Natural England

Ornithological and Marine Mammal Baseline Characterisation Surveys for the POSEIDON project

October-December (Seasonal) Report – South-West Celtic Sea

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1.6	25/10/2024	3.1	4, 5	Update coverage	SY

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1. Executive Summary

This report constitutes the first year two seasonal (October to December 2023) report outlining results from digital aerial surveys conducted in November 2023 within the South-West Celtic Sea under the POSEIDON project and commissioned by Natural England. Surveys were undertaken using APEM's high-resolution camera system to capture digital still imagery of birds and marine megafauna within the Survey Area.

The survey was successfully carried out across two non-consecutive days in November 2023, with one day between surveys. There were no safety issues. A total of 747 observations were recorded in November 2023, of which 584 were observations of birds and 163 observations were of marine megafauna. APEM will continue to monitor the site for these species and others during the remaining seasonal surveys.

2. Introduction

2.1 Background

APEM has been contracted by Natural England for the supply of four, year two seasonal digital aerial surveys within the South-West Celtic Sea, commencing from October 2023. The programme of work repeats the four seasonal surveys of the Survey Area completed by APEM from 2022-2023. The surveys form part of the POSEIDON project which is led by Natural England and funded through The Crown Estates Offshore Wind Evidence and Change (OWEC) programme. Analysis of existing seabird and marine mammal data for English and Welsh waters identified gaps in the evidence base for the Survey Area. The main purpose of the survey programme is to address these evidence gaps through providing baseline information on the abundance, distribution and behaviour of birds and marine mammals within the Survey Area.

The Survey Area is located within the Celtic Sea to the west of Cornwall and Brittany (**Figure 1**) and covers an area of 18,011 square kilometres (km^2). The survey method has been designed to optimise data collection for all bird, marine mammal, and other marine megafauna species using a transect-based survey design at 1.5-centimetre (cm) ground sampling distance (GSD) to achieve a minimum of 3% captured and 3% analysed coverage using a twin-engine aircraft. These surveys have been carried out to meet the aims and objectives of the work by Natural England and the POSEIDON project.

This report describes the seasonal (October to December 2023) survey, undertaken in November 2023 as part of the survey programme.

2.2 Aim of Report

The report presents information on marine birds, mammals, and other megafauna, which includes the following:

- Description of, and rationale for, survey methods and design
- Map of survey route and coverage
- Survey details as actually flown (including dates/times, weather and other relevant conditions)
- Raw count observations for behaviours of all avian and marine mammal species, as well as any other marine megafauna recorded per month within the Survey Area.
- Bird flight heights and direction
- Spatial distribution maps of avian, marine mammal, and other marine megafauna species.

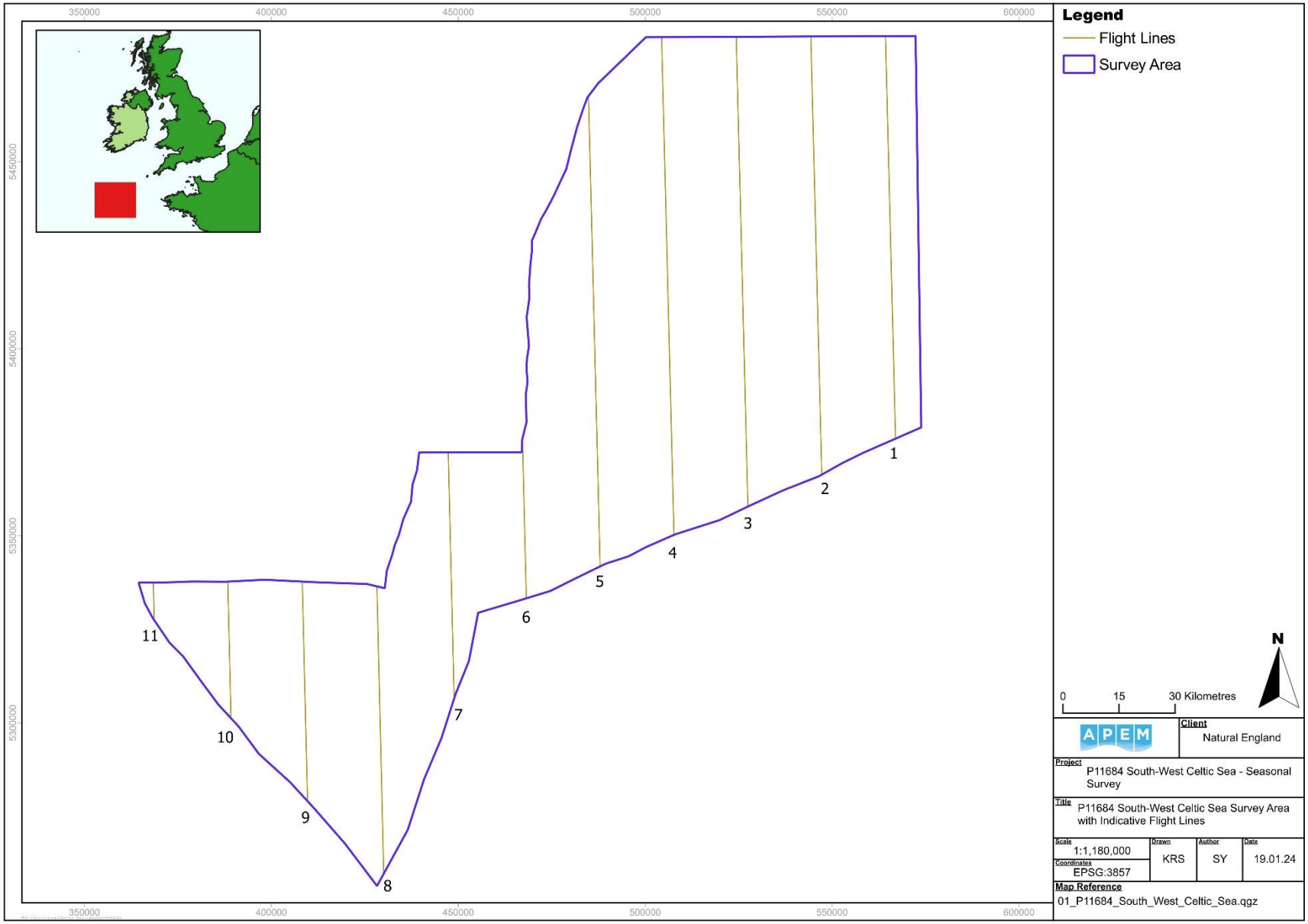

Figure 1 Location of the South-West Celtic Sea Survey Area

3. Survey and Analysis Methodologies

3.1 Digital Aerial Survey Methods

The survey was conducted using APEM's bespoke camera system, termed "Shearwater V", customised by in-house specialists for surveying the offshore environment. The camera system is integrated with custom flight planning software that allows each survey flight line to be accurately mapped before the aircraft leaves the ground. Each image capture node is precisely defined, allowing the system to fire the camera exposures at exactly the right location. This ensures that each survey is flown with the same orientation and the camera is triggered at the same position within set tolerances (**Table 1**). APEM's flight planning software enables tolerances along survey lines to be set, meaning the camera system would automatically abort data capture should the aircraft drift away from the planned flight line. The process of automatically aborting data capture is called a 'cutout'. Should this occur, the plane is required to revisit and resurvey the affected section of the survey line.

APEM's on-board camera technician continually monitored the imagery as it was collected to ensure data collected was fit for purpose. The camera technician would make the decision to cease data collection should conditions become unsuitable for surveying or data collection. Subsequently, the survey would then be resumed at the next earliest opportunity. All completed surveys therefore maintained conditions conducive to successful surveying.

Favourable conditions for surveying were defined as: a cloud base (lowest altitude of the visible portion of the cloud) of at least 1,300 ft, according to a geoidal model, to ensure there is no cloud below the planned altitude of the aircraft, visibility of greater than 5 km, wind speed of less than 30 knots, and sea state of 4 (moderate) or less. Naturally, the cloud base may vary in altitude, but aircraft will always fly lower than the lowest cloud level. If cloud base is lower than the planned aircraft altitude the survey would not take place. Whilst the image footprint and GSD both increase with altitude, the focus of the camera lenses ensures no discernible differences within the range of altitudes potentially flown. Wind speed was recorded at the same altitude as the aircraft, whereas sea state was determined from the appearance of the sea surface recorded by the onboard aerial survey technician. The two measures therefore do not necessarily correlate. For safety reasons, no surveying can take place in icing conditions.

Data capture comprised digital still images of an average 1.5 cm GSD. Images at each camera are processed at each node, resulting in slight variation in GSD across the swath width. GSD is smaller than 1.5 cm GSD at the nadir and increases with distance from the nadir, resulting in an average GSD of 1.5 cm. Image resolution is therefore clearest at the nadir, although the variation is small. Images were collected in a continuous transect-based design along a single line covered by three overlapping cameras, using a Global Positioning System (GPS) linked, bespoke flight management system to ensure the tracks were flown with a high degree of accuracy. The aircraft's internal GPS and Inertial Motion Unit (IMU) systems record to an accuracy of +/- 3 to 5 m as standard.

The camera system captured abutting imagery along 11 survey flight lines spaced approximately 20 km apart within the Survey Area (**Figure 2**). The total Survey Area was 18,011 km^2. The aircraft collected the data at an altitude of approximately 1,450 ft (440 m) according to the ellipsoid model as recorded by GPS, equivalent to 1,300 ft (395 m) above geoidal mean sea level, and at a speed of approximately 120 knots. Images were collected continuously along the survey flight lines with slight overlap between image nodes. To avoid double-counting due to image overlap, all image footprints are merged into a single file, for which total area is calculated. A total of 6,396 nodes were initially captured. Of these, 6,297 were used for analysis. The difference reflects nodes removed during clipping to the boundary area. Total coverage was calculated to be 3.45% captured and 3.45% analysed, generated from 6,297 image nodes. A total of six nodes were not captured on line 1 due to

minor camera issues (**Table 2**). The target of 3% coverage was achieved, including a redundancy of an additional 0.45%, which reflects over 10% contingency with respect to the target coverage.

Effort data is calculated as the area (km^2) per image footprint using trigonometric methods and the pinhole camera model (the mathematical relationship between the coordinates of a point in three-dimensional space, and its projection onto the image plane of an ideal pinhole camera). Effort is dependent on altitude, camera angle and aircraft position (pitch, roll and yaw), accounting for variation both between image nodes and individual cameras at each node. Effort data is only calculated for analysed images. It is therefore possible that some images have an effort value of zero. The effort values provided in the GPS log reflect the total footprint of each image and do not account for overlap. Therefore, summing these values for a survey would result in an overestimate of effort. The true effort for a given survey is calculated geospatially by creating polygons for each image footprint and removing the overlapping areas. Summing the analysed footprints and comparing against entire survey area gives the percentage analysed.

Imagery was captured in raw format and post-processed to ensure optimal quality for the subsequent stage of image analysis, to extract information on marine fauna or other notable occurrences. When a survey was completed, data were checked to ensure the number of lines and the number of images collected was correct, and that the quality of the imagery was acceptable. Once image analysis was completed, further quality assurance (QA) processes took place (see **Section 3.3**).

Survey conditions are summarised in **Table 3**. Weather conditions are defined in **Table 4**. Weather conditions during the survey were conducive to collecting and analysing imagery for the purposes of providing data on the identification, distribution, and abundance of bird species and marine fauna within the Survey Area. Whilst relatively strong winds of up to 28 knots were recorded when surveying lines 1 and 2, they did not affect survey success or cause any health and safety issues.

On 21st November, two planes were used to survey lines 1 to 5, and 8 to 11. The initial attempt to survey line 10 was unsuccessful due to camera flushing – a minor and easily-resolved hardware issue in which the camera's memory fills faster than images are saved – resulting in missed nodes. Once the issue was rectified, the line was immediately re-surveyed. One plane attempted to survey lines 6 and 7 on 22nd November. However, low cloud prevented image capture. The lines were therefore re-surveyed on 23rd November.

Measures were taken to minimise glint and glare, such as avoiding surveying when the sun angle had the greatest potential to impact image quality. Furthermore, data collected provided coverage of 3.45%, thus exceeding the 3% coverage required, enabling sufficient coverage to be collected should images be affected by glint or glare.

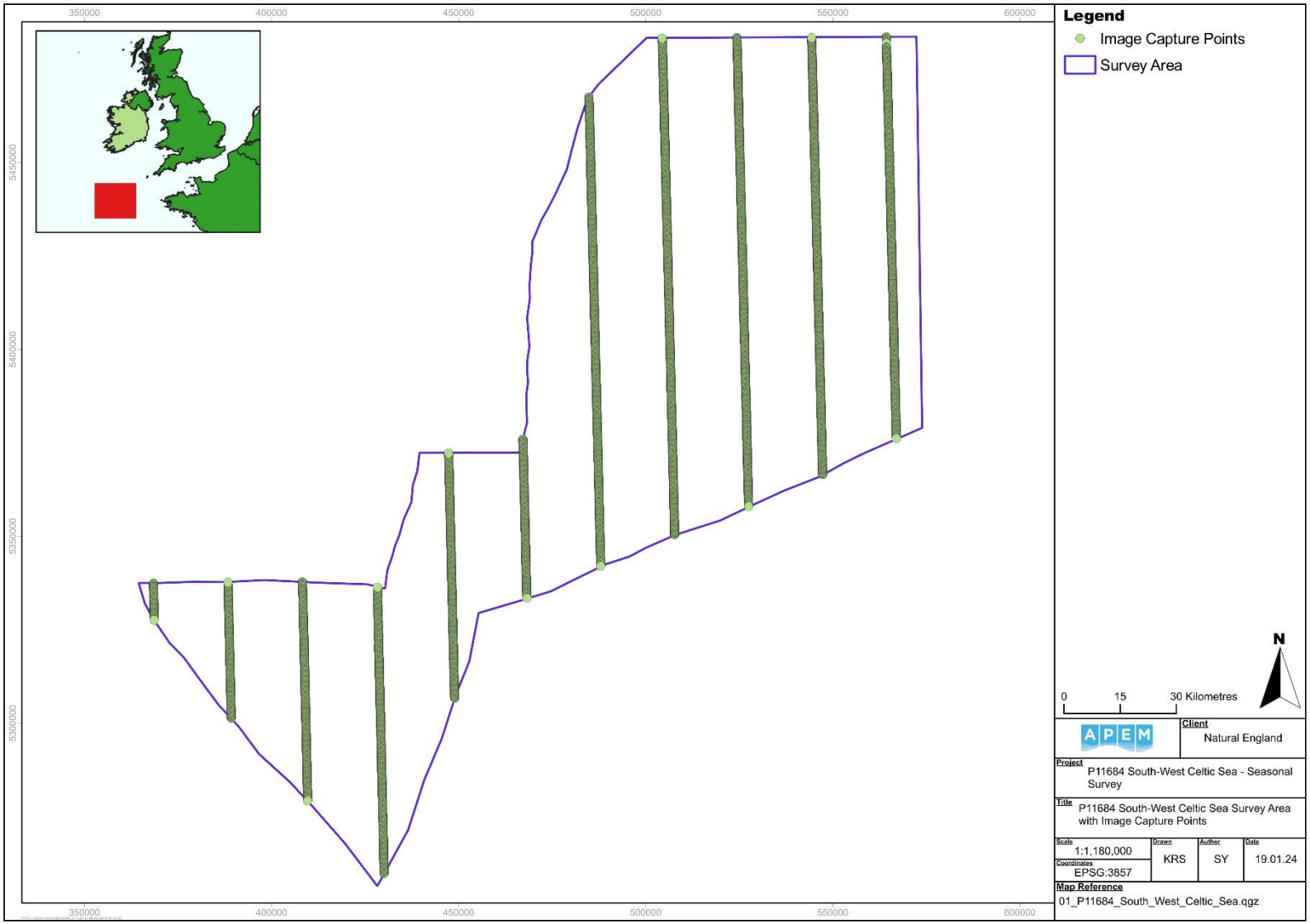

Figure 2 Individual image capture points during the October to December 2023 (November 2023) survey.

Table 1 Lateral and vertical camera tolerances (m). A 'cutout' is the process of automatically aborting data capture. Should this occur, the plane is required to revisit and resurvey the affected section of the survey line.

Survey Tolerances	Warning	Cutout	
Lateral Tolerance	30	60	m
Vertical tolerance	15	30 (No auto cutout)	m

Table 2 Image capture and other observations during the October to December 2023 seasonal survey (November 2023).

Survey line	Transect length (km)	N cameras capturing image	N image nodes (captured)	N image nodes (analysed)	Camera issues*	Shipping observations	Anecdotal observations	Health and Safety
1	107.54	3	757	748	6 missing nodes	-	-	Strong winds
2	116.94	3	829	820	-	-	-	Strong winds
3	125.48	3	888	880	-	-	-	-
4	132.88	3	941	932	-	-	-	-
5	125.57	3	891	881	-	-	-	-
6**	42.52	3	308	299	-	-	-	-
7**	65.61	3	471	461	-	-	-	-
8	76.57	3	547	538	-	-	-	-
9	58.59	3	420	412	-	-	-	-
10***	36.34	3	265	256	-	-	-	-
11	9.83	3	79	70	-	-	-	-

*Due to the vast number of capture points collected during the survey it is not uncommon for camera systems to sometimes miss capture points. Typically, the number of missed capture points is low and random across the site. APEM collected additional data to ensure the required coverage was captured. Additionally, APEM's onboard camera technician monitored data as it was being captured. Surveys are aborted or lines re-surveyed if camera issues impact data collection.

**Very low cloud cover made images unusable on the initial lines 6 and 7 survey attempts on 22nd November. The lines were resurveyed on 23rd November to ensure coverage. All details for lines 6 and 7 within this report refer to the successful resurvey.

***There was an issue with a camera flushing on the initial line 10 survey attempt. The issue was resolved, and the line resurveyed the same day to ensure full coverage. All details for line 10 within this report refer to the successful resurvey.

Table 3 Survey conditions during the October to December 2023 seasonal survey (November 2023).

Survey line	Date	Time (UTC) on line (Start / End)	Ground speed (knots)	Cloud cover (%)	Visibility (km)	Outside temperature (°C)	Wind speed (knots)	Wind direction	Sea state (Douglas)	Turbidity
1	21/11/2023	15:03 / 15:30	125	60	10+	8	22-28	0°	2	1
2	21/11/2023	14:16 / 14:57	120	60	10+	8	22-28	0°	2	1
3	21/11/2023	13:35 / 14:08	130	50	10+	8	22	0°	2	1
4	21/11/2023	12:44 / 13:28	105	50	10+	8	22	0°	2	1
5	21/11/2023	12:02 / 12:35	130	50	10+	8	22	0°	2	1
6	23/11/2023	13:17 / 13:28	119	100	10+	8	10	60°	1	1
7	23/11/2023	13:40 / 14:00	107	100	10+	8	10	60°	1	1
8	21/11/2023	14:03 / 14:25	120	70	10+	9	18	350°	3	2
9	21/11/2023	13:35 / 13:51	120	70	10+	9	18	340°	3	2
10	21/11/2023	13:16 / 13:24	120	70	10+	8	14	350°	3	2
11	21/11/2023	12:40 / 12:43	130	70	10+	9	20	350°	3	2

Table 4 Explanation of weather conditions.

Wind (Beaufort Scale)			Douglas Sea State			Cloud cover (%)		Turbidity	
Scale	**Description**	**Mean wind speed (knots)**	**Scale**	**Description**	**Wave height**	**% Cover**	**Description**	**Scale**	**Description**
0	Calm	0	0	Calm (glass)	No wave	0	Clear	0	Clear
1	Light air	2	1	Calm (rippled)	0 – 0.10 m	1-10	Few	1	Slightly Turbid
2	Light breeze	5	2	Smooth	0.10 – 0.50 m	11-50	Scattered	2	Moderately Turbid
3	Gentle breeze	9	3	Slightly Moderate	0.50 – 1.25 m	51-95	Broken	3	Highly Turbid
4	Moderate breeze	13	*Surveys not typically flown at sea states > 3.*			96-100	Overcast		
5	Fresh breeze	19	4	Moderate	1.25 – 2.50 m				
6	Strong breeze	24							
7	Near gale	30							
8	Gale	37							

3.2 Species Identification

The images were analysed to enumerate birds and marine mammals to species level where possible. Targets identified from the images were 'snagged' (i.e., located within the images) and categorised.

There were occasions when it was not possible to identify an individual in the digital aerial survey imagery to the species level and the individual was therefore identified as belonging to a higher-level taxonomic group (e.g., 'small gull species' or 'dolphin / porpoise species'). The possible groups and the individual species attributed to them are listed in **Table 5** for birds and **Table 6** for marine mammals.

Table 5 Avian species included within higher-level taxonomic groups for the October to December 2023 seasonal survey period (November 2023)

<table>
<tr><th>Species</th><th>Group Level 1</th><th>Group Level 2</th><th>Group Level 3</th><th>Group Level 4</th></tr>
<tr><td>Grey phalarope</td><td colspan="3">Wader species</td><td rowspan="14">Unidentified bird species</td></tr>
<tr><td>Kittiwake</td><td>Small gull species</td><td rowspan="3">Gull species</td><td rowspan="4">Fulmar and / or gull species</td></tr>
<tr><td>Great black-backed gull</td><td rowspan="2">Large gull species</td></tr>
<tr><td>Lesser black-backed gull</td></tr>
<tr><td>Fulmar</td><td colspan="2"></td></tr>
<tr><td>Great skua</td><td colspan="3">Skua species</td></tr>
<tr><td>European storm petrel</td><td colspan="3" rowspan="2">Storm petrel species</td></tr>
<tr><td>Leach's storm petrel</td></tr>
<tr><td>Guillemot</td><td rowspan="2">Guillemot and / or razorbill</td><td rowspan="3">Auk species</td><td rowspan="5">Auk and / or shearwater species</td></tr>
<tr><td>Razorbill</td></tr>
<tr><td>Puffin</td><td colspan="2"></td></tr>
<tr><td>Great Shearwater</td><td>Large shearwater</td><td rowspan="2">Shearwater species</td></tr>
<tr><td>Sooty Shearwater</td><td>Small shearwater species</td></tr>
</table>

Table 6 Marine mammal species included within higher-level taxonomic groups for the October to December 2023 seasonal survey period (November 2023).

<table>
<tr><th>Species</th><th>Group level 1</th><th>Group Level 2</th><th>Group Level 3</th><th>Group Level 4</th><th>Group Level 5</th></tr>
<tr><td>Common Dolphin</td><td rowspan="2">Patterned dolphin species</td><td rowspan="2">Dolphin species</td><td rowspan="3">Dolphin / porpoise species</td><td rowspan="3">Marine mammal species</td><td rowspan="5">Marine organism</td></tr>
<tr><td>Striped Dolphin</td></tr>
<tr><td>Harbour Porpoise</td><td colspan="2"></td></tr>
<tr><td>Atlantic bluefin tuna</td><td colspan="4" rowspan="2">Bony fish species</td></tr>
<tr><td>Ocean sunfish</td></tr>
</table>

3.3 Summary of Quality Assurance

Internal QA was carried out on the data collected during the survey. This consists of two steps:

The first step in the QA process, referred to as Blank QA, reviewed percentage agreement between images identified as positive (containing at least one target of interest) and those identified as blank (not containing any targets of interest). A random sample of 20% of survey imagery were subjected to a QA audit review, in which agreement in positive images (those containing any target of interest) should reach 90% agreement versus the main analysis of the whole survey. Where 90% agreement was not reached, a complete re-analysis of the survey data was undertaken. This consisted of analysing each image from the survey again, and extra positives from the re-analysis and QA audit are included in the data. For the current survey, the initial agreement was 99%. No re-analysis was necessary on this occasion.

The second step of the QA process, referred to as Species ID QA, reviewed species identifications. Target (snag) identifications made by image analysts were reviewed by our dedicated QA team and an agreement rate determined. If the original identification made by the image analyst matched that made by the QA analyst, this was considered agreement. Agreement was also made if the original and the QA identifications were both within the same taxonomic grouping, for example an initial identification of guillemot / razorbill, and a QA identification as guillemot. This method was adopted by BTO's method of species identification QA. A minimum of 10% of snags are checked with the proportion increasing depending on survey difficulty and accuracy of identifications. For this survey 100% of identifications were checked due to the relatively small number of targets overall. For the current survey, the identification agreement rate was 93%.

3.4 Species Distribution Maps

Each animal recorded during the surveys was geo-referenced, enabling locations to be related to the boundary of the Survey Area. Corresponding coordinates for each observation were accurate to ±/- 3 to 5 m. Spatial distribution maps for birds and other marine megafauna within the Survey Area have been produced using QGIS by separating individual species records during the surveys and representing these as symbols on a map. Symbols are determined by the species group, with a relevant icon and a unique colour assigned on a per species basis, the latter of which allows for a differentiation across the board between species that use the same icon. Icons in the distribution map will appear to overlap when individuals recorded during the surveys are in close proximity to each other.

3.5 Species Flight Heights

Bird flight heights were estimated from the digital still images using a size-based methodology developed by APEM from techniques described by Johnston and Cook (2016)[1]. They were determined using bespoke APEM software that applies a set of rules developed in-house and trigonometry to provide an estimate of flight height above mean sea level (MSL). 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 (based on reference lengths taken from the literature) bird measurements, image GSD (the distance between pixel centres), the known height of the aircraft as the image was taken, and the pitch, roll, and yaw of the aircraft. These parameters are entered into

[1] Johnston, A. and Cook, A.S.C.P., 2016. *How High Do Birds Fly?: Development of Methods and Analysis of Digital Aerial Data of Seabird Flight Heights*. British Trust for Ornithology.

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 wingspan from the image) or other aspects that may affect the body length measurement. Such birds are removed from the sample used to calculate flight heights. Flight height data is included within the separate raw data files.

4. Abundance and distribution

4.1 Abundance

A total of 584 birds were recorded in the Survey Area during the October – December 2023 seasonal (November 2023) survey. Of those, 205 were sitting on the water and 379 were in flight (**Table 7)**.

A total of 163 marine megafauna were recorded in the Survey Area (**Table 8**). Scientific names and taxonomy of species recorded are provided in **Appendix I Scientific Names and Taxonomy**.

Table 7 Total number of individuals of birds by species or species group recorded during the October to December 2023 seasonal survey period (November 2023).

Species Group	Species	Flying	Sitting	Perched	Diving	Taking off	Deceased	Total
Waders	Grey phalarope	8	11	-	-	-	-	**19**
Gulls	Kittiwake	175	63	-	-	-	-	**238**
	Great black-backed gull	-	1	-	-	-	-	**1**
	Lesser black-backed gull	8	-	-	-	-	-	**8**
	Large gull species	2	1	-	-	-	-	**3**
Skua	Great skua	2	-	-	-	-	-	**2**
Auk	Guillemot	1	2	-	-	-	-	**3**
	Guillemot / razorbill	-	19	-	-	-	-	**19**
	Puffin	-	56	-	-	-	-	**56**
	Auk species	-	3	-	-	-	-	**3**
Petrel	Storm petrel species	60	-	-	-	-	-	**60**
Fulmar	Fulmar	109	36	-	-	-	-	**145**
Fulmar / gulls	Fulmar / gull species	-	1	-	-	-	-	**1**
Shearwaters	Sooty shearwater	2	-	-	-	-	-	**2**
	Great shearwater	1	4	-	-	-	-	**5**
Auk / shearwater	Auk / shearwater species	-	2	-	-	-	-	**2**
Gannet	Gannet	10	6	-	-	-	-	**16**
Owl	Long-eared owl	1	-	-	-	-	-	**1**
Total		**379**	**205**	**-**	**-**	**-**	-	**584**

Table 8 Total number of individuals of marine megafauna by species or species group recorded during the October to December 2023 seasonal survey period (November 2023).

Species Group	Species	Deeply Submerged*	Submerged**	Surfacing	Bottling***	Hauled Out	Deceased	Total
Dolphin	Common dolphin	2	123	5	-	-	-	**130**
	Striped dolphin	-	3	1	-	-	-	**4**
	Patterned dolphin species	-	6	-	-	-	-	**6**
	Dolphin species	4	7	-	-	-	-	**11**
Dolphin / porpoise	Dolphin / porpoise	-	1	1	-	-	-	**2**
Bony fish	Ocean sunfish	-	5	-	-	-	-	**5**
	Atlantic bluefin tuna	-	2	-	-	-	-	**2**
Shark	Blue shark	-	3	-	-	-	-	**3**
Total		**6**	**150**	**7**	-	-	-	**163**

*The target is far beneath the surface so that many features are difficult to distinguish. Deeply submerged targets may be difficult to identify to species level.

**The target is wholly underwater, within the first few metres of the surface. Features use to aid identification are usually visible.

*** Applies to seals, where the head is positioned above the surface and the rest of the body is submerged vertically.

4.2 Spatial Distribution

Figure 3 and **Figure 4** show the locations of all birds and other marine megafauna, respectively, recorded in the Survey Area. **Figure 5** to **Figure 8** show the locations of the most abundant birds by species within the Survey Area. **Figure 9** shows the aggregated distribution of less abundant bird species recorded in the Survey Area. **Figure 10** shows the location of common dolphins within the Survey Area and **Figure 11** shows the aggregated distribution of less abundant marine megafauna recorded in the Survey Area. Birds were distributed across the Survey Area with the highest concentrations recorded on flight lines six and seven. Marine megafauna species were primarily recorded in the southwestern parts of the Survey Area on flight lines six to 11, though records were also made further east and north.

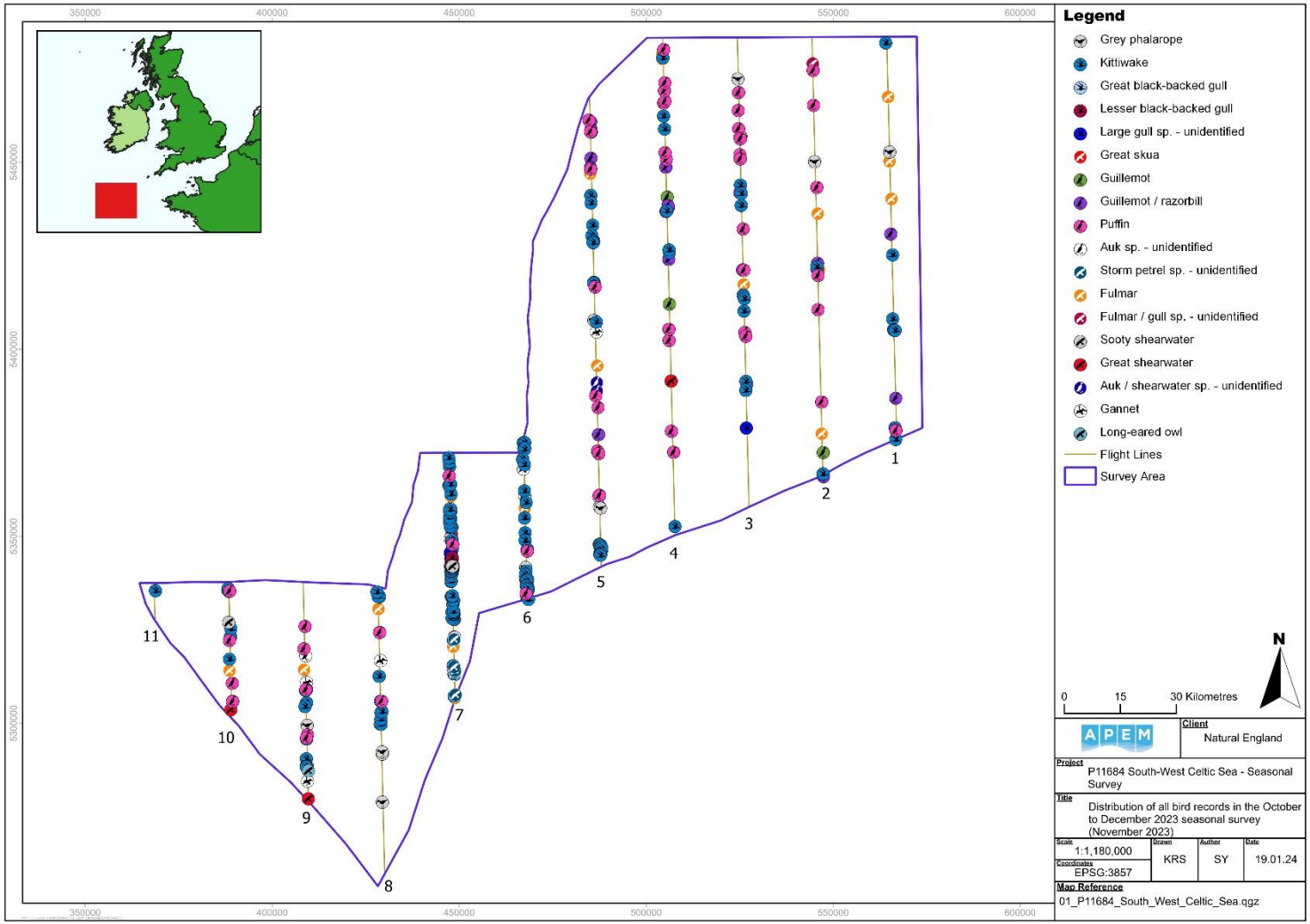

Figure 3 Distribution of all birds recorded in the October to December 2023 seasonal survey (November 2023).

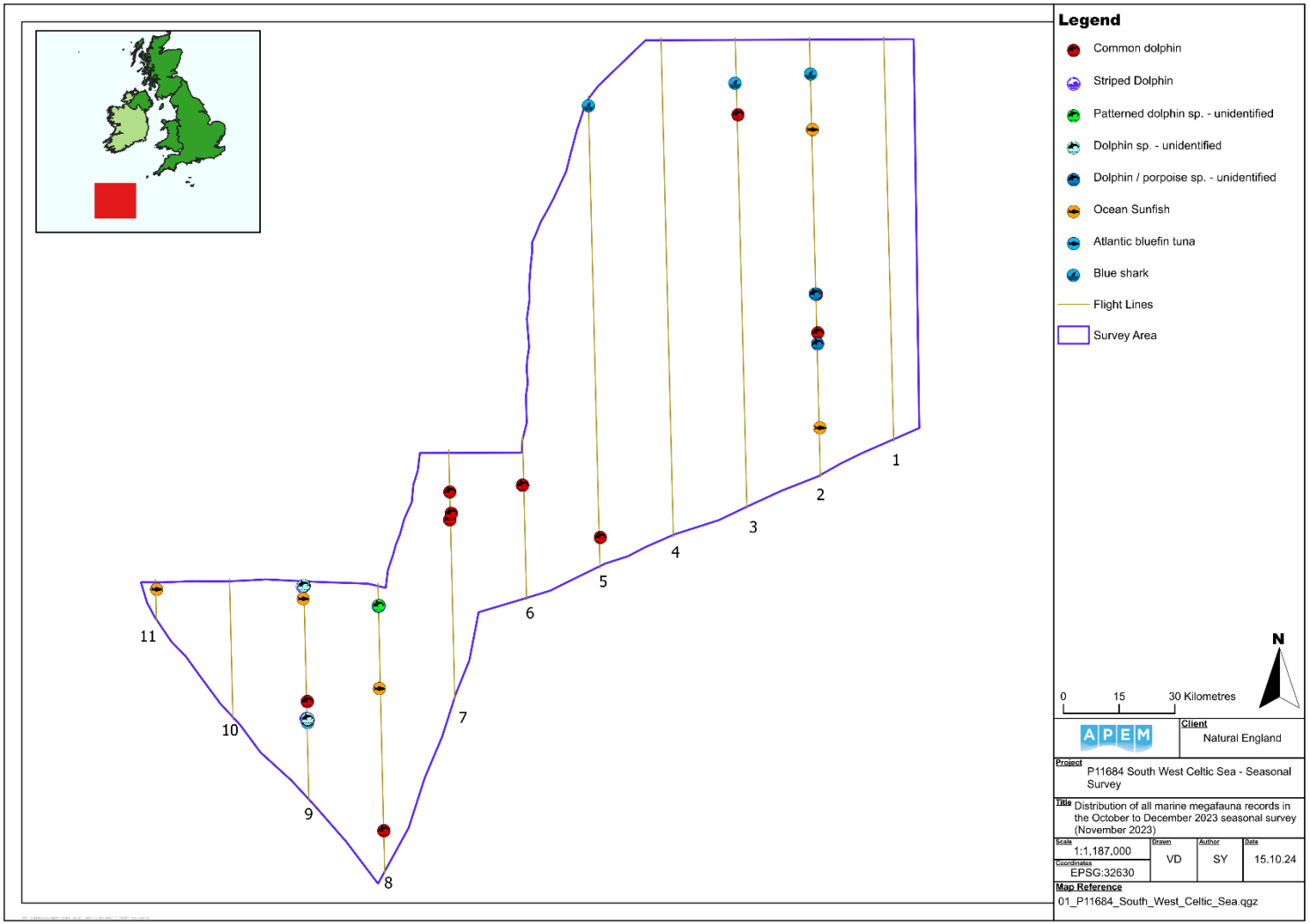

Figure 4 Distribution of all marine megafauna recorded in the October to December 2023 seasonal survey (November 2023)

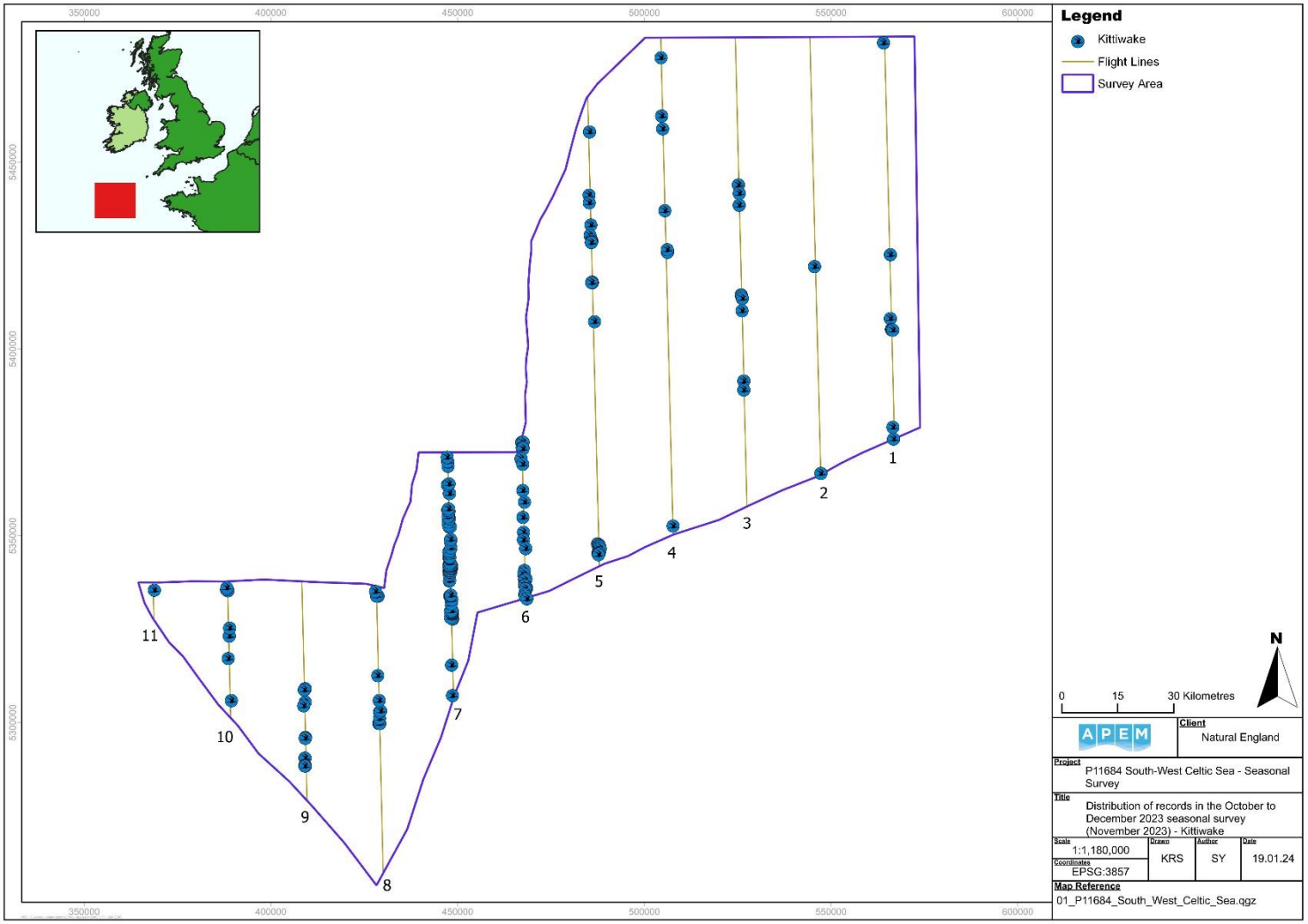

Figure 5 Kittiwake distribution recorded in the October to December 2023 seasonal survey (November 2023).

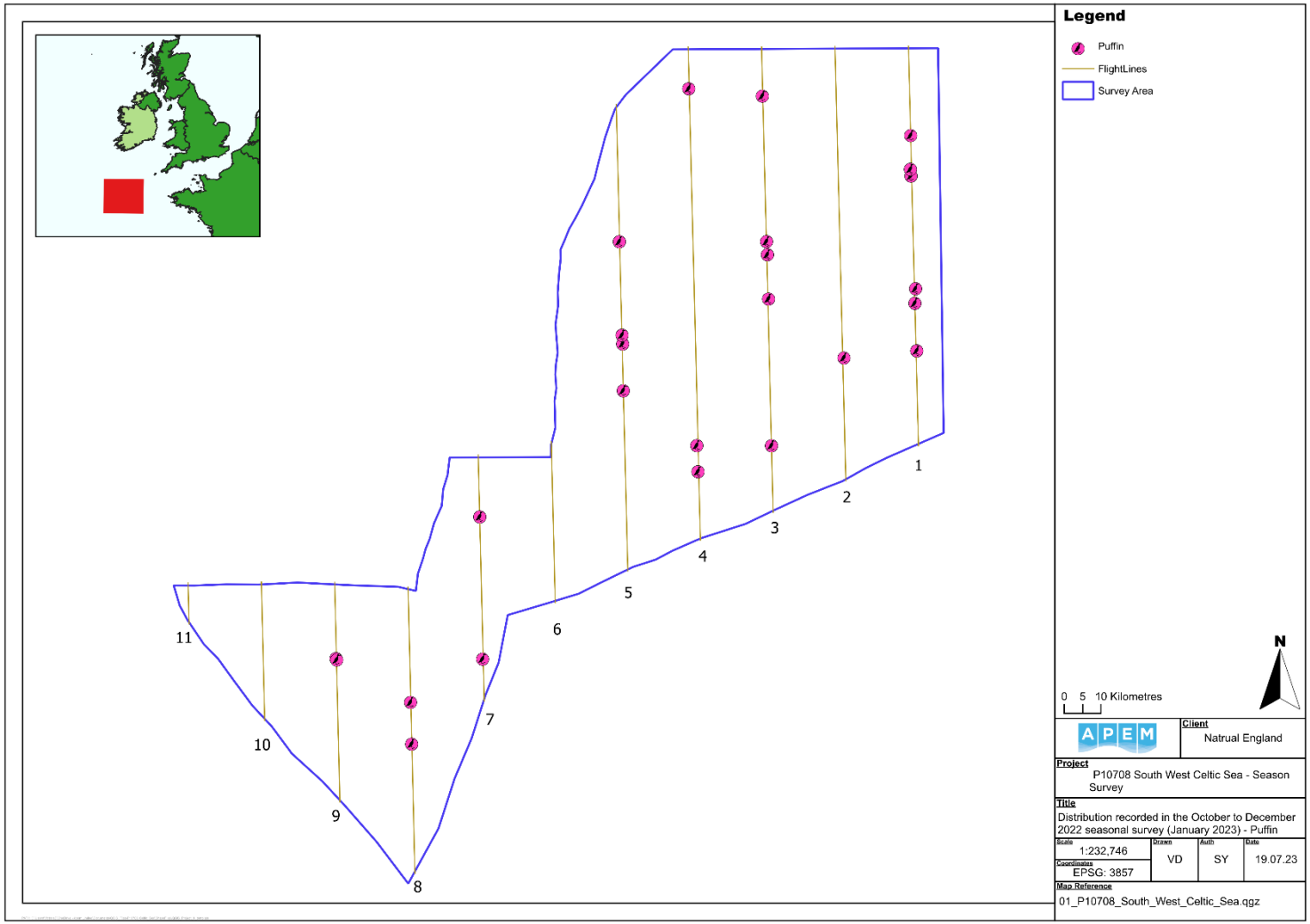

Figure 6 Puffin distribution recorded in the October to December 2023 seasonal survey (November 2023).

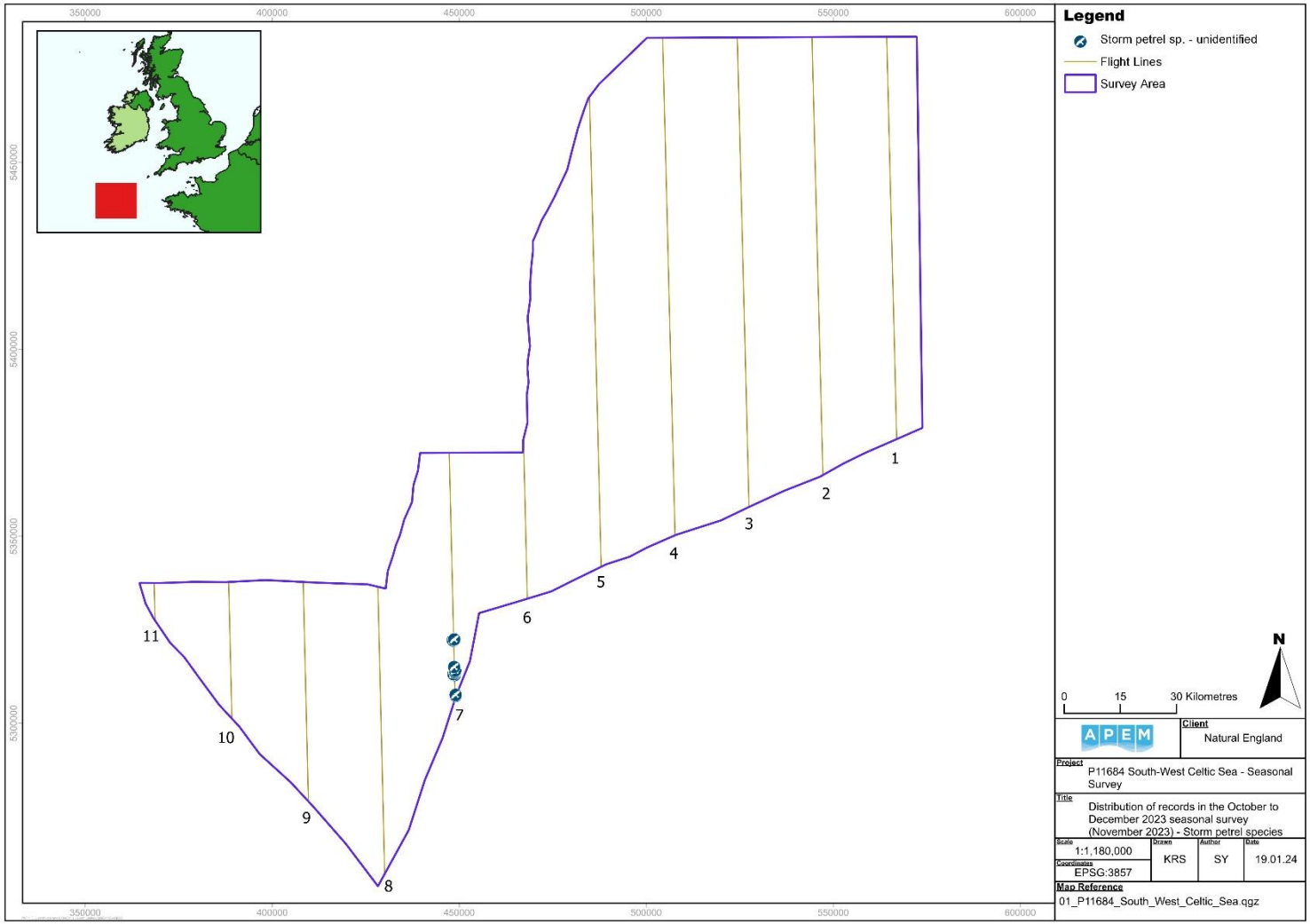

Figure 7 Storm petrel species distribution recorded in the October to December 2023 seasonal survey (November 2023).

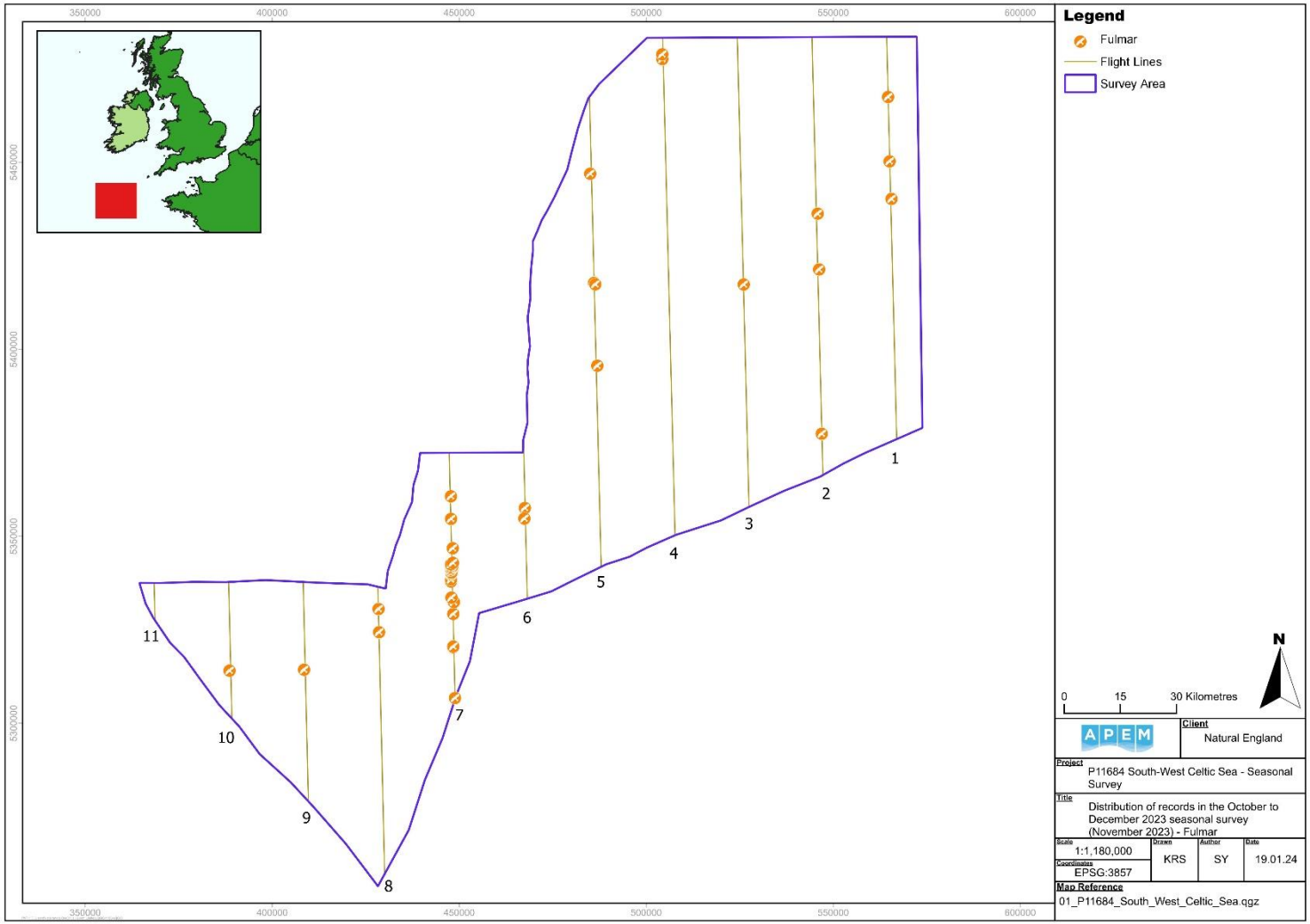

Figure 8 Fulmar distribution recorded in the October to December 2023 seasonal survey (November 2023).

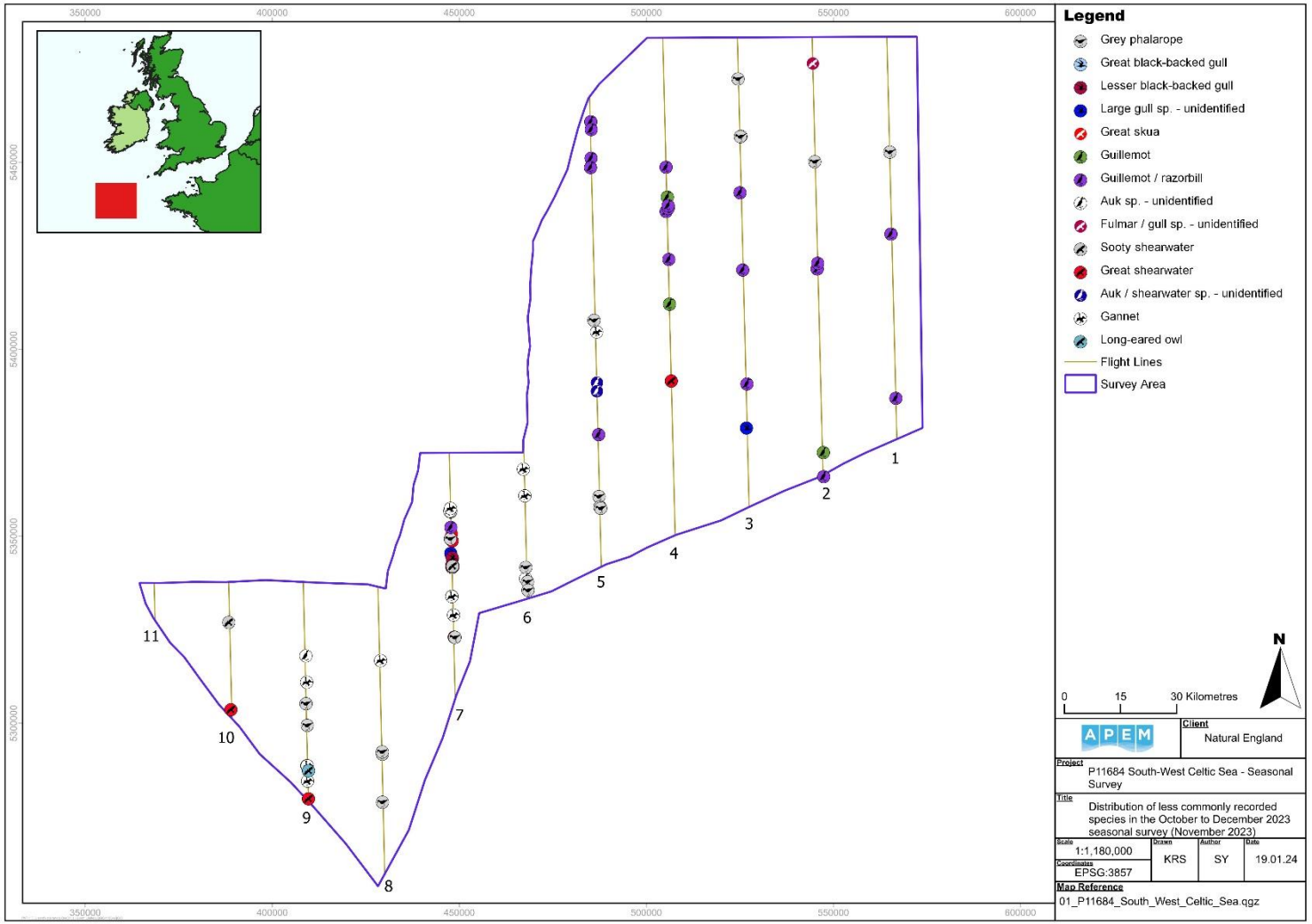

Figure 9 Distribution of less abundant bird species recorded in the October to December 2023 seasonal survey (November 2023).

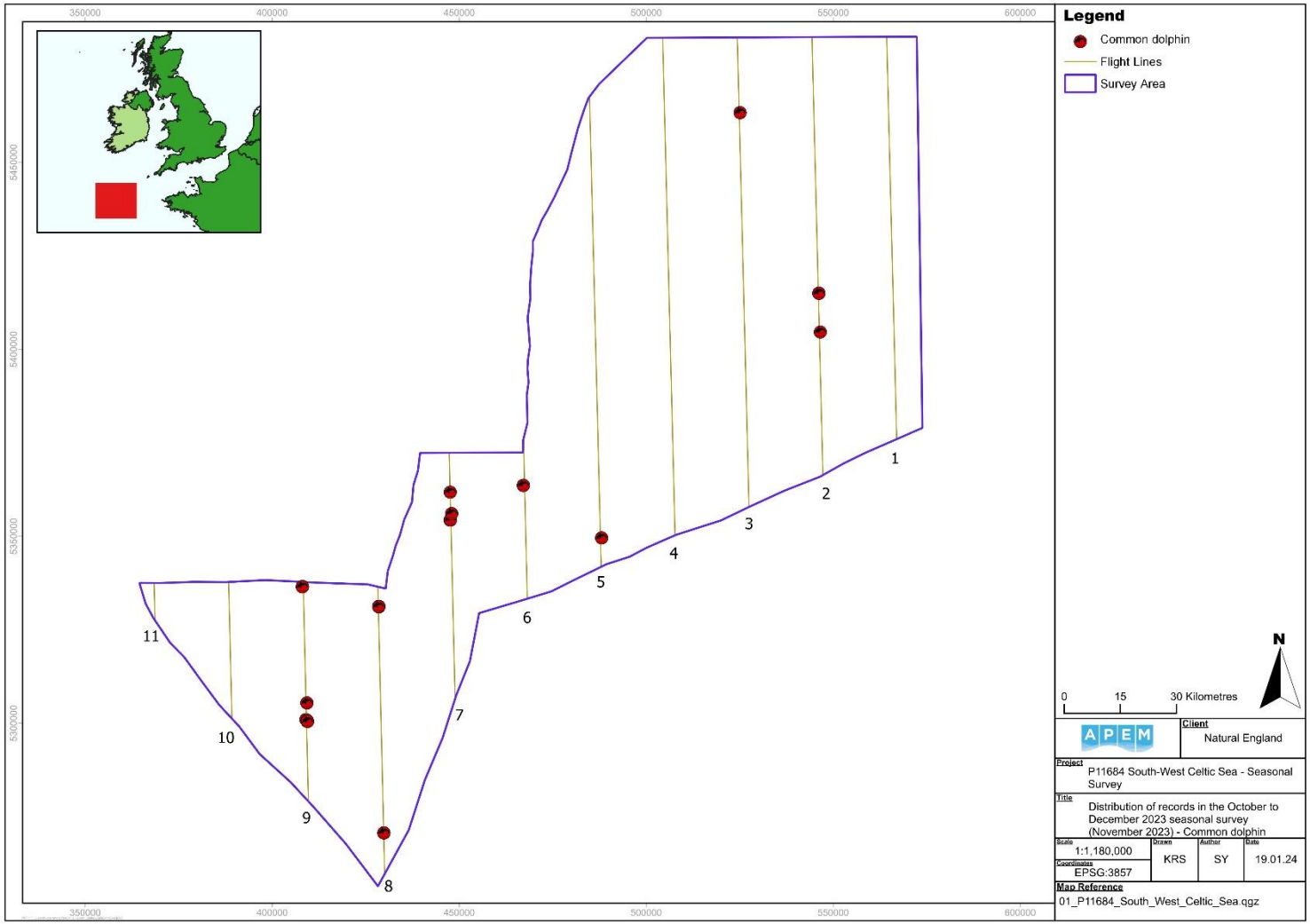

Figure 10 Common dolphin distribution recorded in the October to December 2023 seasonal survey (November 2023).

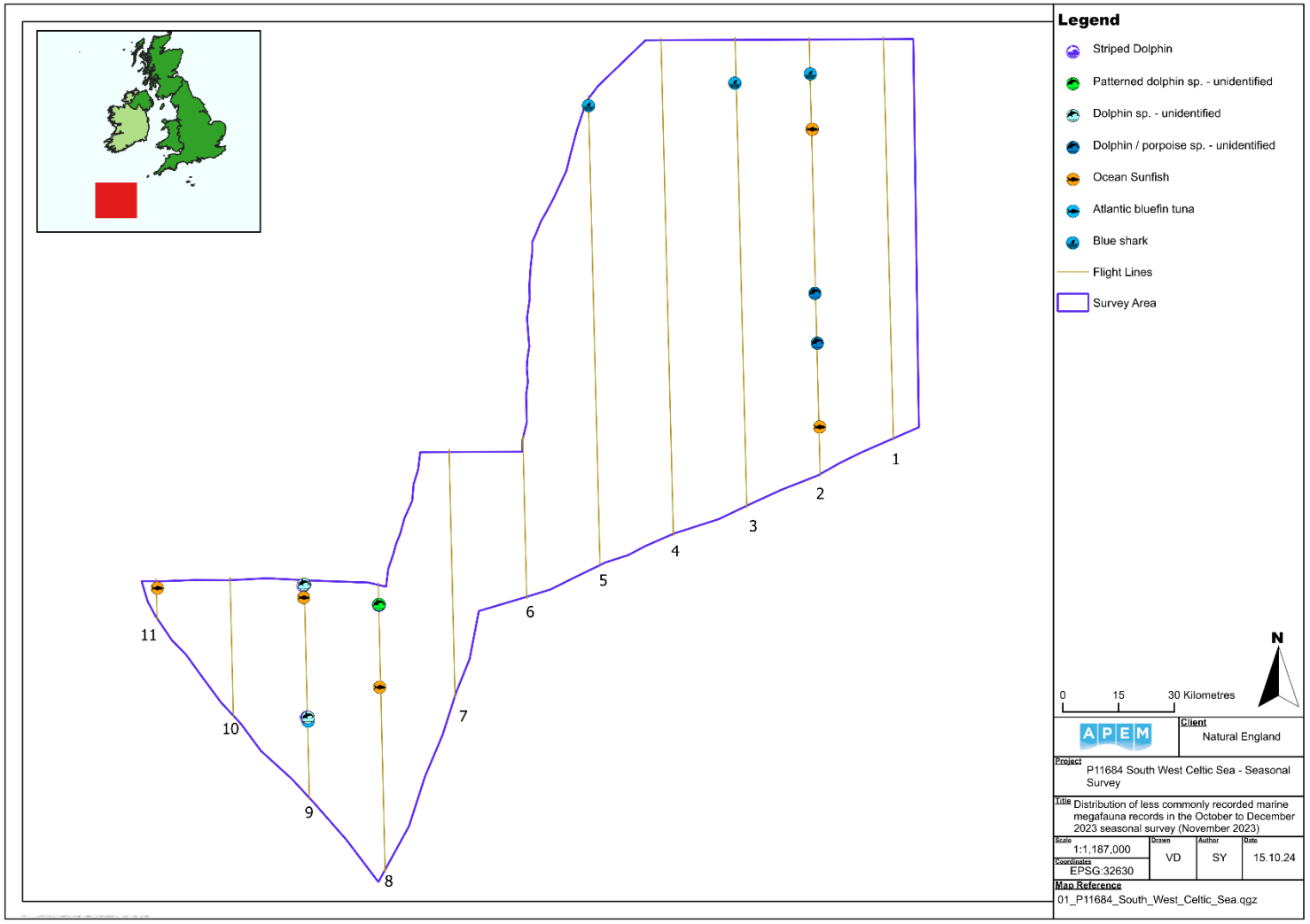

Figure 11 Distribution of less abundant marine megafauna recorded in the October to December 2023 seasonal survey (November 2023).

5. Abiotic Structures and Observations

No abiotic structures were observed during the survey period.

Appendix I Scientific Names and Taxonomy

Scientific names and taxonomy for all species can be found in the below appendix.

Species	Scientific.Name
Grey phalarope	*Phalaropus fulicarius*
Kittiwake	*Rissa tridactyla*
Great black-backed gull	*Larus marinus*
Lesser black-backed gull	*Larus fuscus*
Great skua	*Stercorarius skua*
Puffin	*Fratercula arctica*
Fulmar	*Fulmarus glacialis*
Sooty shearwater	*Ardenna grisea*
Great shearwater	*Ardenna gravis*
Gannet	*Morus bassanus*
Long-eared owl	*Asio otus*
Common dolphin	*Delphinus delphis*
Striped dolphin	*Stenella coeruleoalba*
Atlantic bluefin tuna	*Thunnus thynnus*
Ocean sunfish	*Mola mola*
Blue shark	*Prionace glauca*

Appendix II Example images (snags) of birds and marine mammals.

Images are jpeg files of a lower resolution than those used by image analysts when performing identifications.

Figure 12 Common dolphins

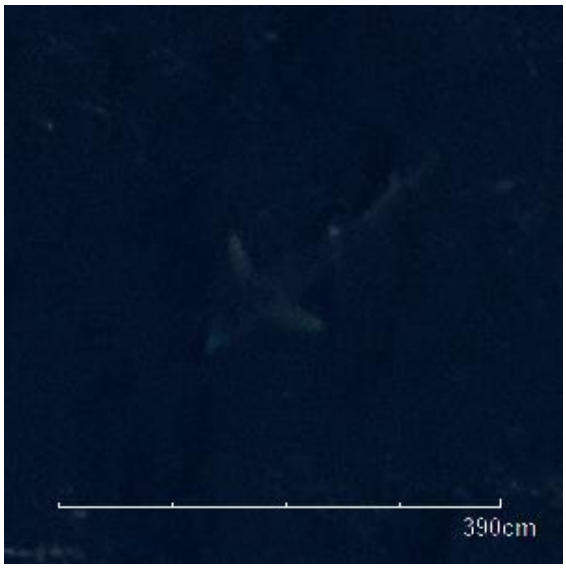

Figure 13 Blue shark. Although submerged, it is still visible and identifiable

Figure 14 Long-eared owl in flight

Figure 15 Gannet in flight, still easy identifiable against the glare

Figure 16 Sitting fulmar

Figure 17 Sitting grey phalarope