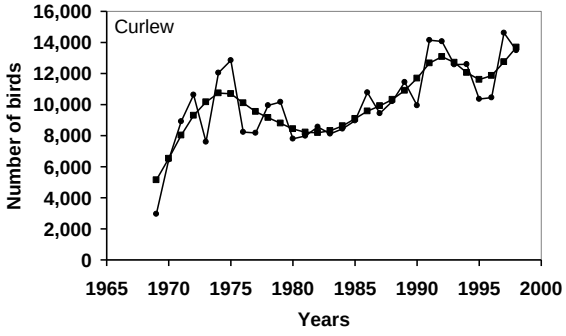
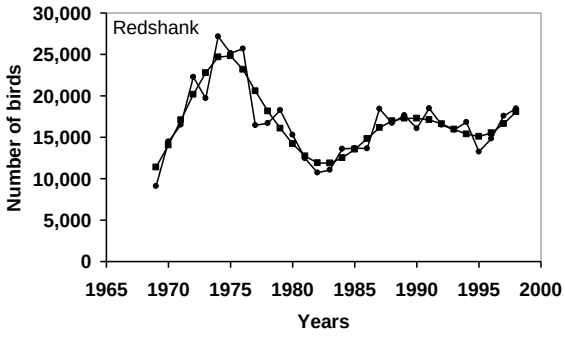


Figure 5.1 Continued.



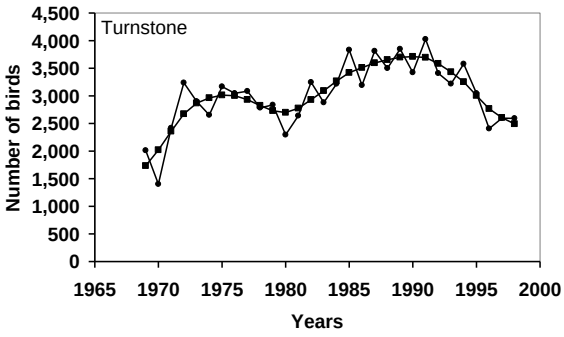


Figure 5.1 Continued.

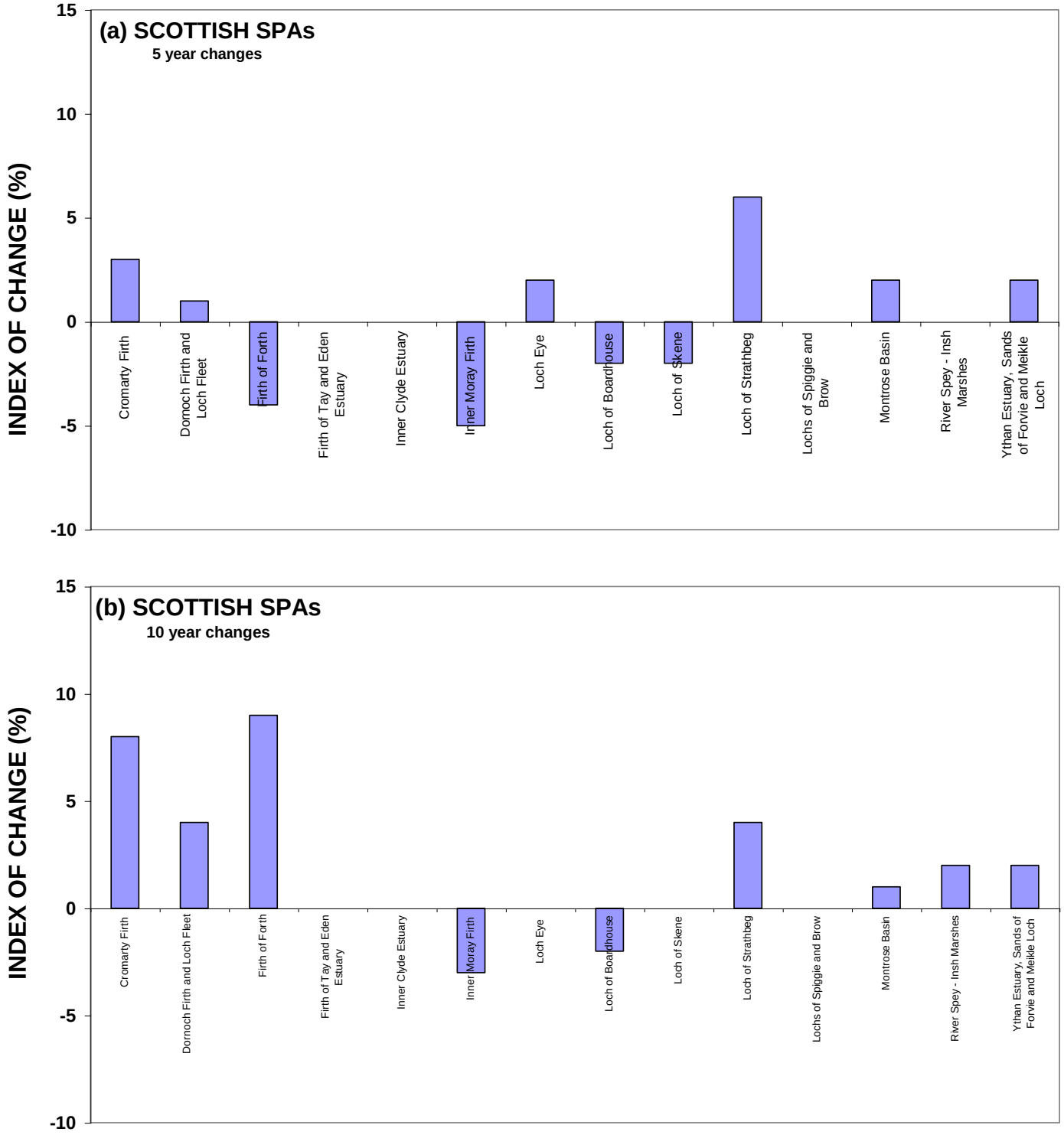


Figure 5.2 (a-c) Changes in the numbers of waterbirds across Scottish SPAs over 5,10 and 25 years. The change index is calculated by summing the Alerts for all species in an SPA, where a 50% negative Alert is given a value of –2, a 25% negative Alert –1 a 25% positive Alert +1 and a positive 50% Alert +2. The index indicates direction of trends and so, if an SPA, has 10 species which are all increasing, the index would be a large positive value and vice versa. If some were going up and some going down an index value of close to zero would be expected. The size of the index also indicates to some extent important SPAs (those with larger numbers of cited species). A large negative value indicates that the SPA supports large numbers of internationally important birds and that there is a general decline across species.

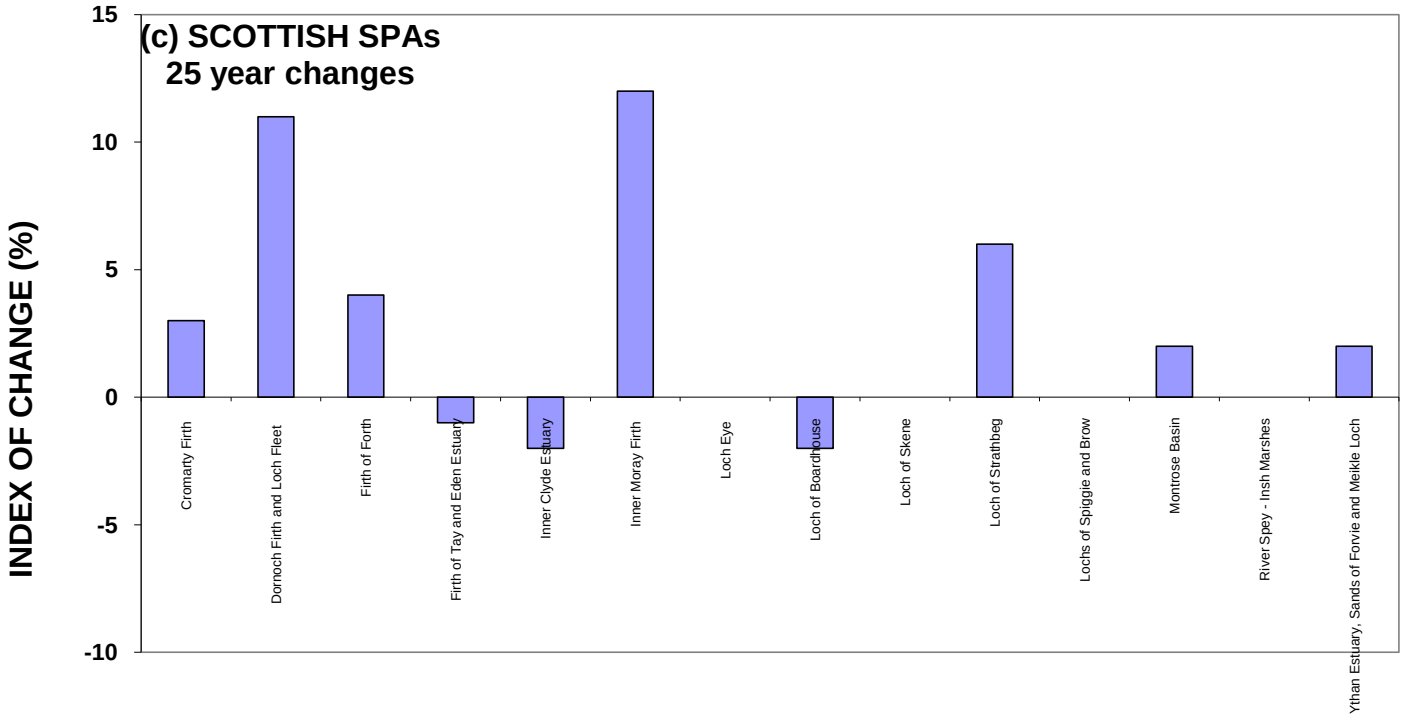


Figure 5.2 (a-c) Continued.

6. WALES

6.1 Population Change and Alerts

Figure 6.1 shows the changes in number of all regularly indexed waterbird species in Wales.

Table 6.1 shows the population change and 5, 10, 25 and all year Alerts generated by using GAMs (see Chapter 1 for details).

Five species have triggered 50% Alerts, 10 species generated 25% Alerts and the remaining species are either stable or increasing.

- European White-fronted Goose, Shoveler, Ringed Plover, Knot and Bar-tailed Godwit generated a 50% Alert under the GAM method.
- Cormorant, Feral Greylag Goose, Wigeon, Mallard, Pochard, Oystercatcher Grey Plover, Dunlin, Redshank and Turnstone generated a 25% Alert using GAMs.
- Using 199 bootstraps, the change measures for Alerts raised for the following species were not significantly below zero: Greylag Goose, Pochard, Wigeon, Bewick's Swan, and Whooper Swan.
- Using the Underhill technique the following differences were found: the Alerts for Wigeon, Mallard and Pochard were elevated to a 50% Alert, Gadwall, Tufted Duck, Goldeneye, Red-breasted Merganser triggered a 25% Alert and Cormorant did not trigger an alert.
- All other species are stable or increasing.

6.2 Coverage of SPAs by the Waterbird Alert System

Coverage in Wales was good with 27 out of the 29 species/site combinations having sufficient data to perform Alerts. Only Spotted Redshank on the Burry Inlet and Greenland White-fronted Goose on the Dyfi Estuary were not included. For the Severn Estuary it is possible to extract WeBS data at country level. We have presented Alerts for the Welsh section but have discussed the changes at a whole SPA level rather than split it on a country basis. This discussion, along with the Dee Estuary appear in Chapter 3.

6.3 Species Generating a 50% Alert Using GAMs

European White-fronted Goose — National Situation: Declining

Numbers of White-fronted Goose in Wales have deceased dramatically from a peak of 1,500 birds in the early 1970s to less than 10 in recent years. This has resulted in 50% Alerts over all periods considered.

Shoveler — National Situation: Increasing

Shoveler numbers in Wales have fluctuated greatly across years. The smoothed index indicates peaks of over 130 in the late 1970s and late 1980s and a decline of over 50% in the last 10 years.

Ringed Plover National Situation: Stable
After initial fluctuations, numbers of Ringed Plover in Wales have shown a steady decline, dropping from 1,500 birds in the 1970s to 500 at present. This has resulted in 50% Alerts over 10-year and 25-year periods and for all years combined and a 25% alert for the last five years.

Knot National Situation: Initial Decline. Now Stable
Knot numbers in Wales have fluctuated greatly from year to year, but have shown an overall downward trend. Numbers peaked at almost 50,000 in the 1970s, but had declined to less than 10,000 by the last two winters. The smoothed index has indicated declines of over 50% over 10-year and 25-year periods and for all years combined and a decline of over 25% in the last five years.

Bar-tailed Godwit National Situation: Stable
Bar-tailed Godwit numbers in Wales have dropped from over 6,000 in the early 1970s to less than 1,000 since the mid-1980s. The smoothed index shows that numbers have been more stable since then, but has indicated declines of over 50% over the last 25 years and for all years combined.

6.4 Species Triggering a 25% Alert Using GAMs

Cormorant National Situation: Increase then Decrease
Numbers of Cormorants in Wales rose from less than 200 in 1986/87 to almost 900 in 1994/95. A subsequent decline to less than 500 has resulted in a 25% Alert being triggered for the past five years. Over all years considered, however, the species has still shown an upward trend of over 50%.

Feral Greylag Goose National Situation: Increasing
The population of feral Greylag Geese in Wales has shown an upward but fluctuating trend since the 1960s, when less than 100 were counted. The population had reached 2,500 by the late 1980s, but has declined since, triggering a 25% Alert for the past 10-year period. Over the past 25 years and all years combined, however, the population has shown increases of over 50%.

Wigeon National Situation: Increasing
Numbers of Wigeon in Wales have shown long-term fluctuations, rising to a peak of over 35,000 in 1986/87 but declining subsequently to previous levels of 10-20,000. The smoothed index indicates a decline of over 25% over the past 10-year period but an increase of over 25% over all years considered.

Mallard National Situation: Slight recent decrease
Mallard numbers in Wales rose to over 6,000 by the early 1980s but have since gradually declined to present levels of around 3,000. 25% Alerts have been triggered for the past five- and 10-year periods.

Pochard National Situation: Stable
Pochard in Wales have shown a long-term, but fluctuating, decrease in numbers and an Alert has been issued for a drop of over 25% for all years considered. Numbers fell from 1,800 in the 1960s to around 800 by the late 1970s. A subsequent increase to numbers of between 1,000 and 1,700 has been followed by a further fluctuating decline.

Oystercatcher National Situation: Increasing
Oystercatcher numbers in Wales rose from under 40,000 in the 1970s to over 50,000 during the 1980s. A decline of over 25% since then to 1970s levels has given rise to a 10-year alert.

Grey Plover National Situation: Increasing
Grey Plover numbers in Wales have fluctuated widely from year to year, but when smoothed, they showed a pattern of gradual increase until the late-1980s followed by gradual decline. The index indicates a population of over 2,000 in the 1980s declining to one of less than 1,500 at present. This has triggered a 25% Alert for the last 10-year period. Over all years combined, however, Grey Plover have shown an increase of over 50% in number.

Dunlin National Situation: Fluctuating/Stable
Dunlin numbers in Wales have shown a fluctuating pattern and have triggered an alert due to a decrease of over 25% over the past 25 years. Numbers peaked in the early 1970s at over 80,000 but had declined to 40,000 by 1985/86. Numbers have shown a slight increase and more stability since.

Redshank National Situation: Increasing/Stable
Numbers of Redshank in Wales rose to a peak of over 12,000 in the late 1980s, but have declined since to around 7,000. This has resulted in a 25%. Alert being triggered for the past 10-year period.

Turnstone National Situation: Decrease followed by Increase
Turnstone numbers peaked in Wales at around 2,000 birds in the late 1980s. The population declined sharply after this to around 1,000 birds, a similar number to that found in the 1970s, but has since stabilised. The decline over the past 10 years has resulted in a 25% Alert.

6.5 Site Alerts – Special Protection Areas (SPAs) in Wales

Burry Inlet

Cited Species: Black-tailed Godwit, Curlew, Dunlin, Knot, Oystercatcher, Pintail, Shelduck, Shoveler

50% Alert: Black-tailed Godwit, Grey Plover, Knot, Turnstone

Over 5 and 25 years there has been a general increase of waterbirds in the Burry Inlet. However, over 10 years the index of change, calculated by summing the alerts (where a negative 50% Alert equals –2, a negative 25% Alert –1, a positive 25% Alert +1 and a positive 50% Alert +2), is low at an index of –6. An arbitrary cut-off point of –5 has been used to flag up sites which are showing declines across most species.

Numbers of Black-tailed Godwit on the Burry Inlet dropped from a peak of over 100 in 1972/73 to zero in 1975/76 and remained low over much of the next decade. Numbers subsequently rose to between 50 and 80 during the mid-1990s before dropping again to less than 30 in the winter of 1998/99. This final decrease has resulted in a five-year Alert.

Grey Plover rose in number on the Burry Inlet from around 200 in the early 1970s to over 600 by the late 1990s. A decline since then to fluctuating numbers of between 60 and 300 has triggered a ten-year Alert.

Numbers of Knot have fluctuated markedly on the Burry Inlet, varying between an initial peak of almost 6,000 to less than 200 in the winters of 1978/79, 1991/92 and 1992/93. Overall the trend has been downward and there has been a drop of over 50% over all the years considered. Counts had fallen to around 2,000 by the last two winters.

No Shoveler were counted on the Burry inlet until 1980/81, but have fluctuated greatly since. Peaks of 150 and 100 were recorded in 1988/89 and 1996/97 respectively, but over the last 10 years the overall trend has been downward with a drop in numbers of over 50%.

Numbers of Turnstone on the Burry Inlet rose from around 200 in the early 1970s to over 1,500 by the mid-1980s. A sharp drop occurred after the winter of 1985/86, however, and since then numbers have declined further from an average of 200 to less than 100. This has resulted in Alerts being triggered for all time periods considered.

Numbers of Shelduck, Teal, Pintail and Dunlin have shown long-term increases of over 50% on the Burry Inlet, whilst those of Wigeon, Oystercatcher, Curlew and Redshank have been more stable.

Traeth Lafan/Lavan Sands, Conway Bay

Cited Species: Oystercatcher

50% Alert: Oystercatcher

Although numbers of Oystercatcher have fluctuated from year to year there has been an overall downward trend and declines of over 50% over the past five and 25 years.

Severn Estuary

Separate Alerts were calculated for the Gwent section of the Severn Estuary and are presented in Table 6.4. However we have only discussed the changes in waterbird numbers over the SPA as a whole. This discussion appears in Chapter 3.

Dee Estuary

The WeBS counts for the Dee Estuary are amalgamated at the whole estuary level and it is not possible to split the English and Welsh populations. The discussion of the Dee estuary appears in Chapter 3.

Table 6.1 Percentage change and Alerts over 5,10, 25 and all years of counts. For interpretation of symbols see section 1.6. Population size refers to the average number of birds per month recorded on the WeBS sites used. It was not possible to run the Underhill model for European White-fronted Goose due to Modelling errors.

ALERTS CALCULATED USING GAMS				**WALES**				ALERTS CALCULATED USING UNDERHILLMETHOD								
5-yr	10-yr	25-yr	All	5-yr	10-yr	25-yr	All	Species	5yr	10yr	25yr	All	5yr	10yr	25yr	All	Pop size 1998
+	++	n/a	++	27	109	n/a	218	Little Grebe	46	58	n/a	184	+	++	n/a	++	110
		n/a	++	-5	-3	n/a	229	Great Crested Grebe	10	8	n/a	94			n/a	++	155
-		n/a	++	-30	-2	n/a	53	Cormorant	-8	15	n/a	18			n/a		439
+	++	++	++	42	102	157	81	Mute Swan	55	46	110	65	++	+	++	++	187
--	-	--		-54	-43	-56	24	Bewick's Swan	149	77	-13	308	++	++		++	0
--	--	--	--	-72	-87	-89	-86	Whooper Swan	-70	-79	-84	-50	--	--	--	--	3
--	--	--	--	-89	-99	-100	-100	European White-fronted Goose		see legend							6
	-	++	++	15	-42	235	>1000	Feral Greylag Goose	-30	-112	288	>1000	-	--	++	++	910
	++	++	++	20	106	580	308	Canada Goose	73	68	449	536	++	++	++	++	608
		++	++	5	10	>1000	>1000	Dark-bellied Brent Goose	-5	20	>1000	>1000			++	++	795
		++	++	-4	-14	163	216	Shelduck	-7	-29	146	207		-	++	++	4,500
	-		+	-13	-25	-2	37	Wigeon	-10	-93	-10	26		--		+	11,000
	+	++	++	-2	49	250	>1000	Gadwall	-33	31	364	>1000	-	+	++	++	41
+		++	++	25	-6	186	781	Teal	43	3	273	850	+		++	++	5,500
-	-			-26	-36	-23	22	Mallard	-15	-65	-20	15		--			3,000
++		++	++	64	-3	183	226	Pintail	90	6	188	281	++		++	++	1,500
	--		++	23	-51	-16	57	Shoveler	24	-194	-33	9		--	-		48
			-	-13	-13	-16	-49	Pochard	-33	-80	-42	-54	-	--	-	--	712
			+	-5	1	1	27	Tufted Duck	-14	-32	-13	2		-			956
		+	++	-23	-7	45	155	Goldeneye	-50	-62	25	70	--	--	+	++	109
			++	-7	-17	2	441	Red-breasted Merganser	-8	-28	21	276		-		++	103
++	++	++	++	124	113	288	>1000	Goosander	117	41	217	838	++	+	++	++	68
++	++	++	++	53	169	>1000	>1000	Ruddy Duck	49	64	>1000	>1000	+	++	++	++	110
		n/a	+	15	21	n/a	40	Coot	16	12	n/a	23			n/a		2,500
	-			-16	-35	12	-7	Oystercatcher	1	-25	21	11		-			34,000
								Avocet									0
-	--	--	--	-50	-61	-76	-75	Ringed Plover	-41	-51	-71	-67	-	--	--	--	339
	-	+	++	-24	-46	34	105	Grey Plover	-23	-38	70	121		-	++	++	1,000
-	--	--	--	-47	-50	-81	-79	Knot	-26	-4	-74	-71	-		--	--	5,000
	+		+	24	28	6	48	Sanderling	22	30	-19	9		+			766
		-		12	8	-45	-18	Dunlin	14	14	-47	-29			-	-	49,000
	++	+	++	-12	68	49	113	Black-tailed Godwit	11	266	85	70		++	++	++	851
		--	--	14	3	-89	-84	Bar-tailed Godwit	88	23	-87	-83	++		--	--	654
			++	0	-7	22	63	Curlew	1	-6	18	54				++	11,000
	-			-21	-44	-1	10	Redshank	-15	-37	13	11		-			6,500
	-			9	-46	-12	11	Turnstone	10	-46	-9	7		-			877

Table 6.2 Species which are cited/proposed for SPAs in Wales and are covered by the Waterbird Alert System

SITE NAME	Bewick`s Swan	Black-tailed Godwit	Curlew	Dunlin	Gadwall	Grey Plover	Knot	Mallard	Oystercatcher	Pintail	Pochard	Redshank	Shelduck	Shoveler	Teal	Tufted Duck	Turnstone	White-fronted Goose	Wigeon
Traeth Lafan/Lavan Sands, Conway Bay			●						●										
Severn Estuary-WALES ONLY	●				●			●		●	●		●	●	●	●		●	●
Burry Inlet		●	●	●		●	●		●	●		●	●	●	●		●		●

Table 6.3 Species which are cited for SPAs in Wales that are not currently covered by the Waterbird Alert System.

	Greenland White-fronted Goose	Spotted Redshank
Dyfi Estuary	●	
Burry Inlet		●

Table 6.4 Population change (%) and Site Alerts for waterbirds on SPAs in Wales over 5, 10, 25 and all years. (++ / -- = 50% Alert, + / - = 25% Alert)

5-year Alert	10-year Alert	25-year Alert	All years Alert	5-year change	10-year change	25 year change	All years change	First count	Last count	Site	Species
++		++	++	57	-20	220	416	66	98	Shelduck	Burry Inlet
++				124	-16	15	-20	66	98	Wigeon	Burry Inlet
++		++	++	519	11	544	571	66	98	Teal	Burry Inlet
++		++	++	110	-9	506	178	66	98	Pintail	Burry Inlet
++	--	++	++	282	-73	>1000	>1000	66	98	Shoveler	Burry Inlet
	-			6	-31	-4	-18	69	98	Oystercatcher	Burry Inlet
	--		+	20	-59	9	46	69	98	Grey Plover	Burry Inlet
++		-	--	128	24	-46	-60	69	98	Knot	Burry Inlet
++	+	+	++	91	29	32	114	69	98	Dunlin	Burry Inlet
--	++	++	-	-51	399	166	-29	69	98	Black-tailed Godwit	Burry Inlet
+	-			48	-28	-3	7	69	98	Curlew	Burry Inlet
++	-	-		79	-33	-35	17	69	98	Redshank	Burry Inlet
--	--	--	--	-72	-78	-90	-68	69	98	Turnstone	Burry Inlet
--	-	--	--	-55	-40	-68	-73	69	98	Oystercatcher	Traeth Lafan/Lavan Sands, Conway Bay
-	-	--		-27	-39	-50	-14	69	98	Curlew	Traeth Lafan/Lavan Sands, Conway Bay
--	++	++	++	-69	610	>1000	>1000	66	98	Bewick`s Swan	Severn Estuary - Wales only
--	--	--	--	-100	-100	-100	-100	66	98	European White-fronted Goose	Severn Estuary - Wales only
		++	++	-15	-1	361	222	66	98	Shelduck	Severn Estuary - Wales only
--	--	+		-88	-94	27	-8	66	98	Wigeon	Severn Estuary - Wales only
--	--	++	++	-99	-99	>1000	>1000	66	98	Gadwall	Severn Estuary - Wales only
--	--	++	N/A	-83	-74	295	.	73	98	Teal	Severn Estuary - Wales only
-	--	++	N/A	-35	-52	800	.	73	98	Mallard	Severn Estuary - Wales only
-		++	++	-29	-14	>1000	>1000	66	98	Pintail	Severn Estuary - Wales only
--	--	--	N/A	-98	-97	-100	.	73	98	Shoveler	Severn Estuary - Wales only
--	--	++	++	-60	-70	>1000	724	66	98	Pochard	Severn Estuary - Wales only
--	--	++	++	-77	-77	>1000	>1000	66	98	Tufted Duck	Severn Estuary - Wales only
-	--	--	N/A	-38	-70	-69	.	73	98	Grey Plover	Severn Estuary - Wales only
--	--	--	N/A	-57	-71	-73	.	73	98	Dunlin	Severn Estuary - Wales only
-	--	++	N/A	-28	-56	114	.	73	98	Redshank	Severn Estuary - Wales only

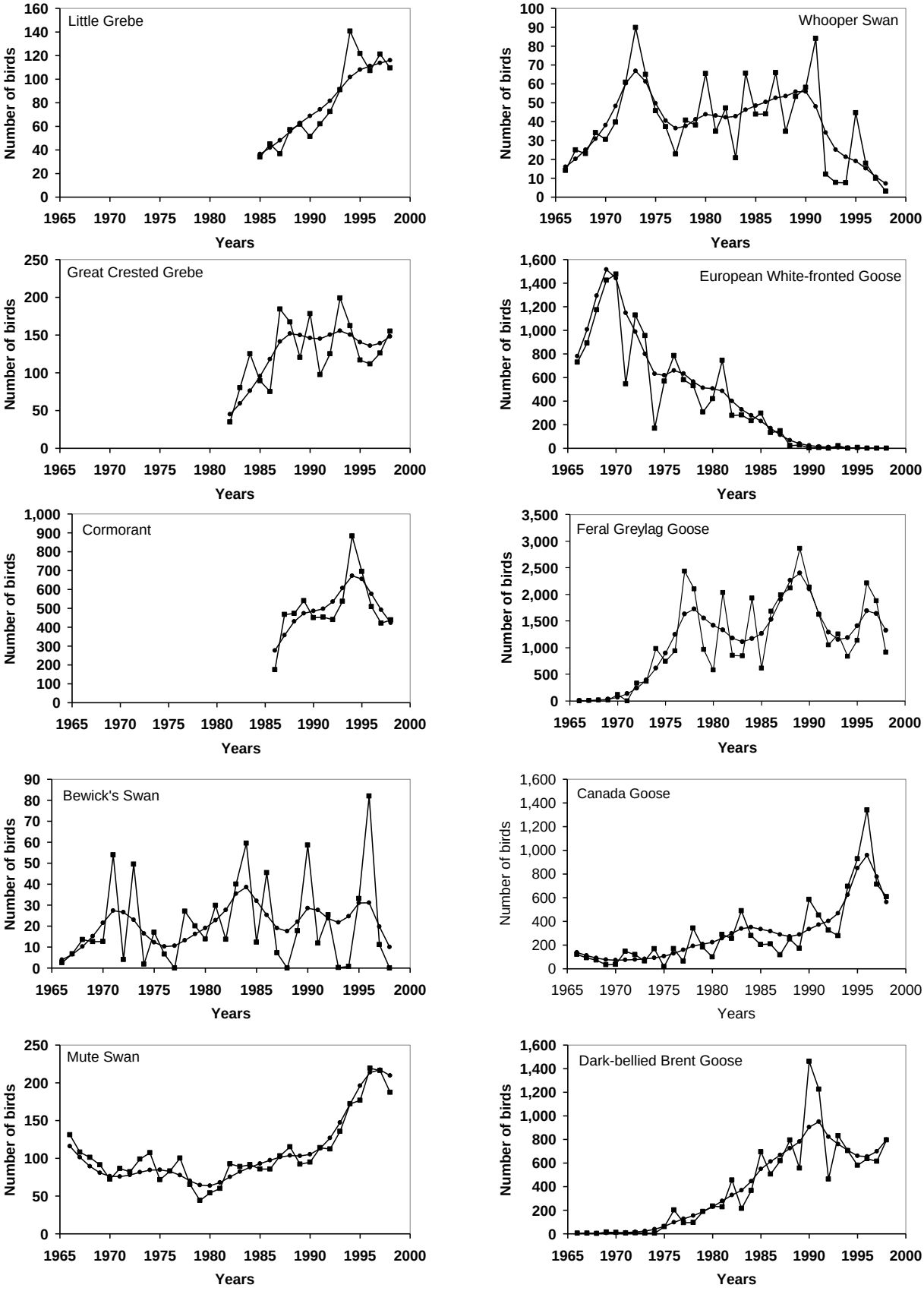
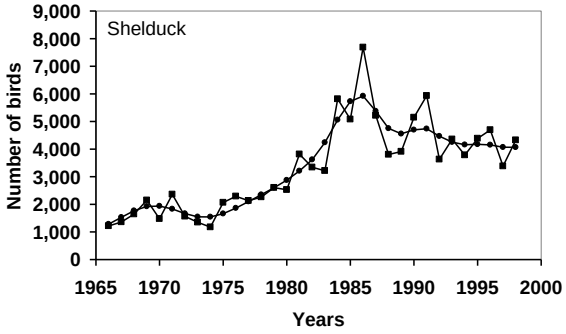
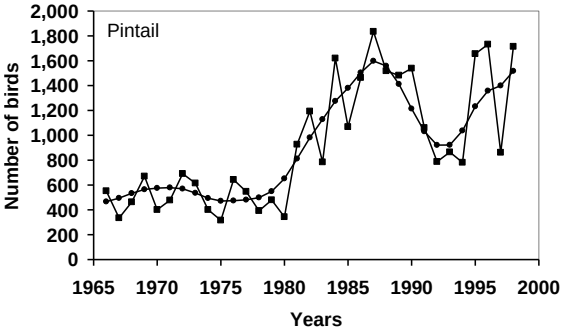
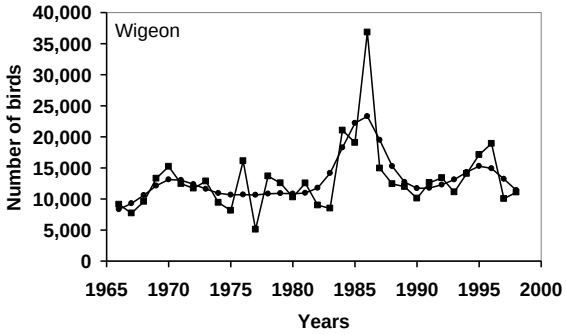
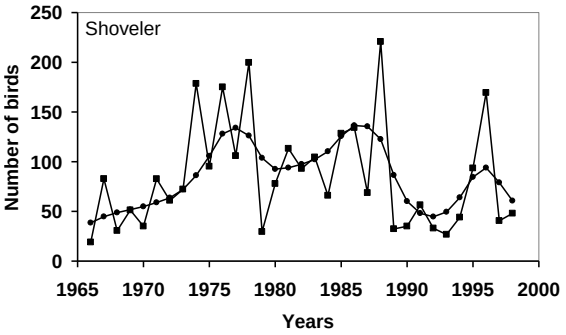


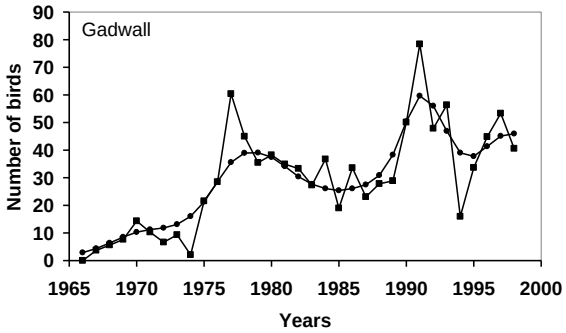
Figure 6.1 Changes in the average number of birds recorded per month on WeBS sites in Wales. ■ = mean number of birds recorded per month, ● = smoothed average number of birds.

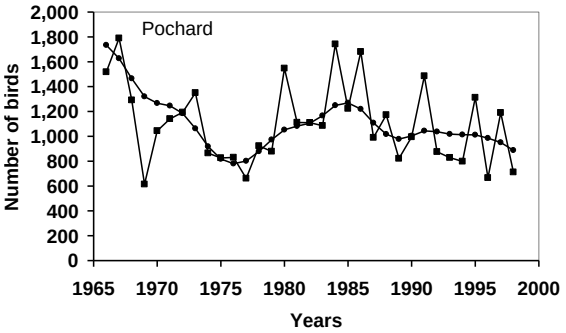


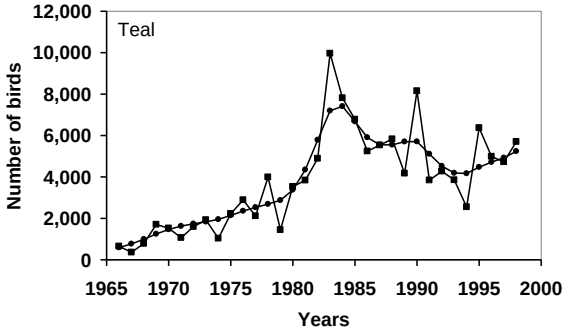


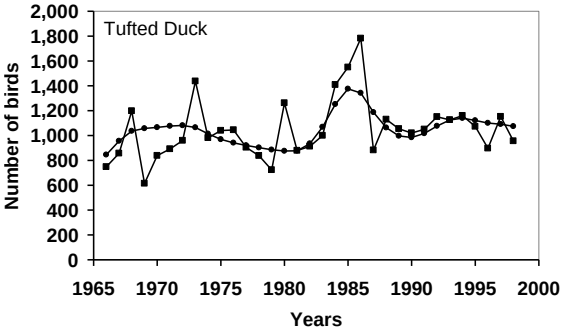


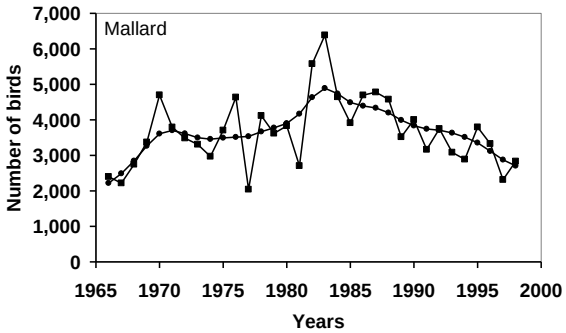


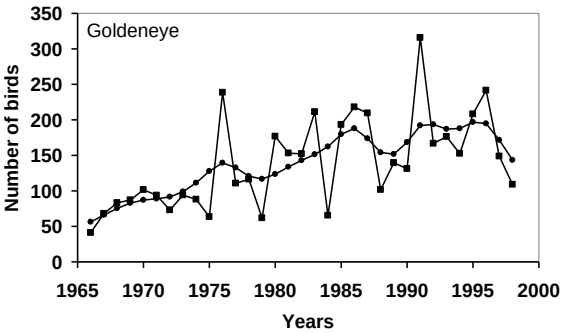












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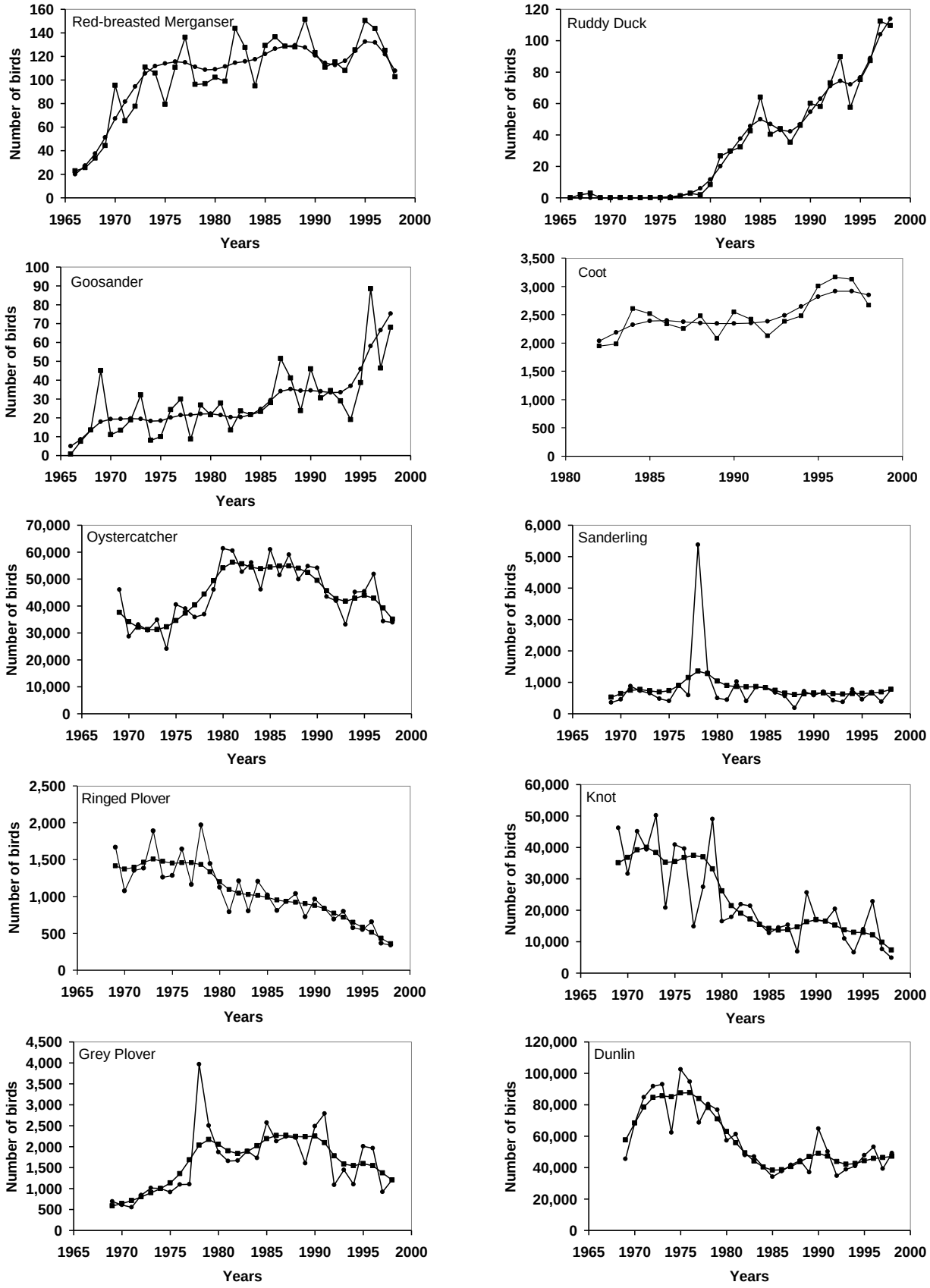

Figure 6.1 Continued.

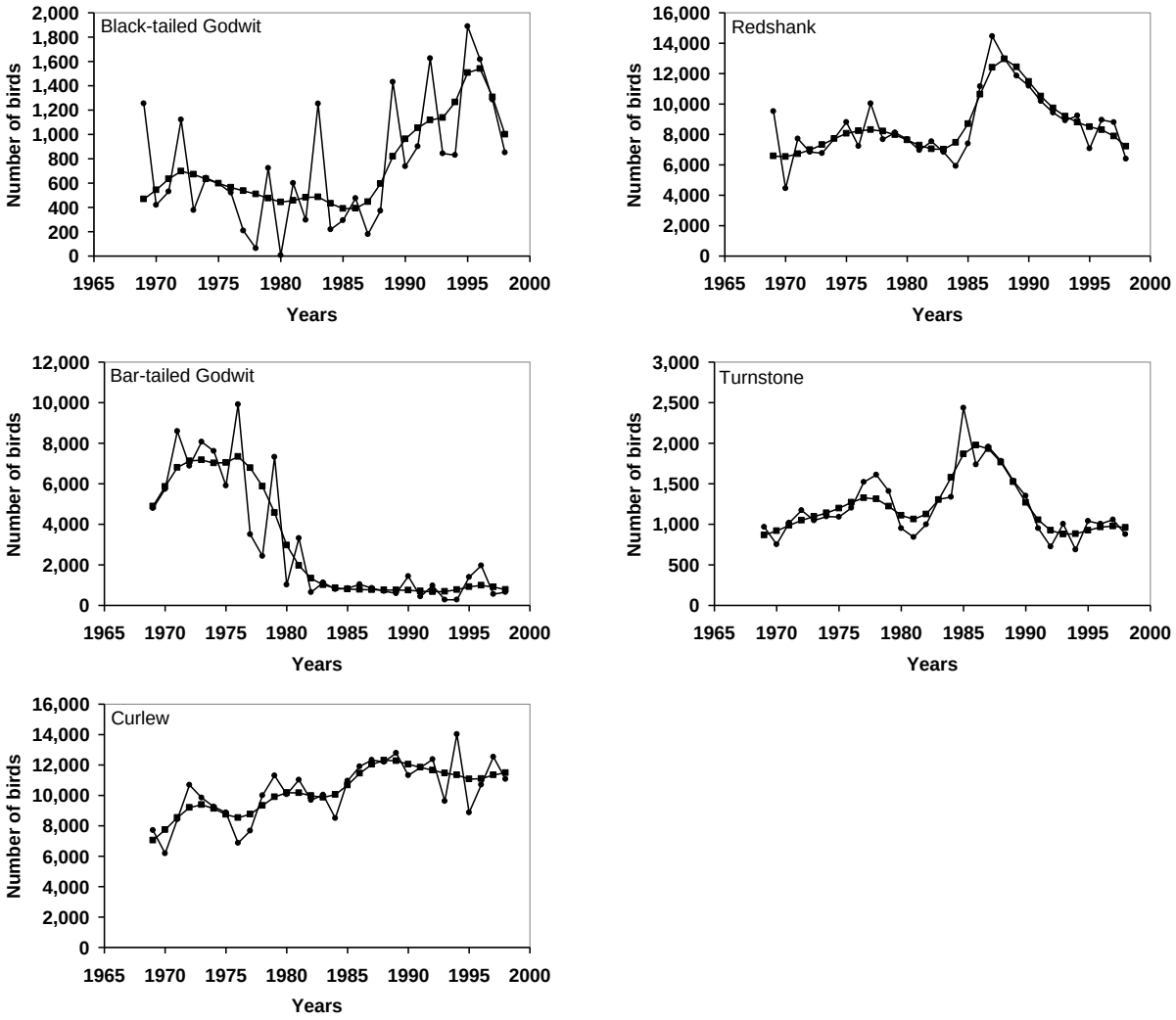

Figure 6.1 Continued.

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7. CONCLUSIONS

7.1 National Alerts

The Alerts process has reinforced the message given by the annual WeBS reports that, on a national basis, the majority of waterbirds wintering in the United Kingdom are stable or increasing. Only two species of wildfowl, European White-fronted Goose and Mallard, and two waders, Knot and Turnstone, have triggered a Medium (25% negative) Alert.

One of the species of most concern is the European White-fronted Goose. Numbers in the UK are at their lowest ebb since counts began, and this species is now effectively extinct in Wales. The population in England, although a small part of the flyway population, has declined from over 10,000 birds to 4,000 currently. Numbers have remained effectively stable at 4,000 birds over the last five winters counts but have not shown an upturn.

Mallard triggered a 10 year Alert and numbers have fallen from 140,000 to the current level of just over 100,000. This decline started in the mid-1980s and the UK population has changed from a population that was increasing slightly into one that is in sustained decline. The reasons for this are unknown. Alerts raised for individual sites (see Mallard map in Appendix 1) showed that over ten years the numbers of Mallard declined on all English SPAs for which they are cited but remained stable on most similar sites in Northern Ireland. The decline is most marked on some east coast SPAs, e.g. the Firth of Forth, the Humber Estuary and Stodmarsh, where number have continued to go down over the last five years. Numbers have remained stable on west coast SPAs but Belfast Lough showed a decline. Over 25 years, only one site, the Solway, has seen a large increase in the number of wintering birds.

Knot triggered a Medium Alert over 25 years, due to the large decline in the wintering population in the early 1970s. As discussed in Chapter 2, this was probably due to a period of poor spring and summer weather in the Greenland breeding areas which increased adult mortality, through lack of food. This lack of food made the birds tame and more susceptible to hunting. Although now stable, there has been no return to former levels.

Turnstone numbers have fluctuated over the past 30 years. They initially increased but are currently in decline and have returned to the level they were at in the early 1970s. The reasons for this are unknown.

7.2 Geographical Trends and Country Alerts

The Alerts process has highlighted that, although the majority of species are stable or increasing at a national level, many more species are decreasing at a country level (Table 7.1). The most extreme examples of these declines are Bar-tailed Godwit and European White-fronted Goose in Wales and Bewick's Swan in Northern Ireland.

There seems to be an east-west split, in that waterbird populations are generally decreasing in the west and increasing in the east. This especially seems to be the case to waders. Of the 11 species of wader that occur in Wales, seven triggered Alerts and only Curlew, Black-tailed Godwit and Sanderling are not in decline, whereas in England only Turnstone and Knot triggered an Alert. In Northern Ireland, the populations of some wildfowl are of great international significance and Alerts for Bewick's Swan, Pochard and Goldeneye are worrying.

These changes may indicate a shift in the distribution of the wintering population as shown by other studies (Austin & Rehfisch 1999) rather than a true decline in numbers. The evidence from the UK population trends is that most of these species are increasing. This requires that either there are site specific factors occurring in Wales and Northern Ireland or that this shift is taking place due to some other large scale factor. Winters have become increasingly warmer throughout this century and this shift in bird populations may represent a response to climate change.

7.3 Site-based Alerts

7.3.1 Coverage

Overall, 64% of the 967 species/site combinations which were requested had sufficient data to run Alerts (Table 7.2). The species which are currently outside the WeBS Alert System accounted for 25% of this total. For the species which are covered, an 85% coverage was achieved.

Coverage varied between countries (Table 7.2). Very few SPAs are associated with Wales and a near 100% coverage was achieved. For England and Northern Ireland, reasonable coverage was achieved with 87% and 86% coverage for species currently included in the system and 70% and 68% overall. In contrast, data were only available for 39% of the requested Site Alerts in Scotland, highlighting how poorly that country is currently covered by this process.

7.3.2 Site Alerts

Alerts present an opportunity to examine and measure change on a number of different scales. Site-based Alerts can be used in two ways. First, they give an effective picture of population change at individual sites over time. Individual species which are declining can be flagged up. Second, these Alerts can also be used to produce a picture of the general state of the populations on that site. To address this second point, we used a simple index of change for each site which was the sum of the Alert values totalled across all cited/proposed SPA species where negative Alerts were given negative values (50% Alert = -2, 25% Alert = -1) and positive Alerts positive values (25% Alert = +1, 50% Alert = +2). A high negative score indicated that large numbers of nationally or internationally important waterbirds had declined over that period.

This index is a first attempt at highlighting sites where widespread declines are taking place among nationally or internationally important waterbird populations. The following sites had a high negative score:

Over 25 years: Lindisfarne, indicating a general long term decline in a number of waterbird populations.

Over 10 years: Chichester and Langstone Harbours, Lindisfarne, the Medway, the Welsh part of the Severn and the Wash, indicating medium-term declines across waterbird populations.

Over 5 years: the Blackwater has shown a spectacular decline across species and Chichester and Langstone Harbours, the Severn, the Solent and Southampton Water, Belfast Lough, Loughs Neagh & Beg and the Inner Moray Firth have all shown lesser declines.

Most other estuaries show general increases across species, notably Breydon Water and the North Norfolk Coast.

This simple analysis can be taken further and the change in the populations at these sites can be examined between years. Figure 7.1 shows the mean annual percentage changes in all cited species for selected SPAs in England. These graphs show that populations fluctuate markedly over time but that general patterns can be

deduced. They also allow the identification of when turning points occur, i.e. for sites at which waterbird populations are declining, the turning points or the years in which the decline started, can be identified.

In the example graphs shown in Figure 7.1, Chichester and Langstone Harbours showed a general increase across the populations of cited species until the winter of 1988/89 when populations started to decline. This decline has continued since and seems to be intensifying. The Blackwater Estuary is an estuary that has shown long-term increase in most species and, up until 1992/93, the rate of increase in numbers was increasing. However, the following winter saw a fall in the rate of increase and there has since been a short-term decline across most species. A similar case is seen in the Solent and Southampton Water where populations of birds were increasing until 1995/96 after which there was sharp fall since. In the Wash, populations of birds increased rapidly from the start of counts but the rate of increase declined and by 1989/90 there was overall stability on the Wash. This turning point coincided with crashes in the commercial shellfish stocks in the Wash. In 1997/98 numbers started to fall for the first time.

Similar graphs are shown for sites where large increases have been identified, such as Breydon Water, the North Norfolk Coast, the Alde-Ore estuary and The Swale. Although fluctuating, there is an apparent upward trend on Breydon Water and the North Norfolk Coast, whereas the Swale and the Alde-Ore have shown periodic increases followed by stability.

When considering population changes on SPAs as a whole in England, there has been an overall increase across all species. The average rate of increase was initially high at 14% a year and then declined to 1980 after which it increased again to 10% a year throughout the 1980s. From 1990 there has been a decline, indicating that the average rate of increase has slowed down.

7.4 Recommendations and Future Development of the Alerts System

7.4.1 Implementation of the Alerts System

As this is the first year of a new system there are, inevitably, problems with implementation. While the technical specification (i.e. GAMs & Underhill method) has worked well, a quick and efficient system of processing Alerts needs to be implemented.

The national and country Alerts produce information that is easy to interpret. However, Site Alerts can produce a mass of confusing information and a method of highlighting those that are behaving atypically needs further development. In this first year, much time was spent developing methods to run the Alerts and inevitable this report has concentrated on species rather than sites. There was only limited time available to evaluate results or designing an output which condenses the appropriate information into an easily-digestible format.

7.4.2 Technical issues to be addressed

- Site Alerts, in terms of the species and sites to run, should be clearly identified. A list of sites and species was provided by JNCC for this analysis. For future years, when SSSIs will be reported on, a similar list will be required. GIS coerages of these locations and boundaries would aid matching these sites to WeBS count section boundaries.

- The data needs to be extractable in a quick and easy manner. In this analysis, two different database systems (one for waders and one for ducks) were used. A great deal of time was required to develop methods to deal with the two different sets of data. With the new database system, these methods will need to be modified again but, once in place, can be used in future years.

- For some species which are not regularly indexed and currently lie outside the WeBS Alerts system, a method of extracting data from the WeBS database needs to be implemented.

- Sites need to be matched up with WeBS sites. At present, more than one SPA can occur in a WeBS site and vice versa. For an effective system, WeBS sites will have to be split and the appropriate sectors used. Matching of SPAs and correct WeBS codes (NWC codes for wildfowl & BoEE codes for waders) took a disproportionate amount of time in this analysis.

- Further to this, it is essential that reporting sites can be defined in terms of WeBS count sections interactively in the database, and the database return all data summarised at the reporting site level with the completeness of compounded sites clearly indicated.

- Some sites, which include more than one WeBS site, can suffer from count quality problems. If one or more of these WeBS sites are not counted, then missing data are imputed. In some cases the imputed count may make up a very large proportion of the estimated count and make the estimated count unrealistic. A cut-off point needs to be included to address this problem.

The large-scale approach used here has identified a number of problems:

- The number of months over which birds are indexed for Alerts needs to be considered. For national and country Alerts, there is a case for using the existing series of months, as these months have been chosen as they refer to a period of stability in the populations. However for individual sites this may not be appropriate. For example, many ducks congregate to moult on some sites in late summer before moving on to winter elsewhere, and the current indexing months may miss internationally important populations at some sites. It may be more appropriate to index over all WeBS months (September to March) if data are available, rather than the current months.

- WeBS counts of some species for some SPAs are generally low but have qualified due to high maximum counts. In some cases, these counts are from other sources (e.g. goose counts) or the site may only sporadically hold large numbers of birds (e.g. in cold weather). These sites should be identified during the Alerts process and excluded if they are not suited to the current system of Alerts.

These recommendations indicate that more preparatory work needs to be carried out, initially at the database level, and then in the methods used to implement the Site Alerts. The latter includes effective filtering of the data to exclude sites with poor quality or inappropriate data and devising methods to highlight the sites which are behaving atypically to the national and country picture. To assess change on sites, we would recommend an approach based on scoring change in comparison with the national or country trends rather than the current method used here. The graphs showing annual change of species were a useful indicator of how populations change on a site. This was an initial attempt at assessing inter-annual changes and in future, instead of expressing change as a percentage of the previous years population, expressing it as a percentage change of the flyway population may be more appropriate. This would reduce the problem of species which occur in small numbers contributing a disproportionate amount to the average change measure (e.g. a change from 2 to 20 birds is a 1,000% increase, whereas a change from 100,000 to 140,000 is only a 40% increase but probably more significant). However, it is necessary to be clear what scale this should be investigated. If the national or internationally important population is the important factor then the current approach is fine. If however, the proportionate change in the flyway population is important then weighting the annual changes by this value is necessary.

In this analysis, SPAs were reported on. These are outstanding sites, and as such, tend to have a long series of counts associates with them. In future, when SSSIs are reported on data quality may be a much larger issue.

Table 7.1 Summary of the Alerts issued in 2000, using the 1998/99 WeBS data. High Alerts refer to declines in the population of over 50% over 5, 10, 25 or all year periods; Medium Alerts refer to declines that are between 25% and 50% over similar time periods.

Species	United Kingdom	England	Northern Ireland	Scotland	Wales
Little Grebe			Medium Alert		
Great Crested Grebe					
Cormorant					Medium Alert
Mute Swan					
Bewick's Swan			High Alert	High Alert	High Alert
Whooper Swan			Medium Alert	High Alert	High Alert
European White-fronted Goose	Medium Alert	Medium Alert			High Alert
Feral Greylag Goose					Medium Alert
Canada Goose					
Dark-bellied Brent Goose					
Light-bellied Brent Goose					
Shelduck					
Wigeon					Medium Alert
Gadwall			Medium Alert		
Teal					
Mallard	Medium Alert	Medium Alert		Medium Alert	Medium Alert
Pintail					
Shoveler			Medium Alert	High Alert	High Alert
Pochard			Medium Alert	High Alert	Medium Alert
Tufted Duck				Medium Alert	
Goldeneye			Medium Alert		
Red-breasted Merganser				Medium Alert	
Goosander				High Alert	
Ruddy Duck					
Coot					
Oystercatcher					Medium Alert
Avocet					
Ringed Plover			Medium Alert		High Alert
Grey Plover					Medium Alert
Knot	Medium Alert	Medium Alert	High Alert	Medium Alert	High Alert
Sanderling			Medium Alert		
Dunlin					Medium Alert
Black-tailed Godwit					
Bar-tailed Godwit			High Alert		High Alert
Curlew					
Redshank					Medium Alert
Turnstone	Medium Alert	Medium Alert	Medium Alert	Medium Alert	Medium Alert

Table 7.2 Coverage of the Site Alert species/site combinations by country and nationally.

	Total species/site combinations requested	Number referring to species currently outside the WeBS Alert system	Number for which data were available	% of species/site combinations successfully run for species currently covered	% of species/site combinations successfully run overall
England	661	130	461	87%	70%
Northern Ireland	96	20	65	86%	68%
Scotland	181	85	70	73%	39%
Wales	29	2	27	100%	93%
UK	967	237	623	85%	64%

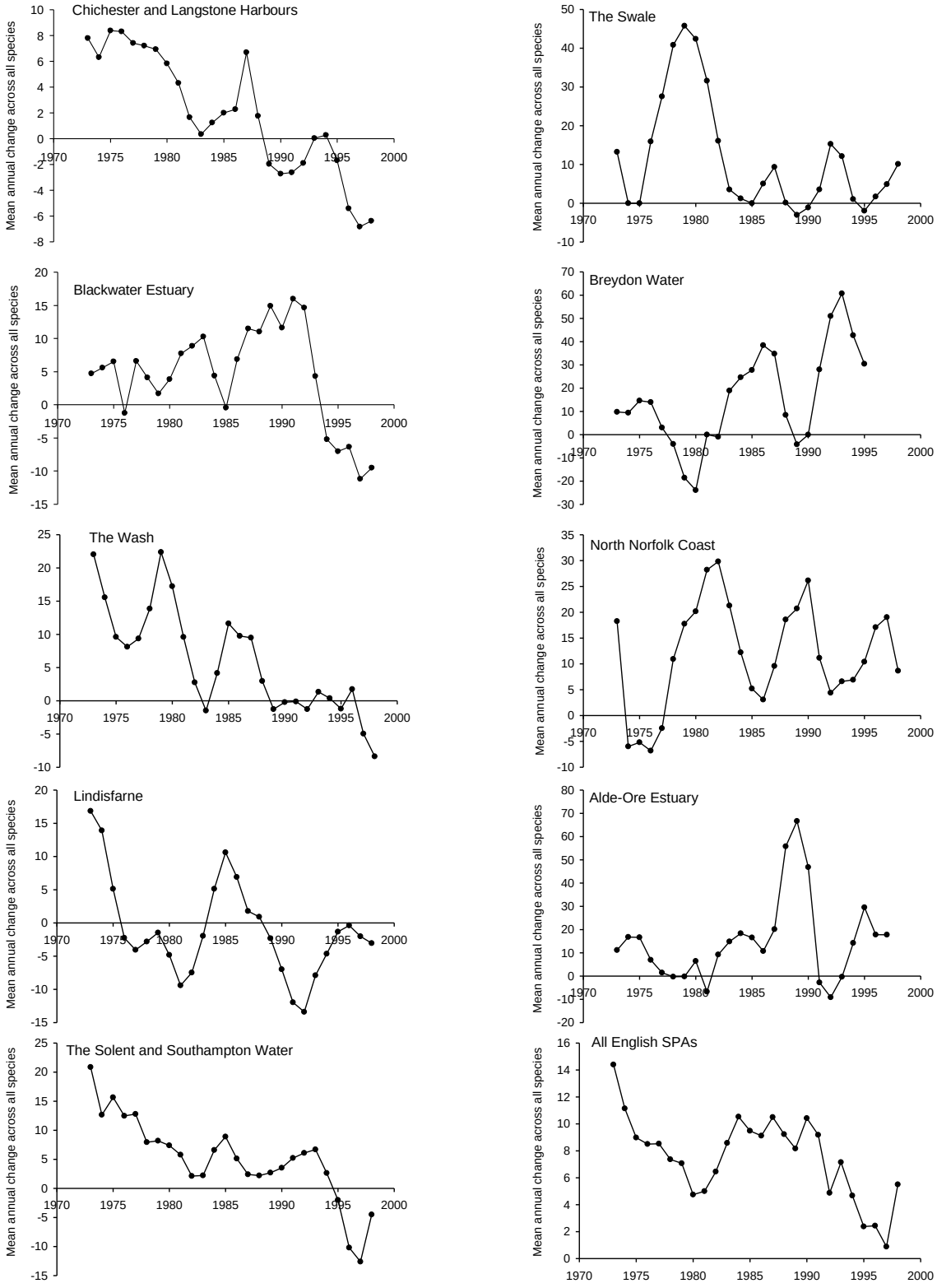

Figure 7.1 General indicator of inter-annual change of waterbirds on selected estuarine sites in England. The measure is calculated by taking the mean, across all species cited for the SPA, of the annual change in the smoothed index. The value for 1998 indicates the mean change in the smoothed index across all species from the winter 1997/98 to the winter of 1998/99. Sites on the left hand sides have shown recent declines in across many waterbird populations, those on the right increases. Values above the line indicate increasing populations, below declining.

Acknowledgements

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