# Aerial Surveys of Waterbirds in the UK: 2007/08
# Final Report

WWT Consulting
Report to
Department of Energy and Climate Change

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# 1. ACKNOWLEDGEMENTS

**1.1** The 'Aerial Surveys of Waterbirds in the UK: 2007/08. Final Report' has been produced by the Department of Energy & Climate Change (DECC, formerly BERR & DTI). We would like to thank Airtricity, Dong Energy, Joint Nature Conservation Committee (JNCC) and RWE Npower for allowing the inclusion into this report of their data collected during the period that these surveys were undertaken. We would also like to thank the JNCC for constructive comments during the preparation of the survey programme and Hartley Anderson Ltd for managing the project on behalf of DECC.

# 2. INTRODUCTION

**2.1** Data on the numbers and distribution of waterbirds and seabirds in UK inshore waters are required for a variety of purposes. These include Strategic Environmental Assessment (SEA) for offshore energy development, including further rounds of offshore windfarm (OWF) development, the Environmental Impact Assessments (EIAs) required by Round 2 windfarms and compliance with licence conditions for constructed Round 1 windfarms. Data are also required for identification of Special Protection Areas (SPAs) and for monitoring waterbird populations.

**2.2** Prior to 2004, only limited data on the abundance or distribution of birds were available for many near shore waters in England and Wales (Cranswick *et al.* 2003, WWT Wetlands Advisory Service 2003, Cranswick *et al.* 2004). Consequently, the then Department of Trade and Industry (DTI), which is now the Department of Energy and Climate Change (DECC), supported by other Government departments, agencies and industry, commissioned a large-scale survey of strategic areas identified for the second round of OWF development. Adjoining areas identified as potentially important for birds were also included.

**2.3** The first comprehensive survey was undertaken by WWT Consulting in 2004/05 (DTI 2006), with a subsequent programme of surveys from winter 2005/06 through to summer 2006 (BERR 2007). These provided large-scale survey data covering the nearshore waters of strategic windfarm areas in Northwest England (from Anglesey to the Solway Firth), in the Greater Wash and in the Thames (from Flamborough Head, Yorkshire, to Sandwich Bay, Kent). BERR commissioned a third programme of aerial surveys to be undertaken between January and March 2007, which included repeat surveys of many of the areas surveyed in the previous surveys (WWT Consulting 2007).

## Purpose and Scope

**2.4** Surveys detailed in this report were primarily commissioned to inform further rounds of OWF development, through the Strategic Environmental Assessment (SEA) process, plus surveys conducted for the purpose of continued monitoring of SPAs. The geographical range of this new round of surveys was extensive, providing near-continuous coverage from Stranraer in the north-west to Sandwich Bay in the south-east, plus coverage of parts of the east coast from the Thames approaches to Berwick-on-Tweed, often to a distance of up to 40km offshore. This report provides results from aerial surveys undertaken between October 2007 and August 2008. Numbers of birds encountered are provided, and estimates of total numbers calculated using 'distance analysis' are provided for the more numerous species of conservation importance. Maps are provided showing the large-scale distribution of waterbirds in each of the original three strategic windfarm areas, plus extended coverage of the areas mentioned above. Brief comparisons are made with the results of previous surveys, where applicable. Non-avian observations were recorded and have been published separately (WWT Consulting 2009).

# 3. METHODS

## Aerial survey

**3.1** Aerial surveys used for this report were undertaken using a methodology developed in Denmark by the National Environment Research Institute (NERI) (Kahlert *et al.* 2000; see also Camphuysen *et al.* 2004). This involved a 'distance sampling' approach (see Buckland *et al.* 2001), whereby birds or flocks of birds were assigned a distance band, to estimate their range from the aircraft. Because birds further from the observer will be more difficult to detect, recording of distance allows the number of missed birds to be estimated. This approach allows statistical analyses of the data, for example, confidence limits to be calculated. This was not possible with data collected using previous aerial survey methods. Further, using a combination of the time at which birds were encountered and the Global Positioning System (GPS) track from the aircraft, the location of birds can be calculated with considerable accuracy, in most cases to within a few hundred metres.

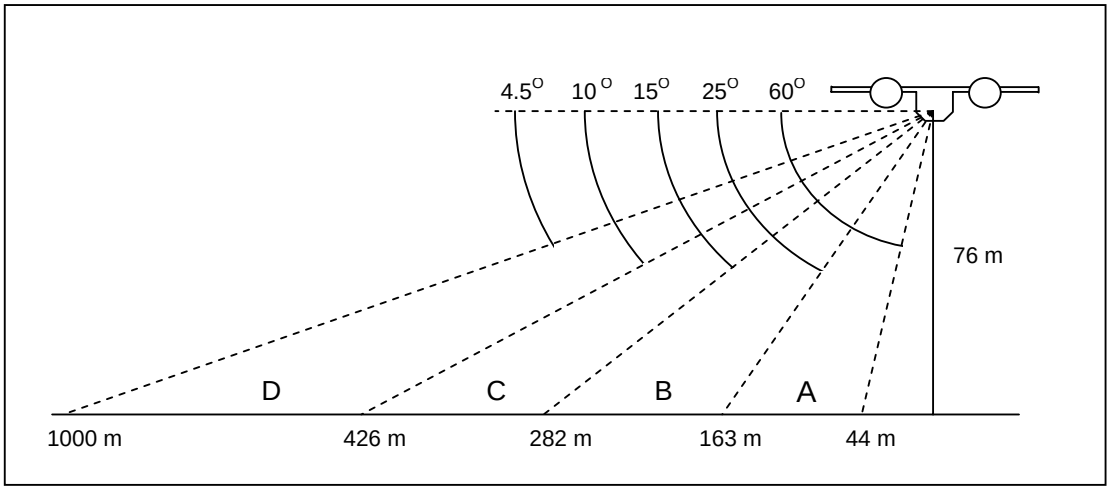
**3.2** Aerial surveys were undertaken by WWT Consulting using experienced observers whose previous projects have included aerial surveys of many OWF sites, and surveys to identify sites for classification as SPAs. These surveys were undertaken between 2001/02 and 2006/07.

**3.3** A number of Partenavia PN68 aircraft were used, flying at an altitude of 76m and at a speed of approximately 185kmh$^{-1}$. This airspeed may increase to approximately 200kmh$^{-1}$ in conditions presenting a strong tailwind. The location of the aircraft was recorded every five seconds using a GPS, with a second, backup GPS recording location every eight seconds.

**3.4** A series of north-south transects spaced 2km apart was designed to cover nearshore waters. Transects that run north-south reduce the effect of glare during the survey, thus aiding the detection and identification of birds. The transects were assigned to flying blocks, which represented the optimal length of survey (approximately 600km). For the 2007/08 programme, any transects used in previous large-scale or regional surveys were retained to enable comparison of data with previous results. For ease of planning, transects followed northings of the GB Ordnance Survey grid, which itself is independent of environmental variables.

**3.5** For each bird or flock of birds, the species, number, behaviour, distance band and the time at which it was perpendicular to the flight path of the aircraft were recorded using a dictaphone. Where conditions allowed it was also possible to record age and sex of birds of some species, though this was generally rarely achieved in aerial survey. Using a clinometer, birds were located in one of four distance bands covering an area from 44m to 1,000m either the side of the aircraft (Figure i); birds beyond 1,000m from the flight path of the aircraft were not recorded. The survey method assumes that all birds in distance Band A were detected, and effort was concentrated on this band. Inevitably, birds further from the aircraft in other bands are missed owing to their distance from their aircraft and the need for the observers to concentrate observation on the area of sea nearest the flight line.

**Figure i – Distance bands used for aerial survey (not to scale)**




**3.6** Surveys were generally made during a four-hour period centred on midday GMT to minimise the effects of glare on counts. Surveys were undertaken in good weather conditions, generally with wind speeds of 15 knots or less.

**3.7** Survey was suspended during the turns between transects, though significant observations, *e.g.* notable bird species, cetaceans or large flocks of birds, were sometimes recorded on an *ad hoc* basis.

**3.8** A cautionary approach was taken with regard to species identification, such that only those individuals that were observed clearly were identified to species level; otherwise, birds were identified as belonging to a species group. In the case of large, near mono-specific flocks, such as

Common Scoter *Melanitta nigra*, individual, similar, but less common species, may not have been identified, particularly in the further distance bands.

**3.9** Divers *Gavia* spp. not identified to species level were recorded as 'diver spp'. Caution was exercised given the possibility of confusion between Red-throated Divers *Gavia stellata* and Black-throated Divers *Gavia arctica*. Great Northern Divers *Gavia immer* are readily separated from both Red-throated and Black-throated Divers and very few will have been overlooked within those birds recorded as 'diver spp.'.

**3.10** From the air, the identification of Manx Shearwaters *Puffinus puffinus* and Balearic Shearwaters *Puffinus mauretanicus* can be difficult to confidently separate. All shearwaters seen of this general size were recorded as Manx Shearwaters, unless individuals could be positively identified as another species. Unidentified larger shearwaters, were recorded as 'shearwater spp.'

**3.11** All Storm Petrels seen were recorded as European Storm Petrel *Hydrobates pelagicus* unless they were obviously not this species. If these records could not be identified to species level they were recorded as 'storm petrel spp.'

**3.12** Cormorants *Phalacrocorax carbo* and Shags *Phalacrocorax aristotelis* can be difficult to distinguish from each other during aerial survey. Any birds not identified to species level were recorded as 'cormorant spp.'.

**3.13** Scoters at large distances are not easily identifiable as Common Scoter, as they are indistinguishable from Velvet Scoter *Melanitta fusca* at that range. However, experience has shown that the vast majority of birds in Bands A and B can be identified to species, and when flying, any Velvet Scoter, even out to Bands B and C, can be readily distinguished. As only small numbers of Velvet Scoter have been recorded in previous years, it has been assumed that the vast majority of scoters present were Common Scoter.

**3.14** Gulls not identified to species level were identified as being in one of the following species groups; 'grey gull' (Common Gull *Larus canus* or Herring Gull *Larus argentatus*), 'black-backed gull' (Lesser Black-backed Gull *Larus fuscus* or Great Black-backed Gull *Larus marinus*), 'large gull' (Herring Gull, Lesser Black-backed Gull or Great Black-backed Gull), 'small gull' (Black-headed Gull *Croicocephalus ribidundus*, Common Gull, Little Gull *Hydrocoloeus minutus* or Kittiwake *Rissa tridactyla*) or gull (*Larus* spp., *Hydrocoloeus* spp., or Kittiwake).

**3.15** Terns *Sterna* spp. not identified to species level were recorded as 'tern spp'. Common Terns *Sterna hirundo* and Arctic Terns *Sterna paradisaea*, are not easily separated, and the majority of observations of these species are recorded as Arctic/Common ('commic') Tern. Little Terns *Sterna albifrons* and Sandwich Terns *Sterna sandvicensis* are distinguishable from 'commic terns' although usually only birds seen in Band A are readily identifiable to species.

**3.16** Auks are not readily identified to species level during aerial survey and most observations are recorded as 'auk spp.'. This category includes Little Auk *Alle alle*, Puffin *Fratercula arctica*, Black Guillemot *Cepphus grille*, Guillemot *Uria aalge* and Razorbill *Alca torda*. The majority of auks encountered during the survey are believed to have been Guillemots, with fewer numbers of Razorbills.

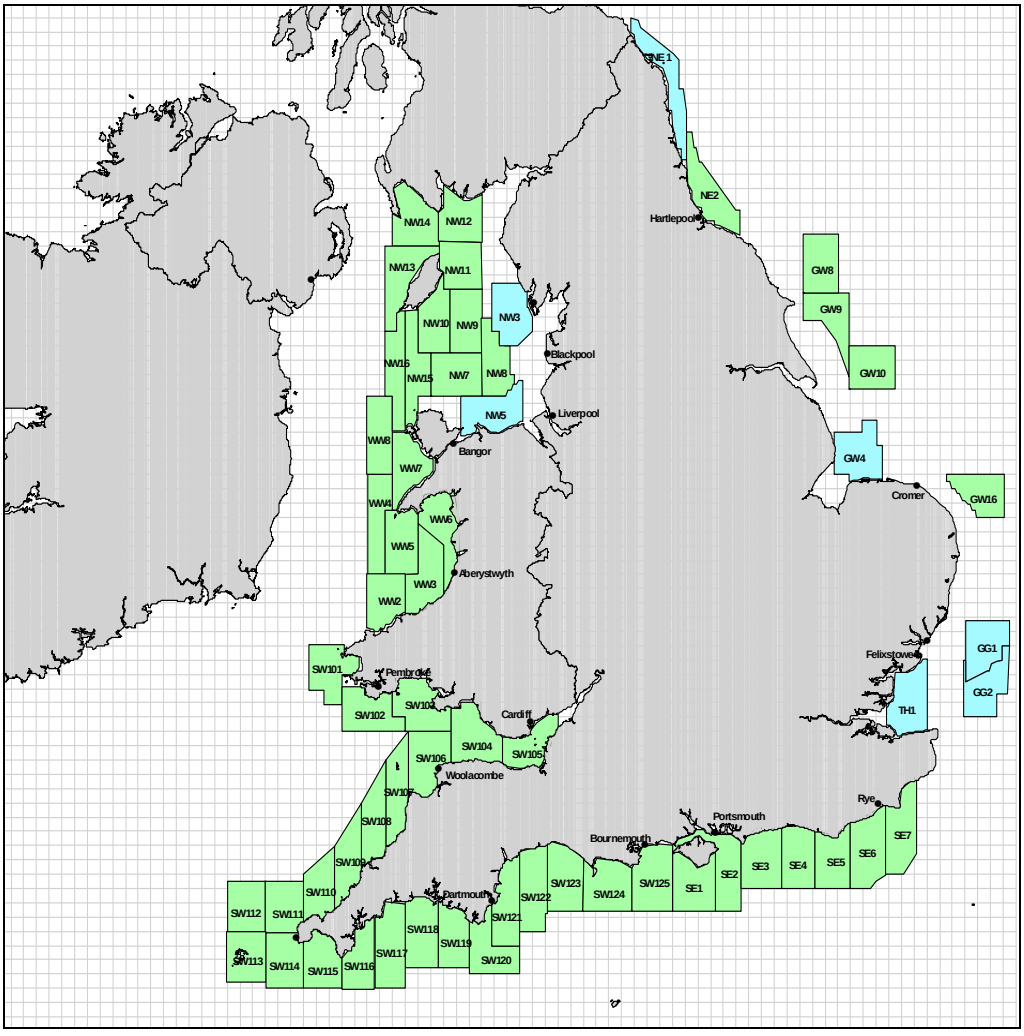
**3.17** Other species groups were also used as appropriate, where specific identification of birds to species level was not possible, *e.g.* 'duck spp.', 'goose spp.', and 'wader spp.'.

**3.18** Behaviour codes assigned to observations included 'sitting' and 'flying' and differentiating between birds that were flying when first detected and birds that had obviously just 'flushed', presumably in response to the aircraft, as per the recommendations of Maclean *et al.* (in press).

**3.19** During the survey observers record sea state, based on the Beaufort Scale, cloud cover, in octas, any physical conditions such as haze, rain and glare, and a subjective assessment of 'visibility.' This is recorded at the start of each transect and whenever conditions change. The recorded visibility is a subjective assessment of the overall 'detectability' of birds based on the combination of these conditions. Visibility categories are defined as 'excellent', 'good', 'moderate', 'poor' and 'bad'. When a combined effect of sea state, cloud cover and glare conditions constitute to 'poor' visibility (observer regularly feels they are missing a proportion of birds in the inner distance band) on several transects, surveys would be abandoned. Data collected during poor conditions were then analysed to determine whether they should be kept or discarded.

## Survey area

**Figure ii – Survey blocks flown in 2007/08 aerial surveys. Blocks surveyed for DECC are shown in green, blocks surveyed for other projects are shown in blue.**




**3.20** The areas to be surveyed were divided into a series of survey blocks that could be covered by a single aircraft in one day (approximately 600km total length of survey flight). The survey area was designed to cover all areas requested by BERR, plus a buffer zone and any control areas, and to cover areas known or thought to be important for waterbirds and seabirds. The boundaries of the survey blocks were placed to avoid cutting any possible OWF footprints and any areas known to be important for marked concentrations of birds, such as shallow water over sand banks.

**3.21** Ten survey blocks were identified for the North West, one for the North East, four for the Greater Wash, seven for the South East, 25 for the South West and seven for West Wales. Survey blocks NW3, NW5, NE1, GW4, TH1, GG1 and GG2 (Figure ii) are also included in this report.

**3.22** Work in survey blocks TH1 and NW3 was commissioned by DONG Energy; in NW5 by RWE nPower, in GG1 & GG2 by Airtricity, in NE1 by the JNCC and in GW4 by Centrica Renewable Energy. Data are included in this report in order to present a more comprehensive account of bird numbers and distribution in these regions, and enable comparisons with data from previous years.

## Coverage

**3.23** The distribution of many waterbirds wintering in the UK changes during the course of the seasons. Many birds breed outside the UK and migrate here at different times of year, and changes in food resources or weather can affect distribution. Changes during summer months will relate particularly to breeding and fledging of young. In previous aerial survey projects seven survey periods were identified to record changes in abundance and distribution during the course of the year (Table 1). For this project data were collected through Periods 1 to 7, though with some slight variation in the start and end dates to the periods for practical reasons, agreed with the client at the time.

**3.24** The dates of flights in each survey block are given in Tables 2-9. Some small parts of some survey blocks could not be flown, for example, because of 2km flying exclusion zones around nuclear power stations such as the ones on Anglesey and at Dungeness. In some survey blocks on some dates, survey was also curtailed by military activity in danger zones, but this generally affected only small areas at the periphery of the survey block. Small areas of survey blocks were occasionally omitted due to the necessity of avoiding oil/gas platforms, such as in NW8.

**3.25** Due to weather deterioration resulting in poor visibility conditions in the offshore area of the survey block, two blocks in the North West (NW14 and NW15) were only partially completed.

**3.26** Coverage of NW14 on 15 March 2008 was reduced due to adverse sea state conditions in southern parts, not predicted from the nearest weather forecast. Conditions outside of Luce Bay were deemed too bad to allow reliable detection of birds in inner distance bands, although the sea was suitably calm within the bay itself. Overall visibility in some offshore parts where data were recorded was deemed to be 'poor', where observers felt they were regularly missing a proportion of birds in Band A. However, as previous surveys have confirmed inner parts of Luce Bay to be the main area of interest for seaducks and divers, the survey was modified to cover those areas where visibility conditions allowed collection of data of sufficient quality for distance analysis to be used.

**3.27** Due to complications with obtaining approval, it was not possible to fly through and therefore survey within the footprint of constructed windfarms. At these sites, the aircraft either flew at a higher altitude over the windfarm, preventing the prescribed methods being used within the footprint and for a distance of 1-2km either side, or flew around the windfarm, departing from the intended transect route by approximately 1km. This affected coverage of North Hoyle OWF in NW5, Barrow OWF in NW3, and Kentish Flats OWF in TH1.

## Analysis and map production

**3.28** The precise location of each bird or flock of birds was calculated by linking the time (to the nearest second) at which they were recorded to the location of the aircraft, recorded by the GPS (generally, every five seconds). Interpolation of the GPS data enabled the position of the aircraft to be determined at each second. The positions of birds detected were recorded either side of the flight path at a distance in the middle of the distance band in which they were seen. The location of most observations is consequently considered to be accurate to within 200-300 m.

**3.29** The distribution of the more numerous species or species groups in each area is shown using an encounter rate, which are the numbers of birds counted per unit length of transect flown. Data are summarised by 2x2km grid squares, corrected for survey effort (distance flown over which observers were actively looking for birds) in each cell. Casual observations of 'out of transect' birds, which are those recorded while the aircraft was turning between transects, were omitted from this analysis.

**3.30** The density scales used in the maps were selected to best illustrate the distribution patterns of encounter rates. They are broadly comparable between surveys for any given species, but small variations occurred owing to the different conditions of visibility during and between surveys. Densities are not, however, comparable between species due to the different detection rates of different species. Note that the range of relative density values may vary markedly between species and reference should be made to the key in each figure to interpret apparent high concentrations of birds appropriately.

### Analytical methods for population assessment

**3.31** The density and population abundance of Common Scoters, all diver species combined, Manx Shearwaters and all auk species combined were estimated using Distance 5.0 software (Thomas *et al.* 2005). Line transect methods were employed for the diver, shearwater and auk analyses and strip transect methods for Common Scoter, due to complications arising from the tendency for scoters to move away from the flight path in response to the aircraft. No significant differences between observers were found and it was thus unnecessary to include observer as a covariate. Data were post-stratified by flock size or survey block to improve precision, and 95% confidence intervals were obtained by bootstrap simulation.

## 4. RESULTS

### Overall numbers and distribution

**4.1** Maps showing the survey blocks, place names and features referred to in the text for the North West, West Wales, South West, South East, Thames and Greater Gabbard, Greater Wash and North East Areas are presented in Figures 1-4.

**4.2** Maps showing the distribution of bird observations of all species in winter (Periods 1-4) and summer (Periods 5-7) for the North West, West Wales, South West, South East, Thames and Greater Gabbard, Greater Wash and North East Areas are presented in Figures 5-17. Relative densities of all birds encountered in winter and summer are presented in Figures 18-30. These maps show total numbers of birds counted per 2x2km grid cell, corrected for survey effort.

**4.3** Total numbers of birds counted on transects during aerial surveys of the eight areas listed above are given in Tables 10-16. Numbers recorded in each individual survey block are given in Tables 17-55. Note these are not absolute numbers of birds in the surveys area, estimates for which need to be calculated using 'Distance', allowing for the numbers of birds which are missed by the observer with increasing distance from the transect line.

**4.4** Large numbers of birds were recorded in both winter and summer, those in the winter being generally higher with the exceptions of West Wales where peak numbers were nearly three times greater during the summer, and the Greater Wash.

**4.5** The highest numbers of birds were counted in the South West Area (58,539), followed by West Wales (54,802), then the South East (37,644), North West (36,527), Thames & Greater Gabbard (31,487), Greater Wash (26,125) and North East (11,841). Dividing these overall figures by survey effort shows the highest numbers of birds recorded per flight were in the Thames & Greater

Gabbard (3,936), then the North East, (2,960) and West Wales (2,030), with the remaining areas showing between 1,148 and 1,742 birds per flight.

**4.6** The highest numbers of birds counted were in Period 3 (46,415), followed by Period 7 (41,664), with the remaining periods yielding from 26,222 to 38,865 birds. On dividing each period by survey effort, Periods 3 & 7 remained the times when bird numbers were highest per survey (2,321 and 1,984 birds respectively). The bulk of records from Period 7 were from West Wales and the South West. West Wales numbers in this period comprised primarily one third Manx Shearwaters (spread fairly evenly across the survey blocks) and two thirds auks, with the stand-out count of 10,002 auks in WW8 being most notable. After distance analysis, the estimate for auk numbers in this block is 41,608.

**4.7** From a grand total of 256,965 birds counted, the most abundant species were auks (79,124), constituting almost one third of all observations. Most of these birds were in West Wales (21,831), South West (16,726) and North West (12,226). Manx Shearwaters accounted for 33,971 observations, arising strictly from the west of the country, as expected, with West Wales holding the majority (17,890). Common Scoter totalled 22,012 birds, with the North West holding the highest numbers (9,135).

## North West

**4.8** Coverage of the North West Area during winter varied considerably between survey periods, though no blocks were surveyed more than twice. In the blocks with repeat counts during the winter, changes in total numbers occurred largely due to changes in auk numbers, though the extent of the differences varied between survey blocks.

**4.9** Auks and gulls comprised the majority of observations, though in Period 3 large numbers of Common Scoters (6,608) were observed in NW5. Areas of highest density were along the north Wales Coast (due to scoters), off Barrow-in-Furness (NW3), Luce Bay, and to the east and south-west of the Isle of Man (due to auks and gulls).

**4.10** The highest numbers were observed in Period 3 (9,843), though this included nearly 7,000 Common Scoters due to coverage of NW5, a major scoter area, in this period. Exclusion of these scoters from the dataset results in the highest numbers recorded in Period 4 (6,258) despite no coverage of NW5. Fewer birds were recorded in Periods 1 and 2 due to reduced coverage.

**4.11** During the summer, each North West survey block was covered only once, with all except NW10 carried out in Periods 5 or 6. Summer in the North West was characterised by large numbers of Manx Shearwaters, auks, Gannets, Kittiwakes and terns in Period 6, and a large aggregation of Common Scoters (2,015 birds) in Luce Bay, Dumfries and Galloway (NW14) in Period 5. Other high density areas included NW12, and to the north of Anglesey.

**4.12** Highest numbers of birds were recorded during Period 6 (9,170), then Period 5, followed by Period 7, reflecting the extent of coverage in these periods. In Period 6 the highest numbers were seen in NW16 (3,495), and the lowest in NW8, largely due to Manx Shearwaters, Kittiwakes and auks. In Period 5, NW14 held the highest numbers primarily due to Common Scoters.

## West Wales

**4.13** The majority of survey coverage in West Wales occurred in Periods 2 and 3 during winter and Periods 5 and 7 in summer.

**4.14** During the winter West Wales was characterised by moderate numbers of auks, gulls, and Common Scoters in inner Cardigan Bay (WW6). Other areas of high bird densities were the north Pembrokeshire coast and Caernarfon Bay (WW7).

**4.15** During the winter the highest numbers of birds were recorded in Period 2 (6,339), due to greater coverage of the area during this period and the higher number of birds recorded in WW5 than in Period 3. Despite the only coverage being of WW7 in Period 1, much higher numbers were recorded here than in Period 3 (1,272 and 163 respectively), primarily due to auks and gulls. Numbers in WW3 and WW4 increased between Periods 2 and 4. Numbers in WW5 were considerably greater in Period 2, due to higher numbers of auks and gulls, especially Kittiwakes, and numbers in WW6 increased slightly due to Common Scoters.

**4.16** During the summer West Wales was characterised by large numbers of Manx Shearwaters, auks, Kittiwakes and terns. The highest concentrations and densities were observed in WW7 and WW8, in and offshore from Caernarfon Bay, around Bardsey Island, and along the North Pembrokeshire coast.

**4.17** By far the largest numbers were recorded in Period 7 (22,967) despite the greatest coverage being in Period 5 (14,006 birds). Except for WW5 and WW6, numbers in all other survey blocks more than doubled in Period 7. The large increase observed in WW8 from 4,144 to 12,252 was primarily due to auks, whereas that seen in WW2 (from 241 to 1,485) occurred due to auks, Manx Shearwaters and Kittiwakes. Bird numbers in WW7 were higher in Period 5 (2,557) than in Period 6 (3,941), largely due to Manx Shearwaters.

## South West

**4.18** During the winter the majority of surveys in the South West Area took place in Period 1, resulting in by far the largest numbers recorded in this period (24,980 birds). Areas of high density occurred in SW103 in Carmarthen Bay, particularly around Worm's Head on the Gower Peninsula and near Pembrey, Carmarthenshire, due to large numbers of auks, Common Scoters and gulls. This block also held more birds than any other South West block. Other areas of high density were SW102, west of Land's End, Cornwall, east of Start Point, Devon, east of Portland Bill, Dorset, and Poole Bay, Dorset. The area as a whole was characterised by large numbers of auks and gulls. Four survey blocks held in excess of 1,000 birds in Period 1, as well as one block (SW124) in Period 3.

**4.19** In summer the South West Area was dominated by Manx Shearwaters, Gannets and gulls. Fifteen survey blocks were covered in both Periods 6 and 7, but only one (SW108) in Period 5. Six blocks were covered in more than one period.

**4.20** The highest numbers of birds were present in Period 6 (16,506), though Period 7 also held high numbers (13,681). Areas of high numbers of observations and high densities were in the south of SW101 around the Pembrokeshire Islands of Skomer and Skokholm, primarily due to Manx Shearwaters and Gannets; along Pembrey Sands, due to gulls; outer parts of the mid-Bristol Channel; North Cornwall between Land's End and Boscastle; Whitsand Bay, South Cornwall; offshore parts of SW120; and Poole Bay, Dorset.

**4.21** During Period 6 four survey blocks held in excess of 1,000 birds, largely due to Manx Shearwaters and Gannets, with SW101 holding the highest overall numbers (4,158). SW109 held the highest numbers in Period 7, with 3,531 out of the 4,614 birds overall being Manx Shearwaters.

**4.22** Survey blocks where numbers changed substantially between periods were SW108, due to larger numbers of Manx Shearwaters in Period 5; SW107, where numbers more than doubled between Periods 6 and 7, again due to Manx Shearwaters; and SW109, where greater numbers of Manx Shearwaters and Gannets in Period 7 resulted in numbers higher than Period 7.

## South East

**4.23** During the winter, surveys in the South East Area were conducted in Periods 2 to 4, though only one block (SE7) was surveyed in the latter. In the summer all areas except SE3 were repeated in two periods, though SE3 was flown twice in Period 7.

**4.24** Areas of high density in winter were to the south west of the Isle of Wight in Period 3, and eastwards from Shoreham, West Sussex. The larger numbers of observations and high densities in the northern halves of survey blocks and south of the Isle of Wight were largely due to auks, whereas in other offshore areas dense aggregations were primarily Gannets and gulls. Numbers further west (in blocks SE2 and SE3) were considerably lower in Period 2.

**4.25** The highest numbers were recorded in Period 3 (14,984), despite lower coverage than in Period 2. Bird numbers increased considerably in Period 3, primarily due to an increase in auk and gull numbers, with only one block containing fewer than 2,000 birds. The highest numbers during this period were recorded in SE5 due to large numbers of gulls, and in Period 2 in SE4 and SE5. Numbers in SE7 during Period 4 were almost three times those in Period 2, primarily due to gulls and Gannets.

**4.26** Species composition during summer was comprised largely of gulls and Gannets. Areas of highest density were coastal areas around Shoreham and Eastbourne, East Sussex, and east of Dungeness, Kent, primarily due to gulls.

**4.27** Many fewer birds were recorded during the summer, with overall numbers ranging from 2,644 in Period 6 to 3,079 in Period 5, though coverage was also greatest in Period 5. Numbers in individual blocks were generally highest during mid-summer (Period 6), with the exception of SE6 (highest in Period 5). In Period 7 numbers in survey block SE3 were higher in July than August, accounted for mainly by Gannets and gulls.

## Thames and Greater Gabbard

**4.28** Surveys in the Thames (TH1) were conducted during all winter periods, with total numbers of birds highest in Periods 1 and 2 (7,170 and 7,155), then declining during Periods 3 and 4. TH1 held large numbers of waders, gulls, divers, scoters and other wildfowl species distributed over shallow inter-tidal sand banks around the estuary mouth.

**4.29** Surveys in the Greater Gabbard Area were conducted during Periods 3 and 4, with numbers in the area as a whole greatest in Period 3 (7,433), more than double those recorded in Period 4, due to large numbers of auks and gulls. Moderate numbers of divers were also recorded in the north of the area. In both periods combined large numbers of observations and high densities were found across the whole of the Greater Gabbard Area.

**4.30** No surveys of the Thames and Greater Gabbard Area were conducted during the summer.

## Greater Wash

**4.31** Coverage of the Greater Wash Area varied between the winter periods, with GW4 the only block covered in all four periods. Coverage was lowest in Periods 1 and 3, when only GW4 was surveyed, while offshore areas were also covered in Periods 2 and 4. Overall bird numbers were therefore highest in Periods 2 and 4 when coverage was greatest.

**4.32** Though observations were relatively evenly distributed across individual survey blocks, areas of high density occurred off the north Norfolk coast due to inter-tidal waterbirds and divers, and throughout GW9, especially in offshore areas, in Period 4. Offshore survey blocks were largely characterised by pelagic species such as auks, Gannets and Kittiwakes, though moderate numbers of

divers also occurred throughout GW16. The largest numbers were observed in GW4 in Period 2 (2,747), though this comprised two 1,000-strong flocks of scoters.

**4.33** Surveys in GW4 revealed the highest numbers in Periods 1 and 2 (2,615 and 2,747 respectively) due to aggregations of scoters, divers and inter-tidal species, and the lowest in Period 4 (459). Numbers in GW9 during Period 4 were considerably greater than those recorded in Period 2 (2,390 and 290), with large numbers of auks and other pelagic species recorded.

**4.34** Summer surveys of the Greater Wash Area covered GW8, GW9 and GW10 during Periods 5 and 6, with high numbers of observations and densities occurring in most areas but generally declining further south. The area was characterised largely by auks, Kittiwakes and Gannets.

**4.35** Overall numbers of birds were highest during Period 5, with GW8 holding the most (5,271), then GW9 (3,066), followed by GW10 (449). Numbers in Period 6 were more similar between survey blocks, exceeding 1,000 birds in each, though with the highest in GW9.

## North East

**4.36** Surveys in the North East took place in blocks NE2 in Periods 2 and 4, and NE1 in Period 4. Due to the increased coverage overall numbers were highest in Period 4. Numbers were highest in NE1 (6,199) due to large numbers of auks, particularly around the Farne Islands, Northumberland, and Gannets in the north. Inter-tidal species such as seaducks, waders and gulls were also found close to shore, around the Farne Islands, Holy Island, and around the Tees Estuary. Numbers of observations and densities in NE2 were higher in Period 2 than in Period 4, with bird numbers reducing by nearly half by Period 4, mainly due to changes in gull numbers.

**4.37** NE2 was the only North East block flown during the summer (in Period 6). Fewer birds were recorded than during the winter (794), with observations distributed across the survey block but with areas of higher density in the north west close to shore by Staithes, North Yorkshire.

## Species numbers and distribution

## Common Scoter

**4.38** Total numbers of Common Scoters counted in each survey block are given in Table 56. Estimates of scoter numbers calculated using 'Distance' analysis for all areas and periods where suitable data exist and, in which significant numbers were recorded, are given in Table 57. Relative densities of scoters recorded in each period and area are found in Figures 31-46.

**4.39** Highest numbers of scoters were recorded in the North West Area, the majority being in NW5 along the North Wales coast. Moderate numbers were recorded in West Wales (primarily Cardigan Bay in WW6), the South West (Carmarthen Bay in SW103), the Greater Wash (North Norfolk coast in GW4), and the Thames Estuary (TH1). Relatively small numbers were recorded from Luce Bay (NW14), Wigtown Bay (NW12), the north Lleyn Peninsula coast (WW7), and Rye Bay (SE6).

**4.40** As previously discussed, flocks of scoters seen on surveys were all counted as though they comprised only Common Scoters. Very small numbers of birds of similar, but less common species (most often Velvet Scoter) may not have been identified, particularly in the further distance bands, but inclusion of these in the counts will not have significantly affected counts of the commoner species, Common Scoter.

### Winter

**4.41** In the North West, on the North Wales coast (NW5) 6,612 scoters were recorded in Period 3. Birds were distributed from Colwyn Bay east to the Point of Ayr, generally within 6km of the coast, with the highest concentrations on the shallow waters of Rhyl Flats north of Rhyl and Prestatyn,

approximately 3km from shore. Smaller numbers were recorded from within Conwy Bay. In NW12, 228 scoters were recorded in Period 3, mostly from the central region of Wigtown Bay, and approximately 6km offshore from Abbey Head. In NW14, 48 scoters were recorded in Period 2, rising to 201 in Period 4. These birds were distributed across the northern half of Luce Bay.

**4.42** In West Wales, within Cardigan Bay (WW6), the main concentrations of scoters were found between Harlech and Barmouth, generally within 12km of the coast, with smaller numbers and lower densities between Aber Dysinnis and Aberystwyth, generally less than 10km from shore. 1,683 birds were recorded in Period 2, rising to 2,190 in Period 3, and showing a similar distribution.

**4.43** In the South West, within Carmarthen Bay (SW103), 2,352 scoters were recorded during Period 1. The majority of birds were off Pembrey Sands, within 6km of the coast, with smaller numbers off Pendine Sands, generally less than 4km from shore.

**4.44** In the South East, 216 scoters were recorded in Rye Bay in Period 2, and 280 in Period 3. These birds were predominately clumped approximately 5km offshore from Walland Marsh in both periods.

**4.45** Within the Thames Estuary (TH1) 906 scoters were recorded in Period 1, 681 in Period 2, 78 in Period 3 and 14 in Period 4. Records were widely distributed across the survey area, but showed marked higher numbers and densities east of Foulness Point from 4km to 14km offshore.

**4.46** In the Greater Wash (GW4), 15 scoters were recorded in Period 1, 2,028 in Period 2, and 1,000 in Period 3. Another 1,000 birds were observed in Period 2 close to the north Norfolk coastline, just outside the survey block boundary. In Period 2 almost all of the scoters were clumped in two flocks approximately 5km north of Scolt Head Island, and in Period 3 were 13km north of Brancaster Bay.

**4.47** Estimated numbers of scoters calculated using 'Distance' were between 1.4 and 3.5 times greater than actual counts. The widely-spaced confidence intervals were likely to be partly a result of the clumped flock distribution of scoters, and partly due to the tendency of the birds to flush ahead of the aircraft, moving away from the transect, resulting in some areas with minimum confidence intervals falling below the actual number counted. This was the case for SW103, and the North West as a whole.

### Summer

**4.48** Total numbers of Common Scoters counted in each survey block during the summer are given in Table 56.

**4.49** Relative densities of scoters found during Period 5 in the North West are given in Figure 34, Period 6 in the South West in Figure 40, and combined summer periods in the South East in Figure 42.

**4.50** In the North West, 2,015 scoters were recorded during Period 5 in NW14 within the northern half of Luce Bay. These birds were in much bigger flocks and more discretely clumped than was noted in this location in Periods 2 and 4.

**4.51** In West Wales, 246 scoters were recorded in WW6 in Period 5. Most of these birds were between 2km and 6km east of Shell Island, with another flock 3km out from the mouth of the Dovey Estuary.

**4.52** In the South West, 891 scoters were recorded in SW103 during Period 6 in closely-spaced flocks approximately 5km south-west of Pembrey Sands.

**4.53** In the South East in SE7, 98 scoters were recorded during Period 5, and 20 during Period 7. These birds were found in Rye Bay, due south of Lydd, approximately 2km from shore.

## Divers

**4.54** Total numbers of divers (Red-throated Diver, Black-throated Diver, Great Northern Diver and those not identified to species) recorded in each area and survey block in each period are given in Table 58. Summed numbers of divers in each survey block in Periods 1-5 are given in Table 58. Estimates of diver numbers with upper and lower confidence intervals, calculated using 'Distance' for each area in each winter period are given in Table 59. Where individual survey blocks held relatively large numbers of divers, these were analysed separately, and results are also presented in Table 59. Relative densities of divers in each area in Periods 1-5 are shown in Figures 47-70.

**4.55** Divers were recorded in all winter periods, but only in Period 5 during the summer.

**4.56** Divers were recorded in all areas, with the highest numbers in the Thames and Greater Gabbard, particularly in TH1, the Greater Wash Area, particularly in GW4 and GW16, and West Wales, particularly in WW6.

**4.57** Most divers were recorded close to the shore, usually in bays, though records extended out to over 40km from the coast, mainly over shallow water, for example in the Greater Gabbard Area.

**4.58** The majority of divers encountered were recorded as "diver species" owing to the difficulty in identifying birds to species from the aircraft. Of those divers identified to species, Red-throated Divers made up the highest proportions in West Wales, the South East, the Thames and Greater Gabbard and the Greater Wash (45%, 12%, 21% and 17% of divers recorded respectively). In the North West 20% of divers were identified as Great Northern Divers and 18% as Red-throated Divers, and in the South West 13% (three records) were identified as Black-throated Divers and 4% (one record) as Great Northern Diver.

### Winter

**4.59** Divers were recorded from six blocks surveyed through the winter in the North West: NW3, NW5, NW11, NW12, NW13 and NW14 (Figures 47 to 50).

**4.60** Small numbers of divers were recorded in the North West Area, with peak counts of 25 birds occurring in NW5 during Period 3, located in the south of Liverpool Bay, in Conwy Bay, Colwyn Bay and over Rhyl Flats and 22 and 18 birds in NW14 (Periods 2 and 4 respectively), almost all located in Luce Bay.

**4.61** Numbers in the other North West blocks surveyed (NW11, NW3 and NW13) never exceeded 14 birds, with small concentrations occurring between 2km and 10km to the west of the Duddon Estuary and The Isle of Walney (NW3), in Ramsey Bay and Bahama Bank to the north-east of the Isle of Man (NW11), and within 12km of the west coast of Isle of Man (NW13).

**4.62** Two other blocks were surveyed twice during the winter: NW3, where numbers increased from three to 11 birds in Periods 1 and 4 respectively and NW11 with seven and two birds in Periods 2 and 3.

**4.63** In the West Wales Area, divers were found in four blocks surveyed through the winter: WW3, WW5, WW6 and WW7.

**4.64** The highest numbers of divers in West Wales occurred in WW6 during both surveys of the block (Periods 2 and 3), with 53 and 244 divers recorded respectively. In Period 2, divers were scattered throughout the shallower areas of the survey block which occupied the easternmost part of Cardigan Bay. In Period 3 the highest relative densities were recorded around Saint Patrick's Causeway (145 birds), around the north of Tremadog Bay and around Cynfelyn Patches, which are all areas of shallower water.

**4.65** Elsewhere in the West Wales Area only small numbers of divers were found. Sixteen and eight birds were recorded in WW7 in Periods 1 and 3, in Period 1 along the coast to the east and south of Caernarfon Bay, and in Period 3 they were only recorded to the east of the Bay, in a relatively linear distribution stretching south-west of Menai Strait.

**4.66** Fewer than eight birds per survey block were counted in WW3 and WW5.

**4.67** WW7 was flown twice during the winter, in Periods 1 and 3 with 16 and eight divers recorded in each survey respectively.

**4.68** Divers were only recorded in five aerial survey blocks in the South West Area during the winter: SW103; SW109; SW114 and SW122 in Period 1 and SW124 in Period 3, with numbers not exceeding seven. These records were from Carmarthen Bay, Watergate Bay, Lands End, Lyme Bay, around Portland and 10km south of St. Albans Head (1). One diver off Land's End was identified as a Great Northern Diver and three to the west of Portland were identified as Black-throated Divers.

**4.69** Divers were recorded in six blocks in the South East Area during the winter: SE1, SE2, SE4, SE5, SE6 and SE7.

**4.70** SE6, counted in Periods 2 and 3, held the highest count of divers with 47 and 16 in each period respectively. In Period 2 these were mainly located within 10km of the coast south of Bexhill and Hastings, with one record further from the coast to the south-east. In Period 3 all records were within 6km of the coast from Bexhill east to Rye Bay.

**4.71** Survey blocks SE4 and SE5 were both surveyed twice during the winter, in Periods 2 and 3, with both blocks holding higher numbers during Period 2. SE4 held 28 and five divers in each period respectively, and SE5 held 22 birds in Period 2 but none in Period 3. In SE4 divers were mainly recorded within about 10km of the coast south and south-east of Brighton and Hove, with other records from further offshore through the block. In SE5 12 divers were located around Seaford Bay and the remainder south-east of Pevensey Bay or offshore from Beachy Head.

**4.72** SE7 was surveyed in Periods 2 and 4 of the winter, with 19 and 13 divers recorded during each survey respectively. In both periods most divers were recorded up to 10km off the coast between Dungeness and Folkstone. In Period 2 divers were seen further offshore, up to 36km south of Dungeness.

**4.73** SE1 and SE2 were both surveyed during Periods 2 and 3, though smaller numbers were found than in the other blocks. In SE1 divers were only recorded in Period 3, with seven up to 10km south of the Isle of Wight. In SE2 one and eight birds were found in Periods 2 and 3 respectively. During Period 2 in the latter block only limited coverage of The Solent was achieved due to high levels of boat activity, and no coverage was possible during the Period 3 survey for this reason. In Period 3 divers occurred up to 8km off the Hampshire coast, east of the Isle of Wight and up to 20km south-east of the Isle of Wight.

**4.74** Divers were recorded in TH1 and the Greater Gabbard Areas (GG1, GG2, GG3 and GG4) during the winter. TH1 was surveyed in all winter periods, with 41, 635, 346 and 127 divers recorded in Periods 1-4 respectively. In all periods the diver records were widely distributed through the Thames Estuary with areas of relatively higher density observed north-east of the Isle of Sheppey in Periods 2, 3 and 4 and through the outer estuary in Periods 2 and 3. There is an apparent pattern of distribution, particularly in Periods 2 and 3, with the south-west to north-east trending bathymetric features of the Thames Estuary.

**4.75** The Greater Gabbard blocks were surveyed in Periods 3 and 4 in the winter, with 51 (GG1 and GG2 combined) and 124 (GG3 and GG4 combined) divers recorded respectively. In Period 3 these were mostly located in the north and west of the area, between Kentish Knock and The Galloper,

and north of Inner Gabbard. In Period 4 most observations were in an area around Outer Gabbard and stretching north and west. The 2km grid cell in Period 3, and the two in Period 4, showing relative densities over five birds per km in Figures 64 and 65 respectively are due to only partial coverage of these cells. These cells only contained three or fewer divers each.

**4.76** Divers were recorded in three aerial survey blocks in the Greater Wash Area in the winter: GW4, GW9 and GW16.

**4.77** GW4 was flown in all four winter periods, with 616, 36, 113 and 22 divers recorded in Periods 1 to 4 respectively. In Period 1 these were largely located over shallow areas around the mouth of The Wash, particularly around Middle Bank and Burnham Flats. In Period 2 many fewer divers were recorded, widely distributed through the survey block, though with slightly higher concentrations around Middle Bank. In Period 3 birds were again largely located around Burnham Flats but with other areas of higher concentration over Docking Shoal, around 22km from the coast in the centre of the survey block and also around 8km north-east of Skegness. In Period 4 much smaller numbers were again recorded, widely distributed through the survey block.

**4.78** Only two divers were recorded during the survey of GW9 in Period 4. Of note, these were recorded up to 38km from the coast.

**4.79** GW16 was surveyed in winter Periods 2 and 4. Only four divers were recorded in Period 2, located between 34km and 46km east and north-east of Great Yarmouth. In Period 4 129 divers were counted, widely distributed throughout the survey area. The two 2km squares showing relative densities over 5 birds per km display this high relative density due to very short lengths of transect falling into these 2km cells. These squares only contained one diver each.

**4.80** In the North East Area NE1 was surveyed once in Period 4, and NE2 once in Period 2, with five and six divers recorded in each survey respectively. In NE1 birds were located up to 2km off the shore around Holy Island and in NE2 mainly up to 7.5km off the coast from Souter Point to Hartlepool with one observation 20km offshore from Seaham.

**4.81** Numbers of divers calculated using 'Distance' gave estimates between 3.2 and 14.6 times greater than actual counts (Tables 58 and 59), with confidence intervals much smaller than those for scoters, largely a consequence of the less clumped distribution of divers.

**4.82** The highest estimate of 2,129 divers was in TH1 in Period 2. Combined with the Greater Gabbard, this area also had the highest estimates of divers of the blocks surveyed in Periods 3 and 4 with 1,714 and 1,469 birds respectively. Estimates were also particularly high for the Greater Wash Area in Periods 1 and 4 (1,975 and 1,010 birds) and West Wales (WW6) in Periods 2 and 3 (776 and 995 birds).

### Summer

**4.83** During summer divers were recorded in six blocks in Period 5: NW14, WW3, WW6, SE3, SE4 and GW10. These were all records of single birds with the exception of NW14 in which 33 divers were recorded. These 33 birds were all recorded around the centre of Luce Bay, within the range of locations recorded during the winter, and of which 24 were recorded as Great Northern Divers.

## Manx Shearwater

**4.84** Table 60 shows the numbers of Manx Shearwaters and unidentified shearwater species recorded in each area and survey block in each period.

**4.85** With the exception of 15 birds in the Greater Wash Area, one bird in the Thames and Greater Gabbard Area and two birds in the South East, all records of shearwaters came from the west coast (North West, West Wales and South West Areas combined).

**4.86** Manx Shearwaters winter off the coasts of Brazil and Argentina, and so were generally only recorded in small numbers before the first summer period, Period 5. The only substantial number was that of 105 birds recorded in WW3 in Period 4. All other winter records were of five birds or fewer per survey block.

**4.87** Relative densities of Manx Shearwaters recorded during the summer in the North West, West Wales and South West Areas are presented in Figures 71-73. Estimates of Manx Shearwater numbers with upper and lower confidence intervals, calculated using 'Distance', for each area in each period are given in Table 61. Where individual survey blocks held relatively large numbers of shearwaters, these were analysed separately, and results are also presented in Table 61.

**4.88** In the North West Area Manx Shearwaters were mainly concentrated in a band approximately 20km off the coast around Anglesey. There was also a relatively higher density of birds situated midway between the Isle of Man and the UK mainland. The highest counts were of 2,173 in NW16 and 1,194 in NW15, both in Period 6. The highest figure estimated using 'Distance' for the region was 18,118 birds in Period 6.

**4.89** In the West Wales Area the band of Manx Shearwaters recorded around Anglesey in the North West area extended down through Caernarfon Bay, past the Lleyn Peninsula and into Cardigan Bay. Manx Shearwaters were recorded in more 2km squares in the north of Cardigan Bay than in the south, though there are concentrations near the coast in the southern part of the bay. The highest counts were of 3,032 in WW4 in Period 5, 2,726 in WW7 in Period 6 and 2,680 in WW3 in Period 7. The highest total estimated using 'Distance' for the West Wales Area was 25,486 birds, which occurred in Period 5. Survey Block WW4 held an estimated 9,192 Manx Shearwaters in the same period.

**4.90** In the South West Area Manx Shearwaters were distributed mainly around the coast of west Wales and north Devon and Cornwall, with concentrations west of the Pembrokeshire Islands, south of Carmarthen Bay, and west of Trevose Head in Cornwall. The highest counts were of 3,534 in SW109 in Period 7 and 2,237 in SW101 in Period 6. There were only a few records off the south Devon and Cornwall coasts.

**4.91** The highest estimated total of birds, calculated using 'Distance' in the South West was 17,804, which occurred in Period 6. SW 101 held an estimated 6,040 Manx Shearwaters during the same period, and SW109 held an estimated 6,168 birds in Period 7.

## Terns

**4.92** Tables 17 to 55 show the numbers of Little Terns, Sandwich Terns, 'Arctic or Common Terns' and unidentified terns recorded in each area and survey block in each period. Relative densities of terns in each area from the summer surveys (Periods 5 to 7) are shown in Figures 74 to 79.

**4.93** Terns were mainly recorded from Periods 5 to 7, with very few records in Period 4 and none in Periods 1-3.

**4.94** Terns were recorded from every survey area except the Thames and Greater Gabbards, which were only surveyed in the winter.

**4.95** Highest numbers and relative densities of terns were in WW7 and WW8 in Period 5 (403 and 281 terns respectively) and NW15 in Period 6 (335 terns).

**4.96** Of a total of 2,152 terns recorded, 120 (5.6%) were identified as Sandwich Terns, six (0.3%) as Little Tern, 1,048 (48.7%) as 'Common or Arctic Terns', and 978 (45.4%) as 'tern species'.

**4.97** In the North West, the highest relative densities of terns were in Period 6 in the southern parts of NW15 and NW16 with 335 and 144 terns counted in these blocks respectively, mostly over The Skerries and up to 15km north-west from Anglesey. Much smaller numbers of terns were recorded in the remaining North West blocks covered in the summer.

**4.98** The highest numbers and relative densities of terns counted in West Wales were in Period 5 in WW7 and WW8, with 403 and 281 terns recorded in each block respectively. These were mainly located to the west and south-west of Anglesey in Caernarfon Bay. Numbers of terns recorded in these blocks in subsequent periods had decreased (84 birds in WW7 in Period 6 and 211 terns in WW8 in Period 7). Terns were widely distributed in much lower numbers through the remaining West Wales blocks.

**4.99** Fewer terns were recorded in the South West, with the highest counts in SW125 in Period 6 (36 terns) and SW107 in Period 7 (35 birds). Highest relative densities were correspondingly found from Poole Bay up to 42km south-east of Swanage and up to 14km north of Lundy.

**4.100** In the South East area, most tern records were from SE4 and SE6 in Period 5 (both with 59 terns) and SE7 in Period 7 (64 birds). SE3 and SE1 held more moderate numbers of terns, and far fewer were recorded in blocks SE2 and SE5. The highest relative densities were in Rye Bay and between Dungeness and Folkestone, with lower densities distributed widely throughout the remaining survey blocks.

**4.101** The highest count of terns in the Greater Wash was 109 across GW8, GW9 and GW10 in Period 5. The same three blocks were surveyed in Period 6 when a total of only 16 terns were counted. Most terns were recorded east and north-east of the Humber Estuary with the remaining birds widely distributed through the survey blocks.

**4.102** Forty four terns were counted during the survey of NE2 in the North East in Period 6. These were distributed between 2km and 10km offshore along the coast, especially east of Newcastle.

## Eider

**4.103** Tables 17 to 55 show the numbers of Eiders recorded in each Area and survey block in each period. Relative density maps of Eiders are only shown for winter in the North East, where they reached their highest counts (Figure 80).

**4.104** Small numbers of Eiders were recorded during the winter in all Areas except the South East and South West. Only two birds were recorded during the early summer, in the North East and North West.

**4.105** The majority of Eiders were recorded either at the mouths of estuaries or in shallow inshore waters.

**4.106** By far the largest numbers were recorded in the North East, with a peak of 190 birds in NE1 during Period 4. Here birds were mainly distributed around Holy Island, Budle Bay and the Farne Islands. There were, however, no Eiders recorded in NE2 during Period 4.

**4.107** A peak count of 18 birds occurred in the Greater Wash in Period 1 (GW4) dropping to four birds in Period 4. In the North West, the highest count was of nine birds in NW5 during Period 3, with smaller numbers in NW13 and NW3. Smaller numbers of fewer than five birds were recorded in WW6 and TH1.

## Fulmar

**4.108** Tables 17 to 55 show the numbers of Fulmars recorded in each Area and survey block in each period. Relative densities of Fulmars recorded in each Area during the summer and winter are shown in Figures 81 to 91.

### Winter

**4.109** The highest numbers of Fulmars in the North West were recorded in Period 4, with 227 birds observed. Of these, 140 were recorded in NW13, with 29 each in NW7 and NW10 and much smaller numbers in the remaining blocks. Totals from other periods were lower, largely as a result of fewer blocks being surveyed, with highest counts in NW14 (16 birds) in Period 2 and NW10 (25 birds) in Period 3.

**4.110** In the West Wales Area low numbers of Fulmars were recorded during the winter with 19 in Period 2, 47 in Period 3 and 10 in Period 4. These birds were widely distributed, mostly in the west of the Area.

**4.111** In the South West the highest numbers were recorded in Period 1 in SW108 (112 birds), offshore from Padstow Bay, SW114 (41 birds), south of Land's End, SW118 (73 birds) and SW119 (53 birds) off the south Cornwall and Devon coast and SW122 (48 birds), south of Lyme Bay. Other periods had fewer birds, though also more restricted survey coverage.

**4.112** In the South East the highest count of 205 Fulmars was in Period 2. The highest numbers of birds were counted in the east (95 in SE6, 48 in SE7) with more moderate numbers in central blocks (15 in SE3, 30 in SE4 and 14 in SE5) and lower numbers in SE1 and SE2. In Period 3 the highest numbers were recorded in the more easterly blocks, and in Period 4, 75 Fulmars were counted in SE7. The highest relative densities were present in offshore areas from south of Worthing to south of Folkestone, centred around 35km from the coast.

**4.113** During the winter only one Fulmar was recorded in TH1, occurring in Period 3. Higher numbers were recorded in the Greater Gabbard blocks: 83 in Period 3 and 333 in Period 4. These were mainly located in the south and east of the area with the highest relative densities near South Falls in the south and the Gabbards to the north.

**4.114** In the Greater Wash Area the highest numbers of Fulmars were recorded in Period 2 (264 birds), the only period when all the Greater Wash blocks were surveyed, then Period 4 (85 birds), and only small numbers in Periods 1 and 3 when only GW4 was covered. The highest counts in Period 2 occurred in GW8 and GW9 (134 and 90 birds respectively), and GW9 and GW16 during Period 4 (29 and 59 birds respectively). Much lower numbers were recorded in GW4. The highest relative densities were north-east of Flamborough Head (GW8 and GW9) and off north-east Norfolk (GW16).

**4.115** In the North East Fulmar records were distributed widely through the area. Highest numbers were recorded in Period 4 when 25 were recorded in NE1 and 32 in NE2.

### Summer

**4.116** For the summer months, the results show Fulmars in all regions to be more widely distributed, lacking many of the areas of higher density noted in the winter. Overall numbers between winter and summer were similar within regions.

**4.117** Low numbers were observed in the North West Area during the summer, with a total of 21 birds observed in Period 6, 18 in Period 5 and 16 in Period 7.

**4.118** In West Wales Fulmars were mainly recorded west of Anglesey (15 birds in WW8, Periods 5 and 7), south of the Lleyn Peninsula and off the north coast of Pembrokeshire (11 birds in WW2, Period 7), generally appearing slightly closer to the coast than was observed during the winter.

**4.119** The higher concentrations of Fulmar recorded in the South West during the winter were less evident during summer surveys. Records were much more widely distributed, with most coming from around the Isles of Scilly and west and north of Cornwall, more moderate numbers in the outer Bristol Channel and the lowest numbers along the South Coast.

**4.120** In the South East the highest numbers of Fulmars were in the east of the area, as was observed during the winter surveys, with more moderate numbers in the central blocks and lower numbers in SE1 and SE2. Birds were more dispersed through these blocks than during the winter. The peak counts were of 45 in SE7 in Period 7, 43 in SE5 and 36 in SE6 during Period 5.

**4.121** In the Greater Wash Area, GW8 held the most Fulmar records in Periods 5 and 6, with 91 and 118 birds respectively, mainly located around the centre of the block. Fewer birds were found in GW9 and GW10 during the same periods, with most recorded in Period 5: 25 in GW9 and 27 in GW10. These were widely distributed through the blocks.

**4.122** Very small numbers of Fulmars were observed in the North East in Period 6 (16 birds), where low relative densities were sparsely distributed throughout survey block NE2.

## Gannet

**4.123** Numbers of Gannets recorded in each survey block in each period are given in Tables 17 to 55. Relative densities of Gannets for summer and winter in each area are given in Figures 92 to 104.

**4.124** The highest numbers were generally recorded during summer surveys except for the South East where the majority occurred in winter, and the North East which only had limited coverage during summer.

### Winter

**4.125** In the North West the highest winter count was of 74 records in NW13 during Period 4 with the next highest count of just 13 in NW14 during the same period. Where blocks were surveyed more than once through the winter, numbers were found to increase, with the maximum numbers in Period 4.

**4.126** The highest densities were found off the west to north-west coast of the Isle of Man, around 14km offshore.

**4.127** Low numbers were recorded in the West Wales Area with the highest count of 24 birds occurring in WW2 during Period 3. Very few birds were recorded in other parts of West Wales, with the only other records of three and one bird occurring in WW8 in Periods 2 and 3 respectively. Figure 94 illustrates a very sparse distribution across the whole area with a few occurrences off the coast north of Fishguard and Cardigan, and a few to the west of Anglesey.

**4.128** The highest number recorded for the South West occurred in SW114 during Period 1 with 200 birds recorded. Only SW124 and SW125 were flown during Periods 2 and 3, with 147 Gannets counted in SW124 and nine in SW125 in Period 3. No South West surveys took place in Period 4.

**4.129** The highest densities in the South West occurred off Land's End, within blocks SW108 and SW109, as well as a patch of relatively high density to the northern edge of SW111. Another small area of relatively high density was found to the south-west of Portland Bill (SW124), as well as more moderate densities along the south Devon coast.

**4.130** The South East was the only area to hold greater numbers of Gannets during the winter periods (4,224 individuals representing 73% of the South East total through the year and 55% of the total winter Gannet count for all areas surveyed in the present study).

**4.131** Where blocks were repeated through the winter, no overall trends between periods were evident, with numbers increasing in some blocks and decreasing in others. The highest counts were of 1,137 in SE3 in Period 2, 1,048 in SE4 in Period 3 and 683 in SE7 in Period 4. The highest densities were in the south and south-eastern parts of the area, with generally fewer records in inshore areas.

**4.132** In the Thames and Greater Gabbard Area, Gannets were only recorded in the Greater Gabbard which was surveyed in Periods 3 and 4; there were no records from TH1 in Periods 1 and 2. Similar numbers were recorded from the Greater Gabbard in both periods, with 483 in Periods 3 and 454 in Period 4. The highest relative densities were in the north, around 20km east of Orford Ness, and in the south around Falls Gap, 20km north-east of North Foreland.

**4.133** The highest numbers of Gannets in the Greater Wash Area were recorded during Period 4, with 362 in GW9 and 56 in GW16. These showed an increase on the earlier counts in Period 2, of eight and four in each block respectively. Only two Gannets were present in GW4 in all winter periods.

**4.134** The highest relative densities were found in the east of GW9 approximately 24km off the coast. More moderate densities were found throughout the remainder of GW9 and GW16.

**4.135** In the North East higher numbers of Gannets were recorded in winter than in summer, though coverage was limited during summer. Survey Block NE2 was covered in Periods 2 and 4, and NE1 only in Period 4. Nine Gannets were recorded in Period 2 and 651 in Period 4. The highest densities of Gannets were around the Farne Islands and north-west to St. Abb's Head.

### Summer

**4.136** In the North West no survey blocks were repeated during the summer, so inter-period trends cannot be detected. The highest counts were of 193 in NW12 and 166 in NW14 in Period 5, 191 in NW8, and 173 in NW11 in Period 6. Gannet records were distributed throughout the North West, with areas of higher relative densities towards the south of Liverpool Bay, around the northern and southern ends of the Isle of Man, Luce Bay, Wigtown Bay and mid-channel between the Isle of Man and the mainland.

**4.137** In West Wales numbers increased from the peak count of 25 birds in Period 3 during winter, to 789 in Period 7 in the summer. The highest counts came from WW7 in Period 6 (122 birds) and WW3 (388 birds), WW5 (114 birds) and WW6 (180 birds) in Period 7. The highest densities were found within Cardigan Bay and Caernarfon Bay.

**4.138** Numbers of Gannets increased considerably in the South West from 1,288 in the winter to 7,632 in the summer. Only SW108 was flown in Period 5 with 49 individuals, whereas in Periods 6 and 7 the majority of the South West was covered.

**4.139** The highest South West counts were from SW101 (1,011 birds), SW120 (972 birds) and SW110 (469 birds) in Period 6 and SW111 (1,220 birds), SW109 (575 birds) and SW110 (497 birds) in Period 7. The highest relative densities were found around and to the south of the Pembrokeshire Islands, off the north coast of Cornwall, around the Isles of Scilly, to the south of Lyme Bay and south-east of Start Point.

**4.140** Gannet numbers in the South East were lower in the summer than during the winter. Additionally there was a trend of increasing counts in individual blocks through the summer (with the exception of SE5 which increased between Periods 5 and 6, but decreased again in Period 7). Peak counts were of 185 in SE7, 168 in SE3, 167 in SE6 and 138 in SE4 all during Period 7. Records are widely

distributed through the survey blocks, with lower densities in SE2 (Figure 99) probably due to this block not being covered in later summer periods.

**4.141** The Greater Wash survey blocks GW8, GW9 and GW10 were all flown in Periods 5 and 6 enabling comparisons between them to be made. All survey blocks showed increases in Gannet numbers between these two periods. The highest counts were of 395 Gannets in GW8 in Period 5, and 630 and 418 Gannets in GW9 and GW8 respectively in Period 6. Correspondingly, the highest relative densities of Gannets were to the east and north-east of Flamborough Head, with much lower densities to the south.

**4.142** Only NE2 was surveyed in Period 6 with a total of 39 records. Figure 104 shows the relatively sparse distribution of Gannets across the block.

## Cormorant and Shag

**4.143** Numbers of Cormorants and Shags recorded in each survey block in each period are given in Tables 17 to 55.

**4.144** Cormorants were recorded in all areas during the project, with higher numbers found along the north and mid-Wales coast and in the Thames Estuary. Shags were recorded much more frequently from the west coast, with higher numbers off the north Cornish coast, mid and north Wales, the Isle of Man and around Luce Bay.

**4.145** Overall, 22% of observations were recorded as Cormorants, 45% as Shags and 33% could only be identified as 'Cormorant or Shag'. Seventy five percent of Cormorants and 60% of Shags were recorded in the winter, though different coverage was achieved in each period.

### Winter

**4.146** In the North West during the winter, birds were identified as 43% Shags, 11% Cormorants and the remainder were not identified to species. The highest numbers of birds recorded during the winter were in NW11 in Period 2 (26 birds) and in NW5 in Period 3 (36 birds).

**4.147** In West Wales during the winter, birds were identified as: 65% Shags, 15% Cormorants and the remainder were not identified to species. The highest numbers of birds were recorded in WW6 in Period 2 (128 birds) and Period 3 (84 birds).

**4.148** In the South West during the winter, 78% of the birds observed were identified as Shags, 9% as Cormorants and the remainder were not identified to species. Generally only low numbers of cormorant species were recorded in the South West during the winter, with the exception of 51 Shags recorded in SW115 and 19 Shags recorded in SW109 in Period 1.

**4.149** In the South East, 60% of the birds seen during the winter were recorded as Cormorants and the remainder were not identified to species. Generally, few birds were recorded in the South East during the winter, with the highest number of records in SE3 (nine birds) during Period 2.

**4.150** In the Thames and Greater Gabbard Area, Cormorants and Shags were only recorded in TH1, with none recorded in GG1 and GG2.

**4.151** In TH1, the majority of birds (85%) were identified as Cormorants and the remainder were not identified to species. The number of birds recorded generally increased towards the end of the winter; 28 birds (22 Cormorants) in Period 1, 113 birds (50 Cormorants) in Period 2, 88 birds (87 Cormorants) in Period 3 and 232 birds (all Cormorants) in Period 4.

**4.152** In the Greater Wash Cormorants were only recorded in GW4 during the winter, with a peak count of 10 birds in Period 2. No Shags were recorded.

**4.153** In the North East during the winter, the majority of birds were recorded as Shags (75%) and the remainder were not identified to species. Birds were only seen in Period 4, with the majority in NE1 (39 birds) and only five birds in NE2 (Table 54).

### Summer

**4.154** In the North West during the summer, 38% of birds were identified as Shags, 28% as Cormorants and the remainder were not identified to species. The highest number of birds were seen in NW14 in Period 5 (26 birds) and NW11 in Period 6 (23 birds).

**4.155** During summer surveys in West Wales 30% of birds were identified as Shags, 25% as Cormorants and the remainder not identified to species. The greatest number of birds were recorded in WW6 (37 birds) in Period 5.

**4.156** In the South West 67% of birds were recorded as Shags, 8% as Cormorants and the remainder were not identified to species. The highest numbers were recorded around Lundy (25 Shags in Period 6, 18 in Period 7 in SW107), off the north Cornwall coast (18 birds in SW110 in Period 7) and around the Isles of Scilly (81 birds of which 65 were Shags in SW113 in Period 7).

**4.157** In the South East the majority of birds (91%) were not identified to species; the remainder were identified as Cormorants. Individual counts in blocks did not exceed four birds, with the exception of the second survey of SE3 (SE3b) in which 21 birds were seen.

**4.158** No Cormorants or Shags were recorded in the Greater Wash area over the summer.

## Gulls

**4.159** Tables 17 to 55 show gull numbers for each period and area and include numbers assigned to individual species.

**4.160** Seven species of gull were recorded during these surveys: Kittiwake, Black-headed Gull, Little Gull, Common Gull, Lesser Black-backed Gull, Herring Gull, and Great Black-backed Gull. All unidentified gull groups were also used (see Methods): 'Grey gull'; 'black-backed gull'; 'large gull'; 'small gull' and 'gull'.

**4.161** As large numbers of Kittiwakes were identified to species, these have been presented separately. Similarly Little Gulls have been separated in this report due to their restricted passage and wintering population in the UK. Otherwise all other gull species have been combined in the figures, as a high proportion of these birds were only identified to species groups and not to individual species.

## Kittiwake

**4.162** Figures 105 to 117 show the relative densities of Kittiwakes recorded in each area during winter and summer surveys.

### Winter

**4.163** In the North West Area Kittiwakes were recorded in all survey blocks flown. The highest relative densities of birds occurred around 30km north-east of Anglesey, with other areas of relatively high density midway between the Isle of Man and the UK mainland. The highest counts came from surveys of NW11 in Period 2 (216 birds) and NW7 in Period 4 (142 birds).

**4.164** In the West Wales Area the highest relative density of Kittiwakes occurred approximately 20km off the westernmost tip of the Lleyn Peninsula, with 55 Kittiwakes recorded in WW7 in Period 1 and 586 recorded in WW5 in Period 2. Kittiwakes were recorded in more moderate numbers around Cardigan Bay (110 recorded in WW3 in Period 4) and lower numbers throughout the rest of the region.

**4.165** In the South West Area Kittiwakes were widely distributed through the area, with lower numbers towards the east of the Bristol Channel and east of Portland on the South Coast. Higher numbers occurred south of Pembrokeshire and Carmarthen Bay, up to approximately 20km off the north Cornwall coast, off Land's End, south of Lyme Bay and in a small area around the south of Portland. Peak counts were of 401 birds in SW102, 478 birds in SW103, 120 birds in SW108, 103 birds in SW114, 323 birds in SW121 and 233 birds in SW122 and 89 birds in SW124 in Period 3.

**4.166** In the South East Kittiwakes were found to be widely distributed throughout the area with highest numbers counted in SE4 (254 birds, Period 3) and SE7 (223 birds, Period 4).

**4.167** In the Thames and Greater Gabbard Area Kittiwakes were mainly recorded in the Greater Gabbard blocks and the outer parts of Thames Estuary. The highest numbers were recorded in Period 4 when 309 were recorded in the Greater Gabbards, mainly to the south and east of the blocks.

**4.168** Kittiwakes were recorded in all blocks of the Greater Wash Area, with the highest numbers counted in Period 4 in GW9 (305), especially east of Flamborough Head and to the east of the block. A second area of higher concentration was also found in GW16 of north-east Norfolk which is largely attributable to a count of 98 birds in Period 2.

**4.169** Peak counts of Kittiwakes in the North East were of 125 in NE2 in Period 2 and 242 in NE1 in Period 4. The highest relative densities were around the Farne Islands with more moderate densities throughout the remainder of the blocks.

### Summer

**4.170** Results from surveys in the North West during the summer show high densities of Kittiwakes in a band approximately 25km to 30km off Anglesey, with peak counts of 335 birds in NW7, 203 in NW15 and 459 in NW16 in Period 6. Numbers were also high in NW10 during Period 7, with 206 birds recorded. Elsewhere relative densities were generally lower, particularly in the east of the area.

**4.171** In West Wales the distribution of Kittiwakes apparently changed to that observed in the winter, with birds concentrating in the south-west of Cardigan Bay and further west of the Lleyn Peninsula. Numbers also increased further north, in Caernarfon Bay. Numbers of birds recorded generally increased through the summer, with peak counts of 231 in Period 5 (WW8), 117 in Period 6 (only WW7 surveyed) and 367, 293 and 128 in Period 7 (WW8, WW2 and WW5 respectively).

**4.172** The distribution of Kittiwakes recorded in the summer in the South West was very different to that in the winter, with relatively low numbers and sparser distributions in all areas flown in the winter. By contrast, around the Pembrokeshire Islands in SW101, which was not flown in the winter, numbers and corresponding relative densities were high, with a peak count of 338 in Period 6. Other smaller concentrations were noted around Lundy Island and off Trevose Head.

**4.173** In the South East during the summer the highest numbers of Kittiwakes were recorded east of Dungeness (103 in SE7 in Period 7) and south of Brighton (181 in SE4 in Period 7) with numbers generally decreasing from around 10km off shore and away from these areas.

**4.174** There was a large increase in the number of birds recorded during the summer in the Greater Wash, with 2,466 birds counted in blocks GW8, GW9 and GW10 in Period 5 and 2,945 in the same blocks in Period 6. Highest relative densities were off Flamborough Head, with numbers decreasing to the north of block GW8 and the south of GW10.

**4.175** The only coverage of the North East in the summer was of NE2 in Period 6, in which 82 Kittiwakes were counted. Highest relative densities were in the north, around Newcastle and in the south, north of Runswick Bay.

## Little Gull

**4.176** Most Little Gulls recorded during the winter were counted in GW4, with a peak count of 168 birds recorded in Period 1. The lower numbers of 14 birds in Period 2, and one in Period 4, would suggest a decrease in numbers through the winter, though caution should be exercised given the difficulty of positively identifying this species at distance or in varying light conditions.

**4.177** Smaller numbers were recorded in NW3 (nine in Period 1), WW3 (three in Period 3), WW5 (two in Period 3), WW6 (three in Period 3), GW16 (one in Period 2).

## Other gull species

**4.178** Figures 118 to 130 show relative densities for all gull species combined (*Larus, Chroicocephalus and Hydrocoloeus* spp.) for each area.

**4.179** Overall, 71% of gulls were recorded in the winter periods, with correspondingly higher relative densities in all areas except the South West. The Thames and Greater Gabbard Area was not surveyed in the summer so comparisons cannot be made.

**4.180** Percentages of each species of gull recorded in the winter and summer are given, but it is beyond the scope of this report to carry out distributional analysis for each species.

### Winter

**4.181** Overall in the winter, 3% of gulls were identified as Black-headed Gull, 6% as Common Gull, 2% as Lesser Black-backed Gull, 9% as Herring Gull, 4% as Great Black-backed Gull, 15% as grey gull species, 8% as black-backed gull species, 8% as large gull species, 11% as small gull species and 35% as gull species.

**4.182** In the North West the highest numbers of gulls were recorded west of the Isle of Man (1,468 in NW13 in Period 4), east of the Isle of Man and through Liverpool Bay.

**4.183** The highest numbers of gulls counted in West Wales were up to 30km off the coast in Cardigan Bay, particularly in Tremadog Bay and south of the Lleyn Peninsula and up to 20km off the coast in Caernarfon Bay. Peak counts were of 1,393 gulls in WW5 in Period 2 and 832 and 960 gulls in WW6 in Periods 2 and 3 respectively.

**4.184** With the exception of SW125 which was flown in Periods 2 and 3, all blocks in the South West were only flown once during the winter, so inter-period comparisons were not possible. The highest count was recorded during Period 1 in SW103 with 1,890 records, followed by SW122 in Period 1 with 1,190 records.

**4.185** Relative densities of gulls in the South West were generally low and well distributed, with localised areas of higher density in Carmarthen Bay, off Land's End and into Mounts Bay, south of Plymouth, the western part of Lyme Bay and in Poole Bay.

**4.186** By contrast, areas in the South East had much higher numbers of gulls, and these were found to consistently increase between winter periods in blocks that had repeat coverage. Most notably counts in SE5 increased from 1,390 to 3,034, SE4 from 951 to 1,728 and SE6 from 809 to 1,647 between Periods 2 and 3. The lowest counts occurred during Period 2 in SE1 with 36 birds, which increased to 141 in Period 3. Numbers and relative densities of gulls were higher in eastern areas and, with the exception of the area east of the Isle of Wight to Bognor Regis, generally lower in the west (Figure 124). Within the eastern areas there were some scattered areas of higher density, particularly 15km offshore from Beachy Head, and along the coast near Brighton and Bexhill.

**4.187** For the Thames and Greater Gabbard Area numbers of gulls increased in TH1, peaking in Period 2 with 2,631 before declining in Period 3 to 1,873, then to 522 in Period 4. These high numbers were distributed widely over the area with some smaller areas of higher density on the coast around Shoebury Ness and Foulness Island. Total counts for the Greater Gabbard blocks in Period 3 were also high, at 2,461 records, declining in Period 4 to 800. Figure 126 shows distribution of gulls throughout the area with a few small areas of higher density.

**4.188** In the North East there was no discernable overall trend in numbers of gulls recorded over the winter. Numbers in GW4 peaked in Period 1 with 1,000 declining in Period 2 to 562 and again in Period 3 to 204, but rose slightly in Period 4 to 380. GW9 showed an increase from Period 2, with 86 birds, to Period 4 with 360, though this block was not surveyed in Period 3. GW16 showed a decline in numbers from 72 in Period 2 to 46 in Period 4. The distribution across GW4 was widespread with some small areas of higher density along the coast especially around Brancaster Bay. In GW9 birds were again widely distributed with perhaps more recorded from the south-east of the block. Numbers and relative densities in GW9 and GW16 were low and widely distributed, with slightly higher numbers in the east of GW16.

**4.189** Relatively high numbers of gulls were recorded in the North East, with 1,305 records from NE1 in Period 4 and 2,969 records in NE2 in Period 2 (decreasing to 463 in Period 4). Distribution of gulls was fairly even through the survey area, with some localised areas of higher density around holy Island and the Farnes, Blyth, Hartlepool, and Runswick Bay.

### Summer

**4.190** Overall in the summer, 0.3% of gulls were identified as Black-headed Gull, 1% as Common Gull, 3% as Lesser Black-backed Gull, 22% as Herring Gull, 4% as Great Black-backed Gull, 10% as grey gull species, 6% as black-backed gull species, 6% as large gull species, 6% as small gull species and 41% as gull species.

**4.191** These results show a decrease in the proportion of Black-headed Gulls and Common Gulls compared to the winter, and an increase in the proportion of Lesser Black-backed Gulls, Herring Gulls and Great Black-backed Gulls. Herring Gull records had increased 2.4 times on winter records.

**4.192** Gulls were widely distributed through the North West Area in the summer (Figure 119), with higher numbers around the south of the Isle of Man and lower numbers in Liverpool Bay. The highest count was of 299 gulls in NW10 in Period 7.

**4.193** In West Wales, the highest relative densities of gulls were west of Anglesey and around the Lleyn Peninsula and Bardsey Island. Peak counts were of 244 in WW6 in Period 5 and 343 in WW8 in Period 7.

**4.194** The majority of flights in the South West took place during Periods 6 and 7, with only SW108 being covered in Period 5 with 106 records. The highest gull numbers occurred in SW103 during Period 6 with 1,054 birds, followed by SW119 with 1,008 birds during Period 7 and SW120 with 1,002 birds during Period 6. Areas of higher relative density were off Pembrey in the north-east of Carmarthen Bay, around Flat Holm and Steep Holm in the Bristol Channel between Burnham-On-Sea and Cardiff, around Lundy, off the North Cornwall coast around Newquay, between Land's End and the Isles of Scilly, south and west of Plymouth and south-east of Start Point. Within these areas there are some localised areas of even higher relative density where birds are associated with commercial fishing vessels, such as 30km south-east of Start Point in Period 6.

**4.195** The South East saw generally lower numbers of gulls in the summer than in the winter. The most notable decrease in numbers can be seen in SE5 with 3,034 records in Period 3 declining to 168 in Period 5 with a peak during Period 6 of 408 decreasing again during Period 7 to 239. SE6 showed a decrease in numbers from 1,647 in Period 3 to 385 in Period 5, 245 records in Period 6, and 272

records in Period 7. A less dense distribution was seen around the Isle of Wight (Figure 125), with relatively even distribution at low density along the coast from Selsey Bill around Beachy Head to Hastings and some small patches around Dungeness and 40km offshore.

**4.196** The highest count in the Greater Wash occurred in GW8 during Period 5 with 752 records, declining in Period 6 to only 119 records. GW9 saw a decline from 360 in Period 4 to 160 in Period 5 and 26 during Period 6. Numbers in GW10 also decreased with 64 records in Period 5 decreasing to 24 in Period 6. A sparse distribution was observed throughout GW9 and GW10 (Figure 128). GW8 had higher numbers though generally low density through the block, particularly in the north-west.

**4.197** In the North East Area only NE2 was flown in the summer, with 184 gulls recorded in Period 6. All records came from just three areas: around Newcastle, Hartlepool and east of Tees Bay (Figure 130).

## Auks

**4.198** Table 62 shows auk numbers for each period and area and includes numbers assigned to individual species.

**4.199** Figures 131 to 168 show the relative densities of auks recorded in each area during winter and summer surveys.

**4.200** Generally large numbers of auks were recorded in all survey areas. Along the south coast of England most of the records were from winter, with many fewer in the summer. In other areas this difference was less marked, with high numbers also being recorded during the summer (note though that the Thames and Greater Gabbard Area was not surveyed during the summer).

**4.201** Owing to the difficulty in identifying auks to species during aerial survey the majority of records (32,219, 99%) were of 'auk species', with 108 (0.3%) Guillemots, 53 (0.2%) Razorbills, 23 (0.1%) Puffins and one Little Auk recorded.

### Winter

**4.202** During the winter in the North West, peak counts were of 1,488 in NW3, the only block to be surveyed in Period 1, 1,027 in NW11 in Period 3 and 829 in NW7 in Period 4. With the exception of some localised patches, particularly in NW3 and NW11, auks were recorded in low numbers mainly east of the Isle of Man and in Liverpool Bay.

**4.203** Overall in the North West Area, no patterns of change in numbers with period through the winter were evident, with numbers of birds in some survey blocks increasing, and some decreasing.

**4.204** The highest total number of auks in the North West estimated using 'Distance' was 26,675 in Period 4. NW11 had the highest single block estimate of 5,584 in Period 3.

**4.205** In West Wales, the highest auk counts were in WW3 where 687 were counted in Period 2 and 602 in Period 4; WW7 where 671 were counted in Period 1; and WW2 where 671 were counted in Period 3. Due to variability in coverage between periods it is difficult to discern trends in distribution, with Caernarfon Bay holding relatively high numbers in Period 1, but much lower numbers in Period 3, and Cardigan Bay having records distributed throughout in Period 2, but more clustered in the south-west in Period 3, though with no coverage of WW3 which again showed a wider distribution in Period 4.

**4.206** The highest estimate for West Wales in the winter obtained using 'Distance' was 11,203 auks in Period 2, with WW3 having the highest single block estimate of 3,725 in Period 4.

**4.207** In the South West, auks were recorded in all blocks surveyed during the winter with the greatest numbers in SW103 and SW102 in Period 1 (7,453 and 2,854 respectively). SW121 and SW122 also held relatively high numbers with 894 and 752 recorded in Period 1. Distance analysis estimated that 66,760 auks were present in the South West in Period 1, with 26,699 estimated for SW103, 17,466 for SW102 and 18,417 between Blocks SW120, SW121 and SW122. In Period 3 coverage was limited to just blocks SW124 and SW125, though high numbers were recorded in both (850 and 373 birds respectively).

**4.208** Auk densities tended to be clumped, mainly south of Pembrokeshire and Carmarthen Bay, south of Lyme Bay, south of Portland and south-west of the Isle of Wight, with much lower numbers in other areas (Figures 145 and 146).

**4.209** Auks were recorded from all blocks in the South East during the winter, with peak counts in SE1 and SE6 in Period 3 with 1,982 and 1,391 birds respectively. With the exception of SE4, counts in all blocks increased through the winter (SE4 decreased from 945 to 680 between Periods 2 and 3).

**4.210** During Periods 2 and 3, auks were generally located in the northern half of the blocks closer to the coast with higher numbers off Hastings and west of Dungeness. There were fewer auks in the west of the area during Period 2 compared to Period 3. Only SE7 was surveyed in Period 4, which had increased in numbers from 363 in Period 2 to 947 in Period 4.

**4.211** Distance analysis estimated 23,612 auks in the South East blocks surveyed in Period 3, of which 8,592 were attributable to SE1.

**4.212** In the Thames during the winter, very low numbers of auks were recorded in TH1 with a peak of 20 recorded in Period 3. In the Greater Gabbard blocks much higher numbers were recorded, peaking at 4,322 in Period 3 but decreasing to 650 in Period 4.

**4.213** Those few auks recorded in TH1 were generally recorded mid-channel in the Thames Estuary rather than near the coast. In the Greater Gabbard the high numbers of auks were distributed throughout the blocks, with areas of higher relative density in the north in Period 3, but lower numbers and relative densities, particularly in the north, in Period 4.

**4.214** The highest estimate from 'Distance' analysis was of 18,900 in the blocks surveyed during Period 3.

**4.215** Auks were recorded in all blocks surveyed in the Greater Wash Area during the winter. Auk numbers recorded in GW4 generally decreased between successive surveys in Periods 1, 2, 3 and 4 (315, 60, 197 and nine respectively) as did those in GW16 (490 Period 2; 184 Period 3). By contrast, numbers in GW9 increased from 104 in Period 2 to 1,327 in Period 4. GW8 held similar numbers of auks (110) to GW9 in Period 2.

**4.216** Auks appeared widely distributed through the blocks in which they were recorded. Consistently few records were made in the north-west of GW4, east of Skegness, instead tending to be distributed in deeper offshore areas outside the mouth of the Wash.

**4.217** The highest 'Distance' estimates for the Greater Wash Area were of 8,822 in Period 4 with 7,426 in GW9 alone.

**4.218** As noted before, coverage in the North East was limited with NE1 being surveyed only in Period 4 and NE2 only in Periods 2 and 4. In NE2 total auk numbers fell from 190 auks in Period 2 ('Distance' analysis estimated 1,051 auks present, see Table 61) to 92 auks in Period 4. These were distributed throughout the block in Period 2 with fewer from central parts in Period 4. During the survey of NE1 4,509 auks were counted, with the highest numbers of these recorded around the Farne Islands.

**4.219** The highest 'Distance' estimate for the North East Area was 16,872 of which 11,536 were attributable to NE1.

### Summer

**4.220** Each survey block in the North West was only surveyed once during the summer, so comparisons between periods cannot be made. Peak counts were of 985 birds in NW10 in Period 7 and 794 birds in NW12 in Period 5.

**4.221** Auks were widely distributed through NW14, NW12 and NW13 in Period 5, with lower numbers in NW9, particularly in the east. In Period 6 auks were widely distributed in NW16, NW15 and NW11, with fewer birds distributed through NW7 and NW8 in Liverpool Bay. In Period 7 a high relative density of birds was recorded in the south of NW10, the only block surveyed in this period, with very few birds recorded in the north of the block.

**4.222** The highest 'Distance' estimate for birds in the North West is 10,363 in Period 6, with no one block contributing substantially more than any other to this total.

**4.223** Survey blocks in Cardigan Bay in West Wales were surveyed in Periods 5 and 7. In Period 5, auks were well distributed throughout the Bay, with slightly fewer in an area west of Aberdovey and Aberystwyth. In Period 7 this area of fewer numbers had extended west, so that auks were mostly recorded from the south of Cardigan Bay, in Tremadog Bay and in the west, particularly south-west of Saint Patrick's Causeway. The peak count recorded in Cardigan Bay was 1,485 in WW2 in Period 7.

**4.224** WW7 was surveyed twice, in Periods 5 and 6. In both surveys, auks were widely distributed through Caernarfon Bay, with similar counts of 732 and 792. WW8 was also surveyed twice, in Periods 5 and 7, with the highest number of auks counted for West Wales blocks in both periods (1,416 and 10,002 respectively). These were mostly recorded from the north of the block in both periods, with another area of high numbers and high relative density in the south in Period 7.

**4.225** The estimate from distance analysis of the WW8 data was 41,608 auks in this survey block alone, with a west Wales Area total of 88,271 in Period 7 (in which all blocks except WW7 were surveyed). The estimate for WW7 from Period 6 is 5,326.

**4.226** The majority of auk records from the summer periods came from between south Pembrokeshire and the Pembrokeshire Islands, and north Devon (Figures 147 to 149). Peak numbers recorded here were of 503 auks in SW102, 404 in SW101, 254 in SW103 and 201 in SW106, in Period 6. Auks were recorded in much lower numbers in other blocks, generally widely distributed, though with a slight concentration of records in the south of Lyme Bay.

**4.227** The estimate for total number of auks in the South West was 15,808 for those blocks surveyed in Period 6.

**4.228** Many fewer auks were recorded in the South East in the summer than in the winter. Highest numbers were recorded in Period 5 in blocks SE2, SE3, and SE4 (29, 46 and 125 birds respectively) with very few records in other blocks and other periods. Auks were widely distributed through all blocks surveyed, with highest numbers south of Worthing and Brighton in Period 5. It should be noted that the blocks with higher numbers in Period 5 were flown earlier in the period, on 9th, 10th and 11th May compared with 21st May, 2nd and 4th June for blocks SE6, SE7 and SE5 respectively.

**4.229** The total number of auks in the Greater Wash was higher during the summer periods than the winter, with higher counts during Period 5 (4,590 birds) than Period 6 (1,307 birds). The highest count was of 3,147 birds in GW8 in Period 5. This contributed to an estimate for the Period 5 blocks of 23,991 auks. In Period 5 most auks were located east of Flamborough Head, mainly in the

south and east of GW8 and west of GW9. In Period 6, though reduced, highest numbers were again recorded east of Flamborough Head, with a more scattered distribution through the remainder of the blocks.

**4.230** In the summer, the number of auks surveyed in NE2 in Period 6 had risen on winter values to 428. These were widely distributed through the block, with a small area of higher relative density off Whitby where a scattered flock of 282 auks was recorded.

## Other Species

### Ducks

**4.231** Small numbers of other duck species were recorded in all survey areas during the winter periods. Species included Shelduck *Tadorna tadorna*, Red-breasted Merganser *Mergus serrator* and a number of ducks that could not be identified to species level.

**4.232** Red-breasted Mergansers were recorded throughout the winter periods in the North West (NW5 and NW14), West Wales (WW3 and WW6), the South East (SE3 and SE7), the Thames (TH1) and the Greater Wash (GW4). In all cases they were only recorded in small numbers, ranging between a minimum of one (SE7, Period 4) and a maximum total of 10 (SE7, Period 2 and TH1, Period 2), generally near the coast.

**4.233** Larger numbers of Shelducks were recorded in surveys where transects went over sand and mudflats, with the highest counts of 71 and 156 recorded over flats in SW105 in Bridgewater Bay in Periods 1 and 6 respectively. Higher numbers of this species were also counted "off transect" on turns between transects, though this data is not presented in the totals tables.

**4.234** Individual records of Scaup *Aythya marila* (NW13, Period 5) and Red-breasted Mergansers (NW14, Period 5) were also made during the summer.

### Grebes

**4.235** Grebe records tended to be made within 5km of the coast, with the exception of records from TH1 where birds were encountered further out in the Thames Estuary.

**4.236** The highest numbers of grebes were recorded in TH1 with 18 in Period 2 and seven in Period 3. Great Crested Grebe *Podiceps cristatus* was the only grebe identified to species, with the highest number of nine birds in TH1 in Period 2, followed by five each in SE7 in Period 4 and WW6 during Period 3.

**4.237** The only summer grebe records were of three birds in WW7 during Period 6.

### European Storm Petrel

**4.238** This migratory species was recorded during the summer periods, with the exception of two records in the South West in Period 1.

**4.239** A total of 87 European Storm Petrels were recorded, with most birds recorded in the South West, with a peak of 38 in the late summer (Period 7). Most records were from around the Isles of Scilly and the Cornish coast, with more moderate numbers from the West Wales coast and south of the Isle of Man. There were many fewer records off the south coast of Devon, Dorset, Hampshire, and the North East.

### Waders

**4.240** The majority of wader records were from TH1 during the winter with fewer observations made in other areas. Where birds could not be identified to species the observations were split into four groups: 'Small wader', 'medium wader', 'large wader' and 'wader species'.

**4.241** In TH1 large numbers of Oystercatchers *Haematopus ostralegus* occurred, with a peak of 4,050 birds during Period 1, declining to 1,343 in Period 2, 409 during Period 3 and 400 in Period 4. Numbers of small waders increased during the winter from 12 in Period 1, 888 in Period 2 and 1,934 in Period 3. Other notable records from TH1 were of 880 Dunlins *Calidris aplina* and 300 Golden Plovers *Pluvialis apricaria* recorded during Period 1. Wader numbers increased during the winter with 80 birds in Period 1, 250 in Period 2 and 511 in Period 3. Medium wader numbers also showed an increase, with one record in Period 2, 141 in Period 3 and 200 in Period 4. In addition GW4 had 400 records of small waders during Period 1.

**4.242** TH1 was not flown during the summer, and numbers of waders in other survey blocks were generally low due to transects not crossing sand and mud banks.

### Skuas

**4.243** Skuas were recorded in small numbers, often as individuals, in all areas with observed species including Great Skua *Stercorarius skua*, Arctic Skua *Stercorarius parasiticus* and a number of individuals which were not identified to species level.

**4.244** Skuas were most regularly seen in the South West and South East Areas, with Great Skuas recorded in Periods 1 to 7. Peaks of 19 occurred in Period 1 in the South West, mainly along the south coast of Cornwall and Devon, and 10 in Period 1 in the South East.

**4.245** Single observations of Arctic Skuas were made mainly in Period 5 from west of Anglesey in West Wales and south of Worthing and Brighton in the South East.

# 5. DISCUSSION

## Overall summary

**5.1** The vast majority of surveys undertaken during the period covered by this report (October 2007 - August 2008) were for the purpose of extending existing knowledge and coverage of waterbird numbers and distribution into areas further offshore (up to 40km in places) and into areas not previously surveyed. A large proportion of the UK coast was covered including much of the north-west, the Welsh coastline, the south-west, south and south-east English coasts, plus parts of the east English coast. The summed area of the survey blocks is approximately 70,000km$^2$.

**5.2** The overall design of the survey was not targeted at collecting data in an optimal fashion for any one species in particular, and results presented for an individual species must be seen as a 'snapshot' record as opposed to a detailed picture of that species' numbers and distribution around the UK coast.

**5.3** Due to the need to maximize efficiency of time spent in the aircraft, the overall shape of survey blocks tended to be longer and narrower, particularly in the South West and South East, to reach further offshore than in previous years. This might have resulted in a slight decrease in synchronicity of inshore monitoring compared to previous survey design, where individual blocks tended to cover more coastal waters.

**5.4** As it was not always possible to survey adjacent blocks - or parts of blocks - on the same day, some birds or flocks could have been counted multiple times or missed should they have moved between areas surveyed on different days. This should be considered when comparing datasets collected on different days.

**5.5** Tidal state is another important factor in determining distribution, especially of species which feed on exposed sand banks, such as gulls and waders.

**5.6** From the data it is not possible to identify any clear distributional and abundance trends throughout the winter or summer period due to the limited number of repeat surveys carried out. The South East region received the greatest degree of coverage across the periods, some survey blocks being covered up to five times, showing an increase in gulls and auks through the winter periods. Differences described between the surveyed periods could merely be consequences of bird movements between different feeding grounds not included in the coverage, and do not necessarily represent seasonal changes.

**5.7** The changes in distributions of birds between periods may be caused by a number of environmental and phenological factors which are themselves linked. The former may include weather and sea conditions and the locations of commercial fishing activities, whereas the latter may include tidal state, breeding state and the dispersal of prey species. It should be noted that whilst the data collected by these aerial surveys have provided a near-synchronous 'snapshot' of the distribution of species, it is outside the scope of this project to analyse relationships with these other factors. Suggested reasons for the observed patterns of distribution discussed here are speculative and untested. It is hoped that as subsequent surveys of the area are undertaken, patterns in species numbers and distribution will become clearer.

**5.8** The highest numbers of birds were counted in the South West Area followed by the West Wales Area, then the South East, North West, Thames & Greater Gabbard, Greater Wash and North East. These numbers of course reflect survey effort related to period more than they do actual bird numbers present. When correcting for survey effort therefore, the highest numbers of birds recorded per flight were in the Thames & Greater Gabbards, then the North East, and West Wales, with the remaining areas showing fewer birds per flight. The Thames & Greater Gabbards were flown exclusively in the winter periods, and the North East received three quarters of its survey effort also in the winter, the figures therefore reflecting the higher numbers of birds present around our coasts at this time of year. Survey effort was spread more evenly between winter and summer periods in the other areas.

**5.9** The highest numbers of birds counted were in Period 3 followed by Period 7, with the remaining periods yielding fewer birds, which remained the case even when survey effort was corrected for. Period 3 is traditionally a time when numbers are high, and was also when NW5, WW6 and GW4, each holding large numbers of scoters, were flown. The bulk of records from Period 7 were from West Wales and the South West, with West Wales comprising large numbers of auks and Manx Shearwaters. The Irish Sea Front forms in this general area and is often a zone of high biological activity where plankton growth can be very high, and is particularly well-developed in August (Pingree and Griffiths 1978), when WW8 was flown.

**5.10** In general the species distributions and seasonal variations shown by the surveys presented here support those recorded by the last wide scale report of marine surveys around the UK, The Seabirds at Sea Project (Stone *et al.* 1995). In many cases the distributions are very similar, such as the use of the Irish Sea off Anglesey by auk species in the summer and the south coasts of England in the winter. However there were some noticeable differences, such as the scattered low density of auks in Cardigan Bay in the winter and of terns off the Sussex and Kent coasts in summer, where there were 'no birds' reported in Stone *et al.* (*op. cit.*) and the apparent higher density of Gannets recorded off the north coast of Cornwall in the summer. More detailed analysis of the datasets available would be required to examine how significant these differences are (earlier data are included in the European Seabirds At Sea database (Reid & Camphuysen, 1998)).

## Common Scoter

**5.11** Common Scoters are known to favour inshore areas of shallow water and as such, much of the extended survey effort for this report did little to further existing knowledge of the species' numbers and distribution, other than to confirm absence in areas where absence was previously an assumption.

**5.12** Of the 13 survey blocks where scoters were recorded, only TH1 was covered in all winter periods. Survey blocks NW3, NW5 and NW12 were each flown just once, making discussion on temporal distribution void. The highest numbers of scoters recorded in previous years have been centred on Shell Flat (Smith *et al.* 2007), off the Lancashire coast near Blackpool, in NW4, which was not surveyed for this project, therefore the results do not portray a definitive picture for this species.

**5.13** The highest number of scoters in the North West, estimated using 'distance', was 15,969 in Period 3 (mostly from NW5). This falls fractionally below the level for international importance (16,000; Wetlands International 2006), although the upper confidence level 27,060 comfortably exceeds it. The 6,612 birds recorded in NW5 in Period 3 compares well with the 2,847 and 6,623 recorded from the same location during the same period in the two previous winters (BERR 2007 & 2008), suggesting no obvious decline in numbers over this period. The notable count of 2,015 scoters within Luce Bay (NW14) in Period 5 exceeds the level for national importance (500: Wetlands International 2006). This count far exceeded those made in Periods 2 and 4 in the same block, and the birds were much more tightly clumped in their distribution, perhaps suggesting that they were migrants using Luce Bay as a staging site.

**5.14** In Cardigan Bay (WW6), estimates of 4,452 and 3,610 in Periods 2 and 3 respectively exceed the level for national importance. A survey block of very similar coverage was flown in 2001/02, 2002/03 and 2003/04, revealing peak winter estimates of 5,293, 7,125 and 11,771,scoters, though occurring in Periods 3, 1 and 4 in each year respectively (Smith *et al.* 2007). Though the estimate from 2007/08 suggests numbers in the Bay may have dropped since this time, this figure may not represent the peak winter number. The peaks from previous years should also be regarded as provisional due to the low numbers of repeat surveys conducted throughout the winters surveyed, and as such it is recommended that further surveys are carried out to be confident of the peak numbers occurring in the bay (Smith *et al.* 2007).

**5.15** In Carmarthen Bay (SW103) the estimate of 3,287 in Period 1 also exceeds the level for national importance. Previous estimates from a combination of land-based and aerial surveys have regularly confirmed the presence of internationally important numbers (Smith *et al.* 2007; WWT Consulting 2007a), though these peaks generally occurred in mid-late winter. The 2007/08 estimate is therefore almost certainly not representative of the peak numbers in the bay during this winter period.

**5.16** The peak scoter estimate for TH1 was 3,212 in Period 1, which exceeds any of the winter estimates for the last two years (BERR 2007 & WWT Consulting 2007), and the level for national importance. Numbers declined steadily from Period 1 to Period 4, possibly illustrating the birds' tendency to move further west during periods of cold weather, or as food resources are depleted.

**5.17** Scoter numbers in GW4 (not surveyed in winter 2006/07) were similar to those observed in this block during winter 2005/06, but with a higher peak count of 2,028 compared to 1,272. Flocks in this area were noticeably tightly clumped, as observed in previous years, compared to the 'looser' aggregations seen within Carmarthen Bay, Cardigan Bay and Liverpool Bay. This could simply be a reflection of the prey distribution in this area, but could also be related to the demographics of the flock.

**5.18** Previous survey seasons in the North West have noted a movement to offshore areas as a response to food depletion in shallower, more energetically profitable inshore waters, during the course of the winter. Assessment of the extent of these movements in winter 2007/08 was, however, limited due to the small number of repeated surveys and reduced coverage.

**5.19** Although the current published estimate for the number of Common Scoters wintering in Britain is 50,000 (Kershaw & Cranswick 2003), this figure was calculated prior to increased aerial survey activity and is certainly too low. The true British total is likely to number more than 100,000 birds (Smith *et al.* 2007).

**5.20** The estimate for the biogeographic population of Common Scoters is 1.6 million, with the majority of the European wintering population found in the Baltic and Kattegat. The eastern North Sea holds several hundred thousand, with smaller numbers in France, Portugal and northern Africa. During cold winters it is thought that many of the birds from the Baltic and Kattegat move into the North Sea (Skov *et al.* 1995).

## Divers

**5.21** Divers were recorded from all areas surveyed in 2007/08, with the highest numbers in the Thames and Greater Gabbard, the Greater Wash and West Wales Areas.

**5.22** With the exception of 33 summer records in NW14, the great majority of records came from winter surveys. Of the main blocks for divers surveyed throughout the winter (TH1, GW4 and WW6), the timing of peak counts varied, occurring in November in the Greater Wash, late December in the Thames and February in West Wales.

**5.23** These results continue the variation in peak count timing shown from aerial surveys over 2004/05 and 2005/06 when blocks TH1 and GW4 were last surveyed throughout each winter (DTI 2006; BERR 2007). In TH1 peak counts were from mid-December to February in 2005/06 (similar numbers counted through these months) and mid-January in 2004/05. In GW4 peaks were in early March in 2005/06 and late November in 2004/05 and in Cardigan Bay (WW6) the peak was in mid-February (though this was only surveyed in November and February).

**5.24** These data may reflect actual temporal differences in peak numbers in the wintering population, or be caused by spatio-temporal differences, with actual timing of regional peaks masked by the movement of significant numbers of birds between un-surveyed areas within the region in each month.

**5.25** Survey in TH1 recorded the highest numbers of divers counted over the last four winters of aerial survey in the block, with a maximum of 635 compared to 457 in 2007 (February flights only), 398 in 2005/06 and 429 in 2004/05. Estimates of total numbers in TH1 calculated using 'Distance' are, however, remarkably similar between years where data are available, with 2,129 calculated in 2007/08, 1,913 in 2005/06 and 2,194 in 2004/05. The GW4 survey also recorded the highest numbers out of the last three winters of surveys there, with a maximum of 615, compared to 102 in 2005/06 and 92 in 2004/05. Estimates using 'Distance' are not available specifically for GW4 from earlier reports.

**5.26** Red-throated Diver was the most commonly recorded diver species in all areas except the North West, where similar numbers of Great Northern Divers were recorded, and the South West where of the very few records, most were recorded as Black-throated Divers.

**5.27** The international population estimate of Red-throated Divers is between 150,000 and 450,000 and an international 1% threshold of 3,000 birds has been adopted (Wetlands International 2006). Summing all non-identified diver records with records for Red-throated Diver, no diver estimates from any area surveyed in 2007/08 exceeded this threshold, the closest being 2,129 in the Thames. However, coverage in known diver-rich areas was limited. Estimates from surveys in 2007, 2005/06 and 2004/05 have all exceeded 3,000 in an extended area from the Thames Estuary (including former survey blocks TH2 and TH4) not surveyed for this project. It is therefore likely, given the higher counts obtained in 2007/08 that the Thames is continuing to support numbers of international importance.

**5.28** Though numbers of divers recorded from the Greater Gabbard Area alone (GG1, GG2, GG3 and GG4) did not exceed numbers of international importance, they did show over the two periods of their survey coverage that significant numbers of divers were still being recorded up to 40km from the coast, over waters up to 35m deep. Taking into account tidal variation, this seems to accord with

Skov *et al.* (1995) who notes that Red-throated Divers feed on small fish caught in waters less than 30m deep. These results also confirm that the area of lower density of divers across the English Channel is relatively narrow before numbers increase again in the east around the Voordelta, an extensive area of coastal waters off the Netherlands (Skov *et al.* 1995), and highlight the close proximity of diver populations across the southern North Sea.

**5.29** Following a review of Red-throated Diver estimates in Great Britain a revised wintering population of 17,000 birds and a 1% national population threshold of 170 birds have been suggested (O'Brien *et al.* 2008). In addition to those in the Thames Estuary estimates from surveys in 2007/08 show that a number of sites exceed this threshold, including the Greater Wash (GW4), the northern part of Cardigan Bay (particularly around Tremadog Bay and Saint Patrick's Causeway, WW6) and the south of Liverpool Bay (NW5). Beyond these sites, other larger areas contain estimates exceeding this threshold, including the south-east coast of England from Worthing (Sussex) to Folkstone (Kent).

**5.30** Distance analysis was not re-applied to summer diver data, so an estimate for Great Northern Divers in Luce Bay, where 24 birds were identified as this species in Period 5, was not obtained. As the level of international significance for this species is 50 birds (Wetlands International 2006), even a correction of just over two times that recorded using 'Distance' would suggest a population of international importance for this species in Luce Bay.

**5.31** The variation in coverage between survey periods puts further analysis of distributional trends beyond the scope of this report. The temporal variations in numbers and distributions of divers presented here emphasise the importance of including continuous large areas in, and around, known areas of high concentration in future diver monitoring programmes, and surveying them as synchronously as possible. Further, conservation measures will have to consider integrated regional areas to support these mobile populations.

## Manx Shearwater

**5.32** Survey in 2007/08 represented the first season of coordinated aerial surveys to cover the majority of inshore waters off Western England and Wales. Thus surveys covered large areas of water surrounding the world's largest breeding colony of Manx Shearwaters, that comprising Skomer, Skokholm and Middleholm Islands, in Pembrokeshire.

**5.33** Manx Shearwaters were encountered widely throughout the West Coast survey areas during summer 2008. Although not all could be identified to species, it is believed that the vast majority of birds were Manx Shearwaters, and are therefore treated as such here unless individuals were positively identified otherwise.

**5.34** Estimates of numbers of Manx Shearwaters calculated using 'distance' exceeded 30,000 birds off the West Coast (North West, West Wales and South West Areas combined) in Periods 5, 6 and 7. Due to reduced coverage of the three West Coast Areas during some summer periods *e.g.* West Wales in Period 6, South West in Period 5 and North West in Period 7, temporal changes in numbers and distribution, both within the three areas and in the West Coast Area as a whole, are unclear.

**5.35** The international population estimate of Manx Shearwaters is between 340,000 and 410,000 pairs, of which Britain holds 68-93% (Mitchell *et al.* 2004). The international threshold is thus currently set at 3,700 birds (1% of the mid-point of the world population; Stroud *et al.* 2001), with estimates from the current surveys easily surpassing this during all summer periods. This is not surprising considering in excess of 150,000 breeding pairs are known to make use of the Pembrokeshire colonies within the West Wales Area.

**5.36** Estimates for the West Wales Area exceeded 20,000 birds in Periods 5 and 7, for the North West Area 18,000 in Period 6, and for the South West Area 13,000 in Periods 5 and 6.

**5.37** The Manx Shearwater is a Species of European Conservation Concern due to the localised concentrations of the species within Europe. As such the major UK breeding colonies are designated as Special Protected Areas (SPAs) under Stage 1.2 of the UK SPA network (sites used regularly by 1% or more of the biogeographic population of a regularly occurring migratory species; Stroud *et al.* 2001). Survey coverage during 2007/08 included waters surrounding two SPAs: Skomer, Skokholm and Middleholm, and Aberdaron Coast and Bardsey Island. These aerial surveys have provided valuable additions to the limited knowledge of important foraging areas used by UK populations of Manx Shearwaters, beyond the boundaries of SPAs localised around breeding colonies.

**5.38** Manx Shearwaters were mainly concentrated in a band approximately 20km off the coast extending from the north of Anglesey, southwards to the Lleyn Peninsula and into Cardigan Bay, to the west of Skomer and Skokholm Islands, and in outer parts of the Bristol Channel and North Cornwall. It is presumed that the majority of birds encountered were from the Pembrokeshire colonies, with smaller numbers from other colonies in the area *e.g.* the Calf of Man (Isle of Man), Bardsey Island (Anglesey), Saltee Islands (County Wexford), Lambay (County Dublin), Copeland Islands (County Down), Southern Parts of Argyll and Bute, Lundy Island (Devon), and the Isles of Scilly (Cornwall). However, as Manx Shearwaters are known to make feeding trips of several days' duration it may be that birds observed were from colonies even further afield (Simmons *et al.* 1977).

**5.39** Though earlier studies based on ringing recoveries and observations recorded birds foraging long distances southwards from Skomer Island (Lockley 1953), recent evidence from GPS tracking has identified foraging areas of breeders to the north and west of the island, with little movement to the south (Guilford *et al.* 2008). Possible explanations are that southwards moving birds are non-breeders not included in the latter study; that there are sub-colonies that utilise their different resource areas; and that there has been a shift in distribution northwards in recent decades, possibly due to warming seas. In the present study, though many birds were recorded as far south as North Cornwall, it is not possible to say which colonies these are from, or if indeed they comprise both breeders and non-breeders.

**5.40** It is recommended that future surveys ensure synchronised coverage across the broad region covered in 2008/09, and perhaps unsurveyed areas further west, and throughout the summer, to ensure an accurate assessment of the usage of the area by foraging shearwaters and identify any future shifts *e.g.* resulting from warming sea temperatures. Large-scale changes in distribution are understandable from a species that feeds on such widespread and mobile food resources.

**5.41** Manx Shearwaters were found to be in strikingly similar summer distributions to Kittiwakes during 2008/09 surveys, the two species presumably utilising similar mobile prey resources.

**5.42** Manx Shearwaters winter off the coasts of Brazil and Argentina, and so were generally only recorded in small numbers before the first summer period, Period 5. The figure of 105 birds counted in WW3 at the end of the winter (Period 4) reflects the return of birds to the UK for the breeding season.

**5.43** Relatively small numbers of Manx Shearwaters were observed during targeted aerial surveys of South West England and Wales during autumn 2007 (WWT Consulting 2007b). A peak number of 1,080 birds identified the majority of birds as being in SW102, South Pembrokeshire, and SW106, North Devon. Numbers in SW102 were very similar to those observed during the current project in Period 6 (c.600 birds), whereas those in SW106 were lower in 2008/09. Much larger numbers were observed in SW103 during 2008/09, though this survey was conducted earlier in the summer (Period 6).

## Terns

**5.44** The majority of terns recorded could not be identified to species, though many could be distinguished as 'commic' terns (either Common or Arctic). Smaller numbers of Sandwich Terns

were observed, and very few Little Terns. Areas where the highest proportions of Sandwich Terns were identified in relation to 'commics' were the South West and Greater Wash Areas.

**5.45** The majority of tern records were from summer surveys, with the only substantial winter numbers recorded in late winter (Period 4), presumably as birds returned to the UK from their wintering grounds.

**5.46** Large numbers of terns were recorded in West Wales and the North West, with smaller numbers in the South East, South West, Greater Wash and North East. The highest densities were found around colonies on Anglesey and the Skerries, which hold some of the major colonies of Arctic, Common and Sandwich Terns in England and Wales and, combined, form the Ynys, Cemlyn Bay and The Skerries SPA. Smaller concentrations were found around Rye Bay and Dungeness, Kent, where Sandwich, Common and Little Terns breed. Moderate numbers of terns were also found throughout the area from Poole Harbour to Rye Bay (SW125, SE2-5), though densities appear less clustered around colonies. However, the other major tern colonies in this area are found in and around the Solent *e.g.* Poole, Southampton, Chichester and Langstone Harbours, though these surveys did not include waters in the Solent (and thus immediately around colonies) due to high densities of boat traffic in the area on survey days.

**5.47** Estimates of tern numbers in the North West and West Wales (both areas combined) during summer were 1,530 birds, with by far the largest concentrations around the Welsh colonies. The national seabird census in 2000 recorded 2,829 occupied nests in Wales (Mitchell *et al.* 2004). The relatively lower numbers recorded here are likely due to reduced coverage around the Anglesey colonies during early summer (no coverage of NW15/16 in Period 5). Numbers in Caernarfon Bay (WW7) were much lower during Period 6, signifying some local movements within the area, though further west in WW8 numbers remained above 200 birds in Periods 5 and 7. Detailed analysis of changes in numbers and distribution throughout the summer would require more synchronised coverage of these main areas during different phases of the breeding season.

**5.48** Terns have previously been recorded in offshore limits of aerial surveys (DTI 2006; BERR 2007), though coverage in 2008 penetrated further into offshore waters than in previous seasons. Nevertheless birds were recorded up to the offshore limits of all areas surveyed during summer 2008, except in the North East where most were found within 10km of the shore. In the Greater Wash birds were regularly found over 100km from the nearest major colonies in North Norfolk and Northumberland in Period 5, but in only small numbers in Period 6, highlighting possible shifts in foraging distributions in the region.

**5.49** Other aerial surveys conducted during the summer have recorded large numbers of terns, especially in the Greater Wash Strategic Area (DTI 2006; BERR 2007). However, previous survey coverage differed considerably to that during 2008/09 and is therefore largely incomparable. Areas of exception are the South East and South West, where certain areas were also covered during summer 2007. Surveys targeting terns in late June-July 2007 (Periods 6-7; WWT Consulting 2007c unpublished) recorded small numbers from Lyme Regis to Worthing (27 birds in total) and from Eastbourne to Dover (48 birds in total). Combined numbers in 2008 in Periods 6 and 7 from a comparative area from Lyme Regis to Dover (though also including survey blocks SE4 and SE5 and areas further offshore, where very few birds were recorded) recorded only slightly higher numbers during Periods 6 and 7 (88 and 100 birds). Numbers in Period 5 were higher across most of this area.

**5.50** Where areas received repeated survey coverage the results generally supported distribution patterns reported from the Seabirds at Sea Project (Stone *et al.* 1995) that showed highest numbers of terns in shallow waters close to shore, particularly near colonies around Anglesey, Poole Bay, Dungeness, Flamborough Head and Tees Estuary, with smaller numbers further offshore and away from colonies. Results from the 2008 aerial surveys however recorded terns relatively frequently off the Sussex and Kent coasts where Stone *et al.* (*op. cit.*) reported no birds.

## Eider

**5.51** Of the survey blocks flown in 2007/08, NE1 was found to hold relatively high numbers of Eiders, mainly located around Holy Island. Numbers recorded here were similar to those recorded previously during aerial surveys *e.g.* March 2007, with 65 birds compared to 67. WeBS counts at Lindisfarne in the winter of 2006/07 produced the lowest WeBS counts ever (Austin *et al.* 2008). Data presented here suggest that numbers had not increased in 2007/08.

## Fulmar

**5.52** Results from these surveys have shown that overall distribution of Fulmars was similar between winter and summer, with no discernible shift towards or away from colonies, though more clumped areas of higher numbers were found in the winter. Comparison with data from previous years shows similar areas of higher numbers (DTI 2006; BERR 2007; WWT Consulting 2007; WWT Consulting 2007a).

## Gannet

**5.53** Results reported here clearly show patterns in distribution relating to the migration and movements of Gannets. Generally higher numbers of Gannets were recorded in all areas in the summer than the winter, with the exception of the South East where 73% of its records (and 55% of all area winter records) were from Periods 1-4. Numbers in the South East generally increased between Periods 5 and 7 in the summer, with peak counts in late July. This pattern accords well with data from ringing studies that show a late summer migration of British birds south towards the Mediterranean (adults) and west Africa coast (mainly immatures) for the winter (Wernham *et al.* 2002).

**5.54** The overall distribution of Gannets reported here accords well with that presented by Stone *et al.* (*op. cit.*), with perhaps higher densities recorded within 35km of the north Cornish coast during the summer. Further surveillance would be required to examine whether this was due to short-term variations in distribution, or a sustained increase in use in this area.

## Cormorants and Shags

**5.55** The distribution of Cormorants and Shags was similar to that recorded in previous years (DTI 2006; BERR 2007; WWT Consulting 2007; WWT Consulting 2007a). However, many fewer birds were recorded in the South West in winter 2007/08 than winter 2006/07. The distribution of Cormorant and Shag records during the summer closely matched the location of breeding colonies, with Shags showing a very westerly distribution from Luce Bay, through Isle of Man, West Wales, South Pembrokeshire, Lundy, North Cornwall and the Isles of Scilly, and Cormorants mostly from west and north Wales and the Thames. In the winter, distribution of both species was more dispersed around the coast.

## Kittiwake

**5.56** The move towards colonies in the summer was again very marked in the data collected for this species, with numbers increasing in the North West, West Wales and North East, especially around Bempton Cliffs (near Flamborough Head). In the winter, the distribution of Kittiwakes was more dispersed, increasing in the South West and South East.

## Little Gull

**5.57** Little Gulls were recorded in similar areas to previous aerial surveys (DTI 2006; BERR 2007; WWT Consulting 2007), with most in the Greater Wash (GW4) and south-west of Morecambe Bay (NW3). GW4 received similar coverage to surveys in 2004/05 and 2005/06 and showed a consistent peak in numbers in Period 1. Numbers recorded during this peak were similar to previous years, with 124 birds recorded, compared with 142 in 2005/06 and 84 in 2004/05.

### Other gull species

**5.58** Large numbers of gulls were recorded from all areas during these surveys. Although not all gulls were identified to species, the data show some interesting seasonal patterns in distribution. Most obvious of these is the decrease in the proportion of small gull species from winter to summer. Looking at individual species results for Common Gulls and Black-headed Gulls the decrease in numbers recorded is highly significant, from 853 Common Gulls and 361 Black-headed Gulls in the winter to 50 Common gulls and 17 Black-headed Gulls in the summer. This reflects the large increase in UK wintering numbers from birds breeding in northern Europe, particularly to the east and south east of England, and the movement of breeding British birds to inland breeding sites. By contrast, the large gulls: Lesser Black-backed Gull, Herring Gull and Great Black-backed Gull tend to have coastal breeding sites in the UK so numbers remain high at coastal locations through the summer.

**5.59** Many large, high-density flocks of gulls, usually of mixed species composition, were recorded travelling to and following active fishing vessels. Observers generally record these flocks as being made up of "gull spp., or "grey gulls", or "large gulls" due to the difficulty of identifying large numbers to species in a very short space of time.

### Auks

**5.60** As has been noted for the other species above, aerial surveys in 2007/08 have shown strong seasonal patterns in distribution for auk species. In the winter high numbers of auks were recorded in the South West and South East, with peak estimates from distance analysis of 66,760 and 23,612 respectively. In the summer, numbers of auks recorded along the south coast of England had greatly reduced from those found in winter, with peak numbers instead being recorded in the Greater Wash and West Wales Areas, and with peak estimates of 23,991 and 88,271 respectively. The estimate for survey block WW8 alone was 41,608 (from 10,002 auks counted during survey in Period 7). These surveys have shown areas of high numbers of auks consistent with previous surveys, and areas which may regularly support over 20,000 auks and other seabirds, thereby exceeding SPA selection criteria.

**5.61** Observations of juvenile birds were made in WW8 during Period 7, showing this to be an area used for post-fledging dispersal. To the west lies Lambay Island, Ireland, which can hold 25% of the breeding Guillemot population of Ireland, and to the east lay the colonies off Anglesey and the north coast of the Lleyn peninsula (Mitchell *et al.* 2004).

**5.62** Generally the distribution of auks recorded here confirmed the distribution reported in Stone *et al.* (*op. cit.*), though the scattered low density of auks in Cardigan Bay recorded in the winter were absent in the former report.

## 6. CONCLUDING REMARKS

**6.1** Aerial surveys continue to represent the most economic method of collecting waterbird distribution data over large areas (Camphuysen *et al.* 2004). The speed of survey and distances that can be covered enable near synchronous coverage of areas of interest both inshore and offshore.

**6.2** Completion of the Round 3 OWF aerial survey programme together with repeated surveys of existing OWF sites has provided essential information on the distribution and abundances of birds for the purposes of EIAs and SEAs, and, due to the congruent design of survey blocks, has provided important data on the wider scale distribution of species, together with temporal changes that have real conservation application.

**6.3** The growth in OWF development has been reflected in the growth of the WWT Consulting aerial survey team, which has enabled our experience to be built on and increased our capacity to survey

more areas as frequently as required and as synchronously as possible. During the October 2007 – August 2008 period, 163 surveys were completed out of 169 attempted flights which is testament to the experience in survey planning and coordination of WWT Consulting.

**6.4** Successful completion of such a large programme of surveys was also dependent on the collaboration of the individual companies and organisations involved in OWF development. By supporting standard methodologies, congruent survey block designs and survey schedules the planning and operation of the programme was more easily administered, and survey teams could work opportunistically where weather conditions allowed and report their findings efficiently.

**6.5** One weakness in the survey programme however has been in monitoring between constructed turbines. To date no aerial surveys in the UK have been conducted between turbines despite Civil Aviation Authority approval, owing to complications with insurance from windfarm companies. Additionally, due to the possibility of non-random distributions of birds within windfarm footprints, and the requirement for aircraft surveying at 250 feet to fly between turbines, for arrays where aircraft would have to deviate from their normal survey transects to avoid turbines, there is potential for bias in distribution and abundance results (JNCC pers. comm.). To address this, WWT Consulting is working with DECC, DEFRA, JNCC and NERI to test remote sensing techniques from platforms operating at higher altitudes that may provide reliable survey data in areas around constructed turbines.

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# 8. FIGURES

Place and feature names referred to in the text are shown in Figures 1-4. These also show the boundaries and ID's of survey blocks for reference.

Observations of bird records are presented in Figures 5-17. A single record of birds (whether an individual or flock) is treated as one observation. The boundary of individual survey blocks is shown in green. Note, a higher proportion of birds is detected close to the aircraft, hence the apparent distribution is of lines of birds running north-south along the path of the transects. Note some survey blocks or parts of survey blocks were not surveyed in all months.

Relative densities of birds, expressed as numbers of birds per $km^2$ are presented in Figures 18-168. Numbers of each species or species group were summed for each 2x2km grid square that received survey coverage, and corrected for survey effort (length of transect flown multiplied by the number of observers counting and number of times the survey block was flown in the timeframe shown in the particular figure). For example for most 2x2km grid cells there was usually 2km of surveyed transect running through the centre and two observers, each counting to 1 km perpendicular to the survey aircraft, resulting in 4 $km^2$ of survey effort. The relative density for a particular species would therefore be calculated as the number of birds recorded in the cell divided by 4 $km^2$. If only one observer was counting through the whole cell, the total coverage would be only 2 $km^2$, or if the cell received only partial coverage by one or both observers, the appropriate coverage would be calculated. This enables different cells in the relative density figures to be compared more reliably as they have been corrected for survey effort.

**Figure** 1 – Place names and **survey blocks in the North West and West Wales Areas referred to in the text.**

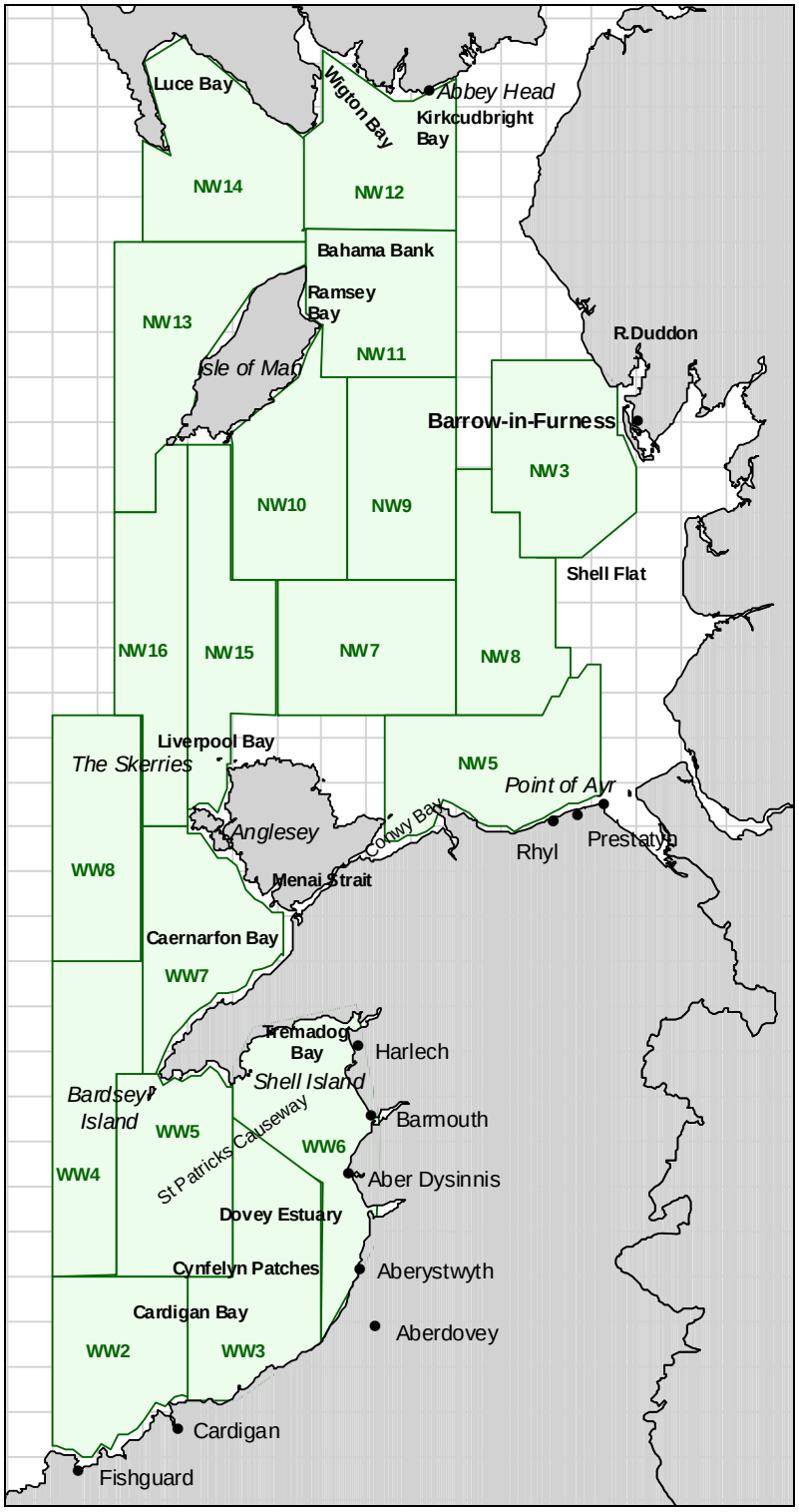


**Figure 2 - Place names and survey blocks in the South West Area referred to in the text.**

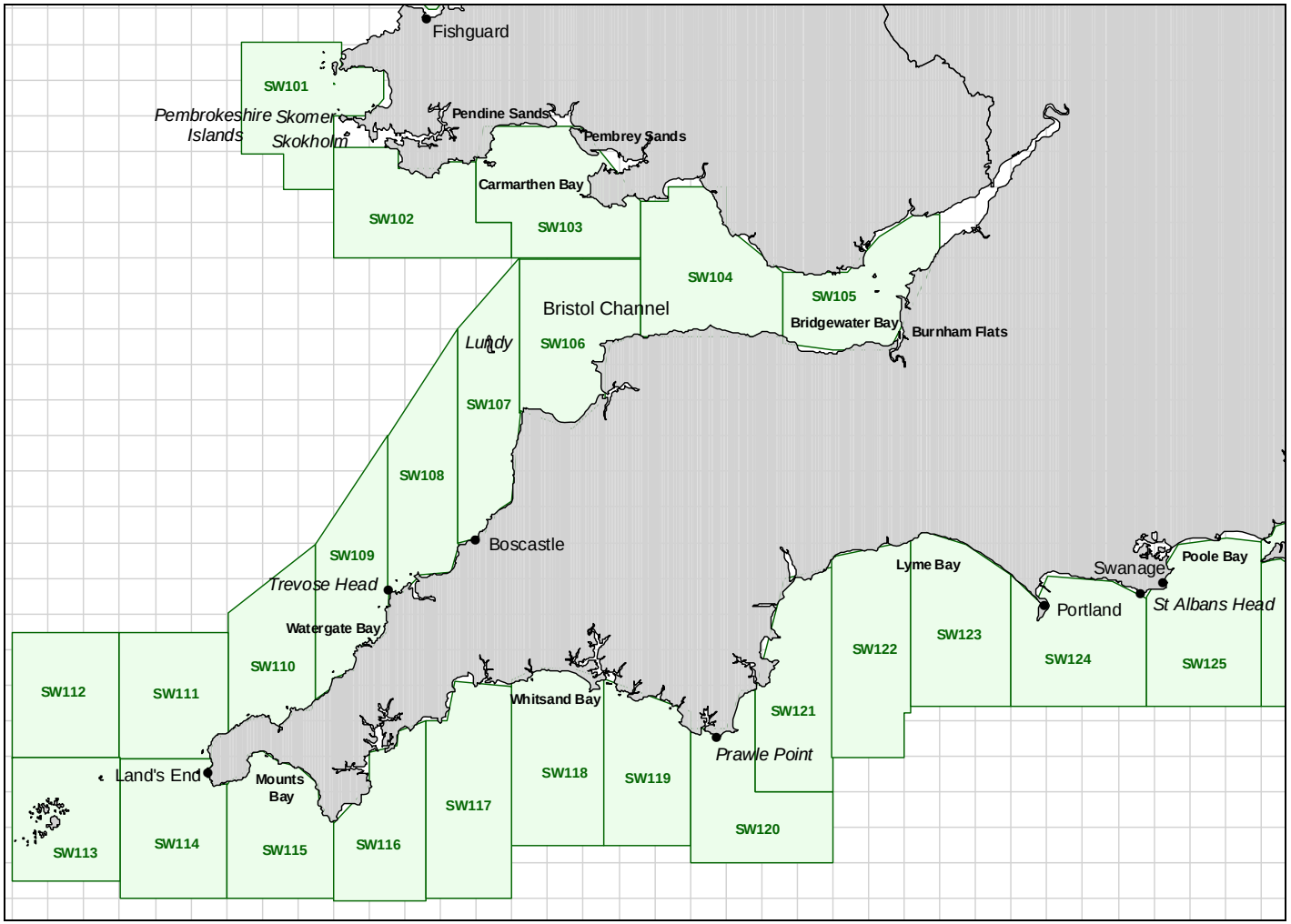


**Figure 3 - Place names and survey blocks in the South East, Thames & Greater Gabbard Areas referred to in the text.**

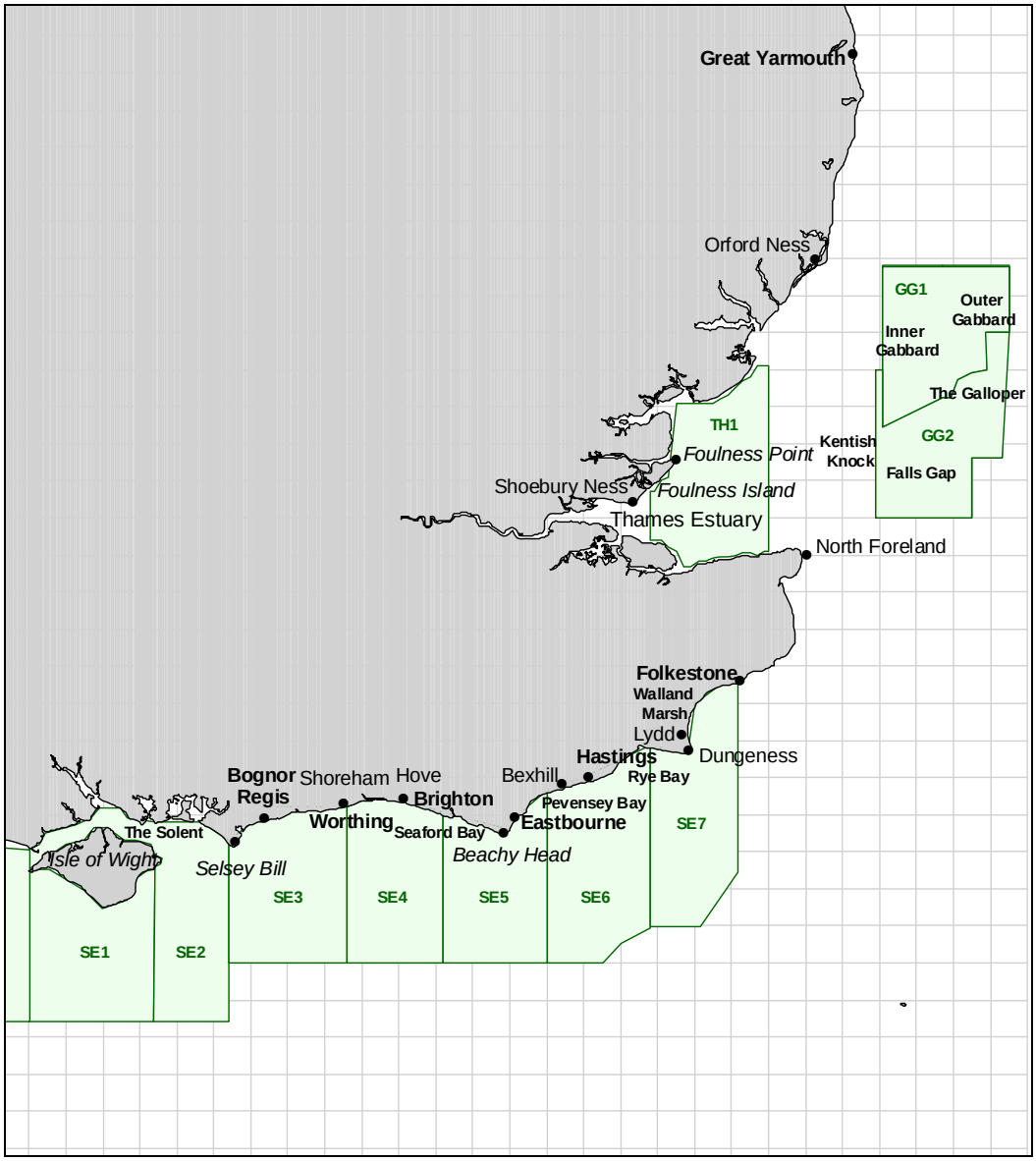


**Figure 4 - Place names and survey blocks in the North East and Greater Wash Areas referred to in the text.**

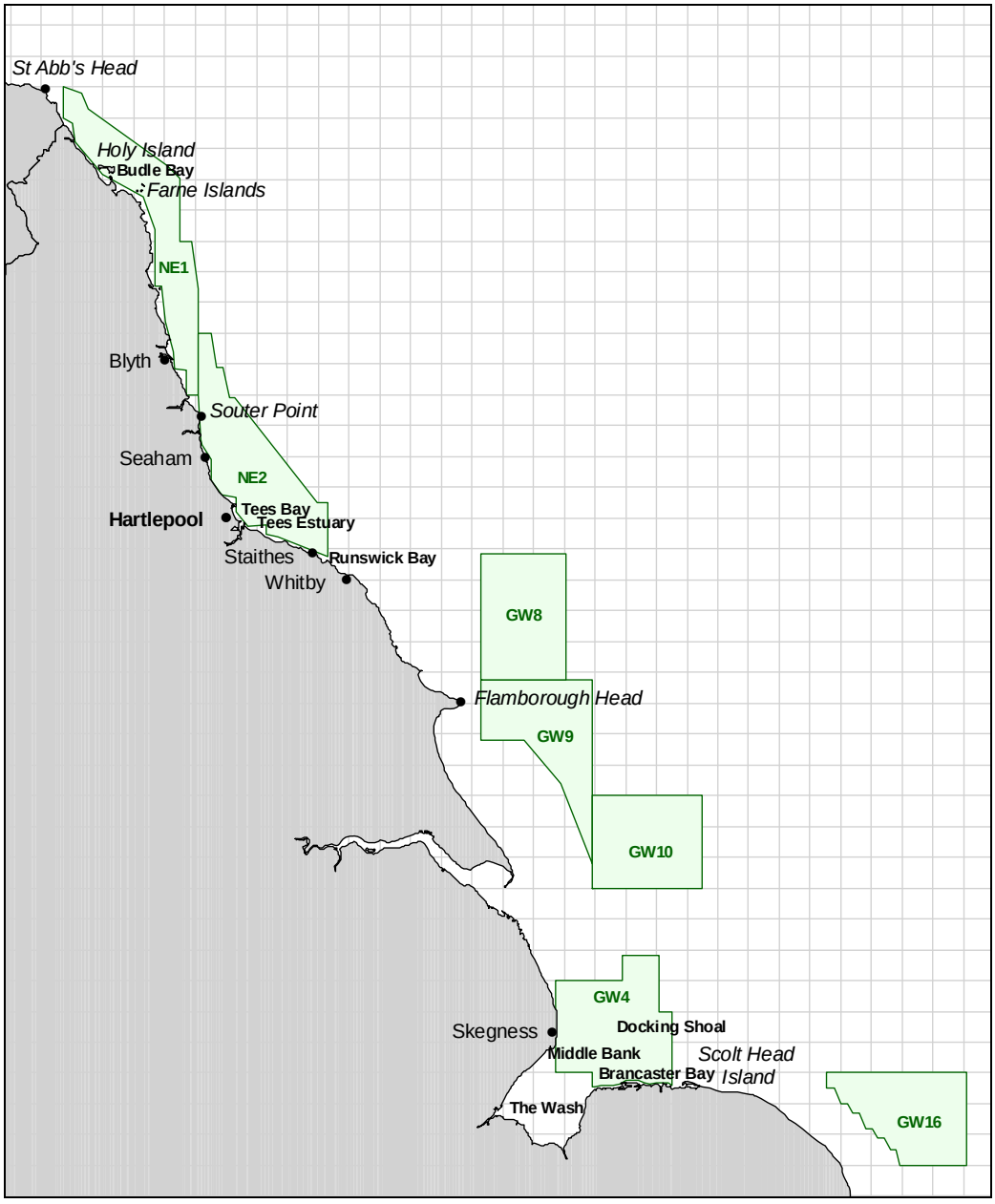


**Figure 5 - Observations of birds in the North West Area during aerial surveys, winter 2007/08.**

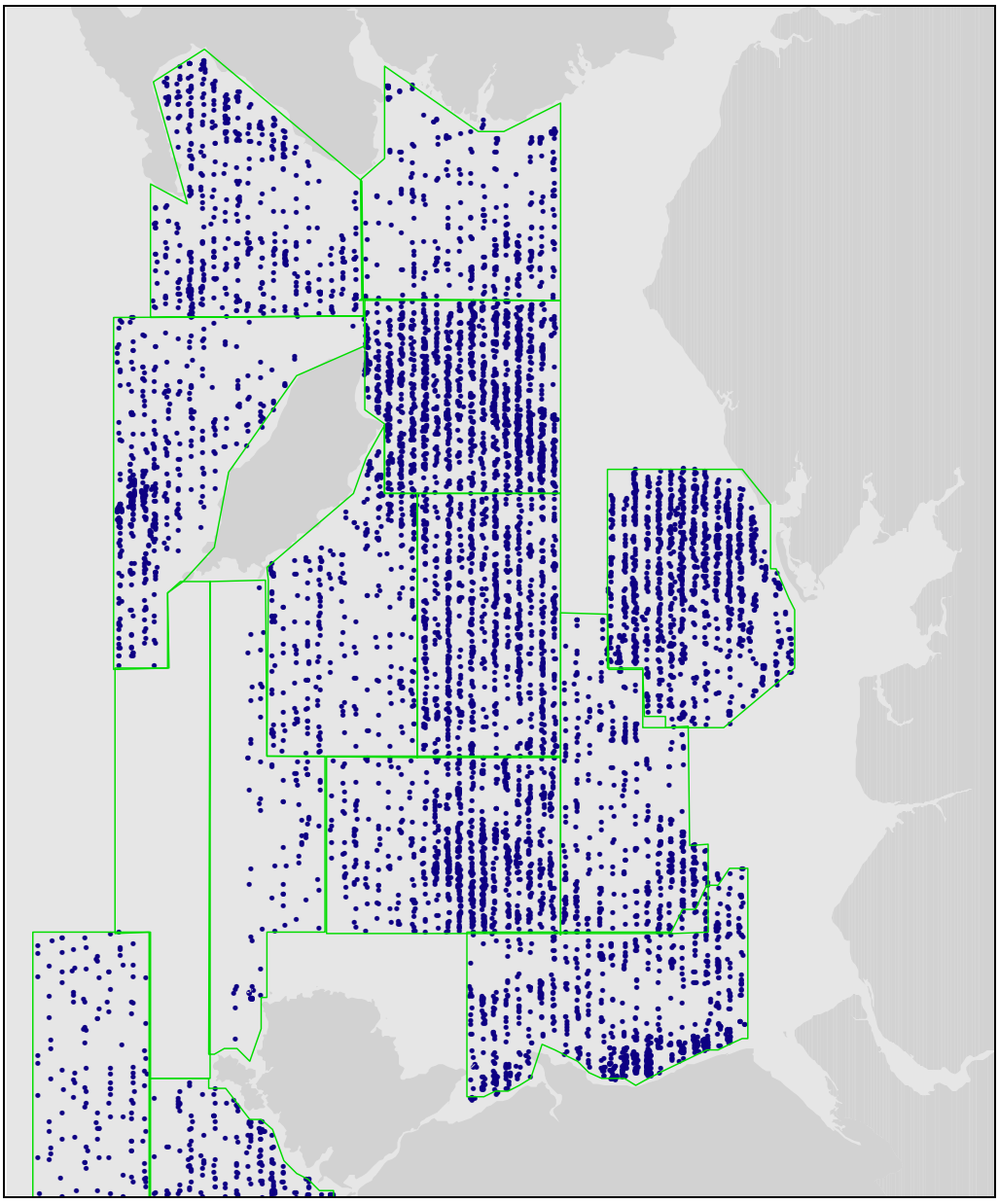


**Figure 6 - Observations of birds in the North West Area during aerial surveys, summer 2008.**

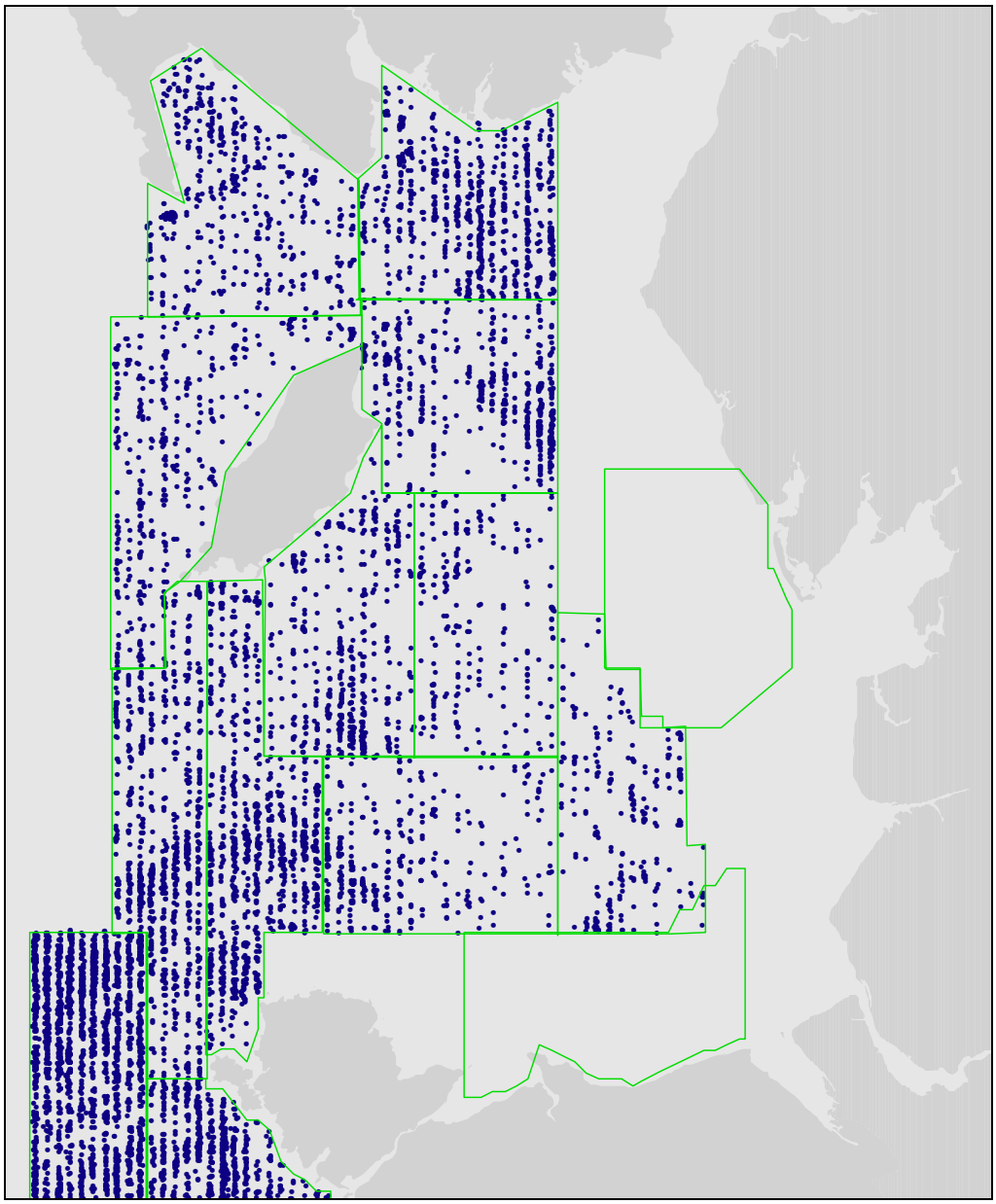


**Figure 7 – Observations of birds in the West Wales Area during aerial surveys, winter 2007/08.**

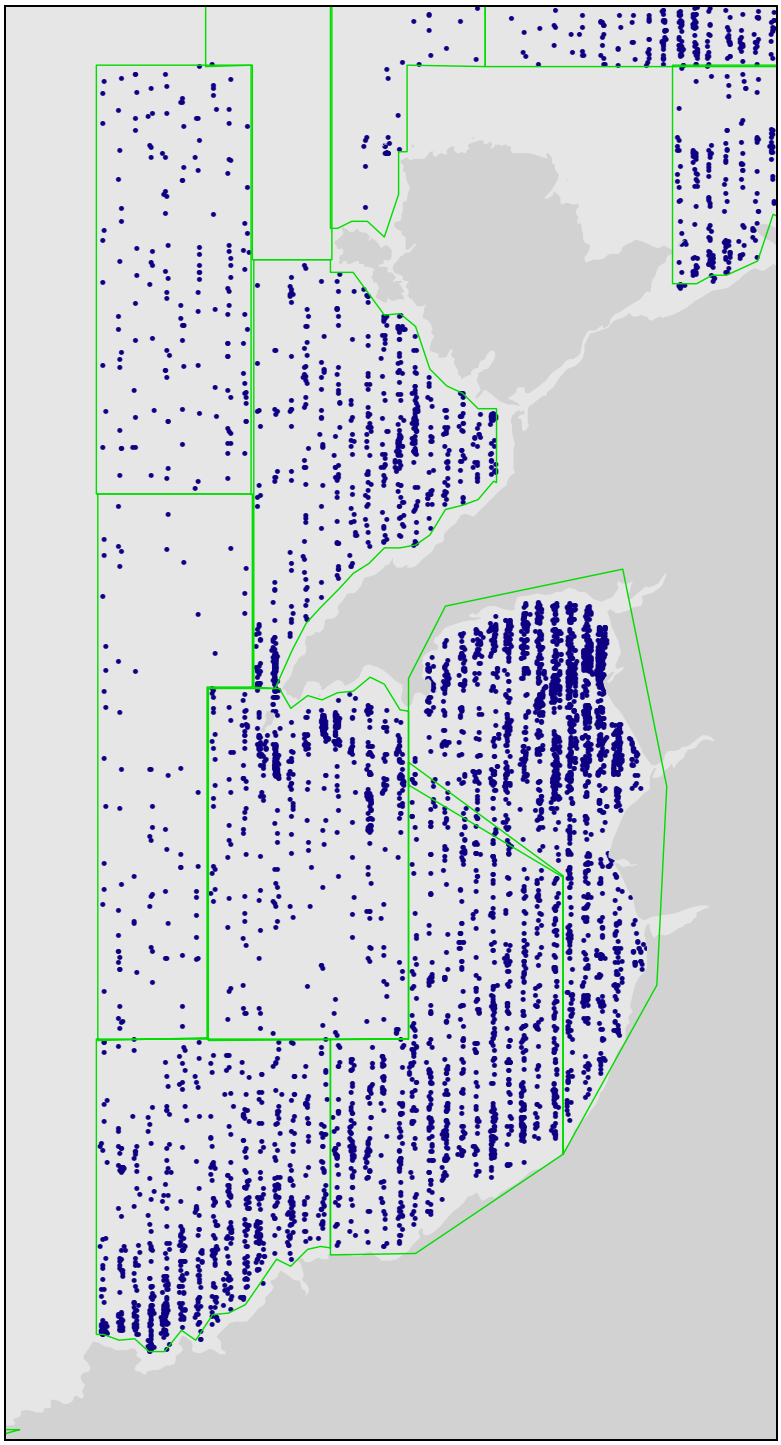


**Figure 8 - Observations of birds in the West Wales Area during aerial surveys, summer 2008.**

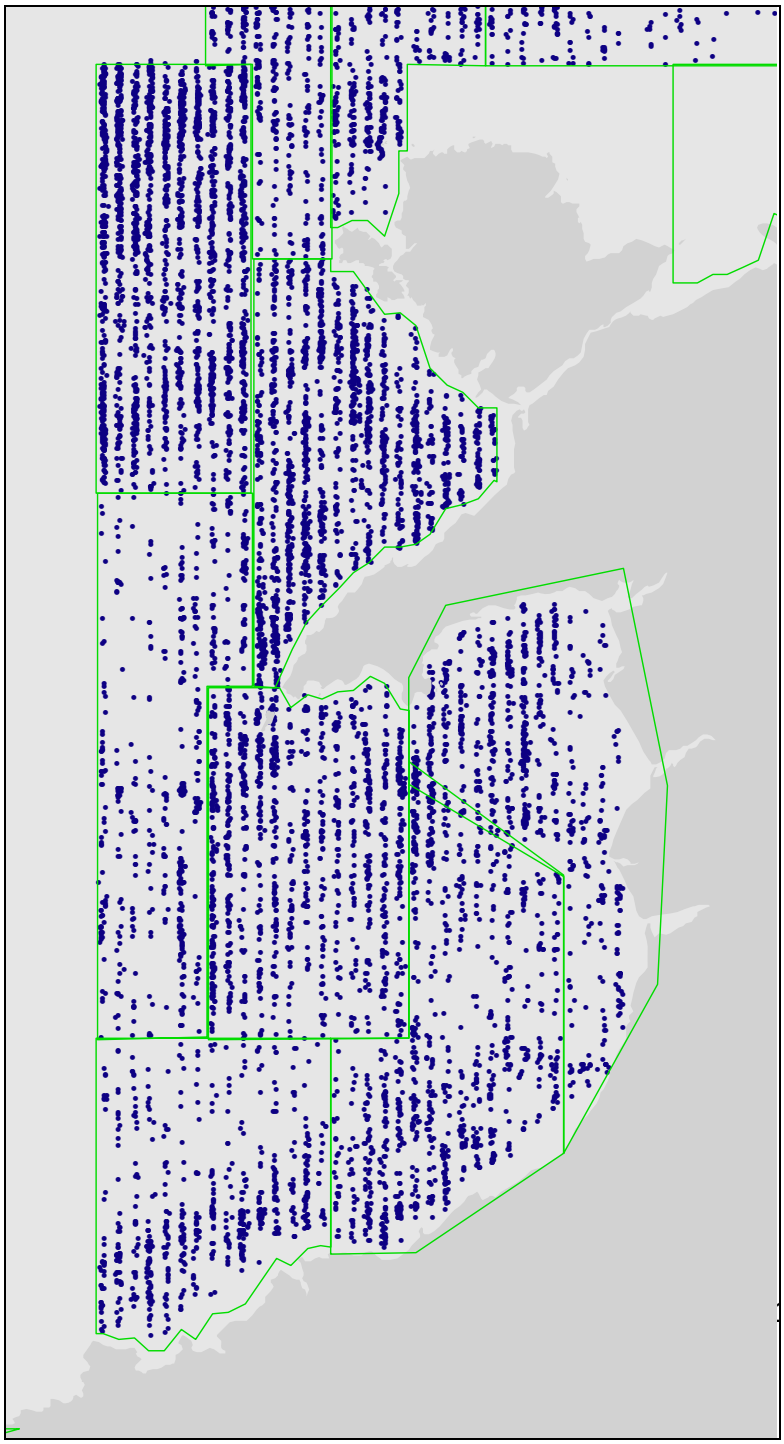


**Figure 9 - Observations of birds in the South West Area during aerial surveys, winter 2007/08.**

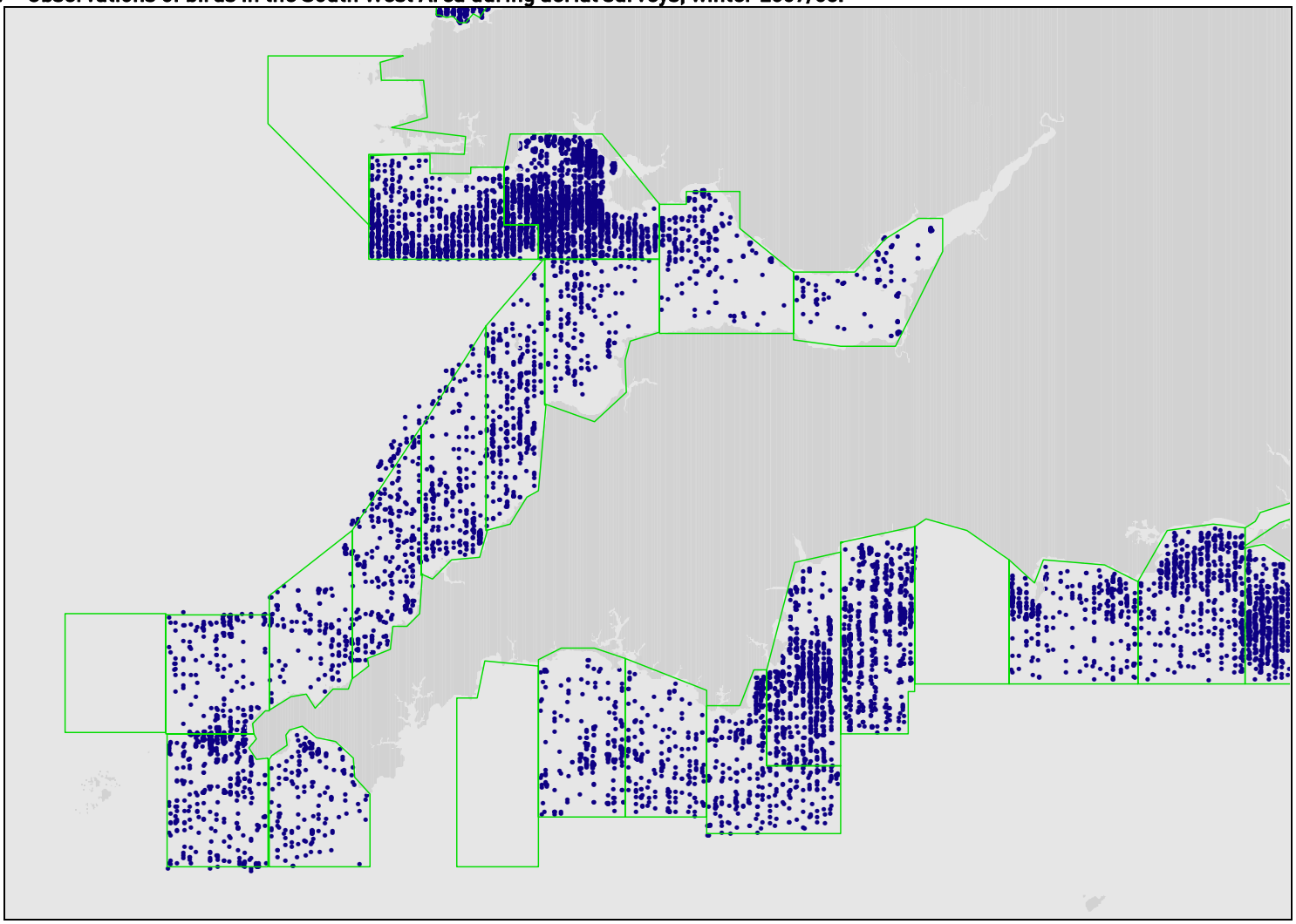


**Figure 10 - Observations of birds in the South West Area during aerial surveys, summer 2008.**

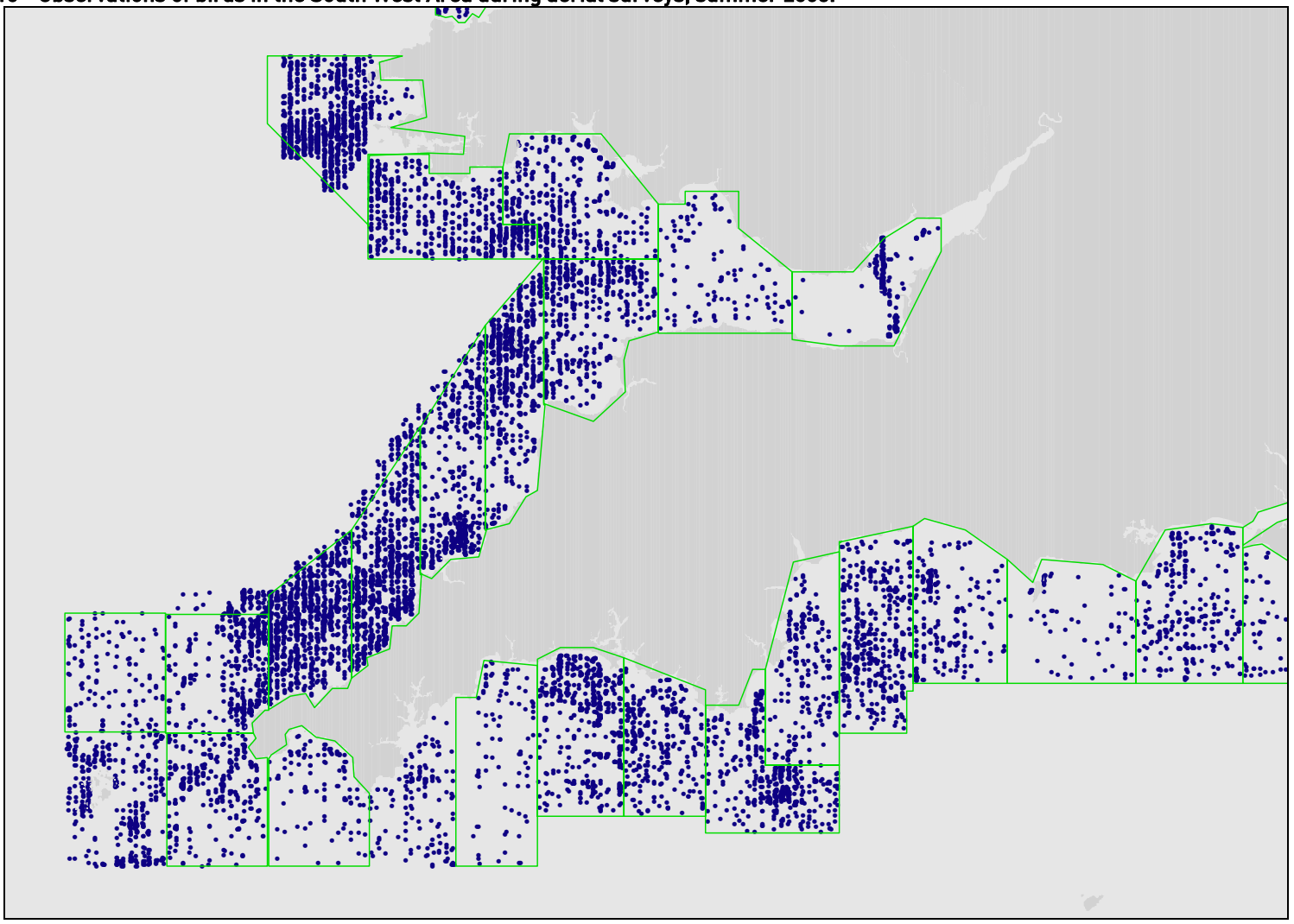


**Figure 11 - Observations of birds in the South East Area during aerial surveys, winter 2007/08.**

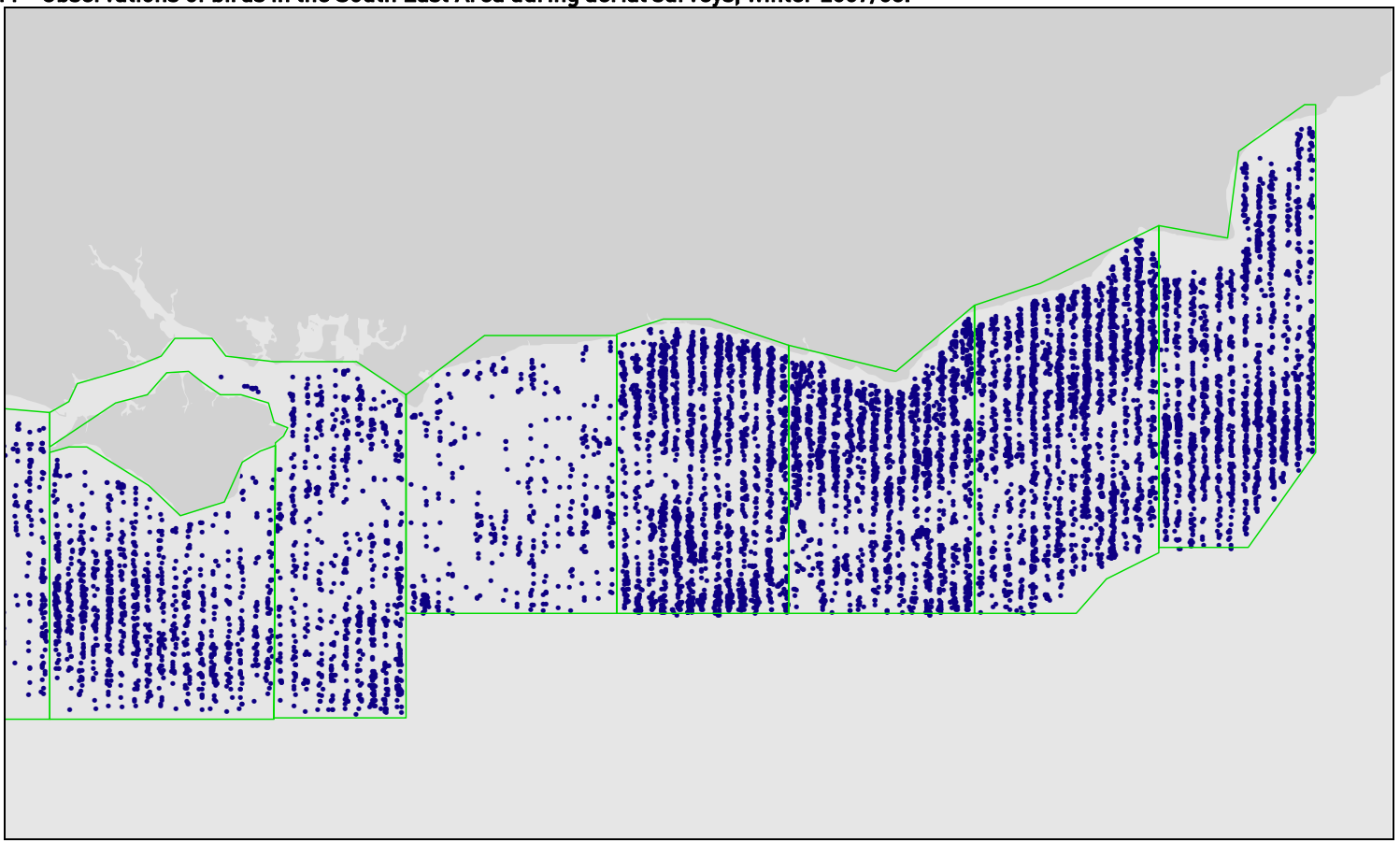


**Figure 12 - Observations of birds in the South East Area during aerial surveys, summer 2008.**

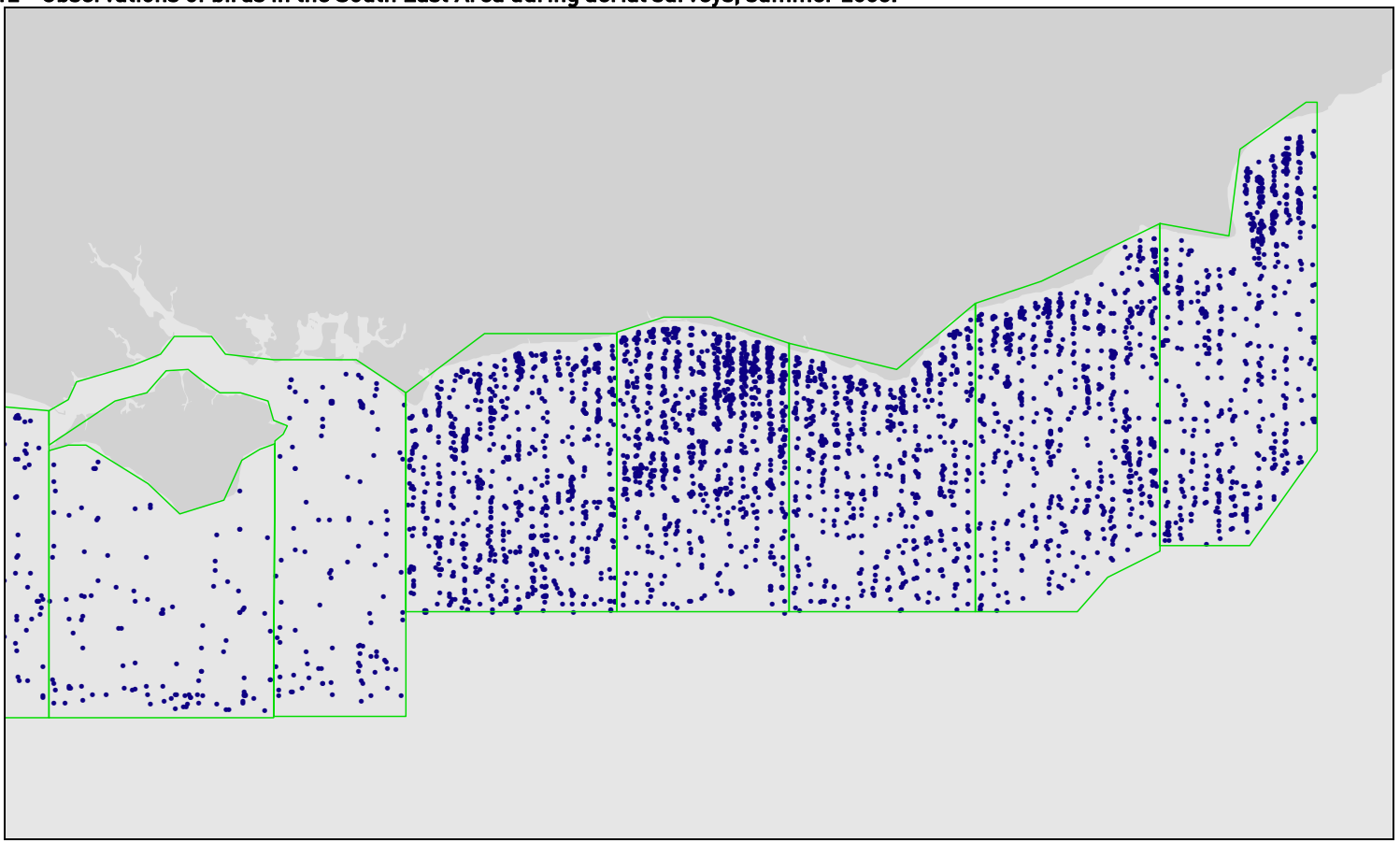


**Figure 13 - Observations of birds in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

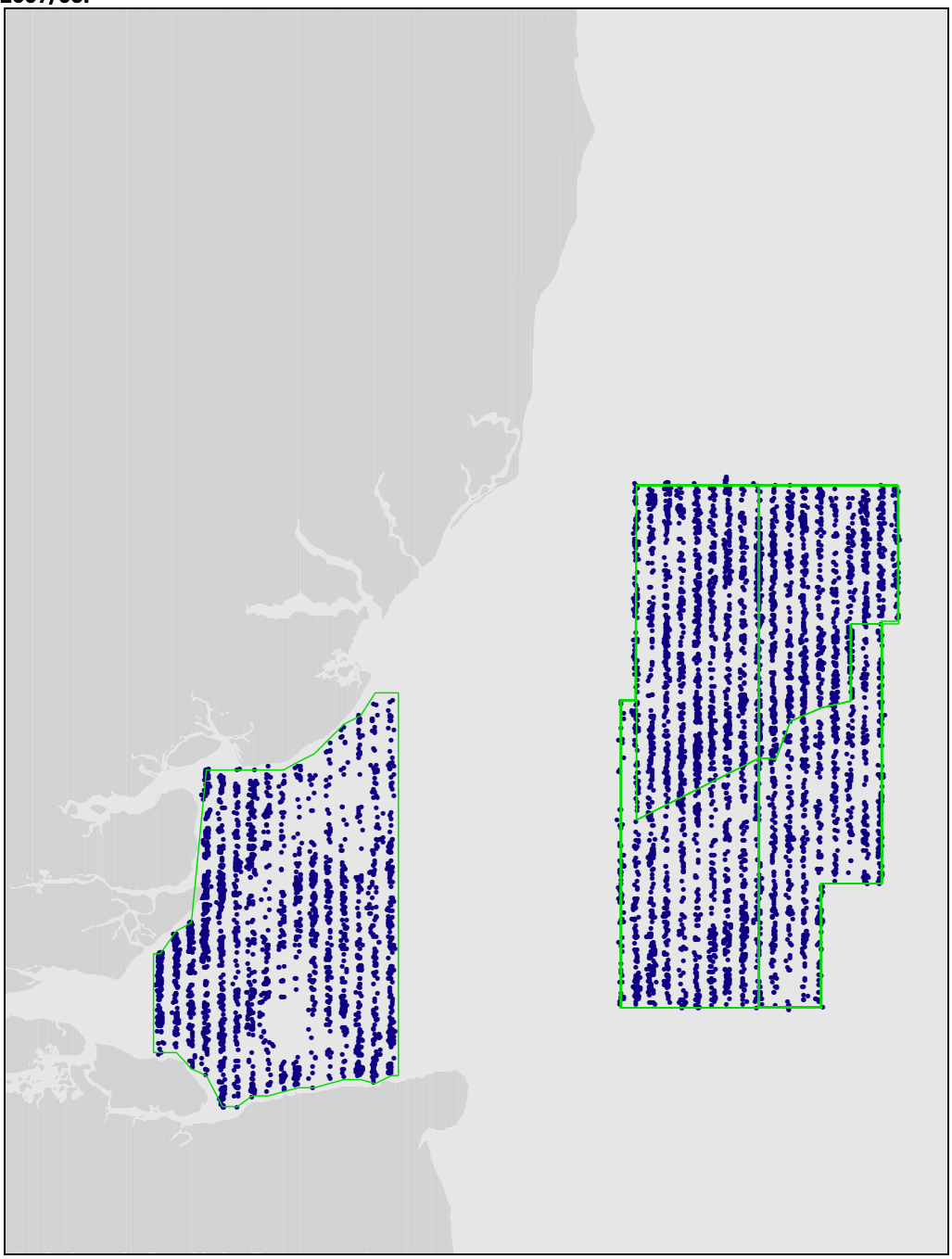


**Figure 14 - Observations of birds in the Greater Wash Area during aerial surveys, winter 2007/08.**

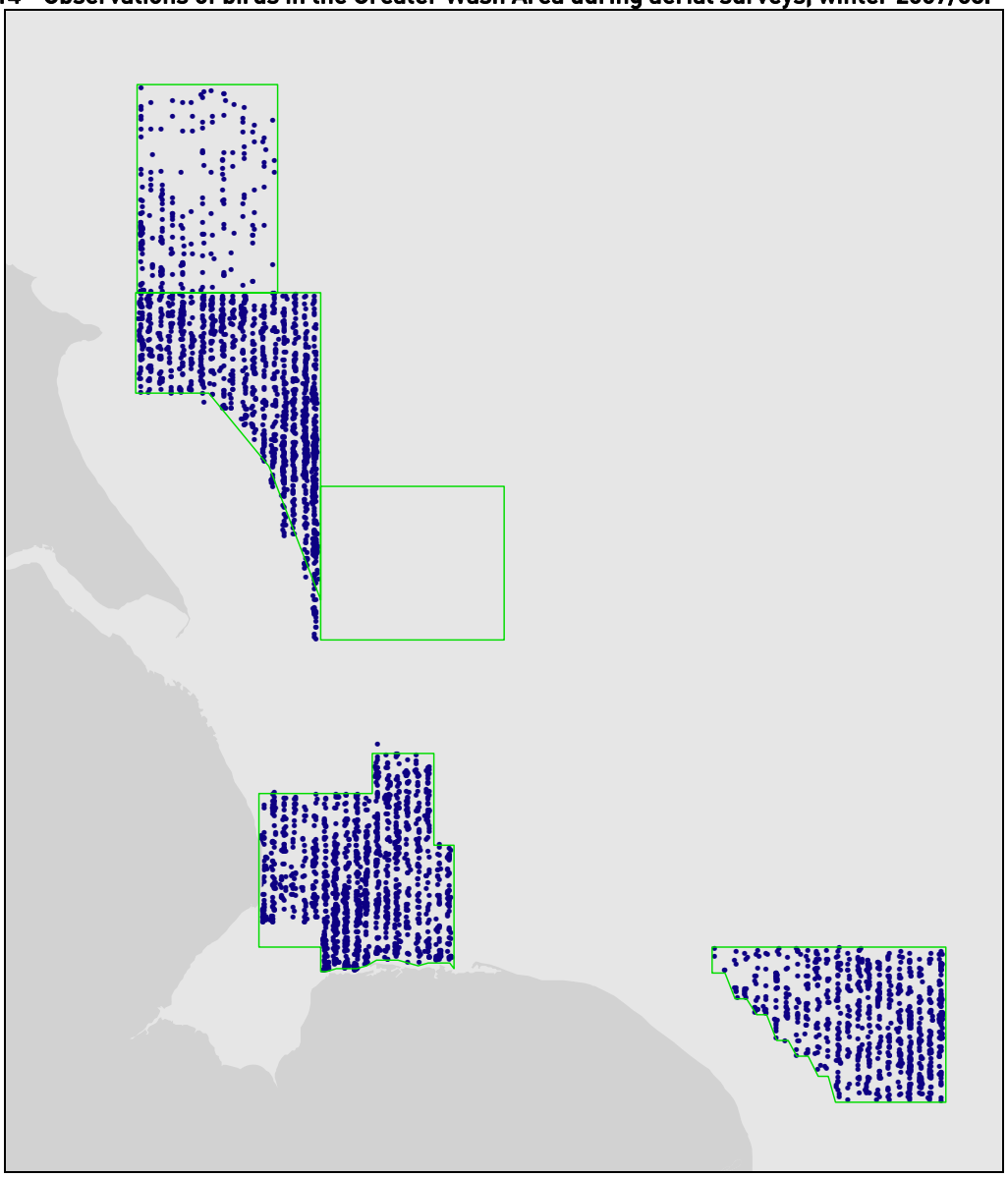


**Figure 15 - Observations of birds in the Greater Wash Area during aerial surveys, summer 2008.**

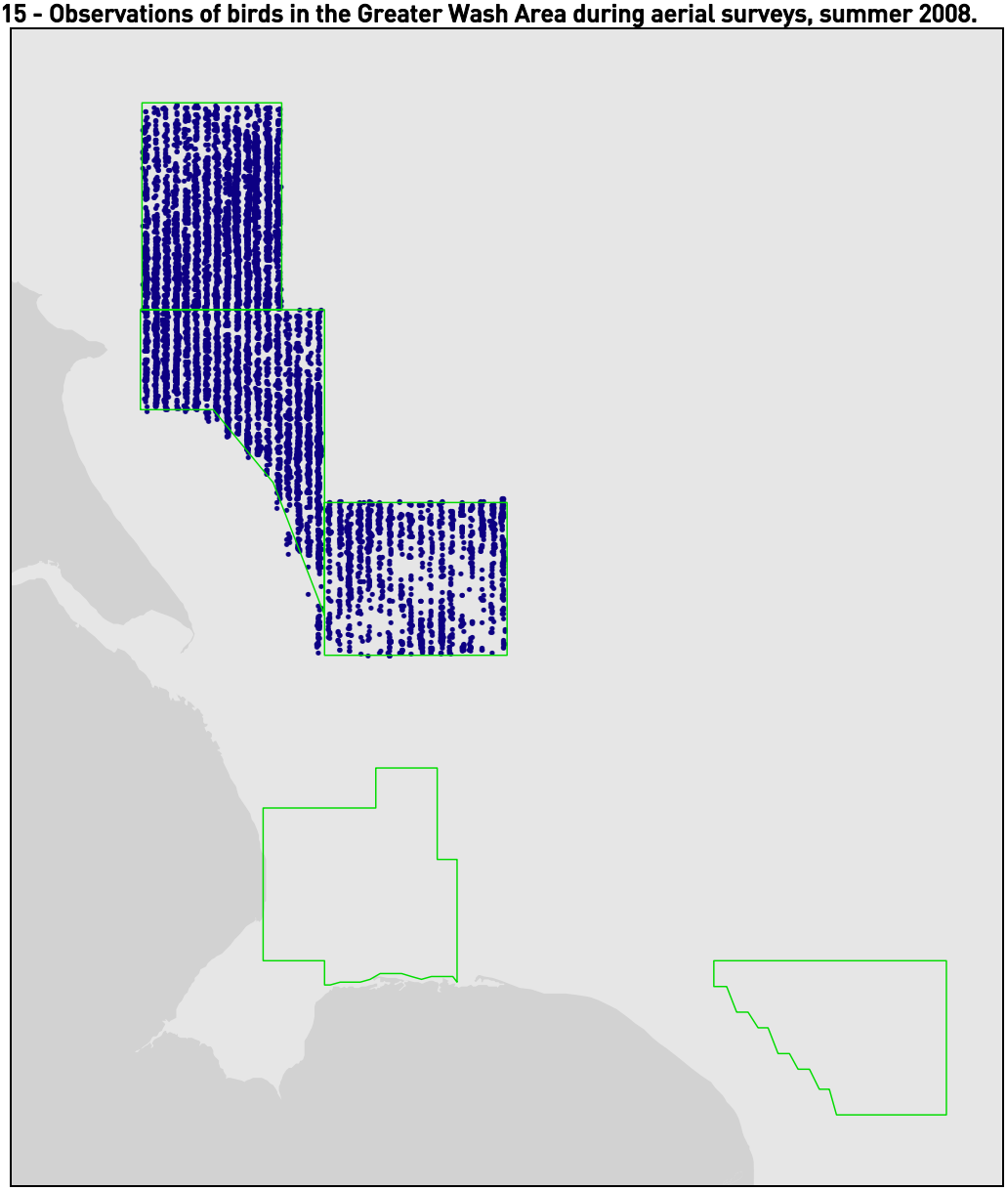


**Figure 16 - Observations of birds in the North East Area during aerial surveys, winter 2007/08.**

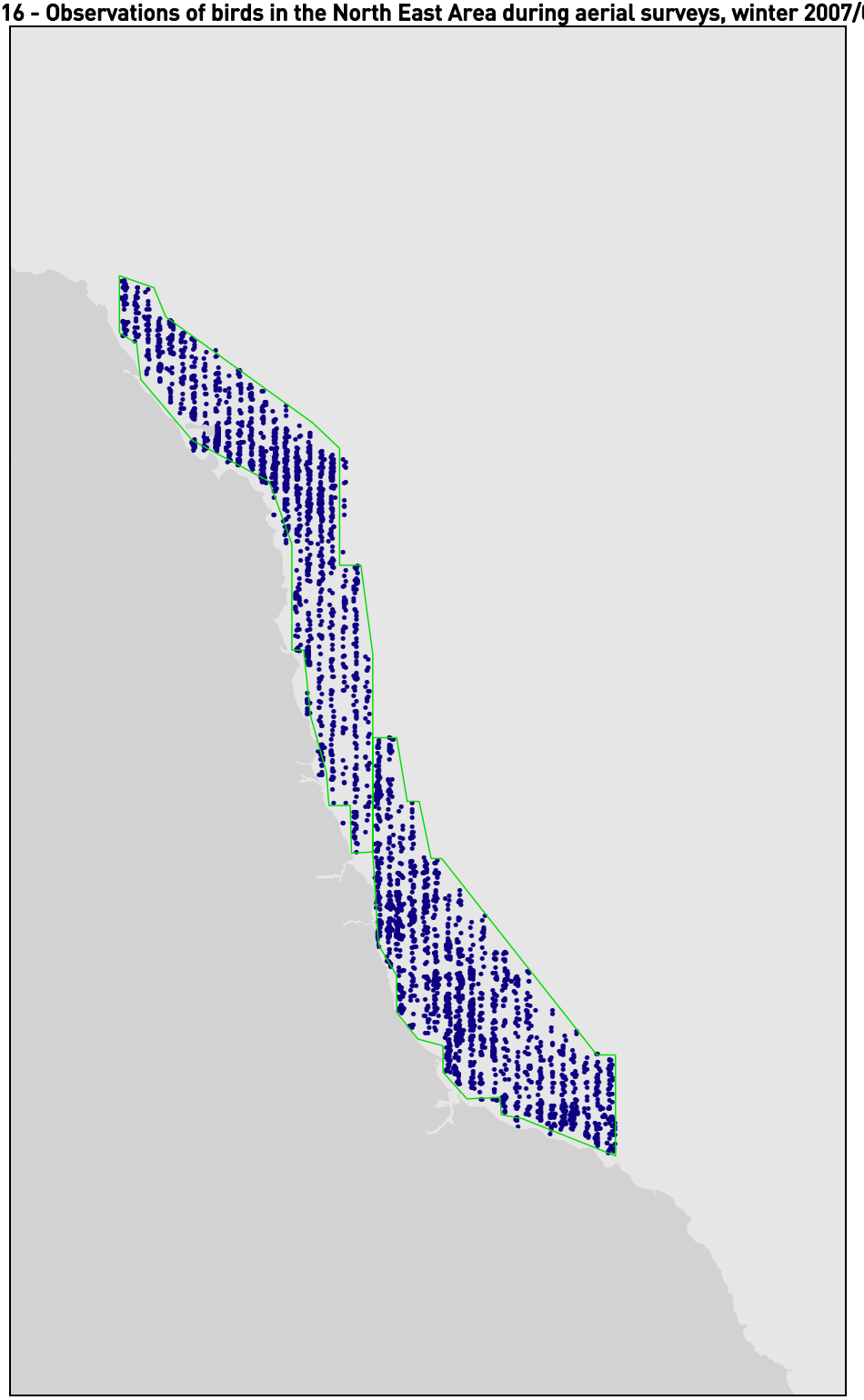


**Figure 17 - Observations of birds in the North East Area during aerial surveys, summer 2008.**

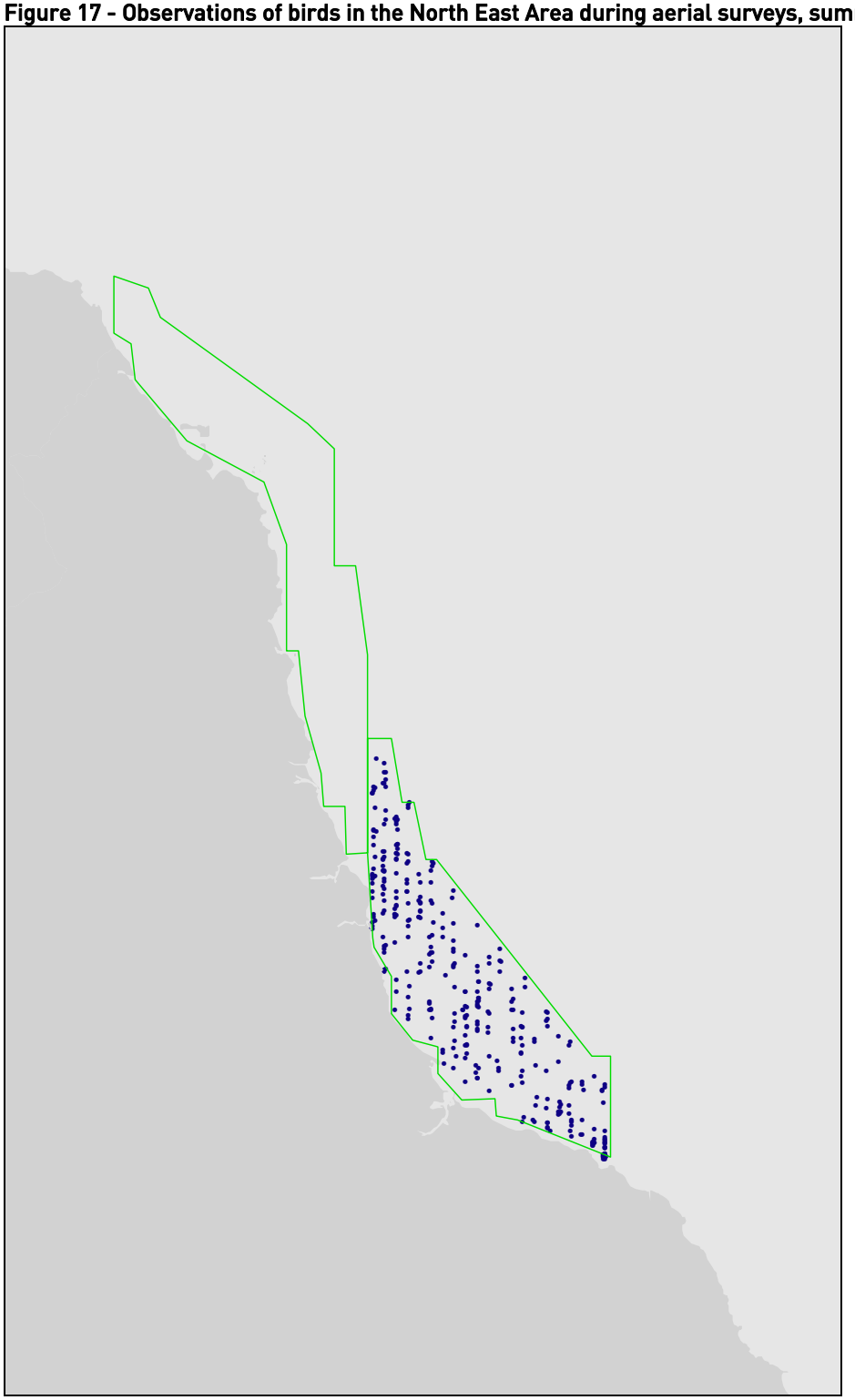


**Figure 18 - Relative density of birds recorded in the North West Area during aerial surveys, winter 2007/08.**

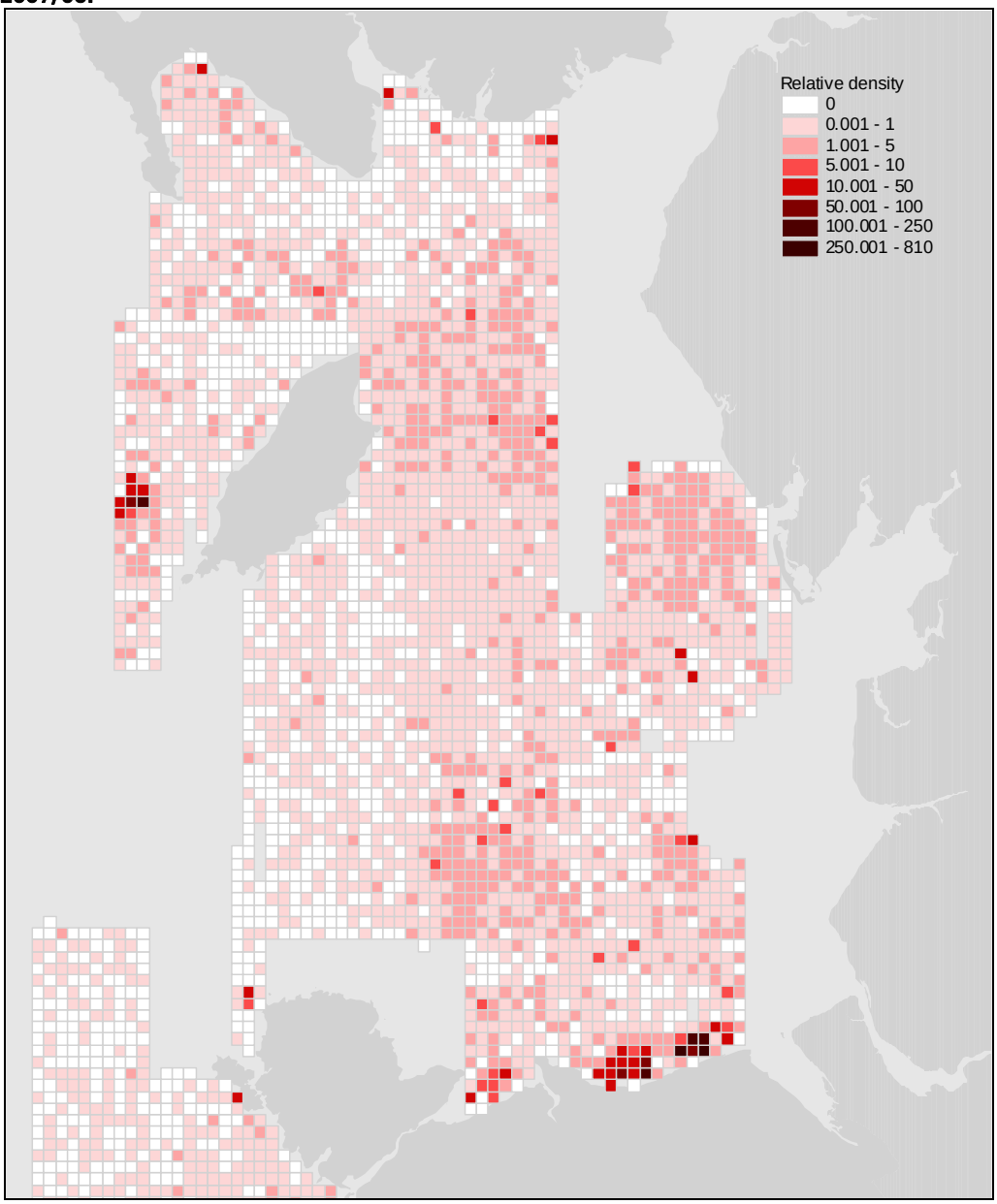


**Figure 19 - Relative density of birds recorded in the North West Area during aerial surveys, summer 2008.**

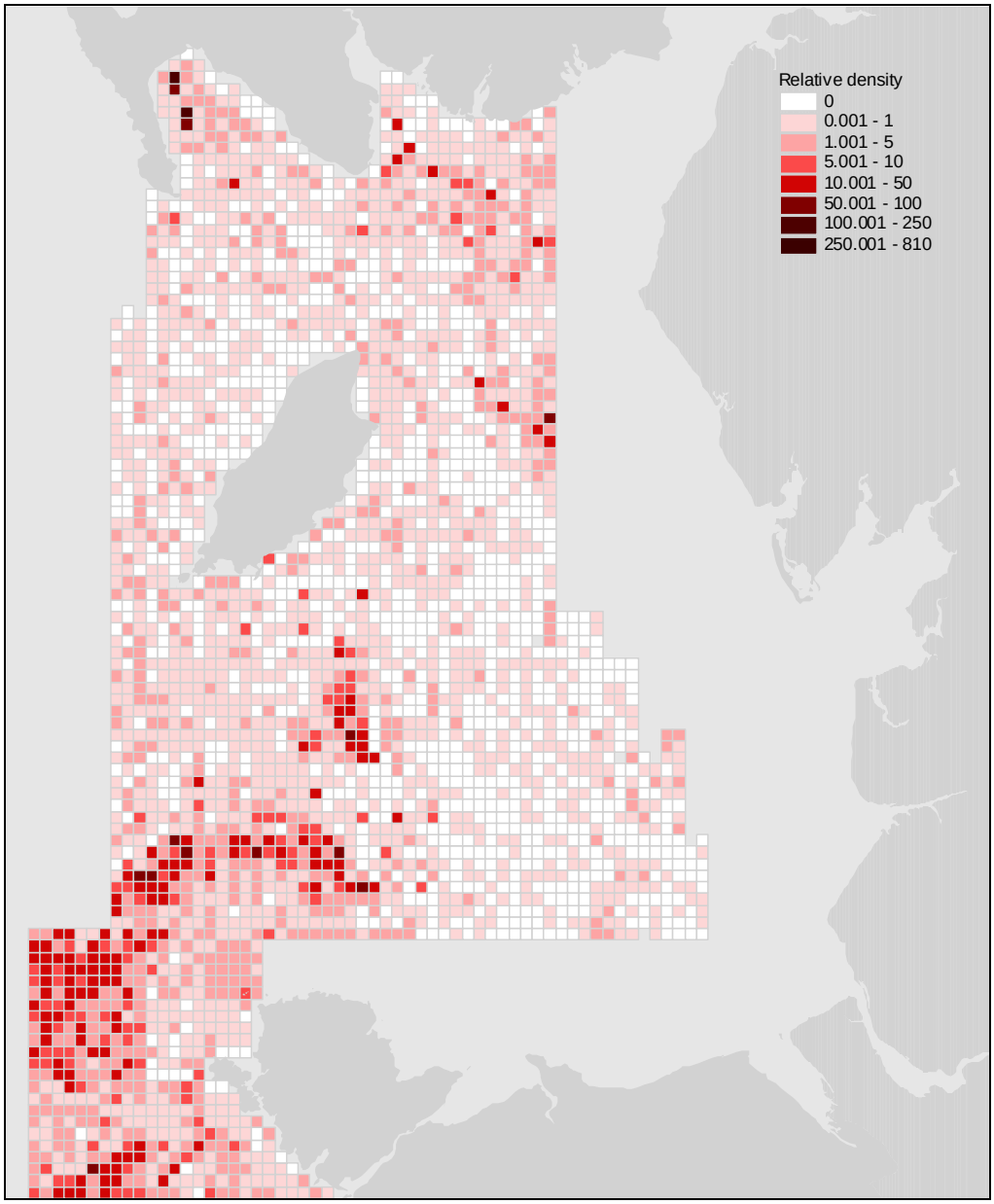


**Figure 20 - Relative density of birds recorded in the West Wales Area during aerial surveys, winter 2007/08.**

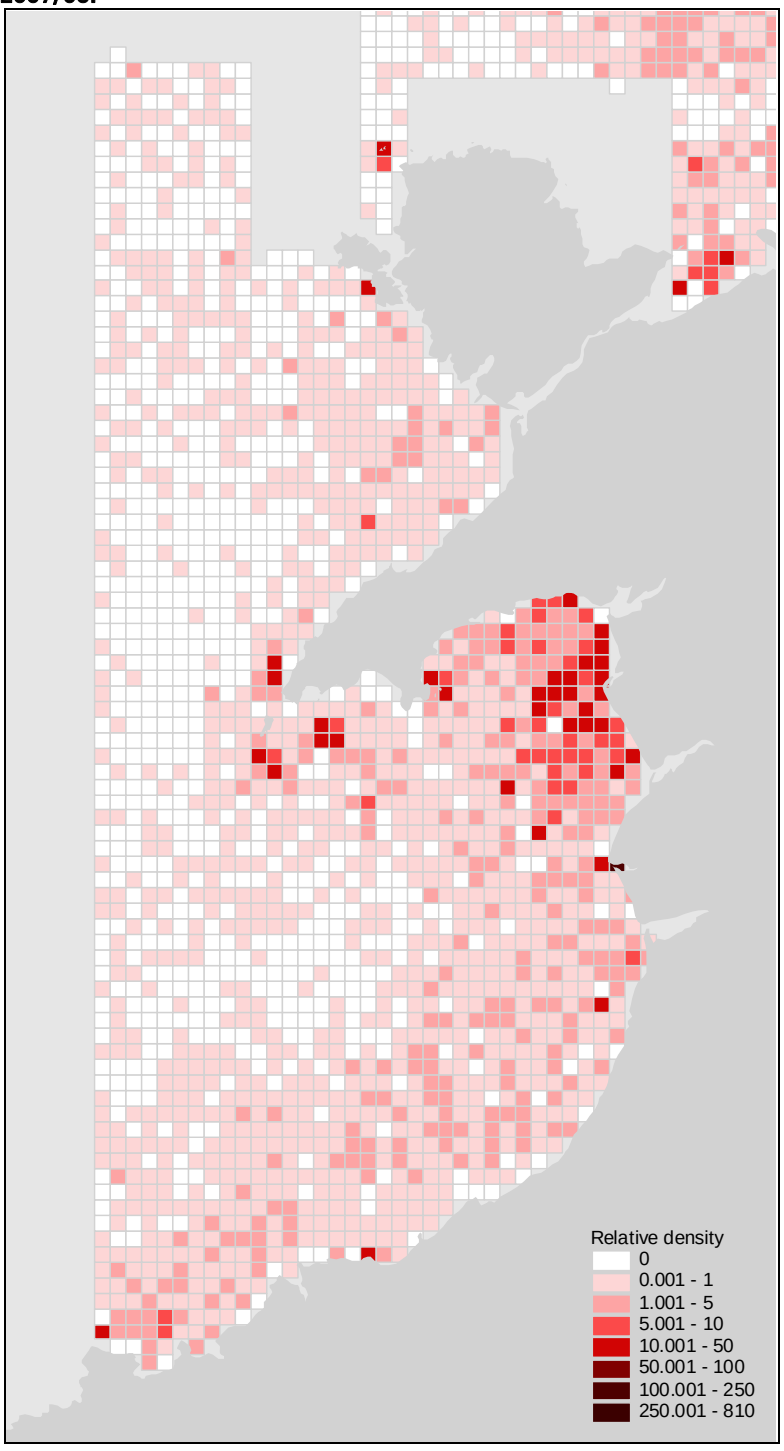


**Figure 21 - Relative density of birds recorded in the West Wales Area during aerial surveys, summer 2008.**

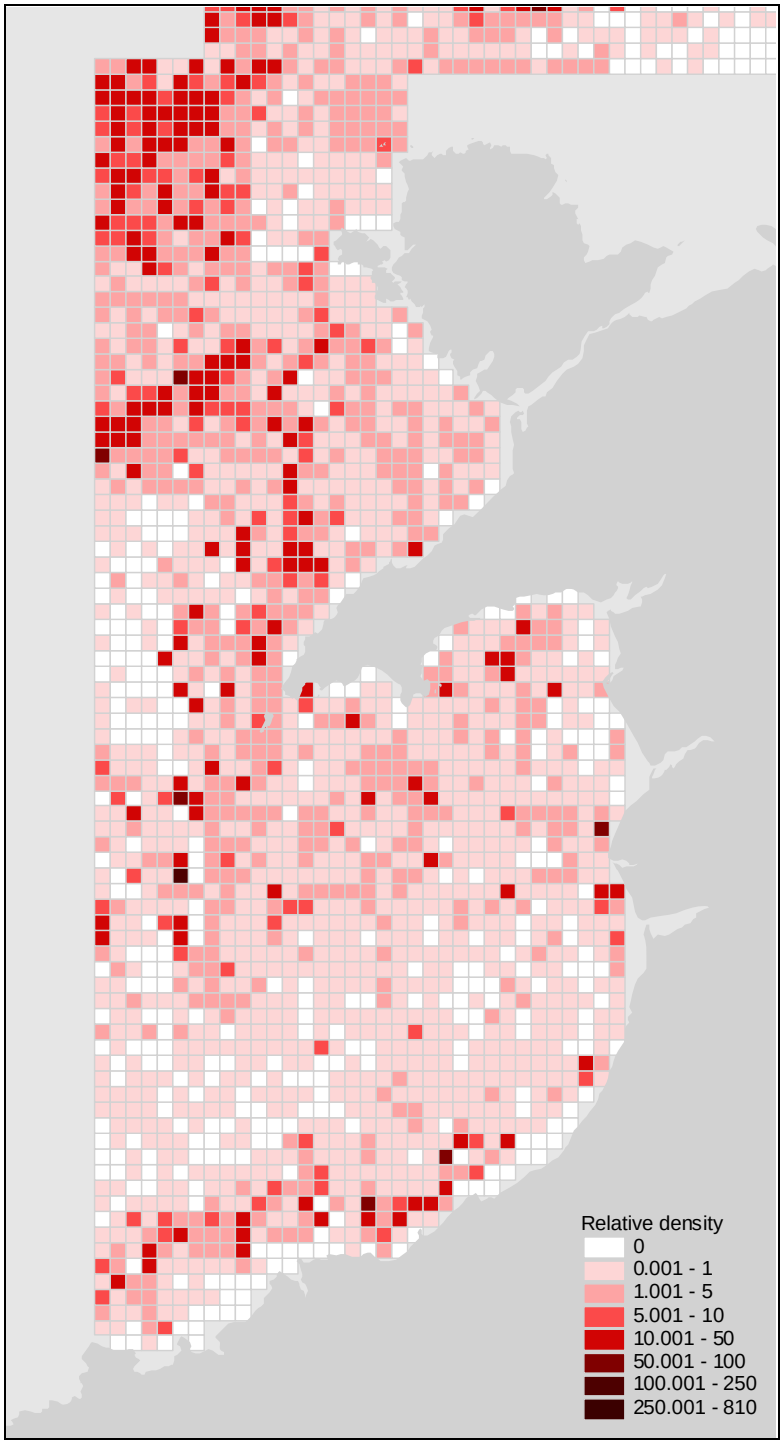


**Figure 22 - Relative density of birds recorded in the South West Area during aerial surveys, winter 2007/08.**

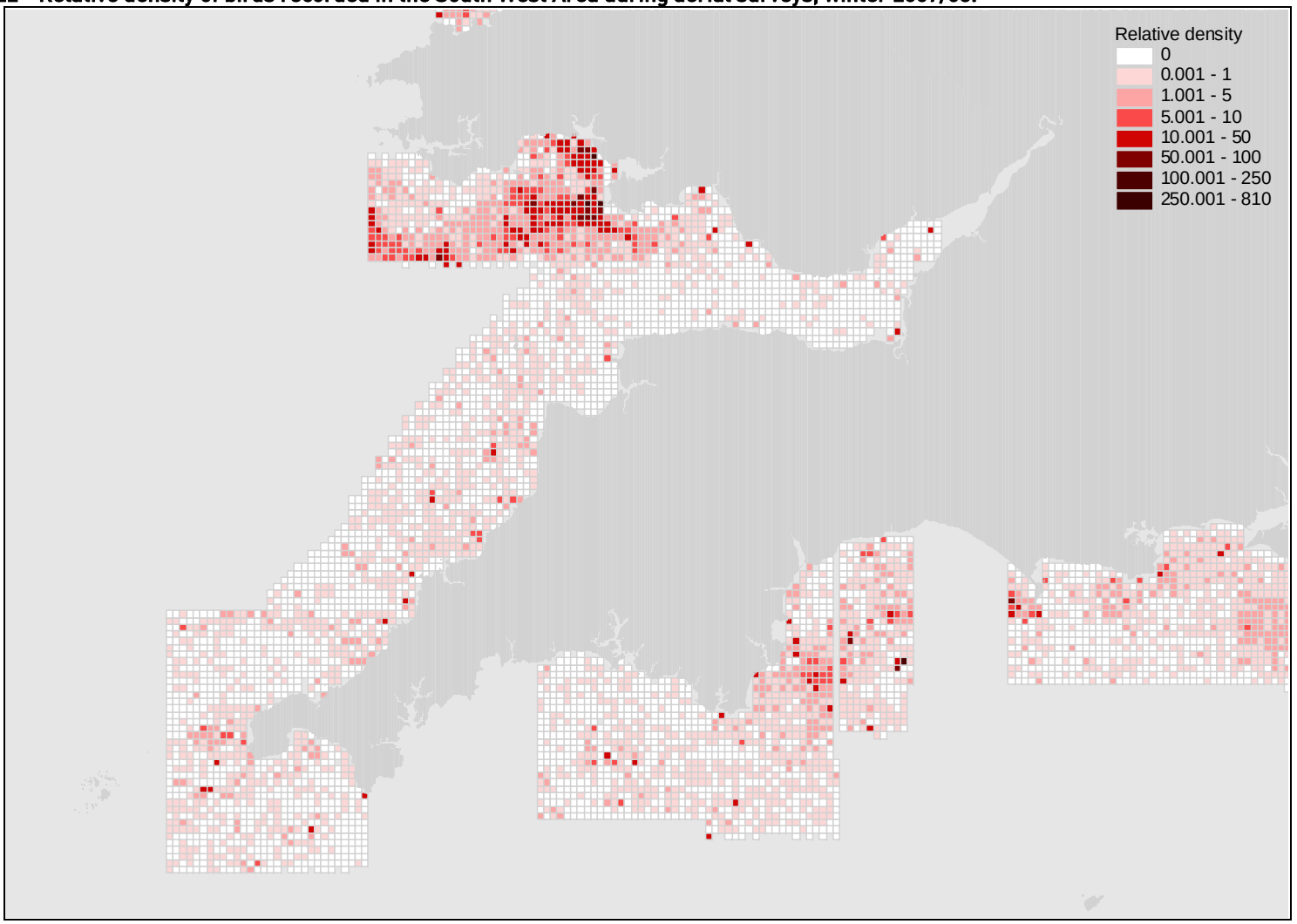


**Figure 23 - Relative density of birds recorded in the South West Area during aerial surveys, summer 2008.**

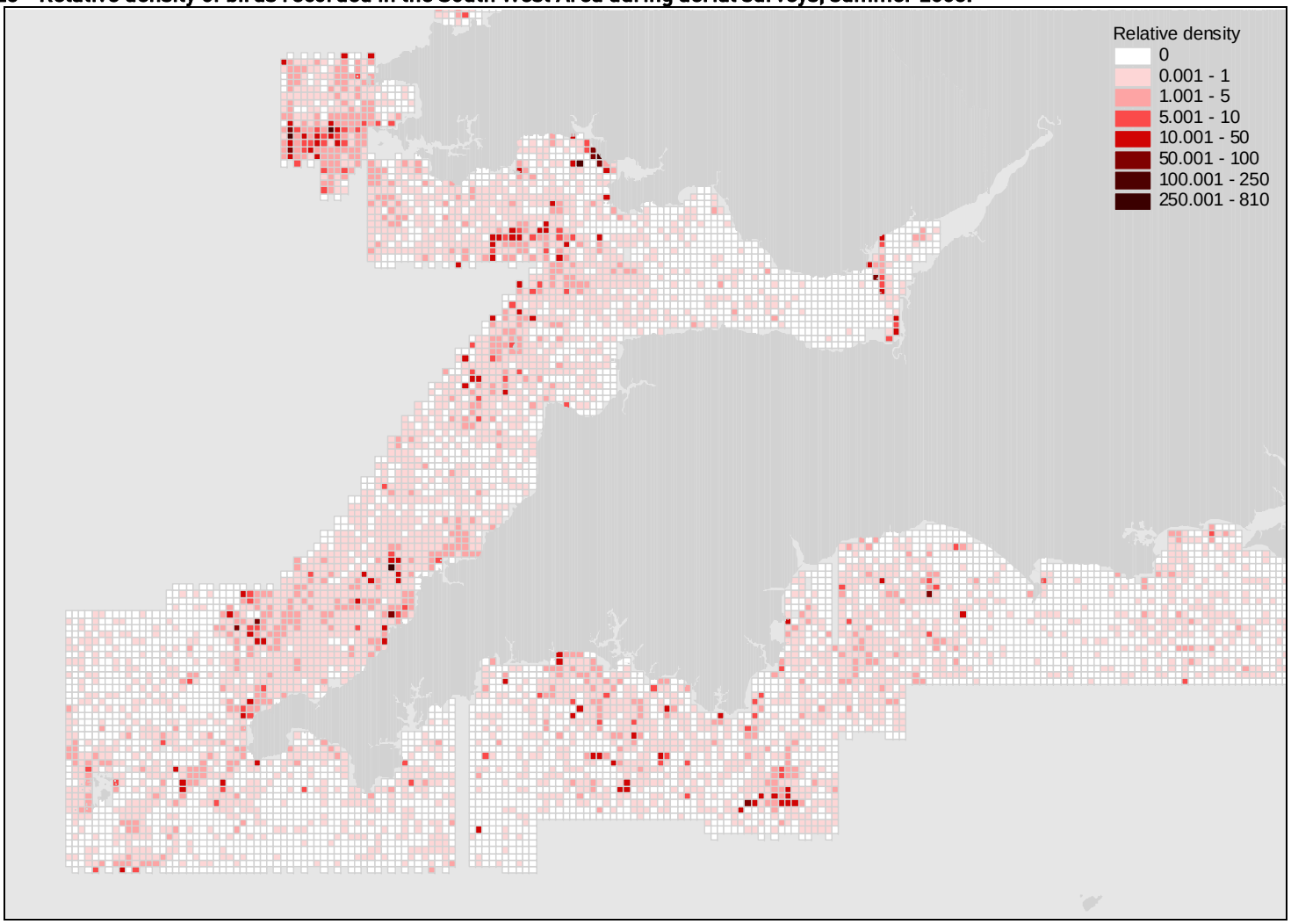


**Figure 24 - Relative density of birds recorded in the South East Area during aerial surveys, winter 2007/08.**

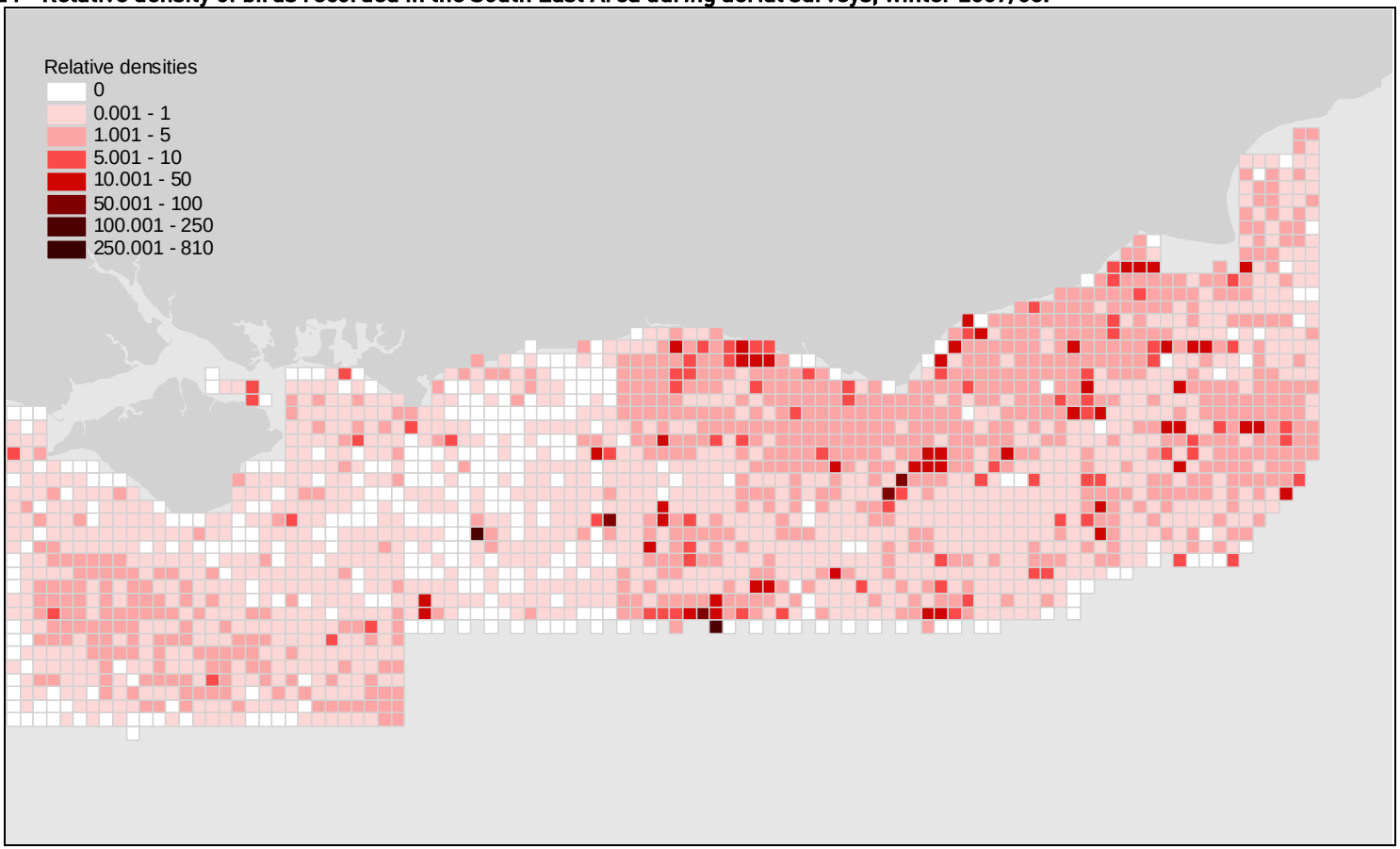


**Figure 25 - Relative density of birds recorded in the South East Area during aerial surveys, summer 2008.**

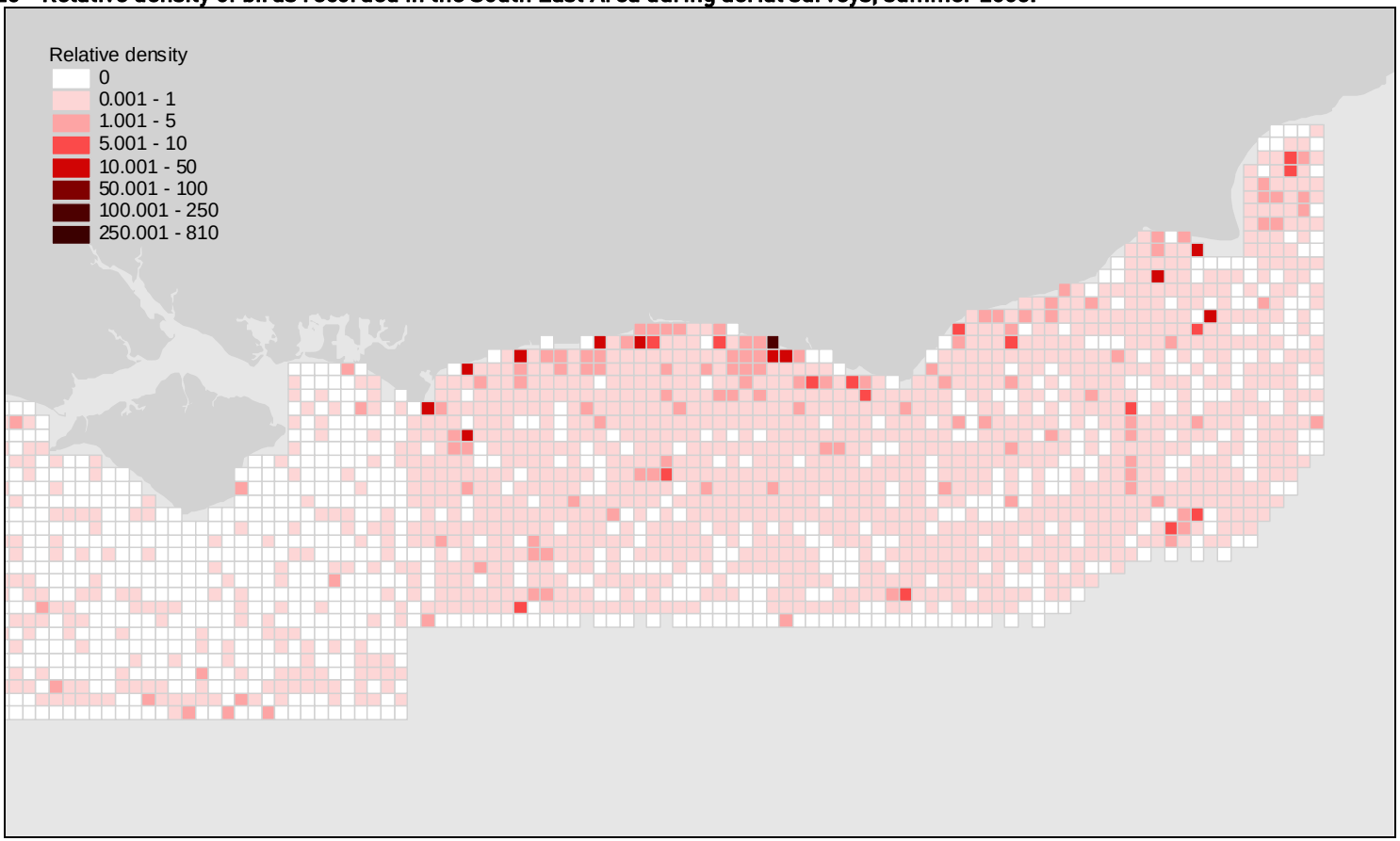


**Figure 26 - Relative density of birds recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

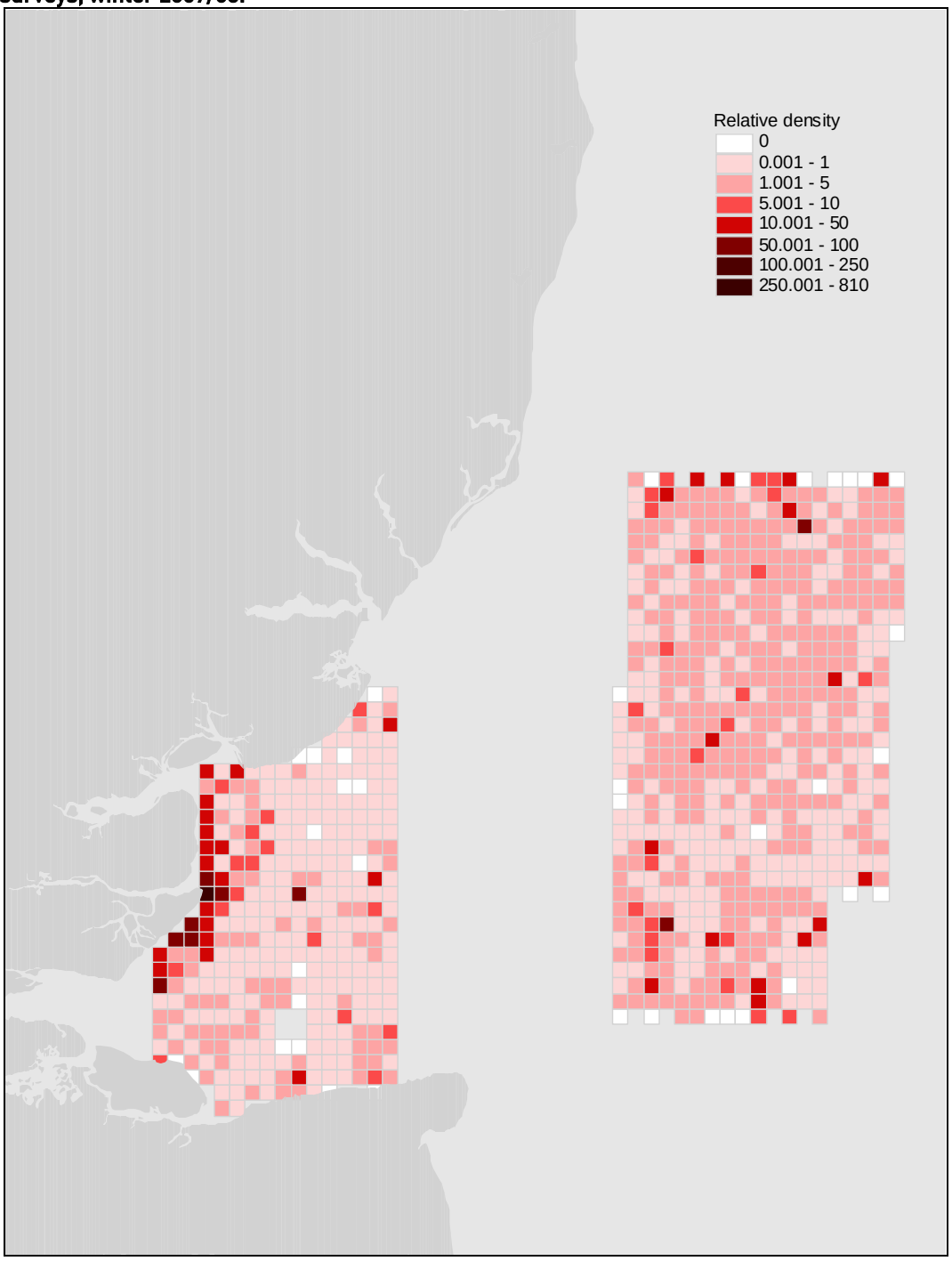


**Figure 27 - Relative density of birds recorded in the Greater Wash Area during aerial surveys, winter 2007/08.**

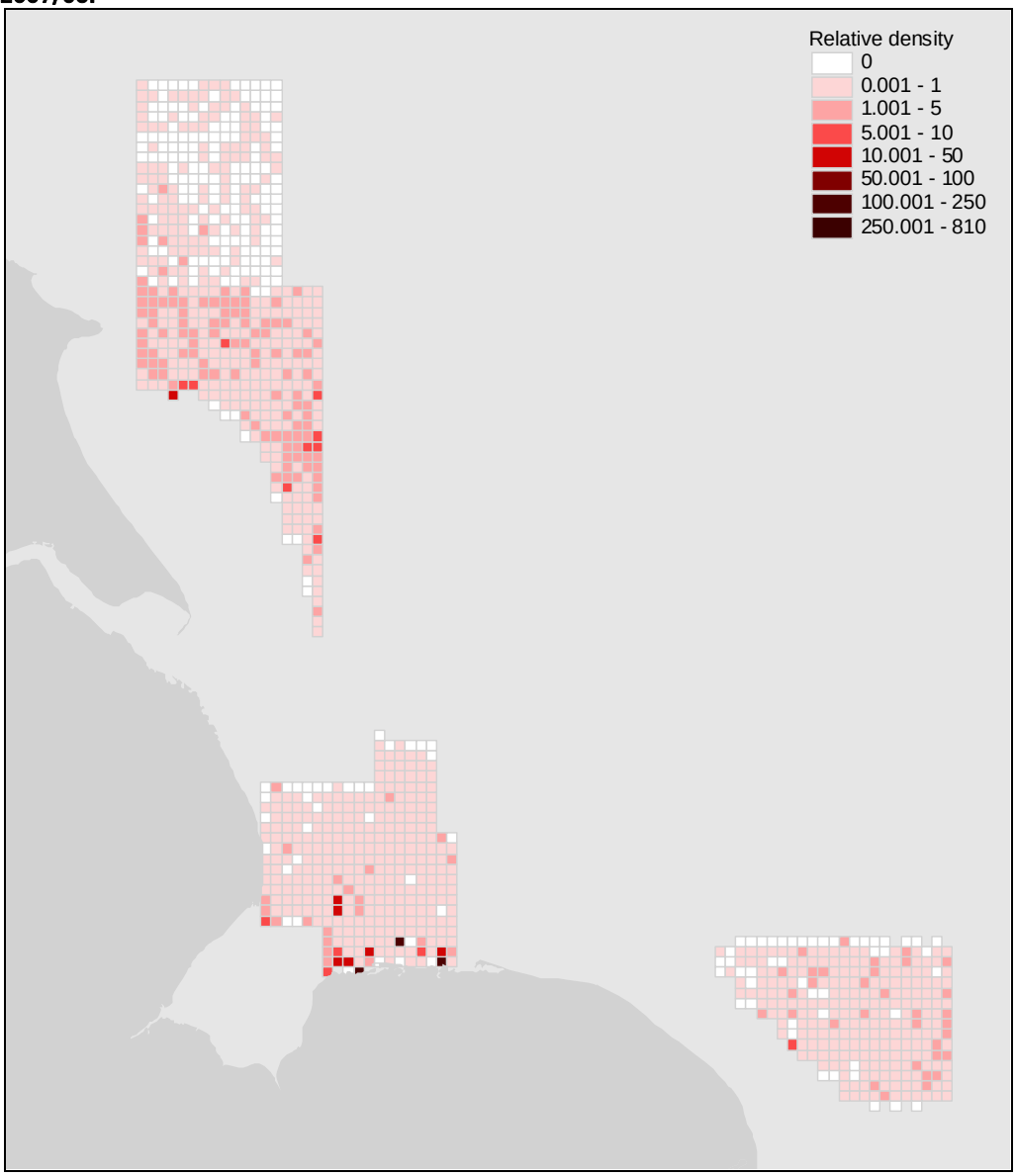


**Figure 28 - Relative density of birds recorded in the Greater Wash Area during aerial surveys, summer 2008.**

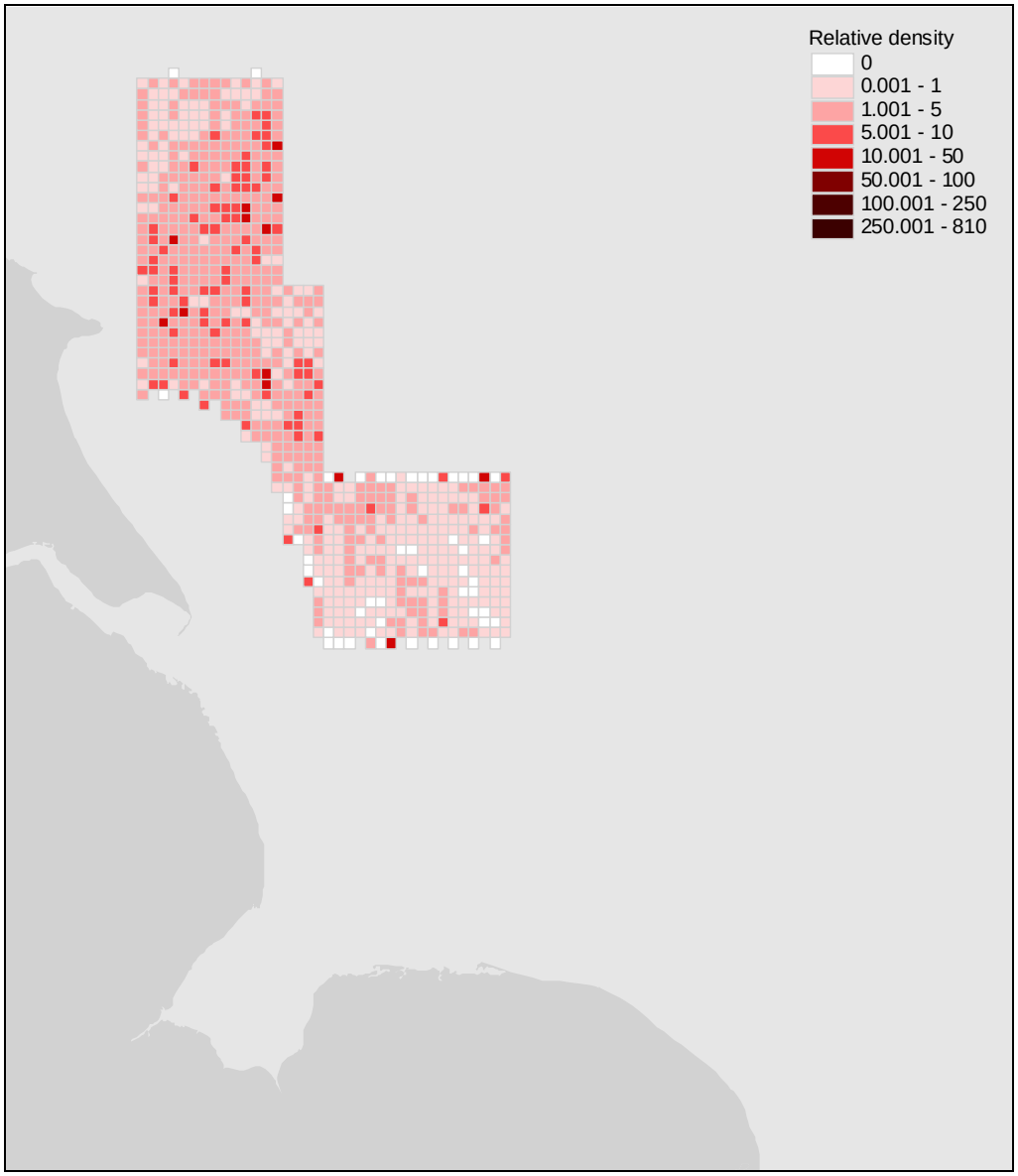


**Figure 29 - Relative density of birds recorded in the North East Area during aerial surveys, winter 2007/08.**

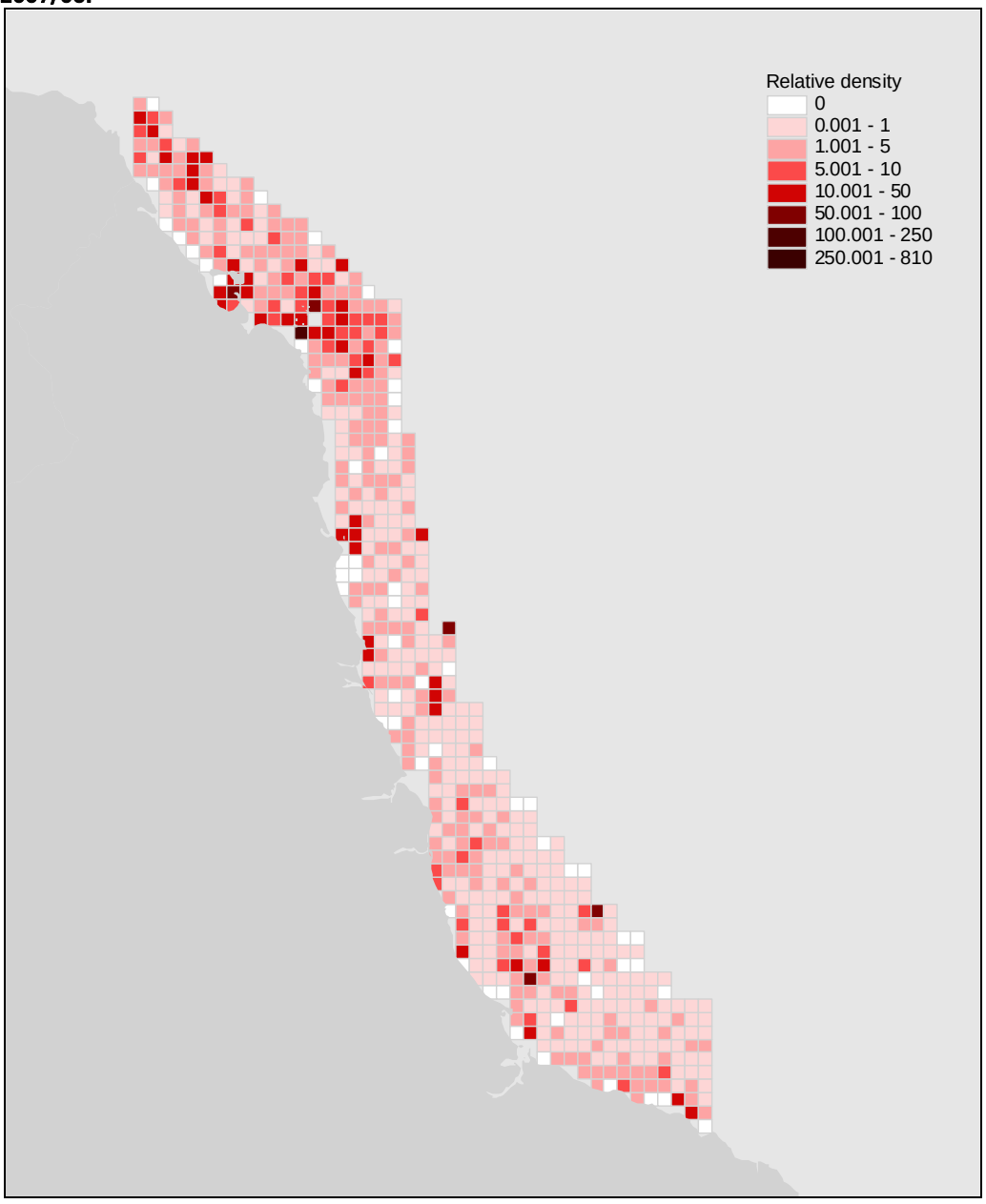


**Figure 30 - Relative density of birds recorded in the North East Area during aerial surveys, summer 2008.**

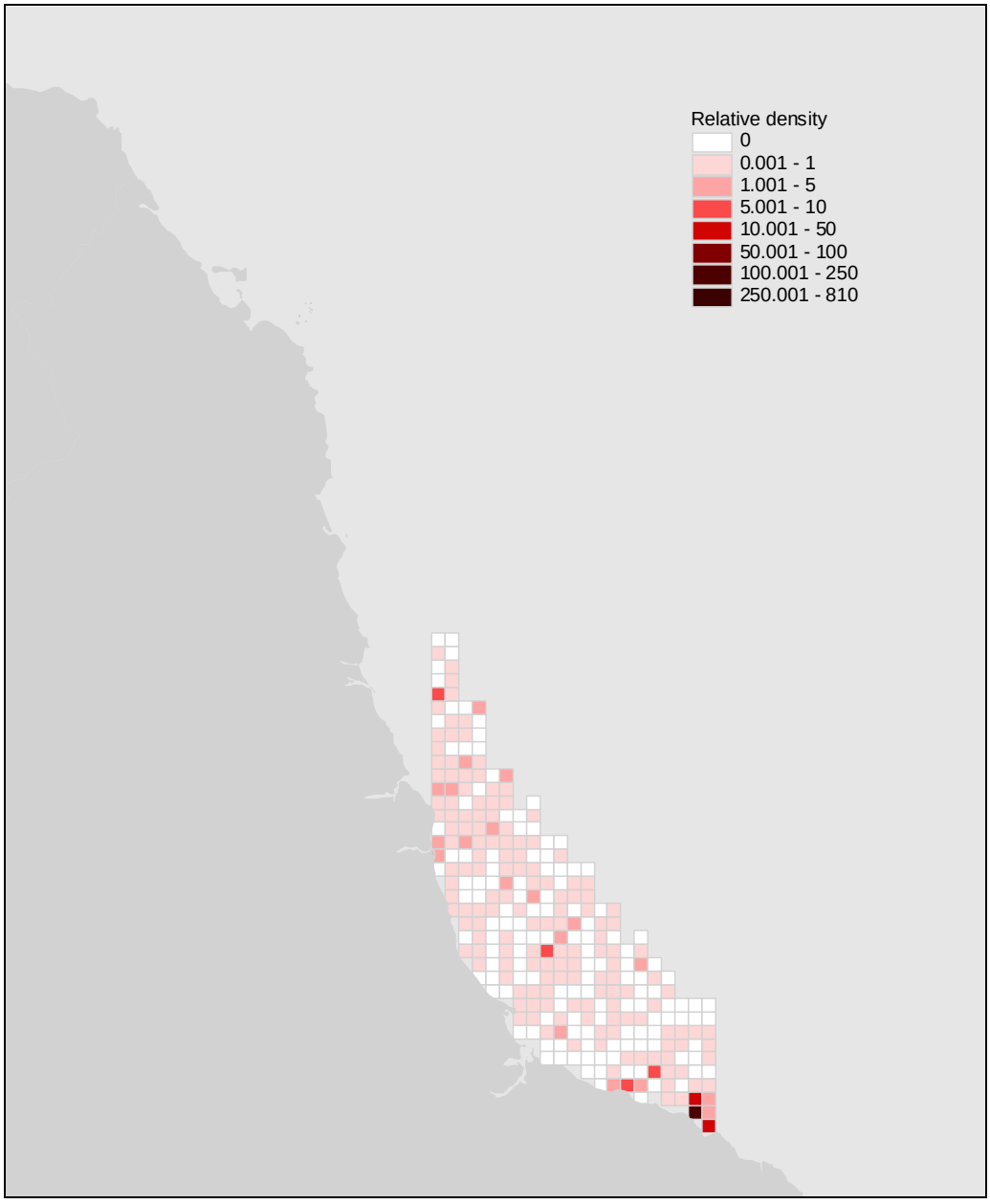


**Figure 31 - Relative density of Common Scoters *Melanitta nigra* recorded in the North West Area during aerial surveys, Period 2.**

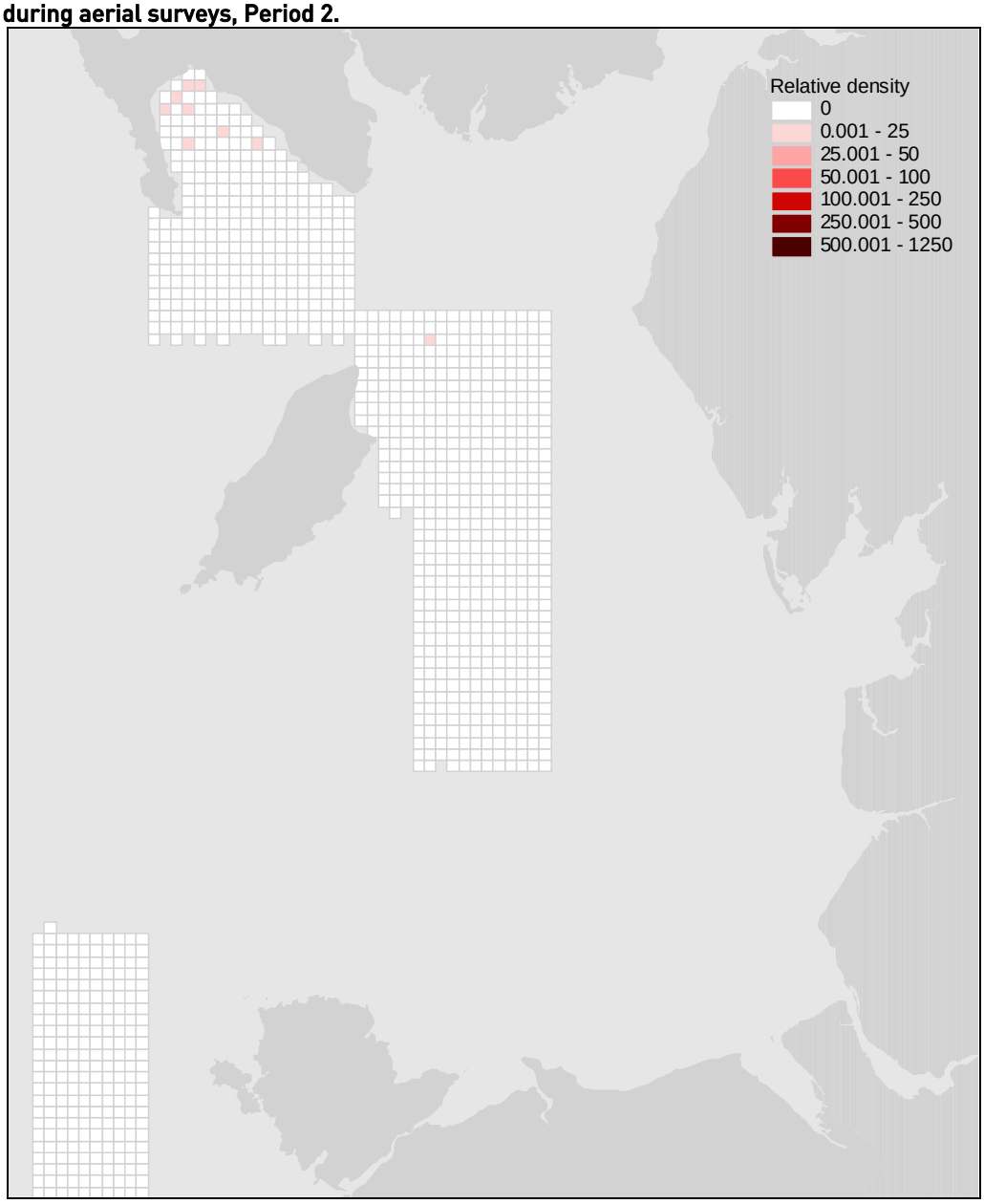


**Figure 32 - Relative density of Common Scoters *Melanitta nigra* recorded in the North West Area during aerial surveys, Period 3.**

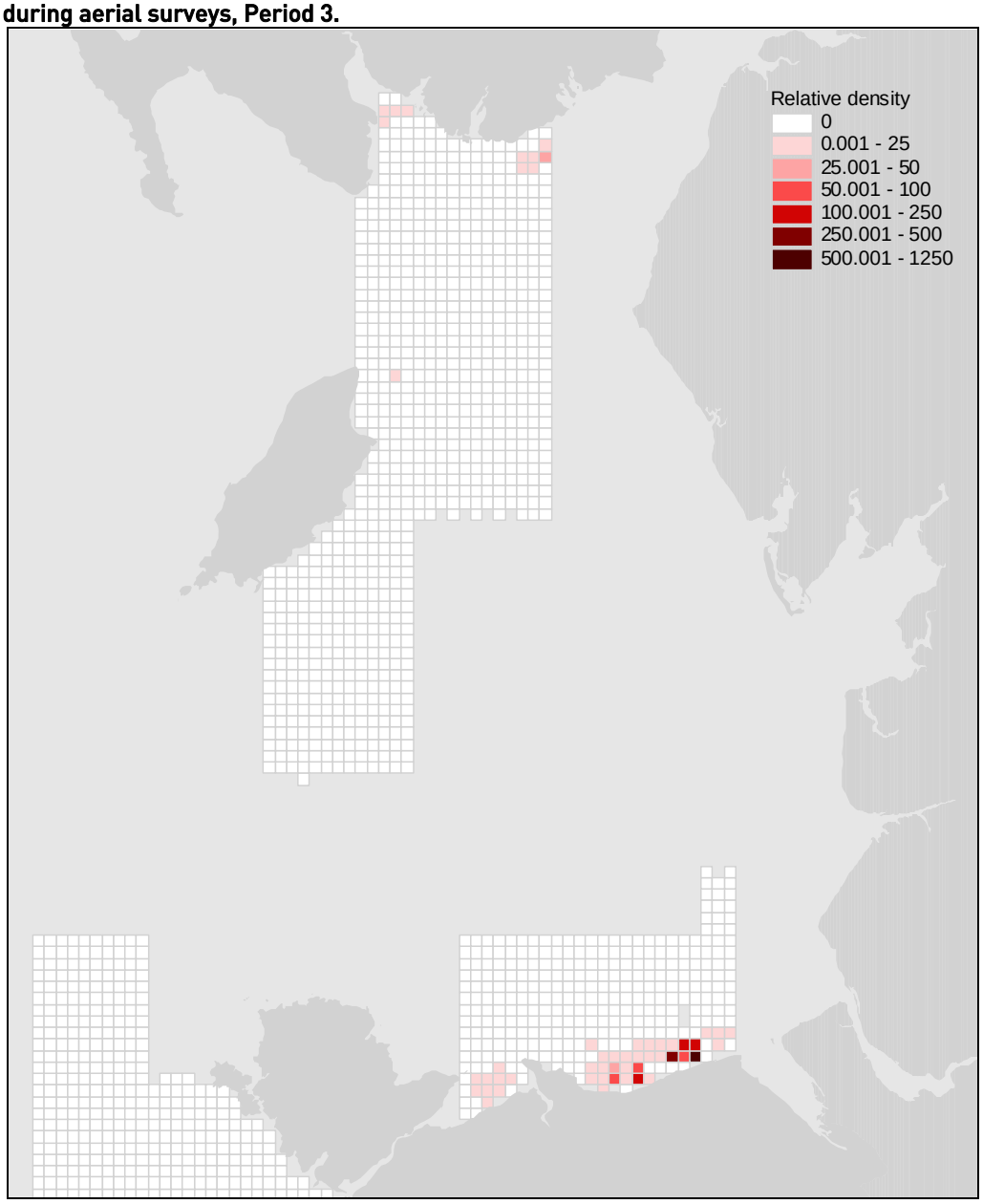


**Figure 33 - Relative density of Common Scoters *Melanitta nigra* recorded in the North West Area during aerial surveys, Period 4.**

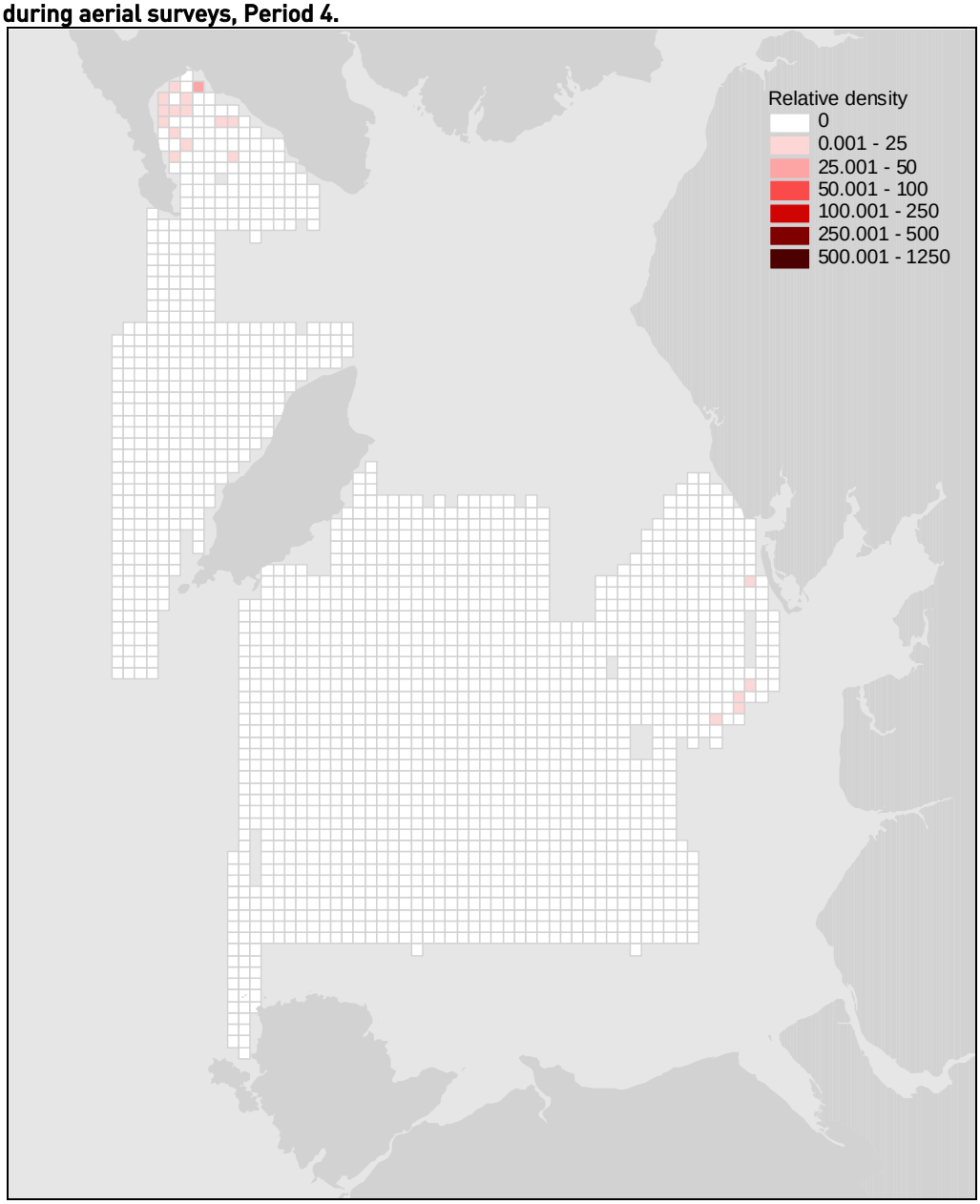


**Figure 34 - Relative density of Common Scoters *Melanitta nigra* recorded in the North West Area during aerial surveys, Period 5.**

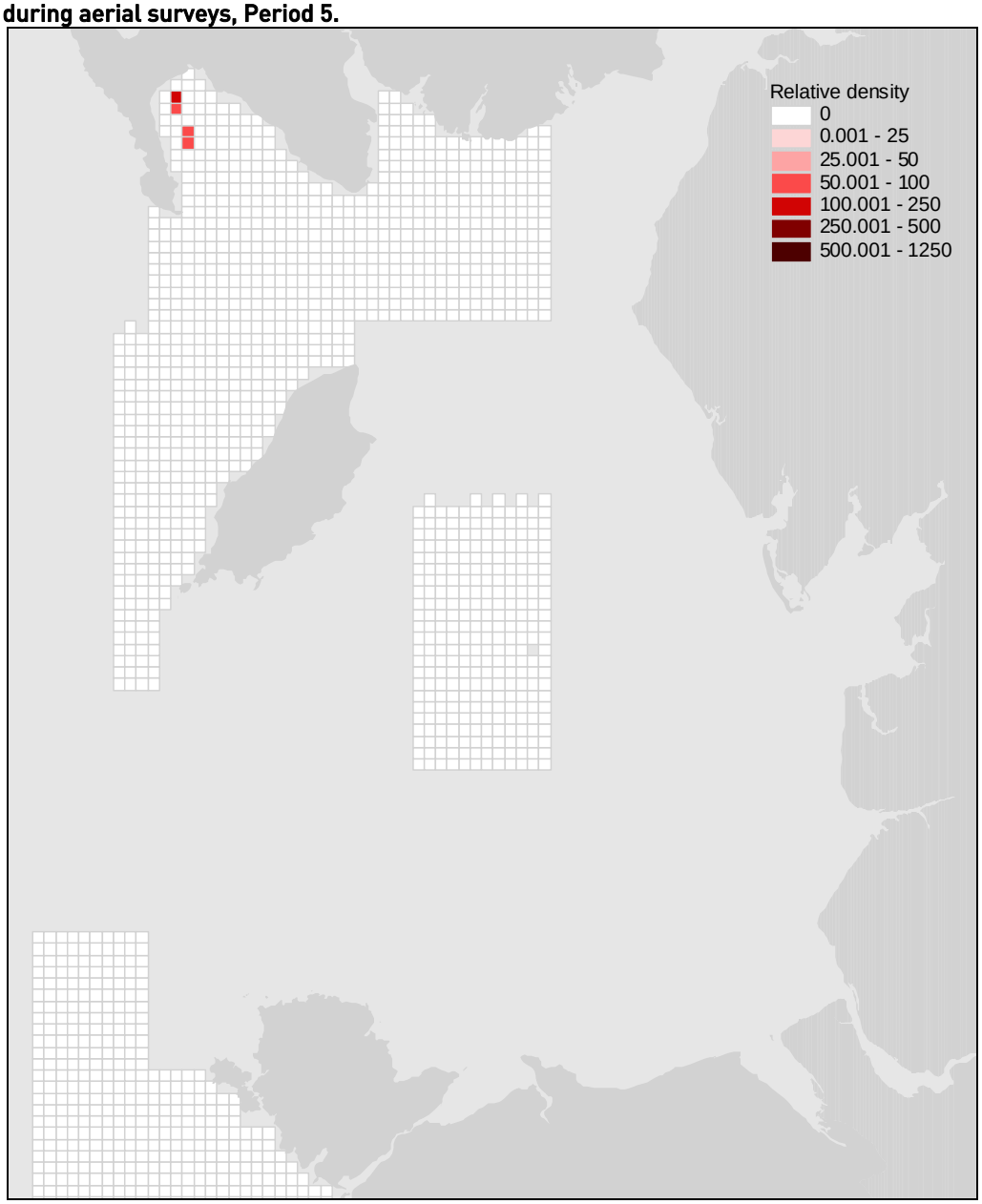


**Figure 35 - Relative density of Common Scoters *Melanitta nigra* recorded in the West Wales Area during aerial surveys, Period 1.**

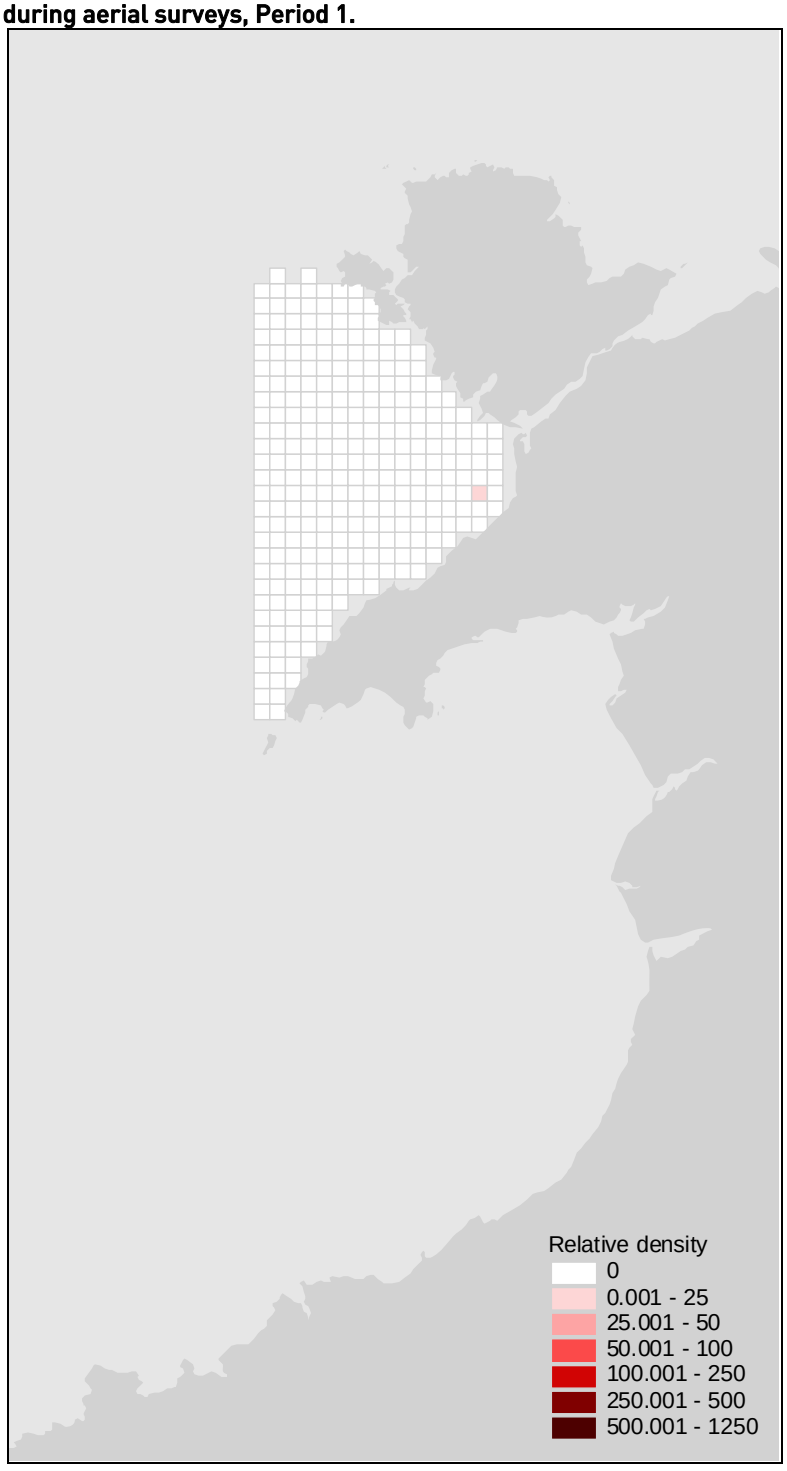


**Figure 36 - Relative density of Common Scoters *Melanitta nigra* recorded in the West Wales Area during aerial surveys, Period 2.**

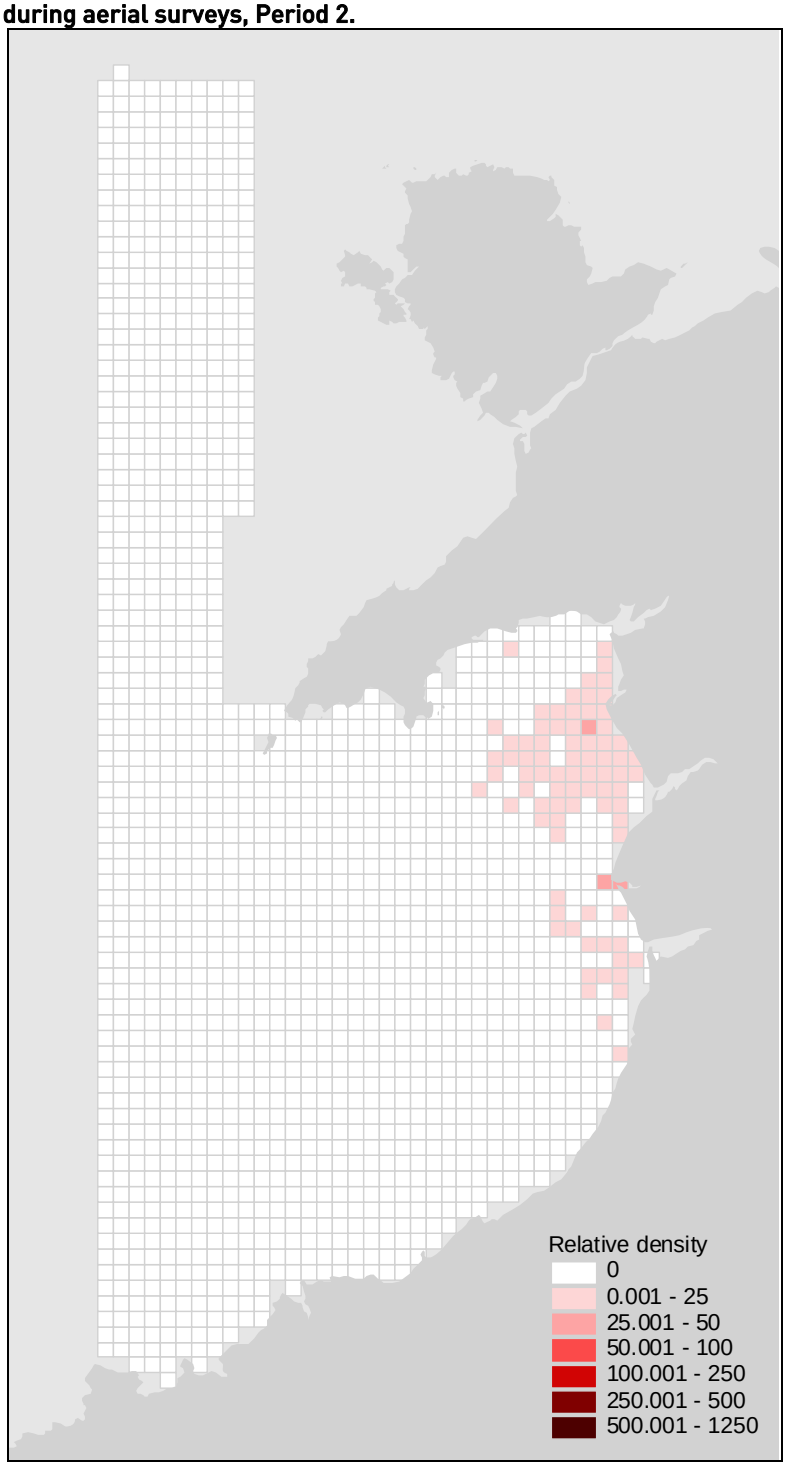


**Figure 37 - Relative density of Common Scoters *Melanitta nigra* recorded in the West Wales Area during aerial surveys, Period 3.**

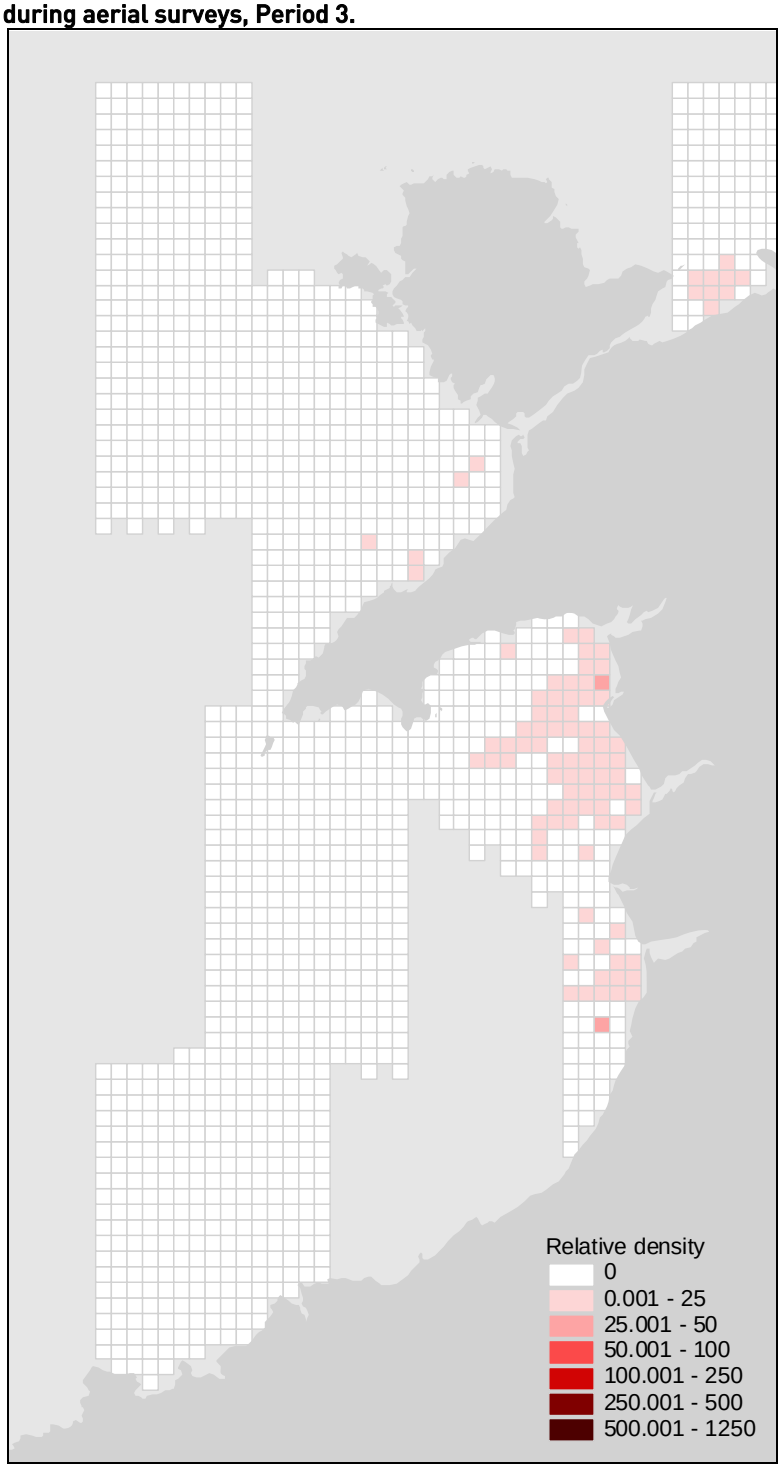


**Figure 38 - Relative density of Common Scoters *Melanitta nigra* recorded in the West Wales Area during aerial surveys, Period 4.**

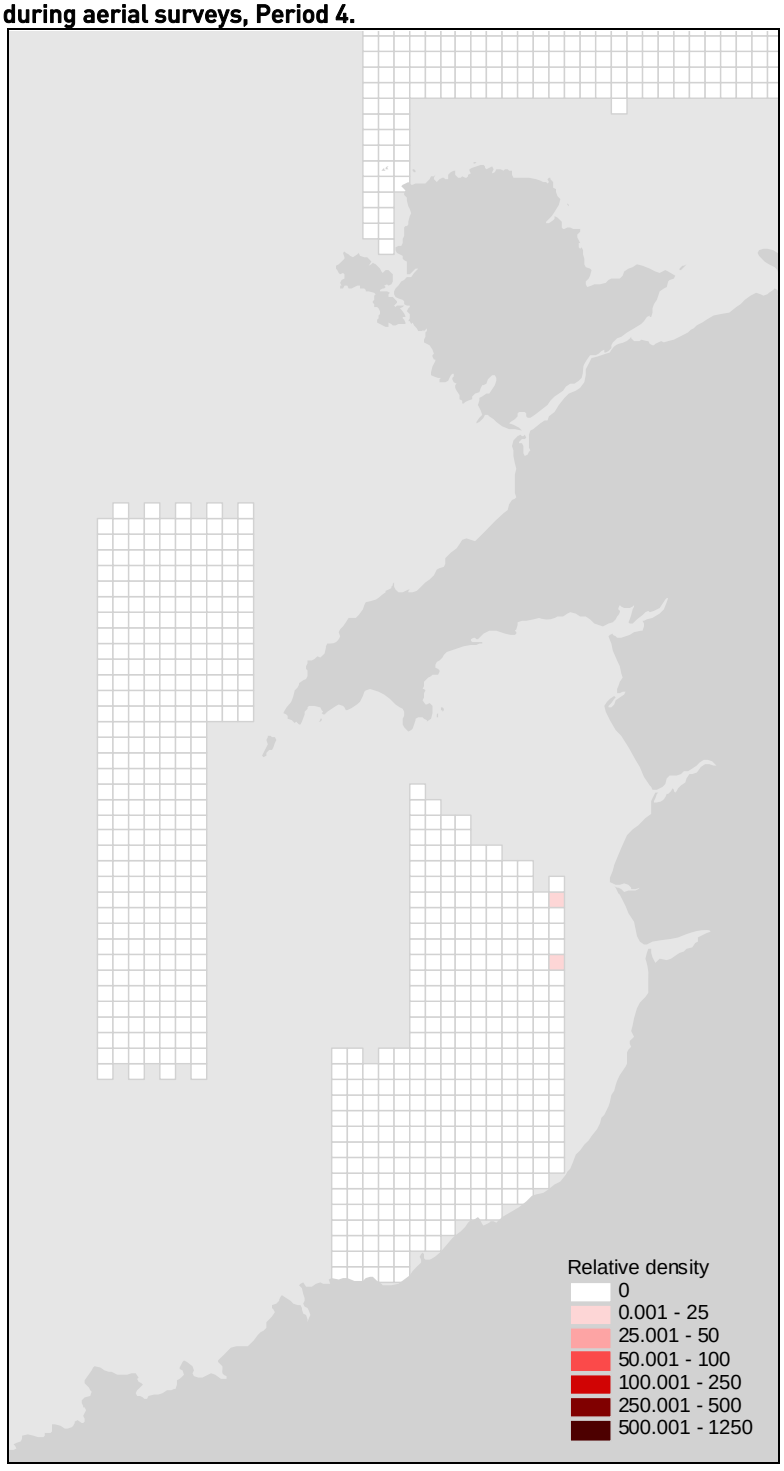


**Figure 39 - Relative density of Common Scoters *Melanitta nigra* recorded in the South West Area during aerial surveys, Period 1.**

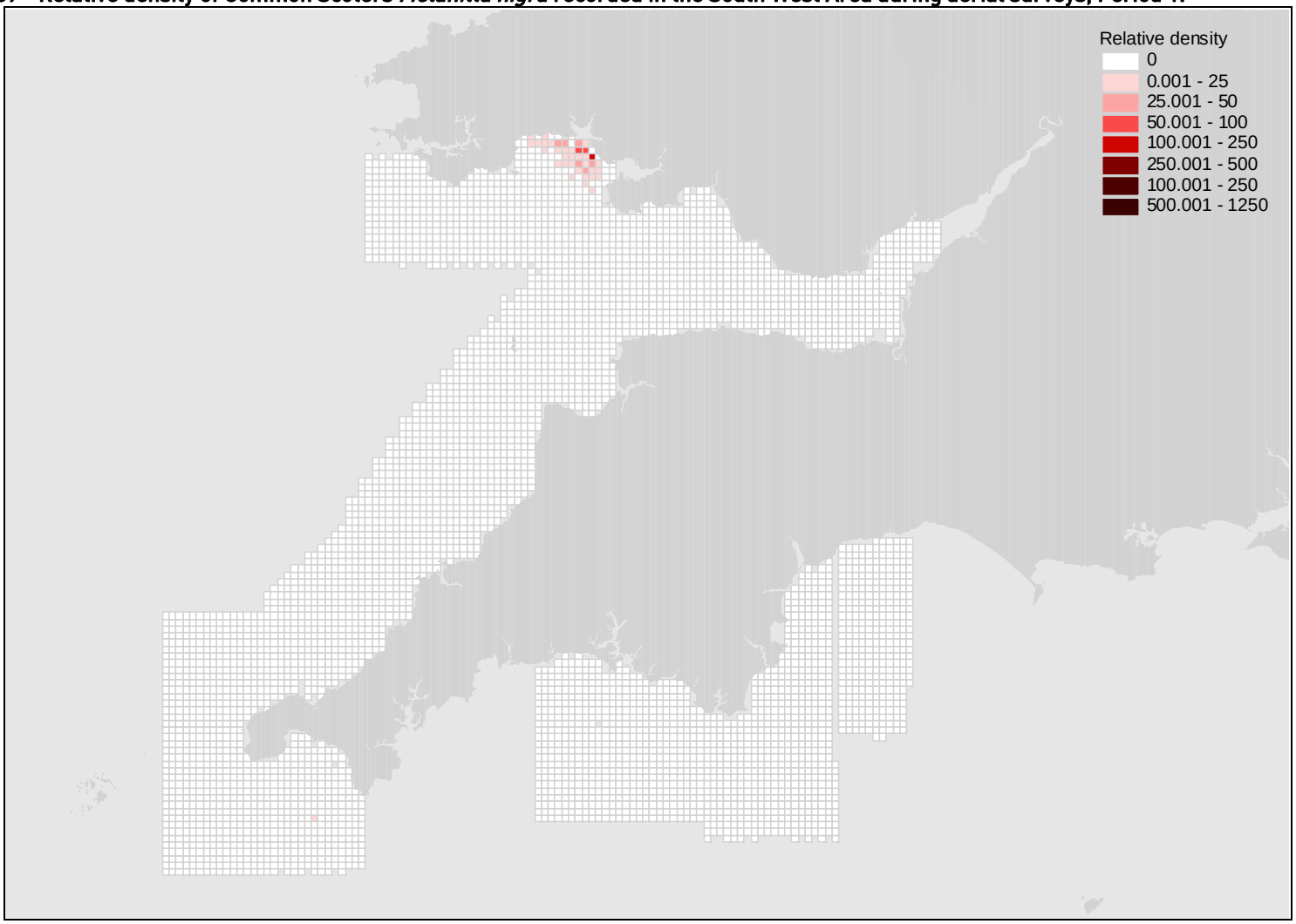


**Figure 40 - Relative density of Common Scoters *Melanitta nigra* recorded in the South West Area during aerial surveys, Period 6.**

**Figure 41 - Relative density of Common Scoters *Melanitta nigra* recorded in the South East Area during aerial surveys, winter 2007/08.**

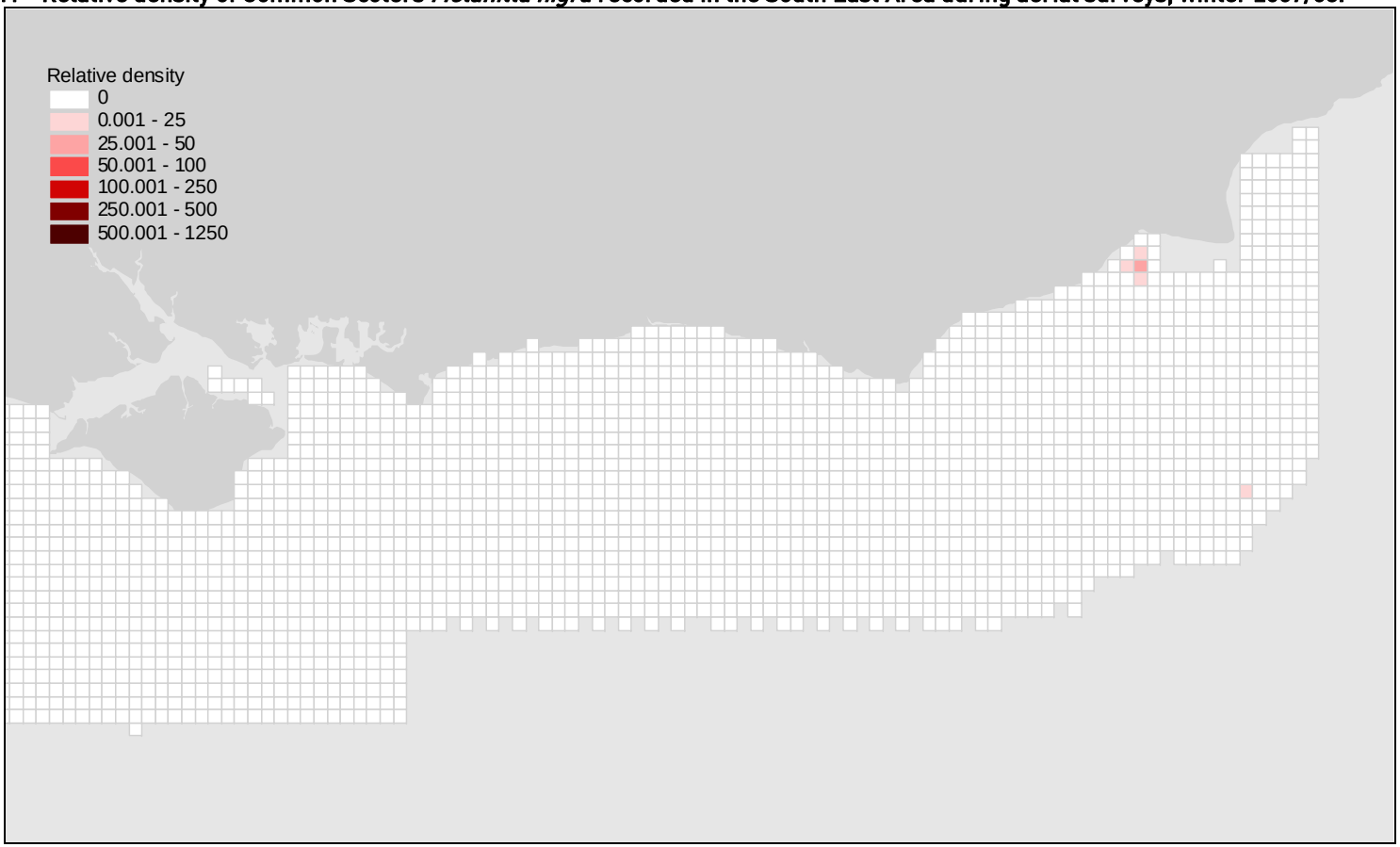


**Figure 42 - Relative density of Common Scoters *Melanitta nigra* recorded in the South East Area during aerial surveys, summer 2008.**

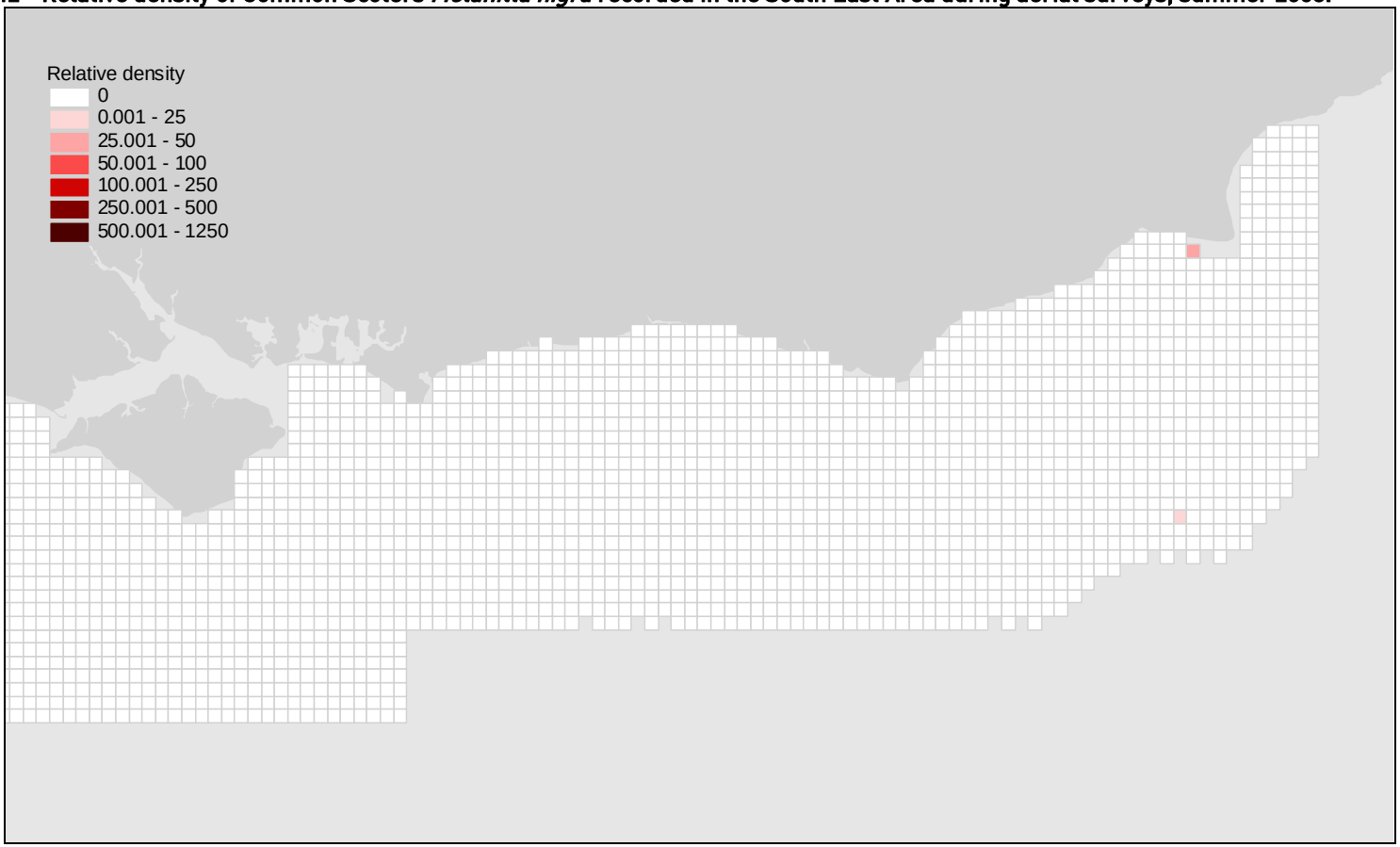


**Figure 43 - Relative density of Common Scoters *Melanitta nigra* recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

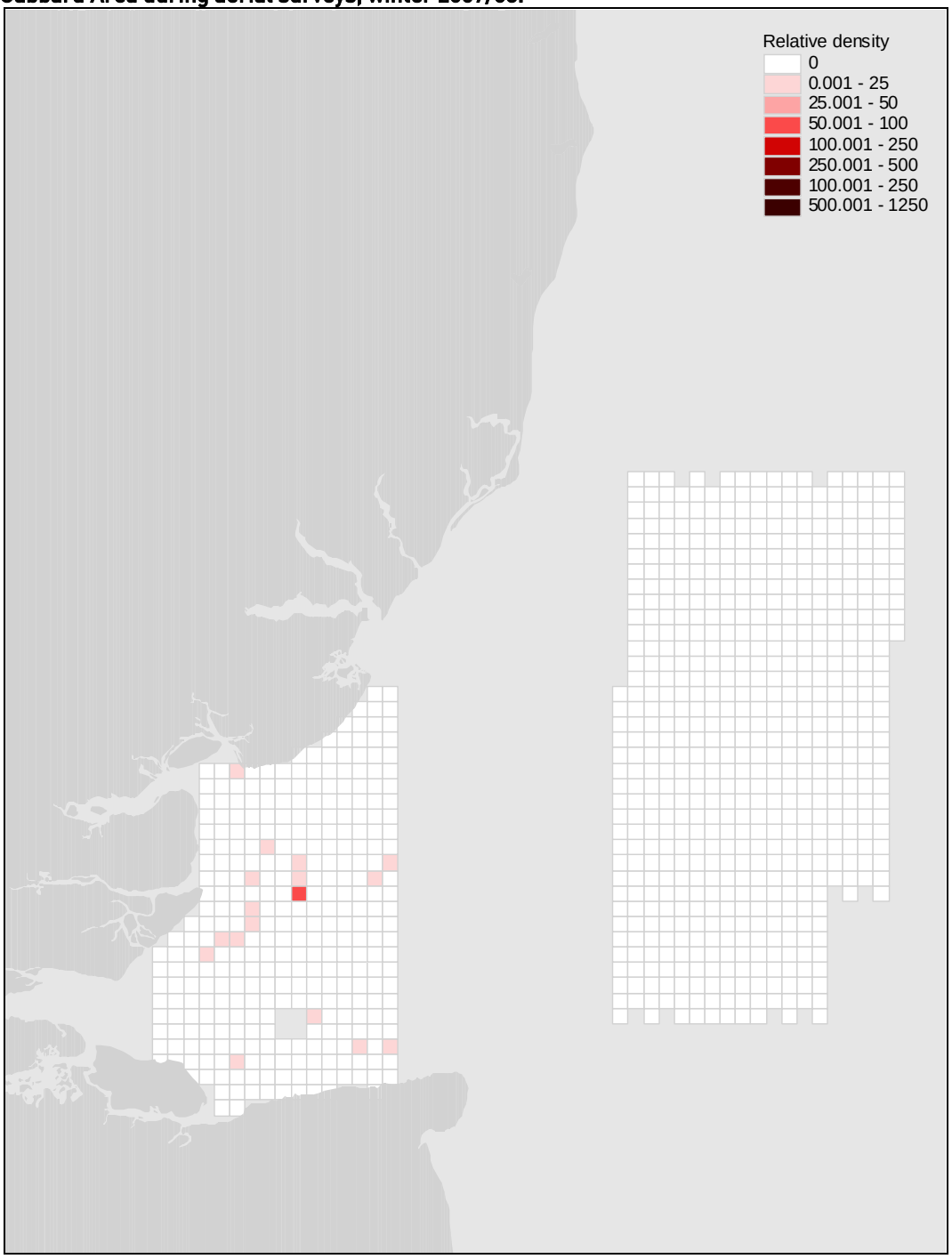


**Figure 44 - Relative density of Common Scoters *Melanitta nigra* recorded in the Greater Wash Area during aerial surveys, Period 1.**

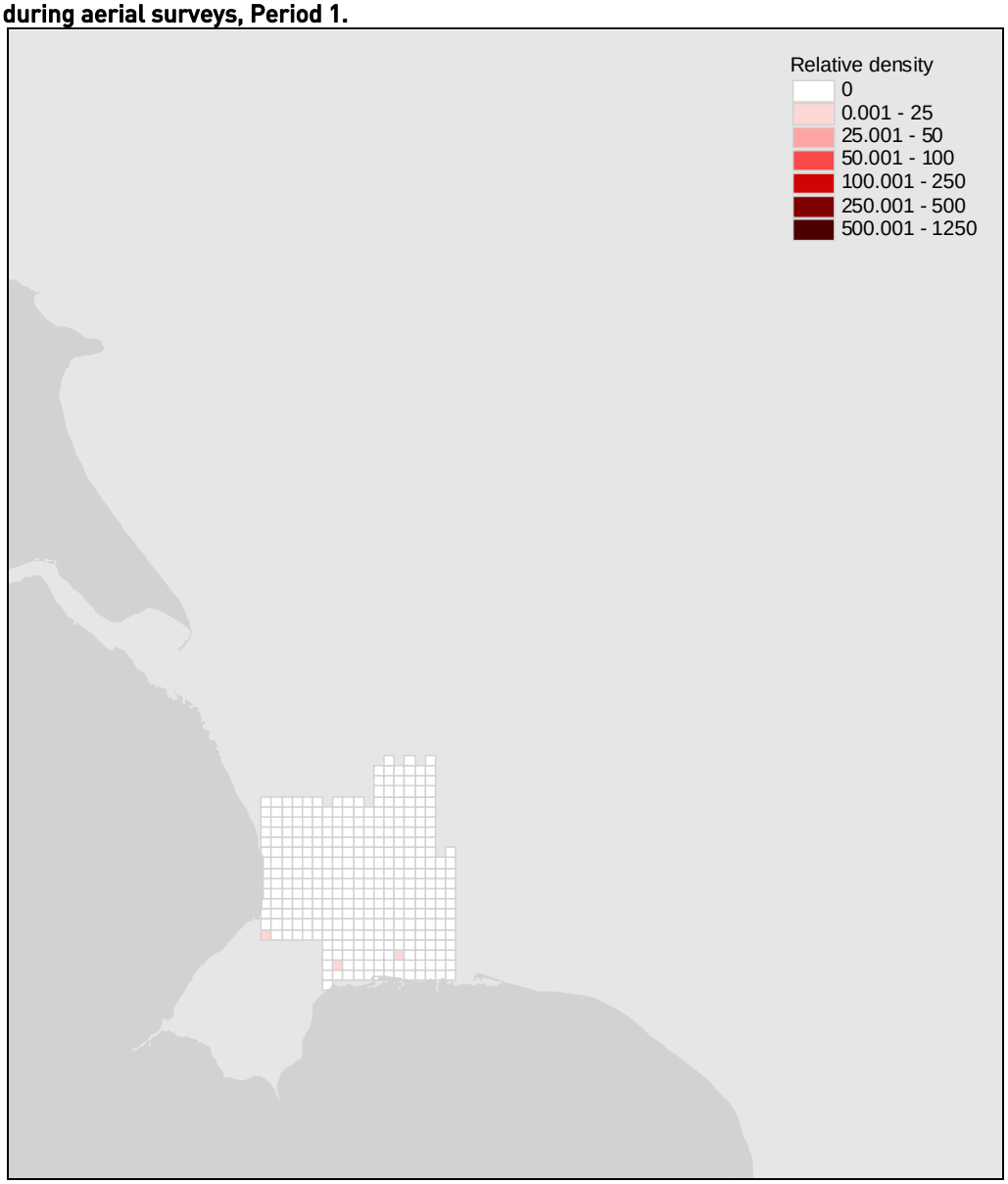


**Figure 45 - Relative density of Common Scoters *Melanitta nigra* recorded in the Greater Wash Area during aerial surveys, Period 2.**

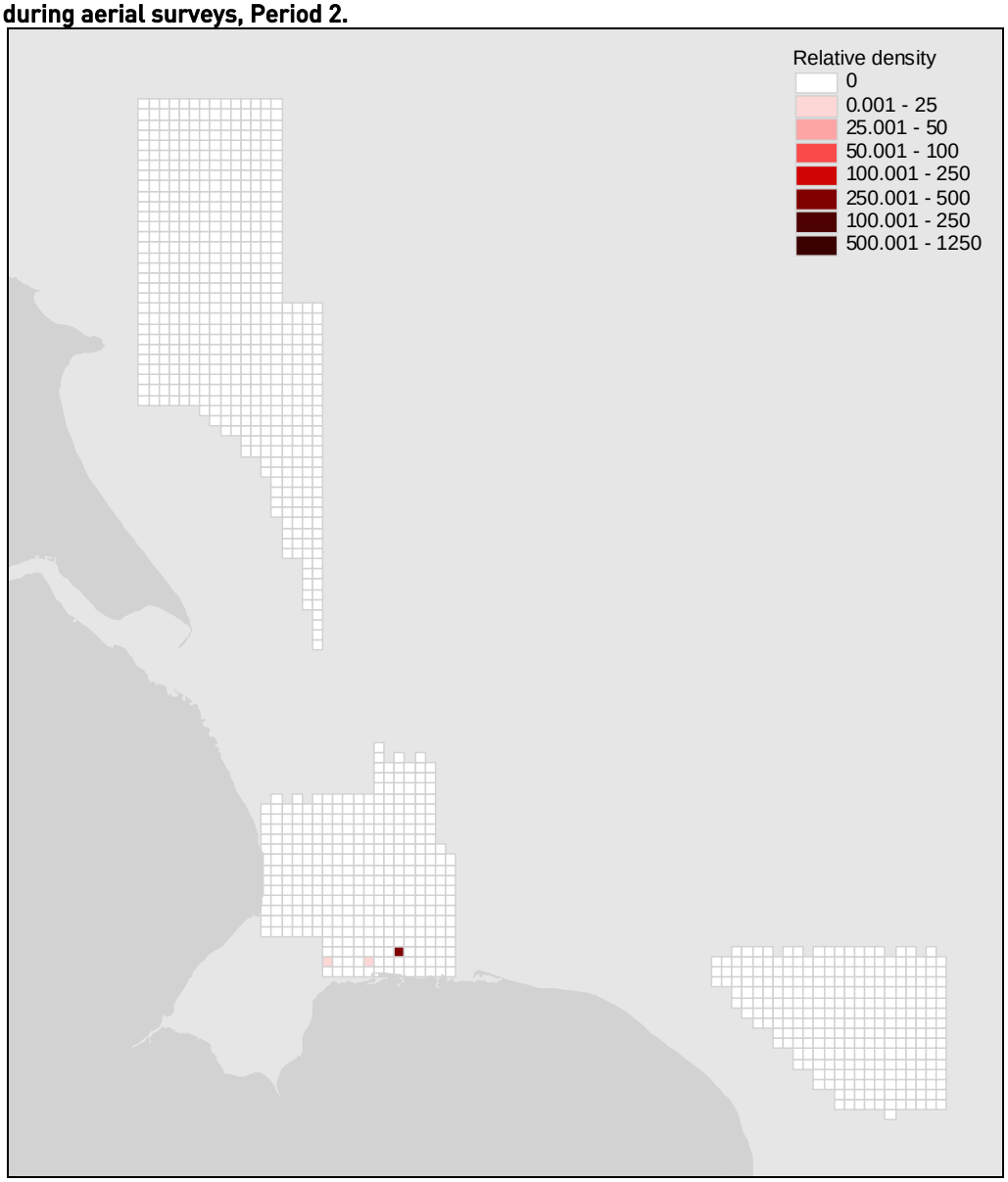


**Figure 46 - Relative density of Common Scoters *Melanitta nigra* recorded in the Greater Wash Area during aerial surveys, Period 3.**

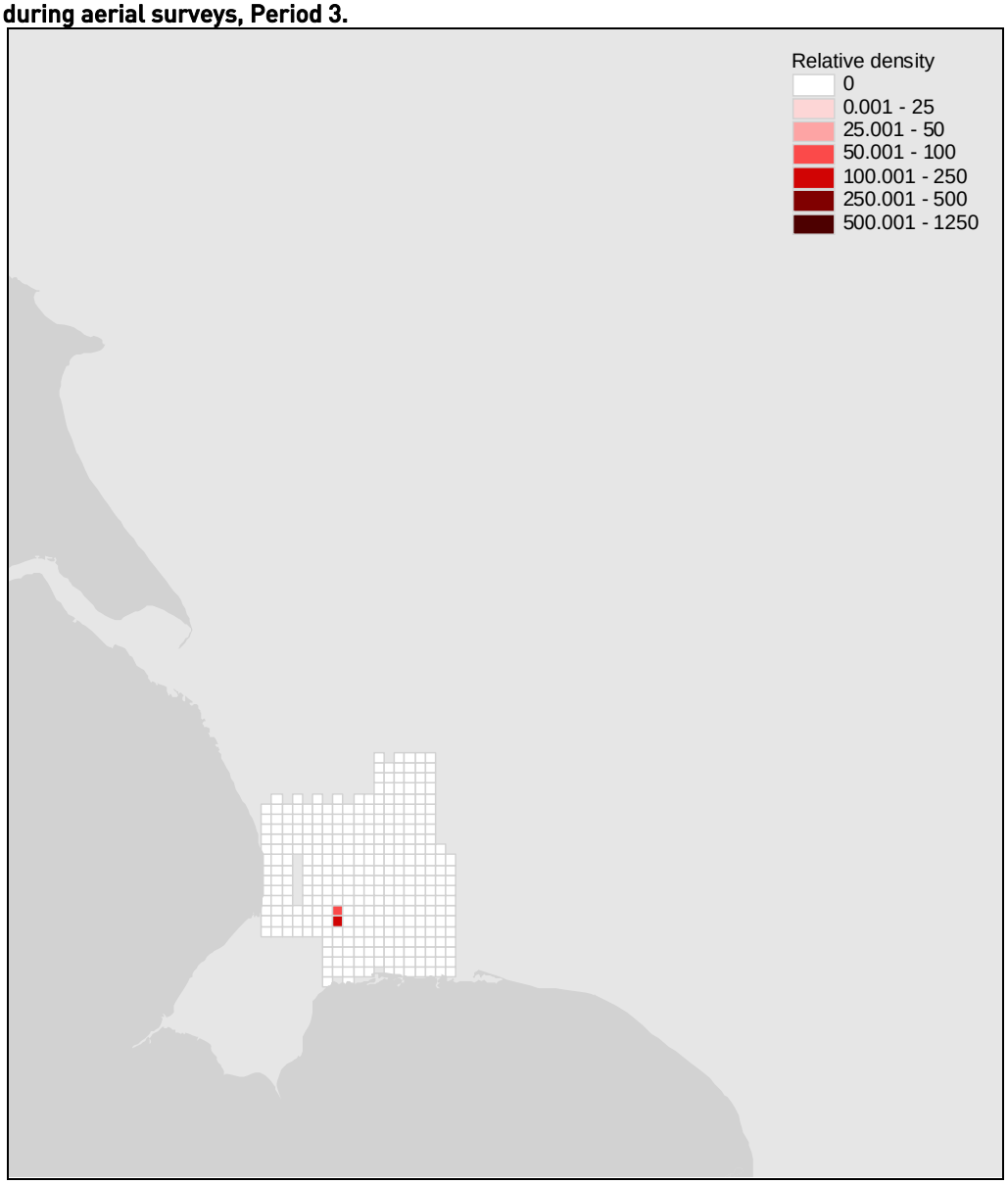


**Figure 47 - Relative density of divers *Gavia* spp. recorded in the North West Area during aerial surveys, Period 1.**

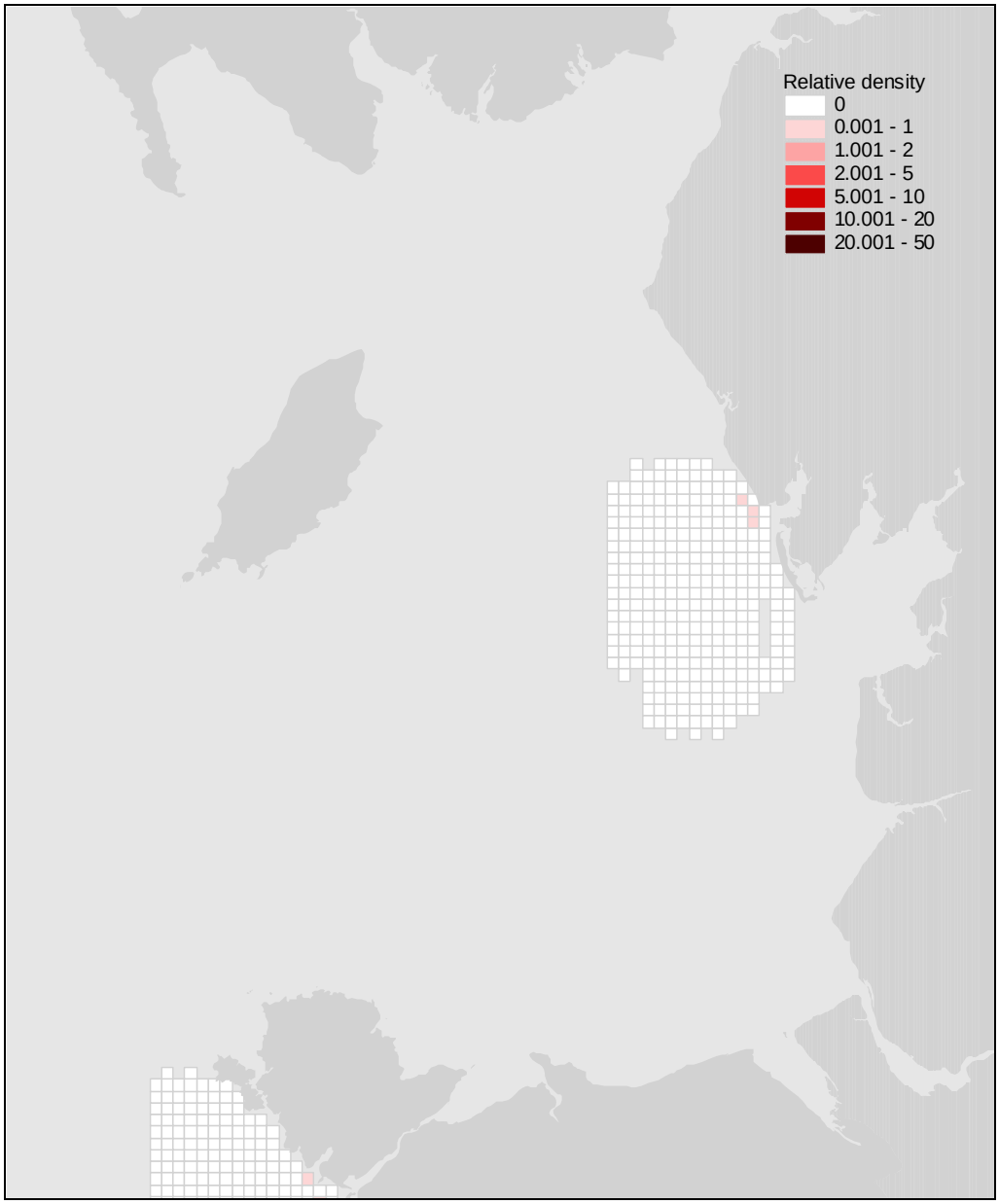


**Figure 48 - Relative density of divers *Gavia* spp. recorded in the North West Area during aerial surveys, Period 2.**

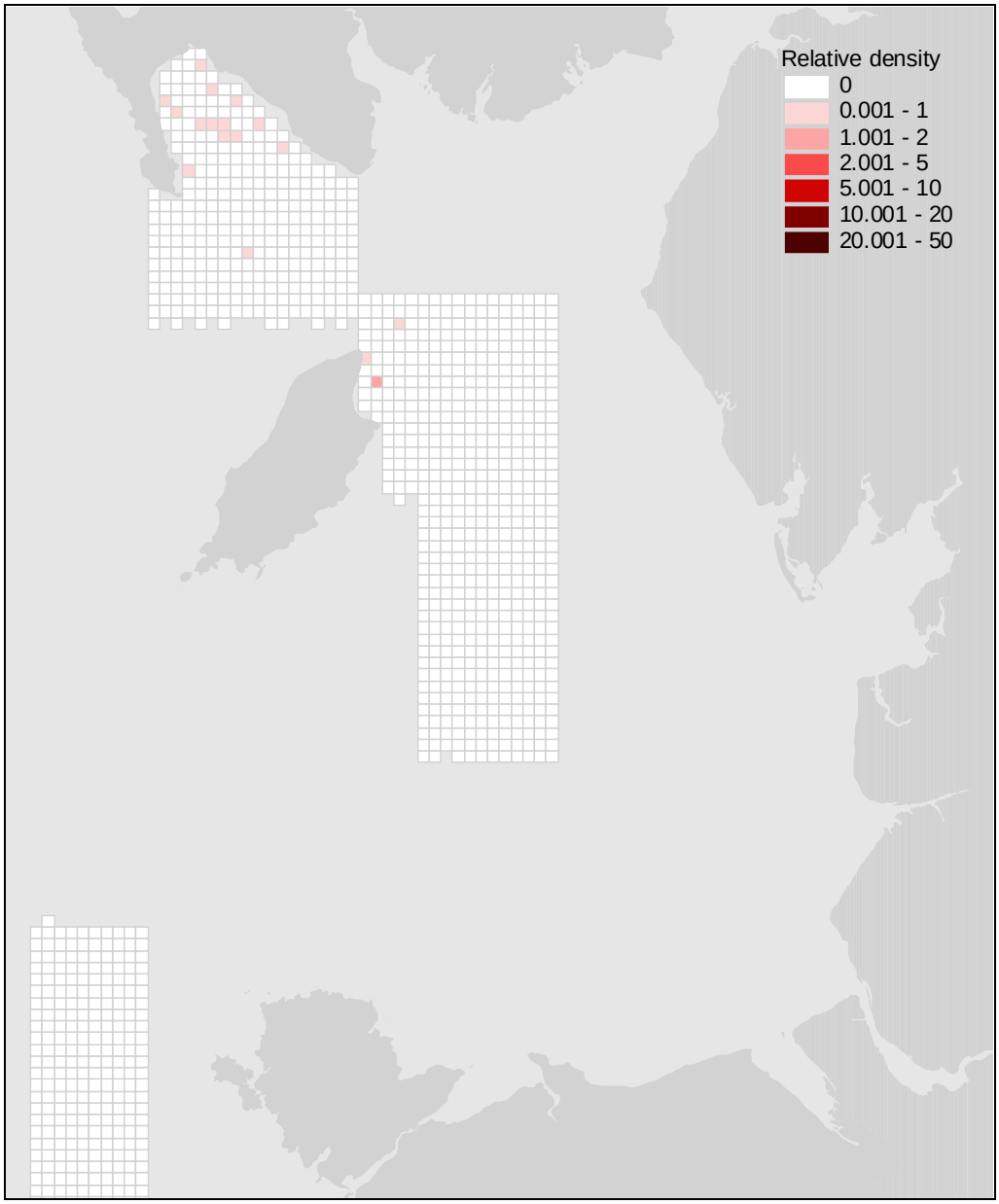


**Figure 49 - Relative density of divers *Gavia* spp. recorded in the North West Area during aerial surveys, Period 3.**

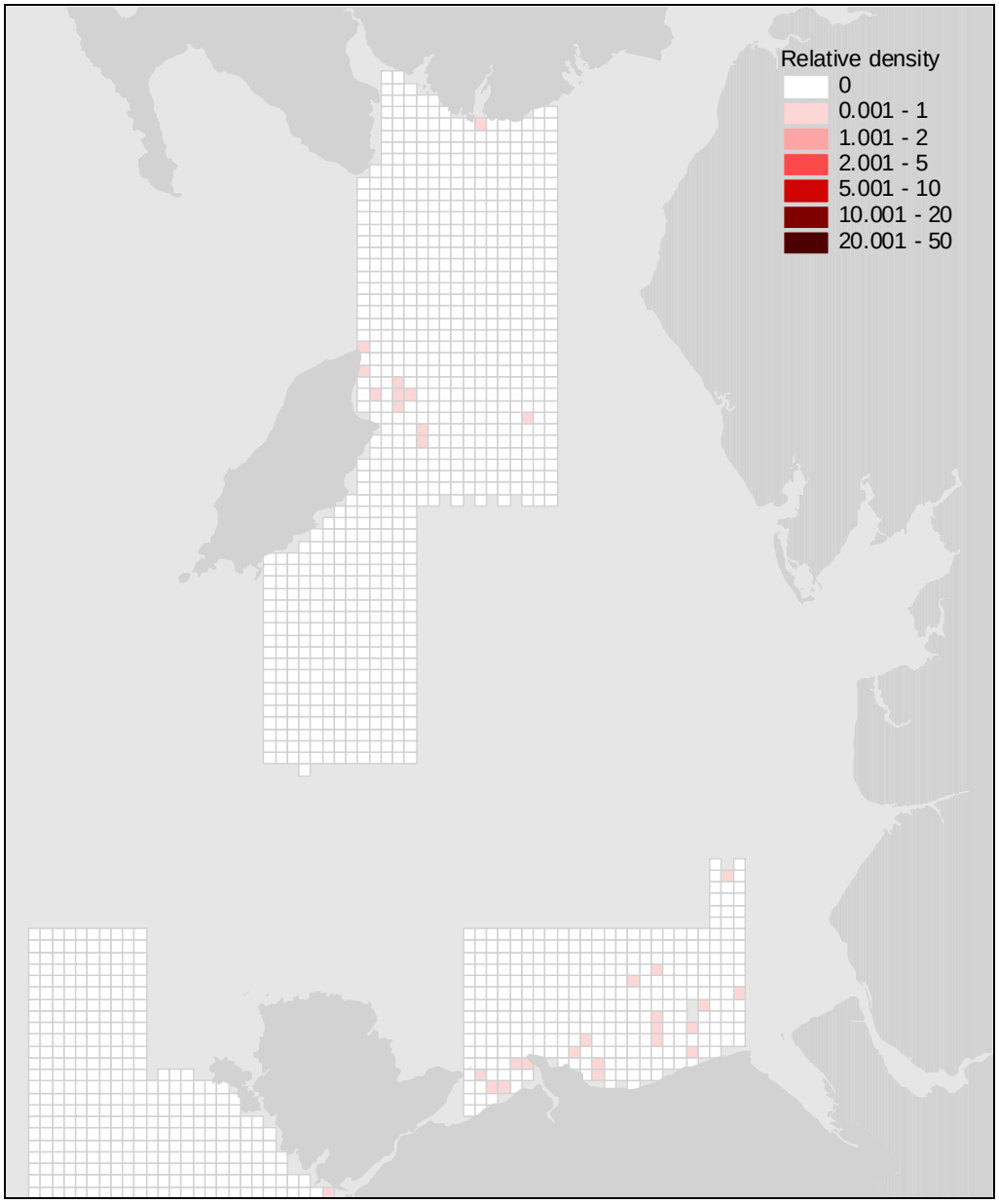


**Figure 50 - Relative density of divers *Gavia* spp. recorded in the North West Area during aerial surveys, Period 4.**

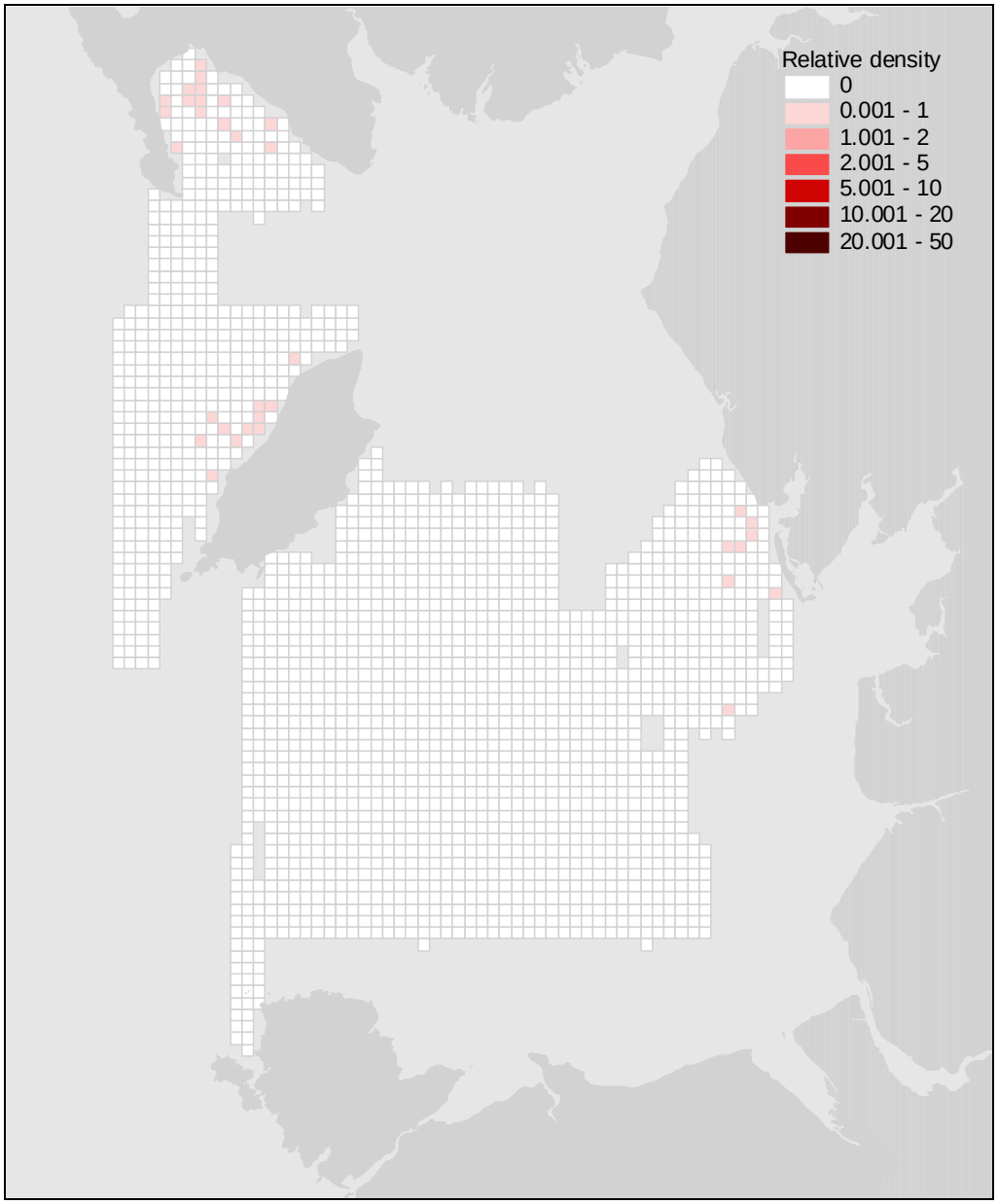


**Figure 51 - Relative density of divers *Gavia* spp. recorded in the North West Area during aerial surveys, Period 5.**

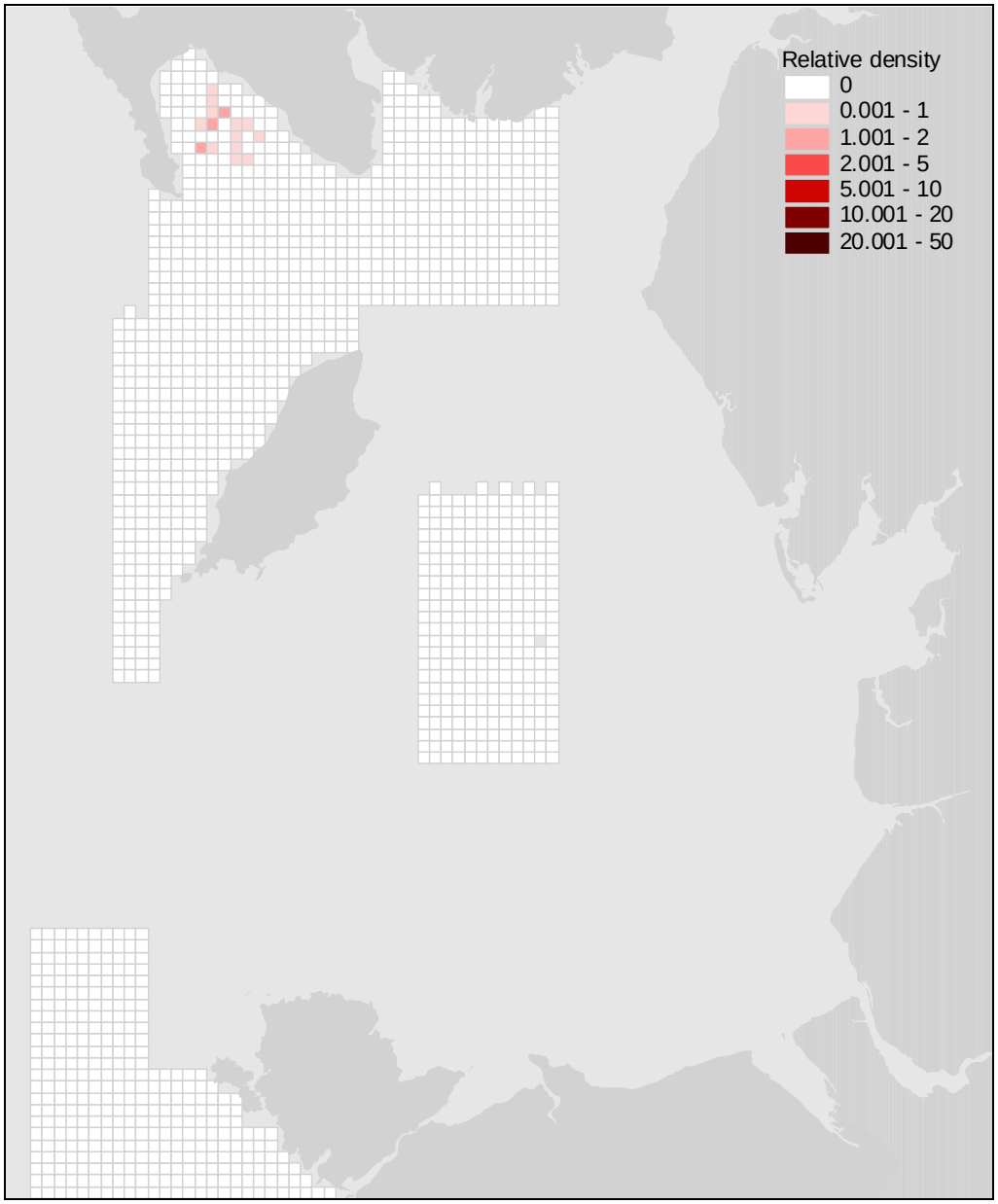


**Figure 52 - Relative density of divers *Gavia* spp. recorded in the West Wales Area during aerial surveys, Period 1.**

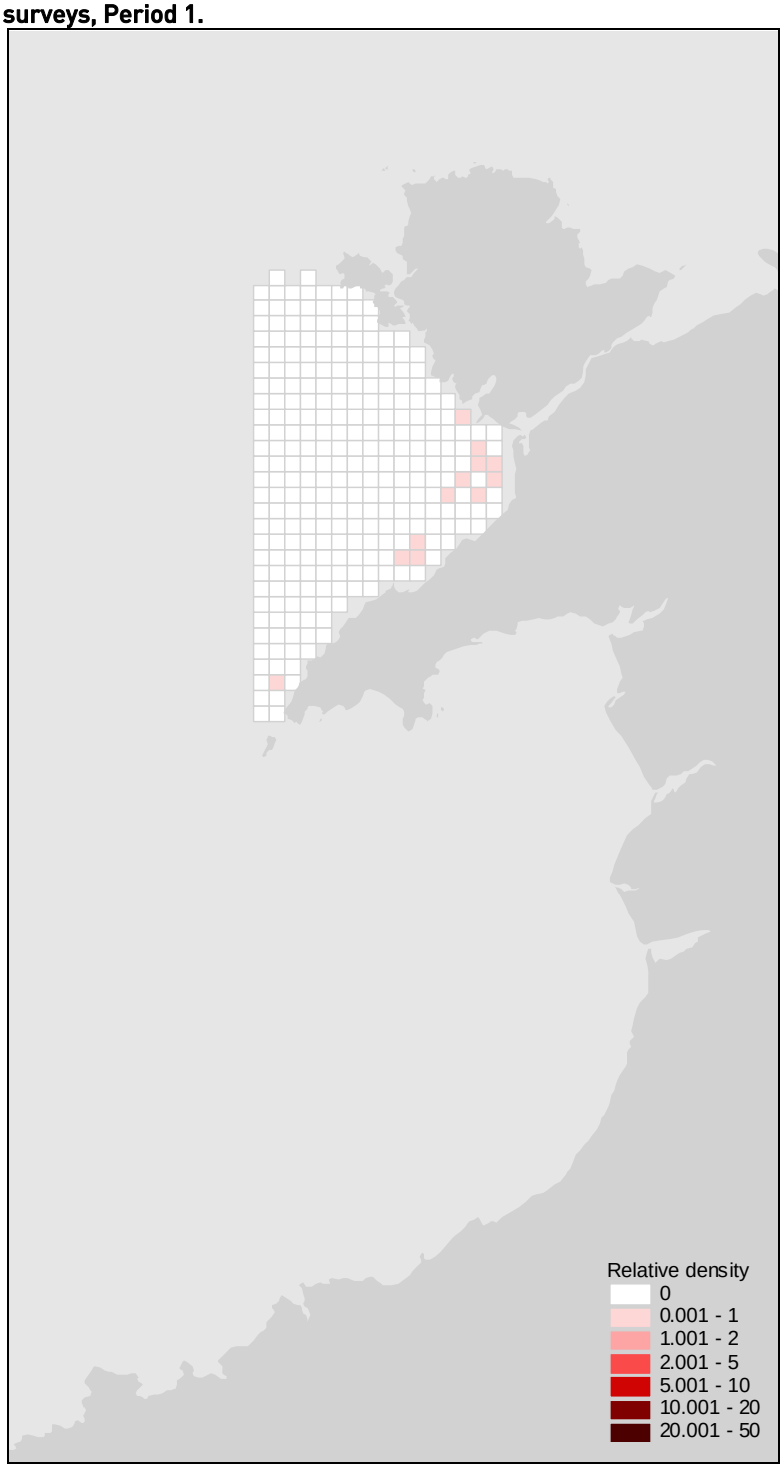


**Figure 53 - Relative density of divers *Gavia* spp. recorded in the West Wales Area during aerial surveys, Period 2.**

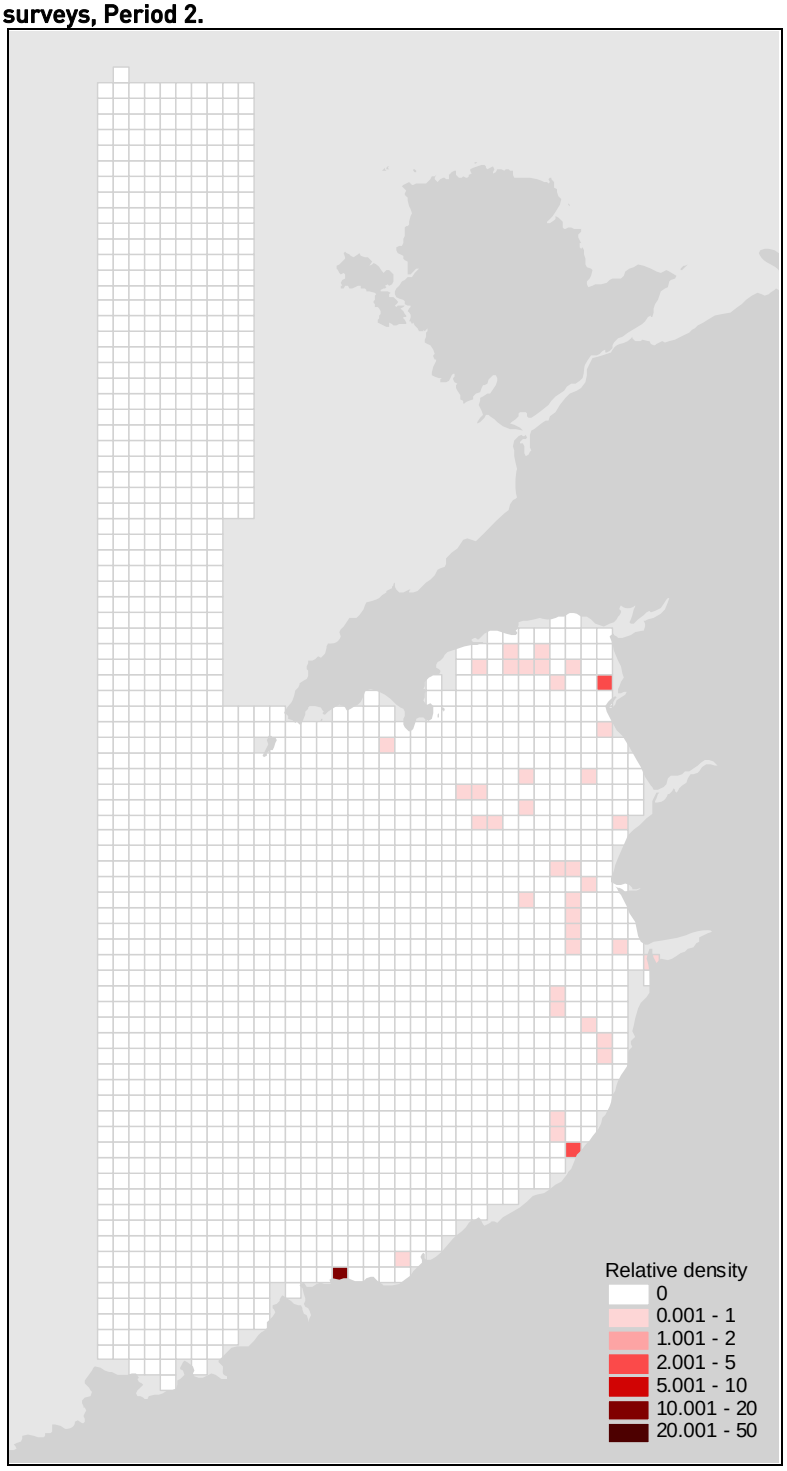


**Figure 54 - Relative density of divers *Gavia* spp. recorded in the West Wales Area during aerial surveys, Period 3.**

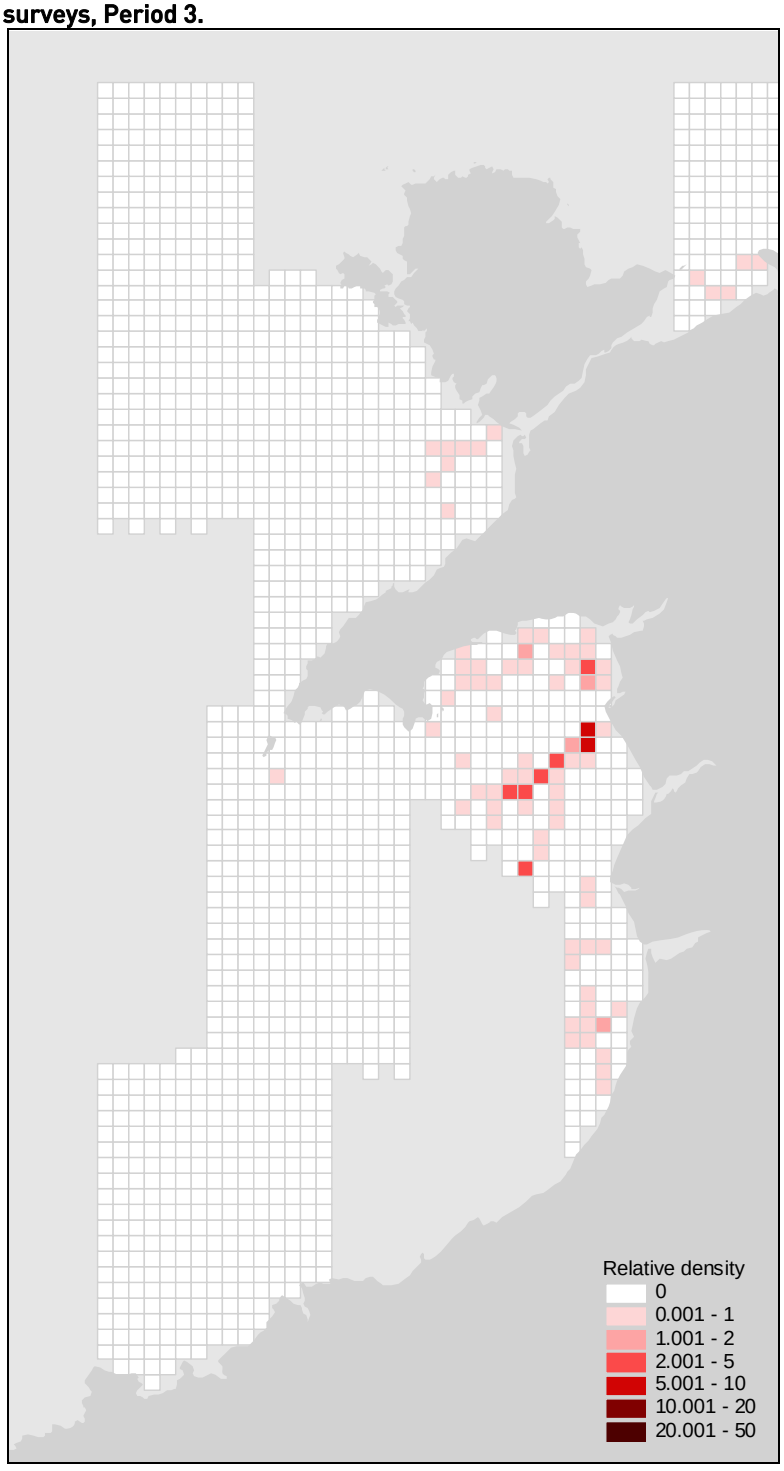


**Figure 55 - Relative density of divers *Gavia* spp. recorded in the West Wales Area during aerial surveys, Period 4.**

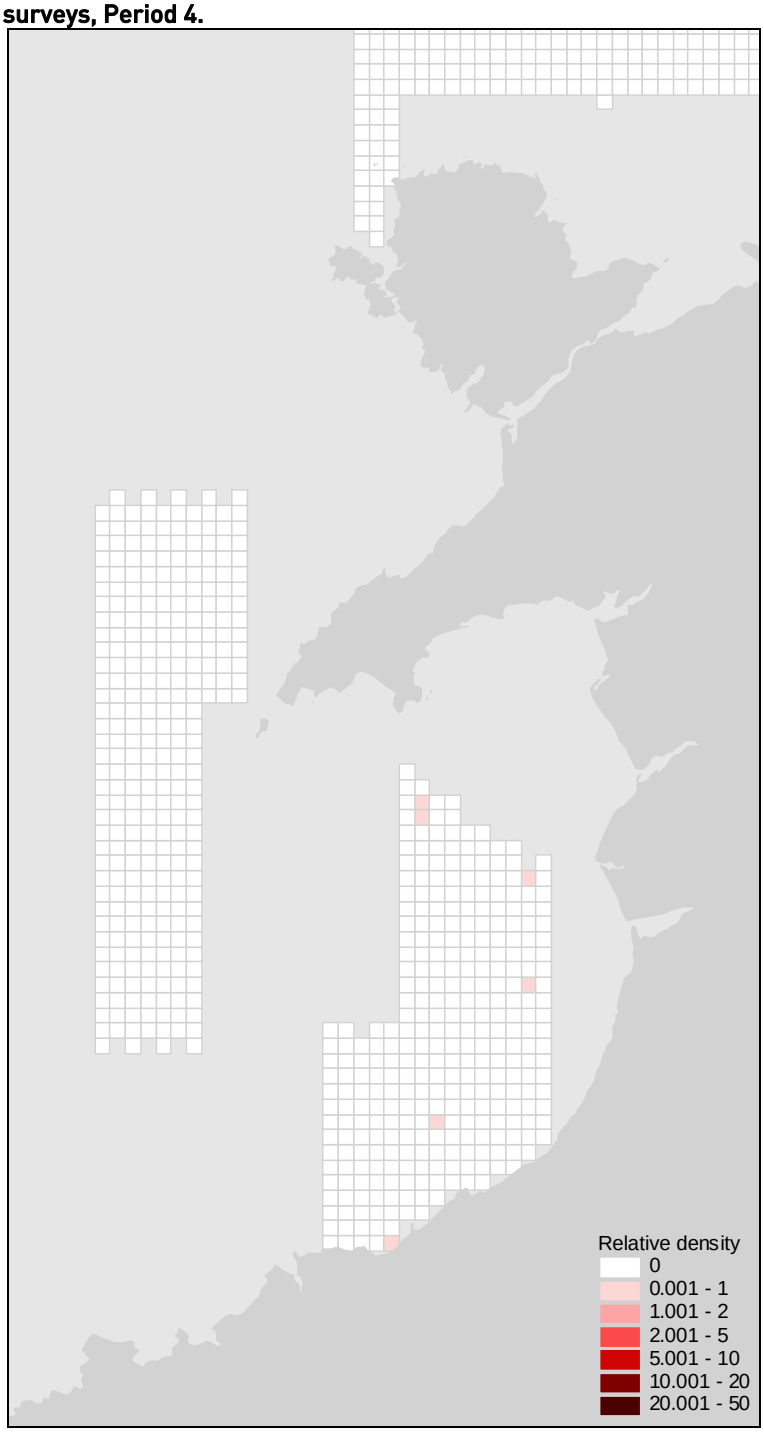


**Figure 56 - Relative density of divers *Gavia* spp. recorded in the West Wales Area during aerial surveys, Period 5.**

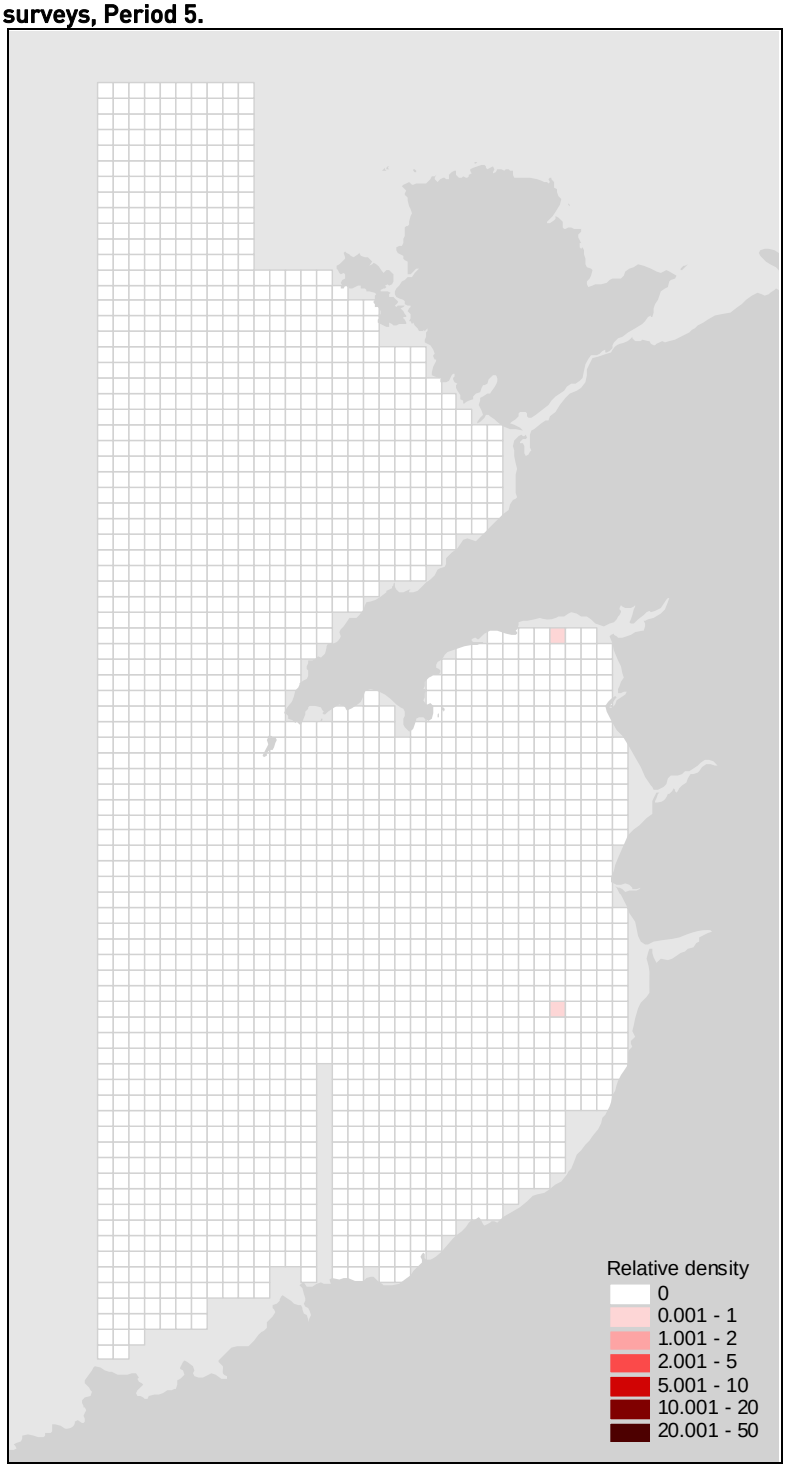


**Figure 57 - Relative density of divers *Gavia* spp. recorded in the South West Area during aerial surveys, winter 2007/08.**

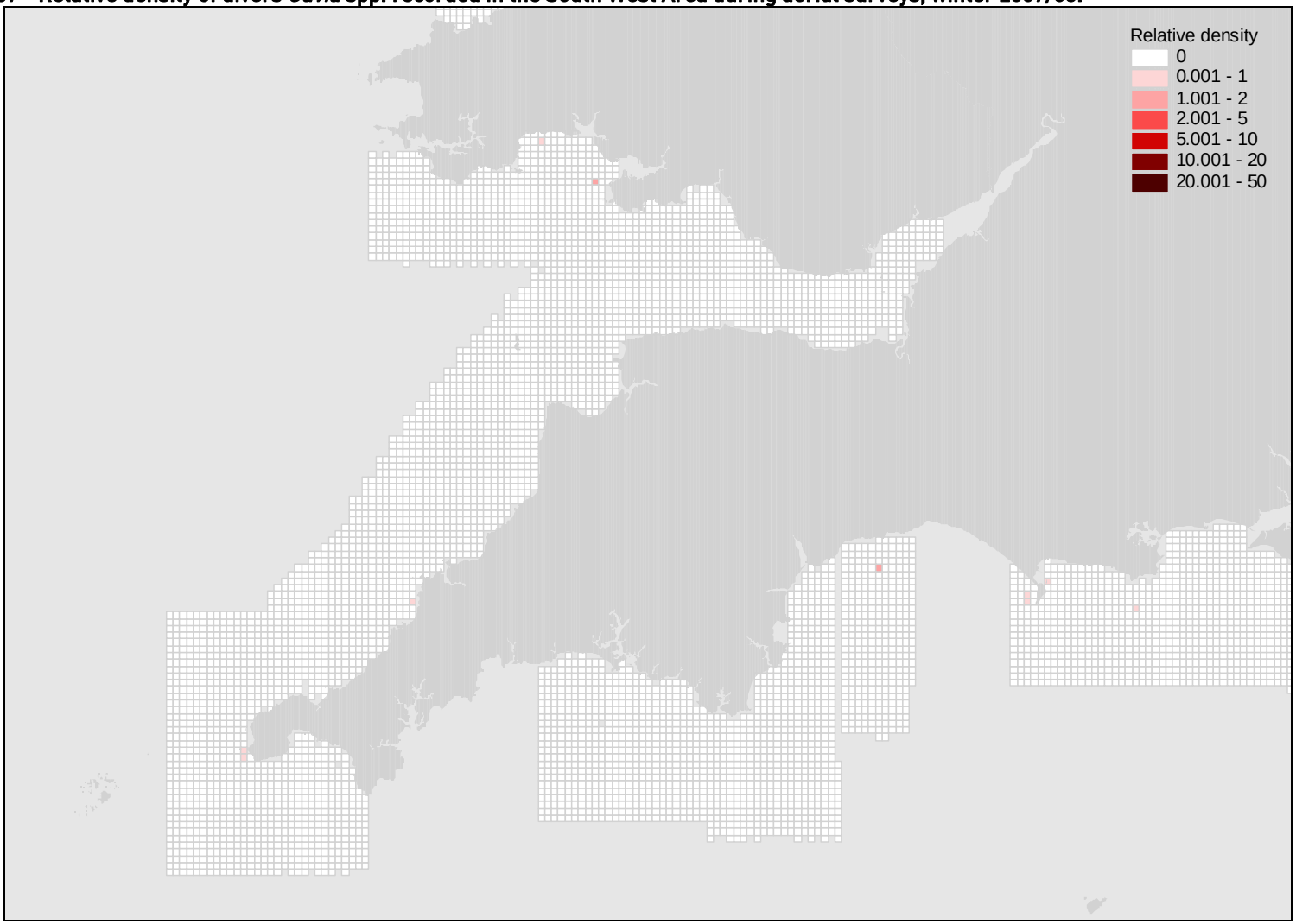


**Figure 58 - Relative density of divers *Gavia* spp. recorded in the South East Area during aerial surveys, Period 2.**

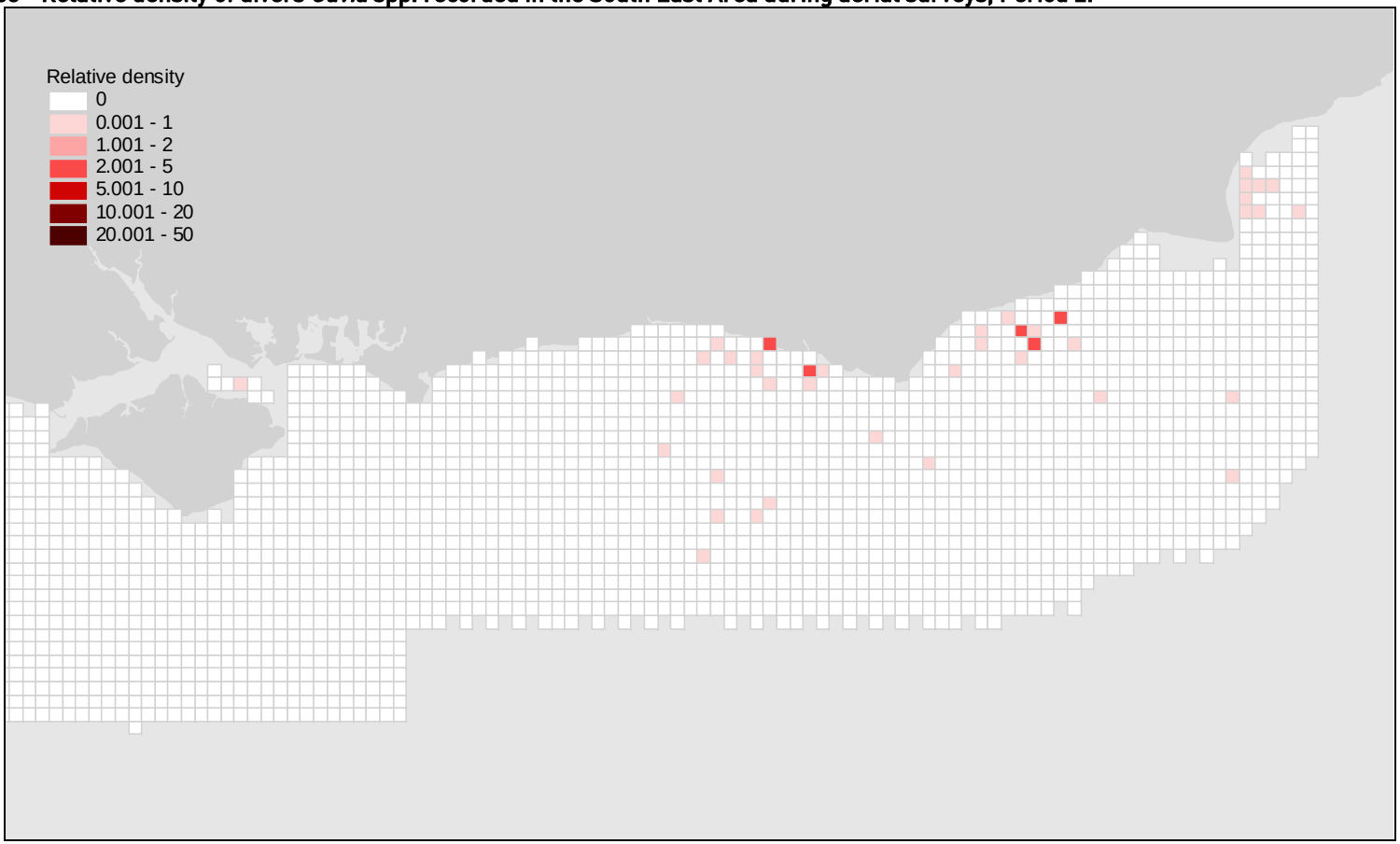


**Figure 59 - Relative density of divers *Gavia* spp. recorded in the South East Area during aerial surveys, Period 3.**

**Figure 60 - Relative density of divers *Gavia* spp. recorded in the South East Area during aerial surveys, Period 4.**

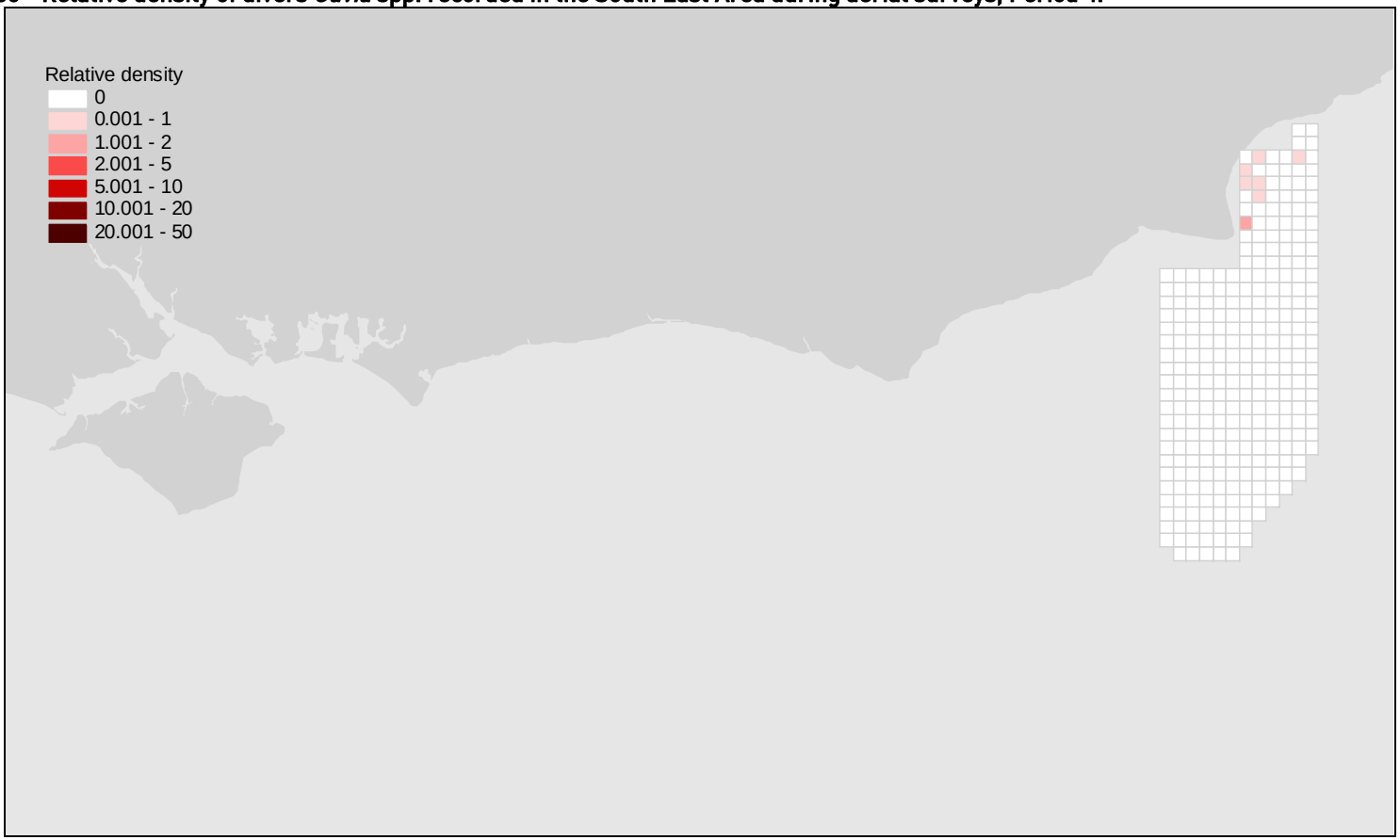


**Figure 61 - Relative density of divers *Gavia* spp. recorded in the South East Area during aerial surveys, Period 5.**

**Figure 62 - Relative density of divers *Gavia* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 1.**

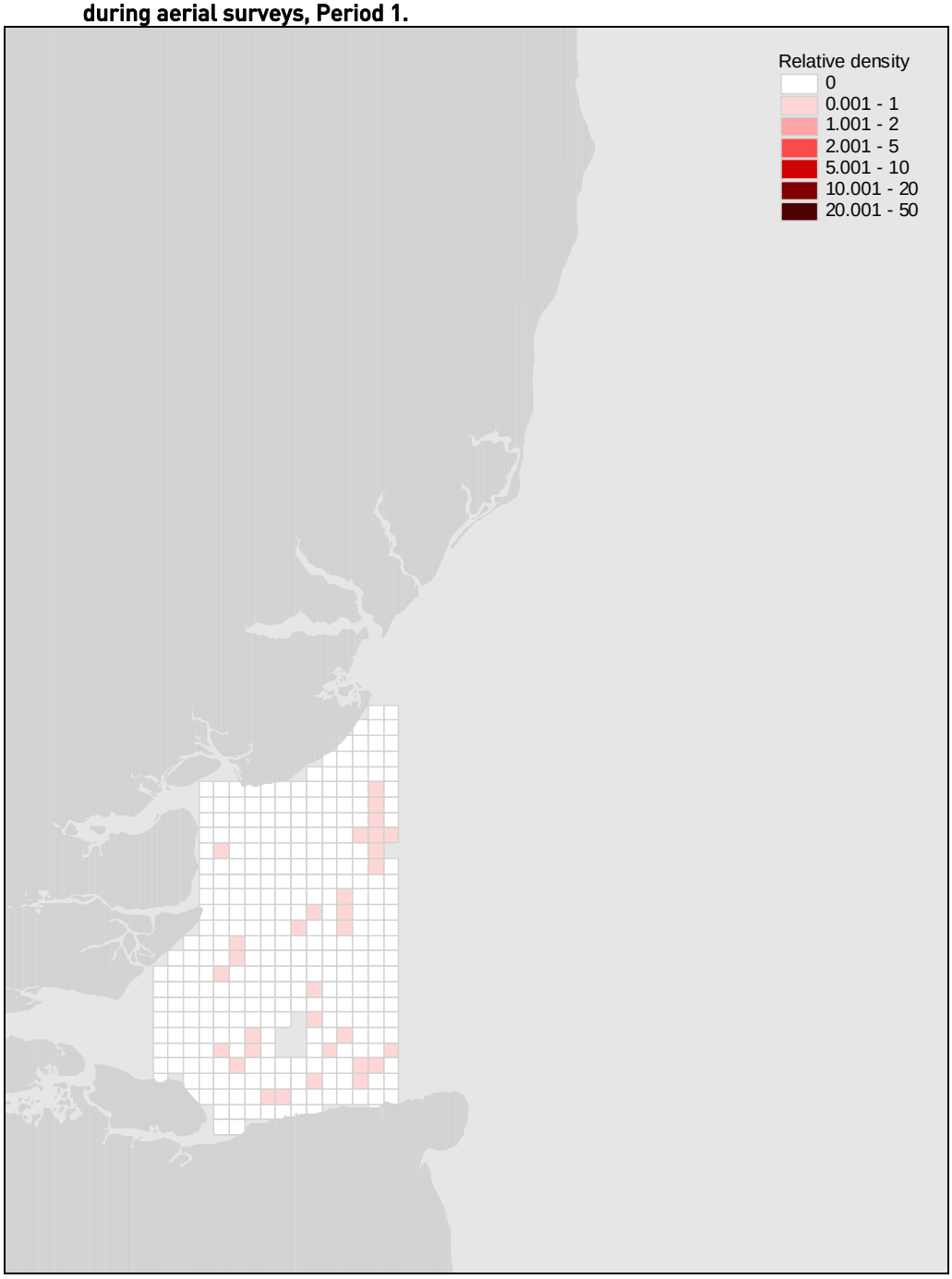


**Figure 63 - Relative density of divers *Gavia* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 2.**

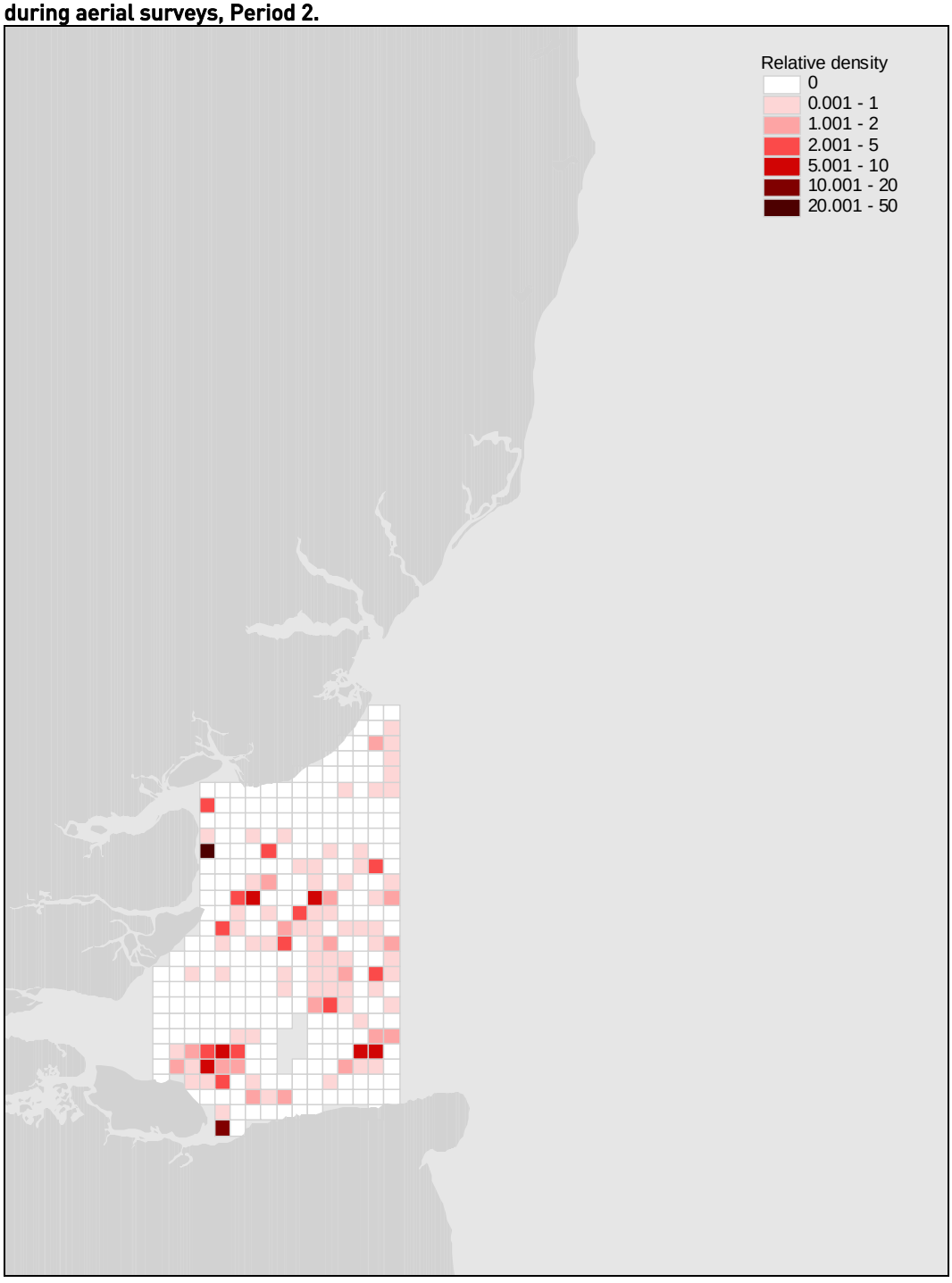


**Figure 64 - Relative density of divers *Gavia* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 3.**

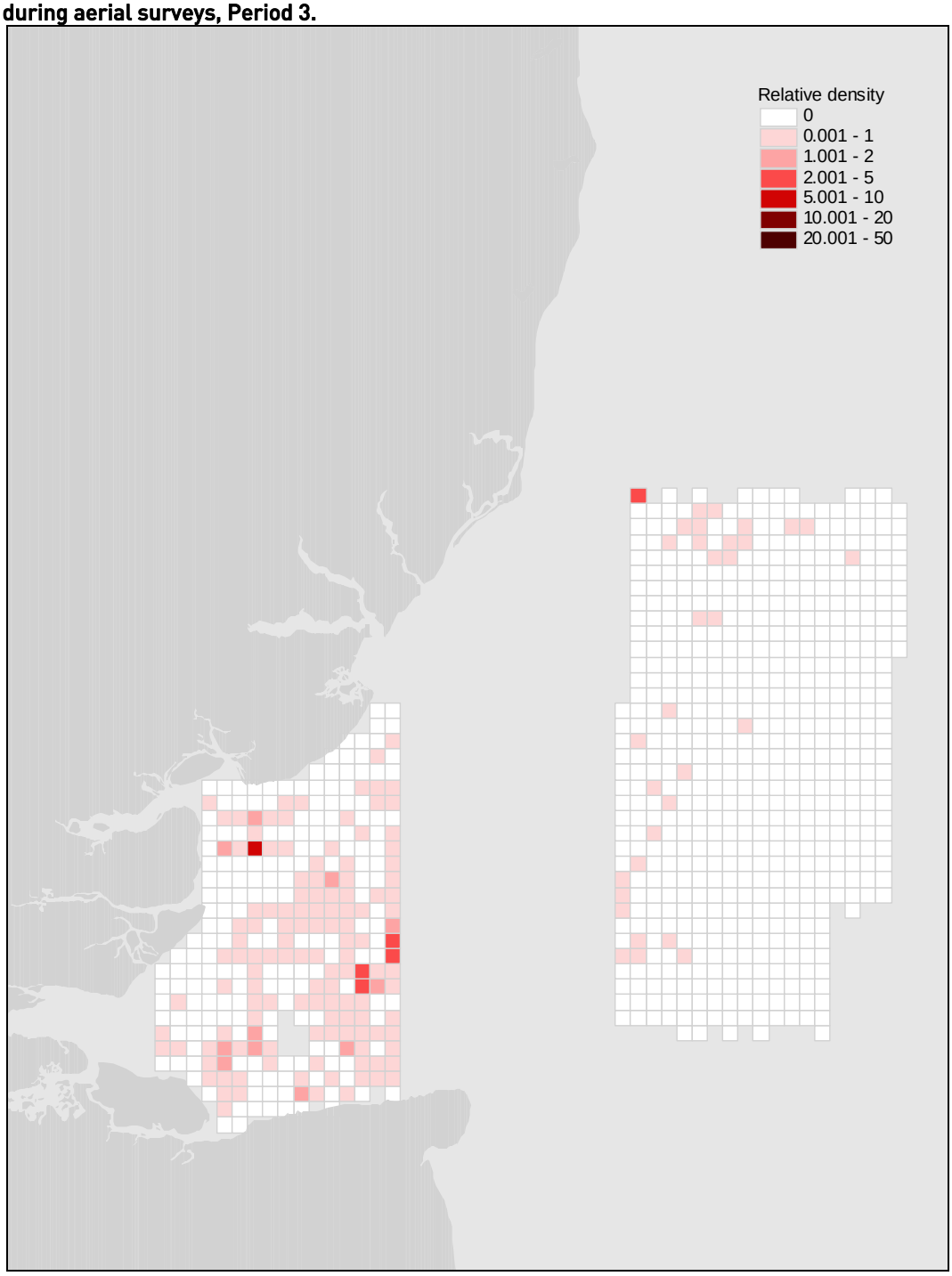


**Figure 65 - Relative density of divers *Gavia* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 4.**

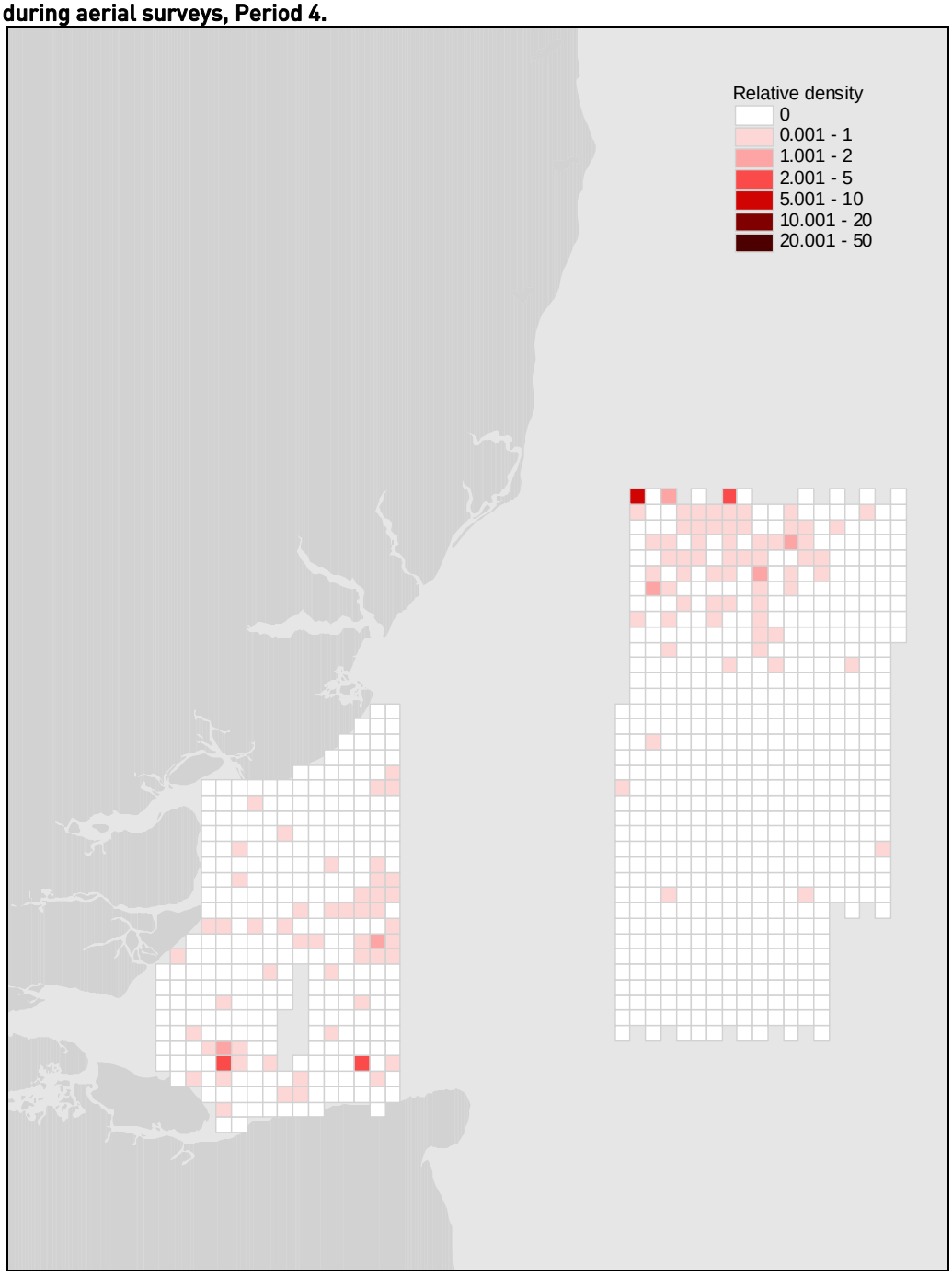


**Figure 66 - Relative density of divers *Gavia* spp. recorded in the Greater Wash Area during aerial surveys, Period 1.**

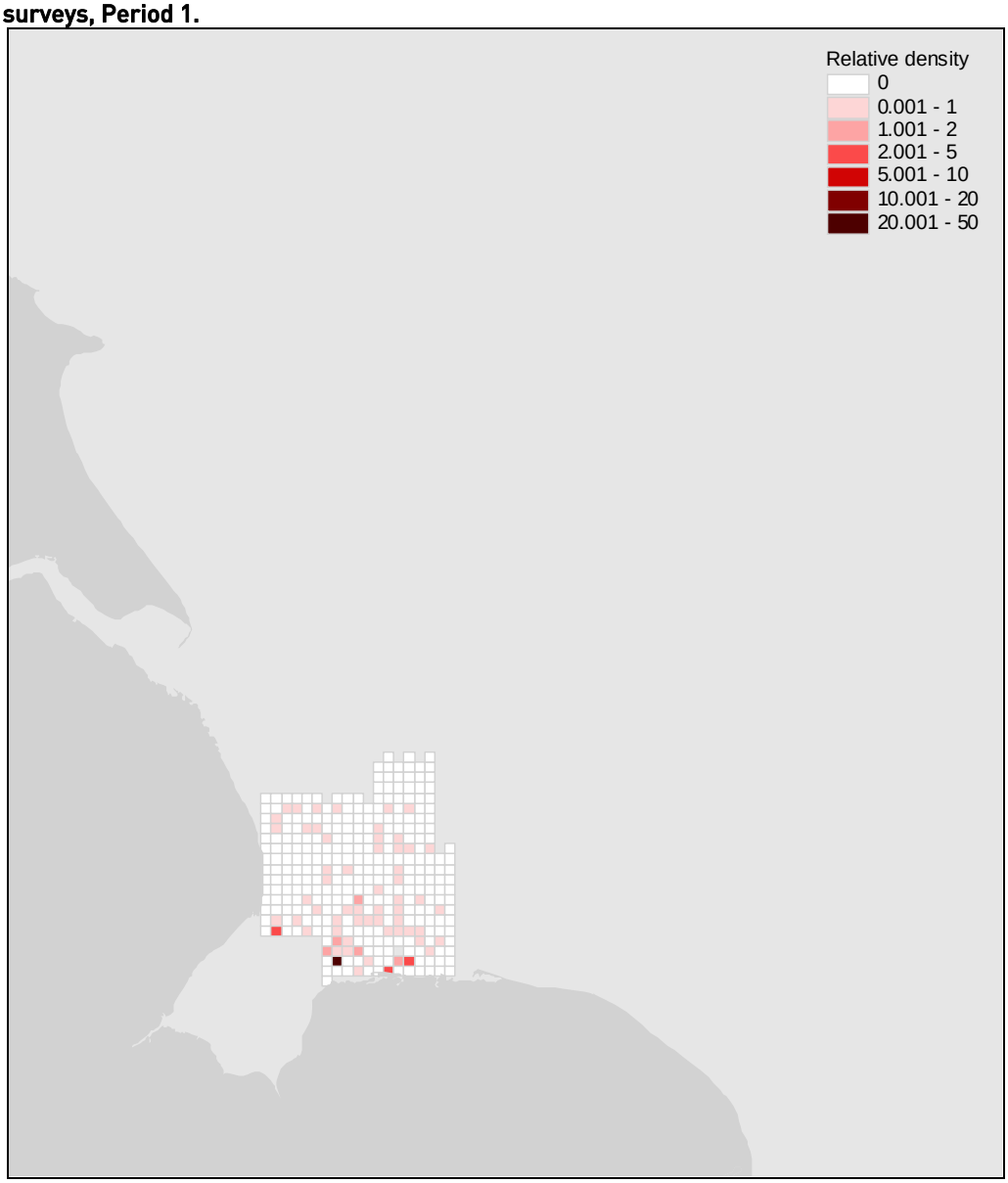


**Figure 67 - Relative density of divers *Gavia* spp. recorded in the Greater Wash Area during aerial surveys, Period 2.**

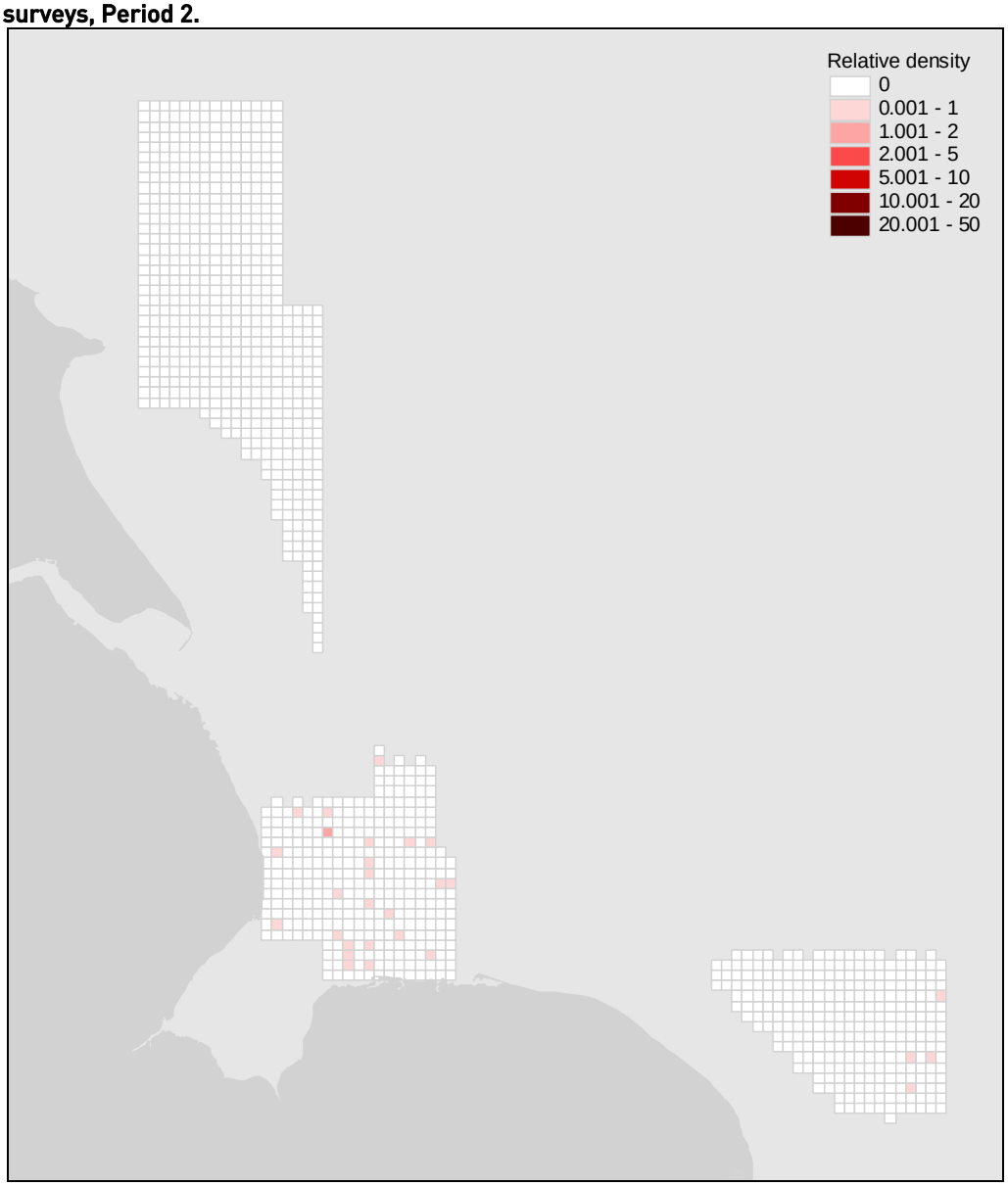


**Figure 68 - Relative density of divers *Gavia* spp. recorded in the Greater Wash Area during aerial surveys, Period 3.**

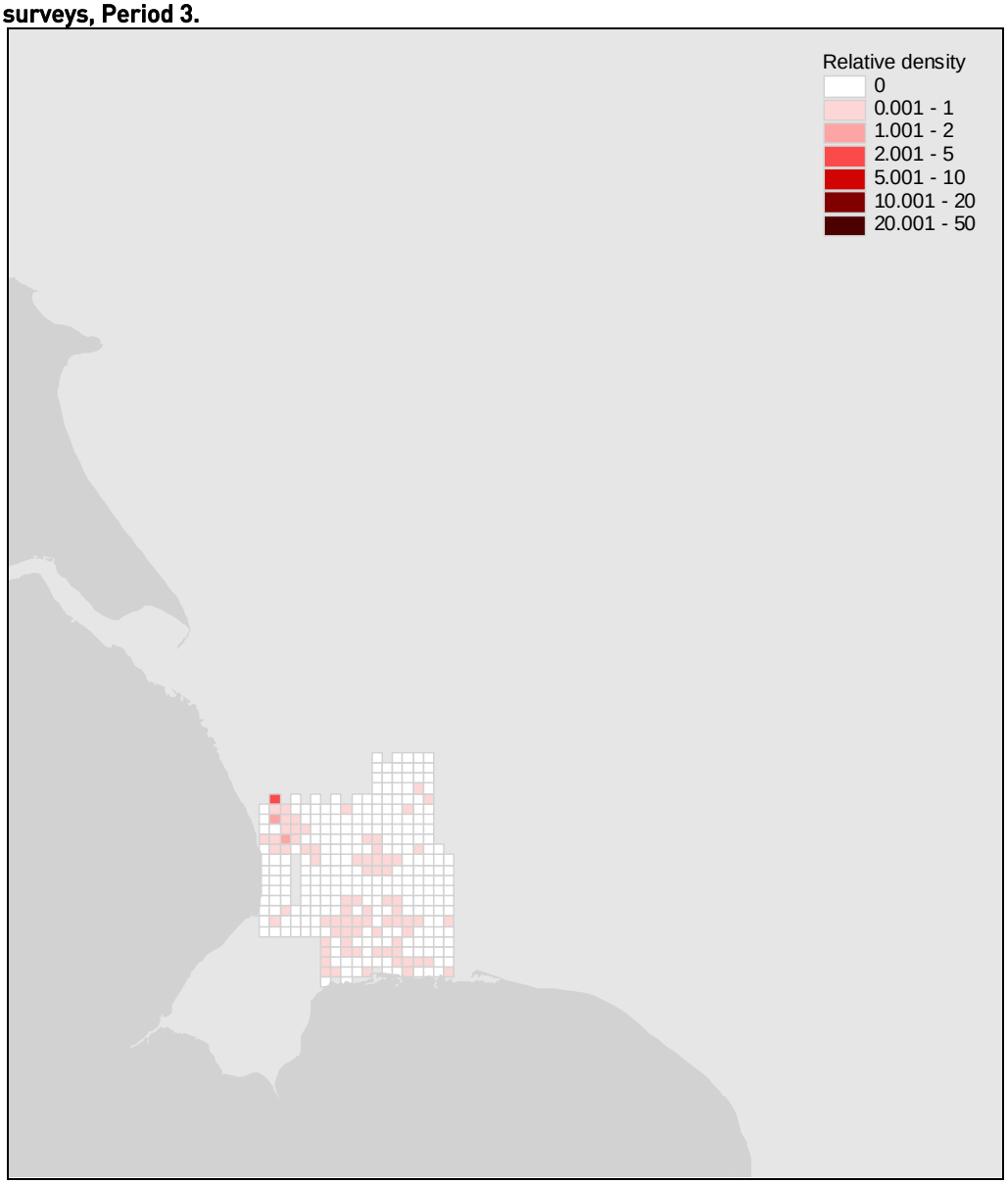


**Figure 69 - Relative density of divers *Gavia* spp. recorded in the Greater Wash Area during aerial surveys, Period 4.**

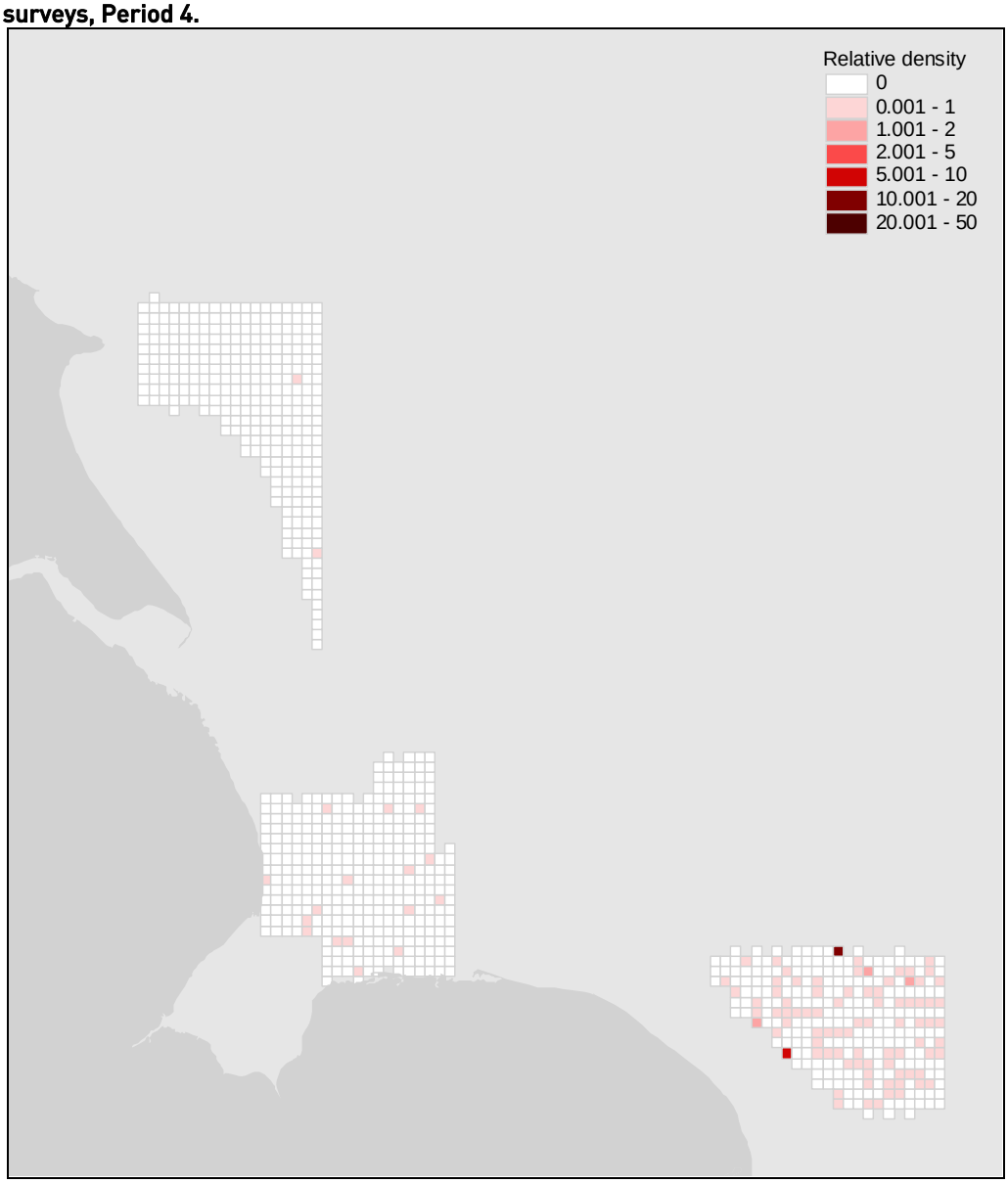


**Figure 70 - Relative density of divers *Gavia* spp. recorded in the North East Area during aerial surveys, winter 2007/08.**

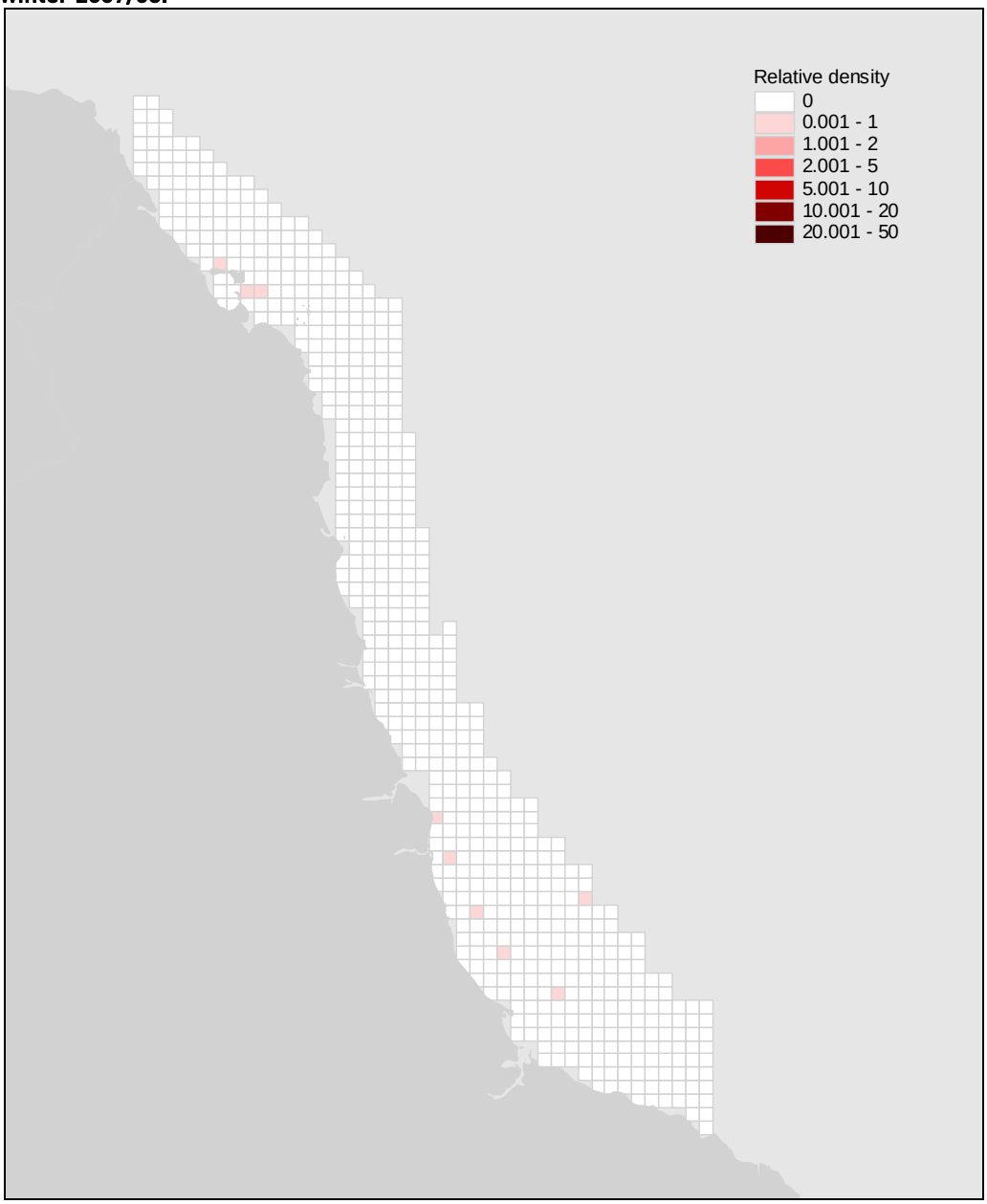


**Figure 71 - Relative density of Manx Shearwaters *Puffinus puffinus* recorded in the North West Area during aerial surveys, summer 2008.**

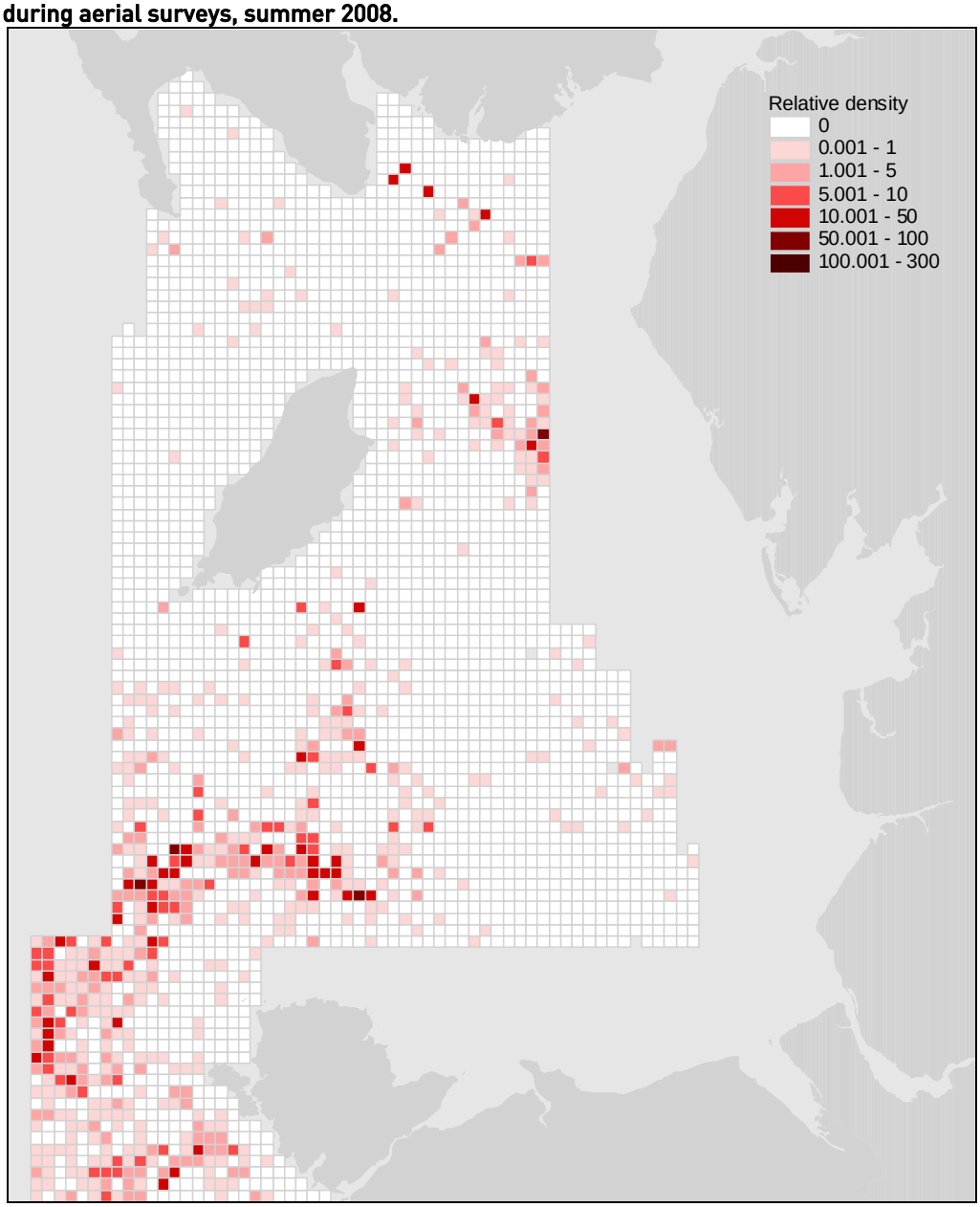


**Figure 72 - Relative density of Manx Shearwaters *Puffinus puffinus* recorded in the West Wales Area during aerial surveys, summer 2008.**

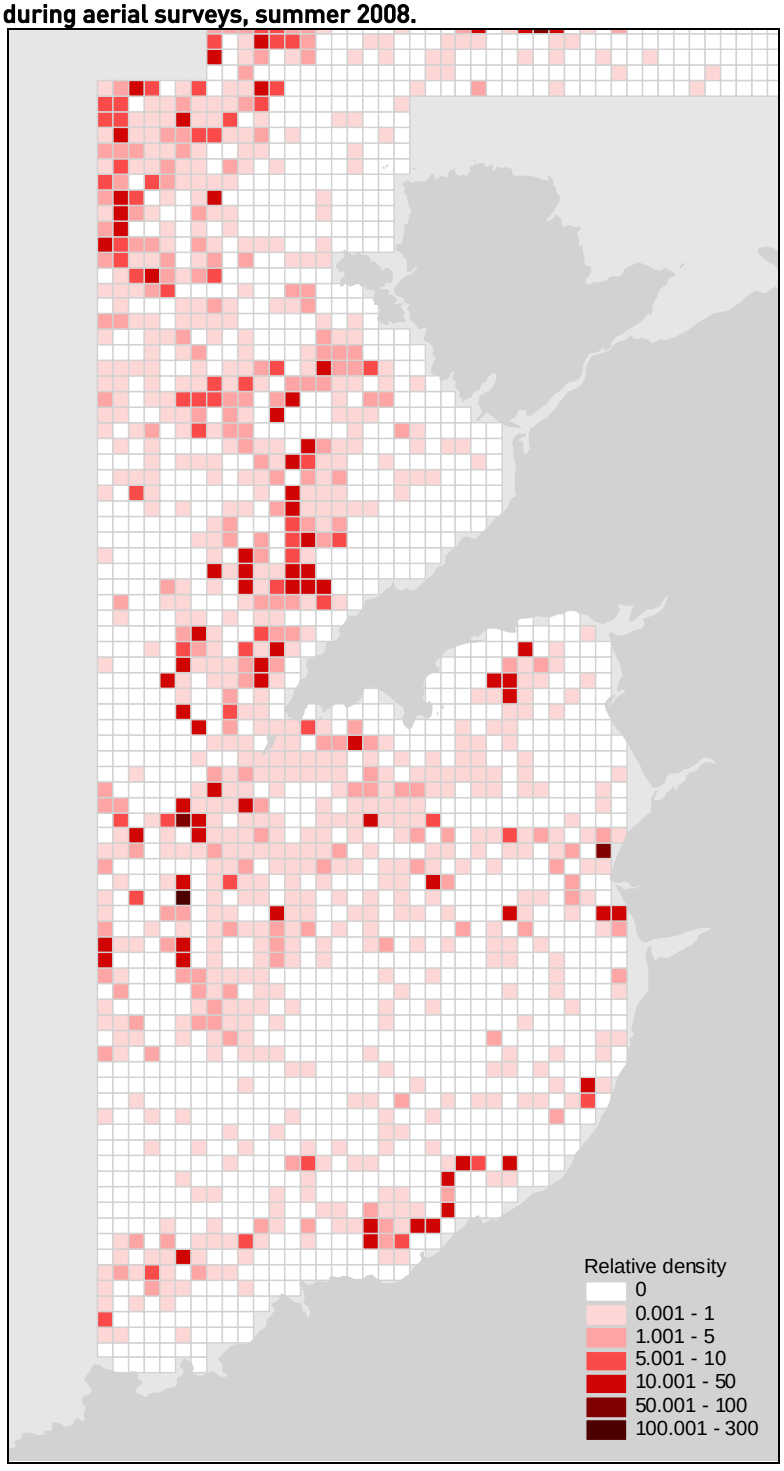


**Figure 73 - Relative density of Manx Shearwaters *Puffinus puffinus* recorded in the South West Area during aerial surveys, summer 2008.**

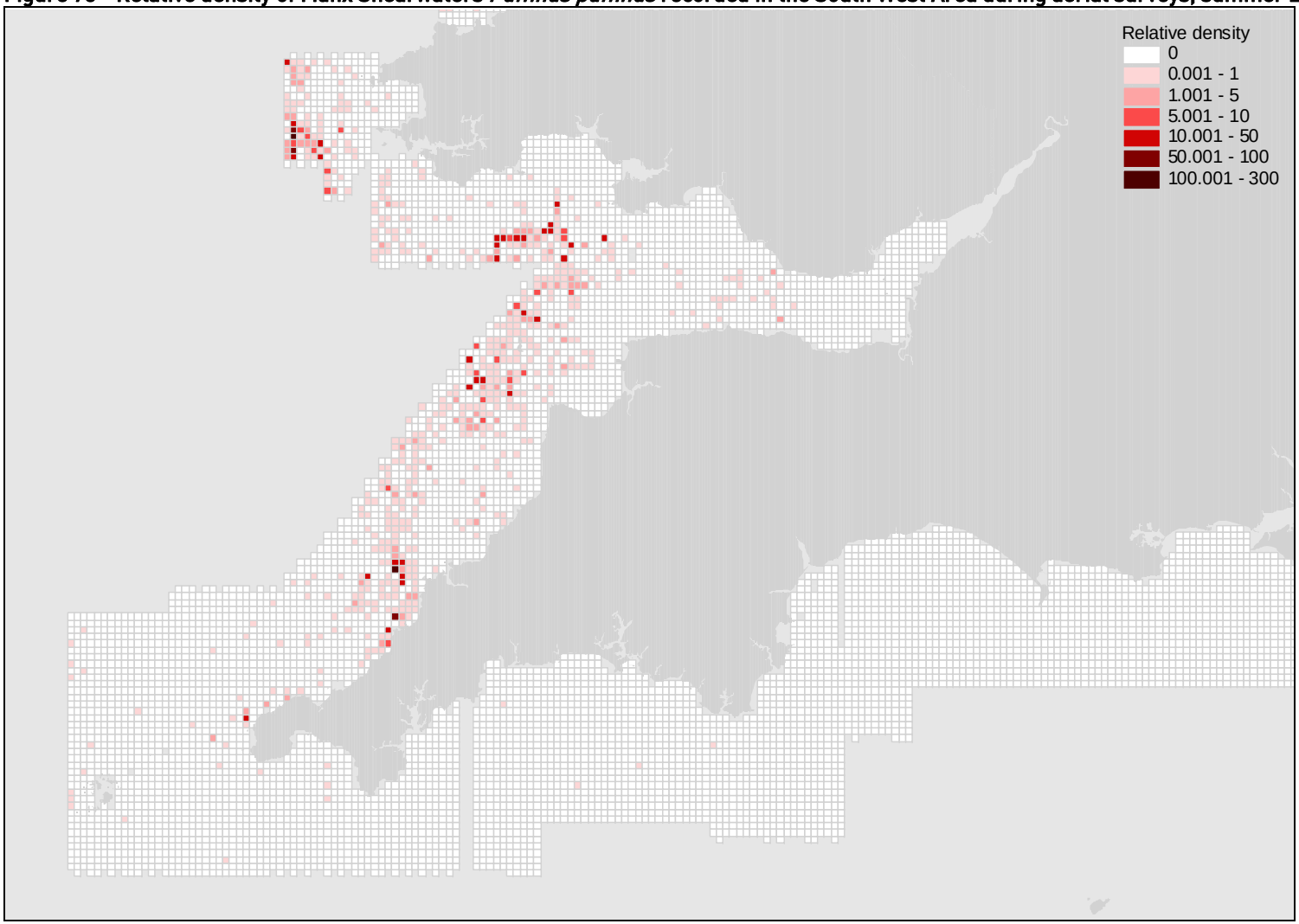


**Figure 74 - Relative density of terns *Sterna* spp. recorded in the North West Area during aerial surveys, summer 2008.**

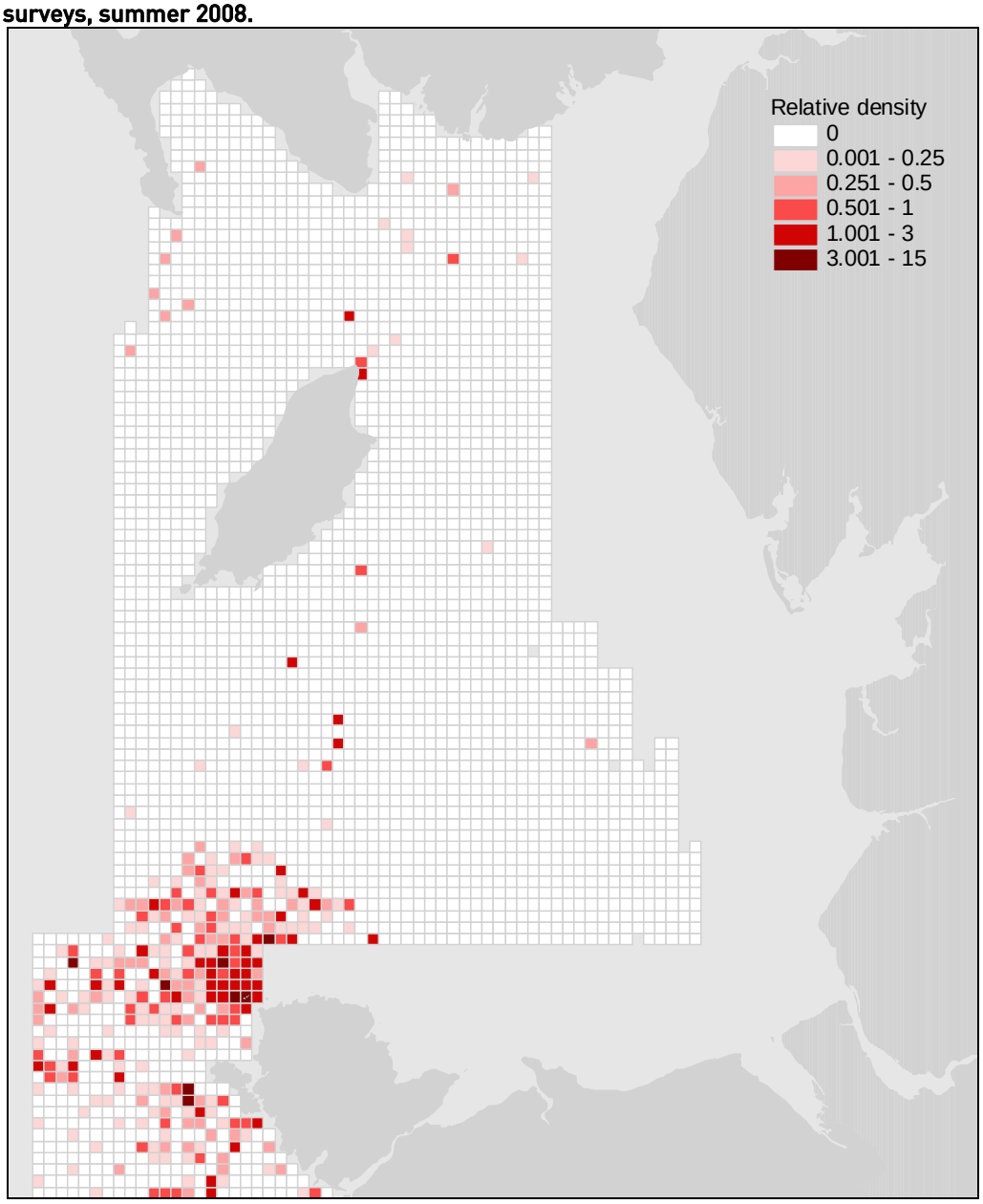


**Figure 75 - Relative density of terns *Sterna* spp. recorded in the West Wales Area during aerial surveys, summer 2008.**

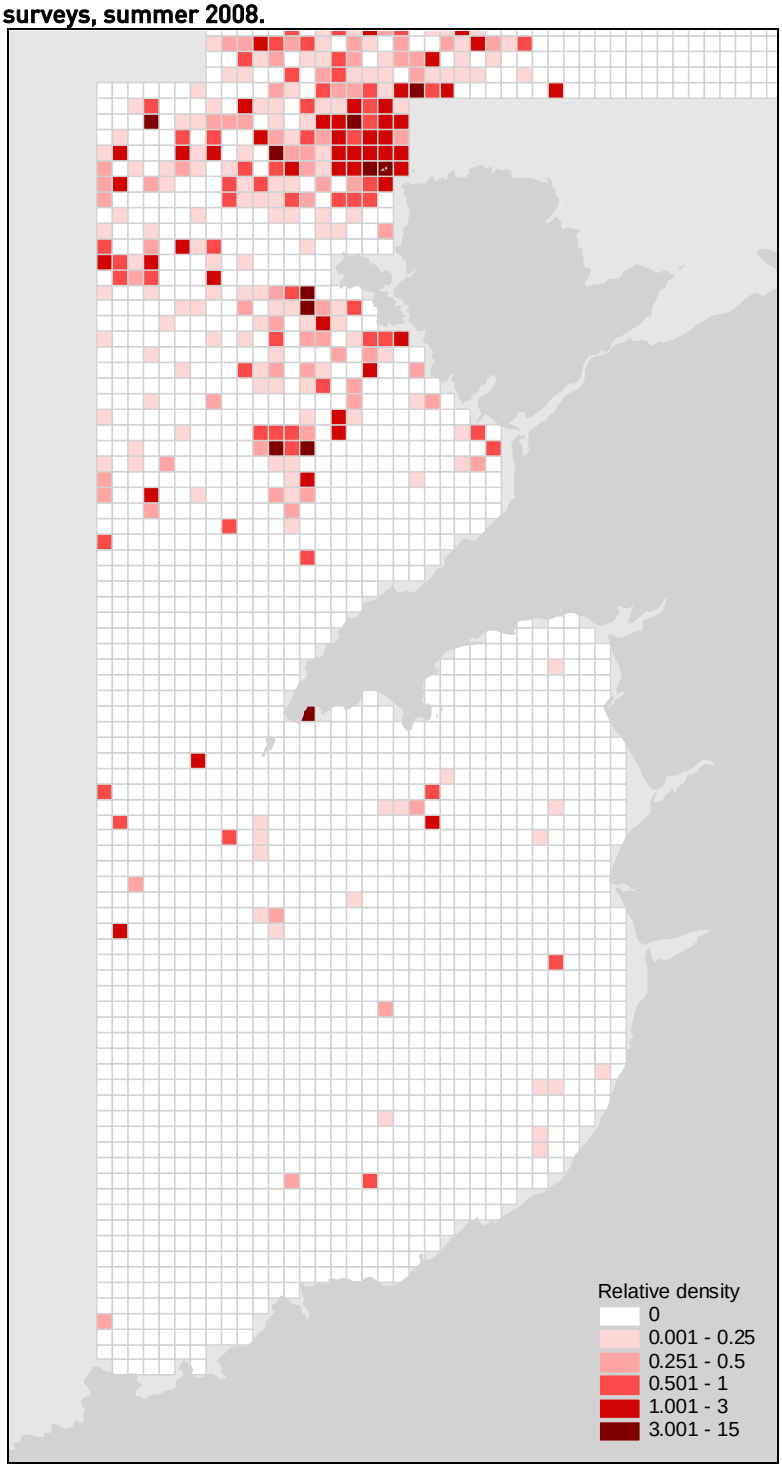


**Figure 76 - Relative density of terns *Sterna* spp. recorded in the South West Area during aerial surveys, summer 2008.**

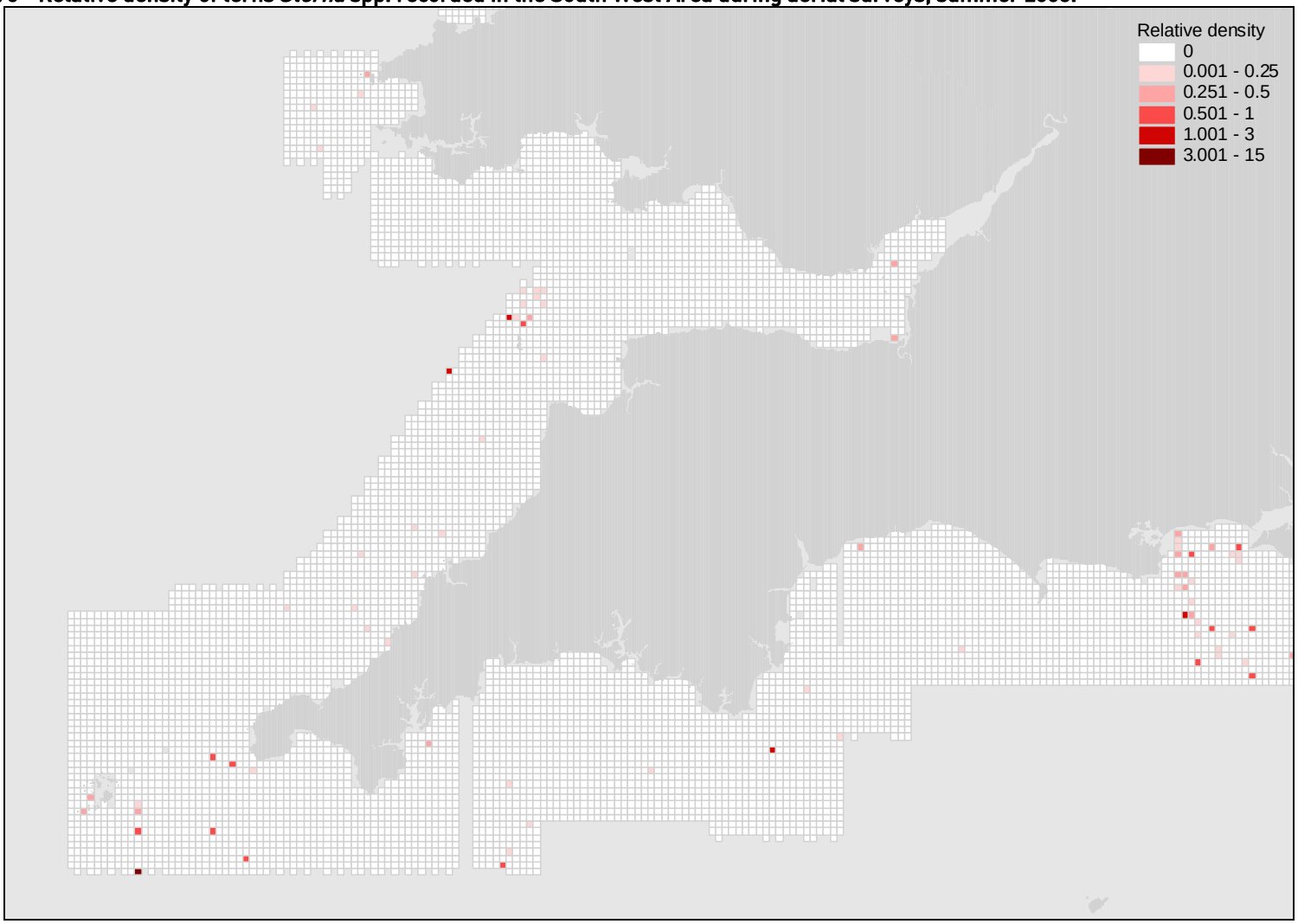


**Figure 77 - Relative density of terns *Sterna* spp. recorded in the South East Area during aerial surveys, summer 2008.**

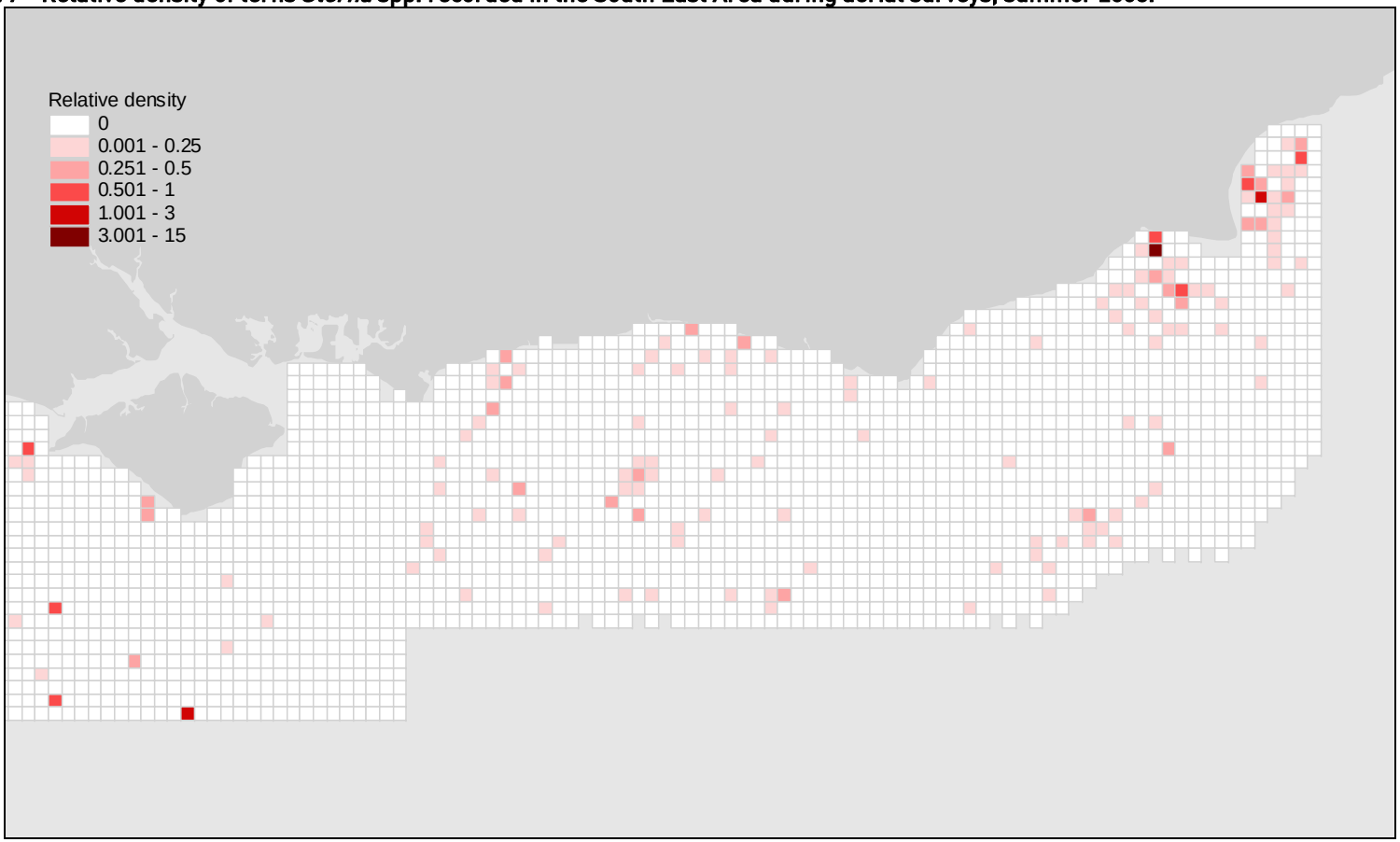


**Figure 78 - Relative density of terns *Sterna* spp. recorded in the Greater Wash Area during aerial surveys, summer 2008.**

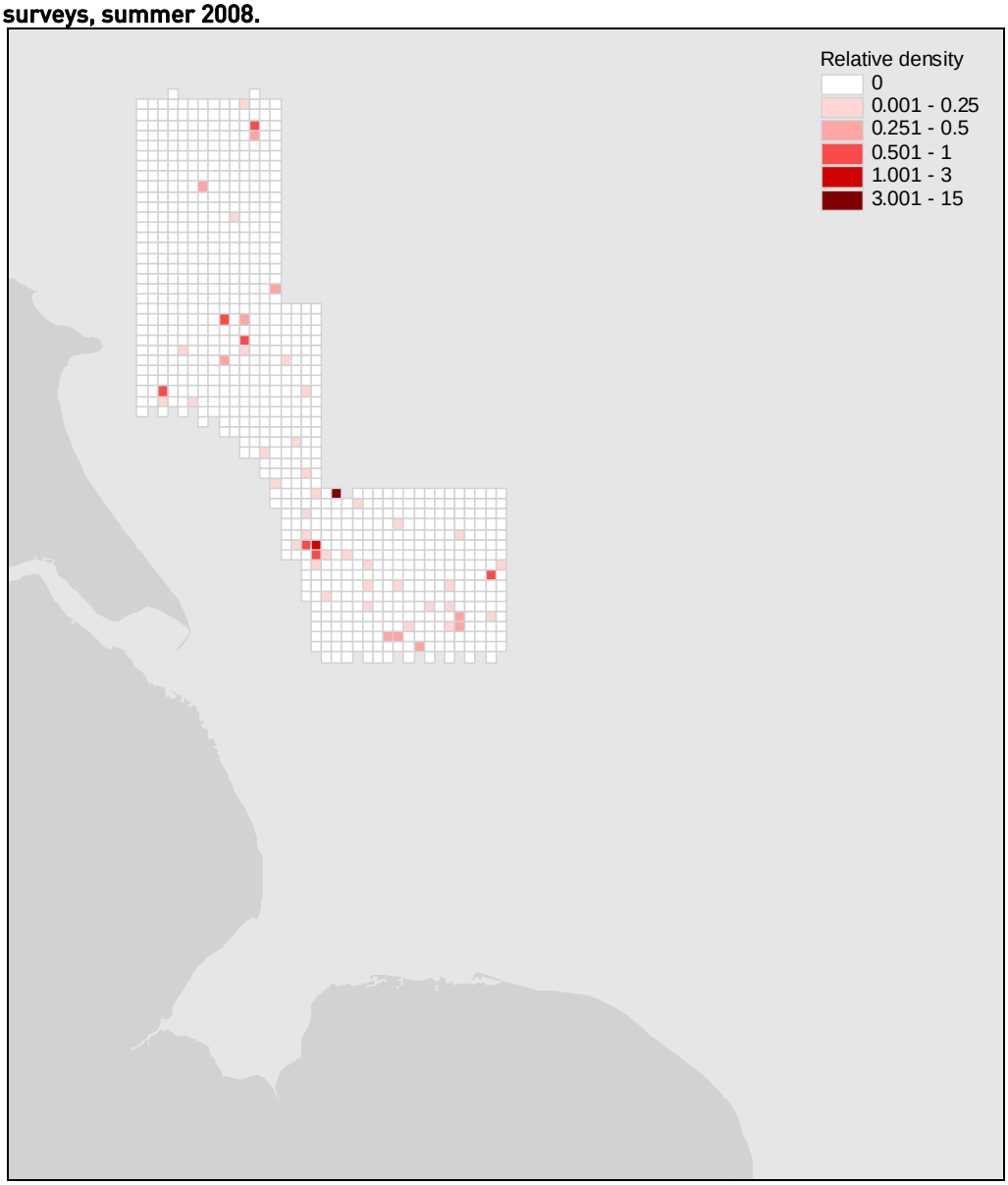


**Figure 79 - Relative density of terns *Sterna* spp. recorded in the North East Area during aerial surveys, summer 2008.**

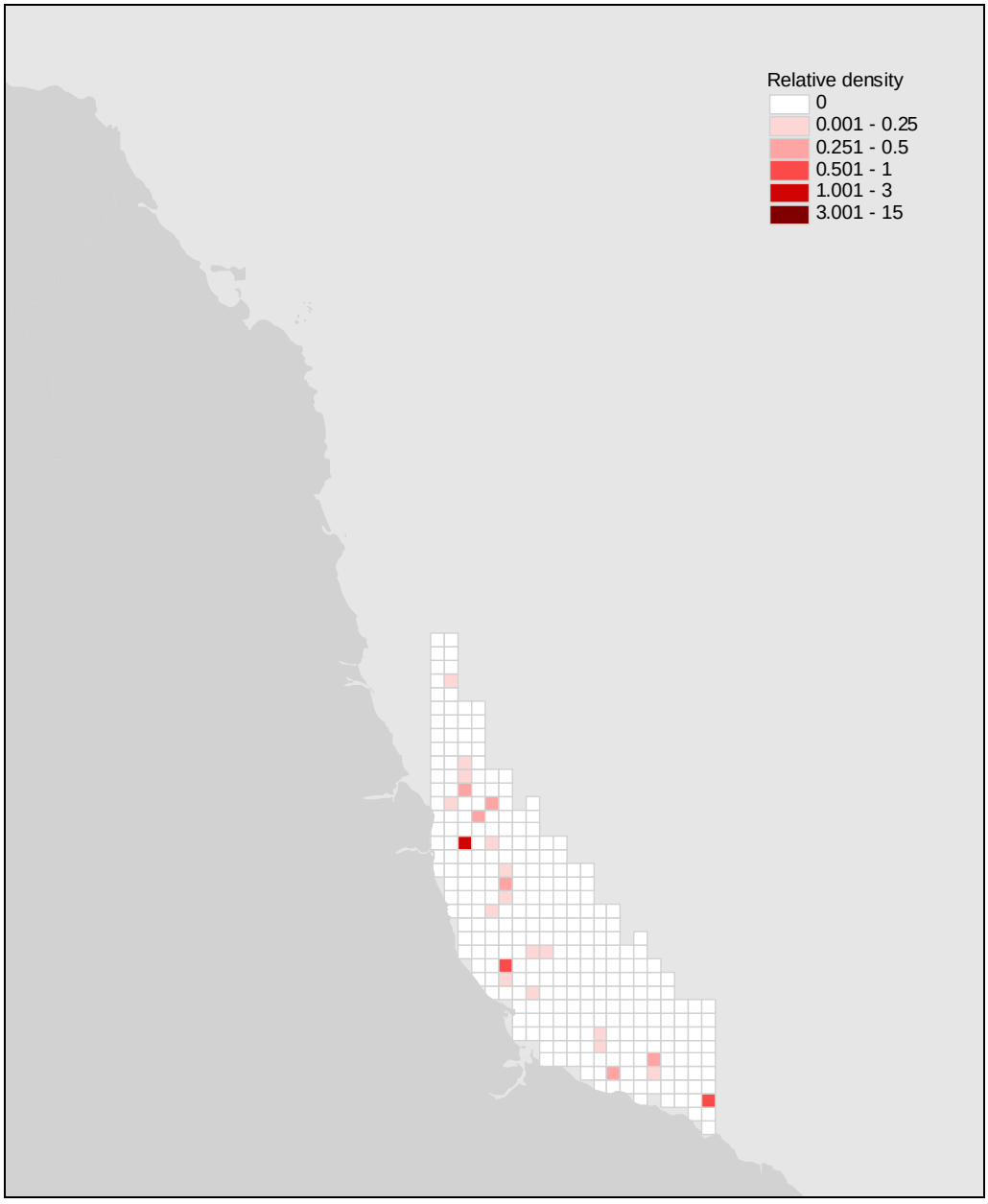


**Figure 80 - Relative density of Eiders *Somateria mollissima* recorded in the North East Area during aerial surveys, winter 2007/08.**

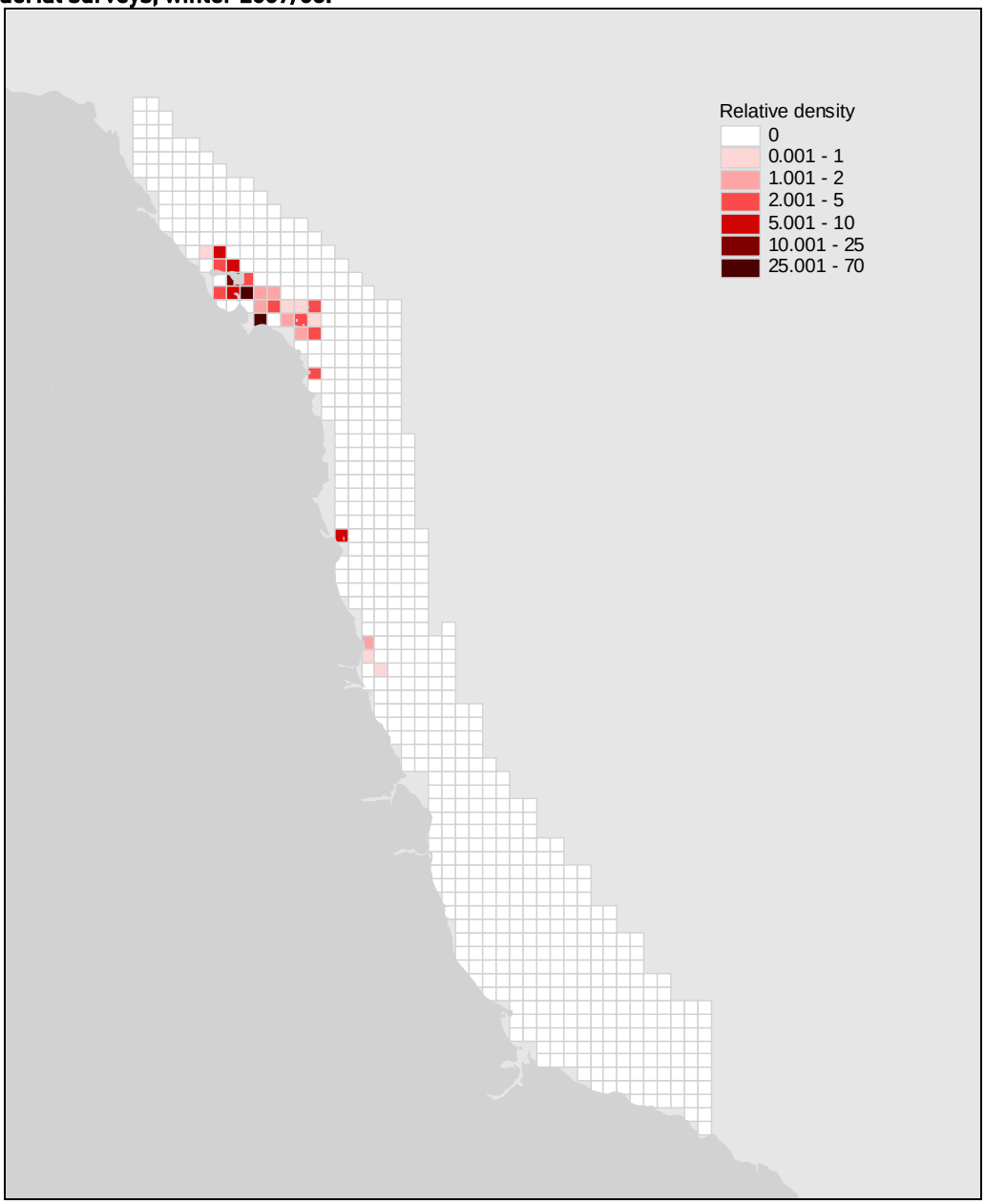


**Figure 81 - Relative density of Fulmars *Fulmarus glacialis* recorded in the West Wales Area during aerial surveys, winter 2007/08.**

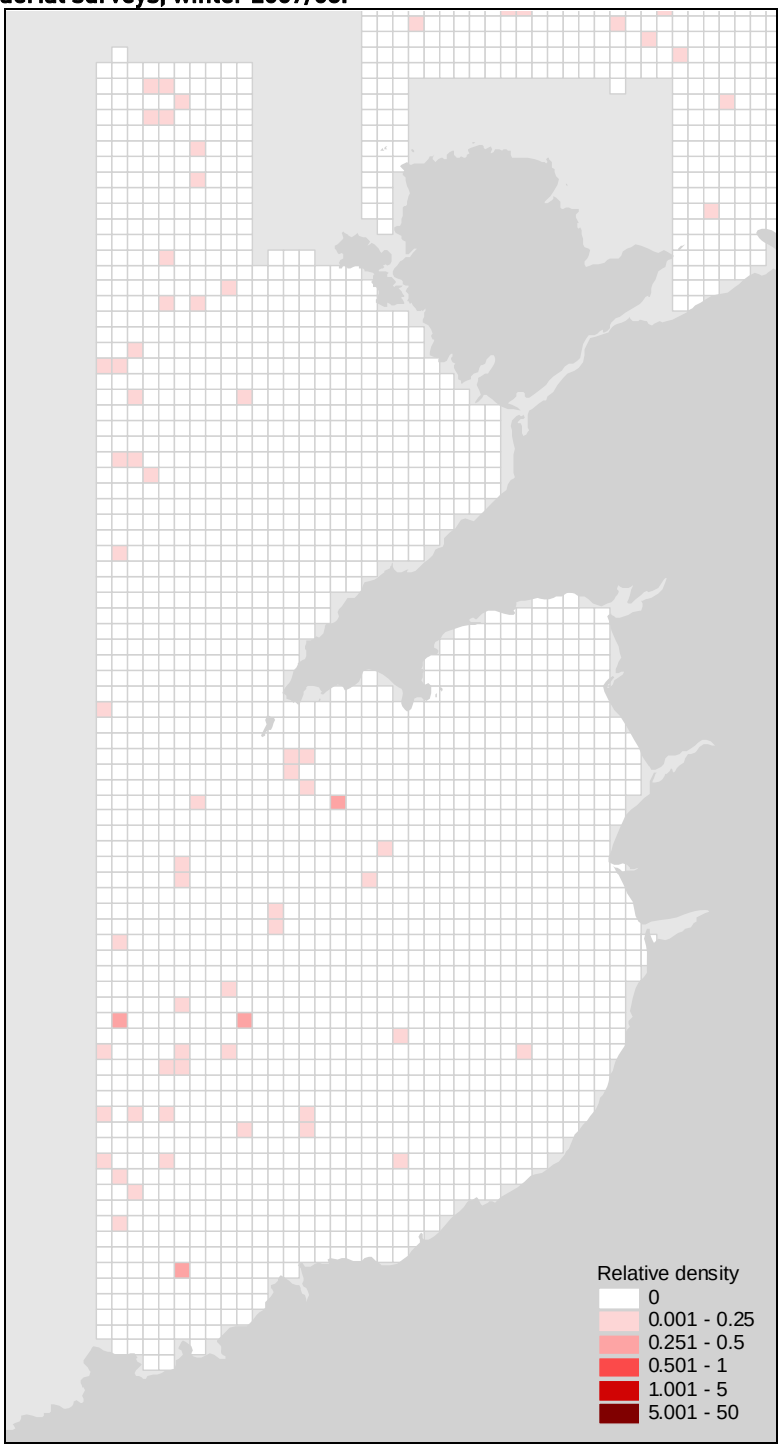


**Figure 82 - Relative density of Fulmars *Fulmarus glacialis* recorded in the West Wales Area during aerial surveys, summer 2008.**

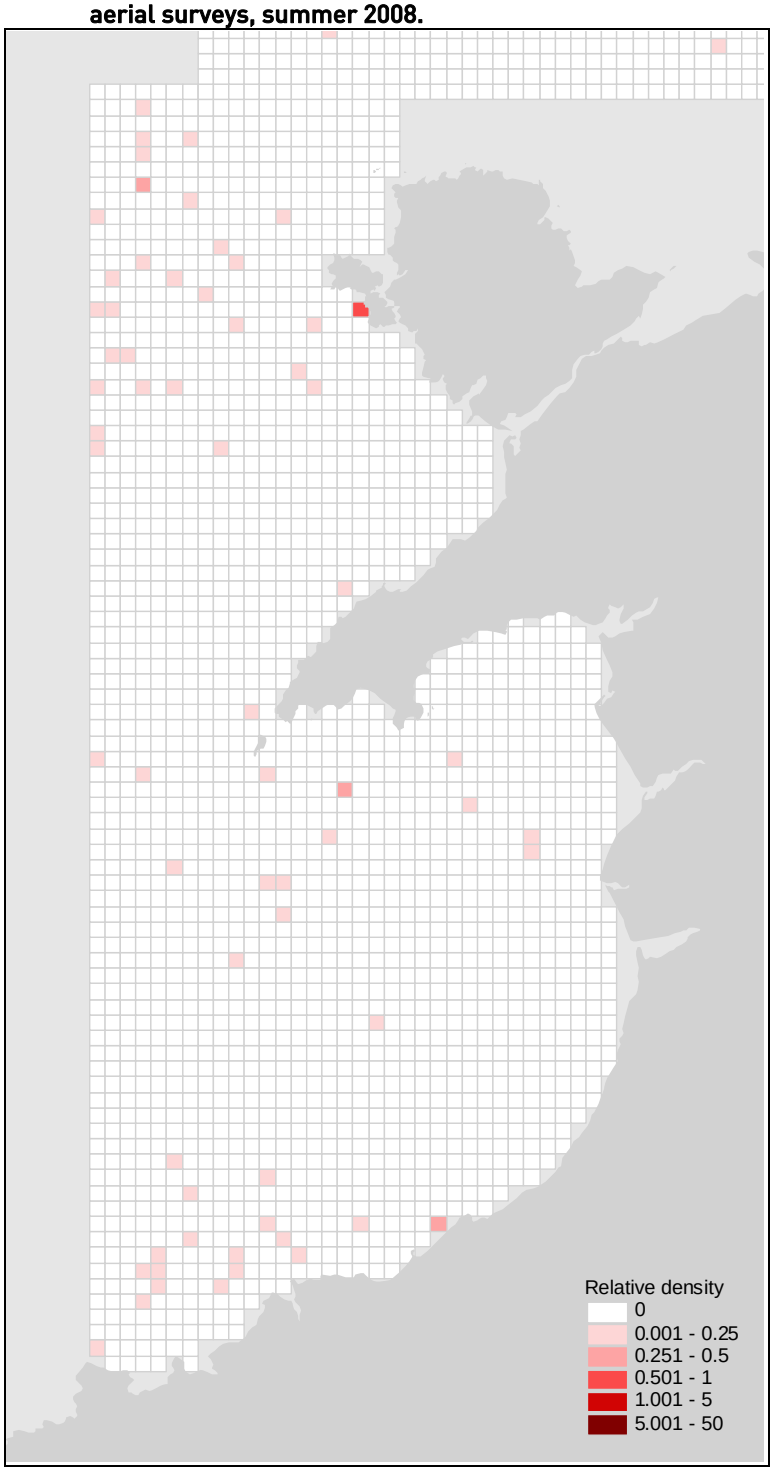


**Figure 83 - Relative density of Fulmars *Fulmarus glacialis* recorded in the South West Area during aerial surveys, winter 2007/08.**

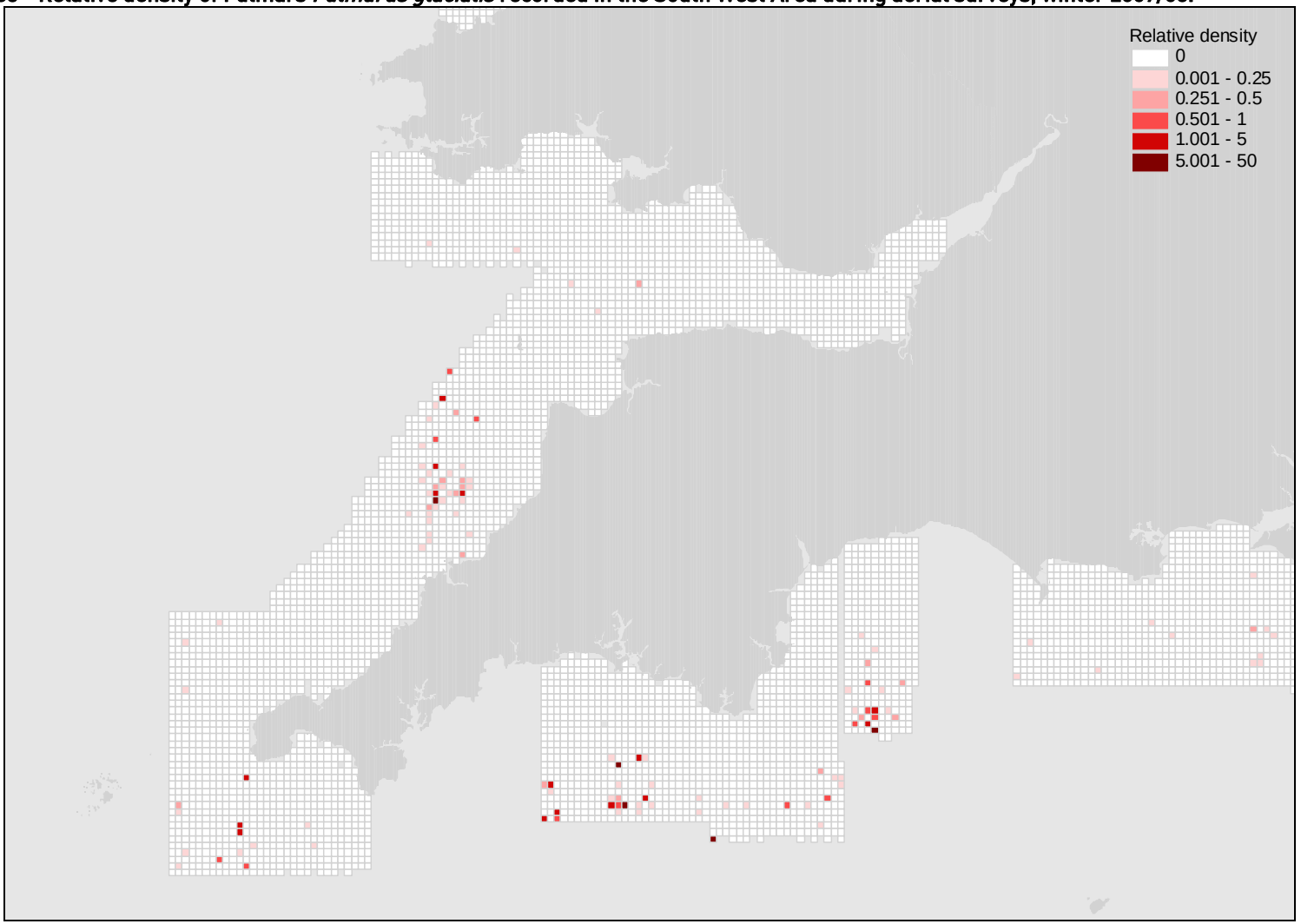


**Figure 84 - Relative density of Fulmars *Fulmarus glacialis* recorded in the South West Area during aerial surveys, summer 2008.**

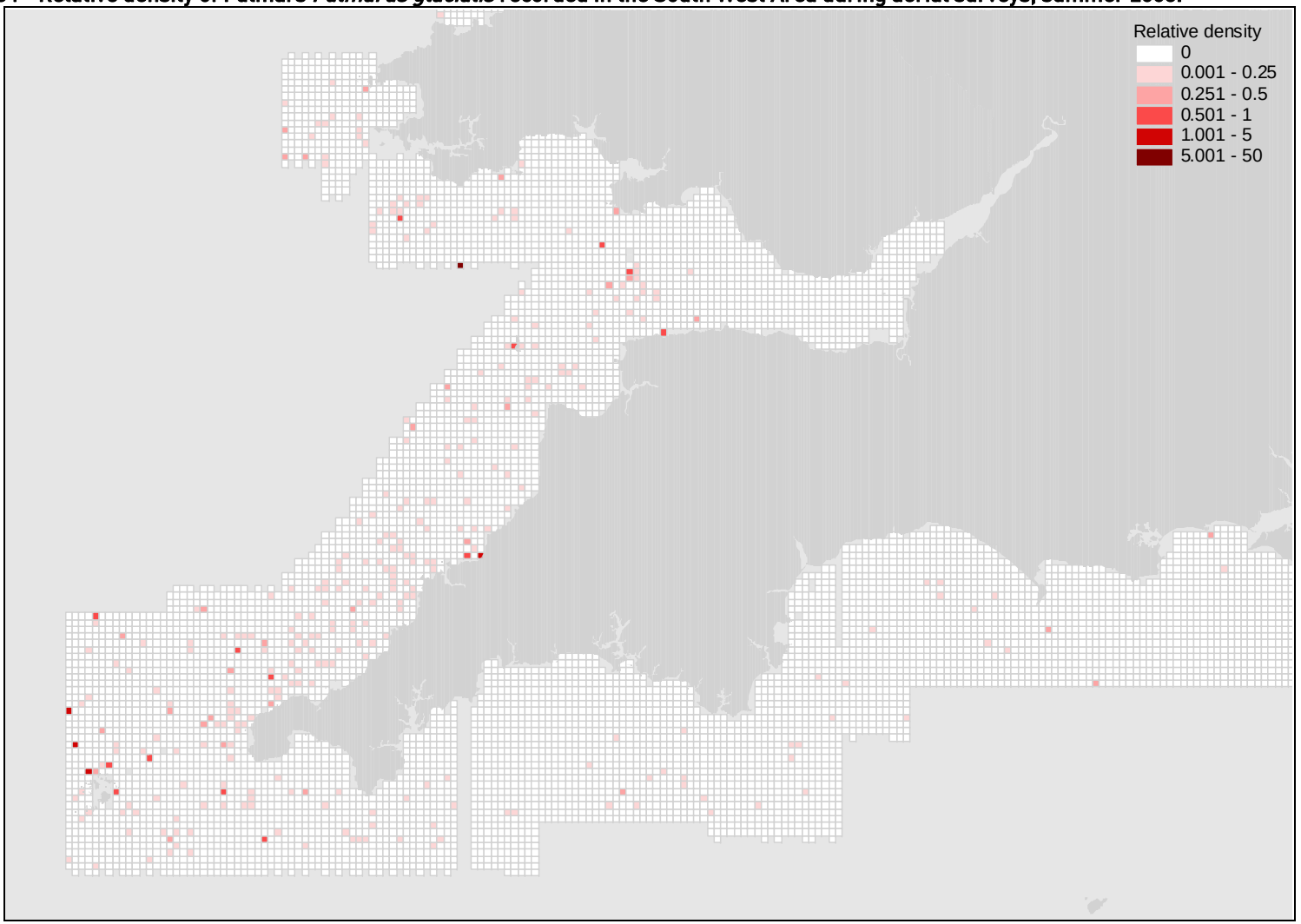


**Figure 85 - Relative density of Fulmars *Fulmarus glacialis* recorded in the South East Area during aerial surveys, winter 2007/08.**

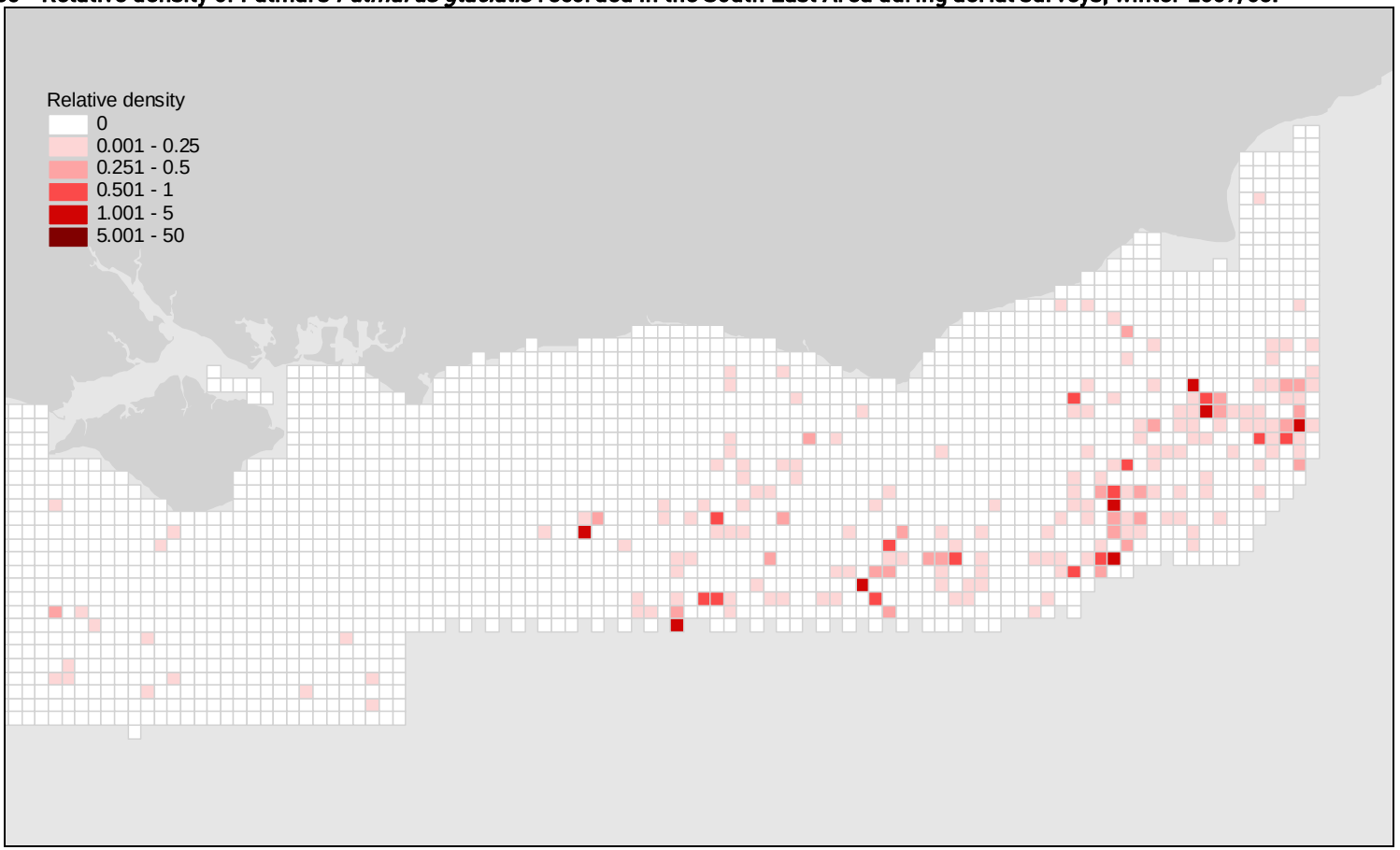


**Figure 86 - Relative density of Fulmars *Fulmarus glacialis* recorded in the South East Area during aerial surveys, summer 2008.**

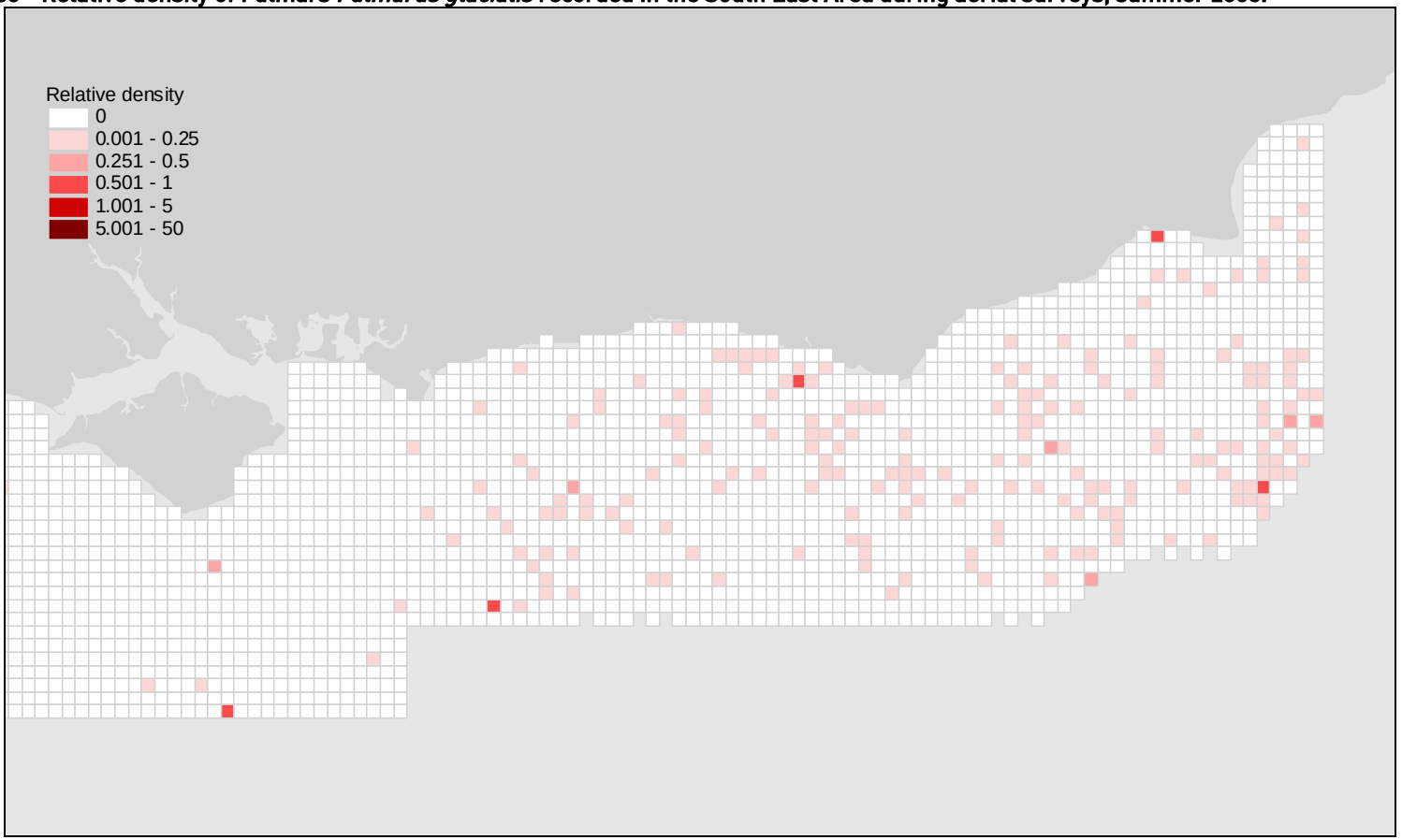


**Figure 87 - Relative density of Fulmars *Fulmarus glacialis* recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

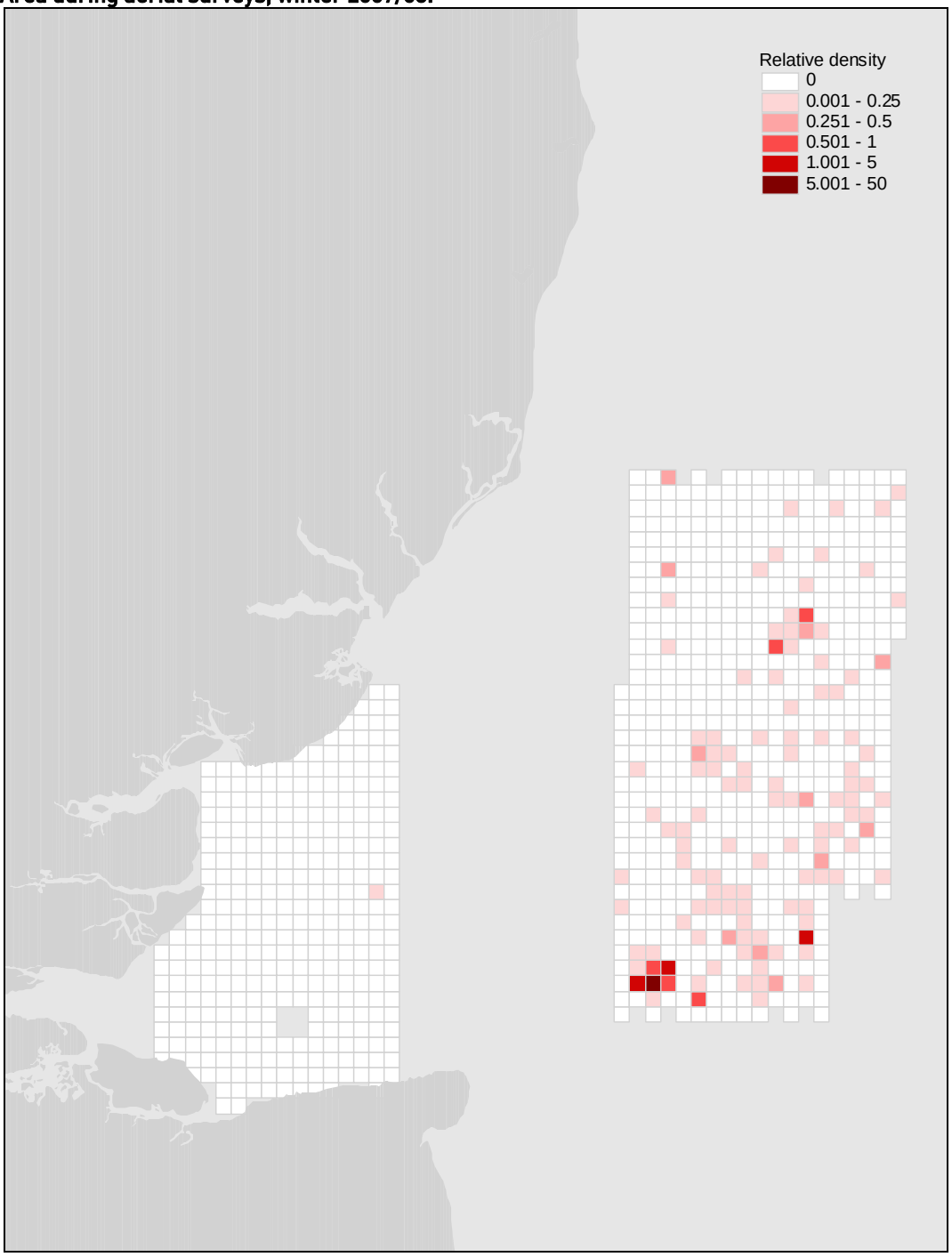


**Figure 88 - Relative density of Fulmars *Fulmarus glacialis* recorded in the Greater Wash Area during aerial surveys, winter 2007/08.**

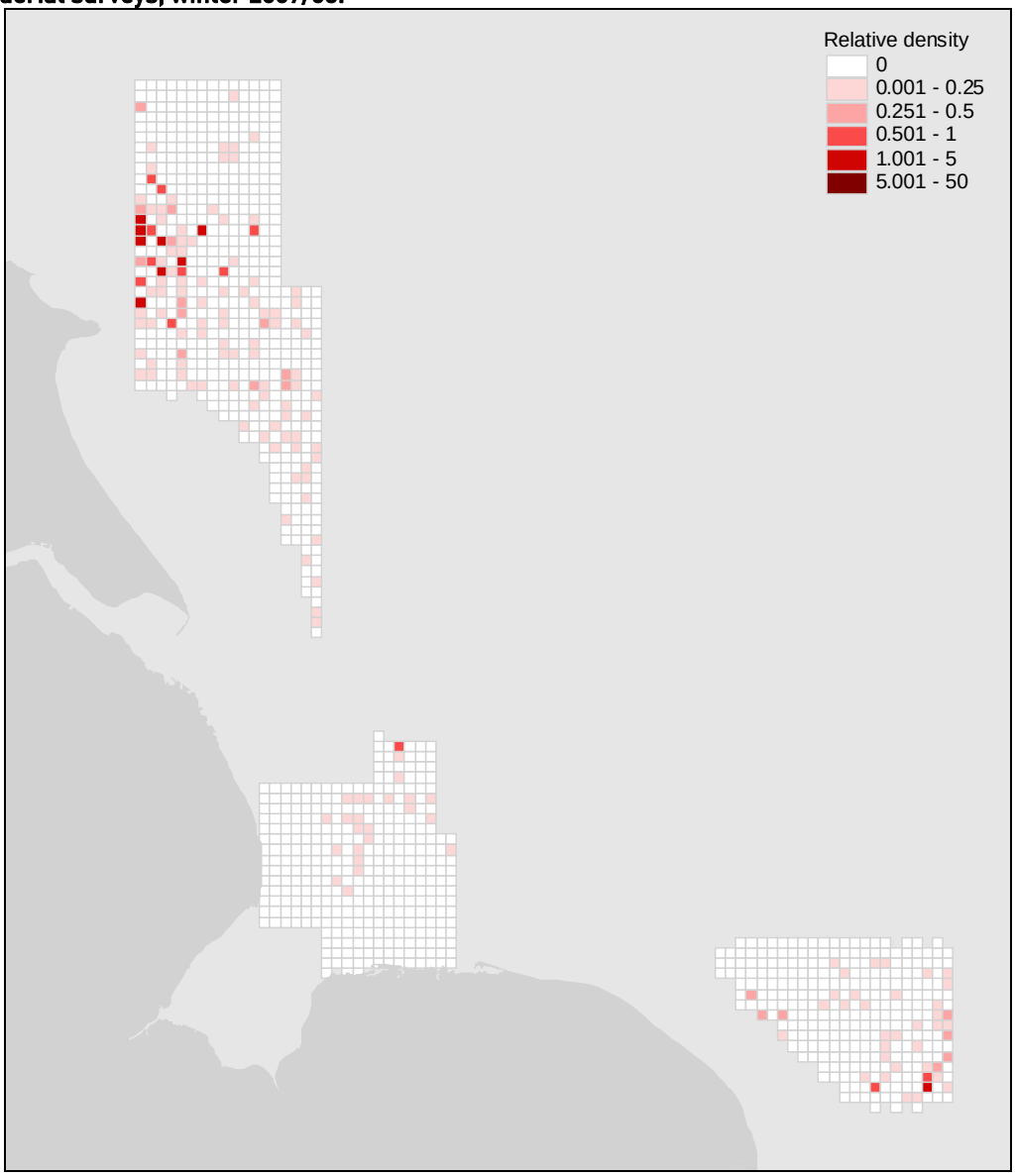


**Figure 89 - Relative density of Fulmars *Fulmarus glacialis* recorded in the Greater Wash Area during aerial surveys, summer 2008.**

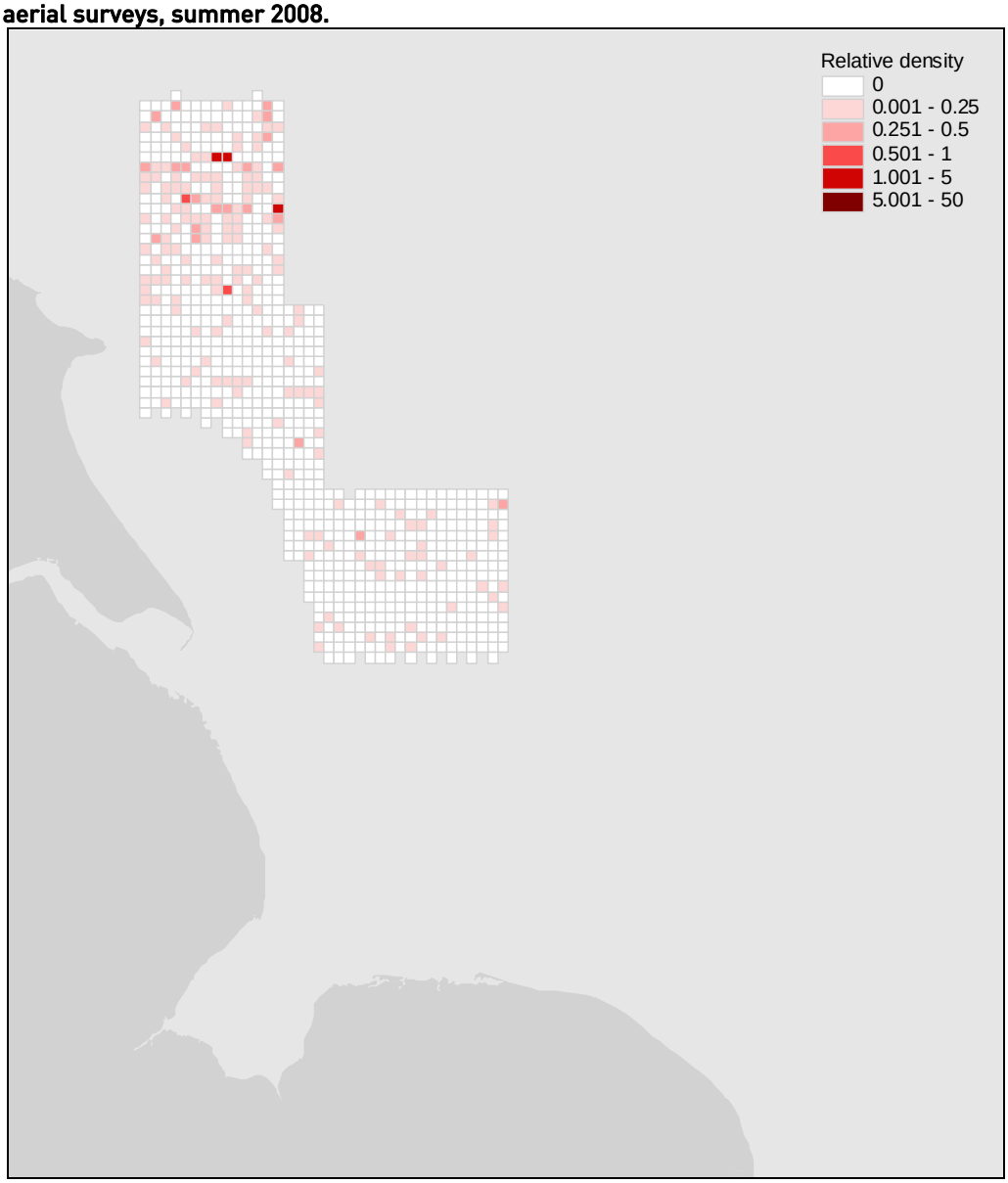


**Figure 90 - Relative density of Fulmars *Fulmarus glacialis* recorded in the North East Area during aerial surveys, winter 2007/08.**

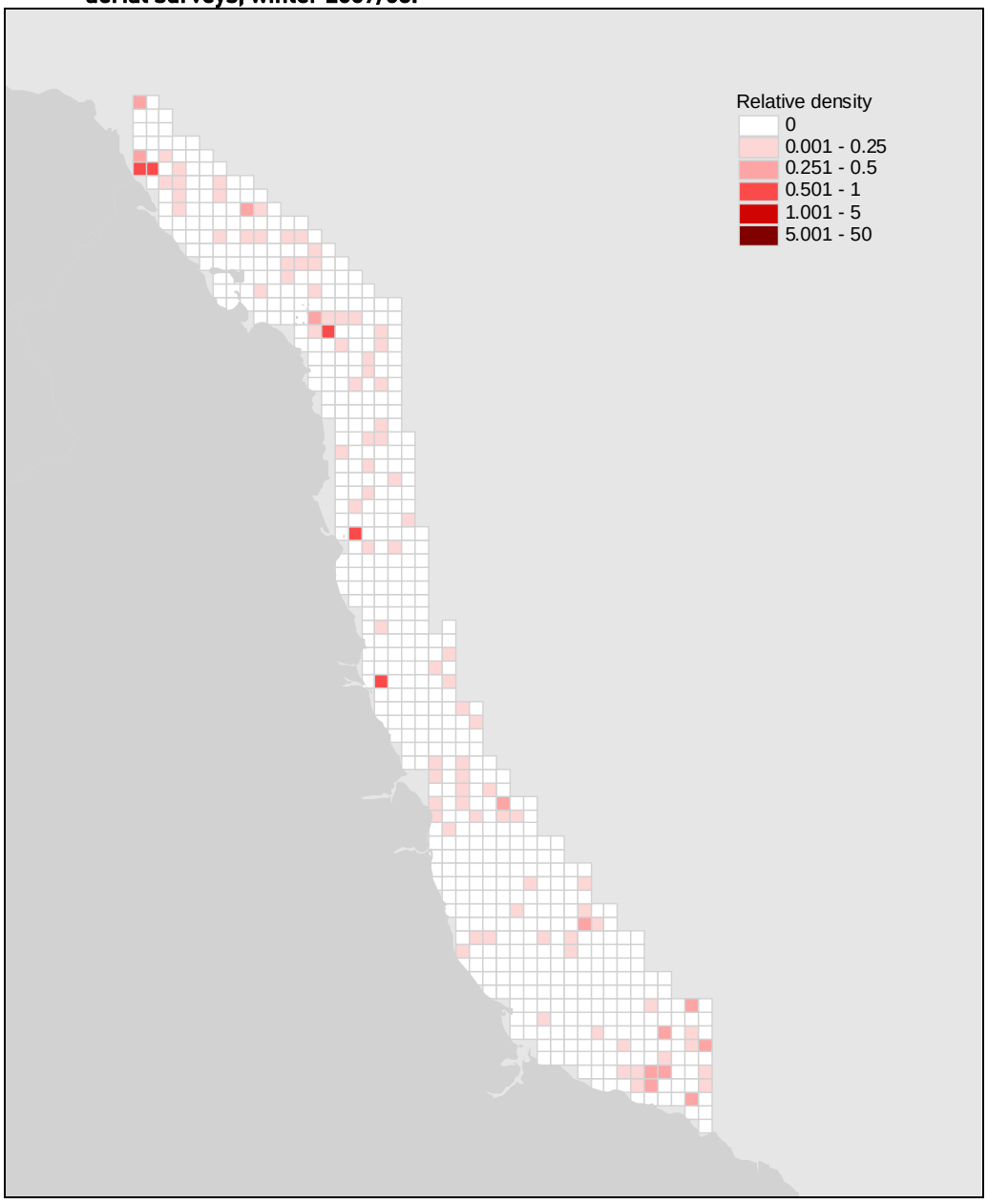


**Figure 91 – Relative density of Fulmars *Fulmarus glacialis* recorded in the North East Area during aerial surveys, summer 2008**

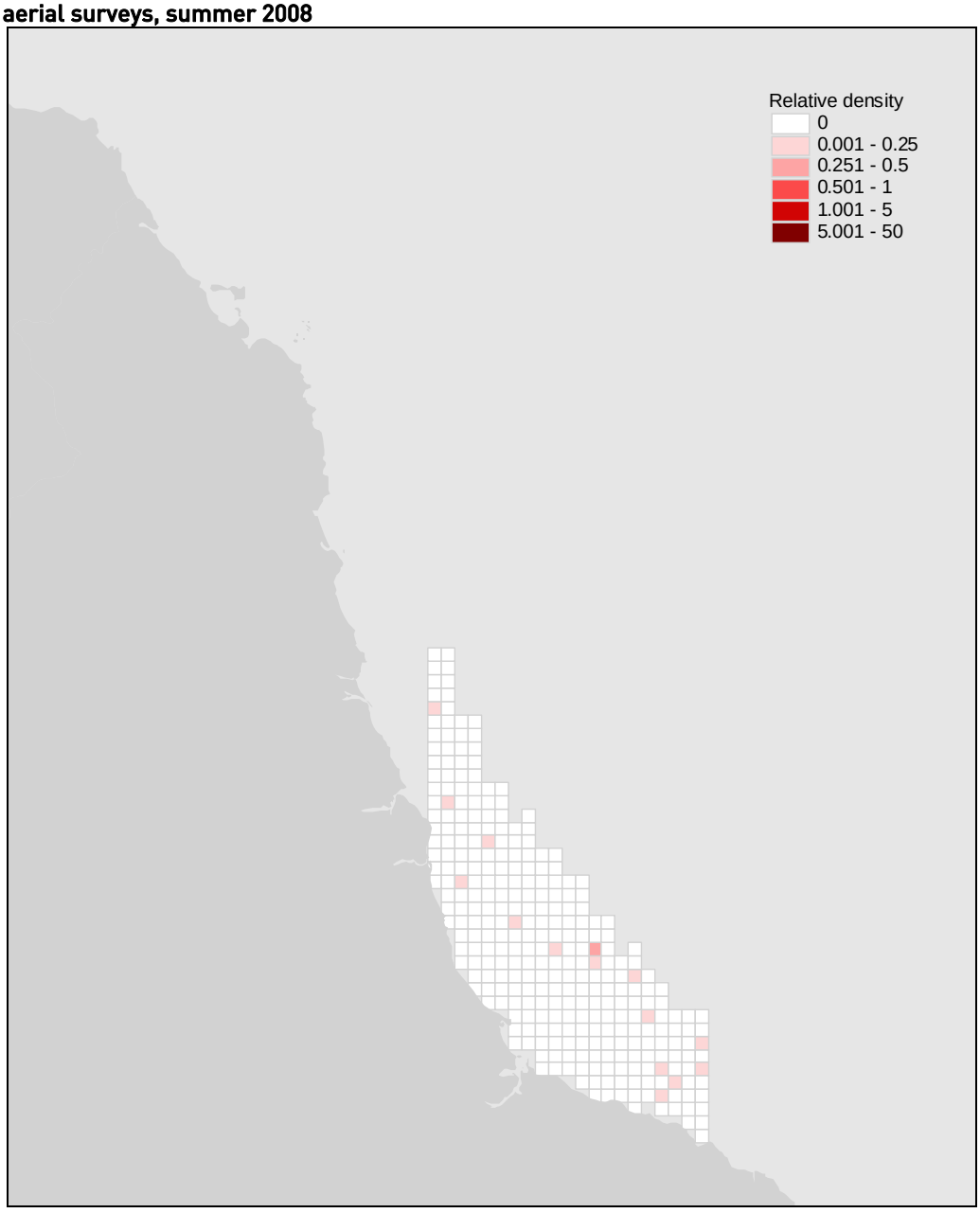


**Figure 92 - Relative density of Gannets *Morus bassanus* recorded in the North West Area during aerial surveys, winter 2007/08.**

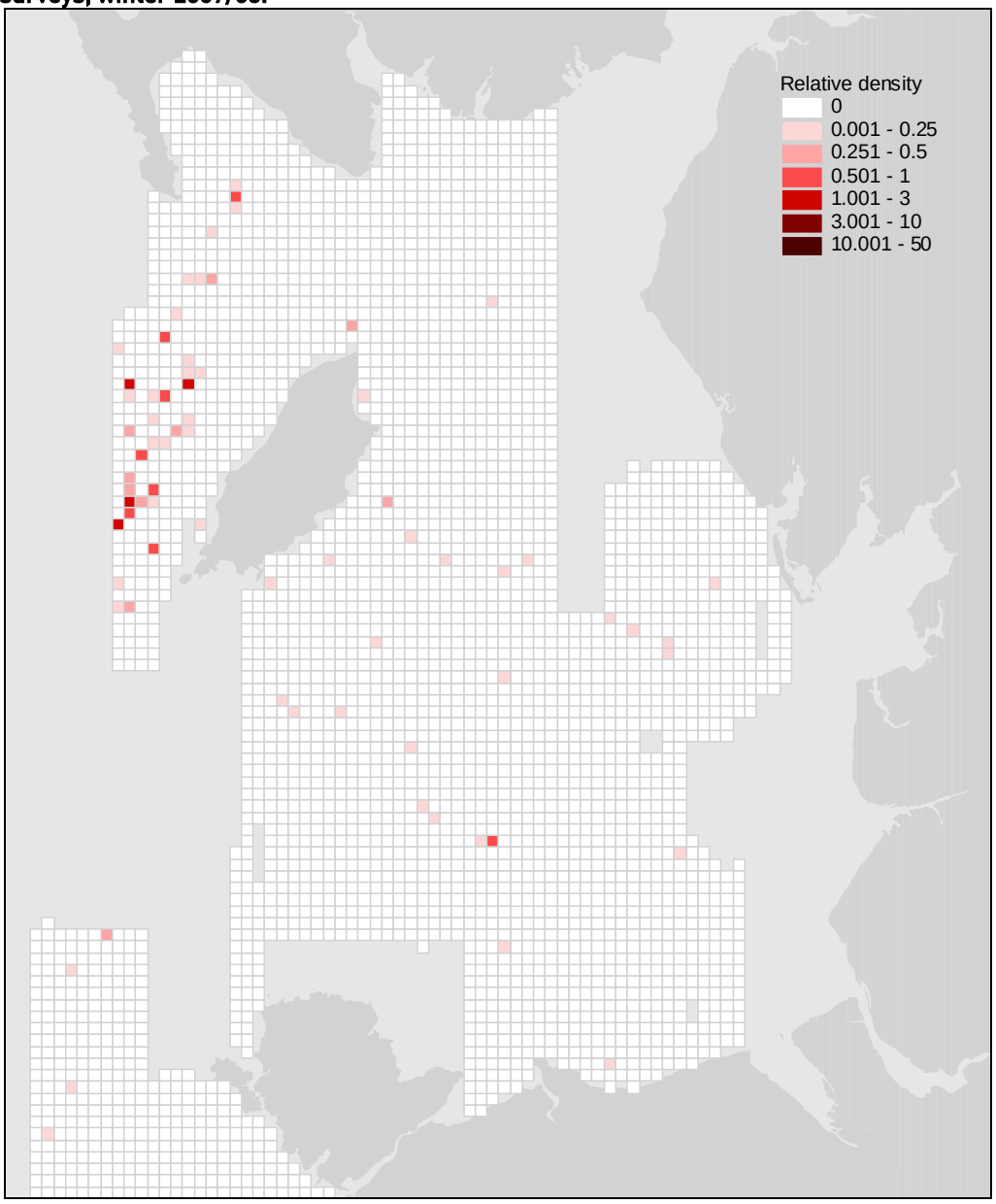


**Figure 93 - Relative density of Gannets *Morus bassanus* recorded in the North West Area during aerial surveys, summer 2008.**

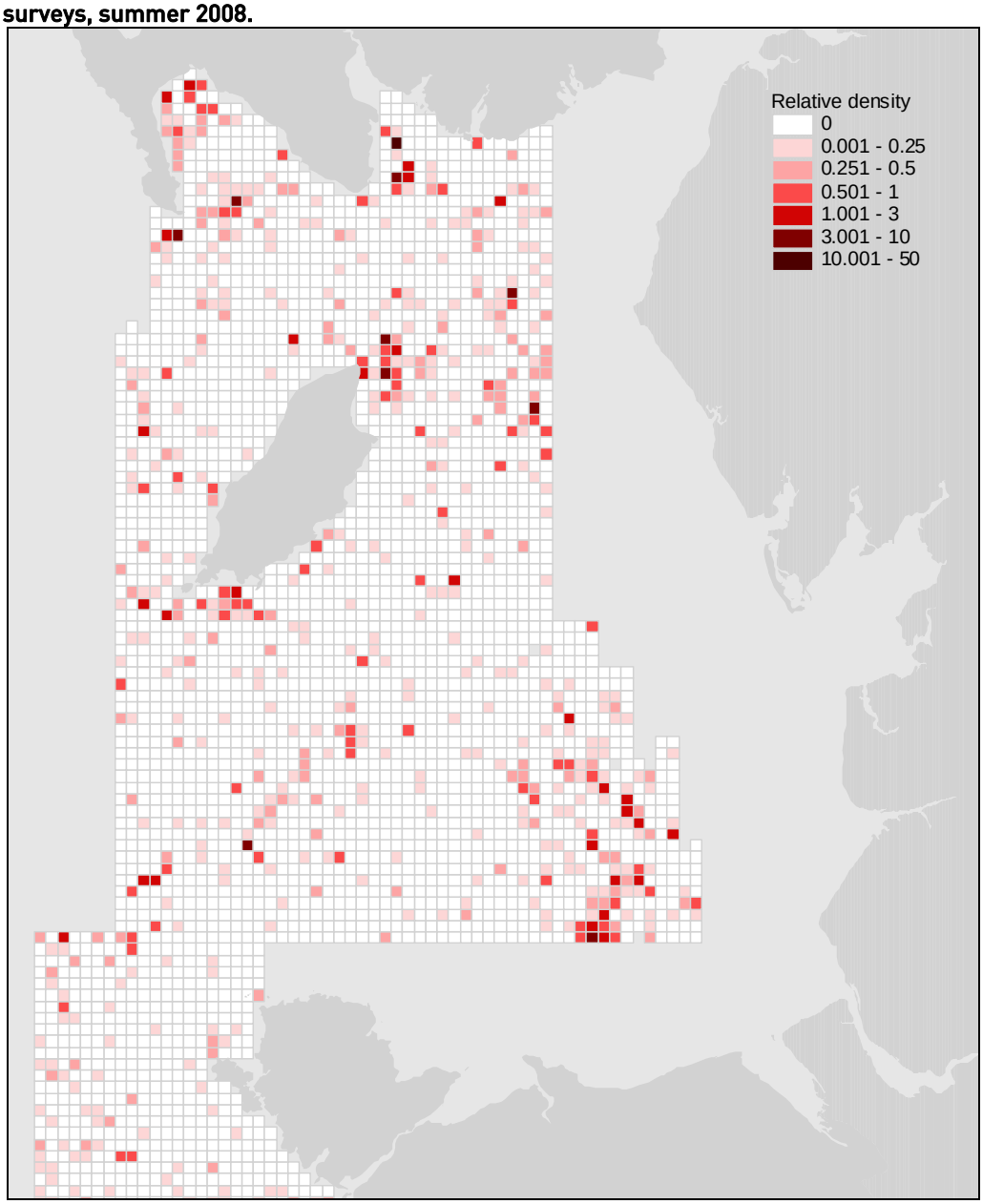


**Figure 94 - Relative density of Gannets *Morus bassanus* recorded in the West Wales Area during aerial surveys, winter 2007/08.**

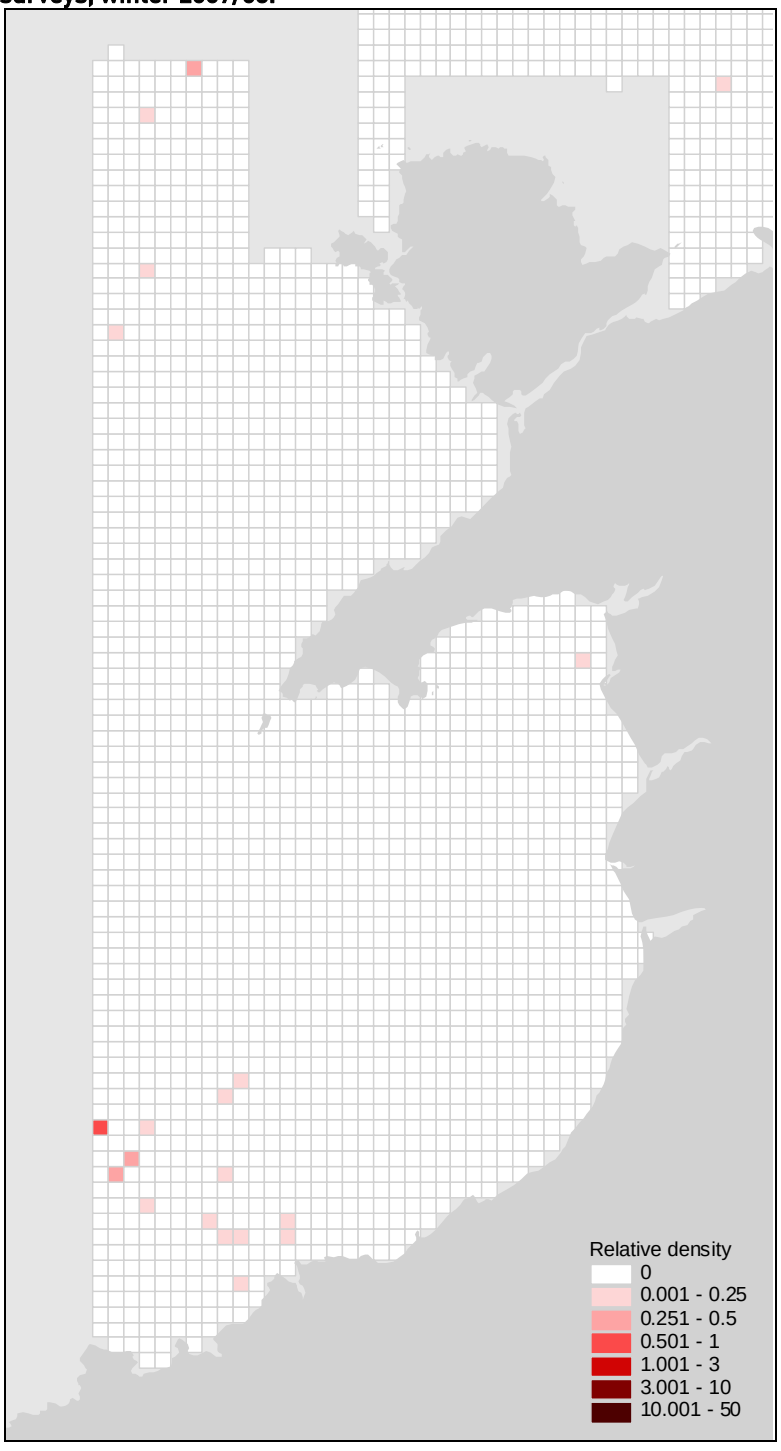


**Figure 95 - Relative density of Gannets *Morus bassanus* recorded in the West Wales Area during aerial surveys, summer 2008.**

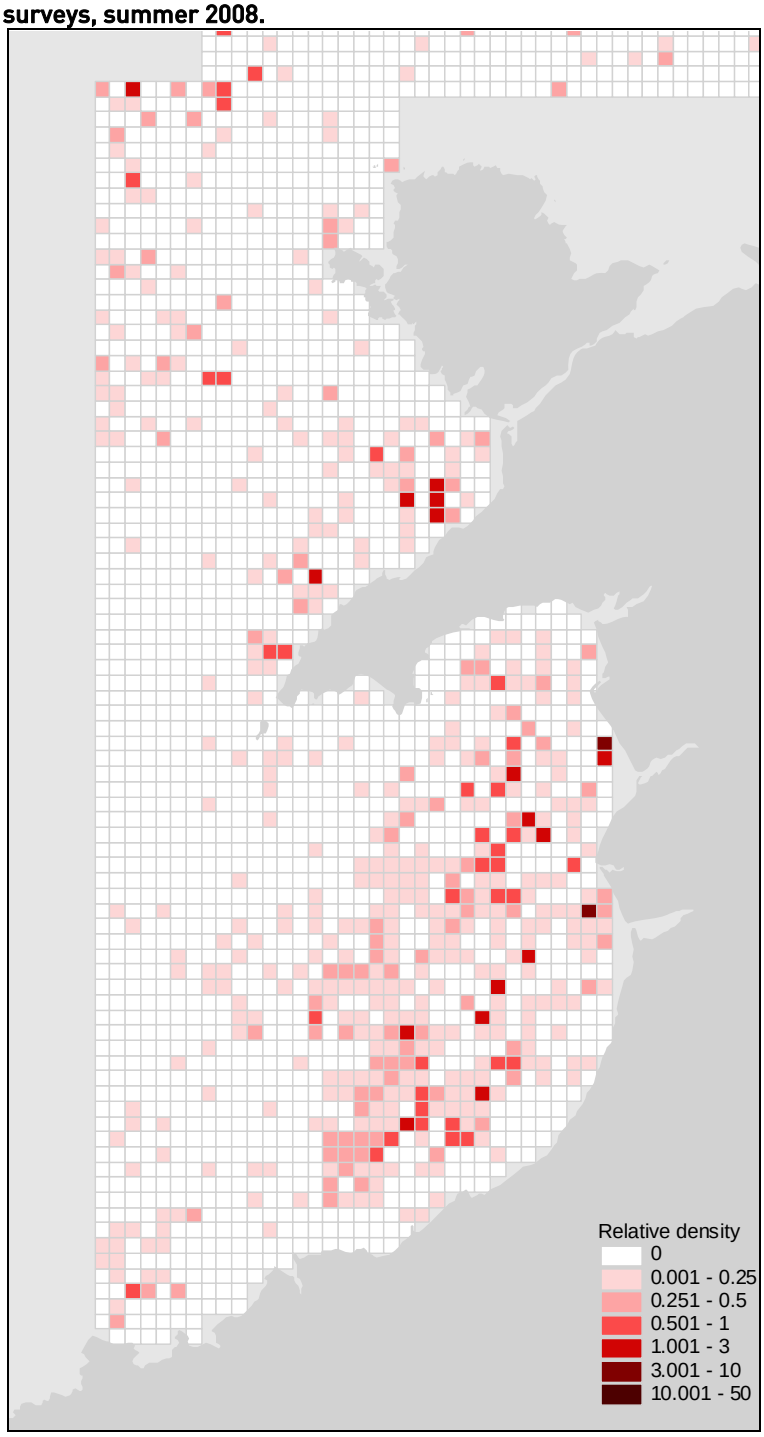


**Figure 96 - Relative density of Gannets *Morus bassanus* recorded in the South West Area during aerial surveys, winter 2007/08.**

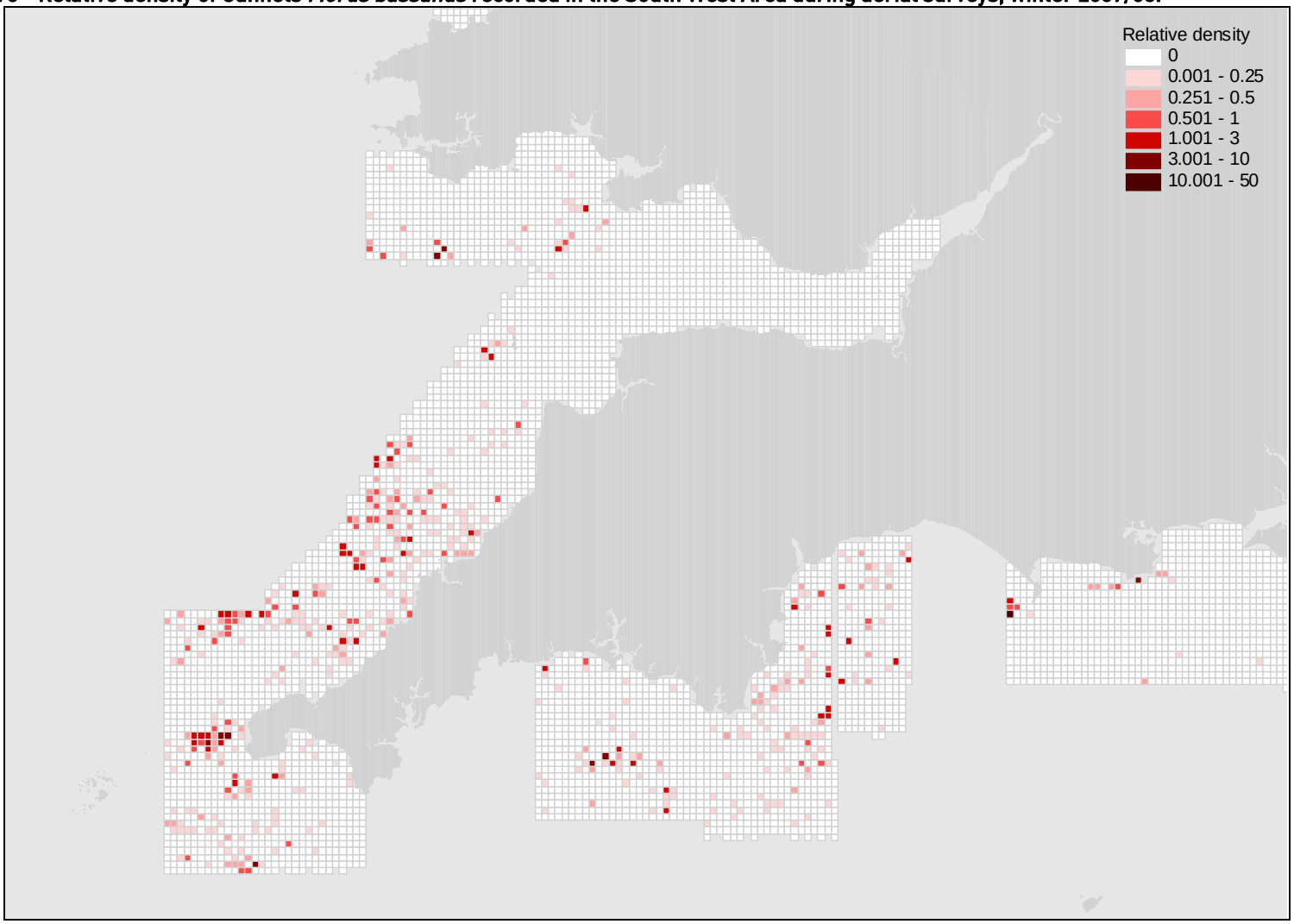


**Figure 97 - Relative density of Gannets *Morus bassanus* recorded in the South West Area during aerial surveys, summer 2008.**

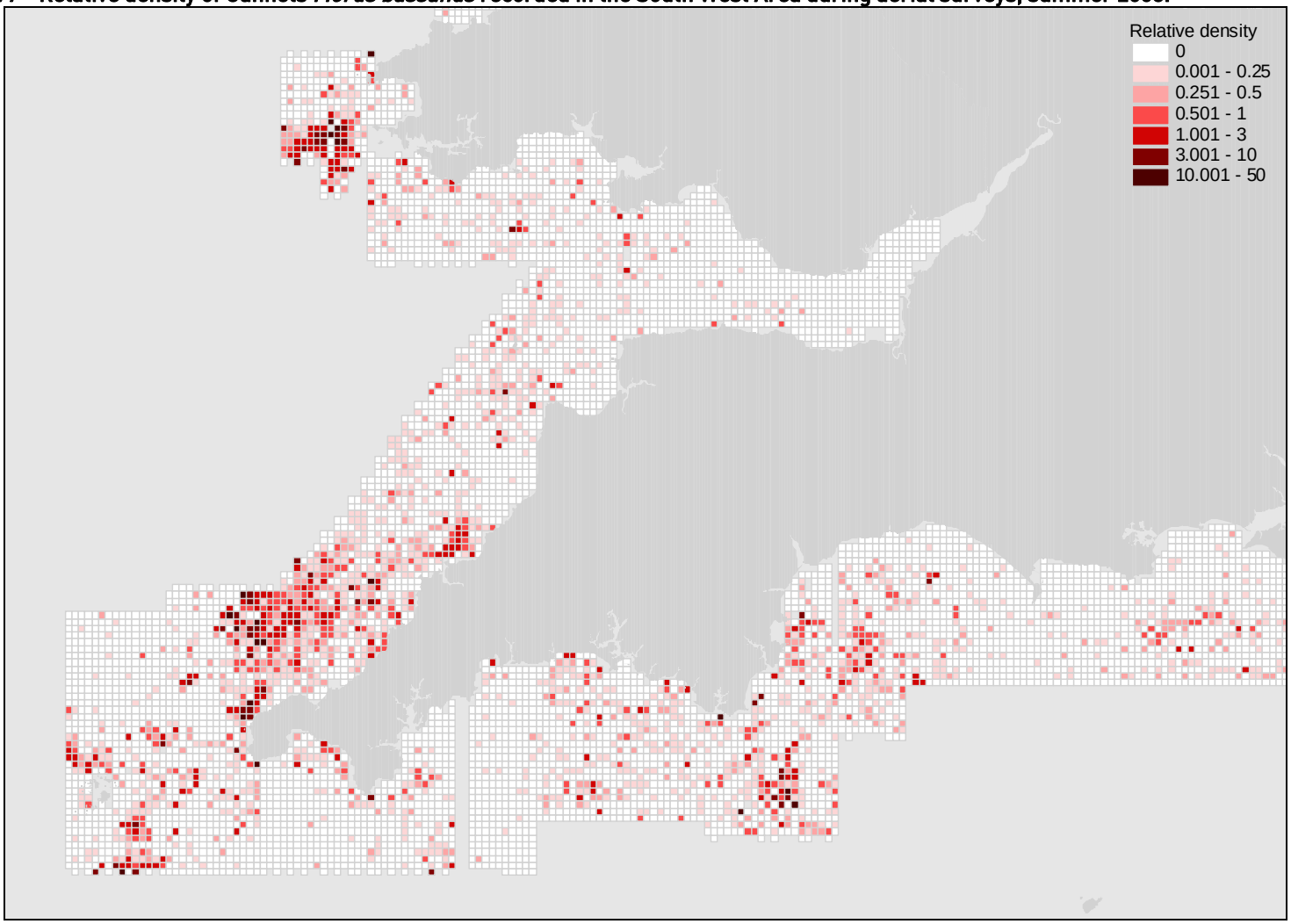


**Figure 98 - Relative density of Gannets *Morus bassanus* recorded in the South East Area during aerial surveys, winter 2007/08.**

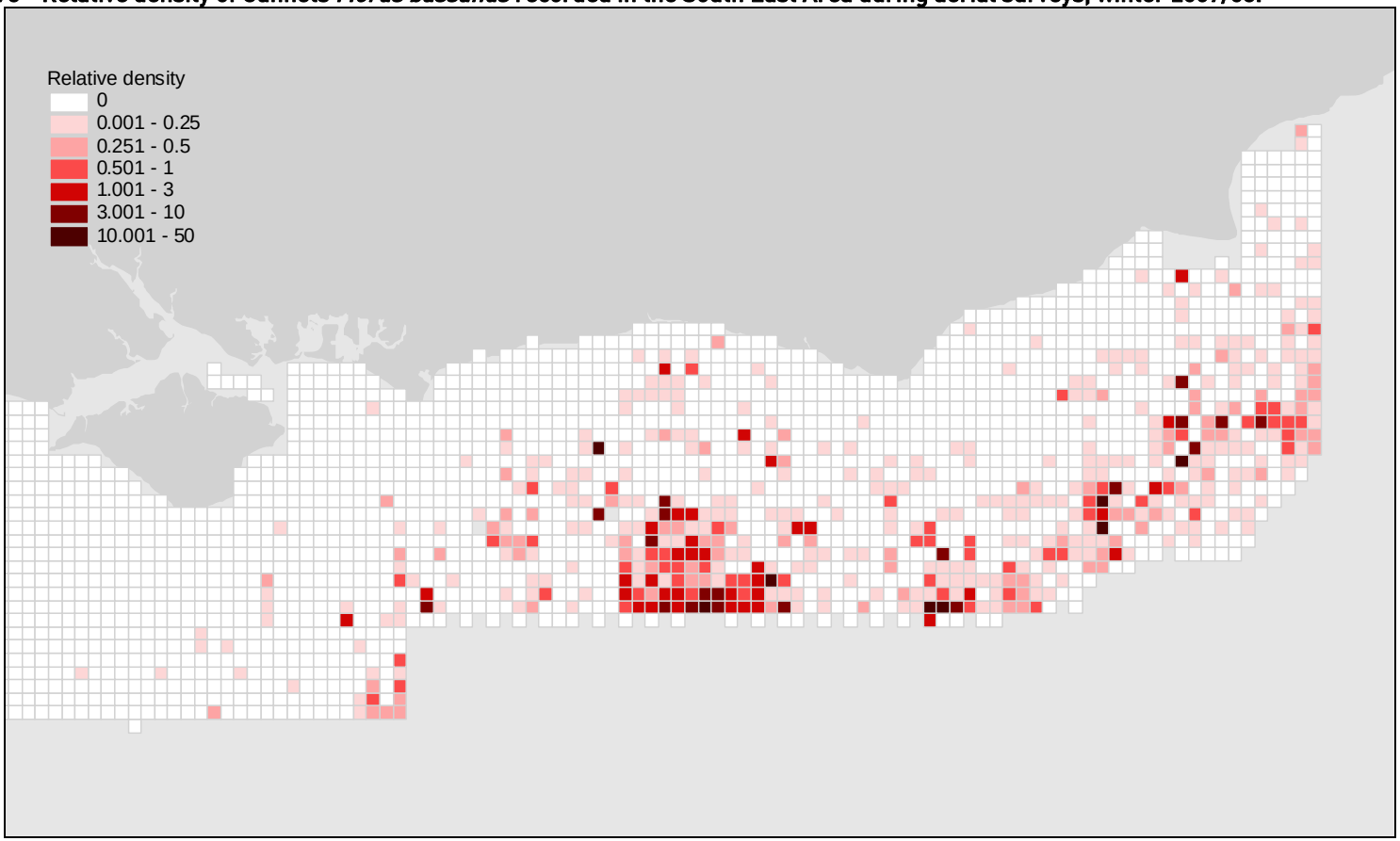


**Figure 99 - Relative density of Gannets *Morus bassanus* recorded in the South East Area during aerial surveys, summer 2008.**

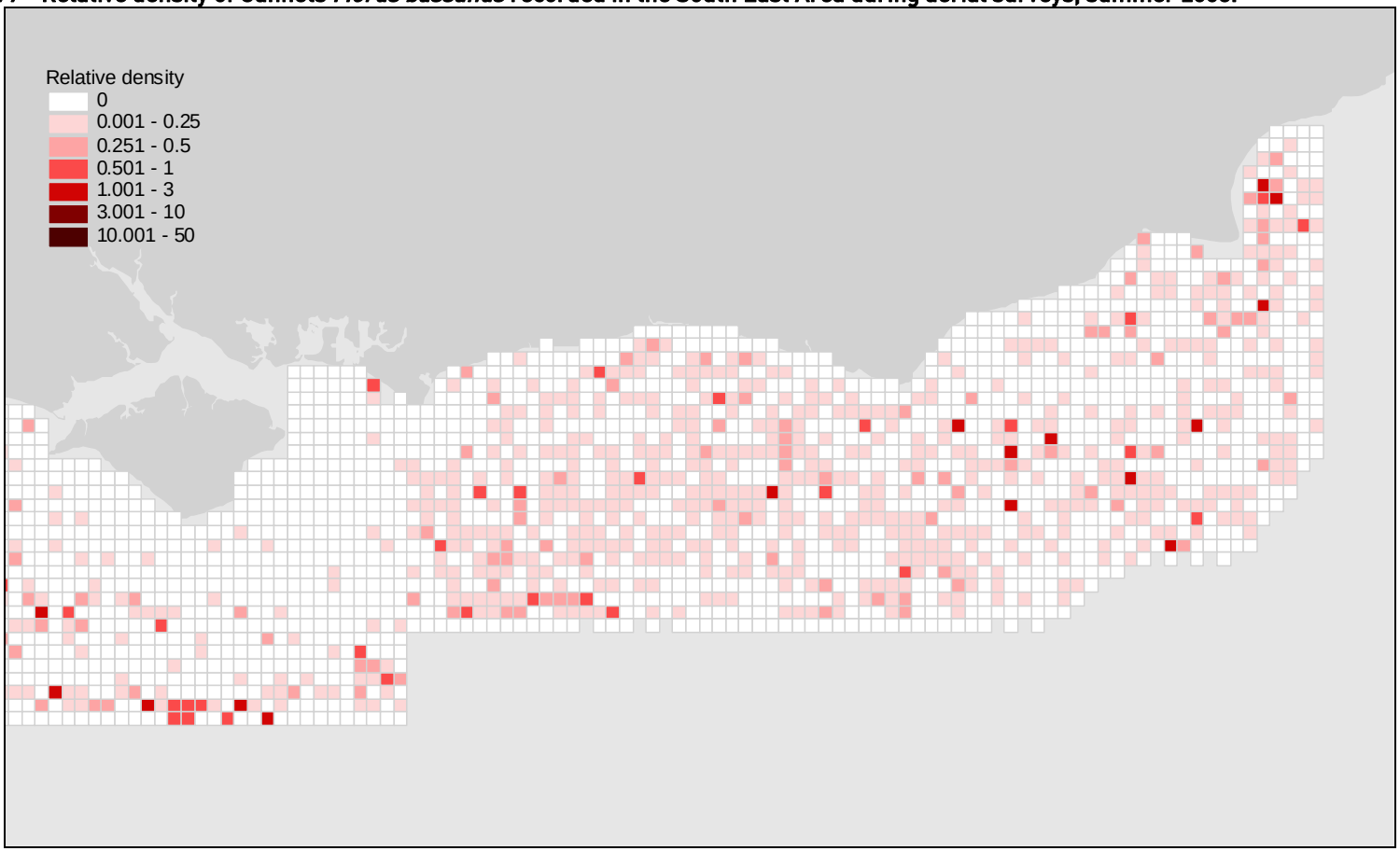


**Figure 100 - Relative density of Gannets *Morus bassanus* recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

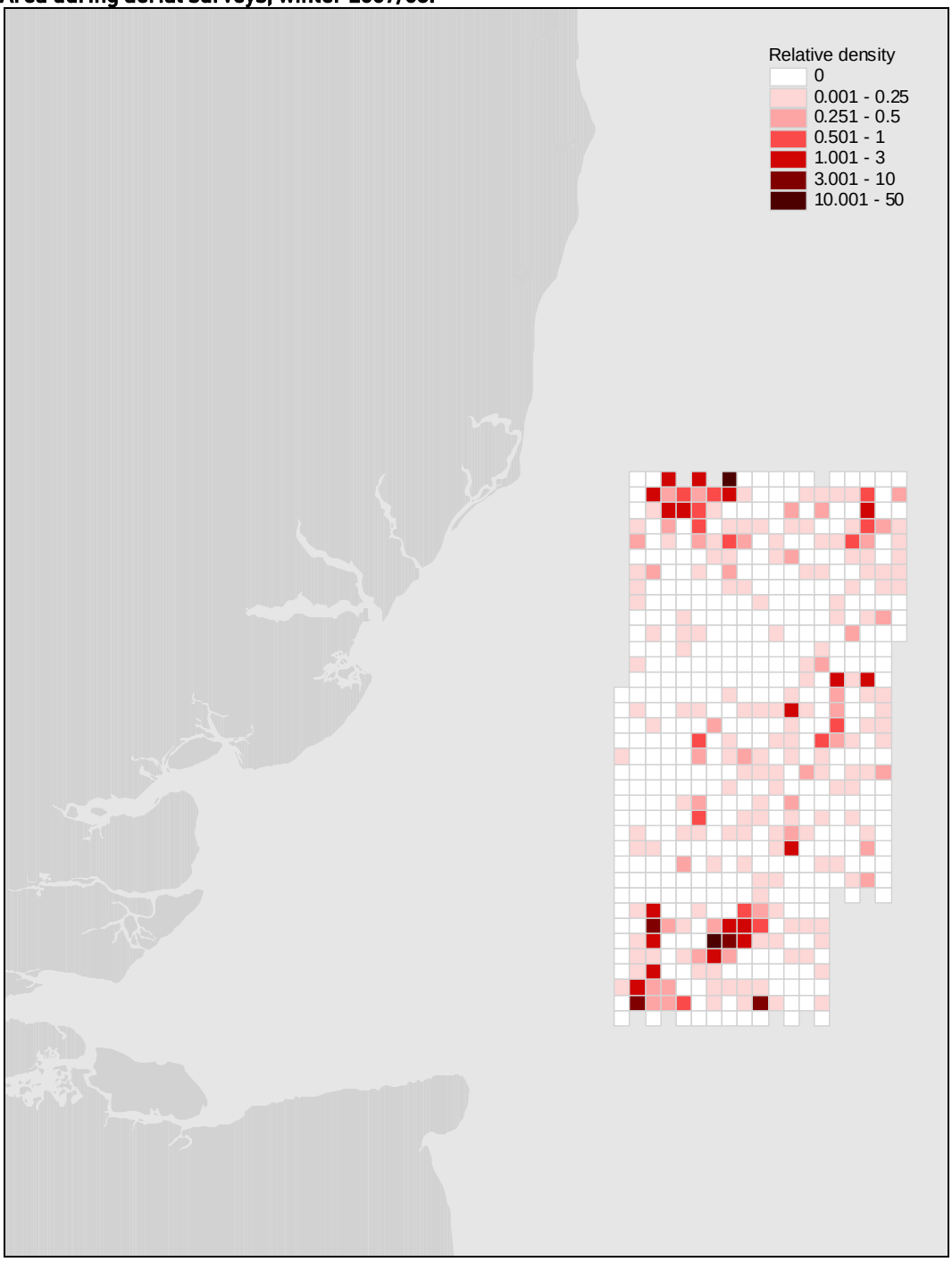


**Figure 101 - Relative density of Gannets *Morus bassanus* recorded in the Greater Wash Area during aerial surveys, winter 2007/08.**

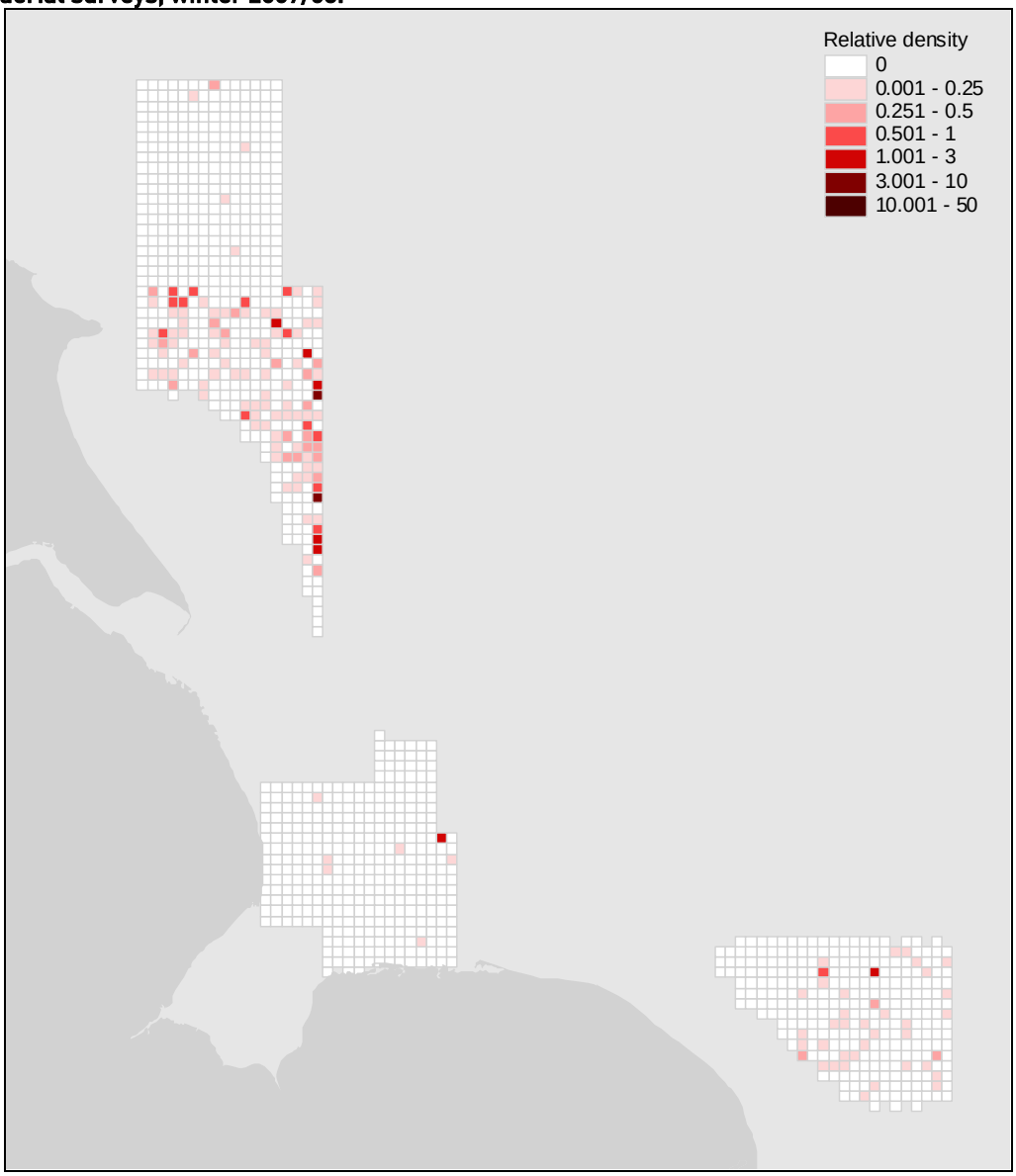


**Figure 102 - Relative density of Gannets *Morus bassanus* recorded in the Greater Wash Area during aerial surveys, summer 2008.**

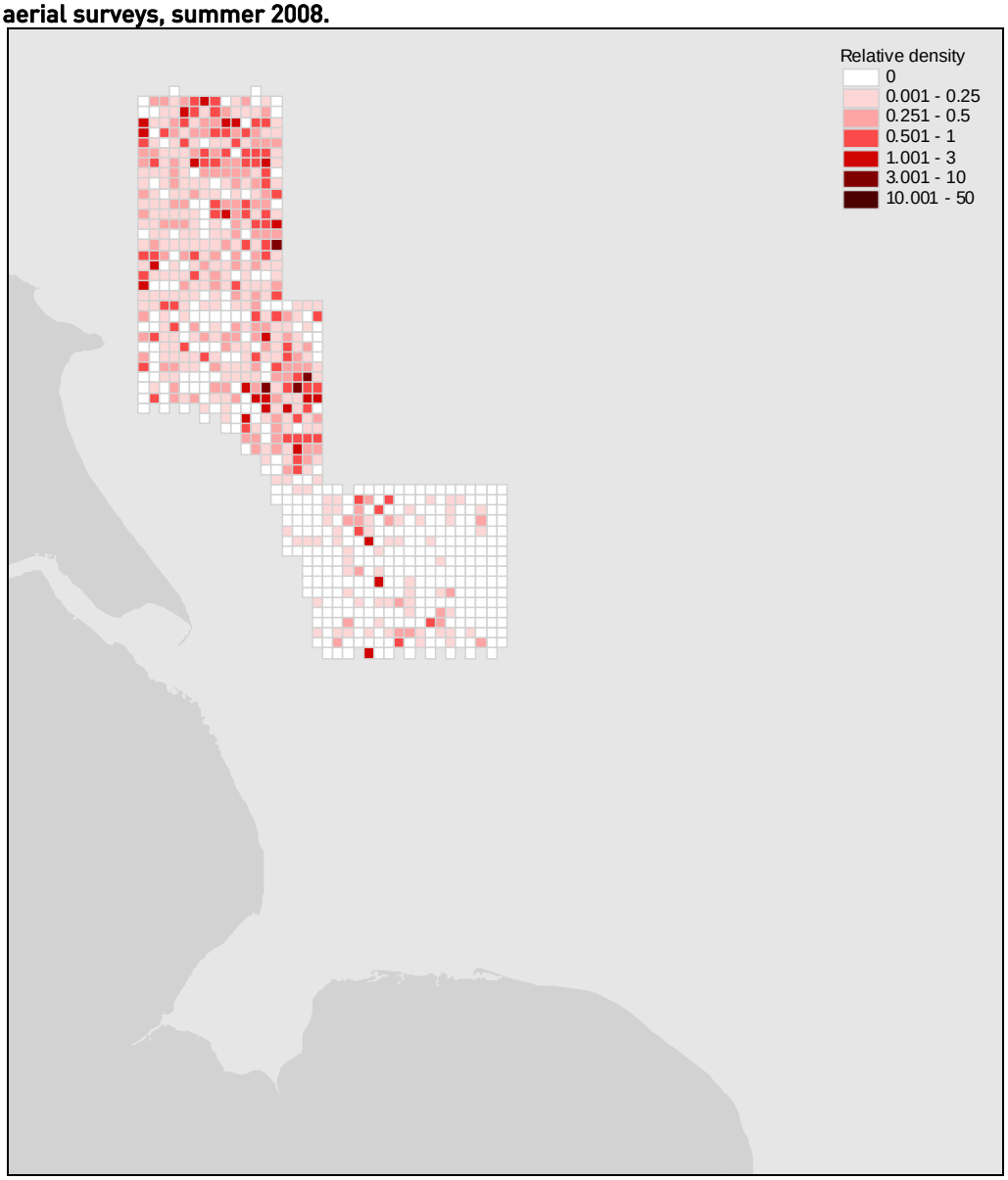


**Figure 103 - Relative density of Gannets *Morus bassanus* recorded in the North East Area during aerial surveys, winter 2007/08.**

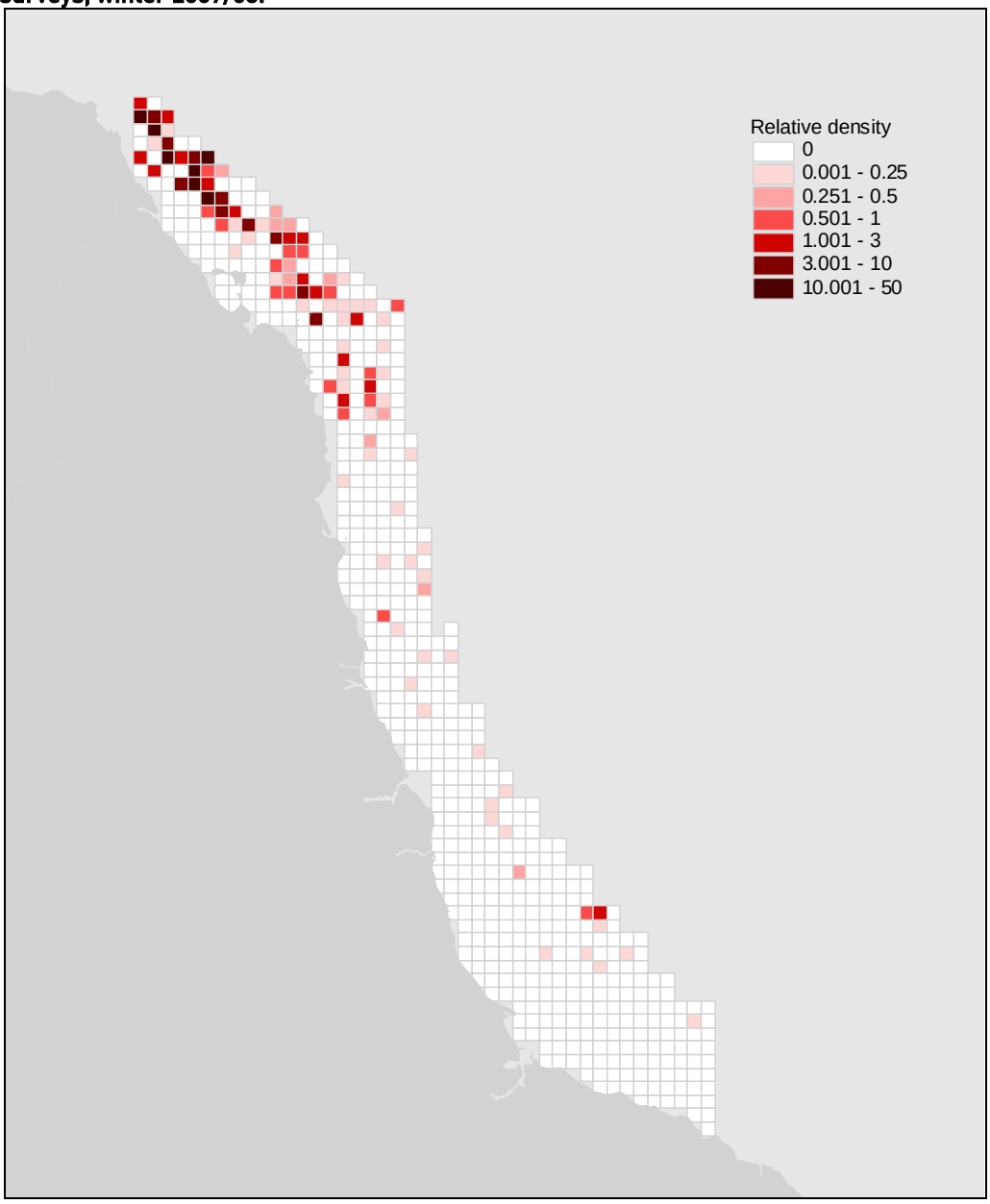


**Figure 104 - Relative density of Gannets *Morus bassanus* recorded in the North East Area during aerial surveys, summer 2008.**

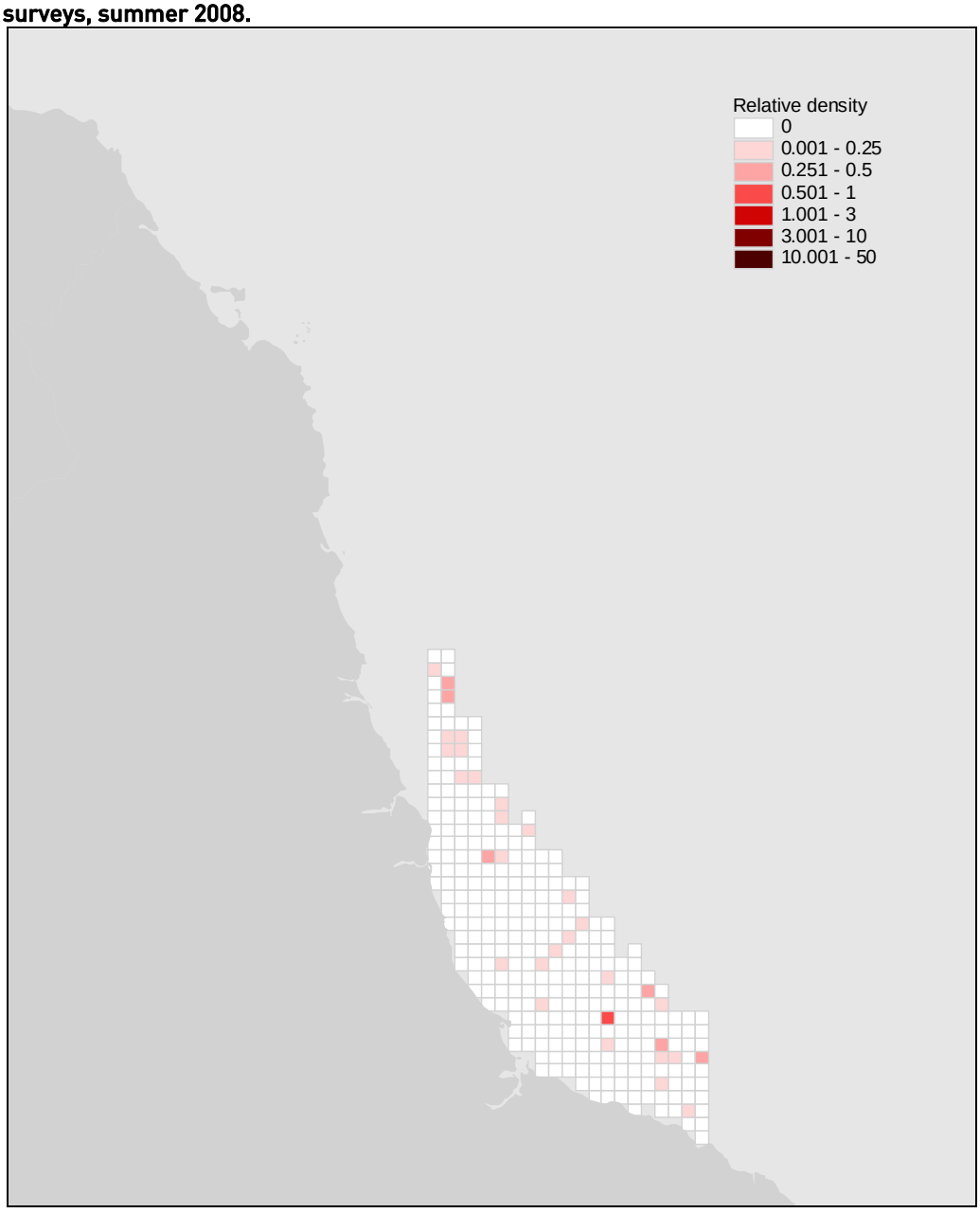


**Figure 105 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the North West Area during aerial surveys, winter 2007/08.**

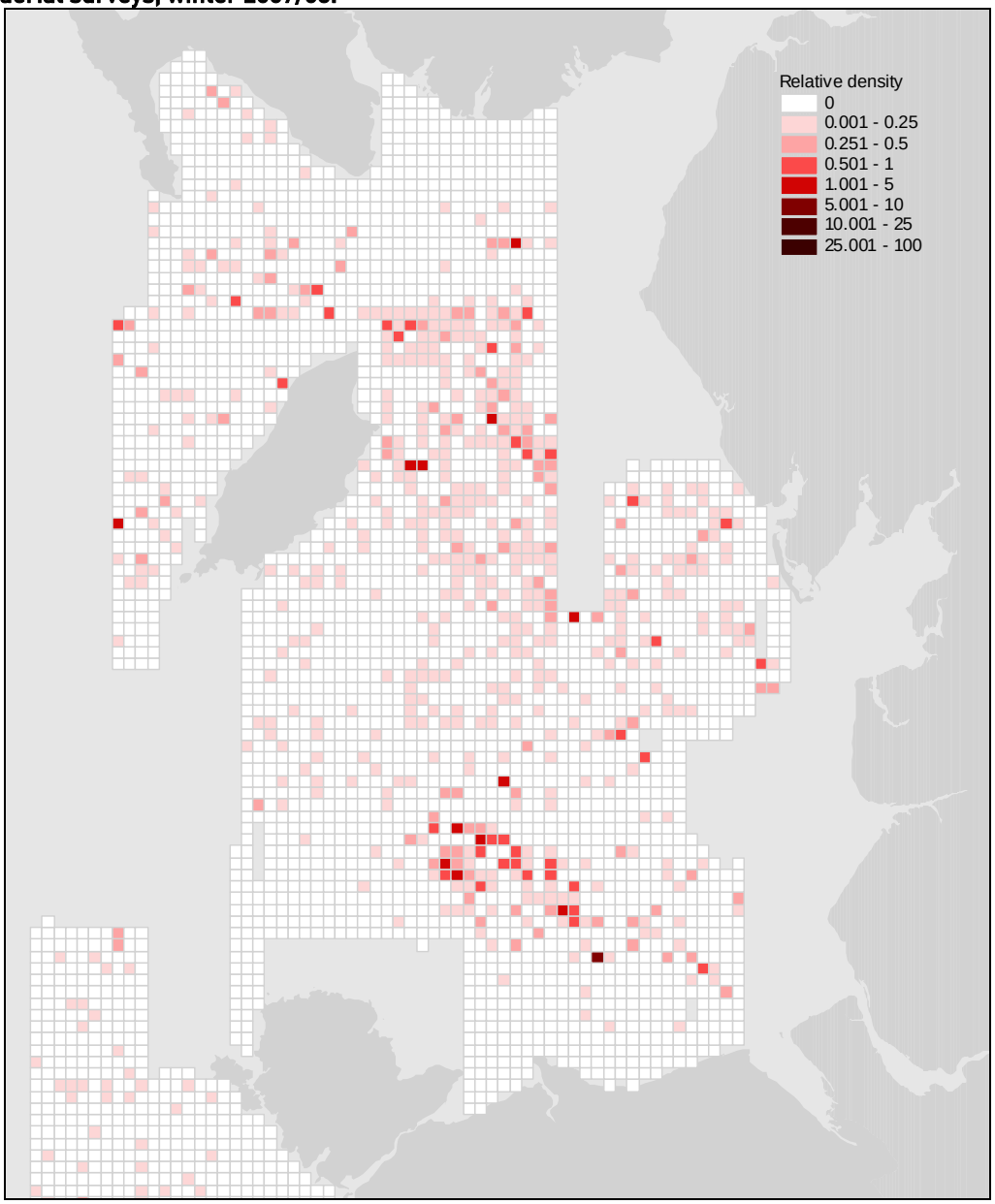


**Figure 106 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the North West Area during aerial surveys, summer 2008.**

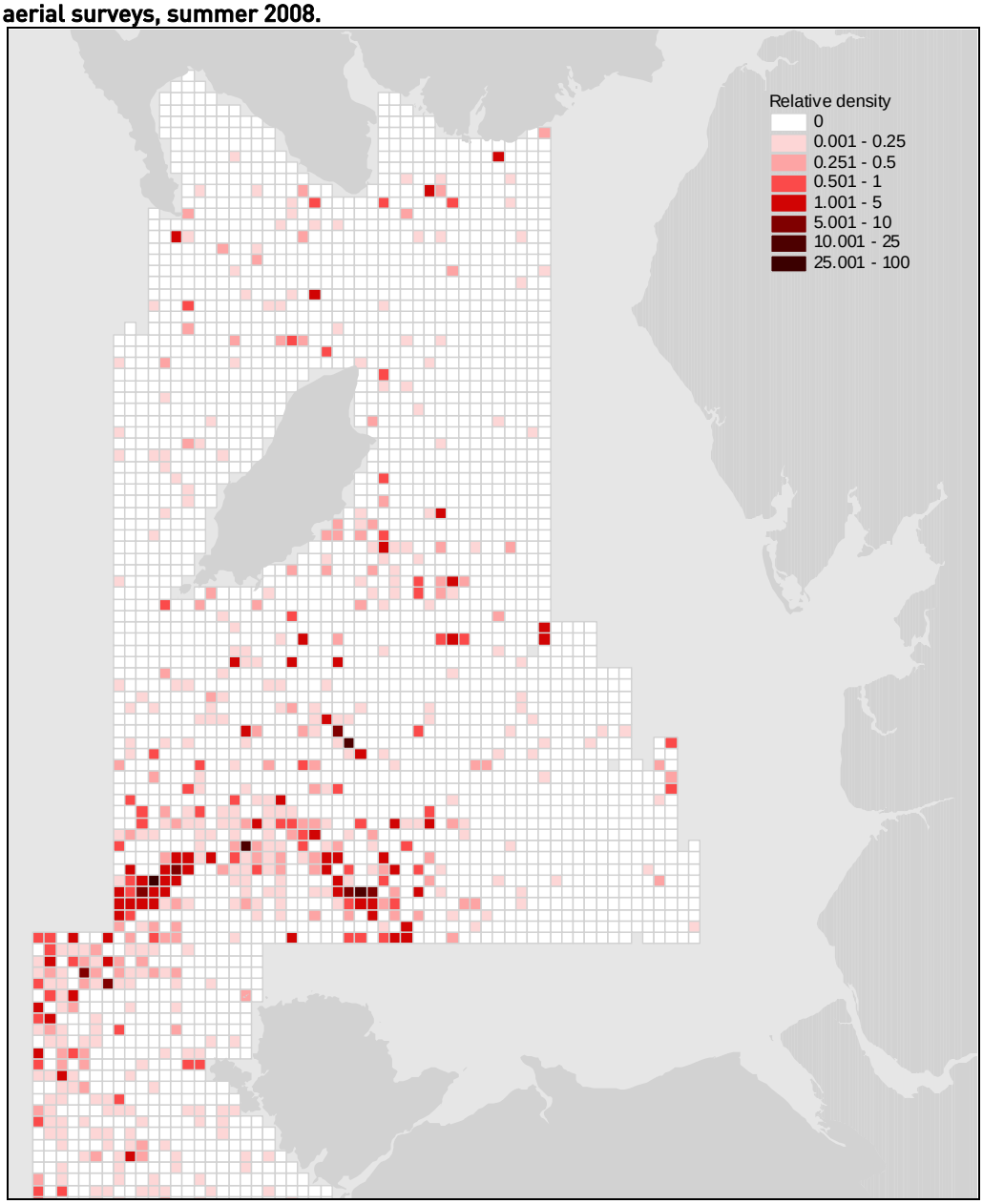


**Figure 107 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the West Wales Area during aerial surveys, winter 2007/08.**

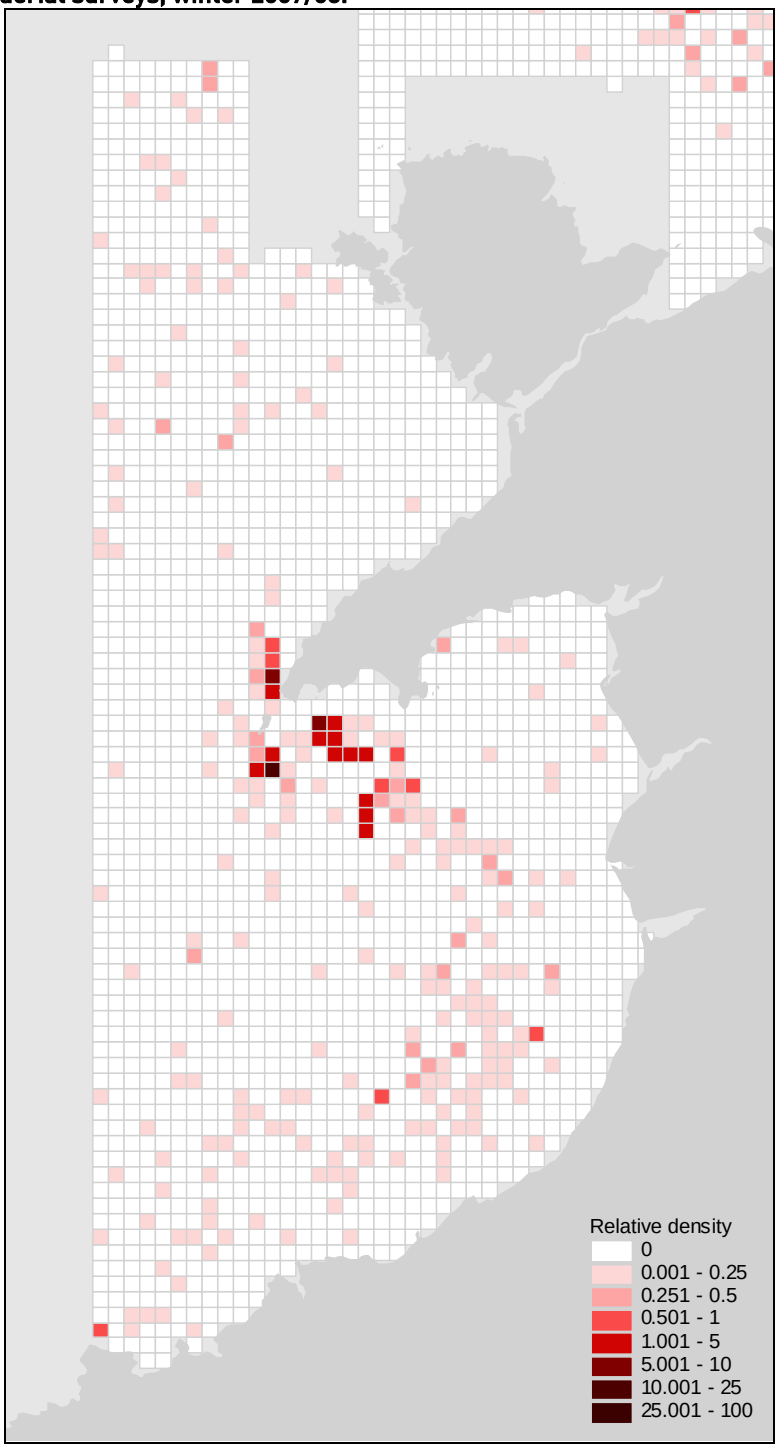


**Figure 108 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the West Wales Area during aerial surveys, summer 2008.**

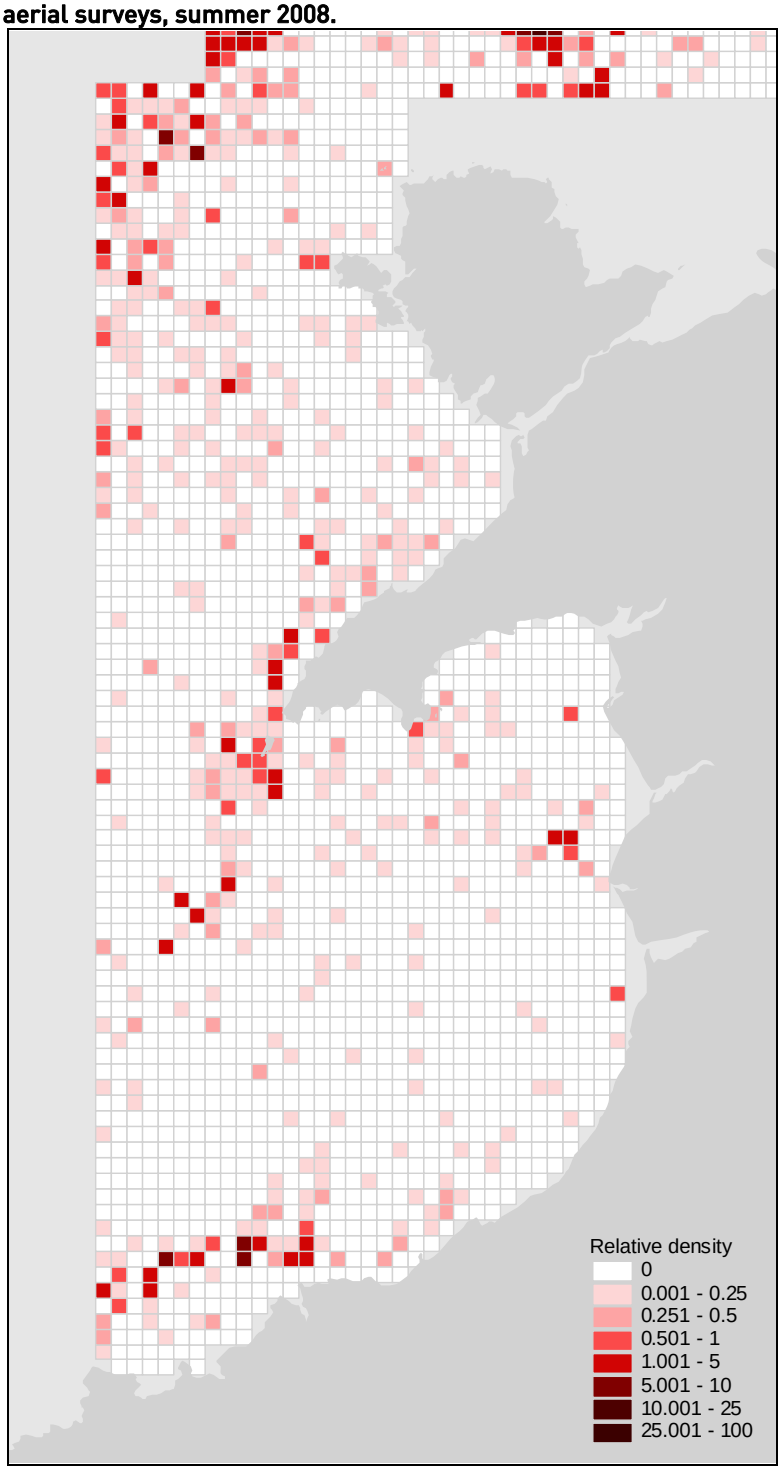


**Figure 109 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the South West Area during aerial surveys, winter 2007/08.**

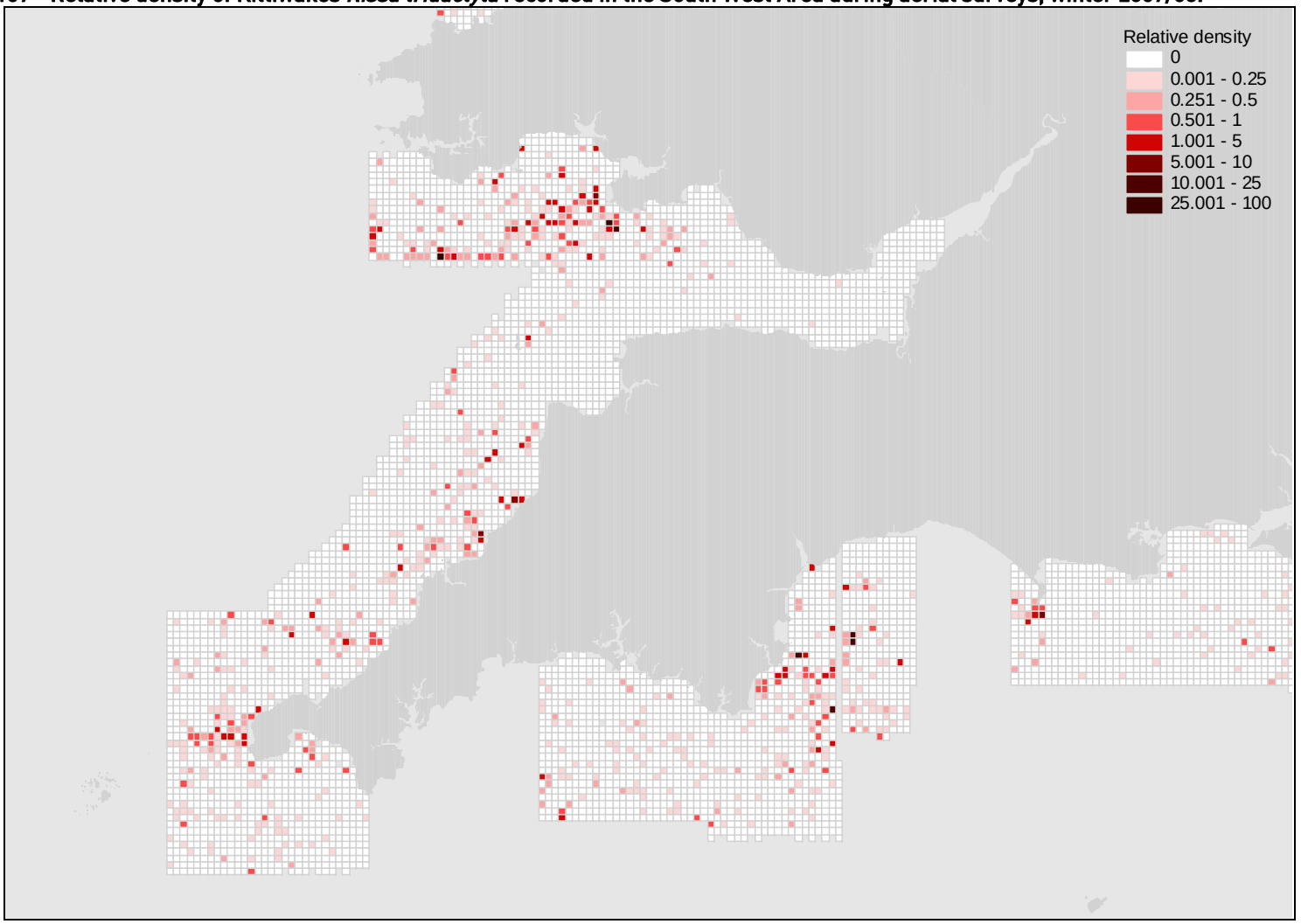


**Figure 110 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the South West Area during aerial surveys, summer 2008.**

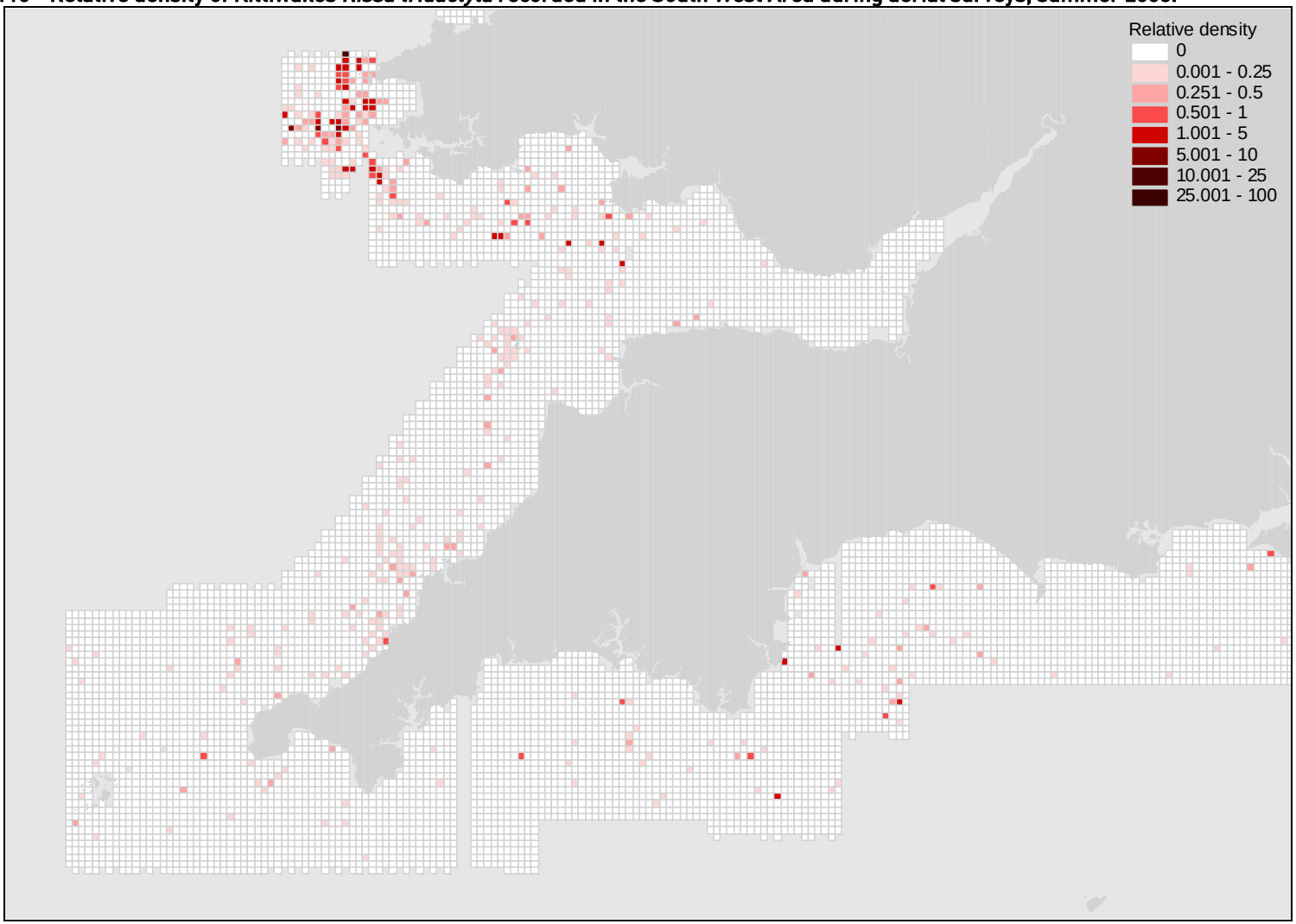


**Figure 111 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the South East Area during aerial surveys, winter 2007/08.**

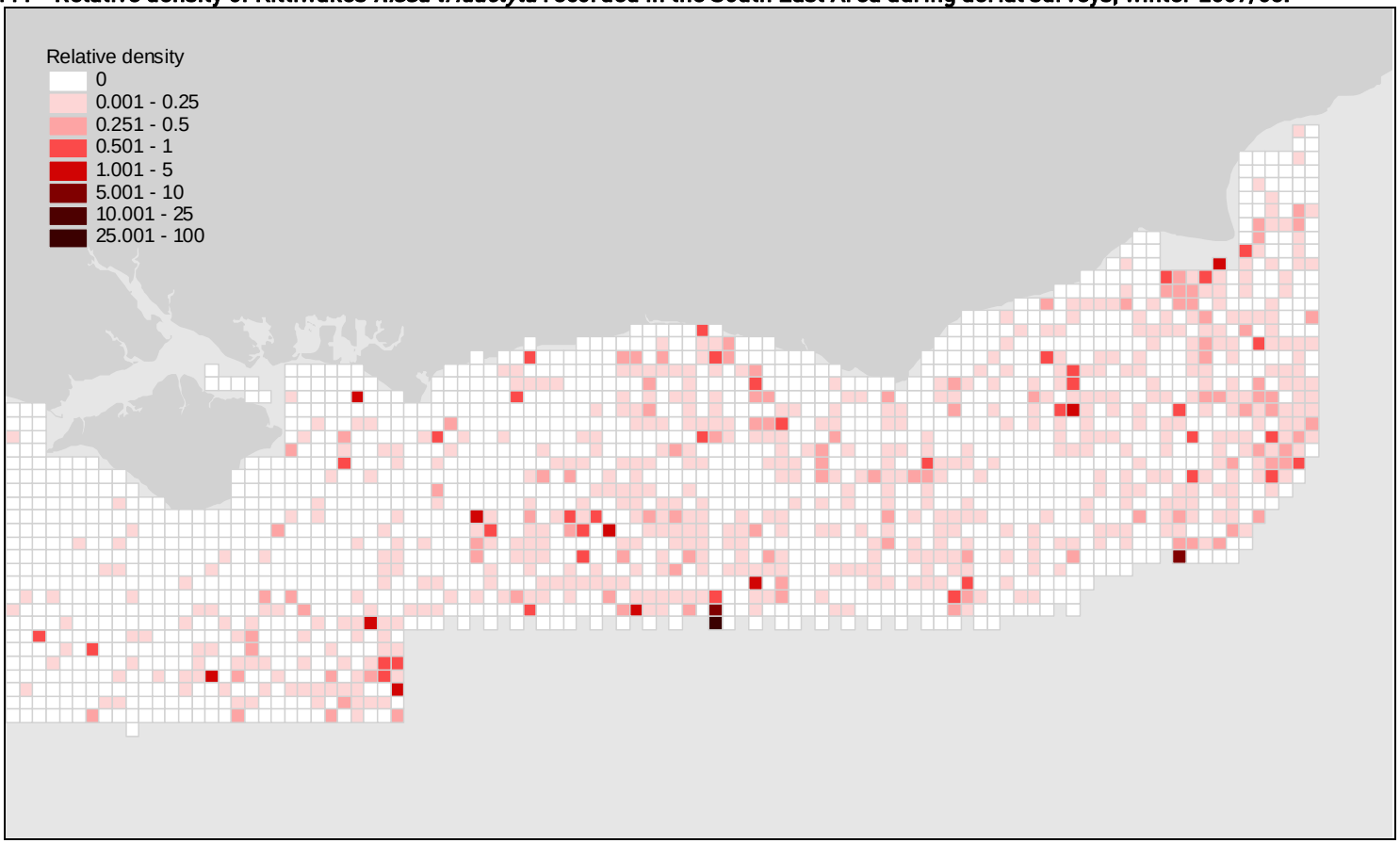


**Figure 112 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the South East Area during aerial surveys, summer 2008.**

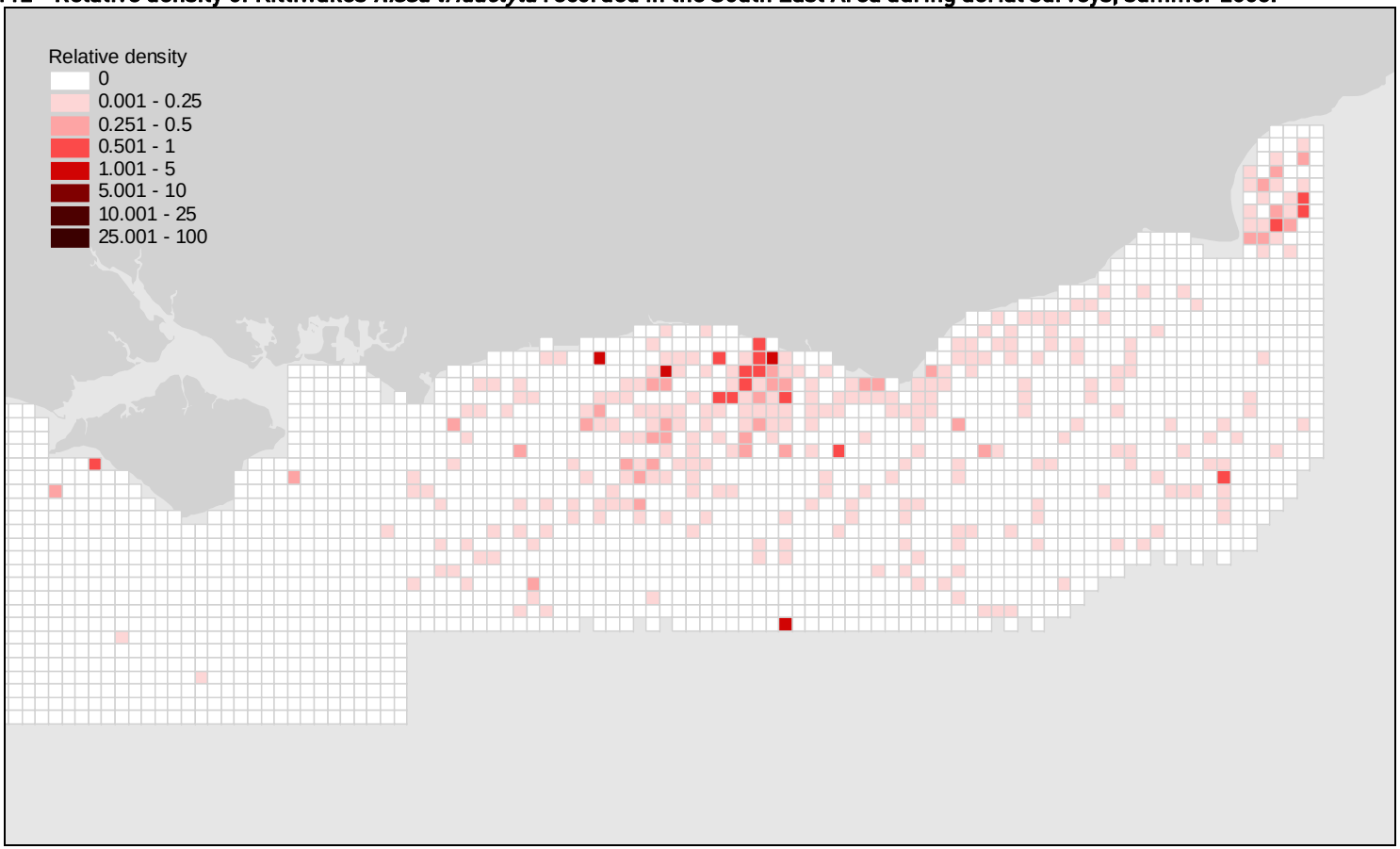


**Figure 113 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

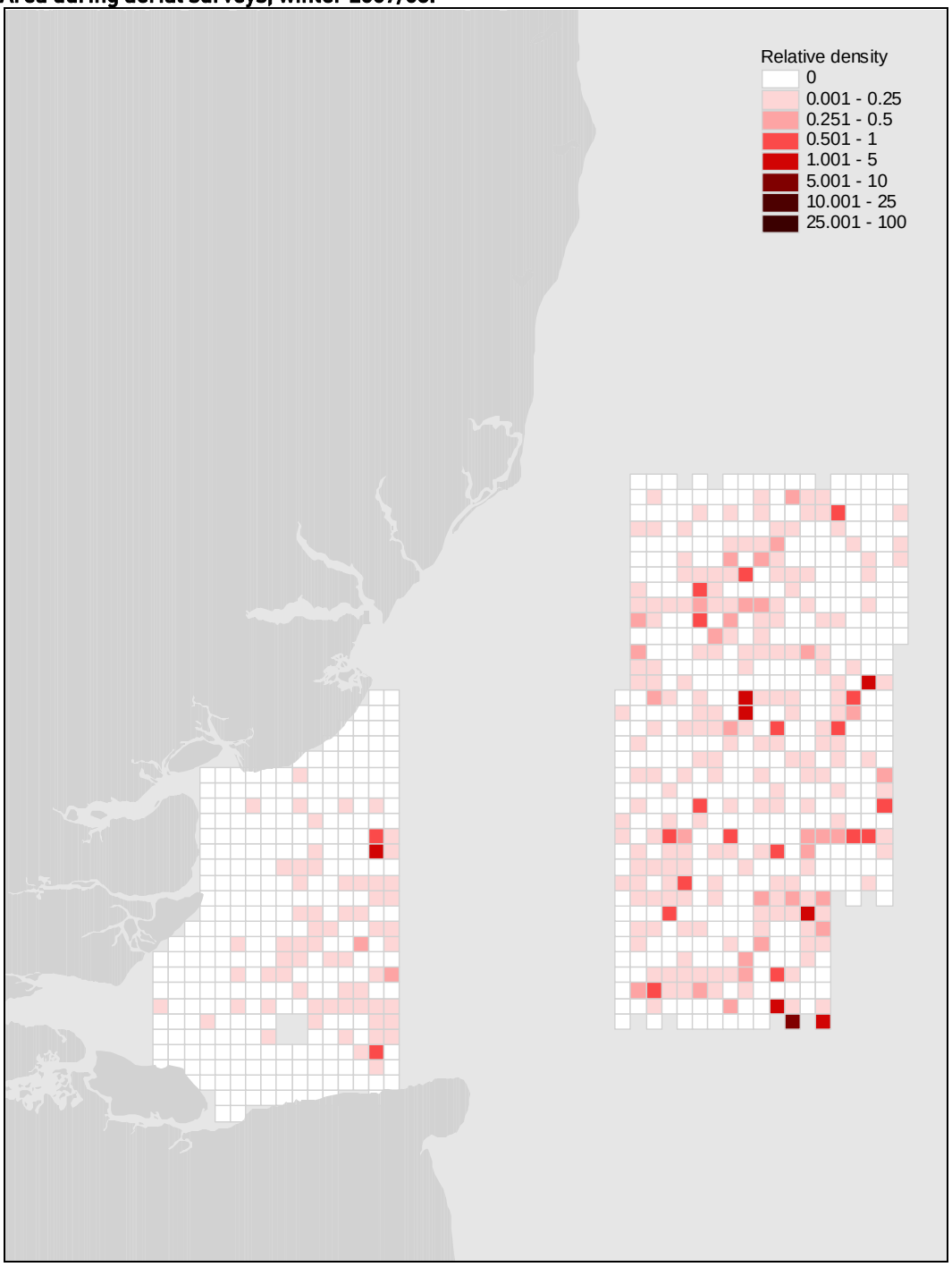


**Figure 114 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the Greater Wash Area during aerial surveys, winter 2007/08.**

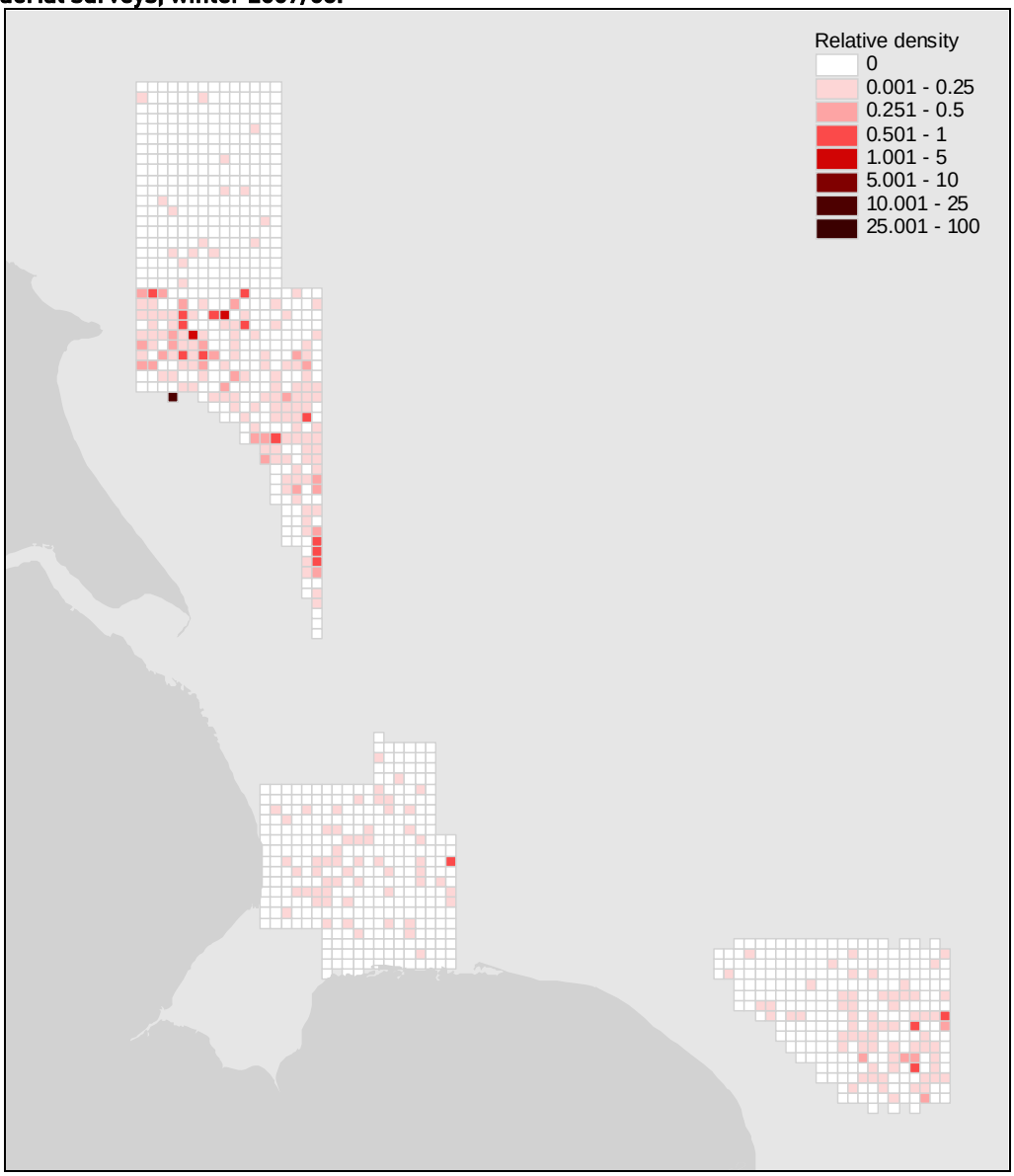


**Figure 115 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the Greater Wash Area during aerial surveys, summer 2008.**

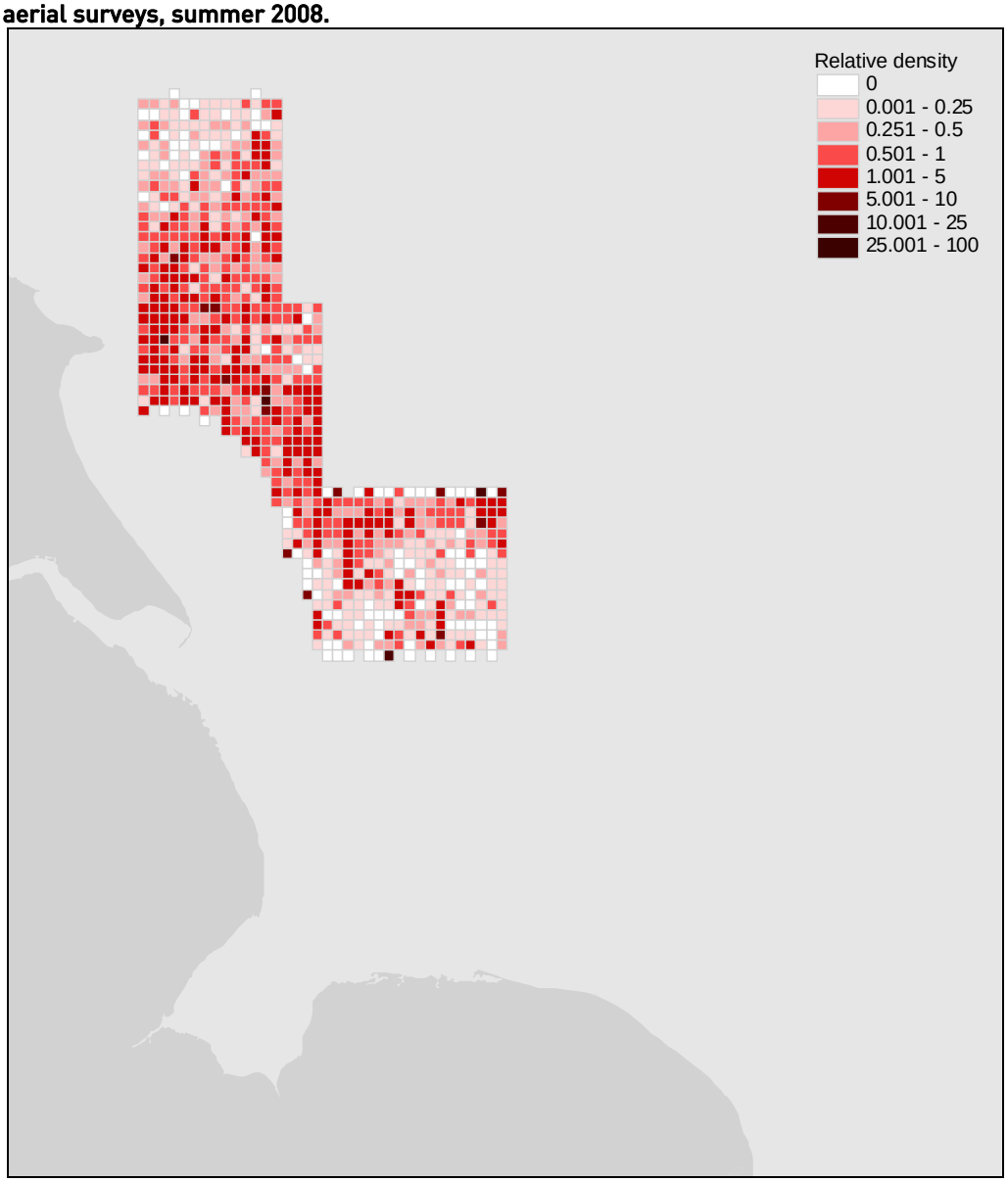


**Figure 116 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the North East Area during aerial surveys, winter 2007/08.**

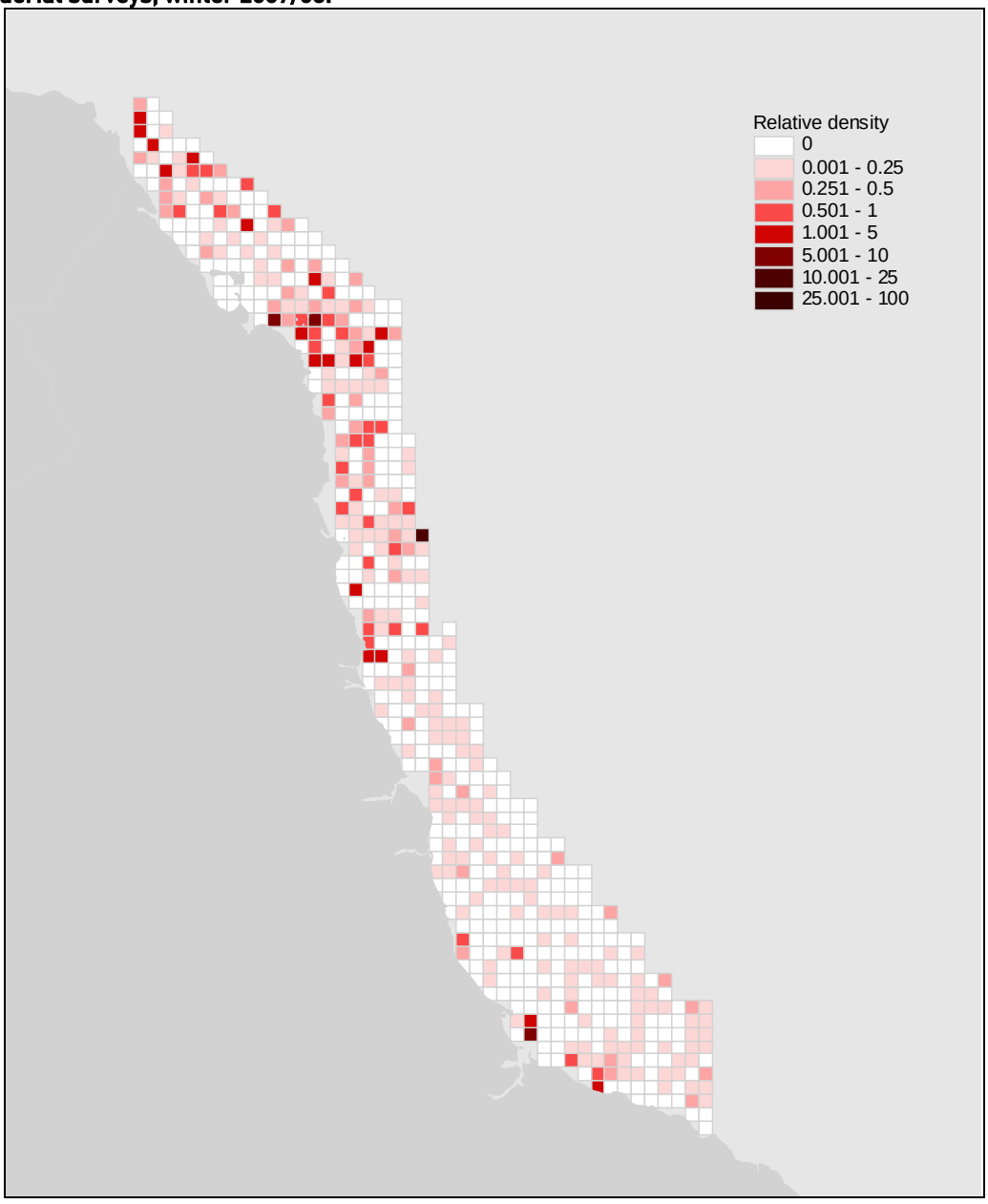


**Figure 117 - Relative density of Kittiwakes *Rissa tridactyla* recorded in the North East Area during aerial surveys, summer 2008.**

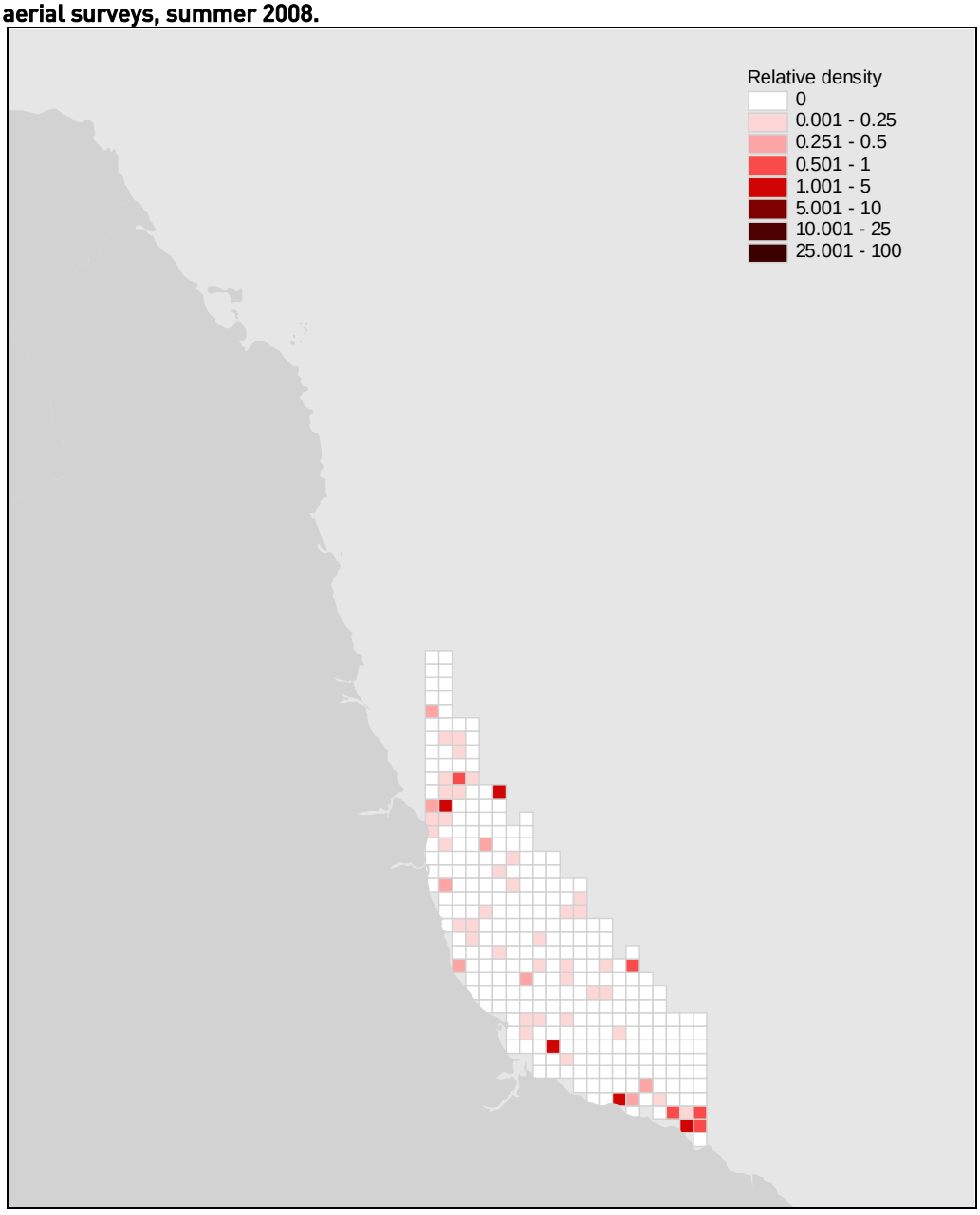


**Figure 118 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the North West Area during aerial surveys, winter 2007/08.**

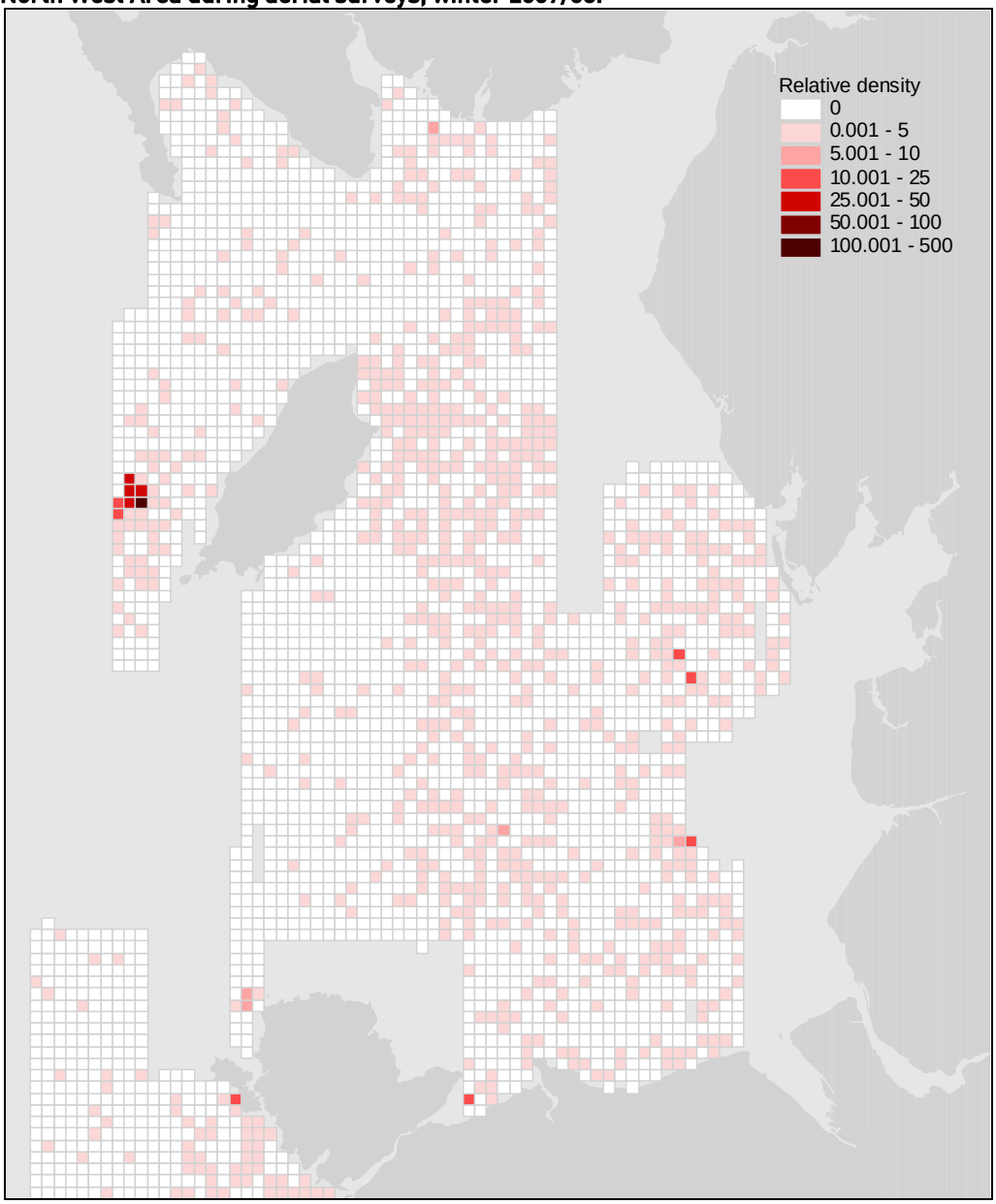


**Figure 119 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the North West Area during aerial surveys, summer 2008.**

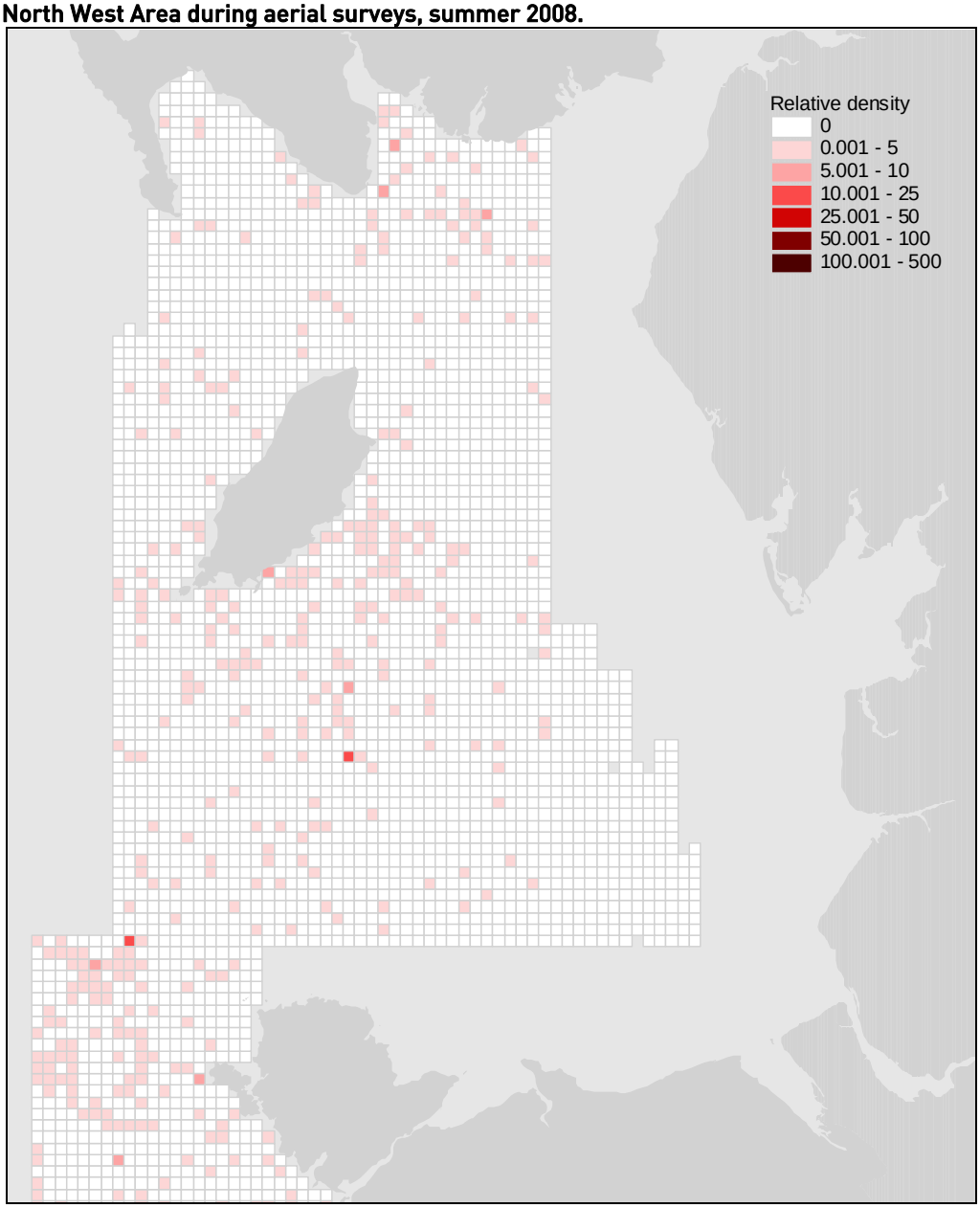


**Figure 120 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the West Wales Area during aerial surveys, winter 2007/08.**

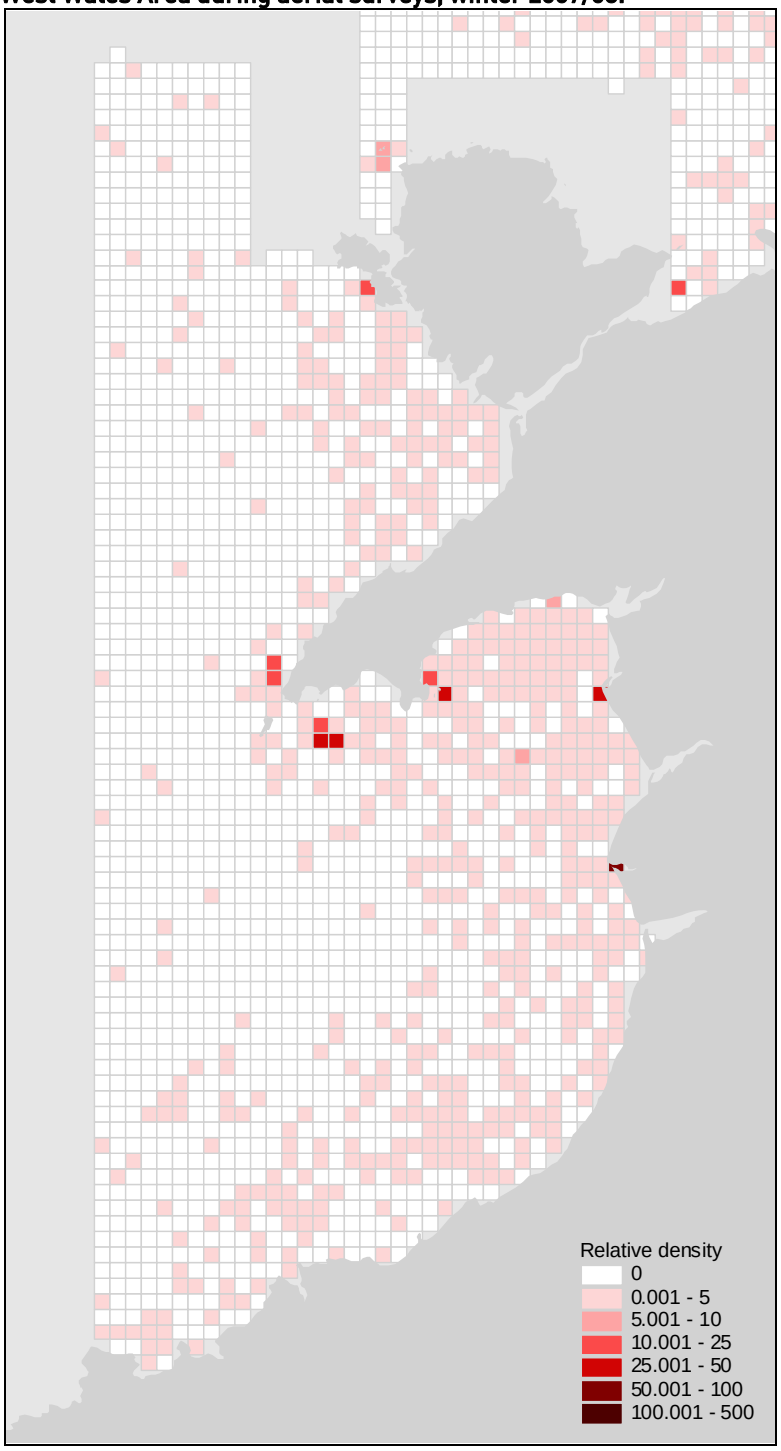


**Figure 121 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the West Wales Area during aerial surveys, summer 2008.**

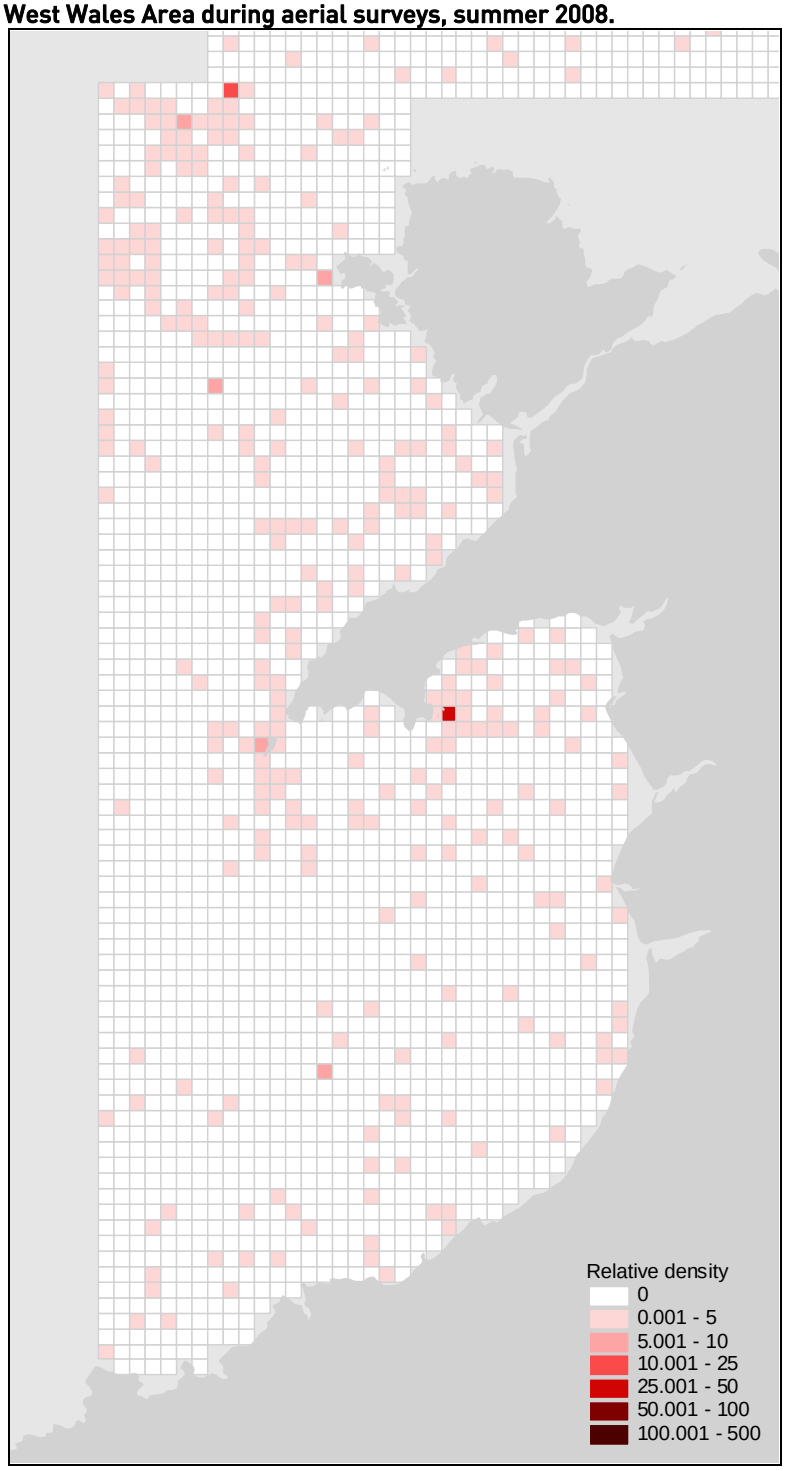


**Figure 122 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the South West Area during aerial surveys, winter 2007/08.**

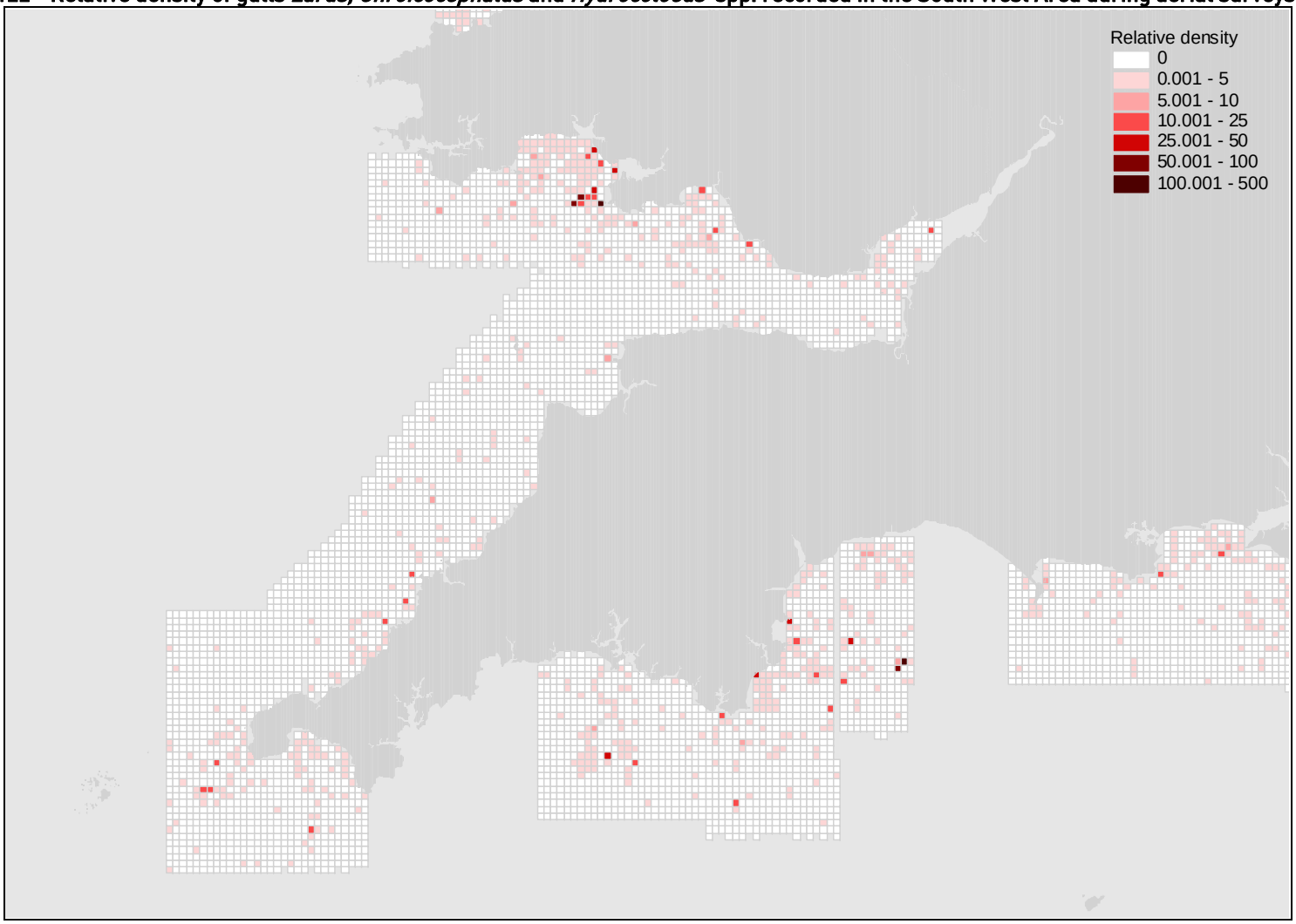


**Figure 123 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the South West Area during aerial surveys, summer 2008.**

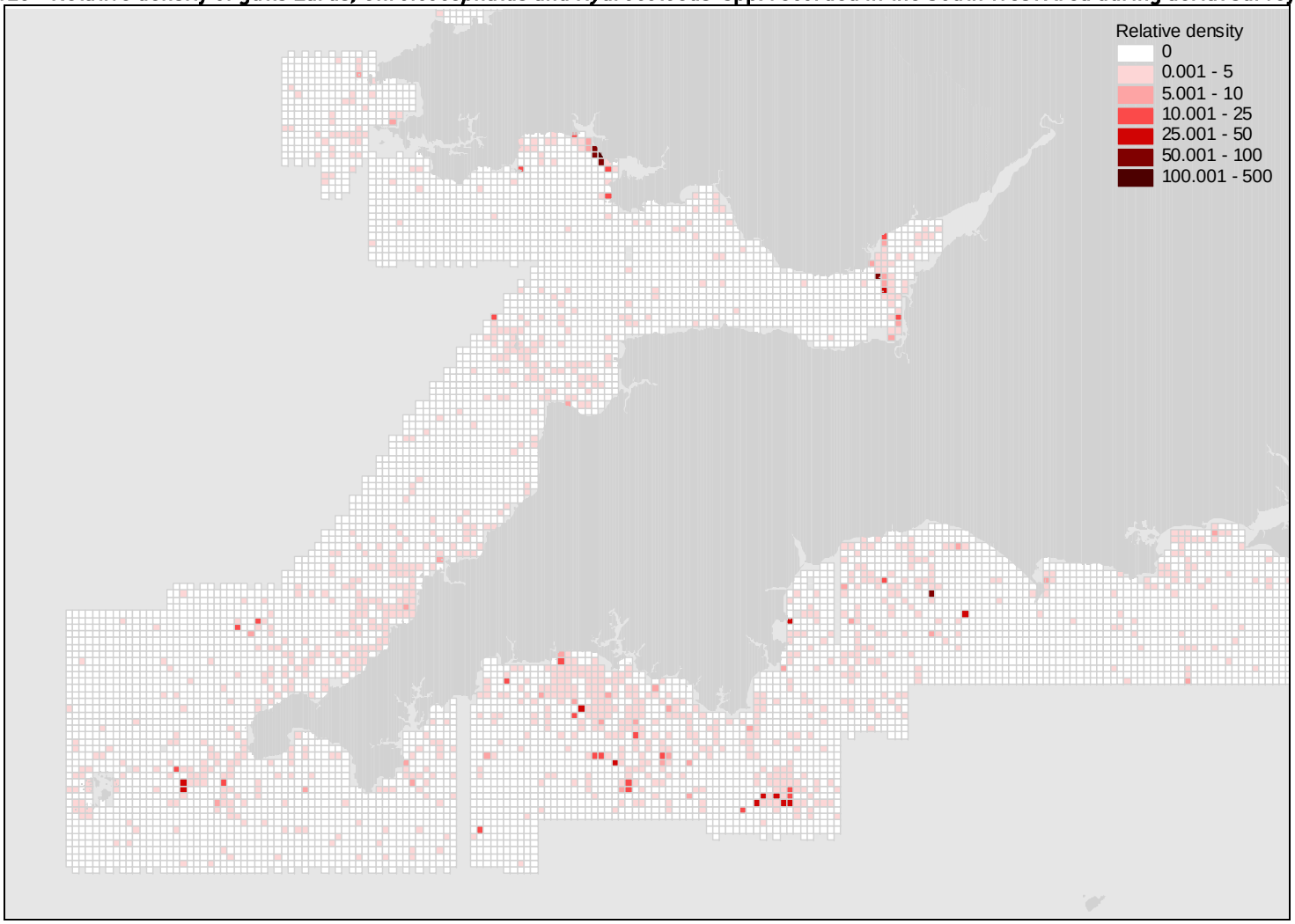


**Figure 124 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the South East Area during aerial surveys, winter 2007/08.**

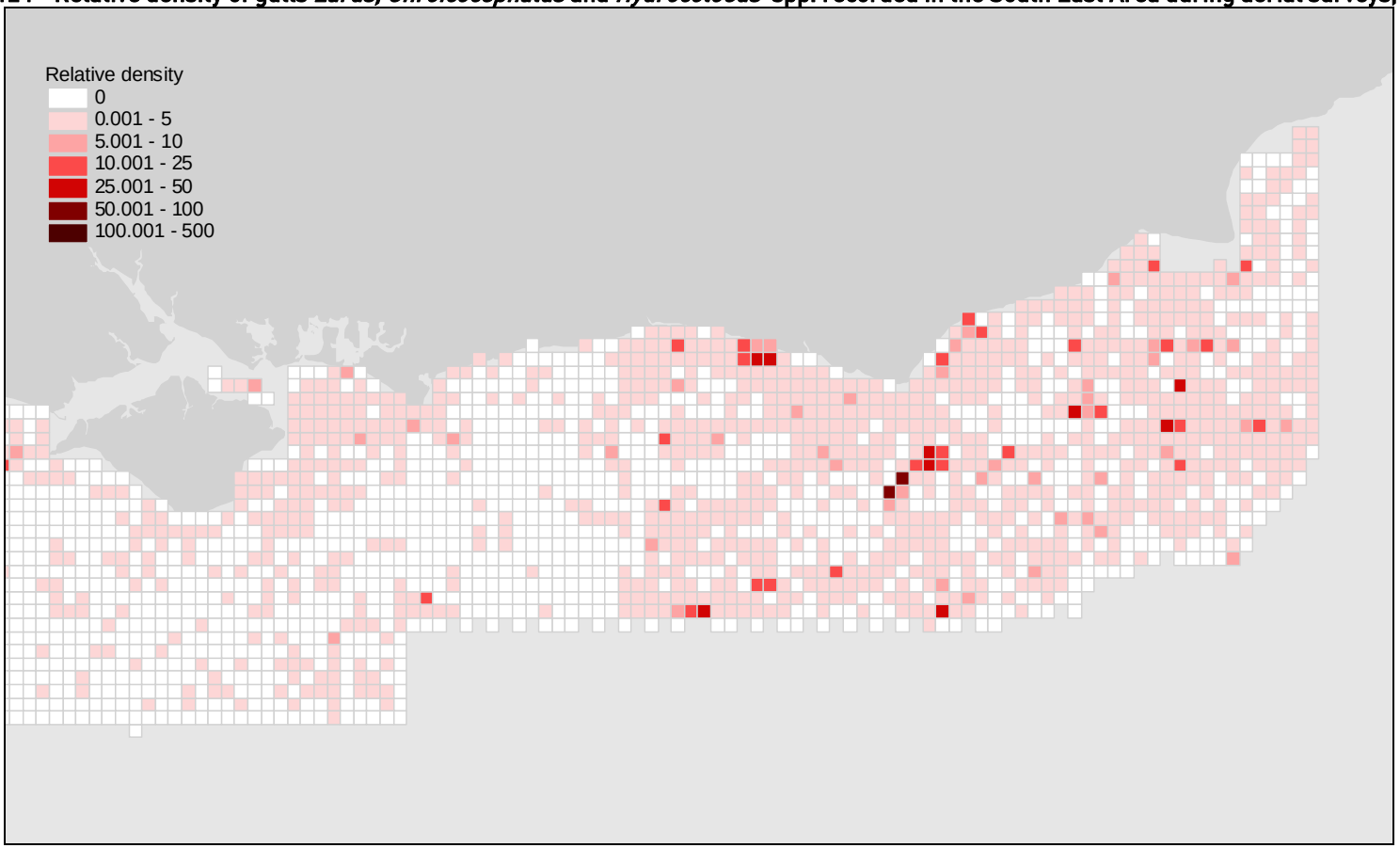


**Figure 125 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the South East Area during aerial surveys, summer 2008.**

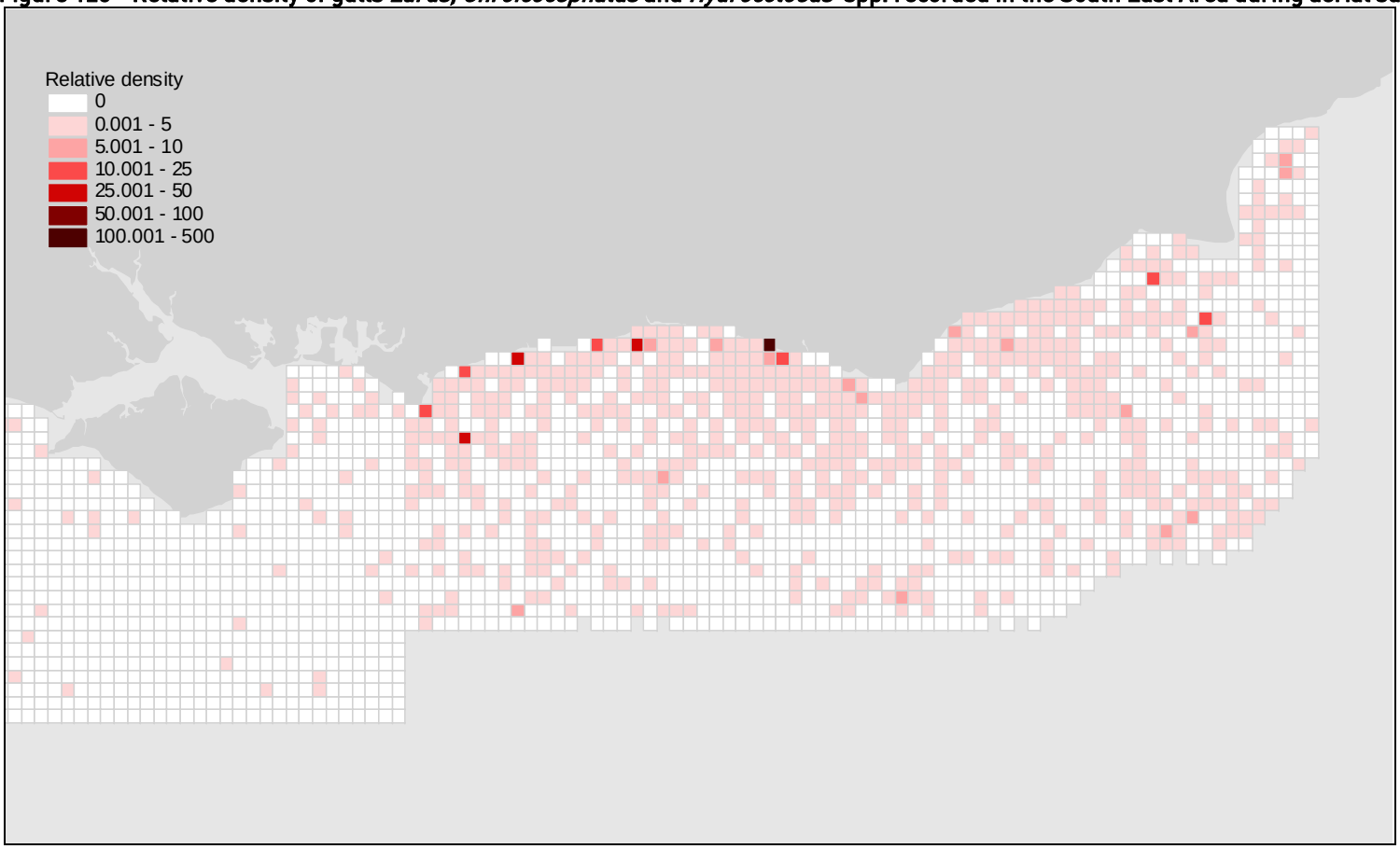


**Figure 126 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, winter 2007/08.**

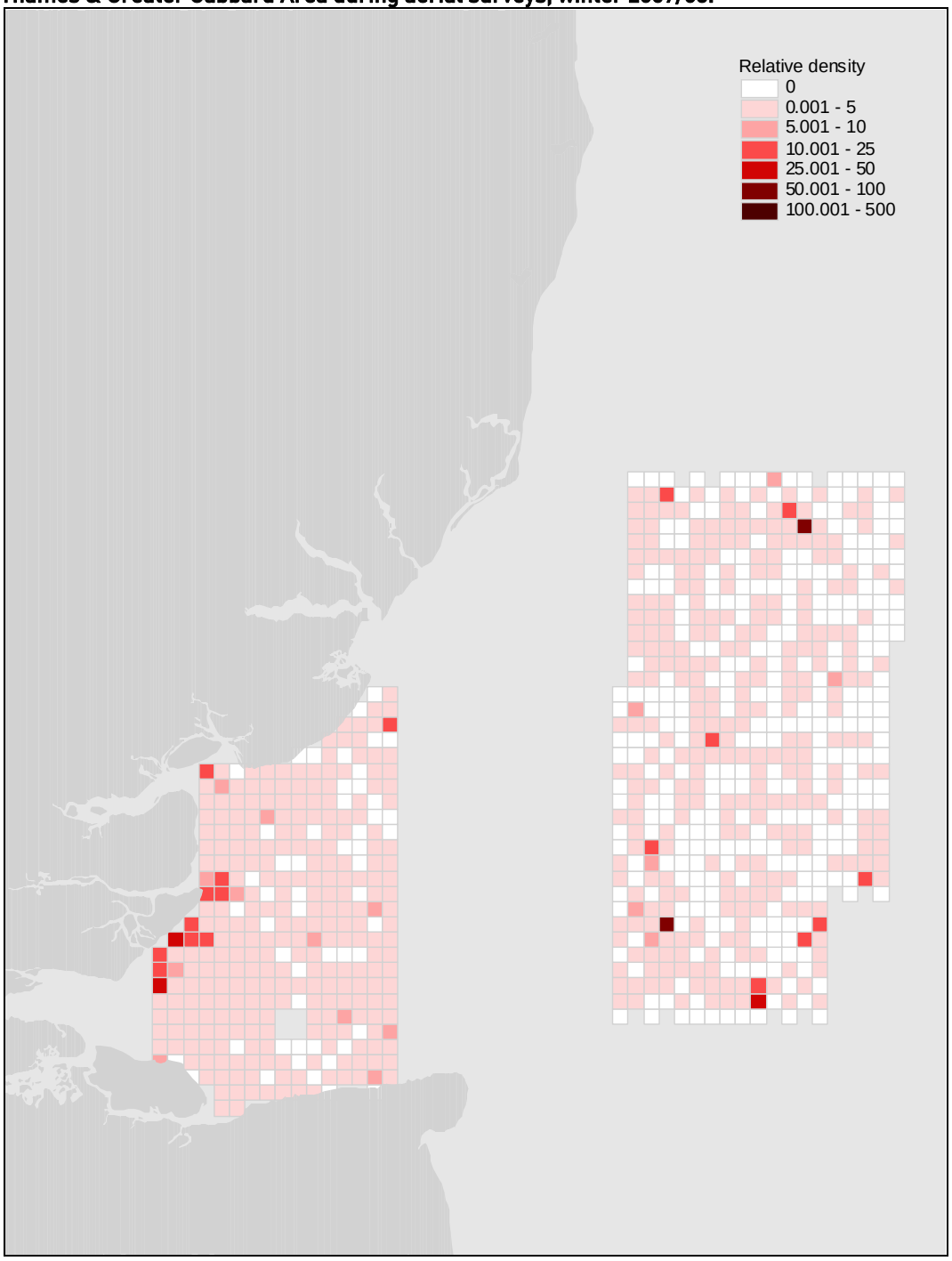


**Figure 127 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the Greater Wash Area during aerial surveys, winter 2007/08.**

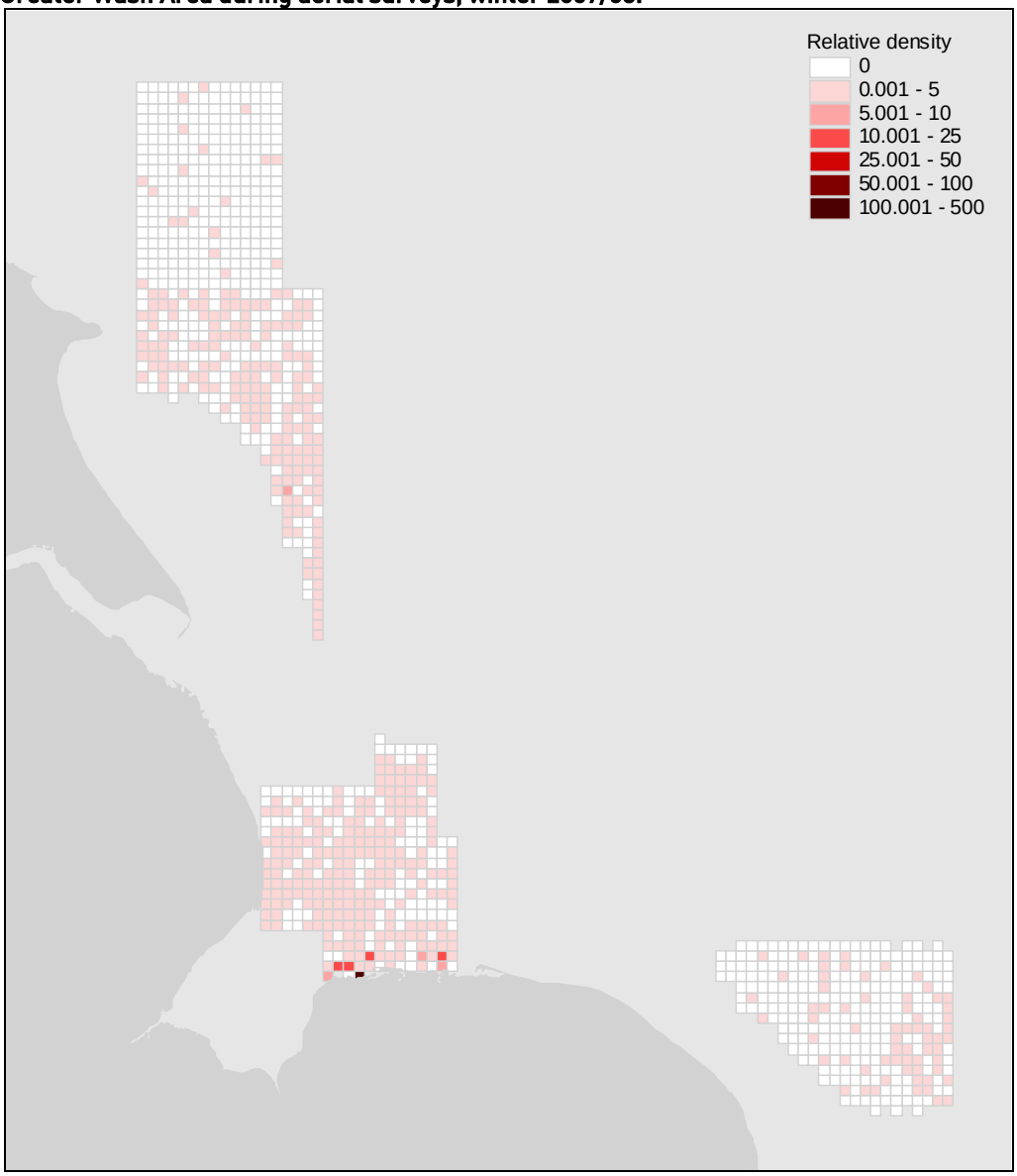


**Figure 128 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the Greater Wash Area during aerial surveys, summer 2008.**

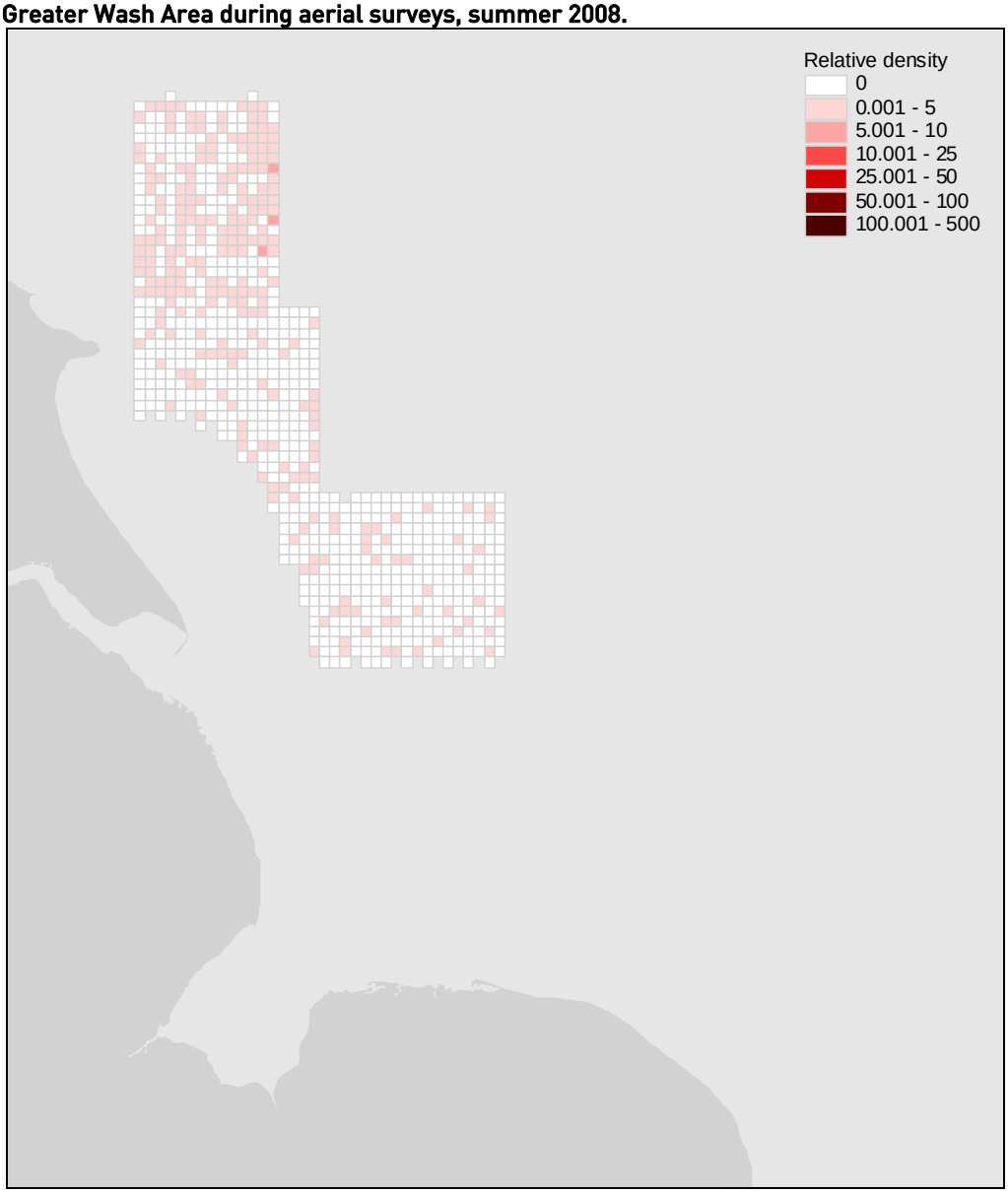


**Figure 129 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the North East Area during aerial surveys, winter 2007/08.**

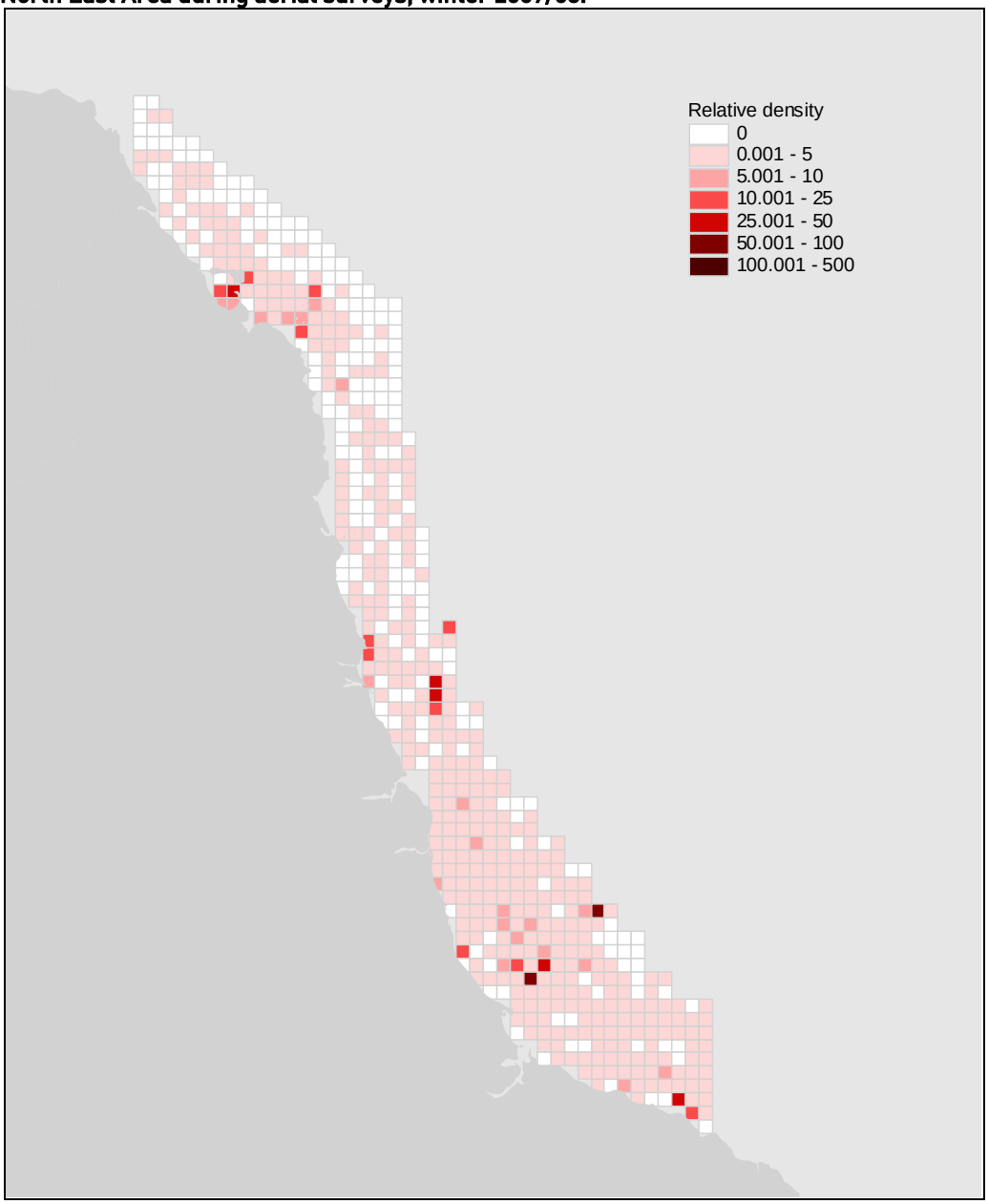


**Figure 130 - Relative density of gulls *Larus, Chroicocephalus* and *Hydrocoloeus* spp. recorded in the North East Area during aerial surveys, summer 2008.**

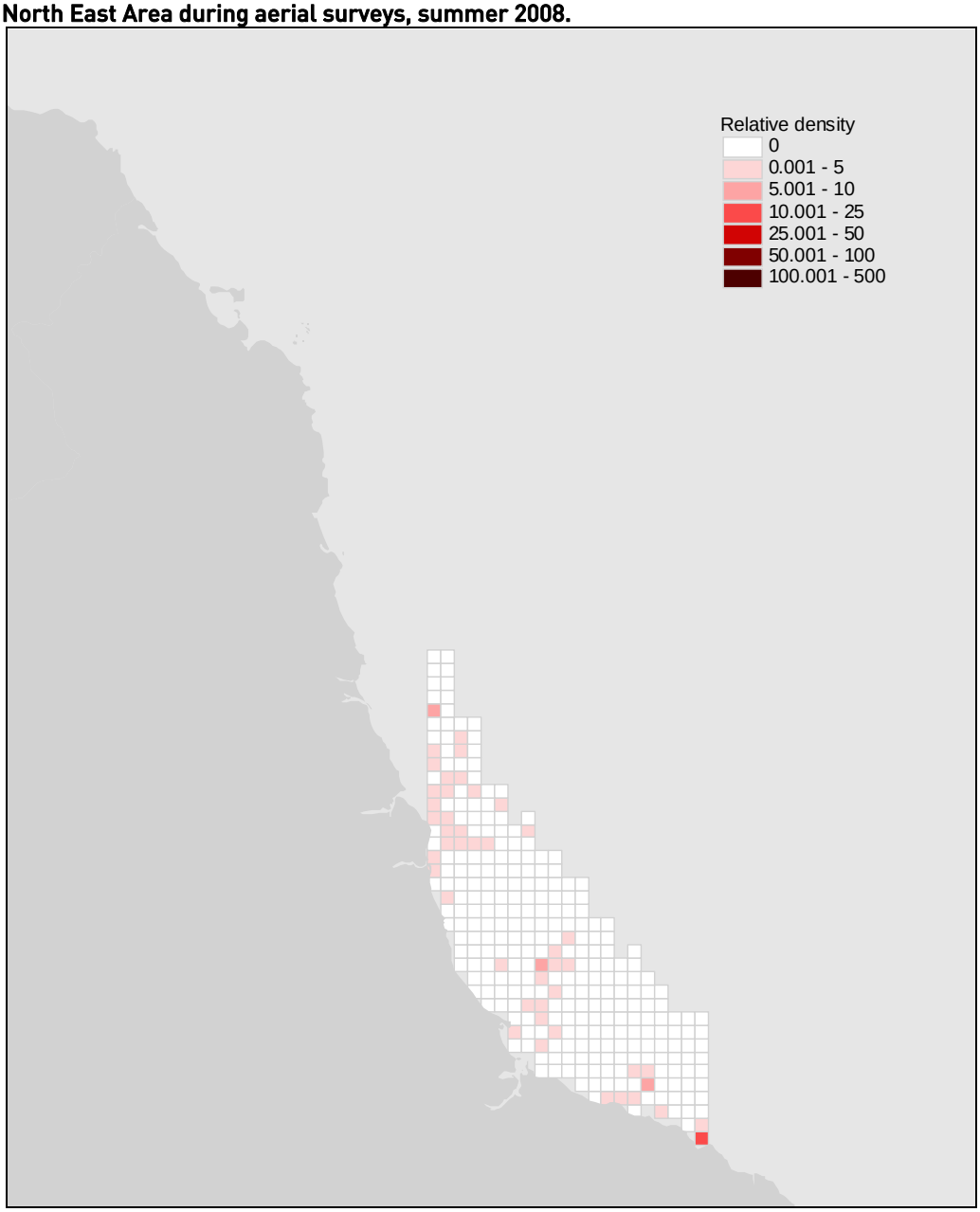


**Figure 131 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 1.**

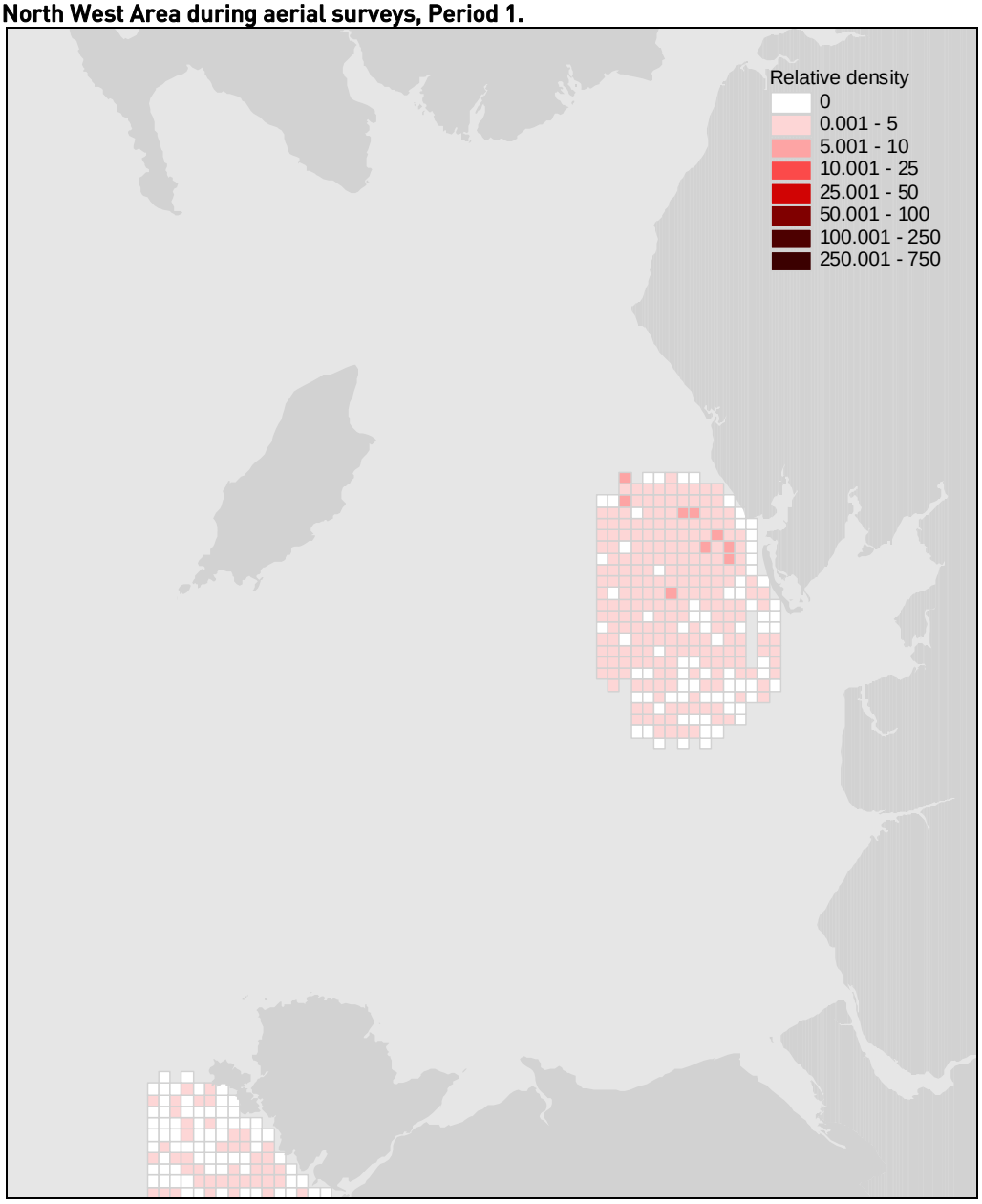


**Figure 132 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 2.**

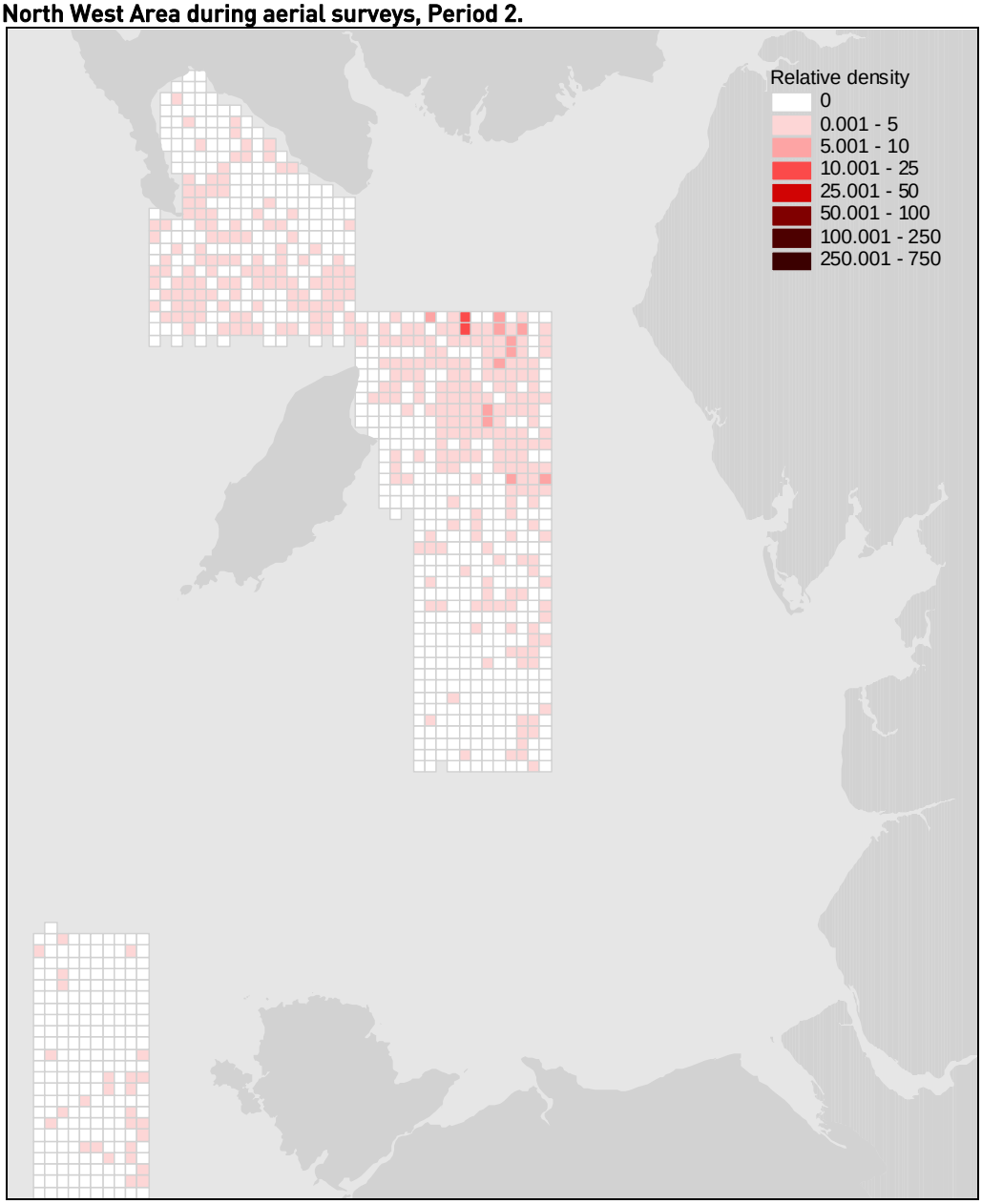


**Figure 133 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 3.**

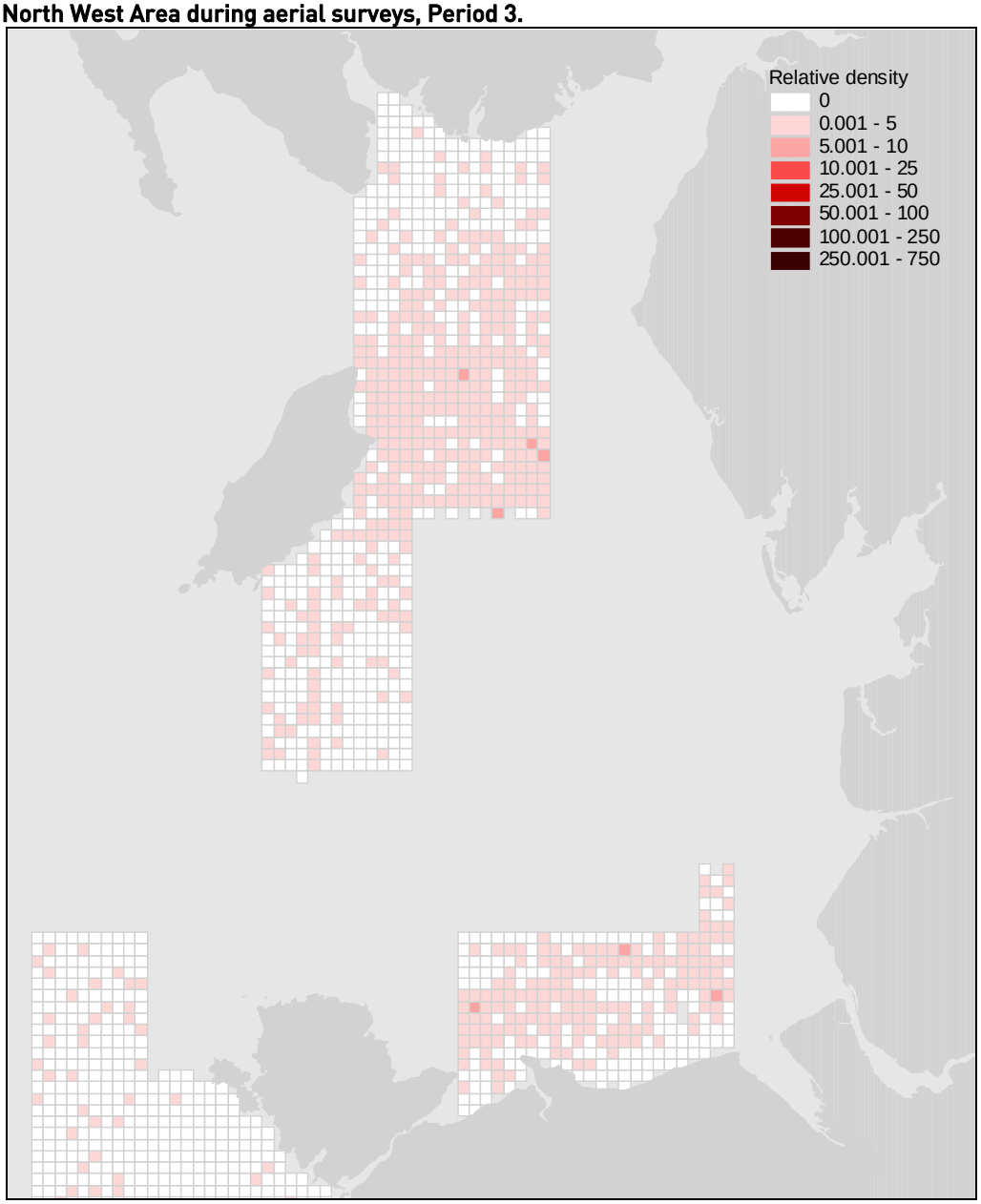


**Figure 134 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 4.**

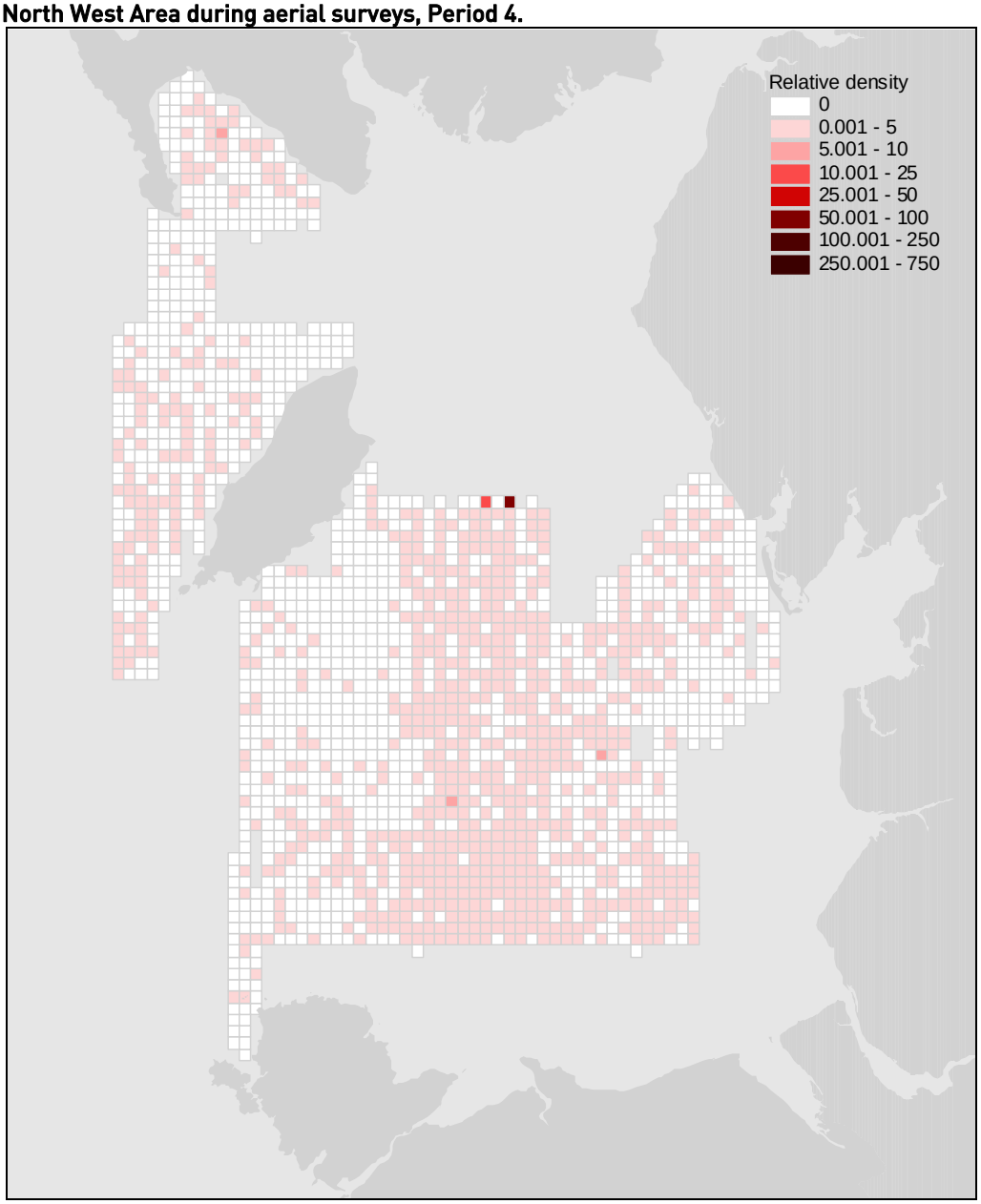


**Figure 135 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 5.**

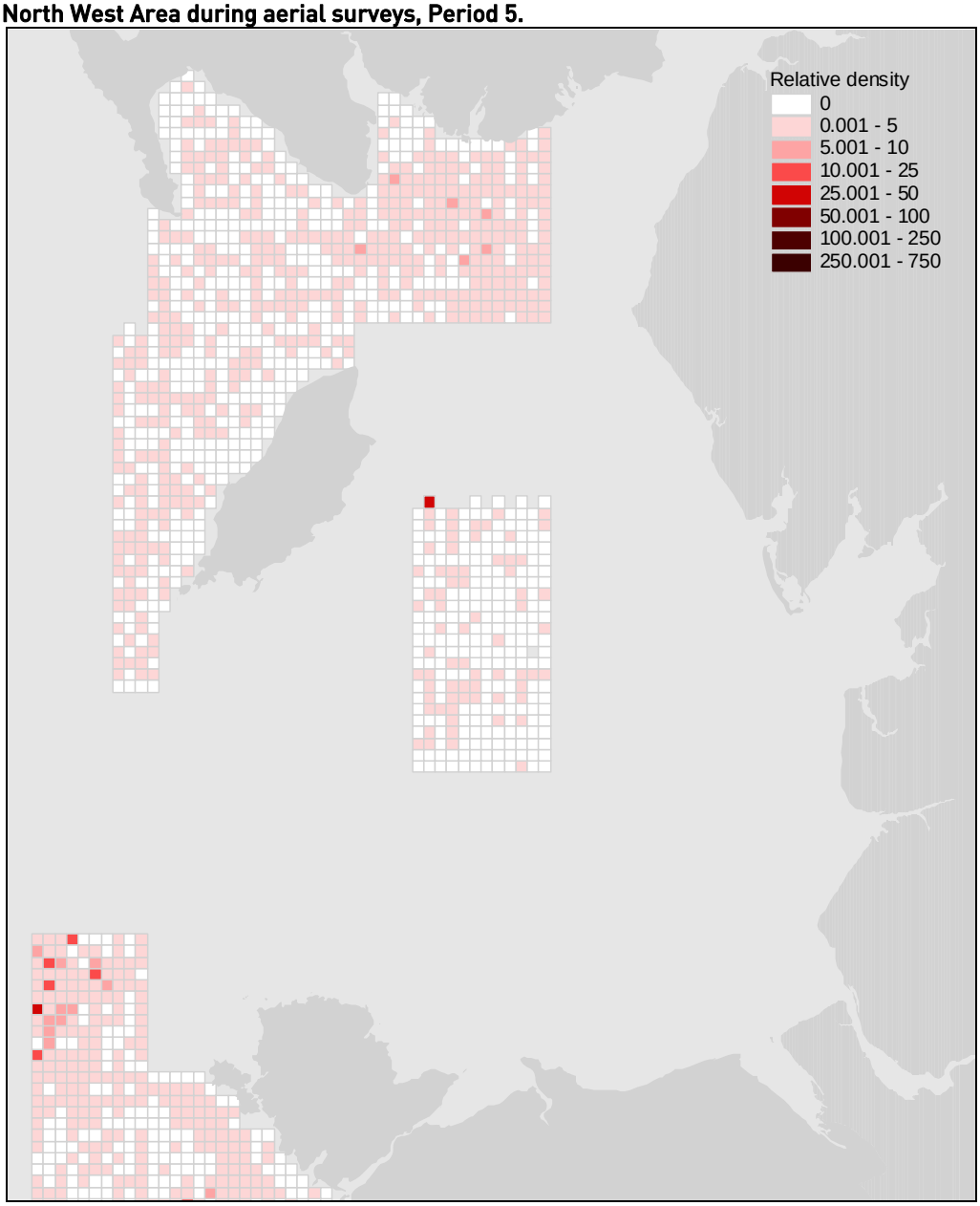


**Figure 136 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 6.**

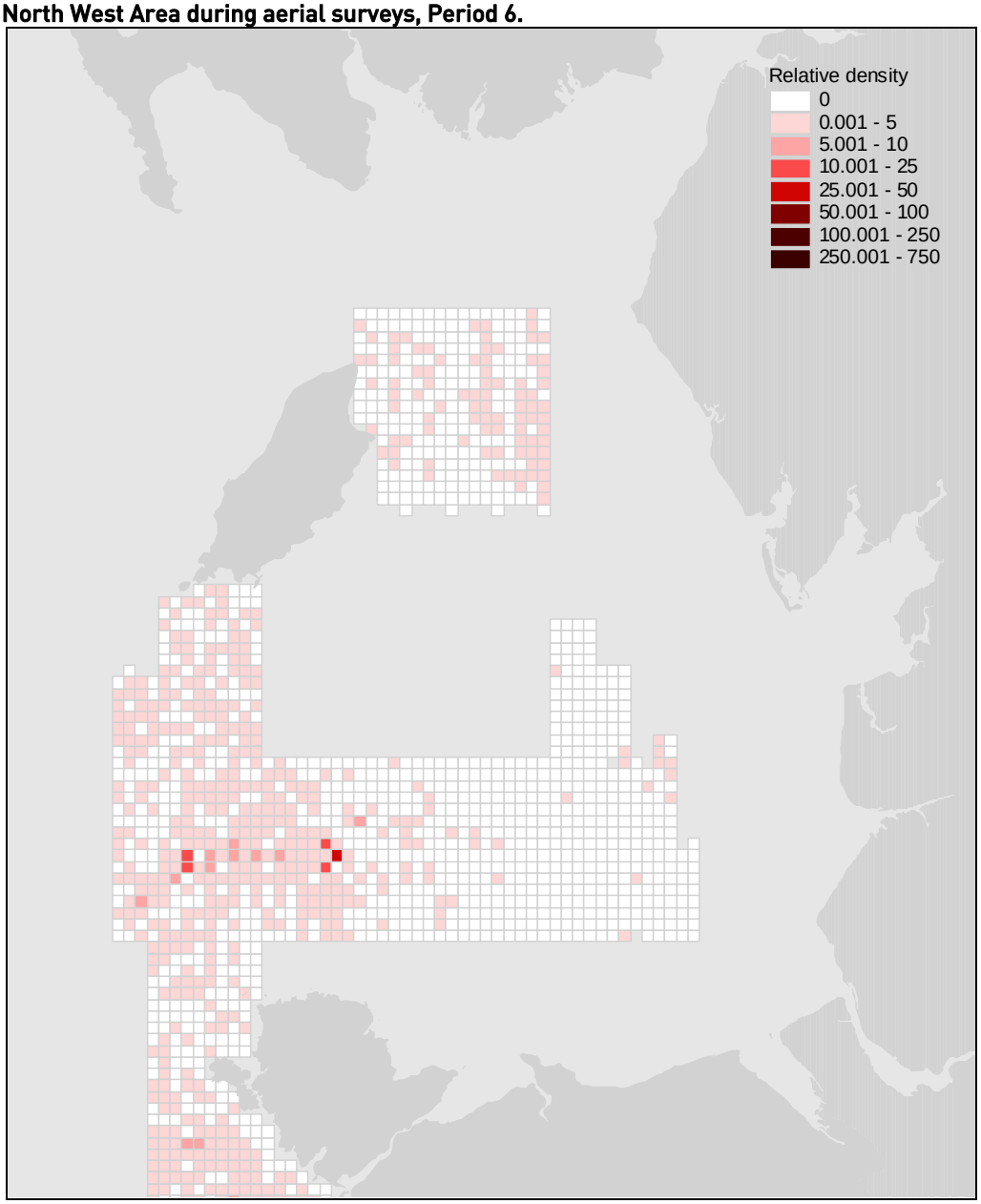


**Figure 137 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North West Area during aerial surveys, Period 7.**

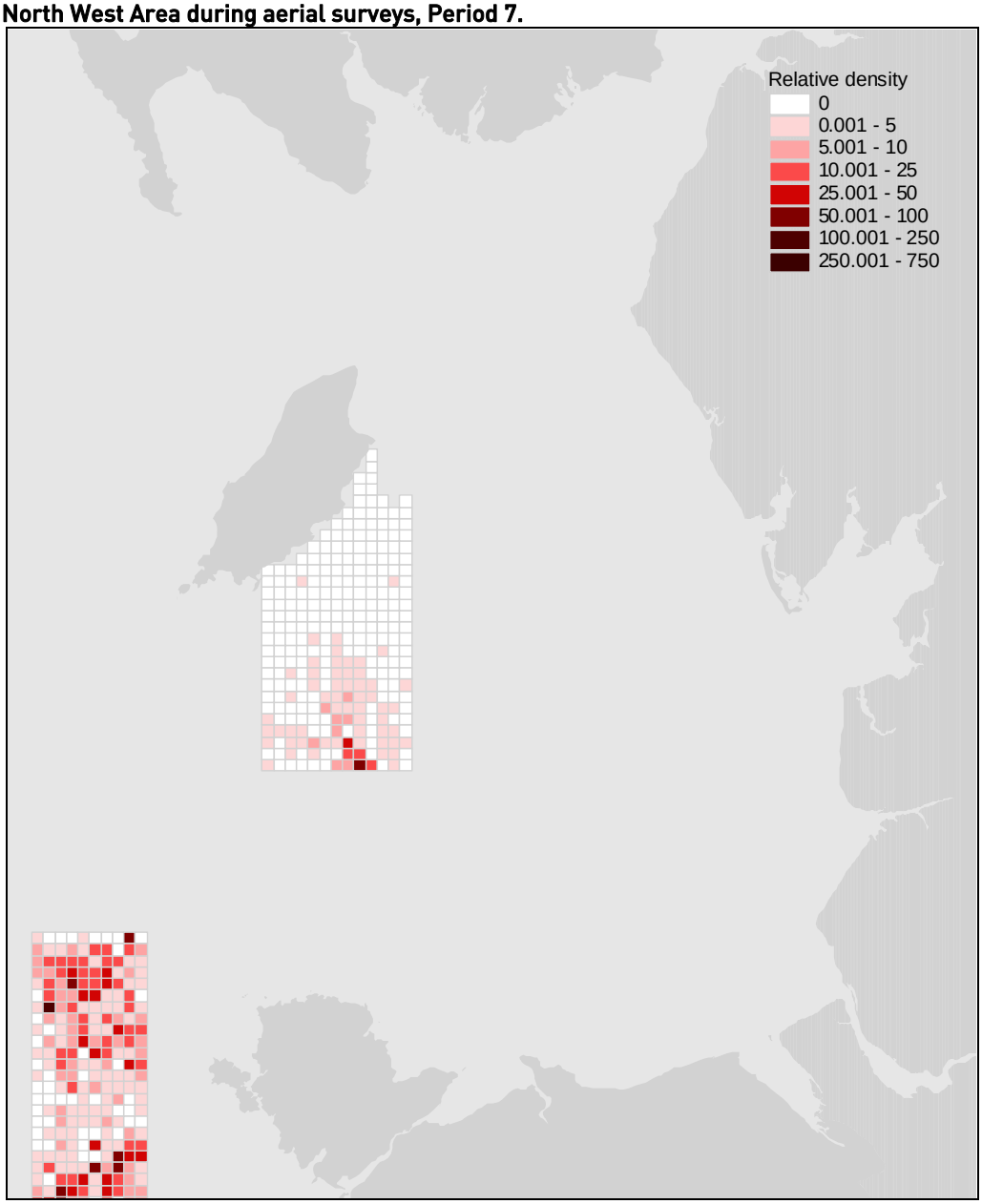


**Figure 138 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 1.**

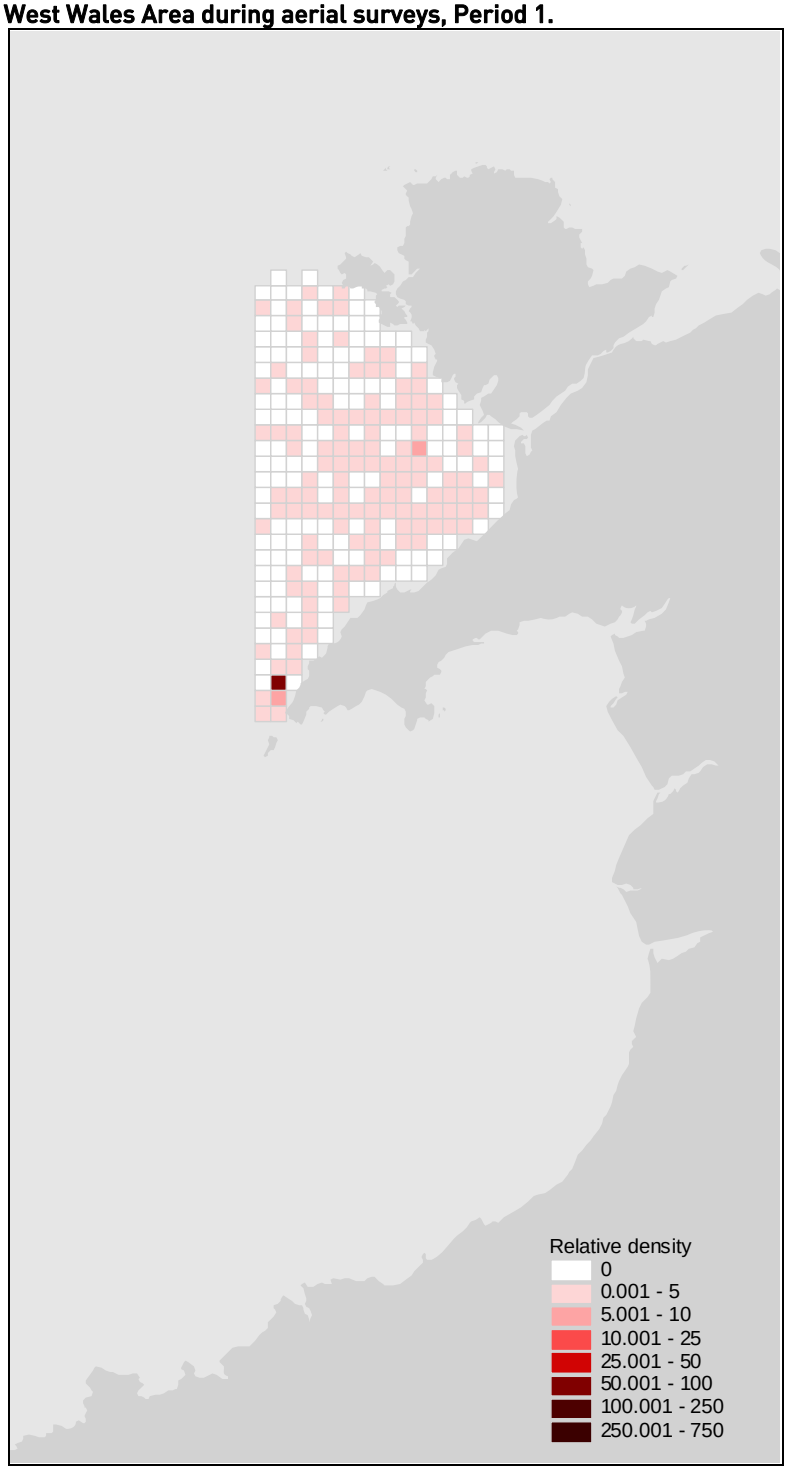


**Figure 139 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 2.**

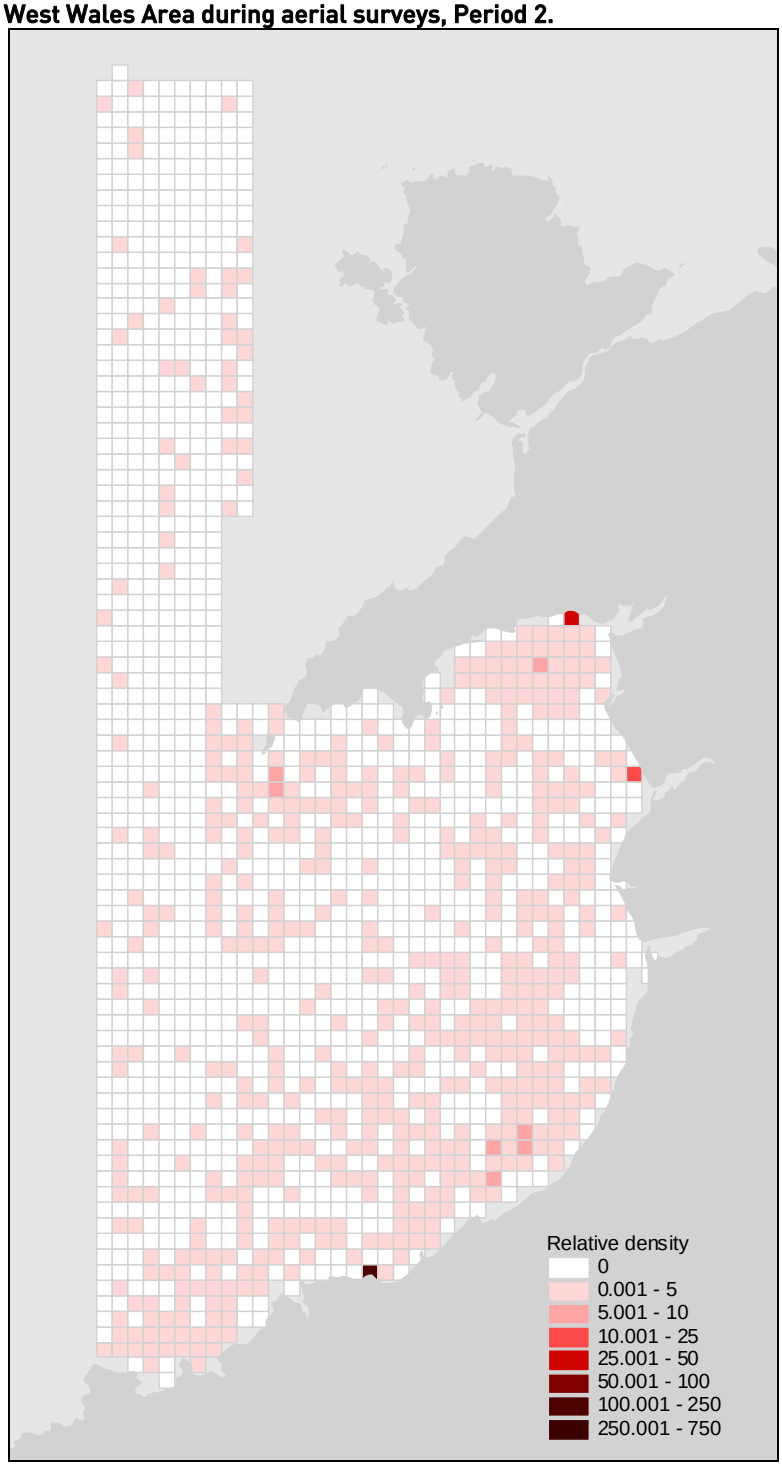


**Figure 140 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 3.**

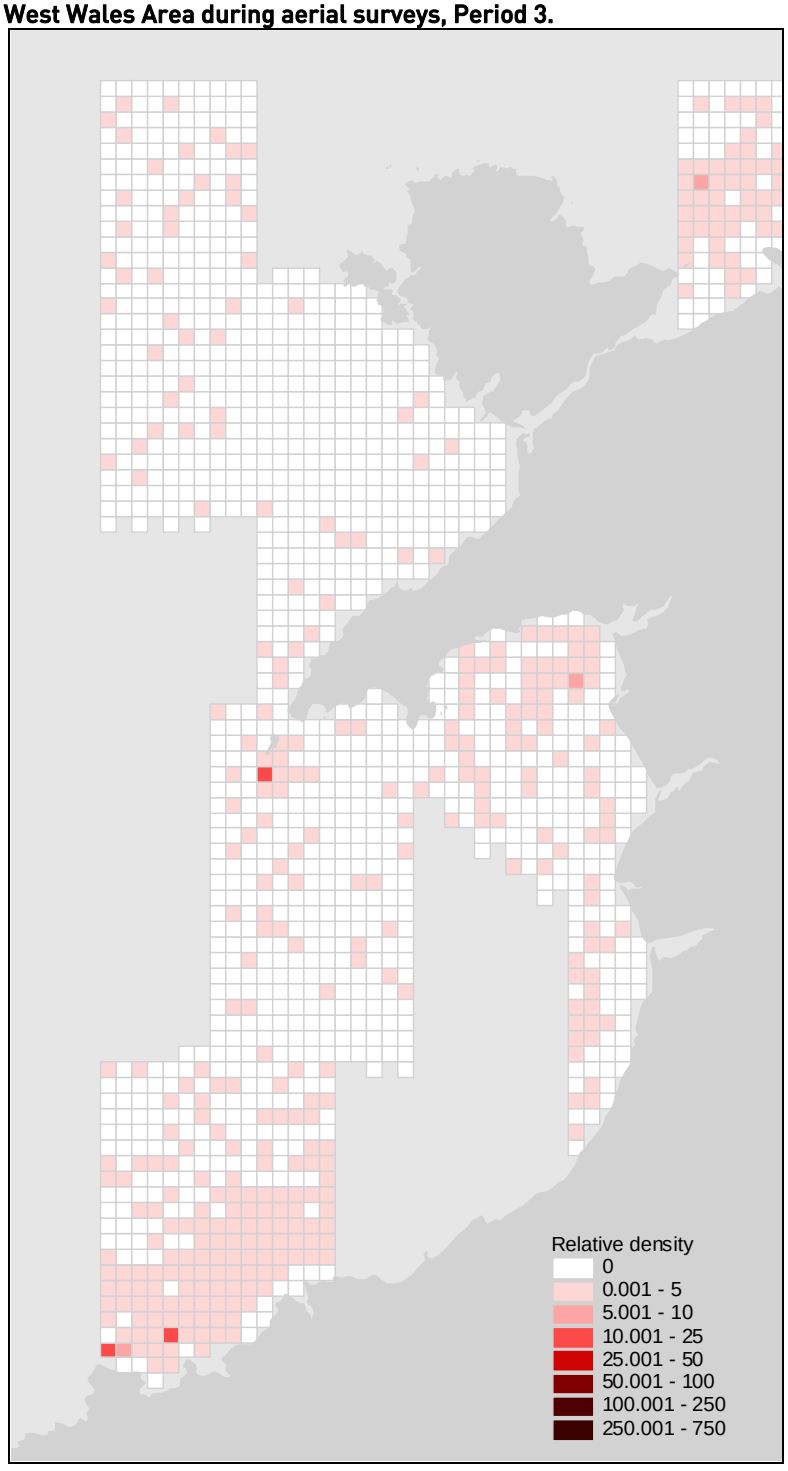


**Figure 141 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 4.**

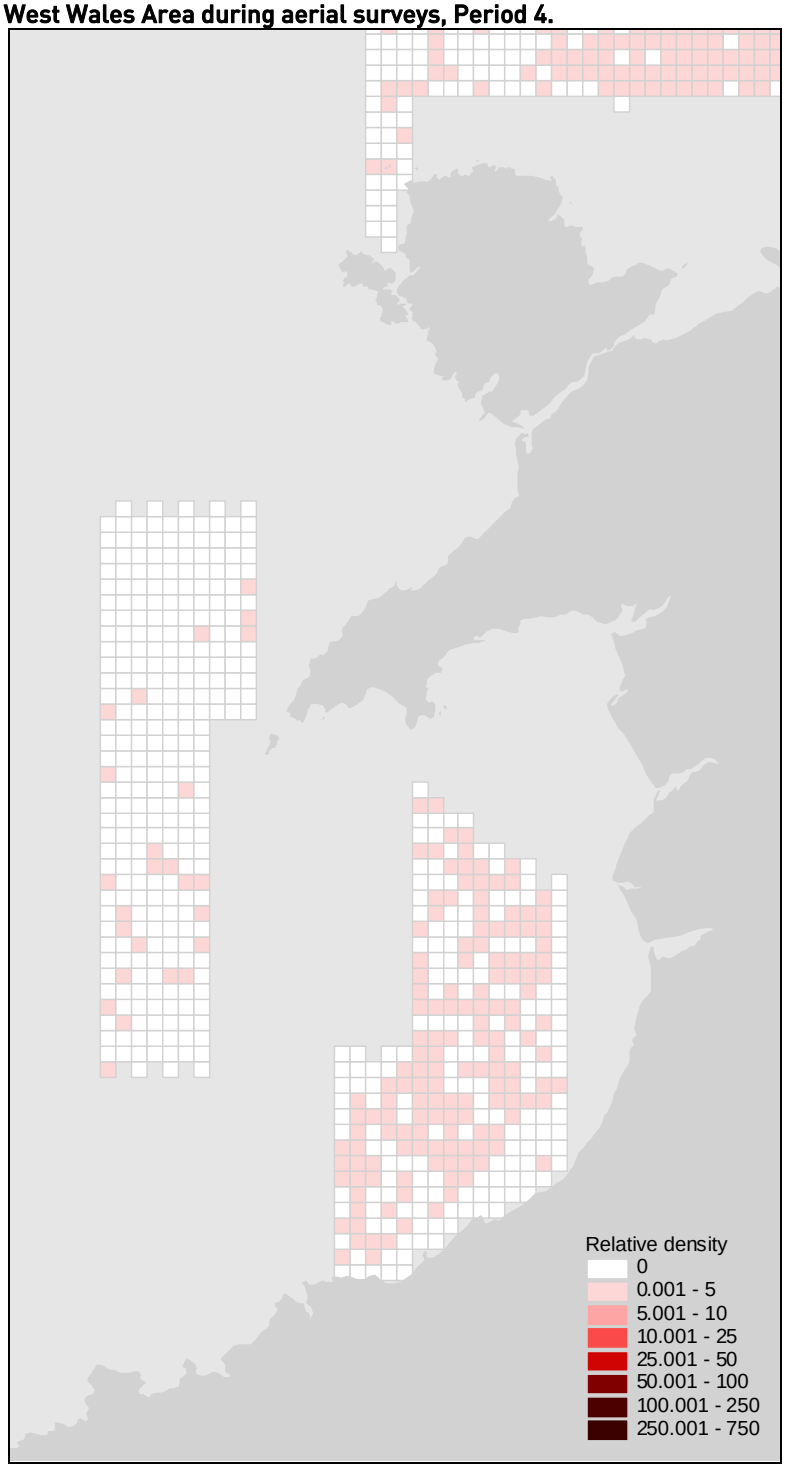


**Figure 142 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 5.**

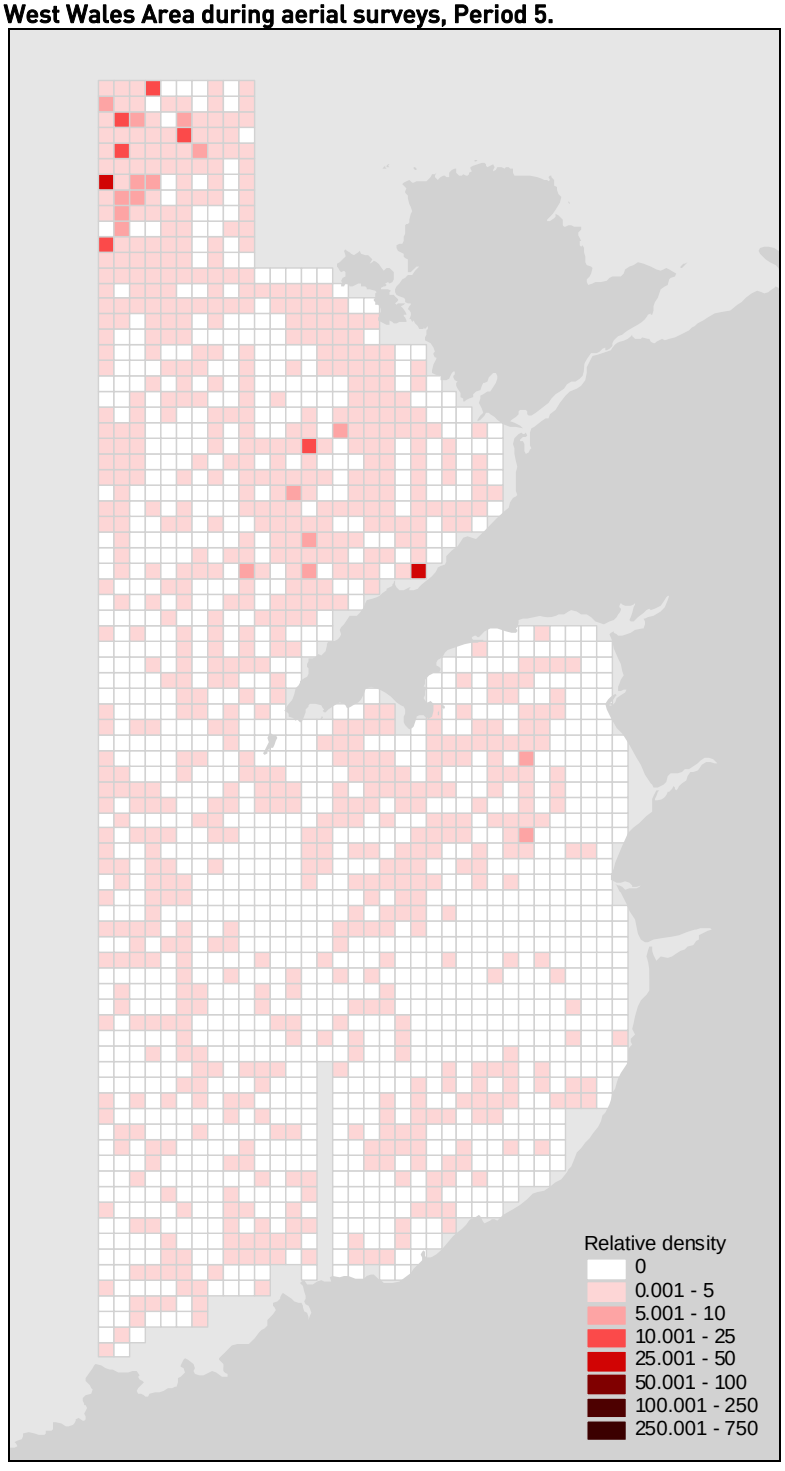


**Figure 143 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 6.**

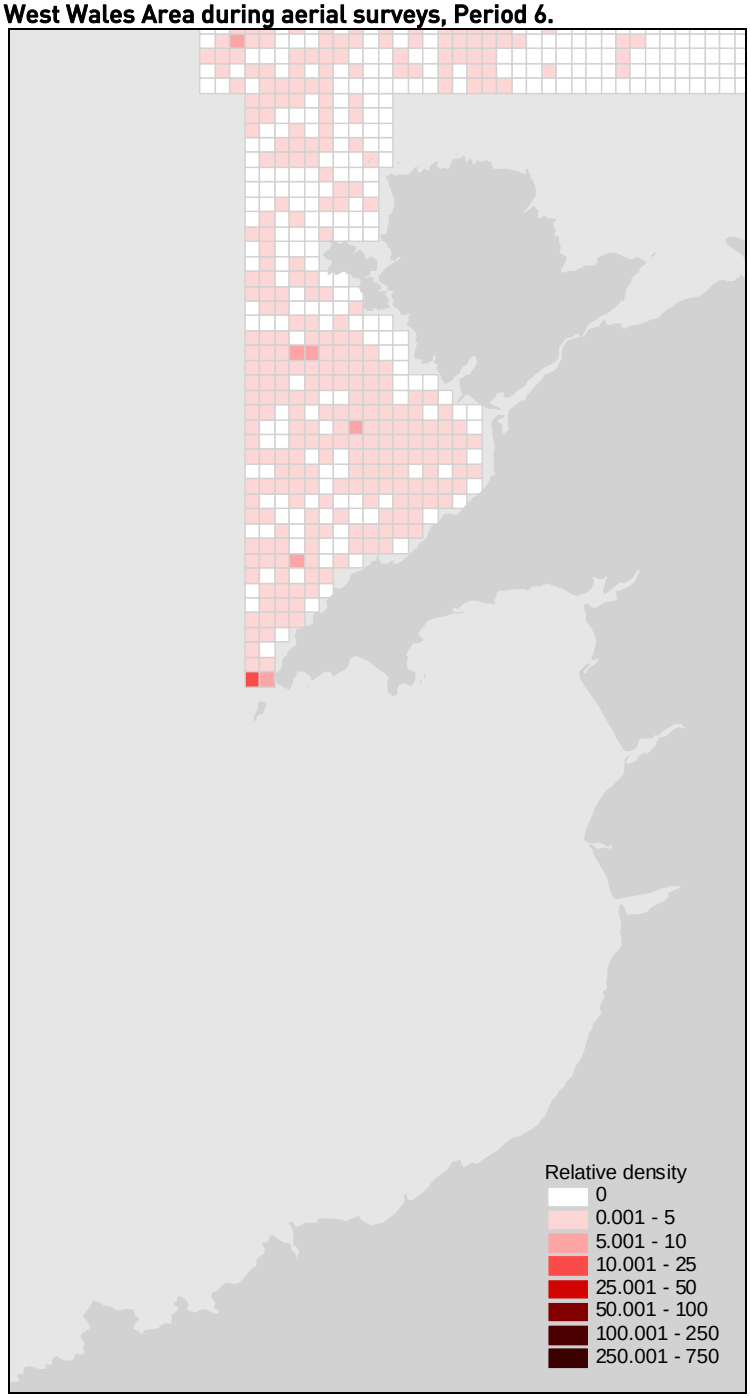


**Figure 144 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the West Wales Area during aerial surveys, Period 7.**

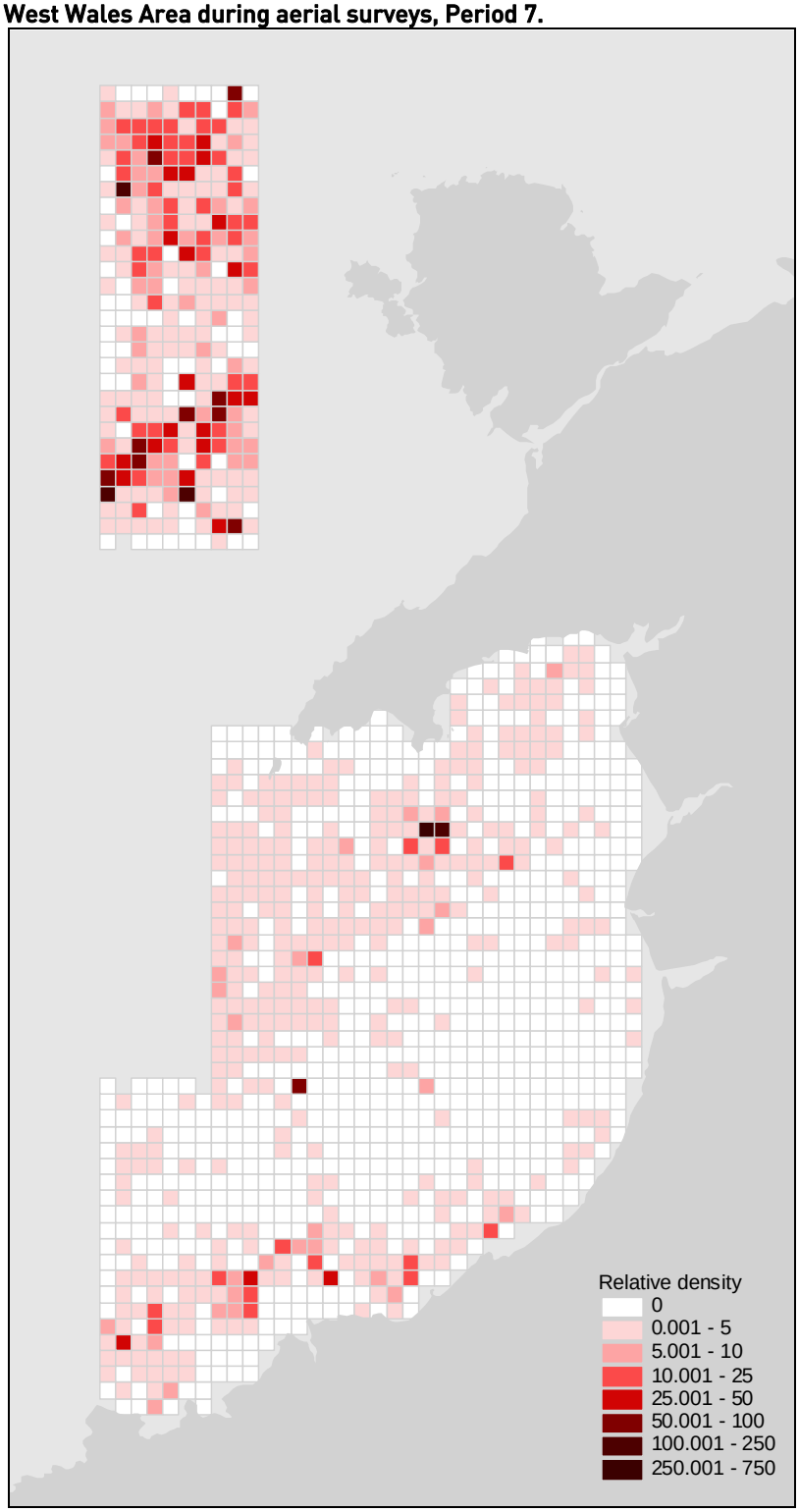


**Figure 145 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South West Area during aerial surveys, Period 1.**

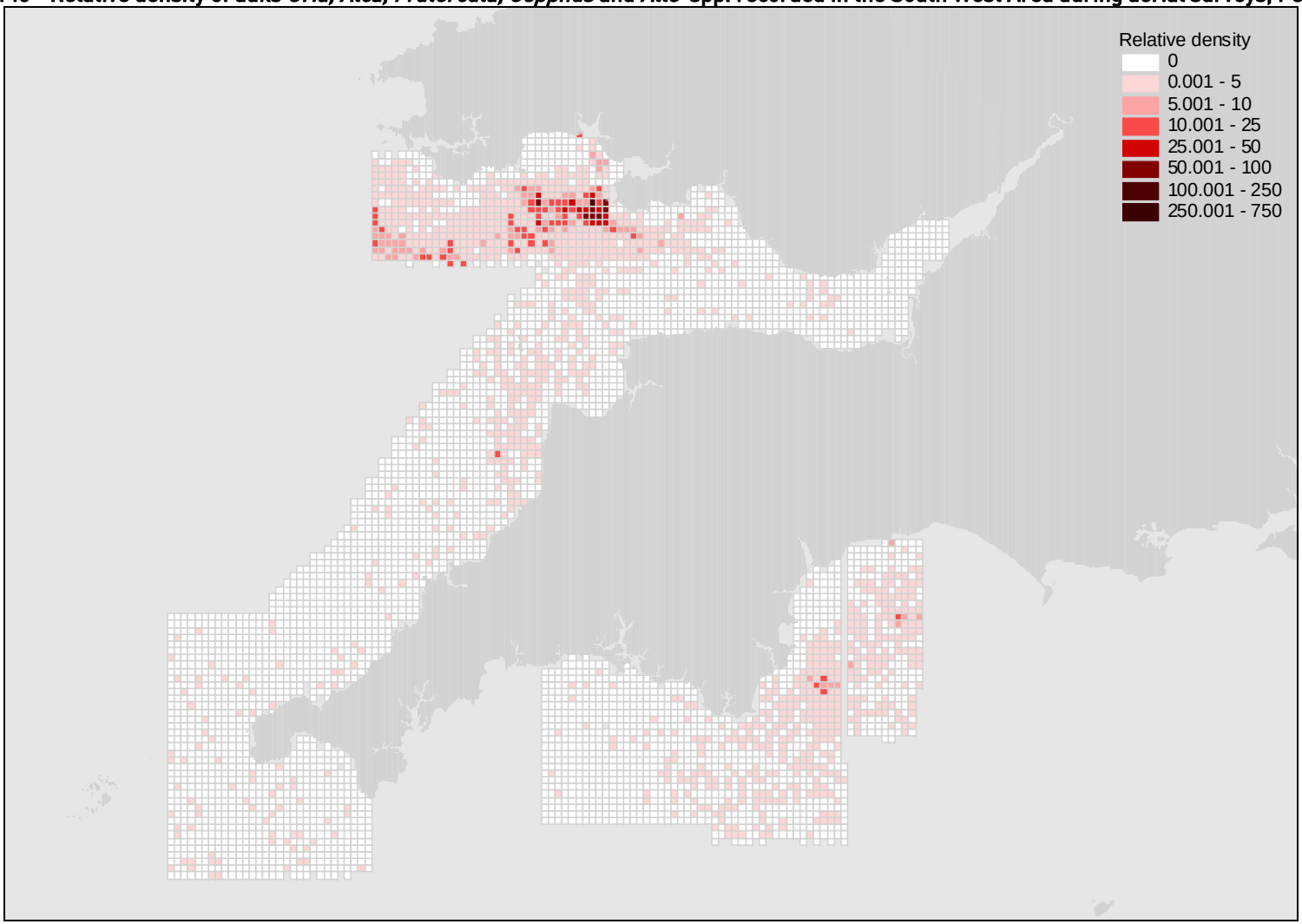


**Figure 146 - Relative density of auks *Uria, Alca, Fratercula, Cephus* and *Alle* spp. recorded in the South West Area during aerial surveys, Period 3.**

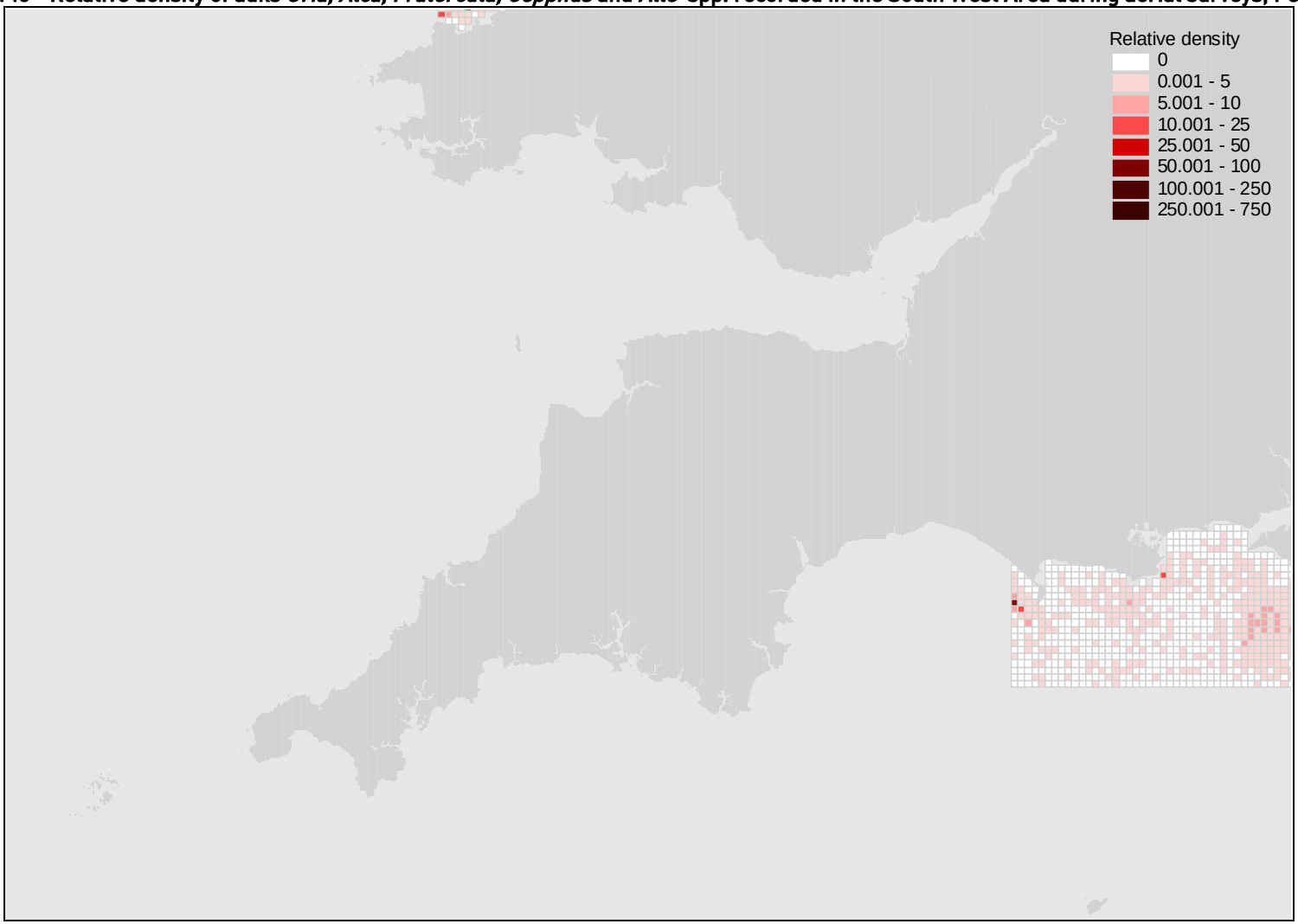


**Figure 147 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South West Area during aerial surveys, Period 5.**

**Figure 148 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South West Area during aerial surveys, Period 6.**

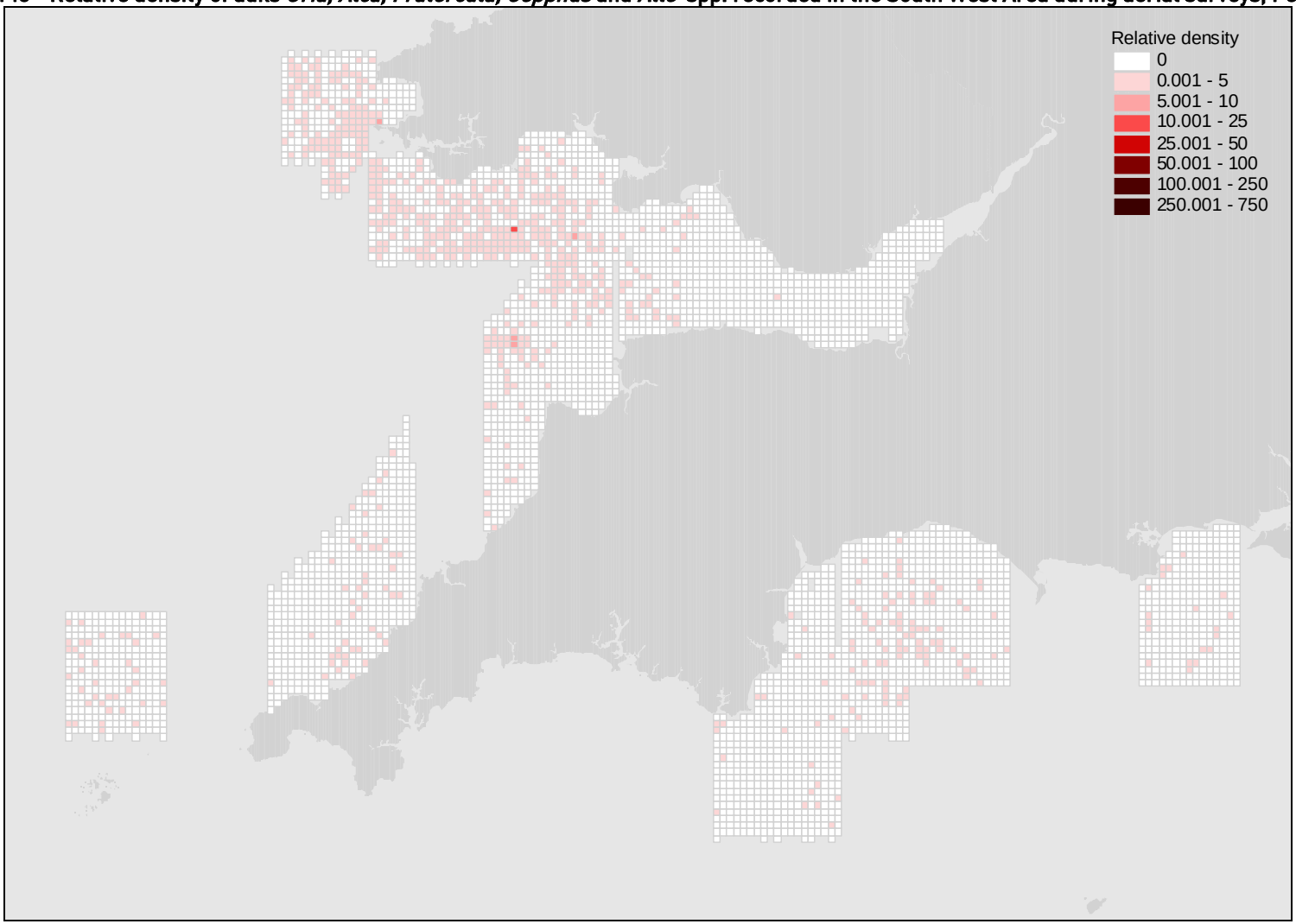


**Figure 149 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South West Area during aerial surveys, Period 7.**

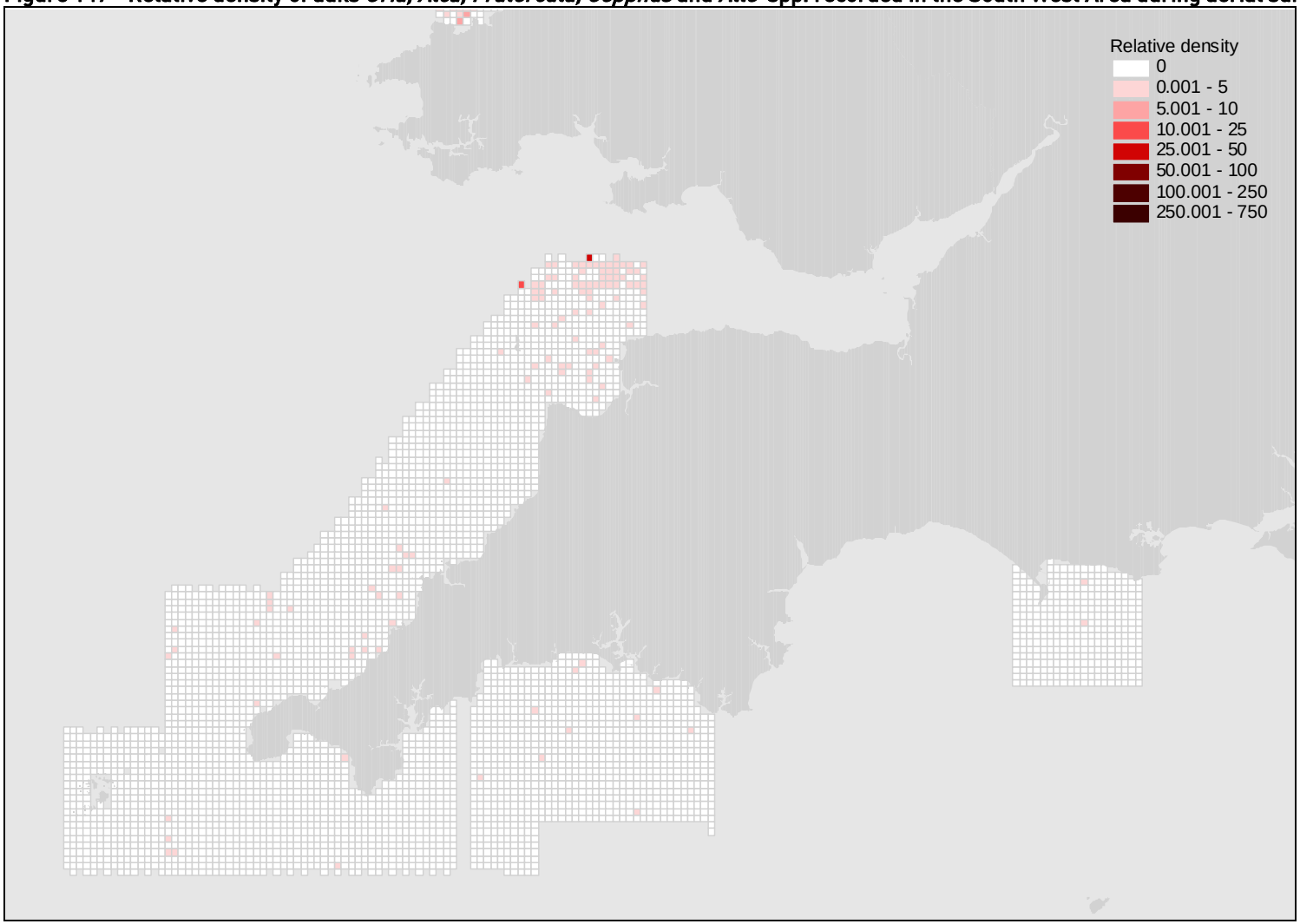


**Figure 150 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 2.**

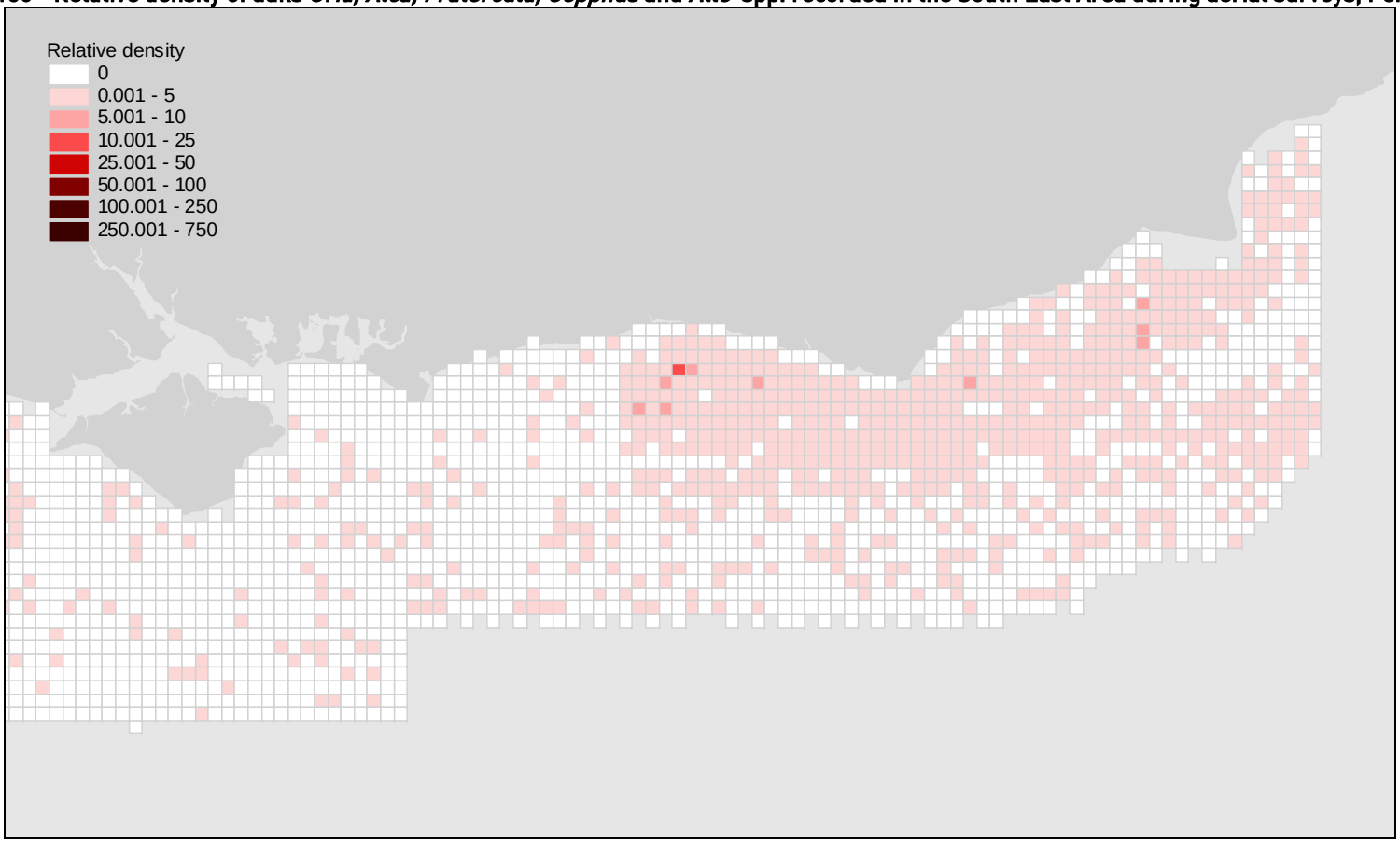


**Figure 151 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 3.**

**Figure 152 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 4.**

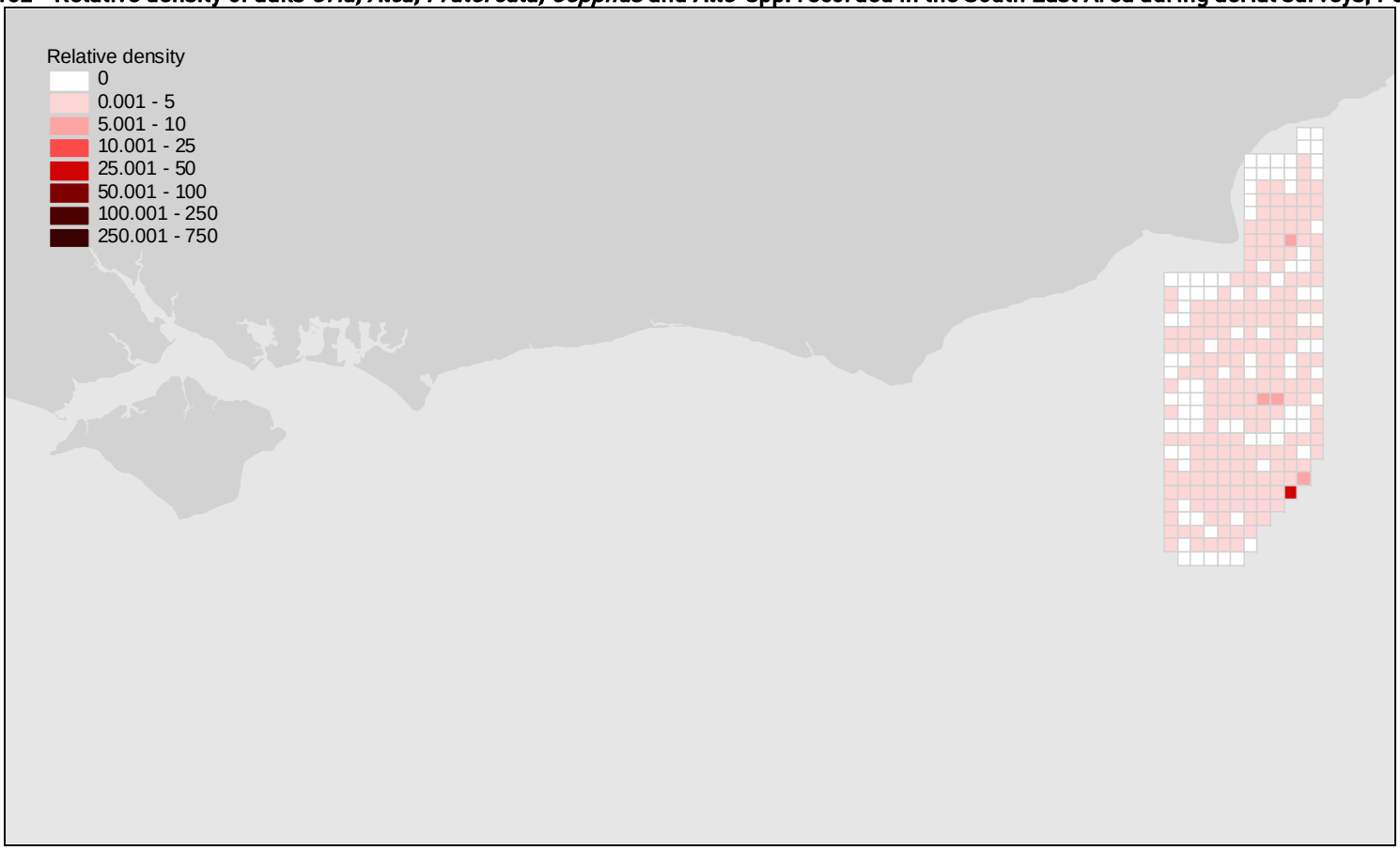


**Figure 153 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 5.**

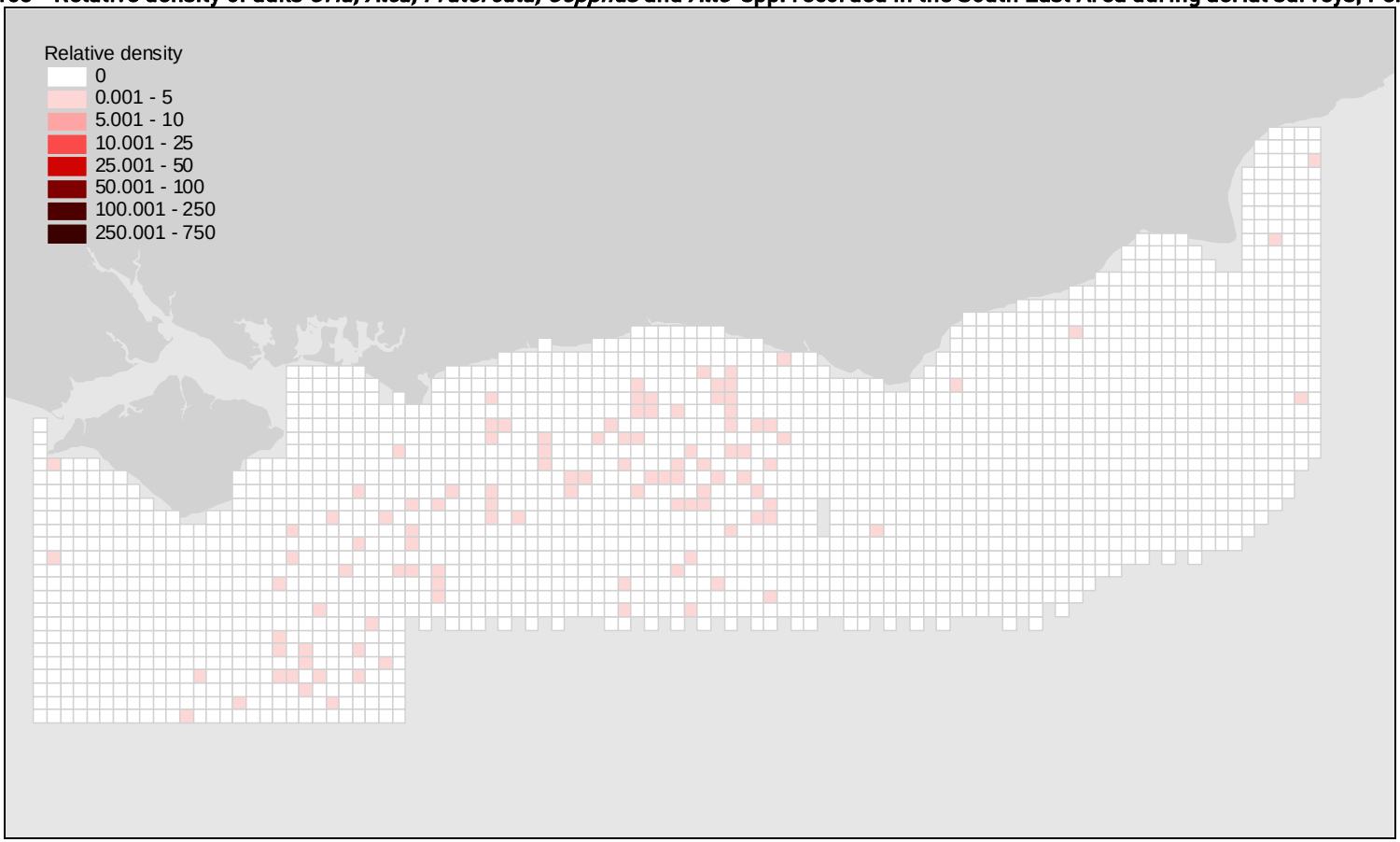


**Figure 154 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 6.**

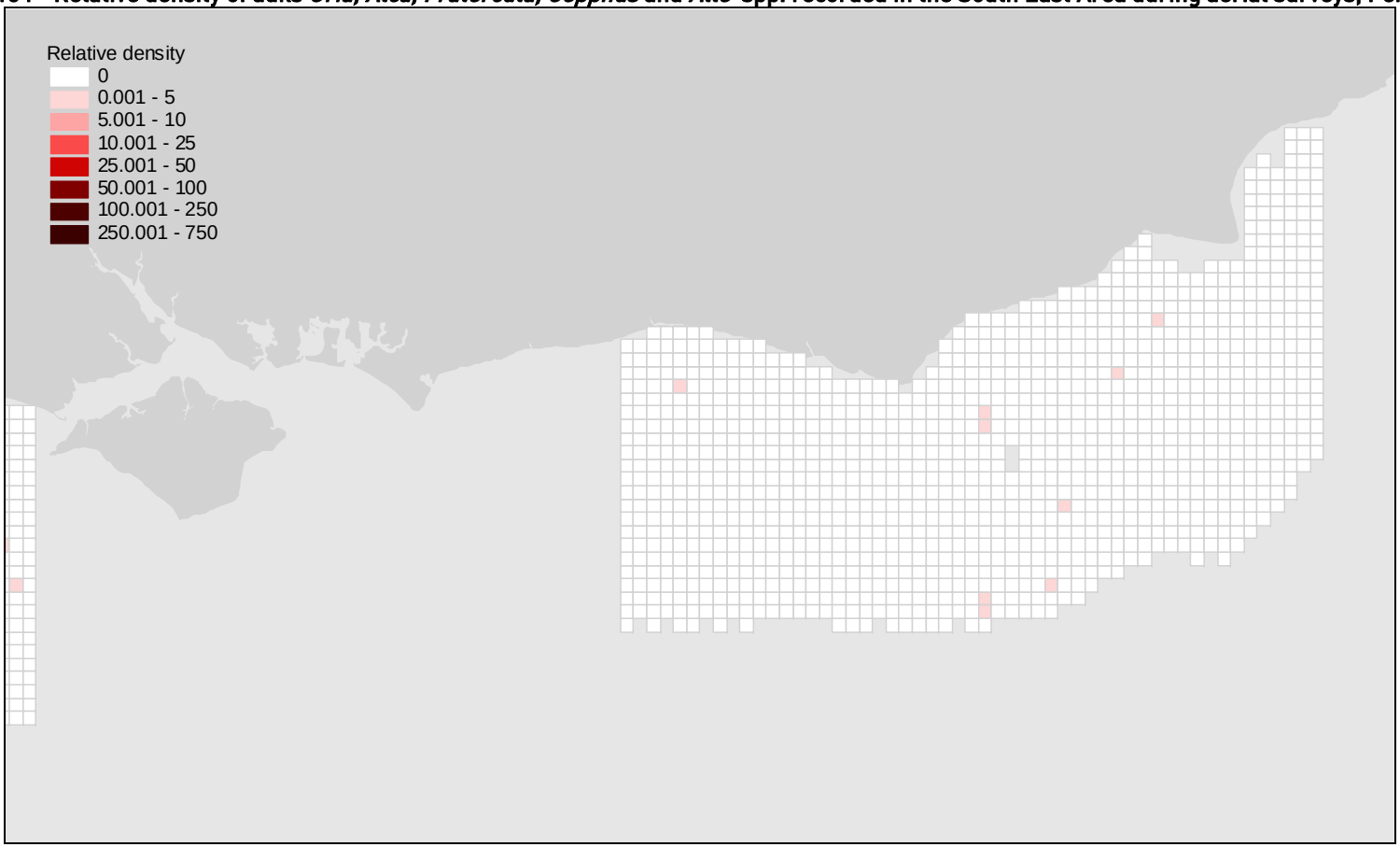


**Figure 155 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the South East Area during aerial surveys, Period 7.**

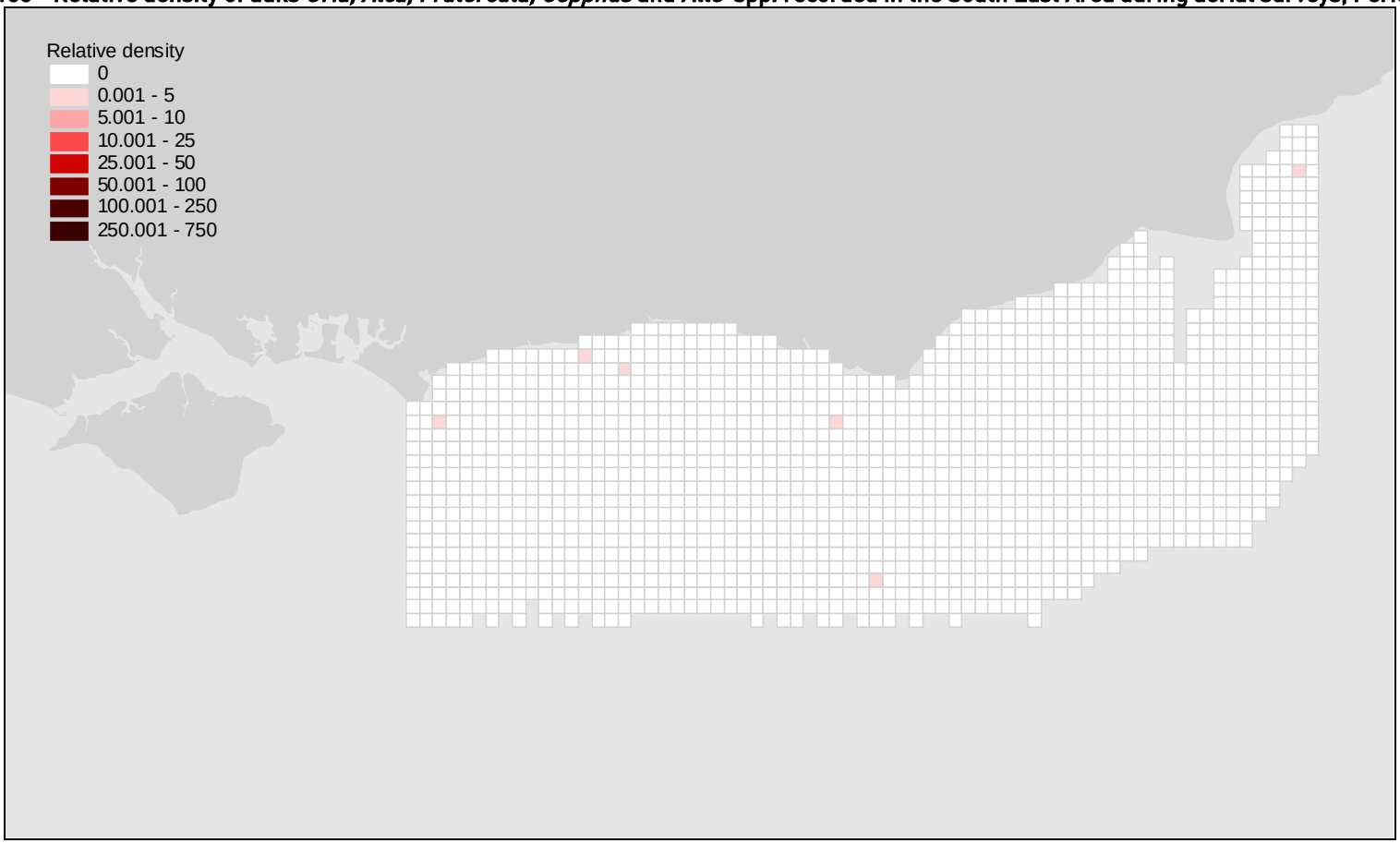


**Figure 156 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 1.**

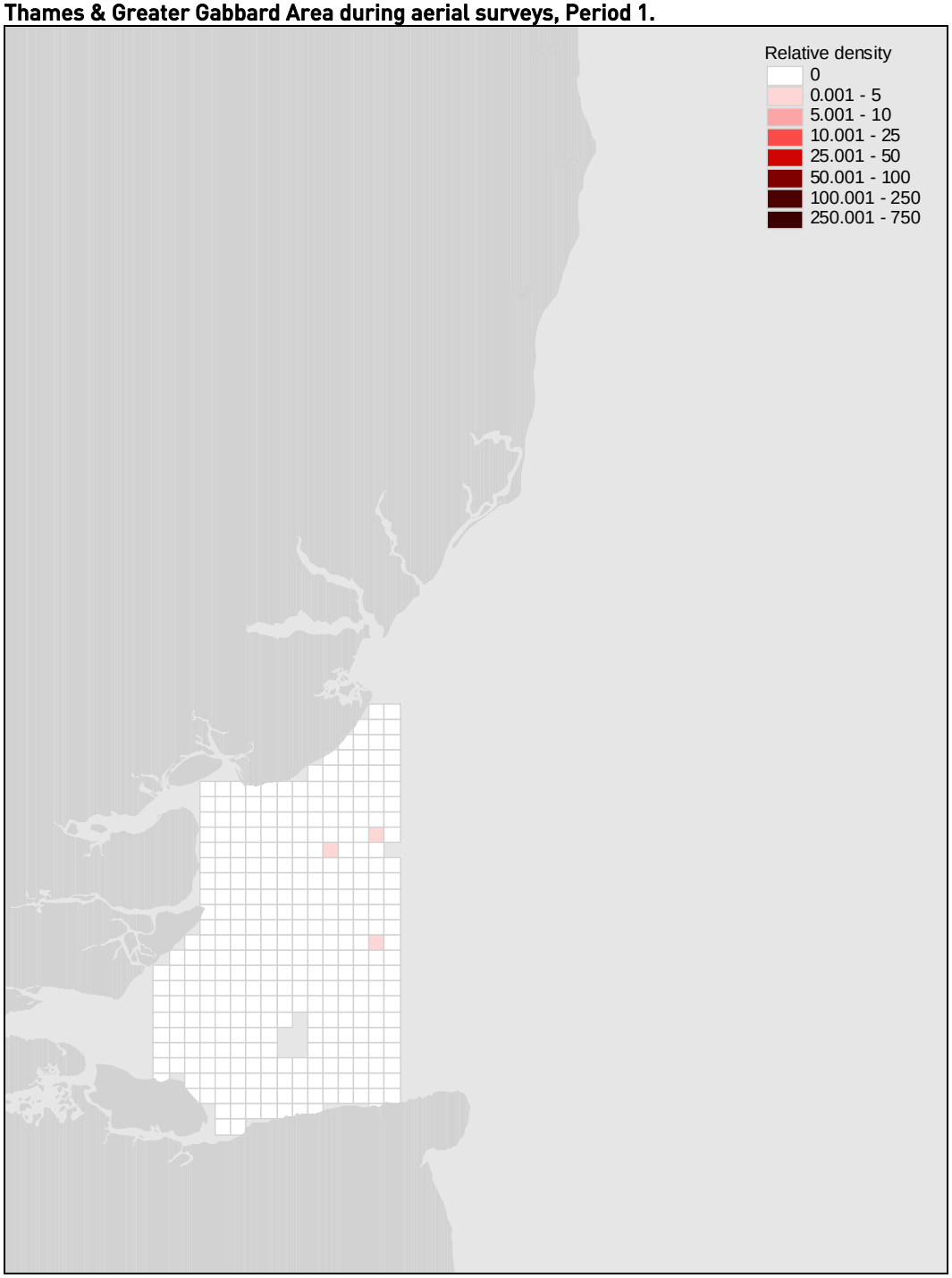


**Figure 157 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 2.**

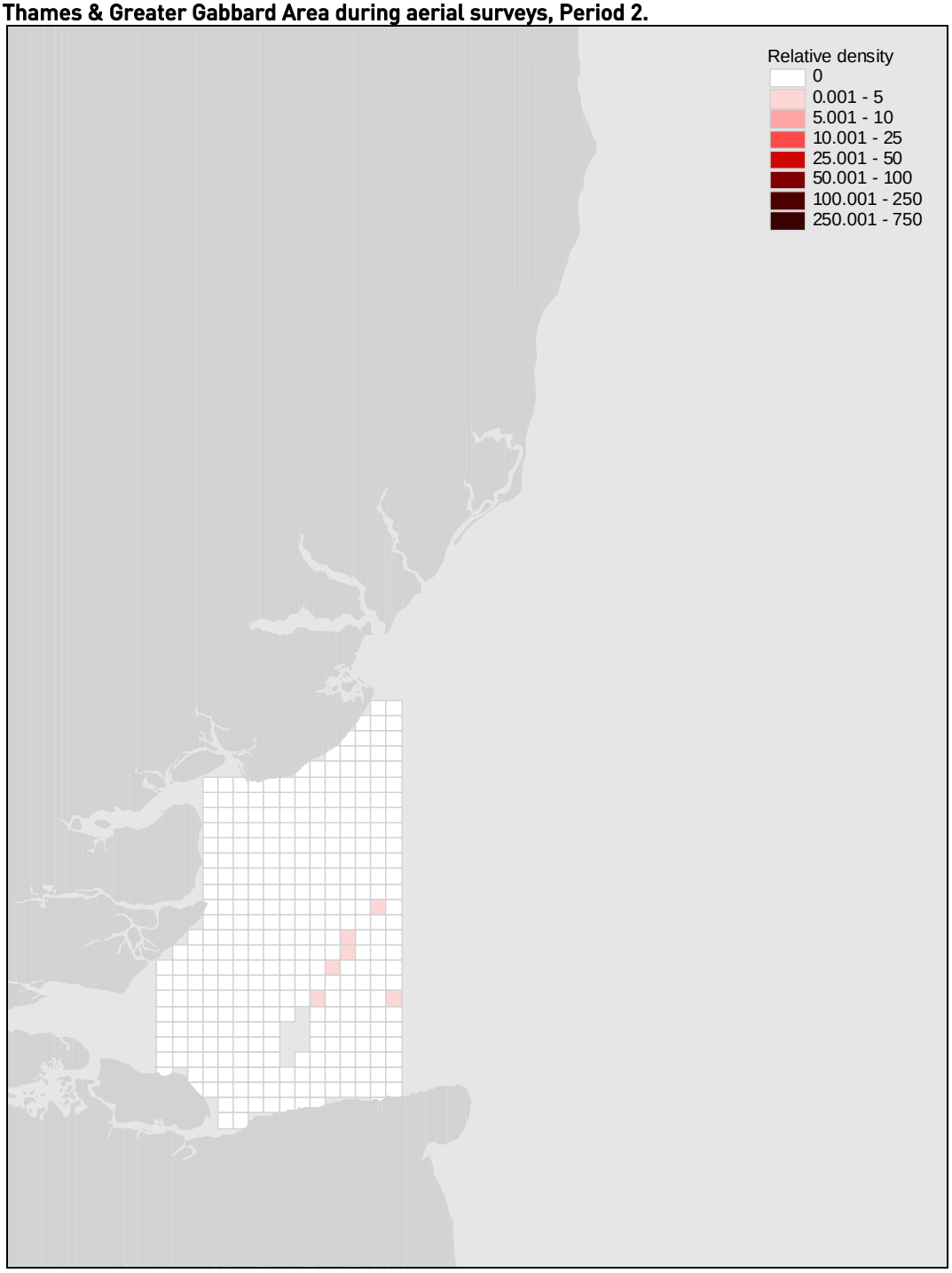


**Figure 158 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 3.**

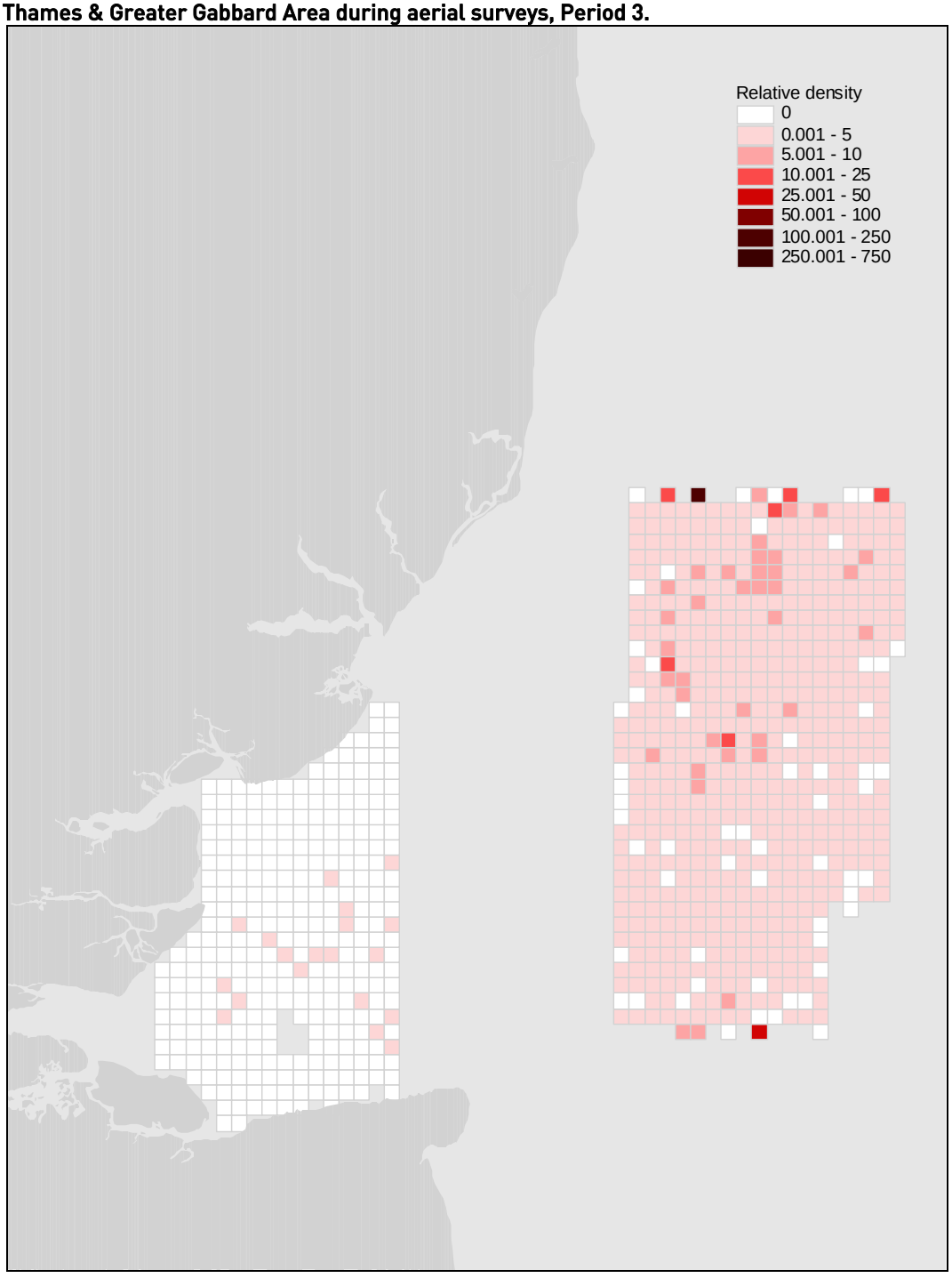


**Figure 159 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Thames & Greater Gabbard Area during aerial surveys, Period 4.**

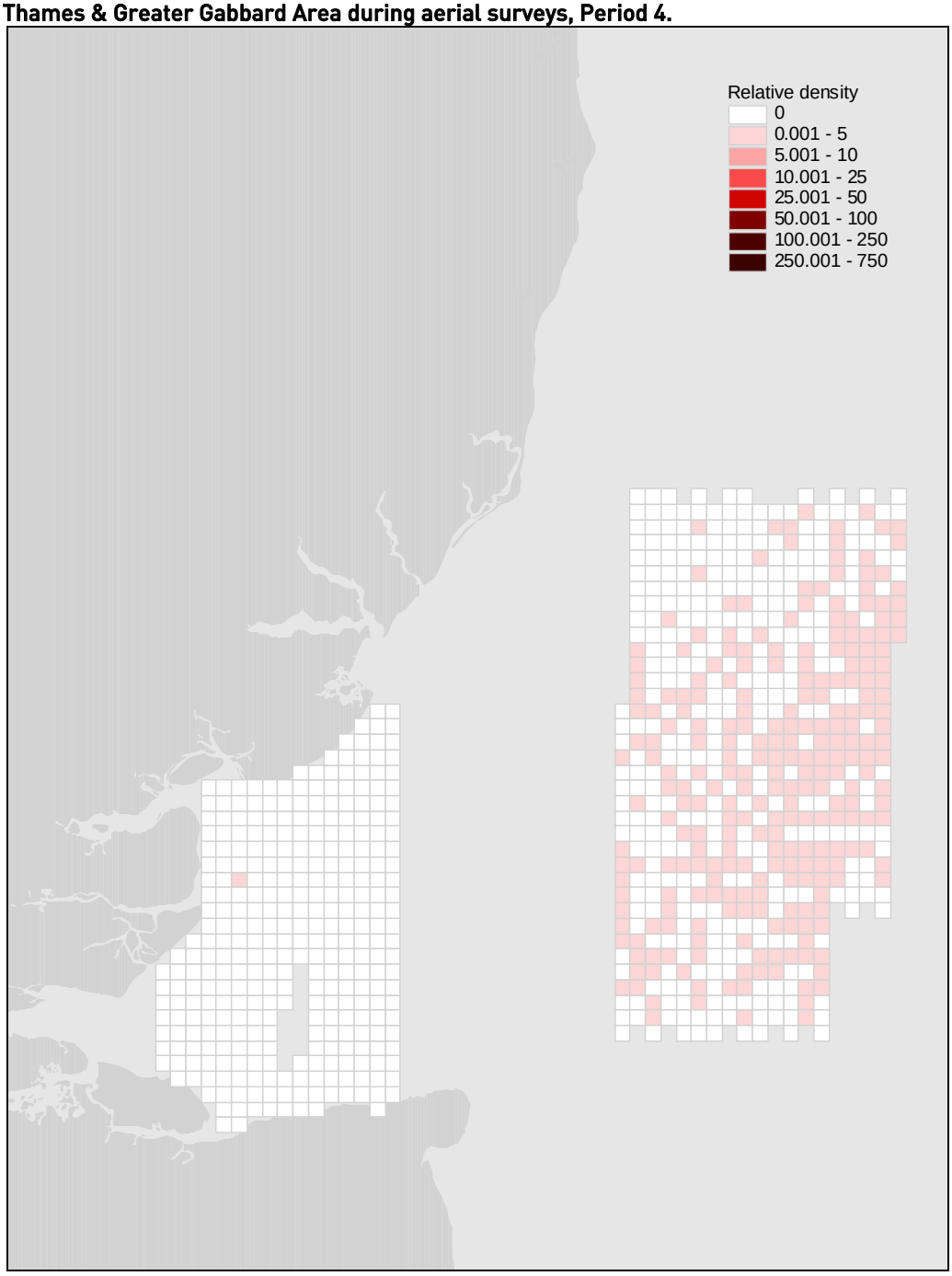


**Figure 160 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 1.**

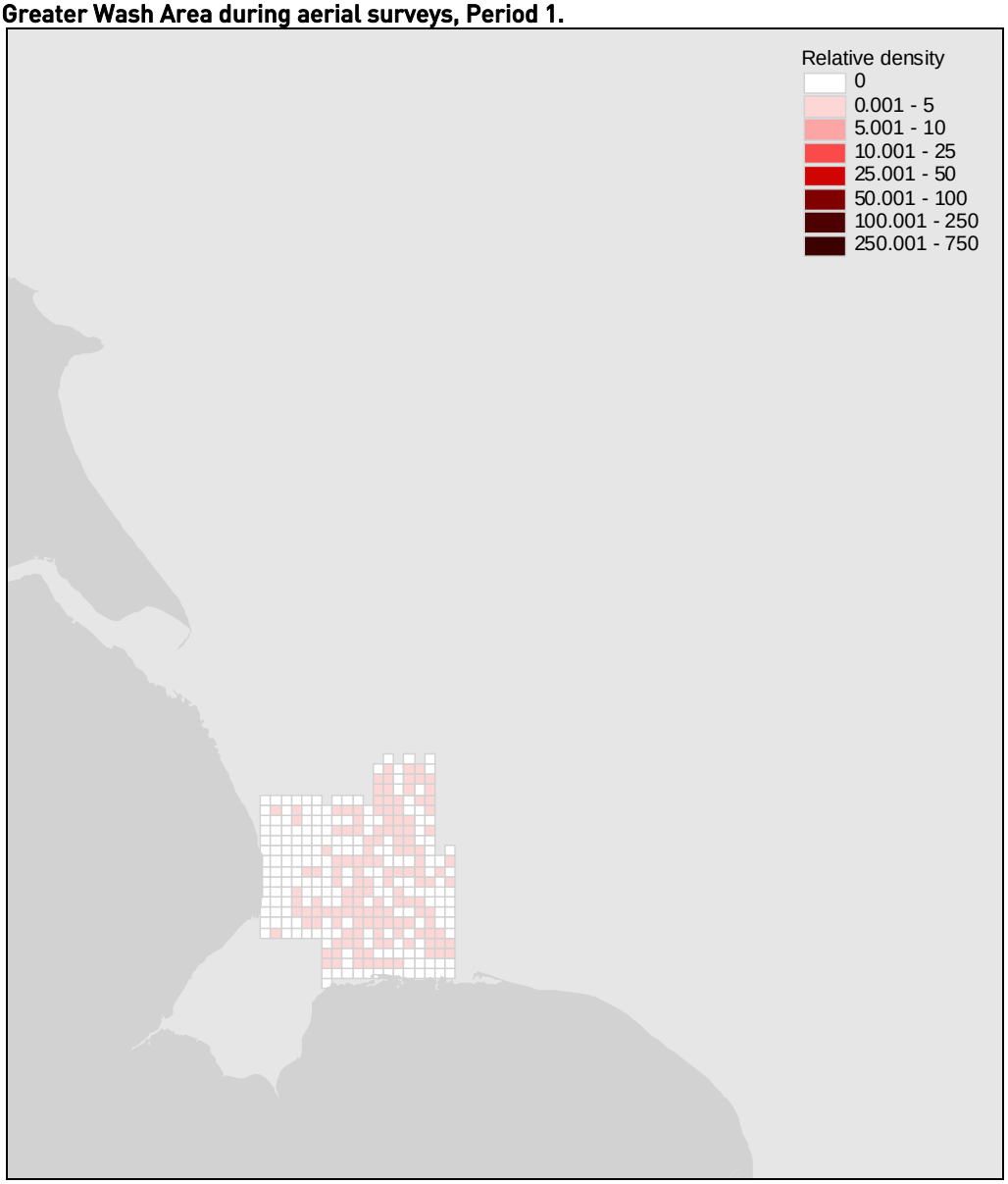


**Figure 161 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 2.**

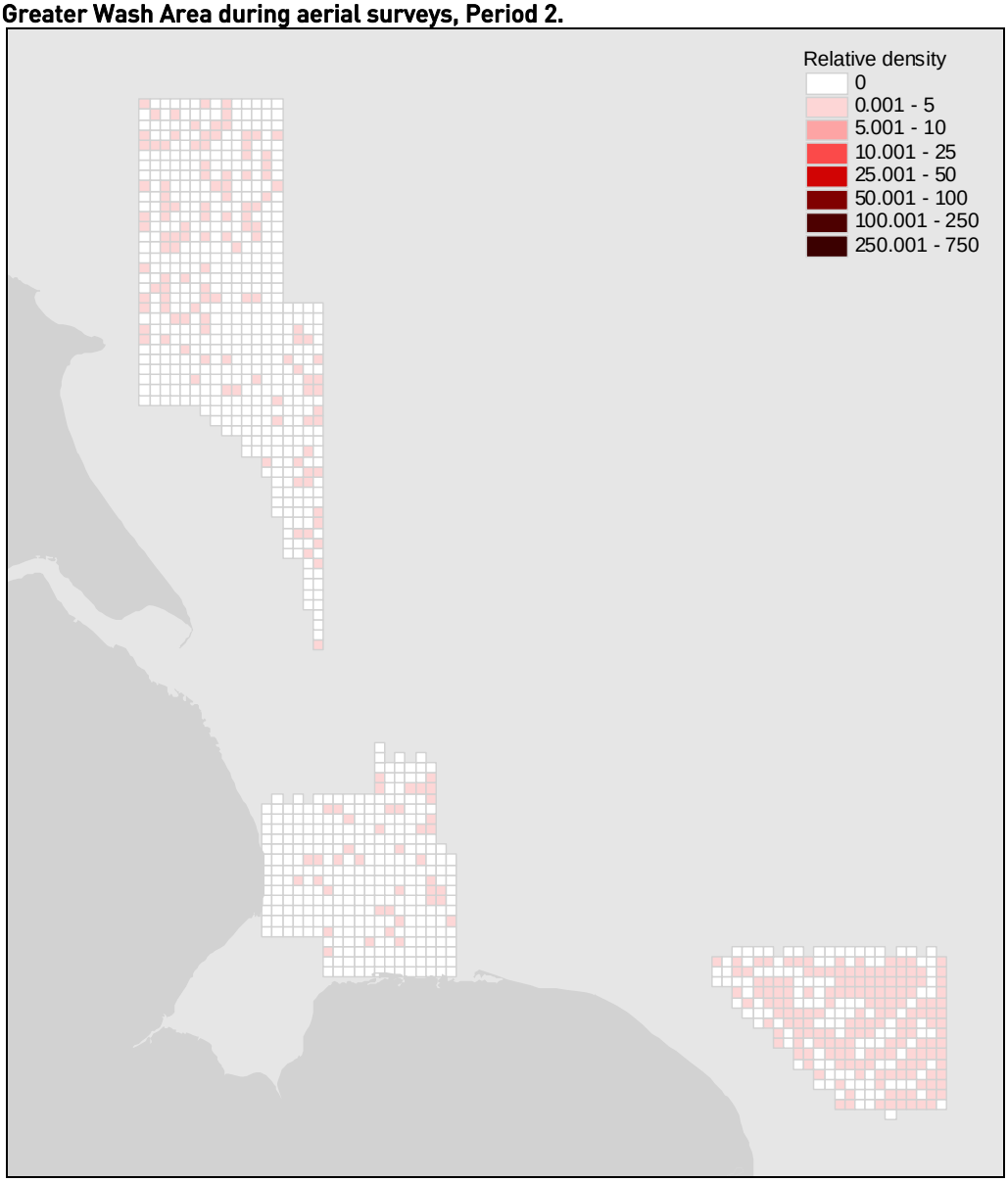


**Figure 162 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 3.**

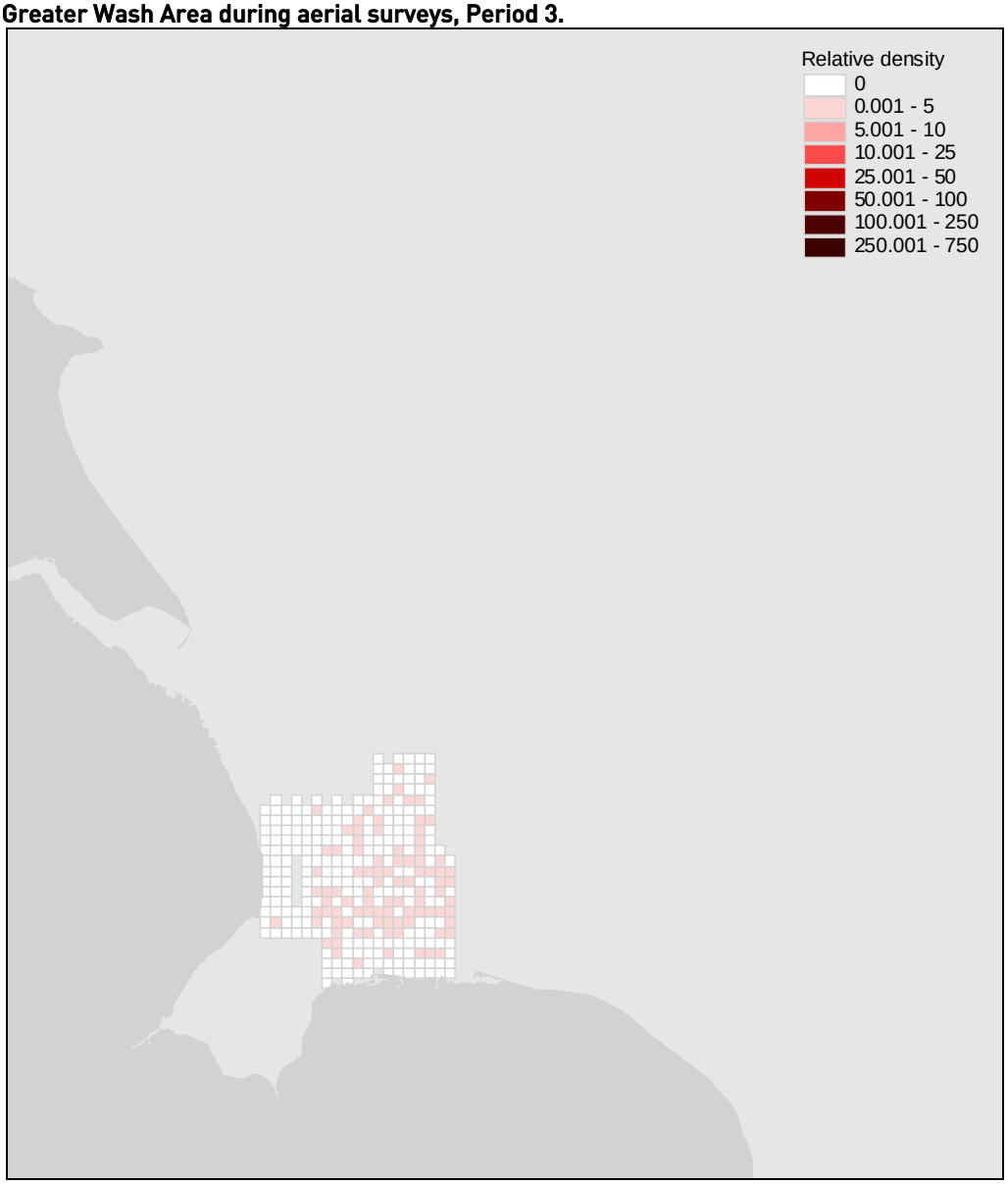


**Figure 163 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 4.**

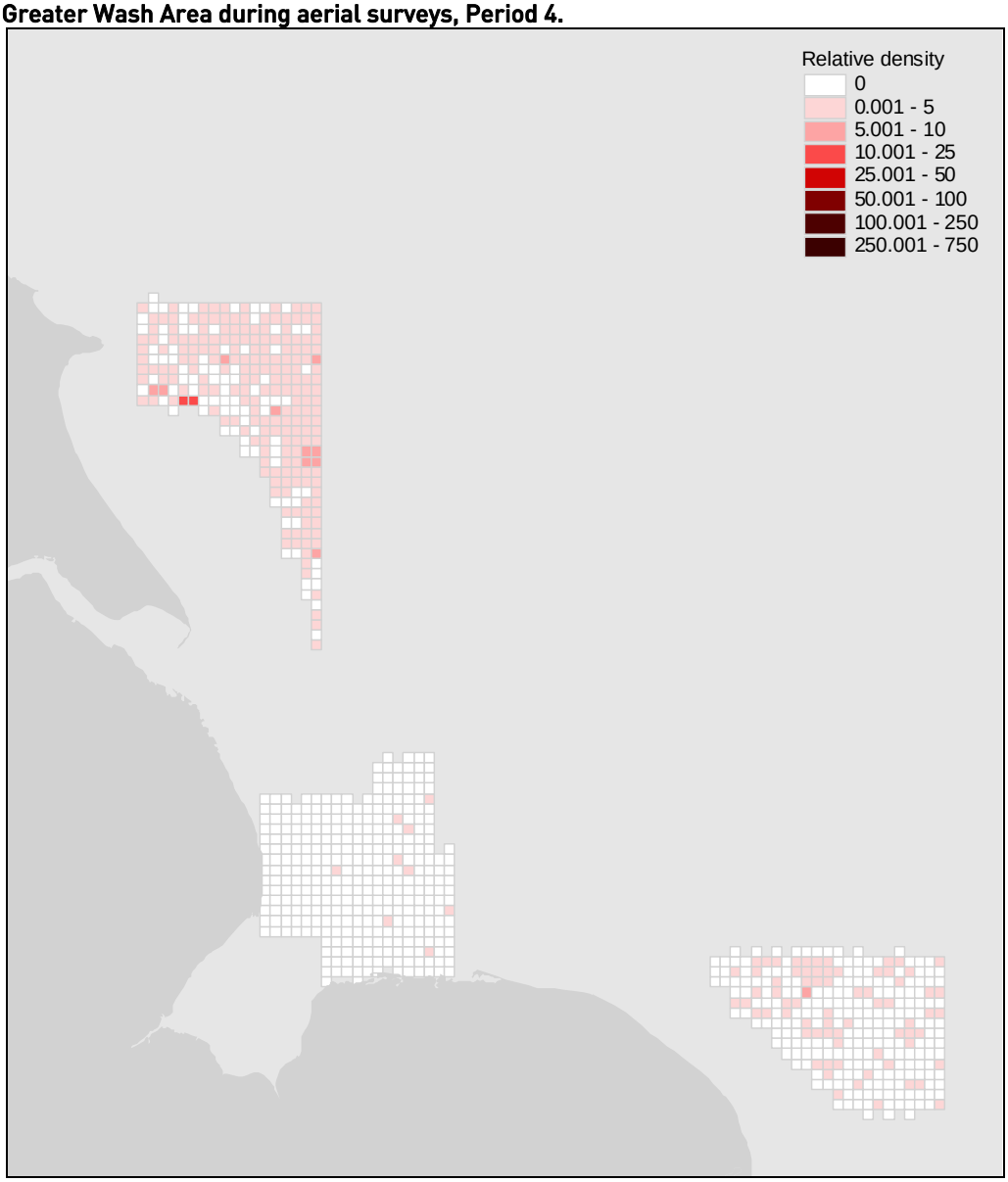


**Figure 164 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 5.**

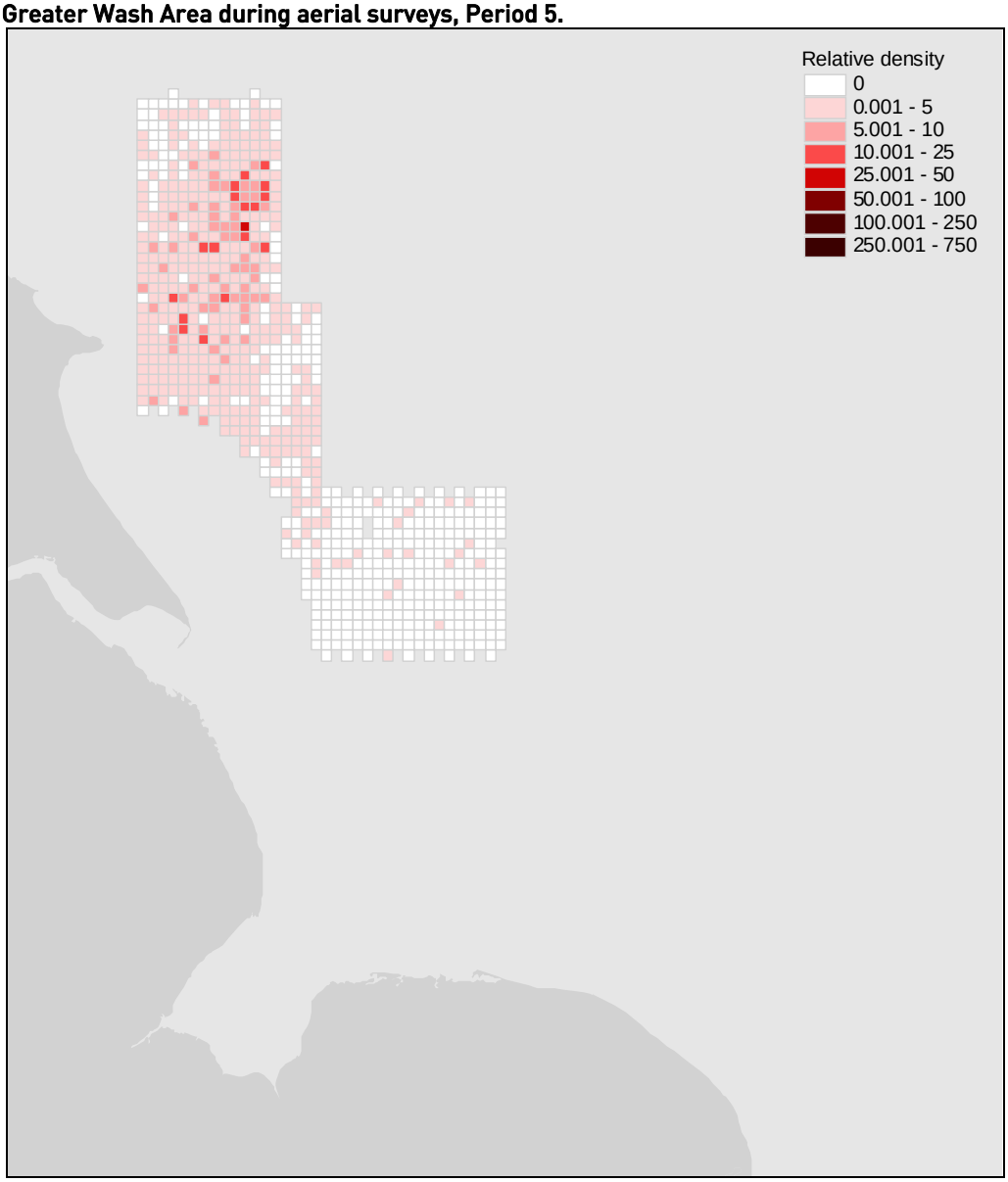


**Figure 165 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the Greater Wash Area during aerial surveys, Period 6.**

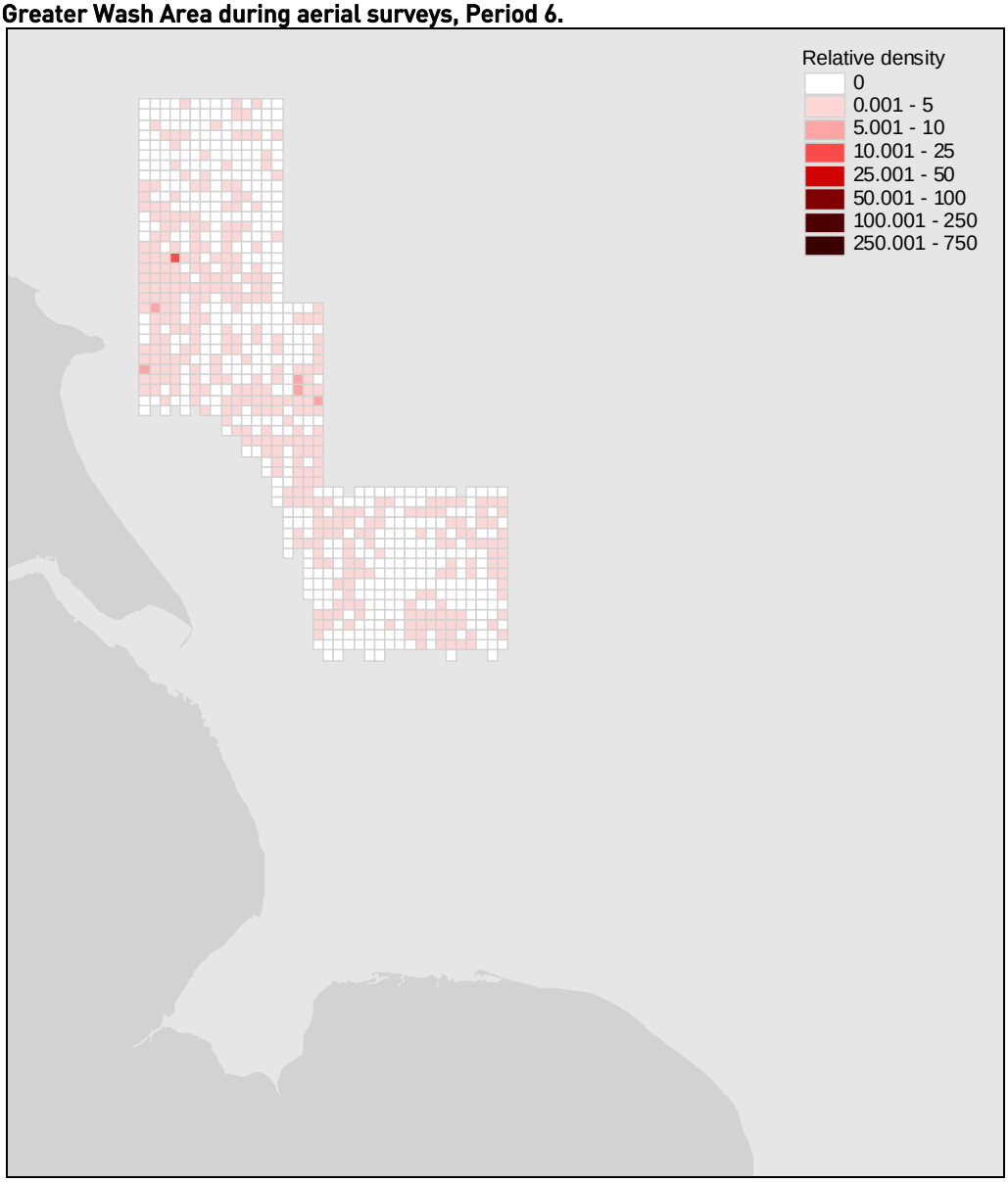


**Figure 166 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North East Area during aerial surveys, Period 2.**

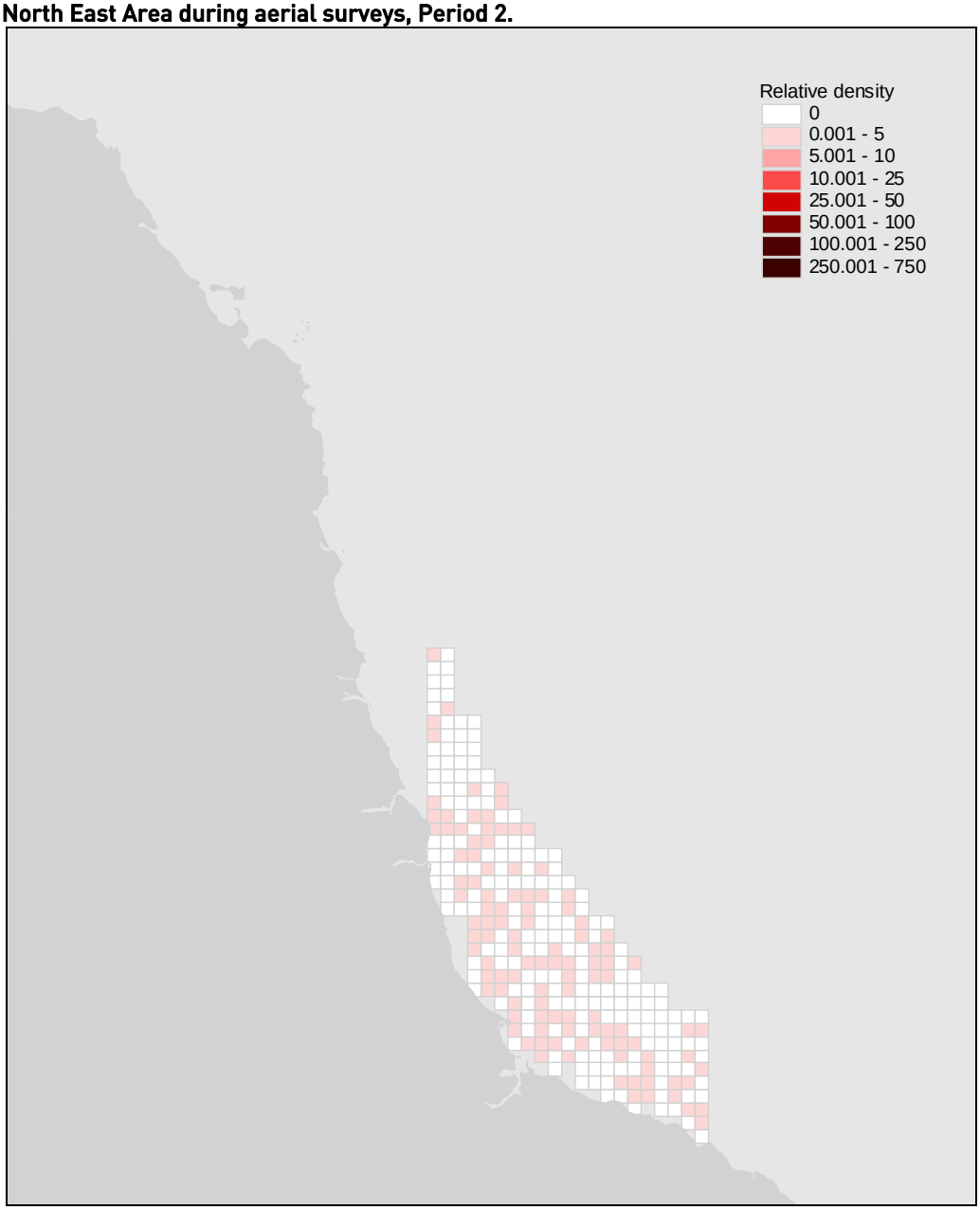


**Figure 167 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North East Area during aerial surveys, Period 4.**

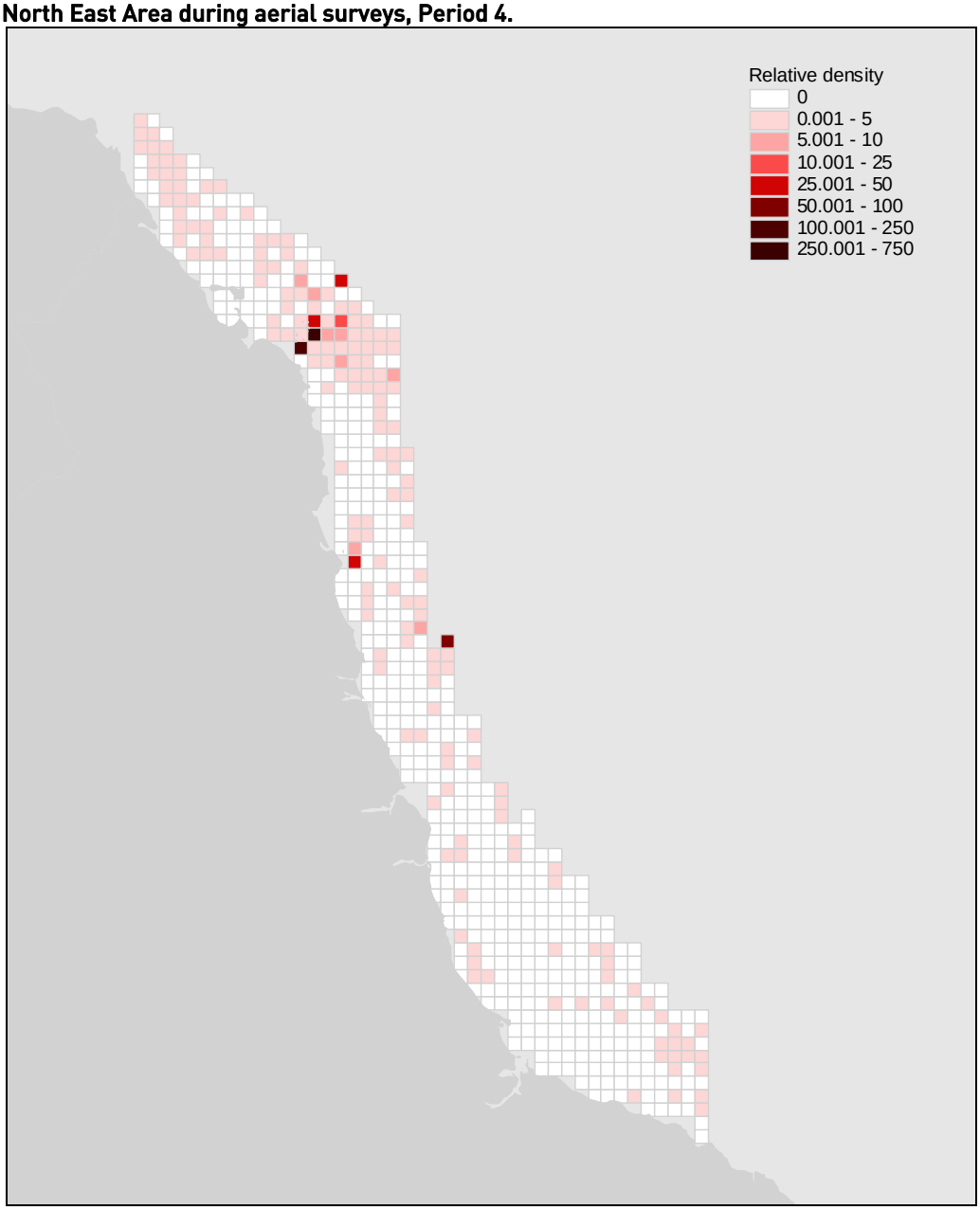
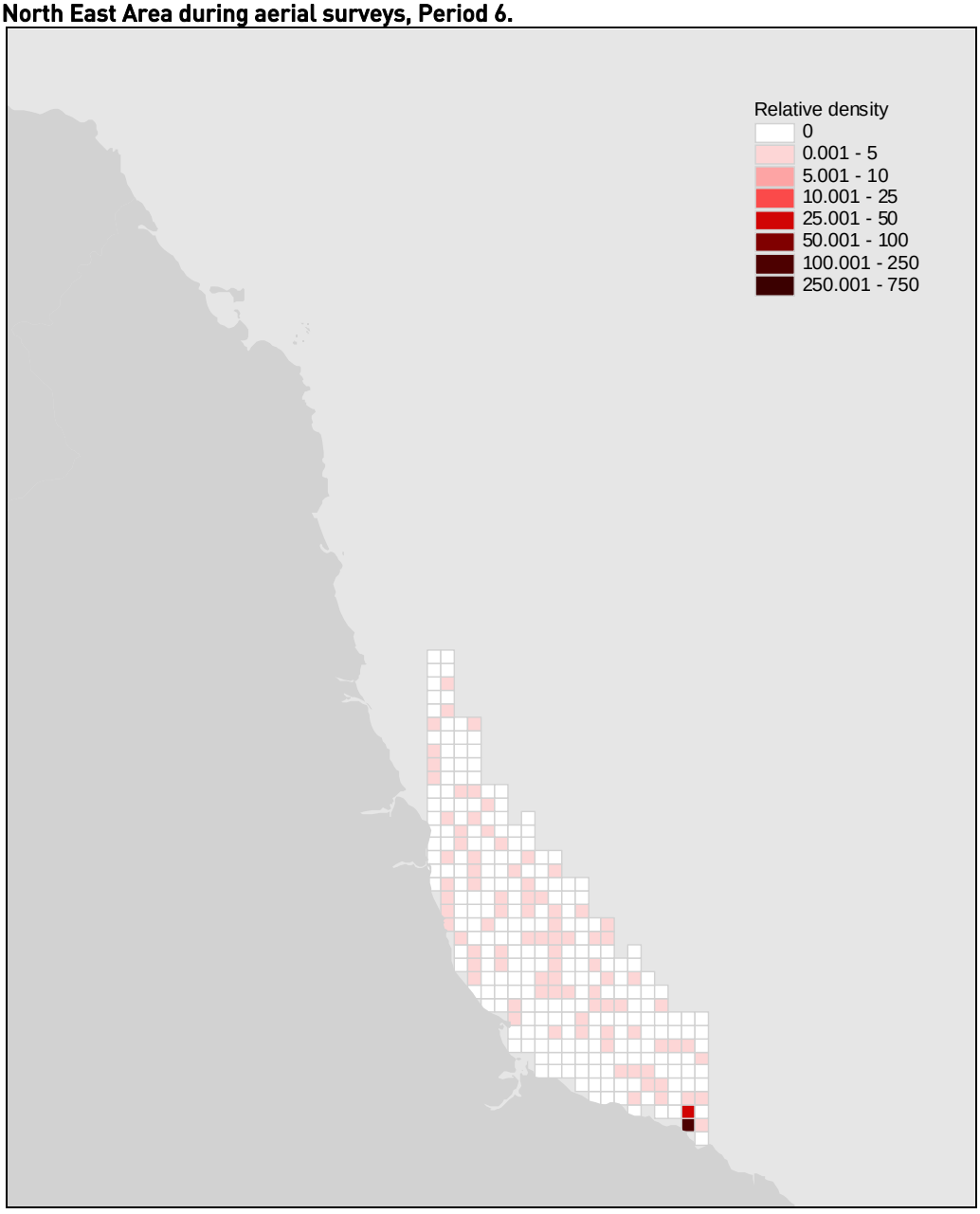


**Figure 168 - Relative density of auks *Uria, Alca, Fratercula, Cepphus* and *Alle* spp. recorded in the North East Area during aerial surveys, Period 6.**



# 9. TABLES

The dates that surveys were made are shown in Tables 1-9.

Tables 10-56, 58, 60 and 62 present total numbers of birds counted. These are not absolute numbers of birds in the survey area, which need to be calculated using 'Distance', to allow for the numbers of birds in the survey area missed with increasing distance from the aircraft.

Estimated numbers of Common Scoters, divers, Manx Shearwaters and auks, calculated using 'Distance' are presented in Tables 57, 59, 61 and 63 respectively. Estimates for survey blocks holding significant numbers of each species are also given. Areas with insufficient data to allow estimates to be calculated were excluded.

**Table 1 – Survey Periods used for aerial surveys, 2005/06-2008.**

| Period | Description | 2004/05 | 2005/06 | 2007 | 2007/08 |
|---|---|---|---|---|---|
| 1 | Early winter | 23 Oct - 21 Nov | 17 Oct - 20 Nov | - | 25 Oct - 24 Nov |
| 2 | Mid winter (1) | 22 Nov - 31 Dec | 21 Nov - 31 Dec | - | 24 Nov - 30 Dec |
| 3 | Mid winter (2) | 1 Jan - 9 Feb | 1 Jan - 12 Feb | 16 Jan - 17 Feb | 6 Jan - 19 Feb |
| 4 | Late winter | 10 Feb - 11 Mar | 13 Feb - 12 Mar | 18 Feb - 8 Mar | 27 Feb - 31 Mar |
| 5 | Breeding: incubation | 9 May - 5 Jun | 8 May - 4 Jun | - | 9 May - 4 Jun |
| 6 | Breeding: chick rearing | 6 Jun - 10 Jul | 5 Jun - 9 Jul | - | 5 May - 11 Jul |
| 7 | Post fledging/moult | 11 Jul - 21 Aug | 10 Jul - 20 Aug | - | 11Jul - 22 Aug |

**Table 2 – Dates of survey flights in the North West Area, Periods 1-7.**

| North West | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NW3 | 30-Oct | - | - | 28-Feb | - | - | - |
| NW5 | - | - | 15-Feb | - | - | - | - |
| NW7 | - | - | - | 18-Mar | - | 3-Jul | - |
| NW8 | - | - | - | 18-Mar | - | 7-Jul | - |
| NW9 | - | 17-Dec | - | 17-Mar | 30-May | - | - |
| NW10 | - | - | 19-Feb | 25-Mar | - | - | 4-Aug |
| NW11 | - | 27-Nov | 13-Feb | - | - | 9-Jul | - |
| NW12 | - | - | 19-Jan | - | 31-May | - | - |
| NW13 | - | - | - | 26-Mar | 15-May | - | - |
| NW14 | - | 21-Dec | - | 15-Mar | 16-May | - | - |
| NW15 | - | - | - | 18-Mar | - | 4-Jul | - |
| NW16 | - | - | - | - | - | 4-Jul | - |

**Table 3 – Dates of survey flights in the West Wales Area, Periods 1-7.**

| West Wales | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| WW2 | - | 17-Dec | 16-Feb | - | 11-May | - | 22-Aug |
| WW3 | - | 18-Dec | - | 26-Mar | 18-May | - | 27-Jul |
| WW4 | - | 16-Dec | - | 15-Mar | 1-Jun | - | - |
| WW5 | - | 19-Dec | 12-Jan | - | 17-May | - | 25-Jul |
| WW6 | - | 27-Nov | 11-Feb | - | 23-May | - | 24-Jul |
| WW7 | 23-Nov | - | 28-Jan | - | 29-May | 24-Jun | - |
| WW8 | - | 15-Dec | 12-Jan | - | 31-May | - | 8-Aug |

**Table 4 – Dates of survey flights in the South West Area, Periods 1-7.**

| South West | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| SW101 | - | - | - | - | - | 1-Jul | - |
| SW102 | 4-Nov | - | - | - | - | 6-Jul | - |
| SW103 | 5-Nov | - | - | - | - | 6-Jul | - |
| SW104 | 6-Nov | - | - | - | - | 21-Jun | - |
| SW105 | 7-Nov | - | - | - | - | 20-Jun | - |
| SW106 | 1-Nov | - | - | - | - | 20-Jun | 11-Jul |
| SW107 | 6-Nov | - | - | - | - | 5-Jun | 7-Aug |
| SW108 | 7-Nov | - | - | - | 12-May | - | 8-Aug |
| SW109 | 26-Oct | - | - | - | - | 1-Jul | 22-Jul |
| SW110 | 25-Oct | - | - | - | - | 23-Jun | 21-Aug |
| SW111 | 20-Nov | - | - | - | - | - | 23-Jul |
| SW112 | - | - | - | - | - | - | 2-Jul |
| SW113 | - | - | - | - | - | - | 21-Aug |
| SW114 | 12-Nov | - | - | - | - | - | 22-Jul |
| SW115 | 21-Nov | - | - | - | - | - | 16-Jul |
| SW116 | - | - | - | - | - | - | 22-Aug |
| SW117 | - | - | - | - | - | - | 21-Jul |
| SW118 | 10-Nov | - | - | - | - | - | 27-Jul |
| SW119 | 10-Nov | - | - | - | - | - | 13-Jul & 17-Aug |
| SW120 | 14-Nov | - | - | - | - | 30-Jun | - |
| SW121 | 5-Nov | - | - | - | - | 7-Jun | - |
| SW122 | 17-Nov | - | - | - | - | 8-Jun | - |
| SW123 | - | - | - | - | - | 8-Jun | - |
| SW124 | - | - | 6-Jan | - | - | - | - |
| SW125 | - | 13-Dec | 24-Jan | - | - | 9-Jun | - |

**Table 5 – Dates of survey flights in the South East Area, Periods 1-7.**

| South East | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| SE1 | - | 24-Nov | 9-Feb | - | 10-May | - | - |
| SE2 | - | 25-Nov | 9-Feb | - | 10-May | - | - |
| SE3 | - | 25-Nov | - | - | 11-May | - | 26-Jul & 22-Aug |
| SE4 | - | 11-Dec | 29-Jan | - | 9-May | 11-Jun | 25-Jul |
| SE5 | - | 12-Dec | 8-Feb | - | 04-Jun | 30-Jun | 30-Jul |
| SE6 | - | 12-Dec | 8-Feb | - | 21-May | 6-Jun | 30-Jul |
| SE7 | - | 13-Dec | - | 27-Feb | 2-Jun | 17-Jun | 31-Jul |

**Table 6 – Dates of survey flights in the Thames Area, Periods 1-7.**

| Thames | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| TH1 | 24-Nov | 30-Dec | 2-Feb | 9-Mar | - | - | - |

**Table 7 – Dates of survey flights in the Greater Gabbard Area, Periods 1-7.**

| Greater Gabbard | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| GG1 | - | - | 17-Feb | - | - | - | - |
| GG2 | - | - | 18-Feb | - | - | - | - |
| GG3 | - | - | - | 14-Mar | - | - | - |
| GG4 | - | - | - | 14-Mar | - | - | - |

**Table 8 – Dates of survey flights in the Greater Wash Area, Periods 1-7.**

| Greater Wash | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| GW4 | 15-Nov | 4-Dec | 16-Feb | 30-Mar | - | - | - |
| GW8 | - | 11-Dec | - | - | 20-May | 2-Jul | - |
| GW9 | - | 30-Dec | - | 31-Mar | 22-May | 3-Jul | - |
| GW10 | - | - | - | - | 23-May | 2-Jul | - |
| GW16 | - | 14-Dec | - | 28-Feb | - | - | - |

**Table 9 – Dates of survey flights in the North East Area, Periods 1-7.**

| North East | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NE1 | - | - | - | 27-Mar | - | - | - |
| NE2 | - | 9-Dec | - | 31-Mar | - | 27-Jun | - |

**Table 10 – Total numbers of all species recorded in the North West Area, Periods 1-7.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| Scaup | | | | | 1 | | |
| Eider | | 1 | 9 | 11 | 1 | | |
| Common Scoter | | 53 | 6837 | 229 | 2015 | 1 | |
| Velvet Scoter | | | 4 | | | | |
| Red-breasted Merganser | | | 5 | 2 | 1 | | |
| Red-throated Diver | | 3 | 10 | 8 | 5 | | |
| duck spp. | | | 1 | 10 | | | |
| Great Northern Diver | | | 1 | 4 | 24 | | |
| diver spp. | 3 | 22 | 29 | 35 | 4 | | |
| Great Crested Grebe | | | 1 | | | | |
| Fulmar | 1 | 22 | 54 | 227 | 18 | 21 | 16 |
| Manx Shearwater | | 5 | | 1 | 573 | 4895 | 454 |
| shearwater spp. | | | | | 1 | 67 | 6 |
| British Storm-petrel | | | | | | 1 | 6 |
| Unidentified storm-petrel | | | | | | 1 | |
| Gannet | 1 | 1 | 6 | 112 | 481 | 586 | 58 |
| Cormorant | | 1 | 7 | 2 | 8 | 7 | |
| Shag | | 19 | 9 | 12 | 12 | 8 | |
| Cormorant/Shag | | 10 | 24 | 9 | 8 | 10 | |
| Peregrine | | 1 | | | | | |
| Oystercatcher | | | 2 | | | 2 | 1 |
| small wader spp. | | | 1 | | 2 | | |
| Great Skua | | | | | | | 1 |
| skua spp. | | | | | 1 | | |
| Kittiwake | 84 | 346 | 142 | 424 | 201 | 1035 | 206 |
| Black-headed Gull | | 2 | 6 | 7 | | | |
| Little Gull | 9 | | | | | | |
| Common Gull | 1 | 11 | 57 | 23 | 2 | 5 | 2 |
| Lesser Black-backed Gull | 2 | 2 | 2 | 54 | 1 | 5 | 2 |
| Herring Gull | 12 | 66 | 61 | 122 | 21 | 15 | 21 |
| Great Black-backed Gull | 12 | 7 | 8 | 9 | 8 | 6 | |
| grey gull spp (Herring or Common) | 18 | 55 | 91 | 271 | 12 | 3 | 8 |
| black-backed gull spp. | 13 | 3 | 29 | 46 | 8 | 2 | 1 |
| large gull spp. | 4 | 1 | 85 | 86 | 19 | 2 | 29 |
| small gull spp. | 5 | 8 | 75 | 186 | 12 | 12 | 78 |
| gull spp. | 9 | 40 | 232 | 1665 | 208 | 63 | 158 |
| Little Tern | | | | | | 6 | |

**Table 10 continued.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| Sandwich Tern | | | | | 8 | 33 | 1 |
| Arctic/Common Tern | | | | 4 | 8 | 342 | 24 |
| tern spp. | | | | 1 | 16 | 126 | 12 |
| Guillemot | | 1 | | 6 | 15 | 23 | |
| Razorbill | | | | 1 | 17 | 5 | |
| Black Guillemot | | | | | 4 | 2 | |
| Puffin | | | | | | 2 | |
| auk spp. | 1488 | 1591 | 2054 | 2691 | 1533 | 1884 | 985 |
| passerine spp. | | | 1 | | 6 | | |

**Table 11 – Total numbers of all species recorded in the West Wales Area, Periods 1-7.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| Eider | | 2 | | | | | |
| Common Scoter | 1 | 1703 | 2255 | 3 | 246 | 25 | 25 |
| Red-breasted Merganser | | 8 | | | | | |
| Red-throated Diver | 1 | 23 | 124 | 3 | | | |
| duck spp. | | 6 | 72 | | | | |
| Great Northern Diver | | | 2 | | | | |
| diver spp. | 15 | 38 | 127 | 3 | 2 | | |
| Great Crested Grebe | | | 5 | | | | |
| grebe spp. | | | 2 | | | 3 | |
| Fulmar | | 19 | 47 | 10 | 39 | 2 | 34 |
| Manx Shearwater | | | | 48 | 8070 | 2723 | 7049 |
| shearwater spp. | | | | 57 | 108 | 3 | 14 |
| British Storm-petrel | | | | | 1 | 2 | 10 |
| Unidentified storm-petrel | | | | | | 1 | |
| Gannet | | 4 | 25 | | 289 | 122 | 789 |
| Cormorant | 1 | 31 | 3 | | 20 | 1 | 5 |
| Shag | | 76 | 74 | 5 | 5 | 15 | 11 |
| Cormorant/Shag | 1 | 28 | 17 | 1 | 24 | 10 | 13 |
| Oystercatcher | | 20 | | | | | |
| Curlew | | 3 | | | | | |
| small wader spp. | | 2 | | | | | 4 |
| Arctic Skua | | | | | 2 | | |
| Great Skua | | | | | 1 | | |
| Kittiwake | 55 | 696 | 54 | 117 | 516 | 117 | 854 |
| Black-headed Gull | 28 | 13 | 19 | 1 | 1 | | |
| Little Gull | | 3 | 5 | | | | |
| Common Gull | 46 | 68 | 50 | 2 | | | 2 |
| Lesser Black-backed Gull | 2 | 1 | 3 | 4 | 16 | 1 | 48 |
| Herring Gull | 45 | 54 | 25 | | 38 | 6 | 49 |
| Great Black-backed Gull | 3 | 5 | 5 | 3 | 1 | 6 | 7 |
| Grey gull spp (Herring or Common) | 110 | 430 | 188 | 7 | 10 | 2 | 8 |
| black-backed gull spp. | 10 | 11 | 26 | 4 | 22 | 7 | 20 |
| large gull spp. | 2 | 62 | 55 | 12 | 90 | | 91 |
| small gull spp. | 27 | 118 | 167 | 107 | 25 | 4 | 15 |
| Gull spp. | 254 | 1060 | 627 | 25 | 455 | 15 | 333 |

**Table 11 continued.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| Little Tern | | | | | 2 | | |
| Sandwich Tern | | | | | 5 | 4 | |
| Arctic/Common Tern | | | | | 236 | 59 | 56 |
| Tern spp. | | 1 | | 2 | 499 | 21 | 80 |
| Guillemot | | | 1 | 5 | 12 | 8 | 3 |
| Razorbill | | | 2 | 6 | 4 | 3 | 3 |
| Black Guillemot | | | | | | 1 | |
| Puffin | | 1 | 1 | | 1 | | |
| Auk spp. | 671 | 1851 | 1189 | 635 | 3261 | 780 | 13444 |
| Feral Pigeon | | | | | 3 | | |
| Carrion Crow | | | | | 1 | | |
| passerine spp. | | 2 | | | 1 | | |

**Table 12 – Total numbers of all species recorded in the South West Area, Periods 1-3 & 5-7.**

| Species | Period 1 | Period 2 | Period 3 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|
| Shelduck | 71 | | | | 156 | |
| Common Scoter | 2356 | | | | 891 | |
| duck spp. | | | | | 1 | |
| Black-throated Diver | | | 3 | | | |
| Great Northern Diver | 1 | | | | | |
| diver spp. | 16 | | 3 | | | |
| Fulmar | 354 | | 5 | 3 | 154 | 284 |
| Manx Shearwater | 2 | | | 934 | 4409 | 4791 |
| shearwater spp. | | | | | 43 | 8 |
| British Storm-petrel | 2 | | | | 27 | 38 |
| Unidentified storm-petrel | | | | | 4 | 1 |
| Gannet | 1132 | | 156 | 49 | 3628 | 3955 |
| Cormorant | 9 | | | | 10 | 8 |
| Shag | 78 | 1 | 1 | 1 | 34 | 105 |
| Cormorant/Shag | 11 | | 3 | 4 | 15 | 36 |
| Little Egret | | | | | 3 | |
| Oystercatcher | | | | | | 1 |
| Curlew | | | | | 25 | |
| large wader spp. | | | | | 1 | |
| medium wader spp. | | | | | 10 | |
| small wader spp. | | | | | 1 | 6 |
| Arctic Skua | 1 | | | | | |
| Great Skua | 19 | | | | 1 | 9 |
| skua spp. | 1 | | | | 1 | |
| Kittiwake | 2181 | 7 | 105 | 6 | 681 | 150 |
| Black-headed Gull | 29 | | | | 8 | 1 |
| Common Gull | 68 | 5 | 9 | | 8 | 5 |
| Lesser Black-backed Gull | 32 | | 2 | | 100 | 32 |
| Herring Gull | 485 | 4 | 14 | 8 | 874 | 326 |
| Great Black-backed Gull | 38 | 1 | 17 | | 57 | 158 |
| grey gull spp (Herring or Common) | 1985 | 4 | 17 | 10 | 527 | 230 |
| black-backed gull spp. | 337 | 6 | 15 | | 138 | 298 |
| large gull spp. | 367 | 18 | 21 | 7 | 184 | 391 |
| small gull spp. | 119 | 3 | 6 | 1 | 82 | 102 |
| gull spp. | 2013 | 4 | 265 | 80 | 2489 | 2461 |
| Sandwich Tern | | | | 1 | 14 | 12 |
| Arctic/Common Tern | | | | 5 | 34 | 14 |

**Table 12 continued.**

| Species | Period 1 | Period 2 | Period 3 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|
| tern spp. | | | | 1 | 21 | 46 |
| Guillemot | | | 2 | 8 | 32 | 2 |
| Razorbill | | | 2 | 1 | 13 | 2 |
| Puffin | | | | | 44 | |
| auk spp. | 13192 | 255 | 1219 | 79 | 1777 | 204 |
| Feral Pigeon | | | | | 7 | |
| Swift | | | | | | 1 |
| Swallow | | | | 1 | | |
| Carrion Crow | | | | | 2 | 1 |
| passerine spp. | 81 | | | | | 3 |

**Table 13 – Total numbers of all species recorded in the South East Area, Periods 2-7.**

| Species | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|
| Brent Goose | 15 | 20 | | | | |
| Common Scoter | 217 | 280 | | 98 | | 20 |
| Red-breasted Merganser | 17 | | 1 | | | |
| Red-throated Diver | 8 | 8 | 4 | | | |
| duck spp. | | 2 | | | | |
| diver spp. | 109 | 28 | 8 | 2 | | |
| Great Crested Grebe | | | 5 | | | |
| grebe spp. | 3 | | | | | |
| Fulmar | 205 | 146 | 76 | 137 | 48 | 94 |
| Manx Shearwater | | | | | | 2 |
| British Storm-petrel | | | | | | 4 |
| Gannet | 1982 | 1559 | 683 | 400 | 375 | 791 |
| Cormorant | 12 | | | 1 | | 5 |
| Cormorant/Shag | 4 | 3 | 1 | 3 | 1 | 24 |
| wader spp. | 7 | | | | | |
| Arctic Skua | | | | 4 | | |
| Great Skua | 10 | 1 | 1 | 2 | 2 | 3 |
| skua spp. | 1 | | | 9 | | 4 |
| Kittiwake | 538 | 579 | 223 | 178 | 95 | 425 |
| Black-headed Gull | 1 | 2 | | 6 | 2 | |
| Common Gull | 76 | 130 | 3 | 6 | 19 | |
| Lesser Black-backed Gull | 20 | 29 | 5 | 11 | 5 | 7 |
| Herring Gull | 125 | 114 | 94 | 197 | 322 | 258 |
| Great Black-backed Gull | 97 | 96 | 10 | 8 | 5 | 15 |
| grey gull spp (Herring or Common) | 191 | 323 | 24 | 282 | 144 | 242 |
| black-backed gull spp. | 248 | 319 | 37 | 7 | 12 | 39 |
| large gull spp. | 435 | 670 | 41 | 70 | 78 | 73 |
| small gull spp. | 229 | 297 | 68 | 23 | 37 | 124 |
| gull spp. | 2896 | 5002 | 1390 | 1239 | 1447 | 708 |
| Little Tern | | | | 1 | 2 | 1 |
| Sandwich Tern | | | | 9 | 9 | 5 |
| Arctic/Common Tern | | | | 108 | 15 | 77 |
| tern spp. | | | | 52 | 14 | 17 |
| Guillemot | 2 | 2 | 1 | 3 | | |
| Razorbill | | 1 | | 1 | | |
| Puffin | | 1 | 1 | | | |
| auk spp. | 2921 | 5372 | 945 | 212 | 11 | 9 |

**Table 13 continued.**

| Species | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|
| Feral Pigeon | | | | 9 | | |
| Swallow | | | | 1 | | |
| passerine spp. | | | | | 1 | |

**Table 14 – Total numbers of all species recorded in the Thames & Greater Gabbard Area, Periods 1-4.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 |
|---|---|---|---|---|
| Brent Goose | 7 | 150 | 100 | |
| Shelduck | 2 | | 1 | |
| Eider | | 2 | | |
| Common Scoter | 906 | 681 | 78 | 14 |
| Red-breasted Merganser | | 10 | | |
| Red-throated Diver | 21 | 187 | 42 | 30 |
| duck spp. | | 68 | | |
| Great Northern Diver | 1 | 2 | | 3 |
| diver spp. | 19 | 446 | 355 | 218 |
| Great Crested Grebe | 1 | 9 | | |
| grebe spp. | 2 | 18 | 7 | 1 |
| Fulmar | | | 83 | 333 |
| shearwater spp. | | | | 1 |
| Gannet | | | 483 | 454 |
| Cormorant | 22 | 50 | 87 | 232 |
| Cormorant/Shag | 6 | 63 | 1 | |
| Oystercatcher | 4050 | 1343 | 409 | 400 |
| Golden Plover | | 300 | | |
| Lapwing | 2 | 1 | | |
| Dunlin | 880 | | | |
| Bar-tailed Godwit | 15 | | | |
| Redshank | 2 | | | |
| large wader spp. | | | 6 | |
| medium wader spp. | | 1 | 141 | 200 |
| small wader spp. | 12 | 888 | 1934 | |
| wader spp. | 80 | 250 | 511 | |
| Great Skua | | | 3 | |
| skua spp. | | 2 | | |
| Kittiwake | 68 | 46 | 251 | 311 |
| Black-headed Gull | 279 | 189 | 226 | 39 |
| Common Gull | 36 | 58 | 65 | 19 |
| Lesser Black-backed Gull | 3 | 17 | 30 | 18 |
| Herring Gull | 104 | 117 | 57 | 19 |
| Great Black-backed Gull | 11 | 55 | 28 | 7 |
| grey gull spp (Herring or Common) | 201 | 289 | 698 | 69 |
| black-backed gull spp. | 9 | 51 | 319 | 163 |
| large gull spp. | 25 | 27 | 554 | 240 |

**Table 14 continued.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 |
|---|---|---|---|---|
| small gull spp. | 1 | 472 | 248 | 123 |
| gull spp. | 402 | 1356 | 1960 | 617 |
| Guillemot | | | 2 | |
| Razorbill | | | | 1 |
| auk spp. | 3 | 7 | 4320 | 649 |
| passerine spp. | | | | 2 |

**Table 15 – Total numbers of all species recorded in the Greater Wash Area, Periods 1-6.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 |
|---|---|---|---|---|---|---|
| Eider | 18 | 2 | | 4 | | |
| Common Scoter | 15 | 2028 | 1000 | | | |
| Red-breasted Merganser | 2 | 7 | 6 | 3 | | |
| Red-throated Diver | 80 | 15 | 33 | 31 | 1 | |
| duck spp. | | | 6 | 2 | 2 | |
| diver spp. | 535 | 25 | 78 | 122 | | |
| Great Crested Grebe | | | 1 | | | |
| grebe spp. | | | 3 | | | |
| Fulmar | 15 | 264 | 8 | 85 | 143 | 154 |
| Manx Shearwater | | | | | 1 | 14 |
| British Storm-petrel | | | | | | 1 |
| Gannet | 2 | 19 | 2 | 420 | 481 | 1198 |
| Cormorant | 2 | 10 | | 1 | | |
| Shag | | | 1 | | | |
| medium wader spp. | 10 | | | | | |
| small wader spp. | 400 | | | 67 | | |
| Great Skua | 1 | | | | | 3 |
| skua spp. | | | | | 1 | 1 |
| Kittiwake | 47 | 136 | 15 | 322 | 2466 | 2945 |
| Black-headed Gull | | 5 | | 4 | | 1 |
| Little Gull | 168 | 15 | | 1 | | |
| Common Gull | 25 | 32 | 14 | 23 | | 1 |
| Lesser Black-backed Gull | 3 | | 1 | 6 | 4 | 4 |
| Herring Gull | 8 | 29 | 8 | 25 | 3 | 5 |
| Great Black-backed Gull | 2 | 25 | 1 | 4 | 3 | |
| grey gull spp (Herring or Common) | 30 | 212 | 1 | 41 | 5 | |
| black-backed gull spp. | 7 | 131 | 1 | 8 | 1 | 1 |
| large gull spp. | 4 | 36 | 7 | 223 | 4 | 6 |
| small gull spp. | 70 | 48 | 43 | 55 | 54 | 4 |
| gull spp. | 851 | 223 | 129 | 397 | 902 | 147 |
| Sandwich Tern | | | | 1 | 10 | 14 |
| Arctic/Common Tern | | | | | 55 | 1 |
| tern spp. | | | | 27 | 44 | 1 |
| Guillemot | | | | | 12 | 1 |
| Razorbill | | | | 3 | 4 | 1 |
| Little Auk | 1 | | | | | |
| auk spp. | 314 | 764 | 197 | 1517 | 4590 | 1307 |

**Table 15 continued.**

| Species | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 |
|---|---|---|---|---|---|---|
| Blackbird | | 1 | | | | |
| passerine spp. | 5 | 1 | | 7 | | |

**Table 16 – Total numbers of all species recorded in the North East Area, Periods 2, 4 & 6.**

| Species | Period 2 | Period 4 | Period 6 |
|---|---|---|---|
| goose spp. | | 9 | |
| Shelduck | | 2 | |
| Eider | | 190 | 1 |
| Common Scoter | | 35 | |
| duck spp. | | 15 | |
| diver spp. | 6 | 5 | |
| Fulmar | 6 | 57 | 16 |
| Gannet | 9 | 651 | 39 |
| Shag | | 33 | |
| Cormorant/Shag | | 11 | |
| Grey Heron | | 1 | |
| Oystercatcher | | 4 | |
| large wader spp. | | 10 | |
| small wader spp. | | 20 | |
| wader spp. | | 5 | |
| skua spp. | 1 | | |
| Kittiwake | 125 | 320 | 82 |
| Black-headed Gull | 2 | 21 | |
| Common Gull | 79 | 46 | 2 |
| Lesser Black-backed Gull | | 16 | 1 |
| Herring Gull | 40 | 55 | 48 |
| Great Black-backed Gull | 80 | 4 | |
| grey gull spp (Herring or Common) | 180 | 183 | 9 |
| black-backed gull spp. | 159 | 13 | 1 |
| large gull spp. | 206 | 136 | 12 |
| small gull spp. | 61 | 38 | 8 |
| gull spp. | 2162 | 1259 | 103 |
| Sandwich Tern | | | 2 |
| Arctic/Common Tern | | | 14 |
| tern spp. | | 4 | 28 |
| Guillemot | | 10 | 3 |
| Razorbill | | 2 | |
| Puffin | | | 1 |
| auk spp. | 190 | 4589 | 424 |

**Table 17 – Numbers of birds recorded in the North West Area survey blocks, Period 1.**

| Species | NW3 | Total |
|---|---|---|
| diver spp. | 3 | 3 |
| Fulmar | 1 | 1 |
| Gannet | 1 | 1 |
| Kittiwake | 84 | 84 |
| Little Gull | 9 | 9 |
| Common Gull | 1 | 1 |
| Lesser Black-backed Gull | 2 | 2 |
| Herring Gull | 12 | 12 |
| Great Black-backed Gull | 12 | 12 |
| grey gull spp (Herring or Common) | 18 | 18 |
| black-backed gull spp. | 13 | 13 |
| large gull spp. | 4 | 4 |
| small gull spp. | 5 | 5 |
| gull spp. | 9 | 9 |
| auk spp. | 1488 | 1488 |
| Total | 1662 | 1662 |

**Table 18 – Numbers of birds recorded in the North West Area survey blocks, Period 2.**

| Species | NW9 | NW11 | NW14 | Total |
|---|---|---|---|---|
| Eider | | | 1 | 1 |
| Common Scoter | | 5 | 48 | 53 |
| Red-throated Diver | | | 3 | 3 |
| diver spp. | | 7 | 15 | 22 |
| Fulmar | 4 | 2 | 16 | 22 |
| Manx Shearwater | | 5 | | 5 |
| Gannet | | 1 | | 1 |
| Cormorant | | 1 | | 1 |
| Shag | | 16 | 3 | 19 |
| Cormorant/Shag | | 9 | 1 | 10 |
| Peregrine | | 1 | | 1 |
| Kittiwake | 77 | 216 | 53 | 346 |
| Black-headed Gull | | 2 | | 2 |
| Common Gull | 6 | 3 | 2 | 11 |
| Lesser Black-backed Gull | 2 | | | 2 |
| Herring Gull | 2 | 61 | 3 | 66 |
| Great Black-backed Gull | 1 | 6 | | 7 |
| grey gull spp (Herring or Common) | 12 | 41 | 2 | 55 |
| black-backed gull spp. | 1 | 2 | | 3 |
| large gull spp. | | 1 | | 1 |
| small gull spp. | 4 | 2 | 2 | 8 |
| gull spp. | 8 | 8 | 24 | 40 |
| Guillemot | | | 1 | 1 |
| auk spp. | 143 | 964 | 484 | 1591 |
| Total | 260 | 1353 | 658 | 2271 |

**Table 19 – Numbers of birds recorded in the North West Area survey blocks, Period 3.**

| Species | NW5 | NW10 | NW11 | NW12 | Total |
|---|---|---|---|---|---|
| Eider | 9 | | | | 9 |
| Common Scoter | 6608 | | 1 | 228 | 6837 |
| Velvet Scoter | 4 | | | | 4 |
| Red-breasted Merganser | 5 | | | | 5 |
| Red-throated Diver | 10 | | | | 10 |
| duck spp. | 1 | | | | 1 |
| Great Northern Diver | 1 | | | | 1 |
| diver spp. | 14 | | 14 | 1 | 29 |
| Great Crested Grebe | 1 | | | | 1 |
| Fulmar | 2 | 25 | 6 | 21 | 54 |
| Gannet | 2 | 3 | 1 | | 6 |
| Cormorant | 7 | | | | 7 |
| Shag | 8 | | 1 | | 9 |
| Cormorant/Shag | 21 | | 3 | | 24 |
| Oystercatcher | 2 | | | | 2 |
| small wader spp. | | | | 1 | 1 |
| Kittiwake | 53 | 15 | 56 | 18 | 142 |
| Black-headed Gull | 5 | | 1 | | 6 |
| Common Gull | 24 | 1 | 1 | 31 | 57 |
| Lesser Black-backed Gull | 2 | | | | 2 |
| Herring Gull | 42 | 4 | 11 | 4 | 61 |
| Great Black-backed Gull | 6 | | 2 | | 8 |
| grey gull spp (Herring or Common) | 47 | | 17 | 27 | 91 |
| black-backed gull spp. | 13 | 2 | 14 | | 29 |
| large gull spp. | 31 | 2 | 48 | 4 | 85 |
| small gull spp. | 16 | 11 | 42 | 6 | 75 |
| gull spp. | 32 | 8 | 138 | 54 | 232 |
| auk spp. | 560 | 174 | 1027 | 293 | 2054 |
| passerine spp. | | 1 | | | 1 |
| Total | 7526 | 246 | 1383 | 688 | 9843 |

**Table 20 – Numbers of birds recorded in the North West Area survey blocks, Period 4.**

| Species | NW3 | NW7 | NW8 | NW9 | NW10 | NW13 | NW14 | NW15 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Eider | 5 | | | | | 6 | | | 11 |
| Common Scoter | 28 | | | | | | 201 | | 229 |
| Red-breasted Merganser | | | | | | | 2 | | 2 |
| Red-throated Diver | | | | | | | 8 | | 8 |
| duck spp. | 1 | | 9 | | | | | | 10 |
| Great Northern Diver | | | | | | | 4 | | 4 |
| diver spp. | 11 | | | | | 14 | 10 | | 35 |
| Fulmar | 4 | 29 | | 11 | 29 | 140 | 8 | 6 | 227 |
| Manx Shearwater | | | | | 1 | | | | 1 |
| Gannet | 5 | 6 | 1 | 4 | 9 | 74 | 13 | | 112 |
| Cormorant | 2 | | | | | | | | 2 |
| Shag | | | | | 5 | 3 | 4 | | 12 |
| Cormorant/Shag | | | | | | | 8 | 1 | 9 |
| Kittiwake | 32 | 142 | 64 | 79 | 32 | 50 | 15 | 10 | 424 |
| Black-headed Gull | | 1 | 3 | | 1 | 2 | | | 7 |
| Common Gull | 9 | 1 | 4 | 3 | | 5 | 1 | | 23 |
| Lesser Black-backed Gull | 6 | 14 | 9 | 16 | 3 | 4 | | 2 | 54 |
| Herring Gull | 5 | 11 | 9 | 3 | 3 | 82 | 2 | 7 | 122 |
| Great Black-backed Gull | 3 | 5 | | | | 1 | | | 9 |
| grey gull spp (Herring or Common) | 7 | 3 | 14 | 10 | 4 | 229 | 4 | | 271 |
| black-backed gull spp. | 14 | 11 | 7 | 7 | 1 | 6 | | | 46 |
| large gull spp. | 12 | 7 | 17 | 18 | 15 | 10 | 7 | | 86 |
| small gull spp. | 19 | 99 | 7 | 36 | 2 | 1 | 16 | 6 | 186 |
| gull spp. | 228 | 80 | 90 | 69 | 2 | 1128 | 3 | 65 | 1665 |
| Arctic/Common Tern | | 1 | | 3 | | | | | 4 |
| tern spp. | | | | | 1 | | | | 1 |
| Guillemot | | | | 3 | | 3 | | | 6 |
| Razorbill | | 1 | | | | | | | 1 |
| auk spp. | 228 | 828 | 482 | 620 | 89 | 279 | 101 | 64 | 2691 |
| Total | 619 | 1239 | 716 | 882 | 197 | 2037 | 407 | 161 | 6258 |

**Table 21 – Numbers of birds recorded in the North West Area survey blocks, Period 5.**

| Species | NW9 | NW12 | NW13 | NW14 | Total |
|---|---|---|---|---|---|
| Scaup | | | 1 | | 1 |
| Eider | | | 1 | | 1 |
| Common Scoter | | | | 2015 | 2015 |
| Red-breasted Merganser | | | | 1 | 1 |
| Red-throated Diver | | | | 5 | 5 |
| Great Northern Diver | | | | 24 | 24 |
| diver spp. | | | | 4 | 4 |
| Fulmar | 2 | 7 | 4 | 5 | 18 |
| Manx Shearwater | 4 | 517 | 6 | 46 | 573 |
| shearwater spp. | | | | 1 | 1 |
| Gannet | 41 | 193 | 81 | 166 | 481 |
| Cormorant | | | | 8 | 8 |
| Shag | | | | 12 | 12 |
| Cormorant/Shag | 1 | 1 | | 6 | 8 |
| small wader spp. | | | 2 | | 2 |
| skua spp. | | 1 | | | 1 |
| Kittiwake | 81 | 38 | 29 | 53 | 201 |
| Common Gull | | | 1 | 1 | 2 |
| Lesser Black-backed Gull | | | | 1 | 1 |
| Herring Gull | | 4 | 12 | 5 | 21 |
| Great Black-backed Gull | | 5 | 3 | | 8 |
| grey gull spp (Herring or Common) | 1 | 2 | 5 | 4 | 12 |
| black-backed gull spp. | | 3 | 1 | 4 | 8 |
| large gull spp. | 2 | 3 | 13 | 1 | 19 |
| small gull spp. | 5 | 2 | 3 | 2 | 12 |
| gull spp. | 39 | 150 | 11 | 8 | 208 |
| Sandwich Tern | | | 2 | 6 | 8 |
| Arctic/Common Tern | 1 | 3 | | 4 | 8 |
| tern spp. | | 8 | | 8 | 16 |
| Guillemot | | 1 | 11 | 3 | 15 |
| Razorbill | | | | 17 | 17 |
| Black Guillemot | | | 2 | 2 | 4 |
| auk spp. | 117 | 793 | 314 | 309 | 1533 |
| passerine spp. | 6 | | | | 6 |
| Total | 300 | 1731 | 502 | 2721 | 5254 |

**Table 22 – Numbers of birds recorded in the North West Area survey blocks, Period 6.**

| Species | NW7 | NW8 | NW11 | NW15 | NW16 | Total |
|---|---|---|---|---|---|---|
| Common Scoter | | | | | 1 | 1 |
| Fulmar | 8 | | 1 | 5 | 7 | 21 |
| Manx Shearwater | 859 | 44 | 625 | 1194 | 2173 | 4895 |
| shearwater spp. | | 5 | 6 | 48 | 8 | 67 |
| British Storm-petrel | | | | | 1 | 1 |
| Unidentified storm-petrel | | | | | 1 | 1 |
| Gannet | 50 | 191 | 173 | 97 | 75 | 586 |
| Cormorant | | | 7 | | | 7 |
| Shag | | | 6 | | 2 | 8 |
| Cormorant/Shag | | | 10 | | | 10 |
| Oystercatcher | | | | 2 | | 2 |
| Kittiwake | 335 | 18 | 20 | 203 | 459 | 1035 |
| Common Gull | | | | 5 | | 5 |
| Lesser Black-backed Gull | | | | | 5 | 5 |
| Herring Gull | | | 3 | 7 | 5 | 15 |
| Great Black-backed Gull | | | 5 | | 1 | 6 |
| grey gull spp (Herring or Common) | | | | 3 | | 3 |
| black-backed gull spp. | 1 | | | | 1 | 2 |
| large gull spp. | | | | | 2 | 2 |
| small gull spp. | 1 | | | 11 | | 12 |
| gull spp. | 20 | | 1 | 30 | 12 | 63 |
| Little Tern | | | 6 | | | 6 |
| Sandwich Tern | 1 | 1 | | 19 | 12 | 33 |
| Arctic/Common Tern | 8 | 1 | 2 | 226 | 105 | 342 |
| tern spp. | 6 | | 3 | 90 | 27 | 126 |
| Guillemot | 1 | | 9 | 13 | | 23 |
| Razorbill | | | | 5 | | 5 |
| Black Guillemot | | | 2 | | | 2 |
| Puffin | | | | 2 | | 2 |
| auk spp. | 435 | 24 | 195 | 632 | 598 | 1884 |
| Total | 1725 | 284 | 1074 | 2592 | 3495 | 9170 |

**Table 23 – Numbers of birds recorded in the North West Area survey blocks, Period 7.**

| Species | NW10 | Total |
|---|---|---|
| Fulmar | 16 | 16 |
| Manx Shearwater | 454 | 454 |
| shearwater spp. | 6 | 6 |
| British Storm-petrel | 6 | 6 |
| Gannet | 58 | 58 |
| Oystercatcher | 1 | 1 |
| Great Skua | 1 | 1 |
| Kittiwake | 206 | 206 |
| Common Gull | 2 | 2 |
| Lesser Black-backed Gull | 2 | 2 |
| Herring Gull | 21 | 21 |
| grey gull spp (Herring or Common) | 8 | 8 |
| black-backed gull spp. | 1 | 1 |
| large gull spp. | 29 | 29 |
| small gull spp. | 78 | 78 |
| gull spp. | 158 | 158 |
| Sandwich Tern | 1 | 1 |
| Arctic/Common Tern | 24 | 24 |
| tern spp. | 12 | 12 |
| auk spp. | 985 | 985 |
| Total | 2069 | 2069 |

**Table 24 – Numbers of birds recorded in the West Wales Area survey blocks, Period 1.**

| Species | WW7 | Total |
|---|---|---|
| Common Scoter | 1 | 1 |
| Red-throated Diver | 1 | 1 |
| diver spp. | 15 | 15 |
| Cormorant | 1 | 1 |
| Cormorant/Shag | 1 | 1 |
| Kittiwake | 55 | 55 |
| Black-headed Gull | 28 | 28 |
| Common Gull | 46 | 46 |
| Lesser Black-backed Gull | 2 | 2 |
| Herring Gull | 45 | 45 |
| Great Black-backed Gull | 3 | 3 |
| grey gull spp (Herring or Common) | 110 | 110 |
| black-backed gull spp. | 10 | 10 |
| large gull spp. | 2 | 2 |
| small gull spp. | 27 | 27 |
| gull spp. | 254 | 254 |
| auk spp. | 671 | 671 |
| Total | 1272 | 1272 |

**Table 25 – Numbers of birds recorded in the West Wales Area survey blocks, Period 2.**

| Species | WW2 | WW3 | WW4 | WW5 | WW6 | WW8 | Total |
|---|---|---|---|---|---|---|---|
| Eider | | | | | 2 | | 2 |
| Common Scoter | | 20 | | | 1683 | | 1703 |
| Red-breasted Merganser | | 4 | | | 4 | | 8 |
| Red-throated Diver | | 1 | | | 22 | | 23 |
| duck spp. | | | | | 6 | | 6 |
| diver spp. | | 6 | | 1 | 31 | | 38 |
| Fulmar | 1 | | 3 | 2 | | 13 | 19 |
| Gannet | | | | | 1 | 3 | 4 |
| Cormorant | | | | | 31 | | 31 |
| Shag | | 6 | | | 70 | | 76 |
| Cormorant/Shag | | 1 | | | 27 | | 28 |
| Oystercatcher | | | | | 20 | | 20 |
| Curlew | | | | | 3 | | 3 |
| small wader spp. | | | | | 2 | | 2 |
| Kittiwake | 22 | 37 | 6 | 586 | 7 | 38 | 696 |
| Black-headed Gull | 1 | | | 5 | 7 | | 13 |
| Little Gull | | 3 | | | | | 3 |
| Common Gull | 4 | 21 | | 18 | 25 | | 68 |
| Lesser Black-backed Gull | | | | | 1 | | 1 |
| Herring Gull | 3 | 5 | | 3 | 42 | 1 | 54 |
| Great Black-backed Gull | | 1 | 1 | | 2 | 1 | 5 |
| grey gull spp (Herring or Common) | 9 | 27 | 3 | 257 | 125 | 9 | 430 |
| black-backed gull spp. | | 1 | | | 9 | 1 | 11 |
| large gull spp. | 10 | 48 | | 3 | 1 | | 62 |
| small gull spp. | 3 | 4 | | 84 | 24 | 3 | 118 |
| gull spp. | 14 | 16 | 1 | 437 | 589 | 3 | 1060 |
| tern spp. | | | | | 1 | | 1 |
| Puffin | | | | | 1 | | 1 |
| auk spp. | 300 | 687 | 40 | 286 | 429 | 109 | 1851 |
| passerine spp. | | | | 2 | | | 2 |
| Total | 367 | 888 | 54 | 1684 | 3165 | 181 | 6339 |

**Table 26 – Numbers of birds recorded in the West Wales Area survey blocks, Period 3.**

| Species | WW2 | WW5 | WW6 | WW7 | WW8 | Total |
|---|---|---|---|---|---|---|
| Common Scoter | | | 2190 | 65 | | 2255 |
| Red-throated Diver | | | 123 | 1 | | 124 |
| duck spp. | 1 | | 71 | | | 72 |
| Great Northern Diver | | | | 2 | | 2 |
| diver spp. | | 1 | 121 | 5 | | 127 |
| Great Crested Grebe | | | 5 | | | 5 |
| grebe spp. | | | 2 | | | 2 |
| Fulmar | 20 | 20 | | | 7 | 47 |
| Gannet | 24 | | | | 1 | 25 |
| Cormorant | | | 2 | 1 | | 3 |
| Shag | | 4 | 66 | 4 | | 74 |
| Cormorant/Shag | 1 | | 16 | | | 17 |
| Kittiwake | 25 | 14 | 4 | 6 | 5 | 54 |
| Black-headed Gull | 6 | | 7 | 6 | | 19 |
| Little Gull | | 2 | 3 | | | 5 |
| Common Gull | 13 | 2 | 30 | 5 | | 50 |
| Lesser Black-backed Gull | | | 2 | 1 | | 3 |
| Herring Gull | | | 22 | 3 | | 25 |
| Great Black-backed Gull | 3 | | 2 | | | 5 |
| grey gull spp (Herring or Common) | 10 | 4 | 158 | 16 | | 188 |
| black-backed gull spp. | 3 | 7 | 15 | 1 | | 26 |
| large gull spp. | 11 | | 43 | | 1 | 55 |
| small gull spp. | 55 | 2 | 109 | 1 | | 167 |
| gull spp. | 60 | 1 | 565 | 1 | | 627 |
| Guillemot | 1 | | | | | 1 |
| Razorbill | 2 | | | | | 2 |
| Puffin | | 1 | | | | 1 |
| auk spp. | 668 | 135 | 279 | 45 | 62 | 1189 |
| Total | 903 | 193 | 3835 | 163 | 76 | 5170 |

**Table 27 – Numbers of birds recorded in the West Wales survey blocks, Period 4.**

| Species | WW3 | WW4 | Total |
|---|---|---|---|
| Common Scoter | 3 | | 3 |
| Red-throated Diver | 3 | | 3 |
| diver spp. | 3 | | 3 |
| Fulmar | 3 | 7 | 10 |
| Manx Shearwater | 48 | | 48 |
| shearwater spp. | 57 | | 57 |
| Shag | 5 | | 5 |
| Cormorant/Shag | 1 | | 1 |
| Kittiwake | 110 | 7 | 117 |
| Black-headed Gull | 1 | | 1 |
| Common Gull | 2 | | 2 |
| Lesser Black-backed Gull | | 4 | 4 |
| Great Black-backed Gull | 1 | 2 | 3 |
| grey gull spp (Herring or Common) | 7 | | 7 |
| black-backed gull spp. | 3 | 1 | 4 |
| large gull spp. | 12 | | 12 |
| small gull spp. | 107 | | 107 |
| gull spp. | 25 | | 25 |
| tern spp. | 2 | | 2 |
| Guillemot | 4 | 1 | 5 |
| Razorbill | | 6 | 6 |
| auk spp. | 598 | 37 | 635 |
| Total | 995 | 65 | 1060 |

**Table 28 – Numbers of birds recorded in the West Wales Area survey blocks, Period 5.**

| Species | WW2 | WW3 | WW4 | WW5 | WW6 | WW7 | WW8 | Total |
|---|---|---|---|---|---|---|---|---|
| Common Scoter | | | | | 246 | | | 246 |
| diver spp. | | 1 | | | 1 | | | 2 |
| Fulmar | 6 | 2 | 3 | 5 | 4 | 4 | 15 | 39 |
| Manx Shearwater | 8 | 99 | 3030 | 704 | 1116 | 1199 | 1914 | 8070 |
| shearwater spp. | | | 2 | 5 | | | 101 | 108 |
| British Storm-petrel | | | | | | | 1 | 1 |
| Gannet | 19 | 61 | 8 | 17 | 95 | 46 | 43 | 289 |
| Cormorant | | | | | 16 | 4 | | 20 |
| Shag | | | | 3 | 2 | | | 5 |
| Cormorant/Shag | | | | 3 | 19 | 2 | | 24 |
| Arctic Skua | | | | | | | 2 | 2 |
| Great Skua | | | | | 1 | | | 1 |
| Kittiwake | 47 | 13 | 60 | 51 | 63 | 51 | 231 | 516 |
| Black-headed Gull | | | | | | 1 | | 1 |
| Lesser Black-backed Gull | 2 | 2 | | 3 | 6 | 3 | | 16 |
| Herring Gull | 1 | 1 | | 11 | 13 | 4 | 8 | 38 |
| Great Black-backed Gull | | | | | 1 | | | 1 |
| grey gull spp (Herring or Common) | | | 2 | 3 | 1 | | 4 | 10 |
| black-backed gull spp. | | 2 | 5 | | 5 | 4 | 6 | 22 |
| large gull spp. | 1 | 9 | 1 | 46 | 9 | 16 | 8 | 90 |
| small gull spp. | 6 | 1 | | 8 | | 6 | 4 | 25 |
| gull spp. | 5 | 18 | 1 | 27 | 209 | 82 | 113 | 455 |
| Little Tern | | | | | | 2 | | 2 |
| Sandwich Tern | | | | | | | 5 | 5 |
| Arctic/Common Tern | | 4 | 53 | | 1 | 49 | 129 | 236 |
| tern spp. | | | | | | 352 | 147 | 499 |
| Guillemot | 4 | | | | | 8 | | 12 |
| Razorbill | | | 1 | | | 1 | 2 | 4 |
| Puffin | | | | | 1 | | | 1 |
| auk spp. | 142 | 189 | 317 | 259 | 220 | 723 | 1411 | 3261 |
| Feral Pigeon | | | 3 | | | | | 3 |
| Carrion Crow | | | | 1 | | | | 1 |
| passerine spp. | | | | | 1 | | | 1 |
| Total | 241 | 402 | 3486 | 1146 | 2030 | 2557 | 4144 | 14006 |

**Table 29 – Numbers of birds recorded in the West Wales survey blocks, Period 6.**

| Species | WW7 | Total |
|---|---|---|
| Common Scoter | 25 | 25 |
| grebe spp. | 3 | 3 |
| Fulmar | 2 | 2 |
| Manx Shearwater | 2723 | 2723 |
| shearwater spp. | 3 | 3 |
| British Storm-petrel | 2 | 2 |
| Unidentified storm-petrel | 1 | 1 |
| Gannet | 122 | 122 |
| Cormorant | 1 | 1 |
| Shag | 15 | 15 |
| Cormorant/Shag | 10 | 10 |
| Kittiwake | 117 | 117 |
| Lesser Black-backed Gull | 1 | 1 |
| Herring Gull | 6 | 6 |
| Great Black-backed Gull | 6 | 6 |
| grey gull spp (Herring or Common) | 2 | 2 |
| black-backed gull spp. | 7 | 7 |
| small gull spp. | 4 | 4 |
| gull spp. | 15 | 15 |
| Sandwich Tern | 4 | 4 |
| Arctic/Common Tern | 59 | 59 |
| tern spp. | 21 | 21 |
| Guillemot | 8 | 8 |
| Razorbill | 3 | 3 |
| Black Guillemot | 1 | 1 |
| auk spp. | 780 | 780 |
| Total | 3941 | 3941 |

**Table 30 – Numbers of birds recorded in the West Wales Area survey blocks, Period 7.**

| Species | WW2 | WW3 | WW5 | WW6 | WW8 | Total |
|---|---|---|---|---|---|---|
| Common Scoter | | | | 25 | | 25 |
| Fulmar | 11 | 1 | 6 | 1 | 15 | 34 |
| Manx Shearwater | 619 | 2679 | 947 | 1402 | 1402 | 7049 |
| shearwater spp. | | 1 | 13 | | | 14 |
| British Storm-petrel | | 5 | | 5 | | 10 |
| Gannet | 34 | 388 | 114 | 180 | 73 | 789 |
| Cormorant | | 1 | | 4 | | 5 |
| Shag | | 3 | 1 | 7 | | 11 |
| Cormorant/Shag | 1 | 5 | | 7 | | 13 |
| small wader spp. | 4 | | | | | 4 |
| Kittiwake | 293 | 40 | 128 | 26 | 367 | 854 |
| Common Gull | | | | 2 | | 2 |
| Lesser Black-backed Gull | 1 | 1 | 6 | 5 | 35 | 48 |
| Herring Gull | | | 3 | 7 | 39 | 49 |
| Great Black-backed Gull | | 2 | | 1 | 4 | 7 |
| grey gull spp (Herring or Common) | | | 2 | 6 | | 8 |
| black-backed gull spp. | 1 | | 2 | 12 | 5 | 20 |
| large gull spp. | | 8 | | 7 | 76 | 91 |
| small gull spp. | | 1 | 1 | 13 | | 15 |
| gull spp. | 67 | 14 | 20 | 48 | 184 | 333 |
| Arctic/Common Tern | 4 | 2 | 18 | 5 | 27 | 56 |
| tern spp. | 4 | 38 | 10 | 5 | 23 | 80 |
| Guillemot | | | 2 | 1 | | 3 |
| Razorbill | | | | | 3 | 3 |
| auk spp. | 1485 | 862 | 900 | 198 | 9999 | 13444 |
| Total | 2524 | 4051 | 2173 | 1967 | 12252 | 22967 |

**Table 31 – Numbers of birds recorded in the South West Area survey blocks, Period 1.**

| Species | SW102 | SW103 | SW104 | SW105 | SW106 | SW107 | SW108 | SW109 | SW110 | SW111 | SW114 | SW115 | SW118 | SW119 | SW120 | SW121 | SW122 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shelduck | | | | 71 | | | | | | | | | | | | | | 71 |
| Common Scoter | | 2352 | | | | | | | | | | 4 | | | | | | 2356 |
| Great Northern Diver | | | | | | | | | | | 1 | | | | | | | 1 |
| diver spp. | | 7 | | | | | | 3 | | | 1 | | | | | | 5 | 16 |
| Fulmar | 2 | | | | 4 | | 112 | 1 | | 3 | 41 | 2 | 73 | 53 | 15 | | 48 | 354 |
| Manx Shearwater | 2 | | | | | | | | | | | | | | | | | 2 |
| British Storm-petrel | | 1 | | | | | 1 | | | | | | | | | | | 2 |
| Gannet | 73 | 29 | | | 1 | 32 | 59 | 194 | 90 | 78 | 200 | 29 | 91 | 44 | 34 | 103 | 75 | 1132 |
| Cormorant | | 3 | 1 | | | | | | 1 | | | | | 1 | | 3 | | 9 |
| Shag | 3 | 1 | | | | 1 | | 19 | 3 | | | 51 | | | | | | 78 |
| Cormorant/Shag | 2 | 5 | | | | | | | | | | | | | | 4 | | 11 |
| Arctic Skua | | | 1 | | | | | | | | | | | | | | | 1 |
| Great Skua | | | | | | | 1 | | 1 | 1 | 2 | | 1 | 7 | 3 | 3 | | 19 |
| skua spp. | | | | 1 | | | | | | | | | | | | | | 1 |
| Kittiwake | 401 | 478 | 29 | 2 | 12 | 109 | 120 | 51 | 53 | 71 | 103 | 46 | 48 | 50 | 52 | 323 | 233 | 2181 |
| Black-headed Gull | 2 | 8 | 6 | 10 | | | | | | | | | | | | 3 | | 29 |
| Common Gull | | 29 | 7 | 14 | | | | | 1 | | | 10 | | 1 | 2 | 4 | | 68 |
| Lesser Black-backed Gull | | 3 | 3 | 2 | | 2 | 3 | 3 | 1 | 1 | | 9 | 2 | | 1 | 2 | | 32 |
| Herring Gull | 6 | 97 | 109 | 5 | 3 | 1 | 1 | 19 | 1 | | 5 | 13 | 27 | | 3 | 158 | 37 | 485 |
| Great Black-backed Gull | 1 | | 5 | 1 | 1 | | | 5 | | | | 2 | 2 | 12 | 2 | | 7 | 38 |

**Table 31 continued.**

| Species | SW102 | SW103 | SW104 | SW105 | SW106 | SW107 | SW108 | SW109 | SW110 | SW111 | SW114 | SW115 | SW118 | SW119 | SW120 | SW121 | SW122 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| grey gull spp (Herring or Common) | 19 | 1308 | 60 | 66 | 5 | 3 | | 6 | 1 | 3 | 9 | 29 | 5 | 72 | 9 | 211 | 179 | 1985 |
| black-backed gull spp. | 1 | 16 | 5 | 4 | | 1 | 3 | 62 | 1 | 1 | 19 | 4 | 139 | 5 | 18 | 46 | 12 | 337 |
| large gull spp. | 31 | 12 | 68 | 2 | 24 | | 1 | 110 | | | 2 | 1 | 7 | 2 | 2 | 67 | 38 | 367 |
| small gull spp. | 3 | 7 | 14 | | 2 | 23 | 5 | 3 | 1 | 1 | 10 | 11 | 1 | 3 | 22 | 5 | 8 | 119 |
| gull spp. | 2 | 410 | 4 | 46 | | 12 | 51 | 5 | | 1 | 221 | 40 | 58 | 8 | 204 | 42 | 909 | 2013 |
| auk spp. | 2854 | 7453 | 177 | 27 | 167 | 367 | 55 | 26 | 20 | 22 | 48 | 62 | 14 | 88 | 166 | 894 | 752 | 13192 |
| passerine spp. | | | | | | | | | | 79 | | | | | | 2 | | 81 |
| Total | 3402 | 12219 | 489 | 251 | 219 | 551 | 412 | 507 | 174 | 261 | 662 | 313 | 468 | 346 | 533 | 1870 | 2303 | 24980 |

**Table 32 – Numbers of birds recorded in the South West Area survey blocks, Period 2.**

| Species | SW125 | Total |
|---|---|---|
| Shag | 1 | 1 |
| Kittiwake | 7 | 7 |
| Common Gull | 5 | 5 |
| Herring Gull | 4 | 4 |
| Great Black-backed Gull | 1 | 1 |
| grey gull spp (Herring or Common) | 4 | 4 |
| black-backed gull spp. | 6 | 6 |
| large gull spp. | 18 | 18 |
| small gull spp. | 3 | 3 |
| gull spp. | 4 | 4 |
| auk spp. | 255 | 255 |
| Total | 308 | 308 |

**Table 33 – Numbers of birds recorded in the South West Area survey blocks, Period 3.**

| Species | SW124 | SW125 | Total |
|---|---|---|---|
| Black-throated Diver | 3 | | 3 |
| diver spp. | 3 | | 3 |
| Fulmar | 3 | 2 | 5 |
| Gannet | 147 | 9 | 156 |
| Shag | 1 | | 1 |
| Cormorant/Shag | 1 | 2 | 3 |
| Kittiwake | 89 | 16 | 105 |
| Common Gull | 5 | 4 | 9 |
| Lesser Black-backed Gull | | 2 | 2 |
| Herring Gull | 13 | 1 | 14 |
| Great Black-backed Gull | 17 | | 17 |
| grey gull spp (Herring or Common) | 9 | 8 | 17 |
| black-backed gull spp. | 10 | 5 | 15 |
| large gull spp. | 13 | 8 | 21 |
| small gull spp. | 4 | 2 | 6 |
| gull spp. | 30 | 235 | 265 |
| Guillemot | 1 | 1 | 2 |
| Razorbill | 1 | 1 | 2 |
| auk spp. | 848 | 371 | 1219 |
| Total | 1198 | 667 | 1865 |

**Table 34 – Numbers of birds recorded in the South West Area survey blocks, Period 5.**

| Species | SW108 | Total |
|---|---|---|
| Fulmar | 3 | 3 |
| Manx Shearwater | 934 | 934 |
| Gannet | 49 | 49 |
| Shag | 1 | 1 |
| Cormorant/Shag | 4 | 4 |
| Kittiwake | 6 | 6 |
| Herring Gull | 8 | 8 |
| grey gull spp (Herring or Common) | 10 | 10 |
| large gull spp. | 7 | 7 |
| small gull spp. | 1 | 1 |
| gull spp. | 80 | 80 |
| Sandwich Tern | 1 | 1 |
| Arctic/Common Tern | 5 | 5 |
| tern spp. | 1 | 1 |
| Guillemot | 8 | 8 |
| Razorbill | 1 | 1 |
| auk spp. | 79 | 79 |
| Swallow | 1 | 1 |
| Total | 1199 | 1199 |

**Table 35 – Numbers of birds recorded in the South West Area survey blocks, Period 6.**

| Species | SW101 | SW102 | SW103 | SW104 | SW105 | SW106 | SW107 | SW109 | SW110 | SW112 | SW120 | SW121 | SW122 | SW123 | SW125 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shelduck | | | | | 156 | | | | | | | | | | | 156 |
| Common Scoter | | | 891 | | | | | | | | | | | | | 891 |
| duck spp. | | | | | | | | | | | | | | | 1 | 1 |
| Fulmar | 17 | 21 | 8 | 3 | | 8 | 9 | 24 | 27 | 18 | 2 | 5 | 3 | 7 | 2 | 154 |
| Manx Shearwater | 2237 | 624 | 568 | 49 | | 161 | 158 | 567 | 39 | 6 | | | | | | 4409 |
| shearwater spp. | | 12 | 23 | | | 3 | | 3 | 2 | | | | | | | 43 |
| British Storm-petrel | | | | | | 1 | 2 | 1 | | 18 | 4 | | | | 1 | 27 |
| Unidentified storm-petrel | | | | | | | | | 3 | | 1 | | | | | 4 |
| Gannet | 1011 | 154 | 77 | 30 | 3 | 40 | 64 | 138 | 469 | 28 | 972 | 170 | 234 | 107 | 131 | 3628 |
| Cormorant | 1 | | 9 | | | | | | | | | | | | | 10 |
| Shag | | 1 | 1 | | | | 25 | 3 | 3 | | | | | | 1 | 34 |
| Cormorant/Shag | | | 8 | | | | | 3 | | | | 3 | | | 1 | 15 |
| Little Egret | | | | | 3 | | | | | | | | | | | 3 |
| Curlew | 25 | | | | | | | | | | | | | | | 25 |
| large wader spp. | | | | | 1 | | | | | | | | | | | 1 |
| medium wader spp. | | | | | 10 | | | | | | | | | | | 10 |
| small wader spp. | | | | | | | | | | | | | 1 | | | 1 |
| Great Skua | | | | | | | | | | | | | 1 | | | 1 |
| skua spp. | | | | | | | | | 1 | | | | | | | 1 |
| Kittiwake | 338 | 81 | 57 | 6 | | 21 | 38 | 32 | 12 | 4 | 31 | 13 | 29 | 15 | 4 | 681 |
| Black-headed Gull | | | | | 8 | | | | | | | | | | | 8 |

**Table 35 continued.**

| Species | SW101 | SW102 | SW103 | SW104 | SW105 | SW106 | SW107 | SW109 | SW110 | SW112 | SW120 | SW121 | SW122 | SW123 | SW125 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common Gull | | | 2 | | | | 4 | 2 | | | | | | | | 8 |
| Lesser Black-backed Gull | 14 | | 12 | 2 | 57 | 2 | 3 | | | | 3 | | 4 | | 3 | 100 |
| Herring Gull | 38 | | 348 | 6 | 62 | 18 | 25 | 7 | 39 | | 104 | 132 | 41 | 15 | 39 | 874 |
| Great Black-backed Gull | 19 | 1 | 4 | 1 | 16 | 1 | 1 | | | 1 | 3 | 5 | 3 | | 2 | 57 |
| grey gull spp (Herring or Common) | | | 9 | 4 | 75 | 11 | 11 | 1 | 5 | 2 | 378 | 9 | 4 | 12 | 6 | 527 |
| black-backed gull spp. | 5 | | 8 | 3 | 73 | 1 | 9 | 4 | 4 | 1 | 9 | 8 | 4 | 2 | 7 | 138 |
| large gull spp. | 18 | 1 | 2 | 17 | 2 | 4 | 3 | 7 | | 3 | 75 | 1 | 36 | 12 | 3 | 184 |
| gull spp. | 27 | 9 | 669 | 10 | 386 | 8 | 32 | 34 | 51 | 5 | 430 | 71 | 173 | 487 | 97 | 2489 |
| Sandwich Tern | 2 | | | | | | | | | | | 5 | | | 7 | 14 |
| Arctic/Common Tern | 1 | | | | 2 | | | | | | | 1 | | 1 | 29 | 34 |
| tern spp. | 1 | | | | 1 | | | 5 | | | | 1 | 1 | | 12 | 21 |
| Guillemot | 18 | | 3 | | | 8 | 1 | | 2 | | | | | | | 32 |
| Razorbill | 1 | 1 | 8 | | | | 3 | | | | | | | | | 13 |
| Puffin | 43 | | | | | | 1 | | | | | | | | | 44 |
| auk spp. | 342 | 502 | 243 | 19 | | 193 | 156 | 38 | 22 | 47 | 21 | 9 | 79 | 72 | 34 | 1777 |
| Feral Pigeon | | | | | | | | | | | | 7 | | | | 7 |
| Carrion Crow | | | 1 | | 1 | | | | | | | | | | | 2 |
| gull spp. | 27 | 9 | 669 | 10 | 386 | 8 | 32 | 34 | 51 | 5 | 430 | 71 | 173 | 487 | 97 | 2489 |
| Total | 4158 | 1407 | 2951 | 150 | 858 | 482 | 549 | 872 | 683 | 135 | 2080 | 442 | 616 | 742 | 381 | 16506 |

**Table 36 – Numbers of birds recorded in the South West area survey blocks, Period 7.**

| Species | SW106 | SW107 | SW108 | SW109 | SW110 | SW111 | SW113 | SW114 | SW115 | SW116 | SW117 | SW118 | SW119 | SW119b | SW124 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fulmar | 28 | 22 | 34 | 26 | 28 | 32 | 45 | 25 | 14 | 10 | 2 | 3 | 10 | 2 | 3 | 284 |
| Manx Shearwater | 178 | 945 | 47 | 3531 | 5 | 65 | 6 | 8 | 3 | | | 1 | 1 | 1 | | 4791 |
| shearwater spp. | | 1 | | 3 | | | 2 | 1 | | | 1 | | | | | 8 |
| British Storm-petrel | | 1 | 1 | | | 7 | 4 | 9 | | 3 | 11 | 2 | | | | 38 |
| Unidentified storm-petrel | | | | | 1 | | | | | | | | | | | 1 |
| Gannet | 49 | 215 | 298 | 575 | 497 | 1220 | 329 | 197 | 56 | 99 | 27 | 172 | 123 | 68 | 30 | 3955 |
| Cormorant | | | | 1 | 1 | | 4 | | | | | 2 | | | | 8 |
| Shag | | 18 | | 10 | 11 | | 65 | | | | | | | 1 | | 105 |
| Cormorant/Shag | | 6 | | 1 | 8 | | 12 | | 2 | | 1 | 6 | | | | 36 |
| Oystercatcher | | | | | | | 1 | | | | | | | | | 1 |
| small wader spp. | | 3 | | | | | 3 | | | | | | | | | 6 |
| Great Skua | | | 1 | | | 2 | 1 | 1 | | | 2 | 1 | 1 | | | 9 |
| Kittiwake | 7 | 11 | 15 | 44 | 6 | 11 | 7 | 11 | 9 | 2 | 3 | 4 | | 19 | 1 | 150 |
| Black-headed Gull | | | | | | | | | | | | 1 | | | | 1 |
| Common Gull | 1 | | | 1 | | | | | | | 2 | | 1 | | | 5 |
| Lesser Black-backed Gull | 1 | 6 | 1 | 8 | | | 3 | 2 | 1 | 4 | 4 | 1 | 1 | | | 32 |

**Table 36 continued.**

| Species | SW106 | SW107 | SW108 | SW109 | SW110 | SW111 | SW113 | SW114 | SW115 | SW116 | SW117 | SW118 | SW119 | SW119b | SW124 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Herring Gull | 4 | 11 | 7 | 50 | | 5 | 5 | 93 | 7 | 9 | 12 | 50 | 63 | 4 | 6 | 326 |
| Great Black-backed Gull | | 2 | 2 | 1 | 10 | 6 | 14 | 43 | 6 | 7 | | 20 | 11 | 34 | 2 | 158 |
| grey gull spp (Herring or Common) | 4 | 1 | | 29 | 1 | 1 | | 31 | 2 | 35 | 2 | 73 | 46 | 2 | 3 | 230 |
| black-backed gull spp. | 2 | 7 | 3 | 2 | 2 | | 20 | 109 | 2 | 52 | | 52 | 41 | 5 | 1 | 298 |
| large gull spp. | | 7 | 1 | 67 | | 5 | 10 | 46 | 3 | 15 | 26 | 134 | 30 | 41 | 6 | 391 |
| small gull spp. | | | | 18 | 1 | 32 | | 12 | 22 | | 1 | 8 | 5 | | 3 | 102 |
| gull spp. | 7 | 37 | 4 | 223 | 6 | 135 | 8 | 283 | 8 | 18 | 142 | 624 | 810 | 129 | 27 | 2461 |
| Sandwich Tern | | 4 | | | | | 3 | 5 | | | | | | | | 12 |
| Arctic/Common Tern | | 6 | | 1 | | | 3 | | | 2 | 2 | | | | | 14 |
| tern spp. | | 25 | | 1 | 1 | | 6 | 9 | | | 3 | | 1 | | | 46 |
| Guillemot | 1 | | | | | 1 | | | | | | | | | | 2 |
| Razorbill | 2 | | | | | | | | | | | | | | | 2 |
| auk spp. | 119 | 30 | 1 | 22 | 9 | 5 | | 4 | 2 | | 2 | 4 | | 4 | 2 | 204 |
| Swift | | | | | | | 1 | | | | | | | | | 1 |
| Carrion Crow | | 1 | | | | | | | | | | | | | | 1 |
| passerine spp. | | | 2 | | | | | | | 1 | | | | | | 3 |
| Total | 403 | 1359 | 417 | 4614 | 587 | 1527 | 552 | 889 | 137 | 257 | 243 | 1158 | 1144 | 310 | 84 | 13681 |

**Table 37 – Numbers of birds recorded in the South East Area survey blocks, Period 2.**

| Species | SE1 | SE2 | SE3 | SE4 | SE5 | SE6 | SE7 | Total |
|---|---|---|---|---|---|---|---|---|
| Brent Goose | | 15 | | | | | | 15 |
| Common Scoter | | | | | | 216 | 1 | 217 |
| Red-breasted Merganser | | | 7 | | | | 10 | 17 |
| Red-throated Diver | | | | 4 | | | 4 | 8 |
| diver spp. | | 1 | | 24 | 22 | 47 | 15 | 109 |
| grebe spp. | | 2 | | 1 | | | | 3 |
| Fulmar | 1 | 2 | 15 | 30 | 14 | 95 | 48 | 205 |
| Gannet | 12 | 71 | 1137 | 268 | 56 | 346 | 92 | 1982 |
| Cormorant | 2 | 3 | 6 | 1 | | | | 12 |
| Cormorant/Shag | | 1 | 3 | | | | | 4 |
| wader spp. | | | | | 7 | | | 7 |
| Great Skua | | 1 | 2 | | 1 | 5 | 1 | 10 |
| skua spp. | | | | | | | 1 | 1 |
| Kittiwake | 34 | 68 | 119 | 90 | 98 | 60 | 69 | 538 |
| Black-headed Gull | 1 | | | | | | | 1 |
| Common Gull | 6 | 11 | 14 | 11 | 20 | 11 | 3 | 76 |
| Lesser Black-backed Gull | 1 | 2 | | 3 | 6 | | 8 | 20 |
| Herring Gull | 11 | 1 | 29 | 16 | 31 | 22 | 15 | 125 |
| Great Black-backed Gull | | 5 | 31 | 7 | 11 | 27 | 16 | 97 |
| grey gull spp (Herring or Common) | 4 | 16 | 14 | 45 | 72 | 5 | 35 | 191 |
| black-backed gull spp. | 4 | 6 | 11 | 72 | 95 | 30 | 30 | 248 |
| large gull spp. | | 4 | 141 | 34 | 22 | 232 | 2 | 435 |
| small gull spp. | | 22 | 14 | 104 | 73 | 11 | 5 | 229 |
| gull spp. | 9 | 105 | 63 | 659 | 1060 | 471 | 529 | 2896 |
| Guillemot | | | 2 | | | | | 2 |
| auk spp. | 55 | 53 | 77 | 945 | 725 | 703 | 363 | 2921 |
| Total | 140 | 389 | 1685 | 2314 | 2313 | 2281 | 1247 | 10369 |

**Table 38 – Numbers of birds recorded in the South East Area survey blocks, Period 3.**

| Species | SE1 | SE2 | SE4 | SE5 | SE6 | Total |
|---|---|---|---|---|---|---|
| Brent Goose | | | | 20 | | 20 |
| Common Scoter | | | | | 280 | 280 |
| Red-throated Diver | | 1 | 1 | | 6 | 8 |
| duck spp. | | | | | 2 | 2 |
| diver spp. | 7 | 7 | 4 | | 10 | 28 |
| Fulmar | 13 | 2 | 32 | 66 | 33 | 146 |
| Gannet | 1 | 3 | 1048 | 380 | 127 | 1559 |
| Cormorant/Shag | | 1 | | 2 | | 3 |
| Great Skua | | 1 | | | | 1 |
| Kittiwake | 58 | 105 | 254 | 71 | 91 | 579 |
| Black-headed Gull | | | 2 | | | 2 |
| Common Gull | 3 | 42 | 35 | 36 | 14 | 130 |
| Lesser Black-backed Gull | | 4 | 5 | 7 | 13 | 29 |
| Herring Gull | 15 | 4 | 53 | 28 | 14 | 114 |
| Great Black-backed Gull | | 1 | 57 | 27 | 11 | 96 |
| grey gull spp (Herring or Common) | 12 | 60 | 62 | 24 | 165 | 323 |
| black-backed gull spp. | 1 | 3 | 55 | 113 | 147 | 319 |
| large gull spp. | 7 | 15 | 458 | 59 | 131 | 670 |
| small gull spp. | 30 | 28 | 182 | 49 | 8 | 297 |
| gull spp. | 73 | 275 | 819 | 2691 | 1144 | 5002 |
| Guillemot | | | | 1 | 1 | 2 |
| Razorbill | | | 1 | | | 1 |
| Puffin | 1 | | | | | 1 |
| auk spp. | 1981 | 551 | 679 | 771 | 1390 | 5372 |
| Total | 2202 | 1103 | 3747 | 4345 | 3587 | 14984 |

**Table 39 – Numbers of birds recorded in the South East Area survey blocks, Period 4.**

| Species | SE7 | Total |
|---|---|---|
| Red-breasted Merganser | 1 | 1 |
| Red-throated Diver | 4 | 4 |
| diver spp. | 8 | 8 |
| Great Crested Grebe | 5 | 5 |
| Fulmar | 76 | 76 |
| Gannet | 683 | 683 |
| Cormorant/Shag | 1 | 1 |
| Great Skua | 1 | 1 |
| Kittiwake | 223 | 223 |
| Common Gull | 3 | 3 |
| Lesser Black-backed Gull | 5 | 5 |
| Herring Gull | 94 | 94 |
| Great Black-backed Gull | 10 | 10 |
| grey gull spp (Herring or Common) | 24 | 24 |
| black-backed gull spp. | 37 | 37 |
| large gull spp. | 41 | 41 |
| small gull spp. | 68 | 68 |
| gull spp. | 1390 | 1390 |
| Guillemot | 1 | 1 |
| Puffin | 1 | 1 |
| auk spp. | 945 | 945 |
| Total | 3621 | 3621 |

**Table 40 – Numbers of birds recorded in the South East Area survey blocks, Period 5.**

| Species | SE1 | SE2 | SE3 | SE4 | SE5 | SE6 | SE7 | Total |
|---|---|---|---|---|---|---|---|---|
| Common Scoter | | | | | | | 98 | 98 |
| diver spp. | | | 1 | 1 | | | | 2 |
| Fulmar | 5 | 2 | 17 | 14 | 43 | 36 | 20 | 137 |
| Gannet | 103 | 42 | 104 | 60 | 42 | 30 | 19 | 400 |
| Cormorant | | | | | | 1 | | 1 |
| Cormorant/Shag | | | | | | 3 | | 3 |
| Arctic Skua | | | 1 | 3 | | | | 4 |
| Great Skua | | | 2 | | | | | 2 |
| skua spp. | 2 | | 2 | 2 | | 2 | 1 | 9 |
| Kittiwake | 5 | 3 | 62 | 68 | 17 | 13 | 10 | 178 |
| Black-headed Gull | | 5 | | 1 | | | | 6 |
| Common Gull | | 1 | | | 4 | 1 | | 6 |
| Lesser Black-backed Gull | 3 | 6 | | | | 2 | | 11 |
| Herring Gull | 3 | 10 | 64 | 30 | 33 | 28 | 29 | 197 |
| Great Black-backed Gull | 1 | 2 | 2 | 1 | | 1 | 1 | 8 |
| grey gull spp (Herring or Common) | | 6 | 70 | 173 | 23 | 6 | 4 | 282 |
| black-backed gull spp. | 3 | | 3 | | | 1 | | 7 |
| large gull spp. | 6 | 9 | 22 | 20 | 7 | 5 | 1 | 70 |
| small gull spp. | | 3 | 2 | 2 | 6 | 9 | 1 | 23 |
| gull spp. | 8 | 15 | 519 | 113 | 95 | 332 | 157 | 1239 |
| Little Tern | | | | 1 | | | | 1 |
| Sandwich Tern | | | 1 | 2 | | 6 | | 9 |
| Arctic/Common Tern | 12 | | 12 | 41 | | 39 | 4 | 108 |
| tern spp. | 6 | | 14 | 15 | 2 | 14 | 1 | 52 |
| Guillemot | | 3 | | | | | | 3 |
| Razorbill | | | | 1 | | | | 1 |
| auk spp. | 10 | 26 | 46 | 124 | 2 | 1 | 3 | 212 |
| Feral Pigeon | | 8 | | | 1 | | | 9 |
| Swallow | | 1 | | | | | | 1 |
| Total | 167 | 142 | 944 | 672 | 275 | 530 | 349 | 3079 |

**Table 41 – Numbers of birds recorded in the South East Area survey blocks, Period 6.**

| Species | SE4 | SE5 | SE6 | SE7 | Total |
|---|---|---|---|---|---|
| Fulmar | 9 | 8 | 23 | 8 | 48 |
| Gannet | 73 | 130 | 54 | 118 | 375 |
| Cormorant/Shag | | | | 1 | 1 |
| Great Skua | | | 1 | 1 | 2 |
| Kittiwake | 42 | 35 | 15 | 3 | 95 |
| Black-headed Gull | 2 | | | | 2 |
| Common Gull | 8 | 9 | 1 | 1 | 19 |
| Lesser Black-backed Gull | 1 | 2 | | 2 | 5 |
| Herring Gull | 55 | 25 | 134 | 108 | 322 |
| Great Black-backed Gull | 1 | 2 | 1 | 1 | 5 |
| grey gull spp (Herring or Common) | 44 | 13 | 48 | 39 | 144 |
| black-backed gull spp. | 2 | 3 | 5 | 2 | 12 |
| large gull spp. | 21 | 13 | 24 | 20 | 78 |
| small gull spp. | | 24 | 5 | 8 | 37 |
| gull spp. | 775 | 317 | 27 | 328 | 1447 |
| Little Tern | | | | 2 | 2 |
| Sandwich Tern | | | | 9 | 9 |
| Arctic/Common Tern | | | | 15 | 15 |
| tern spp. | | 1 | 1 | 12 | 14 |
| auk spp. | 1 | 4 | 6 | | 11 |
| passerine spp. | | 1 | | | 1 |
| Total | 1034 | 587 | 345 | 678 | 2644 |

**Table 42 – Numbers of birds recorded in the South East Area survey blocks, Period 7.**

| Species | SE3 | SE3b | SE4 | SE5 | SE6 | SE7 | Total |
|---|---|---|---|---|---|---|---|
| Common Scoter | | | | | | 20 | 20 |
| Fulmar | 24 | 1 | 11 | 4 | 9 | 45 | 94 |
| Manx Shearwater | 1 | | | | | 1 | 2 |
| British Storm-petrel | | 4 | | | | | 4 |
| Gannet | 168 | 56 | 138 | 77 | 167 | 185 | 791 |
| Cormorant | 1 | | | | 4 | | 5 |
| Cormorant/Shag | 1 | 21 | | | 2 | | 24 |
| Great Skua | | | 1 | | 1 | 1 | 3 |
| skua spp. | | 2 | | 1 | 1 | | 4 |
| Kittiwake | 45 | | 181 | 62 | 34 | 103 | 425 |
| Lesser Black-backed Gull | 4 | | | 2 | | 1 | 7 |
| Herring Gull | 56 | 1 | 82 | 32 | 85 | 2 | 258 |
| Great Black-backed Gull | 3 | 9 | 2 | | 1 | | 15 |
| grey gull spp (Herring or Common) | 130 | 24 | 18 | 25 | 38 | 7 | 242 |
| black-backed gull spp. | 8 | 3 | 4 | 7 | 11 | 6 | 39 |
| large gull spp. | 12 | 26 | 10 | 15 | 9 | 1 | 73 |
| small gull spp. | 31 | 3 | 19 | 41 | 19 | 11 | 124 |
| gull spp. | 271 | 71 | 129 | 117 | 109 | 11 | 708 |
| Little Tern | | 1 | | | | | 1 |
| Sandwich Tern | | 3 | | 2 | | | 5 |
| Arctic/Common Tern | 5 | 7 | 1 | | | 64 | 77 |
| tern spp. | | 4 | 3 | 2 | 1 | 7 | 17 |
| auk spp. | 2 | | 1 | 2 | | 4 | 9 |
| Total | 762 | 236 | 600 | 389 | 491 | 469 | 2947 |

**Table 43 – Numbers of birds recorded in the Thames & Greater Gabbard Area survey blocks, Period 1.**

| Species | TH1 | Total |
|---|---|---|
| Brent Goose | 7 | 7 |
| Shelduck | 2 | 2 |
| Common Scoter | 906 | 906 |
| Red-throated Diver | 21 | 21 |
| Great Northern Diver | 1 | 1 |
| diver spp. | 19 | 19 |
| Great Crested Grebe | 1 | 1 |
| grebe spp. | 2 | 2 |
| Cormorant | 22 | 22 |
| Cormorant/Shag | 6 | 6 |
| Oystercatcher | 4050 | 4050 |
| Lapwing | 2 | 2 |
| Dunlin | 880 | 880 |
| Bar-tailed Godwit | 15 | 15 |
| Redshank | 2 | 2 |
| small wader spp. | 12 | 12 |
| wader spp. | 80 | 80 |
| Kittiwake | 68 | 68 |
| Black-headed Gull | 279 | 279 |
| Common Gull | 36 | 36 |
| Lesser Black-backed Gull | 3 | 3 |
| Herring Gull | 104 | 104 |
| Great Black-backed Gull | 11 | 11 |
| grey gull spp (Herring or Common) | 201 | 201 |
| black-backed gull spp. | 9 | 9 |
| large gull spp. | 25 | 25 |
| small gull spp. | 1 | 1 |
| gull spp. | 402 | 402 |
| auk spp. | 3 | 3 |
| Total | 7170 | 7170 |

**Table 44 - Numbers of birds recorded in the Thames & Greater Gabbard Area survey blocks, Period 2.**

| Species | TH1 | Total |
|---|---|---|
| Brent Goose | 150 | 150 |
| Eider | 2 | 2 |
| Common Scoter | 681 | 681 |
| Red-breasted Merganser | 10 | 10 |
| Red-throated Diver | 187 | 187 |
| duck spp. | 68 | 68 |
| Great Northern Diver | 2 | 2 |
| diver spp. | 446 | 446 |
| Great Crested Grebe | 9 | 9 |
| grebe spp. | 18 | 18 |
| Cormorant | 50 | 50 |
| Cormorant/Shag | 63 | 63 |
| Oystercatcher | 1343 | 1343 |
| Golden Plover | 300 | 300 |
| Lapwing | 1 | 1 |
| medium wader spp. | 1 | 1 |
| small wader spp. | 888 | 888 |
| wader spp. | 250 | 250 |
| skua spp. | 2 | 2 |
| Kittiwake | 46 | 46 |
| Black-headed Gull | 189 | 189 |
| Common Gull | 58 | 58 |
| Lesser Black-backed Gull | 17 | 17 |
| Herring Gull | 117 | 117 |
| Great Black-backed Gull | 55 | 55 |
| grey gull spp (Herring or Common) | 289 | 289 |
| black-backed gull spp. | 51 | 51 |
| large gull spp. | 27 | 27 |
| small gull spp. | 472 | 472 |
| gull spp. | 1356 | 1356 |
| auk spp. | 7 | 7 |
| Total | 7155 | 7155 |

**Table 45 - Numbers of birds recorded in the Thames & Greater Gabbard Area survey blocks, Period 3.**

| Species | GG1 | GG2 | TH1 | Total |
|---|---|---|---|---|
| Brent Goose | | | 100 | 100 |
| Shelduck | | | 1 | 1 |
| Common Scoter | | | 78 | 78 |
| Red-throated Diver | 23 | 3 | 16 | 42 |
| diver spp. | 15 | 10 | 330 | 355 |
| grebe spp. | | | 7 | 7 |
| Fulmar | 20 | 62 | 1 | 83 |
| Gannet | 124 | 359 | | 483 |
| Cormorant | | | 87 | 87 |
| Cormorant/Shag | | | 1 | 1 |
| Oystercatcher | | | 409 | 409 |
| large wader spp. | | | 6 | 6 |
| medium wader spp. | | | 141 | 141 |
| small wader spp. | | | 1934 | 1934 |
| wader spp. | | | 511 | 511 |
| Great Skua | | 3 | | 3 |
| Kittiwake | 149 | 51 | 51 | 251 |
| Black-headed Gull | 1 | | 225 | 226 |
| Common Gull | | 4 | 61 | 65 |
| Lesser Black-backed Gull | 6 | 20 | 4 | 30 |
| Herring Gull | 17 | 5 | 35 | 57 |
| Great Black-backed Gull | 12 | 7 | 9 | 28 |
| grey gull spp (Herring or Common) | 9 | 6 | 683 | 698 |
| black-backed gull spp. | 89 | 21 | 209 | 319 |
| large gull spp. | 470 | 30 | 54 | 554 |
| small gull spp. | 61 | 23 | 164 | 248 |
| gull spp. | 534 | 997 | 429 | 1960 |
| Guillemot | 2 | | | 2 |
| auk spp. | 3248 | 1052 | 20 | 4320 |
| Total | 4780 | 2653 | 5566 | 12999 |

**Table 46 - Numbers of birds recorded in the Thames & Greater Gabbard Area survey blocks, Period 4.**

| Species | GG3 | GG4 | TH1 | Total |
|---|---|---|---|---|
| Common Scoter | | | 14 | 14 |
| Red-throated Diver | 12 | 6 | 12 | 30 |
| Great Northern Diver | | | 3 | 3 |
| diver spp. | 60 | 46 | 112 | 218 |
| grebe spp. | | | 1 | 1 |
| Fulmar | 277 | 56 | | 333 |
| shearwater spp. | | 1 | | 1 |
| Gannet | 345 | 109 | | 454 |
| Cormorant | | | 232 | 232 |
| Oystercatcher | | | 400 | 400 |
| medium wader spp. | | | 200 | 200 |
| Kittiwake | 117 | 192 | 2 | 311 |
| Black-headed Gull | | | 39 | 39 |
| Common Gull | 1 | 1 | 17 | 19 |
| Lesser Black-backed Gull | 8 | 8 | 2 | 18 |
| Herring Gull | 2 | | 17 | 19 |
| Great Black-backed Gull | 3 | 1 | 3 | 7 |
| grey gull spp (Herring or Common) | 3 | 17 | 49 | 69 |
| black-backed gull spp. | 139 | 4 | 20 | 163 |
| large gull spp. | 13 | 7 | 220 | 240 |
| small gull spp. | 89 | 22 | 12 | 123 |
| gull spp. | 462 | 12 | 143 | 617 |
| Razorbill | | 1 | | 1 |
| auk spp. | 236 | 412 | 1 | 649 |
| passerine spp. | 2 | | | 2 |
| Total | 1769 | 895 | 1499 | 4163 |

**Table 47 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 1.**

| Species | GW4 | Total |
|---|---|---|
| Eider | 18 | 18 |
| Common Scoter | 15 | 15 |
| Red-breasted Merganser | 2 | 2 |
| Red-throated Diver | 80 | 80 |
| diver spp. | 535 | 535 |
| Fulmar | 15 | 15 |
| Gannet | 2 | 2 |
| Cormorant | 2 | 2 |
| medium wader spp. | 10 | 10 |
| small wader spp. | 400 | 400 |
| Great Skua | 1 | 1 |
| Kittiwake | 47 | 47 |
| Little Gull | 168 | 168 |
| Common Gull | 25 | 25 |
| Lesser Black-backed Gull | 3 | 3 |
| Herring Gull | 8 | 8 |
| Great Black-backed Gull | 2 | 2 |
| grey gull spp (Herring or Common) | 30 | 30 |
| black-backed gull spp. | 7 | 7 |
| large gull spp. | 4 | 4 |
| small gull spp. | 70 | 70 |
| gull spp. | 851 | 851 |
| Little Auk | 1 | 1 |
| auk spp. | 314 | 314 |
| passerine spp. | 5 | 5 |
| Total | 2615 | 2615 |

**Table 48 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 2.**

| Species | GW4 | GW8 | GW9 | GW16 | Total |
|---|---|---|---|---|---|
| Eider | | | | 2 | 2 |
| Common Scoter | 2028 | | | | 2028 |
| Red-breasted Merganser | 7 | | | | 7 |
| Red-throated Diver | 15 | | | | 15 |
| diver spp. | 21 | | | 4 | 25 |
| Fulmar | 7 | 134 | 90 | 33 | 264 |
| Gannet | 2 | 5 | 8 | 4 | 19 |
| Cormorant | 10 | | | | 10 |
| Kittiwake | 20 | 16 | 2 | 98 | 136 |
| Black-headed Gull | 5 | | | | 5 |
| Little Gull | 14 | | | 1 | 15 |
| Common Gull | 6 | | 21 | 5 | 32 |
| Herring Gull | 15 | 1 | 9 | 4 | 29 |
| Great Black-backed Gull | 11 | 1 | 11 | 2 | 25 |
| grey gull spp (Herring or Common) | 184 | 1 | 10 | 17 | 212 |
| black-backed gull spp. | 121 | 3 | 5 | 2 | 131 |
| large gull spp. | 21 | 5 | 7 | 3 | 36 |
| small gull spp. | 8 | 6 | 21 | 13 | 48 |
| gull spp. | 191 | 4 | 2 | 26 | 223 |
| auk spp. | 60 | 110 | 104 | 490 | 764 |
| Blackbird | 1 | | | | 1 |
| passerine spp. | | 1 | | | 1 |
| Total | 2747 | 287 | 290 | 704 | 4028 |

**Table 49 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 3.**

| Species | GW4 | Total |
|---|---|---|
| Common Scoter | 1000 | 1000 |
| Red-breasted Merganser | 6 | 6 |
| Red-throated Diver | 33 | 33 |
| duck spp. | 6 | 6 |
| diver spp. | 78 | 78 |
| Great Crested Grebe | 1 | 1 |
| grebe spp. | 3 | 3 |
| Fulmar | 8 | 8 |
| Gannet | 2 | 2 |
| Shag | 1 | 1 |
| Kittiwake | 15 | 15 |
| Common Gull | 14 | 14 |
| Lesser Black-backed Gull | 1 | 1 |
| Herring Gull | 8 | 8 |
| Great Black-backed Gull | 1 | 1 |
| black-backed gull spp. | 1 | 1 |
| large gull spp. | 7 | 7 |
| small gull spp. | 43 | 43 |
| gull spp. | 129 | 129 |
| auk spp. | 197 | 197 |
| Total | 1554 | 1554 |

**Table 50 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 4.**

| Species | GW4 | GW9 | GW16 | Total |
|---|---|---|---|---|
| Eider | 4 | | | 4 |
| Red-breasted Merganser | 3 | | | 3 |
| Duck spp. | 1 | 1 | | 2 |
| Red-throated Diver | 7 | | 24 | 31 |
| diver spp. | 15 | 2 | 105 | 122 |
| Fulmar | | 26 | 59 | 85 |
| Gannet | 2 | 362 | 56 | 420 |
| Cormorant | 1 | | | 1 |
| Kittiwake | 8 | 305 | 9 | 322 |
| Little Gull | 1 | | | 1 |
| Black-headed Gull | 2 | | 2 | 4 |
| Common Gull | 15 | 8 | | 23 |
| Lesser Black-backed Gull | 4 | | 2 | 6 |
| Herring Gull | 11 | 10 | 4 | 25 |
| Great Black-backed Gull | 1 | 2 | 1 | 4 |
| grey gull spp (Herring or Common) | 19 | 20 | 2 | 41 |
| black-backed gull spp. | 5 | | 3 | 8 |
| large gull spp. | 181 | 41 | 1 | 223 |
| small gull spp. | 6 | 40 | 9 | 55 |
| gull spp. | 136 | 239 | 22 | 397 |
| Sandwich Tern | 1 | | | 1 |
| tern spp. | 27 | | | 27 |
| Razorbill | | 1 | 2 | 3 |
| auk spp. | 9 | 1326 | 182 | 1517 |
| passerine spp. | | 7 | | 7 |
| Total | 459 | 2390 | 483 | 3332 |

**Table 51 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 5**

| Species | GW8 | GW9 | GW10 | Total |
|---|---|---|---|---|
| Red-throated Diver | | | 1 | 1 |
| duck spp. | 2 | | | 2 |
| Fulmar | 91 | 25 | 27 | 143 |
| Manx Shearwater | | | 1 | 1 |
| Gannet | 395 | 69 | 17 | 481 |
| skua spp. | | 1 | | 1 |
| Kittiwake | 869 | 1314 | 283 | 2466 |
| Lesser Black-backed Gull | | | 4 | 4 |
| Herring Gull | | 2 | 1 | 3 |
| Great Black-backed Gull | | 1 | 2 | 3 |
| grey gull spp (Herring or Common) | 3 | 1 | 1 | 5 |
| black-backed gull spp. | | | 1 | 1 |
| large gull spp. | 3 | | 1 | 4 |
| small gull spp. | 29 | 16 | 9 | 54 |
| gull spp. | 717 | 140 | 45 | 902 |
| Sandwich Tern | | 7 | 3 | 10 |
| Arctic/Common Tern | 15 | 20 | 20 | 55 |
| tern spp. | | 35 | 9 | 44 |
| Guillemot | | 11 | 1 | 12 |
| Razorbill | | 4 | | 4 |
| auk spp. | 3147 | 1420 | 23 | 4590 |
| Total | 5271 | 3066 | 449 | 8786 |

**Table 52 - Numbers of birds recorded in the Greater Wash Area survey blocks, Period 6**

| Species | GW8 | GW9 | GW10 | Total |
|---|---|---|---|---|
| Fulmar | 118 | 20 | 16 | 154 |
| Manx Shearwater | 1 | 3 | 10 | 14 |
| British Storm-petrel | 1 | | | 1 |
| Gannet | 418 | 630 | 150 | 1198 |
| Great Skua | | 2 | 1 | 3 |
| skua spp. | | 1 | | 1 |
| Kittiwake | 622 | 1466 | 857 | 2945 |
| Black-headed Gull | | 1 | | 1 |
| Common Gull | 1 | | | 1 |
| Lesser Black-backed Gull | | 2 | 2 | 4 |
| Herring Gull | | 2 | 3 | 5 |
| black-backed gull spp. | 1 | | | 1 |
| large gull spp. | 2 | 1 | 3 | 6 |
| small gull spp. | 4 | | | 4 |
| gull spp. | 111 | 20 | 16 | 147 |
| Sandwich Tern | | 6 | 8 | 14 |
| Arctic/Common Tern | | 1 | | 1 |
| tern spp. | 1 | | | 1 |
| Guillemot | 1 | | | 1 |
| Razorbill | | | 1 | 1 |
| auk spp. | 385 | 638 | 284 | 1307 |
| Total | 1666 | 2793 | 1351 | 5810 |

**Table 53 - Numbers of birds recorded in the North East Area survey blocks, Period 2**

| Species | NE2 | Total |
|---|---|---|
| diver spp. | 6 | 6 |
| Fulmar | 6 | 6 |
| Gannet | 9 | 9 |
| skua spp. | 1 | 1 |
| Kittiwake | 125 | 125 |
| Black-headed Gull | 2 | 2 |
| Common Gull | 79 | 79 |
| Herring Gull | 40 | 40 |
| Great Black-backed Gull | 80 | 80 |
| grey gull spp (Herring or Common) | 180 | 180 |
| black-backed gull spp. | 159 | 159 |
| large gull spp. | 206 | 206 |
| small gull spp. | 61 | 61 |
| gull spp. | 2162 | 2162 |
| auk spp. | 190 | 190 |
| Total | 3306 | 3306 |

**Table 54 - Numbers of birds recorded in the North East Area survey blocks, Period 4**

| Species | NE1 | NE2 | Total |
|---|---|---|---|
| goose spp. | 9 | | 9 |
| Shelduck | 2 | | 2 |
| Eider | 190 | | 190 |
| Common Scoter | 35 | | 35 |
| duck spp. | | 15 | 15 |
| diver spp. | 5 | | 5 |
| Fulmar | 25 | 32 | 57 |
| Gannet | 640 | 11 | 651 |
| Shag | 30 | 3 | 33 |
| Cormorant/Shag | 9 | 2 | 11 |
| Grey Heron | 1 | | 1 |
| Oystercatcher | 4 | | 4 |
| large wader spp. | 10 | | 10 |
| small wader spp. | 20 | | 20 |
| wader spp. | 5 | | 5 |
| Kittiwake | 242 | 78 | 320 |
| Black-headed Gull | 19 | 3 | 22 |
| Common Gull | 9 | 37 | 46 |
| Lesser Black-backed Gull | 1 | 15 | 16 |
| Herring Gull | 14 | 41 | 55 |
| grey gull spp (Herring or Common) | 134 | 49 | 183 |
| black-backed gull spp. | 7 | 6 | 13 |
| large gull spp. | 87 | 49 | 136 |
| small gull spp. | 11 | 27 | 38 |
| gull spp. | 181 | 1078 | 1259 |
| tern spp. | | 4 | 4 |
| Guillemot | 10 | | 10 |
| Razorbill | 2 | | 2 |
| auk spp. | 4497 | 92 | 4589 |
| Total | 6199 | 1542 | 7741 |

**Table 55 - Numbers of birds recorded in the North East Area survey blocks, Period 6**

| Species | NE2 | Total |
|---|---|---|
| Eider | 1 | 1 |
| Fulmar | 16 | 16 |
| Gannet | 39 | 39 |
| Kittiwake | 82 | 82 |
| Common Gull | 2 | 2 |
| Lesser Black-backed Gull | 1 | 1 |
| Herring Gull | 48 | 48 |
| grey gull spp (Herring or Common) | 9 | 9 |
| black-backed gull spp. | 1 | 1 |
| large gull spp. | 12 | 12 |
| small gull spp. | 8 | 8 |
| gull spp. | 103 | 103 |
| Sandwich Tern | 2 | 2 |
| Arctic/Common Tern | 14 | 14 |
| tern spp. | 28 | 28 |
| Guillemot | 3 | 3 |
| Puffin | 1 | 1 |
| auk spp. | 424 | 424 |
| Total | 794 | 794 |

**Table 56 - Numbers of Common Scoters recorded in Periods 1-7.**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NW3 | | | | 28 | | | |
| NW5 | | | 6612 | | | | |
| NW10 | | | | | | | |
| NW11 | | 5 | 1 | | | | |
| NW12 | | | 228 | | | | |
| NW14 | | 48 | | 201 | 2015 | | |
| NW16 | | | | | | 1 | |
| North West Total | | 53 | 6841 | 229 | 2015 | 1 | |
| WW3 | | 20 | | 3 | | | |
| WW6 | | 1683 | 2190 | | 246 | | 25 |
| WW7 | 1 | | 65 | | | 25 | |
| West Wales Total | 1 | 1703 | 2255 | 3 | 246 | 25 | 25 |
| SW103 | 2352 | | | | | 891 | |
| SW115 | 4 | | | | | | |
| South West Total | 2356 | | | | | 891 | |
| SE6 | | 216 | 280 | | | | |
| SE7 | | 1 | | | 98 | | 20 |
| South East Total | | 217 | 280 | | 98 | | 20 |
| TH1 | 906 | 681 | 78 | 14 | | | |
| Thames & GG Total | 906 | 681 | 78 | 14 | | | |
| GW4 | 15 | 2028 | 1000 | | | | |
| Greater Wash Total | 15 | 2028 | 1000 | | | | |

**Table 56 continued**.

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NE1 | | | | 35 | | | |
| North East Total | | | | 35 | | | |

**Table 57 - Estimates of Common Scoter numbers (with 95% confidence intervals) for each Period in all Areas.**

| Period | Survey Block | Estimate | Lower Confidence Interval | Upper Confidence Interval |
|---|---|---|---|---|
| Period 1 | SW (SW103 only) | 3287 | 1657 | 4995 |
| | TH & GG (TH1 only) | 3212 | 1034 | 9992 |
| Period 2 | WW (most WW6) | 4567 | 2242 | 7466 |
| | WW6 | 4452 | 2988 | 5867 |
| Period 3 | NW (mostNW5) | 15969 | 7684 | 27060 |
| | NW5 | 15872 | 7637 | 23635 |
| | WW (most WW6) | 3764 | 2073 | 5570 |
| | WW6 | 3610 | 2563 | 4609 |
| Period 4 | NW | 749 | 191 | 1792 |

**Table 58 - Numbers of divers recorded in Periods 1-5**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 |
|---|---|---|---|---|---|
| NW3 | 3 | | | 11 | |
| NW5 | | | 25 | | |
| NW11 | | 7 | 14 | | |
| NW12 | | | 1 | | |
| NW13 | | | | 14 | |
| NW14 | | 18 | | 22 | 33 |
| North West Total | 3 | 25 | 40 | 47 | 33 |
| WW3 | | 7 | | 6 | 1 |
| WW5 | | 1 | 1 | | |
| WW6 | | 53 | 244 | | 1 |
| WW7 | 16 | | 8 | | |
| West Wales Total | 16 | 61 | 253 | 6 | 2 |
| SW103 | 7 | | | | |
| SW109 | 3 | | | | |
| SW114 | 2 | | | | |
| SW122 | 5 | | | | |
| SW124 | | | 6 | | |
| South West Total | 17 | | 6 | | |
| SE1 | | | 7 | | |
| SE2 | | 1 | 8 | | |
| SE3 | | | | | 1 |
| SE4 | | 28 | 5 | | 1 |
| SE5 | | 22 | | | |
| SE6 | | 47 | 16 | | |
| SE7 | | 19 | | 12 | |
| South East Total | | 117 | 36 | 12 | 2 |
| TH1 | 41 | 635 | 346 | 127 | |
| GG1 | | | 38 | | |
| GG2 | | | 13 | | |
| GG3 | | | | 72 | |
| GG4 | | | | 52 | |
| GW4 | 615 | 36 | 111 | 22 | |
| GW9 | | | | 2 | |
| GW10 | | | | | 1 |
| GW16 | | 4 | | 129 | |

**Table 58 continued.**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 |
|---|---|---|---|---|---|
| Greater Wash Total | 615 | 40 | 111 | 153 | 1 |
| NE1 | | | | 5 | |
| NE2 | | 6 | | | |
| North East Total | | 6 | | 5 | |

**Table 59 - Estimates of diver numbers (with 95% confidence intervals) for each Period in all Areas**

| Period | Survey Block | Estimate | Lower Confidence Interval | Upper Confidence Interval |
|---|---|---|---|---|
| Period 1 | GW (GW4 only) | 1975 | 1213 | 3218 |
| | TH & GG | 268 | 177 | 355 |
| Period 2 | GW | 230 | 112 | 376 |
| | GW4 | 204 | 115 | 312 |
| | SE | 582 | 295 | 975 |
| | TH & GG (TH1 only) | 2129 | 1524 | 2909 |
| | WW (WW6 only) | 776 | 472 | 1276 |
| Period 3 | GW | 707 | 504 | 989 |
| | NW | 338 | 184 | 543 |
| | NW5 | 218 | 113 | 335 |
| | SE | 218 | 129 | 328 |
| | TH & GG | 1714 | 1238 | 2373 |
| | WW (WW6 only) | 995 | 547 | 1478 |
| Period 4 | GW | 1010 | 741 | 1401 |
| | NI | 641 | 328 | 1092 |
| | NW | 644 | 411 | 896 |
| | TH & GG | 1469 | 1125 | 1867 |

**Table 60 - Numbers of Manx Shearwaters recorded in Periods 1-7**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NW7 | | | | | | 859 | |
| NW8 | | | | | | 44 | |
| NW9 | | | | | 4 | | |
| NW10 | | | | 1 | | | 460 |
| NW11 | | 5 | | | | 625 | |
| NW12 | | | | | 517 | | |
| NW13 | | | | | 6 | | |
| NW14 | | | | | 47 | | |
| NW15 | | | | | | 1194 | |
| NW16 | | | | | | 2173 | |
| North West Total | | 5 | | 1 | 574 | 4895 | 460 |
| WW2 | | | | | 8 | | 619 |
| WW3 | | | | 105 | 99 | | 2680 |
| WW4 | | | | | 3032 | | |
| WW5 | | | | | 709 | | 960 |
| WW6 | | | | | 1116 | | 1402 |
| WW7 | | | | | 1199 | 2726 | |
| WW8 | | | | | 2015 | | 1402 |
| West Wales Total | | | | 105 | 8178 | 2726 | 7063 |
| SW101 | | | | | | 2237 | |
| SW102 | 2 | | | | | 636 | |
| SW103 | | | | | | 591 | |
| SW104 | | | | | | 49 | |
| SW106 | | | | | | 164 | 178 |
| SW107 | | | | | | 158 | 946 |
| SW108 | | | | | 934 | 570 | 47 |
| SW109 | | | | | | | 3534 |
| SW110 | | | | | | 41 | 5 |
| SW111 | | | | | | | 65 |
| SW112 | | | | | | 6 | |
| SW113 | | | | | | | 8 |
| SW114 | | | | | | | 9 |
| SW115 | | | | | | | 3 |
| SW117 | | | | | | | 1 |
| SW118 | | | | | | | 1 |
| SW119 | | | | | | | 1 |

**Table 60 continued.**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| SW119b | | | | | | | 1 |
| South West Total | 2 | | | | 934 | 4452 | 4799 |

**Table 61 - Estimates of Manx Shearwater numbers (with 95% confidence intervals) for each Period in all Areas.**

| Period | Survey Block | Estimate | Lower Confidence Interval | Upper Confidence Interval |
|---|---|---|---|---|
| Period 5 | NW | 3518 | 2000 | 6188 |
| | SW | 3343 | 1905 | 5414 |
| | WW | 25486 | 19292 | 33798 |
| | WW4 | 9192 | 4777 | 15764 |
| Period 6 | NW | 18118 | 13612 | 23514 |
| | SW | 17804 | 11514 | 26426 |
| | SW101 | 6040 | 1640 | 16399 |
| | WW | 7602 | 4763 | 11188 |
| Period 7 | NW | 2485 | 1031 | 4907 |
| | SW | 13540 | 9322 | 19666 |
| | SW109 | 6168 | 2855 | 13324 |
| | WW | 22795 | 17734 | 28978 |

**Table 62 - Numbers of auks recorded in Periods 1-7.**

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| NW3 | 1488 | | | 228 | | | |
| NW5 | | | 560 | | | | |
| NW7 | | | | 829 | | 436 | |
| NW8 | | | | 482 | | 24 | |
| NW9 | | 143 | | 623 | 117 | | |
| NW10 | | | 174 | 89 | | | 985 |
| NW11 | | 964 | 1027 | | | 204 | |
| NW12 | | | 293 | | 794 | | |
| NW13 | | | | 282 | 327 | | |
| NW14 | | 485 | | 101 | 331 | | |
| NW15 | | | | 64 | | 652 | |
| NW16 | | | | | | 598 | |
| North West Total | 1488 | 1592 | 2054 | 2698 | 1569 | 1916 | 985 |
| WW2 | | 300 | 671 | | 146 | | 1485 |
| WW3 | | 687 | | 602 | 189 | | 862 |
| WW4 | | 40 | | 44 | 318 | | |
| WW5 | | 286 | 136 | | 259 | | 902 |
| WW6 | | 430 | 279 | | 221 | | 199 |
| WW7 | 671 | | 45 | | 732 | 792 | |
| WW8 | | 109 | 62 | | 1416 | | 10002 |
| West Wales Total | 671 | 1852 | 1193 | 646 | 3281 | 792 | 13450 |
| SW101 | | | | | | 404 | |
| SW102 | 2854 | | | | | 503 | |
| SW103 | 7453 | | | | | 254 | |
| SW104 | 177 | | | | | 19 | |
| SW105 | 27 | | | | | | |
| SW106 | 167 | | | | | 201 | 122 |
| SW107 | 367 | | | | | 161 | 30 |
| SW108 | 55 | | | | 88 | | 1 |
| SW109 | 26 | | | | | 38 | 22 |
| SW110 | 20 | | | | | 24 | 9 |
| SW111 | 22 | | | | | | 6 |
| SW112 | | | | | | 47 | |
| SW113 | | | | | | | |
| SW114 | 48 | | | | | | 4 |
| SW115 | 62 | | | | | | 2 |

**Table 62 continued**.

| Survey Block | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 | Period 7 |
|---|---|---|---|---|---|---|---|
| SW116 | | | | | | | |
| SW117 | | | | | | | 2 |
| SW118 | 14 | | | | | | 4 |
| SW119 | 88 | | | | | | 4 |
| SW120 | 166 | | | | | 21 | |
| SW121 | 894 | | | | | 9 | |
| SW122 | 752 | | | | | 79 | |
| SW123 | | | | | | 72 | |
| SW124 | | | 850 | | | | 2 |
| SW125 | | 255 | 373 | | | 34 | |
| South West Total | 13192 | 255 | 1223 | | 88 | 1866 | 208 |
| SE1 | | 55 | 1982 | | 10 | | |
| SE2 | | 53 | 551 | | 29 | | |
| SE3 | | 79 | | | 46 | | 2 |
| SE4 | | 945 | 680 | | 125 | 1 | 1 |
| SE5 | | 725 | 772 | | 2 | 4 | 2 |
| SE6 | | 703 | 1391 | | 1 | 6 | |
| SE7 | | 363 | | 947 | 3 | | 4 |
| South East Total | | 2923 | 5376 | 947 | 216 | 11 | 9 |
| TH1 | 3 | 7 | 20 | 1 | | | |
| GG1 | | | 3250 | | | | |
| GG2 | | | 1052 | | | | |
| GG3 | | | | 236 | | | |
| GG4 | | | | 413 | | | |
| Thames & GG Total | 3 | 7 | 4322 | 650 | | | |
| GW4 | 315 | 60 | 197 | 9 | | | |
| GW8 | | 110 | | | 3147 | 386 | |
| GW9 | | 104 | | 1327 | 1435 | 638 | |
| GW10 | | | | | 24 | 285 | |
| GW16 | | 490 | | 184 | | | |
| Greater Wash Total | 315 | 764 | 197 | 1520 | 4606 | 1309 | |
| NE1 | | | | 4509 | | | |
| NE2 | | 190 | | 92 | | 428 | |
| North East Total | | 190 | | 4601 | | 428 | |

**Table 63 – Estimates of auk numbers (with 95% confidence intervals) for each Period in all Areas**

| Period | Survey Block | Estimate | Lower Confidence Interval | Upper Confidence Interval |
|---|---|---|---|---|
| Period 1 | GW | 1800 | 1251 | 2405 |
| | NW | 6146 | 5228 | 7326 |
| | SW | 66760 | 58822 | 75771 |
| | SW103 | 26699 | 20722 | 34399 |
| | SW102 | 17466 | 14010 | 21774 |
| | SW120-122 | 18417 | 13470 | 24081 |
| | WW | 2806 | 1752 | 4437 |
| Period 2 | GW | 6109 | 4888 | 7616 |
| | GW16 | 3807 | 2969 | 4801 |
| | NE | 1051 | 783 | 1394 |
| | NW | 10713 | 8266 | 13417 |
| | SE | 14039 | 12494 | 15494 |
| | SW | 1329 | 834 | 1898 |
| | WW | 11203 | 9041 | 13613 |
| Period 3 | GW | 1247 | 840 | 1671 |
| | NW | 11311 | 9655 | 13579 |
| | NW11 | 5584 | 4367 | 7100 |
| | SE | 23612 | 20942 | 26352 |
| | SE1 | 8592 | 7226 | 10136 |
| | SW | 7528 | 4377 | 12611 |
| | TH&GG | 18900 | 16372 | 21608 |
| | GG1 | 13688 | 11557 | 16053 |
| | WW | 5377 | 4100 | 7040 |
| | WW2 | 3396 | 2353 | 4564 |
| Period 4 | GW | 8822 | 7475 | 10257 |
| | GW9 | 7426 | 6205 | 8695 |
| | NE | 16872 | 10016 | 21615 |
| | NE1 | 11536 | 7370 | 18058 |
| | NI | 3690 | 2846 | 4713 |
| | NW | 26675 | 23627 | 30001 |
| | SE | 8024 | 6069 | 9782 |
| | TH & GG | 18130 | 15311 | 20977 |
| | GG1 | 14710 | 12125 | 17246 |
| | WW | 4187 | 3179 | 5399 |
| | WW3 | 3725 | 2800 | 4826 |

**Table 63 continued**

| | | | | |
|---|---|---|---|---|
| Period 5 | GW | 23991 | 18167 | 30661 |
| | NW | 8362 | 7130 | 9795 |
| | WW | 23011 | 18308 | 28038 |
| Period 6 | GW | 11709 | 9368 | 13825 |
| | NW | 10363 | 7901 | 13656 |
| | SW | 15808 | 13419 | 18476 |
| | WW | 5326 | 4335 | 6628 |
| Period 7 | WW | 88271 | 74501 | 103603 |
| | WW8 | 41608 | 33619 | 50217 |