



Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

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Offshore Ornithology**

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Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex 4-1: Baseline Technical Report - Offshore Ornithology

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Thanet Extension Environmental Statement

Volume 4, Chapter 4, Annex 1

Baseline Technical Report - Offshore Ornithology

Vattenfall Wind Power Ltd

APEM Ref: P00001227-01

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1. Introduction

1.1 Background

The proposed Thanet Extension Offshore Wind Farm (Thanet Extension) project would comprise up to 34 offshore wind turbines, offshore converter station, inter-array cables, interconnector cables and offshore and onshore export cables taking power to an onshore converter station. The Thanet Extension site covers an area of approximately 73 km² and is situated 8 km from its nearest point to the coast of Kent (Appendix 1).

In order to inform the Environmental Statement (ES), there is a clear requirement to obtain site-specific data on habitats and species, including those that are interest features of designated sites. This report is on birds within the offshore environment from two years (24 consecutive months) of aerial digital survey data and three months of boat-based survey data. Vattenfall Wind Power Ltd (VWPL) are committed to undertaking an Environmental Impact Assessment (EIA) that provides the detailed level of baseline data needed to inform a robust assessment of the potential impacts of the proposed wind farm on birds. To facilitate this, surveys have been undertaken by APEM Ltd (hereafter referred to as APEM) as outlined in the Thanet Extension EIA Scoping Report (Royal HaskoningDHV, 2016) and further clarified during subsequent consultation with stakeholders through the Evidence Plan Process.

1.2 Aim of the Report

The aim of this report is to provide the baseline information from site-specific surveys from which the offshore ornithology EIA and Habitats Regulations Assessment (HRA) can be completed.

It presents information on marine birds derived from 24 consecutive months of aerial digital surveys (March 2016 to February 2018, inclusive) and three months of boat-based surveys (January to March 2016) of a survey area consisting of the operational Thanet Offshore Wind Farm (Thanet) site, the proposed Thanet Extension site, plus a 4 km buffer surrounding this (collectively termed the Survey Area and illustrated in Appendix 2). The information that is presented within this report and its appendices includes the following:

- Summary of Thanet post-consent monitoring bird data
- Bird abundance estimates for Thanet Extension (monthly and for bio-seasons);
- Bird density estimates for Thanet Extension (monthly and for bio-seasons);
- Behaviour of birds for Thanet Extension (numbers flying and sitting on the water);
- Bird flight heights;
- Age classification of key species; and
- Spatial distribution maps of birds (for bio-seasons).

1.3 Site Description

The proposed Thanet Extension area lies approximately 8 km from Kent at the closest point to shore. It comprises areas on all sides of the Thanet Offshore Wind Farm and has water depths across the site from 13 - 43 m. The Thanet Extension Offshore Export Cable Corridor (OECC) extends from the south-western boundary of the Thanet Extension array area in a south-westerly direction to Pegwell Bay on the Kent coast. The OECC will be approximately 20 km in length.

2. Data Sources

2.1 Aerial Digital Survey Data

APEM has undertaken 24 consecutive monthly aerial digital surveys from March 2016 to February 2018 inclusive in order to collect data to inform the EIA and HRA for Thanet Extension and assess the temporal and spatial abundance and distribution of birds within the Survey Area. Specific data were collected from aerial digital surveys from across the Survey Area. The 24 months in which aerial digital surveys were carried out, that are referred to in this report, are shown in Table 1.

Table 1 24 Months in which Aerial Digital Surveys were conducted

Month	2016	2017	2018
January		✓	✓
February		✓	✓
March	✓	✓	
April	✓	✓	
May	✓	✓	
June	✓	✓	
July	✓	✓	
August	✓	✓	
September	✓	✓	
October	✓	✓	
November	✓	✓	
December	✓	✓	

2.2 Boat-based Survey Data

In addition, John Ford Environmental Consultancy undertook monthly boat-based surveys from January to March 2016 inclusive in order to collect data on the temporal and spatial abundance and distribution of birds within the specific boat-based Survey Area (Illustrated in Appendix 3). The months in which boat-based surveys were carried out, that are referred to in this report, are shown in Table 2. The boat-based surveys ceased in March 2016 following agreement with Natural England that aerial digital survey was the preferred method to inform the assessment of an offshore wind farm.

Table 2 Months in which Boat-based Surveys were conducted

Month	2016
January	✓
February	✓
March	✓

2.3 Review of Bird Data Available for use in the Thanet Extension EIA

2.3.1 Thanet Offshore Wind Farm

There is a considerable amount of data available on bird activity and abundance from the area within and around Thanet collected in the pre-application and post-consent (construction and post-construction/operation) phases (listed in Table 3) and in Percival (2015). There has also been a programme of surveys related to the nearby Outer Thames Estuary (OTE) SPA, which is in close proximity to the Thanet Extension site. More recently, detailed studies of bird flight activity and abundance have been undertaken at Thanet, as a consequence of the Offshore Renewable Joint Industry Programme's (ORJIP) bird collision avoidance study (Skov et al., 2018).

A recent review of Thanet bird species occurrence and distribution with an evaluation of the significance of that information was undertaken for Vattenfall (Percival, 2015). This review considered the information published in the Thanet specific reports listed in Table 3. This covered data sets derived from boat-based surveys of a full 12 months in 2004/05 and 6 month periods in the winters of 2009/10, 2010/11, 2011/12 and 2012/13. The area covered for these boat-based post-consent monitoring survey programmes covered the Thanet site and a 2 km buffer area surrounding it and an additional control area to the south (collectively termed the Study Area). The emphasis on the winter period is as a result of decisions made as part of the consent for Thanet, whereby the construction and post-construction monitoring carried out had to reflect the identified ornithological sensitivity of the area. This is that there is most interest during the non-breeding seasons (winter) and relatively little during the breeding season. Percival (2015) reviewed the ES baseline data and post consent monitoring survey data and concluded that the primary ornithological interest was wintering red-throated diver, a qualifying feature of the OTE SPA. Percival (2015) also concluded that these surveys provided evidence that the Study Area is overall of generally low ornithological sensitivity. The species that were identified as being present in more than negligible numbers throughout the year, or in any specific bio-season, were: gannet, guillemot, razorbill, kittiwake, herring gull, lesser black-backed and great black-backed gull¹.

Table 3 Historic and Future Offshore Ornithology Reports/data on Thanet and Thanet Extension available for use in Thanet Extension Baseline / EIA / HRA

Report Date	Type	Report
November 2008	Environmental Statement	Chapter 8 Ornithology
		Appendix 8.1 Proposed Thanet Offshore Wind Farm Aerial and Boat Based Surveys: Methodologies, results and statistical analysis (Royal HaskoningDHV)
		Appendix 8.2 Bird Collision Risk Assessment (Royal HaskoningDHV)
February 2009	Monitoring Protocol	Thanet Offshore Wind Farm During and Post-construction Bird Monitoring Protocol (Royal HaskoningDHV)
October 2009	Annual Report (pre-construction)	Thanet Offshore Wind Farm Annual Ornithological Monitoring Report 2009 survey season (Royal HaskoningDHV)

¹ Scientific names of bird species mentioned in this report are given in Appendix 4.

Report Date	Type	Report
July 2010	Annual Report (construction)	Thanet Offshore Wind Farm Annual Ornithological Monitoring Report (During Construction) 2009-2010 (Royal HaskoningDHV)
March 2012	Annual Report (post-construction Year 1)	Thanet Offshore Wind Farm Ornithological Monitoring 2010-2011 (Royal HaskoningDHV)
June 2012	Annual Report (post-construction Year 2)	Thanet Offshore Wind Farm Ornithological Monitoring 2011-2012 (Royal HaskoningDHV)
June 2013	Annual Report (post-construction Year 3)	Thanet Offshore Wind Farm Ornithological Monitoring 2012-2013 (Royal HaskoningDHV)
March 2015	Ornithology Review	Draft Ornithology Review for the Thanet and Ormonde Offshore Wind Farm Extensions (Percival)
January 2016	Data Report	Three months data from boat surveys Thanet Extension (APEM)
April 2017	Annual Report Year 1 Baseline	Thanet Extension 12 month report from Aerial Digital Surveys (APEM)
November 2017	PEIR Baseline Technical Report	PEIR Baseline Technical Report for Thanet Extension (APEM)
March 2018	Data Report	Assessment of Historical Data from Thanet OWF in comparison to more recent Thanet Extension Data (APEM)
April 2018	ORJIP BCA Report	Final report ORJIP Bird Collision and Avoidance study at Thanet (Skov <i>et al.</i> , 2018)

2.3.2 English southern North Sea

A considerable amount of data has been amassed on seabirds in the southern North Sea through over 450 offshore surveys, including The Crown Estate's enabling actions surveys, Statutory Nature Conservation Body (SNCB) monitoring programmes and individual developers baseline and / or post-consent surveys for multiple Offshore Wind Farms (OWFs), covering a large extent of the English waters in the southern North Sea (Appendix 1). Examination of these data, based on Percival (2015), demonstrates that this region of the North Sea is of lower ornithological interest during the breeding season than more northern areas. This is because there are very few seabird colonies in this region and therefore little dependence on these waters for foraging (Skov *et al.*, 1995, Stone *et al.*, 1995, Steinen *et al.*, 2007 & Percival, 2015).

One consequence of this is that much of the focus of impact assessments, post-consent monitoring surveys and marine designations within the southern North Sea has been on seabirds in the non-breeding period. In particular, the wintering population of red-throated diver, for which the OTE SPA boundary was determined on the basis of the densities of this species during the non-breeding period (O'Brien *et al.*, 2012). The Thanet and Thanet Extension are both outside the boundary of the OTE SPA (Appendix 1 and Appendix 2) and, as such, lie in an area within which the densities of wintering red-throated diver are relatively low and below that required for inclusion within the SPA.

2.3.3 Use of additional data sources

Where the information gathered by aerial digital or boat-based surveys has been supported by information from other sources, such as published literature on seabirds and the post consent monitoring reporting for Thanet, then that is identified by specific reference to that source and the full citation included in the relevant section for the references.

In addition to the post-consent monitoring data gathered for Thanet, a UK-wide collaborative programme of environmental research (ORJIP) has been collecting and analysing data that quantifies and interprets avoidance behaviours of key seabird species within the operational Thanet site. The aim of this project is to provide data on seabirds to reduce the consenting risks for offshore wind farm projects in the UK. These data were provided in part during the preparation of this baseline technical report for use in the final Thanet Extension ES Chapter.

2.4 Bird Names

Throughout this report the bird species names that are used are those that are in common use amongst English ornithologists and this corresponds to the “British (English) vernacular name 2012” column of the list of English and scientific names prepared by the British Ornithologists’ Union (BOU, 2012). The corresponding scientific names from that publication are listed in Appendix 4.

3. Survey and Analysis Methods

3.1 Aerial digital survey methodology

3.1.1 Approach to Surveys

Throughout the most recent offshore wind farm development applications the use of aerial digital survey platforms have been commonplace to collect data, due to the proposed sites being larger, further offshore and in deeper waters than those in earlier development rounds. Projects such as Thanet Extension, although closer to the UK coast, benefit from improving survey methodologies that offer more flexibility and reliability compared to boat-based surveys. The use of High Resolution digital still photography from an aerial survey platform was selected to satisfy these needs, though three months of boat-based data were also collected prior to this.

Aerial digital surveys are generally perceived as the most preferable way to carry out large scale offshore surveys for ornithology, providing high quality and auditable data. The aerial digital survey method and the subsequent analysis methods for this proposed project were the subject of consultation with Natural England (NE) and the Royal Society for the Protection of Birds (RSPB). This consultation was undertaken through the Defra Major Infrastructure and Environment Unit Evidence Plan Process. Ornithologists from NE and the RSPB participated in this process through the series of Ornithology Expert Technical Group (OETG) meetings held in 2016 and 2017. Though the boat-based surveys commenced prior to the first consultation meeting, the survey methods did form part of the first Evidence Plan OETG meeting, with clarification provided to NE and RSPB on the survey methods. All parties agreed that the preferred survey method would be by aerial digital (Volume 2, Chapter 6, Section 1.3).

3.1.2 High Resolution Digital Still Methodology

Aerial digital survey has been identified as the preferred method for gathering baseline information on seabirds to inform the assessment of offshore wind farms for a number of reasons including the absence of bird disturbance, repulsion or attraction; the ability to cover large areas in a single day; the retention of images for quality assurance; statistical power to measure change and increased precision of abundance estimates. Each survey is assessed for precision *post hoc*, to determine what level of change can confidently be measured. Precision, based on the Coefficient of Variation (CV), indicates the ratio of the mean to the standard error, the target level of precision is often set to $CV \leq 0.16$. This corresponds to a level of precision at which a doubling or halving of the population is detectable between surveys (a 'Class 3' level, Bohlin, 1990). In some situations, especially where abundance is very low, it is not possible to achieve the target level of precision.

Aerial digital surveys have been undertaken using either Vulcan Air P68 Observer or Britten-Norman Islander twin engine survey aircraft. These surveys involved digital still image collection using a GPS-linked bespoke flight management system.

Survey of the Thanet Extension site comprises High Resolution still images taken on a grid system with a resolution of 2 cm Ground Sampling Distance (GSD) to represent a high intensity sampling regime. The Survey Area incorporates the operational Thanet site, proposed Thanet Extension footprint plus a 4 km buffer.

Survey data comprises species, count (number of individual birds), sex (where possible), age (where possible), flight height, flight direction, position (longitude and latitude), date and time stamp of image collection.

Where identification to species level was not possible and the bird was allocated to a species group (as listed in Table 4), reference was made to aerial digital data collected within the Survey Area where members of the relevant species group were identified in order to apportion records at group level to species level (this process of apportionment is described in Section 3.1.3.3).

3.1.3 *Data Analysis*

3.1.3.1 *Bird Abundance and Density Estimates*

For each monthly aerial digital survey of the Survey Area, geo-referenced locations of birds contained within each image were used to generate raw counts. Bird locations contained within the boundaries of the three areas (Thanet, Thanet Extension and the 4 km buffer) were then extracted using ArcGIS, providing raw count data. These data are presented in this baseline technical report to focus on the individuals recorded within and abundance estimates for Thanet Extension only, with the exception of red-throated diver, gannet, guillemot and razorbill. Additional data from the 4 km buffer is presented for these four species to permit the analysis of potentially displaced individuals as outlined in the guidance issued by SNCBs (SNCBs, 2017).

Raw counts were divided by the number of images taken to give mean number of birds per image (i). Abundance estimates (N) for each survey month were then generated by multiplying the mean number of birds per image by the total number of images required to cover the entire study area (A):

$$N = iA$$

Non-parametric bootstrap methods were used for variance estimation. A variability statistic was generated by re-sampling 999 times with replacement from the raw count data. The statistic was evaluated from each of these 999 bootstrap samples and upper and lower 95% confidence intervals of these 999 values taken as the variability of the statistic over the population (Efron and Tibshirani, 1993).

Measures of precision (i.e. how different sample counts are from one another) were calculated using a negative binomial estimator, suitable for a pseudo-Poisson over-dispersed distribution (Elliott, 1977). This produced a CV based on the relationship of the standard error to the mean.

All analysis and data manipulation were conducted in the R programming language (R Development Core Team, 2012) and non-parametric 95% confidence intervals were generated using the 'boot' library of functions (Canty and Ripley, 2010). This results in species-specific monthly abundance estimates being calculated from the raw count data, with upper and lower confidence limits. Where appropriate, a level of precision is also presented for each monthly abundance estimate. Dividing the monthly abundance estimates by the size of the Thanet Extension site or 4 km buffer sites (approximately 73 km² or 212 km², respectively) calculates the density for any given species.

3.1.3.2 Species Identification

There are occasions when it is not possible to identify a particular bird on the aerial digital survey image to the species level and the image is identified as belonging to a higher level group e.g. 'small gulls' or 'black-backed gulls'. The possible groups and the individual species that are included in the groups are listed in Table 4. Fulmar, gannet and skuas were all positively identified to species level and do not form part of the higher level groupings.

Table 4 Bird species included in 'Unidentified Groups'

Species	Group Level 1	Group Level 2	
Red-throated diver	Diver species	n/a	
Black-throated diver			
Great northern diver			
Great crested grebe	Grebe species	n/a	
Red-necked grebe			
Slavonian grebe			
Black-necked grebe			
Kittiwake	Small gulls	Gull species	
Black-headed gull			
Little gull			
Common gull			
Lesser black-backed gull	Black-backed gulls		
Great black-backed gull			
Lesser black-backed gull	Large gulls		
Herring gull			
Great black-backed gull			
Common tern	'Commic' tern		Tern species
Arctic tern			
Sandwich tern	n/a		
Guillemot	Guillemot / Razorbill	Auk species	
Razorbill			

The images were analysed to enumerate birds to species level, where possible. Internal quality assurance (QA) was undertaken to check for missed birds and to ensure the correct species were identified, followed by external QA by the British Trust for Ornithology (BTO), who provide an independent third party assessment of 10% of the birds recorded in each survey. Birds identified from the images were 'snagged' (i.e. located within the images) and categorised normally to species, but sometimes to the standard JNCC categories (Appendix 5). For the purpose of this baseline technical report bird identification was subject to internal QA for all 24 months of data and external QA for 20 months of data (March 2016 to October 2017), due to the cut off point for including data in this report. A selection of bird images from the aerial digital surveys are presented in Appendix 6.

3.1.3.3 *Attribution and Apportionment of Unidentified Birds*

Although the majority of birds recorded from the surveys are identified to species level, a small number remain identified to group level only. In order to account for these unidentified birds, the abundance estimates within this baseline technical report include an attribution of unidentified birds into the monthly abundance estimates and densities. This is based upon an apportionment of the group level identified birds between those species within that group that were identified to species level within each individual monthly abundance estimate.

The number of unidentified birds in a group is proportioned to the specific species that are contained within that group based on the relative abundance of the positively identified species in that month's survey. For example, in the case of kittiwake, the count consists of:

Positively identified kittiwake + proportion of group level identified small gulls

For common tern and Arctic tern no species-specific identification is possible (size and plumage features are so close that it is impossible to separate them) and as a result there is no information on which to apportion these two species. They remain grouped in the data as 'commic' tern.

The ability to identify birds in digital still images to the species level has advanced considerably in recent years with advances in technology, including higher resolution cameras and more refined software to help identify species and measure species-specific parameters. The result is that for the surveys for Thanet Extension the individuals identified to group level contained within the data-set, which were recorded in the Thanet Extension site were limited to:

- Cormorant / shag;
- Grebe species
- Small gull species;
- Large gull species;
- Black-backed gull species;
- 'Commic' tern;
- Tern species;
- Guillemot / razorbill.

There were no birds recorded in digital still images that were categorised as:

- Diver species;
- Skua species;
- Gull species; or
- Auk species.

Raw counts from the aerial digital survey data and abundance estimates prior to any attribution of group level identified birds can be found in Appendix 7, whilst those subject to apportionment are presented in Appendix 8.

The proportion of identified species within the Survey Area (Thanet, Thanet Extension and 4 km buffer) was used for the apportionment of group level identified species recorded in the

Thanet Extension site. This was to ensure that an adequate number of samples were achieved and to limit the number of occurrences where there were no positively identified species in months where group level identified individuals were present.

Instances can occur when there are no positively identified species in months where group level identified individuals have been recorded. A number of rules were applied to such cases, with the preferable method being the first or the second, where possible.

- i. Use the proportion from the same month, different area;
- ii. Use the proportion from the same month, different year;
- iii. Use the proportion from the same bio-season, same area;
- iv. Use the proportion from the same bio-season, next largest area; or
- v. Use the proportion from the same bio-season, any other area.

Instances where this occurred include for 'small gulls' in July 2016 when identified small gulls from other months in the bio-season were used; 'tern species' in July and August 2016 which were divided equally between Sandwich tern and 'commic' tern as there were no other records in that month or bio-season and both species are known to breed on the Kent coast; guillemot/razorbill in March 2016 for which March 2017 was used; guillemot/razorbill in April and June 2016 for which the ratio in the bio-season was used; and cormorant/shag which were all attributed to cormorant as no shag were identified throughout the survey, no shag were recorded during the shore based surveys over the winter of 2016/17 (APEM, 2017 [those surveys recorded a peak count of 729 cormorant roosting in the nearshore area that were observed to fly offshore to feed]) and historically they are known to be much scarcer than cormorant off the coast of Kent (Balmer *et al*, 2013).

The proportion of flying birds in the Thanet Extension site was used to calculate the flying bird density for use in the collision risk modelling. As the proportion of species from the entire Survey Area was used for apportionment of group level identified individuals, this meant there could be instances where there were apportioned individuals in a particular month with no behaviour information. If this occurred, the proportion of flying birds would be derived from the same month and year as the entire Survey Area for each species. If there were no behaviour proportions in the entire Survey Area for a particular species in a particular month, then the same rules as stated above for the apportionment of group level identified individuals were applied. There were no instances where these rules had to be applied for the data that is presented in this report.

3.1.3.4 Availability Bias

Diving birds, such as guillemots and razorbills, spend time foraging beneath the water surface. As a result of this, an unknown number of birds may go undetected due to the snap shot nature of aerial survey techniques. To account for this, a correction factor, the 'availability bias' has to be applied.

The correction factor applied to each relevant auk species was based on that recommended by JNCC in a submission during the examination phase of the East Anglia ONE OWF, referred to by JNCC as Method C (JNCC, 2013) with a copy of the specific text provided in Appendix 9. This applies a correction factor on the basis of aerial surveys recording 76% of sitting guillemots and 83% of sitting razorbills, as 24% and 17% respectively, of these species will be underwater when aerial imagery is captured. Therefore to correct for availability bias the

‘unavailable’ birds are added to the bird totals on a monthly basis to create revised population estimates. The ‘corrected’ abundance estimates for guillemots and razorbills are presented in the relevant sections later in this report. The corrected data are presented in Appendix 10.

3.1.3.5 Bio-seasons

Bird behaviour and abundance is recognised to differ across a calendar year dependent upon the season. Separate seasons are recognised in this baseline technical report in order to establish the level of importance any seabird species has within the Thanet Extension site plus 4 km buffer during any particular period of time. The biologically defined minimum population scales (BDMPS) bio-seasons are based on those in Furness (2015), hereafter referred to as BDMPS bio-seasons or bio-seasons (Table 5). The seasons are defined within this baseline technical report as: winter, spring migration, migration-free breeding and autumn migration bio-seasons. For species not included in Furness (2015) bio-seasons agreed through the Evidence Plan Process were used.

Table 5 BDMPS bio-seasons (Furness 2015) used as the basis for the species accounts presented in Section 5

Species	Migration - spring	Migration-free breeding	Migration - autumn	Winter
Red-throated diver	February to April	May to August	September to November	December to January
Fulmar	December to March	April to August	September to October	November
Gannet	December to March	April to August	September to November	
Arctic skua	April to May	June to July	August to October	
Great skua	March to April	May to July	August to October	November to February
Kittiwake	January to April	May to July	August to December	
Black-headed gull*	March	April to August	September to November	December to February
Common gull*	March	April to August	September to November	December to February
Lesser black-backed gull	March to April	May to July	August to October	November to February
Herring gull	January to April	May to July	August to November	December
Great black-backed gull	January to April	May to July	August to November	December
‘Commic’ tern	April to May	June	July to September	
Sandwich tern	March to May	June	July to September	
Guillemot	December to February	March to June	July to October	November
Razorbill	January to March	April to July	August to October	November to December

Table Note: * These species were not included in Furness (2015) hence the use of bio-seasons agreed during the Evidence Plan Process with NE and RSPB (Volume 2, Chapter 4, Section 4.3).

3.1.3.6 *Spatial Distribution*

Each bird located by the surveys is geo-referenced and this allows those locations to be related to the boundary of Thanet Extension and any buffer placed around it. The spatial distribution within the Survey Area can be illustrated on a map and this has been done, for those seabird species for which there is more than a non-trivial number of observations, within Appendix 11. For those species with a large enough sample size, individual bio-season distribution maps have been presented to provide information on any seasonal-specific distribution based on the BDMPS bio-seasons.

The presentation of spatial distribution on a species map can only be carried out for the observed locations, it cannot account for the attribution of birds identified to group level such as small gulls or corrected for availability for diving behaviour of species groups such as auks. However, group level spatial distributed maps are presented within Appendix 11.

3.1.3.7 *Flight Height*

Bird flight altitude was estimated from the digital still images. It was determined using bespoke APEM software that applies a set of rules developed in-house and trigonometry to provide an estimate of flight height. The accuracy of the application of the trigonometric rules varies depending on the size and position of the bird. The trigonometric calculation is based on species-specific bird measurements, image GSD (the distance between pixel centres), the known height of the aircraft as that image was taken and the pitch, roll and yaw of the aircraft. These parameters are entered into APEM's flight height calculator to estimate the height of each individual bird captured in survey images. Flight height estimates are less reliable for birds that are diving or turning sharply (this affects the measurement of body length and wing span from the image), such birds are removed from the sample used to calculate flight heights. The use of the pitch, roll and yaw of the aircraft was not previously included in APEM's flight height calculations and data relating to this was not routinely collected and recorded from the camera system's Inertial Motion Unit prior to October 2017. Consequently, the accuracy of the estimated flight heights from data collected prior to October 2017 is not deemed reliable for use in the assessments of collision risk from Thanet Extension.

The flight height of birds is an important behavioural consideration within ornithological EIAs as it is required for use in the quantification of collision risk for a proposed wind farm project. The flight heights from the 24 months of site-specific aerial surveys for each of the relevant species recorded within the Thanet Extension site have been collated to establish the percentage of birds flying within the proposed project's rotor sweep (i.e. the area within which the wind turbine blades rotate). This information is presented in Appendix 7 to the CRM report (ES Volume 4, Annex 4.4, Document Ref: 6.4.4.4) for each of the species screened in for CRM, with the percentage of recorded birds flying at Potential Collision Risk Height (PCH) calculated based on birds flying at heights between 22 m and 210 m (the minimum and maximum sweep of the proposed turbine blades). This figure of the percentage at PCH is applied in the Band Option 1 of the CRM, noting that due to the issues relating to the accuracy these data and the small site specific sample sizes, it is not relied upon for impact assessment purposes.

3.1.3.8 *Age Class Proportions*

The knowledge of the different ages of each species of bird present within the proposed area for an offshore wind farm can contribute to the assessment of the significance of potential

impacts. This can include consideration of whether that potential impact might occur to an adult bird that is part of the breeding population of a particular Special Protection Area (SPA) or if it might occur to an immature bird that is not associated with the breeding population of a particular SPA.

Data identifying the age of individual birds were collected routinely from the High Resolution digital surveys of the Thanet Extension site. Appendix 12 describes the ageing of gannet, kittiwake and large gulls from aerial digital still imagery. Data are also presented for the age class proportions on a monthly basis for gannet, lesser black-backed gull, herring gull, great black-backed gull and kittiwake.

3.2 Boat survey methodology

3.2.1 Survey methodology

The surveys comprised boat-based line transects of the Survey Area (covering the same areas as the aerial digital surveys), broadly following the methodology recommended in Camphuysen *et al.* (2004). Surveys were carried out with three observers with two recording each side of the vessel and the third looking ahead to detect and record any divers that might have been flushed in advance of the approach of the vessel (Royal HaskoningDHV, 2013). The surveys were carried out through three months (January, February and March 2016). The survey was designed to provide approximately 3 km intervals between transects with a total of nine transects surveyed (Appendix 3).

3.2.2 Analysis of data

Boat-based survey data was analysed in order to provide numerical figures for the range of bird species occurring within the Survey Area. As birds on the water and birds in the air are recorded using different methodologies, analysis is completed separately and the abundance estimate is the sum of these two components.

3.2.2.1 Abundance estimates using the programme Distance

Where sufficient data were available, the programme Distance was used to account for undetected birds on the water (Buckland *et al.*, 2001). This analysis requires at least 60 to 80 sightings to fit a detection function in order to obtain reliable abundance estimates. There was a limited number of species recorded during the survey period that totalled over 60 individual sightings. In order to obtain distance analysis estimates on more species a global detection function utilising all the data within a survey month was fitted, and results post-stratified by area. Where there were too few observations within a month to reliably estimate the abundance, analysis was performed using correction factors as detailed below.

Data were analysed using Distance 7.0 release 1. The analysis guidelines outlined by Buckland *et al.* (2001), which include model selection, were followed. These data were truncated at 300 m either side of the boat. The program Distance allows several key functions and series expansion terms for modelling the detection function. Model fit and ranking were assessed using Akaike's Information Criterion with correction (AICc) for small sample sizes (Burnham & Anderson, 2002). Monthly survey data were pooled across areas to provide a global detection function with post-stratification by area.

Data collected during the 'snapshot' (i.e. flying birds 'in transect'), were added to the Distance estimate to provide a minimum total estimate. Snapshot counts were adjusted for the actual speed of the boat when the speed dropped below threshold levels.

3.2.2.2 *Abundance Estimates using Correction Factors*

Where distance sampling using the Distance computer programme was not possible (under 60 observations per species), simple extrapolations of the overall density were used to estimate the total number of birds in the boat-based survey areas. The extrapolation of overall density is a relatively quick and simple method of estimating total abundance within the sampled area. However, this method makes assumptions about the data used; overall density assumes that birds are uniformly distributed across the study site (i.e. there is no clumping due to social aggregation or habitat selection), and use of mean density is only accurate if sample densities are normally distributed.

Correction factors were applied to birds on the water to account for variations in detection at different distances from the boat's trackline. These were applied by multiplying the number of birds recorded for a species by its correction factor to give a corrected value with which to calculate the density of each seabird species on the water. Due to the small sample size, it was not possible to calculate correction factors for the study area, instead published corrections factors based upon large data-sets were applied to the data (Table 6).

Table 6 Correction factors from Skov et al. (1995)

Species	Correction Factors	Species	Correction Factors
Arctic skua	1.3	Herring gull	1.2
Auk spp.	1.6	Kittiwake	1.8
Common gull	2.2	Large Gull Spp.	1.2
Diver spp.	1.4	Lesser Black-backed Gull	1.2
Fulmar	1.2	Mediterranean gull	1.0
Gannet	1.4	Razorbill	1.6
Great black-backed gull	1.7	Red-throated diver	1.4
Guillemot	1.6		

The abundance on the water was estimated by multiplying the corrected overall density per sampled area by the total study area. As correction factors cannot be applied to flying birds recorded 'in transect', simple extrapolation was used to estimate population size in flight as discussed in the previous section. Estimated abundances in flight and on water were added together to produce a total population size for each area of the three separate areas; Thanet, Thanet Extension and a 4 km buffer.

Raw counts of bird species recorded from the boat-based survey data and abundance estimates prior to any attribution of unidentified birds can be found in Appendix 13, whilst those species subject to apportionment (following the same methods as those described for the aerial digital survey data above) are presented in Appendix 14. Spatial distribution maps for birds recorded in the boat-based surveys are presented in Appendix 15.

4. Survey details

4.1 Weather conditions and dates of aerial digital surveys

The survey dates and weather conditions were recorded for each aerial digital survey (Table 7), with no surveys carried out in unsuitable conditions. Weather conditions during all surveys were favourable and conducive to collecting and analysing imagery for the purpose of providing data on the identification, distribution and abundance of bird species within the Survey Area.

Table 7 Aerial digital survey dates and weather conditions

Survey Month / Dates	Sea State (WMO code)	Wind Speed (knots)	Wind Direction	Cloud Cover (%)	Visibility (km)	Outside Air Temperature (°C)
21 st March 2016	2	20	NW	100	10	9
5 th April 2016	2	9	W	40	10	10
5 th May 2016	2	20	E	0-10	10	16
21 st June 2016	1-3	10	SW	70-90	10	19-20
7 th July 2016	2	12-22	SW	90-100	10	19-21
11-12 th August 2016	1-3 / 1-2	24-31 / 18-30	E / E-NE	90-100 / 0-5	10 / 10	17-20 / 17-20
6 th September 2016	2-3	4-10	S	95	10	22-24
6 th October 2016	3	20	E	70-80	10	10
13 th November 2016	3-4	20-24	N	0-10	10	9-10
3 rd December 2016	3	17-25	E	70-80	10	5-6
5 th January 2017	3	20	NE	0-5	10	4-5
7 th February 2017	1	5-12	S	100	10	10
2 nd March 2017	1-4	17-25	W	25-50	10	8
6 th April 2017	1-2	5	N	0	10	9
12 th May 2017	1	15-20	SW	20-25	10	16-18
1 st June 2017	2-3	15	S	50-60	10	16
1 st July 2017	3-4	15-30	NW	50-75	10	18
1 st Aug 2017	2-3	15	S	50-60	10	16
19 th September 2017	2-3	5	NE	20-60	10	13-14
4 th October 2017	3-4	25-30	W	95-99	10	10-11
5 th November 2017	2-3	15-20	NW-W	15-70	10	5-8
5 th December 2017	3	15	W	100	10	6
14 th January 2018	1-3	0-15	SE	100	7-10	5
8 th February	1	30	SW	10	10	4-5

4.2 Weather conditions and dates of boat surveys

The survey dates and weather conditions were recorded for each boat-based survey (Table 8). Weather conditions during all surveys were favourable for the purpose of providing data on the identification, distribution and abundance of bird species within the Survey Area.

Table 8 Boat-based survey dates and weather conditions

Survey Months (2016)	Survey Dates	Sea State (WMO code)	Wave Height (m)	Wind Speed (knots)	Wind Direction	Cloud Cover (%)	Precipitation	Visibility	High Tide (Ramsgate)
January	18/01	3	1.0-1.75	3-5	SE	25	No	Good	05:12 (5.3 m) 18:00 (5.1 m)
	19/01	1-2	<0.5	1	variable	25-50	No	Excellent	06:27 (5.1 m) 19:14 (5.0 m)
February	18/02	3-4	1.0-1.75	3-5	S-NW	75-100	Drizzle	Good	07:24 (5.0 m) 20:13 (4.9 m)
	19/02	3	<1.0	3	SW-SE	0-10	No	Excellent	08:43 (5.1 m) 21:24 (5.2 m)
March	20/03	2-4	0.75-1.75	3-4	N-NE	50-100	No	Good	09:33 (5.3 m) 21:58 (5.4 m)
	21/03	1-3	0.5-1.0	2-3	SW-SE	75-90	No	Good	10:21 (5.5 m) 22:42 (5.5 m)

5. Ornithology Baseline Species Accounts

The following species accounts present a combination of data collected from the boat-based post-consent monitoring survey programmes for Thanet, a short baseline programme of three months of boat-based surveys for Thanet Extension and a longer baseline programme of 24 months of aerial digital surveys for Thanet Extension for this ES Chapter baseline technical report.

The post-consent monitoring survey programmes collected data using boat-based survey methods in the winters of 2010/11, 2011/12 and 2012/13. The area covered by the post-consent monitoring survey programmes included the operational Thanet site and a 2 km buffer surrounding it, referred to in this report as the 'Study Area'. More recent data recorded from three months of boat-based surveys and 24 months of aerial digital surveys covers a wider area comprising the operational Thanet site, the proposed Thanet Extension site and a 4 km buffer surrounding it, referred to in this report as the 'Survey Area'. Behavioural data are presented with the tables in each species account, whilst distribution data are also presented in Appendix 11 and 15 for aerial and boat survey data respectively.

5.1 Overview of Bird Species Recorded

The following bird species (Table 9) were recorded within the Thanet Extension site plus 4 km buffer between January 2016 and February 2018. Shelduck were not recorded in Thanet Extension or the 4 km buffer, but were recorded on a single occasion, in flight, in the Thanet site during the boat-based surveys. For the purpose of this baseline technical report shelduck is omitted from the main species accounts, but included in the raw counts, abundance and density estimates and distribution maps presented in the relevant Appendix.

Table 9 Bird species recorded within the Thanet Extension and a 4 km buffer between January 2016 and February 2018 from boat-based and aerial digital surveys

Wildfowl, Divers & Grebes	Gulls	Auks	Other
Brent goose	Kittiwake	Guillemot	Fulmar
Common scoter	Black-headed gull	Razorbill	Gannet
Red-throated diver	Little gull		Cormorant
Great crested grebe	Mediterranean gull		Arctic skua
	Common gull		Great skua
	Lesser black-backed gull		Pomarine skua
	Herring gull		Sandwich tern
	Great black-backed gull		'Commic' tern
	Glaucous gull		Little egret
			Thrush species

5.2 Information within Species Accounts

Of the species recorded within Thanet Extension (Table 9) three species (common scoter, great crested grebe and pomarine skua) occurred on a single occasion. For the purpose of this baseline technical report these three species are omitted from the main species accounts,

but included in the raw counts, abundance and density estimates and distribution maps presented in the relevant Appendix.

Eleven species (brent goose, common scoter, little egret, cormorant, great skua, Arctic skua, Mediterranean gull, glaucous gull, little gull, Sandwich tern and 'commic' tern) were only recorded in the 4 km buffer on three occasions or less. Brent goose was only recorded on a single occasion, in flight, during the boat based surveys. Common scoter was only recorded, in flight, on one occasion in the boat-based surveys and two occasions in the aerial digital surveys. Little egret was recorded on a single occasion in flight in the aerial digital surveys. Cormorant was only recorded on three occasions, sitting on the water surface, in the aerial digital surveys. Great skua was only recorded three occasions, in flight, in the aerial digital surveys. Arctic skua was only recorded on one occasion, during the boat-based surveys. Mediterranean gull was only recorded on a single occasion, in flight, during the aerial digital surveys. Glaucous gull was only recorded on a single occasion, in flight, during the aerial digital surveys. Little gull was only recorded on a single occasion, in flight, during the boat based surveys. Sandwich tern was only recorded on three occasions, in flight, during the aerial digital surveys. 'Commic' tern was only recorded on two occasions, in flight, during the aerial digital surveys. For the purpose of this baseline technical report all eleven of these species are omitted from the main species accounts, but included in the raw counts, abundance and density estimates and distribution maps presented in the relevant Appendix.

The following species accounts present the data recorded from 26 consecutive months of surveys conducted for the Thanet Extension project, including a short programme of three months of boat-based surveys that overlapped for one month with a longer programme of 24 months of aerial digital surveys for this baseline technical report. In addition to these site-specific survey data undertaken for the Thanet Extension project reference is made to the boat-based Thanet post-consent monitoring survey programme data-sets, for which a comparison of data with the Thanet Extension data is presented in Annex 4.2 of the species most abundant throughout the non-breeding bio-seasons (red-throated diver, gannet, herring gull, great black-backed gull, lesser black-backed gull, kittiwake, razorbill and guillemot). The data are presented for all species (except those referenced above) for the Thanet Extension site only and for red-throated diver, gannet, guillemot and razorbill are also tabulated on a monthly basis for the 4 km buffer. Behavioural and distribution data are also discussed in each species account with additional details on raw counts, abundance and density estimates and distribution maps presented in the relevant Appendix.

5.3 Red-throated diver

5.3.1 *Thanet observations (Post-consent monitoring)*

Red-throated divers were widely distributed at low density across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Records were mostly within the 2 km buffer (which forms part of the Thanet Extension site), reflecting red-throated divers' preference to not regularly enter operational OWF sites. The peak counts across the three survey programmes were in January 2011 (n=102), February 2012 (n=262) and February 2013 (n=88). Red-throated divers occurred in 10 of the 12 surveys in 2010/11, seven of the 10 surveys in 2011/12 and nine of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data

over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report concluded that red-throated diver density values were higher in the more recent aerial digital surveys than most boat-based post-consent surveys.

5.3.2 Abundance and density estimates (Thanet Extension boat-based data)

Red-throated divers were recorded in the Thanet Extension site in two out of the three boat-based surveys in the months of January and March 2016, with abundance and densities peaking in March 2016 when an estimated 19 individuals were present at a density of 0.26 birds / km² (Table 10). Birds were recorded in all three months, January to March 2016, within the 4 km buffer, with abundance and densities peaking in February 2016 when an estimated 179 individuals were present at a density of 0.85 birds / km² (Table 11). Appendix 13 provides the raw counts, abundances and density estimates, whilst Appendix 14 provides the abundance and density estimates following attribution of birds identified to group level.

5.3.3 Abundance and density estimates (Thanet Extension aerial digital data)

Red-throated divers were recorded in the Thanet Extension site in six of the 24 aerial digital surveys in the months of February 2017 & 2018, March 2017 and April 2016 (migration-spring bio-season) and December 2016 & 2017 and January 2018 (winter bio-season) (Table 10). Abundance and densities peaked in January 2018 when an estimated 325 individuals were present at a density of 4.46 birds / km² (Table 10). Red-throated divers were recorded in the 4 km buffer in eight of the 24 aerial digital surveys in the months of February 2017 & 2018, March 2016 & 2017 (migration-spring bio-season) and December 2016 & 2017 and January 2017 & 2018 (winter bio-season) (Table 11). Abundance and densities peaked in February 2017, when an estimated 419 individuals were present at densities of 1.98 birds / km² (Table 11). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey data.

Table 10 Red-throated diver monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	12	n/a	0.16	0.16	n/a	0.00	n/a
January	2018	Aerial	325	n/a	4.46	0.12	n/a	4.34	n/a
February	2017	Aerial	92	55	1.26	0.12	0.06	1.14	0.70
	2018	Aerial	18		0.25			0.00	
March	2016	Boat	19	n/a	0.26	0.19	n/a	0.07	n/a
	2016	Aerial	0	52	0.00	0.00	0.00	0.00	0.72
	2017	Aerial	104		1.43			0.00	
April	2016	Aerial	9	5	0.12	0.00	0.00	0.12	0.06
	2017	Aerial	0		0.00			0.00	
December	2016	Aerial	63	32	0.87	0.00	0.00	0.87	0.43
	2017	Aerial	0		0.00			0.00	

Table 11 Red-throated diver monthly abundance and density estimates from survey data within the Thanet Extension 4 km buffer only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	43	n/a	0.20	0.20	n/a	0.00	n/a
	2017	Aerial	114	188	0.54	0.04	0.04	0.50	0.85
	2018	Aerial	261		1.23	0.04		1.19	
February	2016	Boat	179	n/a	0.85	0.09	n/a	0.76	n/a
	2017	Aerial	419	302	1.98	0.05	0.03	1.93	1.40
	2018	Aerial	185		0.87	0.00		0.87	
March	2016	Boat	70	n/a	0.33	0.09	n/a	0.25	n/a
	2016	Aerial	48	83	0.23	0.00	0.00	0.23	0.40
	2017	Aerial	118		0.56	0.00		0.56	
December	2016	Aerial	221	163	1.04	0.00	0.18	1.04	0.59
	2017	Aerial	105		0.50	0.36		0.14	

5.3.4 Bio-season mean peak estimates

Red-throated divers were absent from the Thanet Extension and 4 km buffer for a large part of the calendar year (May to November, seven out of twelve months), representing the entire migration-free breeding and migration-autumn BDMPS bio-seasons (Table 12). Red-throated diver abundance peaked in the Thanet Extension site in the winter bio-season with a mean peak of 194 individuals present at a density of 2.66 birds / km². Although a greater abundance occurred in the 4 km buffer, also peaking in the winter bio-season with an mean peak 241 individuals present, the density was significantly lower with 1.14 birds / km² (Table 12). Monthly abundance and density estimates for all aerial digital survey data are presented in Appendix 7.

Table 12 Red-throated diver bio-season mean peak abundance and density estimates in the Thanet Extension and 4 km buffer areas (aerial digital survey data only).

BDMPS Bio-seasons	Months	Mean peak abundance (Thanet Extension)	Mean peak density (Thanet Extension)	Mean peak abundance (4 km Buffer)	Mean peak density (4 km Buffer)
Migration-free breeding	May-Aug	0	0.00	0	0.00
Migration - autumn	Sep-Nov	0	0.00	0	0.00
Winter	Dec-Jan	194	2.66	241	1.14
Migration - spring	Feb-Apr	44	0.60	217	1.03

5.3.5 Behaviour and distribution

The majority of red-throated divers recorded in the Thanet Extension and 4 km buffer from the boat-based surveys in January, February and March 2016 (n=35 or 65%) were observed

sitting on the sea surface. Birds were also recorded mostly within the south of the 4 km buffer, with none recorded within the operational Thanet area (Appendices 13: Red-throated diver & 15: Figures 15.1-15.3).

The majority of red-throated divers from the aerial digital survey abundance estimates (n=2,007 or 96.4%) were sitting on the sea surface in the Thanet Extension site and 4 km buffer. Of these sitting birds, the majority (n=1,414 or 70.5%) were estimated to be within the 4 km buffer. Of note, there were two records, in March 2017 and February 2018, of an estimated 35 and 10 individuals respectively sitting on the water surface in the operational Thanet site (Appendix 7 and Appendix 11, Figures 11.2). Red-throated divers were loosely distributed across the Thanet Extension and 4 km buffer in the winter and spring bio-seasons, with a higher density of birds located in the west of Thanet Extension in the winter bio-season (Appendix 7: Red-throated diver (Thanet Extension & 4 km Buffer) & Appendix 11: Figures 11.2 & 11.3).

5.4 Fulmar

5.4.1 *Thanet observations (Post-consent monitoring)*

Fulmars were widely distributed at low density across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). The peak counts across the three survey programmes were in March 2011 (n=71), January 2012 (n=71) and March 2013 (n=36). Fulmars occurred in nine of the 12 surveys in 2010/11, seven of the 10 surveys in 2011/12 and nine of the 11 surveys in 2012/13.

5.4.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Fulmars were recorded within the Thanet Extension site during one of the three boat-based surveys in February 2016, part of the migration-spring bio-season (Table 14). During this peak count an estimated four individuals were present within the Thanet Extension site at a density of 0.05 birds / km² (Table 13). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.4.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Fulmars were recorded within the Thanet Extension site during two of the 24 aerial digital surveys in June 2016 and May 2017 part of the migration-free breeding bio-season (Table 14). Abundance and density peaked in May 2017 when an estimated nine individuals were present at a density of 0.12 birds / km² (Table 13). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 13 Fulmar monthly abundance and density estimates from survey data within the Thanet Extension site only.

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
February	2016	Boat	4	n/a	0.05	0.05	n/a	0.00	n/a
May	2016	Aerial	0	5	0.00	0.00	0.00	0.00	0.06
	2017	Aerial	9		0.12	0.00		0.12	
June	2016	Aerial	8	4	0.11	0.11	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	

5.4.4 Bio-season mean peak estimates

The aerial digital surveys only recorded fulmars being present in the Thanet Extension site in the migration-free breeding bio-season, with an estimated mean peak abundance of nine birds at a density 0.12 birds / km² (Table 14).

Table 14 Fulmar BDMPS bio-season mean peak abundance and density estimates within the Thanet Extension site only (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	Apr-Aug	9	0.12
Migration - autumn	Sep-Oct	0	0.00
Winter	Nov	0	0.00
Migration - spring	Dec-Mar	0	0.00

5.4.5 Behaviour and distribution

The single fulmar recorded by the three boat-based surveys was observed in February 2016 flying within the south of the Thanet Extension site (Appendices 13: Fulmar & 15: Figure 15.4).

Similar proportions of fulmars were flying or sitting from the aerial digital survey abundance estimates (n=9 or 53% were sitting on the sea surface) in the Thanet Extension site. Of the two fulmars recorded during the 24 surveys in the Thanet Extension site a single bird was recorded flying within the north-east corner and a single bird was recorded sitting on the water in the west of the Thanet Extension site in June 2016 and May 2017, respectively (Appendices 7: Fulmar (Thanet Extension) & 11: Figures 11.5-11.7).

5.5 Gannet

5.5.1 Thanet observations (Post-consent monitoring)

Gannets were widely distributed across the Study Area, of Thanet and a 2 km buffer, though more frequently recorded in the east in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012

and 2013). Gannet abundance was variable across the three survey programmes with the peak counts in October 2010 (n=152), November 2011 (n=514) and March 2013 (n=409). Gannets occurred in all of the 12 surveys in 2010/11, all of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report concluded that gannet density values in the more recent aerial digital surveys followed the general pattern of those from the boat-based post-consent surveys.

5.5.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Gannets were recorded within the Thanet Extension site during the three boat-based surveys in January, February and March 2016, all part of the migration-spring bio-season (Table 15). The peak abundance of 56 individuals estimated to be present within the Thanet Extension site during the February 2016 boat survey equates to a density of 0.77 birds / km² (Table 15). Gannets were recorded within the 4 km buffer during the three boat-based surveys in January, February and March 2016, all part of the migration-spring bio-season (Table 16). The peak abundance of 209 individuals estimated to be present within the 4 km buffer also during the February 2016 boat survey equates to a density of 0.99 birds / km² (Table 16). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.5.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Gannets were recorded within the Thanet Extension site during eight of the 24 aerial digital surveys in December 2016, January 2018, February 2017 & 2018, March 2016 and March 2017, all part of the migration-spring bio-season, and November 2016 & 2017, part of the migration-autumn bio-season (Table 15). The peak abundance of 152 individuals estimated to be present within the Thanet Extension site during the March 2017 aerial digital survey equates to a density of 2.36 birds / km² (Table 15). Gannets were recorded within the 4 km buffer during 12 of the 24 aerial digital surveys in December 2016 & 2017, January 2018, February 2017 & 2018 and March 2017 (migration-spring bio-season), May and July 2016 & 2017 (migration-free breeding bio-season) and October 2017 and November 2016 & 2017 (migration-autumn bio-season) (Table 16). The peak abundance of 796 individuals estimated to be present within the 4 km buffer during the March 2017 aerial digital survey equates to a density of 3.75 birds / km² (Table 16). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 15 Gannet monthly abundance and density estimates from survey data within the Thanet Extension site only.

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	30	n/a	0.41	0.69	n/a	0.00	n/a
January	2017	Aerial	0	63	0.00	0.00	0.68	0.00	0.19
	2018	Aerial	126		1.73	1.36		0.37	
February	2016	Boat	56	n/a	0.77	0.52	n/a	0.25	n/a
	2017	Aerial	121	65	1.66	0.26	0.19	1.40	0.70
	2018	Aerial	9		0.12	0.12		0.00	
March	2016	Boat	26	n/a	0.36	0.69	n/a	0.00	n/a
	2016	Aerial	9	81	0.12	0.12	0.83	0.00	0.28
	2017	Aerial	152		2.36	1.54		0.55	
November	2016	Aerial	52	77	0.71	0.00	0.64	0.71	0.42
	2017	Aerial	102		1.40	1.28		0.12	
December	2016	Aerial	9	5	0.12	0.12	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	

Table 16 Gannet monthly abundance and density estimates from survey data within the Thanet Extension 4 km buffer only.

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	71	n/a	0.34	0.34	n/a	0.00	n/a
	2017	Aerial	0	178	0.00	0.00	0.60	0.00	0.25
	2018	Aerial	355		1.68	1.19		0.49	
February	2016	Boat	209	n/a	0.99	0.77	n/a	0.22	n/a
	2017	Aerial	523	271	2.47	1.17	0.61	1.30	0.67
	2018	Aerial	18		0.08	0.04		0.04	
March	2016	Boat	108	n/a	0.51	0.49	n/a	0.02	n/a
	2016	Aerial	0	398	0.00	0.00	1.07	0.00	0.81
	2017	Aerial	796		3.75	2.13		1.62	
May	2016	Aerial	10	5	0.05	0.05	0.03	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
July	2016	Aerial	26	27	0.12	0.12	0.13	0.00	0.00
	2017	Aerial	28		0.13	0.13		0.00	
October	2016	Aerial	0	5	0.00	0.00	0.03	0.00	0.00
	2017	Aerial	10		0.05	0.05		0.00	
November	2016	Aerial	114	324	0.54	0.33	1.02	0.21	0.51
	2017	Aerial	534		2.52	1.71		0.81	
December	2016	Aerial	18	14	0.08	0.04	0.05	0.04	0.02
	2017	Aerial	10		0.05	0.05		0.00	

5.5.4 Bio-season mean peak estimates

The aerial digital surveys recorded gannets as being present in the Thanet Extension site in migration-autumn and migration-spring bio-seasons with the highest mean peak abundance of 77 birds with a density of 1.06 birds / km² estimated during the migration-spring bio-season (Table 17). The aerial digital surveys recorded gannets as being present in the 4 km buffer in the migration-autumn, migration-spring and migration-free breeding bio-seasons with the highest mean peak abundance of 384 birds with a density of 1.81 birds / km² estimated during the migration-spring bio-season (Table 17).

Table 17 Gannet abundance bio-season mean peak abundance and density estimates (aerial digital survey data only).

BDMPS Bio-seasons	Months	Mean peak abundance (Thanet Extension)	Mean peak density (Thanet Extension)	Mean peak abundance (4 km Buffer)	Mean peak density (4 km Buffer)
Migration-free breeding	Apr-Aug	0	0.00	27	0.13
Migration - autumn	Sep-Nov	77	1.06	324	1.53
Winter	N/A	N/A	N/A	N/A	N/A
Migration - spring	Dec-Mar	96	1.31	384	1.81

5.5.5 Behaviour and distribution

The majority of gannets recorded within the Thanet Extension and 4 km buffer were observed in flight (n=96 or 87%), in the boat data from January to March 2016. Gannets recorded from the boat surveys were loosely distributed across the Thanet Extension and 4 km buffer (Appendices 13: Gannet & 15: Figures 15.5-15.7.).

The majority of gannets from the aerial digital survey abundance estimates (n=1,887 or 62%) were in flight in the Thanet Extension site and 4 km buffer. Of these flying birds, the majority (n=1,485 or 79%) were estimated to be within the 4 km buffer. Gannets were loosely distributed across the Thanet Extension and 4 km buffer in each of the three bio-seasons, though higher densities were recorded in the eastern 4 km buffer. Of note only one month recorded a single bird within the operational Thanet area (Appendices 7: Gannet (Thanet Extension) & 11: Figures 11.8-11.10).

5.6 Black-headed gull

5.6.1 Thanet observations (Post-consent monitoring)

Black-headed gulls were infrequently recorded across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Black-headed gull abundance was variable across the three survey programmes with peak counts in November 2010 (n=27), November 2011 / January & February 2012 (n=3) and March 2013 (n=52), though most records were of five individuals or under (three out of the 20 monthly records

were of over five individuals). Black-headed gulls occurred in eight out of 12 surveys in 2010/11, four out of 10 surveys in 2011/12 and four out of 11 surveys in 2012/13.

5.6.2 Abundance and density estimates (Thanet Extension boat-based data)

Black-headed gulls were not recorded in the Thanet Extension site during the boat-based surveys (Table 18). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.6.3 Abundance and density estimates (Thanet Extension aerial digital data)

Black-headed gulls were recorded in the Thanet Extension site in three of the 24 aerial digital surveys in March 2016 (migration-spring bio-season), February 2017 (winter bio-season) and September 2017 (migration-autumn bio-season) (Table 18). The peak abundance of 37 individuals estimated to be present within the Thanet Extension site during the March 2017 aerial digital survey equates to a density of 0.51 birds / km² (Table 18). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 18 Black-headed gull monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
February	2017	Aerial	19	n/a	0.26	0.26	n/a	0.00	n/a
March	2016	Aerial	37	19	0.51	0.00	0.00	0.51	0.26
	2017	Aerial	0		0.00	0.00		0.00	
September	2016	Aerial	0	5	0.00	0.00	0.00	0.00	0.06
	2017	Aerial	9		0.12	0.00		0.12	

5.6.4 Bio-season mean peak estimates

Black-headed gulls were recorded in the Thanet Extension site during the migration-autumn, winter and migration-spring bio-seasons with the highest mean peak abundance of 19 birds and density of 0.25 birds / km² estimated during the migration-spring bio-season (Table 19).

Table 19 Black-headed gull bio-season mean peak abundance and density estimates (aerial digital survey data only).

BDMPs Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	Apr-Aug	0	0.00
Migration - autumn	Sep-Nov	5	0.06
Winter	Dec-Feb	10	0.13
Migration - spring	Mar	19	0.25

5.6.5 *Behaviour and distribution*

No black-headed gulls were recorded within the Thanet Extension site in the boat-based surveys from January to March 2016.

All of the black-headed gulls from the aerial digital survey abundance estimates (n=19 or 100%) were in flight in the Thanet Extension site. Black-headed gulls were loosely distributed across the Thanet Extension site, with only one month (March 2016) recording two birds within the operational Thanet area (Appendices 7: Black-headed gull (Thanet Extension) & 11: Figures 11.14-11.17).

5.7 **Common gull**

5.7.1 *Thanet observations (Post-consent monitoring)*

Common gulls were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Common gull abundance was variable across the three survey programmes with peak counts in January 2011 (n=315), February 2012 (n=231) and March 2013 (n=378). Common gulls occurred in 11 out of 12 surveys in 2010/11, nine out of 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

5.7.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Common gulls were recorded in the Thanet Extension site in two of the three boat-based surveys (January and March 2016). The peak abundance of 32 individuals estimated to be present within the Thanet Extension site during the March 2016 boat-based survey equates to a density of 0.44 birds / km² (Table 20). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.7.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Common gulls were recorded in the Thanet Extension site in 12 of the 24 aerial digital surveys in March 2017 (migration-spring bio-season), April 2016 & 2017 and May 2017 (migration-free breeding bio-season), September 2016 and October 2016 (migration-autumn bio-season), and December 2016 & 2017, January 2017 & 2018 and February 2017 (winter bio-season) (Table 20). The peak abundance of 46 individuals estimated to be present within the Thanet Extension site during the April 2017 aerial digital survey, equates to a densities of 0.63 birds / km² (Table 20). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 20 Common gull monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	18	n/a	0.25	0.05	n/a	0.19	n/a
	2017	Aerial	17	13	0.23	0.23	0.18	0.00	0.00
	2018	Aerial	9		0.13	0.13		0.00	
February	2017	Aerial	22	n/a	0.30	0.30	n/a	0.00	n/a
March	2016	Boat	32	n/a	0.44	0.05	n/a	0.38	n/a
	2016	Aerial	0	4	0.00	0.00	0.06	0.00	0.00
	2017	Aerial	8		0.11	0.11		0.00	
April	2016	Aerial	34	40	0.47	0.00	0.26	0.47	0.30
	2017	Aerial	46		0.63	0.51		0.12	
May	2016	Aerial	0	6	0.00	0.00	0.00	0.00	0.08
	2017	Aerial	12		0.16	0.00		0.16	
July	2016	Aerial	27	14	0.37	0.21	0.11	0.16	0.08
	2017	Aerial	0		0.00	0.00		0.00	
September	2016	Aerial	27	14	0.37	0.37	0.19	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
October	2016	Aerial	32	16	0.44	0.22	0.11	0.22	0.11
	2017	Aerial	0		0.00	0.00		0.00	
December	2016	Aerial	27	28	0.37	0.37	0.38	0.00	0.00
	2017	Aerial	28		0.38	0.38		0.00	

5.7.4 Bio-season mean peak estimates

Common gulls were recorded in the Thanet Extension site in all four bio-seasons with the highest mean peak of 28 birds and density of 0.38 birds / km² estimated during the migration-free breeding and winter bio-seasons (Table 21).

Table 21 Common gull bio-season mean abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	Apr-Aug	28	0.38
Migration - autumn	Sep-Nov	16	0.22
Winter	Dec-Feb	28	0.38
Migration - spring	Mar	4	0.05

5.7.5 Behaviour and distribution

The majority of common gulls were observed sitting on the water surface (n=6 or 75%) in the Thanet Extension site during the boat-based surveys from January to March 2016. Common

gulls recorded from the boat surveys were loosely distributed and located within the Thanet Extension and 4 km buffer area (Appendices 13: Common gull & 15: Figure 15.8-15.10).

The majority of the common gulls from the aerial digital survey abundance estimates (n=206 or 71%) were in flight in the Thanet Extension site. Common gulls were loosely distributed across the Thanet Extension site and wider Survey Area (Appendices 7: Common gull (Thanet Extension) & 11: Figure 11.18-11.21).

5.8 Kittiwake

5.8.1 *Thanet observations (Post-consent monitoring)*

Kittiwakes were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Kittiwake abundance was consistent across the three survey programmes with peak counts in January 2011 (n=570), January 2012 (n=355) and January 2013 (n=194). Kittiwakes occurred in all of the 12 surveys in 2010/11, nine out of 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report concluded that kittiwake density values had a pattern of peaks and troughs generally consistent throughout all survey programmes in terms of the pattern of lower densities in October and March and higher densities between January and February.

5.8.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Kittiwakes were recorded within the Thanet Extension during all three boat based surveys (Table 22). Numbers clearly peaked during February 2016 (migration-spring bio-season) when an estimated 102 individuals were present within the Thanet Extension site which equates to a density of 1.40 birds / km² (Table 22). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.8.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Kittiwakes were recorded in the Thanet Extension site in 14 of the 24 aerial digital surveys in January 2017 & 2018, February 2017 & 2018, March 2017, April 2017 (migration-spring bio-season), May 2017 and July 2016 & 2017 (migration-free breeding bio-season) and September 2017, October 2017, November 2017, December 2016 & 2017 (migration-autumn bio-season) (Table 22). The peak abundance occurred during the January 2018 survey, when an estimated 623 individuals were present in the Thanet Extension site, which equates to a density of 8.55 birds / km² (Table 22). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 22 Kittiwake monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	21	n/a	0.29	0.05	n/a	0.23	n/a
	2017	Aerial	8	316	0.11	0.11	0.50	0.00	3.84
	2018	Aerial	623		8.55	0.88		7.68	
February	2016	Boat	102	n/a	1.40	1.16	n/a	0.23	n/a
	2017	Aerial	89	58	1.22	1.22	0.80	0.00	0.00
	2018	Aerial	27		0.37	0.37		0.00	
March	2016	Boat	4	n/a	0.05	0.05	n/a	0.00	n/a
	2016	Aerial	0	16	0.00	0.00	0.22	0.00	n/a
	2017	Aerial	32		0.44	0.44		0.00	
April	2016	Aerial	3	30	0.04	0.00	0.20	0.04	0.22
	2017	Aerial	58		0.78	0.39		0.39	
May	2016	Aerial	0	12	0.00	0.00	0.17	0.00	0.00
	2017	Aerial	24		0.33	0.33		0.00	
July	2016	Aerial	24	17	0.33	0.33	0.23	0.00	0.00
	2017	Aerial	9		0.12	0.12		0.00	
September	2016	Aerial	0	10	0.00	0.00	0.13	0.00	0.00
	2017	Aerial	19		0.26	0.26		0.00	
October	2016	Aerial	0	5	0.00	0.00	n/a	0.00	0.06
	2017	Aerial	9		0.12	0.00		0.12	
November	2016	Aerial	0	5	0.00	0.00	0.06	0.00	0.00
	2017	Aerial	9		0.12	0.12		0.00	
December	2016	Aerial	36	65	0.49	0.37	0.38	0.12	0.51
	2017	Aerial	93		1.27	0.38		0.89	

5.8.4 Bio-season mean peak estimates

Kittiwakes were recorded in the Thanet Extension site during the migration-spring, migration-free breeding and migration-autumn bio-seasons with the highest mean peak abundance being 235 birds and density of 3.23 birds / km² estimated during the migration-autumn bio-season (Table 23).

Table 23 Kittiwake bio-season mean peak abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	May-Jul	9	0.12
Migration - autumn	Aug-Dec	65	0.89
Winter	N/A	N/A	N/A
Migration - spring	Jan-Apr	235	3.23

5.8.5 Behaviour and distribution

The majority of kittiwakes recorded in the Thanet Extension site were observed in flight (n=22 78.6%) in the boat data from January to March 2016. Kittiwakes recorded from the boat-based surveys were loosely distributed within the Thanet Extension site (Appendices 13: Kittiwake & 15: Figure 15.12-15.14).

The majority of the kittiwakes from the aerial digital survey abundance estimates (n=673 or 63%) were sitting on the water in the Thanet Extension site. Kittiwakes were loosely distributed across the Thanet Extension site (Appendices 7: Kittiwake (Thanet Extension) & 11: Figure 11.22-11.24).

A total of 162 (64%) kittiwakes recorded from the aerial digital surveys within the Thanet Extension and 4 km buffer were observed in flight. However, it is not possible to provide an accurate site-specific PCH for this species due to very few birds being suitable to provide flight height estimates from, so this is not provided in this report.

5.9 Herring gull

5.9.1 Thanet observations (Post-consent monitoring)

Herring gulls were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Herring gull abundance was consistent across the three survey programmes with peaks in March 2011 (n=543), October 2011 (n=1,670) and March 2013 (n=904). Herring gulls occurred in all of the 12 surveys in 2010/11, all of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report concluded that whilst the general pattern of herring gull occurrence is similar the density figures from the aerial digital survey data are at the lower end of those recorded in the boat-based post-consent monitoring survey programme.

5.9.2 Abundance and density estimates (Thanet Extension boat-based data)

Herring gulls were recorded within the Thanet Extension during all three boat based surveys with the highest number occurring in March 2016 (migration-spring bio-season) (Table 24). The peak abundance of 78 individuals estimated to be present within the Thanet Extension site during the March 2016 boat-based survey equates to a density of 1.07 birds / km² (Table 24). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.9.3 Abundance and density estimates (Thanet Extension aerial digital data)

Herring gulls were recorded in the Thanet Extension site in ten of the 24 aerial digital surveys in January 2017 and April 2016 & 2017 (migration-spring bio-season), May 2016, June 2017 and July 2016 & July 2017 (migration-free breeding bio-season), August 2016 (migration-autumn bio-season) and December 2016 & 2017 (winter bio-season) (Table 24). Abundances

and densities peaked in April 2017, when an estimated 120 individuals were present in the Thanet Extension site, which equates to a density of 1.65 birds / km² (Table 24). Appendix 7 provides the raw counts, abundances and density estimates for all 22 months of aerial digital survey.

Table 24 Herring gull monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	66	n/a	0.91	0.64	n/a	0.26	n/a
	2017	Aerial	8	n/a	0.11	0.00	n/a	0.11	n/a
February	2016	Boat	30	n/a	0.41	0.41	n/a	0.00	n/a
March	2016	Boat	78	n/a	1.07	0.69	n/a	0.38	n/a
April	2016	Aerial	120	93	1.65	0.63	0.51	1.02	0.77
	2017	Aerial	65		0.89	0.38		0.51	
May	2016	Aerial	9	5	0.12	0.12	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
June	2016	Aerial	0	5	0.00	0.00	0.06	0.00	0.00
	2017	Aerial	9		0.12	0.12		0.00	
July	2016	Aerial	25	17	0.34	0.23	0.18	0.11	0.06
	2017	Aerial	9		0.12	0.12		0.00	
August	2016	Aerial	8	4	0.11	0.11	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
December	2016	Aerial	104	66	1.43	1.43	0.78	0.00	0.13
	2017	Aerial	27		0.37	0.12		0.25	

5.9.4 Bio-season mean estimates

Herring gulls were recorded in the Thanet Extension site in all four bio-seasons, with the highest mean peak abundance being 63 and density of 0.86 birds / km² estimated during the migration-spring bio-season (Table 25).

Table 25 Herring gull bio-season mean peak abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	May-Jul	17	0.23
Migration - autumn	Aug-Nov	4	0.05
Winter	Dec	63	0.86
Migration - spring	Jan-Apr	62	0.85

5.9.5 *Behaviour and distribution*

The majority of herring gulls were observed in flight (n=31 or 72%) in the boat data from January to March 2016. Herring gulls recorded from the boat-based surveys were loosely distributed within the Thanet Extension site (Appendices 13: Herring gull & 15: Figures 15.15-15.17).

The majority of the herring gulls from the aerial digital survey abundance estimates (n=239 or 62%) within the Thanet Extension site were in flight. Herring gulls were loosely distributed across the Thanet Extension site (Appendices 7: Herring gull (Thanet Extension) & 11: Figures 11.29-11.32).

5.10 Great black-backed gull

5.10.1 *Thanet observations (Post-consent monitoring)*

Great black-backed gulls were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Great black-backed gull abundance was consistently high across the three survey programmes with peaks in October 2010 (n=2,417), October 2011 (n=727) and November 2012 (n=409). Great black-backed gulls occurred in all of the 12 surveys in 2010/11, all of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report considered that, with the exception of the months of October and March, great black-backed gull densities during the more recent aerial digital surveys follow the general pattern of occurrence, which is of low densities throughout the non-breeding period.

5.10.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Great black-backed gulls were recorded within the Thanet Extension during all three boat-based surveys in January, February and March 2016 (migration-spring bio-season) with a peak abundance of 61 birds occurring in January 2016, which equates to a density of 0.84 birds / km² (Table 26). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.10.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Great black-backed gulls were recorded in the Thanet Extension site in 15 of the 24 aerial digital surveys in January 2017 & 2018, February 2017 & 2018, March 2016 & 2017, April 2016 & 2017 (migration-spring bio-season), May 2017 and July 2016 (migration-free breeding bio-season), September 2016, October 2017 & November 2016 (migration-autumn bio-season), December 2016 & 2017 (winter bio-season) (Table 26). Abundances and densities peaked in October 2017, when an estimated 130 individuals were present in the Thanet Extension site, which equates to a density of 1.78 birds / km² (Table 26). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 26 Great black-backed gull monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	61	n/a	0.84	0.47	n/a	0.37	n/a
	2017	Aerial	8	27	0.11	0.11	0.37	0.00	0.00
	2018	Aerial	45		0.62	0.62		0.00	
February	2016	Boat	30	n/a	0.41	0.41	n/a	0.00	n/a
	2017	Aerial	55	37	0.77	0.63	0.38	0.12	0.12
	2018	Aerial	18		0.24	0.12		0.12	
March	2016	Boat	58	n/a	0.79	0.25	n/a	0.54	n/a
	2016	Aerial	9	9	0.12	0.12	0.12	0.00	0.00
	2017	Aerial	8		0.11	0.11		0.00	
April	2016	Aerial	18	14	0.25	0.00	0.00	0.25	0.19
	2017	Aerial	9		0.12	0.00		0.12	
May	2016	Aerial	0	5	0.00	0.00	0.06	0.00	0.00
	2017	Aerial	9		0.12	0.12		0.00	
July	2016	Aerial	8	4	0.11	0.11	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
September	2016	Aerial	18	9	0.25	0.25	0.13	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
October	2016	Aerial	0	65	0.00	0.00	76	0.00	0.13
	2017	Aerial	130		1.78	1.52		0.26	
November	2016	Aerial	26	13	0.36	0.36	0.18	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
December	2016	Aerial	21	66	0.29	0.29	0.46	0.00	0.45
	2017	Aerial	111		1.52	0.63		0.89	

5.10.4 Bio-season mean peak estimates

Great black-backed gulls were recorded in the Thanet Extension site in all four bio-seasons, with the highest density of 1.07 birds / km² recorded during the migration-autumn bio-season (Table 27).

Table 27 Great black-backed gull bio-season mean peak abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	May-Jul	9	0.12
Migration - autumn	Aug-Nov	78	1.07
Winter	Dec	65	0.89
Migration - spring	Jan-Apr	39	0.54

5.10.5 *Behaviour and distribution*

The majority of great black-backed gulls recorded in the Thanet Extension Site were observed in flight (n=20 or 62.5%) during the boat-based surveys from January to March 2016. Great black-backed gulls recorded from the boat-based surveys were loosely distributed within the Thanet Extension site (Appendices 13: Great black-backed gull & 15: Figures 15.18-15.20).

The majority of the great black-backed gulls from the aerial digital survey abundance estimates (n=364 or 74%) within the Thanet Extension site were in flight. Great black-backed gulls were loosely distributed across the Thanet Extension site (Appendices 7: Great black-backed gull (Thanet Extension) & 11: Figures 11.33-11.36).

5.11 Lesser black-backed gull

5.11.1 *Thanet observations (Post-consent monitoring)*

Lesser black-backed gulls were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Lesser black-backed gull abundance was variable across the three survey programmes with fewer birds recorded between December and February and peaks in October 2010 (n=339), October 2011 (n=406) and November 2012 (n=51). Lesser black-backed gulls occurred in all of the 12 surveys in 2010/11, all of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report considered that the more recent aerial digital surveys follow the general pattern of the boat-based post-consent surveys, albeit with lower lesser black-backed gull densities, particularly during the two months of October and March.

5.11.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Lesser black-backed gulls were not recorded during any of the three boat based surveys within the Thanet Extension.

5.11.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Lesser black-backed gulls were recorded in the Thanet Extension site in 11 of the 24 aerial digital surveys in March 2017 and April 2016 & 2017 (migration-spring bio-season), May 2016 & 2017, June 2016 & July 2016 (migration-free breeding bio-season), October 2016 & 2017 (migration-autumn bio-season) and November 2016 & 2017 (winter bio-season) (Table 28). Abundances and densities peaked in April 2017, when an estimated 65 individuals were present in the Thanet Extension site, which equates to a density of 0.89 birds / km² (Table 28). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 28 Lesser black-backed gull monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
March	2016	Aerial	0	4	0.00	0.00	0.06	0.00	0.00
	2017	Aerial	8		0.11	0.11		0.00	
April	2016	Aerial	65	84	0.89	0.00	0.00	0.89	0.58
	2017	Aerial	19		0.26	0.00		0.26	
May	2016	Aerial	9	9	0.12	0.00	0.06	0.12	0.06
	2017	Aerial	9		0.12	0.12		0.00	
June	2016	Aerial	8	4	0.11	0.11	0.06	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
July	2016	Aerial	16	8	0.23	0.11	0.06	0.11	0.06
	2017	Aerial	0		0.00	0.00		0.00	
October	2016	Aerial	8	9	0.11	0.00	0.00	0.11	0.12
	2017	Aerial	9		0.12	0.00		0.12	
November	2016	Aerial	9	5	0.12	0.12	0.00	0.00	0.00
	2017	Aerial	0		0.00	0.00		0.00	
December	2016	Aerial	0	5	0.00	0.00	0.00	0.00	0.06
	2017	Aerial	9		0.12	0.00		0.12	

5.11.4 Bio-season mean peak estimates

Lesser black-backed gulls were recorded in the Thanet Extension site in all four bio-seasons, with the highest mean peak density of 0.58 birds / km² recorded during the migration-spring bio-season (Table 29).

Table 29 Lesser black-backed gull bio-season mean peak abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance	Mean peak density (birds km ²)
Migration-free breeding	May-Jul	13	0.17
Migration - autumn	Aug-Oct	9	0.12
Winter	Nov-Feb	9	0.12
Migration - spring	Mar-Apr	42	0.58

5.11.5 Behaviour and distribution

No lesser black-backed gulls were recorded within the Thanet Extension site in the boat-based surveys from January to March 2016.

The majority of the lesser black-backed gulls from the aerial digital survey abundance estimates (n=127 or 75%) within the Thanet Extension site were sitting on the water. Lesser

black-backed gulls were loosely distributed across the Thanet Extension site (Appendices 7: Lesser black-backed gull (Thanet Extension) & 11: Figures 11.37-11.40).

5.12 Razorbill

5.12.1 *Thanet observations (Post-consent monitoring)*

Razorbills were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Razorbill abundance was variable across the three survey programmes with peaks in January 2011 (n=113), January 2012 (n=285) and October 2012 (n=304). Razorbills occurred nine of the 12 surveys in 2010/11, in seven of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report considered that the more recent aerial digital surveys follow the general pattern of the seasonal fluctuations and densities of razorbill as those recorded in the boat-based post consent surveys.

5.12.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Razorbills were recorded within the Thanet Extension site during two of the three boat-based surveys in January and February 2016 (migration-spring bio-season (Table 30). The peak abundance of 104 individuals estimated to be present within the Thanet Extension site during the January 2016 boat survey equates to a density of 1.43 birds / km² (Table 30). Razorbills were recorded within the 4 km buffer during two of the three boat-based surveys in January and February 2016 (migration-spring bio-season) (Table 31). The peak abundance of 283 individuals estimated to be present within the 4 km buffer also during the January 2016 boat survey equates to a density of 1.34 birds / km² (Table 31). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.12.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Razorbills were recorded within the Thanet Extension site during eight of the 24 aerial digital surveys in January 2017 & 2018, February 2017 & 2018 and March 2016 & 2017 (migration-spring bio-season), August 2016 (migration-autumn bio-season) December 2016 and December 2017 (winter bio-season) (Table 30). The peak abundance of 80 individuals estimated to be present within the Thanet Extension site during the January 2017 aerial digital survey equates to a density of 1.10 birds / km² (Table 30). Razorbills were recorded within the 4 km buffer during eleven of the 24 aerial digital surveys in January 2017 & 2018, February 2017 & 2018 and March 2017 (migration-spring bio-season), September 2016 & 2017, and October 2017 (migration-autumn bio-season) November 2017 and December 2016 & 2017 (winter bio-season) (Table 31). The peak abundance of 359 individuals estimated to be present within the 4 km buffer during the March 2017 aerial digital survey equates to a density of 1.70 birds / km² (Table 31). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 30 Corrected razorbill monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	104	n/a	1.43	0.06	n/a	1.37	n/a
	2017	Aerial	80	51	1.10	0.00	0.0	1.10	0.70
	2018	Aerial	22		0.30	0.00		0.30	
February	2016	Boat	37	n/a	0.51	0.00	n/a	0.51	n/a
	2017	Aerial	68	45	0.93	0.31	0.23	0.61	0.38
	2018	Aerial	22		0.29	0.14		0.14	
March	2016	Aerial	8	33	0.11	0.00	0.00	0.11	0.46
	2017	Aerial	58		0.80	0.00		0.80	
August	2016	Aerial	10	5	0.13	0.00	0.00	0.13	0.07
	2017	Aerial	0		0.00	0.00		0.00	
December	2016	Aerial	33	34	0.45	0.00	0.00	0.45	0.46
	2017	Aerial	34		0.46	0.00		0.46	

Table 31 Corrected razorbill monthly abundance and density estimates from survey data within the Thanet Extension 4 km buffer only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	283	n/a	1.34	0.23	n/a	1.11	n/a
	2017	Aerial	325	337	1.54	0.00	n/a	1.54	1.59
	2018	Aerial	348		1.64	0.00		1.64	
February	2016	Boat	49	n/a	0.23	0.00	n/a	0.23	n/a
	2017	Aerial	206	553	0.98	0.00	0.45	0.98	0.86
	2018	Aerial	347		1.64	0.90		0.73	
March	2016	Aerial	0	180	0.00	0.00	0.00	0.00	0.85
	2017	Aerial	359		1.70	0.00		1.70	
September	2016	Aerial	11	17	0.05	0.00	0.00	0.05	0.08
	2017	Aerial	23		0.11	0.00		0.11	
October	2016	Aerial	0	57	0.00	0.00	0.00	0.00	0.27
	2017	Aerial	114		0.54	0.00		0.54	
November	2016	Aerial	0	52	0.00	0.00	0.09	0.00	0.17
	2017	Aerial	104		0.50	0.17		0.33	
December	2016	Aerial	66	62	0.31	0.00	0.00	0.31	0.30
	2017	Aerial	58		0.28	0.00		0.28	

5.12.4 Bio-season mean peak estimates

The aerial digital surveys recorded razorbills as being present in the Thanet Extension site during the migration-autumn, winter and migration-spring bio-seasons with the highest density of 0.40 birds / km² recorded during the migration-spring bio-season (Table 32). The aerial digital surveys recorded razorbills as being present in the 4 km buffer during the migration-spring, migration-autumn and winter bio-seasons with the highest density of 1.02 birds / km² recorded during the migration-spring bio-season (Table 32).

Table 32 Razorbill bio-season mean peak abundance and density estimates (aerial digital survey data only)

BDMPS Bio-seasons	Months	Mean peak abundance (Thanet Extension)	Mean peak density (Thanet Extension)	Mean peak abundance (4 km Buffer)	Mean peak density (4 km Buffer)
Migration-free breeding	Apr-Jul	0	0.00	0	0.00
Migration - autumn	Aug-Oct	4	0.05	52	0.25
Winter	Nov-Dec	28	0.38	71	0.33
Migration - spring	Jan-Mar	29	0.40	215	1.02

5.12.5 Behaviour and distribution

The majority of razorbills recorded in the Thanet Extension and 4 km buffer from the boat-based surveys in January, February and March 2016 (n=68 or 87%) were observed sitting on the sea surface. Birds were also recorded mostly within the north of the Thanet Extension and 4 km buffer, with none recorded within the operational Thanet area (Appendices 13: Razorbill & 15: Figures 15.23 & 15.24).

The majority of the razorbills from the aerial digital survey abundance estimates in the Thanet Extension and 4 km buffer (n=1,689 or 89%) were observed sitting on the sea surface. Of these sitting birds, the majority (n=1,441 or 85%) were recorded within the 4 km buffer. Razorbills were loosely distributed across the Thanet Extension and 4 km buffer in the winter, spring and autumn bio-seasons, with highest densities of birds in the migration spring period. (Appendices 7: Razorbill (Thanet Extension & 4 km Buffer) & 11: Figures 11.50 & 11.52).

5.13 Guillemot

5.13.1 Thanet observations (Post-consent monitoring)

Guillemots were widely distributed across the Study Area, of Thanet and a 2 km buffer, in all three of the post-consent monitoring survey programmes conducted in 2010/11, 2011/12 and 2012/13 (Royal HaskoningDHV, 2011, 2012 and 2013). Guillemot abundance was consistently high across the three survey programmes with peaks in February 2011 (n=642),

February 2012 (n=1,553) and December 2012 (n=1,244). Guillemots occurred in all of the 12 surveys in 2010/11, all of the 10 surveys in 2011/12 and all of the 11 surveys in 2012/13.

A study completed for this report assessed the historic data collected during the post-consent monitoring programme and presented it alongside the more recent aerial digital survey data over the non-breeding period (ES Volume 4, Chapter 2, Annex 4.2). The summary of that report considered that the more recent aerial digital surveys follow the general pattern, but the January and February peaks of guillemot are greater than other surveys in this month.

5.13.2 *Abundance and density estimates (Thanet Extension boat-based data)*

Guillemots were recorded within the Thanet Extension site during two of the three boat-based surveys in January and February 2016 (migration-spring bio-season) (Table 33). The peak abundance of 812 individuals estimated to be present within the Thanet Extension site during the February 2016 boat survey equates to a density of 11.15 birds / km² (Table 33). Guillemots were recorded within the 4 km buffer during two of the three boat-based surveys in January and February 2016 (migration-spring bio-season) (Table 34). The peak abundance of 2,606 individuals estimated to be present within the 4 km buffer also during the February 2016 boat survey equates to a density of 12.31 birds / km² (Table 34). Appendix 13 provides the raw counts, abundances and density estimates for all three months of boat-based survey.

5.13.3 *Abundance and density estimates (Thanet Extension aerial digital data)*

Guillemots were recorded within the Thanet Extension site during eleven of the 24 aerial digital surveys in December 2016 & 2017, January 2017 & 2018 and February 2017 & 2018 (migration-spring bio-season), March 2017 and June 2017 (migration-free breeding bio-season) October 2017 (migration-autumn bio-season) and November 2016 & 2017 (winter bio-season) (Table 33). The peak abundance of 1,629 individuals estimated to be present within the Thanet Extension site during the January 2018 aerial digital survey equates to a density of 22.37 birds / km² (Table 33). Guillemots were recorded within the 4 km buffer during 16 of the 24 aerial digital surveys in December 2016 & 2017, January 2017 & 2018 and February 2017 & 2018 (migration-spring bio-season), March, May & June 2017 (migration-free breeding bio-season), August & September 2016 and October 2017 (migration-autumn bio-season) and November 2016 & 2017 (winter bio-season) (Table 34). The peak abundance of 2,236 individuals estimated to be present within the 4 km buffer during the February 2018 aerial digital survey equates to a density of 10.55 birds / km² (Table 34). Appendix 7 provides the raw counts, abundances and density estimates for all 24 months of aerial digital survey.

Table 33 Corrected guillemot monthly abundance and density estimates from survey data within the Thanet Extension Site only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	308	n/a	4.23	0	n/a	4.23	n/a
	2017	Aerial	111	870	1.50	0.14	0.07	1.36	11.87
	2018	Aerial	1,629		22.37	0.00		22.37	
February	2016	Boat	812	n/a	11.15	0.18	n/a	10.97	n/a
	2017	Aerial	171	150	2.51	0.16	0.08	2.36	2.06
	2018	Aerial	128		1.75	0.00		1.75	
March	2016	Aerial	3	118	0.04	0.00	0.00	0.04	1.61
	2017	Aerial	232		3.18	0.00		3.18	
June	2016	Aerial	0	6	0.00	0.00	0.00	0.00	0.08
	2017	Aerial	12		0.16	0.00		0.16	
October	2016	Aerial	0	6	0.00	0.00	0.00	0.00	0.08
	2017	Aerial	12		0.16	0.00		0.16	
November	2016	Aerial	12	12	0.16	0.00	0.00	0.16	0.16
	2017	Aerial	12		0.16	0.00		0.16	
December	2016	Aerial	56	53	0.64	0.16	0.08	0.64	0.66
	2017	Aerial	49		0.67	0.00		0.67	

Table 34 Corrected guillemot monthly abundance and density estimates from survey data within the Thanet Extension 4 km buffer only (estimates including positively identified and proportioned out individuals are in bold).

Month	Year	Survey Method	Total birds (flying & sitting)			Flying		Sitting	
			Abundance estimate	Mean abundance	Density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)	Density (birds km ⁻²)	Mean density (birds km ⁻²)
January	2016	Boat	826	n/a	3.90	0.07	n/a	3.83	n/a
	2017	Aerial	780	1,508	3.68	0.33	0.17	3.36	6.96
	2018	Aerial	2,236		10.55	0.00		10.55	
February	2016	Boat	2,606	n/a	12.31	0.29	n/a	12.02	n/a
	2017	Aerial	1,566	996	7.39	0.00	0.15	7.33	4.53
	2018	Aerial	426		2.01	0.29		1.72	
March	2016	Aerial	0	446	0.00	0.00	0.03	0.00	2.08
	2017	Aerial	892		4.21	0.05		4.16	
April	2016	Aerial	25	13	0.12	0.00	0.00	0.12	0.06
	2017	Aerial	0		0.00	0.00		0.00	
May	2016	Aerial	0	19	0.00	0.00	0.00	0.00	0.09
	2017	Aerial	37		0.17	0.00		0.17	
June	2016	Aerial	34	23	0.16	0.00	0.00	0.16	0.11
	2017	Aerial	12		0.05	0.00		0.05	
August	2016	Aerial	11	6	0.05	0.00	0.00	0.05	0.03
	2017	Aerial	0		0.00	0.00		0.00	
September	2016	Aerial	12	6	0.05	0.00	0.00	0.05	0.03
	2017	Aerial	0		0.00	0.00		0.00	
October	2016	Aerial	0	25	0.00	0.00	0.00	0.00	0.12
	2017	Aerial	50		0.24	0.00		0.24	
November	2016	Aerial	12	144	0.05	0.00	0.00	0.05	0.68
	2017	Aerial	276		1.30	0.00		1.30	
December	2016	Aerial	558	536	2.63	0.00	0.04	2.63	2.50
	2017	Aerial	514		2.44	0.07		2.37	

5.13.4 Bio-season mean peak estimates

The aerial digital surveys recorded guillemots as being present in the Thanet Extension site during all four bio-seasons with the highest density of 12.14 birds / km² recorded during the migration-spring bio-season (Table 35). The aerial digital surveys recorded guillemots as being present in the 4 km buffer during all four bio-seasons with the highest density of 8.09 birds / km² also recorded during the migration-spring bio-season (Table 35).

Table 35 **Guillemot bio-season mean peak abundance and density estimates (aerial digital survey data only)**

BDMPS Bio-seasons	Months	Mean peak abundance (Thanet Extension)	Mean peak density (Thanet Extension)	Mean peak abundance (4 km Buffer)	Mean peak density (4 km Buffer)
Migration-free breeding	Mar-Jun	88	1.12	339	1.60
Migration - autumn	Jul-Oct	5	0.06	24	0.11
Winter	Nov	9	0.12	110	0.52
Migration - spring	Dec-Feb	884	12.14	1,713	8.09

5.13.5 Behaviour and distribution

The majority of guillemots recorded in the Thanet Extension and 4 km buffer from the boat-based surveys in January, February and March 2016 (n=68 or 94.4%) were observed sitting on the sea surface. Birds were loosely distributed across the Thanet Extension and 4 km buffer, with a lower density of birds in the north-east of the 4 km buffer, with an additional 46 birds recorded within the operational Thanet area (Appendices 13: Razorbill & 15: Figures 15.25-15.27).

5.13.6 Abundance and density estimates (Thanet Extension boat-based data)

The majority of the guillemots from the aerial digital survey abundance estimates in the Thanet Extension and 4 km buffer (n=9,677 or 98%) were observed sitting on the sea surface. Of these sitting birds, the majority (n=7,273 or 75%) were recorded within the 4 km buffer. Guillemots were loosely distributed across the Thanet Extension and 4 km buffer in all four bio-seasons, with lower densities of birds located in the north of the Thanet Extension and 4 km buffer in the peak bio-season of migration spring (Appendices 7: Guillemot (Thanet Extension & 4 km Buffer) & 11: Figures 11.53 & 11.56).

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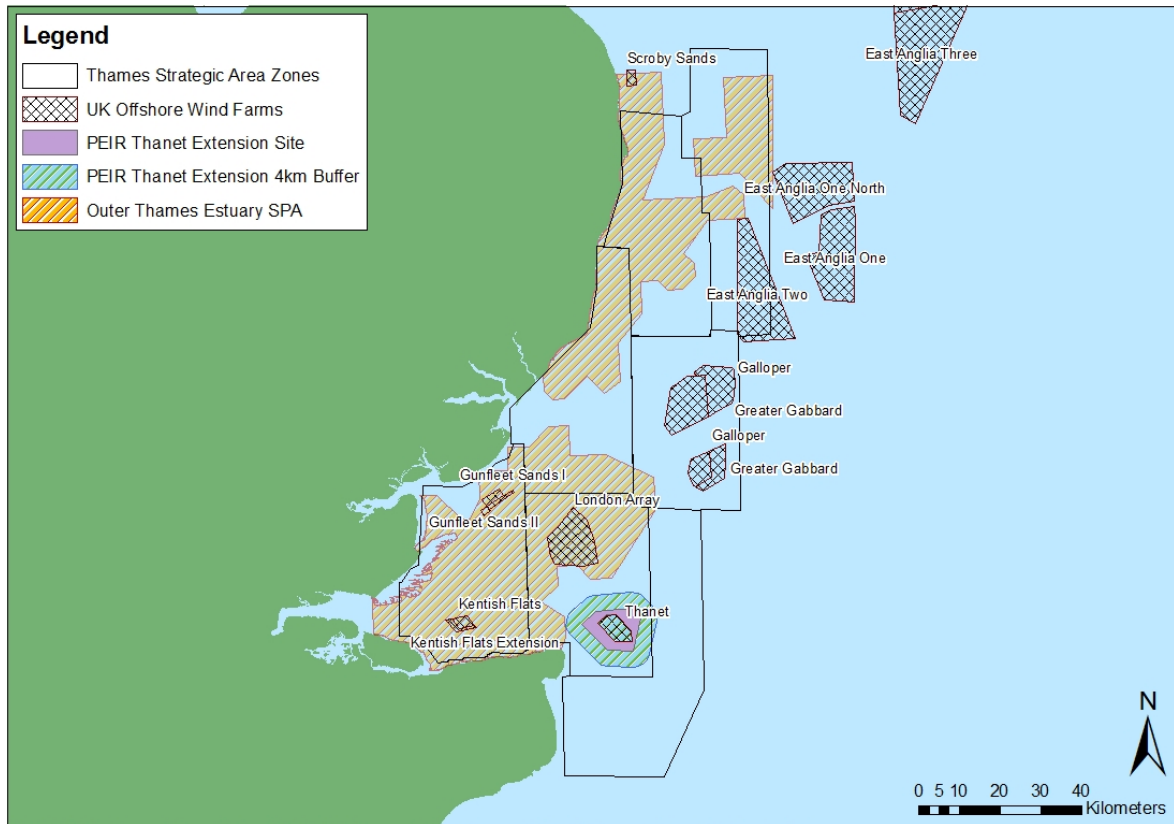
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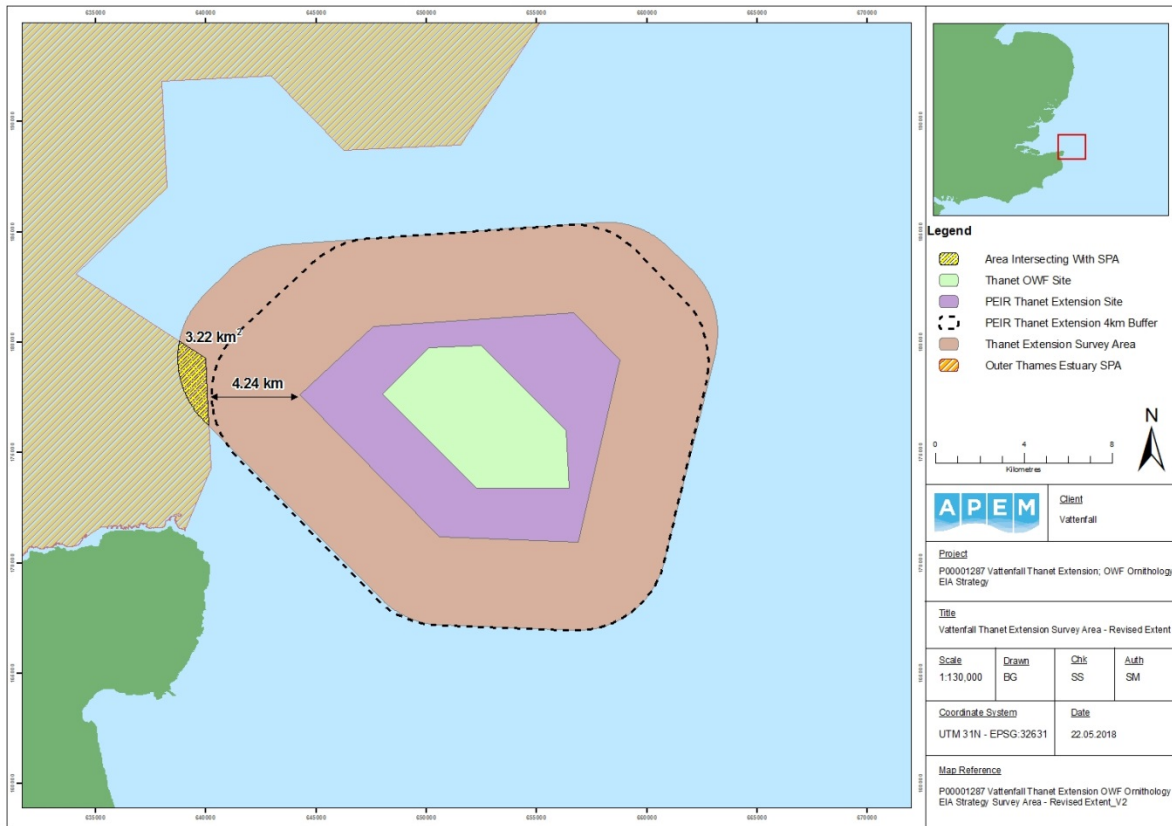
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Appendix 1 Thanet Extension Site Location

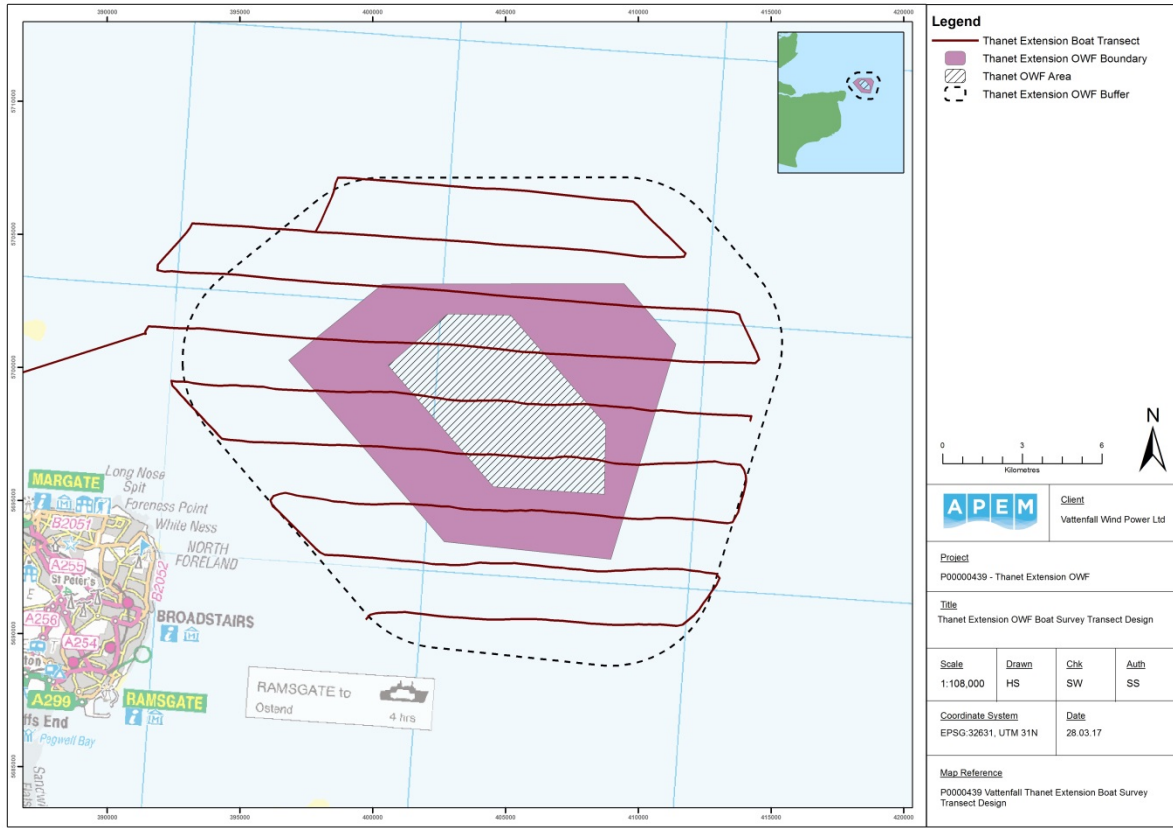


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Appendix 2 Aerial Digital Survey Area



Appendix 3 Boat-based Survey Area



Appendix 4 Scientific Names of Species Recorded in Surveys

Common Name	Scientific Name
Brent goose	<i>Branta bernicla</i>
Shelduck	<i>Tadorna tadorna</i>
Common scoter	<i>Melanitta nigra</i>
Red-throated diver	<i>Gavia stellate</i>
Great crested grebe	<i>Podiceps cristatus</i>
Fulmar	<i>Fulmarus glacialis</i>
Gannet	<i>Morus bassanus</i>
Cormorant	<i>Phalacrocorax carbo</i>
Shag	<i>Phalacrocorax aristotelis</i>
Little egret	<i>Egretta garzetta</i>
Arctic skua	<i>Stercorarius parasiticus</i>
Pomarine skua	<i>Stercorarius pomarinus</i>
Great skua	<i>Stercorarius skua</i>
Black-headed gull	<i>Chroicocephalus ridibundus</i>
Common gull	<i>Larus canus</i>
Mediterranean gull	<i>Larus melanocephalus</i>
Little gull	<i>Hydrocoloeus minutus</i>
Kittiwake	<i>Rissa tridactyla</i>
Herring gull	<i>Larus argentatus</i>
Great black-backed gull	<i>Larus marinus</i>
Lesser black-backed gull	<i>Larus fuscus</i>
Glaucous gull	<i>Larus Hyperboreus</i>
Sandwich tern	<i>Sterna sandvicensis</i>
Common tern	<i>Sterna hirundo</i>
Arctic tern	<i>Sterna paradisaea</i>
Guillemot	<i>Uria aalge</i>
Razorbill	<i>Alca torda</i>

Appendix 5 JNCC Species & Groups Codes

JNCC Code	Grouping	Species Code	Species
02269	Wildfowl species	01730	Shelduck
01639	Other wildfowl species	01680	Brent goose
95018	Scoter species	02130	Common scoter
		02150	Velvet scoter
95003	Diver species	00020	Red-throated diver
		00030	Black-throated diver
		00040	Great northern diver
95004	Grebe species	00090	Great crested grebe
		00100	Red-necked grebe
		00110	Slavonian grebe
		00120	Black-necked grebe
00220	Fulmar	00220	Fulmar
00710	Gannet	00710	Gannet
95009	Cormorant / shag	00720	Cormorant
		00800	Shag
01190	Little Egret	01190	Little Egret
95032	Skua species	05660	Pomarine skua
		05670	Arctic skua
		05680	Long-tailed skua
		05690	Great skua
94003	Small gull species	05750	Mediterranean gull
		05780	Little gull
		05820	Black-headed gull
		05900	Common gull
		06020	Kittiwake
95034	Large gull species	05910	Lesser black-backed gull
		05920	Herring gull
		05990	Glaucous gull
		06000	Great black-backed gull
95037	Tern species	06110	Sandwich tern
		06150	Common tern
		06160	Arctic tern
		06240	Little tern
95038	'Commic' tern (common or Arctic tern)	06150	Common tern
		06160	Arctic tern
95040	Auk species	06340	Guillemot
		06360	Razorbill
		06540	Puffin

**Appendix 6 Example Aerial Digital Still Images from Thanet
Extension Offshore Wind Farm**

	
Common scoter	Red-throated diver
	
Red-throated diver	Fulmar
	
Gannet	Gannet



Cormorant



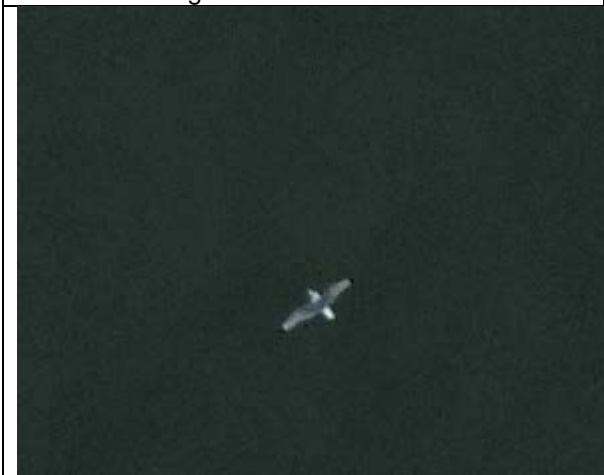
Great skua



Black-headed gull



Common gull



Kittiwake



Herring gull



Great black-backed gull



Great black-backed gull



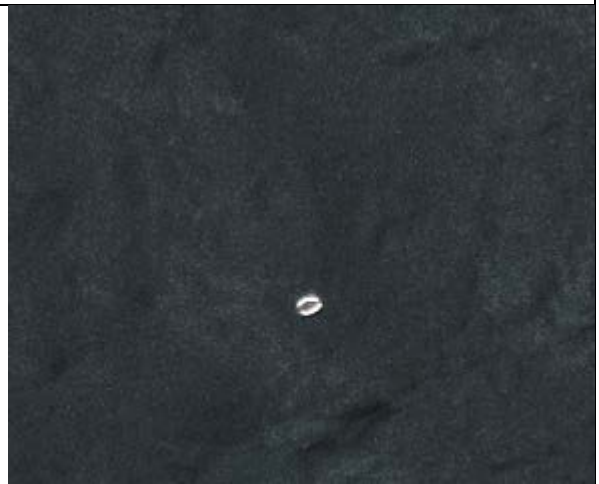
Lesser black-backed gull



Sandwich tern



'Commic' tern



Guillemot

Appendix 7 Aerial Digital Survey Raw Data, Abundance & Density Estimates (TOWF, TEOWF & 4 km Buffer)

Red-throated diver (TOWF)

Survey	Thanet OWF						Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)						
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Mar-17	4	35	4	79	0.50	1.00	0	0	0	0	0	0	4	35	4	88	0.50	1.00						
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Feb-18	1	10	1	29	1.00	0.29	0	0	0	0	0	0	1	10	1	29	1.00	0.29						

Red-throated diver (TEOWF)

Thanet Extension OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	1	9	1	28	>1	0.12	0	0	0	0	0	0	1	9	1	28	>1	0.12
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	8	71	27	134	0.35	0.97	0	0	0	0	0	0	8	71	27	125	0.35	0.97
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	9	83	9	213	0.33	1.14	1	9	1	28	>1	0.12	10	93	10	232	0.32	1.28
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	35	316	136	542	0.17	4.34	1	9	1	27	1.00	0.12	36	325	145	542	0.17	4.46
Feb-18	2	18	2	44	0.71	0.25	0	0	0	0	0	0	2	18	2	44	0.71	0.25

Red-throated diver (4 km Buffer)

Survey	Sitting						Flying						Total						
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	
Mar-16	5	48	10	96	0.44	0.23	0	0	0	0	0	0	5	48	10	86	0.44	0.23	
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	24	418	244	610	0.2	1.97	0	0	0	0	0	0	24	418	244	627	0.2	1.97	
Jan-17	12	105	44	174	0.29	0.5	1	9	1	26	>1	0.04	13	113	52	183	0.28	0.53	
Feb-17	43	409	209	637	0.15	1.93	1	10	1	29	>1	0.05	44	419	228	666	0.15	1.98	
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	0	0	0	0	0	0	27	252	149	364	0.19	1.19	1	9	1	28	1.00	0.04	
Feb-18	1	9	1	28	1.00	0.04	19	176	102	259	0.23	0.83	0	0	0	0	0	0	

Gannet (TEOWF)

Survey	Sitting						Flying						Total						
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	
Mar-16	0	0	0	0	0	0	1	9	1	28	>1	0.12	1	9	1	28	>1	0.12	
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	6	55	9	129	0.41	0.76	0	0	0	0	0	0	6	55	9	129	0.41	0.76	
Dec-16	0	0	0	0	0	0	1	9	1	27	>1	0.12	1	9	1	27	>1	0.12	
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	11	102	37	195	0.30	1.40	2	19	2	56	0.71	0.26	13	120	46	213	0.28	1.65	
Mar-17	5	40	8	88	0.45	0.55	14	112	56	176	0.28	1.54	19	152	80	233	0.24	2.09	
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	1	9	1	28	>1	0.12	10	93	37	157	0.33	1.28	11	102	37	167	0.32	1.40	
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	3	27	3	54	0.58	0.37	11	99	36	181	0.30	1.36	14	127	54	217	0.27	1.74	
Feb-18	0	0	0	0	0	0	1	9	1	27	1.00	0.12	1	9	1	27	1.00	0.12	

Gannet (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	3	26	3	69	0.58	0.12	3	26	3	77	0.58	0.12
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	5	44	9	88	0.44	0.21	8	70	26	123	0.35	0.33	13	114	53	193	0.28	0.54
Dec-16	1	9	1	28	1.00	0.04	1	9	1	28	1.00	0.04	2	18	2	46	0.71	0.09
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	29	276	162	409	0.19	1.30	26	247	143	352	0.20	1.17	55	523	361	704	0.14	2.47
Mar-17	38	344	226	479	0.16	1.62	50	452	244	705	0.14	2.13	88	796	524	1103	0.11	3.76
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	3	28	3	66	0.57	0.13	3	28	3	66	0.57	0.13
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Nov-17	18	172	95	267	0.24	0.81	38	362	238	495	0.17	1.71	56	534	372	696	0.14	2.52
Dec-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Jan-18	11	103	47	168	0.30	0.49	27	252	159	364	0.19	1.19	38	355	233	495	0.16	1.68
Feb-18	1	9	1	28	1.00	0.04	1	9	1	28	1.00	0.04	2	19	2	46	0.71	0.09

Cormorant (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	1	10	1	38	>1	0.05	1	10	1	29	>1	0.05	2	19	2	48	0.7	0.09
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar-17	10	90	10	271	0.32	0.43	0	0	0	0	0	0	10	90	10	271	0.32	0.43
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	1	9	1	37	1.00	0.04	0	0	0	0	0	0	1	9	1	37	1.00	0.04

Cormorant/shag (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	3	28	3	75	0.58	0.13	0	0	0	0	0	0	3	28	3	75	0.58	0.13
Feb-18	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04

Little egret (4 km Buffer)

Thanet Extension 4 km Buffer	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04

Great skua (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-17	0	0	0	0	0	0	1	9	1	26	>1	0.04	1	9	1	26	>1	0.04
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	0	0	0	0	0	0	1	9	1	28	1.00	0.04	1	9	1	28	1.00	0.04

Kittiwake (TOWF)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	1	9	1	28	>1	0.26	0	0	0	0	0	0	1	9	1	28	>1	0.26
Jun-16	1	9	1	27	>1	0.26	0	0	0	0	0	0	1	9	1	36	>1	0.26
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	1	9	1	28	>1	0.26	1	9	1	28	>1	0.26
Dec-16	4	37	4	112	0.5	1.06	2	19	2	47	0.69	0.54	6	56	6	159	0.41	1.6
Jan-17	0	0	0	0	0	0	3	26	3	69	0.58	0.74	3	26	3	69	0.58	0.74
Feb-17	2	19	2	47	0.68	0.54	0	0	0	0	0	0	2	19	2	47	0.68	0.54
Mar-17	0	0	0	0	0	0	1	9	1	26	>1	0.26	1	9	1	26	>1	0.26
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	6	57	6	142	0.41	1.63	9	85	28	151	0.35	2.43	15	142	38	264	0.26	4.06
Jan-18	6	55	6	137	0.41	1.57	8	73	27	128	0.35	2.09	14	128	37	247	0.27	3.66
Feb-18	0	0	0	0	0	0	1	10	1	29	1.00	0.29	1	10	1	38	1.00	0.29

Kittiwake (TEOWF)

Thanet Extension OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	1	9	1	27	1.00	0.12	3	27	3	63	0.58	0.37	4	36	9	80	0.50	0.49
Jan-17	0	0	0	0	0	0	1	8	1	25	>1	0.11	1	8	1	25	>1	0.11
Feb-17	0	0	0	0	0	0	9	83	37	139	0.34	1.14	9	83	28	148	0.34	1.14
Mar-17	0	0	0	0	0	0	4	32	4	72	0.50	0.44	4	32	4	80	0.50	0.44
Apr-17	2	19	2	46	0.69	0.26	2	19	2	46	0.69	0.26	4	37	9	74	0.49	0.51
May-17	0	0	0	0	0	0	2	18	2	46	0.69	0.25	2	18	2	46	0.69	0.25
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	1	9	1	27	>1	0.12	1	9	1	27	>1	0.12
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	2	19	2	56	0.71	0.26	2	19	2	56	0.71	0.26
Oct-17	1	9	1	37	>1	0.12	0	0	0	0	0.00	0.00	1	9	1	37	>1	0.12
Nov-17	0	0	0	0	0	0	1	9	1	28	>1	0.12	1	9	1	28	>1	0.12
Dec-17	7	65	9	139	0.38	0.89	3	28	3	65	0.57	0.38	10	92	28	175	0.32	1.26
Jan-18	61	551	61	1645	0.13	7.57	7	63	27	108	0.38	0.87	68	615	68	1727	0.12	8.44
Feb-18	0	0	0	0	0	0	3	27	3	62	0.58	0.37	3	27	3	62	0.58	0.37

Kittiwake (4 km Buffer)

Survey	Thanet Extension 4 km Buffer						Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)						
Mar-16	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05						
Apr-16	1	10	1	29	>1	0.05	0	0	0	0	0	0	1	10	1	29	>1	0.05						
May-16	2	19	2	57	0.71	0.09	1	10	1	29	>1	0.05	3	29	3	76	0.58	0.14						
Jun-16	2	17	2	43	0.7	0.08	0	0	0	0	0	0	2	17	2	43	0.7	0.08						
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Oct-16	0	0	0	0	0	0	1	8	1	24	>1	0.04	1	8	1	24	>1	0.04						
Nov-16	0	0	0	0	0	0	2	18	2	44	0.70	0.09	2	18	2	44	0.70	0.09						
Dec-16	1	9	1	28	1.00	0.04	6	55	18	101	0.41	0.26	7	64	18	120	0.38	0.3						
Jan-17	0	0	0	0	0	0	8	70	17	140	0.35	0.33	8	70	17	140	0.35	0.33						
Feb-17	2	19	2	48	0.70	0.09	14	133	57	219	0.27	0.63	16	152	76	238	0.25	0.72						
Mar-17	4	36	4	81	0.50	0.17	10	90	36	163	0.32	0.43	14	127	54	217	0.27	0.60						
Apr-17	5	48	10	105	0.45	0.23	1	10	1	29	>1	0.05	6	57	10	114	0.41	0.27						
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Jun-17	0	0	0	0	0	0	1	9	1	28	>1	0.04	1	9	1	28	>1	0.04						
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Aug-17	2	19	2	48	0.70	0.09	0	0	0	0	0	0	2	19	2	48	0.70	0.09						
Sep-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05						
Oct-17	0	0	0	0	0	0	2	19	2	48	0.70	0.09	2	19	2	57	0.70	0.09						
Nov-17	0	0	0	0	0	0	3	29	3	67	0.57	0.14	3	29	3	67	0.57	0.14						
Dec-17	0	0	0	0	0	0	17	162	48	315	0.24	0.77	17	162	48	324	0.24	0.77						
Jan-18	2	19	2	47	0.71	0.09	54	504	373	644	0.14	2.38	56	523	401	653	0.13	2.47						
Feb-18	0	0	0	0	0	0	2	19	2	46	0.71	0.09	2	19	2	46	0.71	0.09						

Common gull (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	4	38	4	115	0.5	0.18	17	162	38	353	0.24	0.77	21	201	38	468	0.22	0.95
Apr-16	3	29	3	57	0.57	0.14	2	19	2	48	0.7	0.09	5	48	10	95	0.44	0.23
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	4	34	8	67	0.5	0.16	4	34	8	67	0.5	0.16
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	2	16	2	41	0.7	0.08	0	0	0	0	0	0	2	16	2	41	0.7	0.08
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	1	9	1	37	1	0.04	1	9	1	37	1	0.04
Jan-17	0	0	0	0	0	0	1	9	1	26	>1	0.04	1	9	1	35	>1	0.04
Feb-17	3	29	3	76	0.58	0.14	6	57	19	105	0.40	0.27	9	86	29	162	0.33	0.41
Mar-17	1	9	1	27	>1	0.04	9	81	18	172	0.33	0.38	10	90	27	181	0.32	0.43
Apr-17	1	10	1	29	>1	0.05	5	48	10	95	0.44	0.23	6	57	10	114	0.41	0.27
May-17	0	0	0	0	0	0	1	9	1	28	>1	0.04	1	9	1	38	>1	0.04
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	1	10	1	29	>1	0.05	5	48	10	105	0.45	0.23	6	57	6	124	0.41	0.27
Jan-18	0	0	0	0	0	0	2	19	2	47	0.71	0.09	2	19	2	47	0.71	0.09
Feb-18	2	19	2	46	0.71	0.09	2	19	2	56	0.71	0.09	4	37	4	111	0.50	0.17

Small gull species (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	7	67	19	124	0.38	0.32	2	19	2	48	0.7	0.09	9	86	29	162	0.33	0.41
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	3	26	3	68	0.58	0.12	0	0	0	0	0	0	3	26	3	68	0.58	0.12
Jul-16	14	120	51	197	0.27	0.57	0	0	0	0	0	0	14	120	51	197	0.27	0.57
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	1	9	1	37	>1	0.04	1	9	1	37	>1	0.04
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04
Jan-17	0	0	0	0	0	0	2	17	2	44	0.70	0.08	2	17	2	44	0.70	0.08
Feb-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Apr-17	1	10	1	29	>1	0.05	0	0	0	0	0	0	1	10	1	29	>1	0.05
May-17	1	9	1	28	>1	0.04	0	0	0	0	0	0	1	9	1	28	>1	0.04
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	2	19	2	48	0.70	0.09	1	10	1	29	>1	0.05	3	29	3	57	0.57	0.14
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04
Feb-18	2	19	2	46	0.71	0.09	0	0	0	0	0	0	2	19	2	46	0.71	0.09

Herring gull (TOWF)

Thanet OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	2	19	2	47	0.68	0.54	2	19	2	47	0.68	0.54
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	3	28	3	84	0.58	0.8	0	0	0	0	0	0	3	28	3	84	0.58	0.8
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	1	9	1	28	>1	0.26	1	9	1	28	>1	0.26	2	18	2	46	0.68	0.52
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	1	9	1	28	>1	0.26	1	9	1	28	>1	0.26
Dec-16	0	0	0	0	0	0	2	19	2	47	0.71	0.54	2	19	2	47	0.71	0.54
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	1	9	1	28	1.00	0.26	0	0	0	0	0	0	1	9	1	28	1.00	0.26
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	1	10	1	29	>1	0.29	1	10	1	29	>1	0.29
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	21	198	21	576	0.22	5.67	0	0	0	0	0	0	21	198	21	576	0.22	5.67
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	2	19	2	47	0.68	0.54	2	19	2	47	0.68	0.54
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	0	0	0	0	0	0	1	10	1	29	1.00	0.29	1	10	1	29	1.00	0.29

Herring gull (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	1	10	1	29	>1	0.05	4	38	10	76	0.5	0.18	5	48	10	96	0.44	0.23
Apr-16	101	964	101	2425	0.1	4.55	6	57	10	115	0.41	0.27	107	1022	107	2749	0.1	4.83
May-16	1	10	1	29	>1	0.05	3	29	3	76	0.58	0.14	4	38	4	86	0.5	0.18
Jun-16	0	0	0	0	0	0	1	9	1	26	>1	0.04	1	9	1	26	>1	0.04
Jul-16	1	9	1	26	>1	0.04	0	0	0	0	0	0	1	9	1	26	>1	0.04
Aug-16	1	8	1	25	>1	0.04	3	25	3	76	0.58	0.12	4	34	4	93	0.5	0.16
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	7	64	18	129	0.38	0.3	7	64	18	129	0.38	0.3
Jan-17	0	0	0	0	0	0	2	17	2	44	0.70	0.08	2	17	2	44	0.70	0.08
Feb-17	4	38	4	86	0.50	0.18	4	38	4	86	0.50	0.18	8	76	19	143	0.35	0.36
Mar-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	1	10	1	29	>1	0.05	1	10	1	38	>1	0.05
May-17	0	0	0	0	0	0	2	19	2	47	0.70	0.09	2	19	2	47	0.70	0.09
Jun-17	0	0	0	0	0	0	1	9	1	28	>1	0.04	1	9	1	28	>1	0.04
Jul-17	0	0	0	0	0	0	1	9	1	38	>1	0.04	1	9	1	28	>1	0.04
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	1	10	1	29	>1	0.05	0	0	0	0	0	0	1	10	1	29	>1	0.05
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	2	19	2	48	0.70	0.09	2	19	2	48	0.70	0.09
Dec-17	6	57	6	143	0.41	0.27	6	57	10	114	0.41	0.27	12	114	19	257	0.29	0.54
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	2	19	2	56	0.71	0.09	6	56	6	158	0.41	0.26	8	74	8	259	0.35	0.35

Great black-backed gull (TOWF)

Thanet OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	1	9	1	28	>1	0.26	1	9	1	28	>1	0.26
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	9	83	9	258	0.33	2.38	0	0	0	0	0	0	9	83	9	221	0.33	2.38
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	3	28	3	74	0.58	0.80	5	47	9	84	0.42	1.35	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	7	66	19	123	0.38	1.89	5	47	5	104	0.45	1.35	0	0	0	0	0	0
Mar-17	2	18	2	53	0.71	0.52	3	26	3	70	0.58	0.74	0	0	0	0	0	0
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	1	9	1	28	>1	0.26	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	5	47	9	94	0.45	1.35	2	19	2	47	0.68	0.54	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	2	19	2	47	0.68	0.54	0	0	0	0	0	0
Dec-17	3	28	3	76	0.58	0.80	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	7	64	18	119	0.38	1.83	8	73	27	128	0.35	2.09	3	27	3	55	0.58	0.77
Feb-18	0	0	0	0	0.00	0.00	0	0	0	0	0.00	0.00	0	0	0	0	0	0

Great black-backed gull (TEOWF)

Thanet Extension OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	1	9	1	28	>1	0.12	1	9	1	37	>1	0.12
Apr-16	2	18	2	55	0.71	0.25	0	0	0	0	0	0	2	18	2	55	0.71	0.25
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	1	8	1	34	>1	0.11	1	8	1	25	>1	0.11
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	2	18	2	54	0.7	0.25	2	18	2	45	0.7	0.25
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	3	28	3	65	0.57	0.38	3	28	3	65	0.57	0.38
Dec-16	0	0	0	0	0	0	2	18	2	45	0.71	0.25	2	18	2	45	0.71	0.25
Jan-17	0	0	0	0	0	0	1	8	1	25	>1	0.11	1	8	1	25	>1	0.11
Feb-17	1	9	1	28	>1	0.12	5	46	9	83	0.43	0.63	6	56	19	102	0.40	0.77
Mar-17	0	0	0	0	0	0	1	8	1	24	>1	0.11	1	8	1	24	>1	0.11
Apr-17	1	9	1	28	>1	0.12	0	0	0	0	0	0	1	9	1	28	>1	0.12
May-17	0	0	0	0	0	0	1	9	1	28	>1	0.12	1	9	1	28	>1	0.12
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	2	19	2	56	0.71	0.26	12	111	12	315	0.29	1.52	14	130	14	343	0.27	1.79
Nov-17	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0	0	0	0	0
Dec-17	7	65	9	139	0.38	0.89	5	46	9	92	0.43	0.63	12	111	46	185	0.29	1.52
Jan-18	0	0	0	0	0	0	5	45	9	99	0.45	0.62	5	45	9	99	0.45	0.62
Feb-18	1	9	1	27	1.00	0.12	1	9	1	27	1.00	0.12	2	18	2	44	0.71	0.25

Great black-backed gull (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	1	10	1	29	>1	0.05	0	0	0	0	0	0	1	10	1	29	>1	0.05
Apr-16	4	38	4	115	0.5	0.18	2	19	2	57	0.71	0.09	6	57	6	134	0.41	0.27
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	1	9	1	28	>1	0.04	1	9	1	28	>1	0.04	2	19	2	46	0.7	0.09
Oct-16	0	0	0	0	0	0	2	16	2	41	0.7	0.08	2	16	2	41	0.7	0.08
Nov-16	2	18	2	53	0.71	0.09	4	35	9	70	0.50	0.17	6	53	9	106	0.41	0.25
Dec-16	3	28	3	83	0.58	0.13	4	37	4	74	0.5	0.17	7	64	9	138	0.38	0.3
Jan-17	4	35	4	105	0.50	0.17	2	17	2	44	0.70	0.08	6	52	6	140	0.41	0.25
Feb-17	16	152	76	247	0.25	0.72	6	57	19	105	0.40	0.27	22	209	124	314	0.22	0.99
Mar-17	4	36	4	90	0.50	0.17	0	0	0	0	0	0	4	36	4	90	0.50	0.17
Apr-17	1	10	1	29	>1	0.05	0	0	0	0	0	0	1	10	1	29	>1	0.05
May-17	0	0	0	0	0	0	2	19	2	47	0.70	0.09	2	19	2	47	0.70	0.09
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	2	19	2	57	0.71	0.09	1	10	1	38	>1	0.05	3	29	3	76	0.58	0.14
Nov-17	1	10	1	29	>1	0.05	4	38	4	105	0.50	0.18	5	48	5	143	0.45	0.23
Dec-17	11	105	19	248	0.30	0.50	4	38	4	95	0.50	0.18	15	143	29	305	0.26	0.68
Jan-18	0	0	0	0	0	0	5	47	9	93	0.45	0.22	5	47	9	93	0.45	0.22
Feb-18	12	111	12	334	0.29	0.52	6	56	6	111	0.41	0.26	18	167	18	473	0.24	0.79

Lesser black-backed gull (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	38	363	38	955	0.16	1.71	1	10	1	29	>1	0.05	39	372	39	955	0.16	1.76
May-16	1	10	1	38	>1	0.05	2	19	2	57	0.71	0.09	3	29	3	76	0.58	0.14
Jun-16	0	0	0	0	0	0	2	17	2	43	0.7	0.08	2	17	2	43	0.7	0.08
Jul-16	0	0	0	0	0	0	1	9	1	26	>1	0.04	1	9	1	34	>1	0.04
Aug-16	1	8	1	25	>1	0.04	1	8	1	25	>1	0.04	2	17	2	42	0.71	0.08
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	1	8	1	24	>1	0.04	1	8	1	24	>1	0.04
Nov-16	1	9	1	26	>1	0.04	0	0	0	0	0	0	1	9	1	26	>1	0.04
Dec-16	0	0	0	0	0	0	1	9	1	28	1	0.04	1	9	1	28	1	0.04
Jan-17	6	52	6	157	0.41	0.25	0	0	0	0	0	0	6	52	6	157	0.41	0.25
Feb-17	1	10	1	29	>1	0.05	1	10	1	29	>1	0.05	2	19	2	57	0.70	0.09
Mar-17	0	0	0	0	0	0	4	36	4	90	0.50	0.17	4	36	4	81	0.50	0.17
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	2	19	2	47	0.70	0.09	1	9	1	38	>1	0.04	3	28	3	66	0.57	0.13
Jul-17	0	0	0	0	0	0	1	9	1	28	>1	0.04	1	9	1	28	>1	0.04
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	2	19	2	48	0.70	0.09	2	19	2	48	0.70	0.09
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	5	46	5	185	0.45	0.22	7	65	7	185	0.38	0.31	12	111	12	324	0.29	0.52

Large gull species (4 km Buffer)

Thanet Extension 4 km Buffer	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	1	9	1	28	>1	0.04	0	0	0	0	0	0	1	9	1	28	>1	0.04
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	1	9	1	26	>1	0.04	1	9	1	26	>1	0.04
Dec-16	1	9	1	28	1.00	0.04	0	0	0	0	0	0	1	9	1	28	1.00	0.04
Jan-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-17	4	38	4	86	0.50	0.18	0	0	0	0	0	0	4	38	4	95	0.50	0.18
Mar-17	1	9	1	27	>1	0.04	0	0	0	0	0	0	1	9	1	27	>1	0.04
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	3	28	3	66	0.57	0.13	0	0	0	0	0	0	3	28	3	57	0.57	0.13
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	3	28	3	66	0.57	0.13	0	0	0	0	0	0	3	28	3	66	0.57	0.13
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	8	74	8	222	0.35	0.35	1	9	1	28	1.00	0.04	9	83	9	241	0.33	0.39

Razorbill (TOWF)

Thanet OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	1	8	1	25	>1	0.23	0	0	0	0	0	0	1	8	1	25	>1	0.23
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jan-17	2	17	2	43	0.68	0.49	0	0	0	0	0	0	2	17	2	43	0.68	0.49
Feb-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar-17	3	26	3	79	0.58	0.74	0	0	0	0	0	0	3	26	3	105	0.58	0.74
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	1	9	1	28	>1	0.26	0	0	0	0	0	0	1	9	1	28	>1	0.26
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	1	9	1	28	>1	0.26	0	0	0	0	0	0	1	9	1	28	>1	0.26
Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb-18	2	19	2	57	0.71	0.54	0	0	0	0	0	0	2	19	2	57	0.71	0.54

Razorbill (TEOWF)

Thanet Extension OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	1	8	1	25	>1	0.11	0	0	0	0	0	0	1	8	1	25	>1	0.11
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	3	27	3	71	0.58	0.37	0	0	0	0	0	0	3	27	3	71	0.58	0.37
Jan-17	8	66	25	124	0.36	0.91	0	0	0	0	0	0	8	66	25	116	0.36	0.91
Feb-17	4	37	9	74	0.49	0.51	2	19	2	56	0.71	0.26	6	56	9	111	0.41	0.77
Mar-17	6	48	8	96	0.41	0.66	0	0	0	0	0	0	6	48	8	96	0.41	0.66
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	3	28	3	65	0.57	0.38	0	0	0	0	0	0	3	28	3	65	0.57	0.38
Jan-18	2	18	2	45	0.71	0.25	0	0	0	0	0	0	2	18	2	45	0.71	0.25
Feb-18	1	9	1	27	1.00	0.12	1	9	1	27	1.00	0.12	2	18	2	44	0.71	0.25

Razorbill (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	1	9	1	28	>1	0.04	0	0	0	0	0	0	1	9	1	28	>1	0.04
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	6	55	9	120	0.41	0.26	0	0	0	0	0	0	6	55	9	120	0.41	0.26
Jan-17	31	270	157	410	0.18	1.28	0	0	0	0	0	0	31	270	148	419	0.18	1.28
Feb-17	18	171	57	333	0.24	0.81	0	0	0	0	0	0	18	171	57	333	0.24	0.81
Mar-17	33	298	108	597	0.17	1.41	0	0	0	0	0	0	33	298	90	606	0.17	1.41
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	2	19	2	48	0.70	0.09	0	0	0	0	0	0	2	19	2	48	0.70	0.09
Oct-17	10	95	19	200	0.32	0.45	0	0	0	0	0	0	10	95	19	200	0.32	0.45
Nov-17	6	57	10	124	0.41	0.27	3	29	3	86	0.58	0.14	9	86	19	181	0.33	0.41
Dec-17	5	48	10	95	0.44	0.23	0	0	0	0	0	0	5	48	10	95	0.44	0.23
Jan-18	31	289	121	513	0.18	1.36	0	0	0	0	0	0	31	289	131	467	0.18	1.36
Feb-18	14	130	19	269	0.27	0.61	17	158	17	408	0.24	0.75	31	287	65	584	0.18	1.36

Guillemot (TOWF)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	1	8	1	25	>1	0.23	0	0	0	0	0	0	1	8	1	25	>1	0.23
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-16	6	56	9	112	0.41	1.6	0	0	0	0	0	0	6	56	9	112	0.41	1.6
Jan-17	6	52	9	103	0.42	1.49	0	0	0	0	0	0	6	52	9	103	0.42	1.49
Feb-17	4	38	4	76	0.48	1.09	0	0	0	0	0	0	4	38	9	76	0.48	1.09
Mar-17	12	105	12	263	0.29	3.00	0	0	0	0	0	0	12	105	12	254	0.29	3.00
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	1	9	1	28	>1	0.26	0	0	0	0	0	0	1	9	1	28	>1	0.26
Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dec-17	5	47	9	94	0.42	1.35	0	0	0	0	0	0	5	47	9	94	0.42	1.35
Jan-18	26	238	64	494	0.20	6.81	0	0	0	0	0	0	26	238	55	521	0.20	6.81
Feb-18	3	29	3	67	0.58	0.83	0	0	0	0	0	0	3	29	3	67	0.58	0.83

Guillemot (TEOWF)

Thanet Extension OWF	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	1	9	1	26	>1	0.12	0	0	0	0	0	0	1	9	1	26	>1	0.12
Dec-16	4	36	4	89	0.5	0.49	1	9	1	27	1	0.12	5	45	5	98	0.45	0.62
Jan-17	9	75	25	149	0.33	1.03	1	8	1	25	>1	0.11	10	83	25	158	0.32	1.14
Feb-17	14	130	46	232	0.27	1.79	1	9	1	28	>1	0.12	15	139	56	232	0.26	1.91
Mar-17	22	176	80	297	0.22	2.42	0	0	0	0	0	0	22	176	80	297	0.22	2.42
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-17	1	9	1	37	>1	0.12	0	0	0	0	0	0	1	9	1	28	>1	0.12
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	1	9	1	28	>1	0.12	0	0	0	0	0	0	1	9	1	28	>1	0.12
Nov-17	1	9	1	28	>1	0.12	0	0	0	0	0	0	1	9	1	28	>1	0.12
Dec-17	4	37	9	74	0.49	0.51	0	0	0	0	0	0	4	37	9	74	0.49	0.51
Jan-18	137	1238	515	2197	0.09	17.00	0	0	0	0	0	0	137	1238	479	2197	0.09	17.00
Feb-18	11	97	35	195	0.30	1.33	0	0	0	0	0	0	11	97	35	186	0.30	1.33

Guillemot (4 km Buffer)

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
Mar-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apr-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-16	1	8	1	25	>1	0.04	0	0	0	0	0	0	1	8	1	25	>1	0.04
Sep-16	1	9	1	28	>1	0.04	0	0	0	0	0	0	1	9	1	28	>1	0.04
Oct-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nov-16	1	9	1	26	>1	0.04	0	0	0	0	0	0	1	9	1	26	>1	0.04
Dec-16	46	424	193	691	0.15	2.00	0	0	0	0	0	0	46	424	193	691	0.15	2.00
Jan-17	62	541	314	820	0.13	2.55	6	52	9	105	0.41	0.25	68	593	349	881	0.12	2.80
Feb-17	124	1180	809	1589	0.09	5.57	0	0	0	0	0	0	125	1189	818	1627	0.09	5.62
Mar-17	74	669	425	995	0.12	3.16	1	9	1	27	>1	0.04	75	678	407	967	0.12	3.20
Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May-17	3	28	3	76	0.58	0.13	0	0	0	0	0	0	3	28	3	76	0.58	0.13
Jun-17	1	9	1	28	>1	0.04	0	0	0	0	0	0	1	9	1	28	>1	0.04
Jul-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct-17	4	38	4	86	0.50	0.18	0	0	0	0	0	0	4	38	4	86	0.50	0.18
Nov-17	22	210	86	353	0.21	0.99	0	0	0	0	0	0	22	210	95	381	0.21	0.99
Dec-17	40	381	257	515	0.16	1.80	1	10	1	29	>1	0.05	41	391	257	543	0.16	1.85
Jan-18	182	1699	1232	2138	0.07	8.02	0	0	0	0	0	0	182	1699	1260	2175	0.07	8.02
Feb-18	30	278	158	426	0.18	1.31	5	46	5	111	0.45	0.22	35	324	176	510	0.17	1.53

Appendix 8 Apportioned Aerial Digital Survey Data Abundance & Density Estimates.

Cormorant (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
Mar-16	10	0.05	10	0.05	19	0.09
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	8	0.04	1	<0.01	9	<0.05
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	90	0.43	0	0.00	90	0.43
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	9	0.04	0	0.00	9	0.04

Kittiwake (TOWF)

Thanet OWF	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	9	0.26	0	0.00	9	0.26
Jun-16	18	0.52	0	0.00	18	0.52
Jul-16	9	0.24	0	0.00	9	0.24
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	9	0.26	9	0.26
Dec-16	37	1.06	19	0.54	56	1.60
Jan-17	0	0.00	26	0.74	26	0.74
Feb-17	19	0.54	0	0.00	19	0.54
Mar-17	0	0.00	9	0.29	9	0.26
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	57	1.63	85	2.43	142	4.06
Jan-18	59	1.68	78	2.23	137	3.91
Feb-18	0	0.00	10	0.29	10	0.29

Kittiwake (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	3	0.04	0	0.00	3	0.04
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	19	0.26	5	0.07	24	0.33
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	9	0.12	27	0.37	36	0.49
Jan-17	0	0.00	8	0.11	8	0.11
Feb-17	0	0.00	89	1.22	89	1.22
Mar-17	0	0.00	32	0.44	32	0.44
Apr-17	29	0.39	29	0.39	56	0.77
May-17	0	0.00	24	0.33	24	0.33
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	9	0.12	9	0.12
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	19	0.26	19	0.26
Oct-17	9	0.12	0	0.00	9	0.12
Nov-17	0	0.00	9	0.12	9	0.12
Dec-17	65	0.89	28	0.38	92	1.26
Jan-18	559	7.68	64	0.88	624	8.57
Feb-18	0	0.00	27	0.37	27	0.37

Kittiwake (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	10	0.05	10	0.05
Apr-16	19	0.09	0	0.00	19	0.09
May-16	19	0.09	10	0.05	29	0.14
Jun-16	43	0.20	0	0.00	43	0.20
Jul-16	45	0.21	11	0.05	57	0.27
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	8	0.04	8	0.04
Nov-16	0	0.00	19	0.09	19	0.09
Dec-16	10	0.05	61	0.29	71	0.34
Jan-17	0	0.00	84	0.39	84	0.39
Feb-17	20	0.09	139	0.65	158	0.75
Mar-17	36	0.17	90	0.43	127	0.60
Apr-17	56	0.27	12	0.06	67	0.32
May-17	0	0.00	6	0.03	6	0.03
Jun-17	0	0.00	9	0.04	9	0.04
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	19	0.09	0	0.00	19	0.09
Sep-17	0	0.00	39	0.18	39	0.18
Oct-17	0	0.00	19	0.09	19	0.09
Nov-17	0	0.00	29	0.14	29	0.14
Dec-17	0	0.00	162	0.77	162	0.77
Jan-18	19	0.09	513	2.42	532	2.51
Feb-18	0	0.00	30	0.14	30	0.14

Black-headed gull (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	48	0.23	201	0.95	248	1.17
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	33	0.16	33	0.16
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	1	<0.01	1	<0.01
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

Common gull (TOWF)

Thanet OWF	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	28	0.80	28	0.80
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	19	0.54	19	0.54
Mar-17	0	0.00	18	0.52	18	0.52
Apr-17	0	0.00	9	0.26	9	0.26
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	10	0.29	10	0.29
Jul-17	0	0.00	9	0.27	9	0.27
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	9	0.26	9	0.26	19	0.54
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.01	0	0.01
Feb-18	0	0.00	0	0.00	0	0.00

Common gull (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	34	0.47	0	0.00	34	0.47
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	12	0.16	15	0.21	27	0.37
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	27	0.37	27	0.37
Oct-16	16	0.22	16	0.22	33	0.45
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	27	0.37	27	0.37
Jan-17	0	0.00	17	0.23	17	0.23
Feb-17	0	0.00	22	0.30	22	0.30
Mar-17	0	0.00	8	0.11	8	0.11
Apr-17	9	0.12	37	0.51	46	0.63
May-17	12	0.16	0	0.00	12	0.16
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	28	0.38	28	0.38
Jan-18	0	0.00	9	0.13	9	0.13
Feb-18	0	0.00	0	0.00	0	0.00

Common gull (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
Mar-16	38	0.18	162	0.77	201	0.95
Apr-16	75	0.36	50	0.24	125	0.59
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	16	0.07	47	0.22	63	0.30
Aug-16	0	0.00	34	0.16	34	0.16
Sep-16	0	0.00	9	0.04	9	0.04
Oct-16	16	0.08	0	0.00	16	0.08
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	11	0.05	11	0.05
Jan-17	0	0.00	12	0.06	12	0.06
Feb-17	30	0.14	59	0.28	89	0.42
Mar-17	9	0.04	81	0.38	90	0.43
Apr-17	10	0.05	48	0.23	57	0.27
May-17	0	0.00	12	0.06	12	0.06
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	10	0.05	48	0.23	57	0.27
Jan-18	0	0.00	19	0.09	19	0.09
Feb-18	23	0.11	23	0.11	45	0.21

Lesser black-backed gull (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	363	1.71	10	0.05	372	1.76
May-16	10	0.05	19	0.09	29	0.14
Jun-16	0	0.00	17	0.08	17	0.08
Jul-16	0	0.00	9	0.04	9	0.04
Aug-16	8	0.04	8	0.04	17	0.08
Sep-16	1	<1	0	0.00	1	<1
Oct-16	0	0.00	8	0.04	8	0.04
Nov-16	10	0.05	0	0.00	10	0.05
Dec-16	0	0.00	9	0.04	9	0.04
Jan-17	52	0.25	0	0.00	52	0.25
Feb-17	11	0.05	11	0.05	20	0.10
Mar-17	0	0.00	39	0.19	39	0.19
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	7	0.03	7	0.03
Jun-17	19	0.09	9	0.04	28	0.13
Jul-17	0	0.00	23	0.11	23	0.11
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	19	0.09	19	0.09
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	56	0.26	79	0.37	135	0.64

Herring gull (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	74	1.02	46	0.63	120	1.65
May-16	0	0.00	9	0.12	9	0.12
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	8	0.11	17	0.23	25	0.34
Aug-16	0	0.00	8	0.11	8	0.11
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	104	1.43	104	1.43
Jan-17	8	0.11	0	0.00	8	0.11
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	37	0.51	28	0.38	65	0.89
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	9	0.12	9	0.12
Jul-17	0	0.00	9	0.12	9	0.12
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	18	0.25	9	0.12	28	0.38
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

Herring gull (4 km Buffer)

Thanet Extension plus 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	10	0.05	38	0.18	48	0.23
Apr-16	964	4.55	57	0.27	1022	4.83
May-16	10	0.05	29	0.14	38	0.18
Jun-16	0	0.00	9	0.04	9	0.04
Jul-16	9	0.04	0	0.00	9	0.04
Aug-16	8	0.04	25	0.12	34	0.16
Sep-16	1	<1	1	<1	1	0.01
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	70	0.33	70	0.33
Jan-17	0	0.00	19	0.09	19	0.09
Feb-17	41	0.20	41	0.20	83	0.39
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	10	0.05	10	0.05
May-17	0	0.00	19	0.09	19	0.09
Jun-17	0	0.00	9	0.04	9	0.04
Jul-17	0	0.00	23	0.11	23	0.11
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	10	0.05	0	0.00	10	0.05
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	19	0.09	19	0.09
Dec-17	57	0.27	57	0.27	114	0.54
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	24	0.11	70	0.33	92	0.43

Great black-backed gull (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	9	0.12	9	0.12
Apr-16	18	0.25	0	0.00	18	0.25
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	8	0.11	8	0.11
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	18	0.25	18	0.25
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	26	0.36	26	0.36
Dec-16	0	0.00	21	0.29	21	0.29
Jan-17	0	0.00	8	0.11	8	0.11
Feb-17	9	0.12	46	0.63	56	0.77
Mar-17	0	0.00	8	0.11	8	0.11
Apr-17	9	0.12	0	0.00	9	0.12
May-17	0	0.00	9	0.12	9	0.12
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	19	0.26	111	1.52	130	1.79
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	65	0.89	46	0.63	111	1.52
Jan-18	0	0.00	45	0.62	45	0.62
Feb-18	9	0.12	9	0.12	18	0.25

Great black-backed gull (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	10	0.05	0	0.00	10	0.05
Apr-16	38	0.18	19	0.09	57	0.27
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	13	0.06	13	0.06	26	0.12
Oct-16	0	0.00	16	0.08	16	0.08
Nov-16	21	0.10	40	0.19	61	0.29
Dec-16	29	0.14	39	0.18	67	0.32
Jan-17	38	0.18	18	0.09	56	0.26
Feb-17	174	0.82	65	0.31	239	1.13
Mar-17	42	0.20	0	0.00	42	0.20
Apr-17	10	0.05	0	0.00	10	0.05
May-17	0	0.00	40	0.19	40	0.19
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	19	0.09	10	0.05	29	0.14
Nov-17	10	0.05	38	0.18	48	0.23
Dec-17	105	0.50	38	0.18	143	0.68
Jan-18	0	0.00	47	0.22	47	0.22
Feb-18	138	0.65	69	0.33	207	0.98

Sandwich tern (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	4	0.05	4	0.05
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

Sandwich tern (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	10	0.05	10	0.05
Apr-16	0	0.00	10	0.05	10	0.05
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	5	0.02	5	0.02
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

'Commic' tern (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	4	0.05	4	0.05
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

'Commic' tern (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	19	0.09	19	0.09
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	5	0.02	5	0.02
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	0	0.00	0	0.00	0	0.00
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	0	0.00	0	0.00	0	0.00
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	0	0.00	0	0.00	0	0.00
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	0	0.00	0	0.00	0	0.00

Razorbill (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	7	0.09	0	0.00	7	0.09
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	8	0.11	0	0.00	8	0.11
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	27	0.37	0	0.00	27	0.37
Jan-17	66	0.91	0	0.00	66	0.91
Feb-17	37	0.51	19	0.26	56	0.77
Mar-17	48	0.66	0	0.00	48	0.66
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	28	0.38	0	0.00	28	0.38
Jan-18	18	0.25	0	0.00	18	0.25
Feb-18	9	0.12	9	0.12	18	0.25

Guillemot (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	2	0.03	0	0.00	2	0.03
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	9	0.12	0	0.00	9	0.12
Dec-16	36	0.49	9	0.12	45	0.62
Jan-17	75	1.03	8	0.11	83	1.14
Feb-17	130	1.79	9	0.12	139	1.91
Mar-17	176	2.42	0	0.00	176	2.42
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	9	0.12	0	0.00	9	0.12
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	9	0.12	0	0.00	9	0.12
Nov-17	9	0.12	0	0.00	9	0.12
Dec-17	37	0.51	0	0.00	37	0.51
Jan-18	1238	17.00	0	0.00	1238	17.00
Feb-18	97	1.33	0	0.00	97	1.33

Guillemot (4 km Buffer)

Thanet Extension 4 km Buffer	Diving		Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
Survey								
Mar-16	0	0.00	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	19	0.09	0	0.00	19	0.09
May-16	0	0.00	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	26	0.12	0	0.00	26	0.12
Jul-16	0	0.00	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	8	0.04	0	0.00	8	0.04
Sep-16	0	0.00	9	0.04	0	0.00	9	0.04
Oct-16	0	0.00	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	9	0.04	0	0.00	9	0.04
Dec-16	0	0.00	424	2.00	0	0.00	424	2.00
Jan-17	0	0.00	541	2.55	52	0.25	593	2.80
Feb-17	10	0.05	1180	5.57	0	0.00	1189	5.62
Mar-17	0	0.00	669	3.16	9	0.04	678	3.20
Apr-17	0	0.00	0	0.00	0	0.00	0	0.00
May-17	0	0.00	28	0.13	0	0.00	28	0.13
Jun-17	0	0.00	9	0.04	0	0.00	9	0.04
Jul-17	0	0.00	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	38	0.18	0	0.00	38	0.18
Nov-17	0	0.00	210	0.99	0	0.00	210	0.99
Dec-17	0	0.00	381	1.80	10	0.05	391	1.85
Jan-18	0	0.00	1699	8.02	0	0.00	1699	8.02
Feb-18	0	0.00	278	1.31	46	0.22	324	1.53

Appendix 9 Correction factors applied to aerial survey data for availability

The correction factor applied to each relevant species is based on that recommended by JNCC in a submission during the examination phase of the East Anglia ONE OWF, referred to by JNCC as Method C. A copy of the text on Method C is provided below. This has been taken from Paragraph 5.6.5 of this document:

Joint Nature Conservation Committee (2013). *JNCC Expert Statement on Ornithological Issues for Written Representations in Respect of East Anglia ONE Offshore Windfarm by Dr Sophy Allen*. Joint Nature Conservation Committee, Aberdeen.

METHOD C

Guillemots

Underwater (1.9h) / [Sea surface (5.1h) + Diving activity (2.9h)] = 0.2375

Therefore, for guillemot availability JNCC would calculate $g(0) = 0.7625$

Razorbills

Underwater (0.8h) / [Sea surface (3.1h) + Diving activity (1.5h)] = 0.1739

Therefore, for razorbill availability JNCC would calculate $g(0) = 0.8261$

This works on the following assumptions:

1. That all birds observed on the water in the project area are undertaking a foraging trip (in most cases this seems appropriate);
2. That 'birds in flight' are adequately characterised within the 'birds in flight' quotation of the Thaxter et al. (2010) figures (i.e. that portion which has been removed from the Correction Factor calculation);
3. That the proportions of time spent foraging underwater are representative of behaviour throughout the year (i.e. not just the breeding season – the period in which this proportional data was calculated from by Thaxter et al. 2010), should the Correction Factor be applied to annual abundance estimates.

Appendix 10 Aerial Digital Survey Corrected Auk Data Abundance and Density Estimates.

Razorbill (TOWF)

Thanet OWF	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	10	0.28	0	0.00	10	0.28
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	0	0.00	0	0.00	0	0.00
Jan-17	20	0.59	0	0.00	20	0.59
Feb-17	0	0.00	0	0.00	0	0.00
Mar-17	31	0.89	0	0.00	31	0.89
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	11	0.31	0	0.00	11	0.31
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	11	0.31	0	0.00	11	0.31
Jan-18	0	0.00	0	0.00	0	0.00
Feb-18	23	0.65	0	0.00	23	0.65

Razorbill (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	8	0.11	0	0.00	8	0.11
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	10	0.13	0	0.00	10	0.13
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	33	0.45	0	0.00	33	0.45
Jan-17	80	1.10	0	0.00	80	1.10
Feb-17	45	0.61	23	0.31	67	0.93
Mar-17	58	0.80	0	0.00	58	0.80
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	34	0.46	0	0.00	34	0.46
Jan-18	22	0.30	0	0.00	22	0.30
Feb-18	11	0.14	11	0.14	22	0.30

Razorbill (4 km Buffer)

Thanet Extension 4 km Buffer Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	11	0.05	0	0.00	11	0.05
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	125	0.59	0	0.00	125	0.59
Jan-17	325	1.54	0	0.00	325	1.54
Feb-17	206	0.98	0	0.00	206	0.98
Mar-17	359	1.70	0	0.00	359	1.70
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	23	0.11	0	0.00	23	0.11
Oct-17	114	0.54	0	0.00	114	0.54
Nov-17	69	0.33	35	0.17	104	0.49
Dec-17	58	0.28	0	0.00	58	0.28
Jan-18	348	1.64	0	0.00	348	1.64
Feb-18	157	0.73	190	0.90	346	1.64

Guillemot (TOWF)

Thanet OWF	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Mar-16	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	11	0.30	0	0.00	11	0.30
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	0	0.00	0	0.00
Dec-16	74	2.11	0	0.00	74	2.11
Jan-17	68	1.96	0	0.00	68	1.96
Feb-17	50	1.43	0	0.00	50	1.43
Mar-17	138	3.95	0	0.00	138	3.95
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	0	0.00	0	0.00	0	0.00
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	12	0.34	0	0.00	12	0.34
Oct-17	0	0.00	0	0.00	0	0.00
Nov-17	0	0.00	0	0.00	0	0.00
Dec-17	62	1.78	0	0.00	62	1.78
Jan-18	313	8.96	0	0.00	313	8.96
Feb-18	38	1.09	0	0.00	38	1.09

Guillemot (TEOWF)

Thanet Extension	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
Survey						
Mar-16	3	0.04	0	0.00	3	0.04
Apr-16	0	0.00	0	0.00	0	0.00
May-16	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	0	0.00	0	0.00
Jul-16	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	0	0.00	0	0.00
Nov-16	12	0.16	0	0.00	12	0.16
Dec-16	47	0.64	12	0.16	59	0.82
Jan-17	99	1.36	11	0.14	109	1.50
Feb-17	171	2.36	12	0.16	183	2.51
Mar-17	232	3.18	0	0.00	232	3.18
Apr-17	0	0.00	0	0.00	0	0.00
May-17	0	0.00	0	0.00	0	0.00
Jun-17	12	0.16	0	0.00	12	0.16
Jul-17	0	0.00	0	0.00	0	0.00
Aug-17	0	0.00	0	0.00	0	0.00
Sep-17	0	0.00	0	0.00	0	0.00
Oct-17	12	0.16	0	0.00	12	0.16
Nov-17	12	0.16	0	0.00	12	0.16
Dec-17	49	0.67	0	0.00	49	0.67
Jan-18	1629	22.37	0	0.00	1629	22.37
Feb-18	128	1.75	0	0.00	128	1.75

Guillemot (4 km Buffer)

Thanet Extension 4 km Buffer	Diving		Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
Survey								
Mar-16	0	0.00	0	0.00	0	0.00	0	0.00
Apr-16	0	0.00	25	0.12	0	0.00	25	0.12
May-16	0	0.00	0	0.00	0	0.00	0	0.00
Jun-16	0	0.00	34	0.16	0	0.00	34	0.16
Jul-16	0	0.00	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	11	0.05	0	0.00	11	0.05
Sep-16	0	0.00	12	0.05	0	0.00	12	0.05
Oct-16	0	0.00	0	0.00	0	0.00	0	0.00
Nov-16	0	0.00	12	0.05	0	0.00	12	0.05
Dec-16	0	0.00	558	2.63	0	0.00	558	2.63
Jan-17	0	0.00	712	3.36	68	0.33	780	3.68
Feb-17	13	0.07	1553	7.33	0	0.00	1564	7.39
Mar-17	0	0.00	880	4.16	12	0.05	892	4.21
Apr-16	0	0.00	0	0.00	0	0.00	0	0.00
May-16	0	0.00	37	0.17	0	0.00	37	0.17
Jun-16	0	0.00	12	0.05	0	0.00	12	0.05
Jul-16	0	0.00	0	0.00	0	0.00	0	0.00
Aug-16	0	0.00	0	0.00	0	0.00	0	0.00
Sep-16	0	0.00	0	0.00	0	0.00	0	0.00
Oct-16	0	0.00	50	0.24	0	0.00	50	0.24
Nov-16	0	0.00	276	1.30	0	0.00	276	1.30
Dec-16	0	0.00	501	2.37	13	0.07	514	2.43
Jan-17	0	0.00	2236	10.55	0	0.00	2236	10.55
Feb-17	0	0.00	366	1.72	61	0.29	426	2.01

Appendix 11 Distribution Maps of Birds in Aerial Digital Surveys

- Figure 11.1 Common scoter (February / March 2017)
- Figure 11.2 Red-throated diver (Migration-spring bio-season)
- Figure 11.3 Red-throated diver (Migration-winter bio-season)
- Figure 11.4 Little egret (October 2017)
- Figure 11.5 Fulmar (Migration-spring bio-season)
- Figure 11.6 Fulmar (Migration free breeding bio-season)
- Figure 11.7 Fulmar (Migration-autumn bio-season)
- Figure 11.8 Gannet (Migration-spring bio-season)
- Figure 11.9 Gannet (Migration free breeding bio-season)
- Figure 11.10 Gannet (Migration-autumn bio-season)
- Figure 11.11 Cormorant (March 2017)
- Figure 11.12 Cormorant / shag (December 2016)
- Figure 11.13 Great skua (Winter bio-season)
- Figure 11.14 Black-headed gull (Migration-spring bio-season)
- Figure 11.15 Black-headed gull (Migration-autumn bio-season)
- Figure 11.16 Black-headed gull (Winter bio-season)
- Figure 11.17 Black-headed gull (Migration free breeding bio-season)
- Figure 11.18 Common gull (Migration-spring bio-season)
- Figure 11.19 Common gull (Migration free breeding bio-season)
- Figure 11.20 Common gull (Migration-autumn bio-season)
- Figure 11.21 Common gull (Winter bio-season)
- Figure 11.22 Kittiwake (Migration-spring bio-season)
- Figure 11.23 Kittiwake (Migration free breeding bio-season)
- Figure 11.24 Kittiwake (Migration-autumn bio-season)
- Figure 11.25 Mediterranean gull (July 2017)
- Figure 11.26 Small gull species (Migration-spring bio-season)

Figure 11.27 Small gull species (Migration free breeding bio-season)

Figure 11.28 Small gull species (Migration-autumn bio-season)

Figure 11.29 Herring gull (Migration-spring bio-season)

Figure 11.30 Herring gull (Migration free breeding bio-season)

Figure 11.31 Herring gull (Migration-autumn bio-season)

Figure 11.32 Herring gull (Winter bio-season)

Figure 11.33 Great black-backed gull (Migration-spring bio-season)

Figure 11.34 Great black-backed gull (Migration free breeding bio-season)

Figure 11.35 Great black-backed gull (Migration-autumn bio-season)

Figure 11.36 Great black-backed gull (Winter bio-season)

Figure 11.37 Lesser black-backed gull (Migration-spring bio-season)

Figure 11.38 Lesser black-backed gull (Migration free breeding bio-season)

Figure 11.39 Lesser black-backed gull (Migration-autumn bio-season)

Figure 11.40 Lesser black-backed gull (Winter bio-season)

Figure 11.41 Black-backed gull species (Migration-spring bio-season)

Figure 11.42 Glaucous gull (December 2017)

Figure 11.43 Large gull species (Migration-spring bio-season)

Figure 11.44 Large gull species (Migration free breeding bio-season)

Figure 11.45 Large gull species (Migration-autumn bio-season)

Figure 11.46 Large gull species (Winter bio-season)

Figure 11.47 Sandwich tern (Migration-spring bio-season)

Figure 11.48 'Commic' tern (Migration-spring bio-season)

Figure 11.49 Tern species (Migration-autumn bio-season)

Figure 11.50 Razorbill (Migration-spring bio-season)

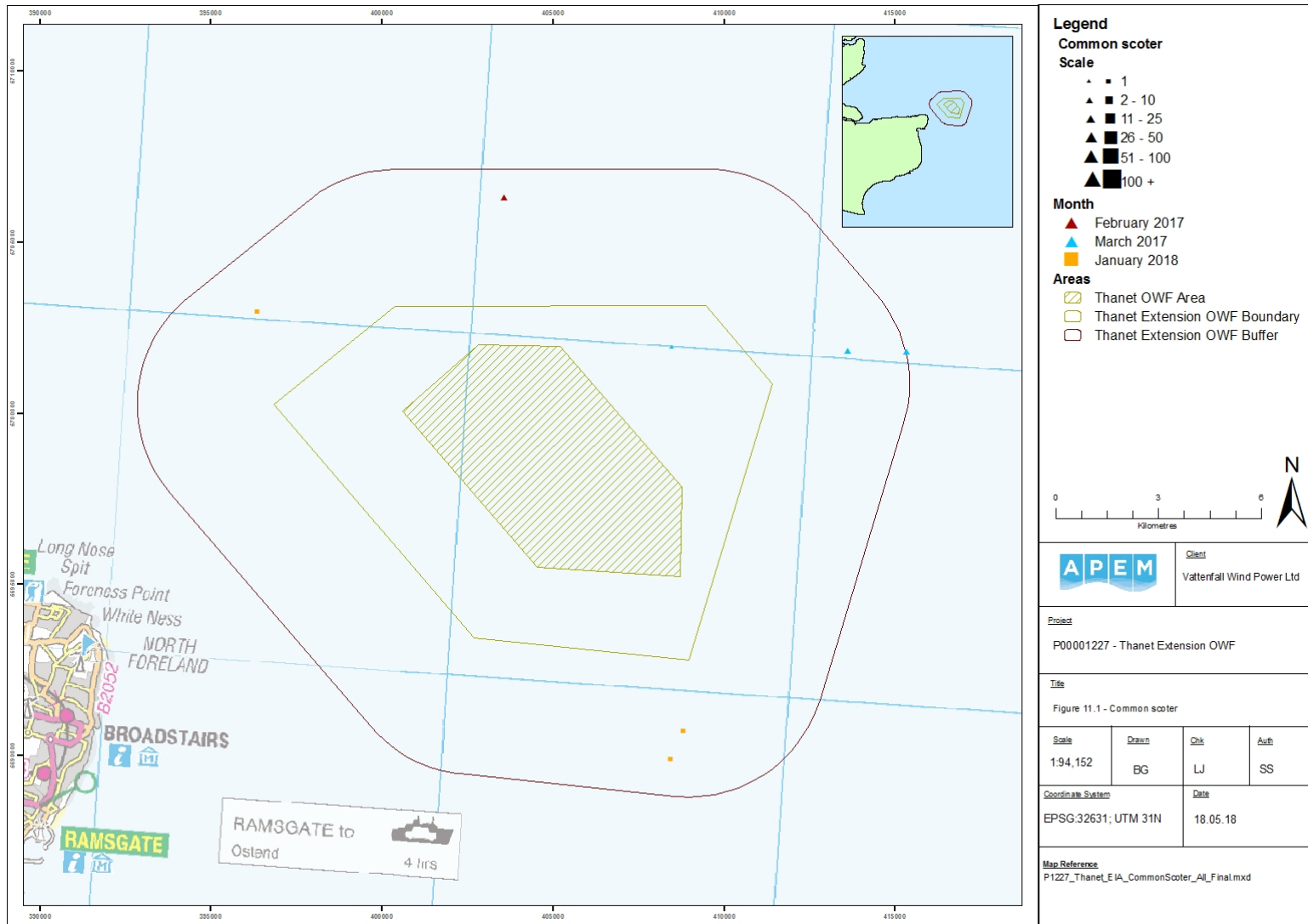
Figure 11.51 Razorbill (Migration-autumn bio-season)

Figure 11.52 Razorbill (Winter bio-season)

Figure 11.53 Guillemot (Migration-spring bio-season)

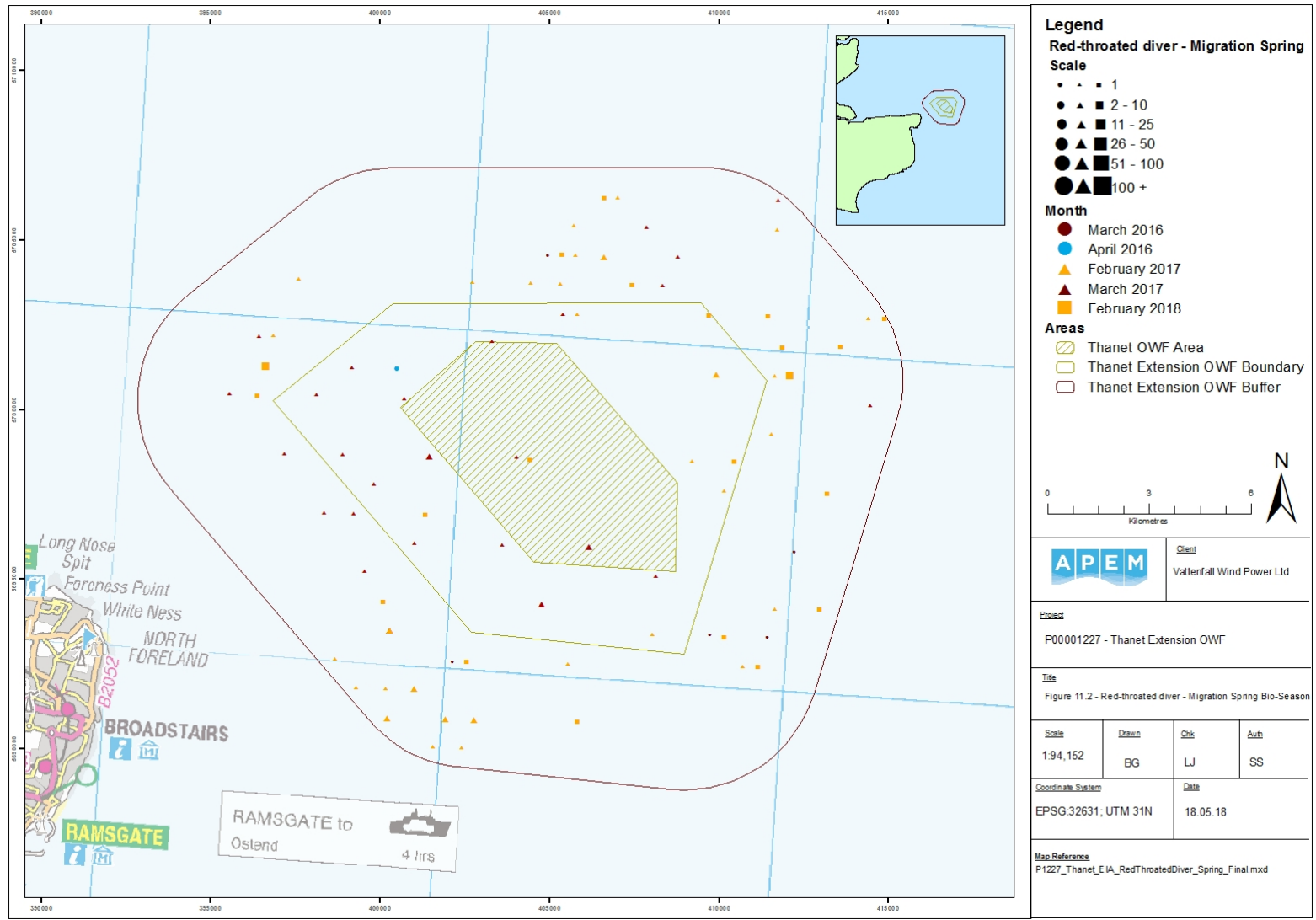
- Figure 11.54 Guillemot (Migration free breeding bio-season)
- Figure 11.55 Guillemot (Migration-autumn bio-season)
- Figure 11.56 Guillemot (Migration-winter bio-season)
- Figure 11.57 Guillemot and / or razorbill (Migration free breeding bio-season)
- Figure 11.58 Thrush species (November 2017)

Figure 11.1 Common scoter (Jan to Mar)



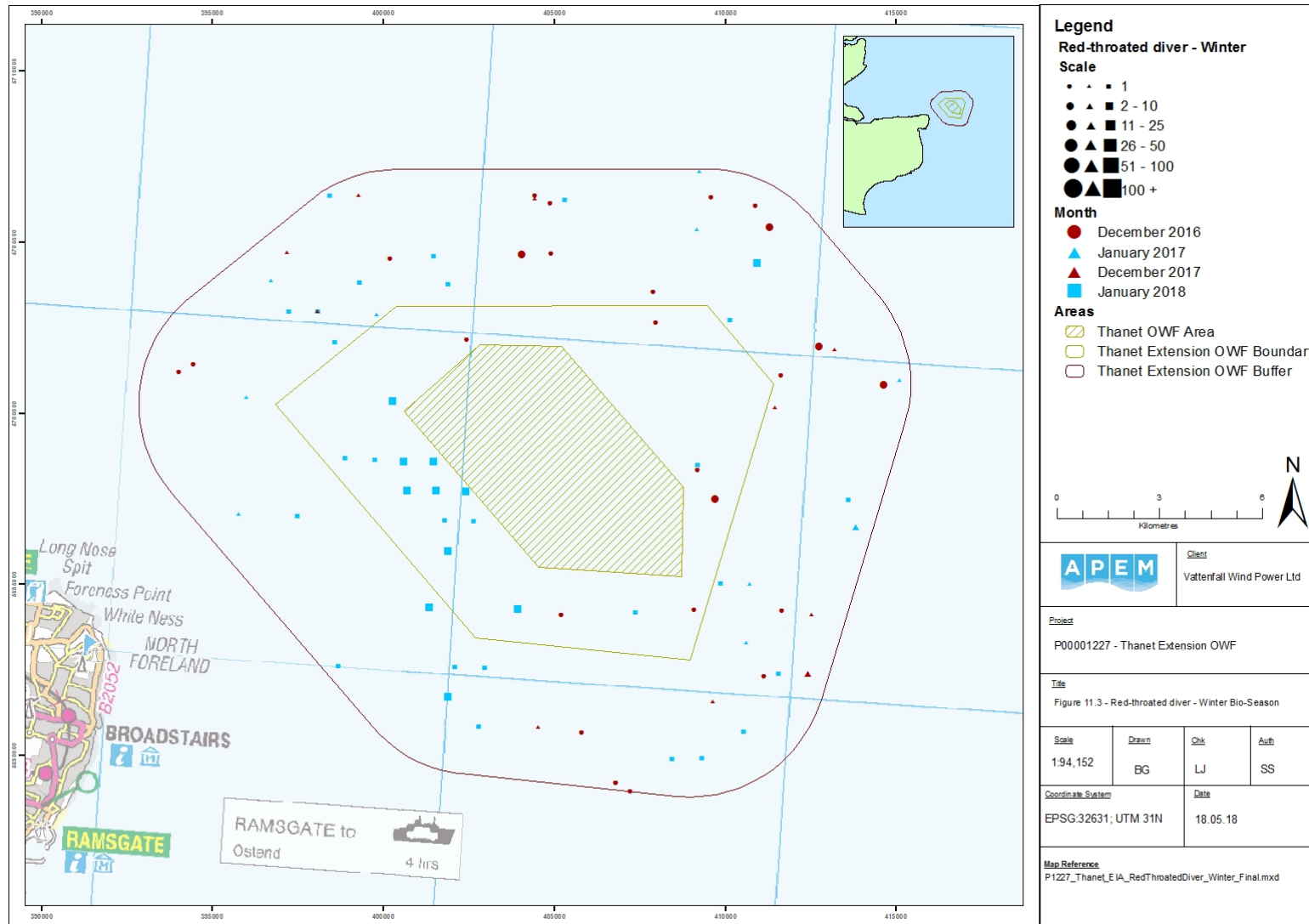
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Figure 11.2 Red-throated diver (Migration-spring bio-season)



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Figure 11.3 Red-throated diver (Winter bio-season)



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Figure 11.4 Little egret (October 2017)

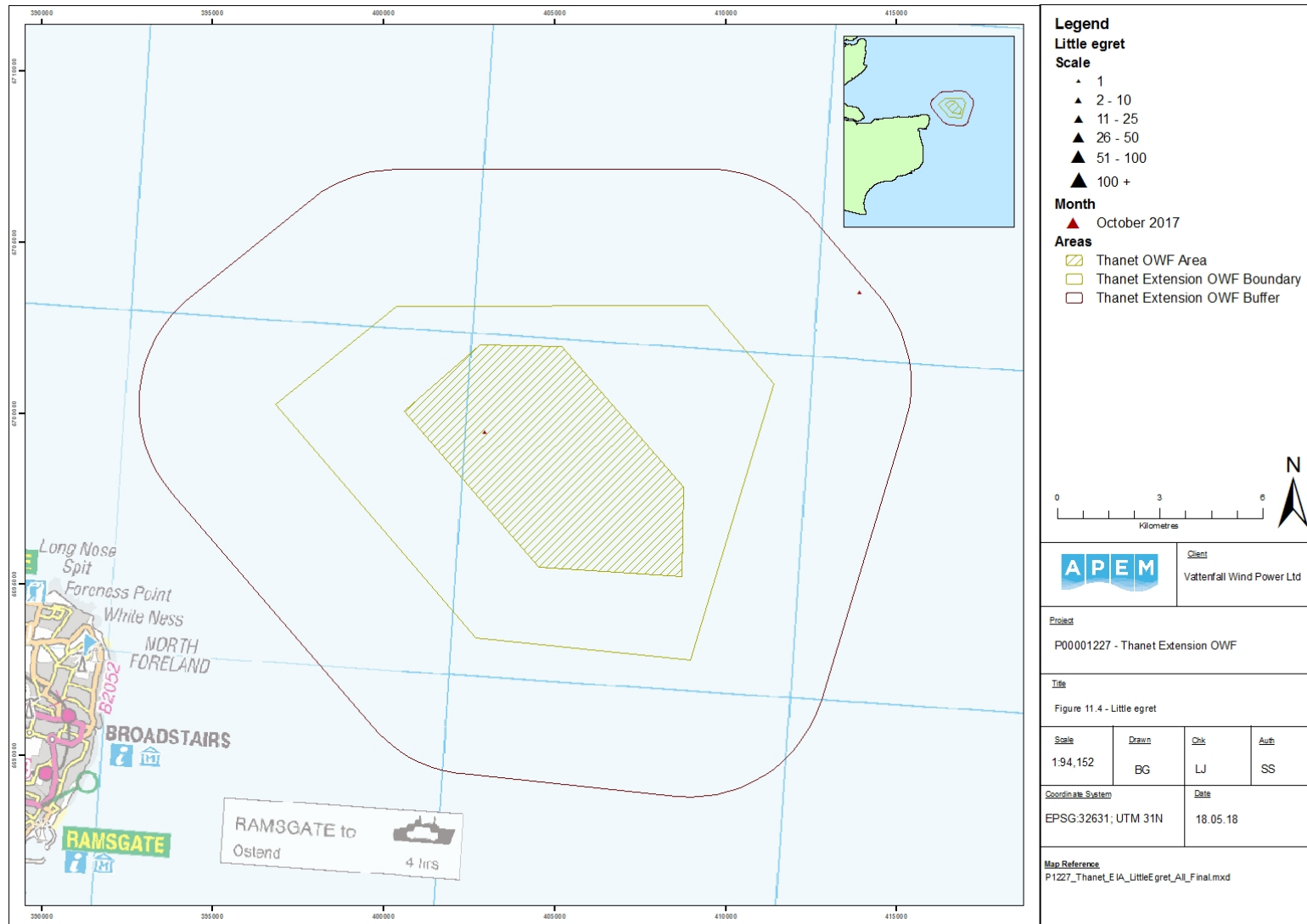
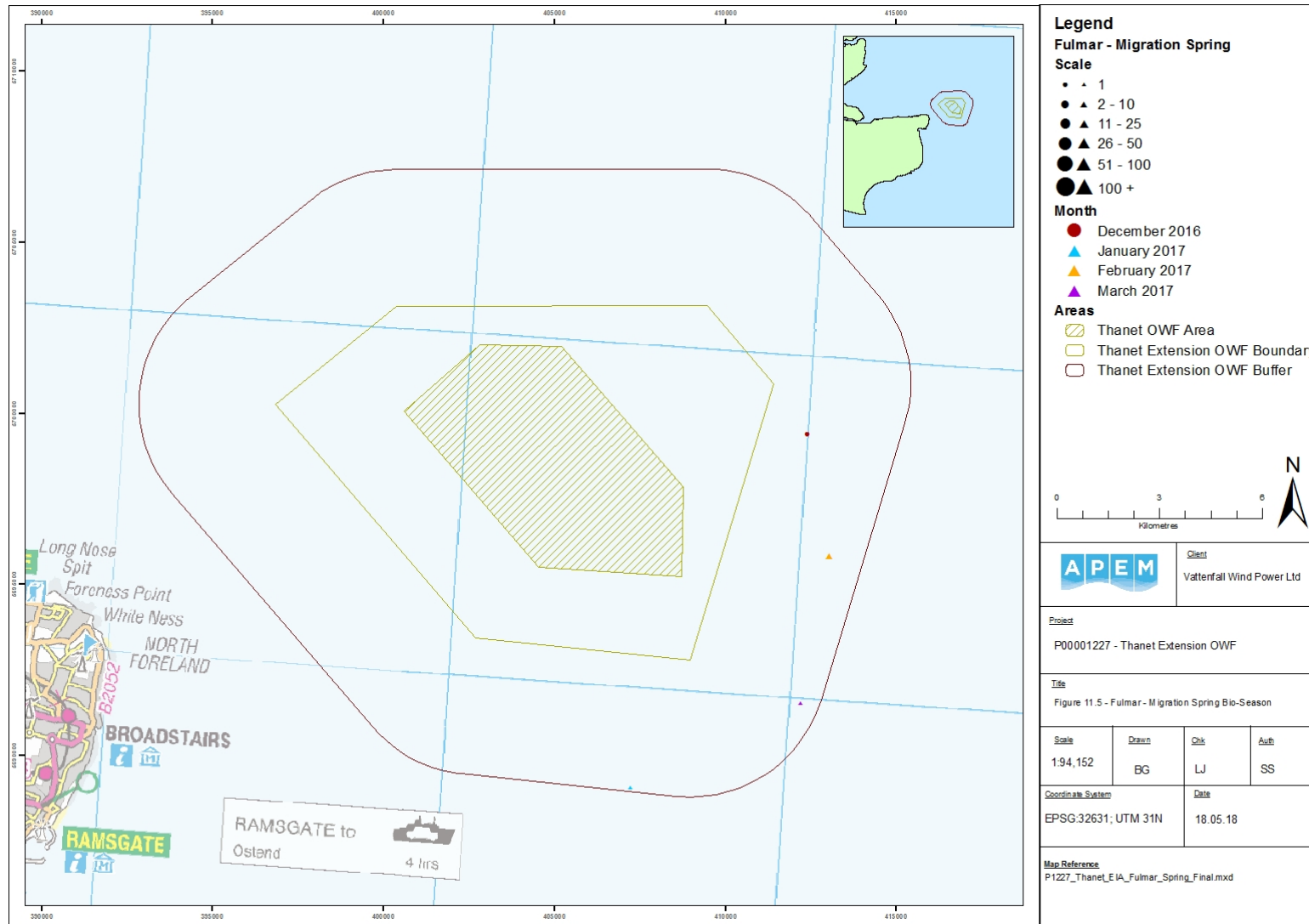
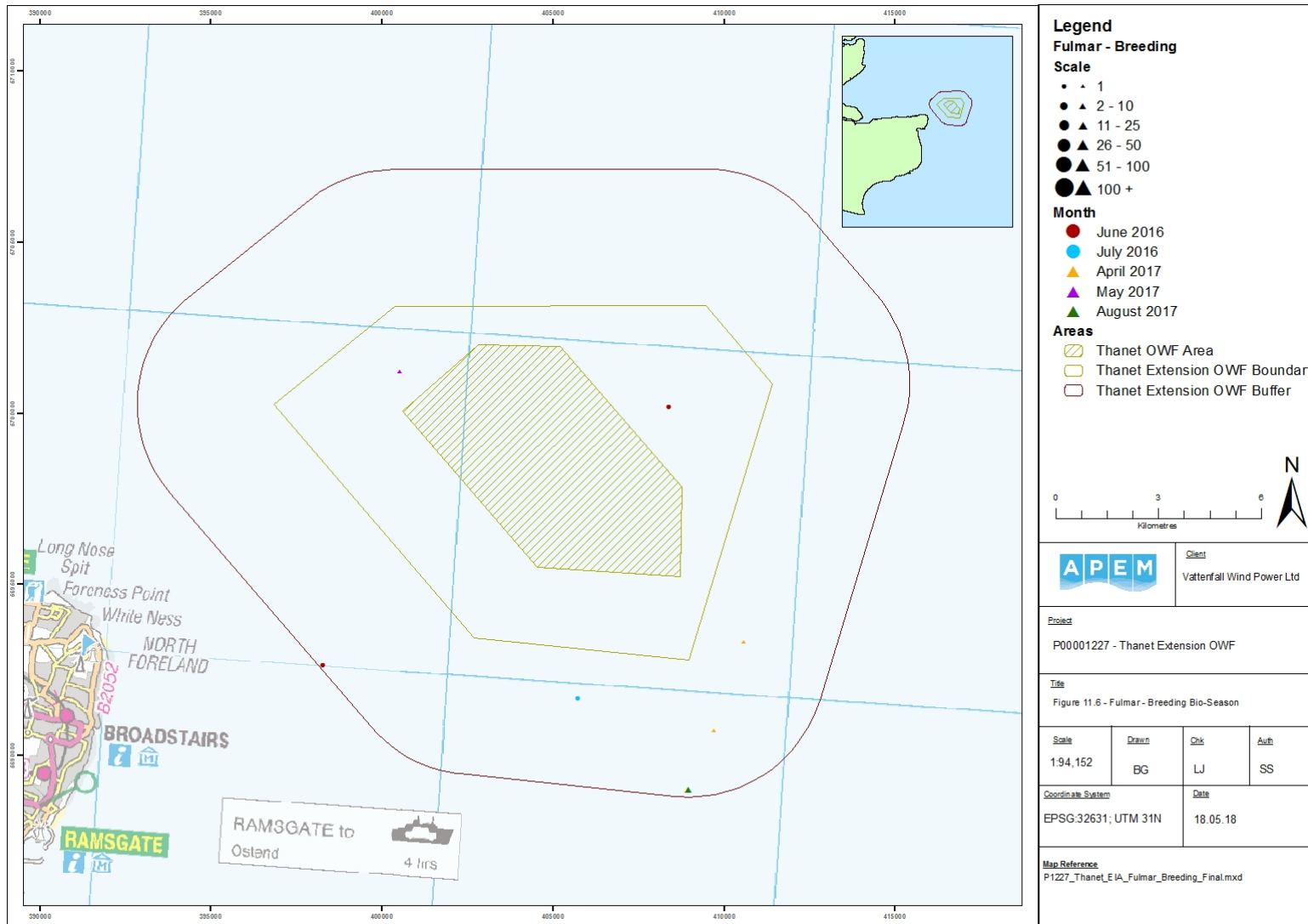


Figure 11.5 Fulmar (Migration-spring bio-season)



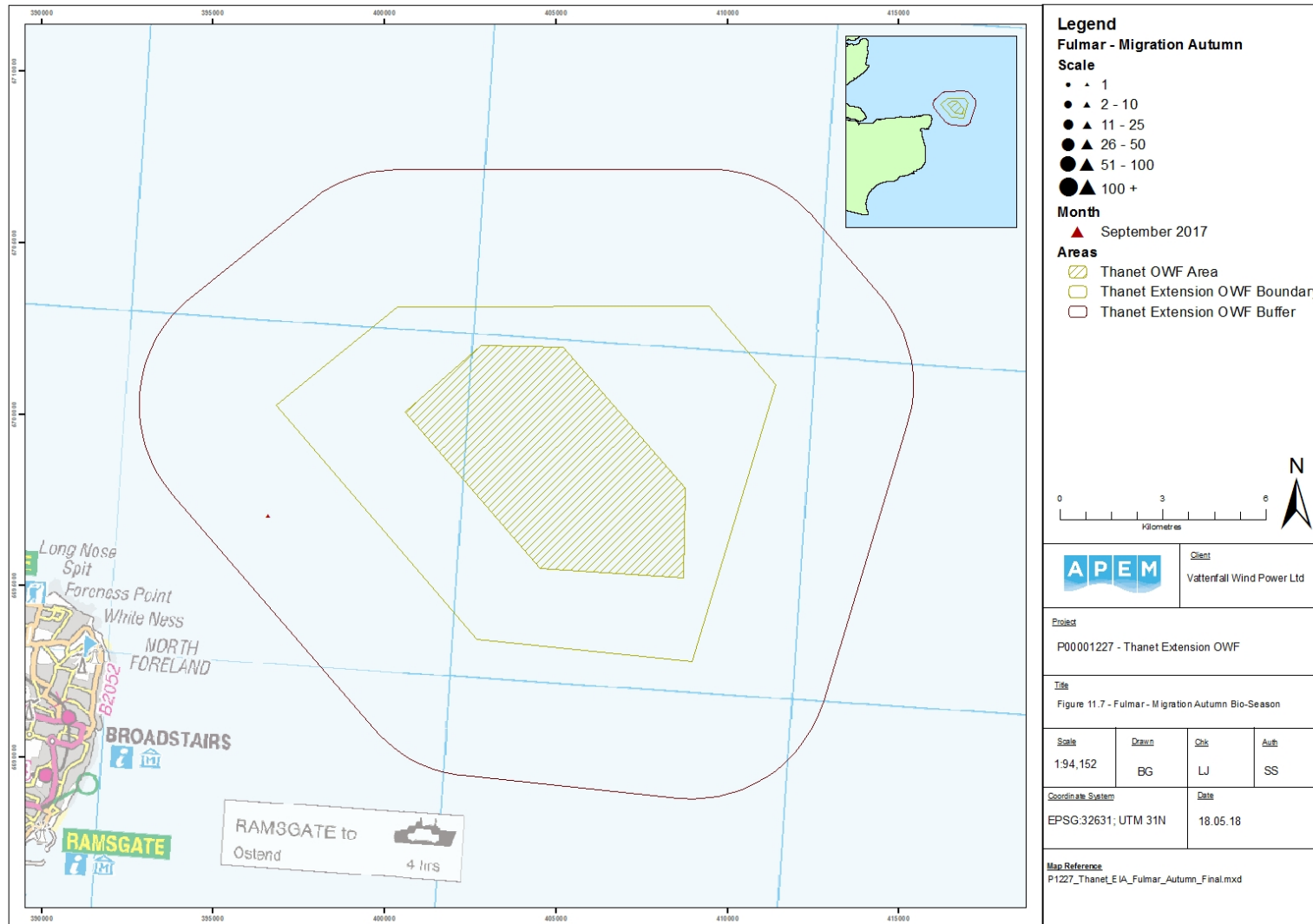
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Figure 11.6 Fulmar (Migration free breeding bio-season)



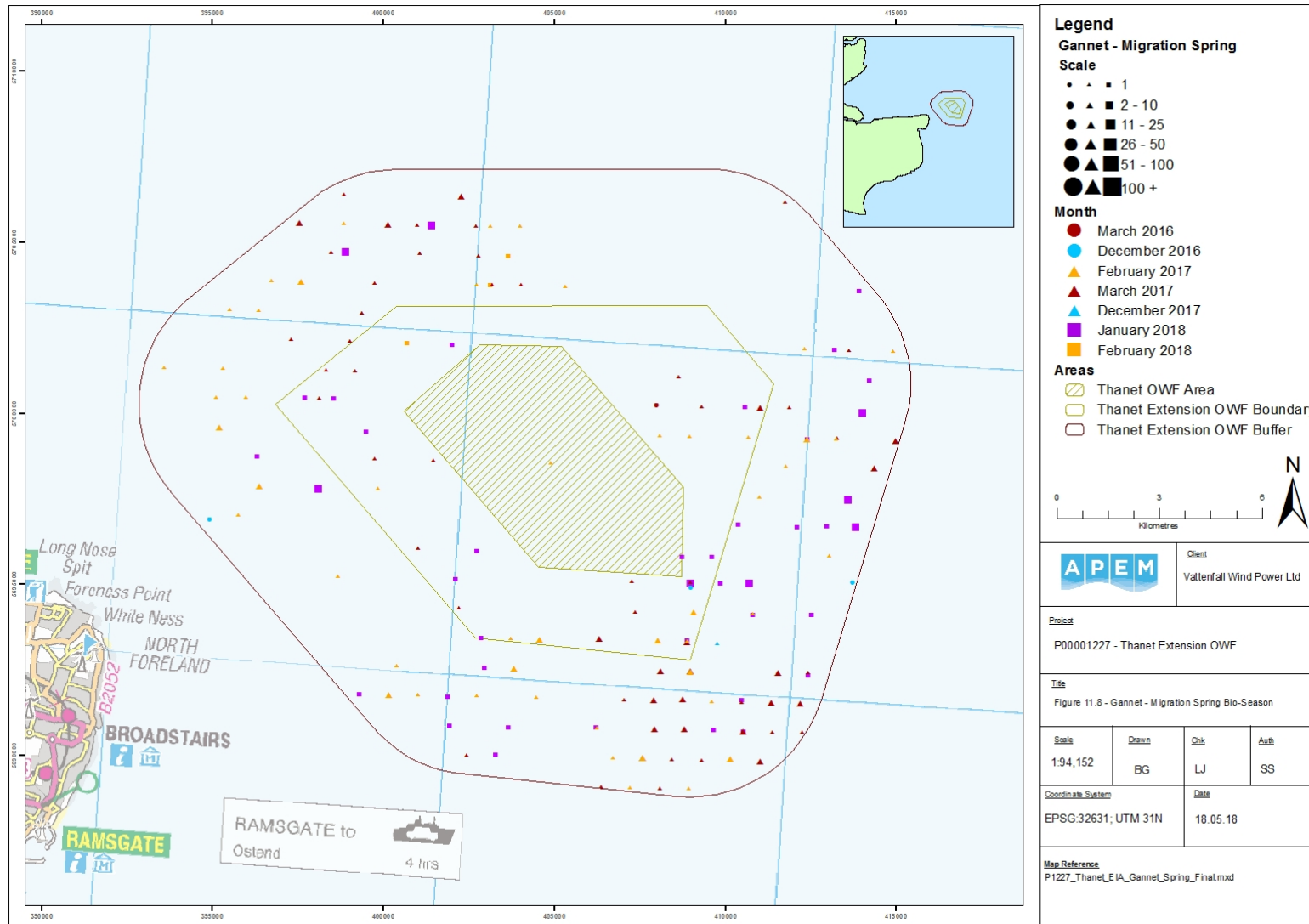
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Figure 11.7 Fulmar (Migration-autumn bio-season)



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Figure 11.8 Gannet (Migration-spring bio-season)



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Figure 11.9 Gannet (Migration free breeding bio-season)

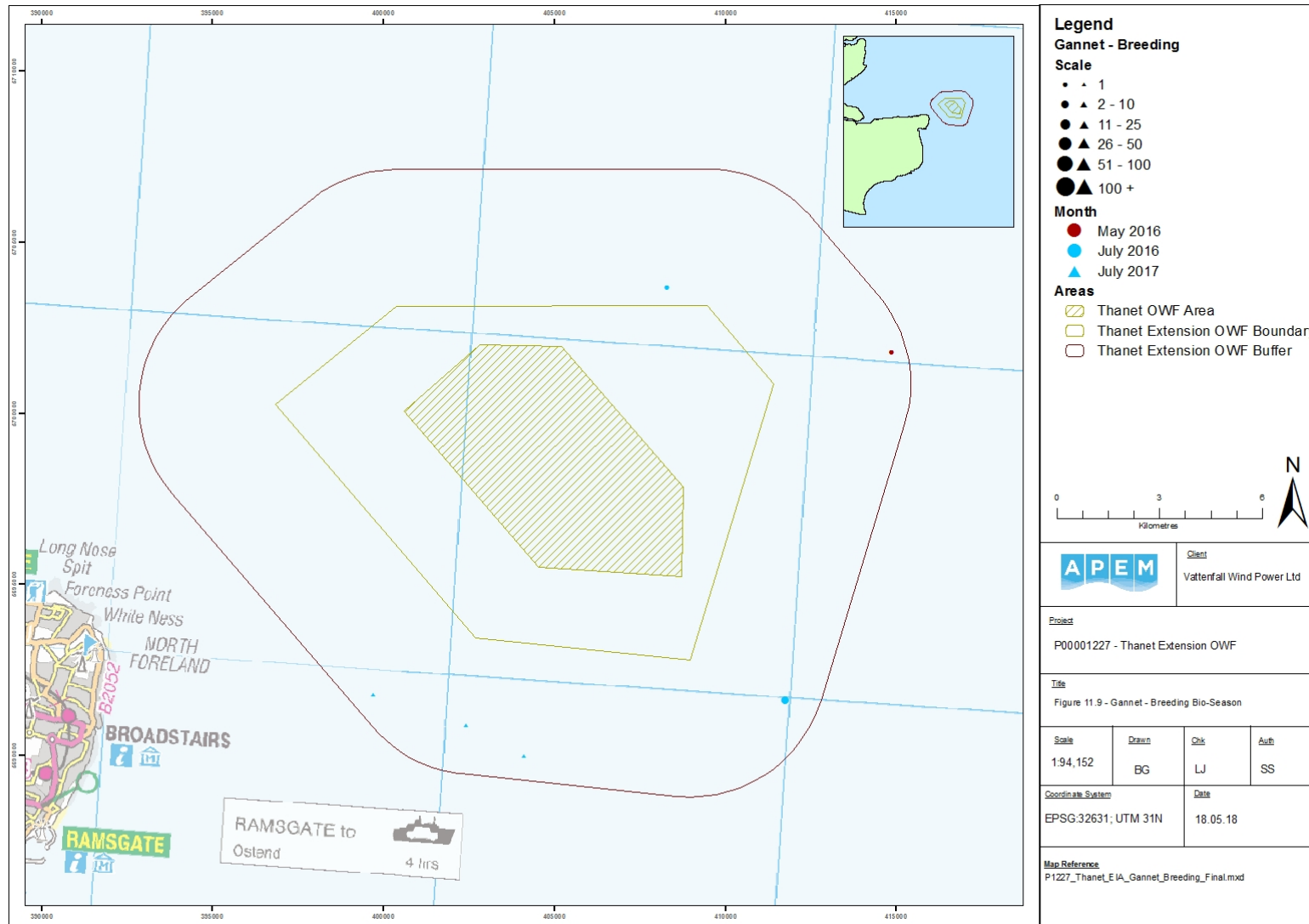


Figure 11.10

Gannet (Migration-autumn bio-season)

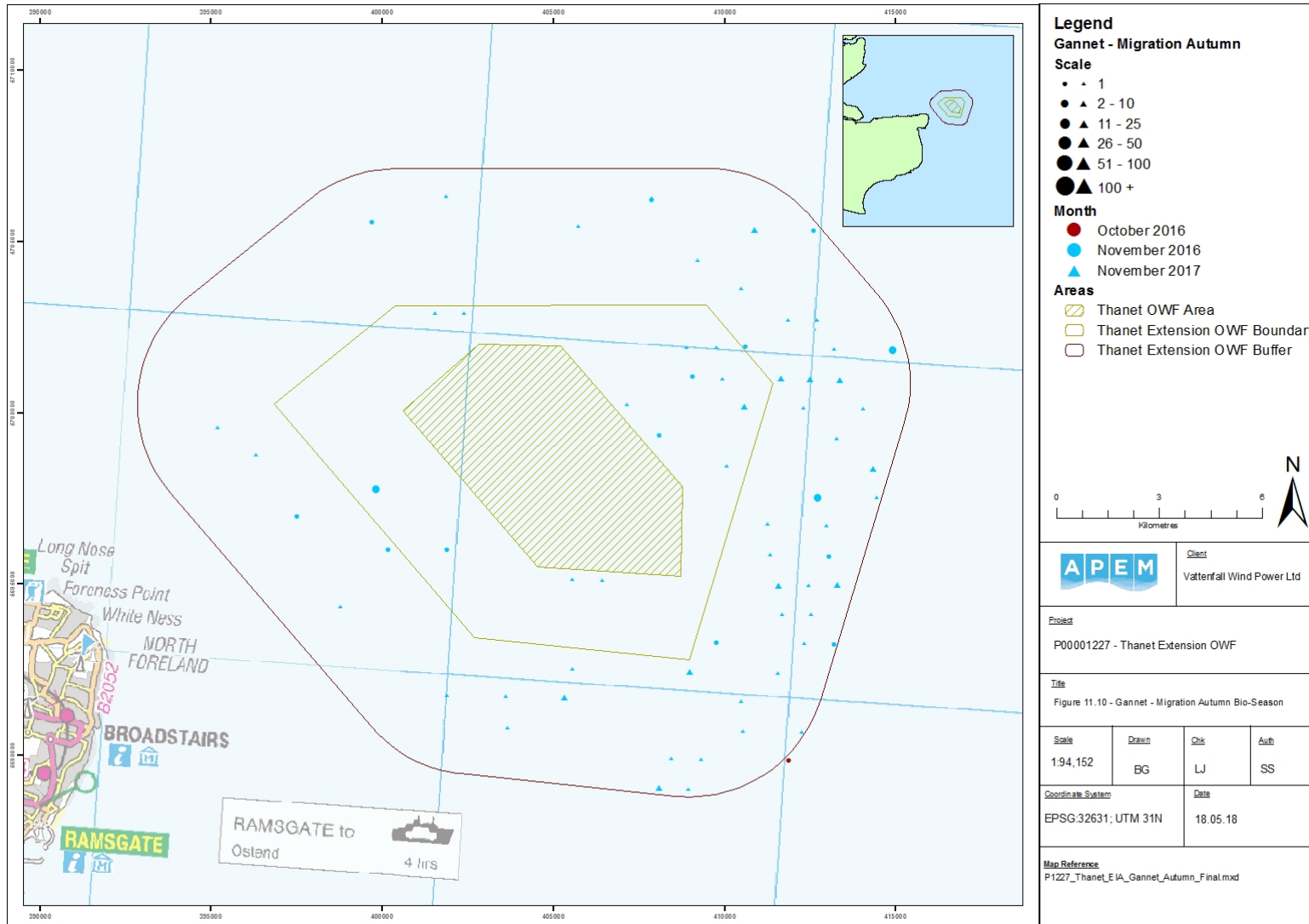
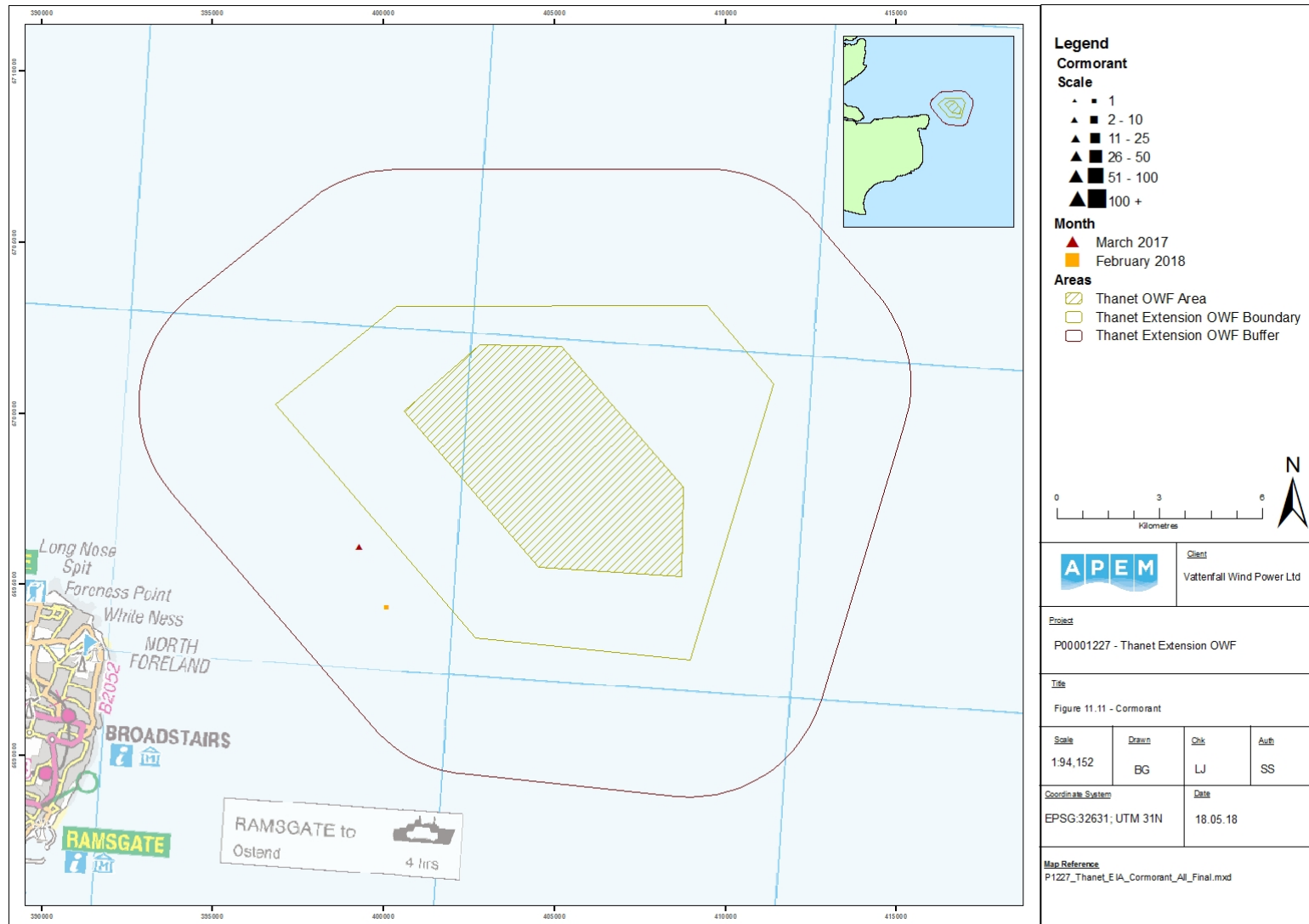


Figure 11.11

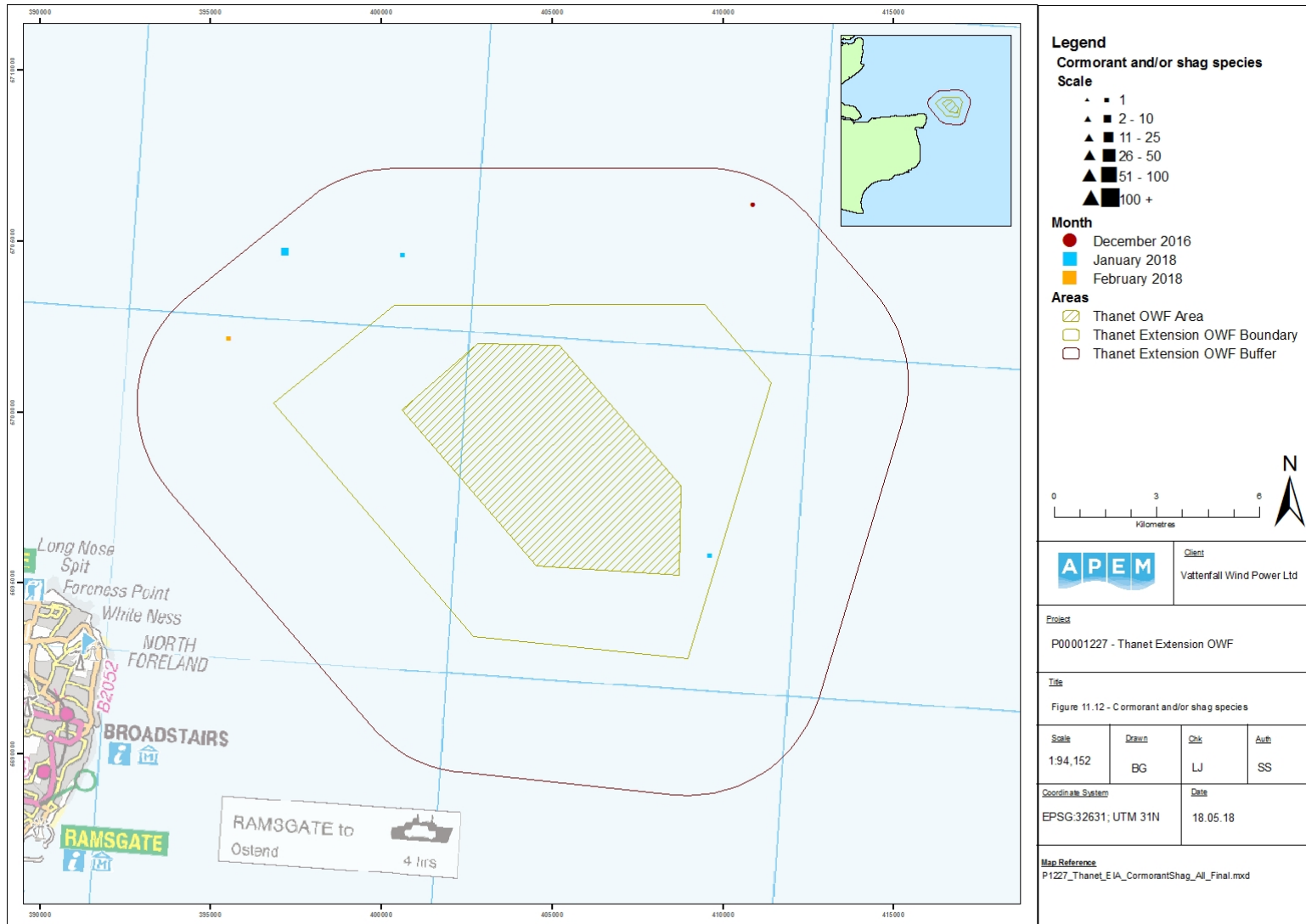
Cormorant (All records)



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Figure 11.12

Cormorant / shag (All records)



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Figure 11.13

Great skua (Winter bio-season)

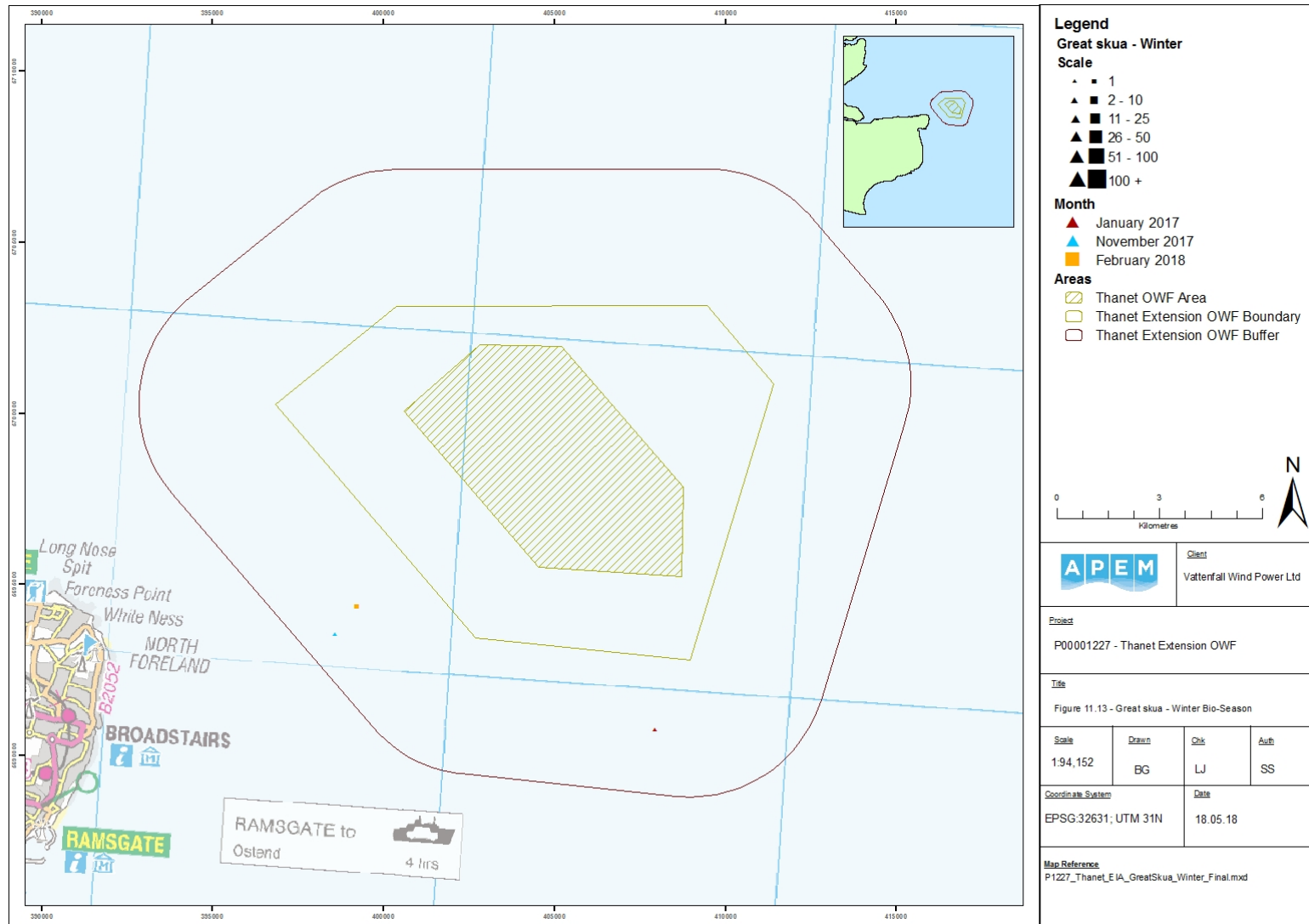


Figure 11.14

Black-headed gull (Migration-spring bio-season)

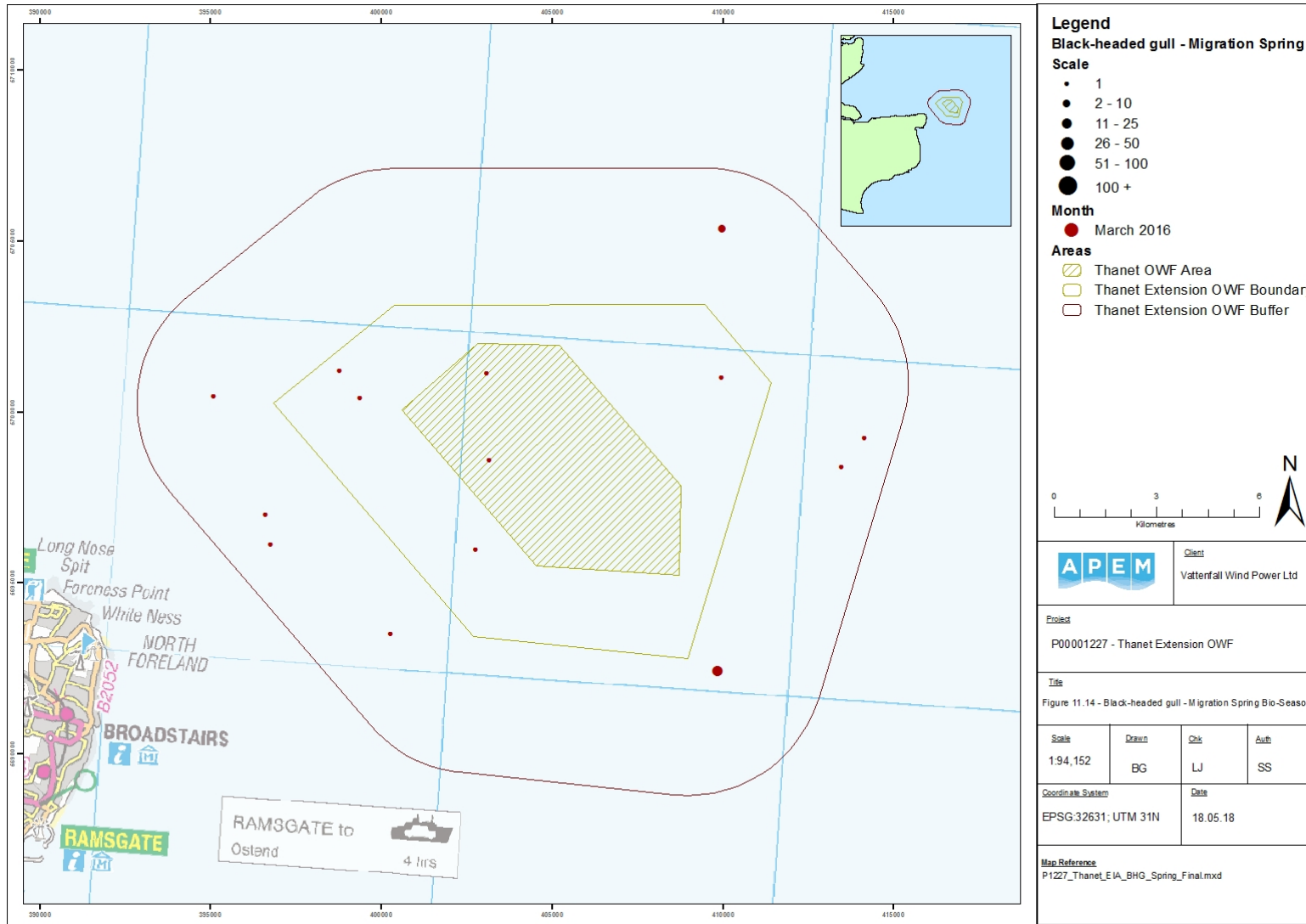
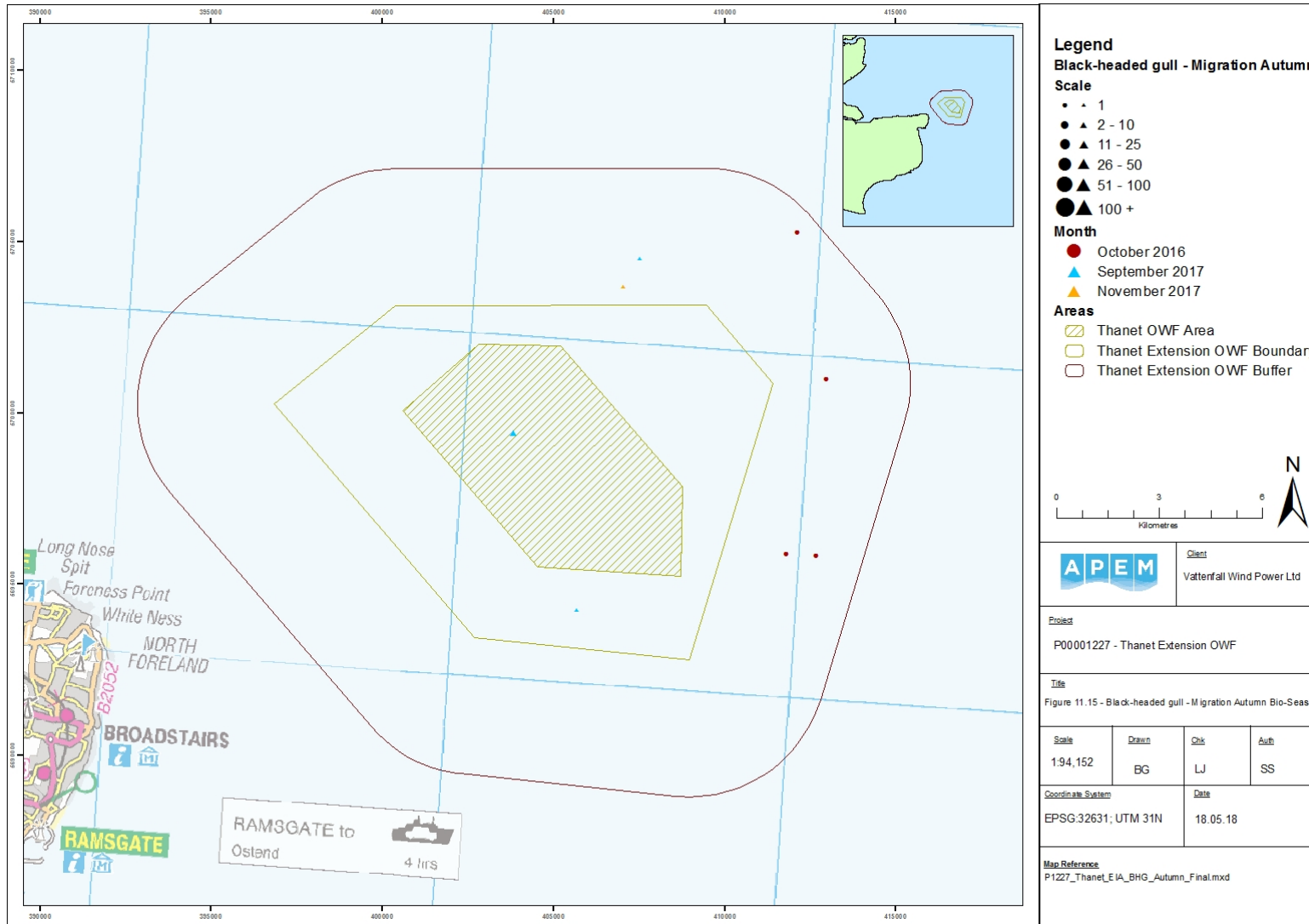


Figure 11.15

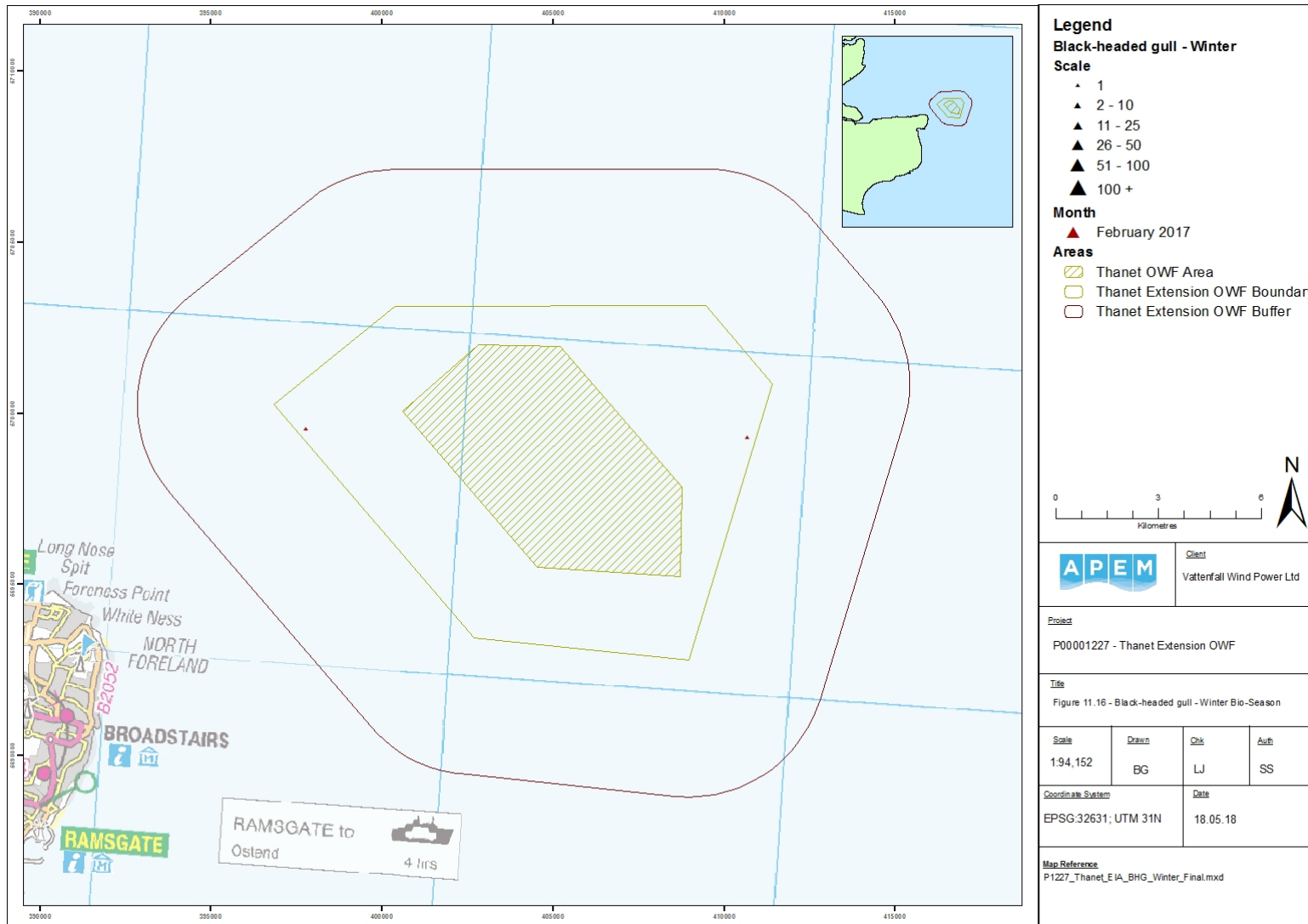
Black-headed gull (Migration-autumn bio-season)



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Figure 11.16

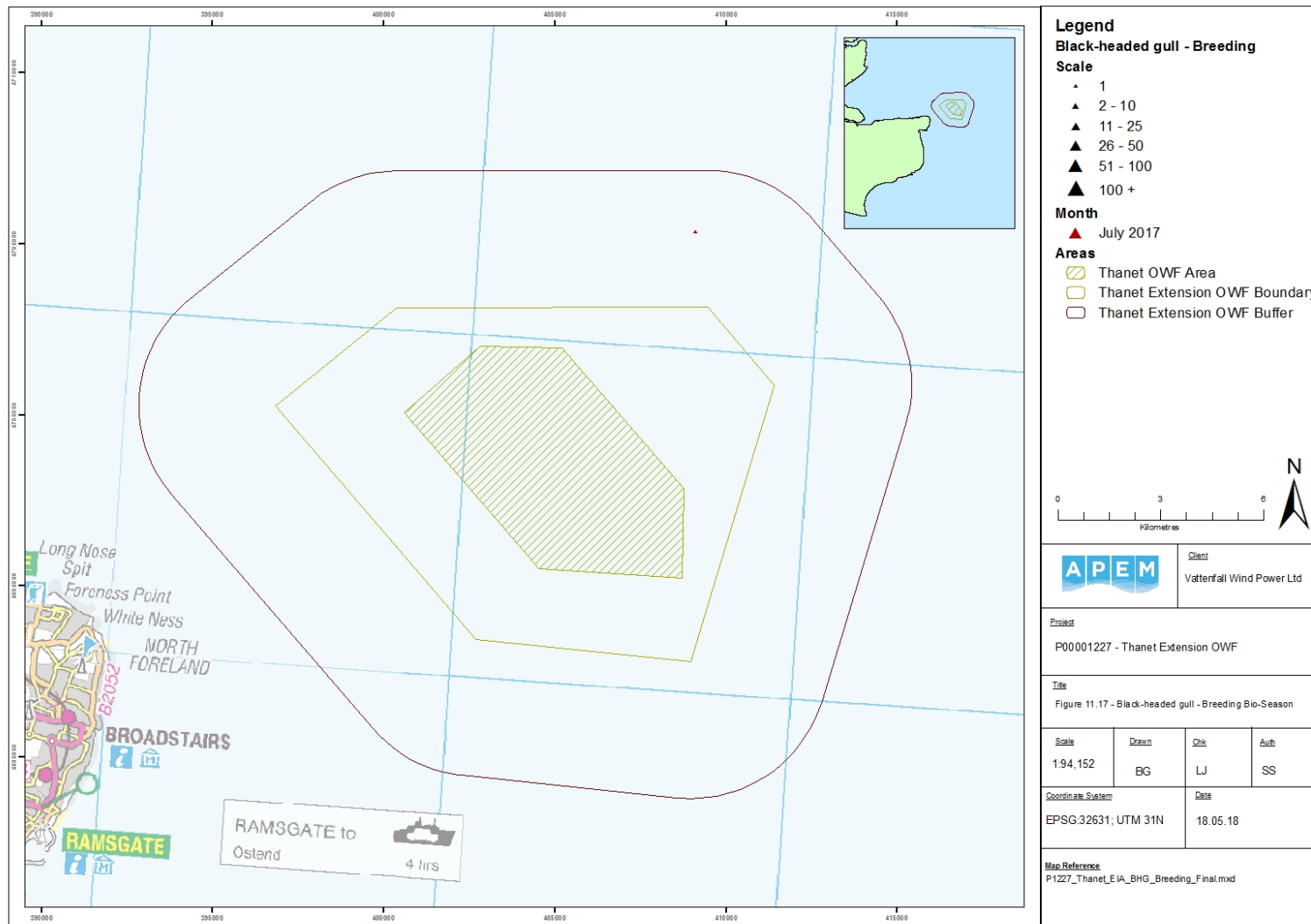
Black-headed gull (Winter bio-season)



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Figure 11.17

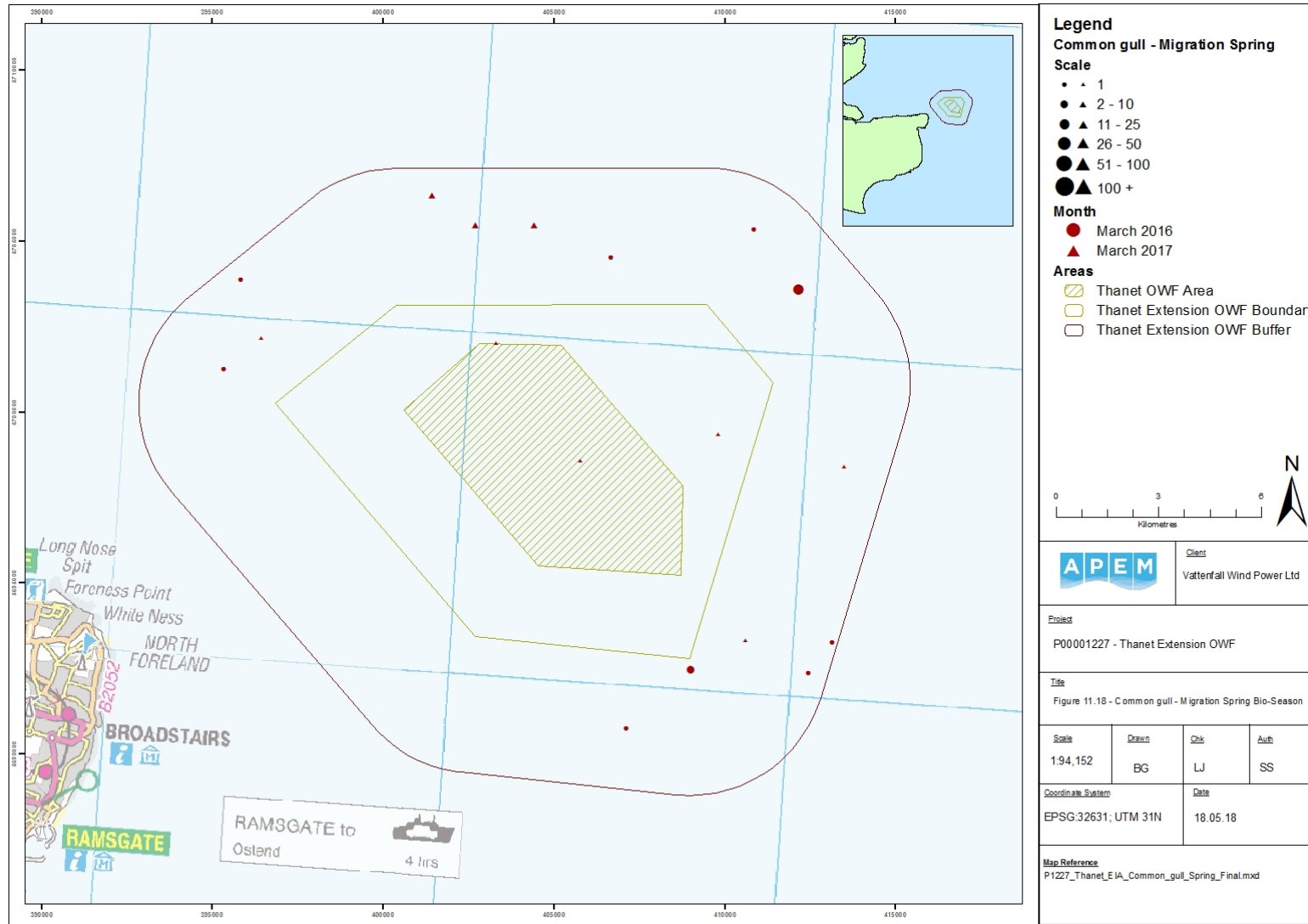
Black-headed gull (Migration free breeding bio-season)



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Figure 11.18

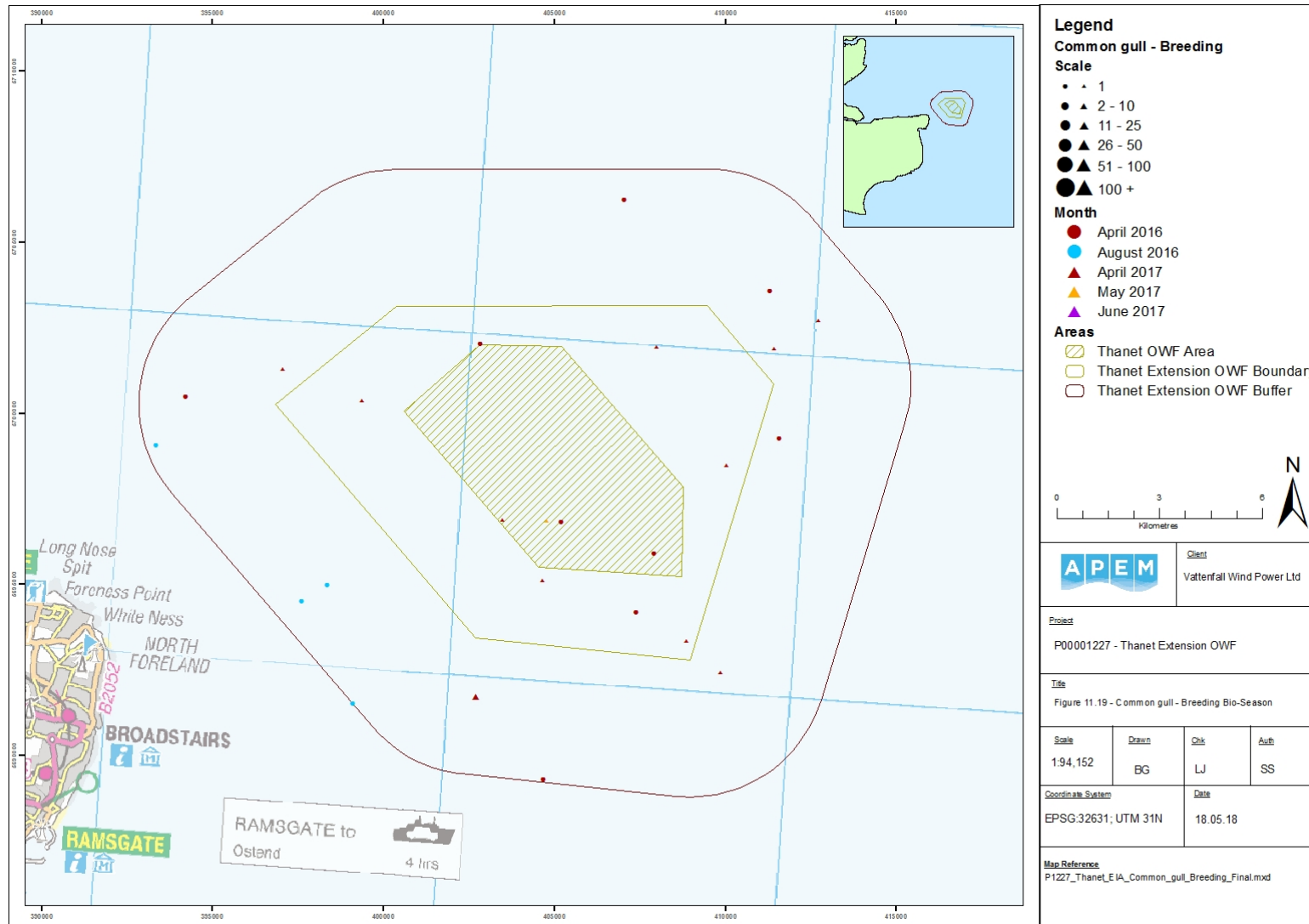
Common gull (Migration-spring bio-season)



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Figure 11.19

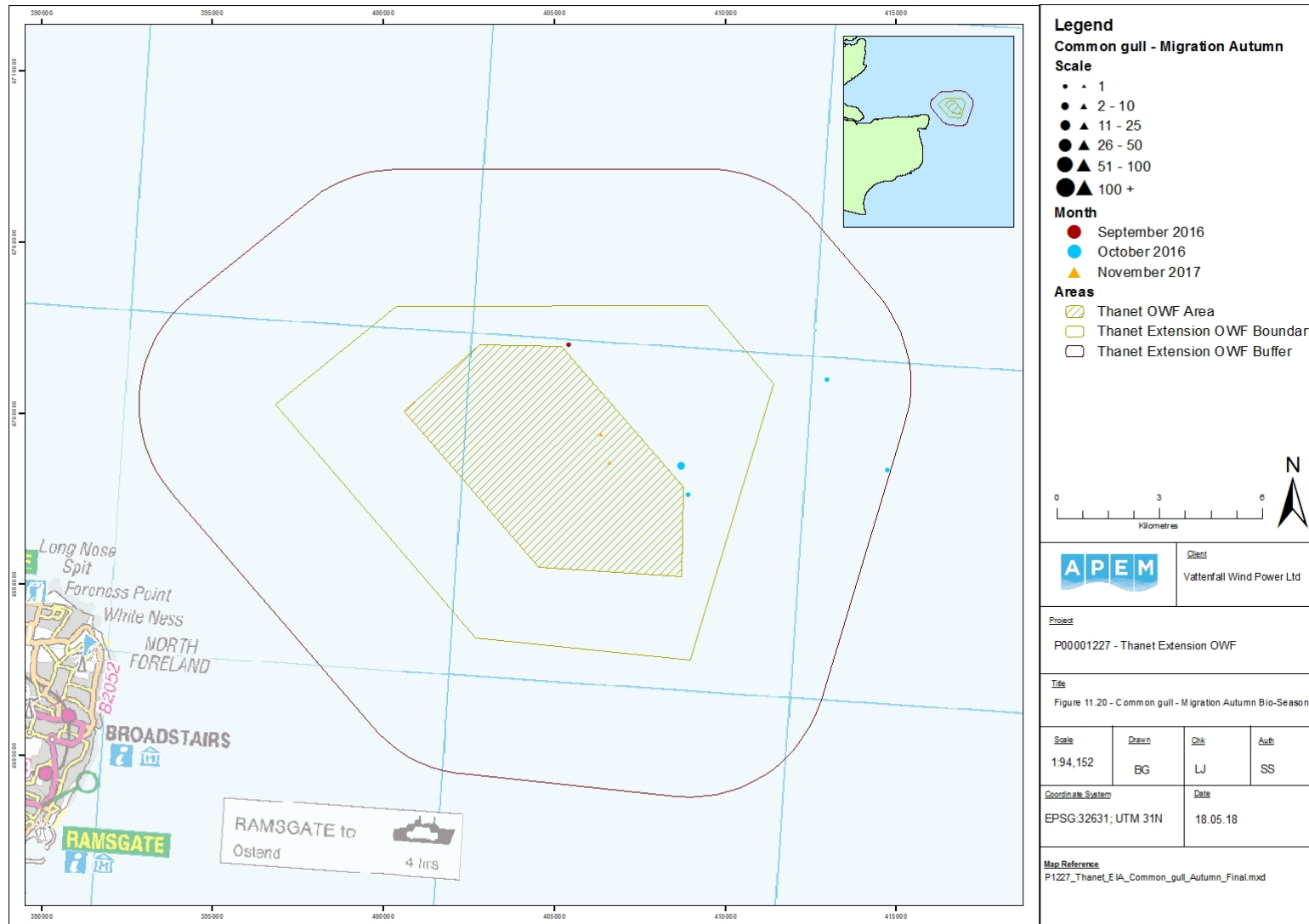
Common gull (Migration free breeding bio-season)



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Figure 11.20

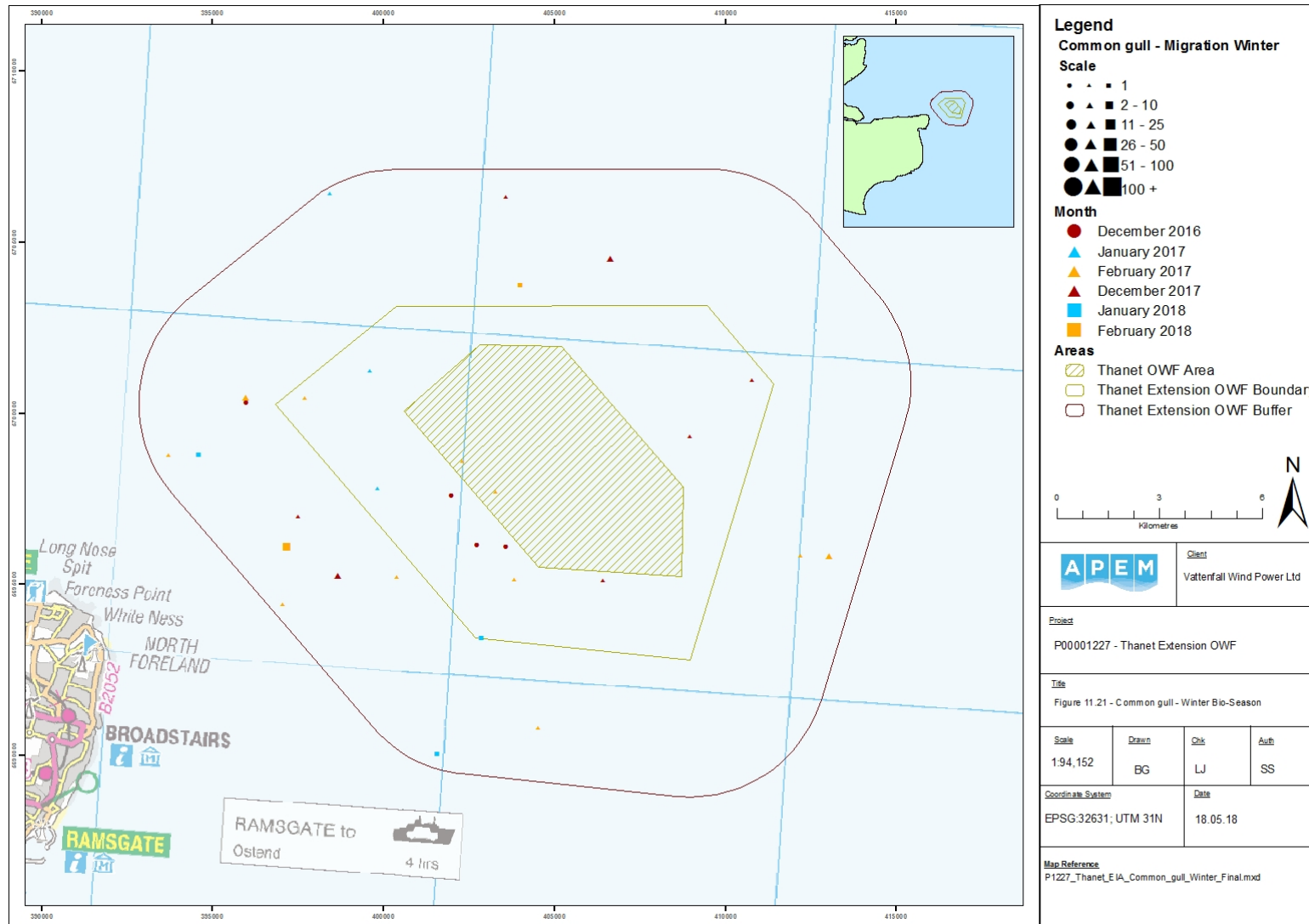
Common gull (Migration-autumn bio-season)



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Figure 11.21

Common gull (Winter bio-season)



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Figure 11.22

Kittiwake (Migration-spring bio-season)

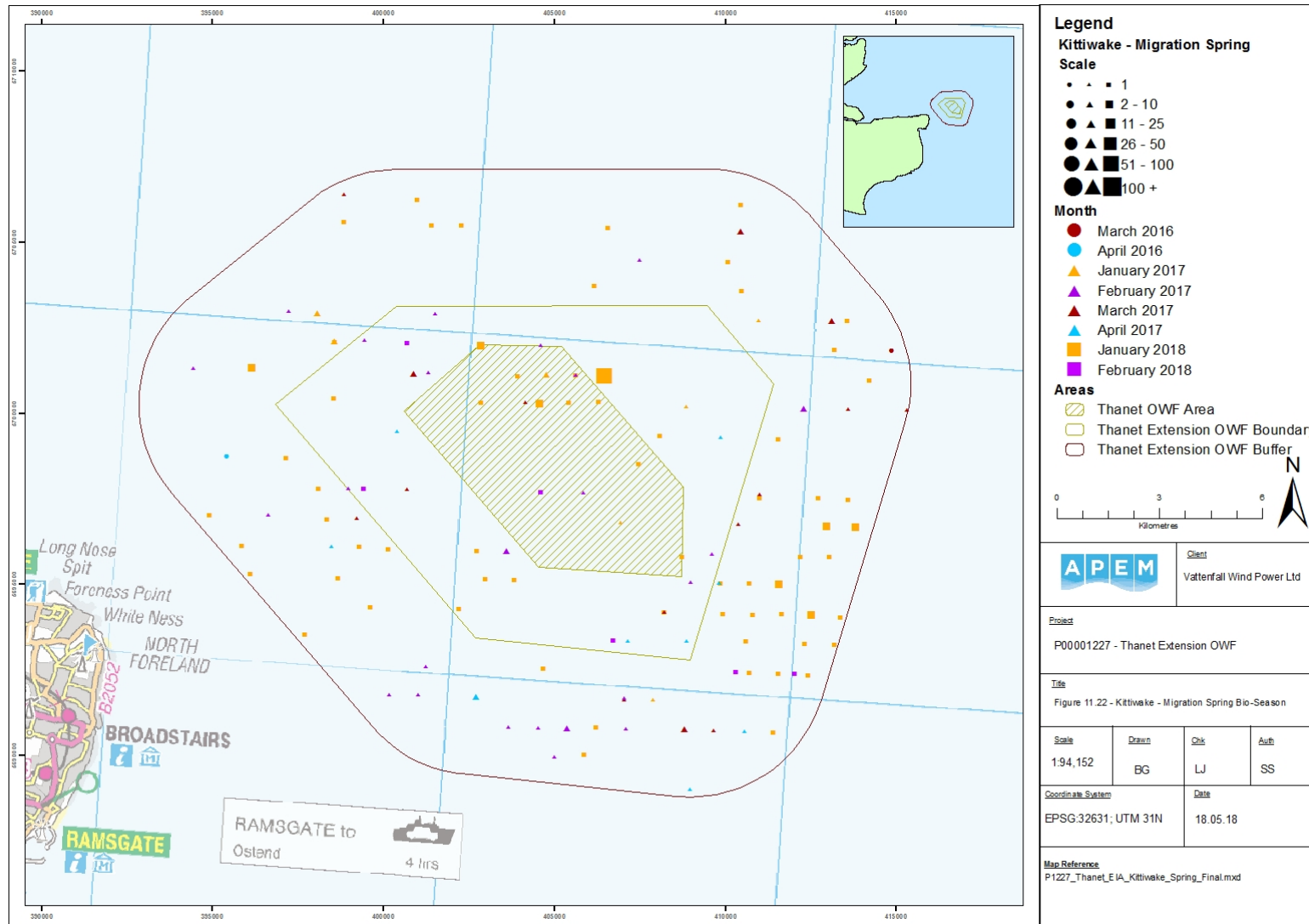


Figure 11.23

Kittiwake (Migration free breeding bio-season)

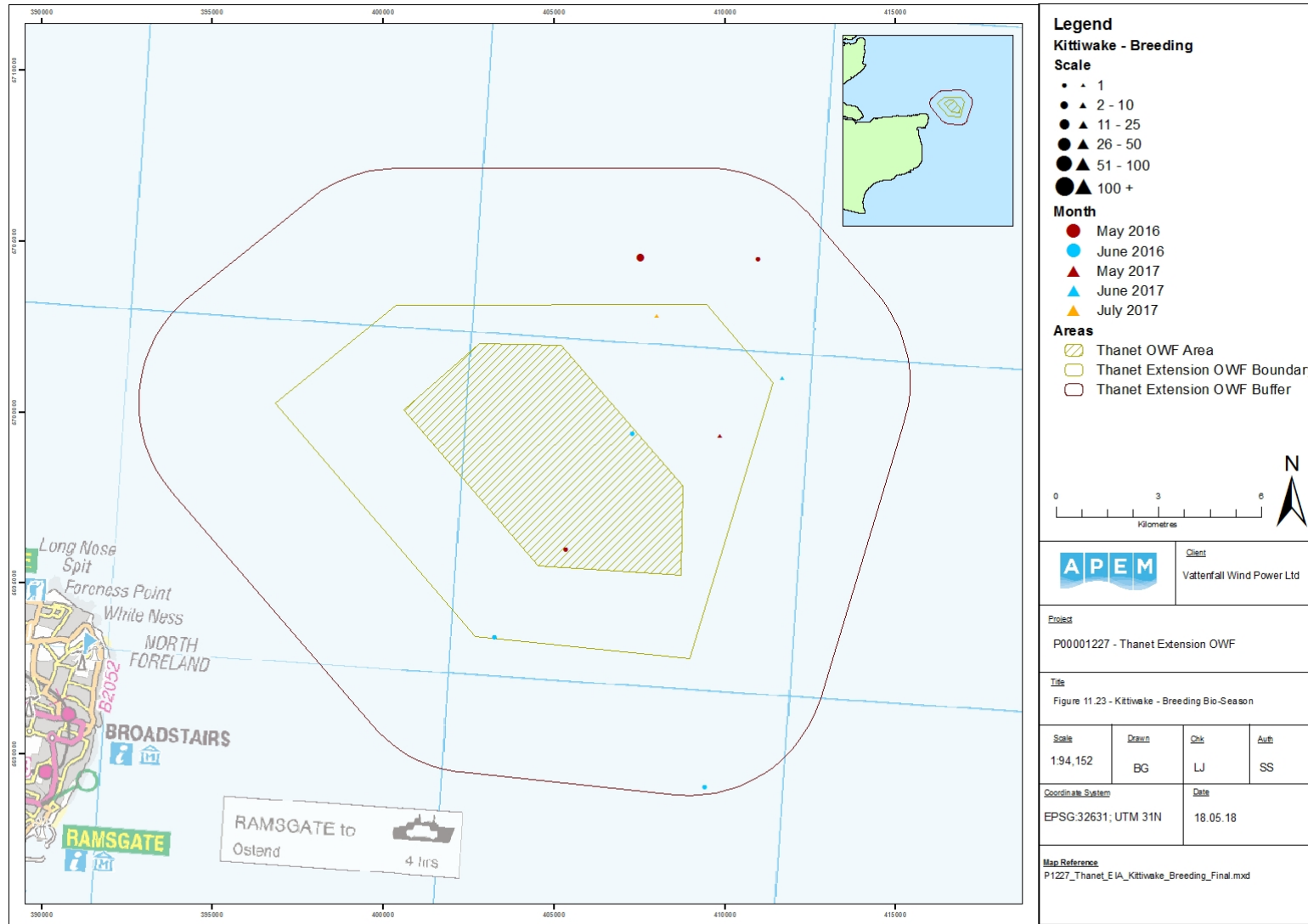
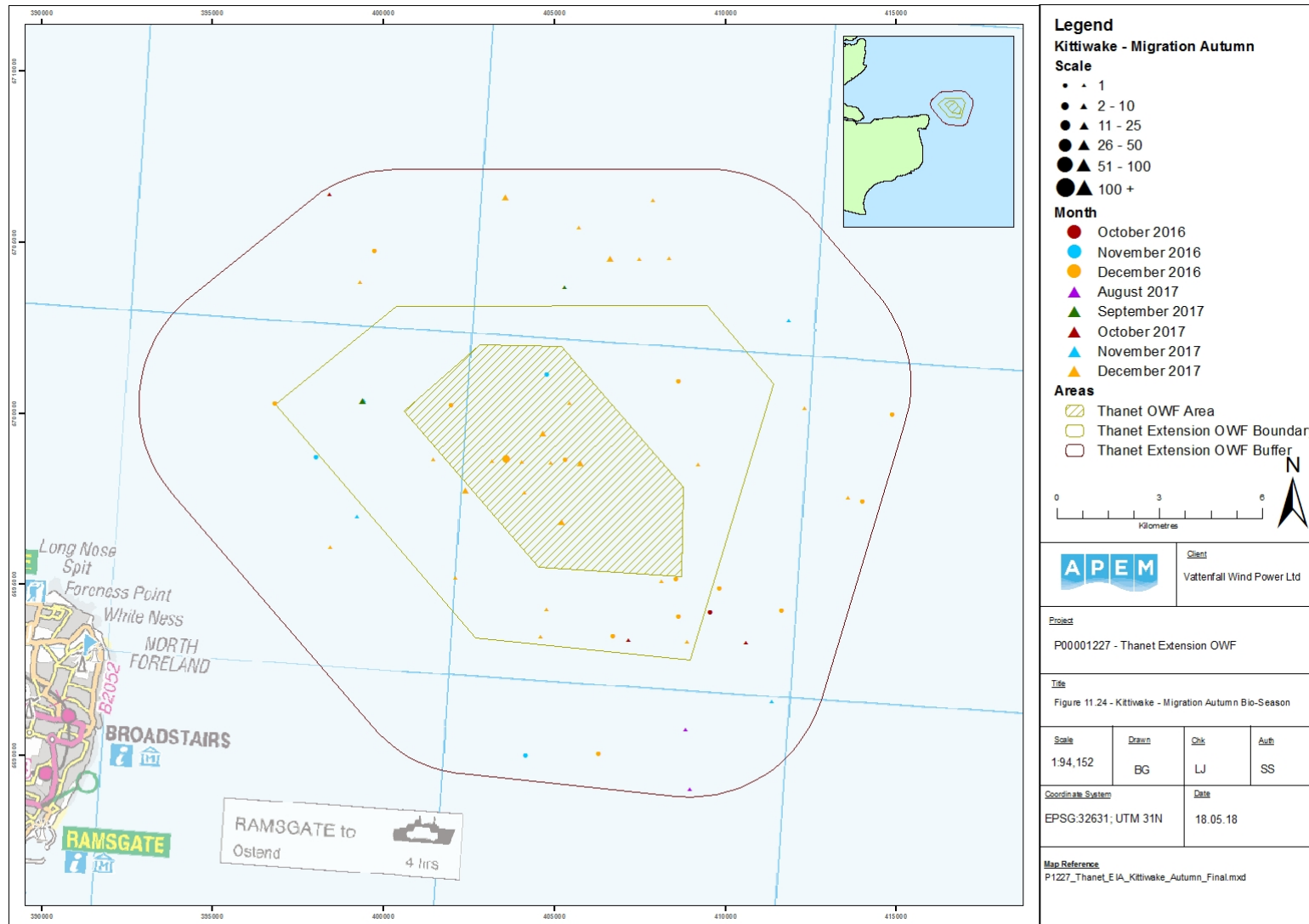


Figure 11.24

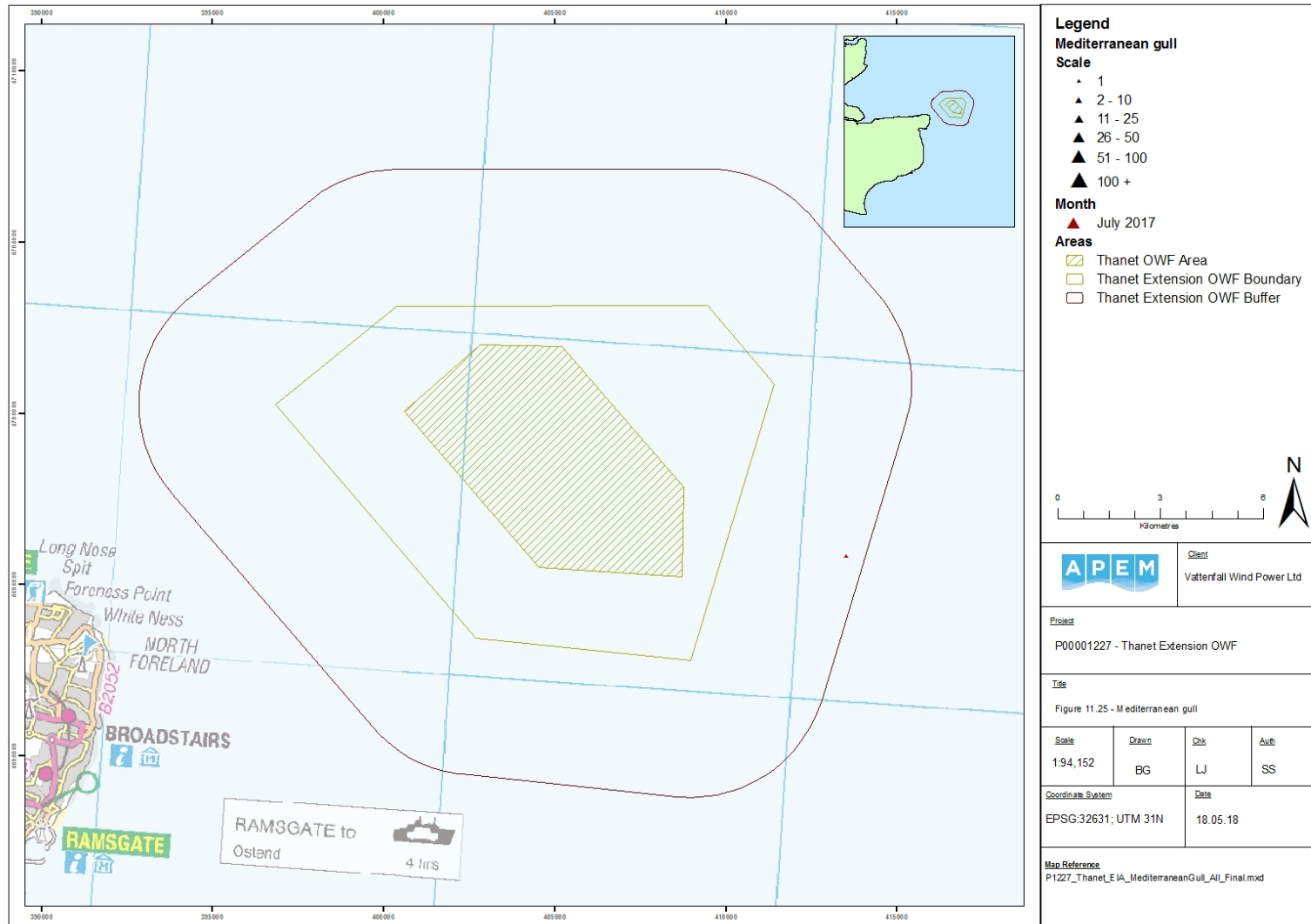
Kittiwake (Migration-autumn bio-season)



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Figure 11.25

Mediterranean gull (July 2017)



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Figure 11.26

Small gull species (Migration-spring bio-season)

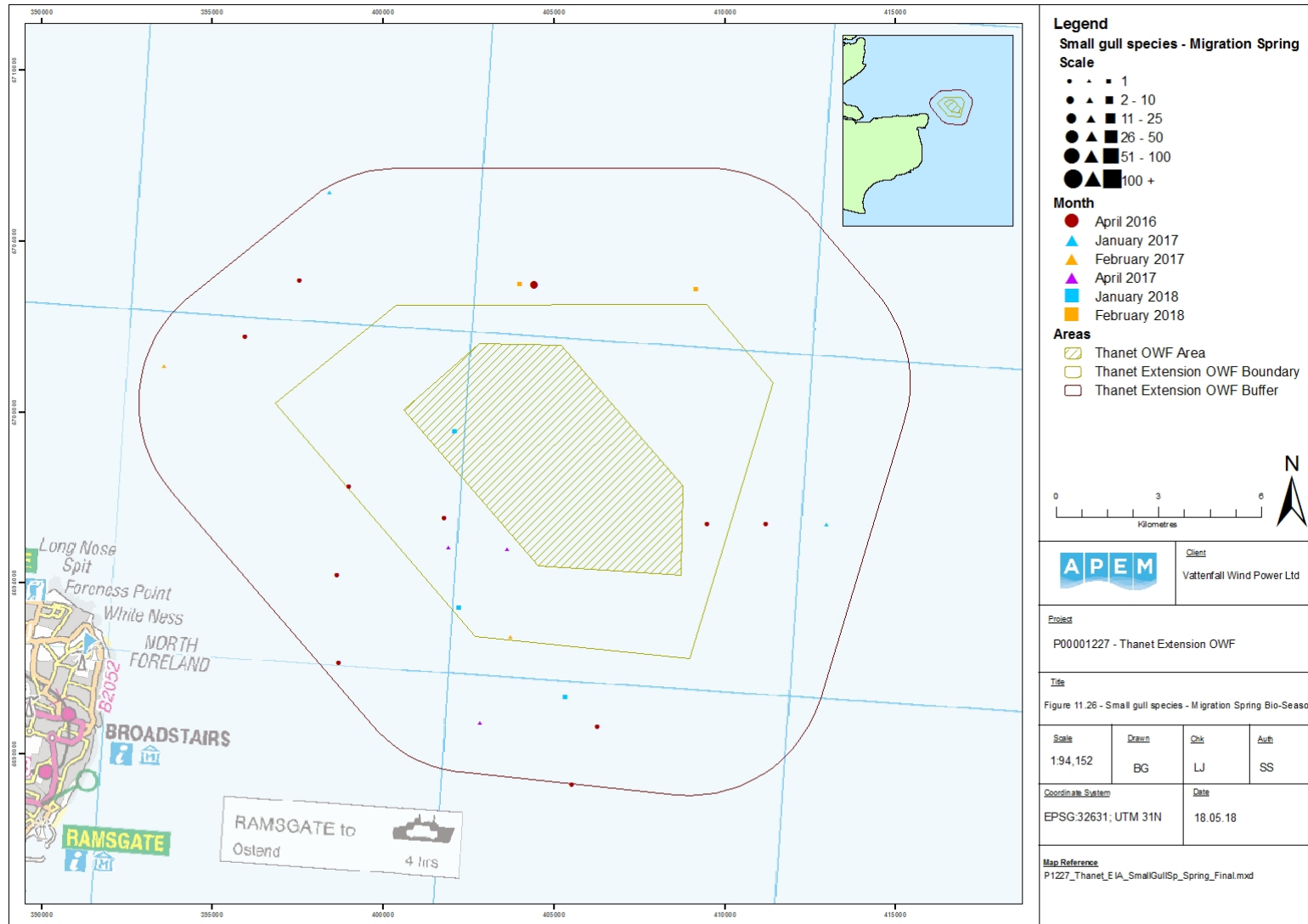
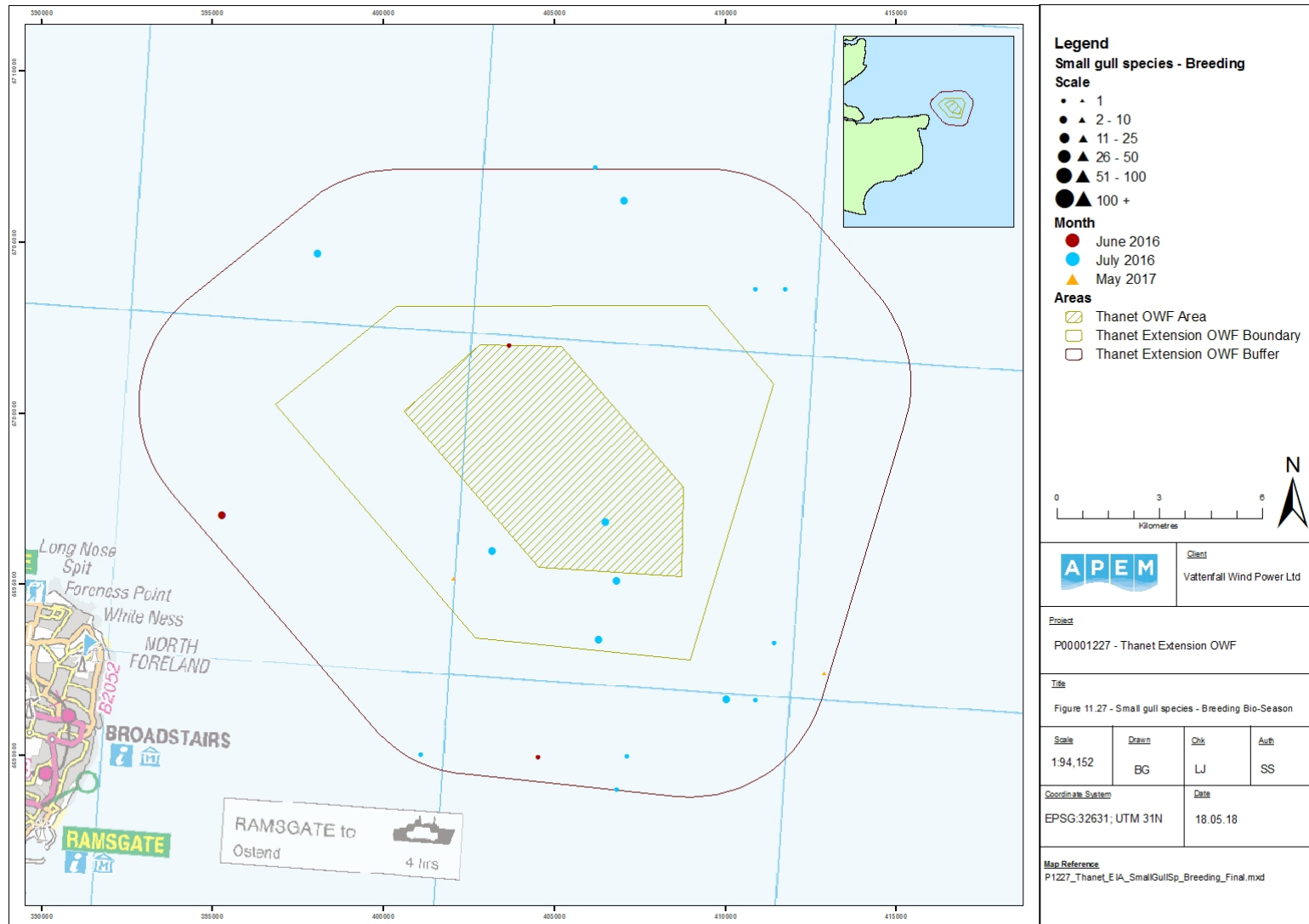


Figure 11.27

Small gull species (Migration free breeding bio-season)



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Figure 11.28

Small gull species (Migration-autumn bio-season)

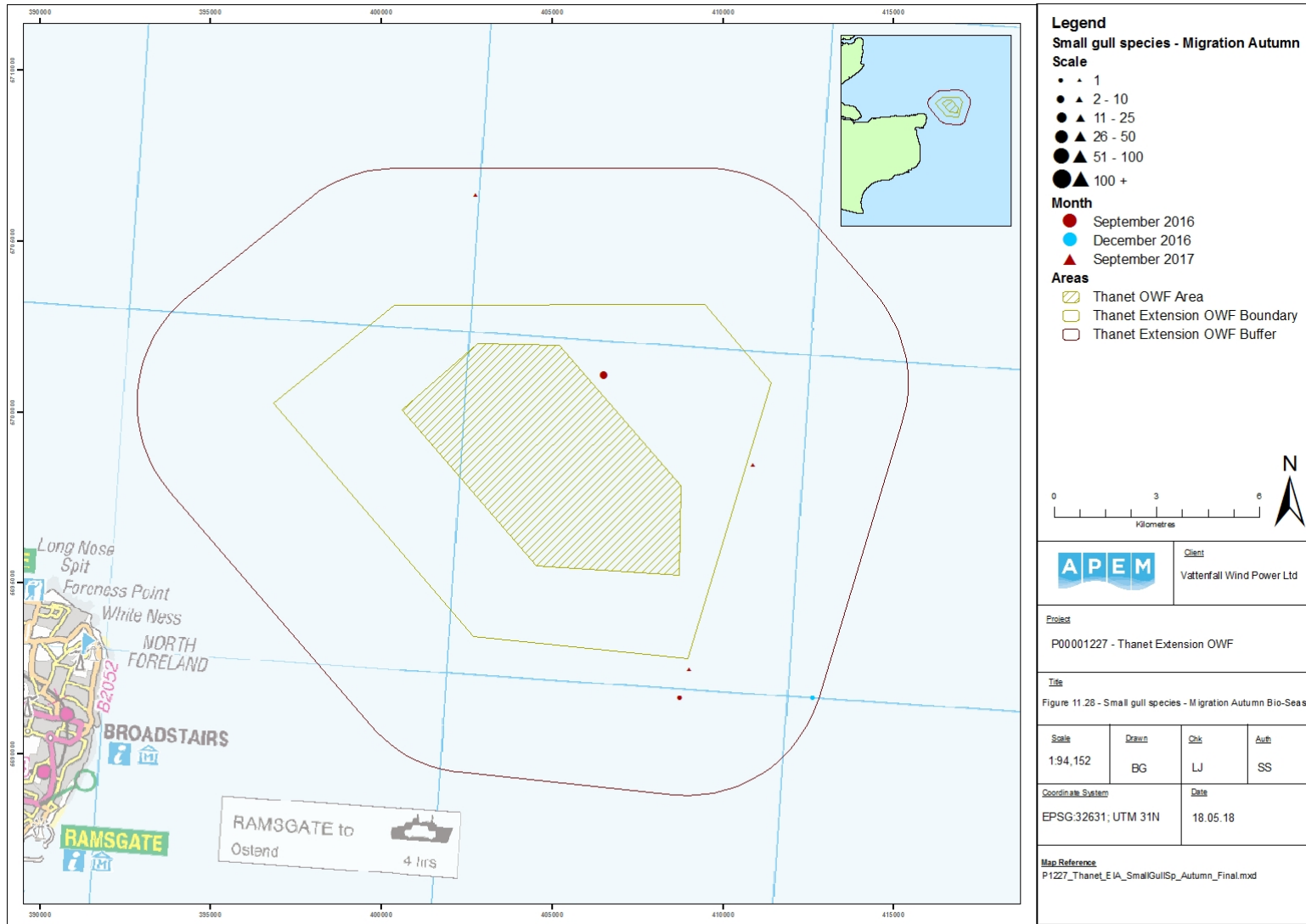


Figure 11.29

Herring gull (Migration-spring bio-season)

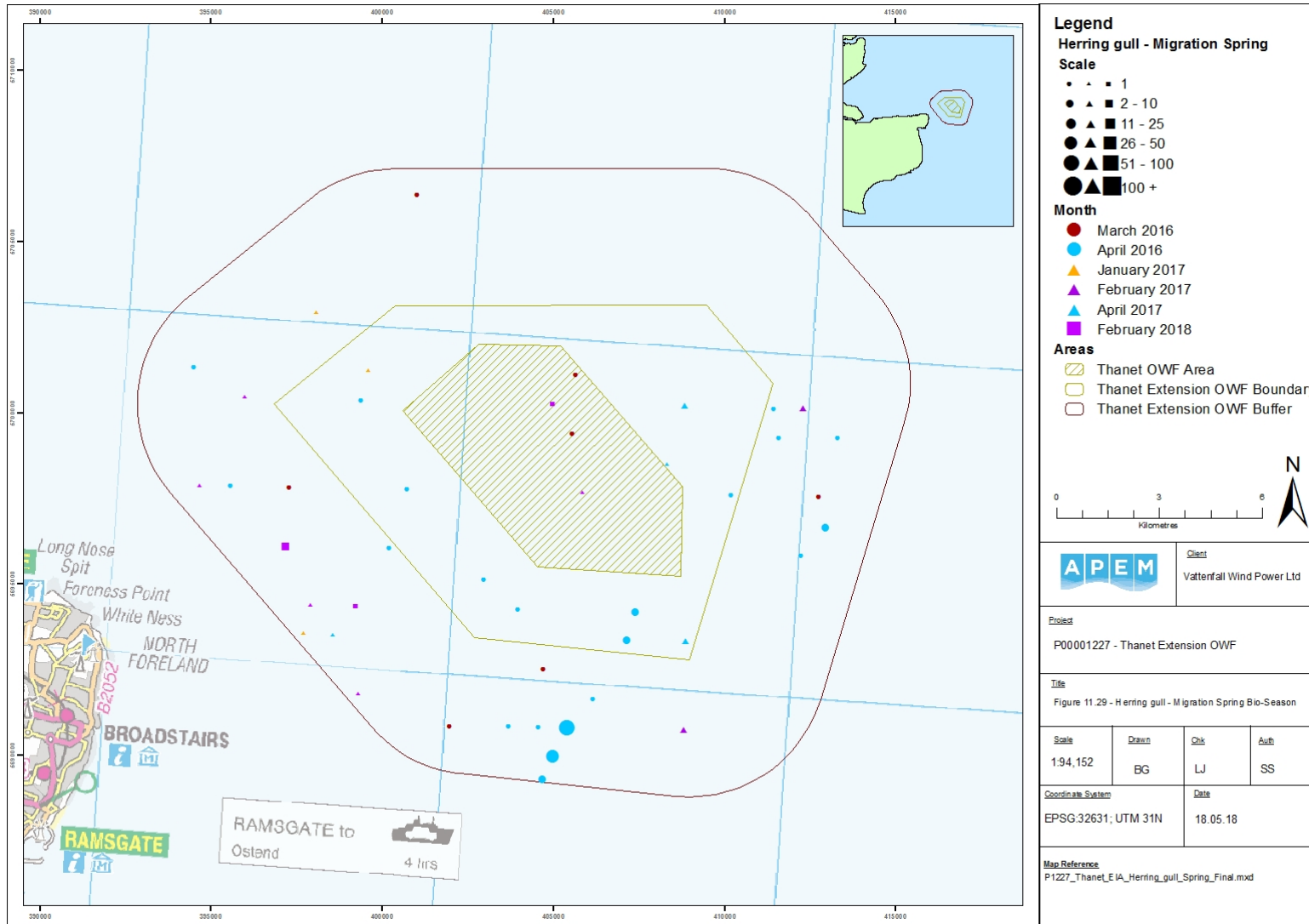


Figure 11.30

Herring gull (Migration free breeding bio-season)

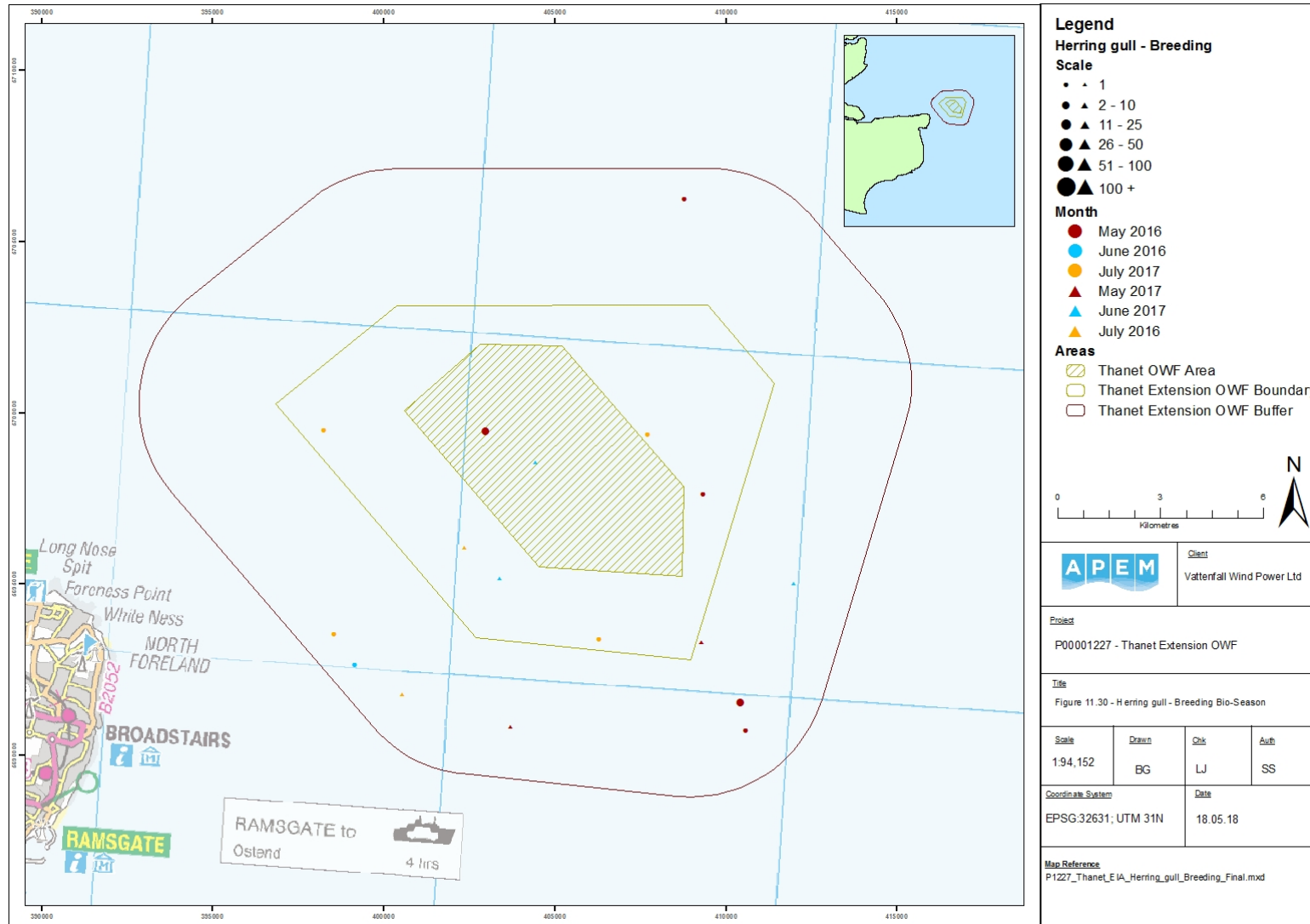


Figure 11.31

Herring gull (Migration-autumn bio-season)

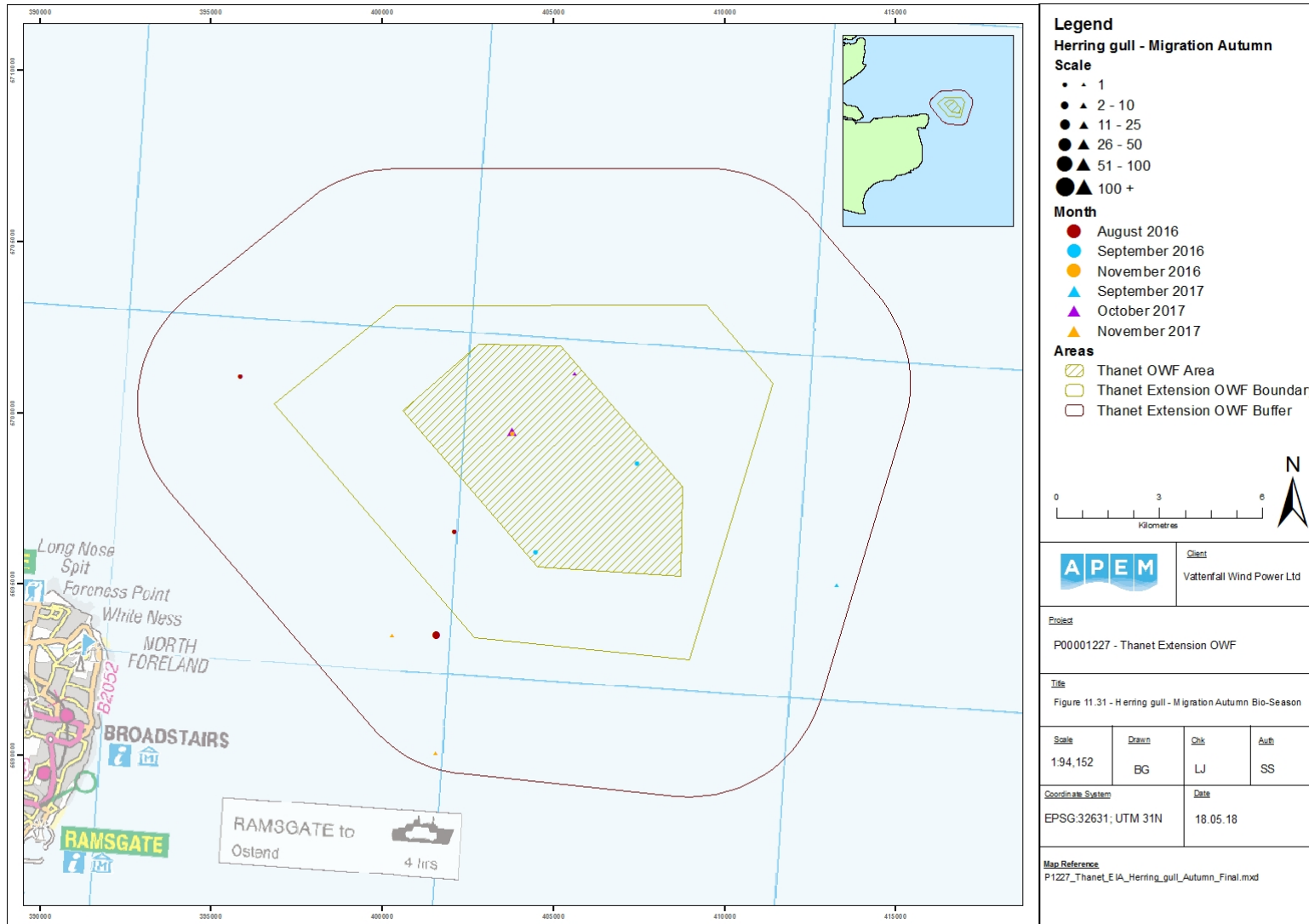
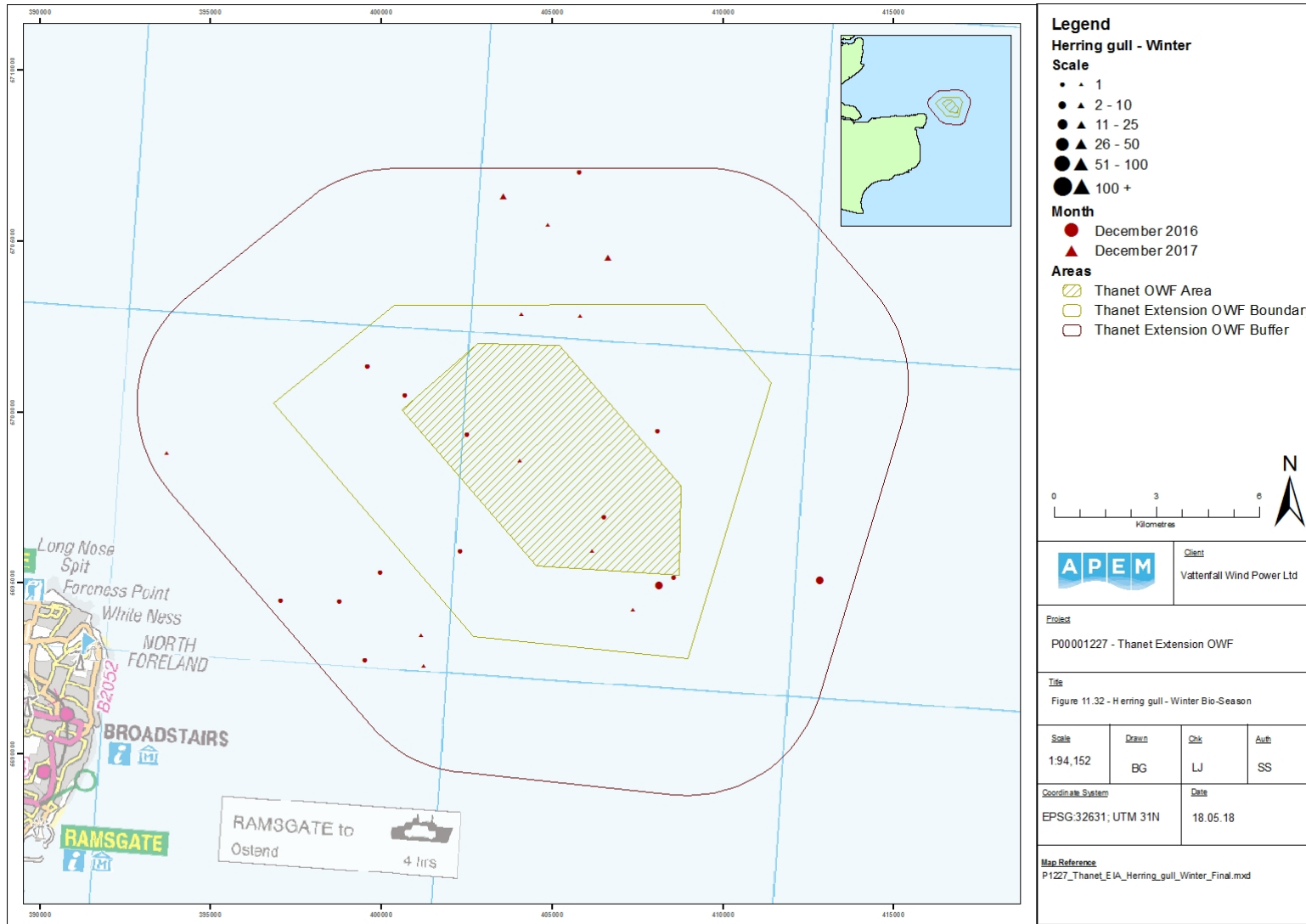


Figure 11.32

Herring gull (Winter bio-season)



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Figure 11.33

Great black-backed gull (Migration-spring bio-season)

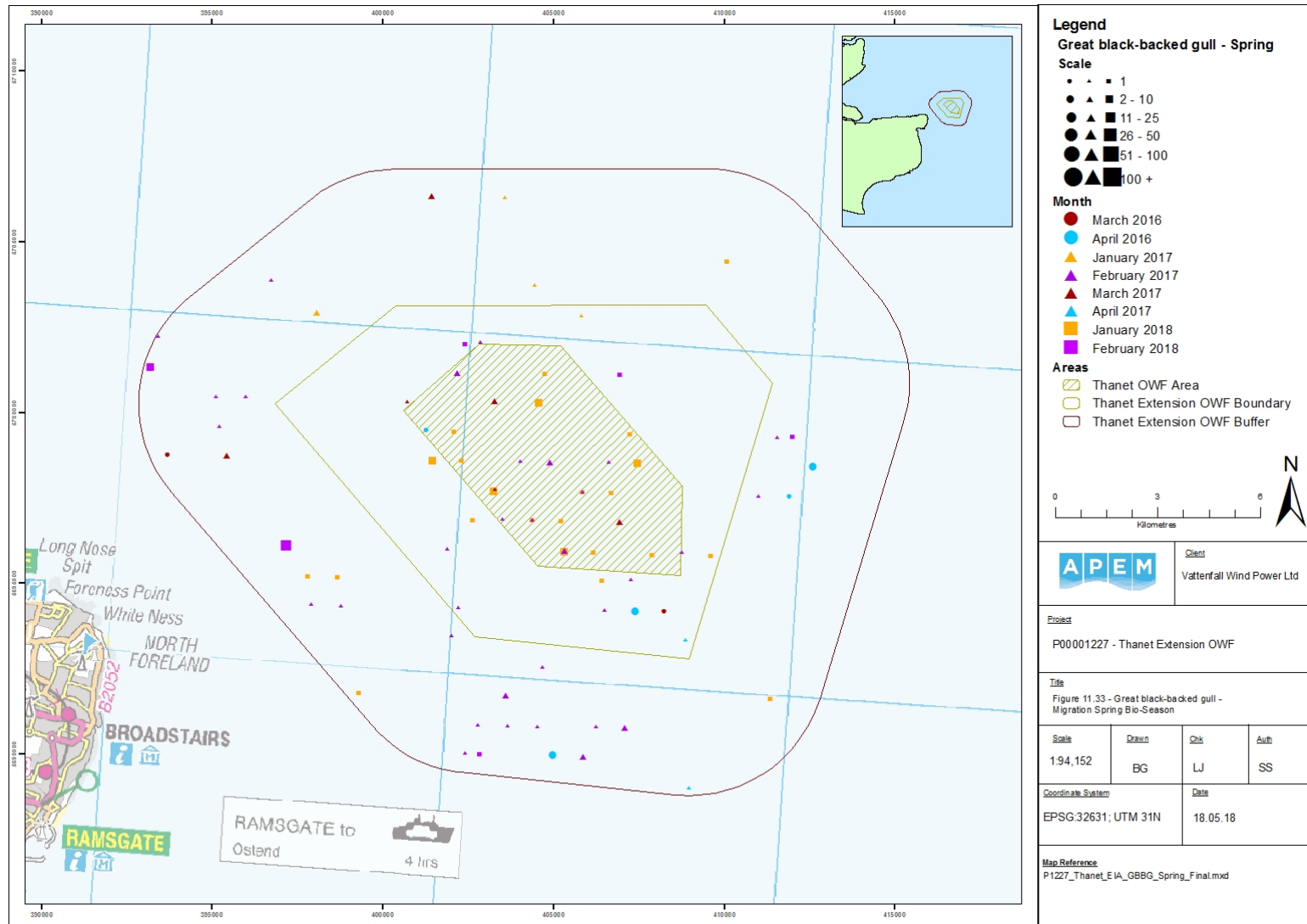


Figure 11.34

Great black-backed gull (Migration free breeding bio-season)

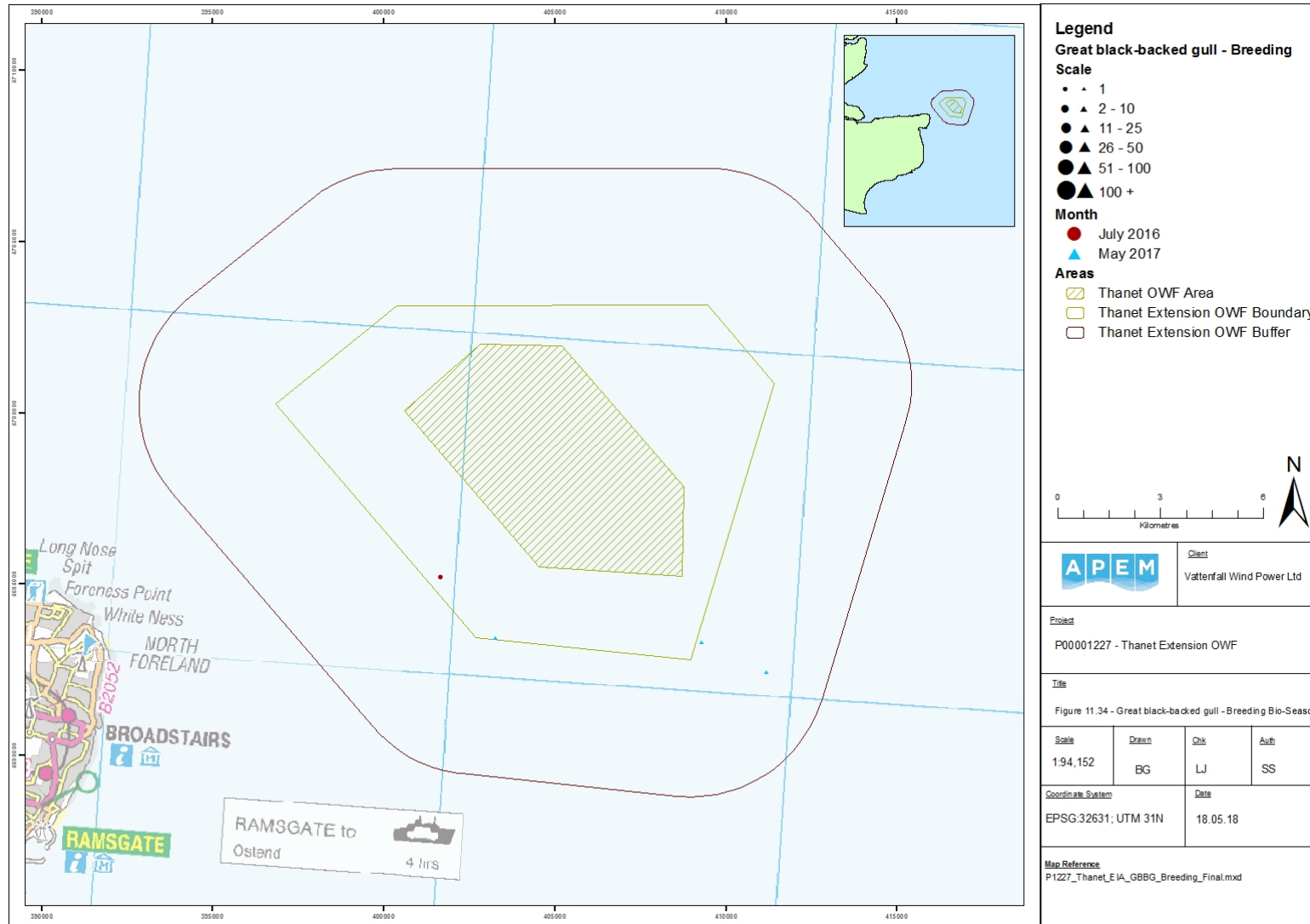
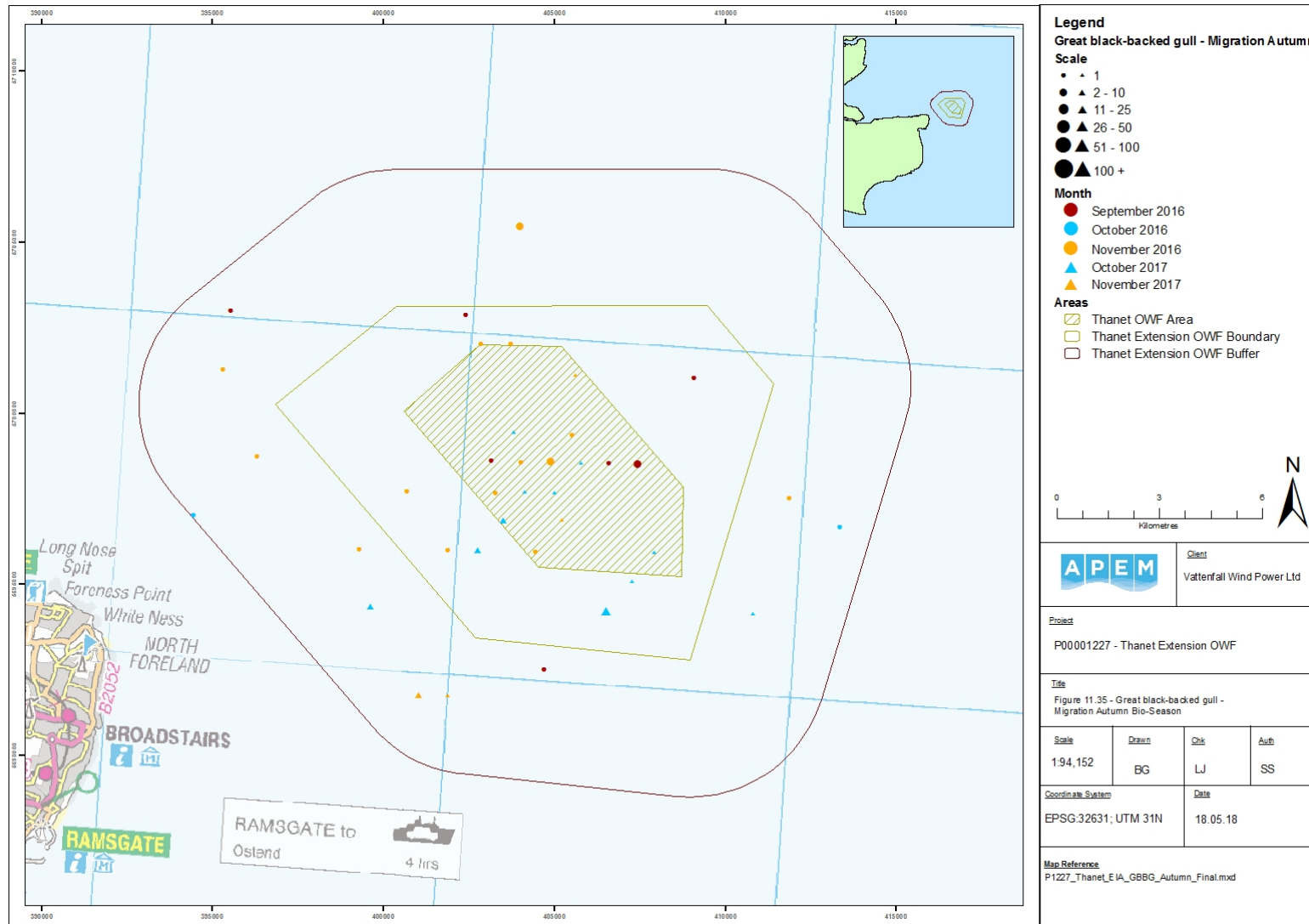


Figure 11.35

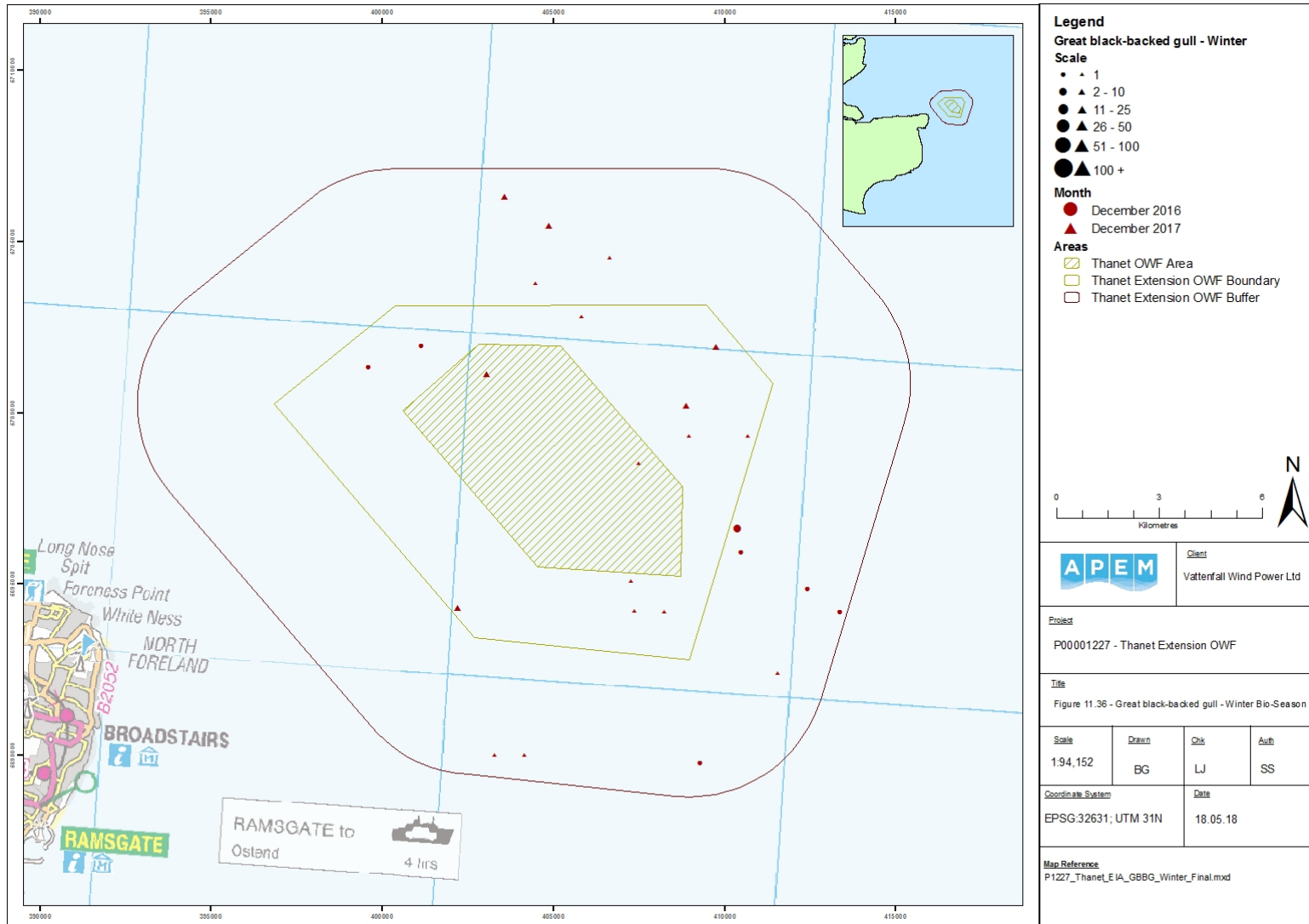
Great black-backed gull (Migration-autumn bio-season)



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Figure 11.36

Great black-backed gull (Winter bio-season)



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Figure 11.37

Lesser black-backed gull (Migration-spring bio-season)

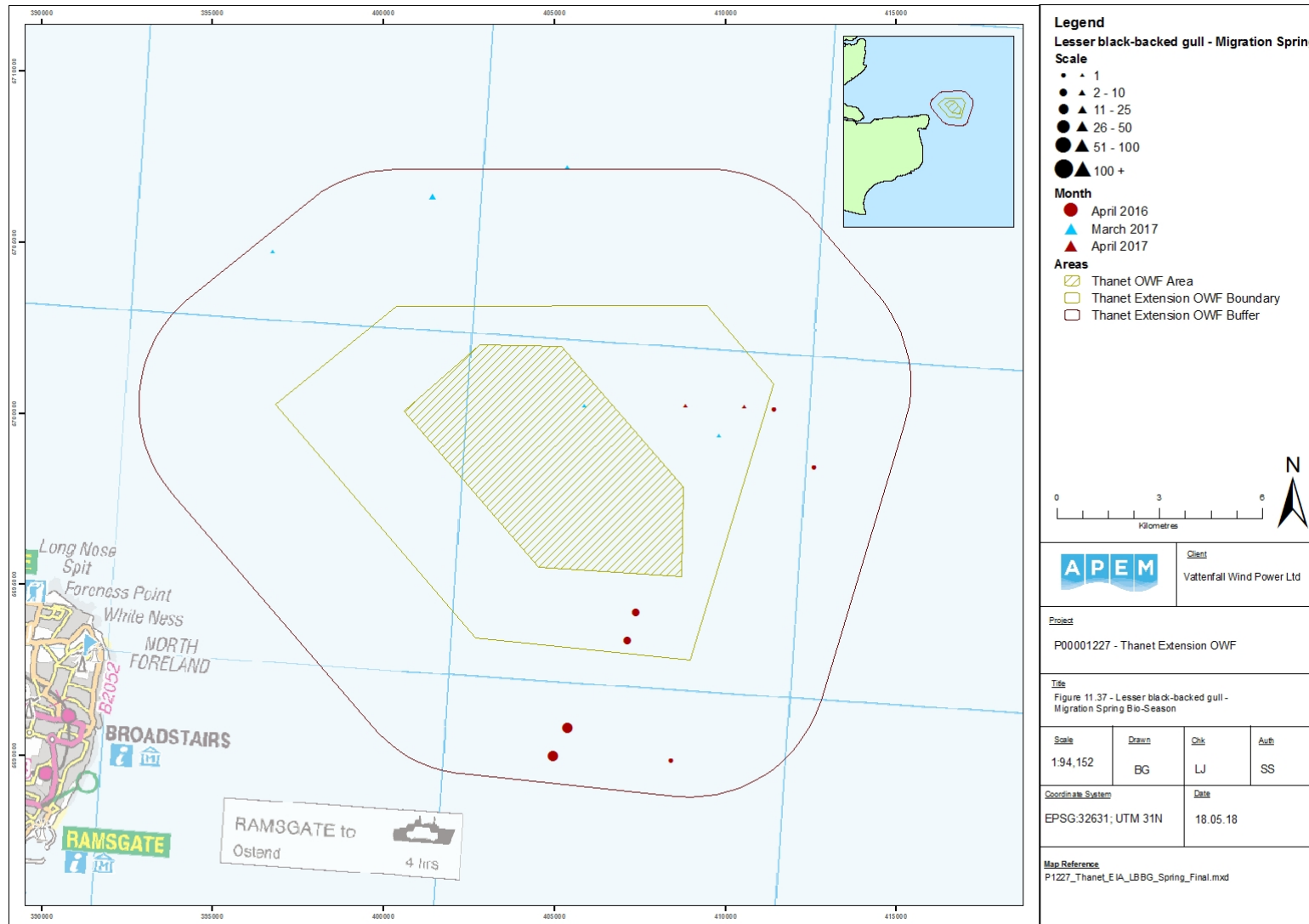
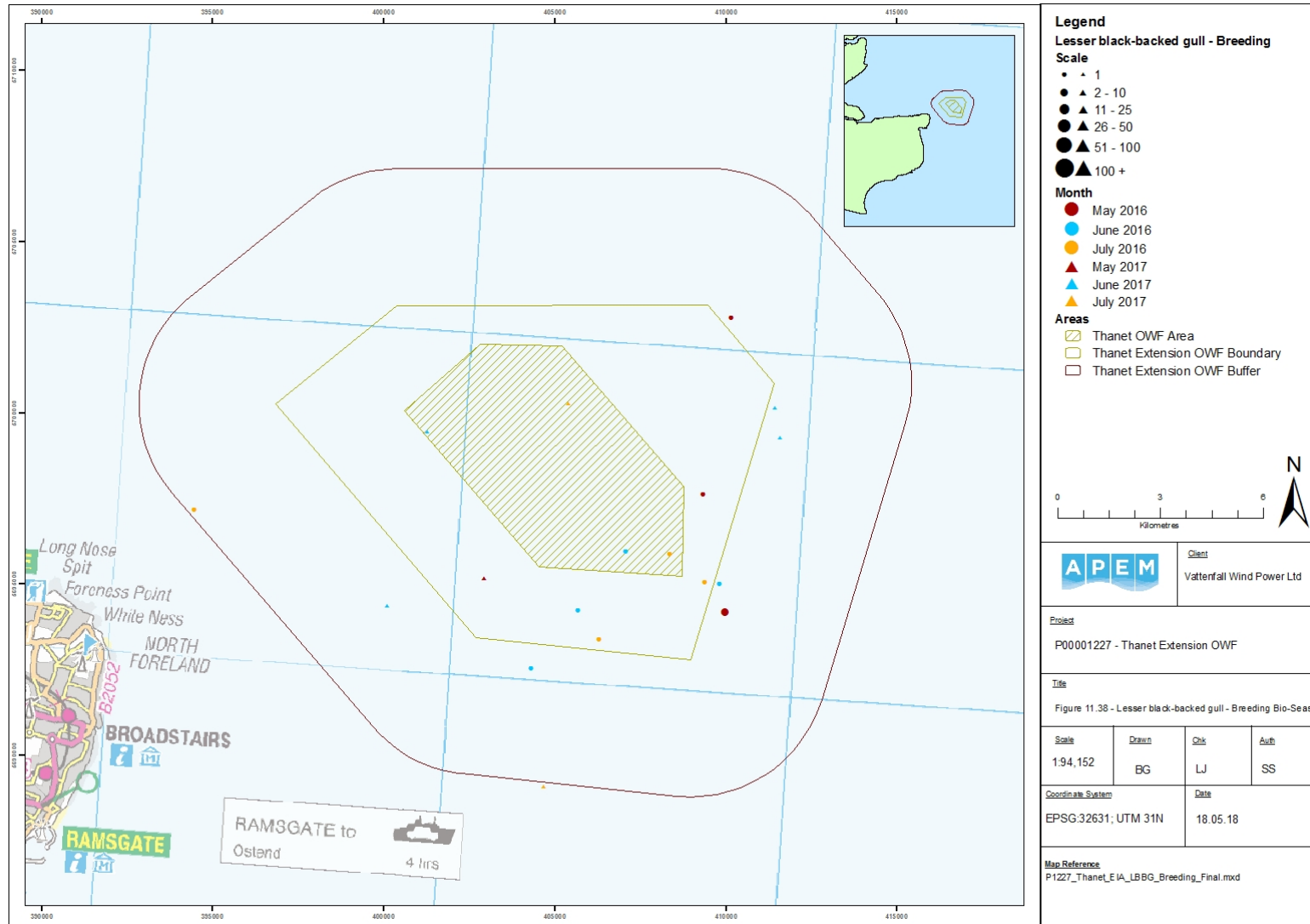


Figure 11.38

Lesser black-backed gull (Migration free breeding bio-season)



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Figure 11.39

Lesser black-backed gull (Migration-autumn bio-season)

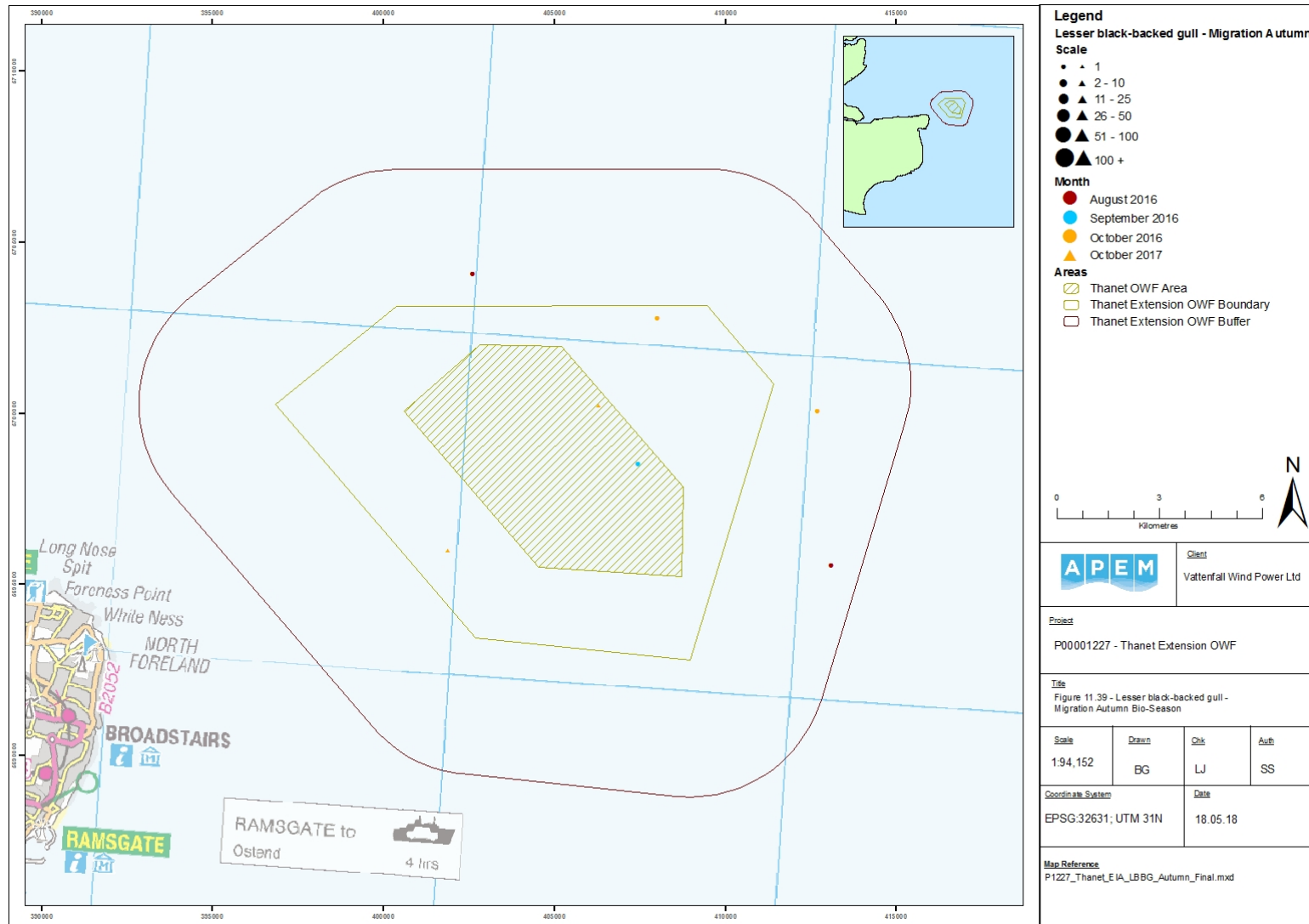
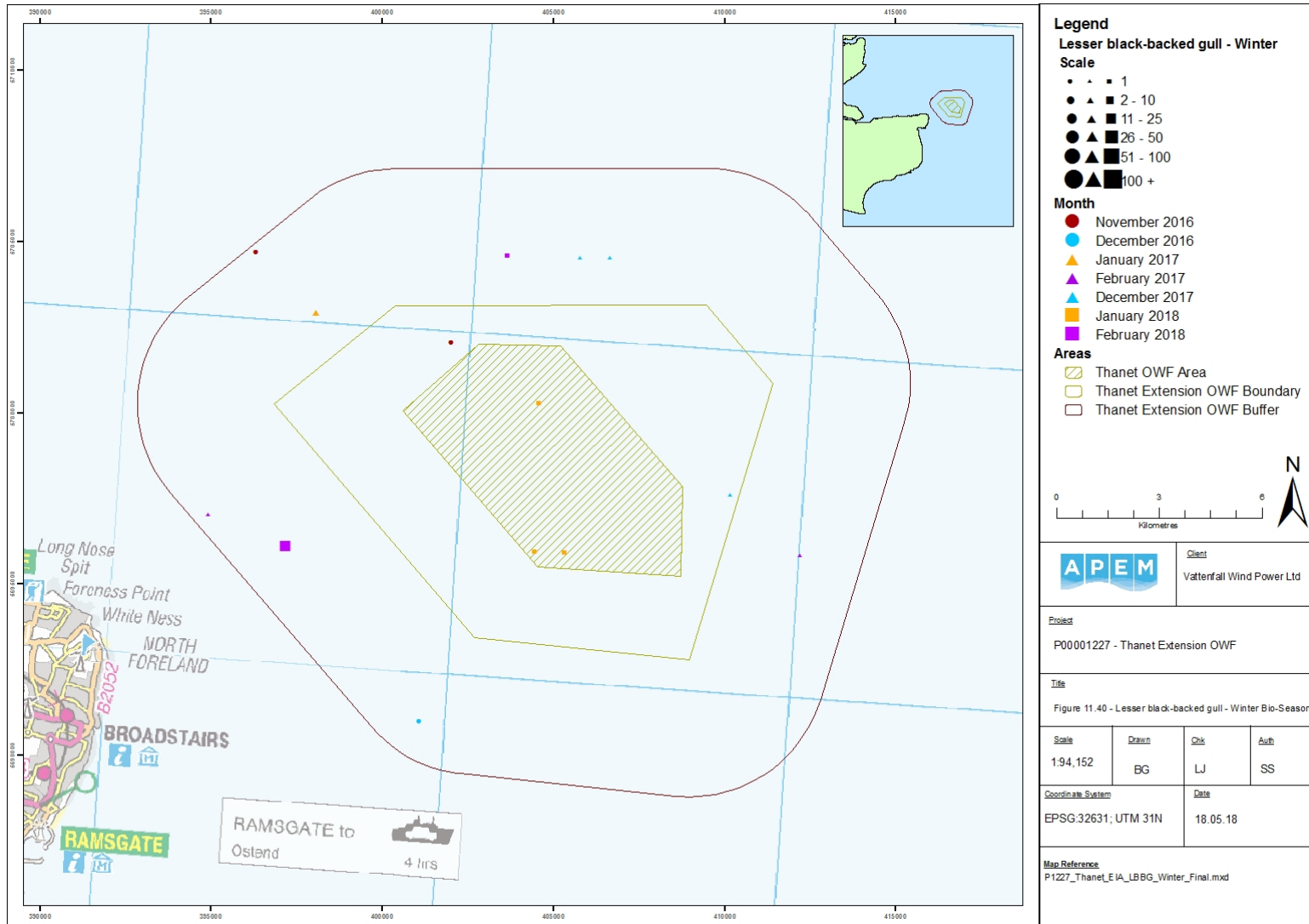


Figure 11.40

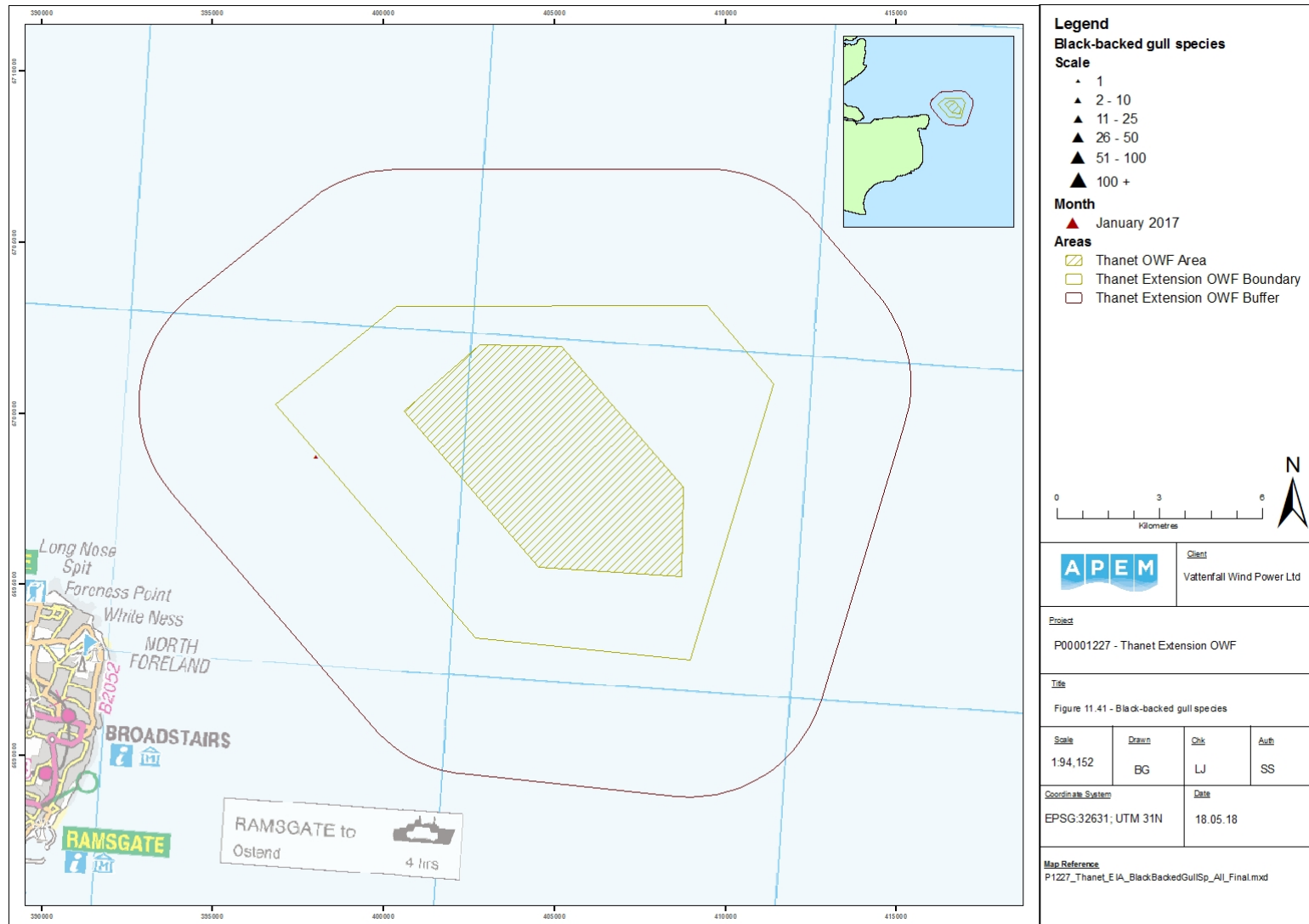
Lesser black-backed gull (Winter bio-season)



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Figure 11.41

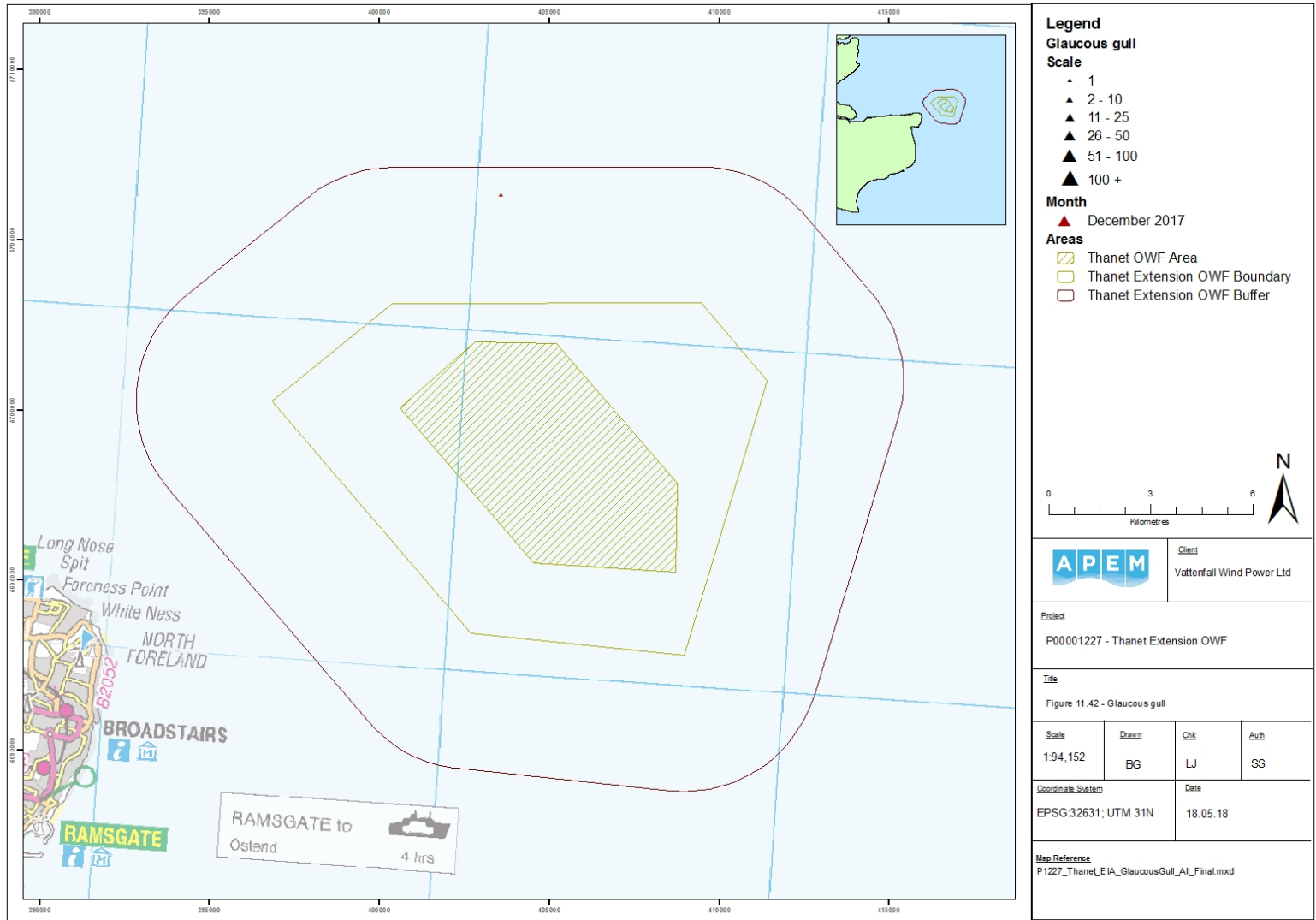
Black-backed gull species (Migration-spring bio-season)



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Figure 11.42

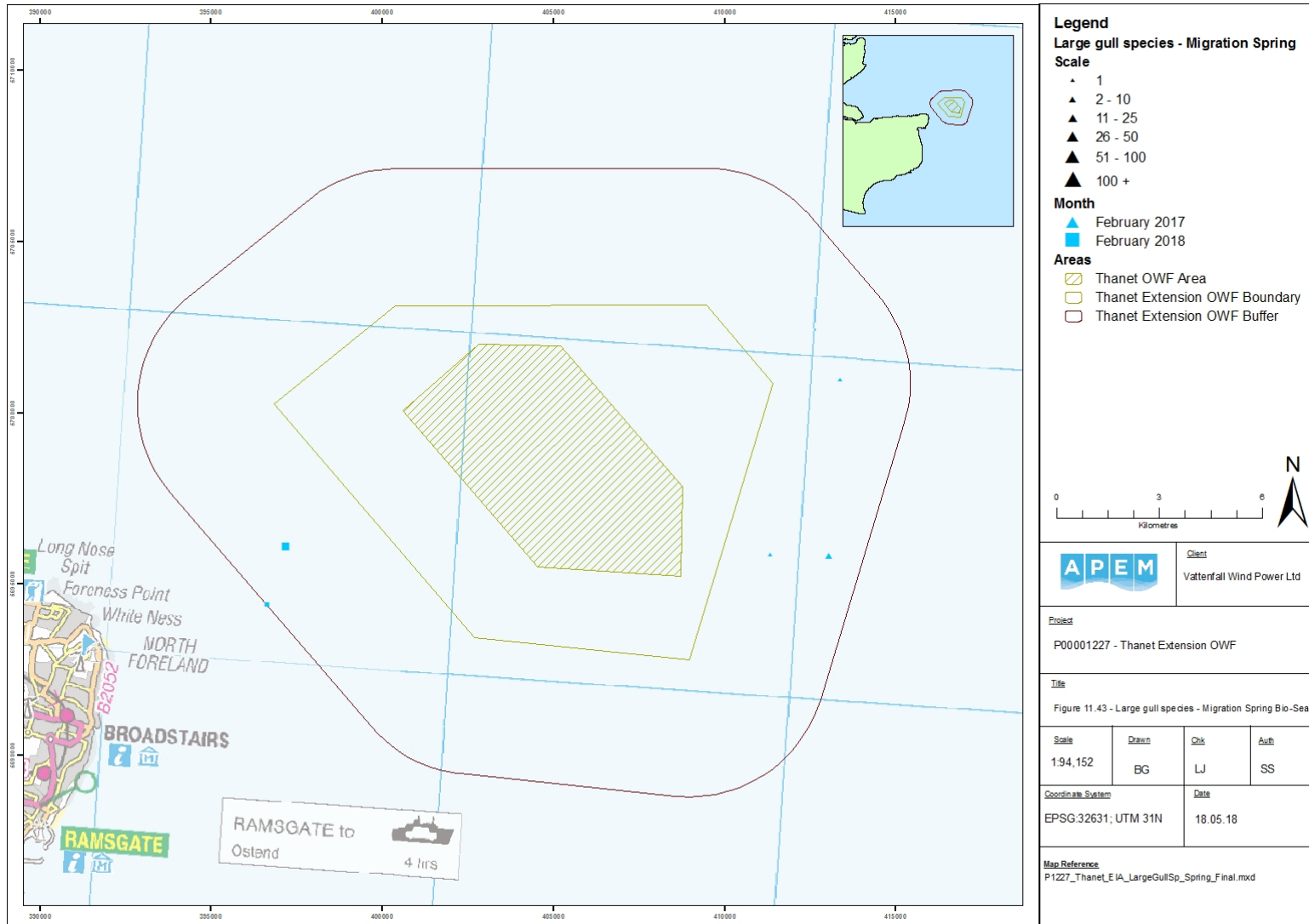
Glaucous gull (December 2017)



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Figure 11.43

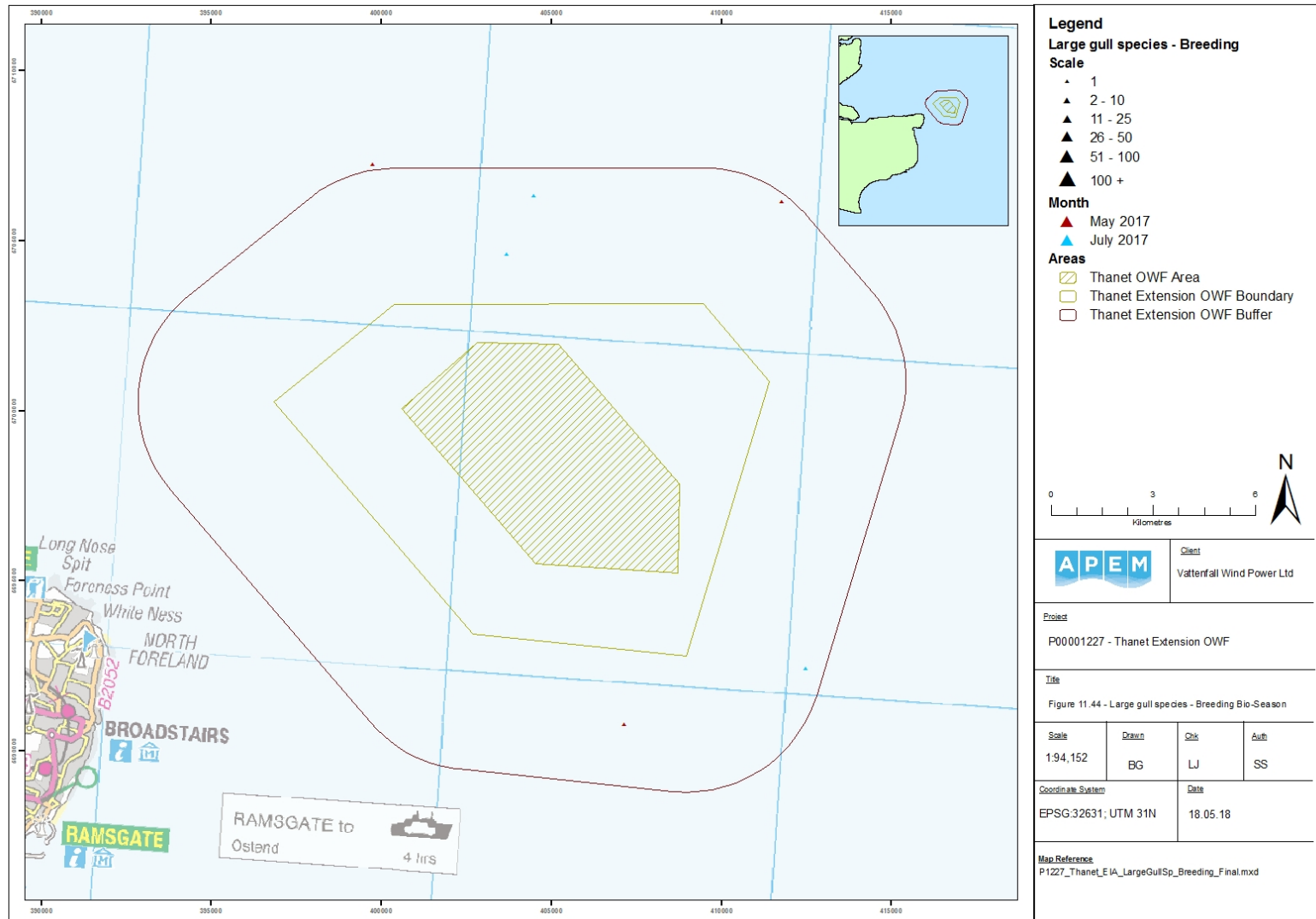
Large gull species (Migration-spring bio-season)



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Figure 11.44

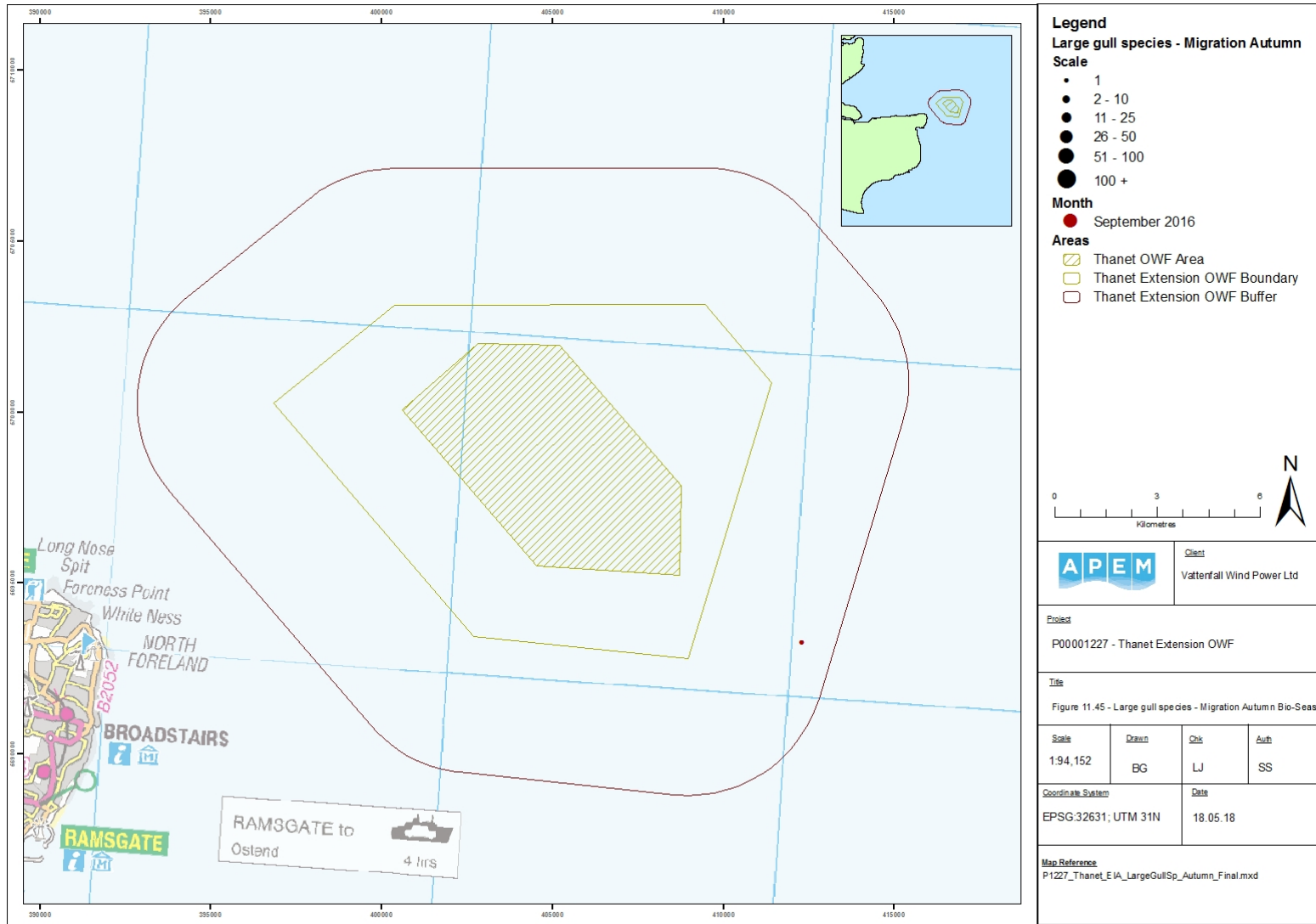
Large gull species (Migration free breeding bio-season)



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Figure 11.45

Large gull species (Migration-autumn bio-season)



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Figure 11.46

Large gull species (Winter bio-season)

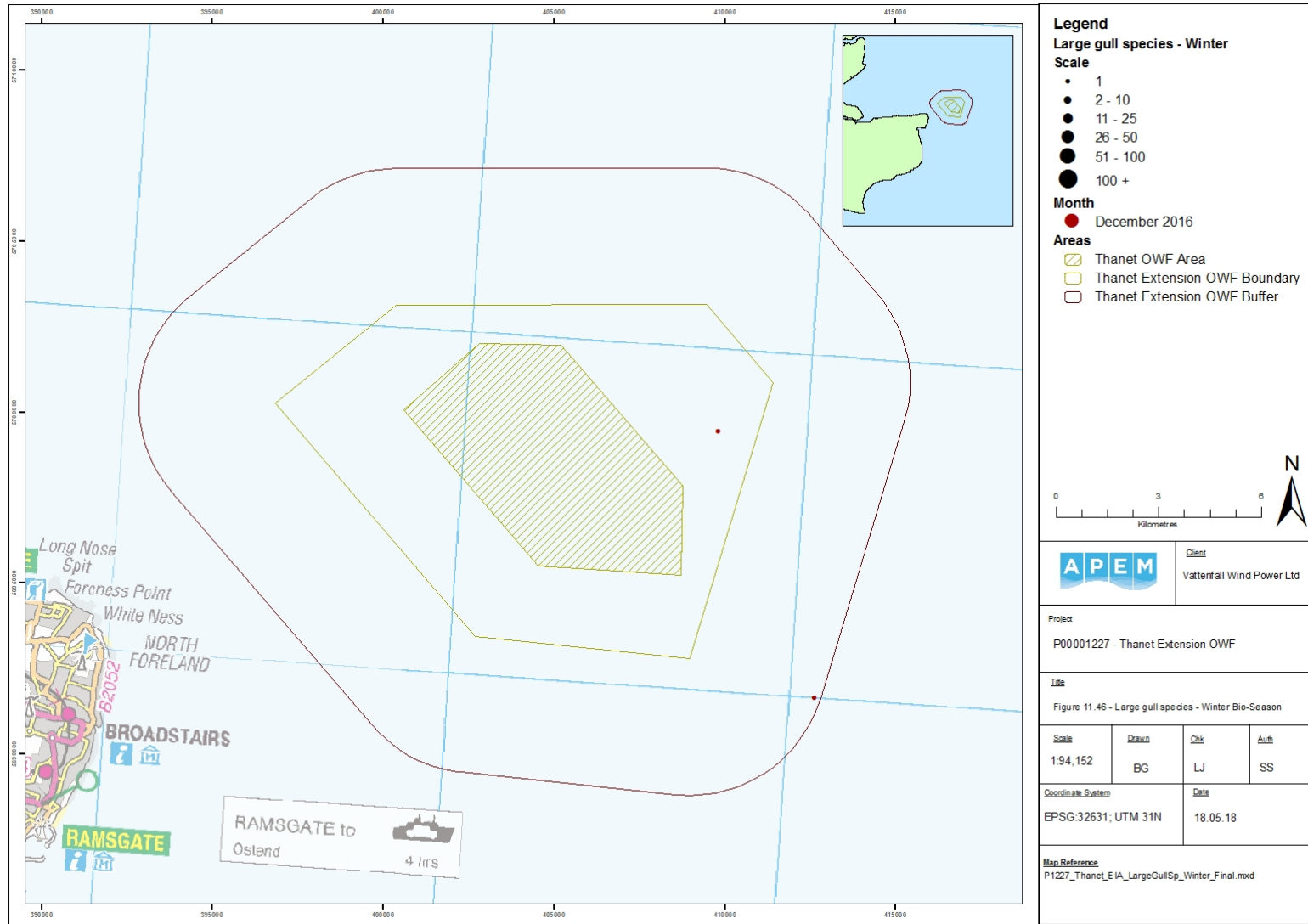


Figure 11.47

Sandwich tern (Migration-spring bio-season)

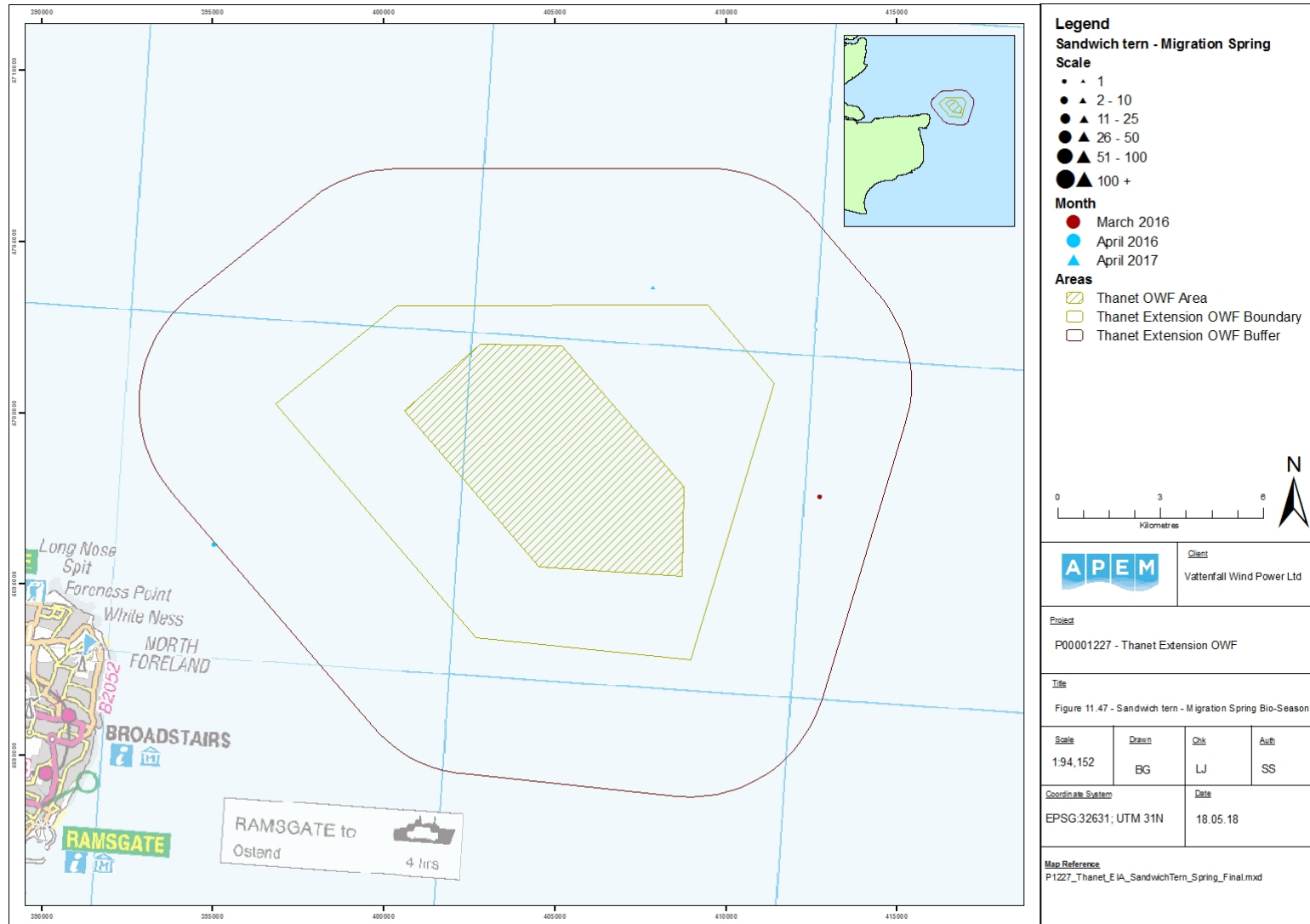
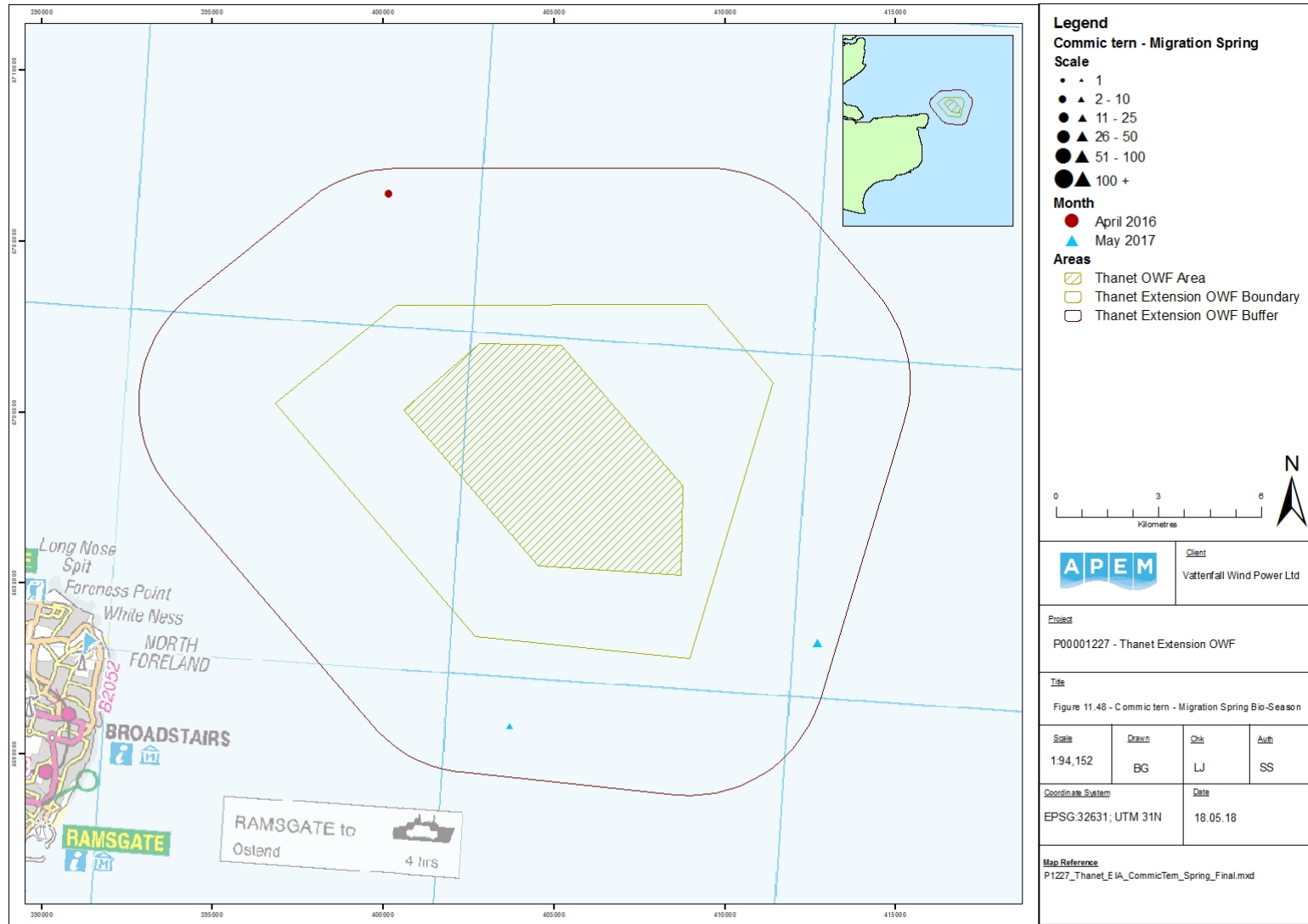


Figure 11.48

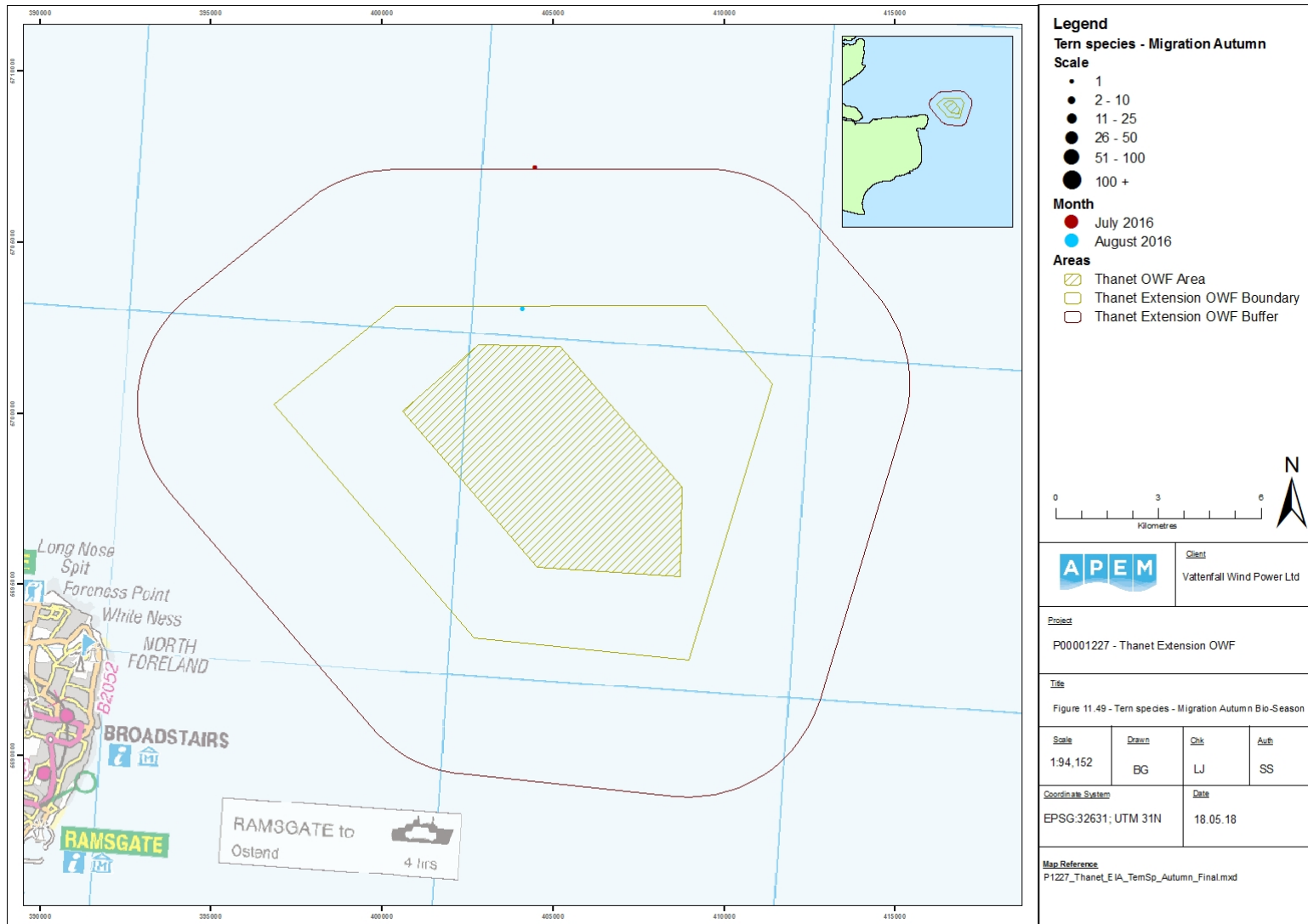
'Commic' tern (Migration-spring bio-season)



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Figure 11.49

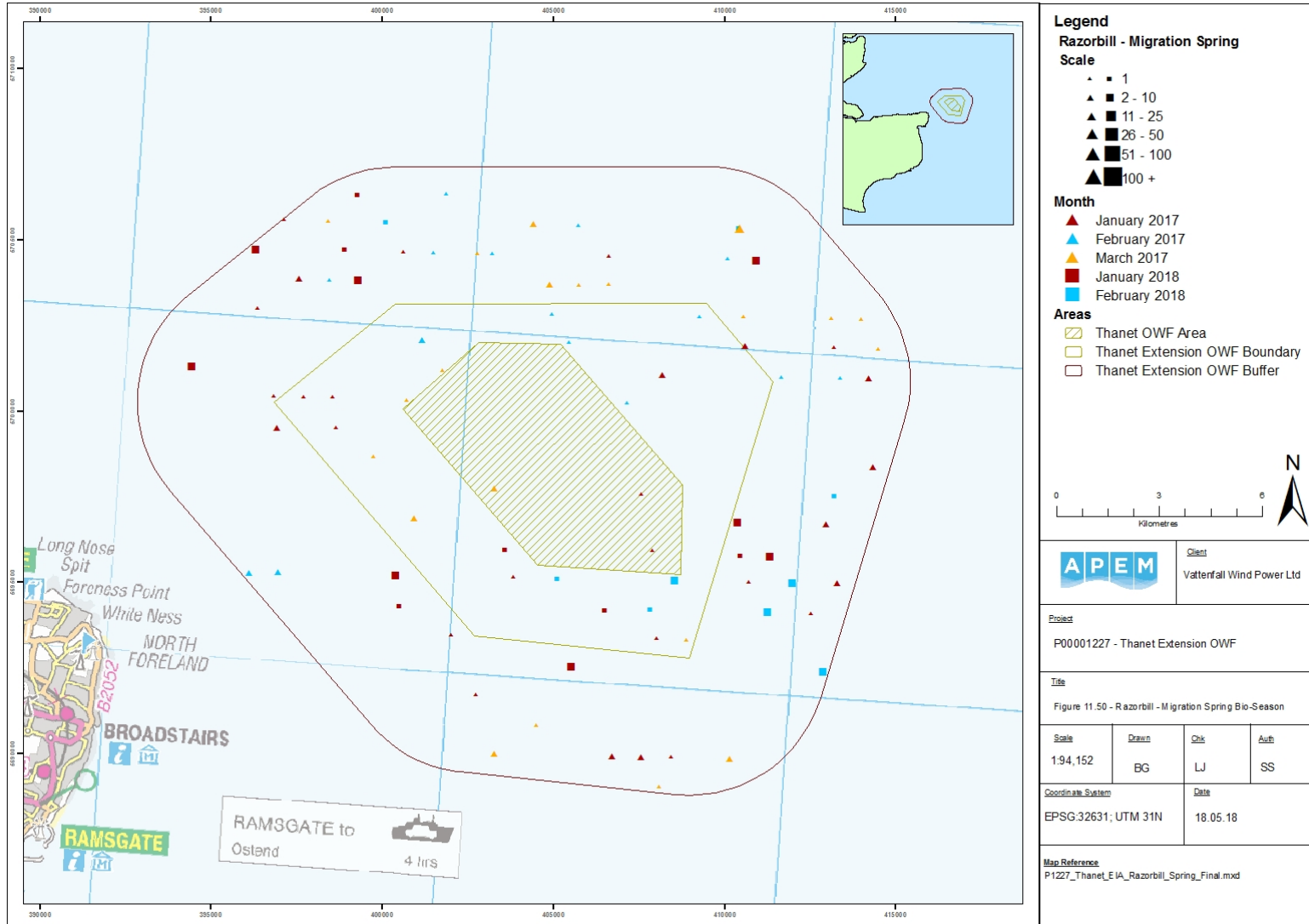
Tern species (Migration-autumn bio-season)



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Figure 11.50

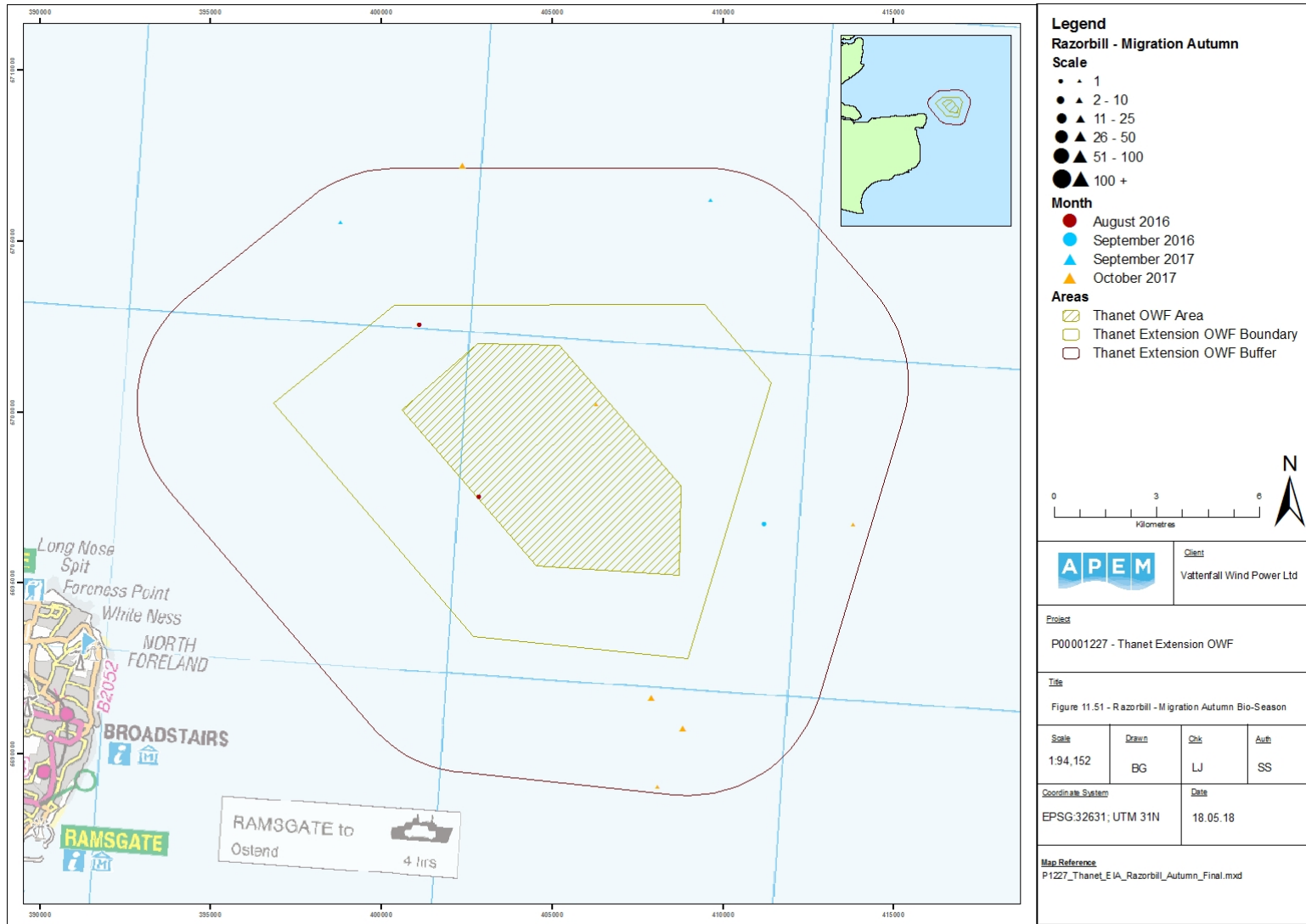
Razorbill (Migration-spring bio-season)



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Figure 11.51

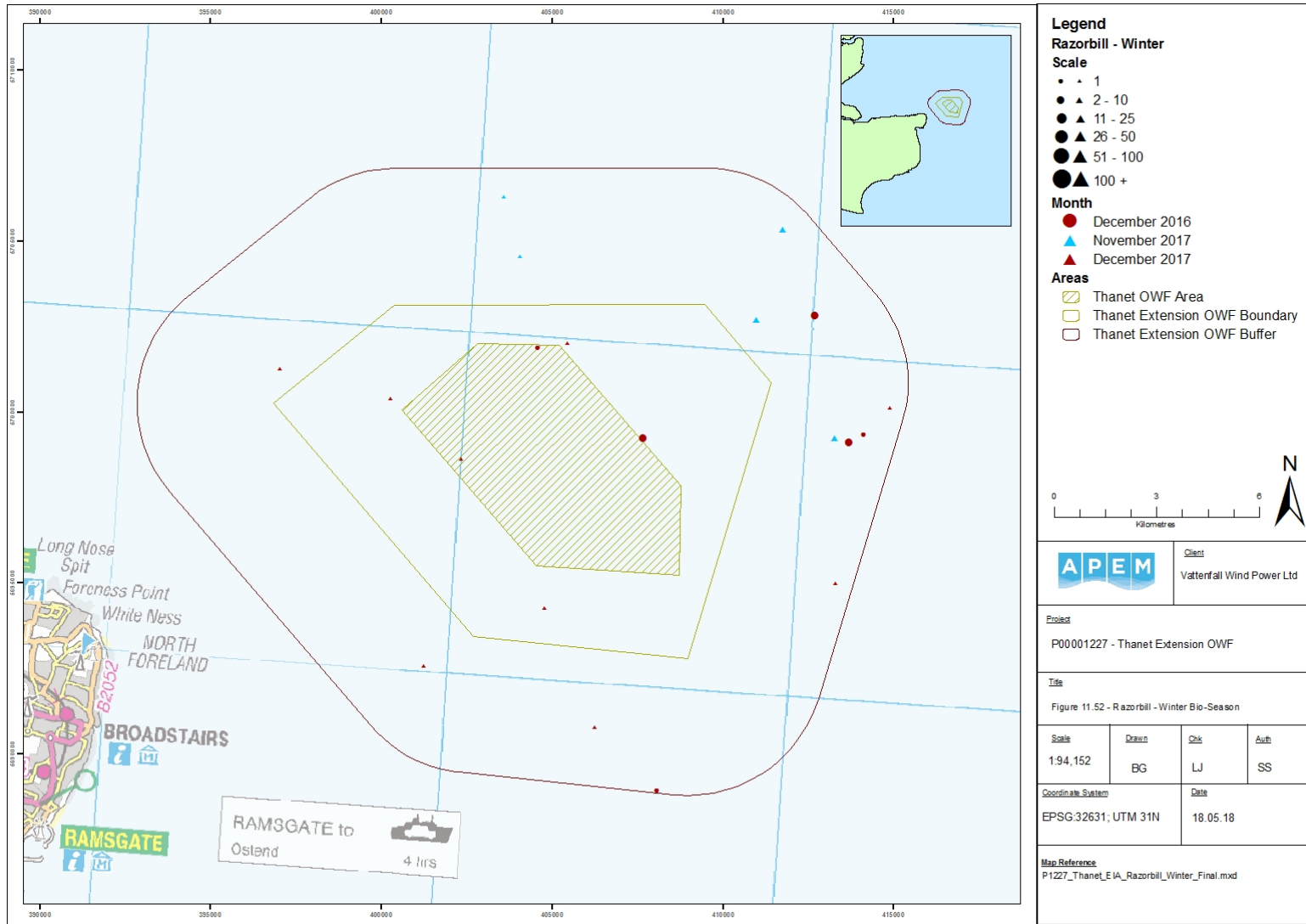
Razorbill (Migration-autumn bio-season)



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Figure 11.52

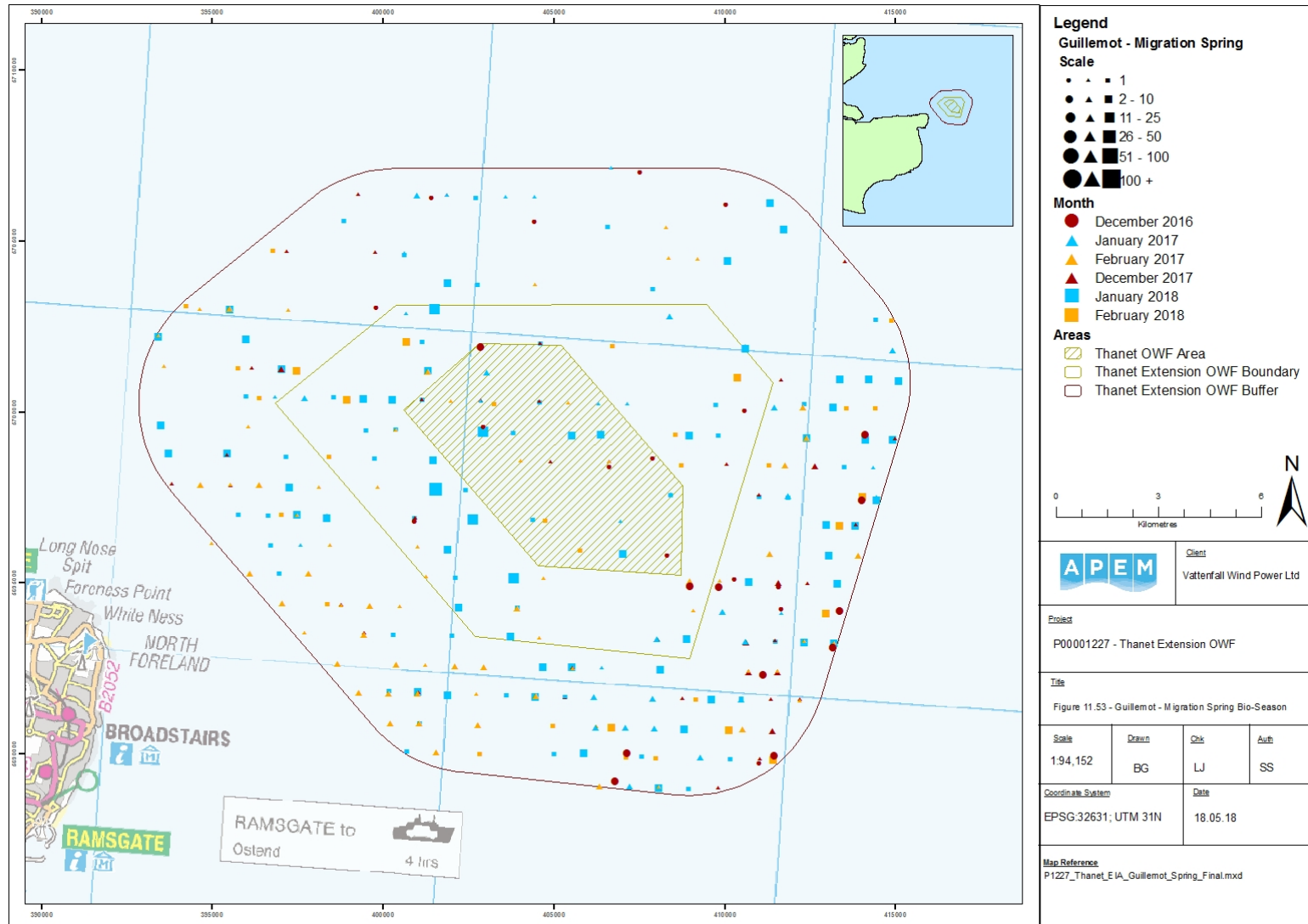
Razorbill (Winter bio-season)



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Figure 11.53

Guillemot (Migration-spring bio-season)



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Figure 11.54

Guillemot (Migration free breeding bio-season)

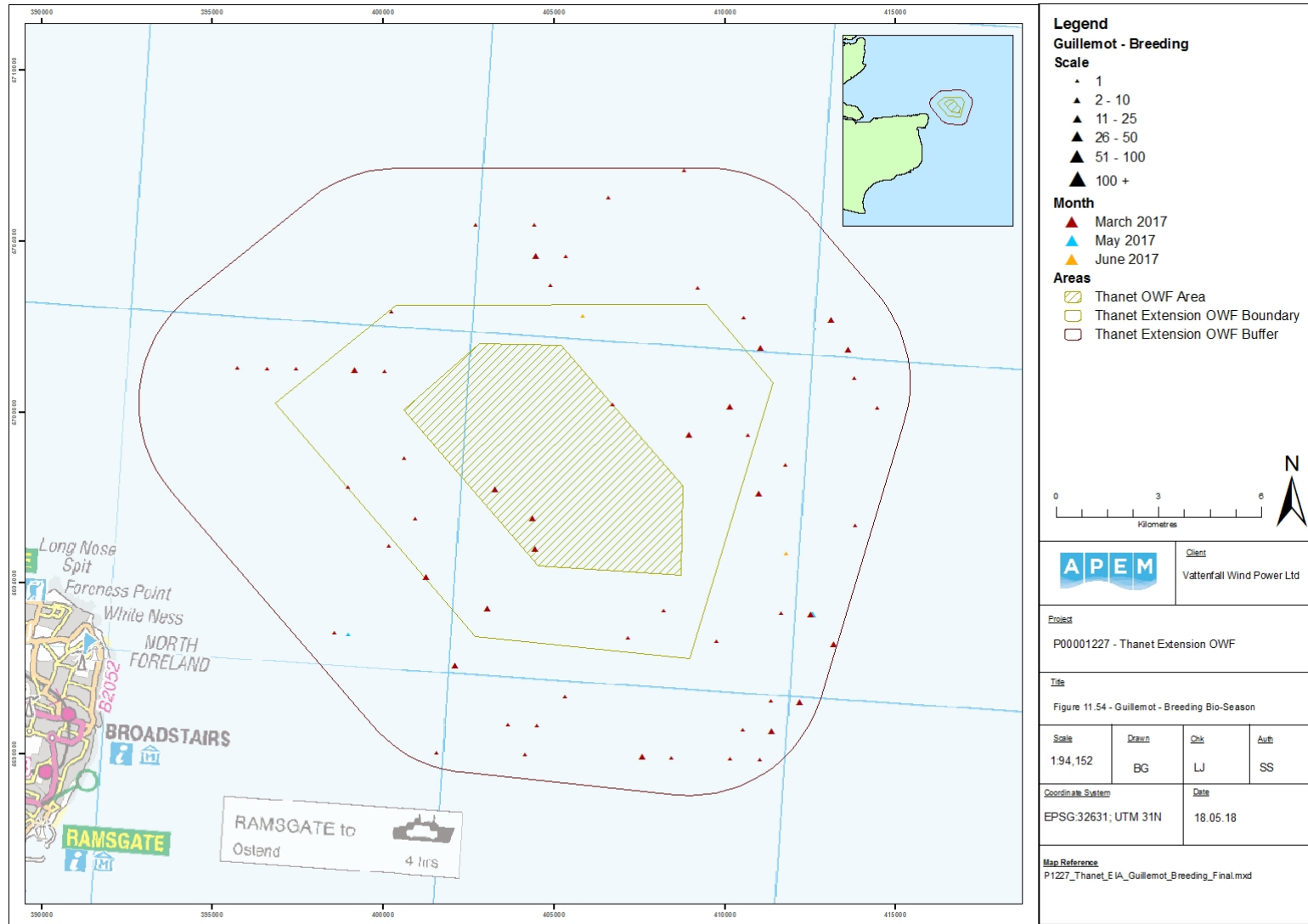
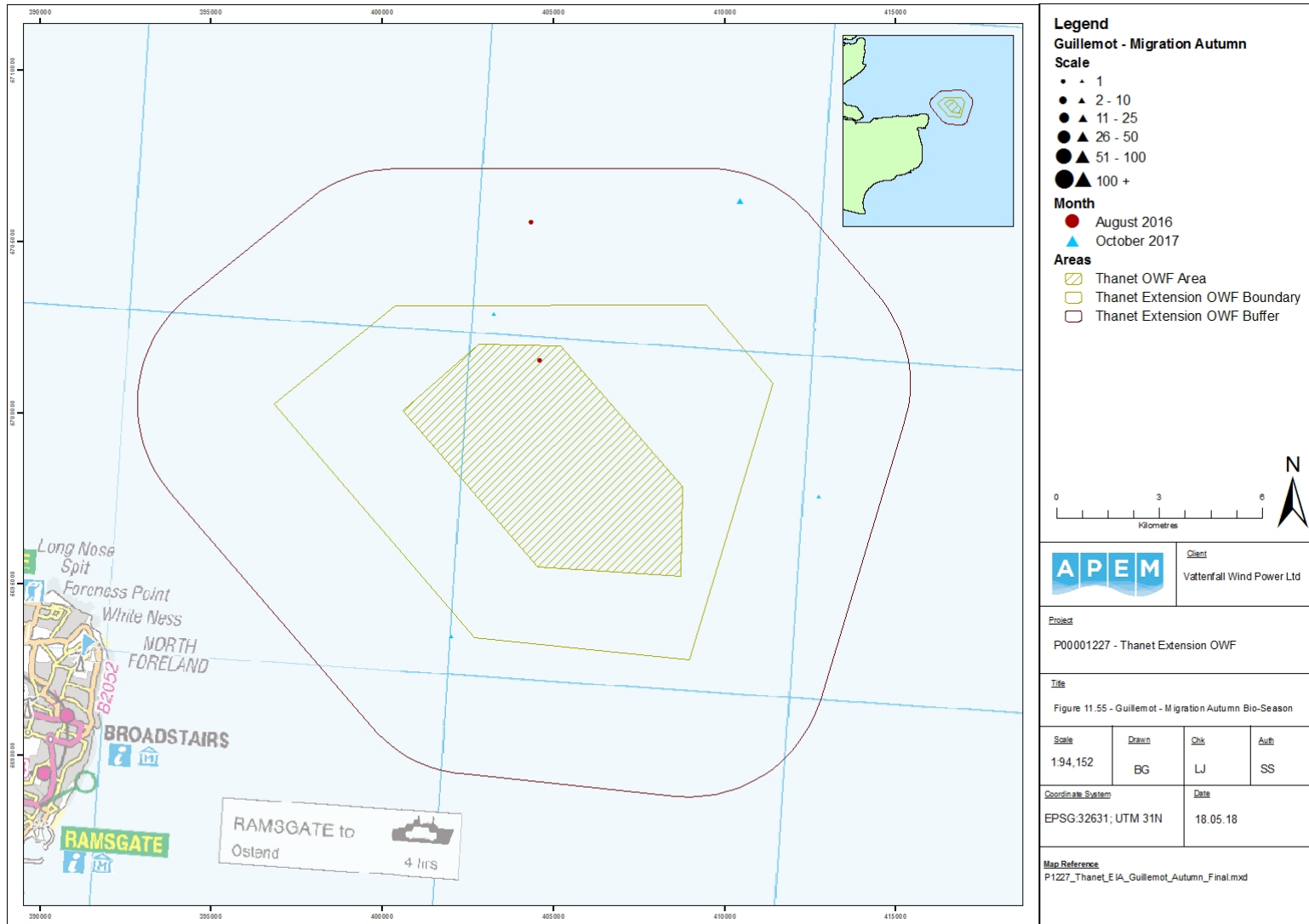


Figure 11.55

Guillemot (Migration-autumn bio-season)



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Figure 11.56

Guillemot (Winter bio-season)

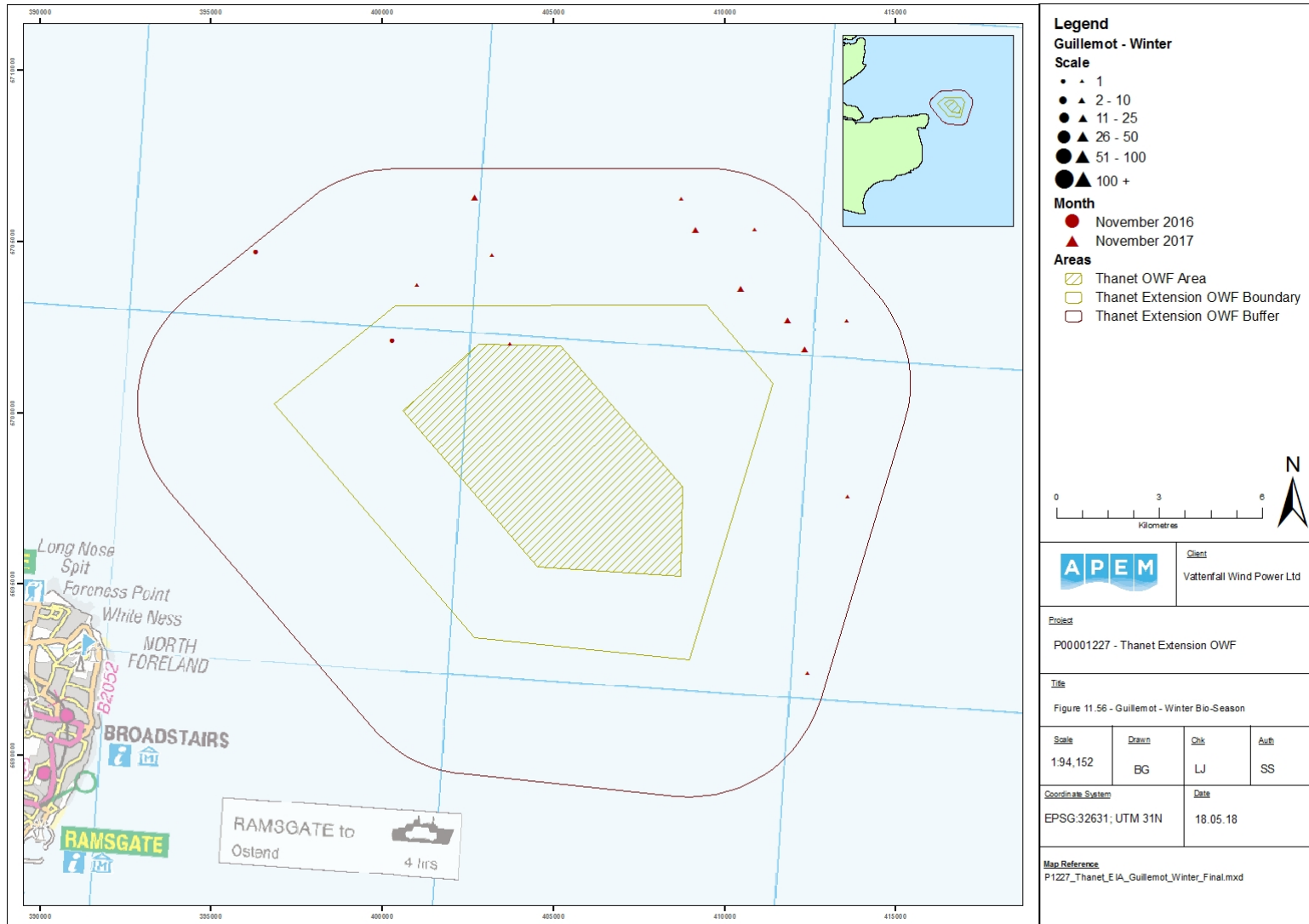


Figure 11.57

Guillemot and / or razorbill (Migration free breeding bio-season)

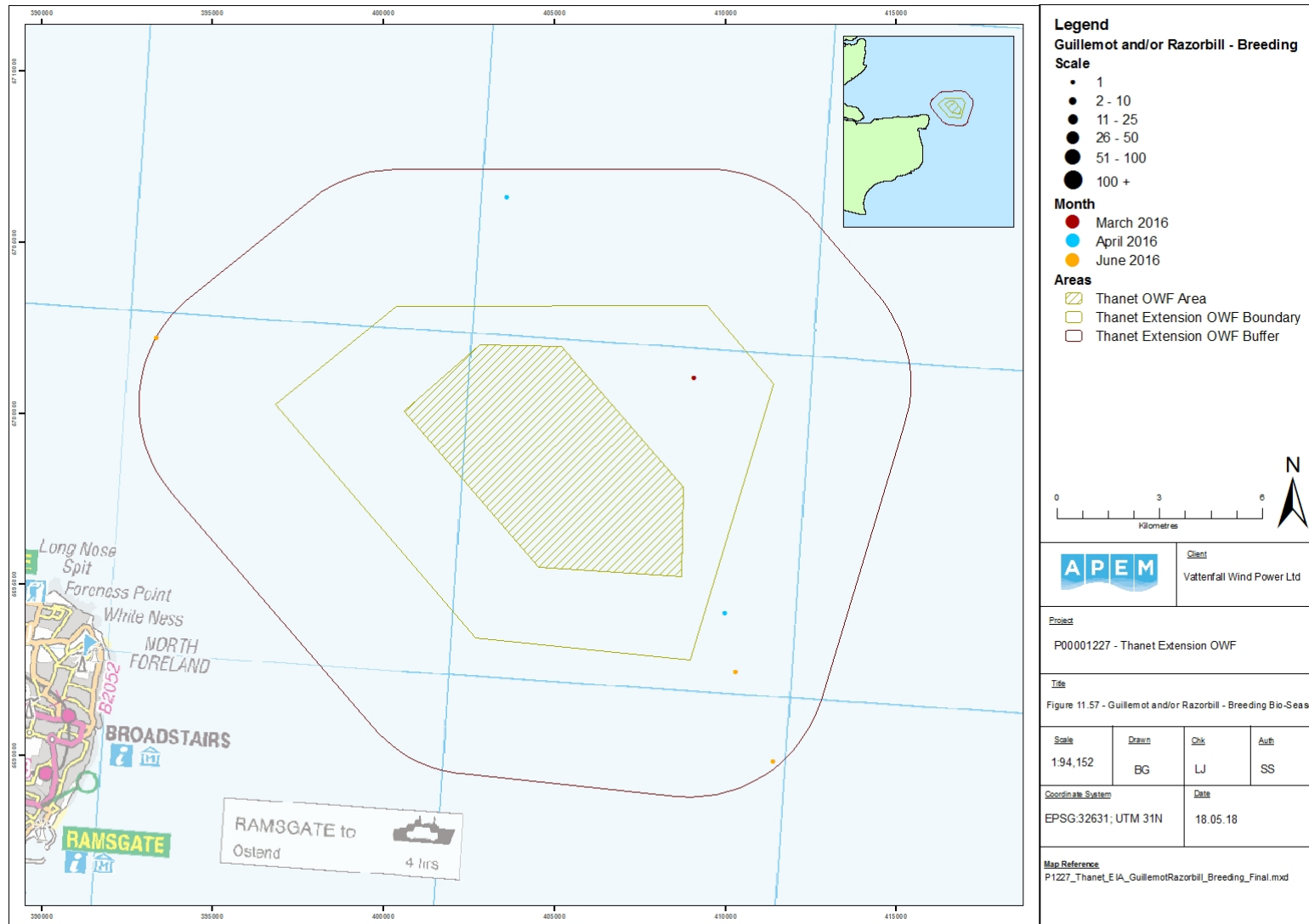
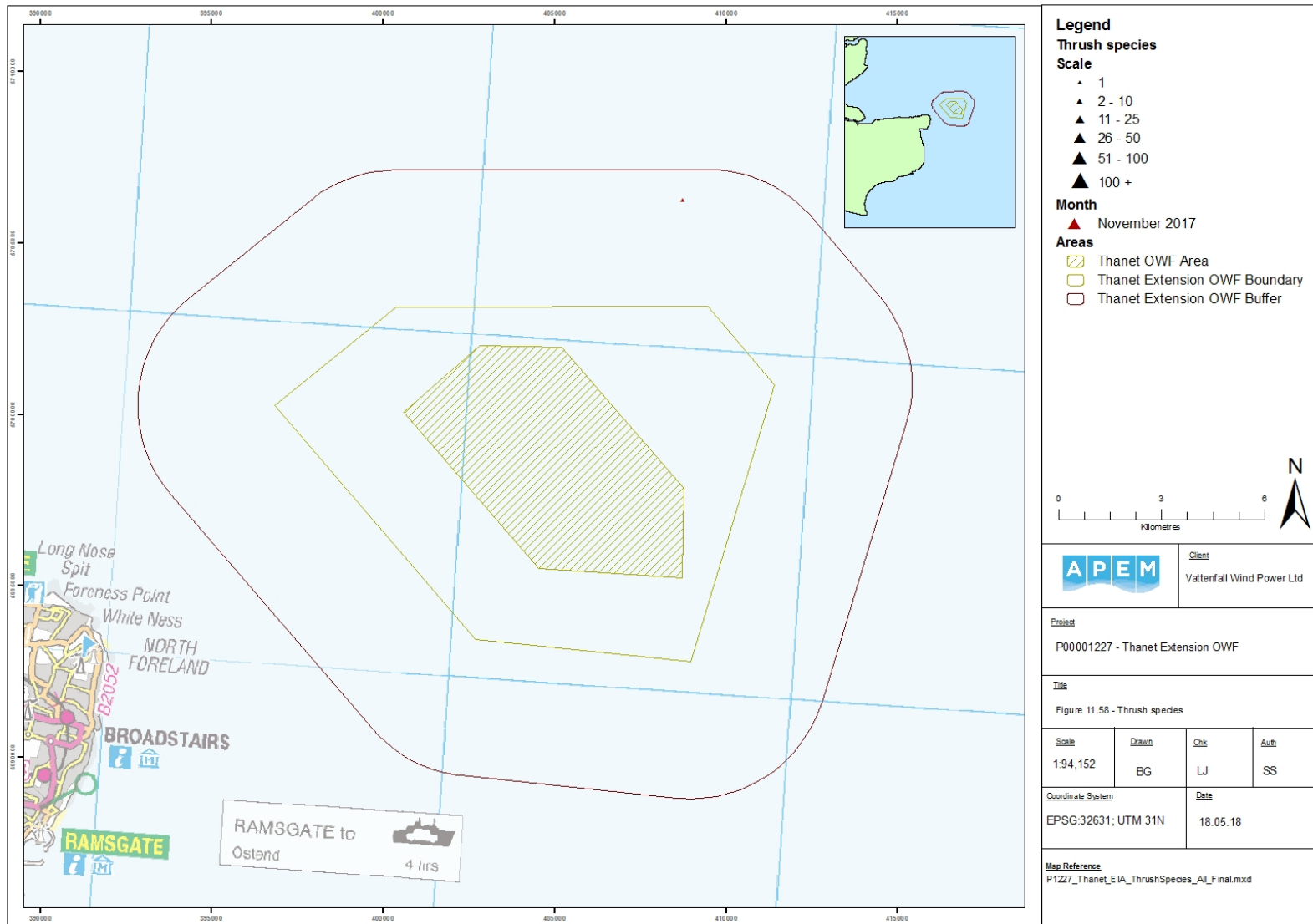


Figure 11.58 Thrush species (November 2017)



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Appendix 12 Age Classification of Key Bird Species

Appendix 12 provides information on the methodology APEM uses to age gannets, kittiwakes and large gulls from digital still imagery. The proportion of adult individuals per species per month is presented in Table 7.

High resolution digital aerial imagery is able to identify most birds to species level given a suitable resolution (expressed as X cm ground sample distance). The only regular exception for surveys in the North Sea is differentiating between common and Arctic tern. High resolution digital aerial imagery is also able to differentiate between the different plumages shown by seabird species as they progress from immature to full adult plumage. For each of these species example images have been provided. It should be noted that the actual image quality is superior to these compressed and cropped examples included in this document.

Gannet

APEM can identify 100% of gannets encountered during our aerial digital surveys at both 2 cm and 3 cm GSD resolution.

Separation of adults from sub-adults, both in flight and sitting on the water surface, is relatively straightforward.

For gannets in flight APEM can identify all age groups, possibly with the exception of fifth year birds as seeing the blackish central tail feathers maybe difficult even with 2 cm resolution. No fifth year gannets were recorded in the surveys of Thanet Extension Offshore Windfarm. Juvenile or first year (top left, Plate 1) can be separated from second year (top right, Plate 1) by the amount of white that is visible. The juvenile fully brown plumage (top left, Plate 1) can be compared in the example below to the second year bird (top right, Plate 1) which shows white head and white forewing patches. First year birds can show slightly more white around the neck and forewing than juveniles, but this can vary considerably in gannets. Adult gannets (bottom right, Plate 1) are obvious with yellow heads clearly visible. It is also possible to separate third year (bottom left, Plate 1) and fourth year gannet, based on the reduced amount of black in the upperparts of fourth year birds.



Plate 1 Flying gannets of different ages captured in digital still imagery (GSD 2 cm)

Ageing gannets sitting on the water is slightly more difficult than in flight when birds have their wings outstretched. For swimming birds APEM can positively identify the following age groups: adults (top left, Plate 2), fourth years, third years, second years (top right, Plate 2), first years and juveniles. Separating third and fourth year is slightly less certain than the other age groups but varying amounts of black on the upperparts is used for separation. Any fifth year birds sitting on the water are likely to be grouped with adults as few black primaries and any black on the tail feathers is unlikely to be visible.

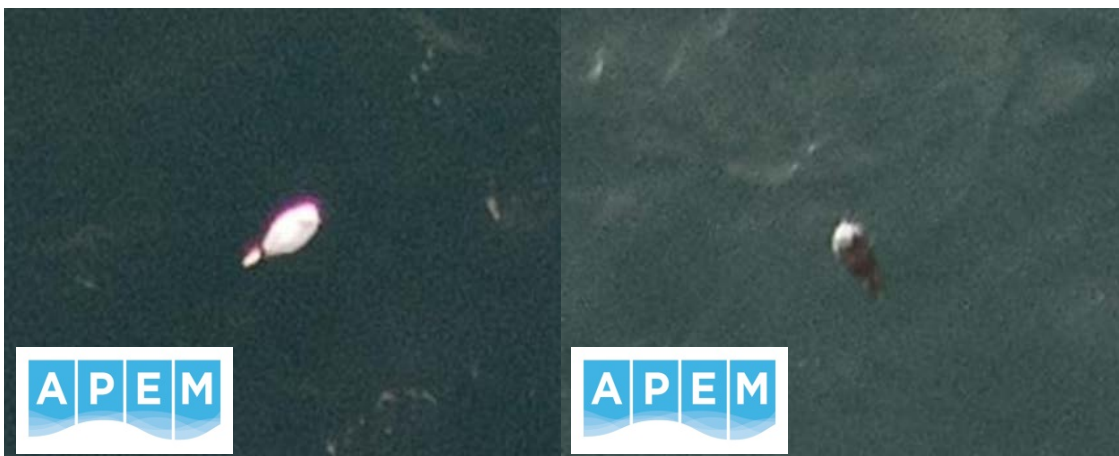


Plate 2 Sitting gannets of different ages captured in digital still imagery (GSD 2 cm)

Age categories of gannets used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 1.

Table 1 Gannet age class

Age of gannet	APEM age category – sitting and flying birds
Adult	Adult
Fifth year	
Fourth year	Fourth year
Third year	Third year
Second year	Second year
First year	First year
Juvenile	Juvenile

Common gull

Common gulls are identifiable by the distinct colouration and wing tip shape. The species is distinguished from herring gull by their smaller size.

In flight APEM can identify both adults (left, Plate 3) and juveniles (right, Plate 3). Juveniles are identified by their slightly darker colouration. Age categories of common gulls used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 2.

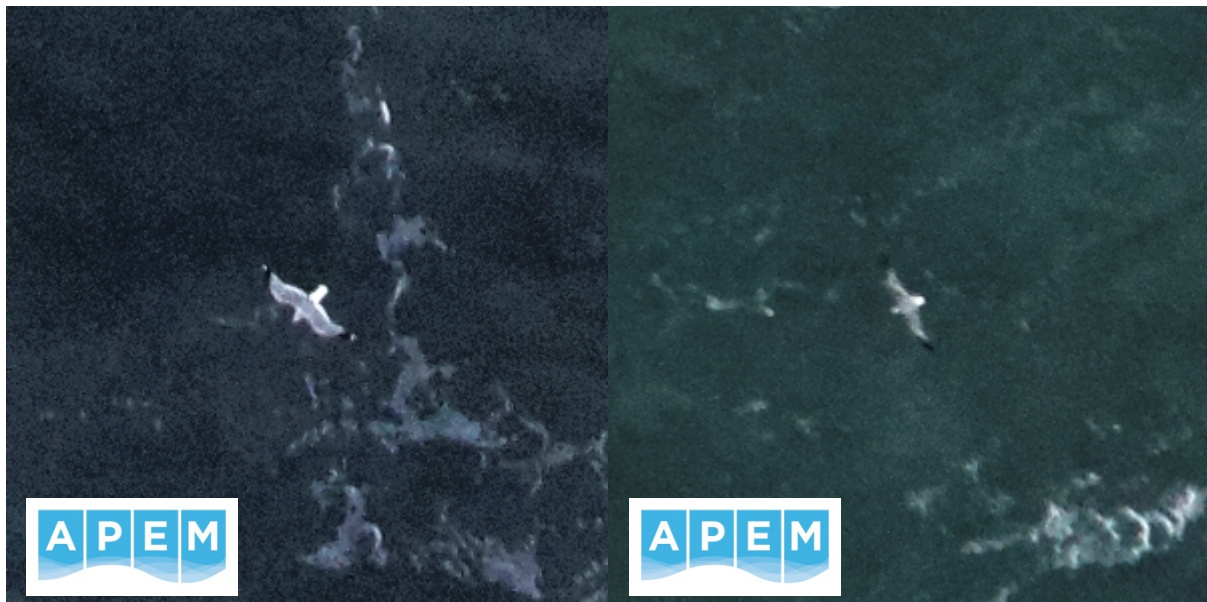


Plate 3 Flying common gulls of different ages captured in digital still imagery (GSD 2 cm)

Table 2 Common gull age class

Age of common gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Second year		Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

Kittiwake

Kittiwakes are the easiest small gull to identify in flight with very distinctive shape and wing tips.

In flight APEM can readily identify both adults (below left, Plate 4) and first years (below right, Plate 4) and with good image quality and higher resolution (i.e. 2 cm GSD) separation between juveniles and first years is possible (the juvenile's black neck collar can be seen from above).

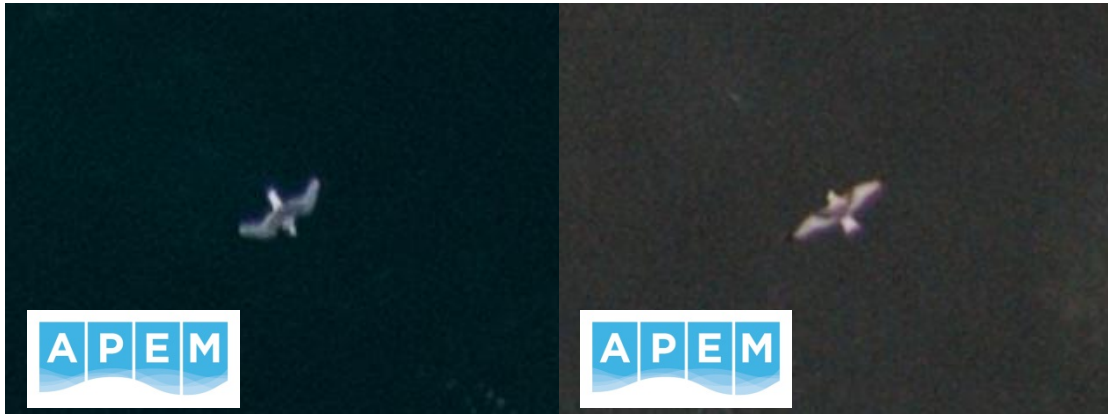


Plate 4 Flying kittiwakes of different ages captured in digital still imagery (GSD 2 cm)

Sitting adults viewed from above (below left, Plate 5) are distinctive, showing a light grey back with white either side and usually the black wing tips are not visible. Separation of sitting adults from immature birds is difficult at any resolution, and only realistically possible with good quality 2 cm GSD imagery. First years (below right, Plate 5) tend to show black around the back of the neck or darker looking upperparts, though these features are not always visible.

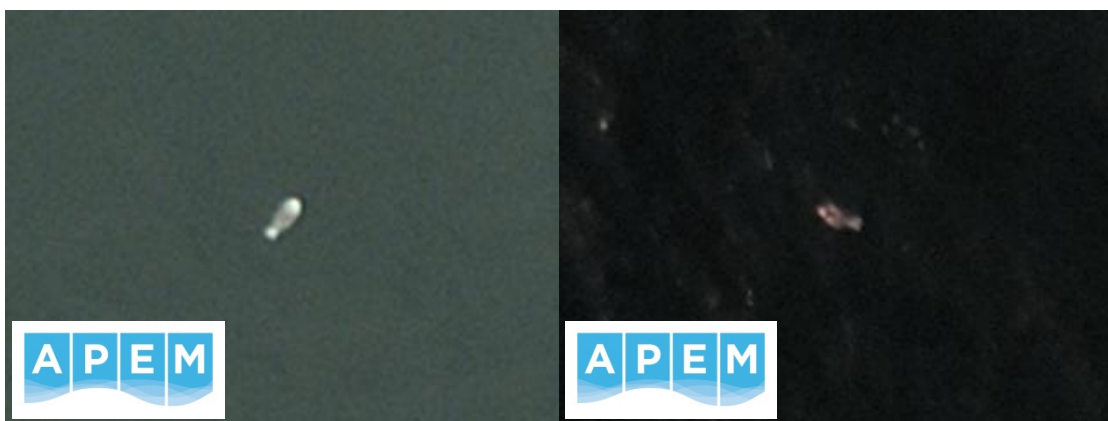


Plate 5 Sitting kittiwakes of different ages captured in digital still imagery (GSD 2 cm)

Age categories of kittiwakes used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 3.

Table 3 Kittiwake age class

Age of kittiwake	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Second year		Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

Lesser black-backed gull

As well as the visible plumage features, APEM’s accurate in house measuring tool is one the best techniques to separate sitting and flying lesser black-backed gulls from the larger great black-backed gulls.

In flight, identification of all age groups is straightforward as seen in the example images below. The adult bird (below right, Plate 6) has grey uniform upperparts and black wing tips with white mirrors visible and the immature birds (first year, below left, Plate 6) have dark brown upperparts, white rump, black tail band and dark wing tips without mirrors. All age classes can be identified in flight.

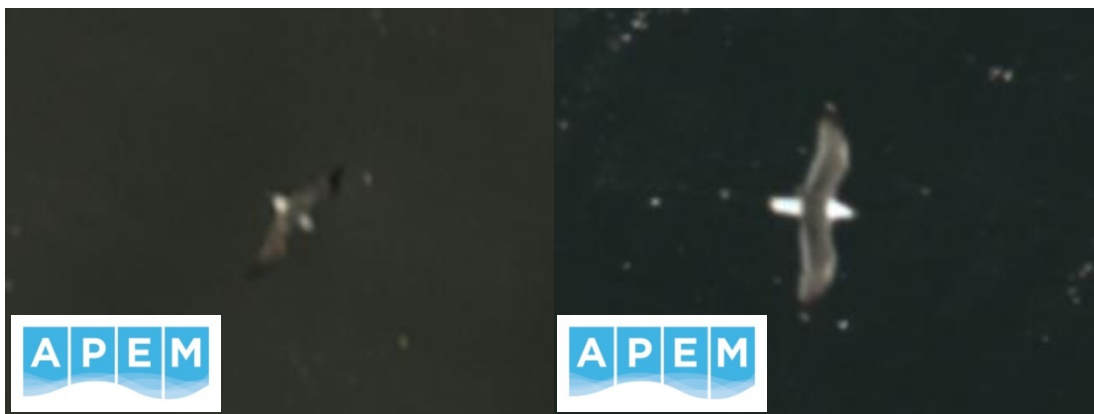


Plate 6 Flying lesser black-backed gulls of different ages captured in digital still imagery (GSD 2 cm)

Sitting juvenile lesser black-backed gulls can often be difficult to separate from juvenile herring gulls but are usually darker in appearance. APEM can positively identify juveniles, first years, second years and adults but attempting to separate third years from adults can be difficult.

Age categories of lesser black-backed gulls used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 4.

Table 4 Lesser black-backed gull age class

Age of lesser black-backed gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Third year		Third year
Second year	Second year	Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

Herring gull

For herring gulls in flight, APEM can identify all the age groups. Adults from above display broad uniform light grey wings (below right, Plate 7) and immature birds show larger black wing tips without white mirrors with varying amounts of brown juvenile plumage (below left, Plate 7).



Plate 7 Flying herring gulls of different ages captured in digital still imagery (GSD 2 cm)

Like the other gulls, sitting birds offer greater identification challenges, though the adults grey upperparts are distinctive (below left, Plate 8). Sitting herring gulls consistently measure around 45 cm body lengths, which is a valuable aid in separating juvenile birds from juvenile great black-backed gulls. APEM can readily identify juveniles (below right, Plate 8) which display a uniformly brown back and mottled brown head. The only potential pitfall is separating sitting third year birds from adults so these are likely to be recorded as adults.

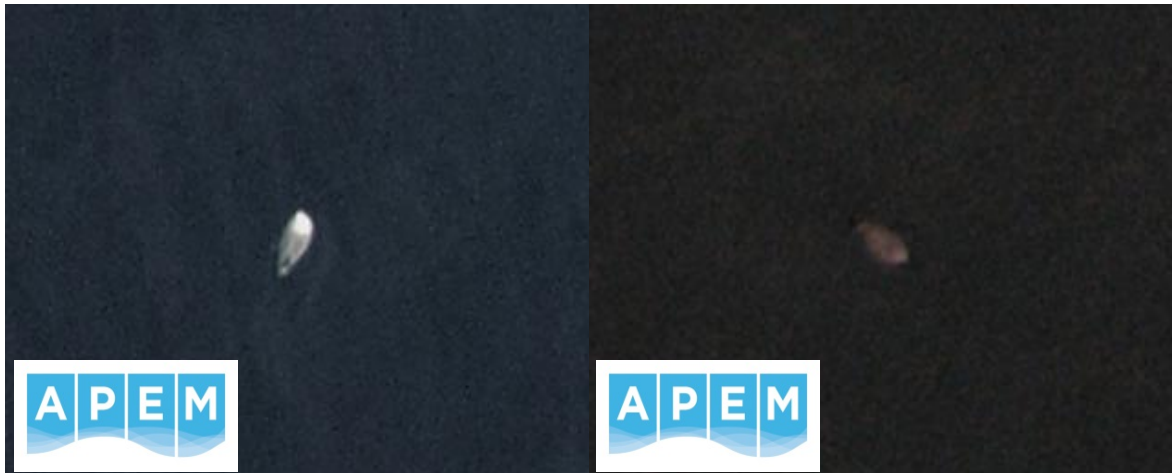


Plate 8 Sitting herring gulls of different ages captured in digital still imagery (GSD 2 cm)

Age categories of herring gulls used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 5.

Table 5 Herring gull age class

Age of herring gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Third year		Third year
Second year	Second year	Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

Great black-backed gull

The easiest large gull to identify and separated from lesser black-backed gull on size.

In flight the following ages can be readily identified: juvenile, first year, second year, third year and adults. The adults are very distinctive (below left, Plate 9), with black upperparts and small white mirrors. First and second year birds (below right, Plate 9) are easily classified by light brown upperparts becoming darker towards the wing tips, white head, and pale tail with dark tail band.



Plate 9 Flying great black-backed gulls of different ages captured in digital still imagery (GSD 2 cm)

Sitting birds on the water tend to show varying amounts of brown from juveniles (bottom right, Plate 10) to the very dark black backed adults (below left, Plate 10). The only age that there may be difficulty in identifying is sitting third years as plumage-wise they will be very similar to adults.



Plate 10 Sitting great black-backed gulls of different ages captured in digital still imagery (GSD 2 cm)

Age categories of great black-backed gulls used in the data tables produced by APEM of its analysed high resolution aerial images are provided in Table 6.

Table 6 Great black-backed gull age class

Age of great black-backed gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Third year		Third year
Second year	Second year	Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

Table 7 Proportion of adult gannets, lesser black-backed gulls, herring gulls, great black-backed gulls, kittiwakes and common gulls recorded in the Thanet Extension and 4 km Buffer from 24 months data (March 2016 to February 2018)

Month	Gannet			Lesser black-backed gull			Herring gull			Great black-backed gull			Kittiwake			Common gull		
	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)
Mar-16	0	1	100	0	0	-	1	3	75	1	1	50	0	1	100	2	15	88
Apr-16	0	0	-	0	46	100	2	118	98	0	8	100	0	1	100	0	6	100
May-16	0	1	100	0	4	100	0	5	100	0	0	-	0	3	100	0	0	-
Jun-16	0	0	-	0	3	100	0	1	100	0	0	-	0	0	-	0	0	-
Jul-16	1	0	0	1	0	0	0	0	-	0	0	-	0	0	-	0	0	-
Aug-16	0	0	-	0	0	-	4	0	0	0	0	-	0	0	-	2	0	0
Sep-16	0	0	-	0	0	-	0	0	-	0	4	100	0	0	-	0	1	100
Oct-16	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
Nov-16	0	19	100	0	2	100	0	0	-	0	7	100	0	2	100	0	0	-
Dec-16	0	3	100	0	1	100	8	10	56	4	5	56	0	10	100	0	4	100
Jan-17	0	0	-	0	6	100	0	3	100	0	7	100	0	9	100	0	3	100
Feb-17	1	67	99	1	0	0	4	4	50	1	26	96	7	18	72	1	10	91
Mar-17	0	107	100	1	4	80	0	0	-	0	5	100	3	13	81	1	9	90
Apr-17	0	0	-	0	2	100	2	6	75	0	2	100	0	4	100	8	2	20
May-17	0	0	-	1	0	0	0	2	100	0	3	100	0	2	100	0	1	100
Jun-17	0	0	-	0	1	100	0	2	100	0	0	-	0	1	100	0	0	-
Jul-17	1	2	67	0	1	100	0	0	-	0	0	-	0	0	-	0	0	-
Aug-17	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
Sep-17	0	0	-	0	0	-	0	0	-	0	0	-	2	1	33	0	0	-
Oct-17	0	1	100	0	1	100	0	0	-	3	12	80	0	2	100	0	0	-
Nov-17	0	66	100	0	0	-	0	2	100	2	2	50	0	3	100	0	0	-
Dec-17	0	1	100	1	1	50	2	3	60	0	20	100	1	25	96	5	3	38

Month	Gannet			Lesser black-backed gull			Herring gull			Great black-backed gull			Kittiwake			Common gull		
	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)	Juvenile & Sub-adult	Adults	Adults (%)
Jan-18	0	52	100	0	0	-	0	0	-	3	7	70	9	52	85	0	3	100
Feb-18	0	3	100	0	1	100	0	6	100	0	13	100	2	3	60	1	0	0

Common scoter

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	3	13	n/a	n/a	n/a	0.06	3	13	n/a	n/a	n/a	0.06

Gannet

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	2	10	n/a	n/a	n/a	0.29	2	9	n/a	n/a	n/a	0.26	4	19	n/a	n/a	n/a	0.54
Feb 2016	0	0	n/a	n/a	n/a	0.00	4	17	n/a	n/a	n/a	0.49	4	17	n/a	n/a	n/a	0.49
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	7	30	n/a	n/a	n/a	0.41	7	30	n/a	n/a	n/a	0.41
Feb 2016	4	18	n/a	n/a	n/a	0.25	9	38	n/a	n/a	n/a	0.52	13	56	n/a	n/a	n/a	0.77
Mar 2016	0	0	n/a	n/a	n/a	0.00	7	26	n/a	n/a	n/a	0.36	7	26	n/a	n/a	n/a	0.36
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	15	71	n/a	n/a	n/a	0.34	15	71	n/a	n/a	n/a	0.34
Feb 2016	9	47	n/a	n/a	n/a	0.22	35	162	n/a	n/a	n/a	0.77	44	209	n/a	n/a	n/a	0.99
Mar 2016	1	5	n/a	n/a	n/a	0.02	23	103	n/a	n/a	n/a	0.49	24	108	n/a	n/a	n/a	0.51

Arctic skua

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
Feb 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
Mar 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
Feb 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
Mar 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0
Feb 2016	1	5	n/a	n/a	n/a	0.02	0	0	n/a	n/a	n/a	0	1	5	n/a	n/a	n/a	0.02
Mar 2016	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	0

Kittiwake

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	3	14	n/a	n/a	n/a	0.40	3	14	n/a	n/a	n/a	0.40
Feb 2016	12	75	n/a	n/a	n/a	2.14	6	26	n/a	n/a	n/a	0.74	18	101	n/a	n/a	n/a	2.89
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	3	17	n/a	n/a	n/a	0.23	1	4	n/a	n/a	n/a	0.05	4	21	n/a	n/a	n/a	0.29
Feb 2016	3	17	n/a	n/a	n/a	0.23	20	85	n/a	n/a	n/a	1.16	23	102	n/a	n/a	n/a	1.40
Mar 2016	0	0	n/a	n/a	n/a	0.00	1	4	n/a	n/a	n/a	0.05	1	4	n/a	n/a	n/a	0.05
4 km Buffer																		
Jan 2016	5	34	n/a	n/a	n/a	0.16	24	114	n/a	n/a	n/a	0.54	29	148	n/a	n/a	n/a	0.70
Feb 2016	185	1,234	n/a	n/a	n/a	5.83	38	176	n/a	n/a	n/a	0.83	223	1,410	n/a	n/a	n/a	6.66
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00

Herring gull

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	5	23	n/a	n/a	n/a	0.66	5	23	n/a	n/a	n/a	0.66
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	1	4	n/a	n/a	n/a	0.11	4	15	n/a	n/a	n/a	0.43	5	19	n/a	n/a	n/a	0.54
TEOWF																		
Jan 2016	5	19	n/a	n/a	n/a	0.26	11	47	n/a	n/a	n/a	0.64	16	66	n/a	n/a	n/a	0.90
Feb 2016	0	0	n/a	n/a	n/a	0.00	7	30	n/a	n/a	n/a	0.41	7	30	n/a	n/a	n/a	0.41
Mar 2016	7	27	n/a	n/a	n/a	0.37	13	48	n/a	n/a	n/a	0.66	20	75	n/a	n/a	n/a	1.03
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	15	71	n/a	n/a	n/a	0.34	15	71	n/a	n/a	n/a	0.34
Feb 2016	3	13	n/a	n/a	n/a	0.06	20	93	n/a	n/a	n/a	0.44	23	106	n/a	n/a	n/a	0.5
Mar 2016	42	186	n/a	n/a	n/a	0.88	37	166	n/a	n/a	n/a	0.78	79	352	n/a	n/a	n/a	1.66

Great black-backed gull

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	2	9	n/a	n/a	n/a	0.26	2	9	n/a	n/a	n/a	0.26
Feb 2016	0	0	n/a	n/a	n/a	0.00	1	4	n/a	n/a	n/a	0.11	1	4	n/a	n/a	n/a	0.11
Mar 2016	1	6	n/a	n/a	n/a	0.17	3	11	n/a	n/a	n/a	0.31	4	17	n/a	n/a	n/a	0.49
TEOWF																		
Jan 2016	5	27	n/a	n/a	n/a	0.37	8	34	n/a	n/a	n/a	0.47	13	61	n/a	n/a	n/a	0.84
Feb 2016	0	0	n/a	n/a	n/a	0.00	7	30	n/a	n/a	n/a	0.41	7	30	n/a	n/a	n/a	0.41
Mar 2016	7	38	n/a	n/a	n/a	0.52	5	18	n/a	n/a	n/a	0.25	12	56	n/a	n/a	n/a	0.77
4 km Buffer																		
Jan 2016	4	25	n/a	n/a	n/a	0.12	10	48	n/a	n/a	n/a	0.23	14	73	n/a	n/a	n/a	0.34
Feb 2016	6	38	n/a	n/a	n/a	0.18	12	56	n/a	n/a	n/a	0.26	18	94	n/a	n/a	n/a	0.44
Mar 2016	17	107	n/a	n/a	n/a	0.51	28	126	n/a	n/a	n/a	0.60	45	233	n/a	n/a	n/a	1.10

Razorbill

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	18	92	n/a	n/a	n/a	1.26	1	4	n/a	n/a	n/a	0.05	19	96	n/a	n/a	n/a	1.32
Feb 2016	7	36	n/a	n/a	n/a	0.49	0	0	n/a	n/a	n/a	0.00	7	36	n/a	n/a	n/a	0.49
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	35	209	n/a	n/a	n/a	0.99	9	43	n/a	n/a	n/a	0.20	44	252	n/a	n/a	n/a	1.19
Feb 2016	8	47	n/a	n/a	n/a	0.22	0	0	n/a	n/a	n/a	0.00	8	47	n/a	n/a	n/a	0.22
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00

Guillemot

Survey	Sitting						Flying						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km ⁻²)
TOWF																		
Jan 2016	4	36	4	353	59.63	1.03	0	0	n/a	n/a	n/a	0.00	4	36	n/a	n/a	n/a	1.03
Feb 2016	42	775	217	2764	70.11	22.14	0	0	n/a	n/a	n/a	0.00	42	775	n/a	n/a	n/a	22.14
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	40	291	70	1,214	57.69	3.99	0	0	n/a	n/a	n/a	0.00	40	291	n/a	n/a	n/a	3.99
Feb 2016	49	795	254	2,485	62.91	10.89	3	13	n/a	n/a	n/a	0.18	52	808	n/a	n/a	n/a	11.07
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	86	749	466	1,204	22.2	3.54	3	14	n/a	n/a	n/a	0.07	89	763	n/a	n/a	n/a	3.60
Feb 2016	165	2,507	755	8,330	66.86	11.84	13	60	n/a	n/a	n/a	0.28	178	2,567	n/a	n/a	n/a	12.12
Mar 2016	0	0	n/a	n/a	n/a	0.00	1	4	n/a	n/a	n/a	0.02	1	4	n/a	n/a	n/a	0.02

Harbour porpoise

Survey	Submerged						Surfacing						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	3	10	n/a	n/a	n/a	0.29	3	10	n/a	n/a	n/a	0.29
Feb 2016	0	0	n/a	n/a	n/a	0.00	1	3	n/a	n/a	n/a	0.09	1	3	n/a	n/a	n/a	0.09
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	2	6	n/a	n/a	n/a	0.08	2	6	n/a	n/a	n/a	0.08
Feb 2016	0	0	n/a	n/a	n/a	0.00	1	3	n/a	n/a	n/a	0.04	1	3	n/a	n/a	n/a	0.04
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	6	22	n/a	n/a	n/a	0.10	6	22	n/a	n/a	n/a	0.10
Feb 2016	0	0	n/a	n/a	n/a	0.00	22	82	n/a	n/a	n/a	0.39	22	82	n/a	n/a	n/a	0.39
Mar 2016	0	0	n/a	n/a	n/a	0.00	4	15	n/a	n/a	n/a	0.07	4	15	n/a	n/a	n/a	0.07

Grey seal

Survey	Submerged						Surfacing						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	1	3	n/a	n/a	n/a	0.09	1	3	n/a	n/a	n/a	0.09
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	1	3	n/a	n/a	n/a	0.04	1	3	n/a	n/a	n/a	0.04
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	1	4	n/a	n/a	n/a	0.02	1	4	n/a	n/a	n/a	0.02

Seal species

Survey	Submerged						Surfacing						Total					
	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)	Count	Abundance Estimate	Lower Confidence Limit	Upper Confidence Limit	Precision (CV)	Density (birds km-2)
TOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
TEOWF																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
4 km Buffer																		
Jan 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00
Feb 2016	0	0	n/a	n/a	n/a	0.00	1	4	n/a	n/a	n/a	0.02	1	4	n/a	n/a	n/a	0.02
Mar 2016	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00	0	0	n/a	n/a	n/a	0.00

Appendix 14 Apportioned Boat-based Survey Data Abundance & Density Estimates (TOWF, TEOF & 4 km Buffer)

Red-throated diver

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
TOWF						
Jan 2016	0	0.00	0	0.00	0	0.00
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	0	0.00	0	0.00	0	0.00
TEOWF						
Jan 2016	0	0.00	21	0.29	21	0.29
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	5	0.07	14	0.19	19	0.26
4 km Buffer						
Jan 2016	0	0.00	64	0.27	64	0.27
Feb 2016	172	0.72	36	0.15	208	0.87
Mar 2016	53	0.22	28	0.12	81	0.34

Note: Bold numbers highlight those subject to apportionment.

Common gull

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	0	0.00	21	0.60	21	0.60
Feb 2016	8	0.23	0	0	8	0.23
Mar 2016	0	0.00	14	0.40	14	0.40
TEOWF						
Jan 2016	14	0.19	7	0.10	21	0.29
Feb 2016	0	0.00	0	0	0	0.00
Mar 2016	28	0.38	7	0.10	35	0.48
4 km Buffer						
Jan 2016	8	0.03	50	0.21	58	0.24
Feb 2016	0	0.00	42	0.18	42	0.18
Mar 2016	183	0.77	92	0.39	275	1.16

Note: Bold numbers highlight those subject to apportionment.

Kittiwake

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	0	0.00	21	0.60	21	0.60
Feb 2016	75	2.15	42	1.20	117	3.35
Mar 2016	0	0.00	0	0.00	0	0.00
TEOWF						
Jan 2016	17	0.23	7	0.10	24	0.33
Feb 2016	17	0.23	141	1.94	158	2.17
*Mar 2016	0	0.00	7	0.10	7	0.10
4 km Buffer						
Jan 2016	35	0.15	170	0.71	205	0.86
Feb 2016	1,282	5.39	276	1.16	1,558	6.55
Mar 2016	0	0.00	0	0.00	0	0.00

Note: Bold numbers highlight those subject to apportionment.

*In this instance as apportionment added 0.14 birds it did not increase the total.

Herring gull

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)	Abundance Estimate	Density (birds km ⁻²)
TOWF						
Jan 2016	0	0.00	35	1.00	35	1.00
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	5	0.14	35	1.00	40	1.15
TEOWF						
Jan 2016	19	0.26	78	1.07	97	1.33
Feb 2016	0	0.00	50	0.69	50	0.69
Mar-16	28	0.38	95	1.31	123	1.69
4 km Buffer						
Jan 2016	0	0	130	0.55	130	0.55
Feb 2016	18	0.08	141	0.59	159	0.67
Mar 2016	193	0.81	285	1.20	478	2.01

Note: Bold numbers highlight those subject to apportionment.

Great black-backed gull

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	0	0.00	14	0.40	14	0.40
Feb 2016	0	0.00	7	0.20	7	0.20
Mar 2016	7	0.21	26	0.74	33	0.95
TEOWF						
Jan 2016	27	0.37	57	0.78	84	1.15
Feb 2016	0	0.00	50	0.69	50	0.69
Mar 2016	39	0.54	36	0.49	75	1.03
4 km Buffer						
Jan 2016	32	0.13	87	0.37	119	0.50
Feb 2016	39	0.16	92	0.39	131	0.55
Mar 2016	112	0.47	210	0.88	322	1.35

Note: Bold numbers highlight those subject to apportionment.

Lesser Black-backed gull

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	0	0.00	0	0.00	0	0.00
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	0	0.00	0	0.00	0	0.00
TEOWF						
Jan 2016	0	0.00	0	0.00	0	0.00
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	0	0.00	0	0.00	0	0.00
4 km Buffer						
Jan 2016	0	0.00	0	0.00	0	0.00
Feb 2016	0	0.00	7	0.03	7	0.03
Mar 2016	24	0.10	29	0.12	53	0.22

Razorbill

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	0	0.00	0	0.00	0	0.00
Feb 2016	0	0.00	0	0.00	0	0.00
Mar 2016	0	0.00	0	0.00	0	0.00
TEOWF						
Jan 2016	105	1.44	8	0.11	113	1.55
Feb 2016	37	0.51	0	0	37	0.51
Mar 2016	0	0.00	0	0.00	0	0.00
4 km Buffer						
Jan 2016	257	1.08	72	0.30	329	1.38
Feb 2016	51	0.21	0	0	51	0.21
Mar 2016	0	0.00	0	0.00	0	0.00

Note: Bold numbers highlight those subject to apportionment.

Guillemot

Survey	Sitting		Flying		Total	
	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)	Abundance Estimate	Density (birds km-2)
TOWF						
Jan 2016	22	0.63	0	0.00	22	0.63
Feb 2016	223	6.39	0	0.00	223	6.39
Mar 2016	0	0.00	0	0.00	0	0.00
TEOWF						
Jan-16	233	3.20	0	0	233	3.20
Feb-16	257	3.52	21	0.29	278	3.82
Mar 2016	0	0.00	0	0.00	0	0.00
4 km Buffer						
Jan 2016	601	2.53	24	0.10	625	2.63
Feb 2016	1,124	4.72	103	0.43	1,228	5.16
Mar 2016	0	0.00	7	0.03	7	0.03

Note: Bold numbers highlight those subject to apportionment.

Appendix 15 Distribution Maps of Birds in Boat-based Surveys

- Figure 15.1 Red-throated diver / diver species (January 2016)
- Figure 15.2 Red-throated diver / diver species (February 2016)
- Figure 15.3 Red-throated diver (March 2016)
- Figure 15.4 Fulmar (January, February & March 2016)
- Figure 15.5 Gannet (January 2016)
- Figure 15.6 Gannet (February 2016)
- Figure 15.7 Gannet (March 2016)
- Figure 15.8 Common gull (January 2016)
- Figure 15.9 Common gull (February 2016)
- Figure 15.10 Common gull (March 2016)
- Figure 15.11 Little gull (January 2016)
- Figure 15.12 Kittiwake (January 2016)
- Figure 15.13 Kittiwake (February 2016)
- Figure 15.14 Kittiwake (March 2016)
- Figure 15.15 Herring gull (January 2016)
- Figure 15.16 Herring gull (February 2016)
- Figure 15.17 Herring gull (March 2016)
- Figure 15.18 Great black-backed gull (January 2016)
- Figure 15.19 Great black-backed gull (February 2016)
- Figure 15.20 Great black-backed gull (March 2016)
- Figure 15.21 Lesser black-backed gull (February & March 2016)
- Figure 15.22 Large gull species (January, February & March 2016)
- Figure 15.23 Razorbill (January 2016)
- Figure 15.24 Razorbill (February 2016)
- Figure 15.25 Guillemot (January 2016)
- Figure 15.26 Guillemot (February 2016)

Figure 15.27 Guillemot (March 2016)

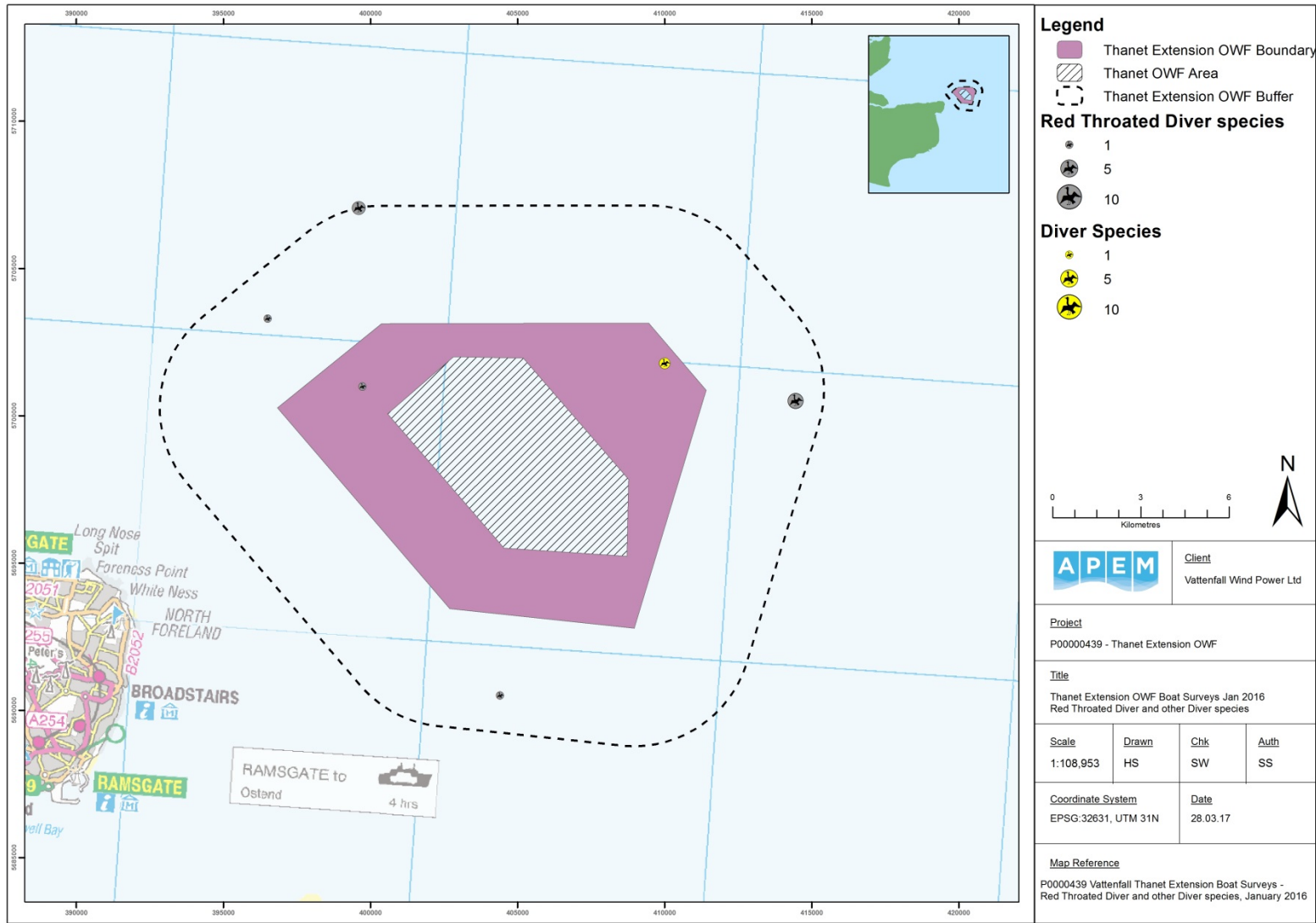
Figure 15.28 Auk species (January 2016)

Figure 15.29 Auk species (February 2016)

Figure 15.30 Other - Arctic Skua, black-headed gull & Mediterranean gull (February 2016)

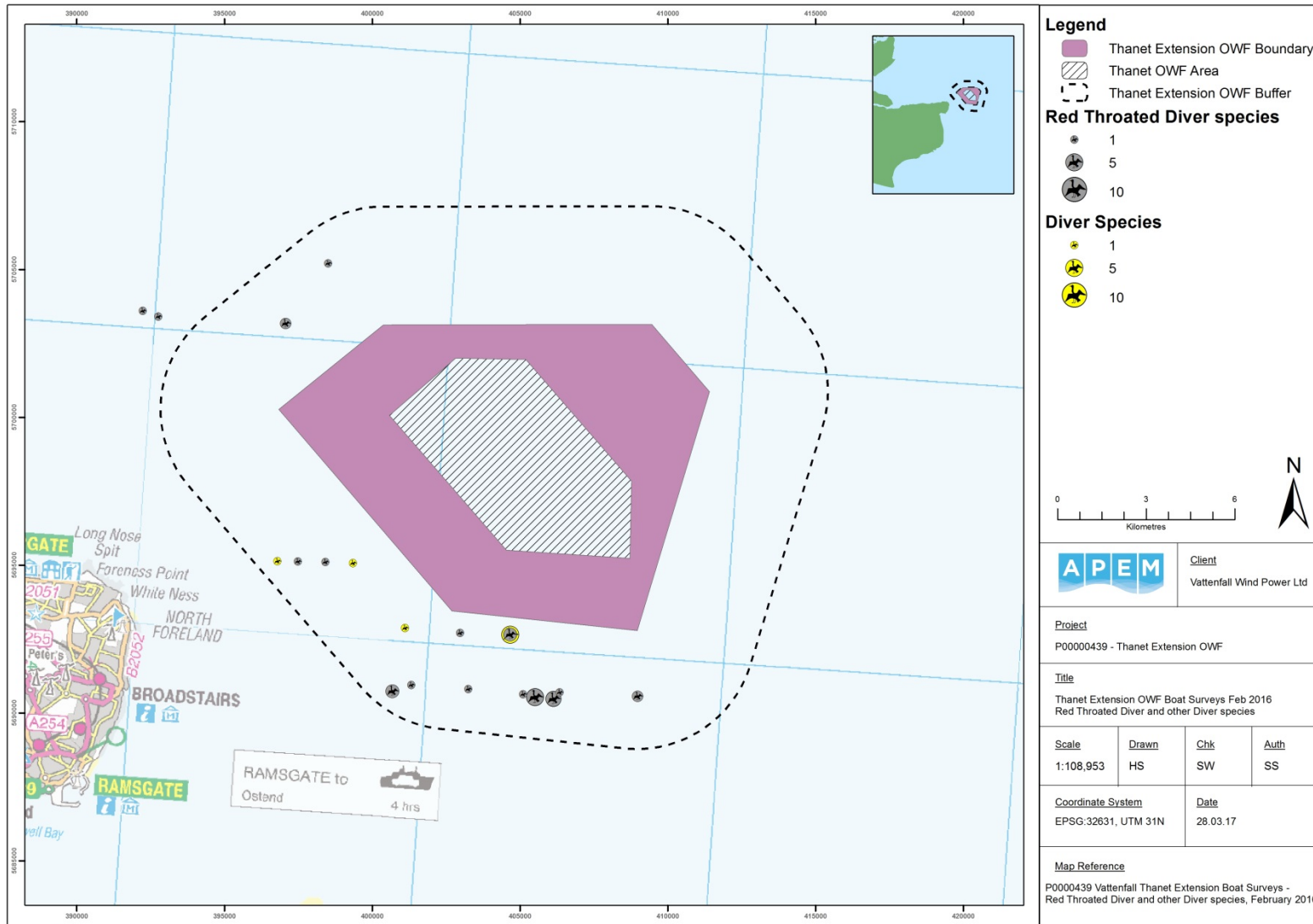
Figure 15.31 Other - Black-backed gull species, gulls species, common scoter, shelduck and brent goose (March 2016)

Figure 15.1 Red-throated diver (January 2016)



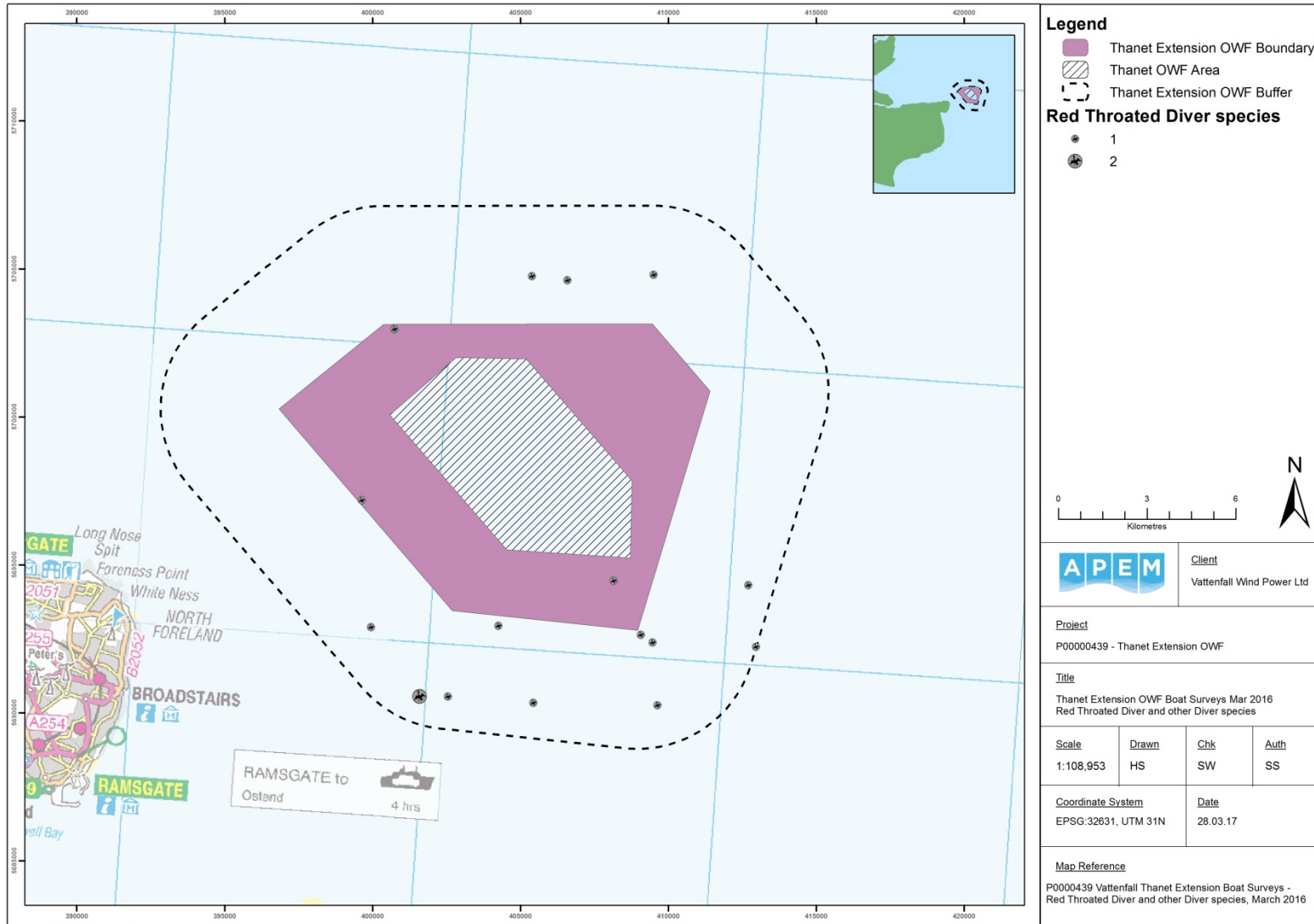
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Figure 15.2 Red-throated diver (February 2016)



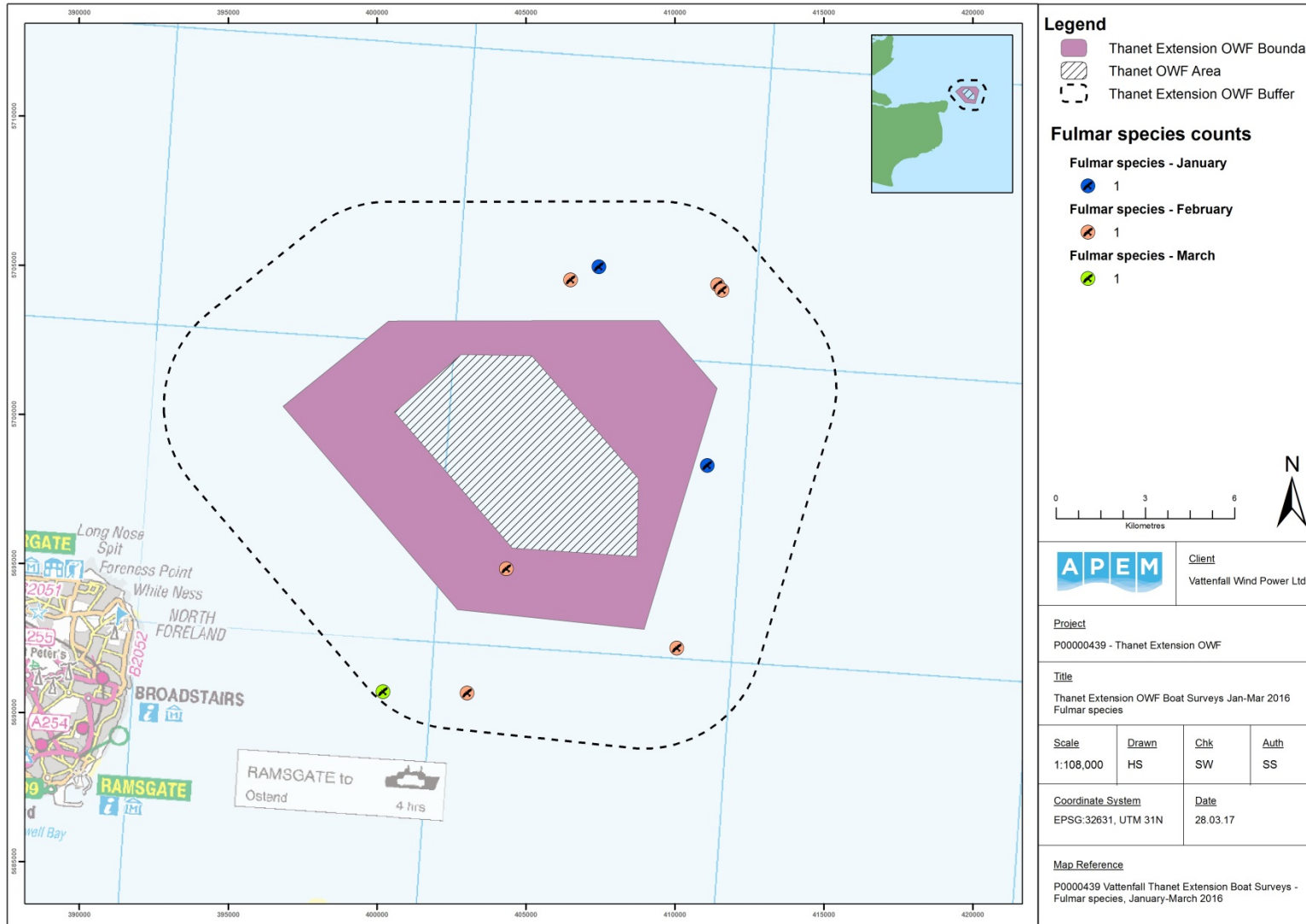
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Figure 15.3 Red-throated diver (March 2016)



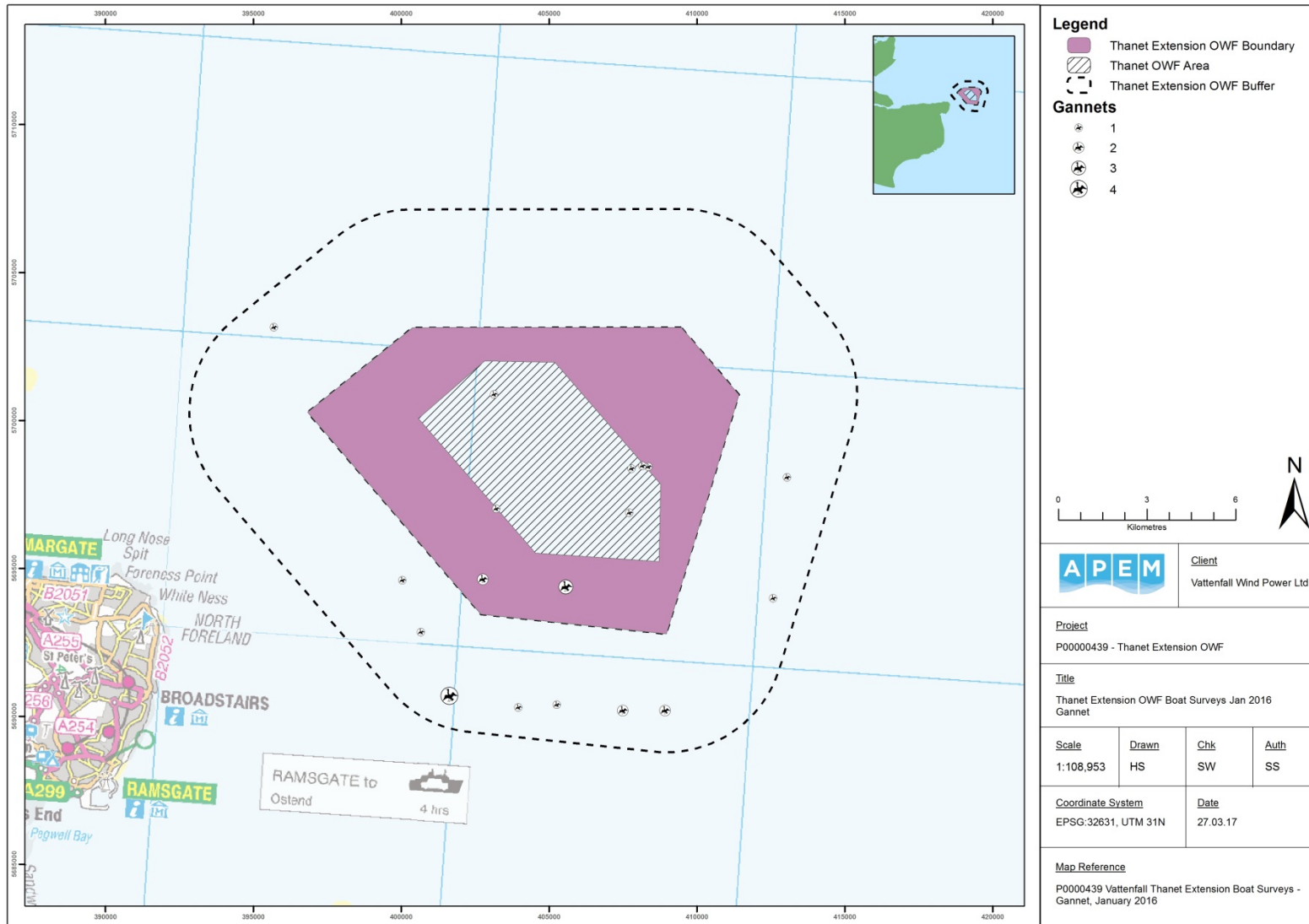
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Figure 15.4 Fulmar (January, February & March 2016)



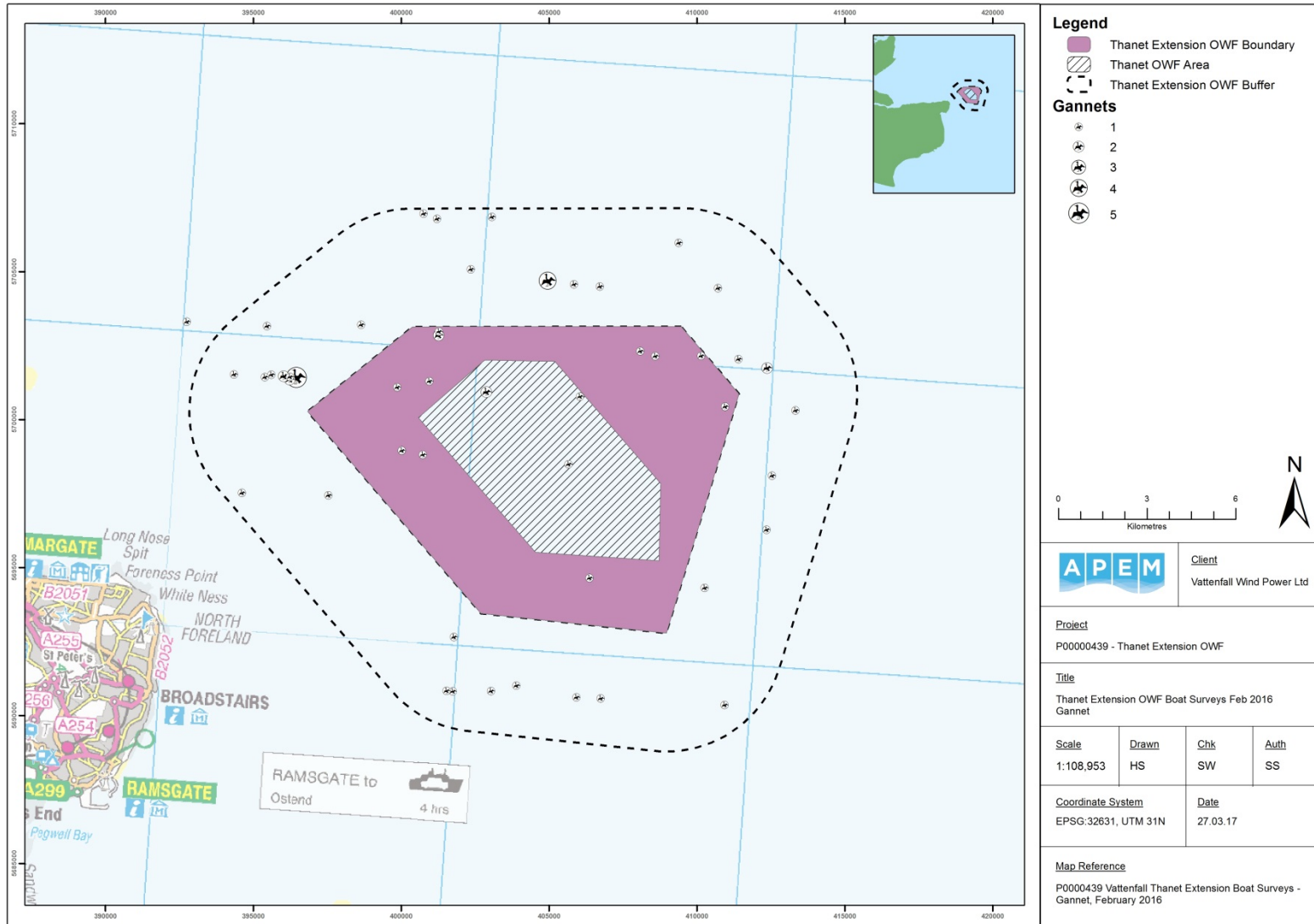
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Figure 15.5 Gannet (January 2016)



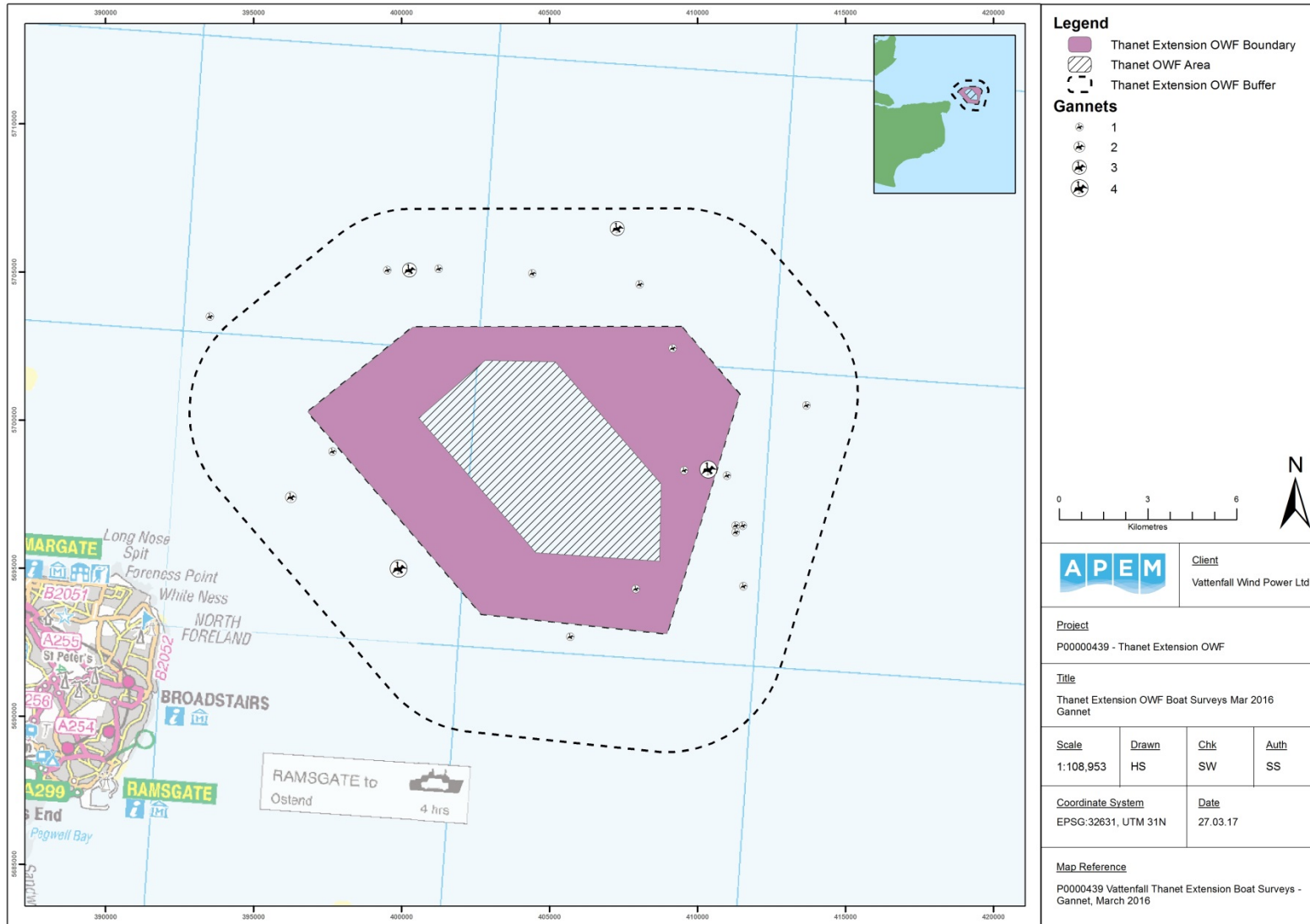
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Figure 15.6 Gannet (February 2016)



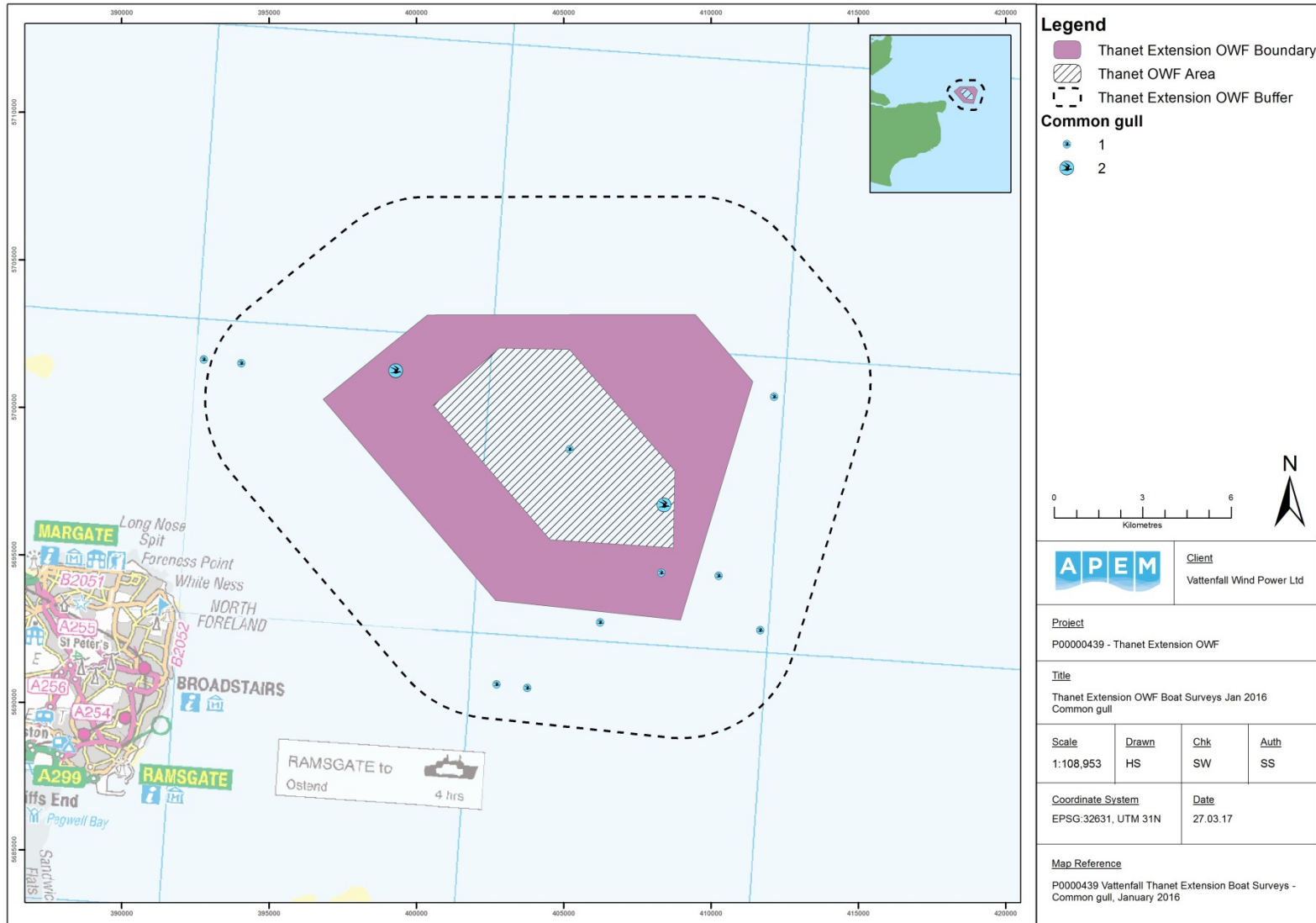
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Figure 15.7 Gannet (March 2016)



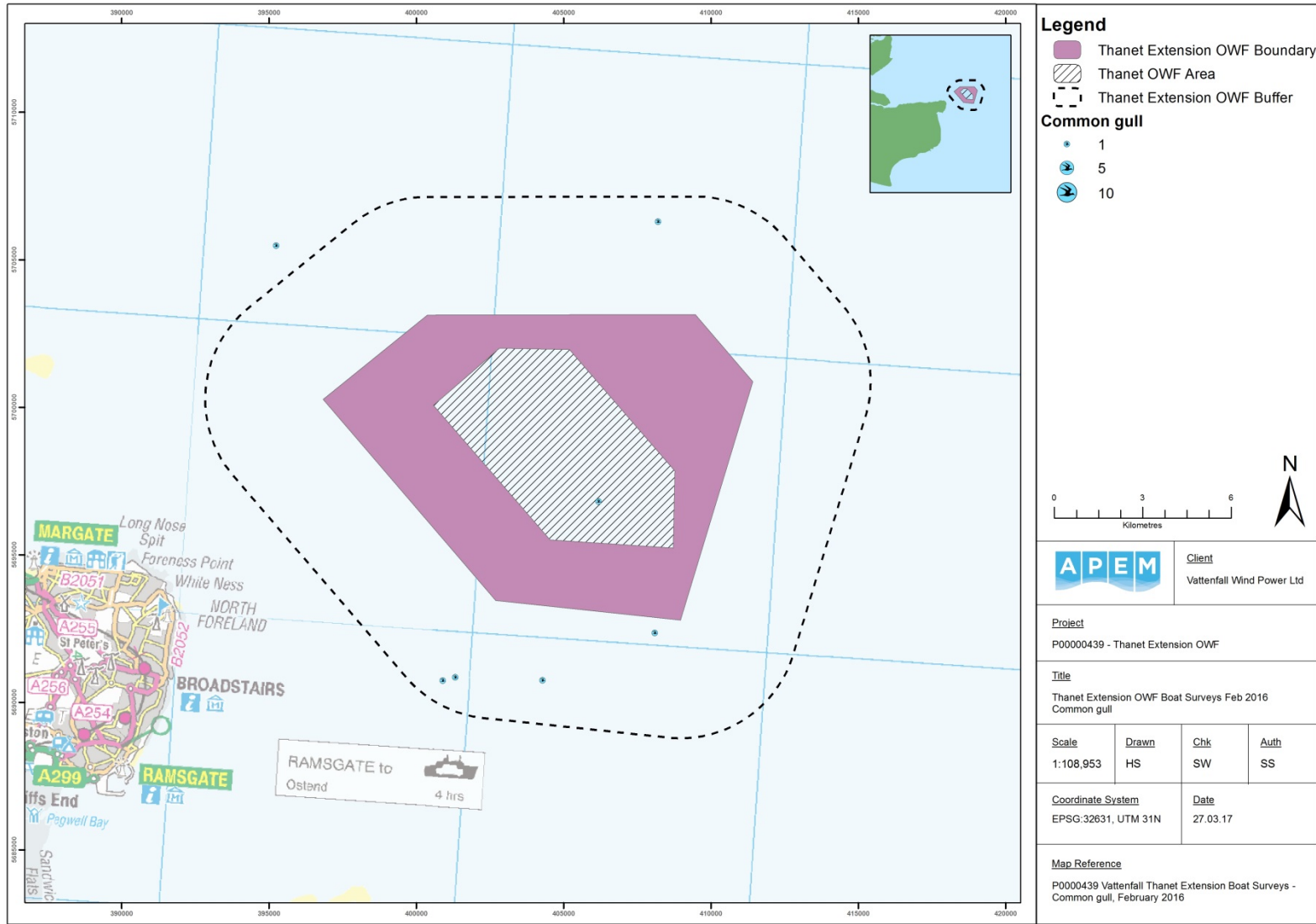
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Figure 15.8 Common gull (January 2016)



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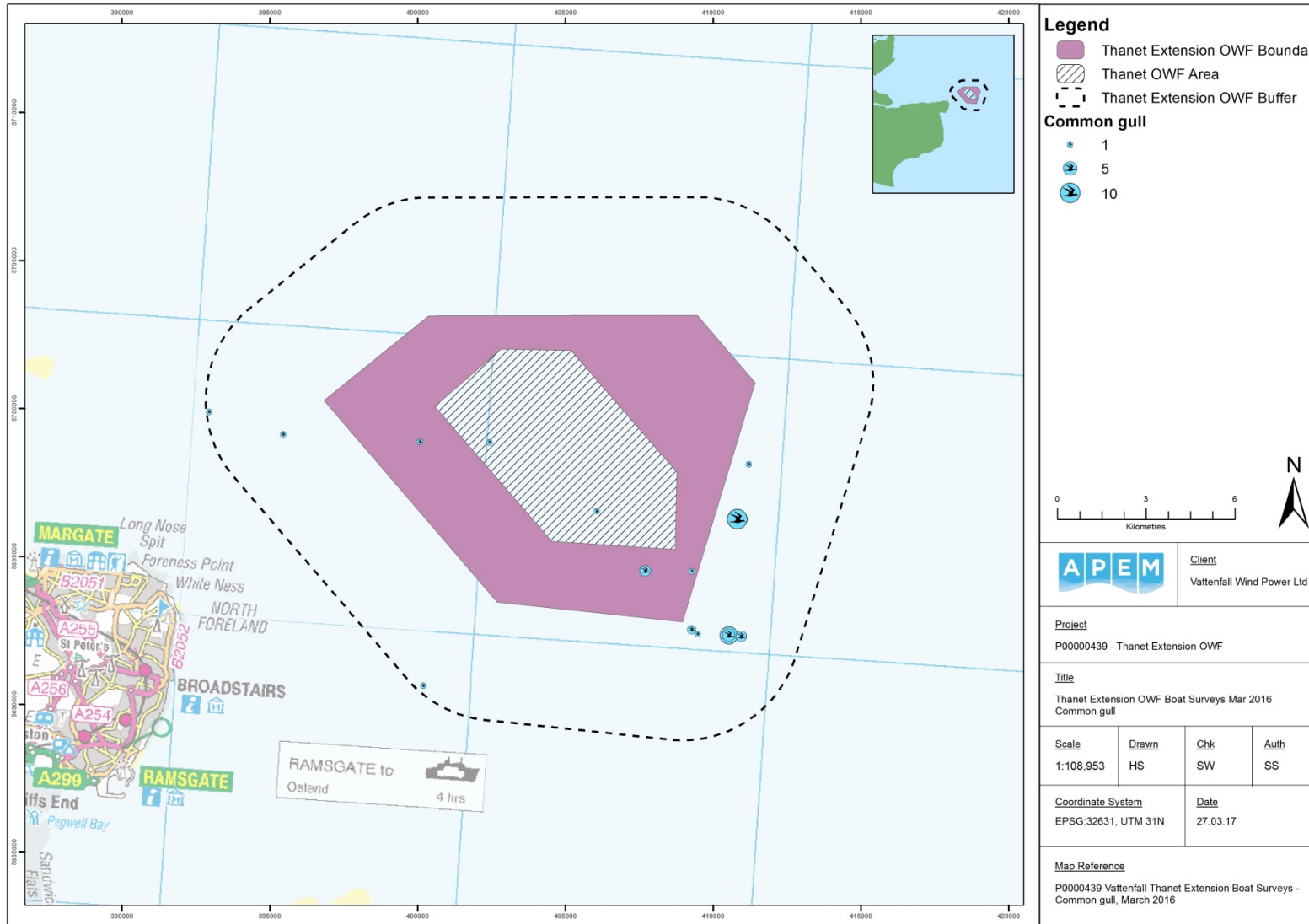
Figure 15.9 Common gull (February 2016)



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Figure 15.10

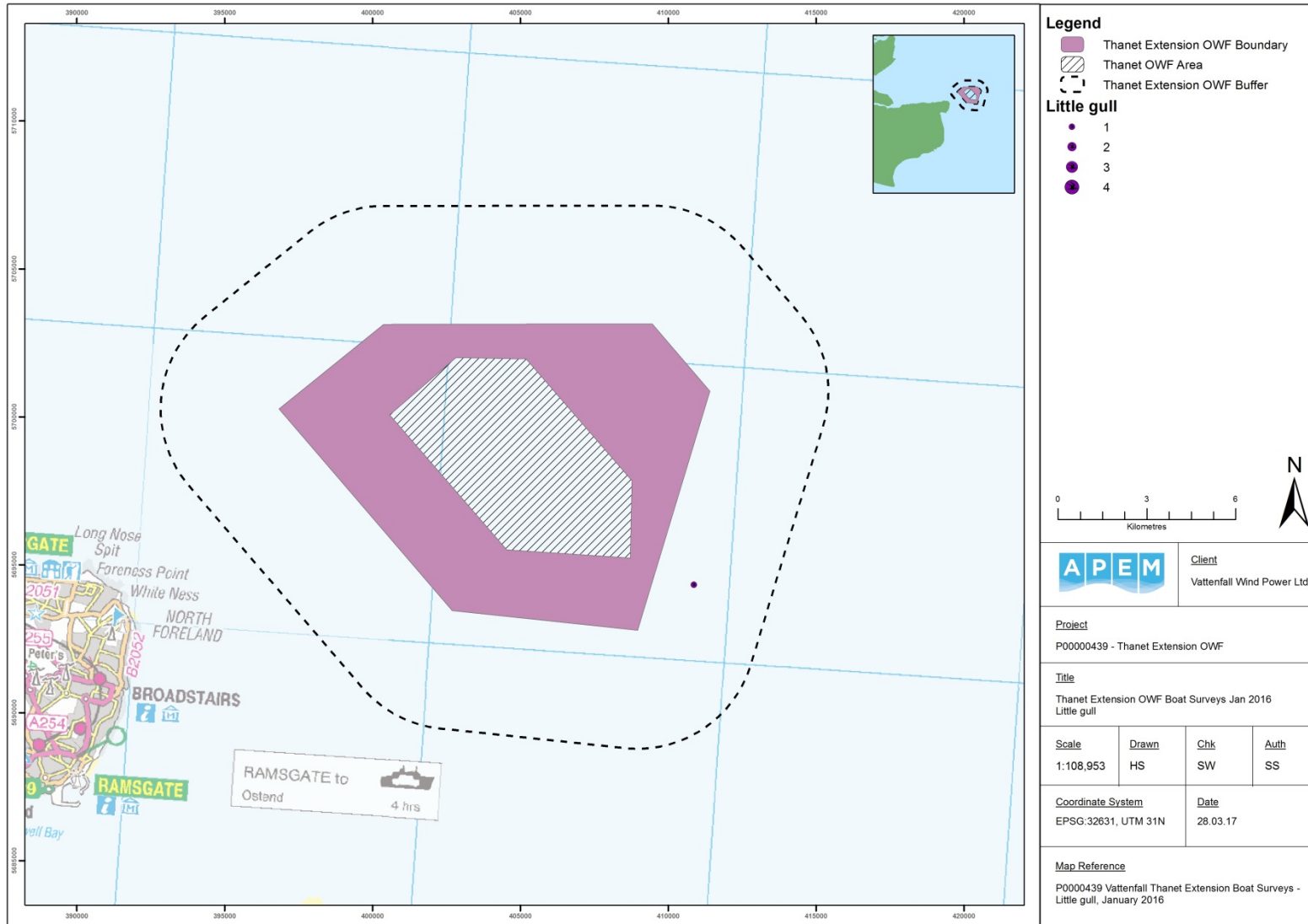
Common gull (March 2016)



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Figure 15.11

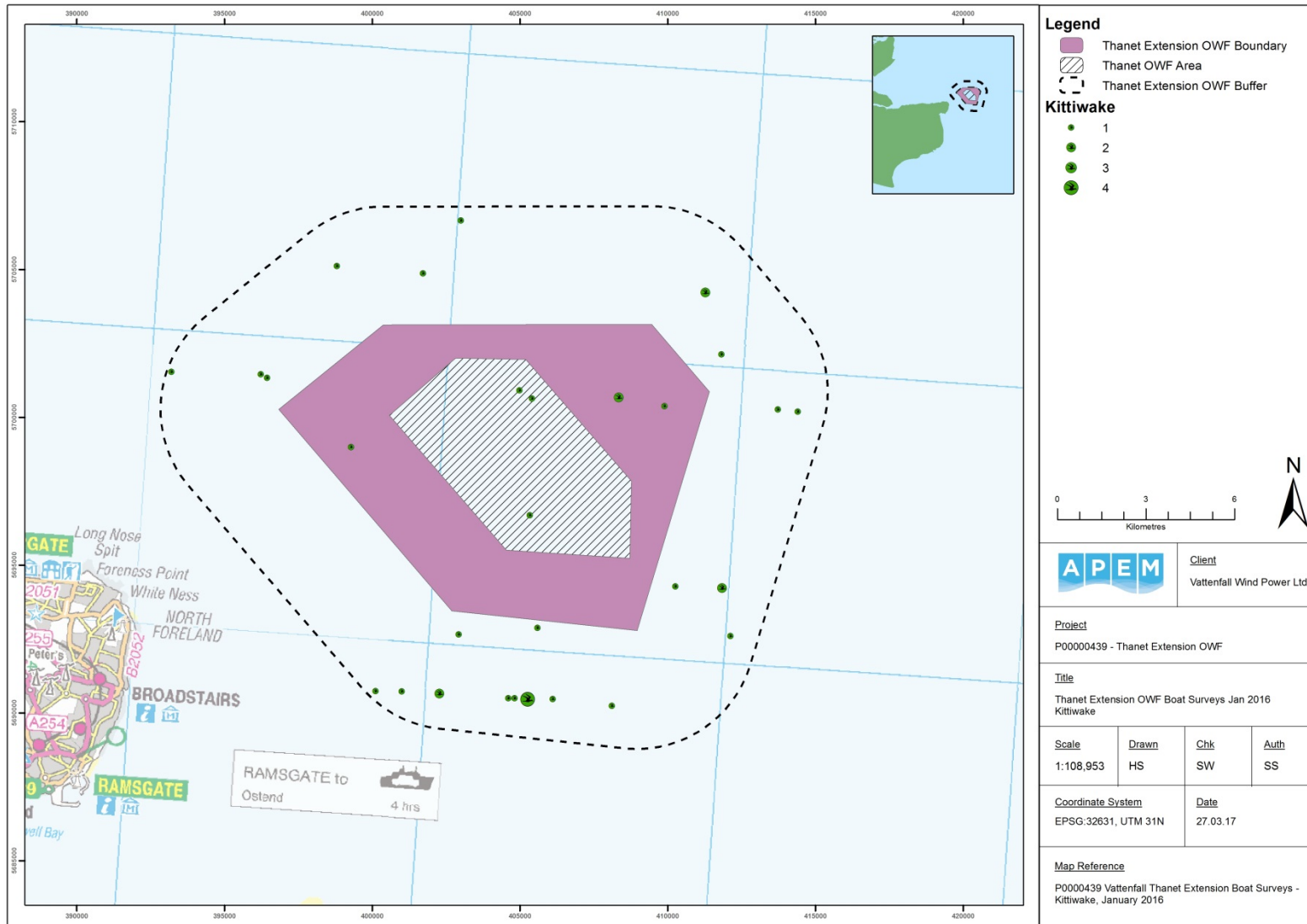
Little gull (January 2016)



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Figure 15.12

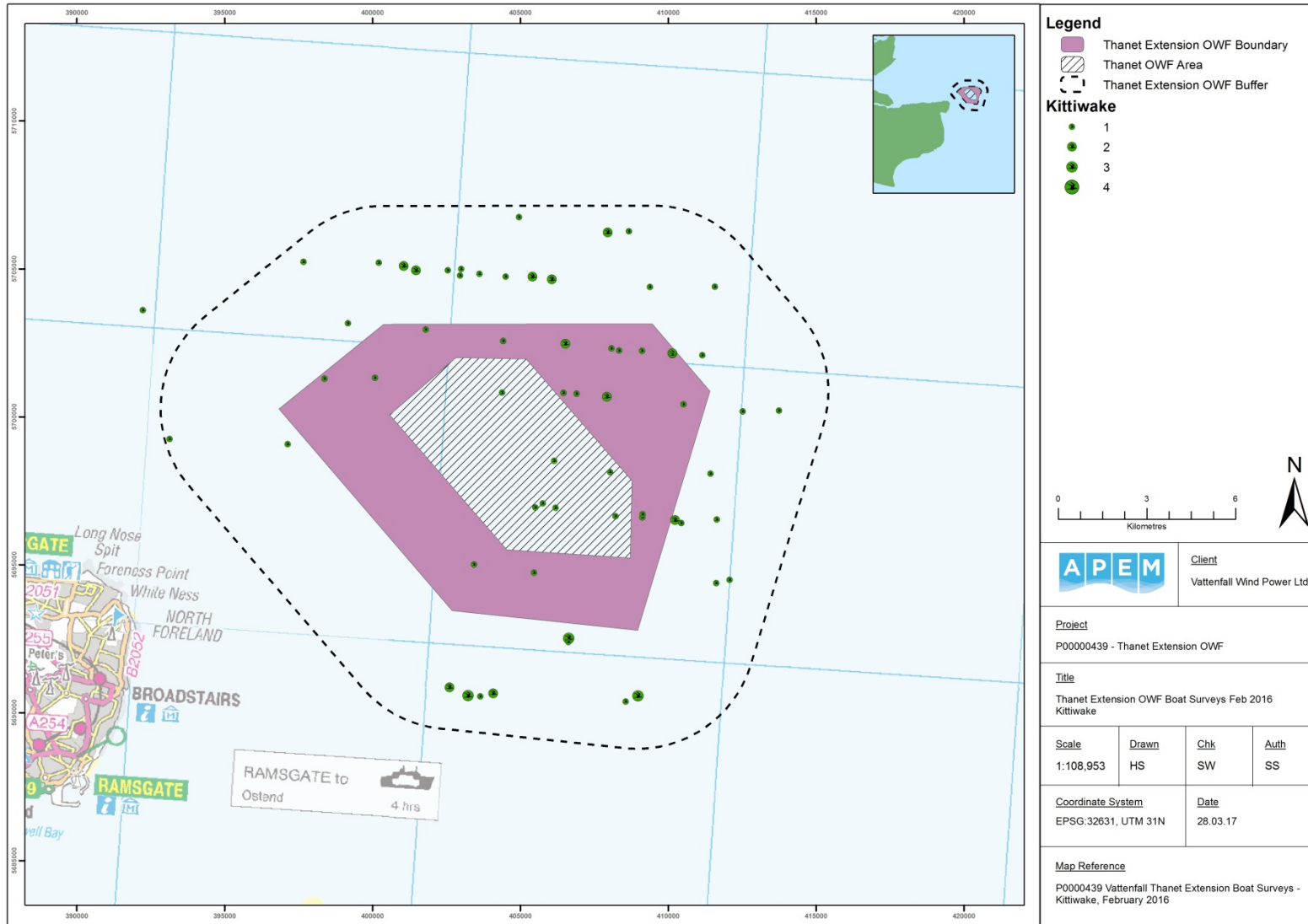
Kittiwake (January 2016)



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Figure 15.13

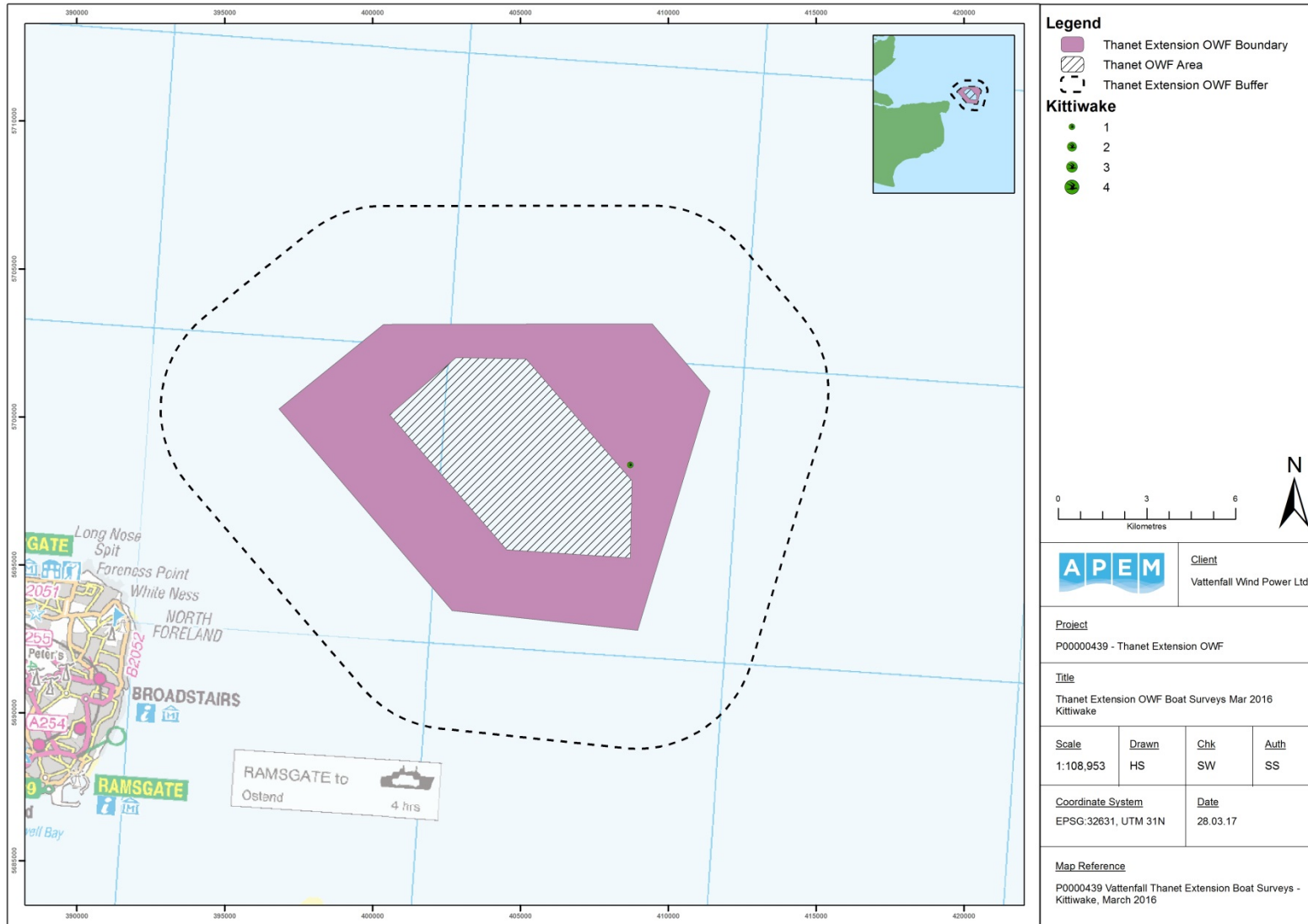
Kittiwake (February 2016)



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Figure 15.14

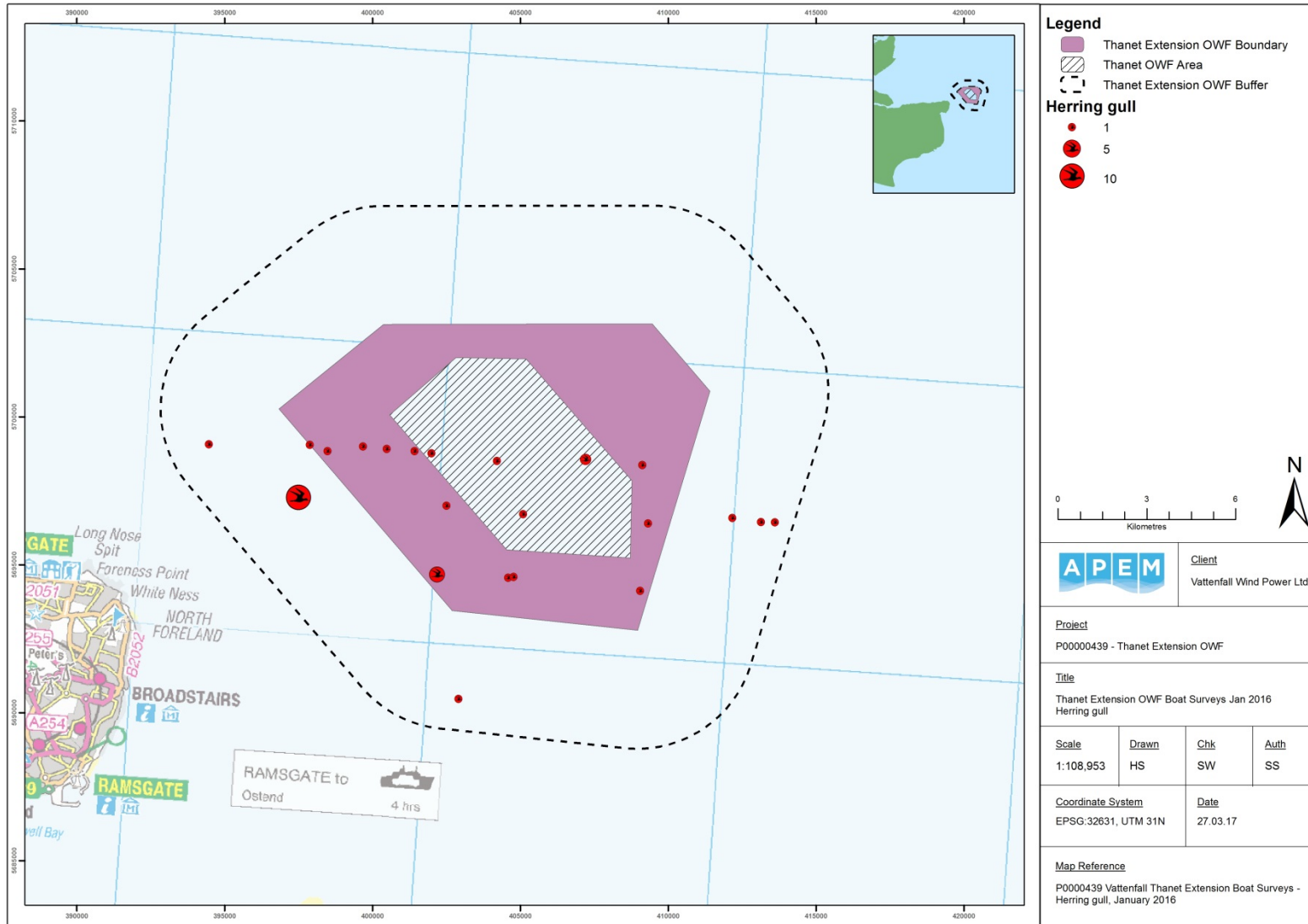
Kittiwake (March 2016)



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Figure 15.15

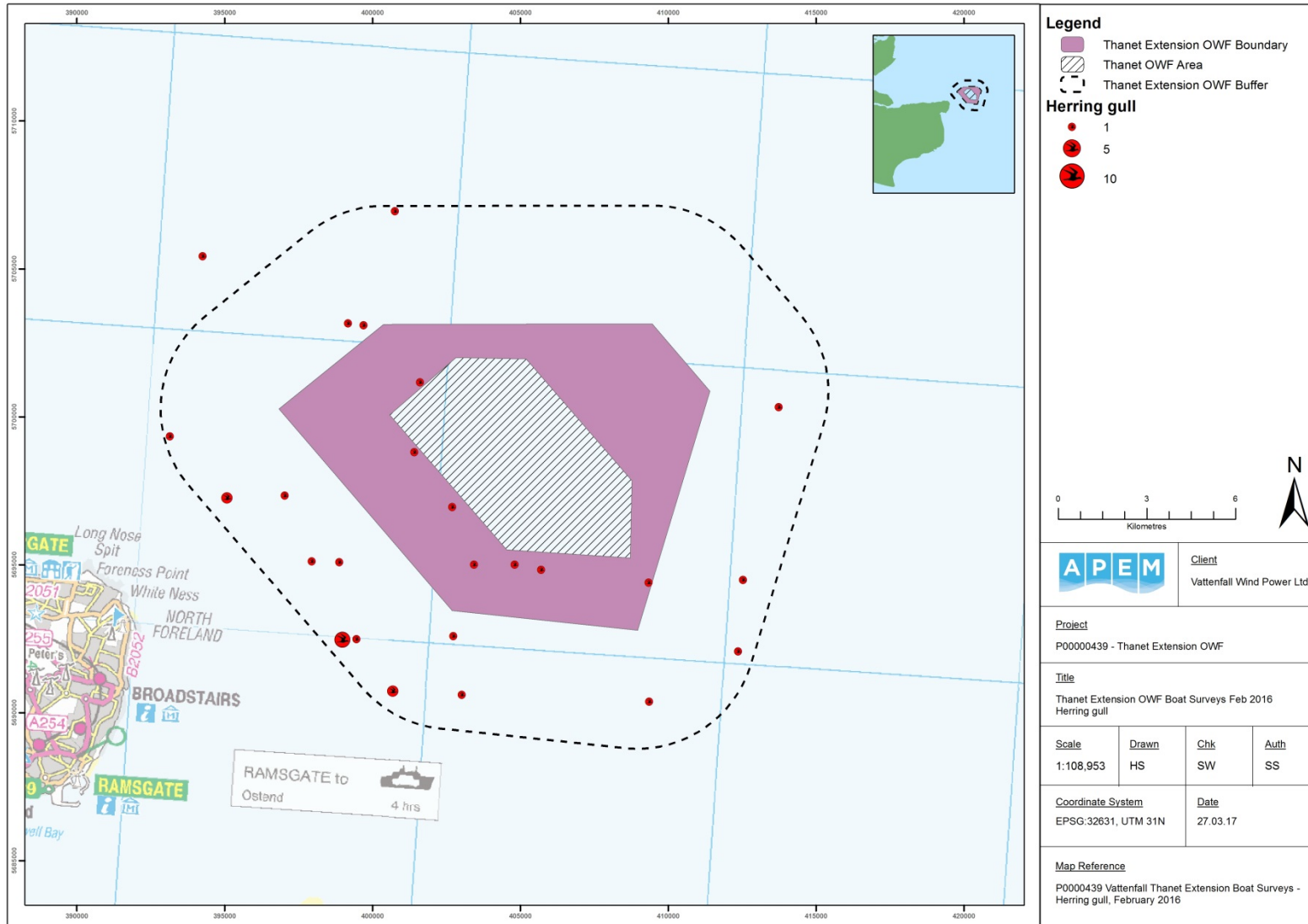
Herring gull (January 2016)



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Figure 15.16

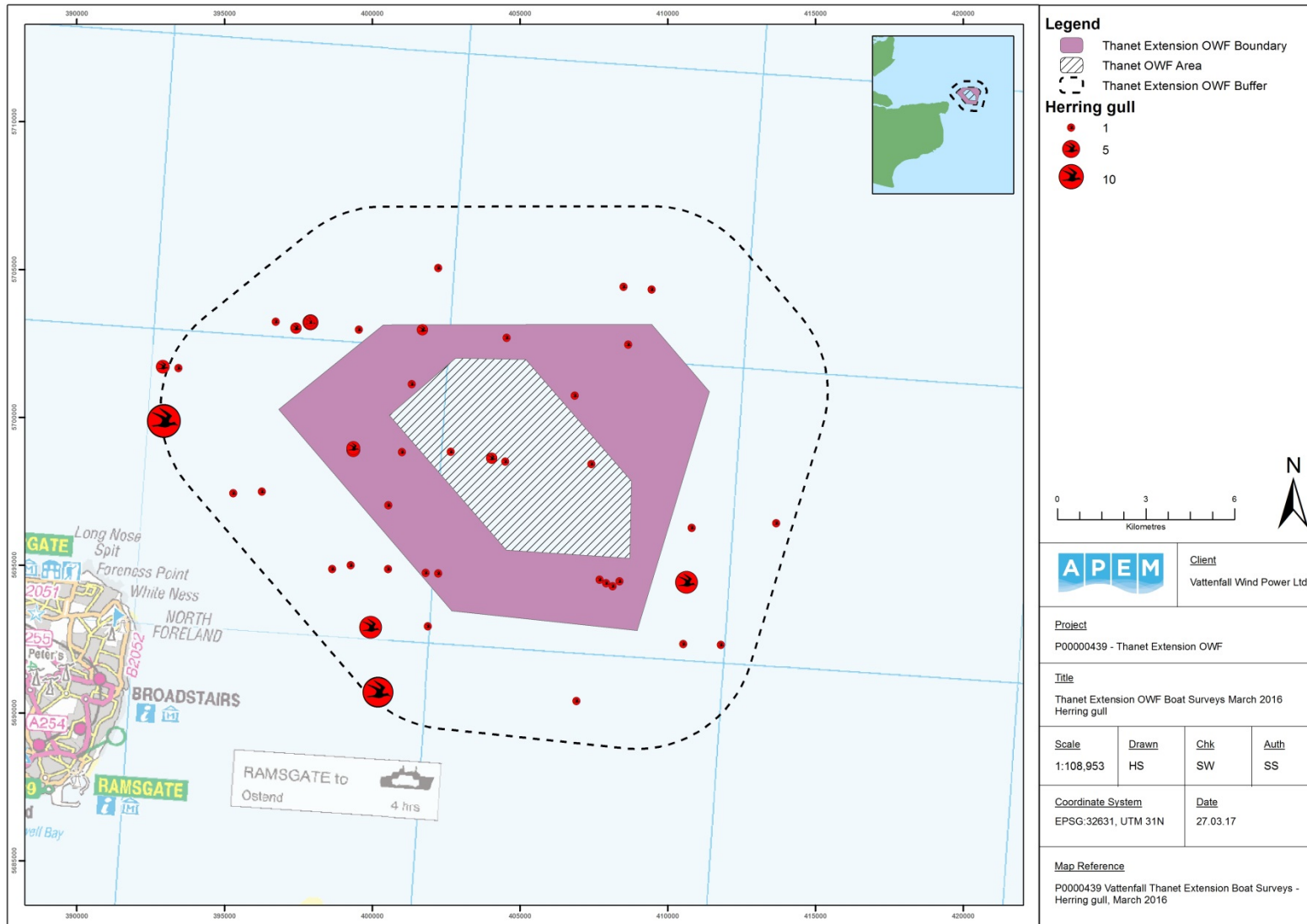
Herring gull (February 2016)



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Figure 15.17

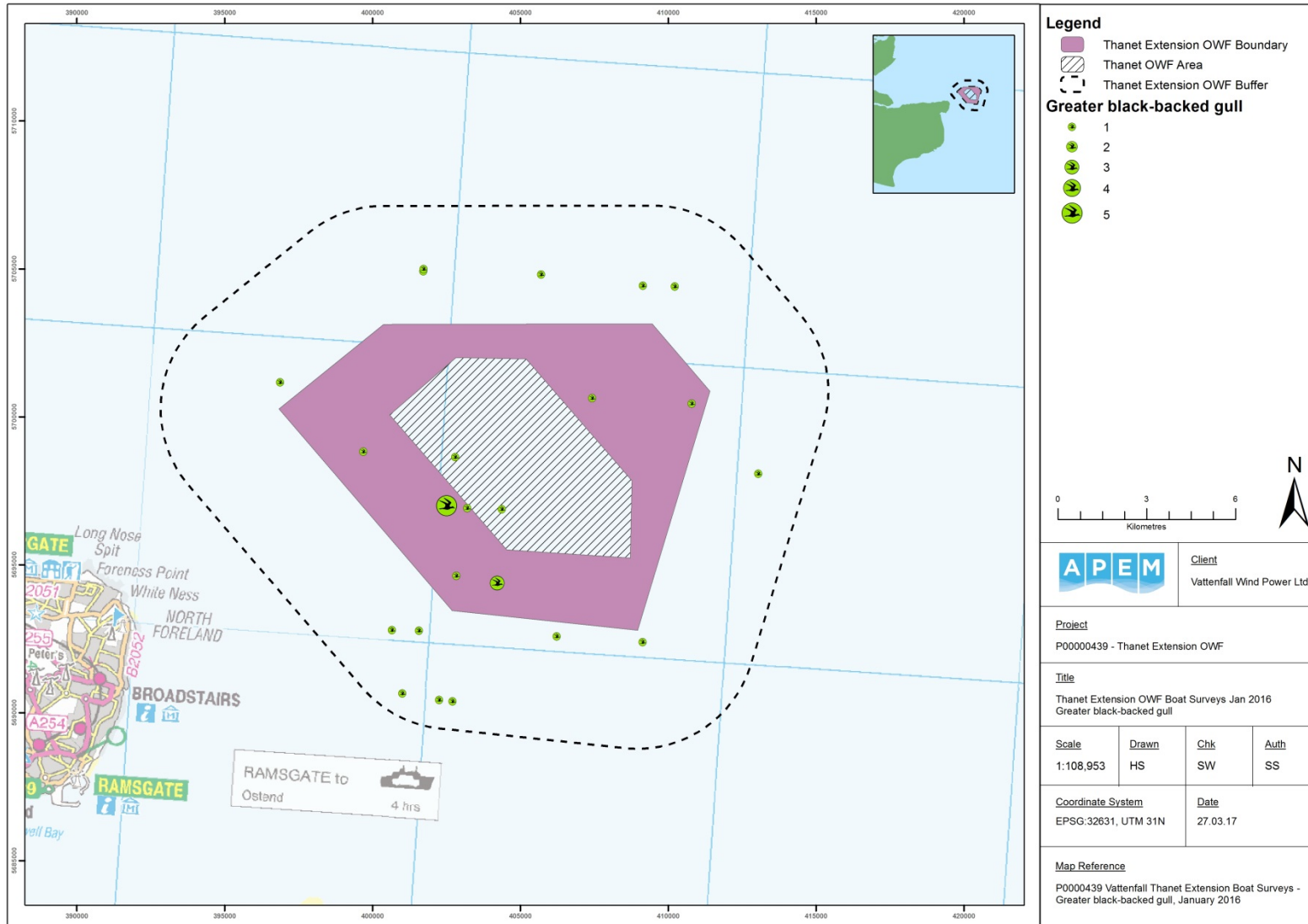
Herring gull (March 2016)



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Figure 15.18

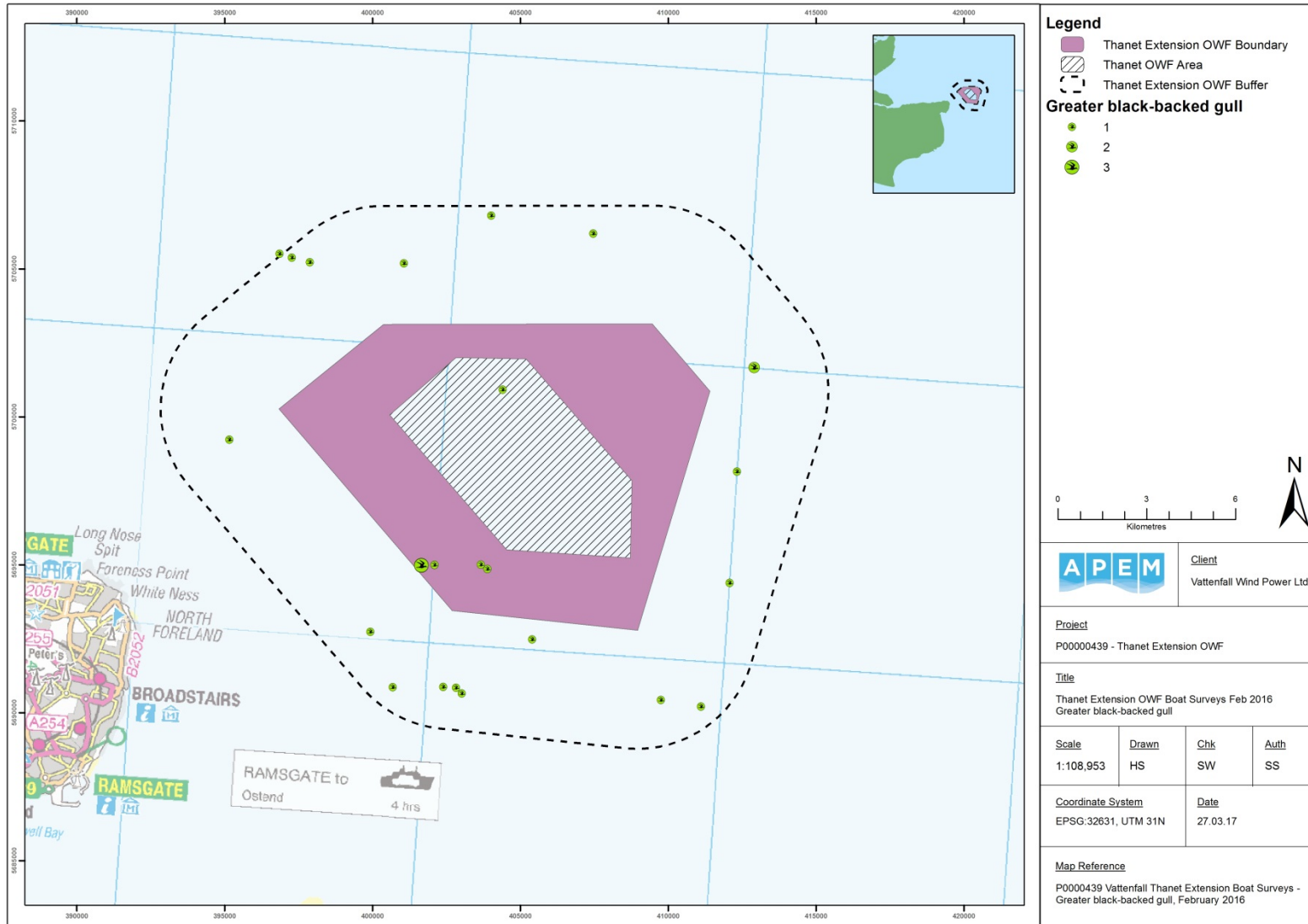
Great black-backed gull (January 2016)



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Figure 15.19

Great black-backed gull (February 2016)



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Figure 15.20

Great black-backed gull (March 2016)

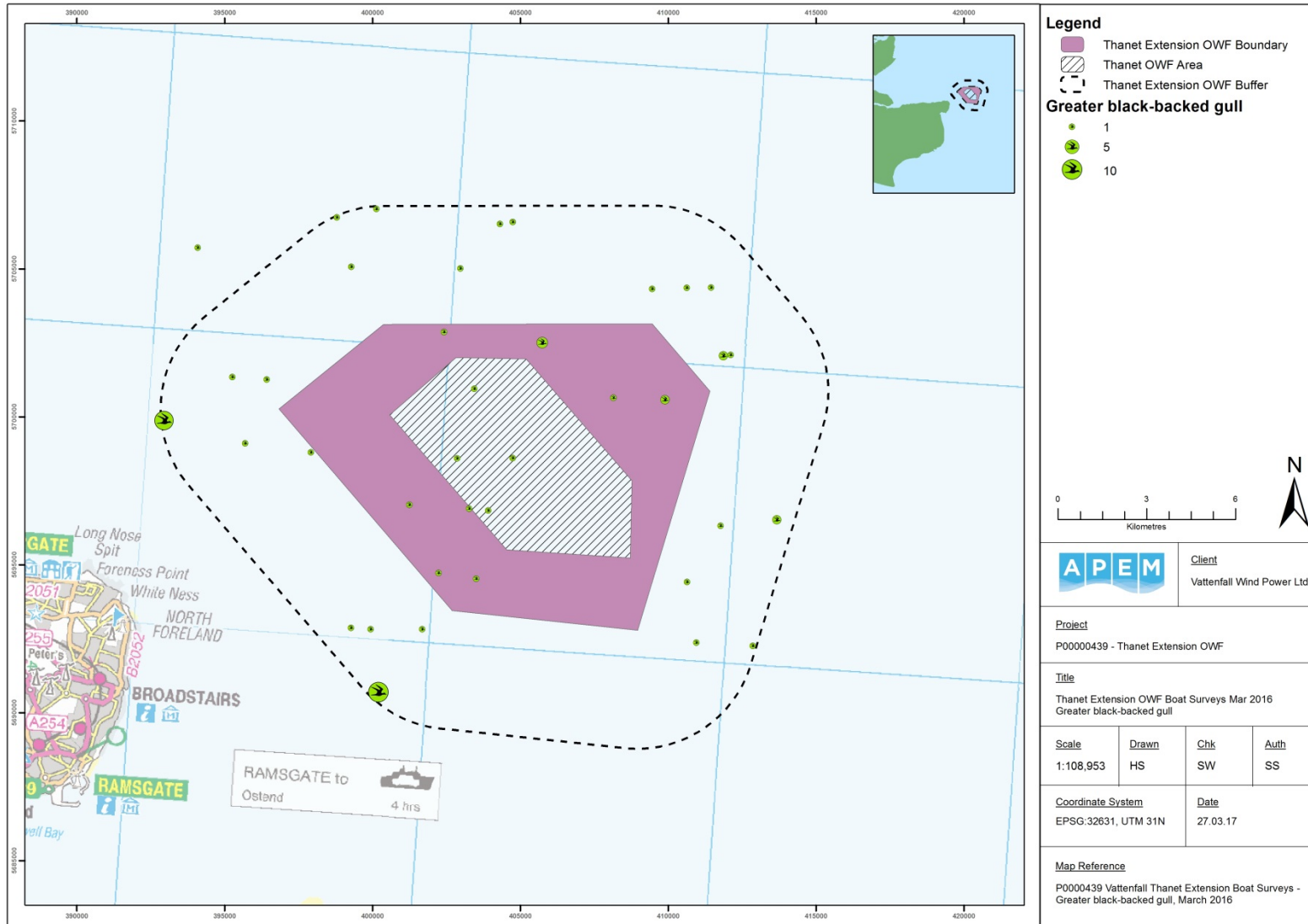


Figure 15.21

Lesser black-backed gull (February & March 2016)

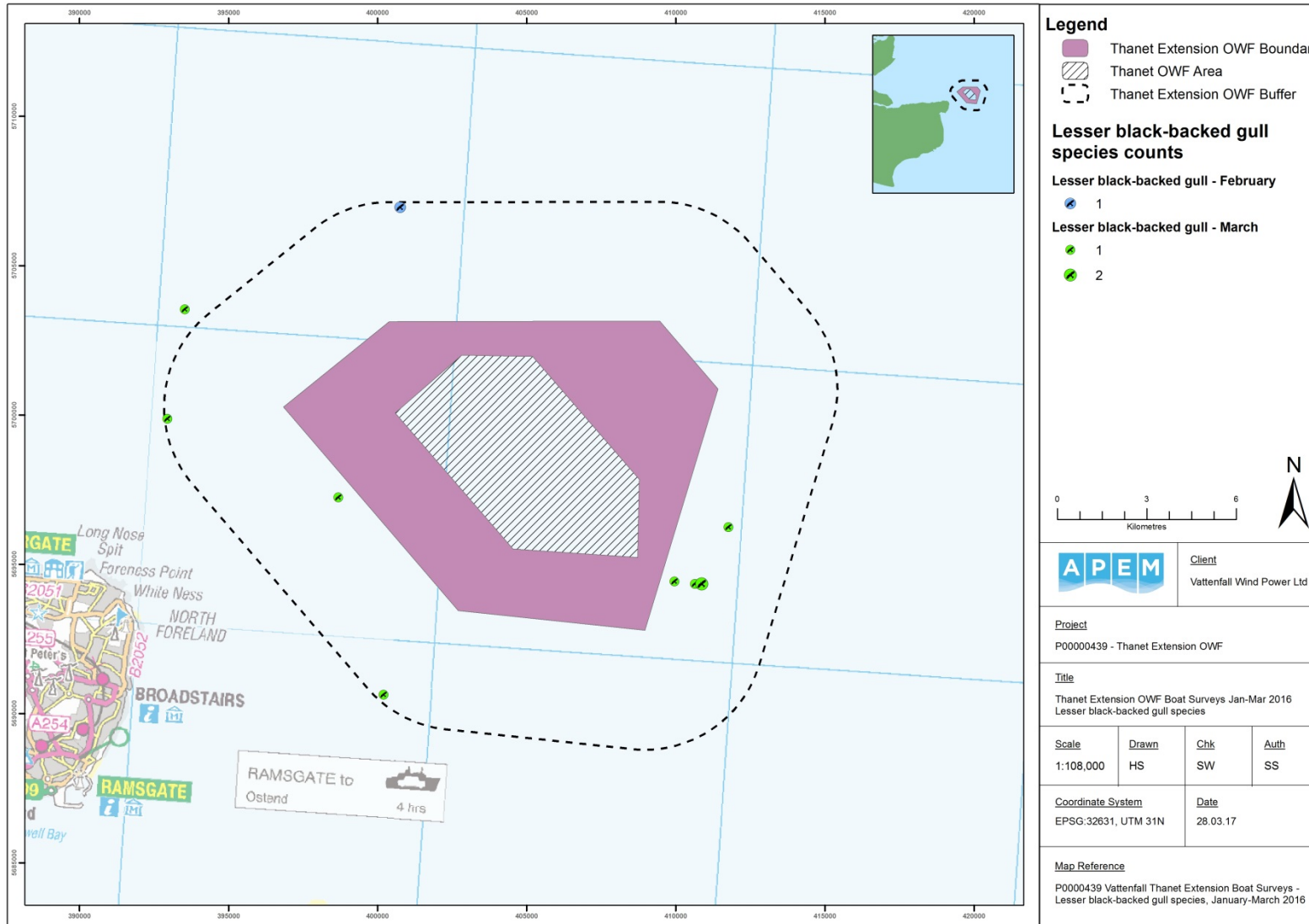
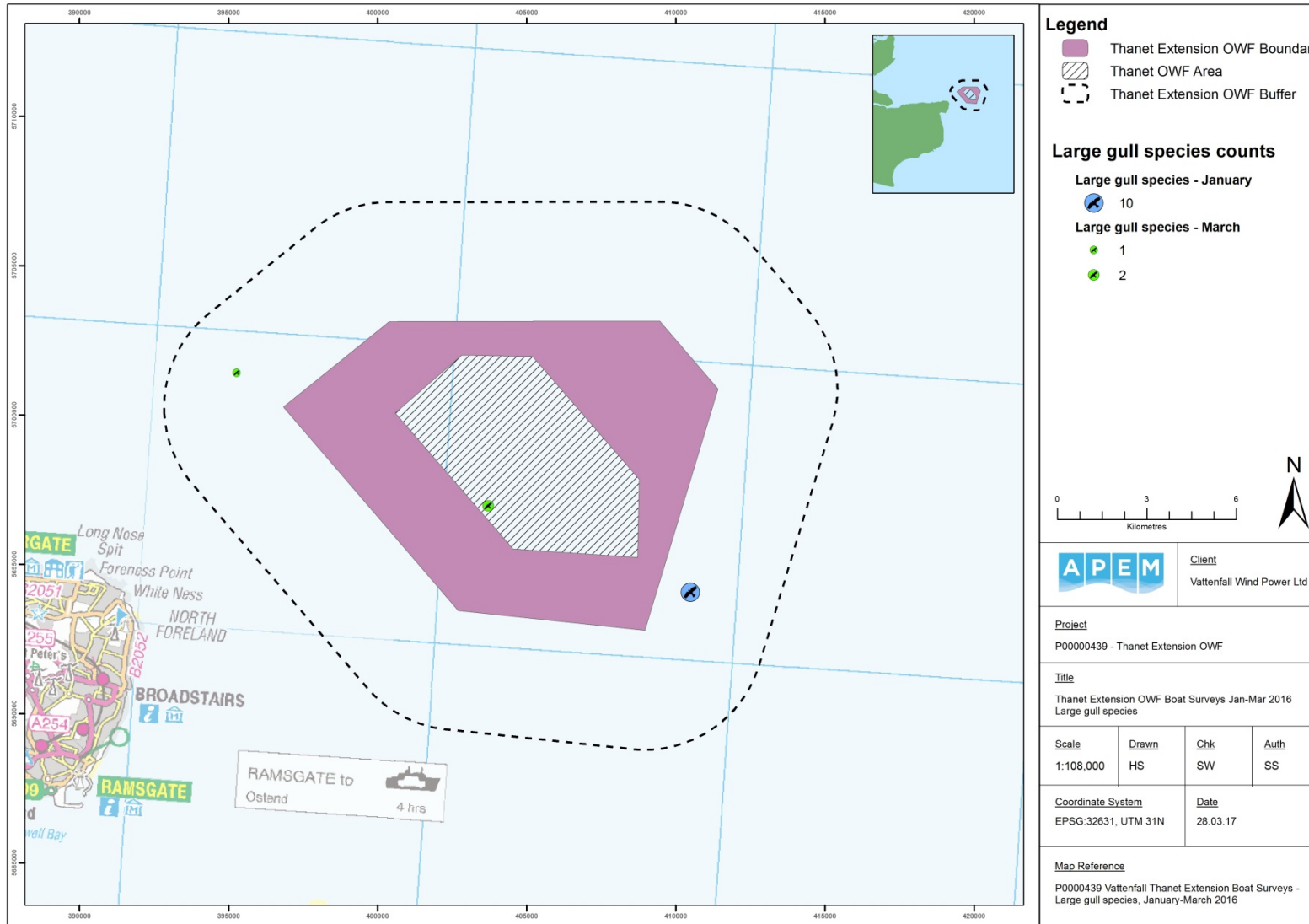


Figure 15.22

Large gull species (January & March 2016)



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Figure 15.23

Razorbill (January 2016)

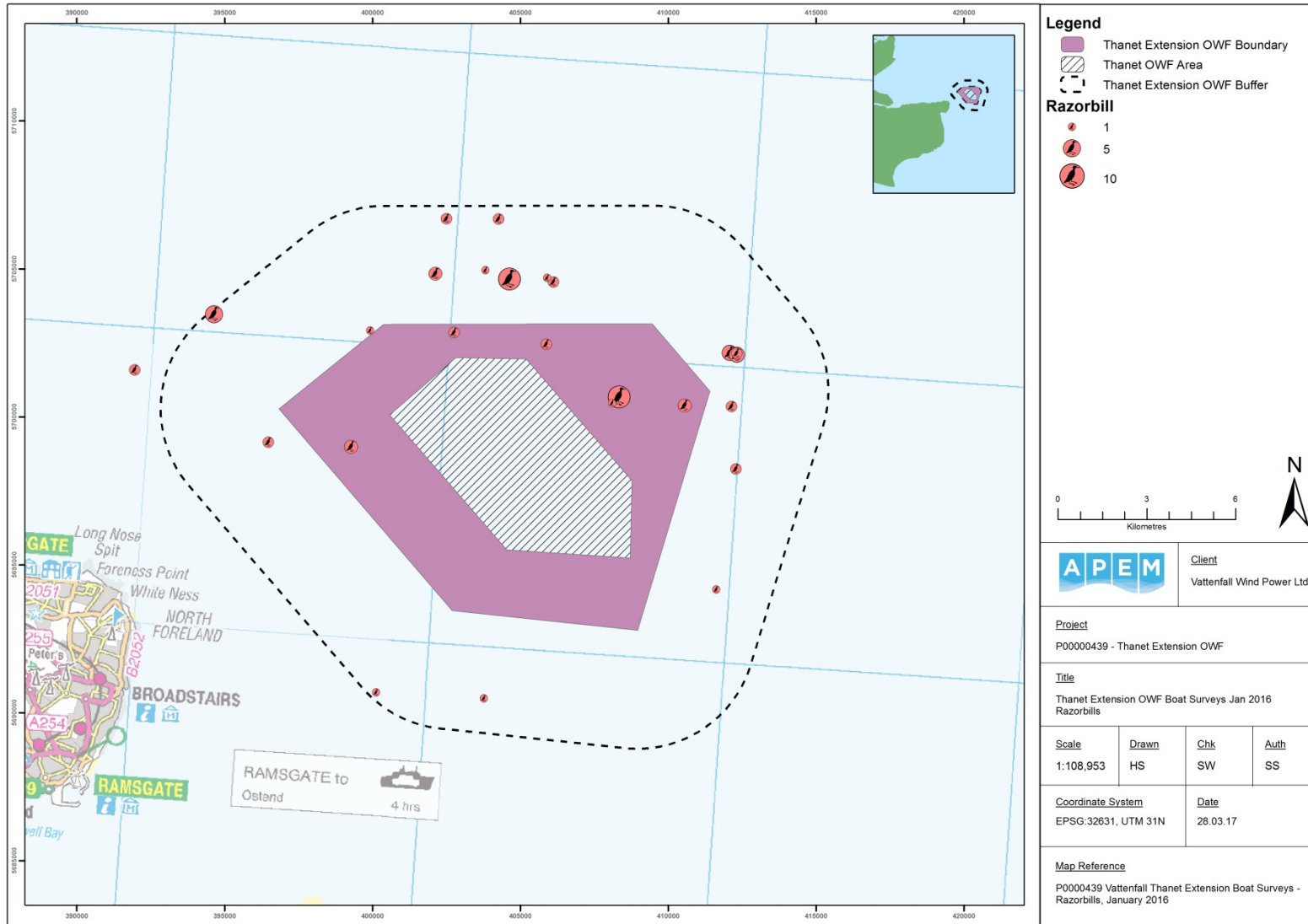
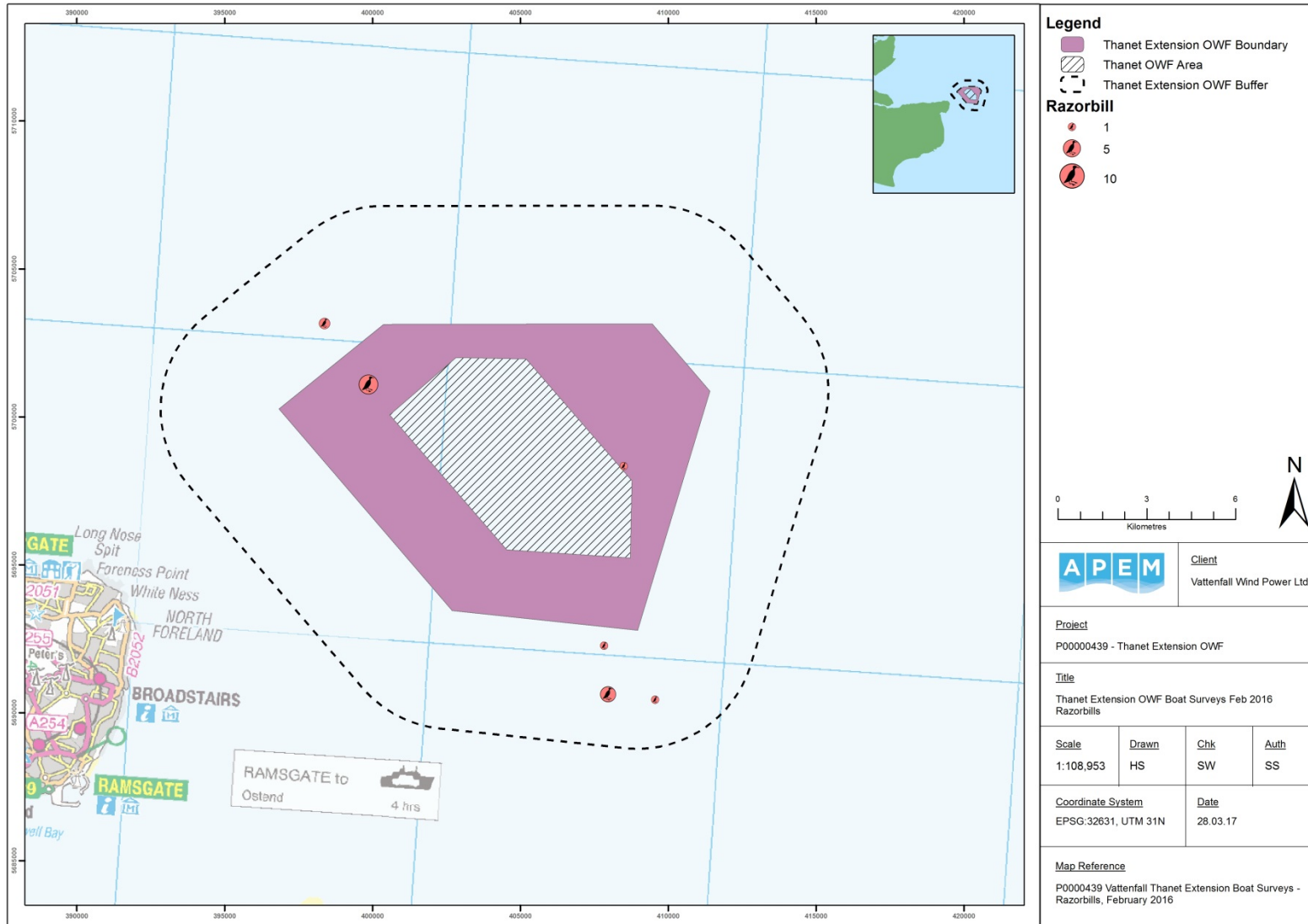


Figure 15.24

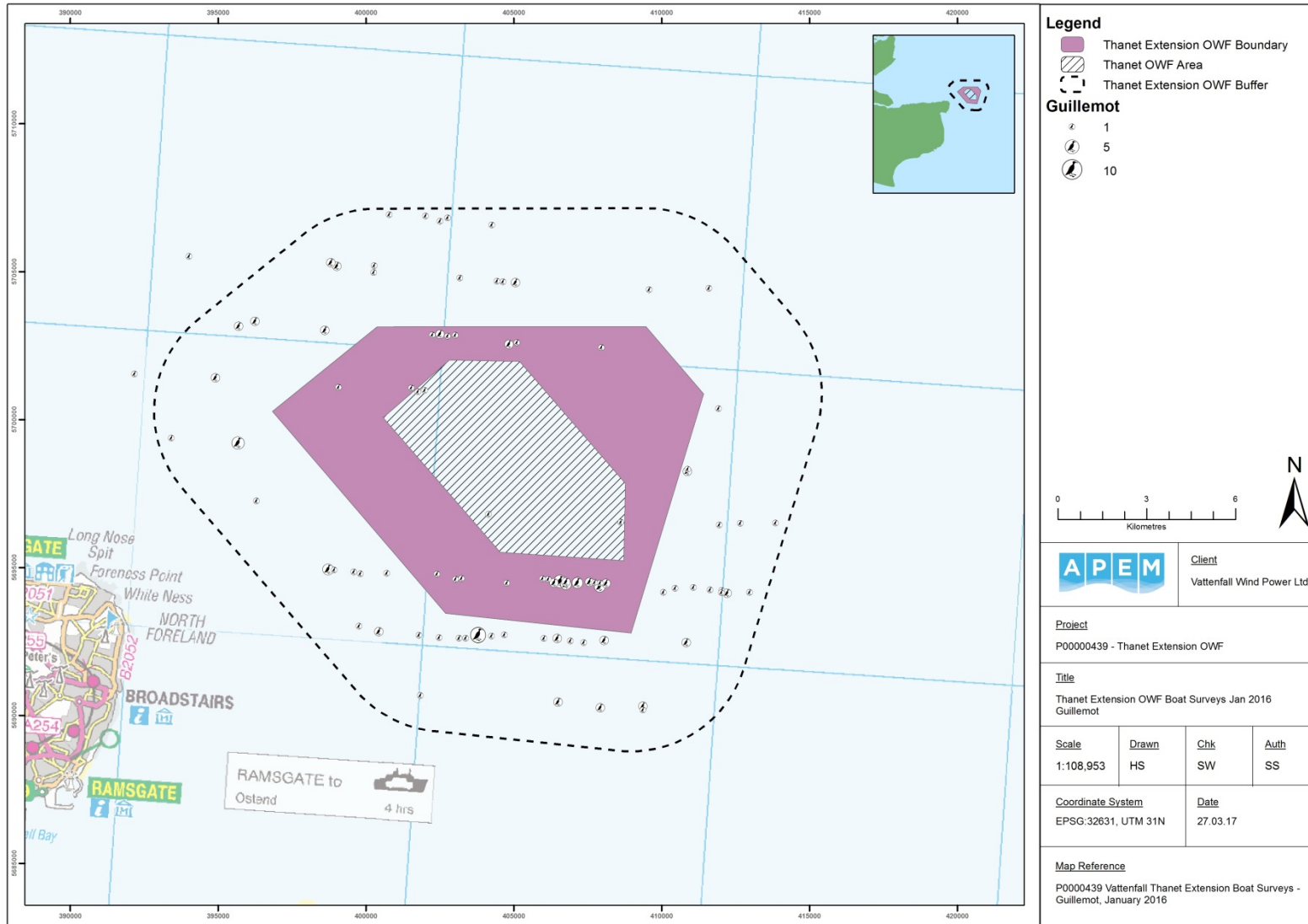
Razorbill (February 2016)



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Figure 15.25

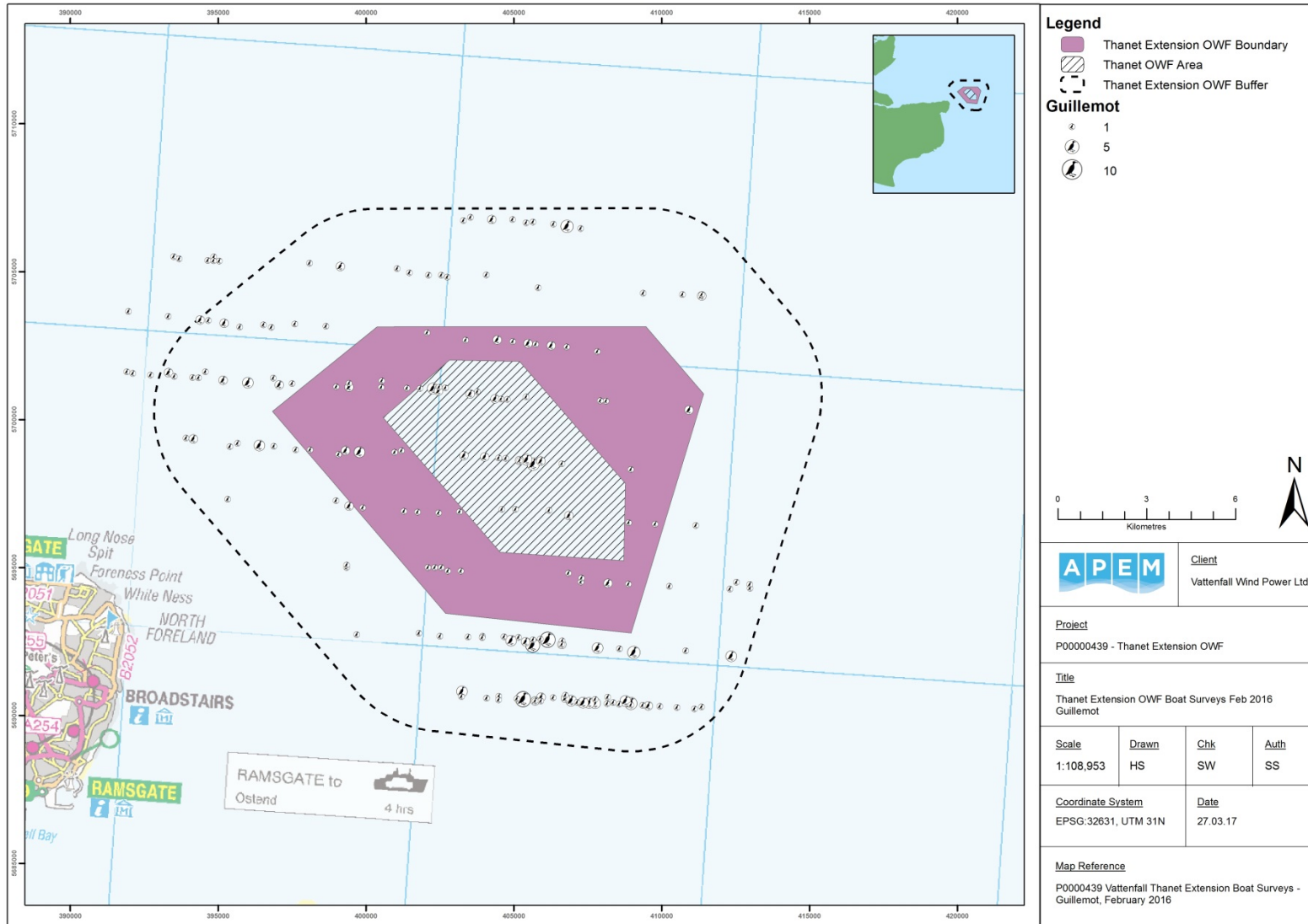
Guillemot (January 2016)



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Figure 15.26

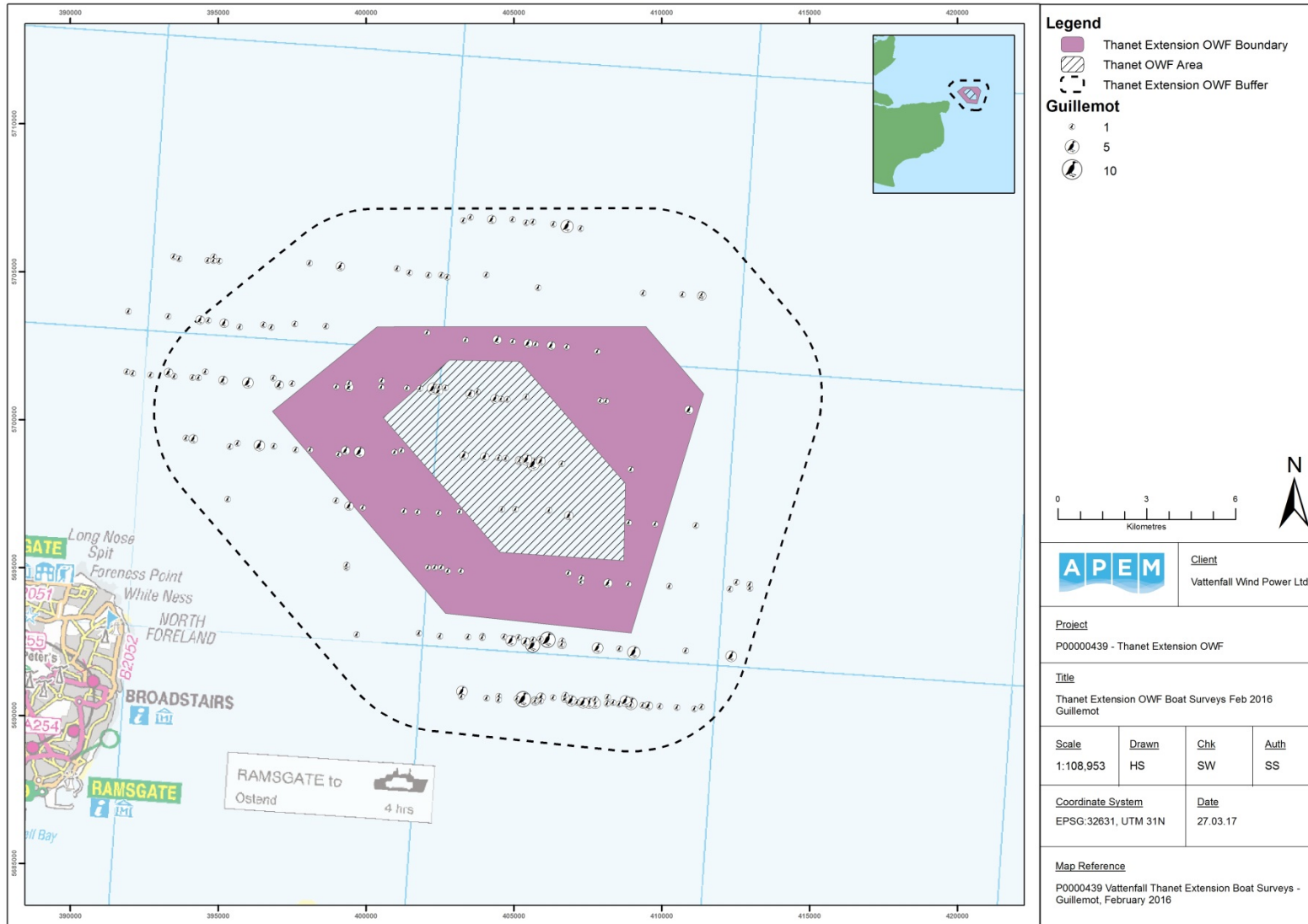
Guillemot (February 2016)



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Figure 15.27

Guillemot (March 2016)



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Figure 15.28

Auk species (January 2016)

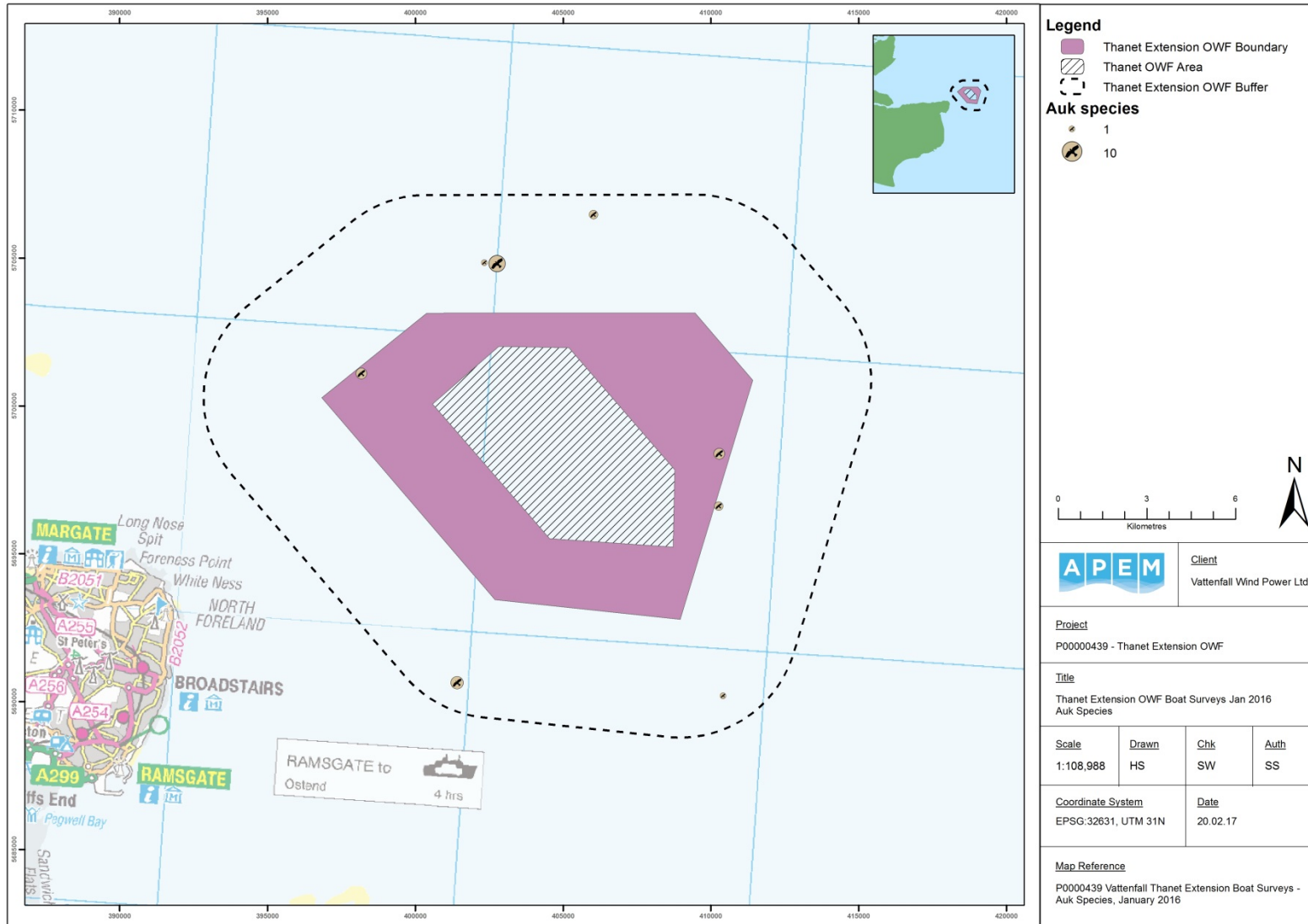
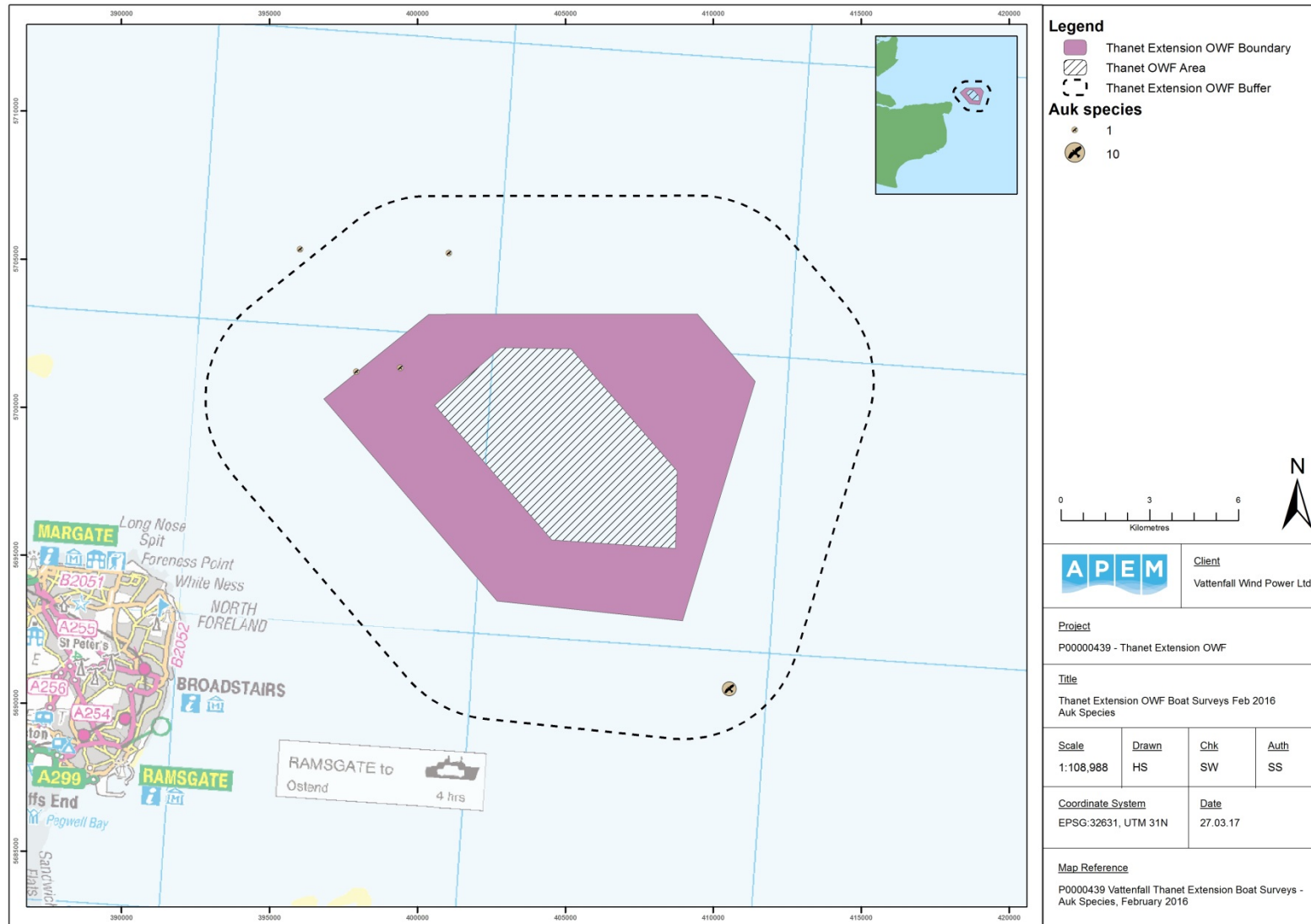


Figure 15.29

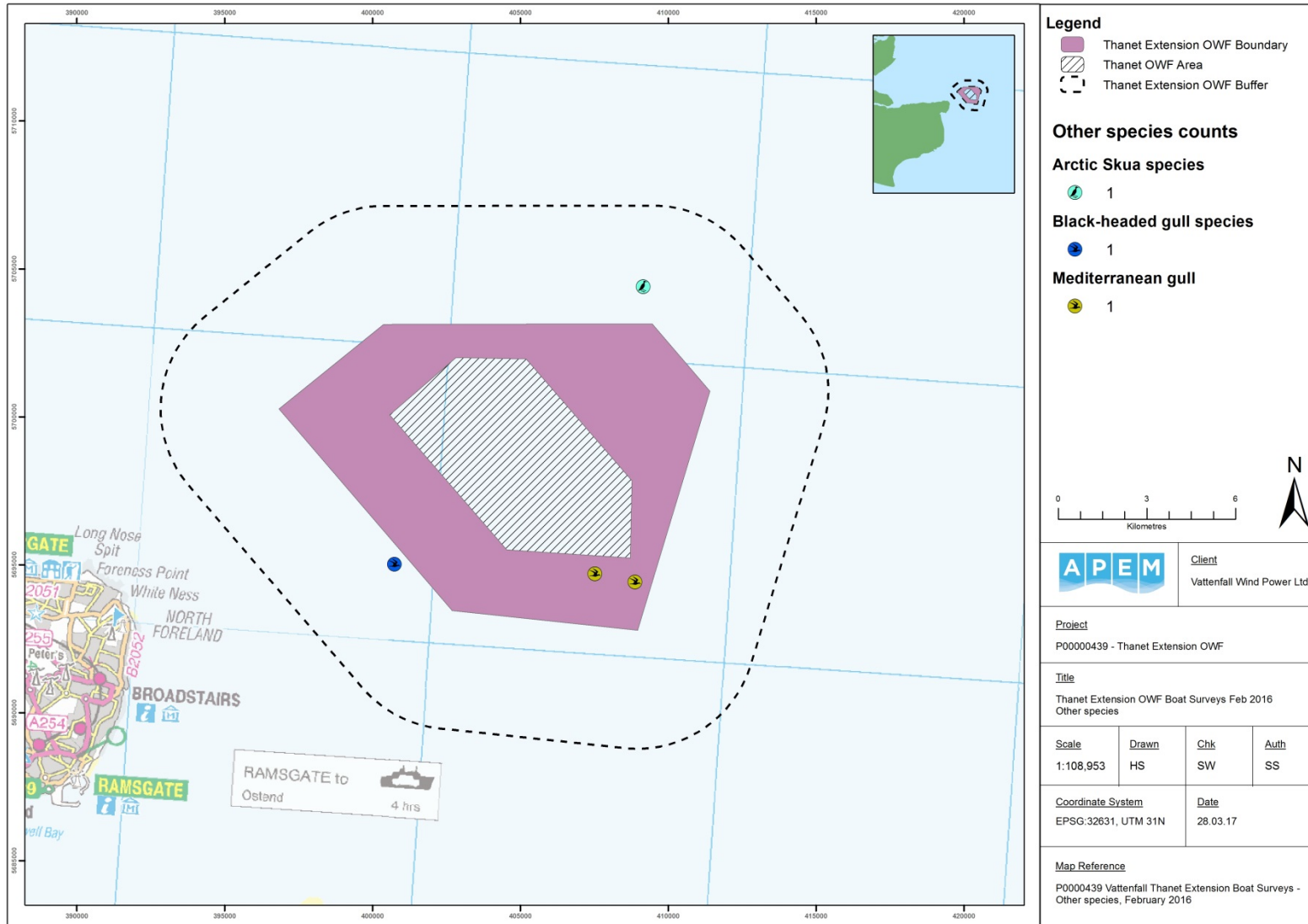
Auk species (February 2016)



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Figure 15.30

Other - Arctic Skua, black-backed gull species & Mediterranean gull (February 2016)



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Figure 15.31

Other - Black-backed & gull species, common scoter, shelduck and brent goose (March 2016)

