Spiorad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 13.1: Digital Aerial Bird and Marine Megafauna Surveys Report, Volume 2

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Year 2 Final Report – March 2022 to February 2024

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Executive Summary

This report constitutes the final report outlining results from digital aerial surveys conducted between March 2022 and March 2024 at Spiorad na Mara proposed offshore windfarm site for Spiorad na Mara Limited. Surveys were undertaken using APEM's high-resolution camera system to capture digital still imagery of birds and marine megafauna within the proposed offshore wind farm site and a 10-kilometre (km) buffer referred to as the Survey Area for the remainder of this report.

Surveys were successfully carried out on a monthly basis for the duration of this report, with no technical or safety issues. However, delays due to bad weather affected four surveys, specifically: December 2022 was carried out in January 2023, December 2023 was carried out in January 2024, January 2024 was carried out in February 2024 and February 2024 was carried out in March 2024.

A peak of 3,915 observations were recorded in July 2022, of which 3,898 were observations of birds and 17 observations of marine megafauna.

The key findings from each monthly digital aerial survey are as follows:

- Survey 1 – March 2022
  - A total of 1,146 birds and 36 marine megafaunas were recorded. The most abundant species recorded in March was guillemot with 292 observations. There were 15 species groups recorded in this survey, 10 bird groups and five marine megafauna groups.
- Survey 2 – April 2022
  - A total of 1,426 birds and eight marine megafaunas were recorded. The most abundant species recorded in April was razorbill with 389 observations. There were 14 species groups recorded in the survey, 11 bird groups and three marine megafauna groups.
- Survey 3 – May 2022
  - A total of 453 birds and 10 marine megafaunas were recorded. The most abundant species recorded in May was guillemot with 181 observations. There were 15 species groups recorded in this survey, 12 bird groups and three marine megafauna groups.
- Survey 4 – June 2022
  - A total of 360 birds and 26 marine megafaunas were recorded. The most abundant species recorded in June was guillemot with 111 observations. There were 14 species groups recorded in the survey, 11 bird groups and three marine megafauna groups.
- Survey 5 – July 2022
  - A total of 3,898 birds and 17 marine megafaunas were recorded. The most abundant species recorded in July was puffin with 2,340 observations. There were 17 species groups recorded in this survey, 13 bird groups and four marine megafauna groups.
- Survey 6 – August 2022
  - A total of 423 birds and eight marine megafaunas were recorded. The most abundant species recorded in August was gannet with 169 observations. There were 17 species groups recorded in this survey, 14 bird groups and three marine megafauna groups.

- Survey 7 – September 2022
    - A total of 1,646 birds and 74 marine megafaunas were recorded. The most abundant species recorded in September was guillemot with 603 observations. There were 19 species groups recorded in this survey, 13 bird groups and six marine megafauna groups.
- Survey 8 – October 2022
    - A total of 322 birds and six marine megafaunas were recorded. The most abundant species recorded in October was guillemot with 110 observations. There were 13 species groups recorded in this survey, 11 bird groups and two marine megafauna groups.
- Survey 9 – November 2022
    - A total of 182 birds and five marine megafaunas were recorded. The most abundant species recorded in November was kittiwake with 69 observations. There were 11 species groups recorded in this survey, 10 bird groups and one marine megafauna group.
- Survey 10 – December 2022
    - A total of 214 birds were recorded. The most abundant species recorded in December was fulmar with 117 observations. There were six bird groups recorded.
- Survey 11 – January 2023
    - A total of 511 birds and 17 marine megafaunas were recorded. The most abundant species recorded in January was kittiwake with 244 observations. There were 14 species groups recorded in this survey, 10 bird groups and four marine megafauna groups.
- Survey 12 – February 2023
    - A total of 773 birds and 57 marine megafaunas were recorded. The most abundant species recorded in February was kittiwake with 369 observations. There were 16 species groups recorded in this survey, 12 bird groups and four marine megafauna groups.
- Survey 13 – March 2023
    - A total of 750 birds and 14 marine megafaunas were recorded. The most abundant species recorded in March was guillemot with 274 observations. There were 13 species groups recorded in this survey, 11 bird groups and two marine megafauna groups.
- Survey 14 – April 2023
    - A total of 526 birds and five marine megafaunas were recorded. The most abundant species recorded in April was fulmar with 185 observations. There were 12 species groups recorded in this survey, 10 bird groups and two marine megafauna groups.
- Survey 15 – May 2023
    - A total of 447 birds and 104 marine megafaunas were recorded. The most abundant species recorded in May was fulmar with 95 observations. There were 15 species groups recorded in this survey, 12 bird groups and three marine megafauna groups.

- Survey 16 – June 2023
    - A total of 540 birds and 17 marine megafaunas were recorded. The most abundant species recorded in June was guillemot with 116 observations. There were 14 species groups recorded in this survey, 11 bird groups and three marine megafauna groups.
- Survey 17 – July 2023
    - A total of 647 birds and nine marine megafaunas were recorded. The most abundant species recorded in July was Arctic tern with 114 observations. There were 18 species groups recorded in this survey, 13 bird groups and five marine megafauna groups.
- Survey 18 – August 2023
    - A total of 1,186 birds and ten marine megafaunas were recorded. The most abundant species recorded in August was razorbill with 393 observations. There were 15 species groups recorded in this survey, 12 bird groups and three marine megafauna groups.
- Survey 19 – September 2023
    - A total of 1,224 birds and 30 marine megafaunas were recorded. The most abundant species recorded in September was guillemot with 640 observations. There were 17 species groups recorded in this survey, 13 bird groups and four marine megafauna groups.
- Survey 20 – October 2023
    - A total of 254 birds and 46 marine megafaunas were recorded. The most abundant species recorded in October was puffin with 57 observations. There were 15 species groups recorded in this survey, 10 bird groups and five marine megafauna groups.
- Survey 21 – November 2023
    - A total of 132 birds and seven marine megafaunas were recorded. The most abundant species recorded in November was guillemot with 27 observations. There were 11 species groups recorded in this survey, nine bird groups and two marine megafauna groups.
- Survey 22 – December 2023
    - A total of 259 birds and two marine megafaunas were recorded. The most abundant species recorded in December was fulmar with 145 observations. There were 12 species groups recorded in this survey, 10 bird groups and two marine megafauna groups.
- Survey 23 – January 2024
    - A total of 486 birds and 137 marine megafaunas were recorded. The most abundant species recorded in January was guillemot with 110 observations. There were 14 species groups recorded in this survey, nine bird groups and five marine megafauna groups.
- Survey 24 – February 2024
    - A total of 696 birds and 17 marine megafaunas were recorded. The most abundant species recorded in February was kittiwake with 284 observations. There were 13 species groups were recorded in this survey, 11 bird groups and two marine megafauna groups.

Below (**Table 1 - Table 2**) are summary tables of the raw counts for all species recorded in the March 2022 to February 2024 surveys; presented in four, three-month periods.

Table 1 Number of individual birds recorded in the Survey Area for between March 2022 and February 2024 grouped in three-month periods

Species	Number of individuals per quarter								
	Year 1 DAS (2022-2023)				Year 2 DAS (2023-2024)				Total
	Breeding		Non-breeding		Breeding		Non-breeding		
	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	
Greylag goose	0	26	0	0	0	0	0	0	26
Swan species	0	0	0	1*	0	0	0	0	1
Anser species	35	0	0	0	0	0	0	0	35
Common eider	79	4	32	40	117	5	52	55	384
Wigeon	0	6	0	0	0	0	0	0	6
Black-tailed godwit	0	8	0	0	0	0	0	0	8
Curlew	0	4	0	8	2	0	3	2	19
Oystercatcher	0	0	0	2	5	1	0	1	9
Wader species	0	17	2	0	0	4	5	0	28
Rock dove	0	1	0	0	0	0	0	0	1
Kittiwake	95	55	168	628	174	35	38	305	1,498
Common gull	7	2	5	5	4	38	14	8	83
Black-headed gull	0	0	1	0	0	4	1	0	6
Small gull species	0	7	0	1	0	2	4	4	18
Great black-backed gull	9	3	26	38	13	6	19	22	136
Herring gull	16	23	16	11	6	6	18	41	137
Lesser black-backed gull	0	2	0	0	0	0	0	0	2
Large gull species	1	0	1	2	0	0	2	2	8
Gull species	0	1	1	1	0	0	0	0	3
Arctic tern	46	148	0	0	5	189	0	0	388
Common tern	5	1	0	0	0	2	0	0	8
'Commic'[1] tern	7	45	1	0	0	49	0	0	102
Tern species	0	1	0	0	0	0	0	0	1
Great skua	3	1	1	0	0	0	0	0	5
Arctic skua	0	0	0	0	0	0	1	0	1
Guillemot	767	329	730	263	503	555	696	246	4,089
Razorbill	634	151	108	54	71	415	202	131	1,766
Guillemot / razorbill	296	120	328	53	50	78	90*	174	1,189
Black guillemot	41	57	8	10	33	8	26	28	211
Puffin	65	2,361	137	10	81	436	163	9	3,262
Auk species	56	28	171	11	17	11	34	38	366
Red-throated diver	3	1	5	4	3	8	6	7	37

Species	Number of individuals per quarter								
	Year 1 DAS (2022-2023)				Year 2 DAS (2023-2024)				Total
	Breeding		Non-breeding		Breeding		Non-breeding		
	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	
Great northern diver	50	3	7	13	34	0	13	33	153
Diver species	0	0	1	2	1	0	0	1	5
European storm petrel	0	0	0	0	0	0	1	0	1
Storm petrel species	0	1	17	0	0	1	2	0	21
Fulmar	493	162	56	249	455	168	32	261	1,876
Fulmar / gull species	0	0	3	1*	1	2	1	7	15
Cory's shearwater	0	1	0	0	0	0	0	0	1
Sooty shearwater	0	0	1	0	0	1	2	0	4
Manx shearwater	4	404	29	0	0	57	1	0	495
Small shearwater species	0	40	1	0	0	5	0	0	46
Auk / shearwater species	20	203	17	0	6	73	2	0	321
Gannet	203	350	133	21	89*	188	143*	12	1,139
Cormorant	1	0	0	0	0	0	2	0	3
Shag	51	11	109	0	20	0	0	1	192
Cormorant / shag	24	78	9	38	9	19	30	37	244
Passerine species	0	0	0	0	4	0	0	0	4
Unidentified bird species	13	6	22	14	20*	7*	7	14	103
Total	**3,024**	**4,661**	**2,146**	**1,480**	**1,723**	**2,373**	**1,610**	**1,439**	**18,456**

[1] *'Commic' refers to either common or Arctic tern*

* *Refers to the presence of deceased individual (s). For further details, see Table 10*

Table 2 Number of individual non-avian megafauna recorded in the Survey Area for between March 2022 and February 2024 grouped in three-month periods

Species	Number of individuals per quarter								
	Year 1 DAS (2022-2023)				Year 2 DAS (2023-2024)				Total
	Breeding		Non-breeding		Breeding		Non-breeding		
	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	Q1 Mar-May	Q2 Jun-Aug	Q3 Sep-Nov	Q4 Dec-Feb	
Grey seal	4	19	9	8	74	1	6	6	127
Common seal	8	0	0	0	5	2	1	0	16
Seal species	3	4	15	5	21	3	28	5	84
Minke whale	1*	0	0	0	0	1	0	0	2
Bottlenose dolphin	0	1	0	0	0	0	0	0	1
Common dolphin	9	0	29	8	0	7	20	34	107
Risso's dolphin	5	11	0	0	0	2	0	0	18
White-beaked dolphin	0	0	0	0	6	0	0	3	9
Orca	0	0	0	7	0	0	0	0	7
Dolphin species	2	0	0	0	0	0	18	0	20
Harbour porpoise	16	4	4	37	17	14	3	58	153
Dolphin / porpoise species	3	2	1	9	0	4	5	48	72
Marine mammal species	2	0	1	0	0	0	0	1	4
Blue shark	0	1	25	0	0	0	0	0	26
Basking shark	0	0	0	0	0	1	0	0	1
Ocean sunfish	0	0	1	0	0	1	0	0	2
Atlantic bluefin tuna	0	0	0	0	0	0	1	0	1
Fish species	0	9	0	0	0	0	0	0	9
Leatherback turtle	0	0	0	0	0	0	1	0	1
Unidentified marine organism	0	0	0	0	0	0	0	1	1
Total	**53**	**51**	**85**	**74**	**123**	**36**	**83**	**156**	**661**

** Refers to the presence of deceased individual (s). For further details, see Table 10*

1 Introduction

APEM has been contracted by Spiorad na Mara Limited for the supply of a pre-application survey programme consisting of 24 monthly digital aerial surveys. The surveys commenced in March 2022 and were completed in March 2024. Where a survey was delayed until the subsequent month, it has been considered as still representative of the planned survey month and referred to as such throughout – the final survey which took place in March 2024, is still therefore referred to as the February 2024 survey. The main purpose of the programme was to provide baseline information on the distribution and abundance of seabirds and marine megafauna within Spiorad na Mara Array Area (161 km^2) and a 10-kilometre (km) buffer (779 km^2; referred collectively to as the 'Survey Area' [940 km^2]) (**Figure 1**). These surveys will support the work required by Spiorad na Mara Limited to inform future Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA).

The survey method was designed to optimise data collection for birds and marine mammal species. APEM's bespoke digital still camera system was fitted into a twin-engine aircraft. The survey design used 2.2 km spaced flight lines (**Figure 1**) to capture approximately 30% coverage of the sea surface, of which 10% was analysed in a grid-based survey design. The survey was flown at approximately 1,300 feet (ft) (396 meters [m]) and captured a ground sampling distance (GSD) of 1.5 centimetres (cm). During the surveys, the camera system captured abutting still imagery along 19 survey lines at a speed of approximately 120 knots.

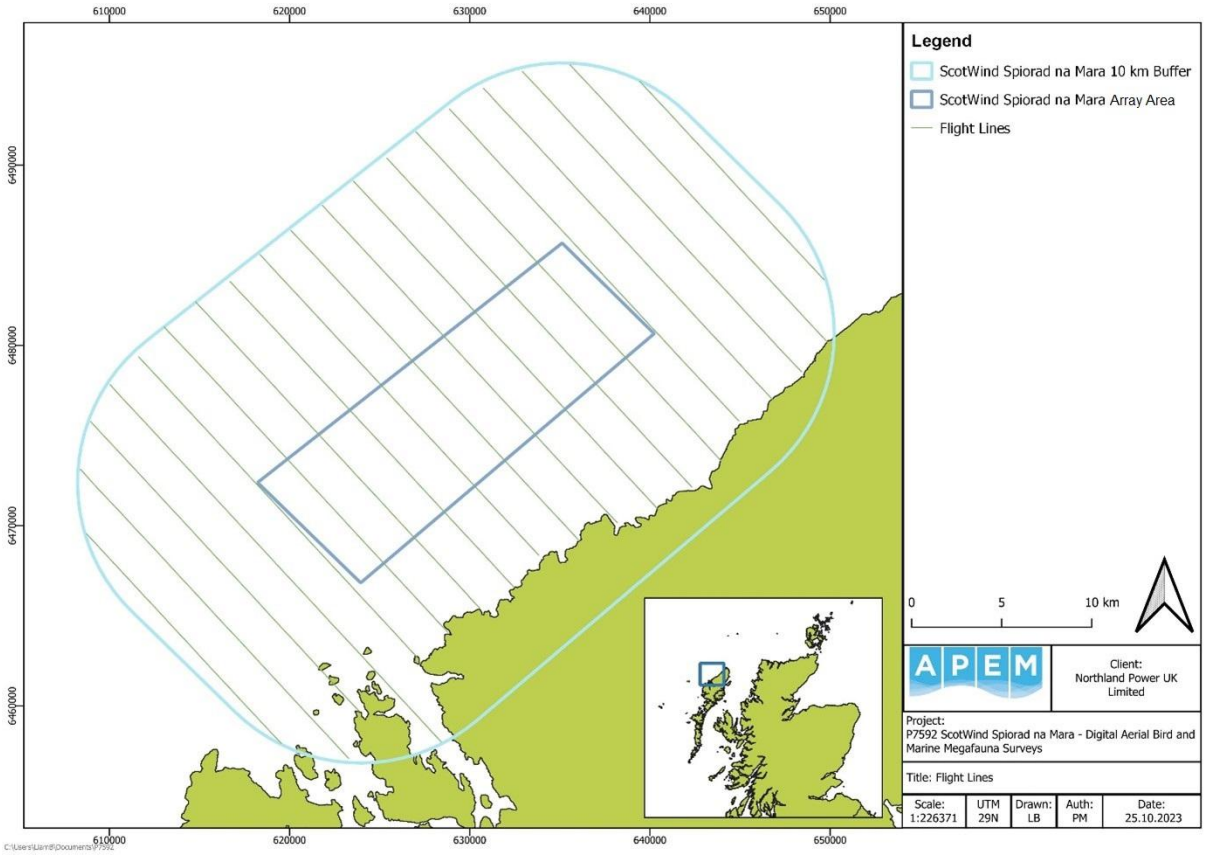


Figure 1 Flight lines of the digital aerial still imagery of the Spiorad na Mara Array Area plus 10 km Buffer

The Spiorad na Mara array area is set in an area approximately 5-13 kilometres off the west coast of the Isle of Lewis (**Figure 1**).

The proposed survey design for the study area utilised a design to capture data within the area of potential Development as well as a buffered area extending out to 10 km, exclusive of the onshore zone, where the 10 km Buffer overlaps with the land. It is necessary to capture information on the surrounding area of proposed Developments (the Buffer) as certain species exhibit displacement and disturbance behaviours (NatureScot, 2023a). It has been shown that species inhabiting nearshore environments, such as divers and sea ducks, are particularly sensitive to offshore Developments, including associated disturbance from boat and helicopter traffic (Marine Scotland Directorate, 2019; NatureScot, 2023b, c). For these species, a 10 km connectivity distance should be assumed; the 10 km buffer captured in these surveys ensures that this range is covered.

Further information on the basic overview of the expected species assemblage that may be captured during the survey, can be found in the method statement provided by APEM (2023). Special Areas of Conservation (SAC) that feature non-ornithological species in proximity of the Spiorad na Mara Development include Loch Roag Lagoons (9 km), Lewis Peatlands (11 km south), Tràigh na Berie (12 km), Langavat (19 km), Inner Hebrides and the Minches (28 km), and North Harris (31 km). Additionally, the Lewis Peatlands SAC boundary constitutes part of the greater Ramsar site of the same name, beginning at a minimum distance of 9 km from the Development. Special Protection Areas (SPAs) that feature ornithological species in proximity of the Spiorad na Mara Development include the Lewis Peatlands SPA (9 km), West Coast of the Outer Hebrides (32 km), Flannan Isles (33 km), Seas off St Kilda (47 km), Shiant Islands (52 km), North Rona and Sula Sgeir (70 km), and St Kilda (100 km). On the eastern coast of Lewis and Harris, the Northeast Lewis Marine Protected Area (MPA) is located at a minimum distance of 21 km from the Development. The extent of protected areas surrounding Spiorad na Mara Development can be seen in **Figure 2**. Note that for the purpose of this report, a radius of 100 km surrounding the Survey Area was considered to identify conservation areas in proximity of the Survey Area. It is recognised that displayed conservation areas do not reflect an exhaustive list of sites with connectivity to the Survey Area based on foraging ranges of expected species. Identification of all sites with potential connectivity to the Survey Area falls outside of the scope of this report and is generally undertaken for consent risk and HRA level reporting. Species of interest predicted to forage within or close to the survey area, based on the identified designated sites listed above, include:

- Kittiwake
- Great black-backed gull
- Great skua
- Guillemot
- Razorbill
- Puffin
- Red-throated diver
- Black-throated Diver
- European Storm petrel
- Leach's Storm petrel
- Fulmar
- Manx shearwater
- Gannet
- Harbour porpoise
- Risso's dolphin
- Harbour seal
- Grey seal

However, it is acknowledged that species designated to other protected areas not listed may also be present within the Survey Area during migration.

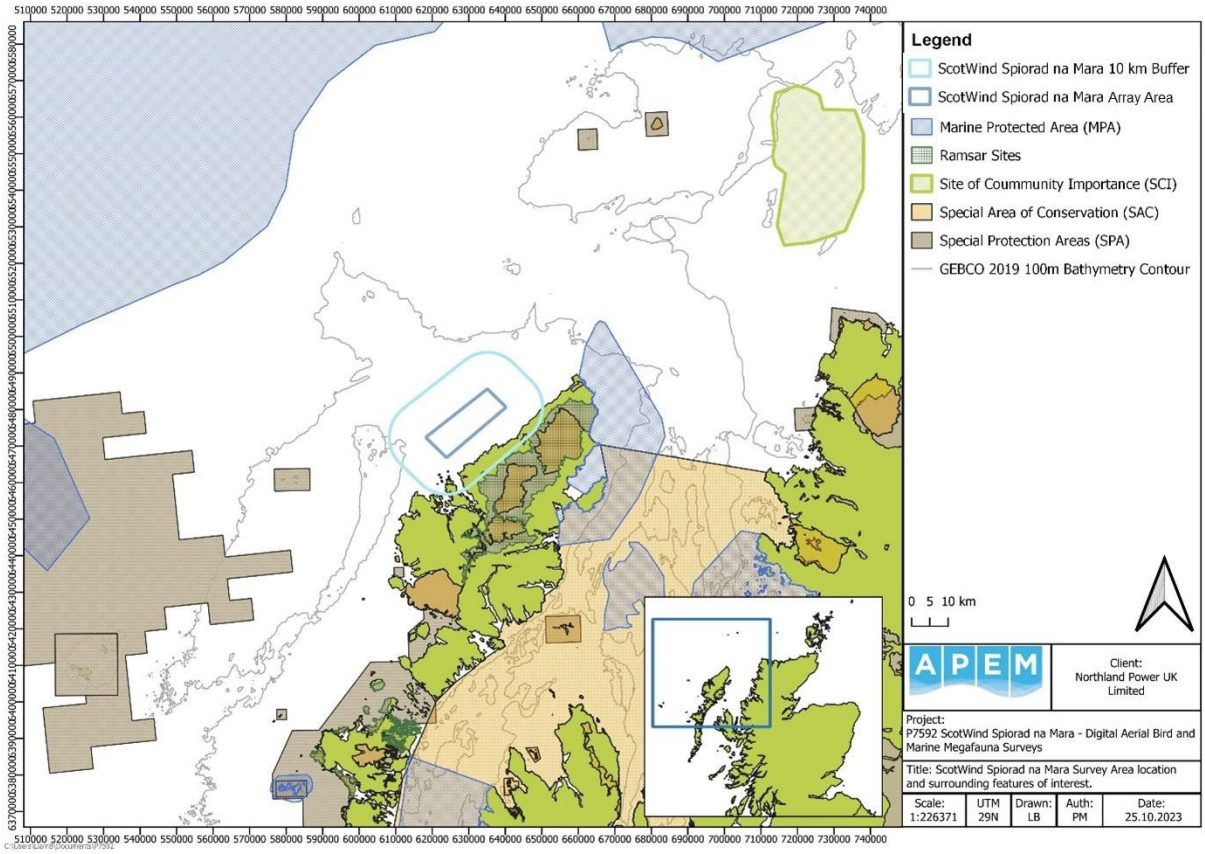


Figure 2 **Location of Spiorad na Mara Array Area and 10 km Buffer, designated protected areas and surrounding features of interest.**

2 Survey and Analysis Methodologies

2.1 Digital Aerial Survey Methods

The methods and results presented in this report are from surveys of the Development plus a 10 km Buffer using APEM's bespoke camera system the 'Shearwater IV' customised by in-house specialists for surveying the offshore environment. The camera system was integrated with custom flight planning software that allowed each survey transect to be accurately mapped out before the aircraft left the ground. Each image capture node was precisely defined, allowing the system to trigger the camera at exactly the right location. This ensures each survey was flown with the same transect orientation and the camera was triggered at the same position along each transect within set tolerances. APEM's planning systems enable set tolerances along survey lines which automatically abort those that drift away from the planned flight line.

During each survey, APEM's on-board camera technician continually monitored imagery as it was collected to ensure the data were fit for purpose. If weather conditions became unsuitable, the surveys were terminated and flown at a later, more suitable, date as seen with Survey 10 from December 2022, Survey 22 from December 2023, Survey 23 from January 2024, and Survey 24 from February 2024.

Data captured comprises 1.5 cm GSD digital still images collected in a grid-based design using a Global Positioning System (GPS)-linked, bespoke flight management system to ensure the tracks are flown with a high degree of accuracy. The aircraft's internal GPS and Inertial Measurement Unit (IMU) systems record to an accuracy of +/- three to five metres (m) as standard.

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. After the completion of surveys, the data were checked to ensure the number of lines and images was correct and ensure the quality of the imagery.

In accordance with the APEM methodology, additional imagery was captured to serve as an alternative dataset for analysis, ensuring sufficient coverage in case the primary images were negatively affected. However, no additional imagery was required for the surveys presented here as the primary dataset met all the necessary criteria for analysis.

The date(s), start, and end times are presented below in **Table 3**.

Table 3 Date and start / end time (Coordinated Universal Time) for each flight for the March 2022 to February 2024 surveys.

Survey No.	Date	Start Time (HH:MM)	End Time (HH:MM)
1	26/03/2022	09:19	14:10
		14:31	16:21
2	15/04/2022	07:36	12:33
3	15/05/2022	10:45	14:32
4	01/06/2022	09:37	15:03
5	21/07/2022	12:52	19:28
6	26/08/2022	08:36	13:46

Survey No.	Date	Start Time (HH:MM)	End Time (HH:MM)
7	10/09/2022	08:19	14:47
8	29/10/2022	07:59	12:32
9	21/11/2022	09:47	15:17
10	03/01/2023	09:28	14:44
	04/01/2023	09:35	14:10
11	13/02/2023	09:55	14:52
12	24/02/2023	09:15	14:07
13	23/03/2023	12:42	17:22
14	15/04/2023	12:22	17:26
15	02/05/2023	07:25	11:31
16	09/06/2023	12:55	17:00
17	14/07/2023	07:42	12:30
18	09/08/2023	07:58 12:18	11:22 14:48
19	07/09/2023	07:50	12:37
20	17/10/2023	08:53	13:37
21	12/11/2023	10:41	14:22
22	05/01/2024	08:35	13:45
23	14/02/2024	11:45	15:22
24	03/03/2024	09:15	14:51

Following rescheduling, weather conditions (**Table 4**) during all surveys were conducive to collecting and analysing imagery to provide data on the identification, distribution, and abundance of bird species and marine megafauna within the Survey Area. Favourable conditions for surveying were defined as a cloud base of >1,700 ft, visibility of >5 km, wind speed of <30 knots, and Douglas Scale Sea state of three (slight) or less. For safety reasons, no surveying took place in icing conditions. Poor weather prevented the initial surveys from four surveys from being completed in the scheduled month; these were subsequently concluded in the following month (**Table 5**). No health or safety issues were reported during the surveys.

Measures were taken to minimise glint and glare such as avoiding surveying when the sun angle has the greatest potential to impact image quality. Additional imagery was also captured as part of the APEM methodology that could have been selected as an alternative dataset for analysis to ensure sufficient coverage should images be negatively affected.

The number of images and coverage captured per survey are presented in **Table 6**. For all surveys, analysed capture exceeded the required 10%.

Table 4 Weather conditions recorded for the March 2022 to February 2024 surveys.

Survey No.	Date	Douglas Sea State[1]	Turbidity[2]	Wind Speed (knots) / Direction	Cloud Cover (%)[3]	Visibility (km)	Air Temp (°C)
1	26/03/2022	0	0-1	2-8 / NW, S, N	20-50	>10	7

Survey No.	Date	Douglas Sea State[1]	Turbidity[2]	Wind Speed (knots) / Direction	Cloud Cover (%)[3]	Visibility (km)	Air Temp (°C)
2	15/04/2022	2	0	10-15 / S	90-100	>10	12
3	15/05/2022	1	2	5 / S	40	>10	9
4	01/06/2022	1	1	8-10 / E	20	>10	9-10
5	21/07/2022	1	2	4-7 / W-NNW	100	15-20	9-10
6	26/08/2022	2	1	10 / WSW	60-65	>10	11
7	10/09/2022	2	0	5 / S-SW	0-10	>10	13-15
8	29/10/2022	0-1	1	7-16 / ESE	50-80	>10	10
9	21/11/2022	2-3	2	27-30 / E	5-30	>10	5-6
10	03/01/2023	1	2	15 / NW	70-90	20	4-6
	04/01/2023	1	1	11 / W	70	>10	7
11	13/02/2023	2-4	1-3	30 / S	40-100	>10	6
12	24/02/2023	3	3	20-25 / NE	40-100	>10	4-5
13	23/03/2023	3	0	14-21 / SW	0-100	>10	5
14	15/04/2023	1-2	1	14-17 / S	30-70	>10	7-8
15	02/05/2023	1	2	15-32 / E	70-95	>30	4
16	09/06/2023	1	0	6-26 / NE	0-10	>10	11-13
17	14/07/2023	1	1	14-31 / E	10-30	>10	10-11
18	09/08/2023	2	1	8-13 / NE	80-95	>10	9
19	07/09/2023	0-1	1	30-36 / NNE	30-90	>10	19
20	17/10/2023	2	1	3-12 / ESE	10-60	>10	9-10
21	12/11/2023	1-2	1	14-18/ E	5-10	>10	4
22	05/01/2024	3-4	1-2	21-28 / W-WNW	40-90	5->10	4-6
23	14/02/2024	0-2	0-1	6-10 / E-ENE	25-45	>10	5-6
24	03/03/2024	1-2	1	15-20 / S	45-90	>10	5

[1] *0 = Calm (Glassy), 1 = Calm (Rippled), 2 = Smooth, 3 = Slightly Moderate, 4 = Moderate*

[2] *0 = Clear, 1 = Slightly Turbid, 2 = Moderately Turbid, 3 = Highly Turbid*

[3] *0 = Clear, 1-10 = Few, 11-50 = Scattered, 51-95 = Broken, 96-100 = Overcast*

Table 5 Surveys flown in subsequent month due to poor weather.

Survey No.	Scheduled Month	Date Flown
10	December 2022	3rd & 4th January 2023
22	December 2023	5th January 2024
23	January 2024	14th February 2024
24	February 2024	3rd March 2024

Table 6 Number of images and analysed survey coverage for each monthly survey

Survey No.	No. of Images	Analysed Coverage (%)
1	3,063	11.66
2	3,015	11.52
3	3,027	11.65
4	3,024	11.80
5	3,050	11.67
6	3,024	11.64
7	3,018	11.65

Survey No.	No. of Images	Analysed Coverage (%)
8	3,021	11.44
9	3,030	11.58
10	3,030	11.50
11	3,021	11.64
12	3,029	11.73
13	3,030	11.65
14	3,021	11.50
15	3,030	11.57
16	3,006	11.30
17	3,030	11.52
18	3,024	11.67
19	3,030	11.66
20	3,030	11.56
21	3,030	11.46
22	3,030	11.61
23	3,027	11.44
24	3,030	11.73

2.2 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. Scientific names and taxonomy of birds and marine megafauna are provided in Appendix I Scientific Names and Taxonomy, with JNCC Species Group Codes provided in Appendix II JNCC Species and Taxa Grouping Level Codes of Seabirds and Marine Megafauna.

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 7** for birds and **Table 8** for marine mammals and other marine megafauna.

Note: Whilst some species groups have been included for clarity as part of the broader group levels (i.e., tern species), they were not recorded in the surveys. Likewise, whilst common terns form part of the 'commic' tern designation, no common terns were recorded. Some designations (e.g., small gull species) are not exhaustive and only include species recorded for this report.

Note: Sooty shearwaters have been categorised as 'small shearwater species' despite being recognised as a medium to large shearwater. This is because they are more readily confused with the smaller shearwaters in aerial imagery, particularly in poor image quality and in the outer parts of the footprint.

Table 7 Avian species included within 'unidentified' groups for the March 2022 to February 2024 survey period.

Species	Group Level 1	Group Level 2	Group Level 3	Group Level 4
Greylag goose	Anser species	Wildfowl		Unidentified bird species
Common eider	Duck species			

Species	Group Level 1	Group Level 2	Group Level 3	Group Level 4
Wigeon				
Black-tailed godwit	Wader species			
Curlew				
Oystercatcher				
Kittiwake	Small gull species		Gull species	
Common gull				
Black-headed gull				
Great black-backed gull	Black-backed gull species	Large gull species		
Lesser black-backed gull				
Herring gull				
Common tern	'Commic' tern		Tern species	
Arctic tern				
Great skua	Skua species			
Arctic skua				
European storm petrel	Storm petrel species			
Leach's storm petrel				
Guillemot	Guillemot and / or Razorbill	Auk species	Auk / shearwater species	
Razorbill				
Black guillemot				
Puffin				
Cory's shearwater	Large shearwater species	Shearwater species		
Great shearwater				
Sooty shearwater	Small shearwater species			
Manx shearwater				
Red-throated diver	Diver species			
Great northern diver				
Fulmar	Fulmar / gull species			
Gannet				
Cormorant	Cormorant / shag			
Shag				

Table 8 Marine mammal and other marine megafauna species included within 'unidentified' groups for the March 2022 to February 2024 survey period.

Species	Group Level 1	Group Level 2	Group Level 3	Group Level 4
Grey seal	Seal species		Marine mammal species	Unidentified marine organism
Common seal				
Common minke whale	Whale species			
Bottlenose dolphin	Dolphin species	Dolphin / porpoise species		
Common dolphin				
Risso's dolphin				
Orca				
Harbour porpoise				
Ocean sunfish	Fish species			
Atlantic bluefin tuna				
Blue shark	Shark species			

Basking shark		
Leatherback turtle	Turtle species	

2.3 Summary of Quality Assurance

APEM's senior image analysts have at least five years' full-time experience identifying birds and marine mammals to species level. They receive ongoing identification training from APEM's quality assurance (QA) manager and access to our regularly updated-in-house Image Archive Library. Images were viewed by a minimum of two members of staff as part of a comprehensive internal QA process.

2.4 Species Abundance Estimates

Statistically robust, design-based population estimates were calculated for all birds identified in the Spiorad na Mara Survey Area. For each monthly digital aerial survey of the Survey Area, geo-referenced locations of birds, marine mammals and other marine megafauna contained within each individual digital still image were used to generate raw counts. Marine fauna locations contained within the boundaries of the Survey Area were then extracted using GIS, providing raw count data. Please note that deceased individuals were excluded from the abundance and density estimate calculations because the aim is to assess species' populations in the Survey Area at the time of surveying, at which time a deceased individual would no longer form part of the population. As a result, raw counts henceforth may not reflect those reported in monthly reports.

These raw counts were divided by the number of images collected to give the mean number of animals per image (i). Population estimates (N) for each survey month were subsequently generated by multiplying the mean number of animals per image by the total number of images required to cover the Survey Area (A):

$$N = i\,A$$

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 because it is recommended that a value between 400 and 1,000 is used for distance sampling when estimating abundance of biological populations (Buckland *et al*, 1993). The statistic was evaluated from each of these 999 bootstrap samples and upper and lower 95% confidence intervals of these taken as the variability of the statistic over the population (Efron and Tibshirani, 1993).

A measure of precision was calculated using a Poisson estimator, suitable for a pseudo-Poisson over-dispersed distribution. This produced a CV (coefficient of variation) based on the relationship of the standard error to the mean (Thomas *et al.*, 2010). A target precision of ≤ 0.16 allows the detection of a population change of a factor as small as 2 (Bohlin, 1990). We didn't exclude data with low sighting numbers for the calculations, therefore lower confidence can be expected with a low number of individuals.

All analyses and data manipulation were conducted in the R programming language (R Development Core Team, 2024) and non-parametric 95% confidence intervals were generated using the 'boot' library of function (Canty and Ripley, 2010). This resulted 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 in this report for each monthly abundance estimate. Dividing the monthly abundance estimates by the size of the area covered (Survey Area, Spiorad na Mara Array Area, or Buffer) calculates the associated density (e.g., animals per km^2) for any given species.

Please note that for species abundance and density estimates, raw counts are 'clipped' to the Survey Area, so observations made outside the area are excluded. Therefore, raw counts may not necessarily reflect those reported in monthly survey reports comprising species outside the Buffer boundary when an analysed image has captured such an area.

2.5 Attribution and Apportionment of Unidentified Individuals

APEM identify individuals to species level when there is a high level of confidence. The majority of individuals recorded during the surveys were identified to species level; however, on occasion, we do not have sufficient visual data to identify to species level. In these instances, where possible, individuals are identified to group level only.

For example, when analysing an image containing a group of guillemots and razorbills sitting interspersed amongst one another, there may be some difficulty differentiating between the two species for some of the individuals present. On these occasions, they would be recorded as guillemot / razorbill.

To account for individuals identified to group level only, apportionment is used to estimate, proportionally, the quantities of specific species contained within the group-level species recorded, per monthly survey. For this annual report, apportioning is calculated using the 24 months of abundance estimate data available. Following the same methodology, confidence limits were also apportioned.

For example, if a survey month had 10 'small gull species' recorded (group-level), we would use the proportions of any small gulls identified to species level within the same month to calculate how many of the 'small gull species' recorded are those specific species. If the same survey month contained 20 kittiwakes and 20 common gulls, we would estimate proportionally that the 10 'small gull species' recorded is likely to consist of five kittiwakes and five common gulls.

The apportioned individuals are added to the original abundance estimates to give an apportioned total (for the above example, the apportioned totals would be 25 kittiwakes and 25 common gulls).

As the abundance estimates are divided into Survey Area (Spiorad na Mara Array Area + Buffer), Spiorad na Mara Array Area, and Buffer only, the apportionment is also calculated for each area separately.

For the 24 months of surveys, the individuals identified to group level contained within the dataset were:

Seabirds:

- Anser species
- Wader species
- Small gull species
- Large gull species
- Unidentified gull species
- 'Commic' tern

- Tern species
- Guillemot / razorbill
- Auk species
- Diver species
- Storm petrel species
- Fulmar / gull species
- Small shearwater species
- Auk / shearwater species
- Cormorant / shag
- Passerine species
- Unidentified bird species

Marine megafauna:

- Seal species
- Dolphin species
- Dolphin / porpoise
- Marine mammal species
- Fish species
- Unidentified marine organism

Where no species-specific identification for common tern and Arctic tern is possible (size and plumage features are so similar that it is often difficult to separate them), they remain in the data as 'commic' tern. Similarly, where no species-specific identification for storm petrel species is possible (again, size and plumage features are so similar it is difficult to separate them), they remain in the data as 'storm petrel species' and apportionment does not apply. As a wide-ranging group, unidentified bird species (0.56% of the total of birds recorded across both years in the Survey Area) do not undergo apportionment. Similarly, passerine species and fish species do not undergo apportionment.

Where available, the abundance estimates of species-specific individuals within the same survey month and the same area are used to apportion the group level species (step 1). Where the survey month being apportioned does not contain any specific species within the group-level species, a hierarchy is used to obtain the most relevant data available for apportionment. The hierarchy is in order of relevance, step 1 being used first and then moving onto step 2 if step 1 data is not available, and so on until data is obtained. The apportioning hierarchy is as follows:

Step 1: Same month, same year, same area[†]
Step 2: Same month, same year, Survey Area
Step 3: Same month, same year, Survey Area, different behaviour (use for sitting / diving only)
Step 4: Same (bio-)season, same year, same area[†]
Step 5: Same (bio-)season, same year, Survey Area
Step 6: Same month, different year, same area[†]
Step 7: Same month, different year, Survey Area
Step 8: Same month, different year, Survey Area, different behaviour (use for sitting / diving only)
Step 9: Same (bio-)season, different year, same area[†]
Step 10: Same (bio-)season, different year, Survey Area

[†]*Area refers to the abundance estimates calculated for the specific area being apportioned. This will either be the Spiorad na Mara array area or Buffer only).*

All individuals from the following group levels were apportioned to a specific species: small gull species, large gull species, gull species, tern species, fulmar / gull species, guillemot / razorbills, auk species, auk / shearwater species, small shearwater species, diver species, cormorant / shag, seal species, dolphin species, dolphin / porpoise species and marine mammal species.

Despite the multifaceted process of apportionment, there were a few instances where it was not possible to assign unidentified individuals recorded during a month to a species, as there were no positively identified species in the same month or season where group level identified individuals had been recorded. These were:

- *Anser* species from March 2022 because no other *Anser* species were identified to species level during the survey or the relevant bio-season;
- Cormorant / shag from October and November 2022, and January, October and November 2023, and January 2024 because there were no other flying cormorant / shags were identified to species level during the survey or the relevant bio-season;

Apportioned abundance estimates per species with their confidence limits and density estimates can be found in Section 3 Species Accounts. Apportioned abundance estimates and densities with behaviours for all species, as well as standard deviations for flying birds, can be found in Appendix III Raw Data Abundance and Density.

2.6 Availability Bias

For auk species such as guillemot, razorbill and puffin which make foraging dives underwater, a proportion will not be detectable at the surface during analysis of survey images. As a result, density and abundance estimates need to be adjusted to allow for this 'availability bias'. A species-specific correction factor was applied to the number of each auk species recorded on the sea surface.

The correction factor applied to each relevant auk species is based on that recommended by Joint Nature Conservation Committee (JNCC) in a submission during the examination phase of the East Anglia ONE offshore wind farm, referred to by JNCC as Method C (JNCC, 2013). This applies a correction factor based on aerial surveys recording 76% of sitting guillemots and 83% of sitting razorbills, which suggests that 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 monthly to create revised population estimates. The correction factors applied to the relative abundance estimate of guillemot, razorbill and puffin sitting on the sea surface are 1.311, 1.211 and 1.165, respectively. The 'corrected' abundance estimates for guillemots and razorbills are presented in the relevant sections later in this report.

Aerial imagery can capture individual megafauna at the sea surface as well as beneath the surface. The depth to which megafauna can be detected is dependent on water turbidity, but may extend up to 10 metres into the water column in clear water. Therefore, correction factors are applied to account for the expected presence of individuals too deep to detect. For harbour porpoise, the seasonal correction factors from Voet *et al.*, (2017) were applied to the total monthly abundance estimates (submerged and surfacing). The correction factors consider the probability of harbour porpoise being within the upper 2 m of the water column and therefore assumed to be detected by the aerial surveys (Teilmann *et al.*, 2013). The correction factors applied to the relative abundance estimates of harbour porpoise in spring (March to May), summer (June to August), autumn (September to November), and winter (December to February) are 1.751, 1.828, 2.198 and 2.119, respectively. The 'corrected' abundance estimates for harbour porpoise are presented in the relevant section later in this report.

Average time spent at the water surface is not as well studied for other marine mammal species as it is for harbour porpoise, and although some information does exist, it is limited as the proportion of time spent at depth is not well understood (e.g., grey seal, harbour seal, white-beaked dolphin, bottlenose dolphin and Atlantic white-sided dolphin; see Voet *et al.*, 2017). Due to such limited information and the fact that correction factors are only applicable at the species level, the abundance estimates for 'dolphin species' and 'seal species' groupings were not corrected for availability bias despite recording both seals and dolphins to species level.

2.7 Species Seasonality and Distribution

Bird behaviour and abundance are recognised to differ across a calendar year dependent upon the season, therefore the populations of seabirds with potential to be within the vicinity of the Spiorad na Mara Survey Area are likely to change between seasons. Separate seasons are recognised in this report to establish the level of importance any seabird species has within the Spiorad na Mara Survey Area

during any particular period. The species seasonality presented below are referred to in the discussion in order to better understand species distribution in relation to the species' annual cycle. Bio-seasons used within this report are based on those in NatureScot (2020a):

- Breeding season: Strong association with nest site (includes nesting, egg-laying and feeding young).
- Non-breeding season: Wider dispersion and no strong association with colonies (includes the short "breeding site attendance" season prior to breeding and all other seasons as defined in NatureScot, 2020a).

Note that non-breeding season apportioning (see Section 2.5 for details) is dependent on information within biologically defined minimum population scales (BDMPS) as defined in Furness (2015). Hence, these BDMPS are considered for bio-seasons where applicable. Where BDMPS overlap with breeding seasons as defined in NatureScot (2020a), Furness BDMPS bio-seasons were shortened to allow retention of the more recently provided breeding season data of NatureScot. Resulting bio-seasons for encountered species are summarised in **Table 9**.

Table 9 Bio-season data for bird species captured during the Spiorad na Mara Survey Area surveys between March 2022 to February 2024

Species	Bio-season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Anser species	n.a.												
Greylag goose	Non-breeding												
Common eider	Breeding												
	Non-breeding												
Wigeon	n.a.												
Black-tailed godwit	n.a.												
Curlew	n.a.												
Oystercatcher	n.a.												
Wader species	n.a.												
Rock dove	n.a.												
Kittiwake	Breeding												
	Spring migration												
	Autumn migration												
Common gull	Breeding												
	Non-breeding												
Black-headed gull	Breeding												
	Non-breeding												
Unidentified small gull*	Breeding												
	Non-breeding												
Great black-backed gull	Breeding												
	Non-breeding												
Herring gull	Breeding												
	Non-breeding												
Lesser black-backed gull	Breeding												
	Spring migration												

Species	Bio-season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Autumn migration												
	Winter												
Arctic tern	Breeding												
	Spring migration												
	Autumn migration												
Common tern	Breeding												
	Spring migration												
'Commic' tern*,**	Breeding												
	Spring migration												
	Autumn migration												
Great skua	Breeding												
	Spring migration												
	Autumn migration												
	Winter												
Arctic skua	Breeding												
	Spring migration												
	Autumn migration												
Guillemot	Breeding												
	Non-breeding												
Razorbill	Breeding												
	Spring migration												
	Autumn migration												
	Winter												
Guillemot / razorbill*	Breeding												

Species	Bio-season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Non-breeding												
Black guillemot	Breeding												
	Non-breeding												
Puffin	Breeding												
	Non-breeding												
Auk species*	Breeding												
	Non-breeding												
Red-throated diver	Breeding												
	Spring migration												
	Autumn migration												
	Winter												
Great northern diver	Breeding	n.a.											
	Non-breeding												
Diver species*	Breeding												
	Spring migration												
	Autumn migration												
	Winter												
European storm petrel	Breeding												
	Non-breeding												
Storm petrel species*	Breeding												
Fulmar	Breeding												
	Spring migration												
	Autumn migration												
	Winter												
Fulmar / gull species*	Breeding												
	Non-breeding												

Species	Bio-season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cory's shearwater	Breeding												
	Spring migration												
	Autumn migration												
Sooty shearwater	Breeding												
	Spring migration												
	Autumn migration												
Manx shearwater	Breeding												
	Spring migration												
Small shearwater species*	Breeding												
	Non-breeding												
Auk / shearwater species*	Breeding												
	Non-breeding												
Gannet	Breeding												
	Spring migration												
	Autumn migration												
Cormorant	Breeding												
	Non-breeding												
Shag	Breeding												
	Non-breeding												
Cormorant / shag*	Breeding												
	Non-breeding												
Passerine species*	n.a.												
Unidentified bird species	n.a.												

** These species were not included in NatureScot (2020a) and Furness (2015) and a similar species seasonality was used.*

*** 'Commic' tern refers to Arctic / common tern.*

Note: Yellow boxes represent the breeding seasons, whereas the green boxes represent all other seasons (i.e. non-breeding, spring migration, autumn migration and winter).

For consistency, marine mammal abundance and density have been summarised in a similar way using the seasonal definition according to the correction factors (Voet *et al.*, 2017):

- Winter: December-February
- Spring: March-May
- Summer: June-August
- Autumn: September-November

Each species recorded during the surveys was geo-referenced, enabling those locations to be related to the boundary of the Survey Area. Maps were produced by species, by month although the above bio-seasons were used in discussion in order to better understand species distribution in relation to the species' annual cycle.

2.8 Species Distribution Maps

Every animal recorded during the surveys was geo-referenced, allowing the locations to be related to the boundary of the Survey Area. Monthly distribution maps were produced for each species using QGIS (version 3.18) by representing locations of individuals as symbols on one map per monthly survey. Symbols were determined by the species group, with a relevant icon and a unique colour assigned on a per species basis allowing for differentiation between species that use the same icon. Monthly distribution maps are presented in Section 3 presented in six-month periods (March – September and October- February). Distribution maps for individual species recorded in each month during the survey period can be found in Appendix IV Distribution Maps. Please note that maps do not include apportioned individuals as it is not possible to robustly apportion unidentified species spatially outside of a modelling framework.

2.9 Species Flight Direction Rose Diagrams

The flight direction of birds recorded was ascertained from all digital still images. Bearings of bird flight directions for months where more than three individuals were in flight were plotted using the R statistical program (R Development Core Team, 2021) to summarise directional data using mean angles and vectors. A Rayleigh test, which assumes a null hypothesis of uniform distribution across all directions, was used. A significant result from this test indicates an observed pattern in the movement direction of the birds based on the collected data. The blue triangles show the frequency of birds captured flying with the same vector (heading). The red circle represents the critical value of the Rayleigh test of uniformity. The red arrow placement represents the mean vector, and the length of the arrow denotes how the vectors are clustered around the mean vector (longer arrows indicate the data are clustered more closely around the mean). Directionality of movement is significant if the red arrow extends beyond the circle.

2.10 Avian Flight Heights

Bird flight height was estimated from the digital still images. All median flight heights per species have been presented in **Figure 210**. It was determined using bespoke APEM software that applies a set of rules developed in-house, using trigonometry and other mathematics, to provide an estimate of flight height. This method is dependent upon image quality, size of the bird species and the size of the bird relative to the image. It is not possible to accurately estimate flight heights for birds that are diving or turning sharply, as these individuals are not fully stretched out and therefore their measured lengths

are not comparable to the reference length of the relevant species. These individuals were deemed unsuitable for flight height analysis.

A boxplot (**Figure 210**, **Section 4**) was produced to show flight heights per species, where possible, by combining the suitable data collected from twenty four surveys. Species with five or more flight heights have been presented. It is important to note that this relies on comparing a standard reference length from literature to the length of the bird in the imagery. Therefore, the outputs may be influenced by factors such as discrepancies in bird length, for example a larger than average individual, and how the bird was captured in the image, for example head down, leading to outliers within the data. In addition, as flight height calculations rely upon known species lengths, the results presented in Section 4 are based on unapportioned flight height data.

3 Species Accounts

The following species accounts present apportioned and corrected (where applicable) design-based abundance estimates and lower and upper confidence limits (LCL and UCL respectively), as well as density estimates for total behaviours. Apportioned abundance estimates, LCL, UCL and densities for each behaviour (sitting, flying, and diving for seabirds; and submerged, surfacing and hauled out for marine mammals) can be found in Appendix III Raw Data Abundance and Density. The density estimates provide the number of individuals per square kilometre (km^2). The abundance estimates for each of the three areas (Spiorad na Mara Array Area, the 10 km Buffer, and the total Survey Area) are likely to differ due to the abundance estimates being calculated independently based on the numbers of recorded targets per location and the area covered.

Between March 2022 and March 2024, 35 individuals were recorded as deceased (**Table 10**). No further analysis was carried out on these.

Table 10 Deceased animals recorded during the survey period (March 2022 to February 2024)

Survey No.	Survey Month	Species	Total
02	April 2022	Common dolphin	1
03	May 2022	Minke Whale	1
03	May 2022	Gannet	1
04	June 2022	Gannet	1
05	July 2022	Guillemot / razorbill	1
05	July 2022	Gannet	7
06	August 2022	Fulmar	1
06	August 2022	Gannet	10
07	September 2022	Gannet	2
07	September 2022	Unidentified bird species	2
10	December 2022	Swan species	1
12	February 2023	Fulmar / gull species	1
15	May 2023	Gannet	2
15	May 2023	Unidentified bird species	1
17	July 2023	Unidentified bird species	1
19	September 2023	Gannet	1
20	October 2023	Guillemot / razorbill	1
Total			**35**

3.1 Seabirds

3.1.1 Anser species – Unidentified

Anser species were recorded in March (breeding season), with 35 individuals recorded sitting on the sea surface, resulting in an abundance estimate of 300 [95% CI: 35, 900] within the Survey Area equating to 0.31 birds/km^2 (**Table 11**).

All birds were in close proximity to each other and found in the east of Spiorad na Mara Array Area (**Figure 3**).

Table 11 Raw counts, abundance, and density estimates (birds per km^2) of Anser species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	35	300	35	900	0.17	0.31
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	35	318	35	954	0.17	1.97
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.						

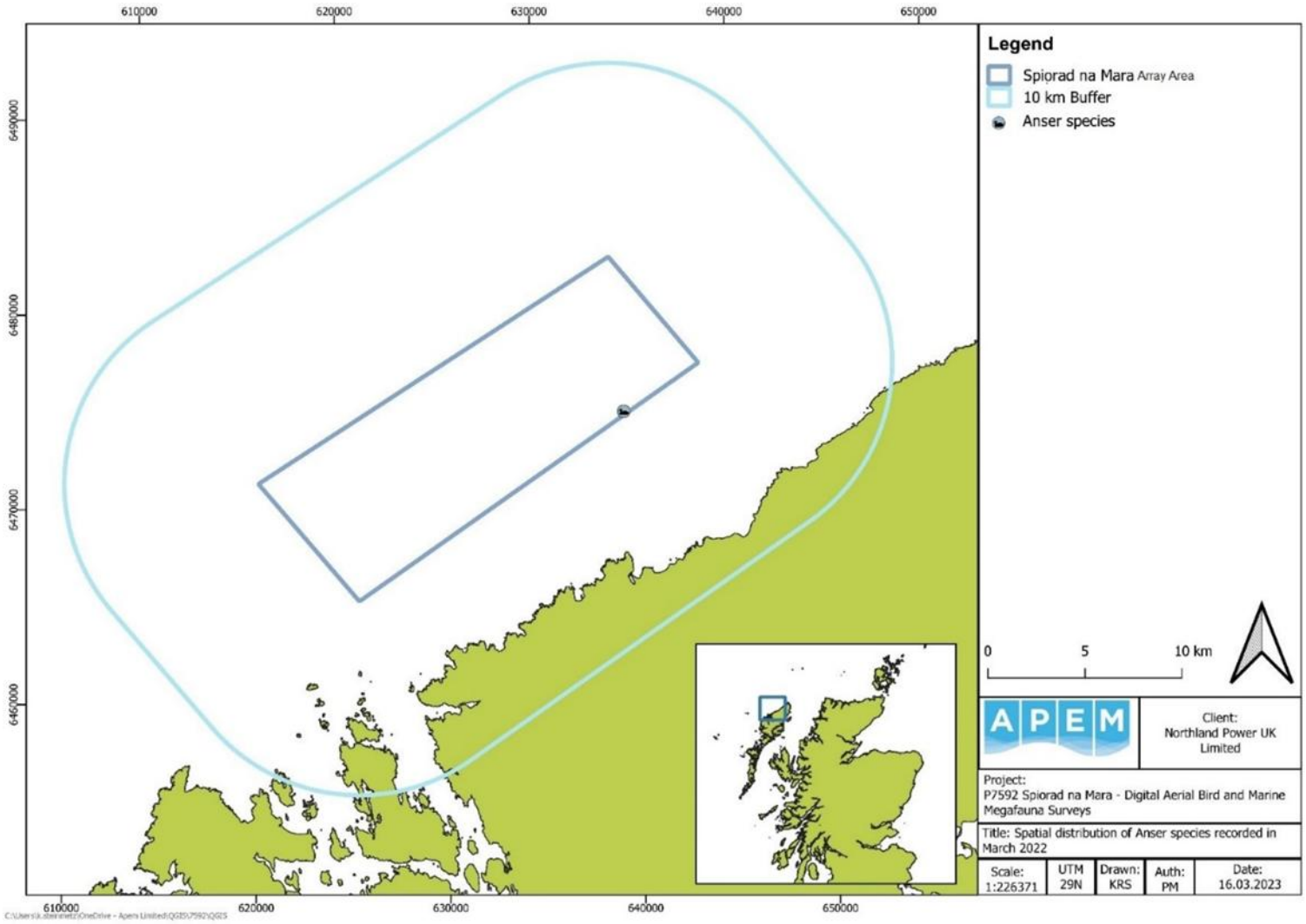


Figure 3 Distribution of Anser species in the Survey Area during March 2022

Note: Individuals in close proximity may appear overlapping

3.1.2 Greylag goose – *Anser anser*

Greylag geese were recorded in June 2022, during the breeding season, with an estimate of 220 [95% CL: 26, 661] within the Survey Area equating to 0.23 birds/km^2 (**Table 12**). All geese were recorded flying in the east of the 10 km Buffer (**Figure 4**). Significant flight direction for greylag geese was recorded in a west-northwest direction (**Figure 5a**).

Table 12 Raw counts, abundance, and density estimates (birds per km^2) of greylag goose in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Jun-22	26	221	26	662	0.20	0.23
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Jun-22	26	219	26	657	0.20	0.27

Note: Apportioning calculations were carried out; however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

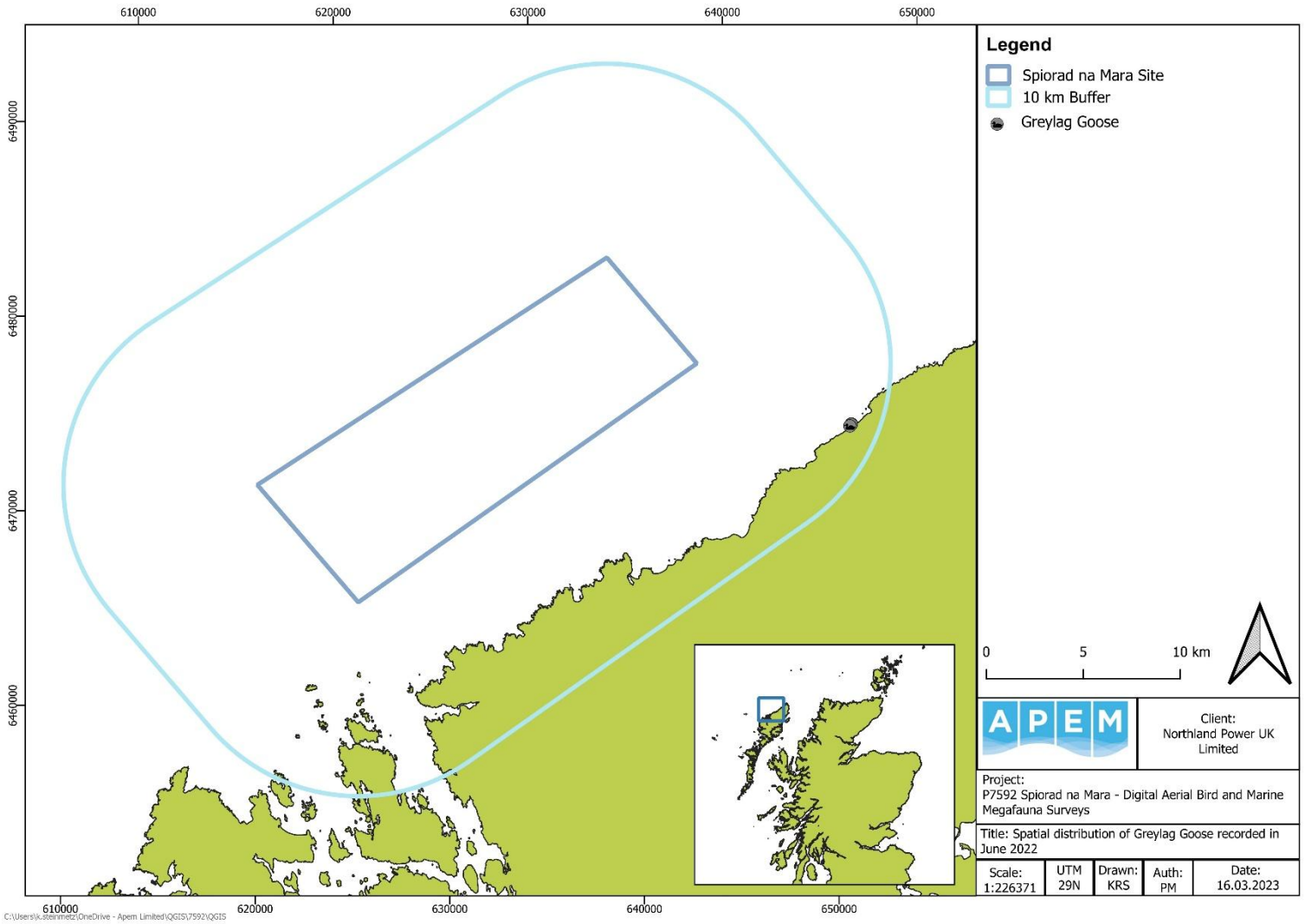
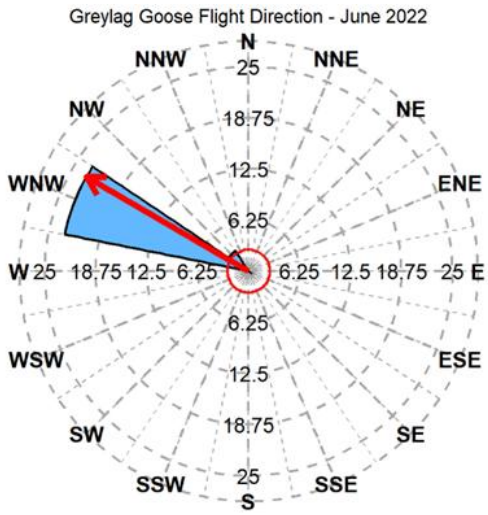


Figure 4 Distribution of greylag goose in the Survey Area during June 2022

Note: Individuals in close proximity may appear overlapping



Number of Observations	26
Mean vector	300.045
Length of mean vector (r)	0.998
Rayleigh Test (Z)	25.885
Rayleigh Test (p)	<0.001
a. June 2022 (Survey 04)	

Figure 5 Summary of flight direction of greylag goose during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.3 Common Eider – *Somateria mollissima*

Common eiders were recorded in both breeding (March to June 2022, March to June 2024) and non-breeding seasons (October and November 2022, January, February, September, October 2023, and December 2023 to February 2024). Peak abundance occurred in May 2023 with an estimate of 700 [95% CL: 86, 1,451] within the Survey Area equating to 0.73 birds/km^2 (**Table 13**).

The common eiders were found along the coast of the Isle of Lewis, appearing in the south-west of the 10 km Buffer in all surveys. In March and November 2022, January to March 2023, and December 2023 to February 2024, the eiders also occurred further along the coast in the east of the 10 km Buffer (**Figure 6** to **Figure 9**).Two individuals were recorded as flying during the May 2023 survey, with no significant flight direction.

Table 13 Raw counts, unapportioned abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of common eider in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Mar-22	50	429	50	977	0.14	0.45
Apr-22	27	234	27	599	0.19	0.24
May-22	2	17	2	51	0.71	0.02
Jun-22	4	34	4	136	0.50	0.04
Oct-22	3	26	3	70	0.58	0.03
Nov-22	29	250	29	690	0.19	0.26
Jan-23	18	155	18	412	0.24	0.16
Feb-23	22	187	22	426	0.21	0.20
Mar-23	30	257	30	669	0.18	0.27
Apr-23	6	52	6	139	0.41	0.05
May-23	81	700	86	1,451	0.11	0.73
Jun-23	5	44	5	124	0.45	0.05
Sep-23	13	111	13	317	0.28	0.12
Oct-23	39	337	39	951	0.16	0.35
Dec-23	20	172	20	499	0.22	0.18
Jan-24	32	280	32	699	0.18	0.29
Feb-24	3	26	3	77	0.58	0.03
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Mar-22	50	424	51	949	0.14	0.53
Apr-22	27	232	27	575	0.19	0.29
May-22	2	17	2	51	0.71	0.02

Jun-22	4	34	4	135	0.50	0.04
Oct-22	3	26	3	69	0.58	0.03
Nov-22	29	248	29	684	0.19	0.31
Jan-23	18	153	18	391	0.24	0.19
Feb-23	22	186	22	405	0.21	0.23
Mar-23	30	255	30	681	0.18	0.32
Apr-23	6	52	6	138	0.41	0.07
May-23	81	691	85	1,434	0.11	0.87
Jun-23	5	44	5	114	0.45	0.06
Sep-23	13	110	13	366	0.28	0.14
Oct-23	39	335	39	944	0.16	0.42
Dec-23	20	170	20	495	0.22	0.21
Jan-24	32	277	32	761	0.18	0.35
Feb-24	3	25	3	101	0.58	0.03

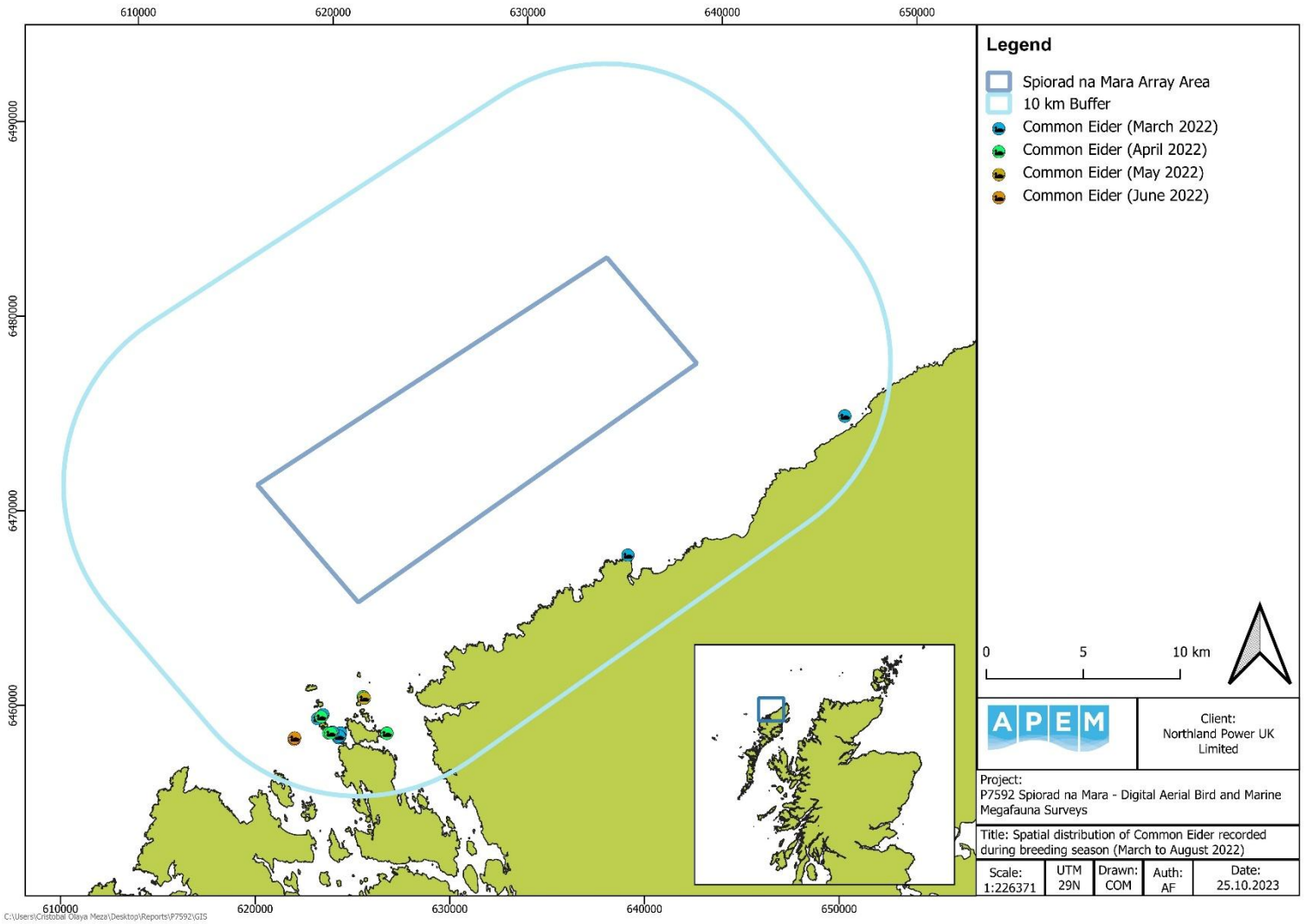


Figure 6 Distribution of common eider in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

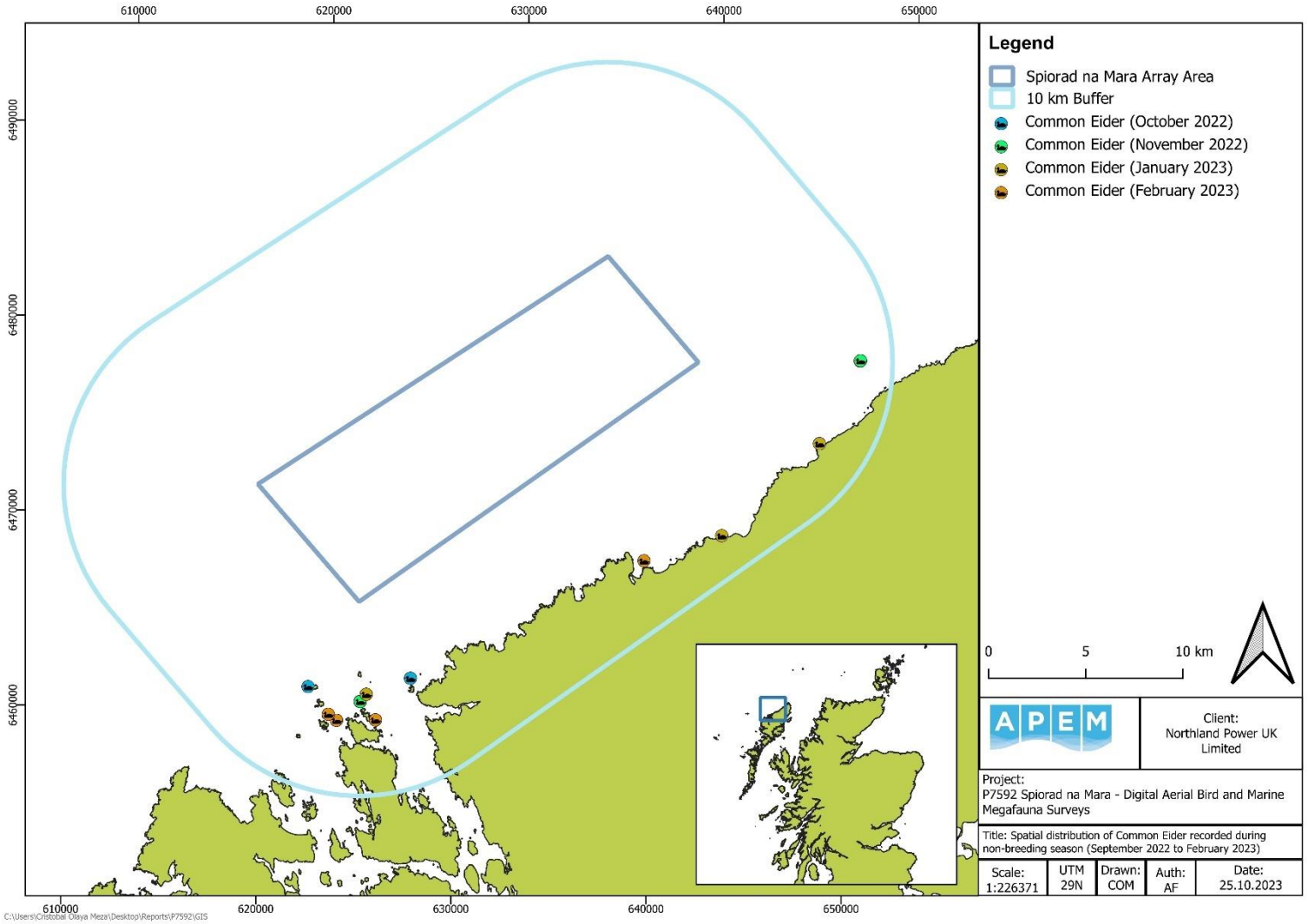


Figure 7 Distribution of common eider species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

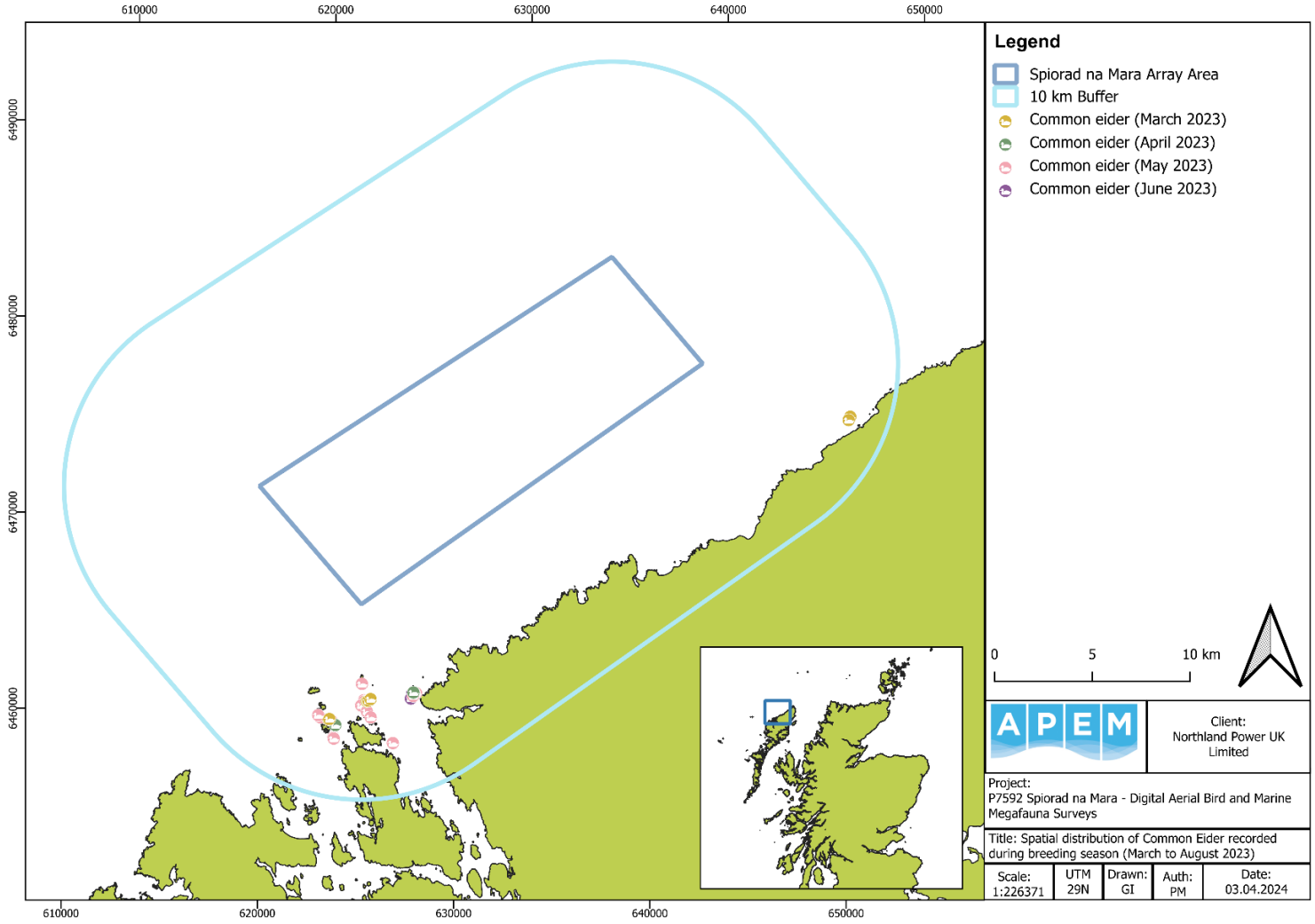


Figure 8 Distribution of common eider in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

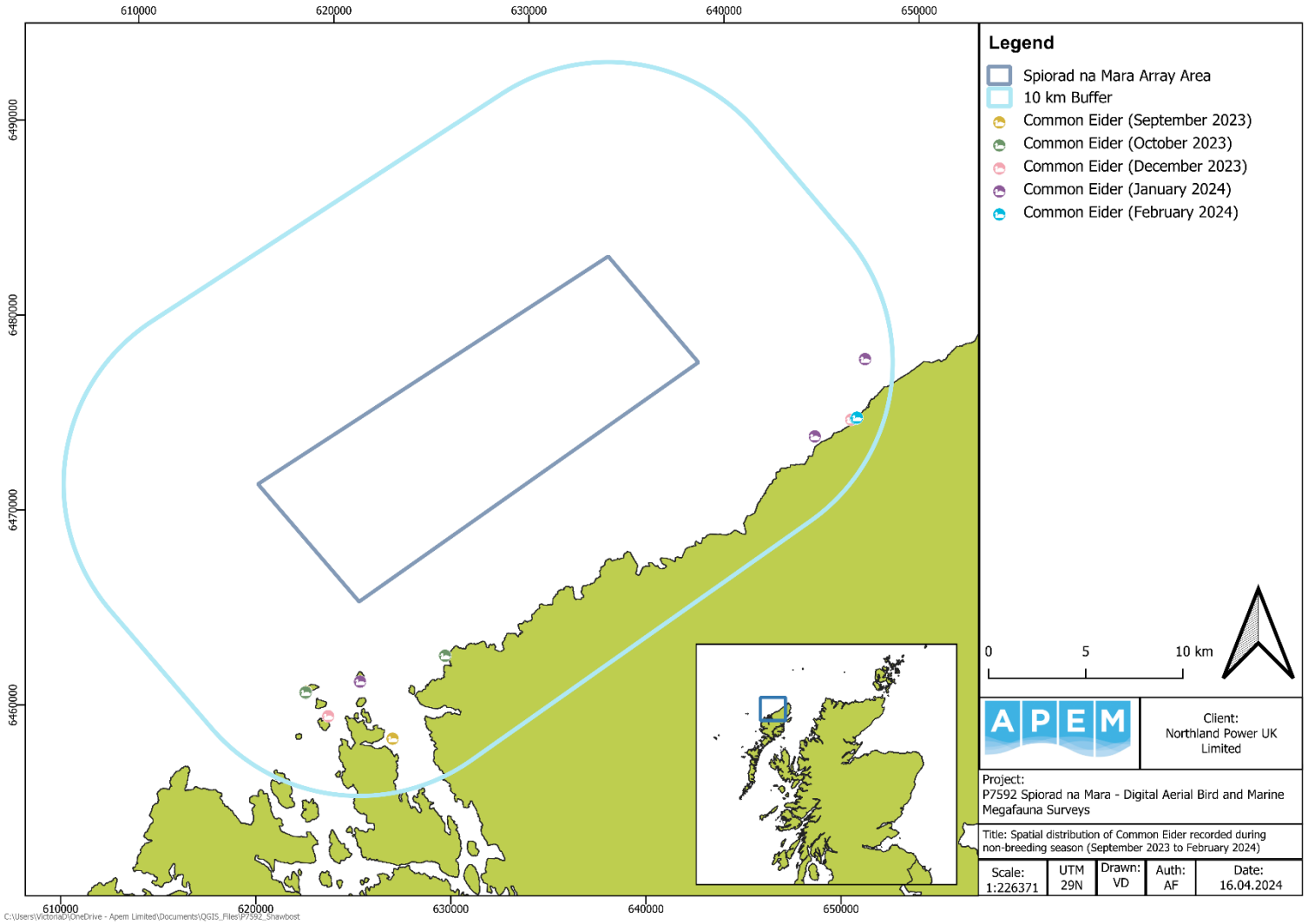


Figure 9 Distribution of common eider in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.4 Wigeon – *Mareca penelope*

Wigeons were recorded in August 2022 (breeding season), resulting in an abundance estimate of 51 [95% CL: 6, 154] within the Survey Area, equating to 0.05 birds/km^2 (**Table 14**). The wigeons were observed near the coast in the east of the 10 km Buffer (**Figure 10**).

A significant predominant direction of flight was recorded to the west-northwest (**Figure 11**).

Table 14 Raw counts, unapportioned abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of wigeon in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Aug-22	6	52	6	155	0.41	0.05
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Aug-22	6	51	6	154	0.41	0.06

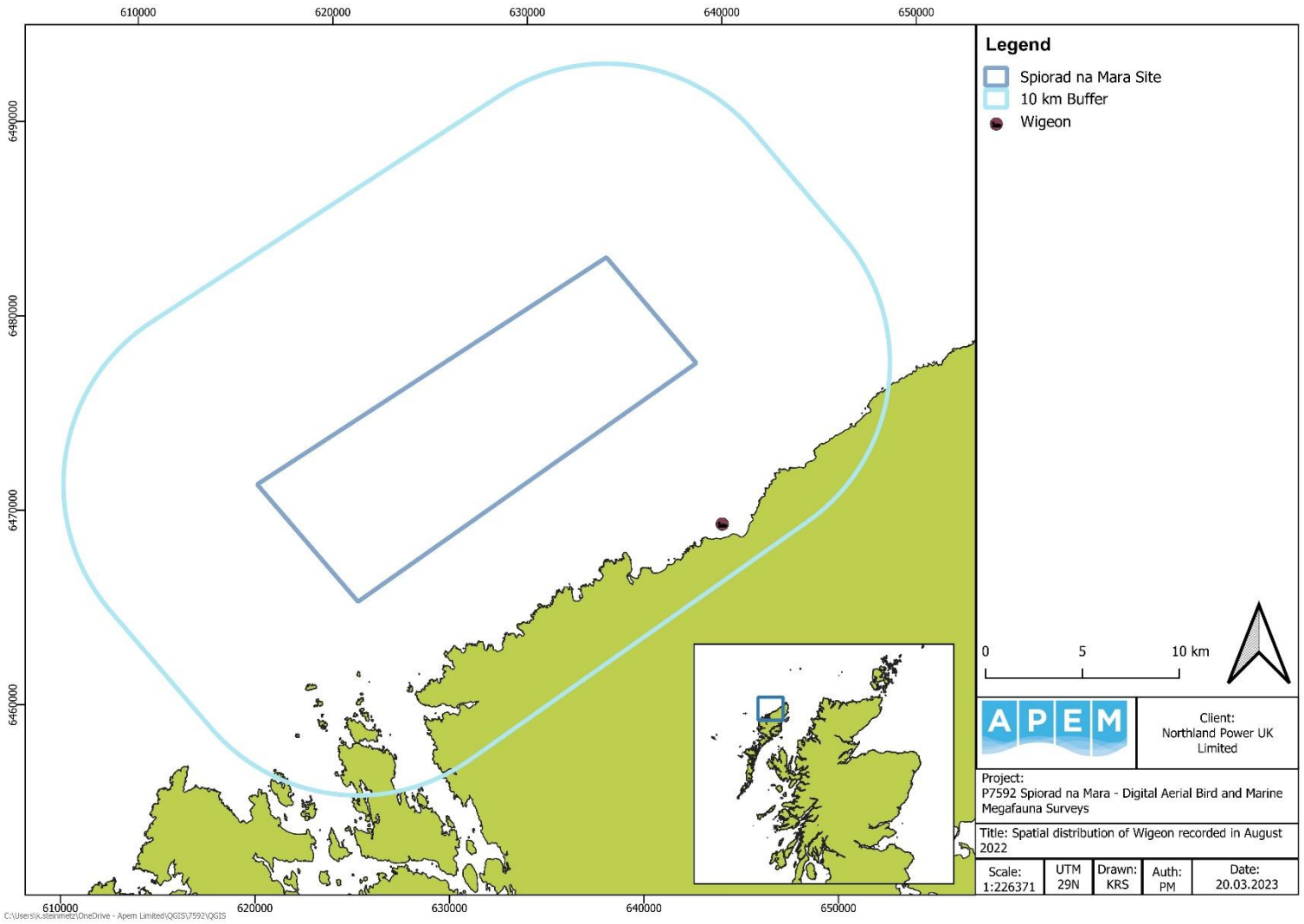
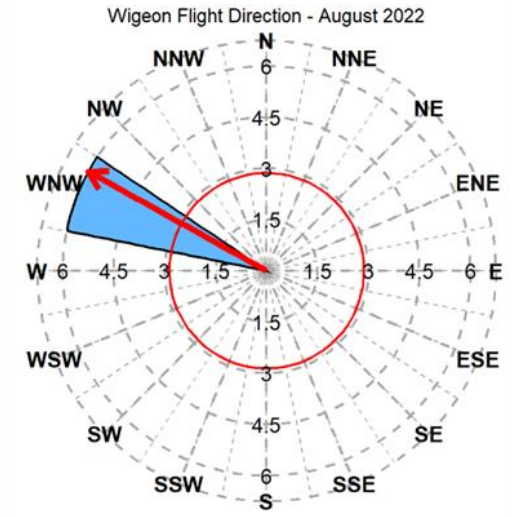


Figure 10 Distribution of wigeon in the Survey Area during August 2022

Note: Individuals in close proximity may appear overlapping



Number of Observations	6
Mean vector	299.355
Length of mean vector (r)	0.999
Rayleigh Test (Z)	5.984
Rayleigh Test (p)	<0.001
a. August 2022 (Survey 06)	

Figure 11 Summary of flight direction of wigeon during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.5 Black-tailed godwit – *Limosa limosa*

Black-tailed godwits were recorded in August 2022 during the breeding season, with an abundance estimate of 69 [95% CL: 8, 206] within the Survey Area equating to 0.07 birds/km^2 (**Table 15**).

In August 2022, all black-tailed godwits recorded were flying in the northwest of the 10 km Buffer (**Figure 12**), with a significant predominant flight direction of south-southwest (**Figure 13**).

Table 15 Raw counts, abundance and density estimates (birds per km^2) of black-tailed godwit in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Aug-22	8	69	8	206	0.35	0.07
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
8	68	8	205	0.35	0.09	8.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

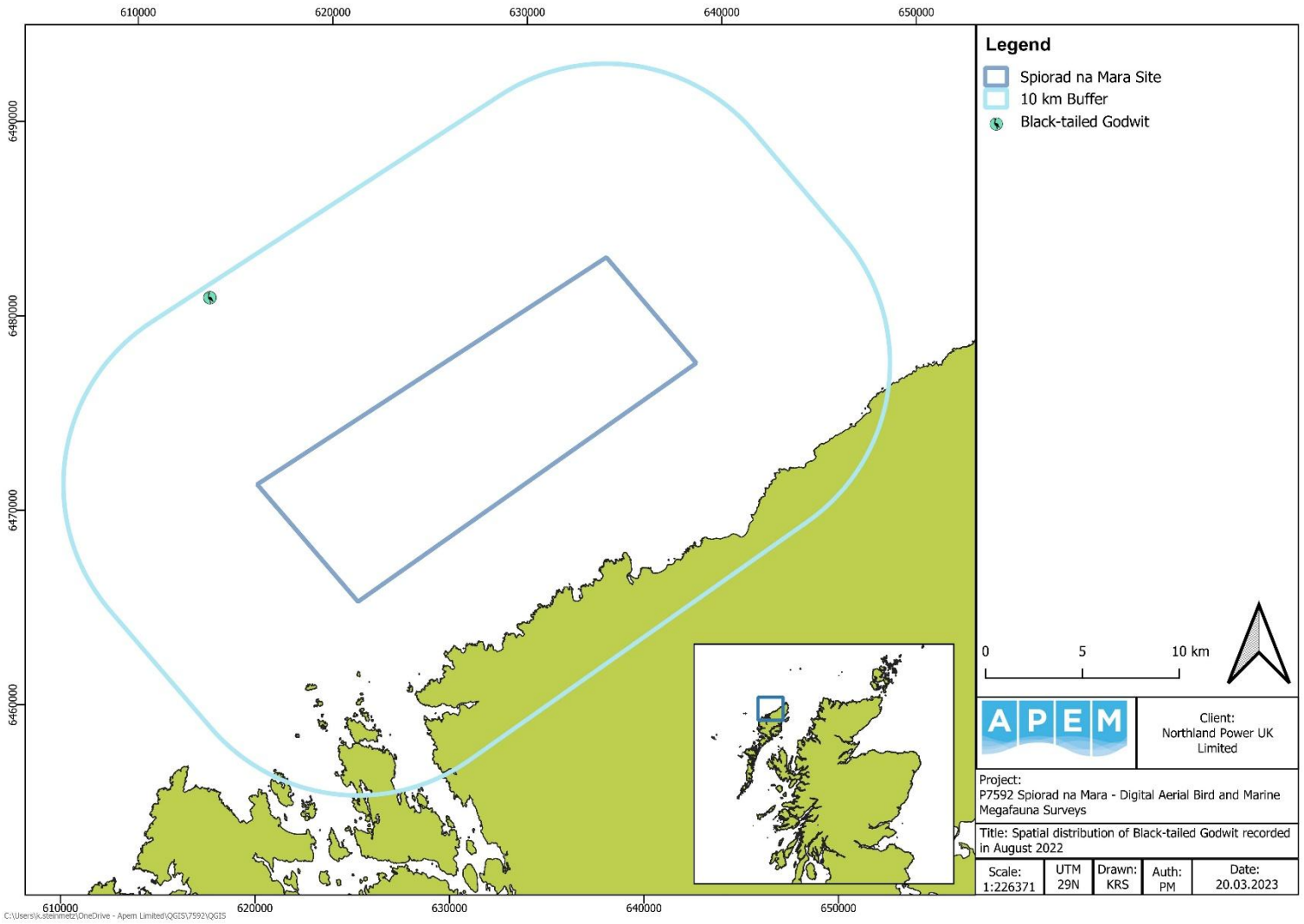
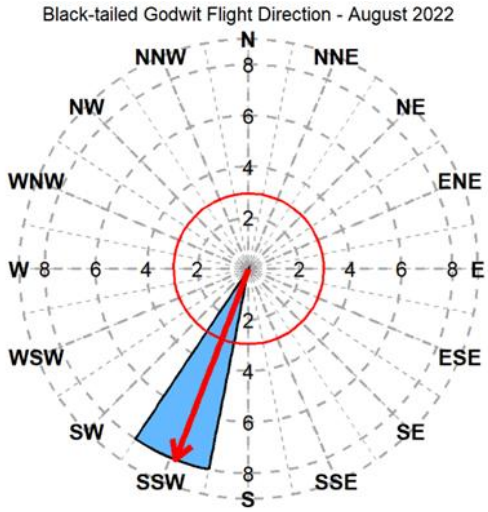


Figure 12 Distribution of black-tailed godwit in the Survey Area during August 2022

Note: Individuals in close proximity may appear overlapping



Number of Observations	8
Mean vector	201.407
Length of mean vector (r)	0.998
Rayleigh Test (Z)	7.975
Rayleigh Test (p)	<0.001
a. August 2022 (Survey 06)	

Figure 13 Summary of flight direction of black-tailed godwit during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.6 Curlew – *Numenius arquata*

Curlews were recorded in the breeding season (August 2022 and May 2023) and non-breeding season (January and November 2023, and February 2024). Peak abundance occurred in January 2023 with an estimate of 69 [95% CL: 8, 189] within the Survey Area equating to 0.07 birds/km^2 (**Table 16**). Curlews were primarily recorded in the east of the 10 km Buffer near the coast (**Figure 14, Figure 15**, and **Figure 17**); however, two individuals were recorded flying within the Spiorad na Mara Array Area during the May 2023 survey, with no significant flight direction (**Figure 16**).

Table 16 Apportioned abundance and density estimates (birds per km^2) of curlew in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	0	0	0	0	0.00	0.00	137	16	412	0.14
Aug-22	4	34	4	86	0.50	0.04	43	5	111	0.04
Sep-22	0	0	0	0	0.00	0.00	17	2	52	0.02
Jan-23	8	69	8	189	0.35	0.07	69	8	215	0.07
May-23	2	17	2	52	0.71	0.02	17	2	52	0.02
Sep-23	0	0	0	0	0.00	0.00	43	5	129	0.04
Nov-23	3	26	3	79	0.58	0.03	26	3	105	0.03
Feb-24	2	17	2	51	0.71	0.02	17	2	51	0.02
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-23	2	18	2	55	0.71	0.11	18	2	55	0.01
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	0	0	0	0	0.00	0.00	136	16	409	0.17
Aug-22	4	34	4	85	0.50	0.04	43	5	112	0.05
Sep-22	0	0	0	0	0.00	0.00	17	2	51	0.02
Jan-23	8	68	8	196	0.35	0.09	68	8	204	0.09
Sep-23	0	0	0	0	0.00	0.00	42	5	128	0.05
Nov-23	3	26	3	78	0.58	0.03	26	3	78	0.03
Feb-24	2	17	2	51	0.71	0.02	17	2	51	0.02

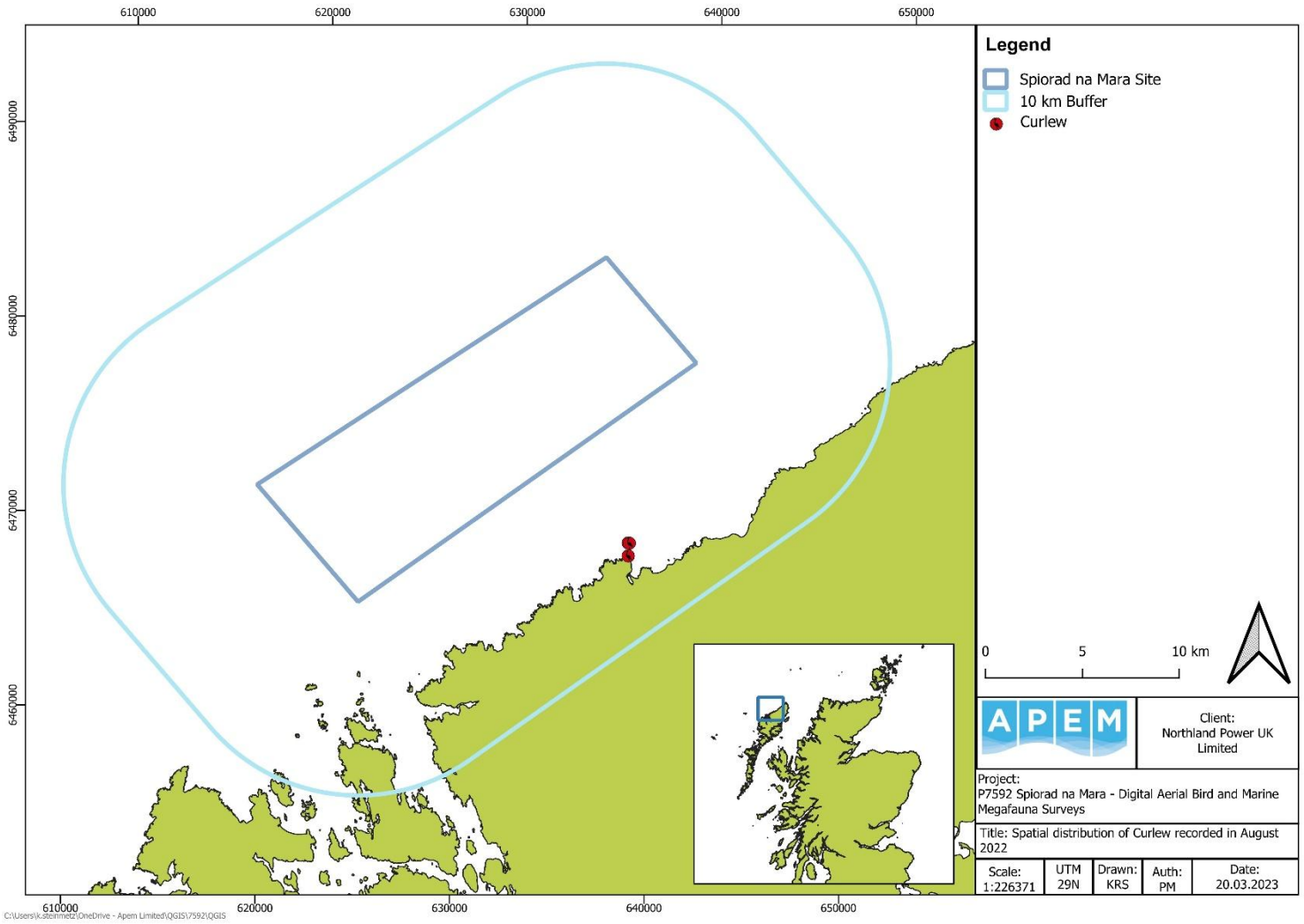


Figure 14 Distribution of curlew in the Survey Area during March to August 2022

Note: Individuals in close proximity may appear overlapping

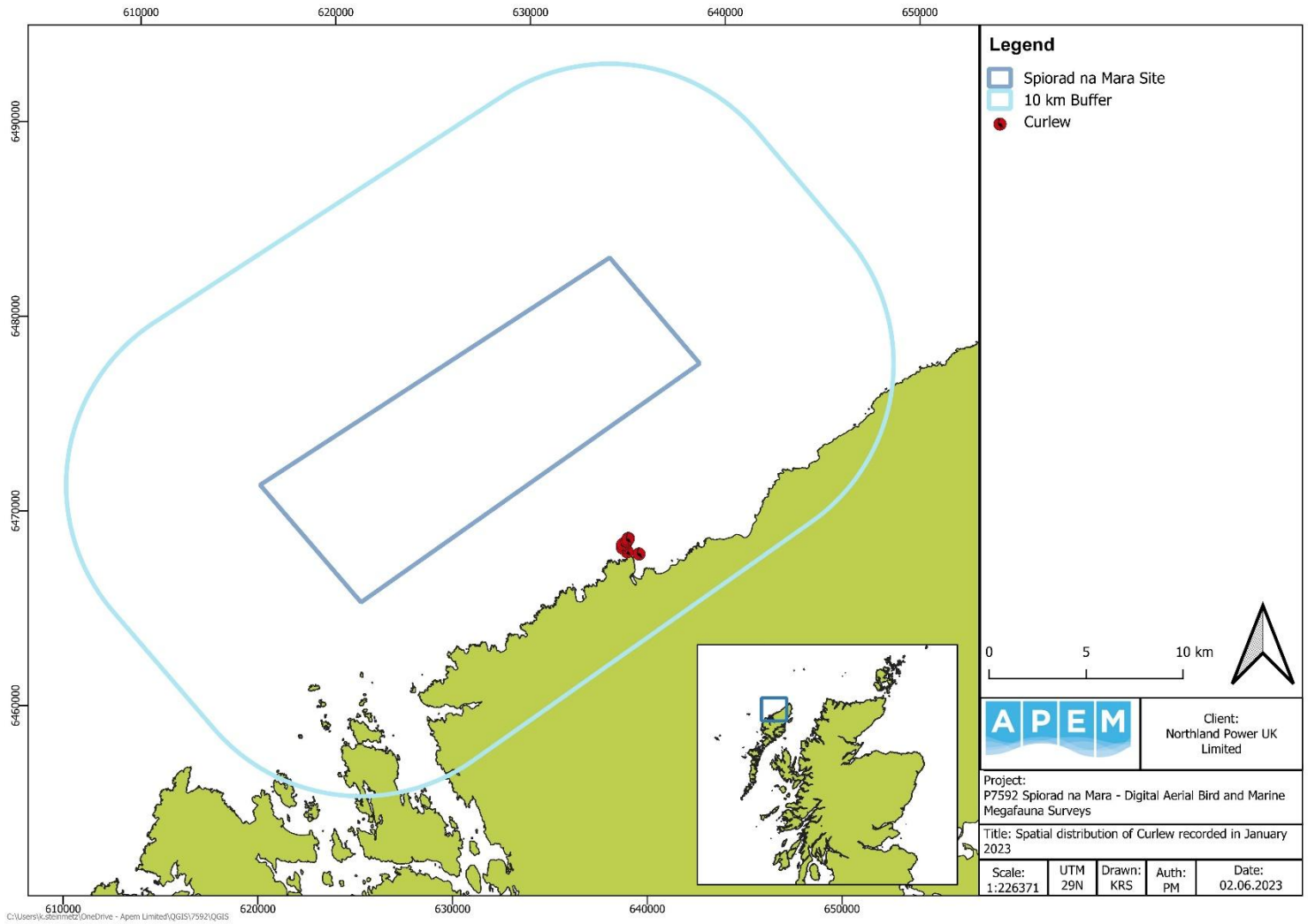


Figure 15 Distribution of curlew in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

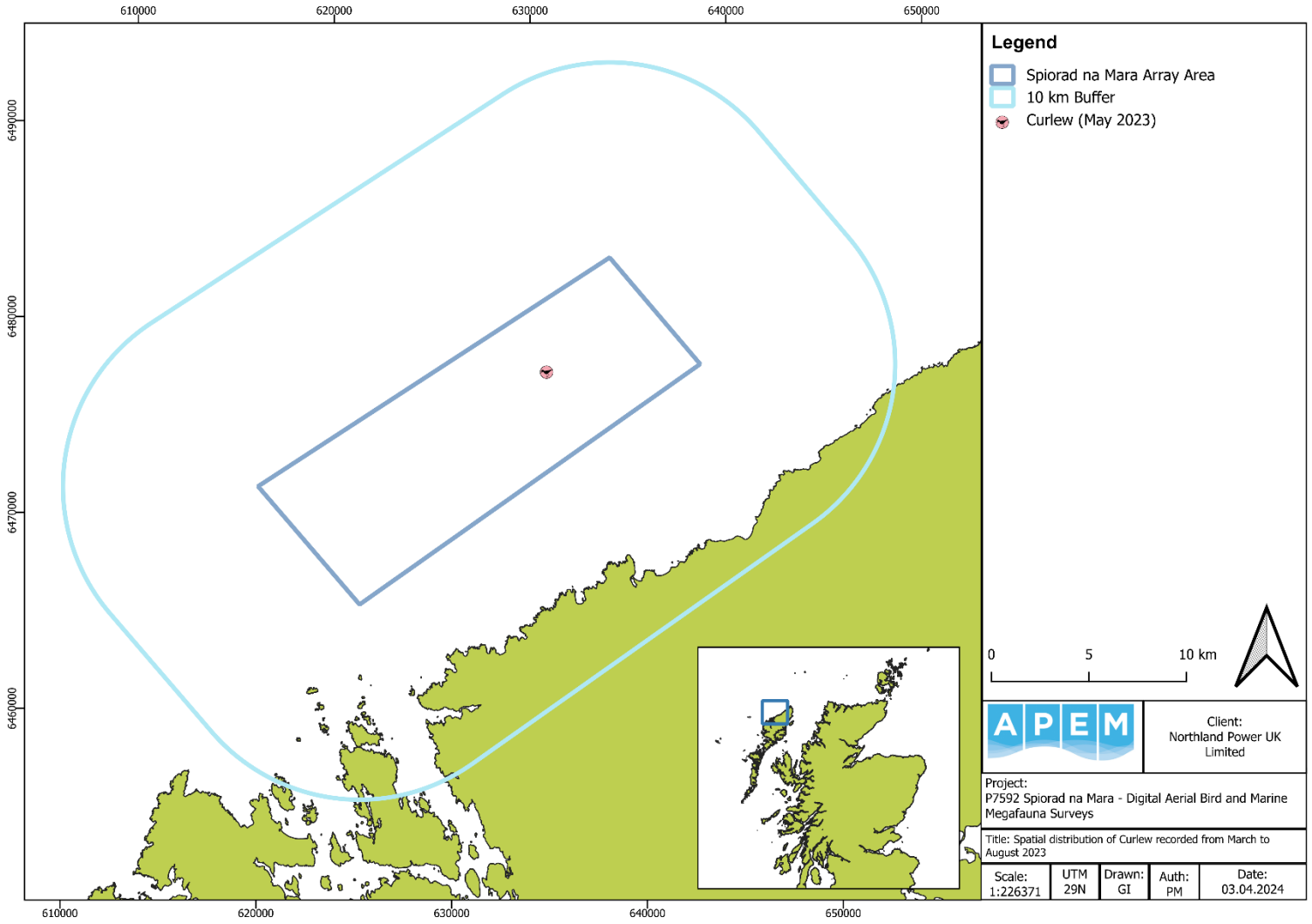


Figure 16 Distribution of curlew in the Survey Area during March to August 2023

Note: Individuals in close proximity may appear overlapping

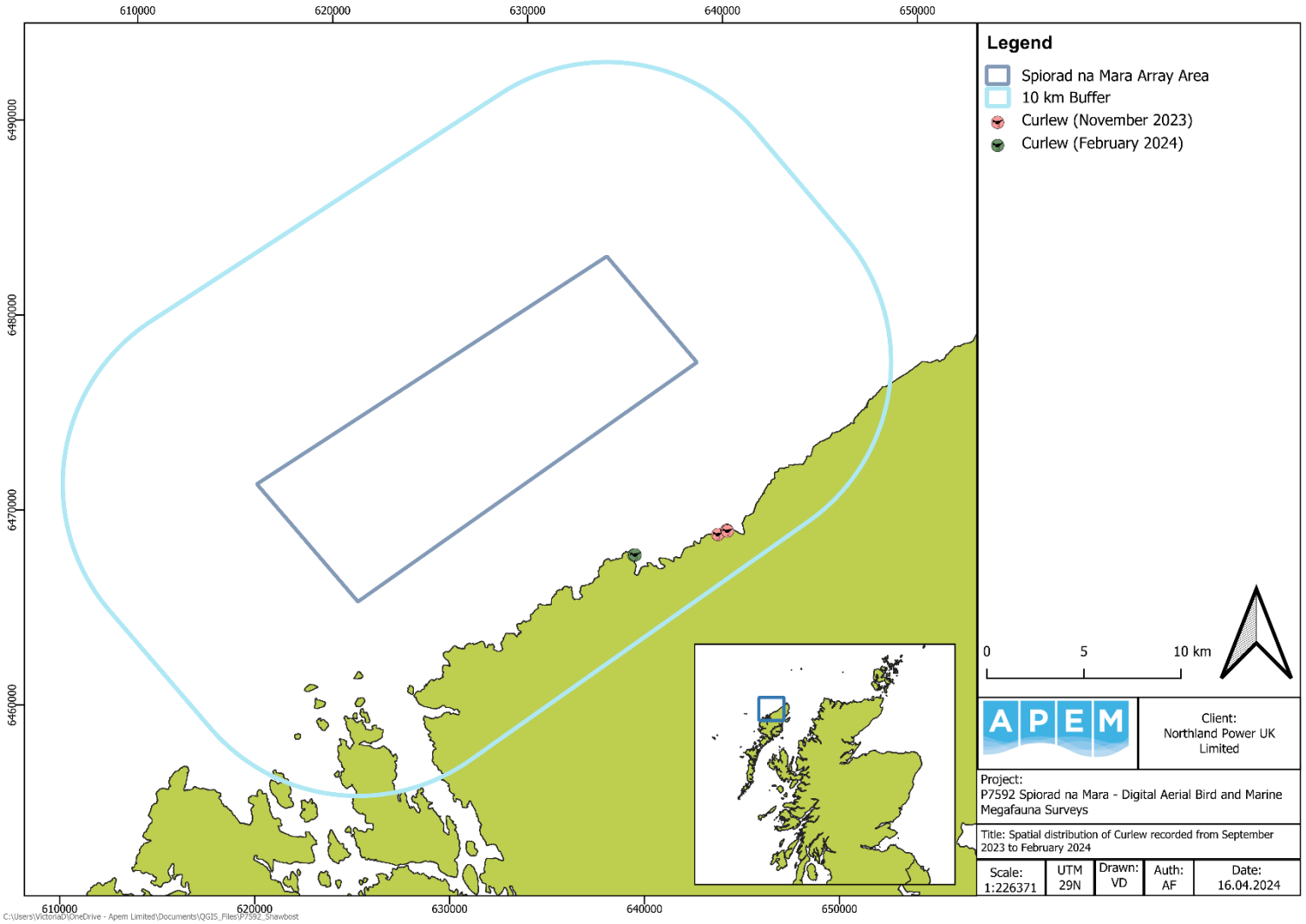


Figure 17 Distribution of curlew in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

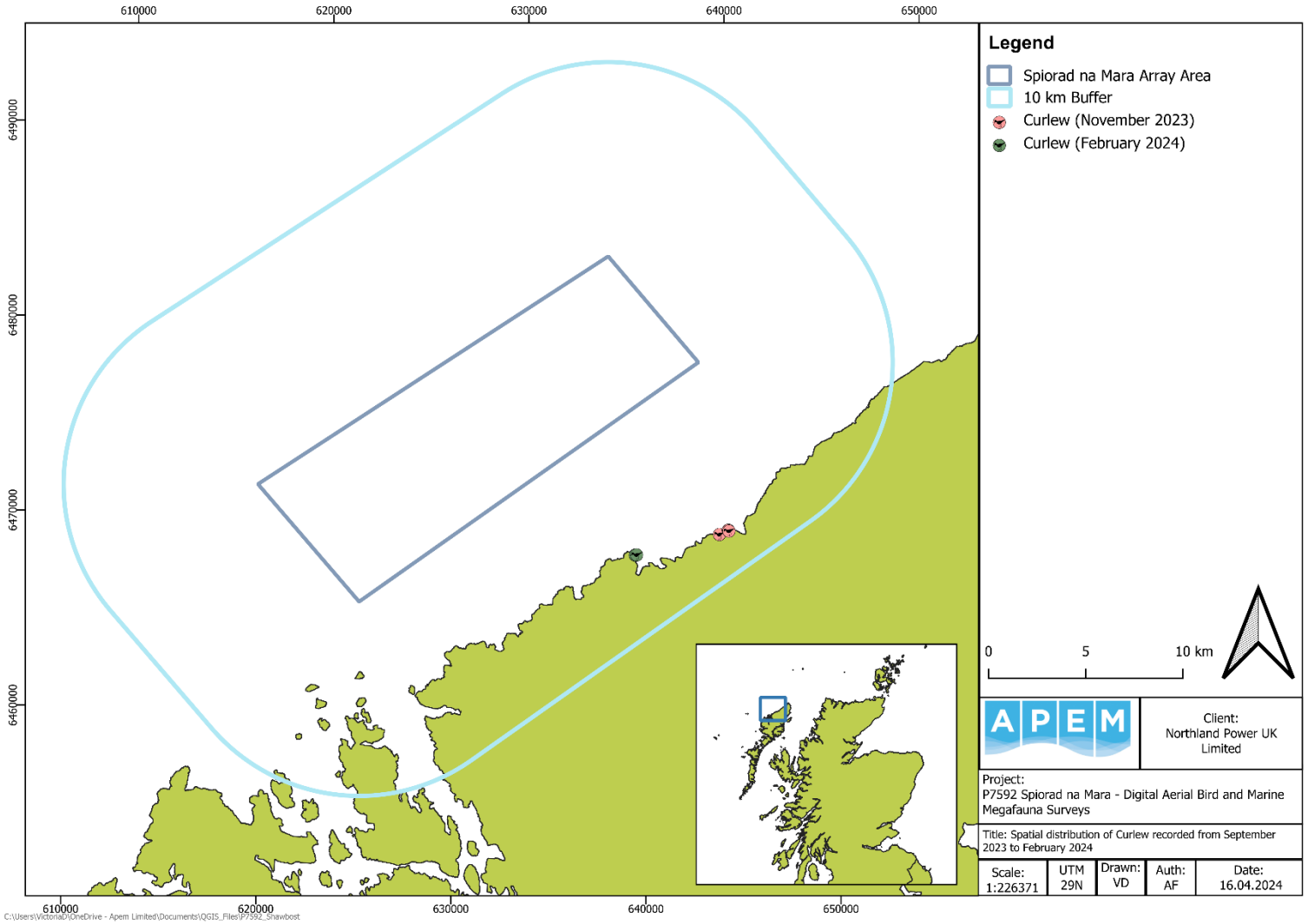


Figure 18 Distribution of curlew in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.7 Wader species - Unidentified

Wader species were recorded in the breeding season (July and August 2022, and July 2023) and non-breeding season (September 2022 and September 2023). Peak abundance occurred in July 2022 with an estimate of 137 [95% CL: 16, 411] within the Survey Area equating to 0.14 birds/km^2 (**Table 17**). Wader species were recorded solely in the northwest and southeast of the 10km Buffer Zone (**Figure 19** to **Figure 22**).

In July 2022, there was a significant predominant direction of flight towards the south-southeast (**Figure 23a**). In September 2023, there was a significant predominant direction of flight towards the south-southwest (**Figure 23b**)

Table 17 Apportioned abundance and density estimates (birds per km^2) of wader species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	16	137	16	412	0.25	0.14	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	1	9	1	26	<1.00	0.01				
Sep-22	2	17	2	52	0.71	0.02				
Jul-23	4	35	4	104	0.50	0.04				
Sep-23	5	43	5	129	0.45	0.04				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	16	136	16	409	0.25	0.17	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	1	9	1	26	<1.00	0.01				
Sep-22	2	17	2	51	0.71	0.02				
Jul-23	4	34	4	137	0.50	0.04				
Sep-23	5	42	5	128	0.45	0.05				

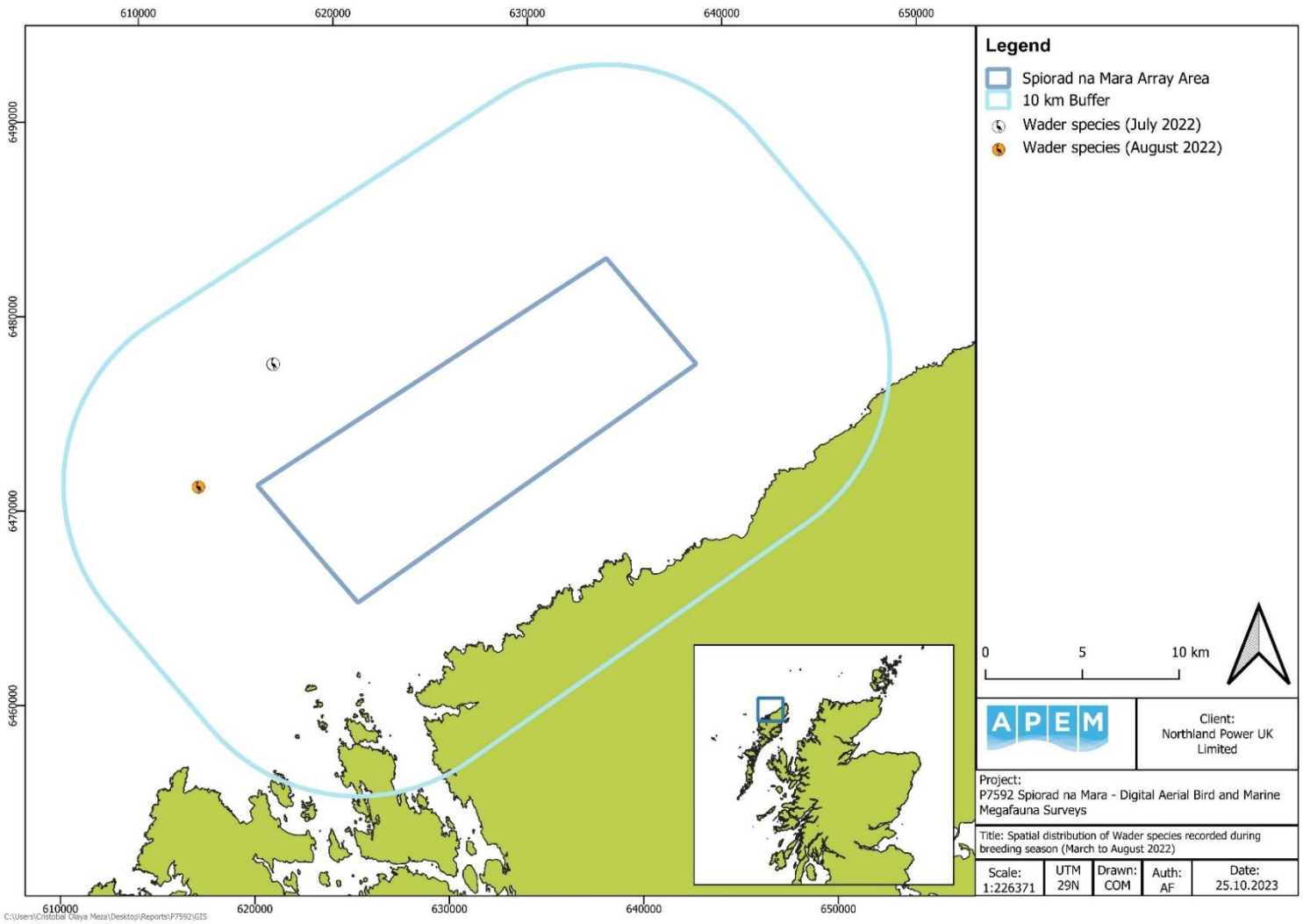


Figure 19 Distribution of wader species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

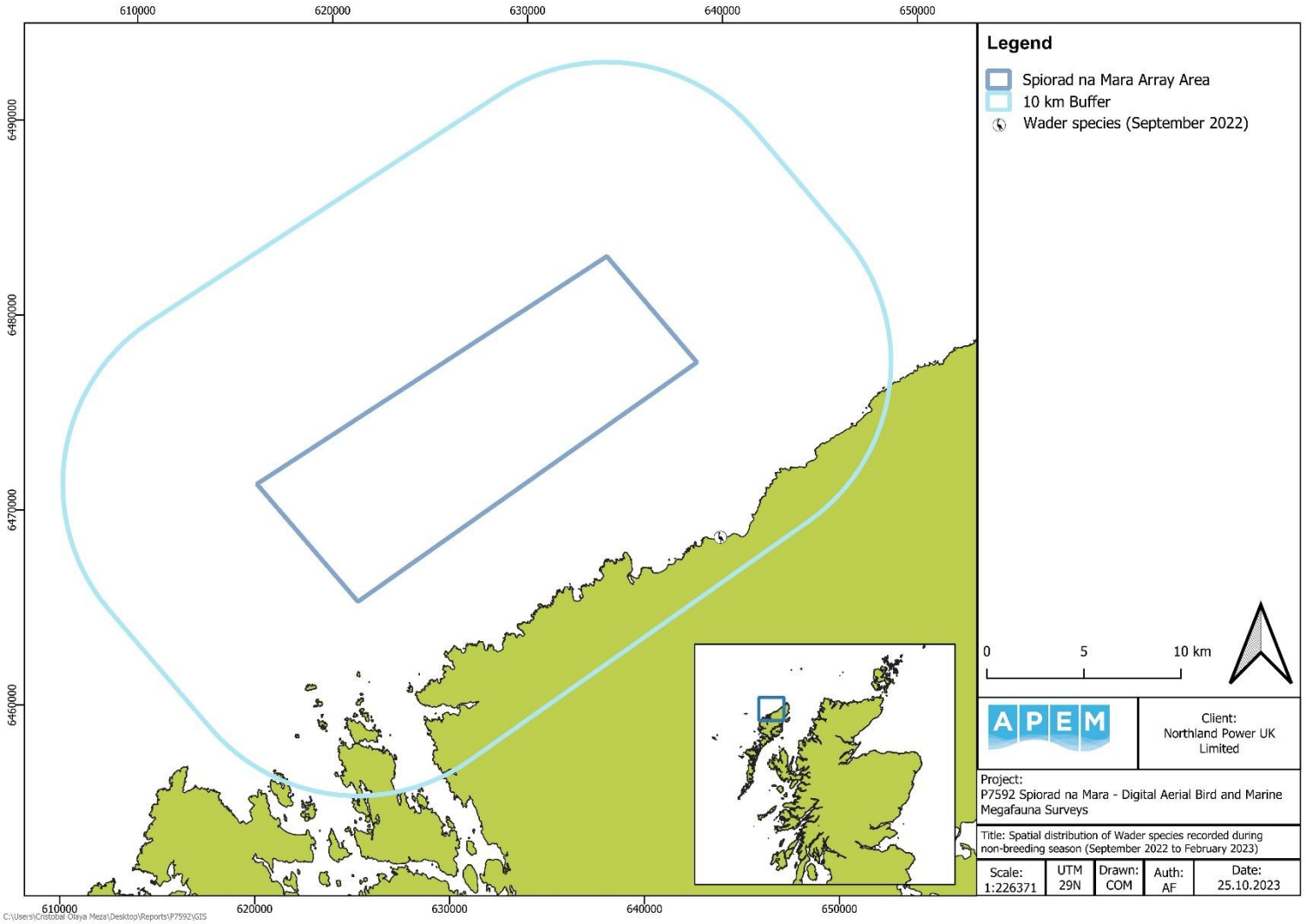


Figure 20 Distribution of wader species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

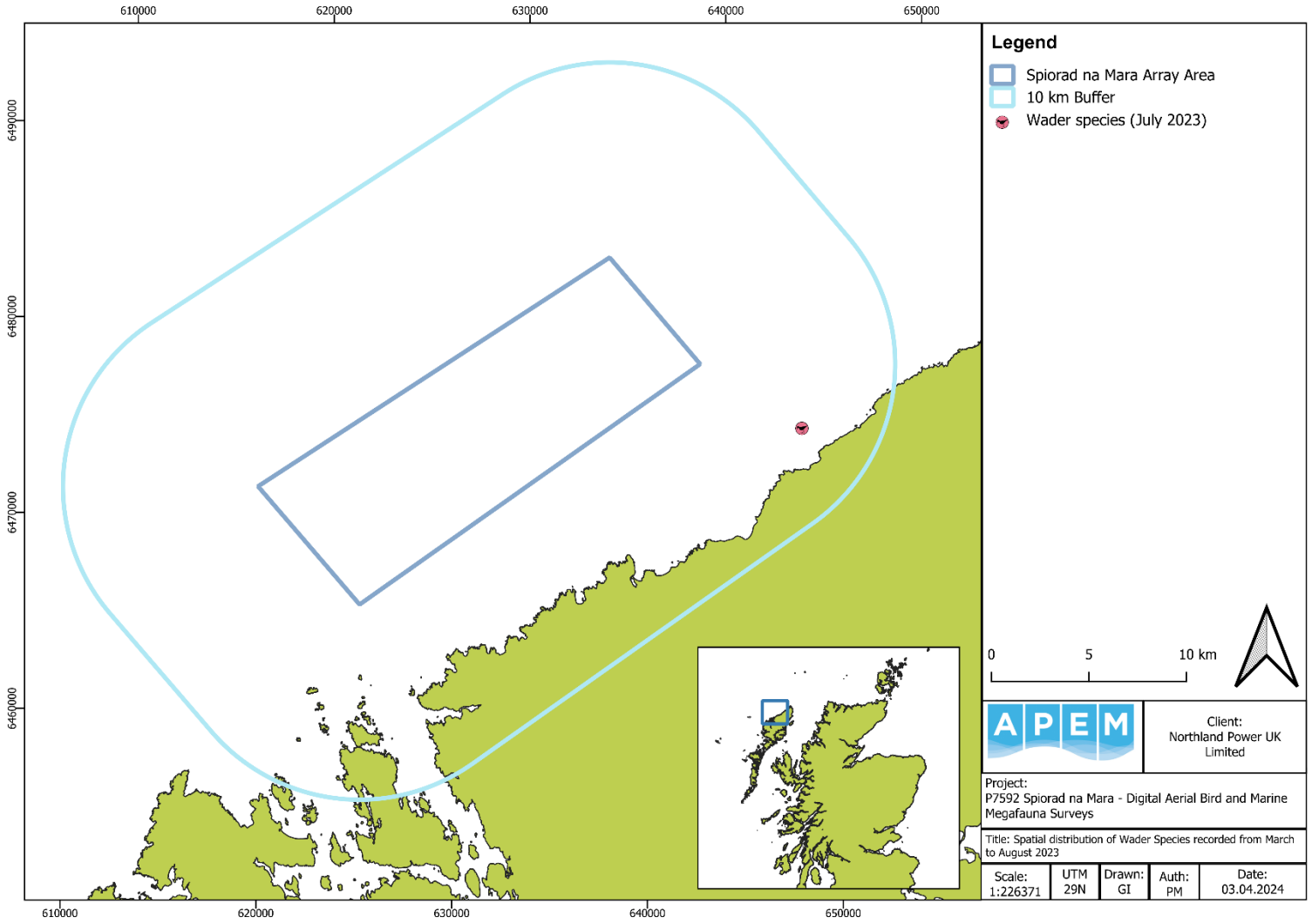


Figure 21 Distribution of wader species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

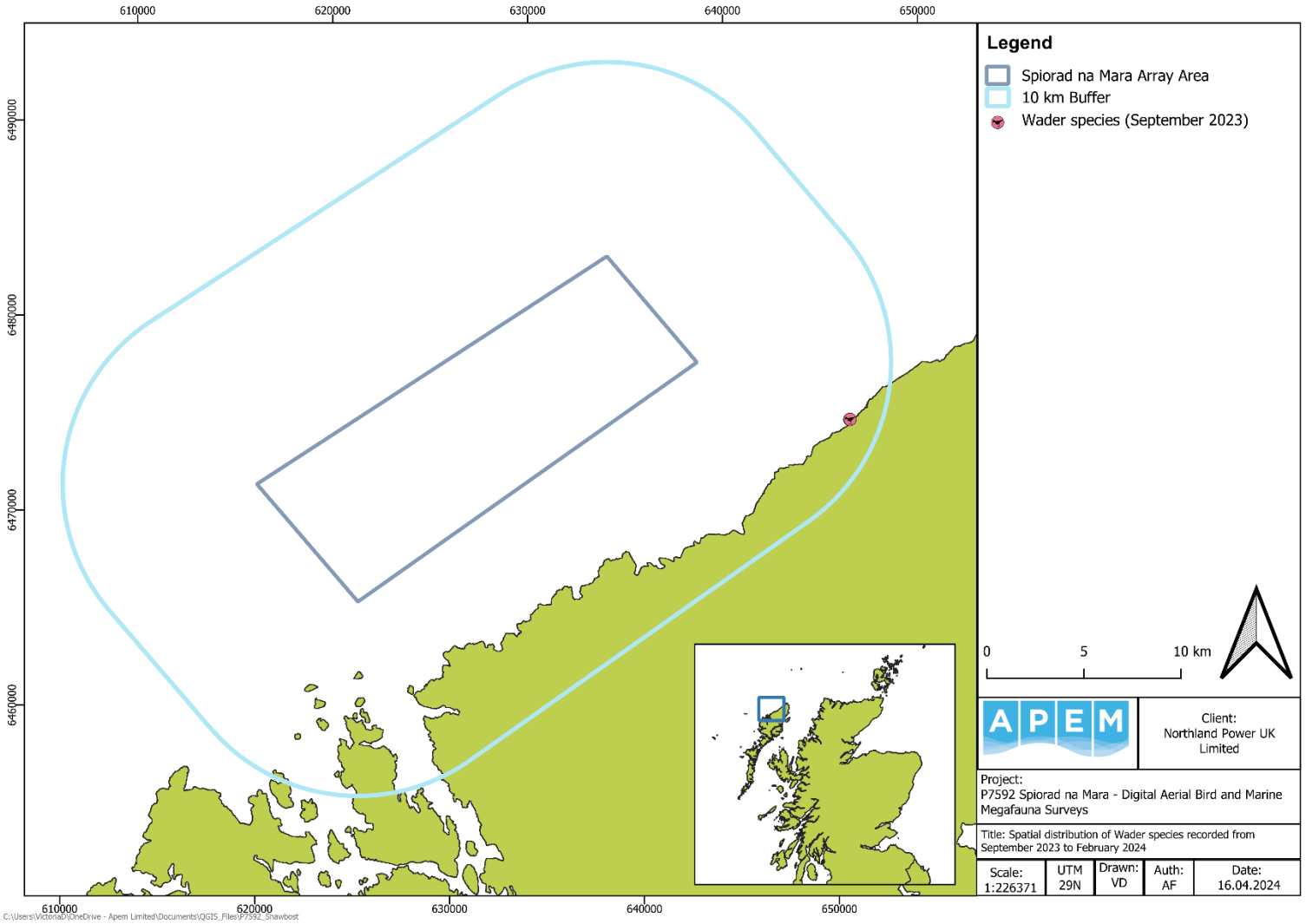
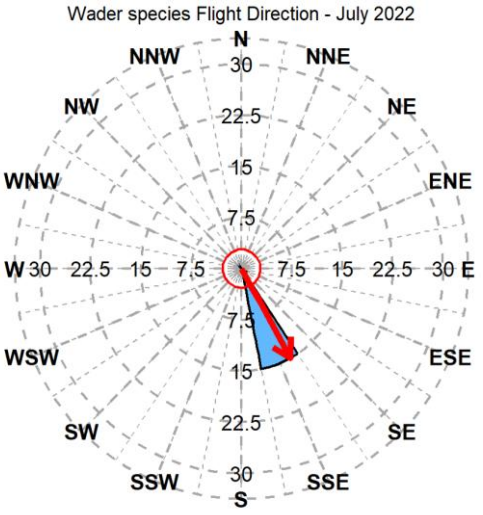
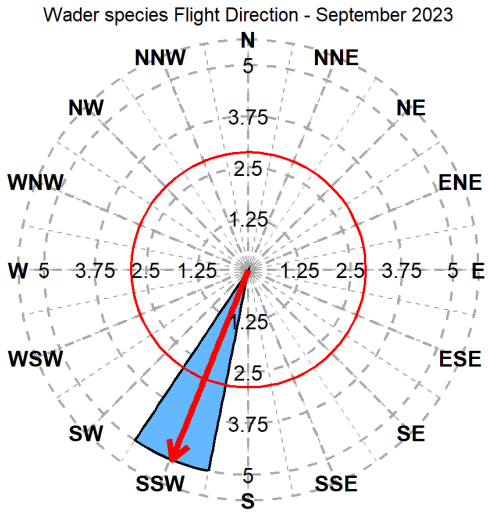


Figure 22 Distribution of wader species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping





Number of Observations	16	Number of Observations	5
Mean vector	151.274	Mean vector	202.907
Length of mean vector (r)	0.996	Length of mean vector (r)	0.998
Rayleigh Test (Z)	15.887	Rayleigh Test (Z)	4.977
Rayleigh Test (p)	<0.001	Rayleigh Test (p)	0.001
a. July 2022 (Survey 05)		**b. September 2023 (Survey 19)**	

Figure 23 Summary of flight direction of wader species during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.8 Oystercatcher – *Haematopus ostralegus*

Oystercatchers were recorded in the breeding season (March, May, and July 2023) and non-breeding season (February and December 2023). Peak abundance occurred in July 2023 with an estimate of 44 [95% CL: 5, 130] within the Survey Area equating to 0.05 birds/km^2 (**Table 18**). The oystercatchers were primarily found along the coast, appearing in the south-west of the 10 km Buffer in all surveys (**Figure 24** to **Figure 26**). In March and May 2023, the oystercatchers also occurred further along the coast in the east of the 10 km Buffer (**Figure 25**).

In May 2023, there was a significant predominant direction of flight towards the north-northwest, respectively (**Figure 27a**).

Table 18 Apportioned abundance and density estimates (birds per km^2) of oystercatcher in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Feb-23	2	17	2	51	0.71	0.02	17	2	51	0.02
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
May-23	4	35	4	78	0.50	0.04	35	4	95	0.04
Jul-23	1	9	1	26	<1.00	0.01	44	5	130	0.05
Dec-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Feb-23	2	17	2	51	0.71	0.02	79	2	51	0.02
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
May-23	4	34	4	77	0.50	0.04	34	4	94	0.04
Jul-23	1	9	1	26	<1.00	0.01	43	5	163	0.05
Dec-23	1	8	1	26	<1.00	0.01	8	1	26	0.01

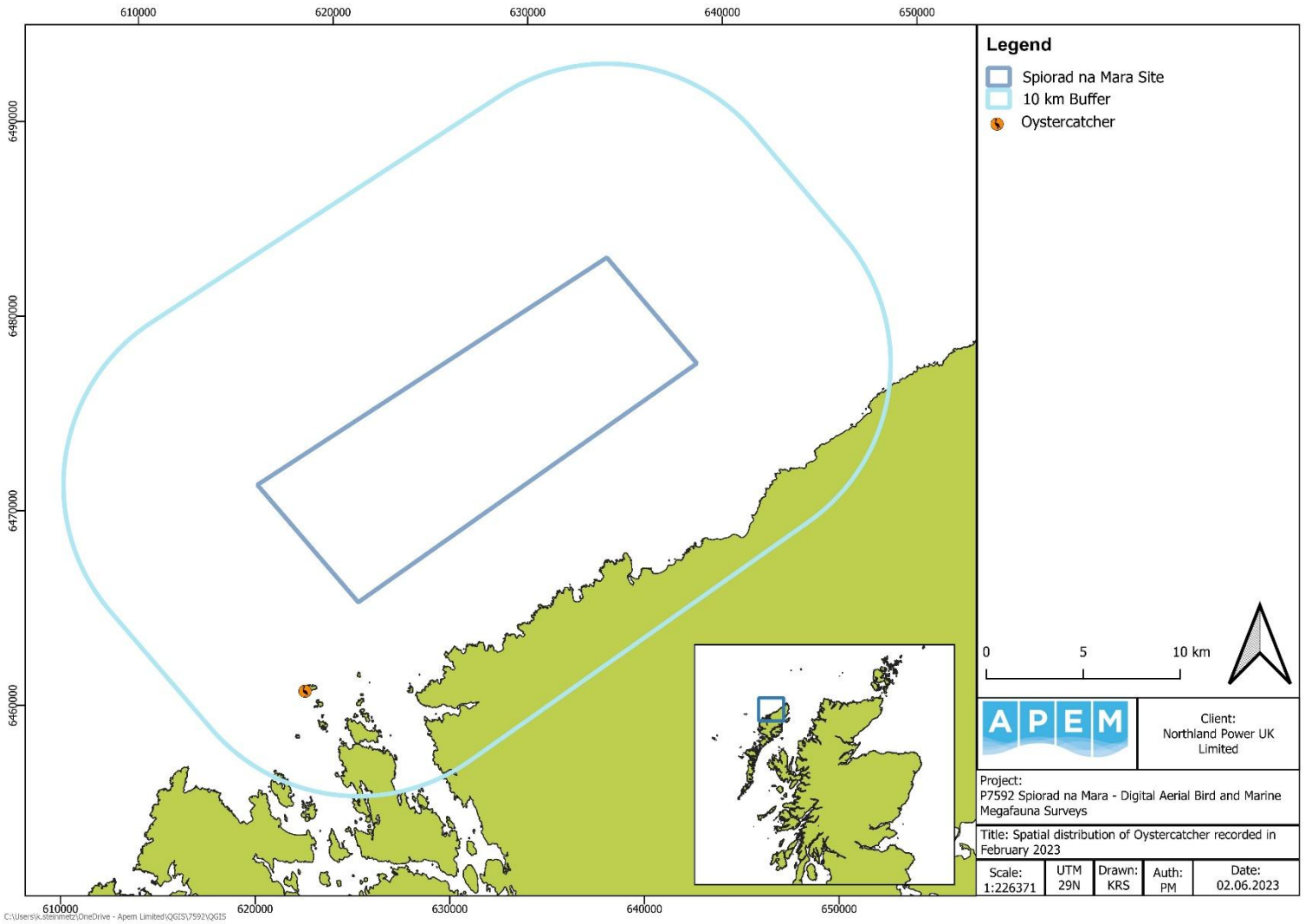


Figure 24 Distribution of oystercatcher in the Survey Area during March 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

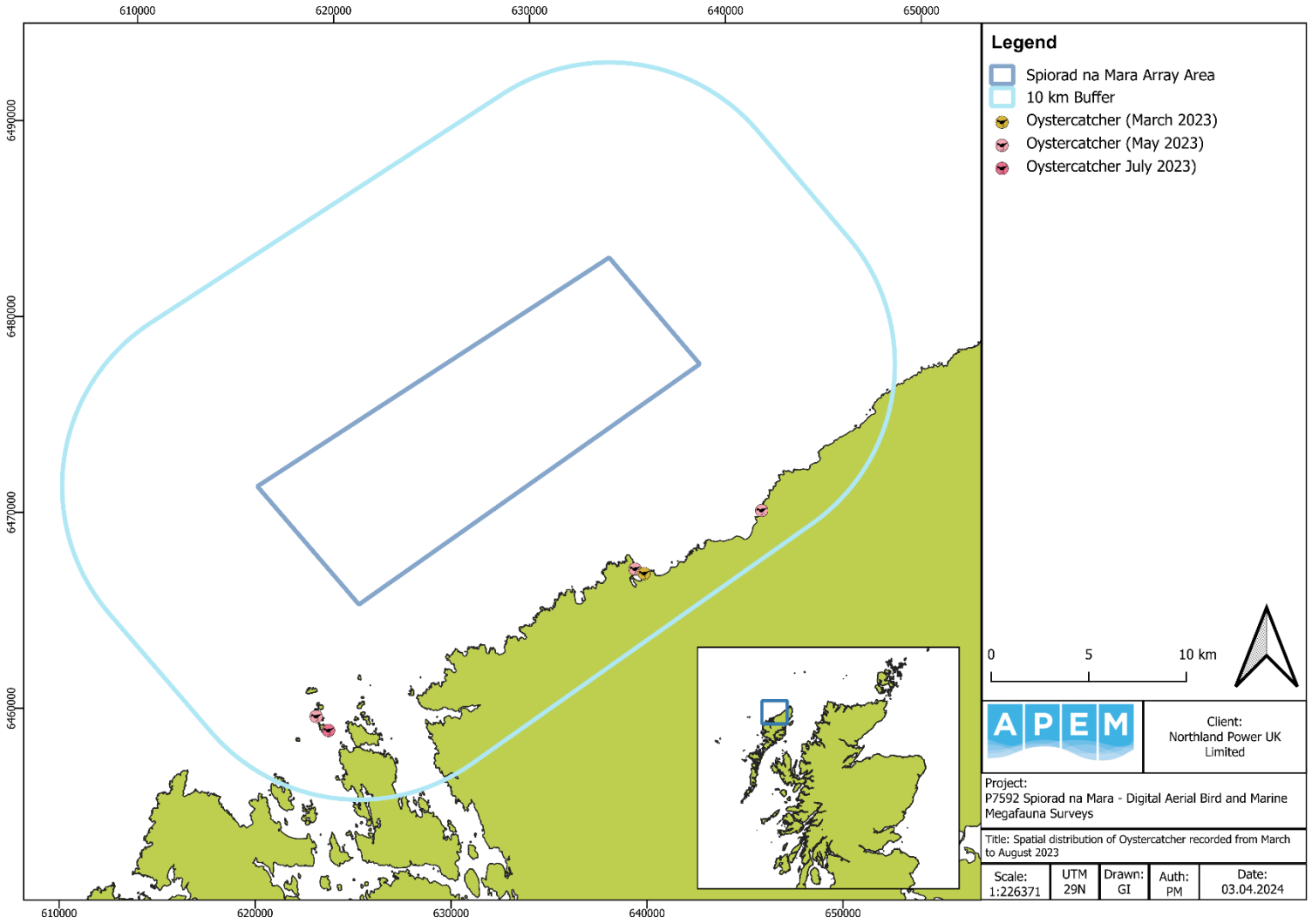


Figure 25 Distribution of oystercatcher in the Survey Area during March 2023 and August 2023

Note: Individuals in close proximity may appear overlapping

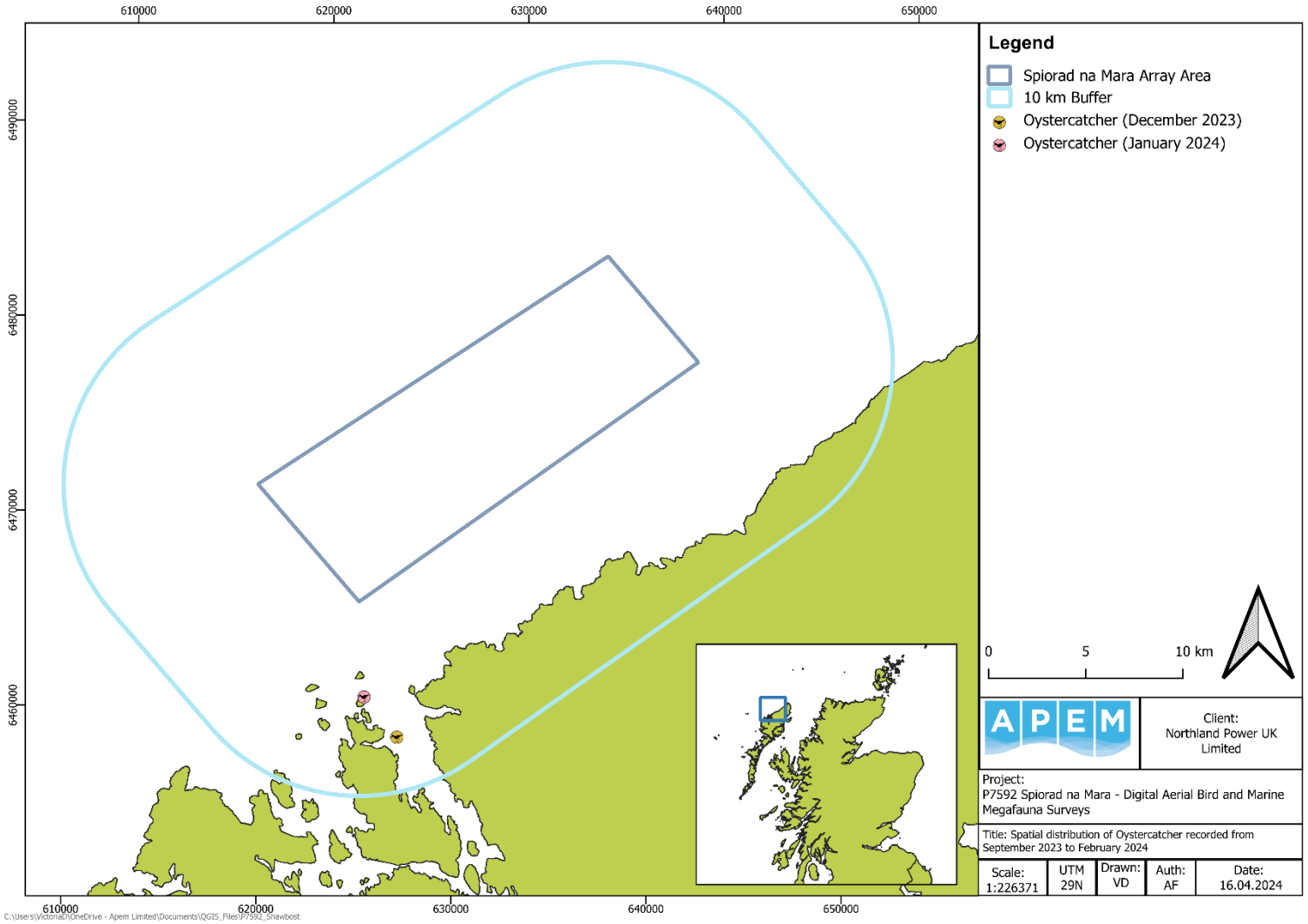
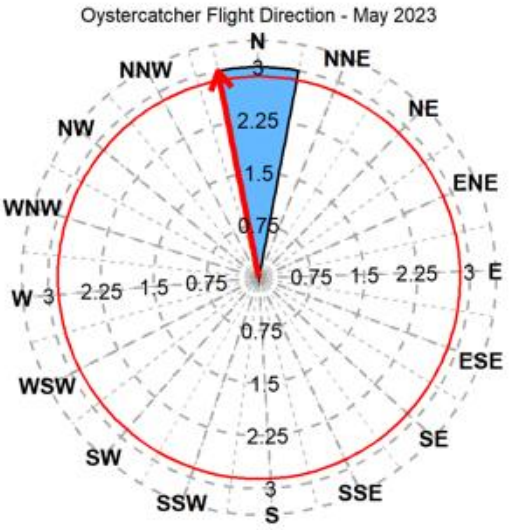


Figure 26 Distribution of oystercatcher in the Survey Area during September 2023 and February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	3
Mean vector	355.432
Length of mean vector (r)	0.999
Rayleigh Test (Z)	2.992
Rayleigh Test (p)	0.034
a. May 2023 (Survey 15)	

Figure 27 Summary of flight direction of oystercatcher during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.9 Rock dove – *Columba livia*

Rock dove were recorded in July 2022 during the breeding season, resulting in an abundance estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 **(Table 19**). The rock dove was recorded in the southwest of the 10 km Buffer **(Figure 28**). The individual was recorded flying, with no significant flight direction.

Table 19 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of rock dove in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01

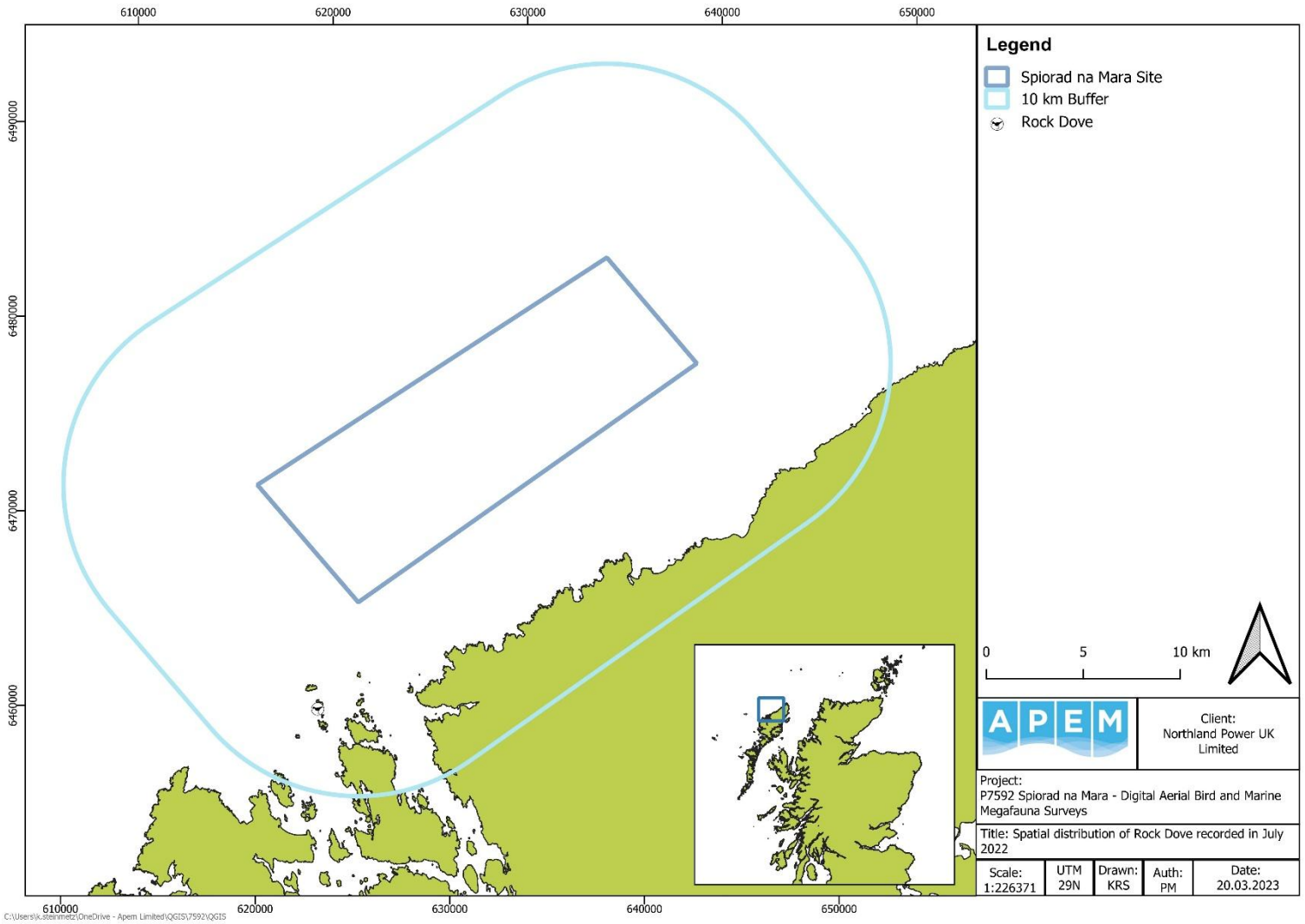


Figure 28 Distribution of rock dove in the Survey Area during July 2022

Note: Individuals in close proximity may appear overlapping

3.1.10 Kittiwake – *Rissa tridactyla*

Kittiwakes were recorded in all survey months throughout the year. Peak abundance occurred in February 2023 with an estimate of 3,160 [95% CL:2,455, 3,950] within the Survey Area equating to 3.30 birds/km^2 (**Table 20**). Notably more kittiwakes were recorded in the non-breeding season across both years of surveys, particularly in January and February 2023 as well as February 2024. During the non-breeding season, they were widely dispersed across the Survey Area, with a notable presence in the north in October 2022, February 2023, and February 2024 (**Figure 30** and **Figure 32**). During the breeding seasons, kittiwakes predominantly occurred in the southwest of the 10 km Buffer in May 2022 and May to August 2023, in the south and north in June 2022, and across the site in July 2022 (**Figure 29** and **Figure 31**).

Throughout the survey period, kittiwakes displayed varying significant monthly flight trends. Notably, during the first year of surveys individuals flew northeast in May and June 2022, shifted to southeast in October and November 2022, west in December 2022, south in January 2023, and northwest in February 2023 (**Figure 33a-g**). Comparably, in the second year of surveys, kittiwakes flew northeast in March and May 2023, shifting to east-northeast in June and November 2023, and southeast in February 2024 (**Figure 33h-l**). No significant flight direction was recorded outside these months.

Table 20 Apportioned abundance and density estimates (birds per km^2) of kittiwake in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	171	94	249	0.22	0.18	171	94	266	0.18
Apr-22	36	312	52	763	0.17	0.33	312	68	989	0.33
May-22	39	335	172	541	0.16	0.35	335	127	618	0.35
Jun-22	30	254	42	509	0.18	0.27	262	31	576	0.27
Jul-22	23	198	86	361	0.21	0.21	241	65	515	0.25
Aug-22	2	17	2	43	0.71	0.02	30	3	105	0.03
Sep-22	16	137	26	318	0.25	0.14	138	16	378	0.14
Oct-22	83	725	507	970	0.11	0.76	734	455	1088	0.77
Nov-22	69	595	431	776	0.12	0.62	598	416	813	0.62
Dec-22	15	130	61	209	0.26	0.14	138	61	209	0.14
Jan-23	244	2,095	1,734	2,490	0.06	2.19	2,095	1,683	2,568	2.19
Feb-23	369	3,144	2,624	3,706	0.05	3.28	3,160	2,455	3,950	3.30
Mar-23	146	1,253	618	2,163	0.08	1.31	1,256	446	2,461	1.31
Apr-23	6	52	9	104	0.41	0.05	52	9	122	0.05
May-23	22	190	78	337	0.21	0.20	190	86	328	0.20
Jun-23	12	106	27	230	0.29	0.11	109	24	263	0.11
Jul-23	21	182	52	399	0.22	0.19	183	35	394	0.19
Aug-23	2	17	2	43	0.71	0.02	17	2	51	0.02
Sep-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-23	21	182	86	294	0.22	0.19	212	83	423	0.22
Nov-23	16	140	70	227	0.25	0.15	141	62	238	0.15
Dec-23	14	120	60	181	0.27	0.13	129	61	215	0.13

Jan-24	7	61	17	105	0.38	0.06	67	12	147	0.07
Feb-24	284	2,421	1,764	3,281	0.06	2.53	2,470	1,664	3,521	2.58

b) Spiorad na Mara Array Area

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	27	3	64	0.58	0.17	27	3	73	0.17
May-22	4	36	4	98	0.50	0.22	36	4	107	0.22
Jul-22	0	0	0	0	0.00	0.00	27	3	81	0.17
Aug-22	0	0	0	0	0.00	0.00	3	0	12	0.02
Sep-22	1	9	1	27	<1.00	0.06	9	1	27	0.06
Oct-22	31	282	146	437	0.18	1.75	282	109	510	1.75
Nov-22	21	189	108	289	0.22	1.17	189	108	289	1.17
Dec-22	5	45	9	100	0.45	0.28	45	9	100	0.28
Jan-23	63	567	405	756	0.13	3.52	567	378	792	3.52
Feb-23	17	152	80	224	0.24	0.94	152	67	268	0.94
Mar-23	25	224	25	610	0.20	1.39	224	29	637	1.39
Apr-23	2	18	2	45	0.71	0.11	18	2	63	0.11
Oct-23	2	18	2	45	0.71	0.11	18	2	45	0.11
Nov-23	4	37	4	82	0.50	0.23	37	4	82	0.23
Dec-23	3	27	3	63	0.58	0.17	30	3	72	0.18
Jan-24	1	9	1	28	<1.00	0.06	9	1	28	0.06
Feb-24	14	125	53	205	0.27	0.78	125	39	240	0.77

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	169	94	254	0.22	0.21	169	93	271	0.21
Apr-22	33	283	34	756	0.17	0.36	283	50	961	0.35
May-22	35	298	136	485	0.17	0.37	298	115	545	0.37
Jun-22	30	253	51	573	0.18	0.32	261	31	606	0.33
Jul-22	23	196	85	341	0.21	0.24	213	62	434	0.27
Aug-22	2	17	2	43	0.71	0.02	27	3	78	0.03
Sep-22	15	128	26	298	0.26	0.16	128	15	324	0.16
Oct-22	52	451	303	624	0.14	0.57	457	261	705	0.57
Nov-22	48	410	273	555	0.14	0.51	412	267	598	0.52
Dec-22	10	86	34	147	0.32	0.11	86	34	138	0.11
Jan-23	181	1,540	1,225	1,855	0.07	1.93	1,540	1,166	1,948	1.93
Feb-23	352	2,971	2,447	3,519	0.05	3.73	2,986	2,348	3,734	3.74
Mar-23	121	1,029	476	1,829	0.09	1.29	1,032	363	2,152	1.29
Apr-23	4	34	4	86	0.50	0.04	34	4	78	0.04
May-23	22	188	77	324	0.21	0.24	188	68	324	0.24
Jun-23	12	105	26	219	0.29	0.13	108	24	261	0.14
Jul-23	21	180	34	404	0.22	0.23	181	35	407	0.23
Aug-23	2	17	2	42	0.71	0.02	17	2	42	0.02

Sep-23	1	8	1	26	<1.00	0.01	8	1	26	0.01
Oct-23	19	163	69	266	0.23	0.20	192	65	385	0.24
Nov-23	12	104	52	164	0.29	0.13	105	44	177	0.13
Dec-23	11	94	43	162	0.30	0.12	101	35	175	0.13
Jan-24	6	52	17	95	0.41	0.07	58	12	128	0.07
Feb-24	270	2,282	1,614	3,076	0.06	2.86	2,330	1,548	3,340	2.92

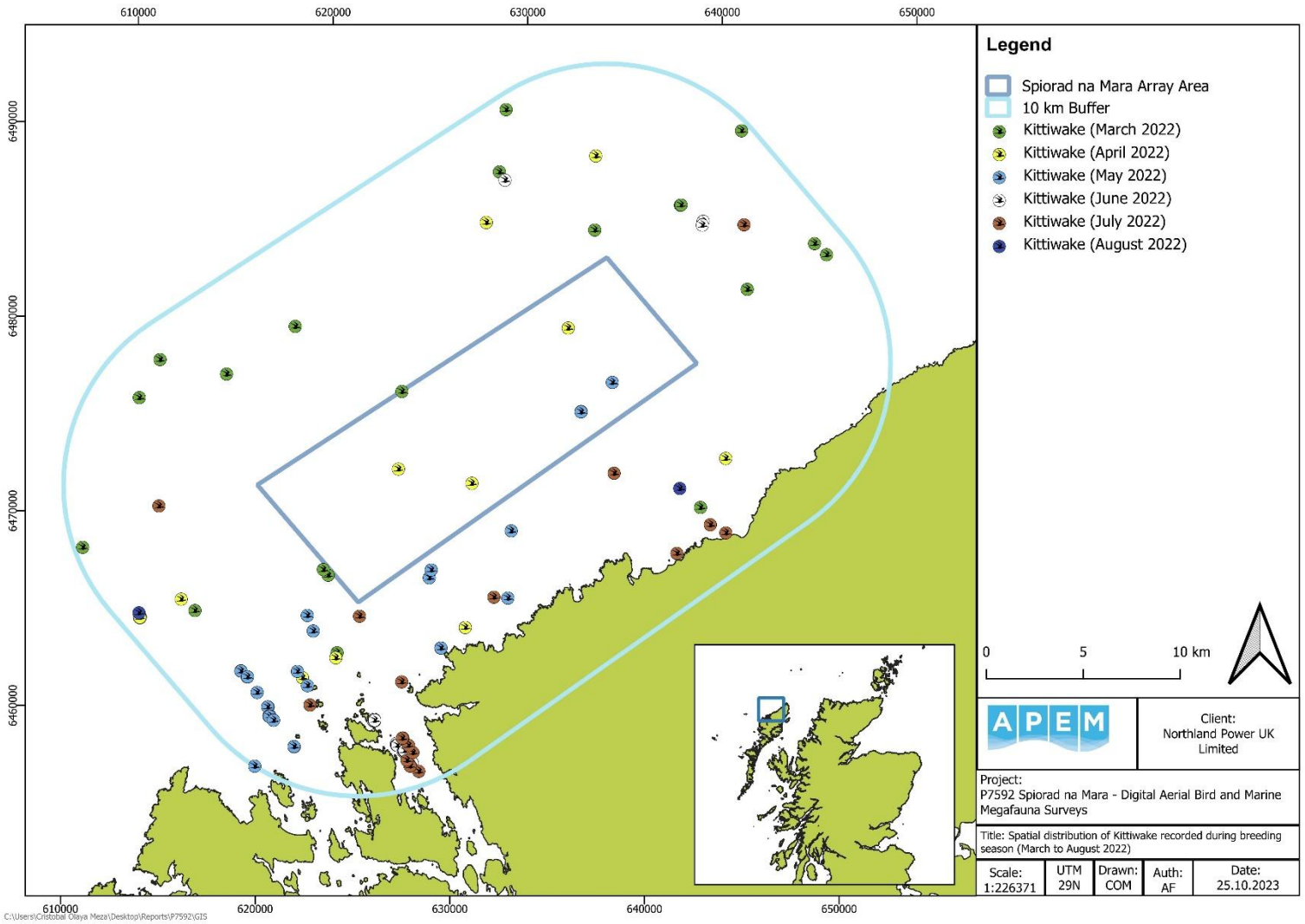


Figure 29 Distribution of kittiwake in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

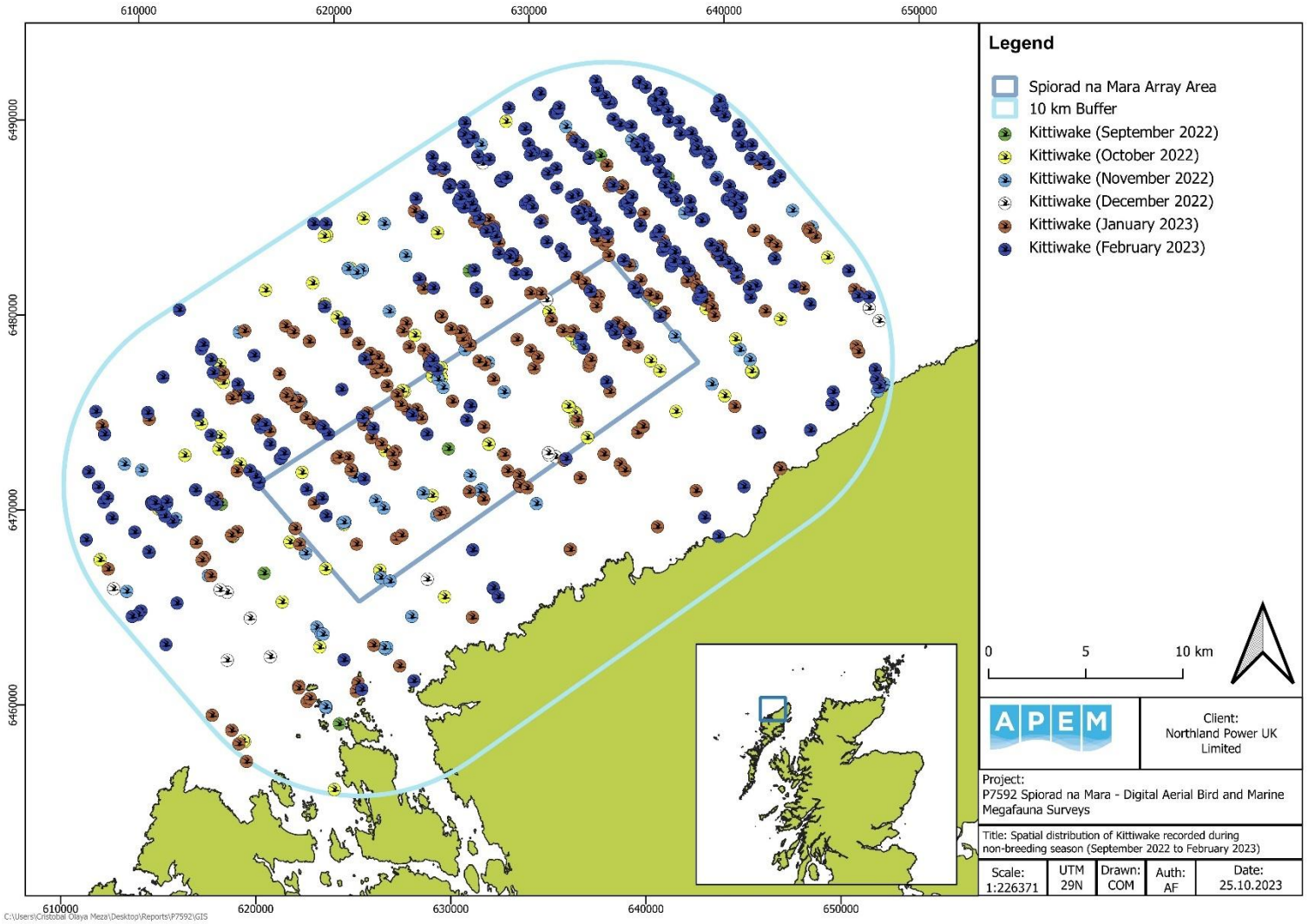


Figure 30 Distribution of kittiwake in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

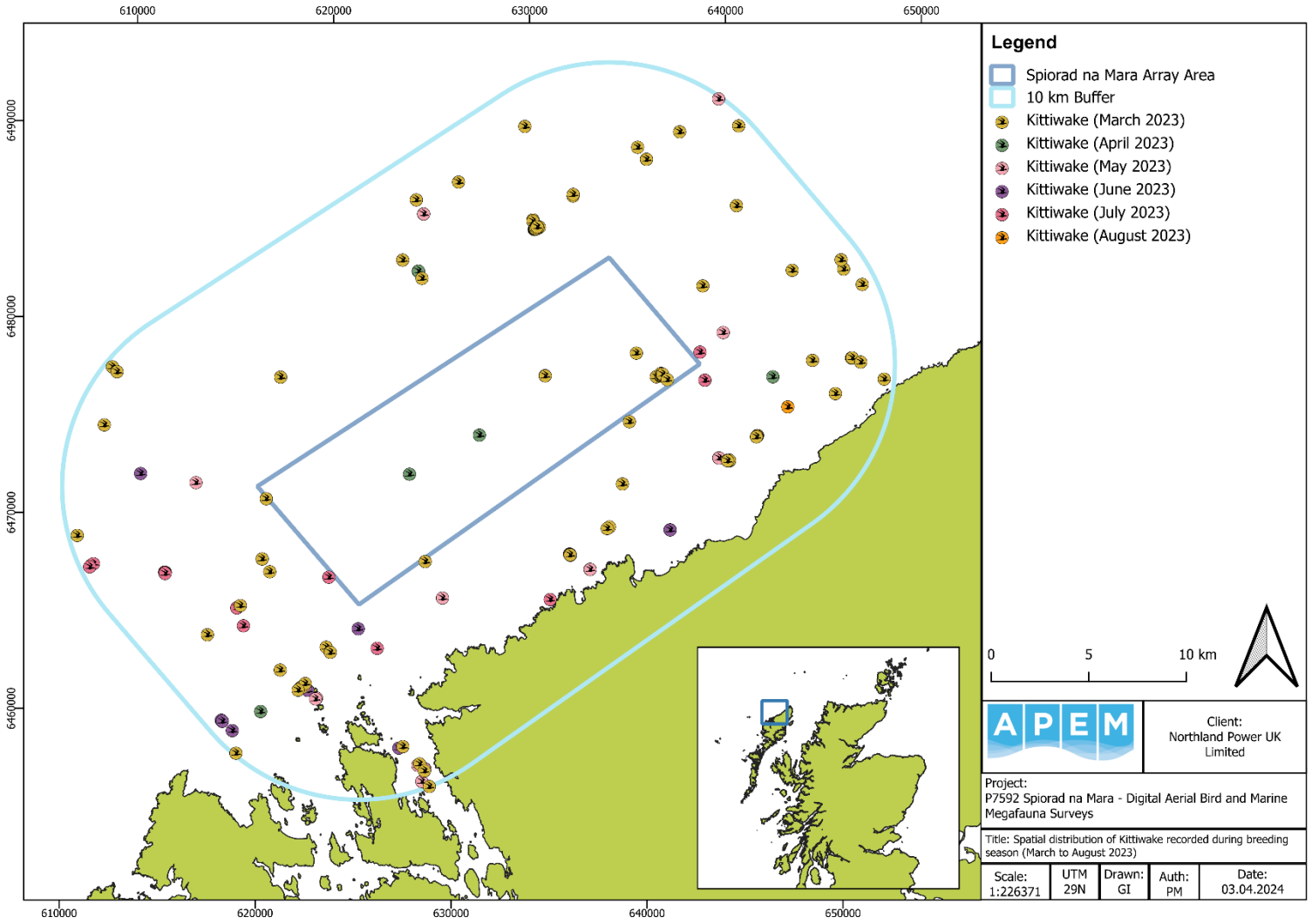


Figure 31 Distribution of kittiwake in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

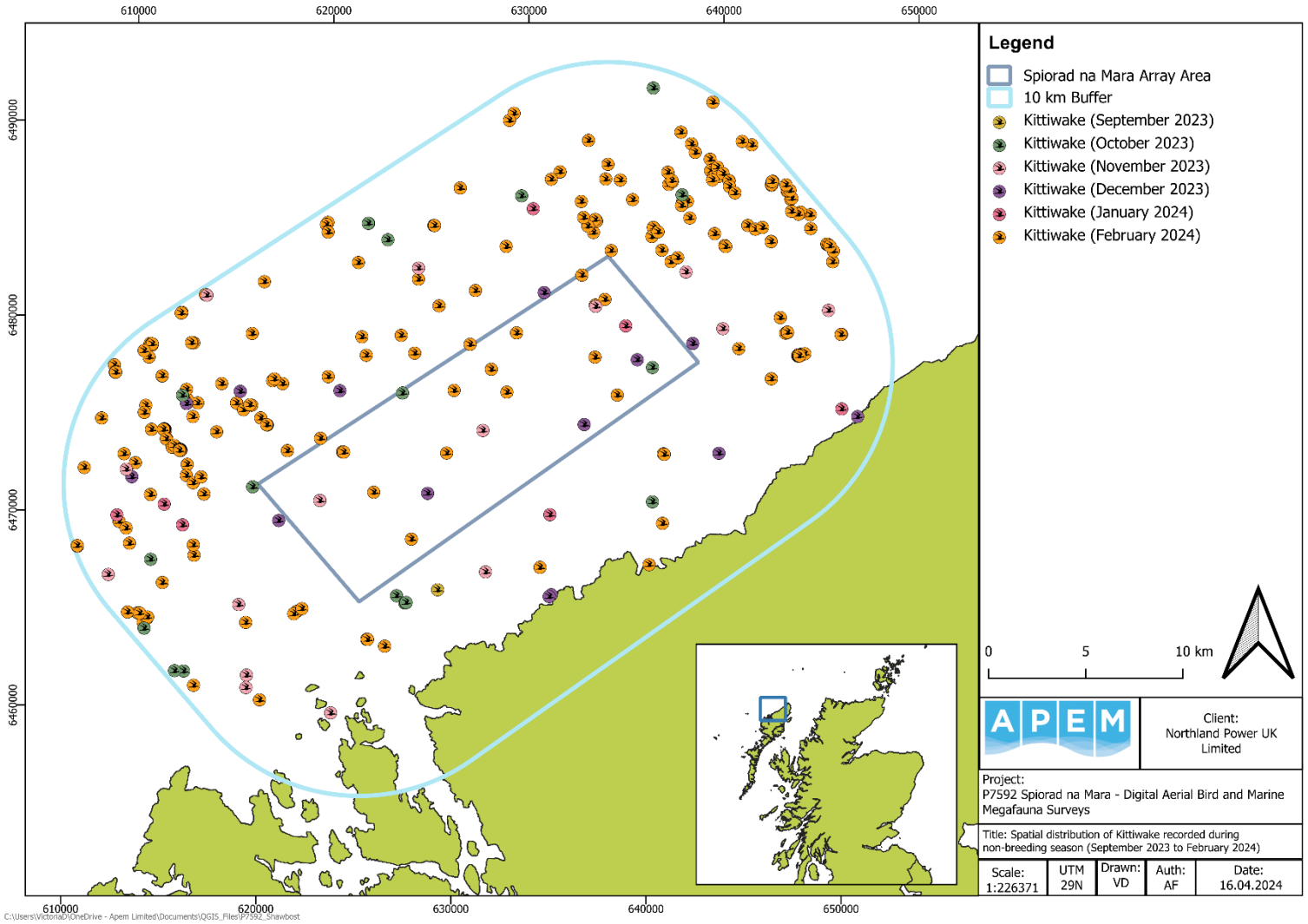
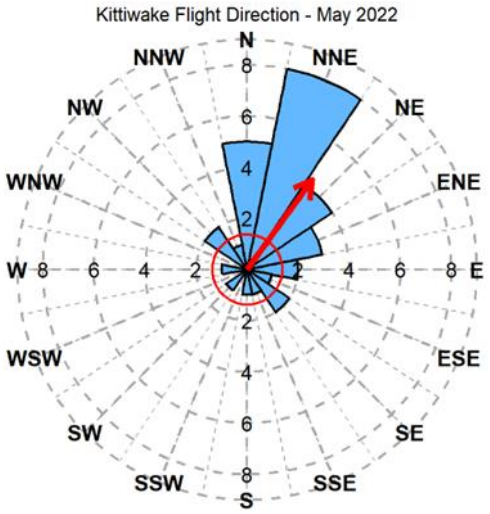


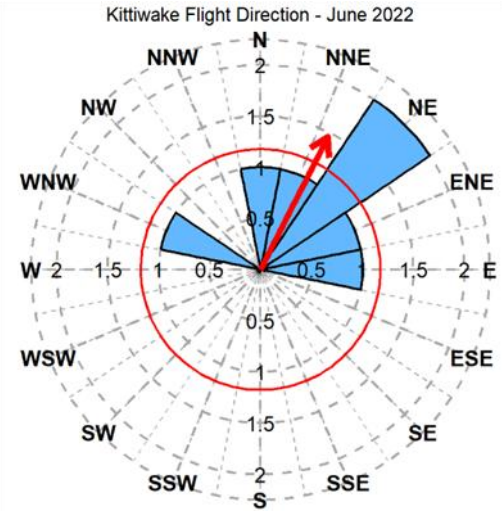
Figure 32 Distribution of kittiwake in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



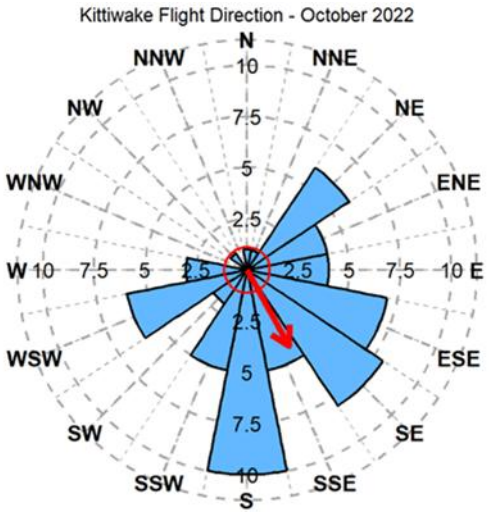
Number of Observations	32
Mean vector	36.343
Length of mean vector (r)	0.542
Rayleigh Test (Z)	9.386
Rayleigh Test (p)	<0.001

a. May 2022 (Survey 03)



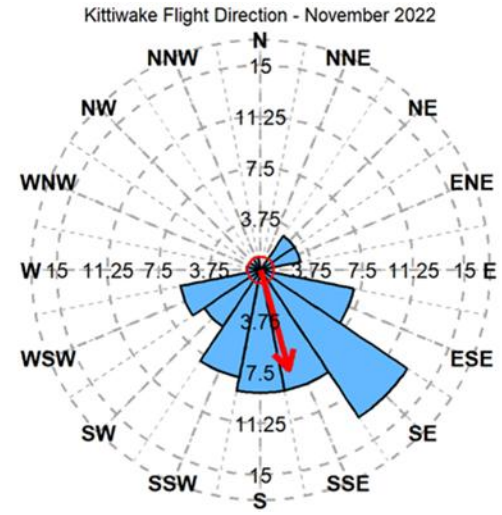
Number of Observations	7
Mean vector	27.599
Length of mean vector (r)	0.727
Rayleigh Test (Z)	3.698
Rayleigh Test (p)	0.018

b. June 2022 (Survey 04)



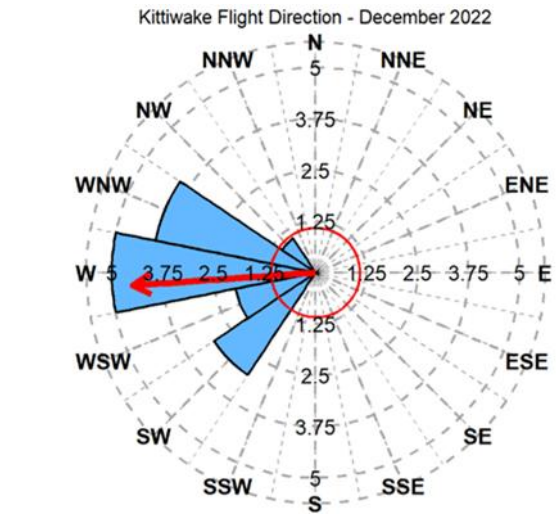
Number of Observations	63
Mean vector	151.597
Length of mean vector (r)	0.422
Rayleigh Test (Z)	11.241
Rayleigh Test (p)	<0.001

c. October 2022 (Survey 08)



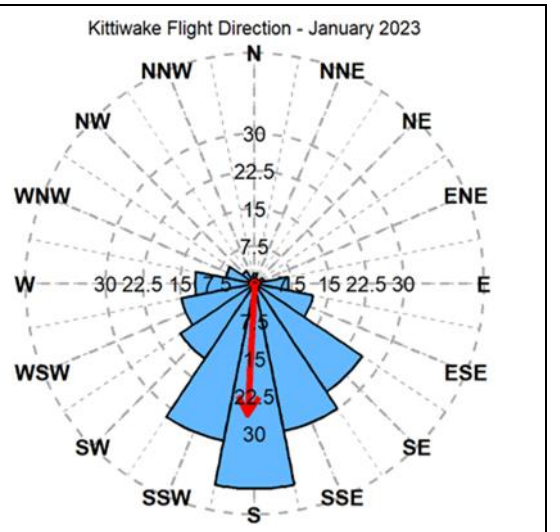
Number of Observations	67
Mean vector	164.694
Length of mean vector (r)	0.580
Rayleigh Test (Z)	22.537
Rayleigh Test (p)	<0.001

d. November 2022 (Survey 09)



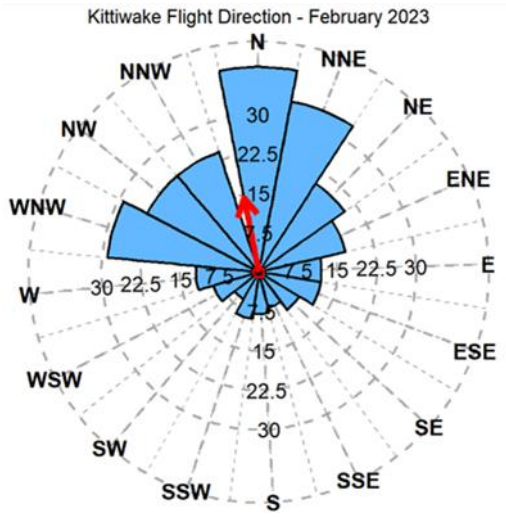
Number of Observations	15
Mean vector	266.274
Length of mean vector (r)	0.899
Rayleigh Test (Z)	12.127
Rayleigh Test (p)	<0.001

e. December 2022 (Survey 10)



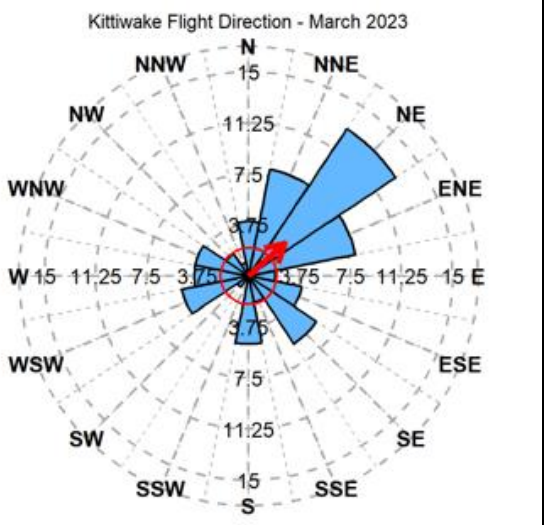
Number of Observations	208
Mean vector	183.488
Length of mean vector (r)	0.639
Rayleigh Test (Z)	84.884
Rayleigh Test (p)	<0.001

f. January 2023 (Survey 11)



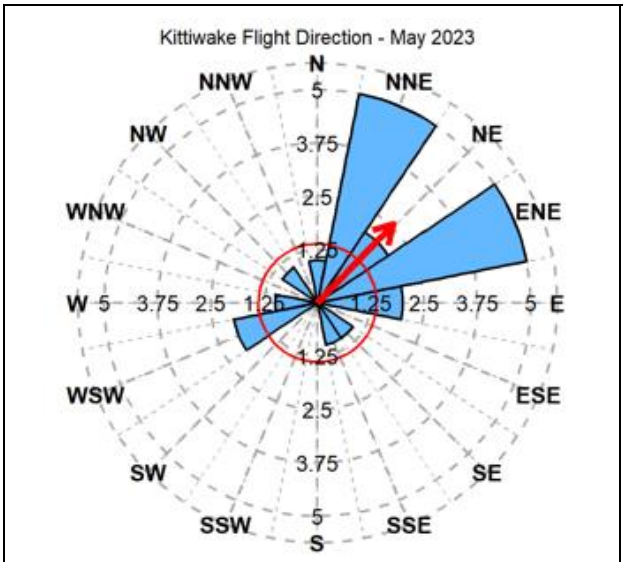
Number of Observations	270
Mean vector	356.663
Length of mean vector (r)	0.377
Rayleigh Test (Z)	38.424
Rayleigh Test (p)	<0.001

g. February 2023 (Survey 12)



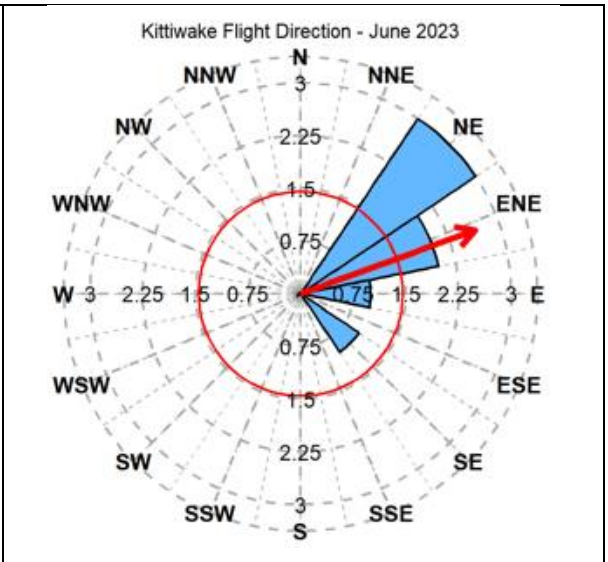
Number of Observations	69
Mean vector	48.357
Length of mean vector (r)	0.272
Rayleigh Test (Z)	5.090
Rayleigh Test (p)	0.006

h. March 2023 (Survey 13)



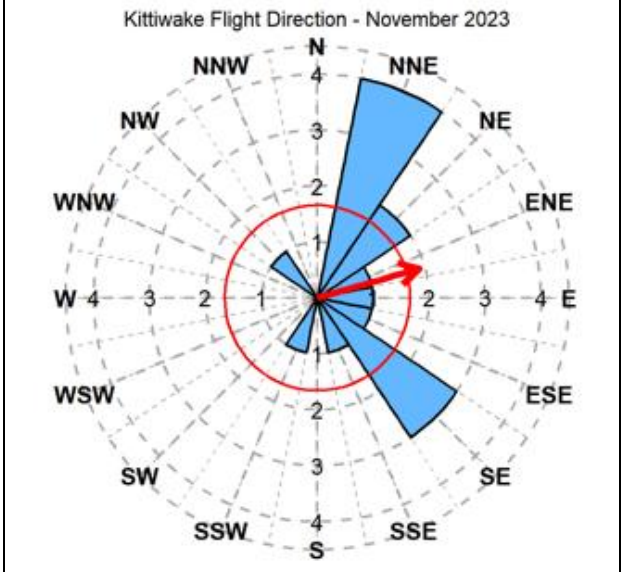
Number of Observations	21
Mean vector	44.375
Length of mean vector (r)	0.512
Rayleigh Test (Z)	5.508
Rayleigh Test (p)	0.003

i. May 2023 (Survey 15)



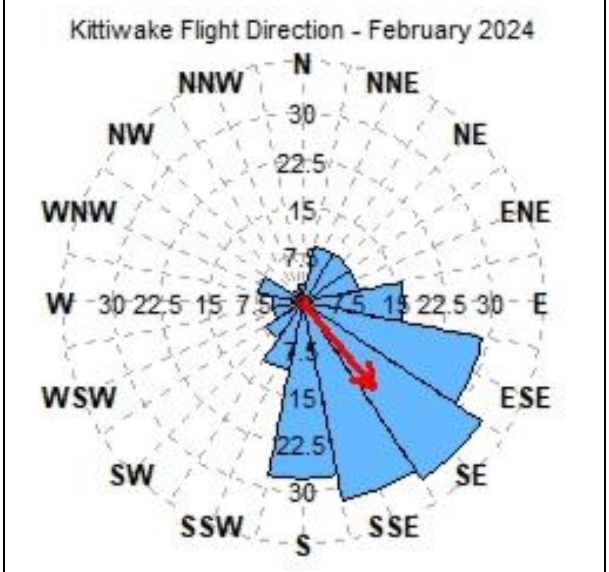
Number of Observations	7
Mean vector	70.473
Length of mean vector (r)	0.881
Rayleigh Test (Z)	5.431
Rayleigh Test (p)	0.001

j. June 2023 (Survey 16)



Number of Observations	15
Mean vector	74.509
Length of mean vector (r)	0.473
Rayleigh Test (Z)	3.360
Rayleigh Test (p)	0.032

k. November 2023 (Survey 21)



Number of Observations	208
Mean vector	140.563
Length of mean vector (r)	0.519
Rayleigh Test (Z)	56.128
Rayleigh Test (p)	<0.001

l. February 2024 (Survey 24)

Figure 33 Summary of flight direction of kittiwake during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.11 Common gull – *Larus canus*

Common gulls were recorded in 17 months throughout the survey period, with no individuals observed during the March, July, and September surveys across both years. Peak abundance occurred in June 2023 with an estimate of 342 [95% CL: 38, 822] within the Survey Area equating to 0.36 birds/km^2 (**Table 21**). Common gulls typically occurred in the southwest, southeast, and east of the 10 km Buffer adjacent to the coastline (**Figure 34** to **Figure 36**). However, between October 2023 and January 2024, individuals were observed further offshore toward the Spiorad na Mara Array Area (**Figure 37**).

In May 2022, June, and December 2023, common gulls had a significant predominant flight direction of northwest to north-northeast, respectively (**Figure 38a,c,e**). In October 2022 and November 2023, a significant predominant direction of flight was recorded from the southeast to the east-southeast (**Figure 38b,d**).

Table 21 Apportioned abundance and density estimates (birds per km^2) of common gull in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	26	3	78	0.58	0.03	26	3	61	0.03
May-22	4	34	9	69	0.50	0.04	34	9	69	0.04
Jun-22	1	8	1	25	<1.00	0.01	8	1	25	0.01
Aug-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-22	4	35	4	87	0.50	0.04	35	4	87	0.04
Nov-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Dec-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Feb-23	3	26	3	60	0.58	0.03	26	3	61	0.03
Apr-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
May-23	3	26	3	78	0.58	0.03	26	3	78	0.03
Jun-23	37	327	37	832	0.16	0.34	342	38	822	0.36
Aug-23	1	9	1	26	<1.00	0.01	11	1	40	0.01
Oct-23	7	61	17	112	0.38	0.06	66	19	131	0.07
Nov-23	7	61	17	105	0.38	0.06	61	17	113	0.06
Dec-23	4	34	9	69	0.50	0.04	36	9	74	0.04
Jan-24	3	26	3	52	0.58	0.03	29	3	80	0.03
Feb-24	1	9	1	26	<1.00	0.01	9	1	27	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Nov-23	1	9	1	27	<1.00	0.06	9	1	27	0.06
c) 10 km Buffer										
Month		Total unapportioned					Total apportioned			

	Raw Count	Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	26	3	69	0.58	0.03	26	3	69	0.03
May-22	4	34	9	68	0.50	0.04	34	9	68	0.04
Jun-22	1	8	1	25	<1.00	0.01	8	1	25	0.01
Aug-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-22	4	35	4	87	0.50	0.04	35	4	87	0.04
Nov-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Dec-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Feb-23	3	25	3	59	0.58	0.03	25	3	60	0.03
Apr-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
May-23	3	26	3	68	0.58	0.03	26	3	68	0.03
Jun-23	37	324	37	859	0.16	0.41	338	38	822	0.42
Aug-23	1	8	1	25	<1.00	0.01	9	1	30	0.01
Oct-23	7	60	26	112	0.38	0.08	65	19	130	0.08
Nov-23	6	52	17	95	0.41	0.07	52	17	95	0.07
Dec-23	4	34	9	68	0.50	0.04	35	9	72	0.04
Jan-24	3	26	3	61	0.58	0.03	29	3	79	0.04
Feb-24	1	8	1	25	<1.00	0.01	8	1	26	0.01

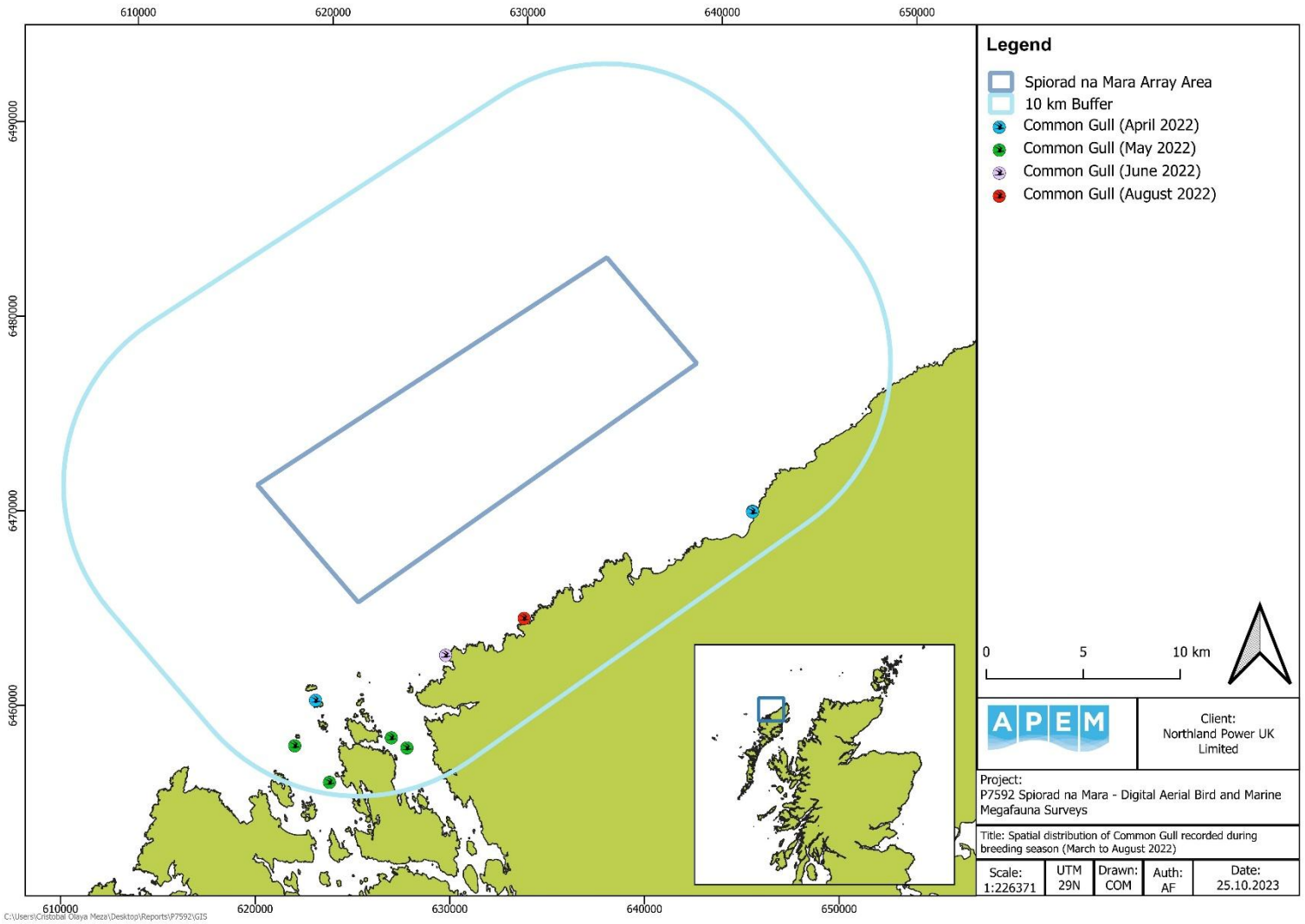


Figure 34 Distribution of common gull in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

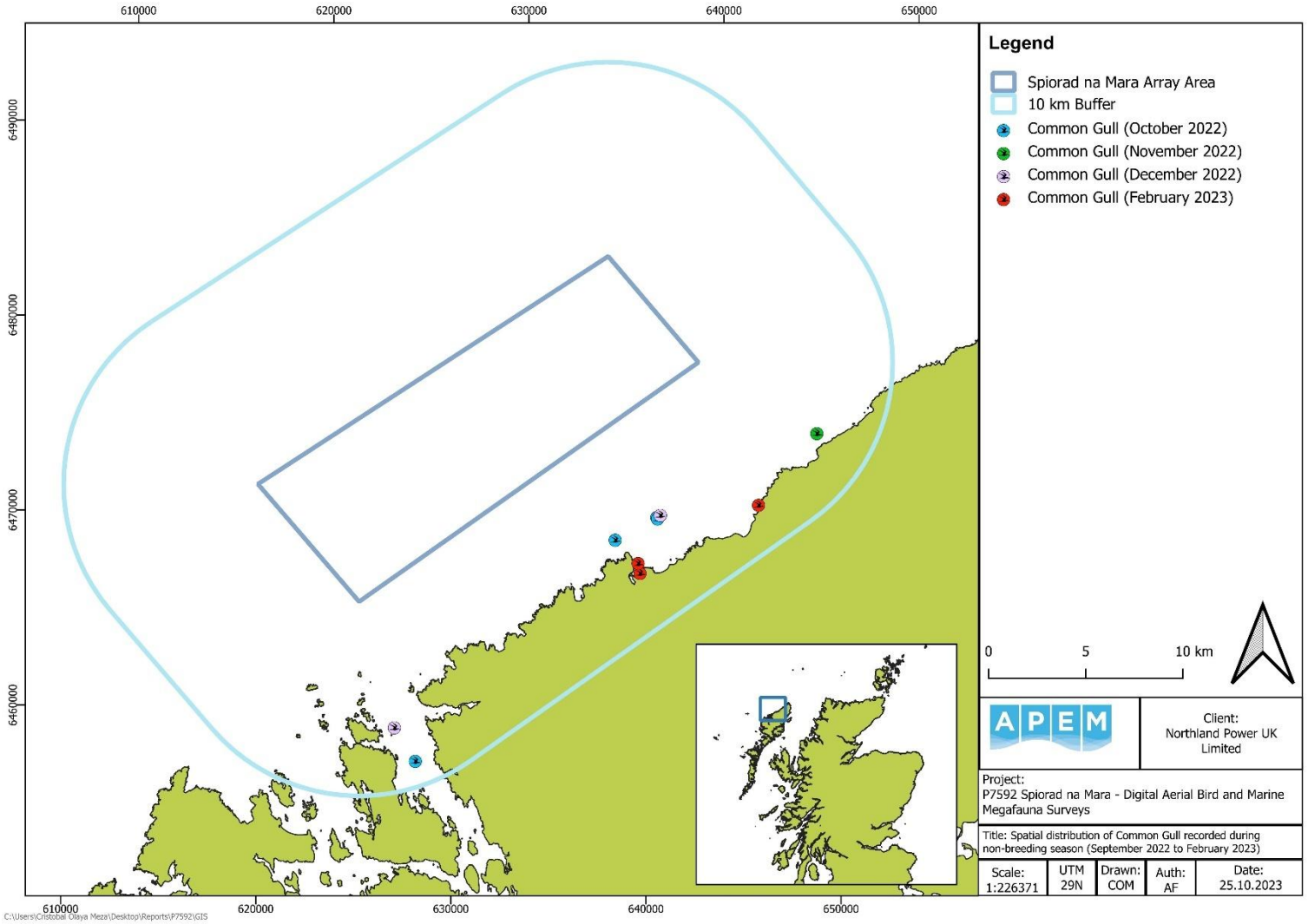


Figure 35 Distribution of common gull in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

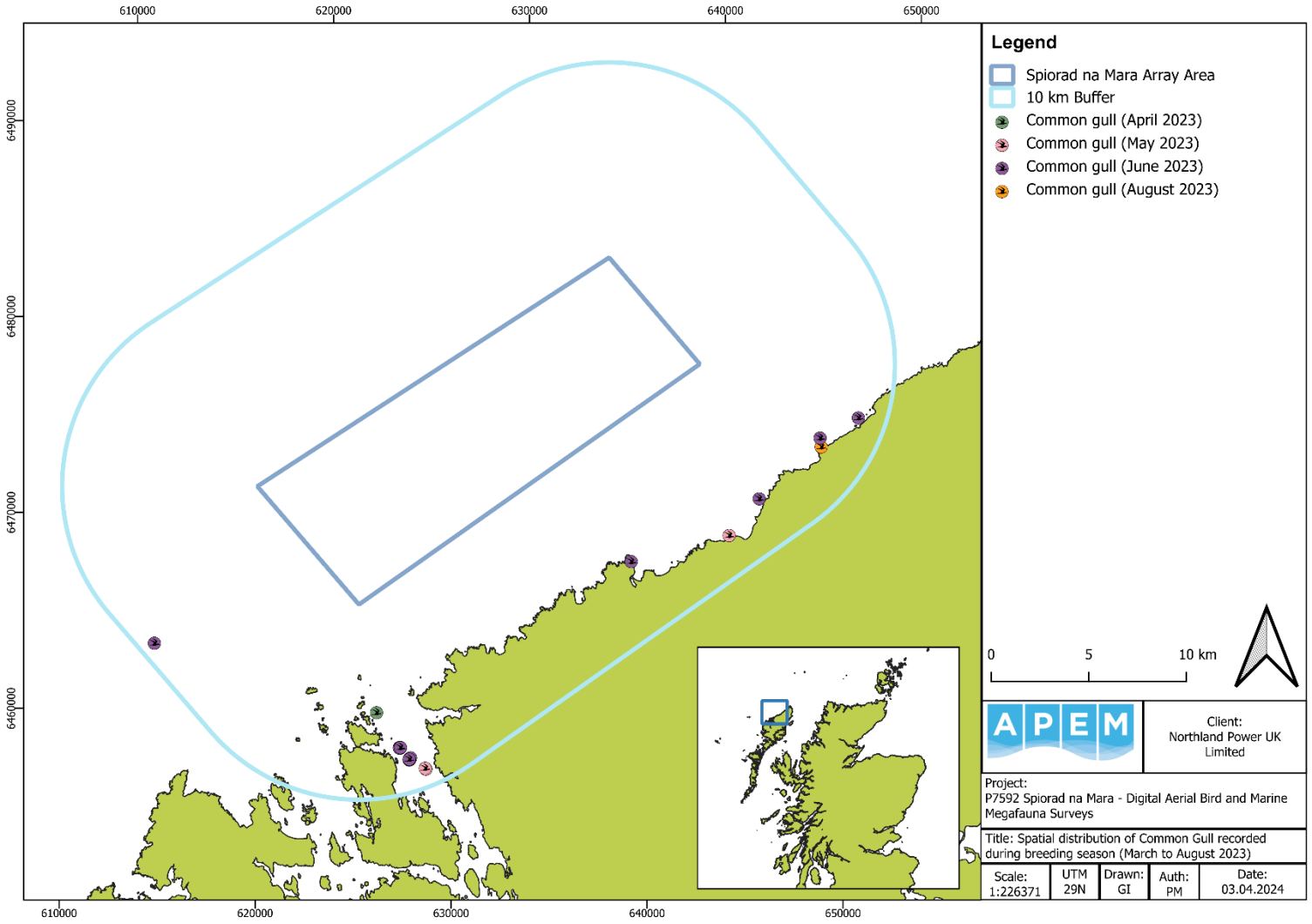


Figure 36 Distribution of common gull in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

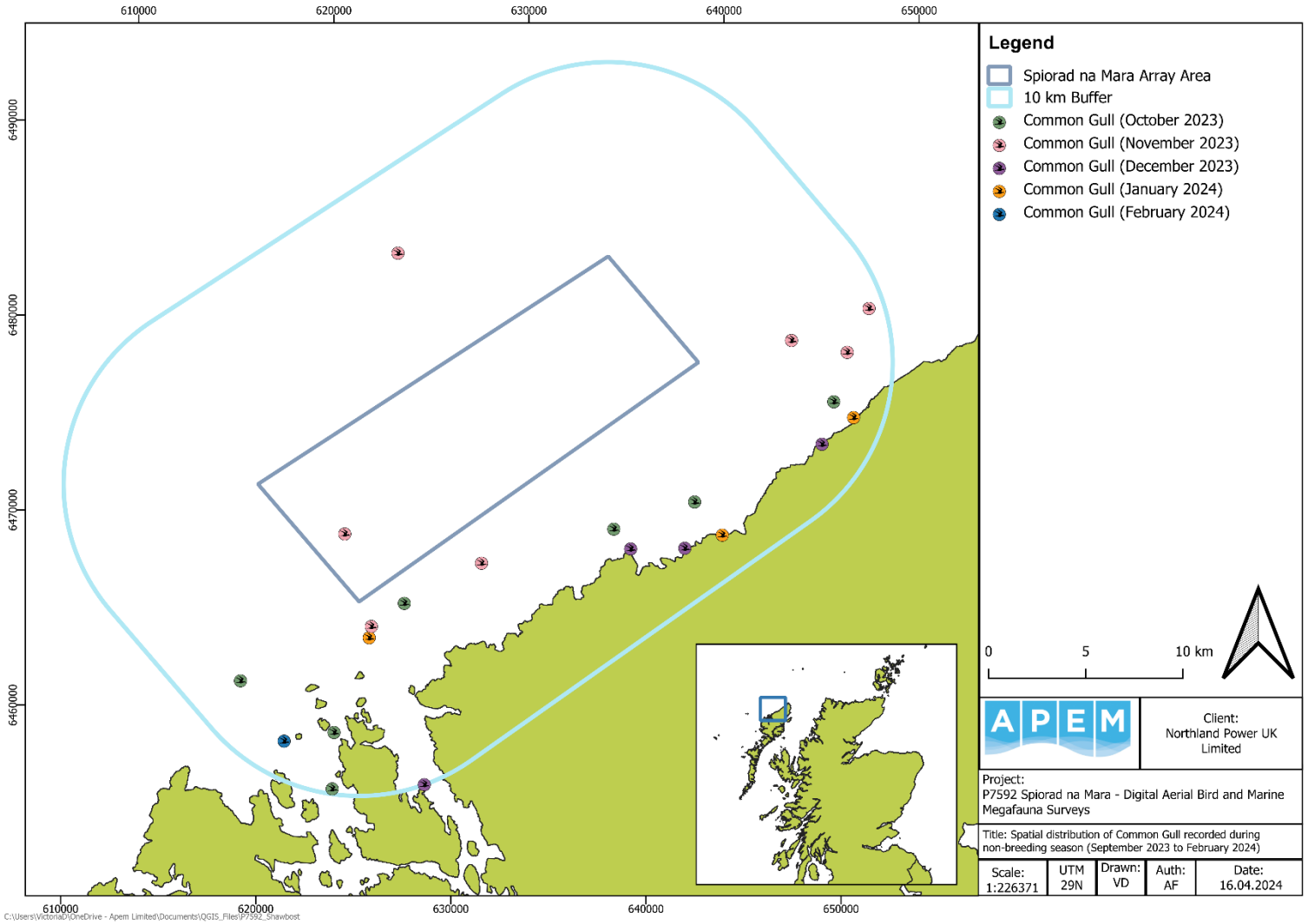
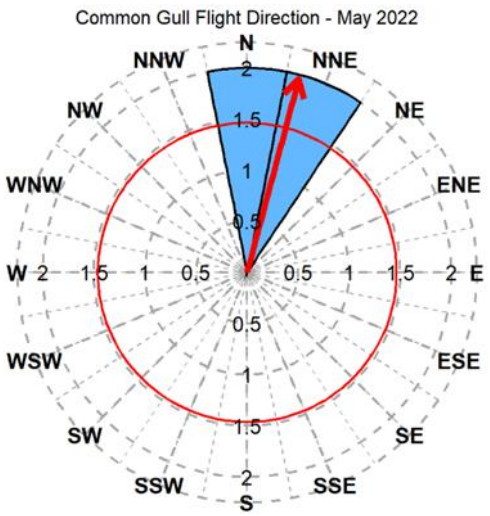


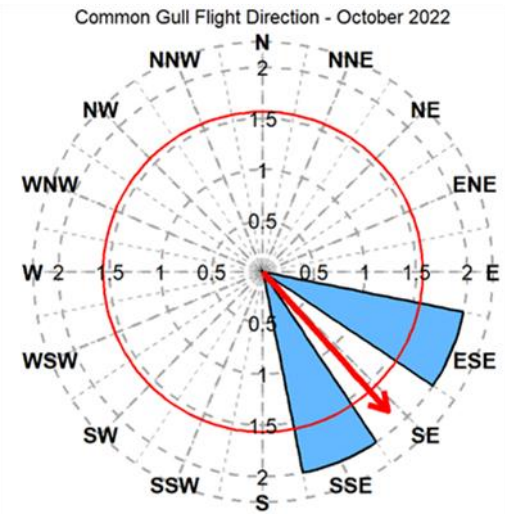
Figure 37 Distribution of common gull in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



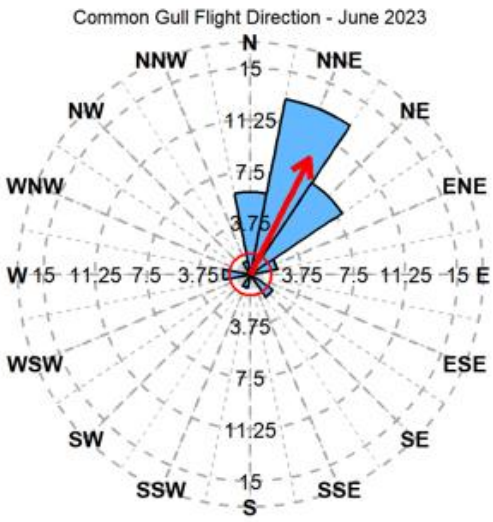
Number of Observations	4
Mean vector	15.809
Length of mean vector (r)	0.977
Rayleigh Test (Z)	3.821
Rayleigh Test (p)	0.010

a. May 2022 (Survey 03)



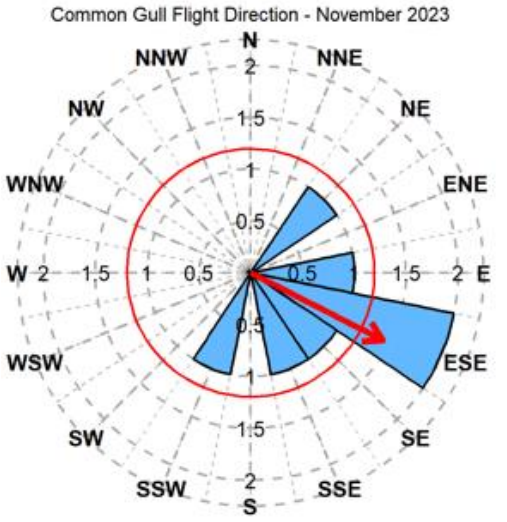
Number of Observations	4
Mean vector	138.730
Length of mean vector (r)	0.914
Rayleigh Test (Z)	3.343
Rayleigh Test (p)	0.023

b. October 2022 (Survey 08)



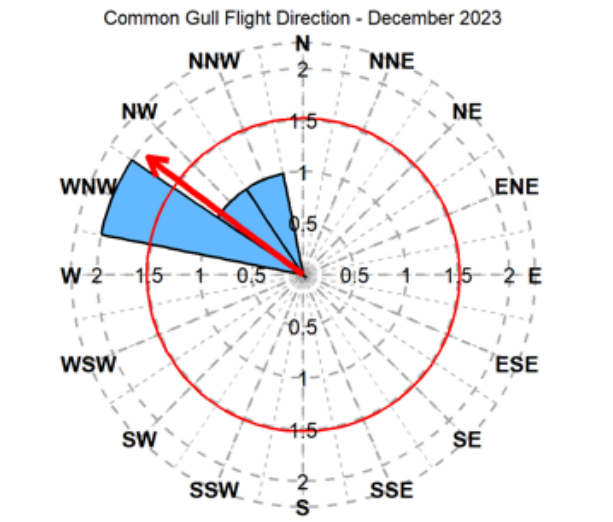
Number of Observations	35
Mean vector	27.844
Length of mean vector (r)	0.725
Rayleigh Test (Z)	18.395
Rayleigh Test (p)	<0.001

c. June 2023 (Survey 16)



Number of Observations	7
Mean vector	117.693
Length of mean vector (r)	0.715
Rayleigh Test (Z)	3.577
Rayleigh Test (p)	0.022

d. November 2023 (Survey 21)



Number of Observations	4
Mean vector	307.870
Length of mean vector (r)	0.942
Rayleigh Test (Z)	3.550
Rayleigh Test (p)	0.016
e. December 2023 (Survey 22)	

Figure 38 Summary of flight direction of common gull during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.12 Black-headed gull – *Chroicocephalus ridibundus*

Black-headed gulls were recorded in October 2022 and 2023 (non-breeding season) and June 2023 (breeding season). Peak abundance occurred in June 2023 with an estimate of 37 [95% CL: 4, 102] within the Survey Area equating to 0.04 birds/km^2 (**Table 22**). Black-headed gulls were typically observed southwest of the 10 km Buffer adjacent to Great Bernera coastline (**Figure 40** and **Figure 41)** with a single flying individual recorded offshore in the west of the 10 km Buffer in October 2022 (**Figure 39**).

In June 2023, black-headed gulls had a significant predominant direction of north-northwest to north, respectively (**Figure 42a**).

Table 22 Apportioned abundance and density estimates (birds per km^2) of black-headed gull in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-23	4	35	4	97	0.50	0.04	37	4	102	0.04
Oct-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-23	4	35	4	96	0.50	0.04	37	4	110	0.05
Oct-23	1	9	1	26	<1.00	0.01	9	1	26	0.01

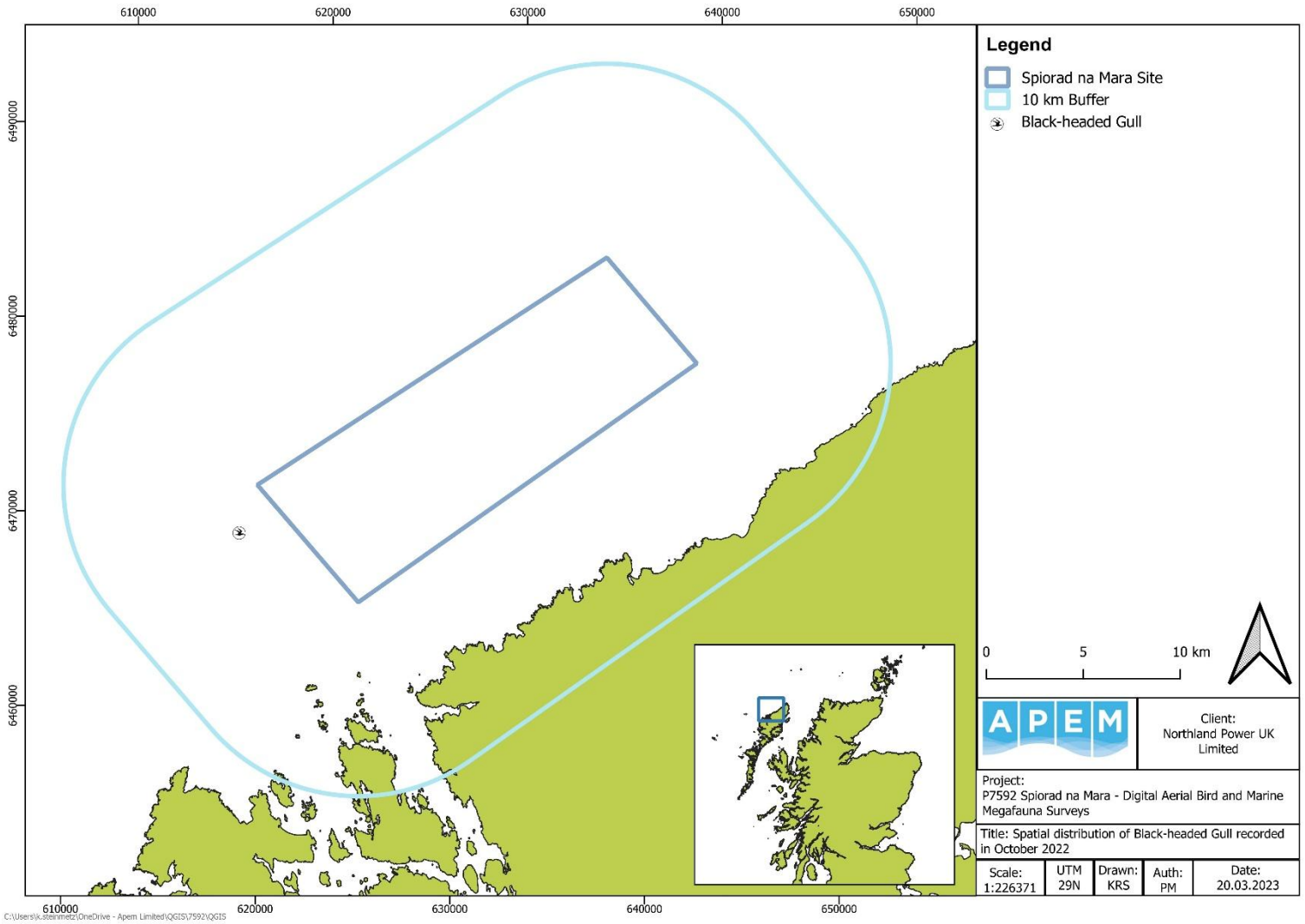


Figure 39 Distribution of black-headed gull in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

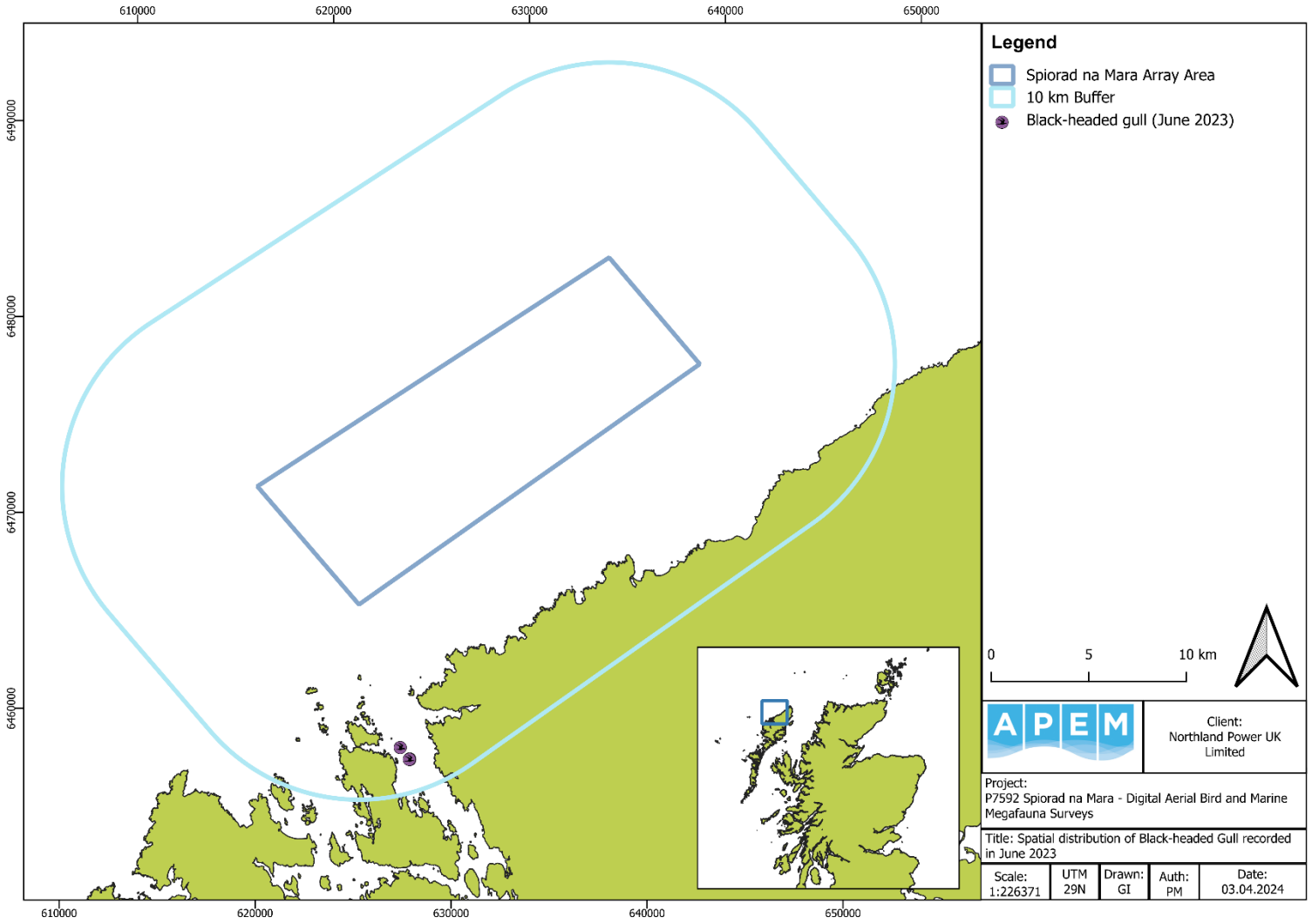


Figure 40 Distribution of black-headed gull in the Survey Area between March to August 2023

Note: Individuals in close proximity may appear overlapping

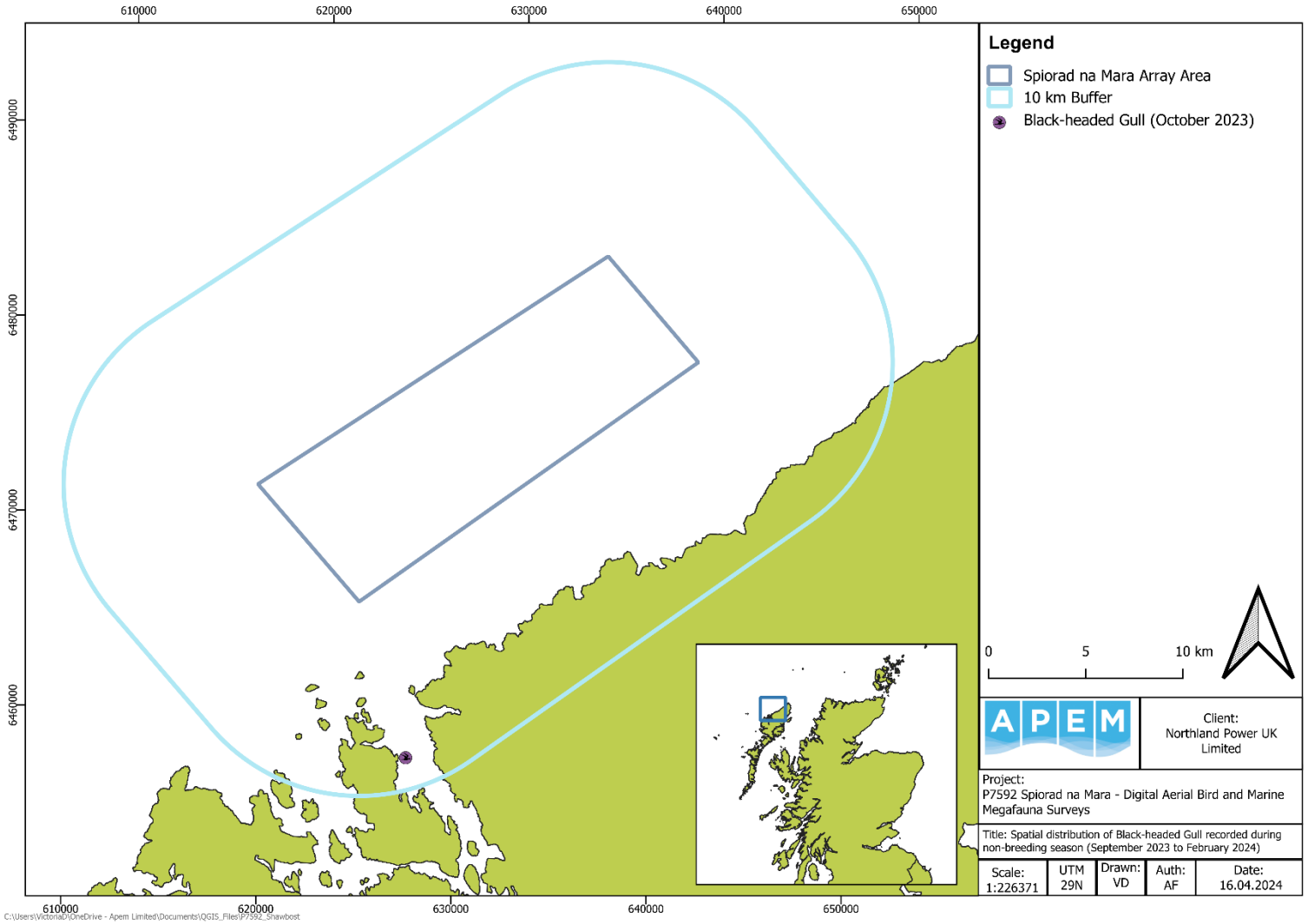
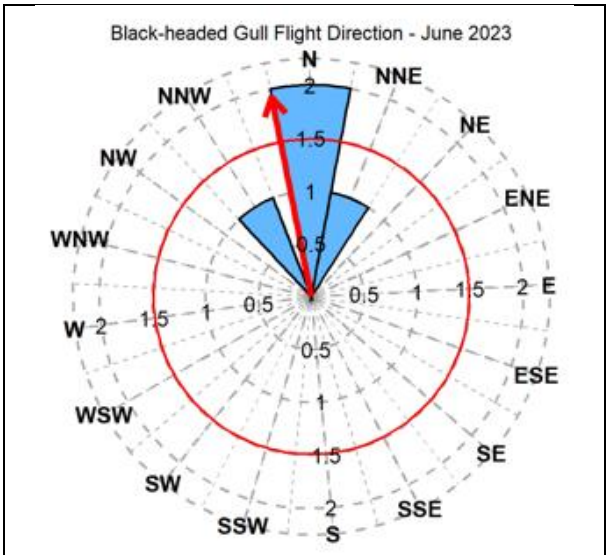


Figure 41 Distribution of black-headed gull in the Survey Area between September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	4
Mean vector	359.027
Length of mean vector (r)	0.960
Rayleigh Test (Z)	3.689
Rayleigh Test (p)	0.013
a. June 2023 (Survey 16)	

Figure 42 Summary of flight direction of black-headed gull during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.13 Small gull species - Unidentified

Small gull species were recorded in nine months throughout the survey period. Peak abundance occurred in July 2022 with an estimate of 43 [95% CL: 5, 120] within the Survey Area equating to 0.04 birds/km^2 (**Table 23**). During the breeding season, small gull species typically occurred in the southwest of the Survey Area; being recorded in June 2022 and 2023 adjacent to the coastline (**Figure 43** and **Figure 45**). During the non-breeding seasons, individuals were observed further offshore in the 10km Buffer Zone (**Figure 44** and **Figure 46**).

No significant monthly trends in flight direction were observed for gull species during the surveys.

Table 23 Apportioned abundance and density estimates (birds per km^2) of small gull species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Jul-22	5	43	5	120	0.45	0.04				
Aug-22	1	9	1	26	<1.00	0.01				
Feb-23	1	9	1	26	<1.00	0.01				
Jun-23	2	18	2	44	0.71	0.02				
Oct-23	4	35	9	69	0.50	0.04				
Dec-23	1	9	1	26	<1.00	0.01				
Jan-24	1	9	1	26	<1.00	0.01				
Feb-24	2	17	2	51	0.71	0.02				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	3	27	3	80	0.58	0.17	None remaining as all abundance estimates apportioned into specific species.			
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Jul-22	2	17	2	51	0.71	0.02				
Aug-22	1	9	1	26	<1.00	0.01				
Feb-23	1	8	1	25	<1.00	0.01				
Jun-23	2	18	2	44	0.71	0.02				
Oct-23	4	34	9	69	0.50	0.04				
Dec-23	1	8	1	26	<1.00	0.01				
Jan-24	1	9	1	26	<1.00	0.01				
Feb-24	2	17	2	51	0.71	0.02				

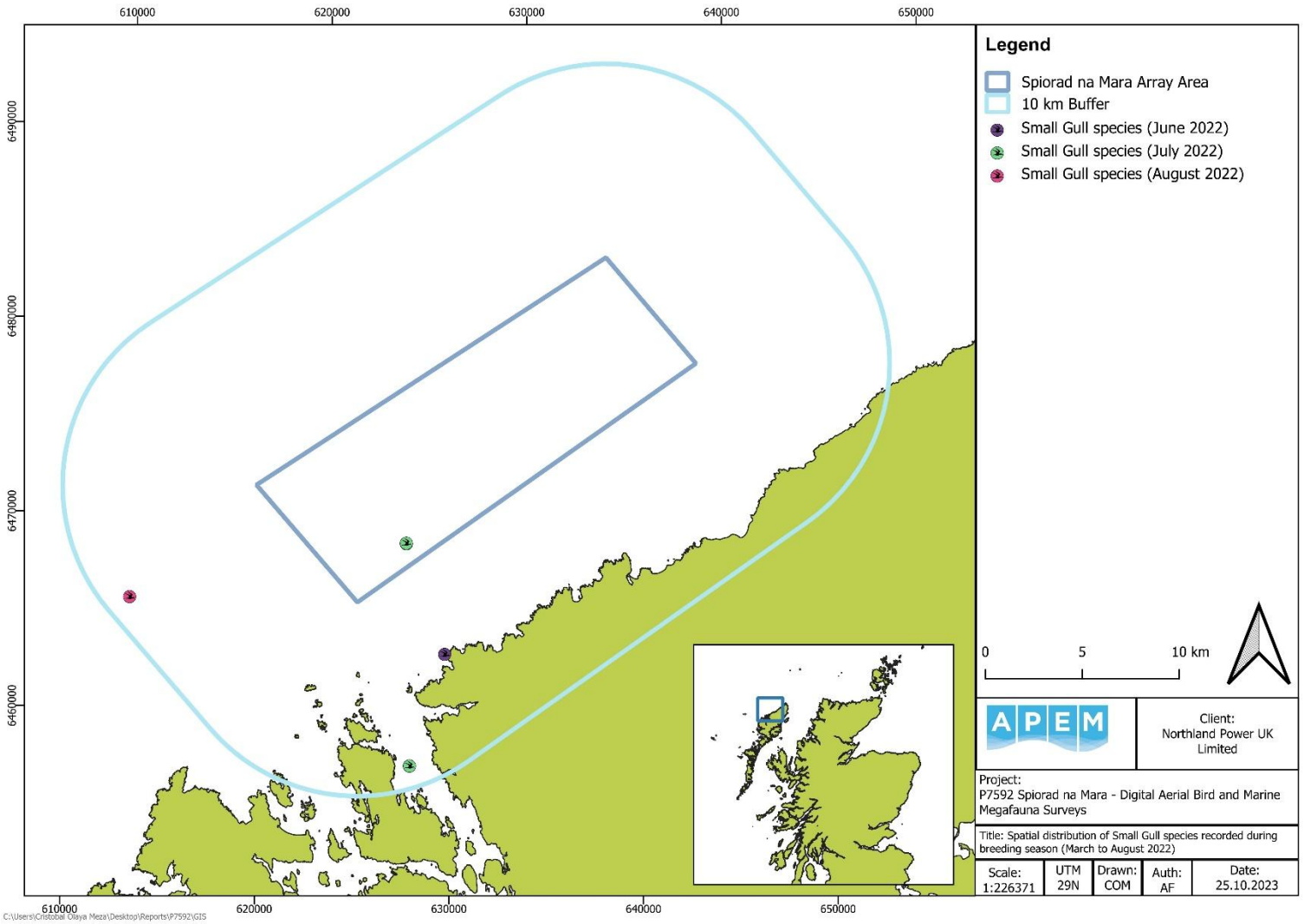


Figure 43 Distribution of small gull species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

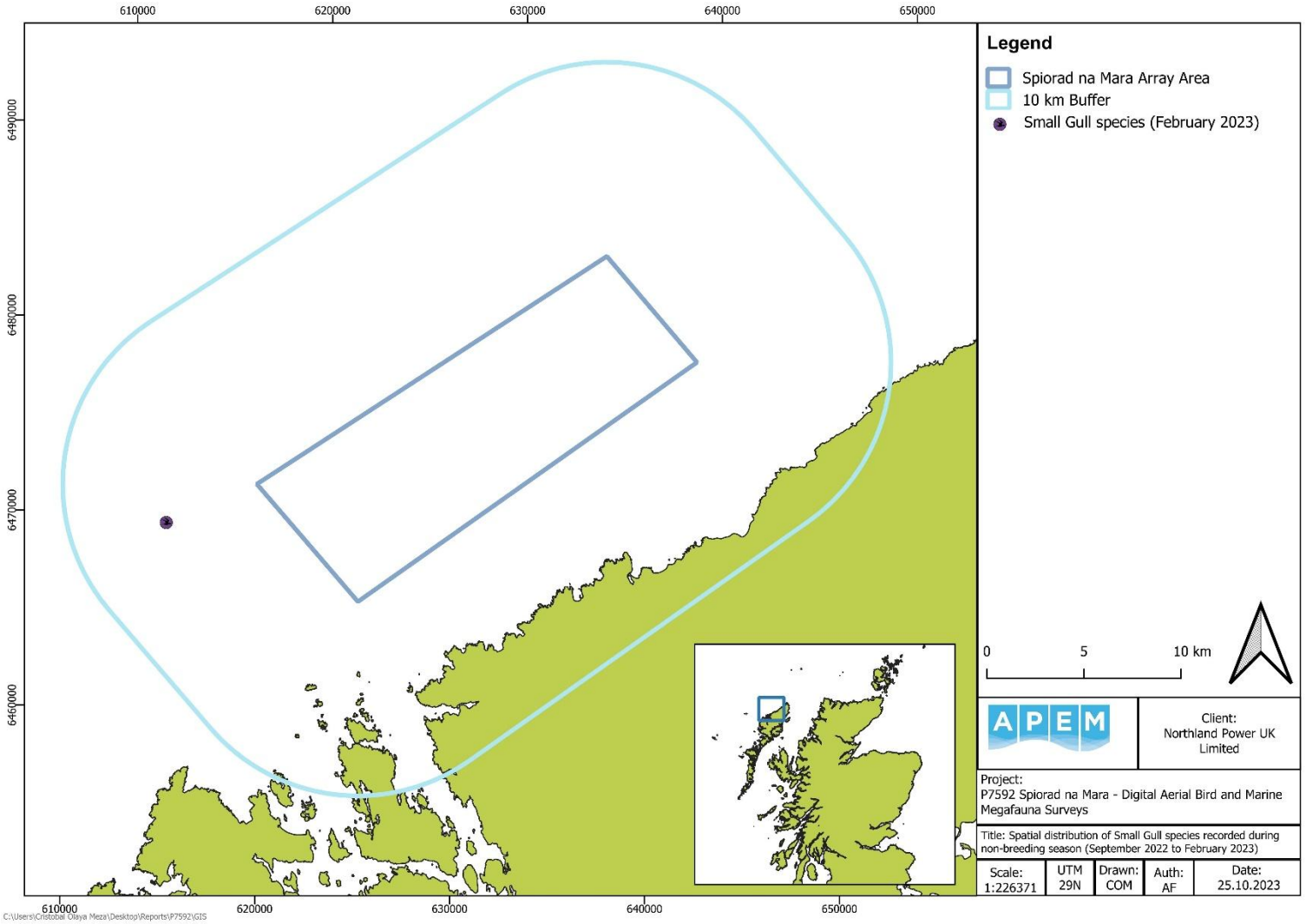


Figure 44 Distribution of small gull species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

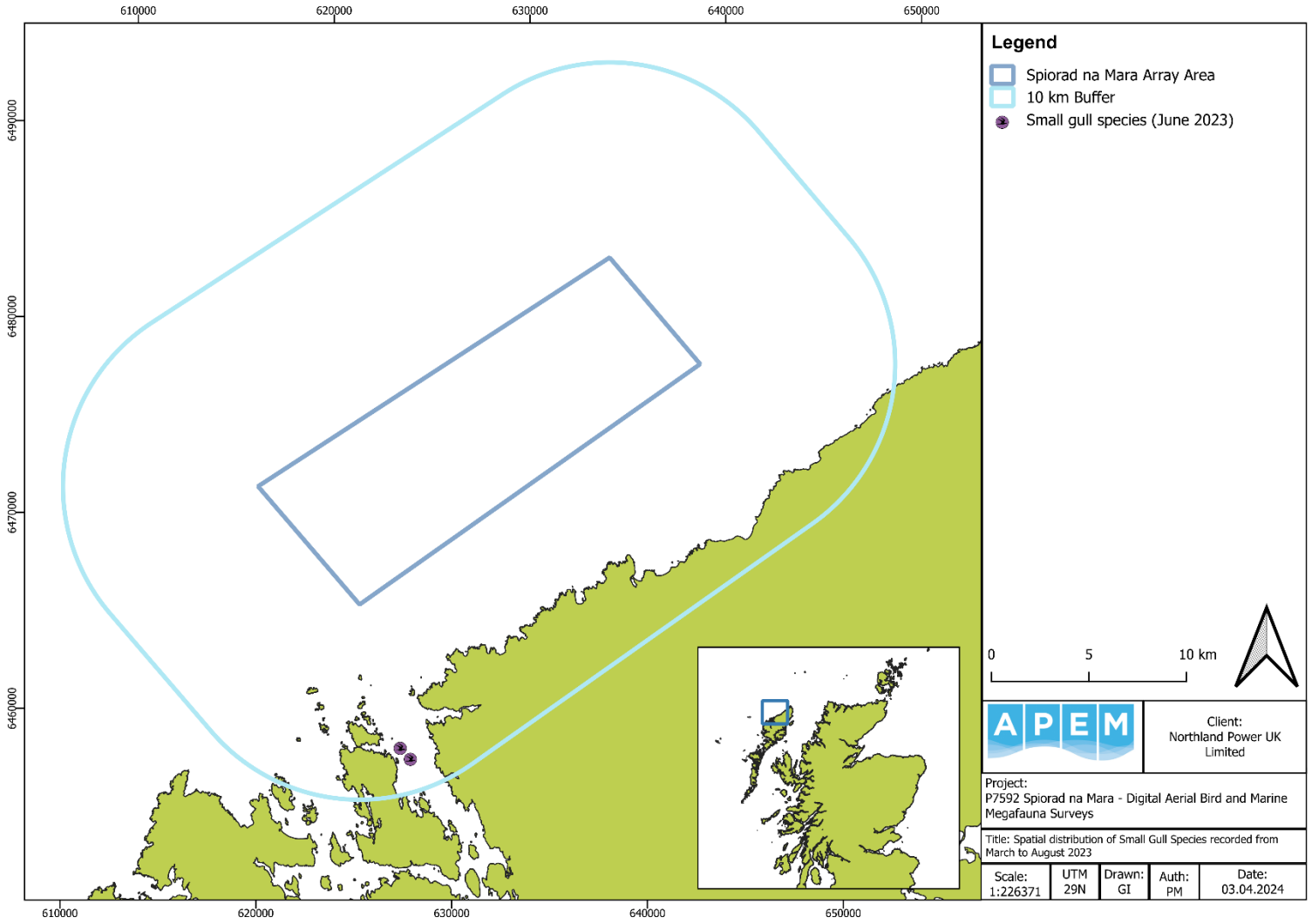


Figure 45 Distribution of small gull species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

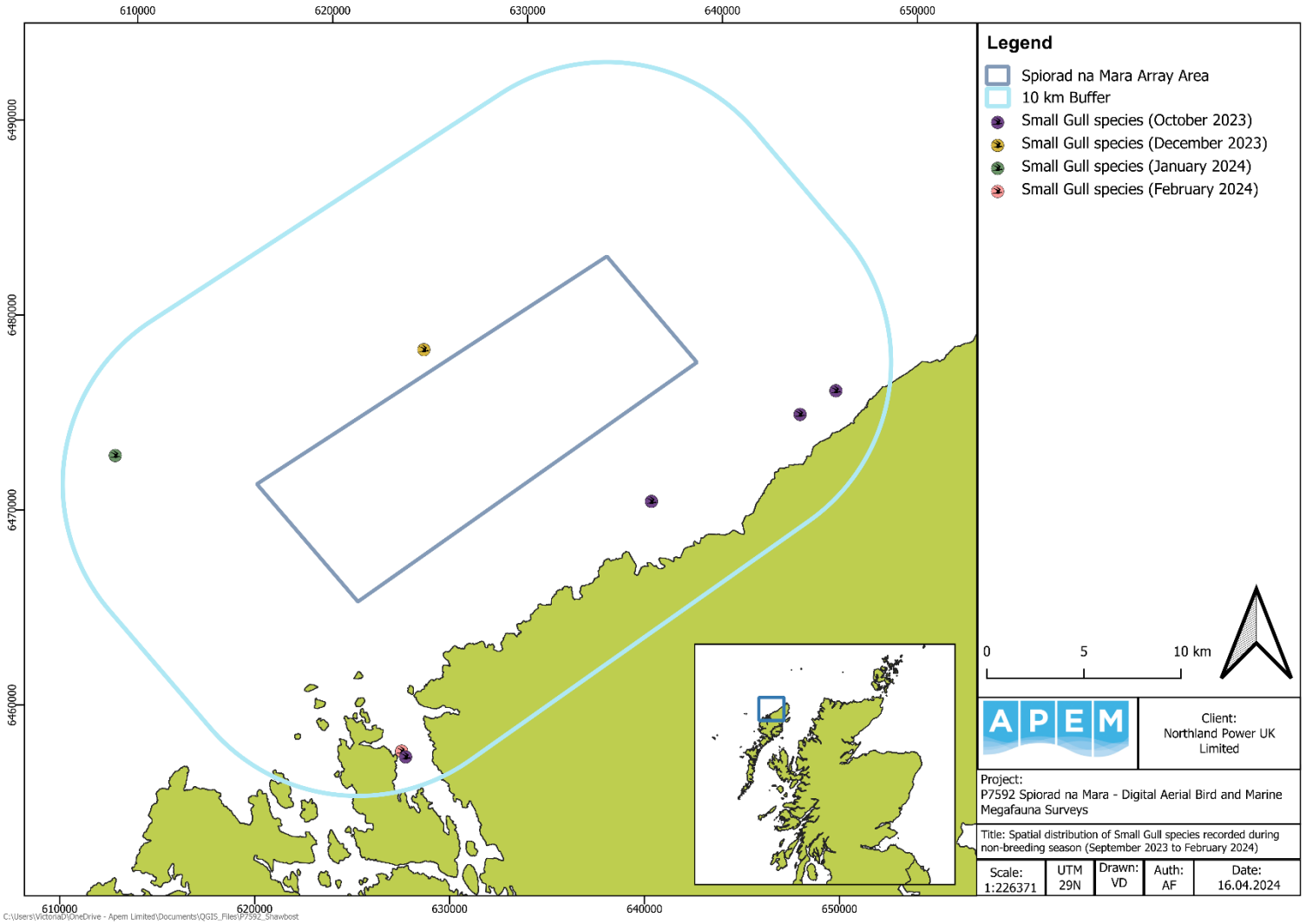


Figure 46 Distribution of small gull species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.14 Great black-backed gull – *Larus marinus*

Great black-backed gulls were recorded in 21 months throughout the survey period. Peak abundance occurred in November 2022 with an estimate of 175 [95% CL: 64, 306] within the Survey Area equating to 0.18 birds/km^2 (**Table 24**). During the first-year breeding season, March to August 2022, great black-backed gulls were recorded in the southwest of the 10 km Buffer in all surveys, however individuals were observed further along the coastline in the east of the 10 km Buffer during the second-year breeding season, March to August 2023 (**Figure 47** and **Figure 49**). Across both years, greater black-backed gulls were more widely distributed across the Survey Area during the non-breeding season (**Figure 48** and **Figure 50**).

There was a significant flight direction of great black-backed gulls between the north and north-northeast in February 2023 and between the south and south-southeast in April 2023 (**Figure 51a-b**).

Table 24 Apportioned abundance and density estimates (birds per km^2) of great black-backed gull in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	3	26	3	69	0.58	0.03	32	4	93	0.03
Apr-22	6	52	6	147	0.41	0.05	52	6	147	0.05
Jun-22	2	17	2	42	0.71	0.02	16	2	50	0.02
Jul-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Sep-22	2	17	2	43	0.71	0.02	18	2	60	0.02
Oct-22	6	52	17	96	0.41	0.05	58	12	128	0.06
Nov-22	18	155	86	241	0.24	0.16	175	64	316	0.18
Dec-22	11	96	35	156	0.30	0.10	95	26	192	0.10
Jan-23	12	103	43	172	0.29	0.11	116	31	227	0.12
Feb-23	15	128	26	315	0.26	0.13	129	15	310	0.13
Mar-23	1	9	1	26	<1.00	0.01	9	1	34	0.01
Apr-23	8	69	17	130	0.35	0.07	69	31	174	0.07
May-23	4	35	4	78	0.50	0.04	35	4	95	0.04
Jun-23	4	35	9	71	0.50	0.04	35	4	80	0.04
Jul-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Sep-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-23	7	61	17	112	0.38	0.06	66	11	143	0.07
Nov-23	11	96	44	166	0.30	0.10	110	22	224	0.11
Dec-23	8	69	26	121	0.35	0.07	73	19	148	0.08
Jan-24	6	52	9	105	0.41	0.05	52	10	131	0.06
Feb-24	6	51	9	102	0.41	0.05	51	6	130	0.05
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	27	<1.00	0.06	9	1	27	0.06
Nov-22	3	27	3	63	0.58	0.17	33	4	89	0.20
Oct-23	1	9	1	27	<1.00	0.06	9	1	27	0.06

Nov-23	2	18	2	46	0.71	0.11	18	2	46	0.11
Dec-23	2	18	2	45	0.71	0.11	19	2	58	0.12

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	3	25	3	68	0.58	0.03	30	4	83	0.04
Apr-22	6	52	6	146	0.41	0.07	52	6	146	0.07
Jun-22	2	17	2	42	0.71	0.02	16	2	59	0.02
Jul-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Sep-22	2	17	2	43	0.71	0.02	17	2	60	0.02
Oct-22	5	43	9	87	0.45	0.05	48	6	120	0.06
Nov-22	15	128	60	205	0.26	0.16	141	45	259	0.18
Dec-22	11	95	34	155	0.30	0.12	95	26	190	0.12
Jan-23	12	102	43	170	0.29	0.13	115	39	218	0.14
Feb-23	15	127	25	295	0.26	0.16	127	15	306	0.16
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Apr-23	8	69	17	138	0.35	0.09	69	31	172	0.09
May-23	4	34	4	77	0.50	0.04	34	4	94	0.04
Jun-23	4	35	9	70	0.50	0.04	35	4	87	0.04
Jul-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Sep-23	1	8	1	26	<1.00	0.01	8	1	26	0.01
Oct-23	6	51	9	112	0.41	0.06	57	11	132	0.07
Nov-23	9	78	26	138	0.33	0.10	91	14	197	0.11
Dec-23	6	51	17	94	0.41	0.06	53	10	118	0.07
Jan-24	6	52	9	104	0.41	0.07	52	10	121	0.07
Feb-24	6	51	8	101	0.41	0.06	51	6	129	0.06

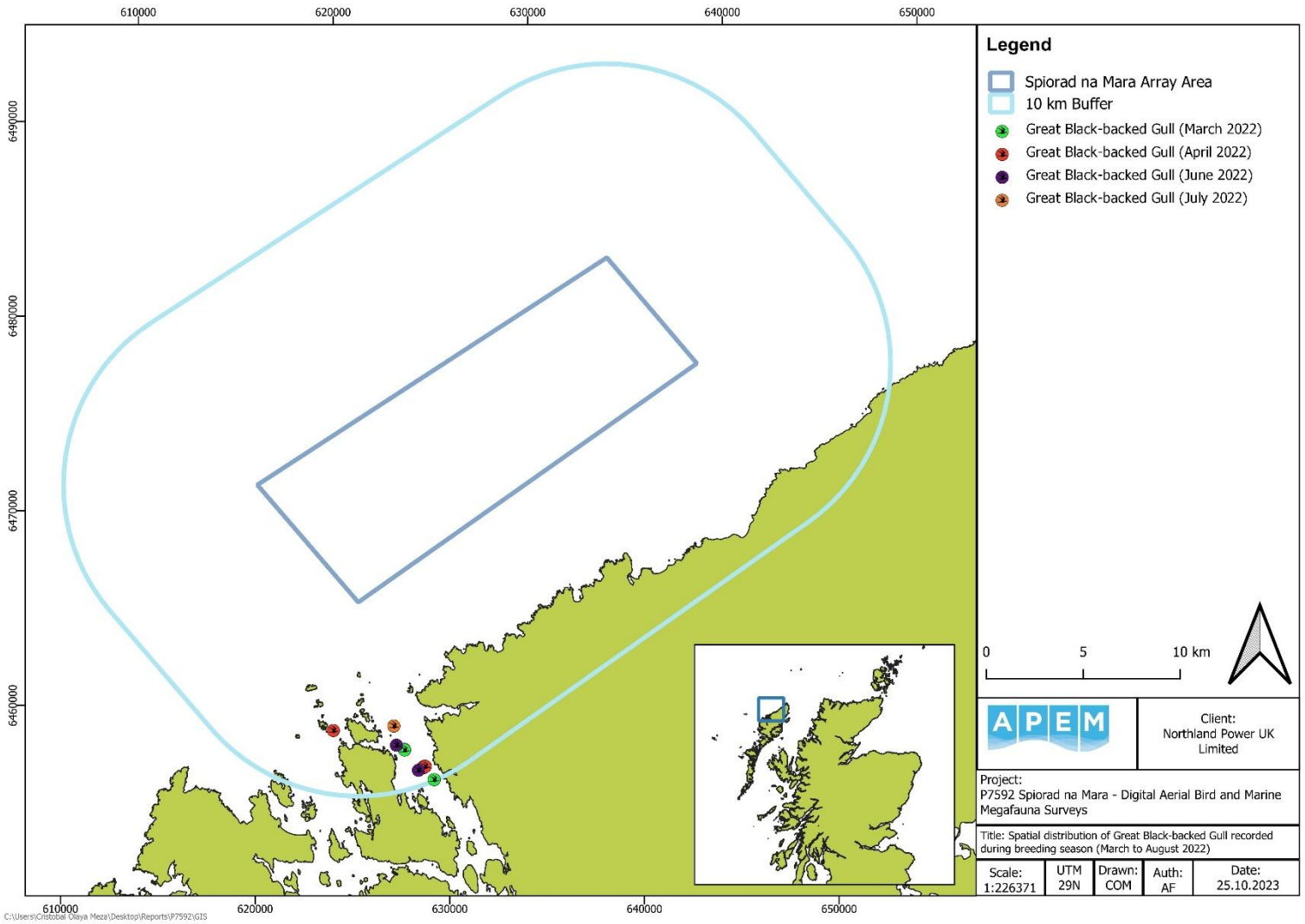


Figure 47 Distribution of great black-backed gull in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

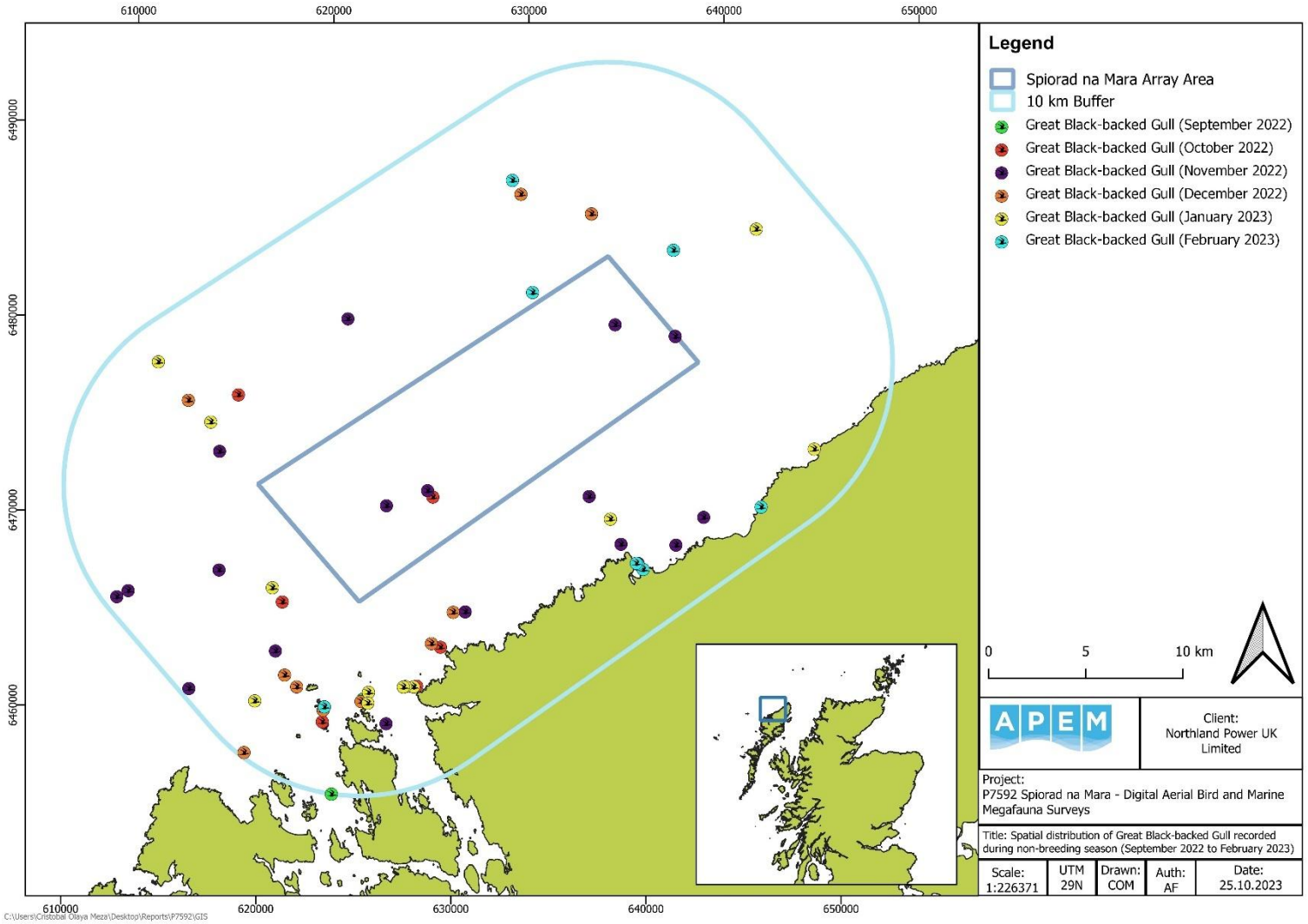


Figure 48 Distribution of great black-backed gull in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

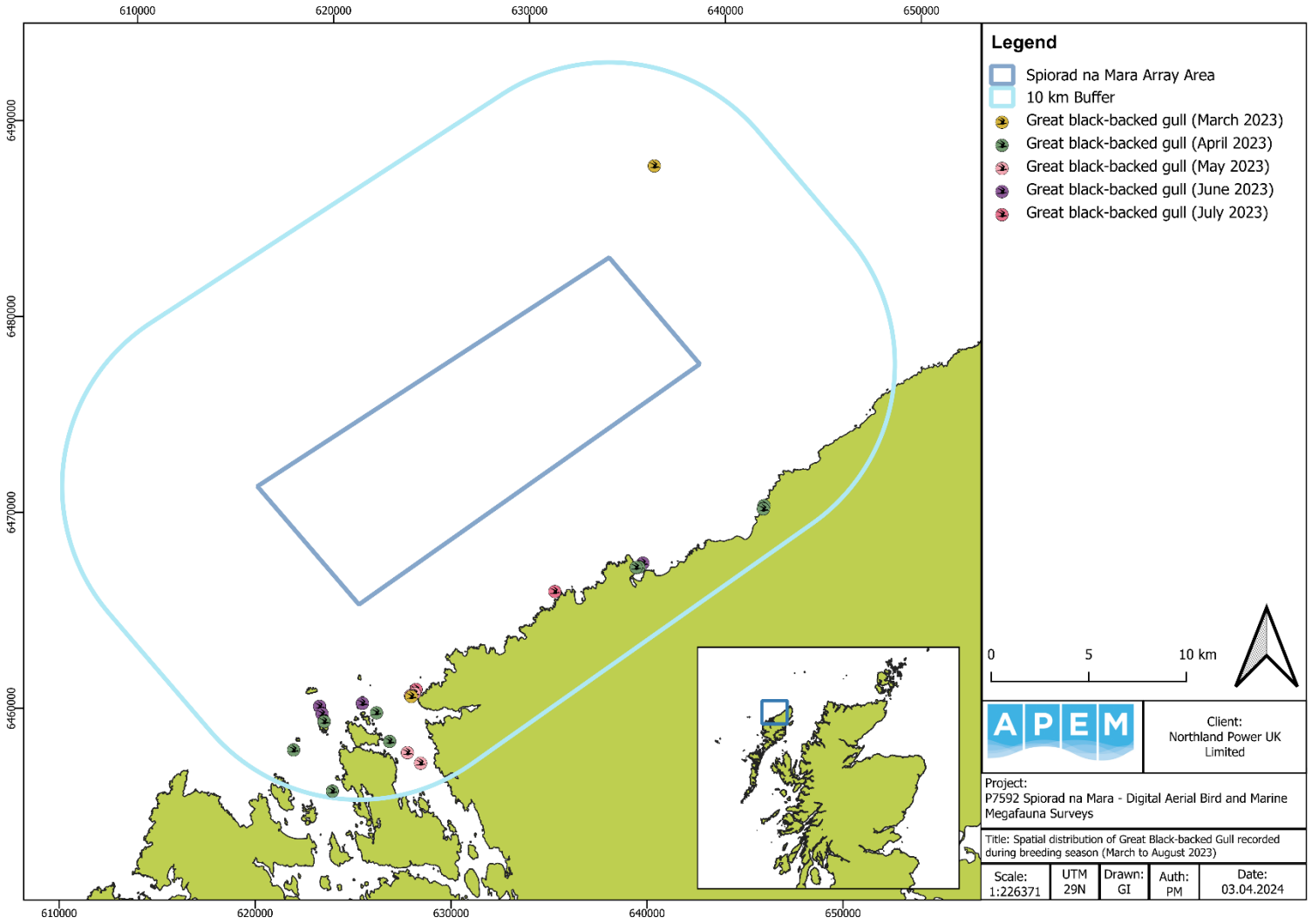


Figure 49 Distribution of great black-backed gull in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

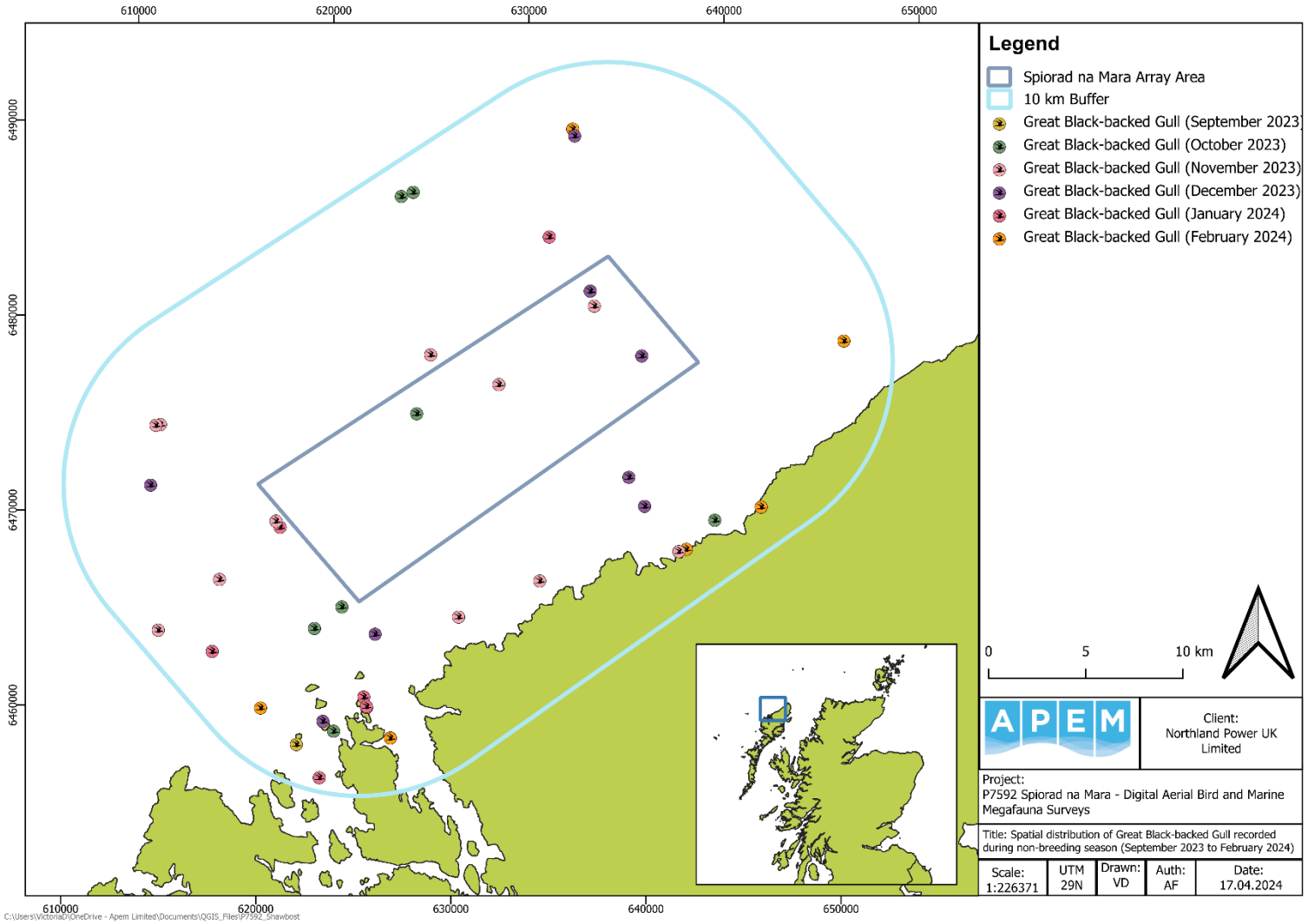
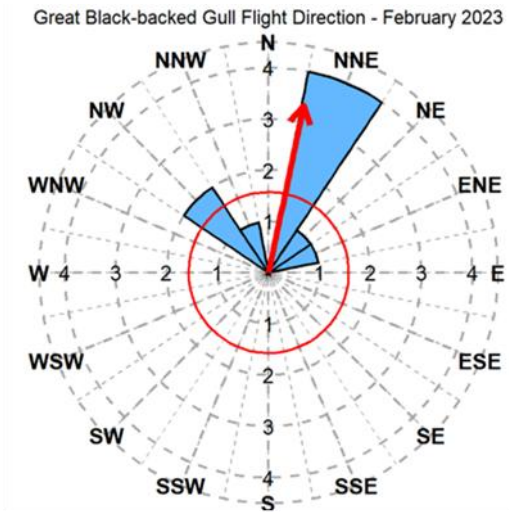
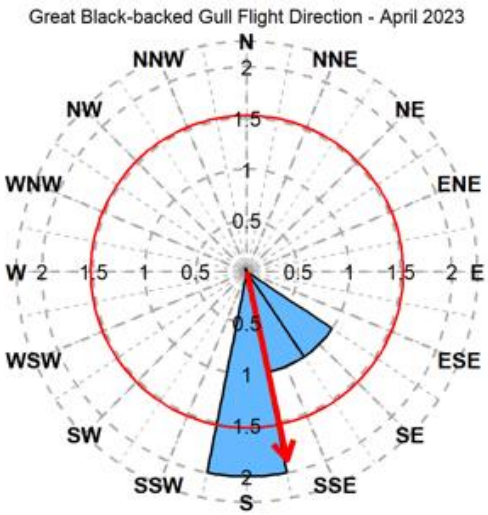


Figure 50 Distribution of great black-backed gull in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping





Number of Observations	9	Number of Observations	4
Mean vector	12.278	Mean vector	168.695
Length of mean vector (r)	0.832	Length of mean vector (r)	0.938
Rayleigh Test (Z)	6.229	Rayleigh Test (Z)	3.516
Rayleigh Test (p)	<0.001	Rayleigh Test (p)	0.017
a. February 2023 (Survey 12)		**b. April 2023 (Survey 14)**	

Figure 51 Summary of flight direction of great black-backed gull during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.15 Herring gull – *Larus argentatus*

Herring gulls were recorded in all survey months throughout the year, except December 2022. Peak abundance occurred in July 2022 with an estimate of 137 [95% CL: 16, 351] within the Survey Area equating to 0.14 birds/km^2 (**Table 25**). Herring gulls were generally observed in the southwest and east of the 10 km Buffer adjacent to the coast (**Figure 52** to **Figure 54**), however in November 2023 (non-breeding season), individuals were also recorded within the Spiorad na Mara Array Area (**Figure 55).**

No significant monthly trends in flight direction were observed for herring gulls during the surveys.

Table 25 Apportioned abundance and density estimates (birds per km^2) of herring gull in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	43	0.71	0.02	21	2	62	0.02
Apr-22	10	87	17	182	0.32	0.09	87	10	217	0.09
May-22	4	34	9	69	0.50	0.04	34	4	86	0.04
Jun-22	5	42	8	93	0.45	0.04	42	9	93	0.04
Jul-22	16	137	16	344	0.25	0.14	137	16	352	0.14
Aug-22	2	17	2	43	0.71	0.02	23	3	58	0.02
Sep-22	9	77	9	189	0.33	0.08	77	11	189	0.08
Oct-22	3	26	3	79	0.58	0.03	31	4	96	0.03
Nov-22	4	34	9	78	0.50	0.04	34	9	69	0.04
Jan-23	4	34	9	77	0.50	0.04	39	5	99	0.04
Feb-23	3	26	3	60	0.58	0.03	26	3	78	0.03
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Apr-23	2	17	2	43	0.71	0.02	17	2	43	0.02
May-23	3	26	3	60	0.58	0.03	26	3	69	0.03
Jun-23	2	18	2	44	0.71	0.02	18	2	54	0.02
Jul-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Aug-23	3	26	3	69	0.58	0.03	31	4	81	0.03
Sep-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-23	10	86	17	164	0.32	0.09	90	14	220	0.09
Nov-23	7	61	17	131	0.38	0.06	64	11	183	0.07
Dec-23	2	17	2	43	0.71	0.02	20	2	58	0.02
Jan-24	3	26	3	61	0.58	0.03	26	3	70	0.03
Feb-24	4	34	9	68	0.50	0.04	34	4	96	0.04
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Aug-22	0	0	0	0	0.00	0.00	6	1	15	0.04
Nov-23	3	27	3	73	0.58	0.17	27	3	82	0.17
c) 10 km Buffer										
Month		Total unapportioned					Total apportioned			

	Raw Count	Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	42	0.71	0.02	19	2	59	0.02
Apr-22	10	86	10	189	0.32	0.11	86	10	215	0.11
May-22	4	34	4	68	0.50	0.04	34	4	86	0.04
Jun-22	5	42	8	93	0.45	0.05	42	9	92	0.05
Jul-22	16	136	16	341	0.25	0.17	136	16	350	0.17
Aug-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Sep-22	9	77	9	179	0.33	0.10	77	11	188	0.10
Oct-22	3	26	3	78	0.58	0.03	31	4	95	0.04
Nov-22	4	34	4	68	0.50	0.04	34	4	68	0.04
Jan-23	4	34	9	77	0.50	0.04	39	5	99	0.05
Feb-23	3	25	3	59	0.58	0.03	25	3	68	0.03
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Apr-23	2	17	2	43	0.71	0.02	17	2	43	0.02
May-23	3	26	3	60	0.58	0.03	26	3	69	0.03
Jun-23	2	18	2	44	0.71	0.02	18	2	61	0.02
Jul-23	1	9	1	34	<1.00	0.01	9	1	26	0.01
Aug-23	3	25	3	68	0.58	0.03	29	4	81	0.04
Sep-23	1	8	1	26	<1.00	0.01	8	1	26	0.01
Oct-23	10	86	26	163	0.32	0.11	91	14	211	0.11
Nov-23	4	35	4	86	0.50	0.04	38	4	111	0.05
Dec-23	2	17	2	43	0.71	0.02	18	2	59	0.02
Jan-24	3	26	3	61	0.58	0.03	26	3	69	0.03
Feb-24	4	34	8	68	0.50	0.04	34	4	86	0.04

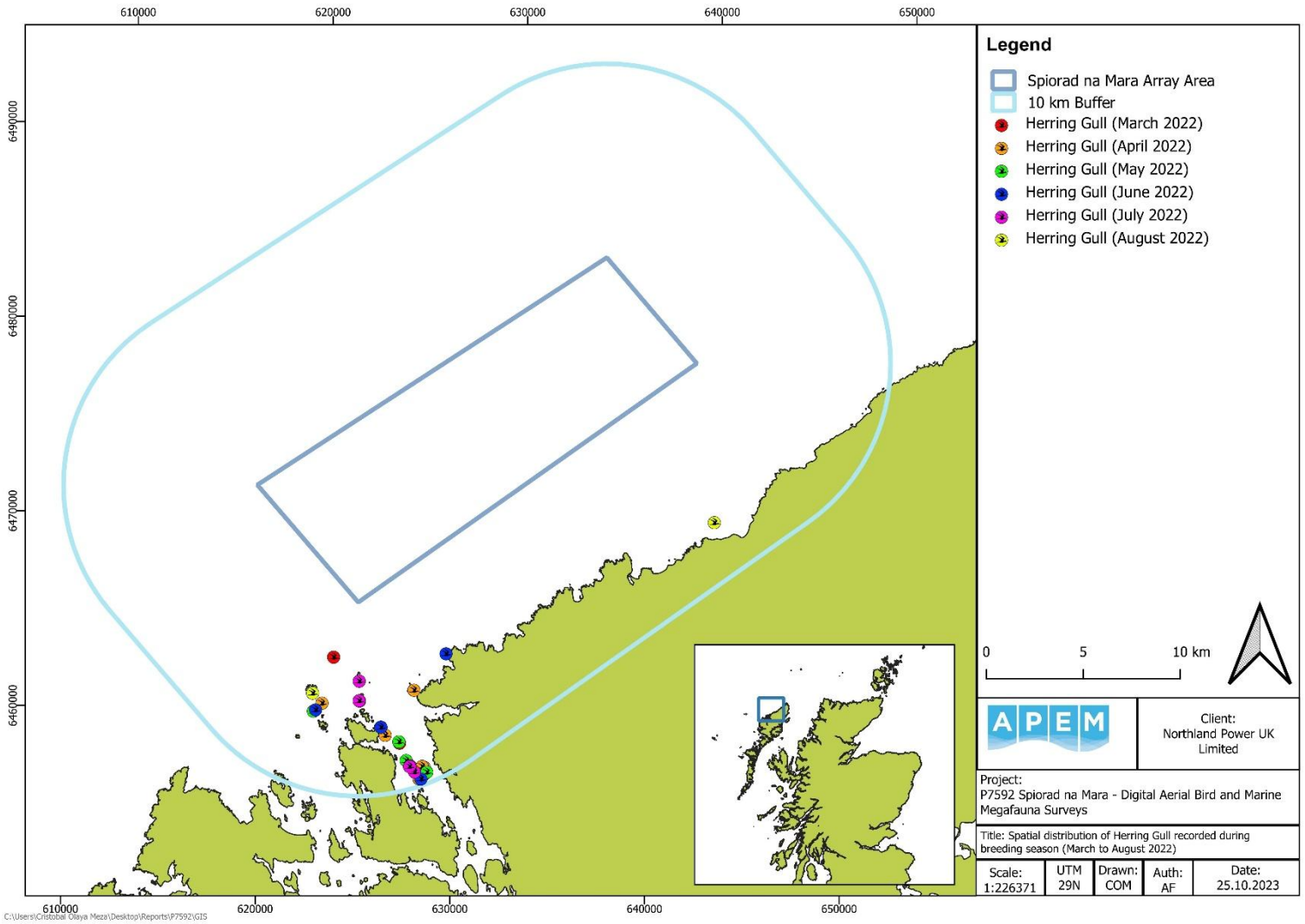


Figure 52 Distribution of herring gull in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

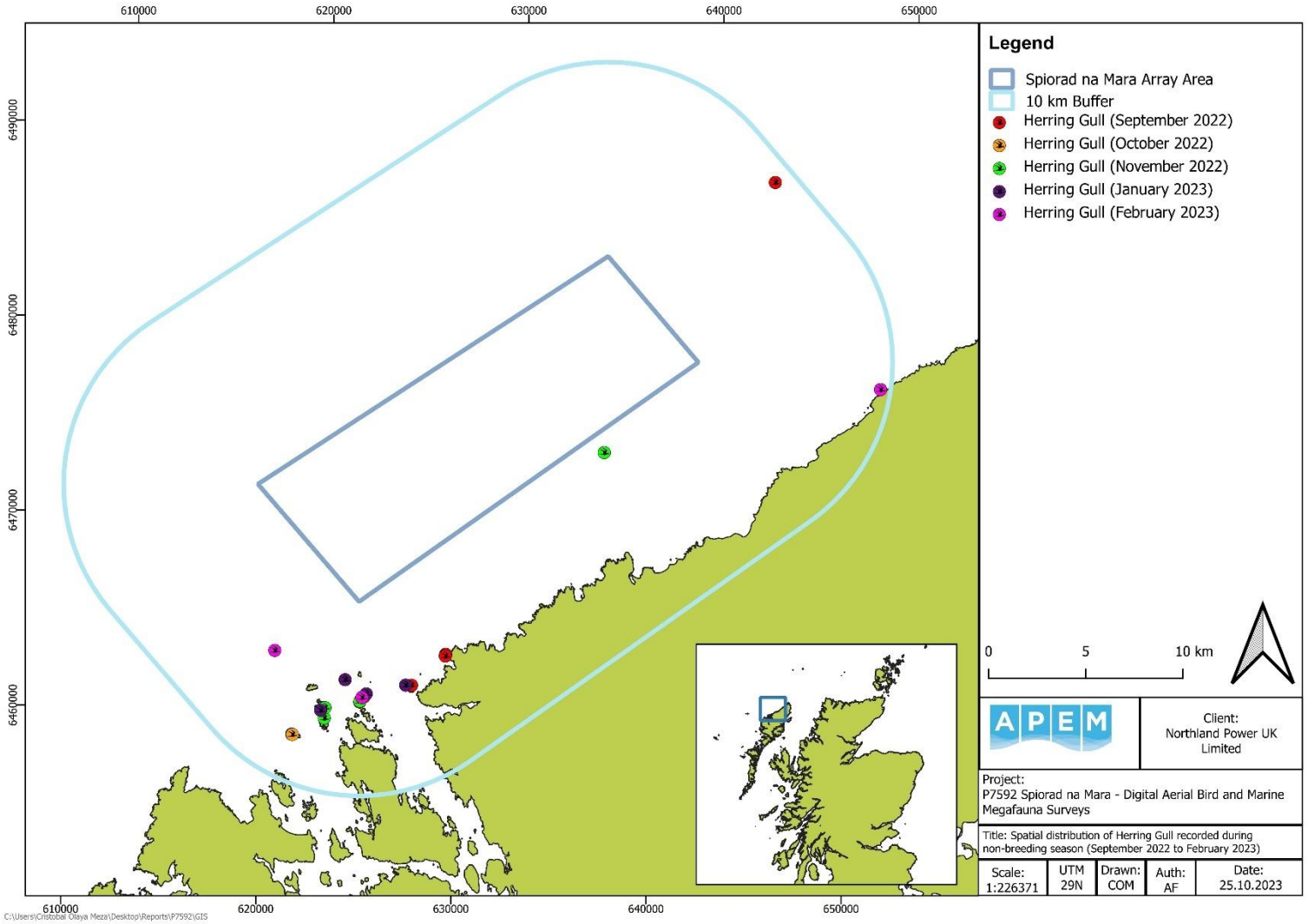


Figure 53 Distribution of herring gull in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

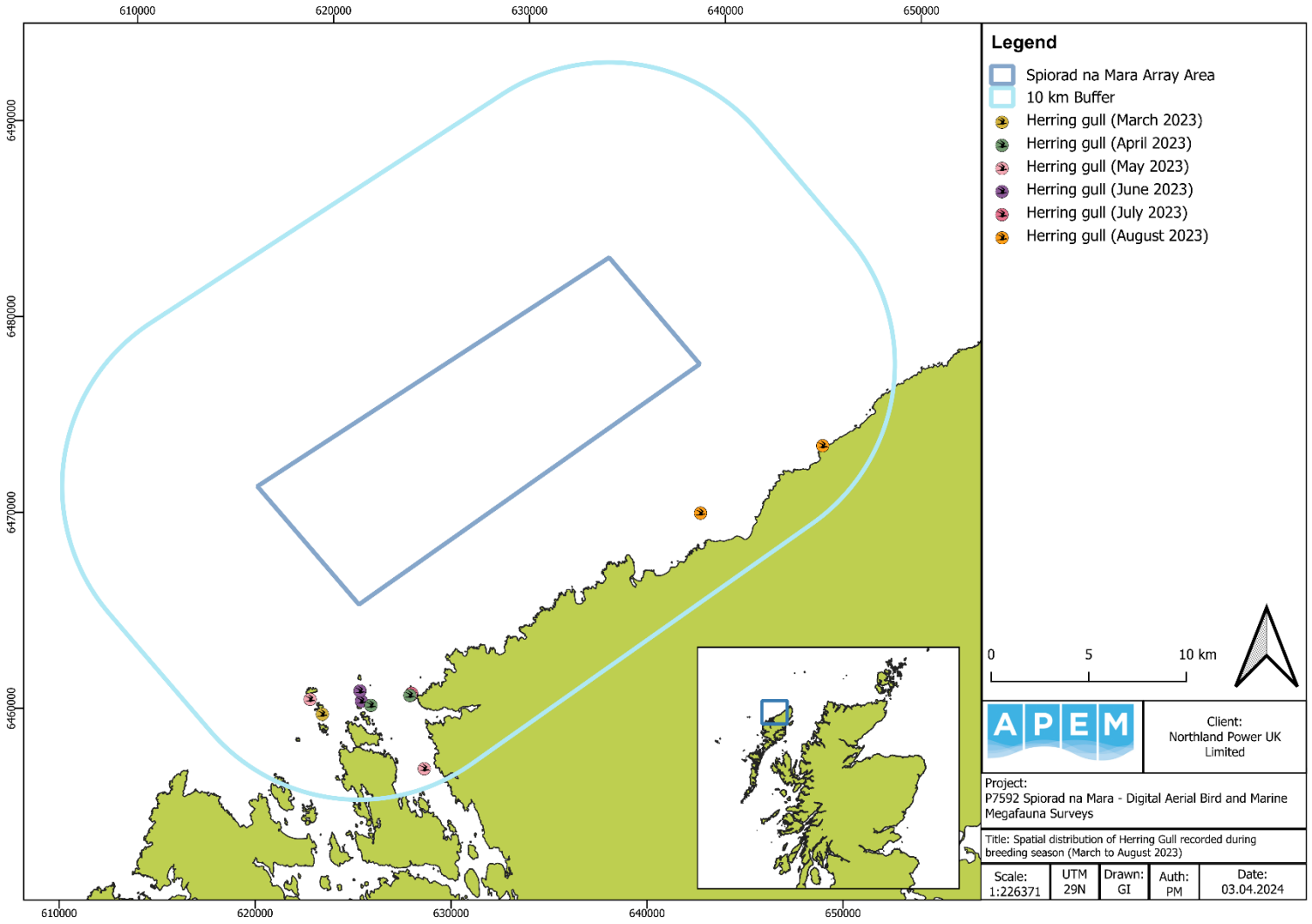


Figure 54 Distribution of herring gull in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

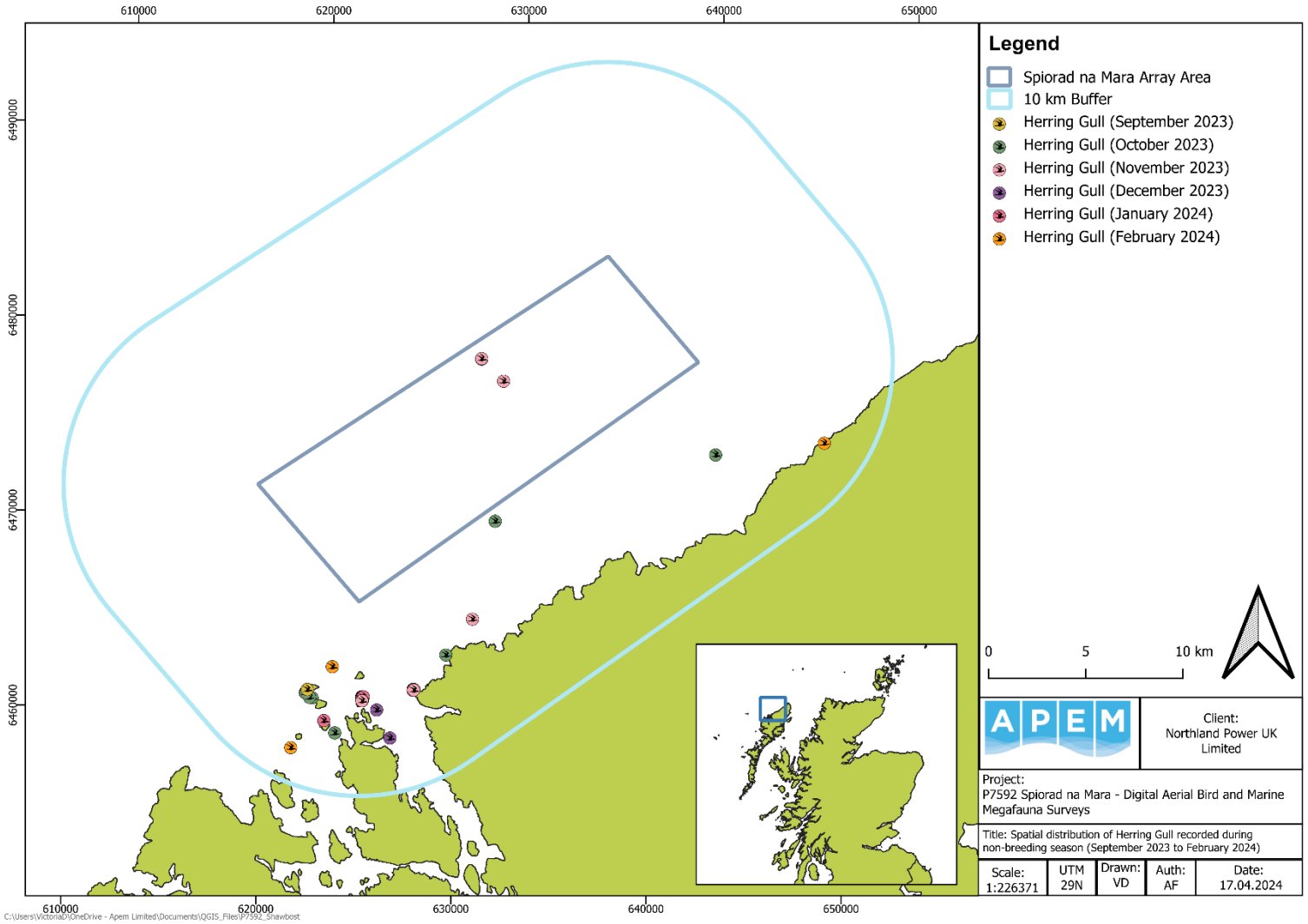


Figure 55 Distribution of herring gull in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.16 Lesser black-backed gull - *Larus fuscus*

A single lesser black-backed gull was recorded in each of June and August 2022 (breeding season), resulting in an abundance estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 (**Table 26**). They were observed in the south of the 10 km Buffer (**Figure 56**).

In June and August 2022, the lesser black-backed gulls were recorded flying north-northwest and north-east, respectively, although these flight directions were not significant.

Table 26 Apportioned abundance and density estimates (birds per km^2) of lesser black-backed gull in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Jun-22	1	8	1	25	<1.00	0.01
Aug-22	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Jun-22	1	8	1	34	<1.00	0.01
Aug-22	1	9	1	26	<1.00	0.01

Note: Apportioning calculations were carried out; however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

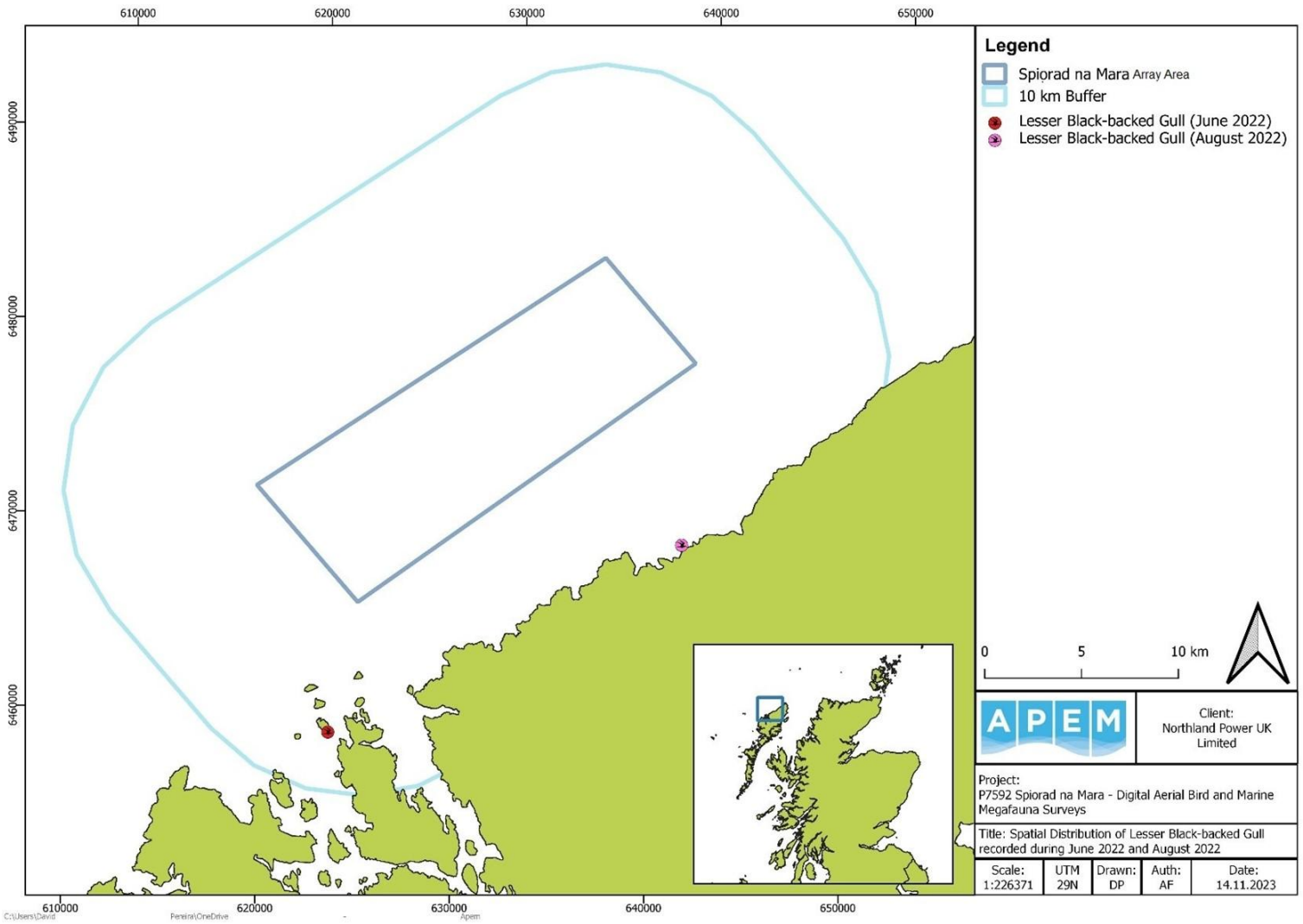


Figure 56 Distribution of lesser black-backed gull in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

3.1.17 Large Gull species - Unidentified

Large gull species were recorded in March and October 2022, and January, October, and November 2023. Peak abundance occurred in January 2023 with an estimate of 17 [95% CL: 2, 43] within the Survey Area equating to 0.02 birds/km^2 (**Table 27**). Large gull species were recorded in close proximity to the coast (**Figure 57 and Figure 59**), except for January 2023, in which two individuals were recorded in the east and west of the 10km Buffer Zone.

No significant monthly trends in flight direction were observed for gull species during the surveys.

Table 27 Apportioned abundance and density estimates (birds per km^2) of large gull species n in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	9	1	26	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Oct-22	1	9	1	26	<1.00	0.01				
Jan-23	2	17	2	43	0.71	0.02				
Oct-23	1	9	1	26	<1.00	0.01				
Nov-23	1	9	1	26	<1.00	0.01				
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Oct-22	1	9	1	26	<1.00	0.01				
Jan-23	2	17	2	43	0.71	0.02				
Oct-23	1	9	1	26	<1.00	0.01				
Nov-23	1	9	1	26	<1.00	0.01				

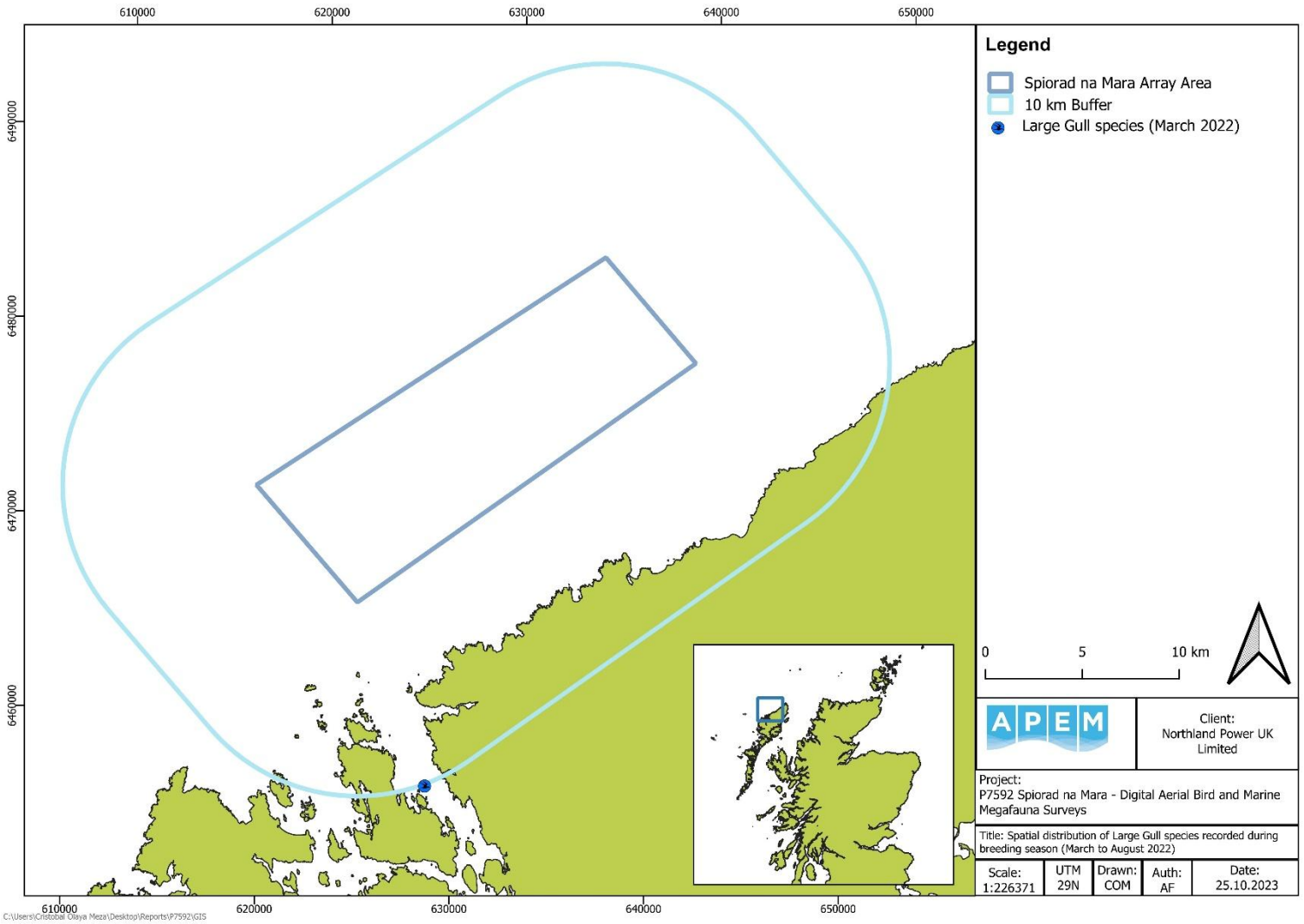


Figure 57 Distribution of large gull species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

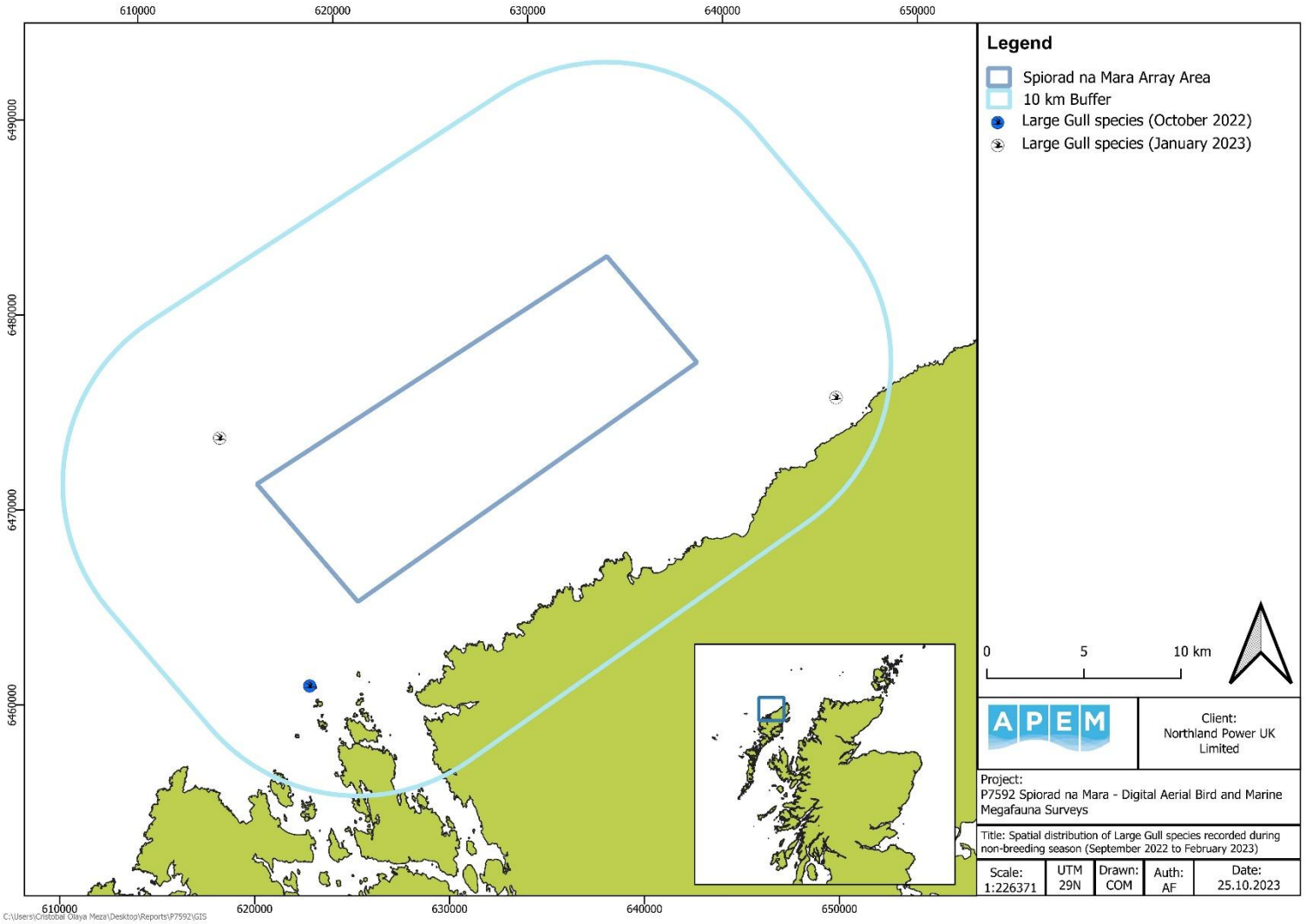


Figure 58 Distribution of large gull species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

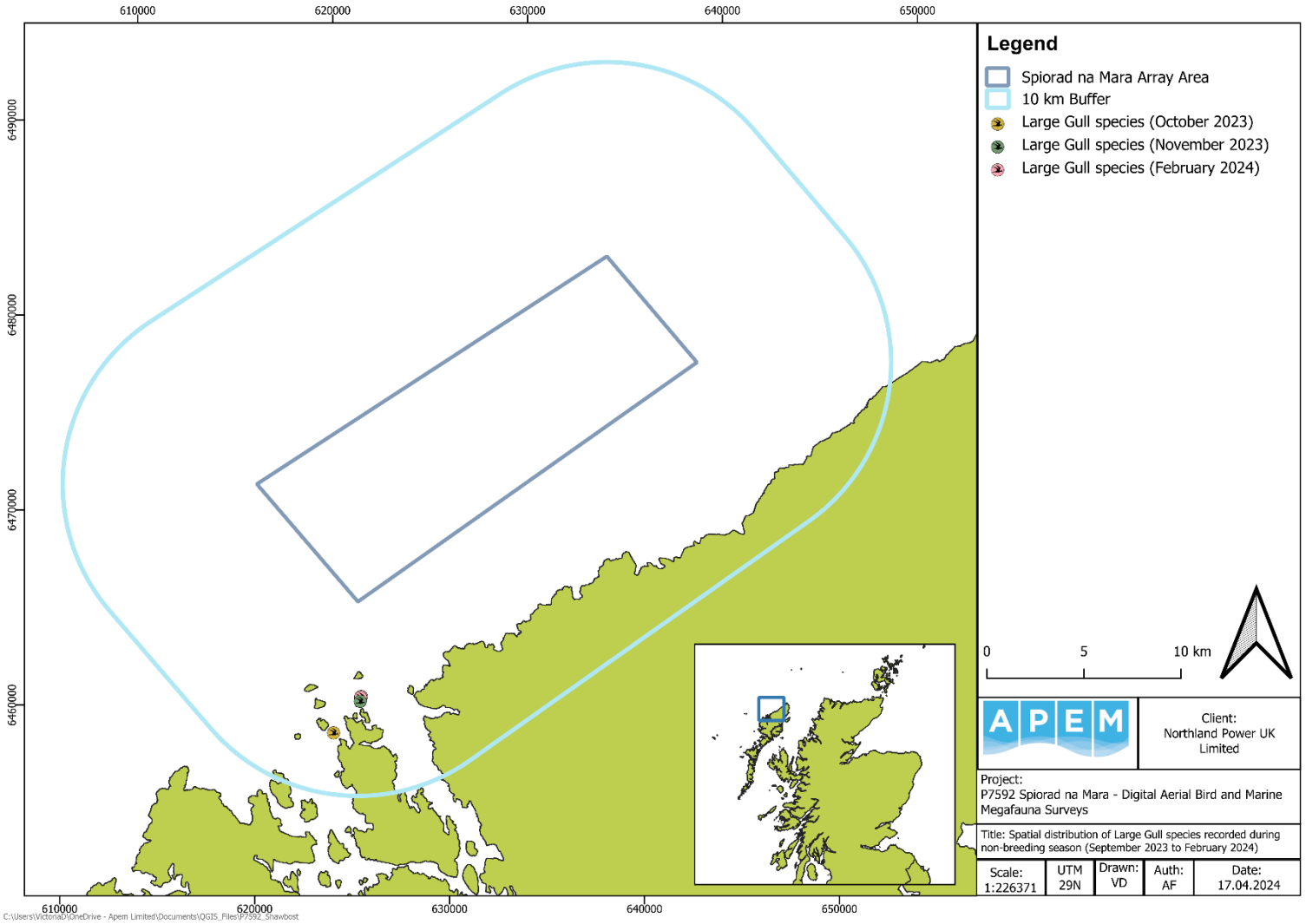


Figure 59 Distribution of large gull species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.18 Gull species - Unidentified

Gull species were recorded in August and October 2022, and February 2023. An individual was recorded in each month, resulting in an estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 (**Table 28**). In August 2022, an individual was recorded in the east of the Spiorad na Mara Array Area (**Figure 60**). In October 22 and February 2023, individuals were recorded in the west of the 10km Buffer Zone (**Figure 61**).

No significant monthly trends in flight direction were observed for gull species during the surveys.

Table 28 Apportioned abundance and density estimates (birds per km^2) of gull species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Aug-22	1	9	1	34	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Oct-22	1	9	1	26	<1.00	0.01				
Feb-23	1	9	1	26	<1.00	0.01				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Aug-22	1	9	1	36	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	26	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Feb-23	1	8	1	25	<1.00	0.01				

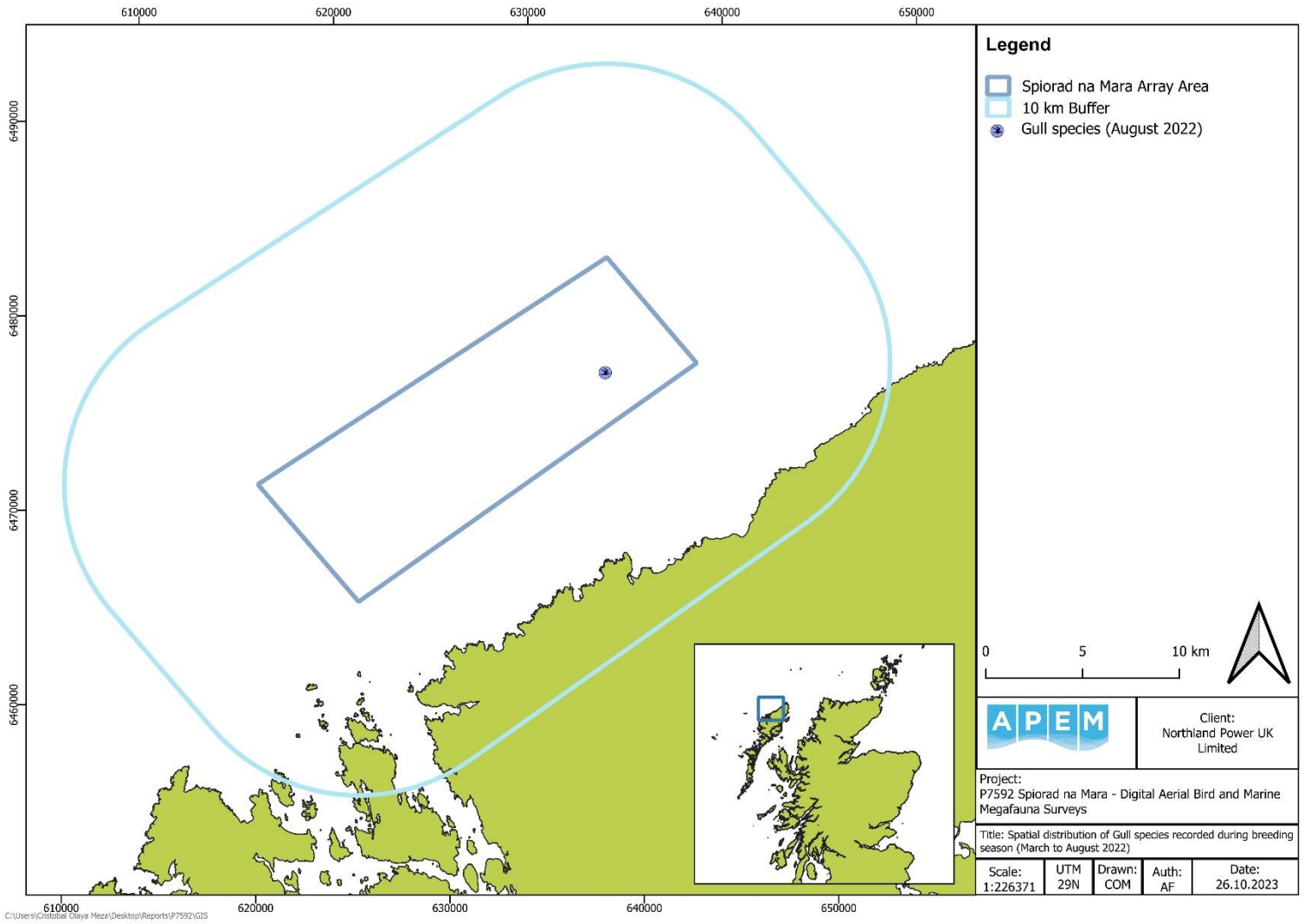


Figure 60 Distribution of gull species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

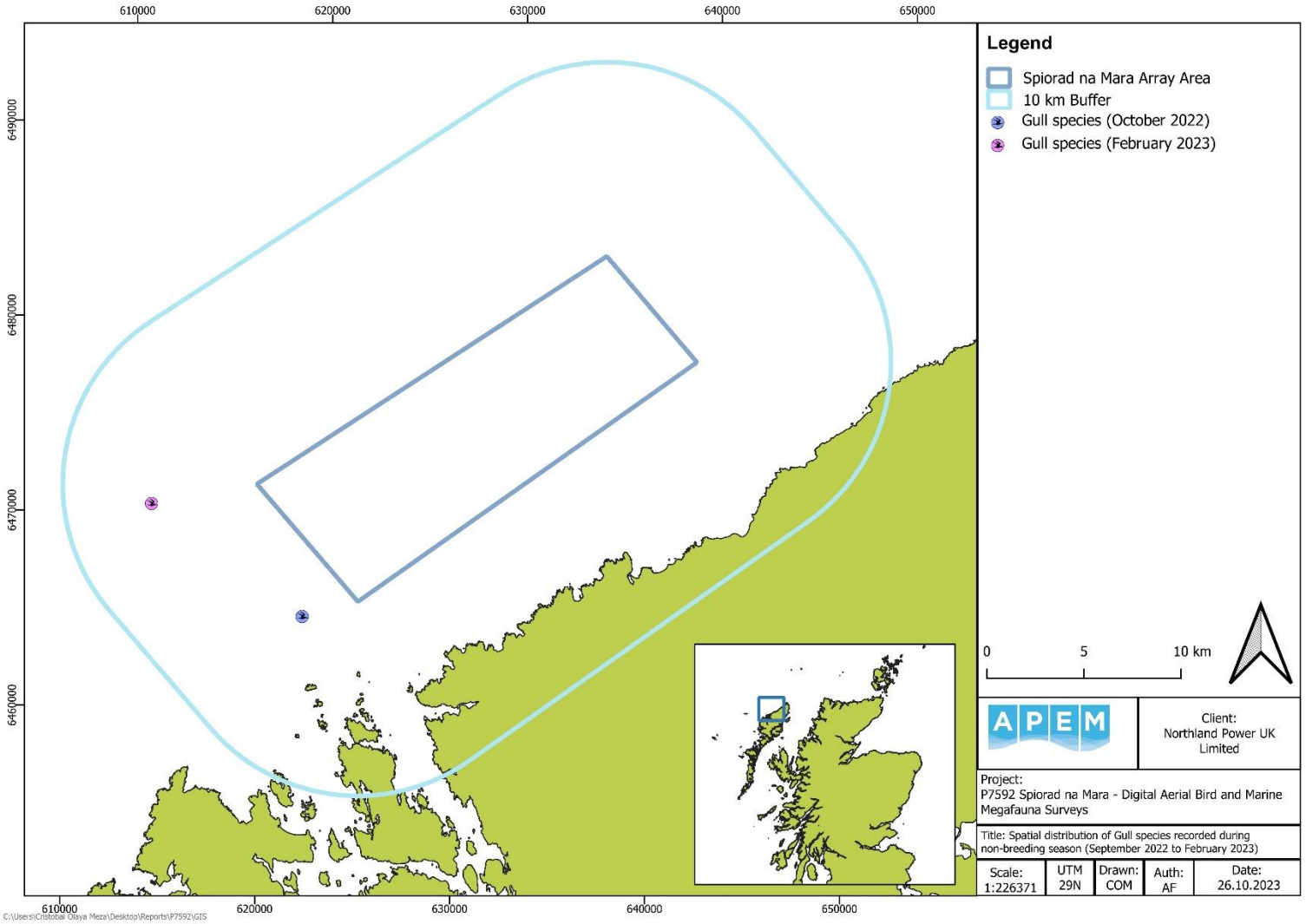


Figure 61 Distribution of gull species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

3.1.19 Fulmar / Gull

Fulmar / gulls were recorded in seven months throughout the survey period. Peak abundance occurred in February 2024 with an estimate of 34 [95% CL: 9, 68] within the Survey Area equating to 0.04 birds/km^2 (**Table 29**). During the breeding season, fulmar/gulls were recorded in the southeast and west of the 10km Buffer Zone (**Figure 62**), whereas in the non-breeding season, individuals were found scattered throughout the Survey Area (**Figure 63**).

No significant monthly trends in flight direction were observed for gull species during the surveys.

Table 29 Apportioned abundance and density estimates (birds per km^2) of fulmar / gulls in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Nov-22	3	26	3	60	0.58	0.03	None remaining as all abundance estimates apportioned into specific species.			
Mar-23	1	9	1	26	<1.00	0.01				
Jul-23	1	9	1	26	<1.00	0.01				
Aug-23	1	9	1	26	<1.00	0.01				
Nov-23	1	9	1	35	<1.00	0.01				
Dec-23	3	26	3	60	0.58	0.03				
Feb-24	4	34	9	68	0.50	0.04				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Nov-22	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
Dec-23	2	18	2	45	0.71	0.11				
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Nov-22	2	17	2	51	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Mar-23	1	9	1	26	<1.00	0.01				
Jul-23	1	9	1	26	<1.00	0.01				
Aug-23	1	8	1	25	<1.00	0.01				
Nov-23	1	9	1	26	<1.00	0.01				
Dec-23	1	8	1	26	<1.00	0.01				
Feb-24	4	34	8	68	0.50	0.04				

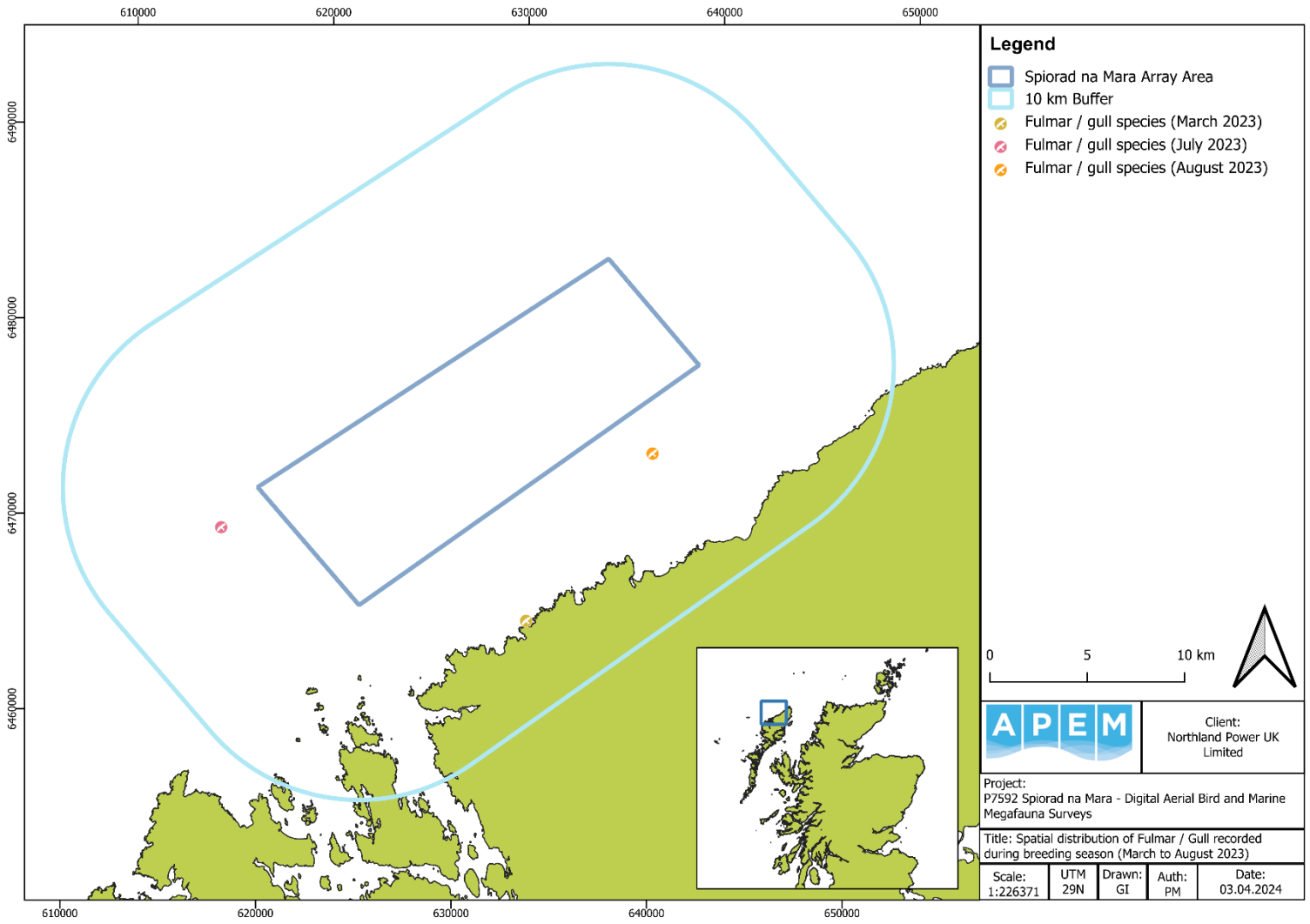


Figure 62 Distribution of fulmar / gulls in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

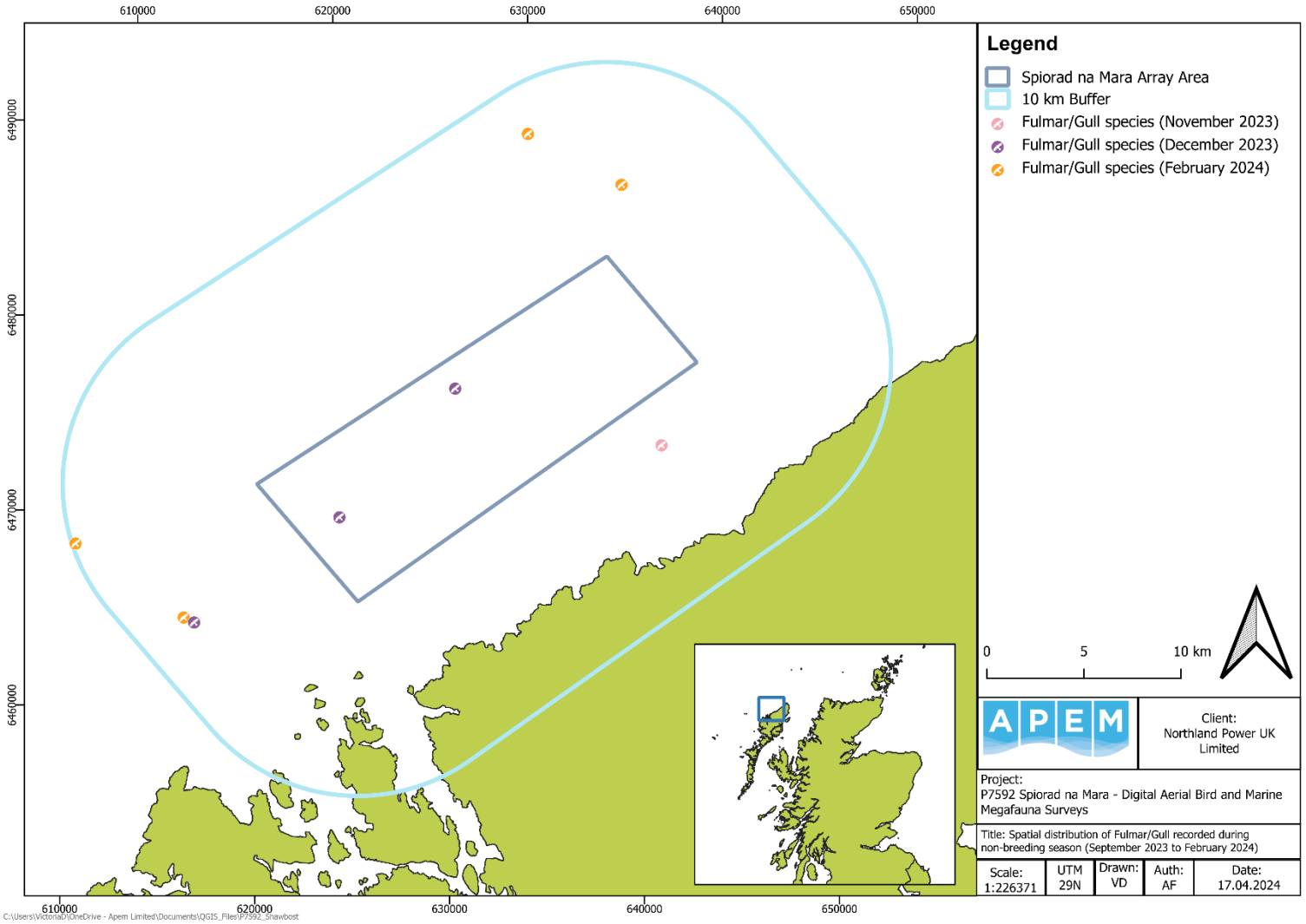


Figure 63 Distribution of fulmar / gulls in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.20 Arctic tern - *Sterna paradisaea*

Arctic terns were recorded from May to July 2022, and May to August 2023. Peak abundance occurred in July 2022 with an estimate of 1,234 [95% CL: 608, 2,091] within the Survey Area equating to 1.29 birds/km^2 (**Table 30**). Arctic terns were mostly concentrated in the southwest of the 10 km Buffer (**Figure 64** and **Figure 65**). No Arctic terns were observed during the non-breeding season.

In May and July 2022, a significant direction of flight towards the northeast and north-northwest was recorded (**Figure 66a-b**). In June 2023, a significant direction of flight towards the north-northeast was recorded, shifting to an easterly direction of flight in July 2023 (**Figure 66c-d**).

Table 30 Apportioned abundance and density estimates (birds per km^2) of Arctic tern in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	46	395	103	824	0.15	0.41	395	112	807	0.41
Jun-22	4	34	4	85	0.50	0.04	40	5	95	0.04
Jul-22	144	1,237	618	1,979	0.08	1.29	1,236	618	2,053	1.29
May-23	5	43	9	95	0.45	0.04	43	9	95	0.04
Jun-23	50	442	203	717	0.14	0.46	442	203	725	0.46
Jul-23	114	989	564	1,561	0.09	1.03	989	599	1,501	1.03
Aug-23	25	214	60	411	0.20	0.22	214	60	394	0.22
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	23	205	23	615	0.21	1.27	205	23	588	1.27
Jun-22	2	18	2	53	0.71	0.11	18	2	53	0.11
Jul-22	31	277	36	624	0.18	1.72	277	45	624	1.72
Jul-23	3	27	3	64	0.58	0.17	27	3	64	0.17
Aug-23	1	9	1	27	<1.00	0.06	9	1	27	0.06
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
May-22	23	196	68	366	0.21	0.25	196	77	349	0.25
Jun-22	2	17	2	42	0.71	0.02	22	3	58	0.03
Jul-22	113	963	408	1,760	0.09	1.20	963	375	1,825	1.20
May-23	5	43	9	94	0.45	0.05	43	5	94	0.05
Jun-23	50	438	202	728	0.14	0.55	438	210	710	0.55
Jul-23	111	953	541	1,485	0.09	1.20	953	532	1,485	1.20
Aug-23	24	204	42	390	0.20	0.26	204	59	407	0.26

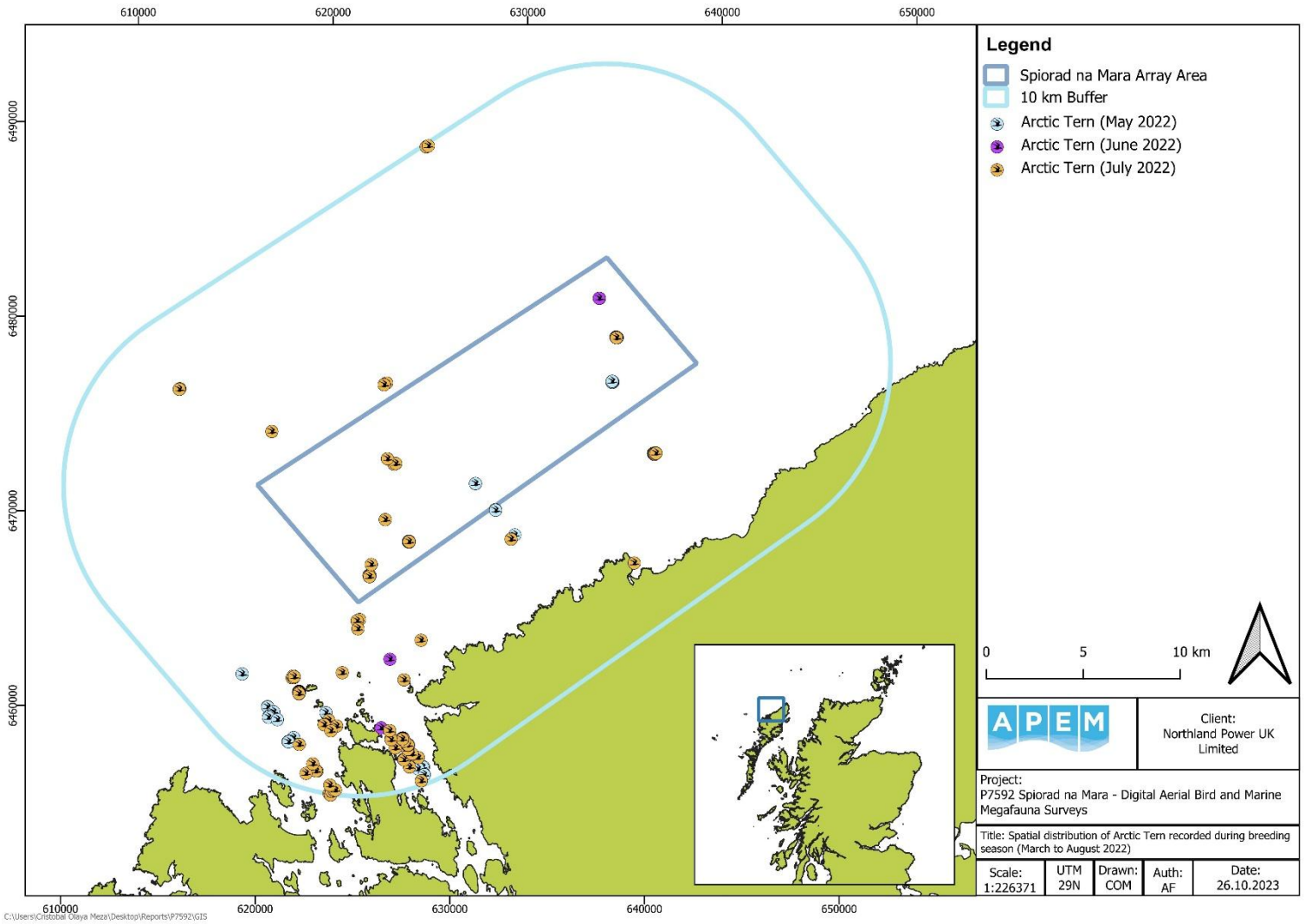


Figure 64 Distribution of Arctic tern in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

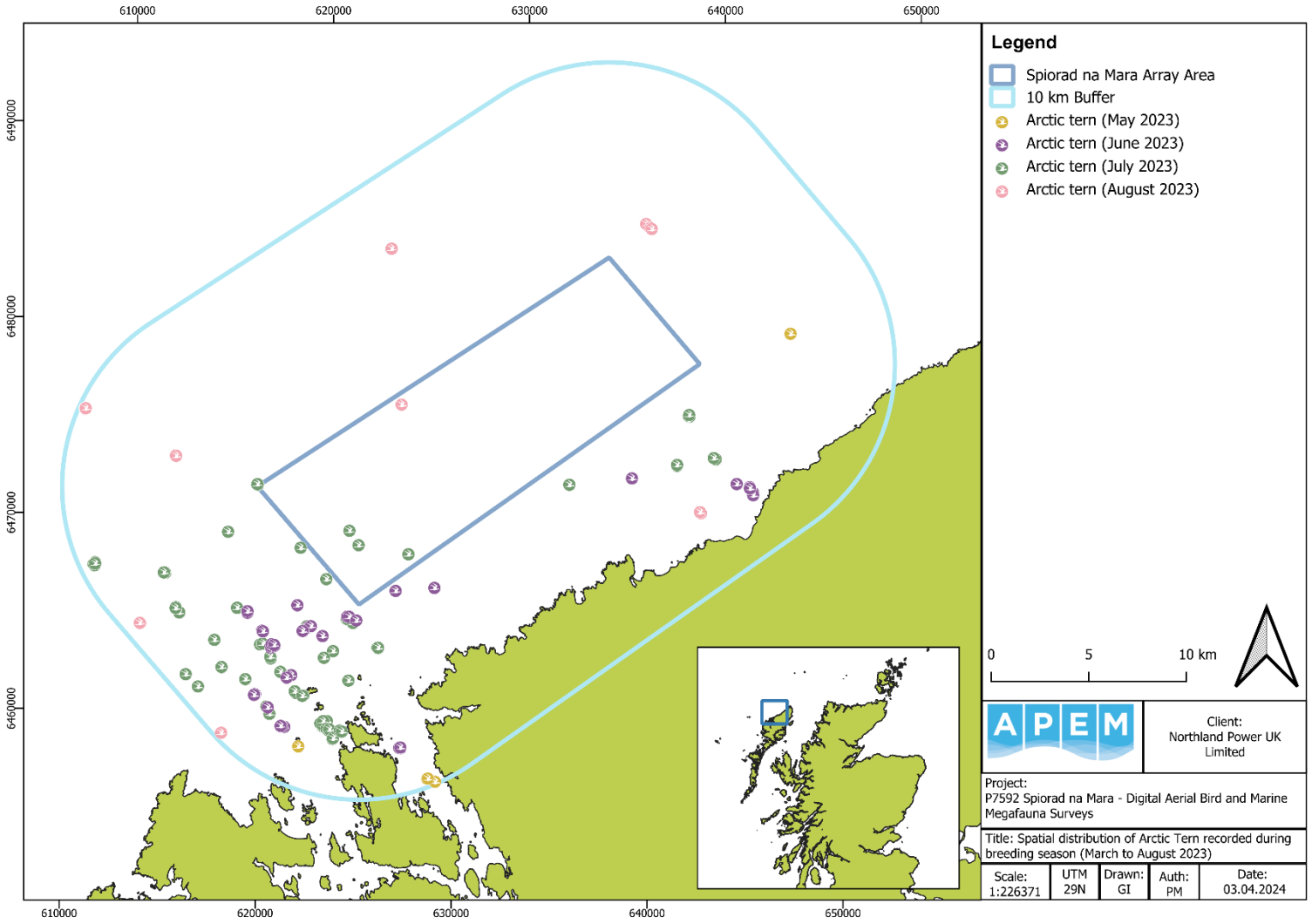
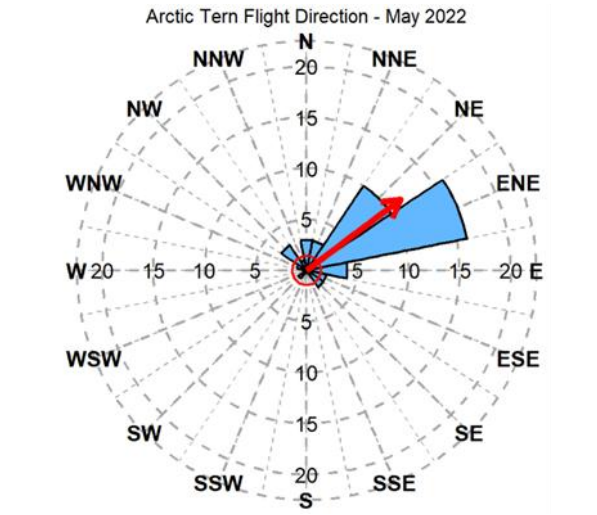


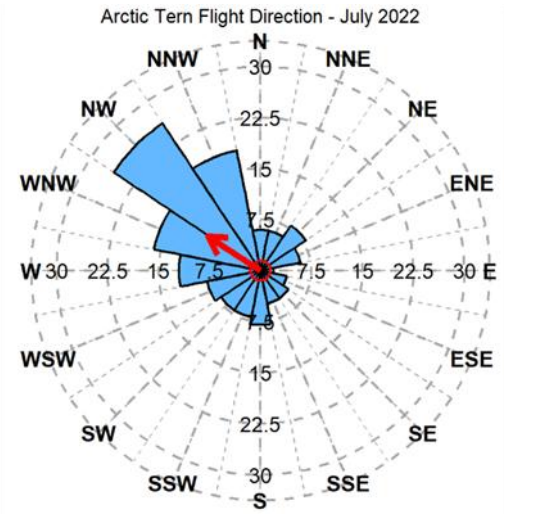
Figure 65 Distribution of Arctic tern in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping



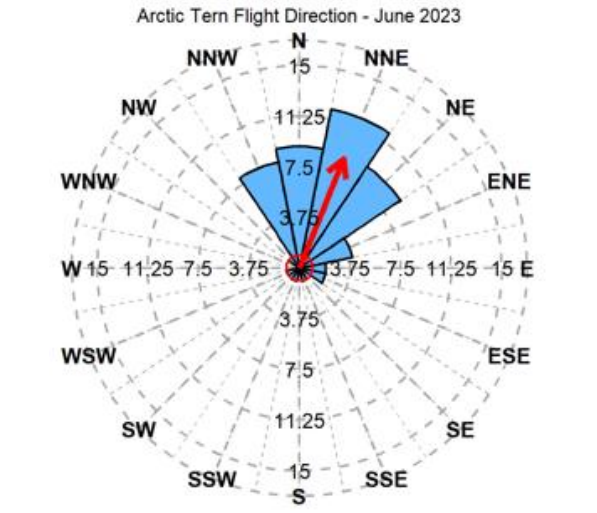
Number of Observations	46
Mean vector	53.516
Length of mean vector (r)	0.721
Rayleigh Test (Z)	23.912
Rayleigh Test (p)	<0.001

a. May 2022 (Survey 03)



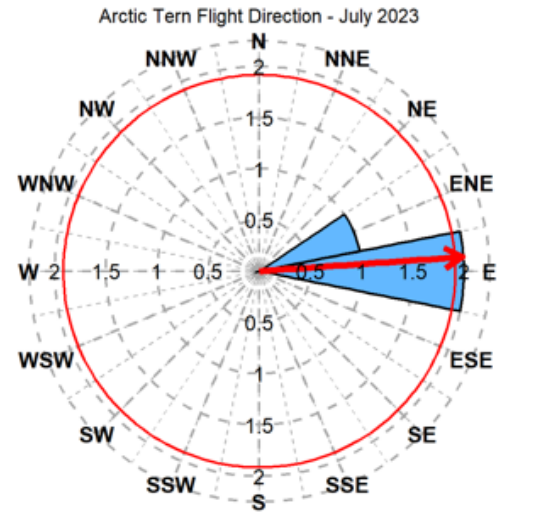
Number of Observations	144
Mean vector	303.901
Length of mean vector (r)	0.354
Rayleigh Test (Z)	18.024
Rayleigh Test (p)	<0.001

b. July 2022 (Survey 07)



Number of Observations	50
Mean vector	22.548
Length of mean vector (r)	0.725
Rayleigh Test (Z)	26.261
Rayleigh Test (p)	<0.001

c. June 2023 (Survey 16)



Number of Observations	3
Mean vector	86.097
Length of mean vector (r)	0.995
Rayleigh Test (Z)	2.972
Rayleigh Test (p)	0.035

d. July 2023 (Survey 17)

Figure 66 Summary of flight direction of Arctic tern during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.21 Common tern - *Sterna hirundo*

Common terns were recorded in May and June 2022 as well as June 2023. Peak abundance occurred in May 2022 with an abundance estimate of 43 [95% CL: 5, 112] within the Survey Area equating to 0.04 birds/km^2 (**Table 31**). Across both years, common terns were only recorded in the southwest of the 10 km Buffer adjacent to the coast (**Figure 67** and **Figure 68**). No common terns were observed during the non-breeding season.

In May 2022, there was a significant predominant direction of flight to the east-northeast (**Figure 69a**).

Table 31 Apportioned abundance and density estimates (birds per km^2) of common tern in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	5	43	5	112	0.45	0.04	43	5	112	0.04
Jun-22	1	8	1	25	<1.00	0.01	10	1	31	0.01
Jun-23	2	18	2	53	0.71	0.02	18	2	53	0.02
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
May-22	5	43	5	102	0.45	0.05	43	5	102	0.05
Jun-22	1	8	1	25	<1.00	0.01	11	1	34	0.01
Jun-23	2	18	2	53	0.71	0.02	18	2	53	0.02

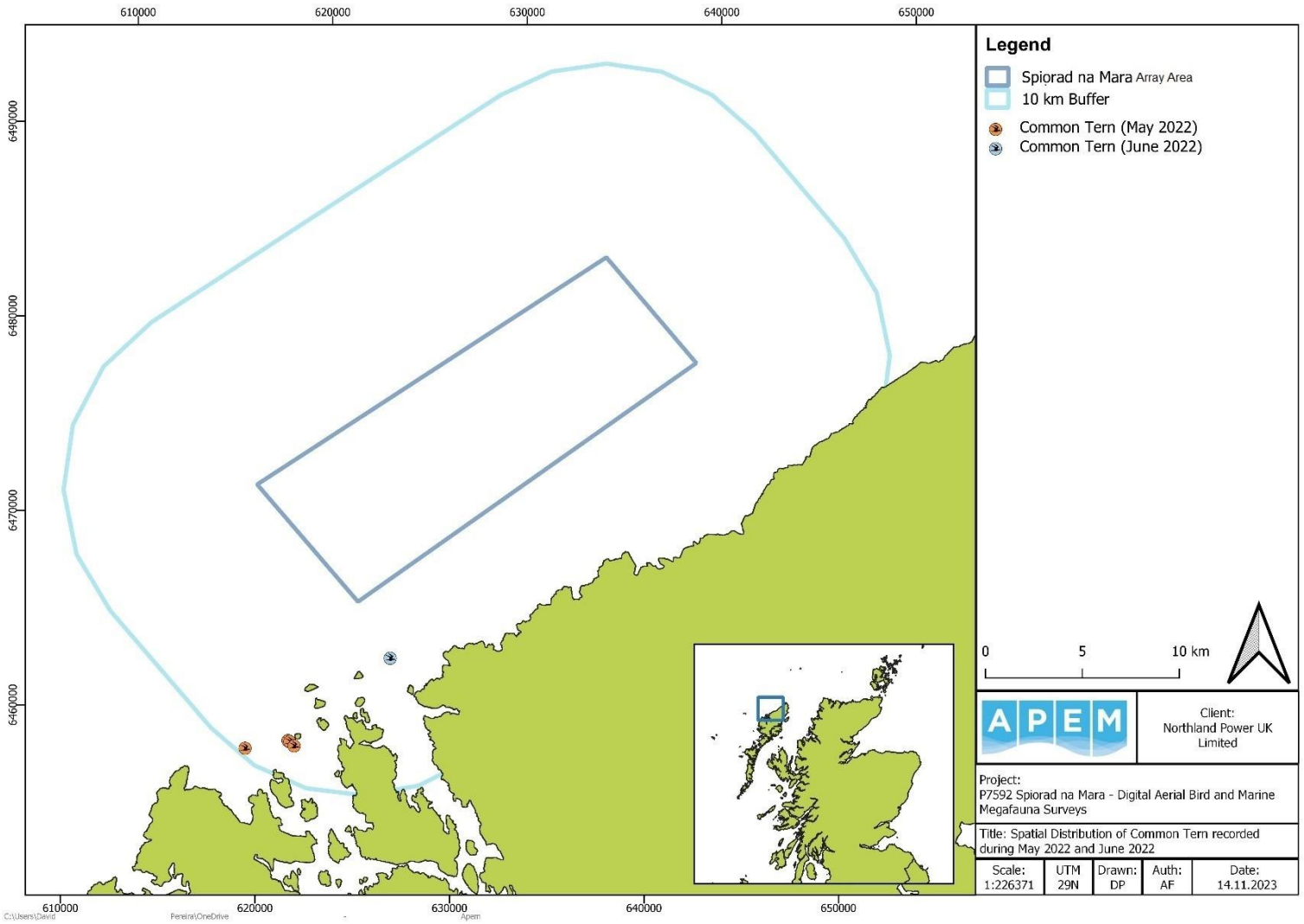


Figure 67 Distribution of common tern in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

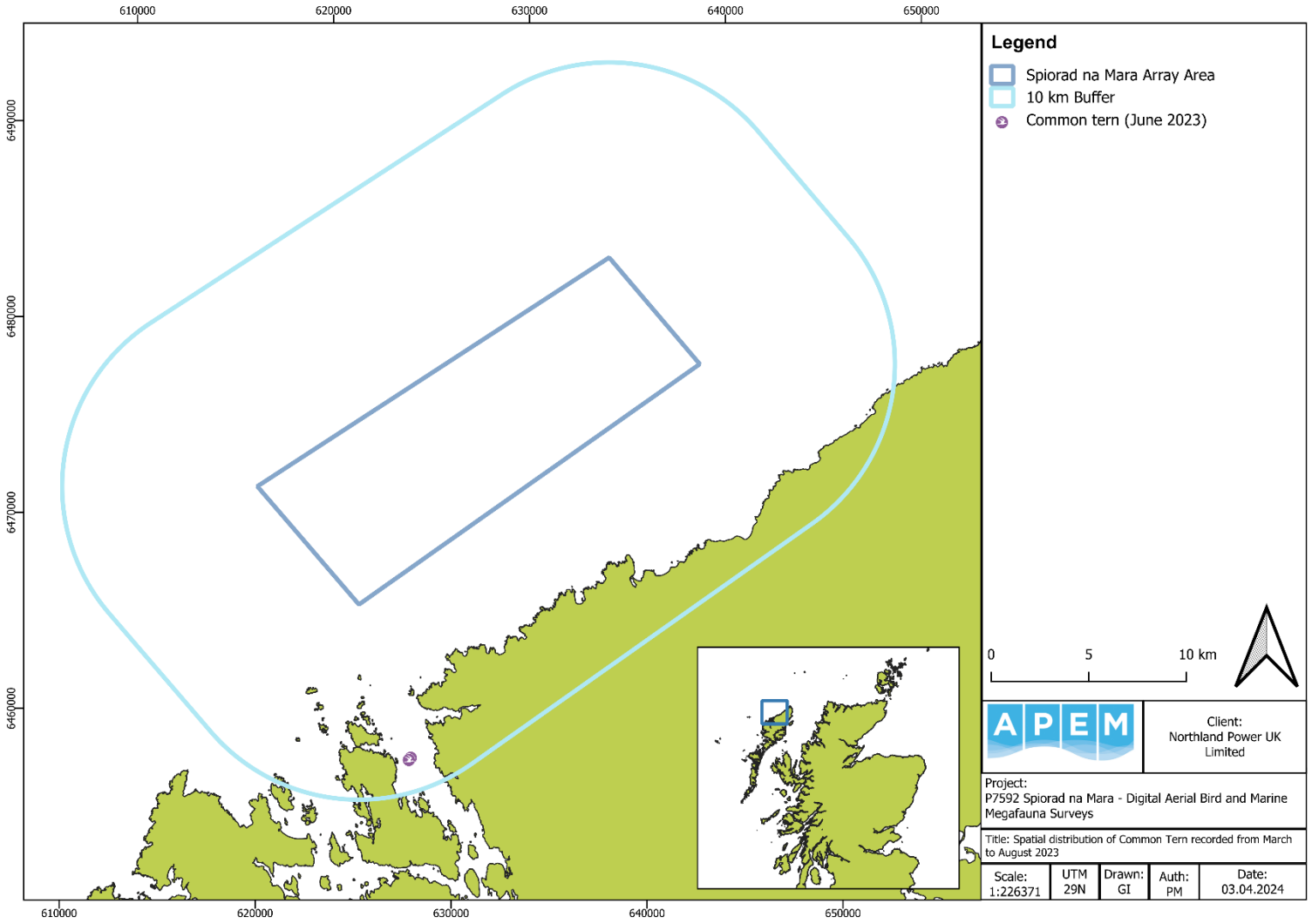
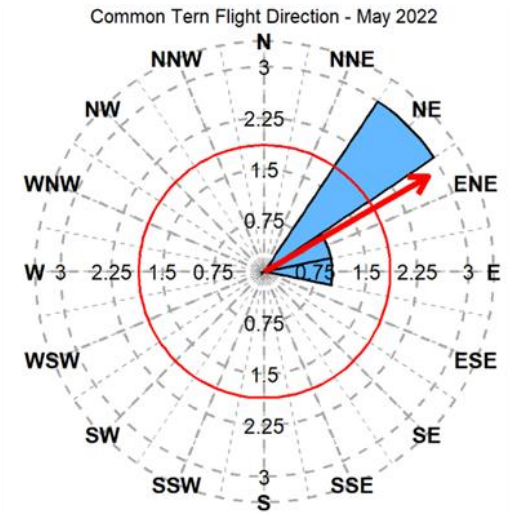


Figure 68 Distribution of common tern in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping



Number of Observations	5
Mean vector	60.547
Length of mean vector (r)	0.927
Rayleigh Test (Z)	4.299
Rayleigh Test (p)	0.006
a. May 2022 (Survey 03)	

Figure 69 Summary of flight direction of common tern during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.22 'Commic' [common or Arctic] tern - *Sterna hirundo / paradisaea*

'Commic' terns were recorded from May to September 2022 and June to August 2023. Peak abundance occurred in July 2022 with an estimate of 283 [95% CL: 103, 480] within the Survey Area equating to 0.30 birds/km^2 (**Table 32**). 'Commic' terns were predominantly observed in the south and west of the Survey Area (**Figure 70** and **Figure 71**). No 'commic' terns were observed outside of the breeding season.

In July 2022, a significant predominant direction of flight was recorded toward the northwest (**Figure 72**).

Table 32 Raw counts, unapportioned abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of 'commic' tern in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
May-22	7	60	9	129	0.38	0.06
Jun-22	10	85	17	178	0.32	0.09
Jul-22	33	283	120	481	0.17	0.30
Aug-22	2	17	2	69	0.71	0.02
Sep-22	1	9	1	26	<1.00	0.01
Jun-23	20	177	20	416	0.22	0.18
Jul-23	21	182	87	321	0.22	0.19
Aug-23	8	69	17	146	0.35	0.07
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	8	71	8	178	0.35	0.44
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
May-22	7	60	9	128	0.38	0.08
Jun-22	10	84	17	177	0.32	0.11
Jul-22	25	213	60	401	0.20	0.27
Aug-22	2	17	2	51	0.71	0.02
Sep-22	1	9	1	26	<1.00	0.01
Jun-23	20	175	20	403	0.22	0.22
Jul-23	21	180	69	309	0.22	0.23
Aug-23	8	68	8	144	0.35	0.09

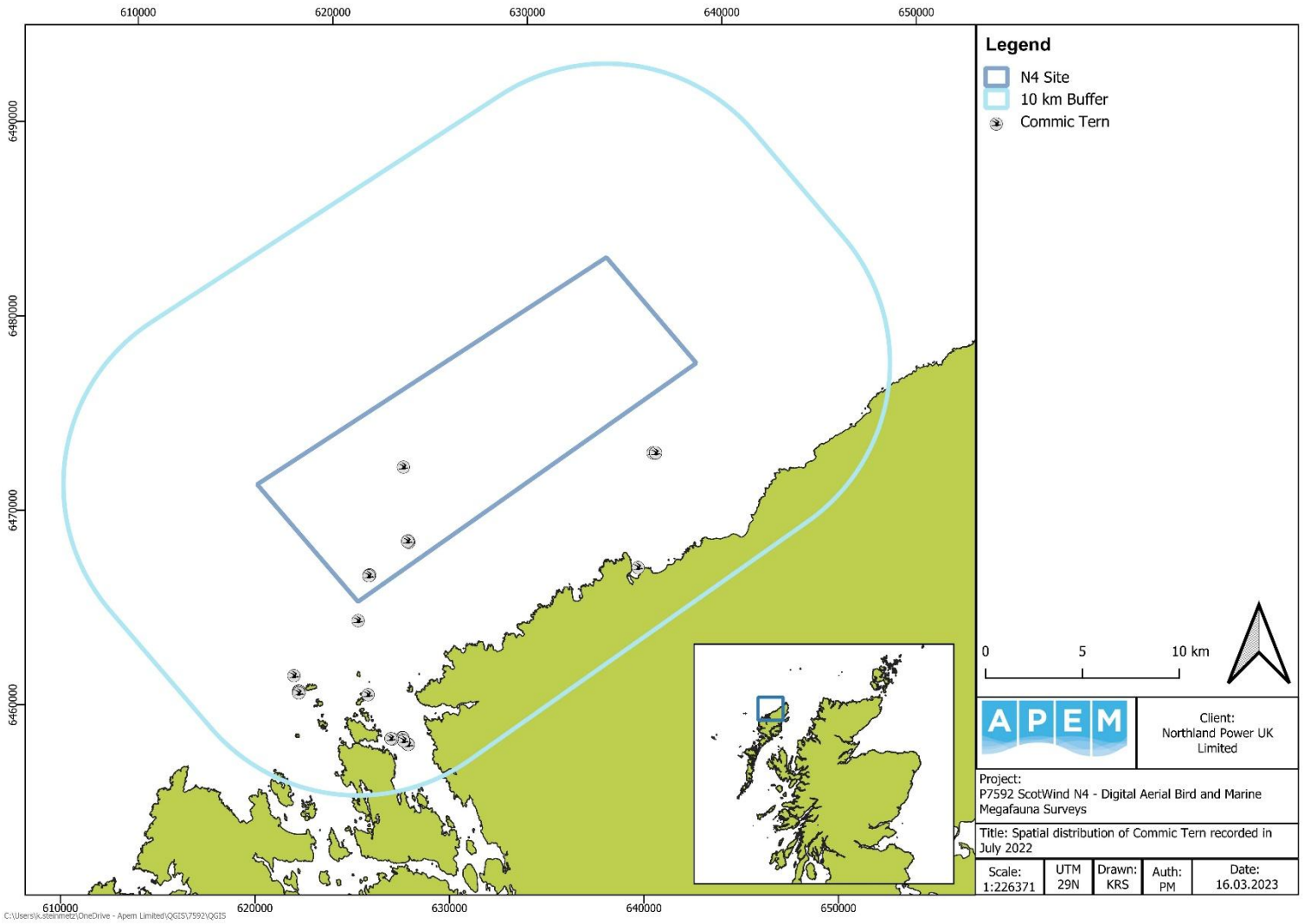


Figure 70 Distribution of 'commic' tern in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

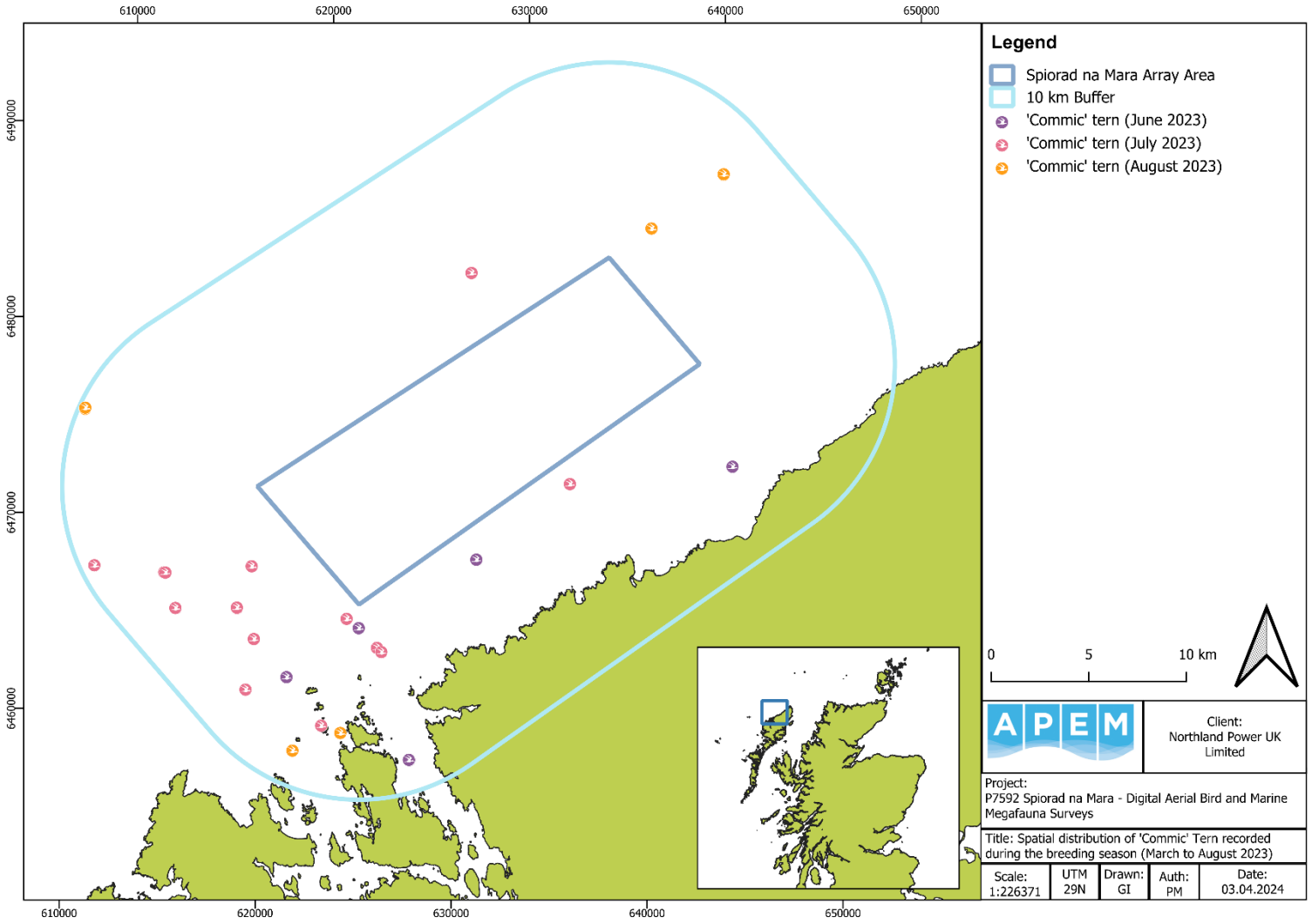
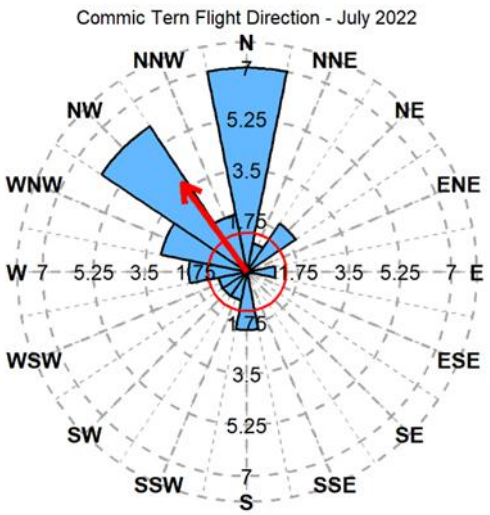
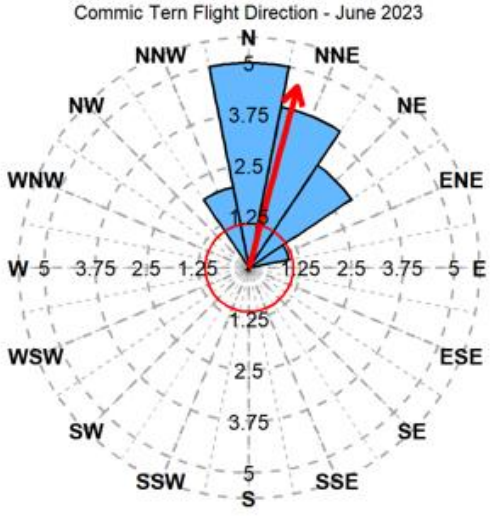


Figure 71 Distribution of 'commic' tern in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping



Number of Observations	29
Mean vector	324.813
Length of mean vector (r)	0.535
Rayleigh Test (Z)	8.314
Rayleigh Test (p)	<0.001
a. July 2022 (Survey 05)	



Number of Observations	15
Mean vector	15.819
Length of mean vector (r)	0.912
Rayleigh Test (Z)	12.480
Rayleigh Test (p)	<0.001
b. June 2023 (Survey 16)	

Figure 72 Summary of flight direction of 'commic' tern during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.23 Tern species - Unidentified

Tern species were recorded in June 2022, with an estimate of 8 [95% CL:1, 25] within the Survey Area equating to 0.01 birds/km^2 (**Table 33**). An individual tern species was recorded in the southeast of the 10km Buffer Zone (**Figure 73**).

No significant monthly trends in flight direction were observed for gull species during the surveys.

Table 33 Apportioned abundance and density estimates (birds per km^2) of tern species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			

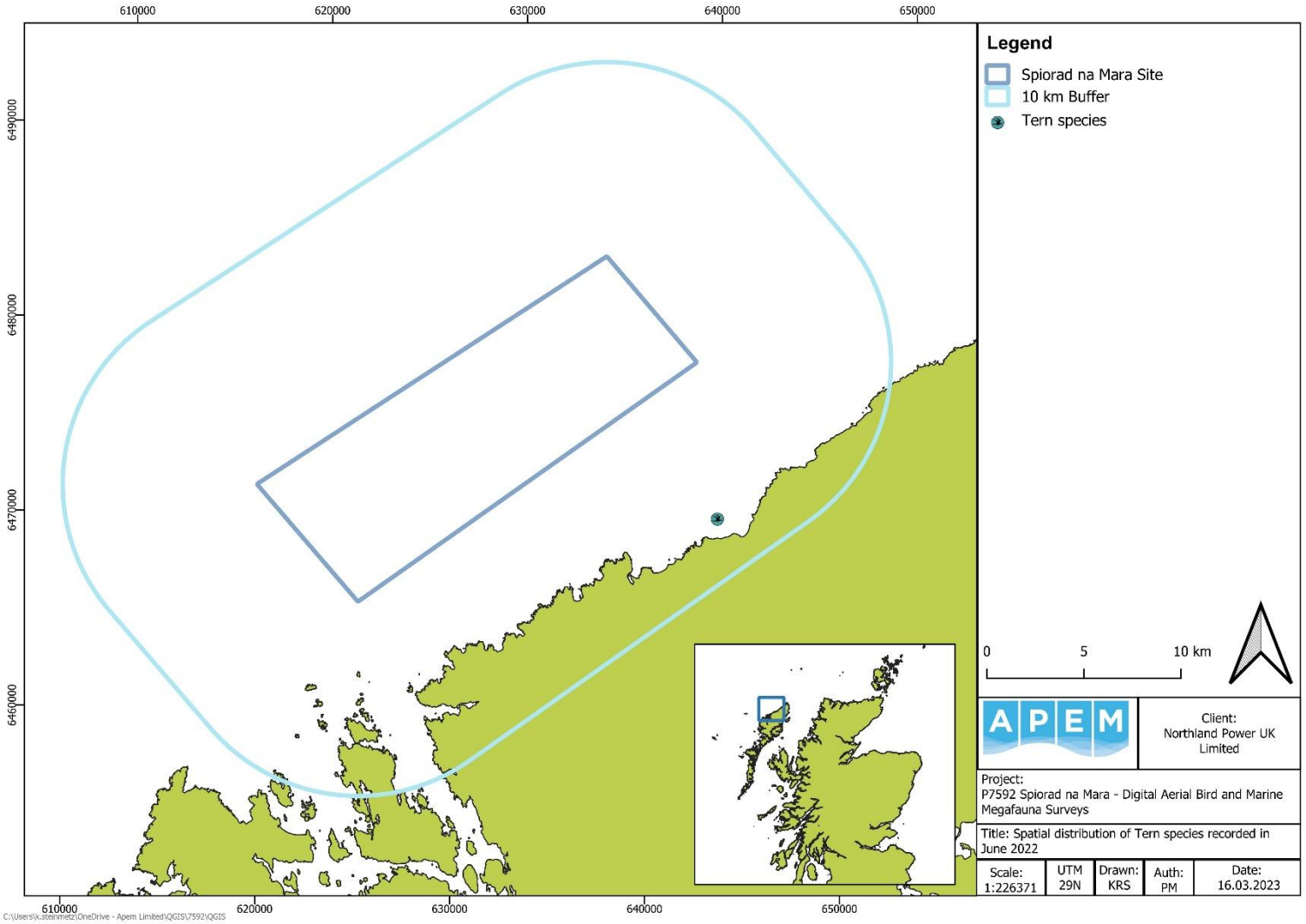


Figure 73 Distribution of tern species in the Survey Area in June 2022

Note: Individuals in close proximity may appear overlapping

3.1.24 Great skua - *Stercorarius skua*

Great skuas were recorded in April, August 2022 (breeding season), and October 2022 (non-breeding season). Peak abundance occurred in April 2022 with an estimate of 26 [95% CL: 3, 69] within the Survey Area equating to 0.03 birds/km^2 (**Table 34**). In April, great skuas were recorded in the east and west of the Survey Area, with all three individuals observed to be flying in no significant direction (**Figure 74**).

In August and October, individuals were recorded in the north and southeast, respectively (**Figure 74** and **Figure 75**). A single individual in August 2022 was flying, with no significant direction.

Table 34 Apportioned abundance and density estimates (birds per km^2) of great skua in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Apr-22	3	26	3	69	0.58	0.03
Aug-22	1	9	1	34	<1.00	0.01
Oct-22	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Oct-22	1	9	1	27	<1.00	0.06
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Apr-22	3	26	3	69	0.58	0.03
Aug-22	1	9	1	26	<1.00	0.01

Note: Apportioning calculations were carried out; however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

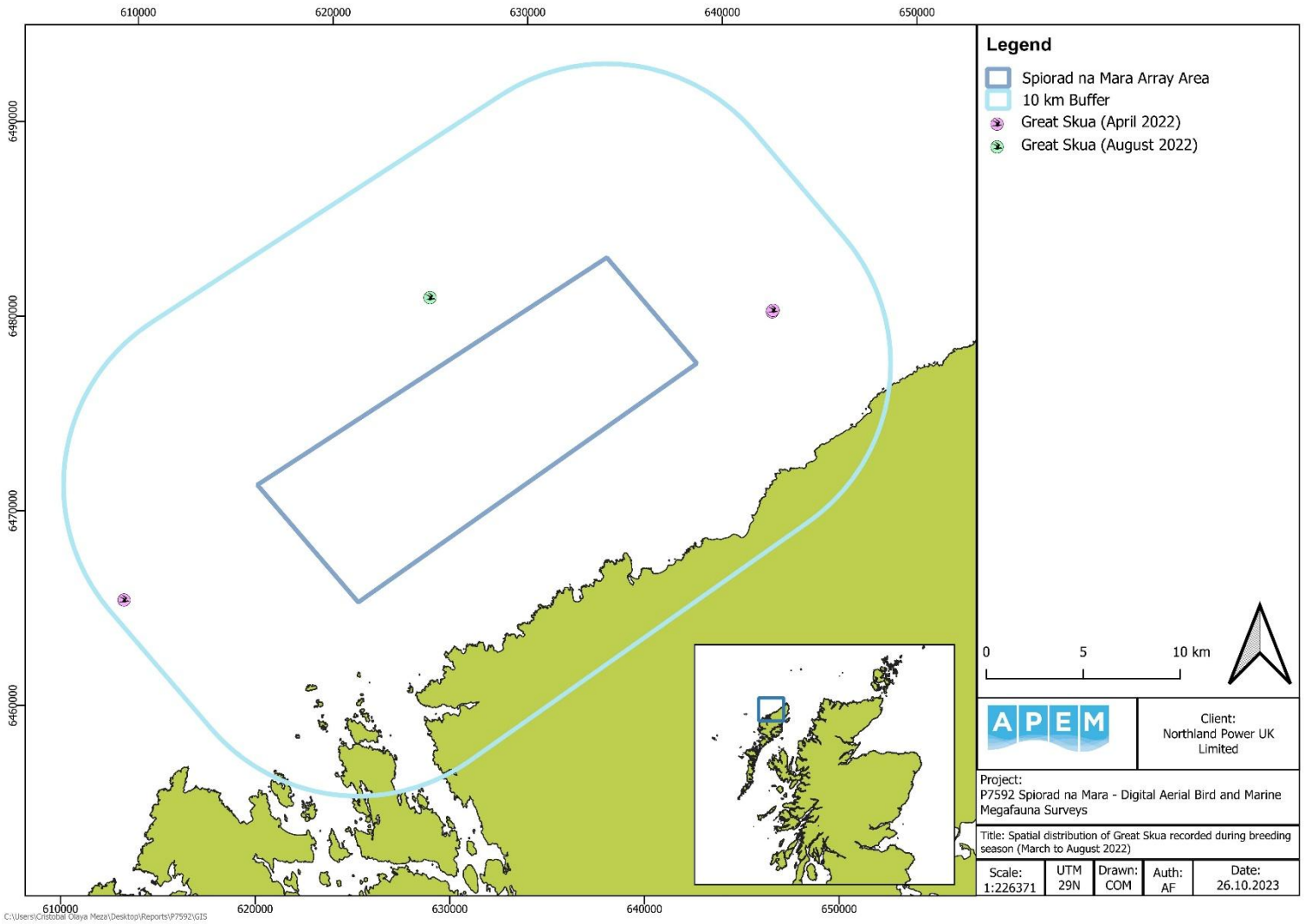


Figure 74 Distribution of great skua in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

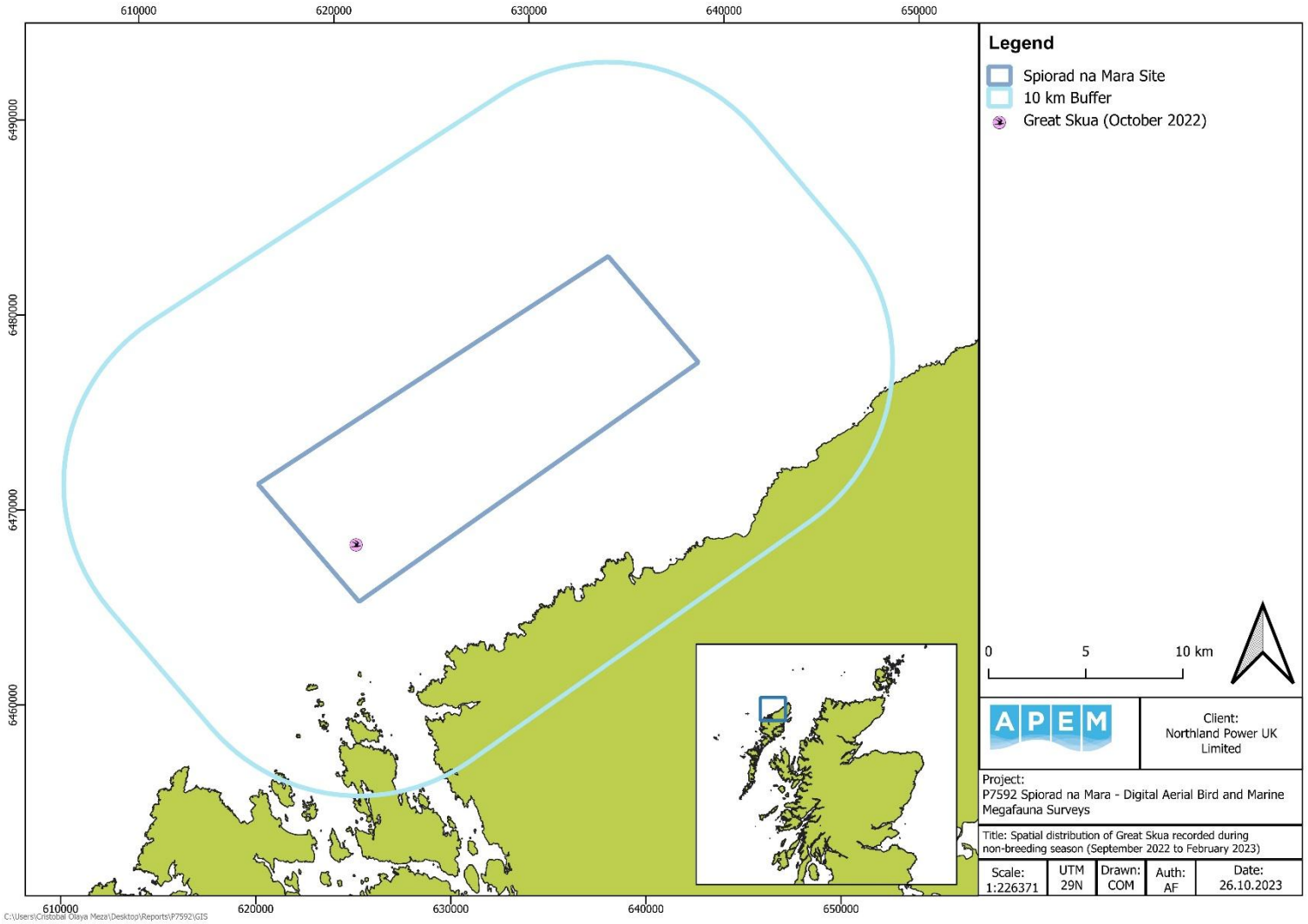


Figure 75 Distribution of great skua in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

3.1.25 Arctic skua - *Stercorarius parasiticus*

A single Arctic skua was recorded in September 2023, resulting in an abundance estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 (**Table 35**). It was recorded flying in the southwest of the 10 km Buffer (**Figure 76**). Flight direction was not significant.

Table 35 Apportioned abundance and density estimates (birds per km^2) of Arctic skua in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Sep-23	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Sep-23	1	8	1	26	<1.00	0.01

Note: Apportioning calculations were carried out; however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

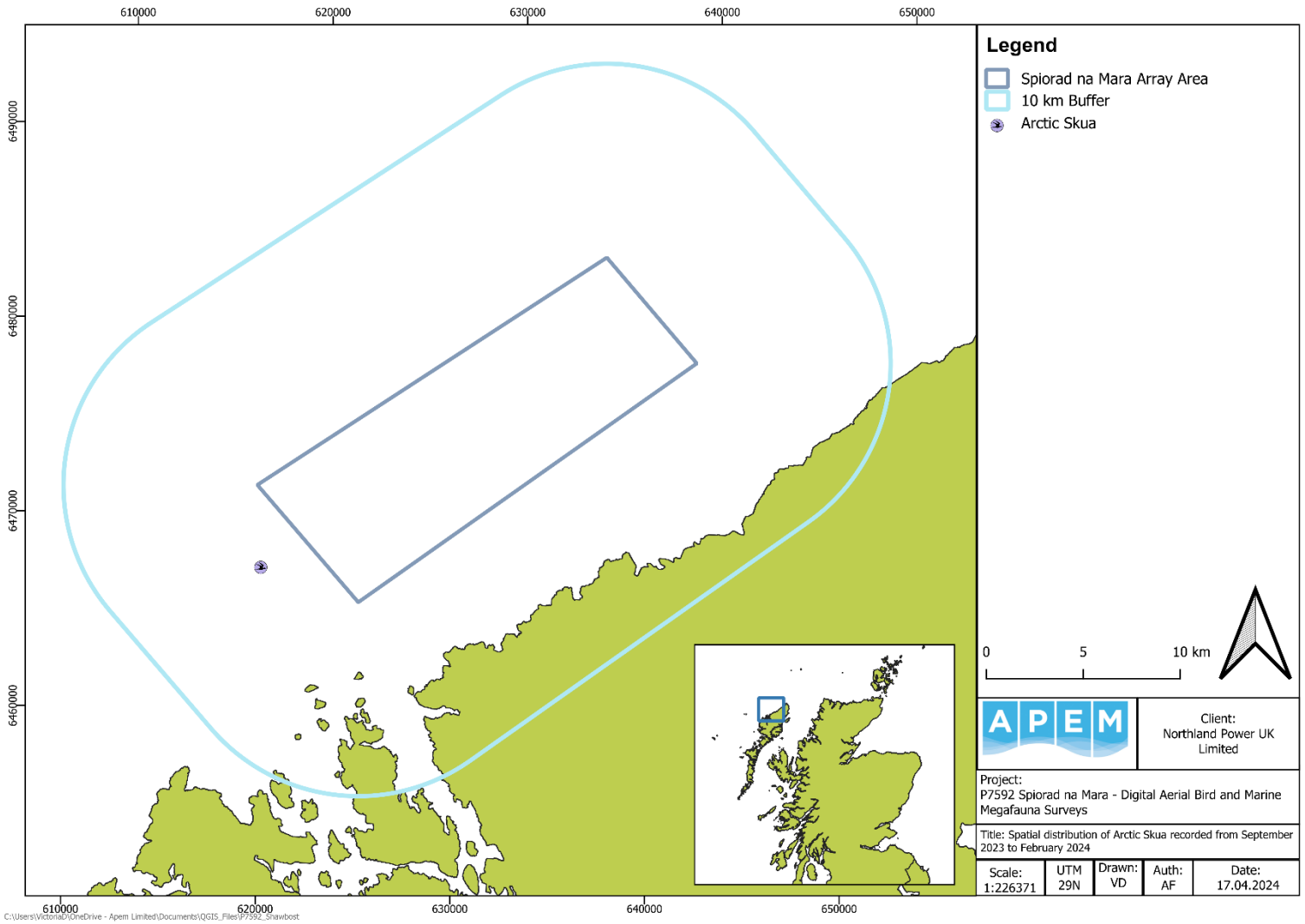


Figure 76 Distribution of Arctic skua in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.26 Guillemot - *Uria aalge*

Guillemots were recorded in all survey months throughout the survey period. Peak abundance occurred in September 2022 with an estimate of 11,146 [95% CL: 9,287, 12,979] within the Survey Area equating to 11.62 birds/km2 **(Table 36**). In most months except September and November 2022, a lower density of guillemots was recorded within the array than within the 10 km Buffer. Overall, in breeding and non-breeding seasons, no obvious trend in seasonal variation was recorded during the March 2022 to February 2024 surveys. However, trends were observed monthly. Guillemots were typically observed in the south of the Survey Area (**Figure 77** and **Figure 79**). In the 2022 breeding season, guillemots were typically observed between the south and west of the 10 km Buffer, with the exception of March, July and August surveys, where guillemots where more widely distributed across the survey area, with all individuals recorded within the 10 km buffer in August (**Figure 77**). In the 2023 breeding season, guillemots showed a wider distribution, initially observed in the northeast of the 10 km Buffer in March, however a distributional shift was recorded between April and June 2023, with highest concentrations occurring in the south of the 10 km Buffer. In July and August, individuals were widely distributed across the Survey Area (**Figure 79**). In the 2022 non-breeding season, guillemots were observed scattered across the Survey Area between September and November. In December, individuals were concentrated in the southwest and northeast of the 10 km Buffer, and in January and February, the guillemots were recorded mostly in the north (**Figure 78**). In the 2023 non-breeding season, individuals were widely distributed across the Survey Area, with more records in the 10 km Buffer for the majority of months. Between October and December, individuals were mostly recorded in the southern half of the Survey Area, whereas, in January and February there were more concentrated in the northern half of the Survey Area (**Figure 80**).

In June, October 2022, and February 2023, guillemots had a significant predominant direction of west to west-northwest, respectively **(Figure 81b-d**). In March 2022, a significant predominant direction of flight was recorded to the north-northeast (**Figure 81a)**. In May and June 2023, a significant predominant direction of flight was recorded between the north-northeast and the northeast (**Figure 81e-f**), whilst in July and November 2023, there was a significant direction of flight between the south-southwest and the west-southwest (**Figure 81g-h**).

Table 36 Corrected apportioned abundance and density estimates (birds per km^2) of guillemot in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	292	2,503	1,971	3,129	0.06	2.61	4,424	3,351	5,642	4.61
Apr-22	294	2,550	1,596	3,704	0.06	2.66	4,108	2,597	6,020	4.29
May-22	181	1,553	1,133	2,016	0.07	1.62	2,041	1,429	2,767	2.13
Jun-22	111	942	450	1,527	0.09	0.98	1,309	484	2,345	1.37
Jul-22	188	1,615	1,074	2,379	0.07	1.69	2,655	1,336	4,526	2.77
Aug-22	29	249	137	387	0.19	0.26	716	403	1,093	0.75
Sep-22	603	5,177	4,473	5,967	0.04	5.40	11,159	9,319	13,106	11.64
Oct-22	110	961	725	1,232	0.10	1.00	1,441	936	2,012	1.50
Nov-22	17	147	69	241	0.24	0.15	234	67	436	0.24
Dec-22	36	313	209	445	0.17	0.33	484	264	752	0.50
Jan-23	87	747	567	953	0.11	0.78	1,408	941	1,935	1.47
Feb-23	140	1,193	963	1,431	0.08	1.24	1,837	1,386	2,371	1.92

Mar-23	274	2,351	1,931	2,823	0.06	2.45	3,196	2,557	3,931	3.33
Apr-23	148	1,286	1,043	1,556	0.08	1.34	1,864	1,302	2,475	1.94
May-23	81	700	449	968	0.11	0.73	1,079	558	1,779	1.13
Jun-23	116	1,026	584	1,619	0.09	1.07	1,510	751	2,569	1.58
Jul-23	94	815	538	1,145	0.10	0.85	1,315	684	2,124	1.37
Aug-23	345	2,955	2,389	3,520	0.05	3.08	4,215	3,387	5,088	4.40
Sep-23	640	5,487	4,612	6,464	0.04	5.73	7,966	6,616	9,516	8.31
Oct-23	29	251	164	355	0.19	0.26	522	317	775	0.54
Nov-23	27	236	148	340	0.19	0.25	339	169	559	0.35
Dec-23	30	258	164	353	0.18	0.27	543	311	824	0.57
Jan-24	110	961	751	1,214	0.10	1.00	1,918	1,434	2,470	2.00
Feb-24	106	903	716	1,082	0.10	0.94	1,858	1,422	2,348	1.94

b) Spiorad na Mara Array Area

Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	45	409	263	563	0.15	2.54	822	423	1,334	5.09
Apr-22	9	82	27	146	0.33	0.51	190	37	410	1.18
May-22	13	116	45	205	0.28	0.72	152	59	269	0.94
Jun-22	1	9	1	26	<1.00	0.06	12	1	34	0.07
Jul-22	16	143	36	294	0.25	0.89	244	38	600	1.51
Aug-22	0	0	0	0	0.00	0.00	35	4	80	0.22
Sep-22	136	1,209	853	1,573	0.09	7.50	2,622	1,842	3,512	16.26
Oct-22	16	146	82	228	0.25	0.91	214	73	396	1.33
Nov-22	3	27	3	72	0.58	0.17	27	3	72	0.17
Dec-22	3	27	3	64	0.58	0.17	47	5	108	0.29
Jan-23	10	90	36	171	0.32	0.56	118	35	224	0.73
Feb-23	8	72	27	125	0.35	0.45	120	39	227	0.74
Mar-23	27	242	144	350	0.19	1.50	326	179	519	2.02
Apr-23	16	145	64	236	0.25	0.90	218	61	457	1.35
May-23	8	73	18	156	0.35	0.45	134	20	316	0.83
Jun-23	7	65	18	120	0.38	0.40	85	24	157	0.53
Jul-23	11	101	27	201	0.30	0.63	149	31	326	0.92
Aug-23	29	260	144	386	0.19	1.61	355	190	549	2.20
Sep-23	62	555	322	859	0.13	3.44	816	434	1,296	5.06
Oct-23	2	18	2	45	0.71	0.11	61	6	142	0.38
Nov-23	1	9	1	27	<1.00	0.06	12	1	35	0.07
Dec-23	2	18	2	45	0.71	0.11	42	5	125	0.26
Jan-24	11	101	37	184	0.30	0.63	174	53	328	1.08
Feb-24	9	80	27	142	0.33	0.50	139	45	261	0.86

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	247	2,093	1,576	2,686	0.06	2.63	3,568	2,599	4,619	4.47
Apr-22	285	2,447	1,537	3,529	0.06	3.07	3,921	2,424	5,829	4.92
May-22	168	1,431	1,030	1,942	0.08	1.80	1,880	1,317	2,575	2.36
Jun-22	110	927	430	1,559	0.10	1.16	1,289	482	2,420	1.62

Jul-22	172	1,467	912	2,174	0.08	1.85	2,410	1,190	4,240	3.03
Aug-22	29	248	128	376	0.19	0.31	378	366	1,052	0.85
Sep-22	467	3,982	3,360	4,630	0.05	5.00	8,559	7,021	10,273	10.73
Oct-22	94	815	589	1,066	0.10	1.02	1,227	767	1,781	1.54
Nov-22	14	120	43	205	0.27	0.15	208	64	376	0.26
Dec-22	33	284	181	405	0.17	0.36	435	239	669	0.55
Jan-23	77	655	476	834	0.11	0.82	1,276	853	1,723	1.60
Feb-23	132	1,114	886	1,350	0.09	1.40	1,706	1,256	2,195	2.14
Mar-23	247	2,101	1,727	2,509	0.06	2.64	2,861	2,266	3,569	3.59
Apr-23	132	1,137	905	1,370	0.09	1.43	1,642	1,140	2,228	2.06
May-23	73	623	376	871	0.12	0.78	947	435	1,599	1.19
Jun-23	109	956	535	1,508	0.10	1.20	1,411	677	2,476	1.77
Jul-23	83	713	472	1,048	0.11	0.89	1,162	572	1,955	1.46
Aug-23	316	2,681	2,215	3,216	0.06	3.36	3,840	3,060	4,675	4.82
Sep-23	578	4,913	4,046	5,874	0.04	6.16	7,126	5,721	8,644	8.94
Oct-23	27	232	146	335	0.19	0.29	455	261	700	0.57
Nov-23	26	225	130	329	0.20	0.28	324	156	533	0.41
Dec-23	28	239	153	333	0.19	0.30	499	272	774	0.63
Jan-24	99	856	640	1,081	0.10	1.07	1,729	1,261	2,191	2.17
Feb-24	97	820	659	1,014	0.10	1.03	1,731	1,299	2,221	2.17

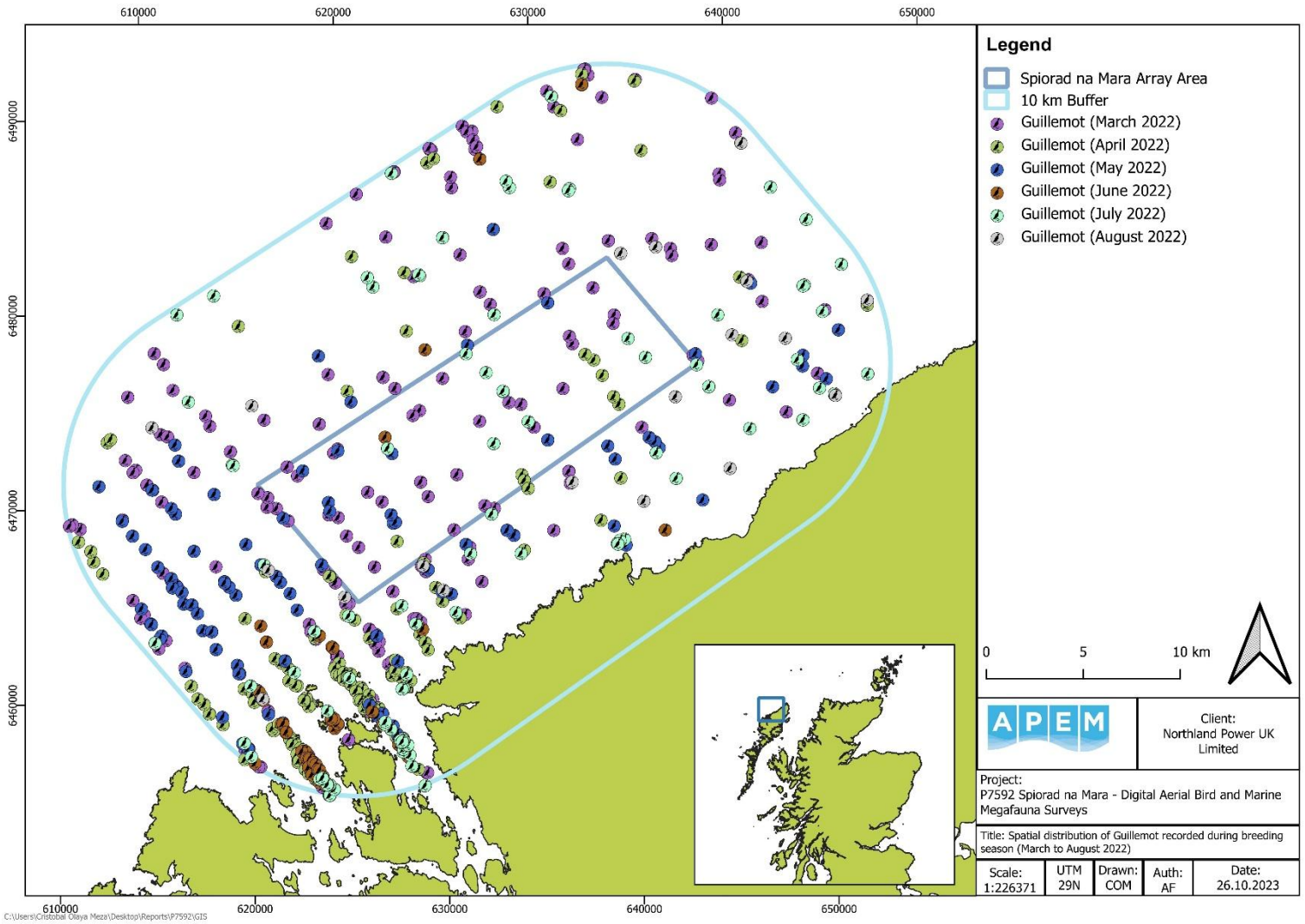


Figure 77 Distribution of guillemot in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

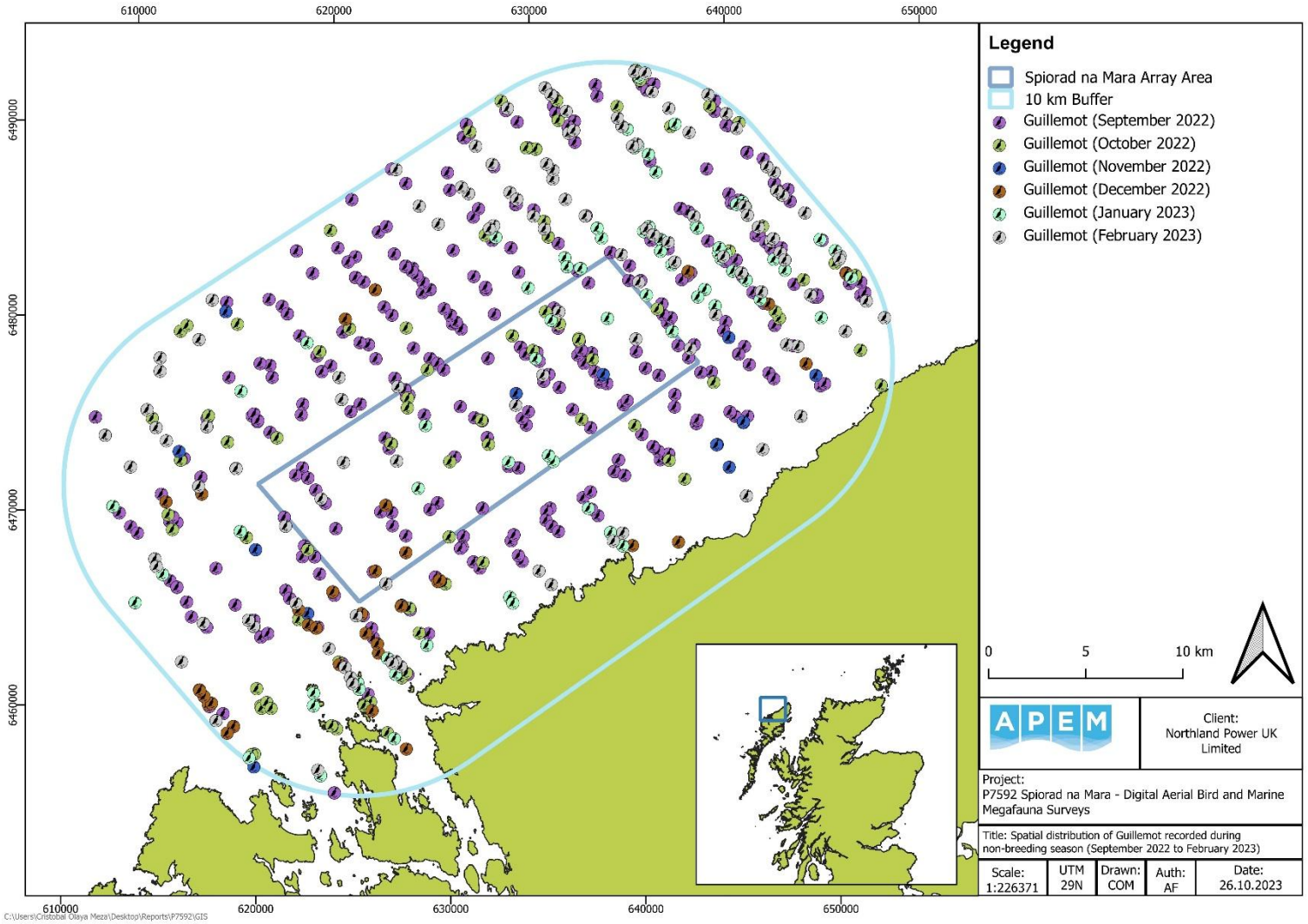


Figure 78 Distribution of guillemot in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

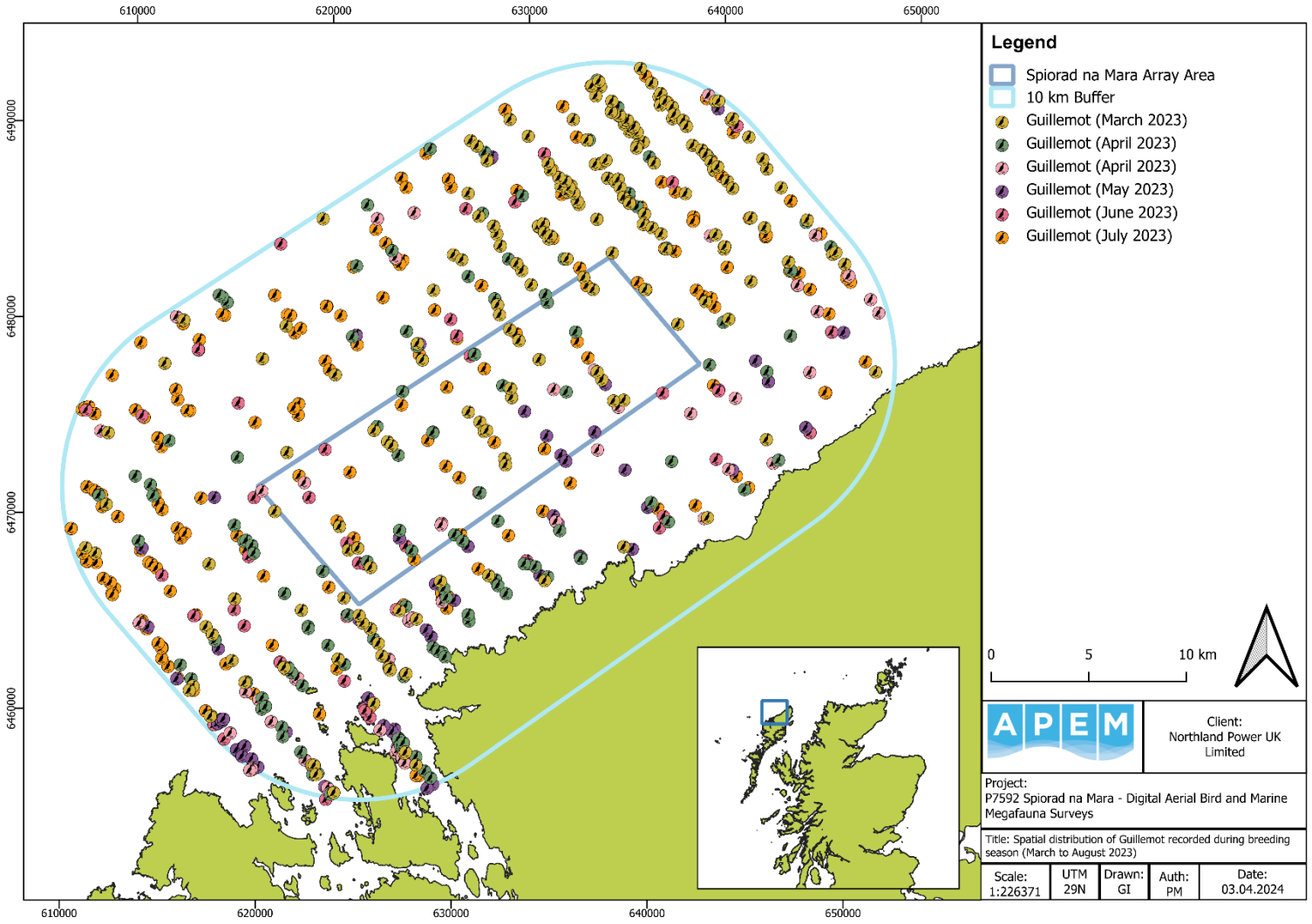


Figure 79 Distribution of guillemot in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

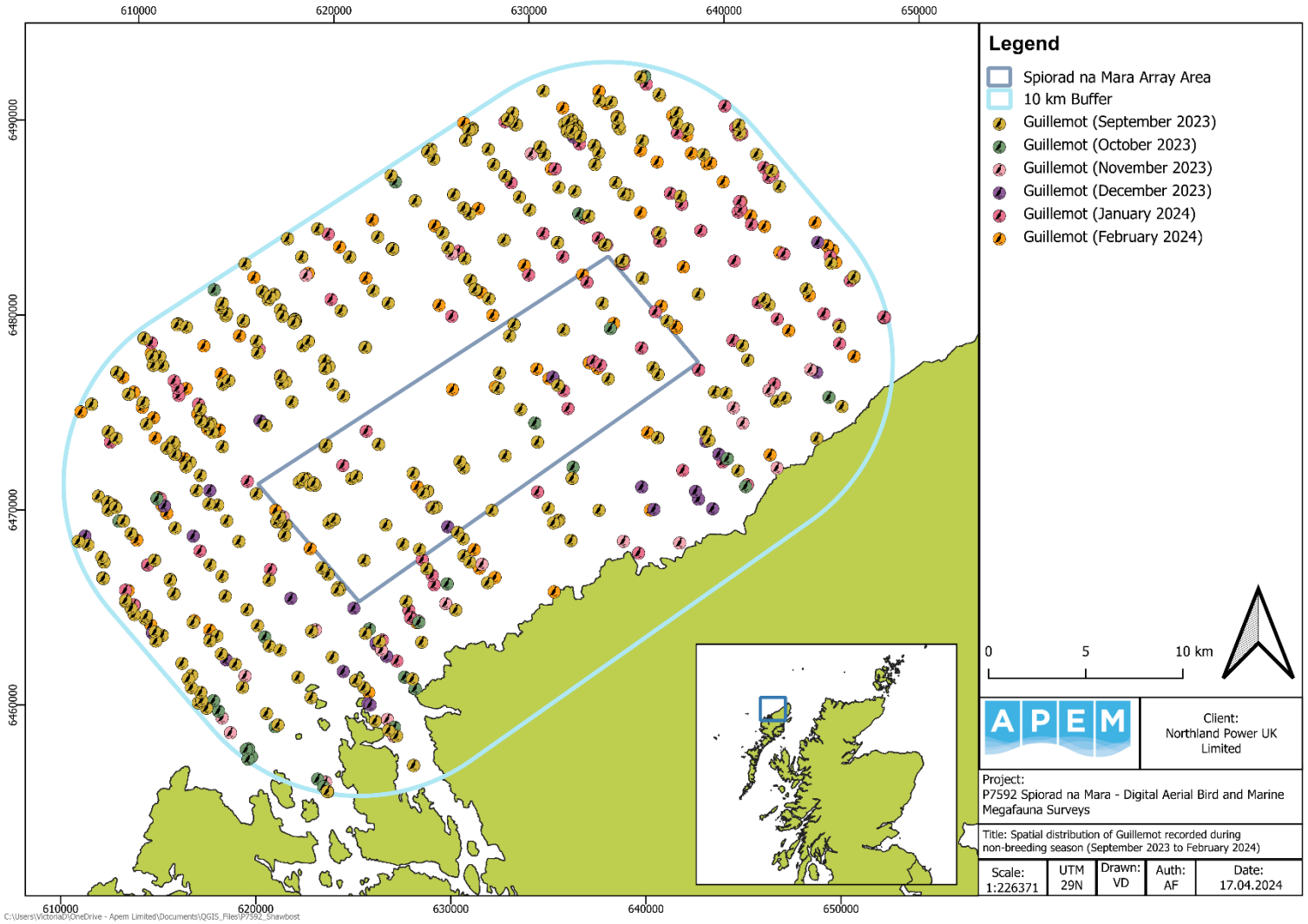
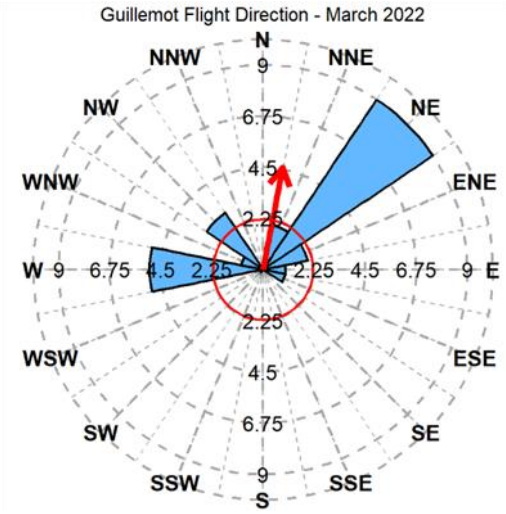


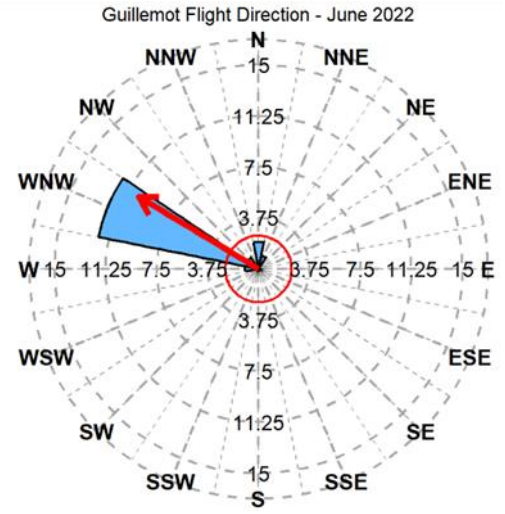
Figure 80 Distribution of guillemot in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



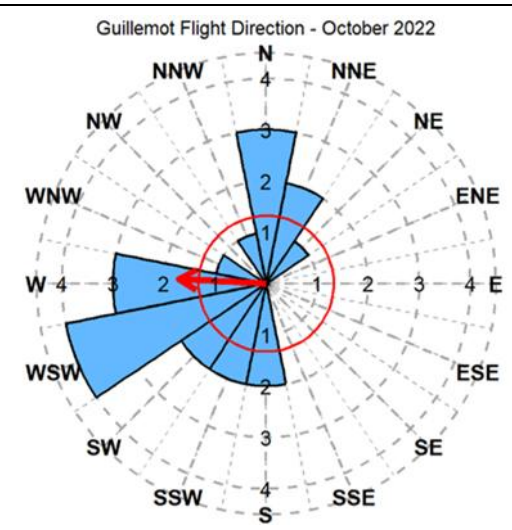
Number of Observations	24
Mean vector	11.755
Length of mean vector (r)	0.507
Rayleigh Test (Z)	6.161
Rayleigh Test (p)	0.002

a. March 2022 (Survey 01)



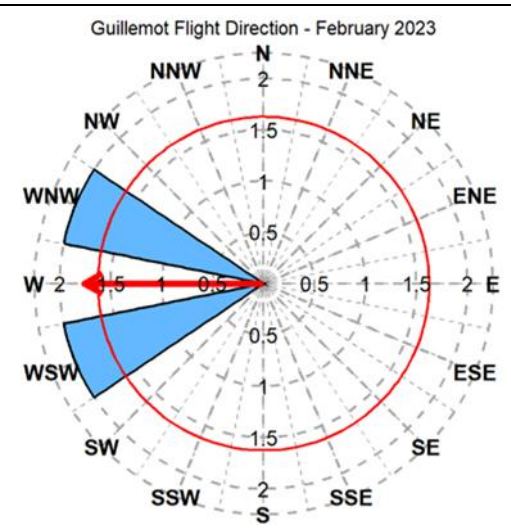
Number of Observations	17
Mean vector	301.852
Length of mean vector (r)	0.857
Rayleigh Test (Z)	12.499
Rayleigh Test (p)	<0.001

b. June 2022 (Survey 04)



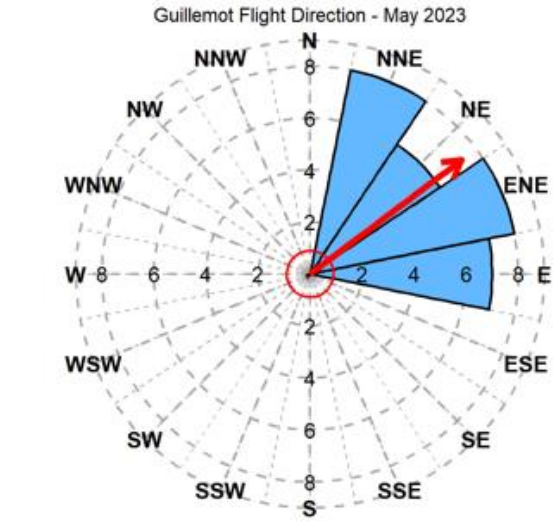
Number of Observations	21
Mean vector	273.867
Length of mean vector (r)	0.429
Rayleigh Test (Z)	3.857
Rayleigh Test (p)	0.019

c. October 2022 (Survey 08)



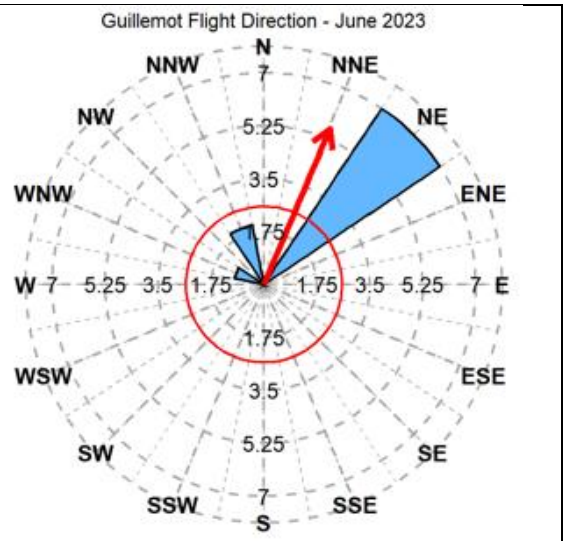
Number of Observations	4
Mean vector	270.748
Length of mean vector (r)	0.880
Rayleigh Test (Z)	3.096
Rayleigh Test (p)	0.033

d. February 2023 (Survey 12)



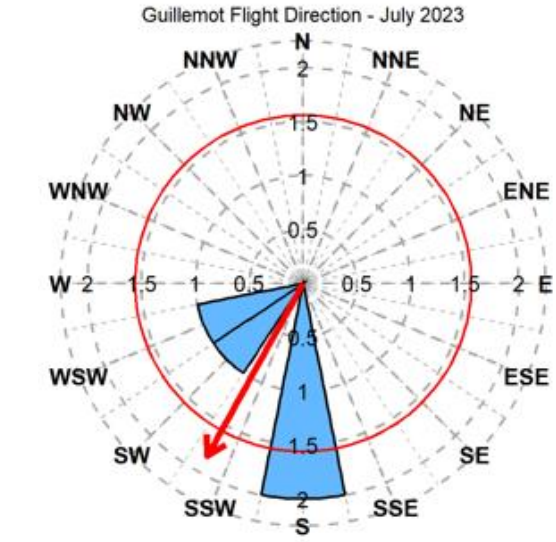
Number of Observations	29
Mean vector	53.635
Length of mean vector (r)	0.912
Rayleigh Test (Z)	24.139
Rayleigh Test (p)	<0.001

e. May 2023 (Survey 15)



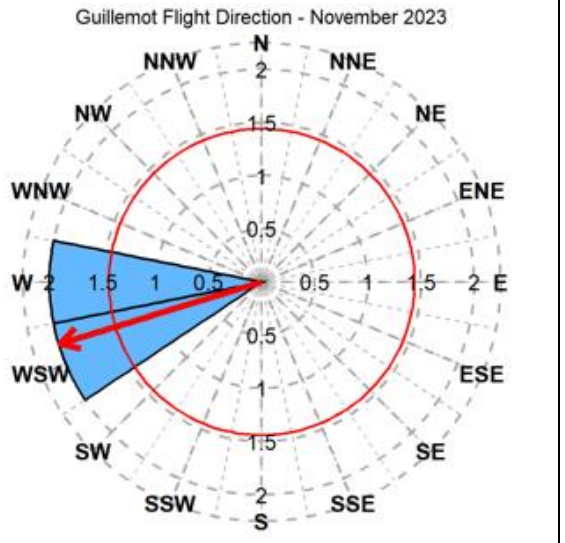
Number of Observations	10
Mean vector	23.914
Length of mean vector (r)	0.798
Rayleigh Test (Z)	6.361
Rayleigh Test (p)	<0.001

f. June 2023 (Survey 16)



Number of Observations	4
Mean vector	209.077
Length of mean vector (r)	0.916
Rayleigh Test (Z)	3.360
Rayleigh Test (p)	0.022

g. July 2023 (Survey 17)



Number of Observations	4
Mean vector	253.893
Length of mean vector (r)	0.993
Rayleigh Test (Z)	3.943
Rayleigh Test (p)	0.008

h. November 2023 (Survey 21)

Figure 81 Summary of flight direction of guillemot during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.27 Razorbill - *Alca torda*

Razorbills were recorded in all surveys except for October and December 2022. Peak abundance occurred in April 2022 with an estimate of 5,056 [95% CL: 3,026, 7,887] within the Survey Area equating to 5.27 birds/km^2 (**Table 37**). Across both years, razorbills were distributed throughout the Survey Area with higher densities in the south during the breeding season (**Figure 82** and **Figure 84**) whilst individuals were more widely dispersed throughout the Survey Area during the non-breeding season (**Figure 83** and **Figure 85**).

A significant direction of flight was recorded in March 2022, January, and February 2023, with razorbills predominantly flying in a north north-easterly or a west south-westerly direction, respectively (**Figure 86a-c**). No significant flight direction was recorded during the second year of surveys.

Table 37 Corrected apportioned abundance and density estimates (birds per km^2) of razorbill in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	228	1,954	1,123	2,966	0.07	2.04	3,251	1,839	5,179	3.39
Apr-22	389	3,374	2,021	5,170	0.05	3.52	5,056	3,026	7,887	5.27
May-22	17	146	51	266	0.24	0.15	179	73	308	0.19
Jun-22	44	373	93	747	0.15	0.39	500	124	1,011	0.52
Jul-22	101	868	464	1,452	0.10	0.90	1,374	632	2,573	1.43
Aug-22	6	52	9	103	0.41	0.05	145	28	294	0.15
Sep-22	103	884	661	1,142	0.10	0.92	1,755	1,252	2,296	1.83
Nov-22	5	43	9	86	0.45	0.04	73	15	146	0.08
Jan-23	16	137	43	258	0.25	0.14	237	48	537	0.25
Feb-23	38	324	170	486	0.16	0.34	454	224	768	0.47
Mar-23	31	266	163	386	0.18	0.28	335	200	507	0.35
Apr-23	14	122	52	200	0.27	0.13	167	57	322	0.17
May-23	26	225	95	415	0.20	0.23	380	132	744	0.40
Jun-23	20	177	80	310	0.22	0.18	241	83	456	0.25
Jul-23	2	17	2	43	0.71	0.02	32	3	85	0.03
Aug-23	393	3,366	2,629	4,222	0.05	3.51	4,425	3,370	5,646	4.62
Sep-23	188	1,612	1,243	2,049	0.07	1.68	2,165	1,621	2,834	2.26
Oct-23	10	86	35	147	0.32	0.09	170	69	295	0.18
Nov-23	4	35	9	70	0.50	0.04	45	5	118	0.05
Dec-23	4	34	4	77	0.50	0.04	70	17	150	0.07
Jan-24	47	411	245	620	0.15	0.43	753	427	1,114	0.79
Feb-24	80	682	452	946	0.11	0.71	1,278	784	1,876	1.33
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	52	472	263	736	0.14	2.93	940	487	1,458	5.83
May-22	3	27	3	71	0.58	0.17	33	4	86	0.20

Jul-22	1	9	1	27	<1.00	0.06	14	1	53	0.08
Aug-22	0	0	0	0	0.00	0.00	7	0	22	0.04
Sep-22	20	178	80	284	0.22	1.10	359	157	621	2.23
Feb-23	3	27	3	54	0.58	0.17	42	4	106	0.26
Mar-23	1	9	1	27	<1.00	0.06	11	1	35	0.07
Apr-23	1	9	1	27	<1.00	0.06	11	1	45	0.07
Jun-23	2	18	2	46	0.71	0.11	29	3	90	0.18
Jul-23	1	9	1	27	<1.00	0.06	14	1	63	0.09
Aug-23	44	395	180	646	0.15	2.45	498	230	841	3.09
Sep-23	10	89	36	143	0.32	0.55	121	58	201	0.75
Oct-23	1	9	1	27	<1.00	0.06	28	3	79	0.17
Jan-24	2	18	2	46	0.71	0.11	29	3	76	0.18
Feb-24	19	169	71	285	0.23	1.05	270	110	470	1.68

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	176	1,491	669	2,652	0.08	1.87	2,372	1,005	4,240	2.97
Apr-22	389	3,340	2,009	5,177	0.05	4.19	4,968	2,846	7,458	6.23
May-22	14	119	26	230	0.27	0.15	146	41	306	0.18
Jun-22	44	371	84	750	0.15	0.47	498	113	996	0.62
Jul-22	100	853	443	1,398	0.10	1.07	1,357	625	2,463	1.69
Aug-22	6	51	9	102	0.41	0.06	135	27	259	0.17
Sep-22	83	708	503	912	0.11	0.89	1,399	946	1,886	1.75
Nov-22	5	43	9	85	0.45	0.05	73	15	146	0.09
Jan-23	16	136	43	255	0.25	0.17	241	50	600	0.30
Feb-23	35	295	152	456	0.17	0.37	411	184	717	0.52
Mar-23	30	255	153	374	0.18	0.32	321	178	481	0.40
Apr-23	13	112	43	198	0.28	0.14	154	56	285	0.19
May-23	26	222	85	418	0.20	0.28	371	115	717	0.46
Jun-23	18	158	53	289	0.24	0.20	218	71	429	0.27
Jul-23	1	9	1	26	<1.00	0.01	18	2	52	0.02
Aug-23	349	2,961	2,257	3,759	0.05	3.71	3,910	2,892	5,035	4.90
Sep-23	178	1,513	1,148	1,904	0.07	1.90	2,030	1,470	2,599	2.54
Oct-23	9	77	34	129	0.33	0.10	144	63	241	0.18
Nov-23	4	35	9	69	0.50	0.04	46	5	117	0.06
Dec-23	4	34	9	68	0.50	0.04	70	7	146	0.09
Jan-24	45	389	233	562	0.15	0.49	722	399	1,124	0.90
Feb-24	61	515	313	769	0.13	0.65	987	563	1,525	1.24

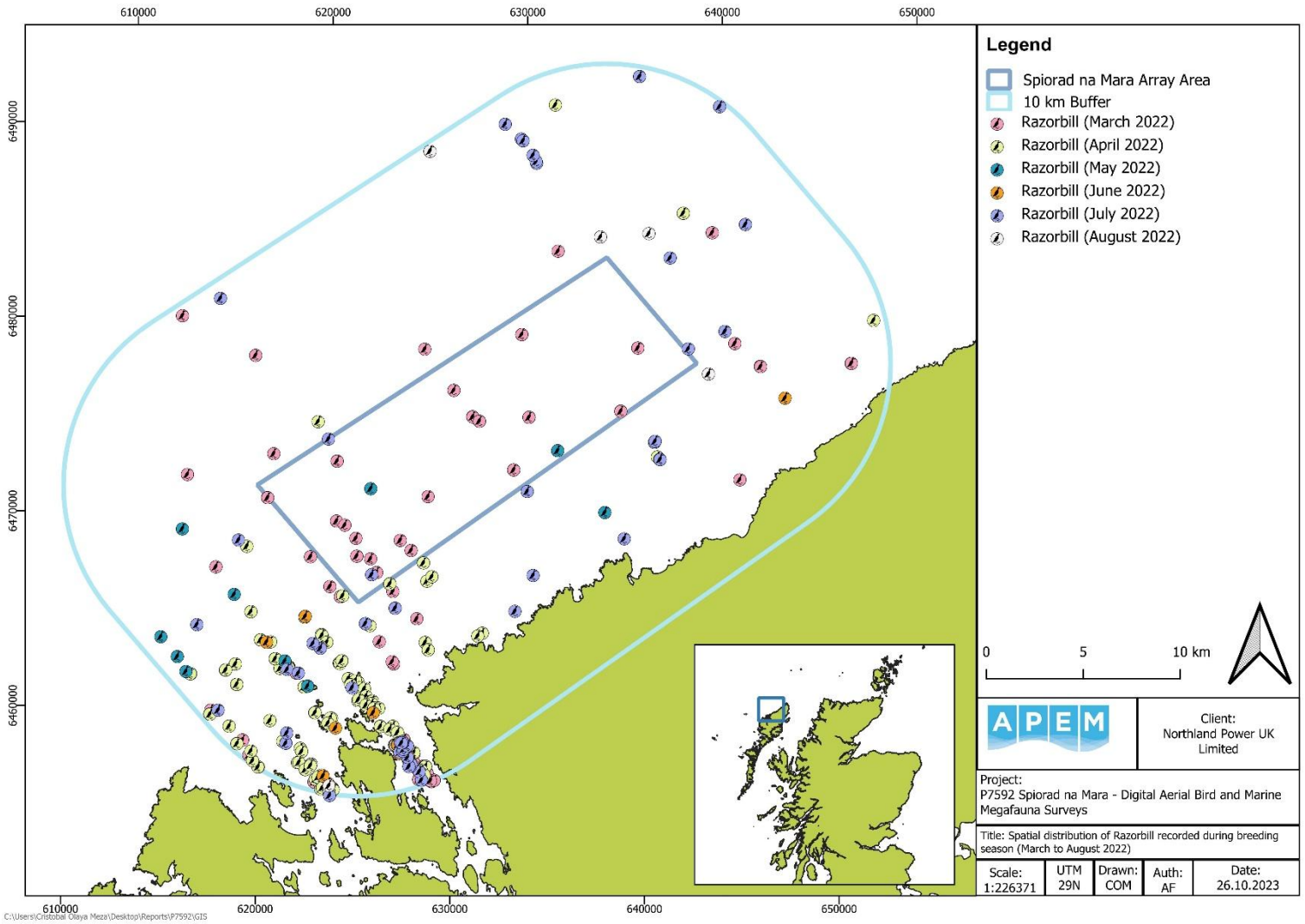


Figure 82 Distribution of razorbill in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

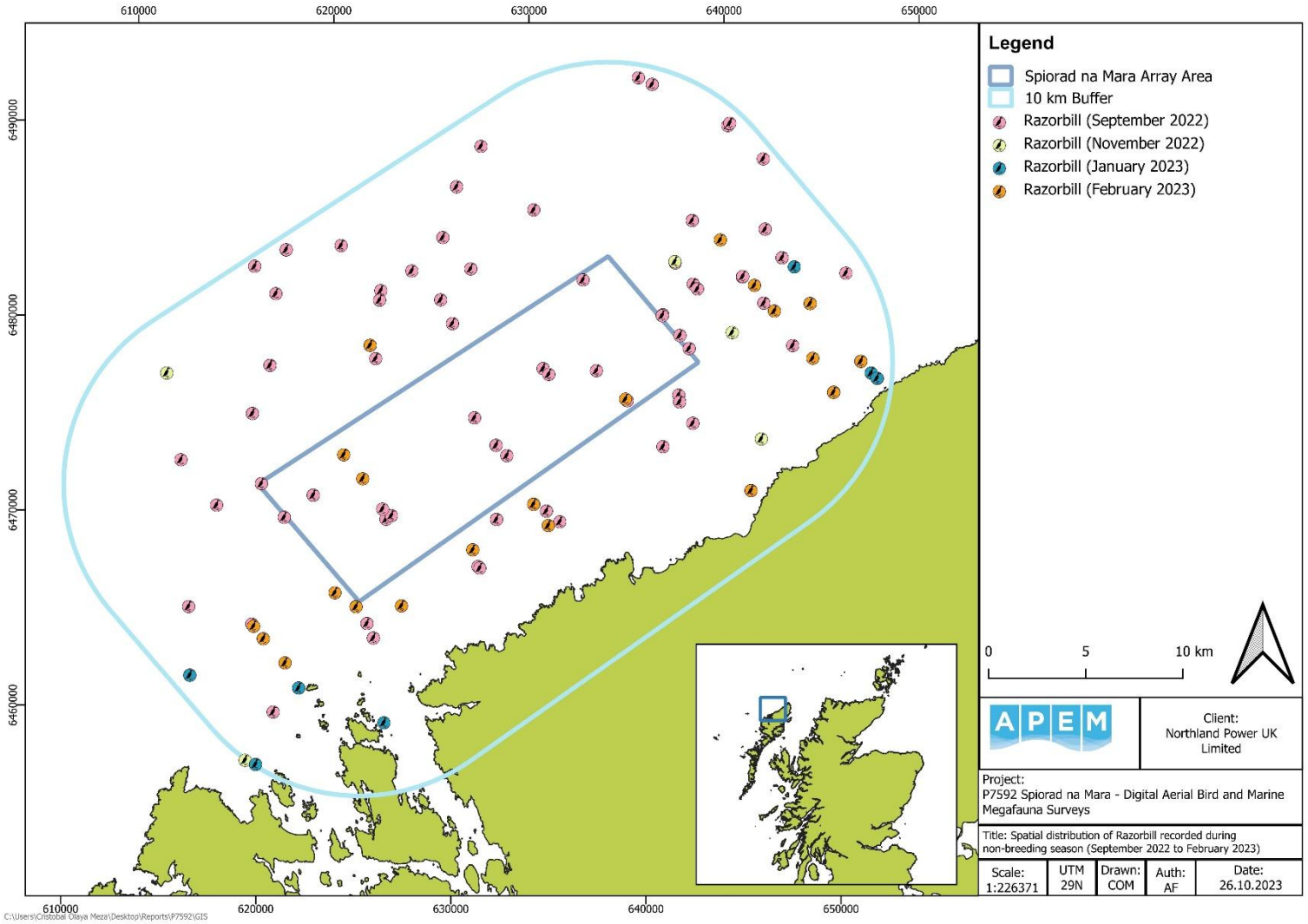


Figure 83 Distribution of razorbill in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

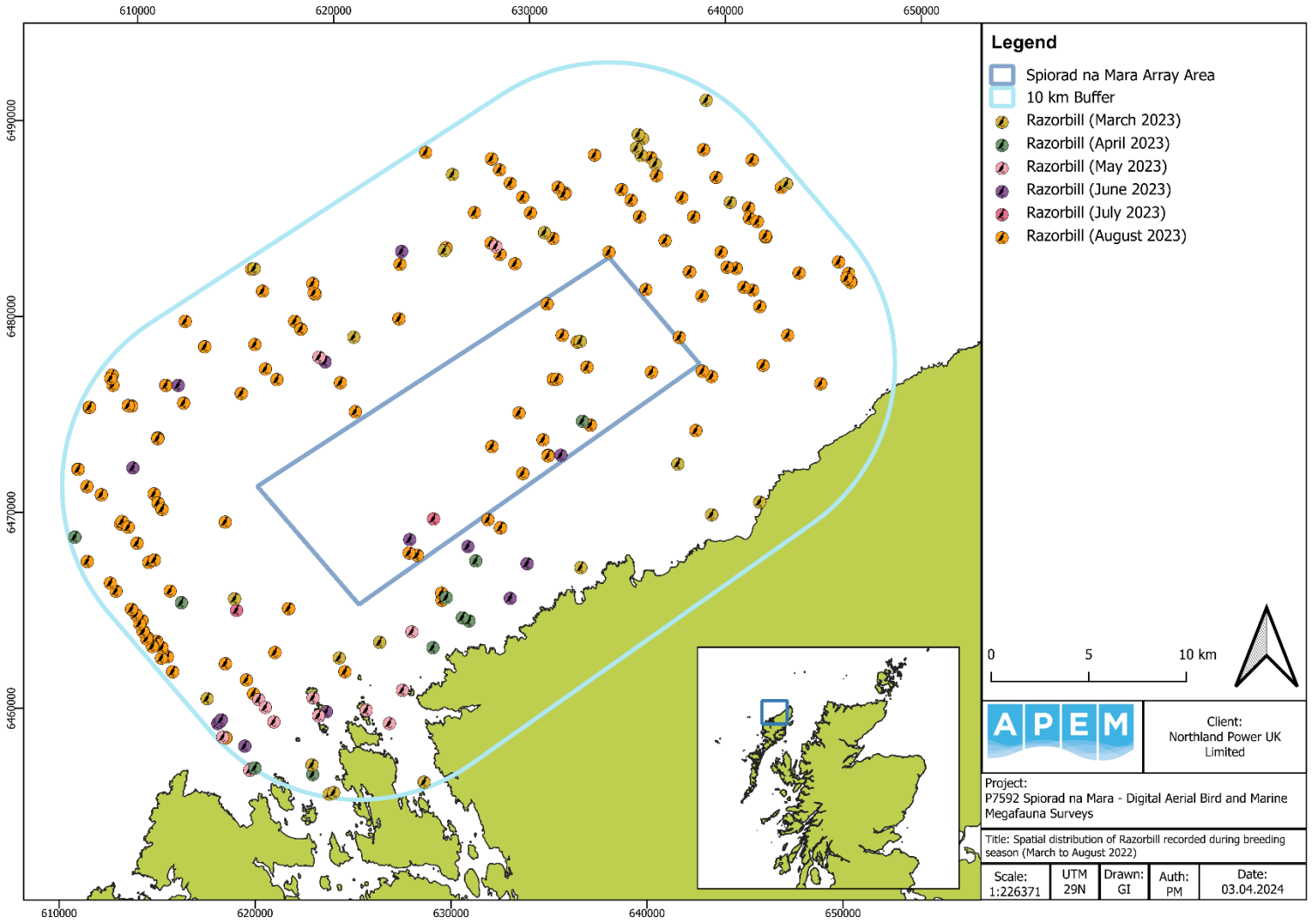


Figure 84 Distribution of razorbill in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

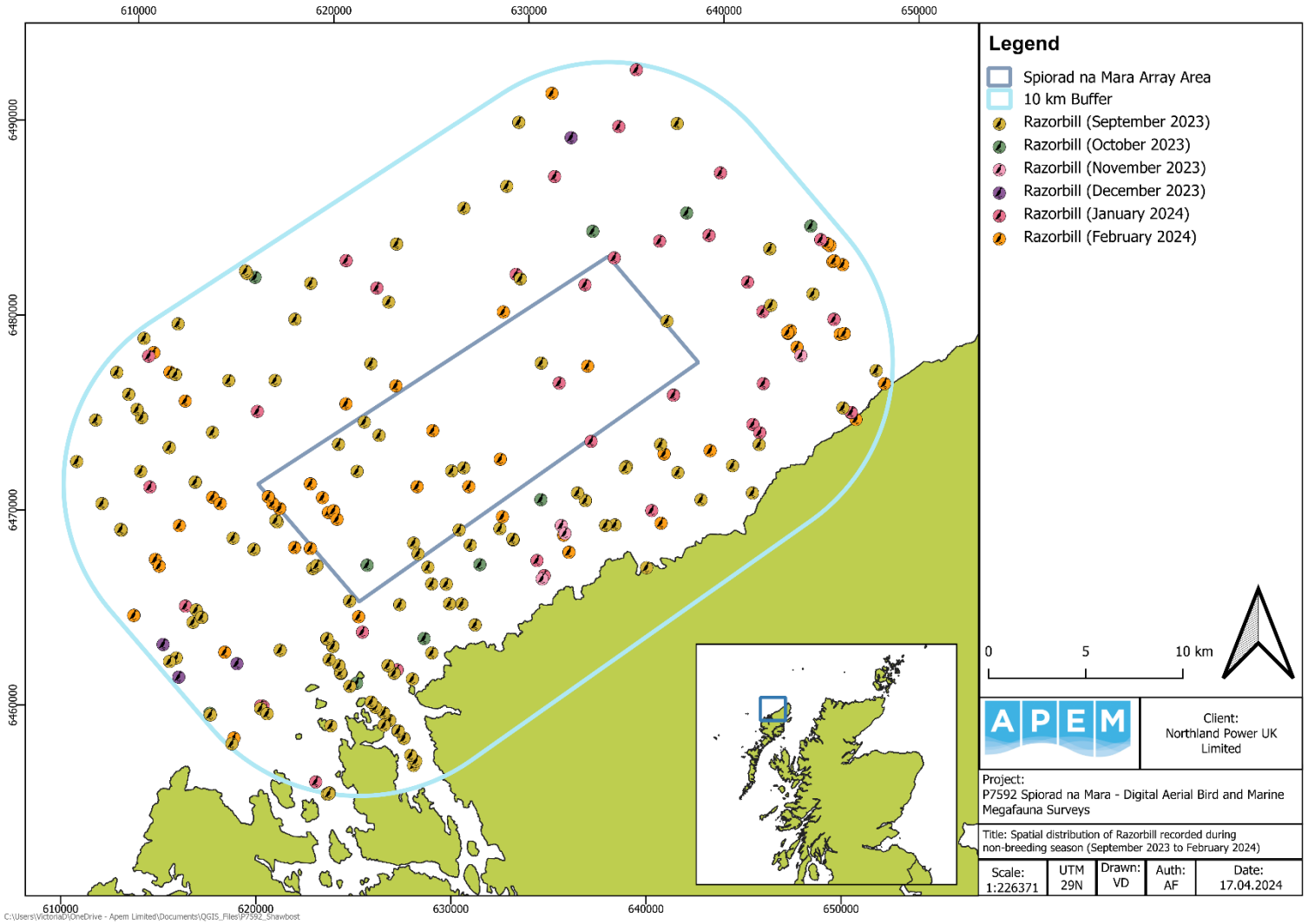
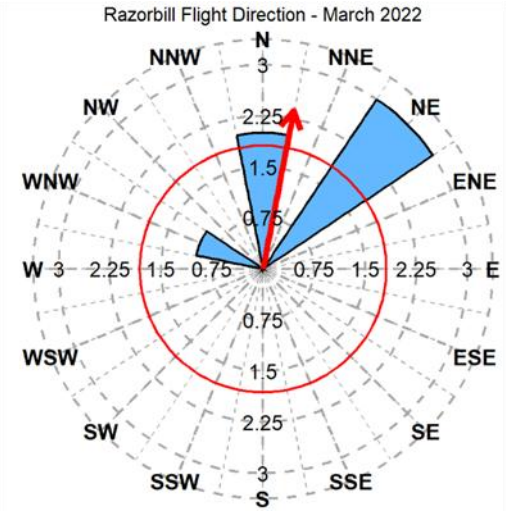


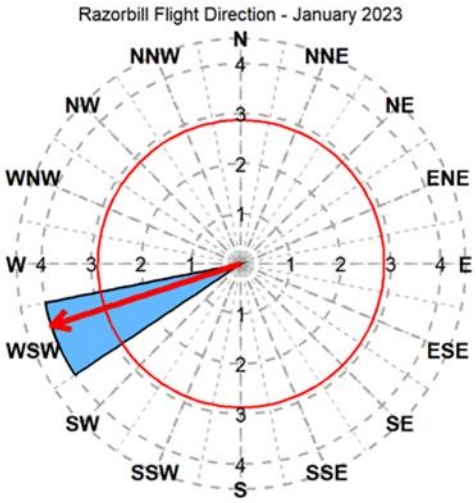
Figure 85 Distribution of razorbill in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



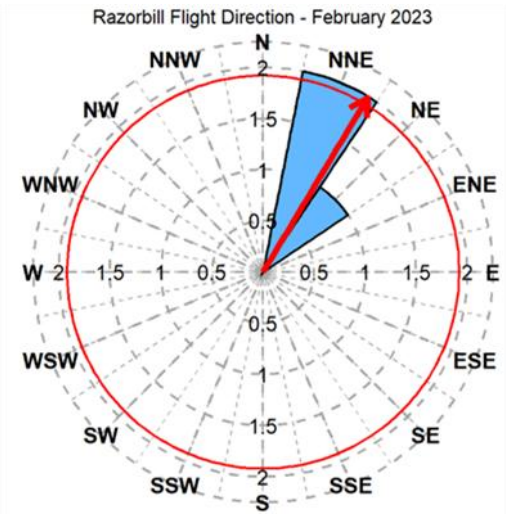
Number of Observations	6
Mean vector	11.916
Length of mean vector (r)	0.789
Rayleigh Test (Z)	3.735
Rayleigh Test (p)	0.016

a. March 2022 (Survey 01)



Number of Observations	4
Mean vector	252.606
Length of mean vector (r)	0.997
Rayleigh Test (Z)	3.976
Rayleigh Test (p)	0.007

b. January 2023 (Survey 11)



Number of Observations	3
Mean vector	31.389
Length of mean vector (r)	0.993
Rayleigh Test (Z)	2.959
Rayleigh Test (p)	0.036

c. February 2023 (Survey 12)

Figure 86 Summary of flight direction of razorbill during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.28 Guillemot / Razorbill

Guillemot / razorbills were recorded in all surveys except for May 2022. Peak abundance occurred in September 2022 with an estimate of 2,624 [95% CL: 2,136, 3,113] within the Survey Area equating to 2.74 birds/km^2 (**Table 38**). During the 2022 breeding season, individuals were found in higher concentrations in the southwest of the 10 km Buffer Zone, in close proximity to the coastline (**Figure 87**), whereas in the 2023 breeding season, individuals were scattered across the Survey Area (**Figure 89**). During the non-breeding seasons, guillemot / razorbills were wildly distributed throughout the Survey Area (**Figure 88** and **Figure 90).**

In July 2022, guillemot / razorbills had a significant predominant direction of flight towards the east-southeast (**Figure 91a**). In January 2023, guillemot / razorbills had a significant predominant direction of flight towards the southeast (**Figure 91b**).

Table 38 Apportioned abundance and density estimates (birds per km^2) of guillemot / razorbills in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	161	1,380	1,003	1,800	0.08	1.44	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	135	1,171	824	1,622	0.09	1.22				
Jun-22	14	119	42	221	0.27	0.12				
Jul-22	65	558	198	1,142	0.12	0.58				
Aug-22	41	352	206	515	0.16	0.37				
Sep-22	306	2,627	2,155	3,099	0.06	2.74				
Oct-22	15	131	70	201	0.26	0.14				
Nov-22	7	60	17	112	0.38	0.06				
Dec-22	6	52	9	104	0.41	0.05				
Jan-23	44	378	232	575	0.15	0.39				
Feb-23	25	213	111	324	0.20	0.22				
Mar-23	9	77	26	137	0.33	0.08				
Apr-23	18	156	78	243	0.24	0.16				
May-23	23	199	78	346	0.21	0.21				
Jun-23	4	35	9	71	0.50	0.04				
Jul-23	18	156	35	330	0.24	0.16				
Aug-23	56	480	317	668	0.13	0.50				
Sep-23	63	540	386	703	0.13	0.56				
Oct-23	22	190	104	277	0.21	0.20				
Nov-23	4	35	4	79	0.50	0.04				
Dec-23	19	164	86	250	0.23	0.17				
Jan-24	70	612	428	795	0.12	0.64				
Feb-24	85	724	503	972	0.11	0.76				
b) Spiorad na Mara Array Area										
Month		Total unapportioned					Total apportioned			

	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	61	554	282	881	0.13	3.44	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	5	46	5	110	0.45	0.29				
Jul-22	7	62	7	169	0.38	0.38				
Aug-22	3	27	3	62	0.58	0.17				
Sep-22	83	738	516	1,013	0.11	4.58				
Oct-22	3	27	3	64	0.58	0.17				
Dec-22	1	9	1	27	<1.00	0.06				
Feb-23	2	18	2	45	0.71	0.11				
Mar-23	1	9	1	27	<1.00	0.06				
Apr-23	3	27	3	73	0.58	0.17				
May-23	3	28	3	64	0.58	0.17				
Jul-23	2	18	2	55	0.71	0.11				
Aug-23	3	27	3	63	0.58	0.17				
Sep-23	6	54	18	98	0.41	0.33				
Oct-23	4	36	4	81	0.50	0.22				
Dec-23	2	18	2	45	0.71	0.11				
Jan-24	4	37	4	92	0.50	0.23				
Feb-24	9	80	27	142	0.33	0.50				

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	100	847	568	1,161	0.10	1.06	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	130	1,116	756	1,520	0.09	1.40				
Jun-22	14	118	42	211	0.27	0.15				
Jul-22	58	495	153	1125	0.13	0.62				
Aug-22	38	324	179	487	0.16	0.41				
Sep-22	223	1,901	1,518	2,302	0.07	2.38				
Oct-22	12	104	43	173	0.29	0.13				
Nov-22	7	60	26	103	0.38	0.08				
Dec-22	5	43	9	86	0.45	0.05				
Jan-23	44	374	204	544	0.15	0.47				
Feb-23	23	194	110	287	0.21	0.24				
Mar-23	8	68	26	128	0.35	0.09				
Apr-23	15	129	60	207	0.26	0.16				
May-23	20	171	60	316	0.22	0.21				
Jun-23	4	35	9	79	0.50	0.04				
Jul-23	16	137	26	301	0.25	0.17				
Aug-23	53	450	297	619	0.14	0.56				
Sep-23	57	485	349	638	0.13	0.61				
Oct-23	18	154	86	232	0.24	0.19				
Nov-23	4	35	4	78	0.50	0.04				
Dec-23	17	145	68	230	0.24	0.18				

Jan-24	66	571	398	769	0.12	0.72
Feb-24	76	642	423	896	0.11	0.81

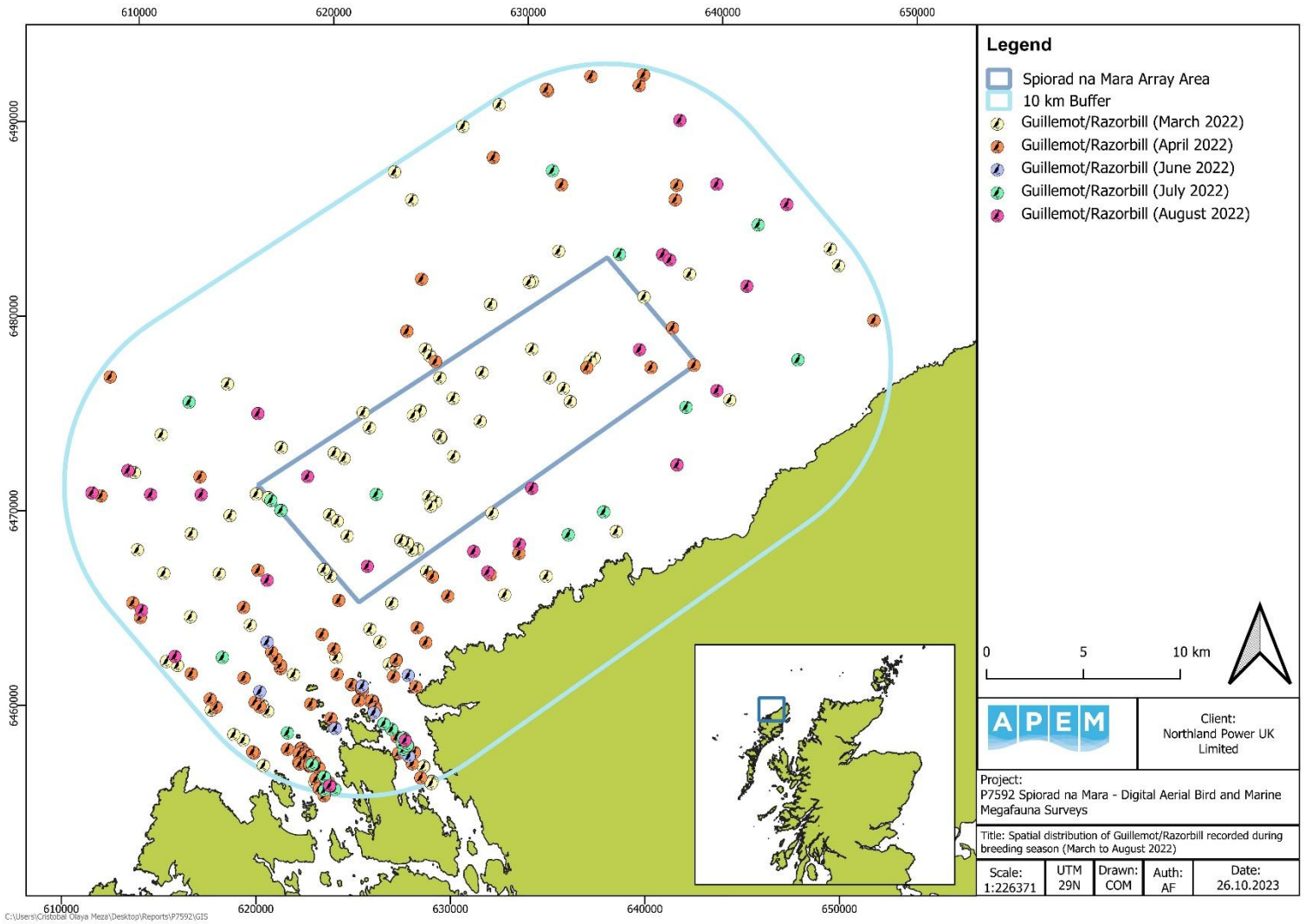


Figure 87 Distribution of guillemot / razorbills in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

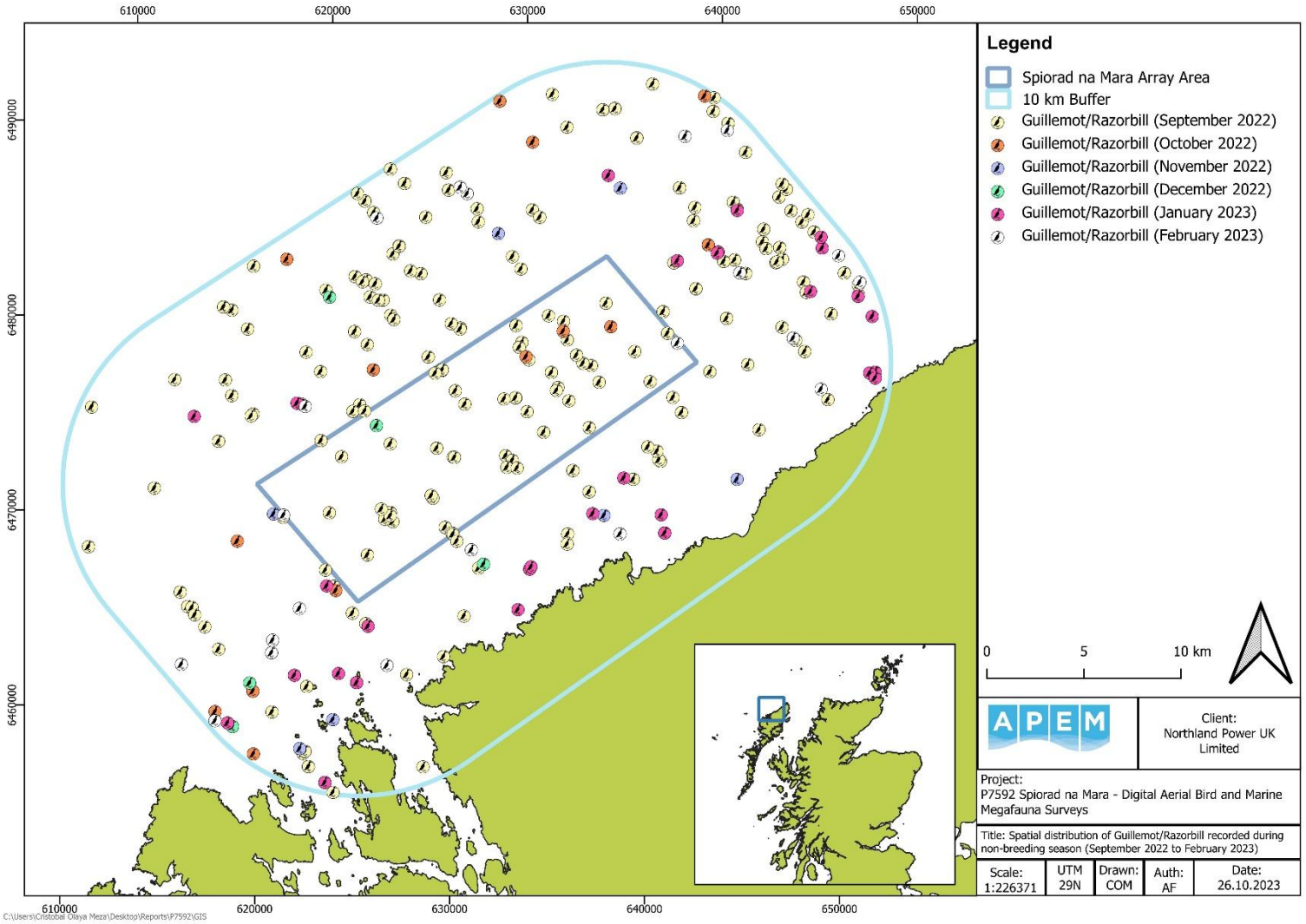


Figure 88 Distribution of guillemot / razorbills in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

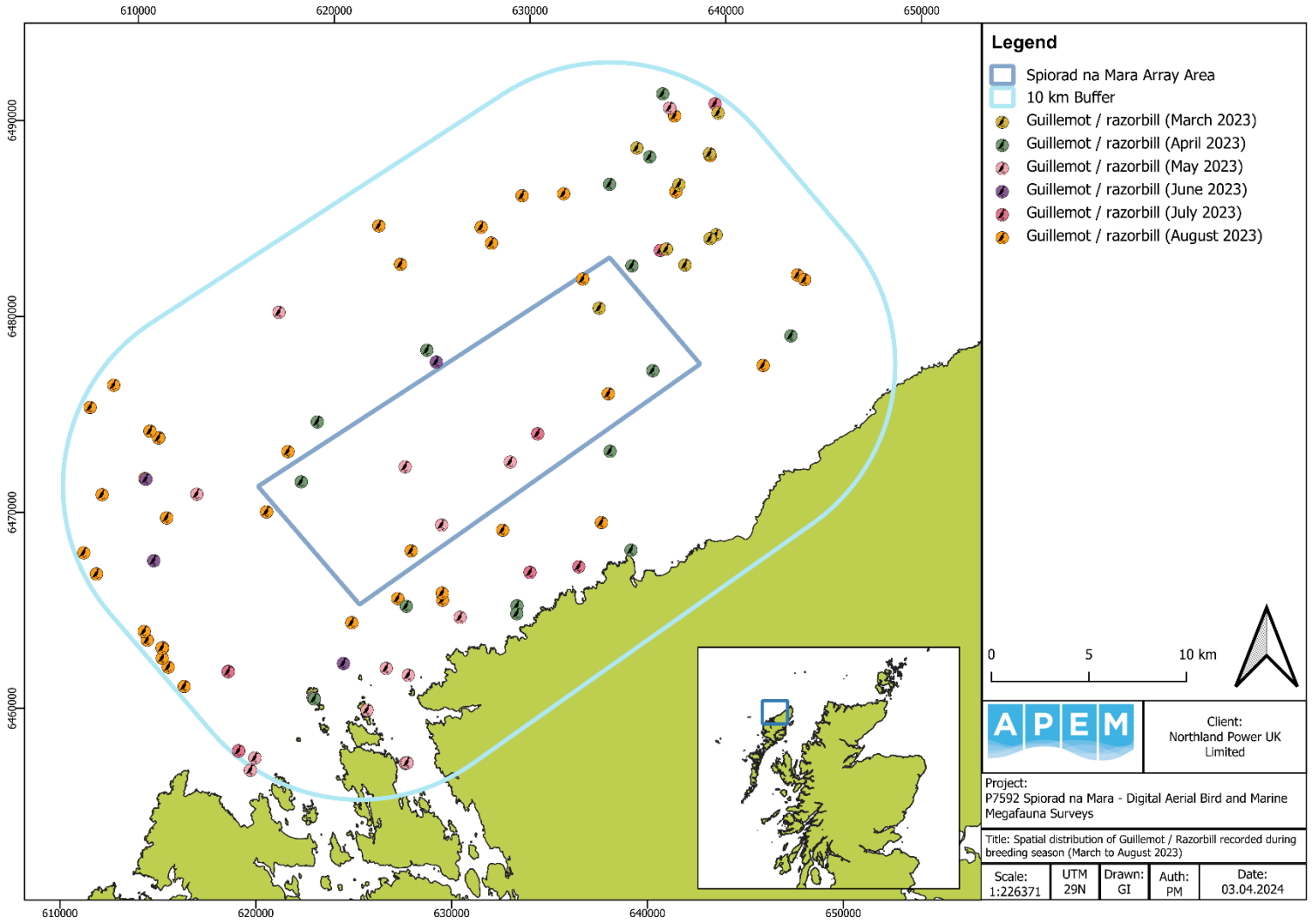


Figure 89 Distribution of guillemot / razorbills in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

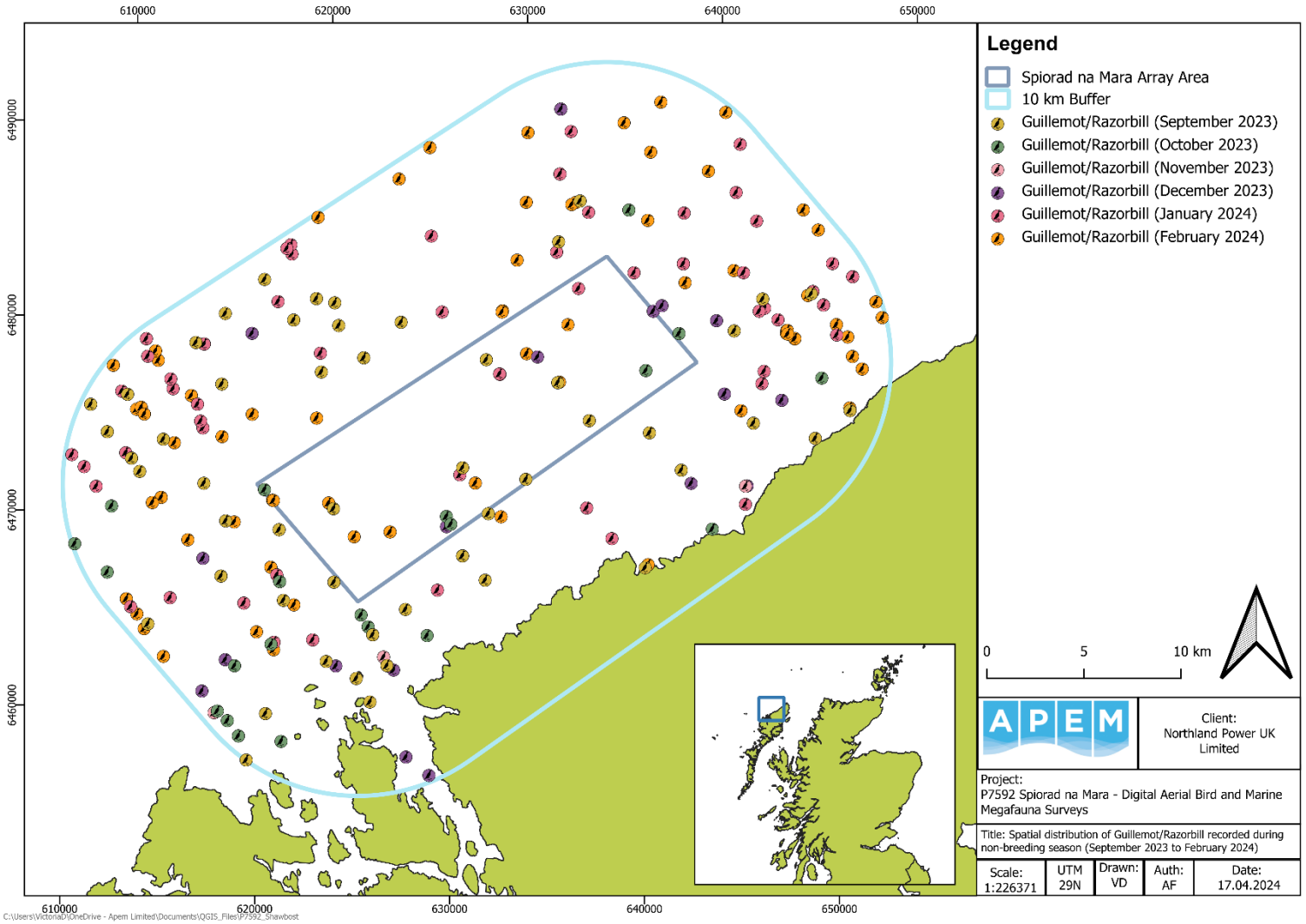
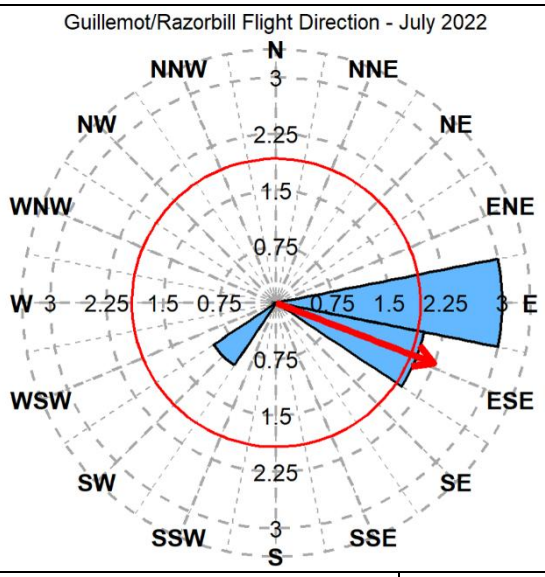
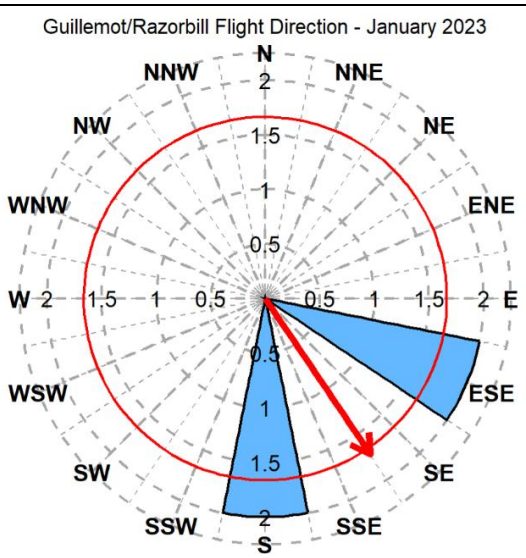


Figure 90 Distribution of guillemot / razorbills in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping





Number of Observations	6	Number of Observations	4
Mean vector	111.080	Mean vector	146.808
Length of mean vector (r)	0.746	Length of mean vector (r)	0.860
Rayleigh Test (Z)	3.340	Rayleigh Test (Z)	2.958
Rayleigh Test (p)	0.028	Rayleigh Test (p)	0.041
a. July 2022 (Survey 05)		**b. January 2023 (Survey 11)**	

Figure 91 Summary of flight direction of guillemot / razorbills during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.29 Black guillemot - *Cepphus grille*

Black guillemots were recorded in all survey months except May, August, and September 2022. Peak abundance occurred in July 2022 with an abundance estimate of 418 [95% CL: 227, 714] within the Survey Area equating to 0.44 birds/km^2 (**Table 39**). Overall, in breeding and non-breeding seasons, black guillemots were primarily recorded outside the Spiorad na Mara Array Area within the 10 km Buffer adjacent to the coastline (**Figure 92** to **Figure 95**).

No significant flight directions were recorded for black guillemots during the survey period.

Table 39 Apportioned abundance and density estimates (birds per km^2) of black guillemot in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	7	60	17	120	0.38	0.06	64	18	130	0.07
Apr-22	34	295	61	685	0.17	0.31	310	56	742	0.32
Jun-22	12	102	12	305	0.29	0.11	103	12	300	0.11
Jul-22	45	387	215	601	0.15	0.40	419	210	684	0.44
Oct-22	7	61	17	105	0.38	0.06	65	17	114	0.07
Nov-22	1	9	1	34	<1.00	0.01	9	1	26	0.01
Dec-22	4	35	9	70	0.50	0.04	36	9	73	0.04
Jan-23	3	26	3	60	0.58	0.03	27	3	63	0.03
Feb-23	3	26	3	60	0.58	0.03	27	3	64	0.03
Mar-23	14	120	51	197	0.27	0.13	121	60	200	0.13
Apr-23	5	43	9	87	0.45	0.04	45	9	92	0.05
May-23	14	121	35	233	0.27	0.13	133	36	269	0.14
Jun-23	1	9	1	27	<1.00	0.01	10	1	31	0.01
Jul-23	2	17	2	43	0.71	0.02	22	2	63	0.02
Aug-23	5	43	9	86	0.45	0.04	43	9	88	0.05
Sep-23	8	69	17	137	0.35	0.07	71	17	143	0.07
Oct-23	10	86	35	164	0.32	0.09	89	36	165	0.09
Nov-23	8	70	17	140	0.35	0.07	70	26	131	0.07
Jan-24	21	183	114	280	0.22	0.19	197	110	297	0.21
Feb-24	7	60	26	111	0.38	0.06	67	18	127	0.07
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	1	9	1	27	<1.00	0.06	9	1	29	0.06
Oct-23	1	9	1	27	<1.00	0.06	11	1	35	0.07
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	7	59	17	119	0.38	0.07	64	18	120	0.08
Apr-22	34	292	60	635	0.17	0.37	305	46	706	0.38

Jun-22	12	101	12	295	0.29	0.13	102	12	298	0.13
Jul-22	44	375	205	588	0.15	0.47	408	200	675	0.51
Oct-22	7	61	17	113	0.38	0.08	66	18	125	0.08
Nov-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Dec-22	4	34	9	69	0.50	0.04	35	9	72	0.04
Jan-23	3	25	3	60	0.58	0.03	26	3	64	0.03
Feb-23	3	25	3	59	0.58	0.03	26	3	63	0.03
Mar-23	14	119	51	196	0.27	0.15	120	60	190	0.15
Apr-23	5	43	9	86	0.45	0.05	44	9	91	0.06
May-23	14	120	34	239	0.27	0.15	133	35	259	0.17
Jun-23	1	9	1	26	<1.00	0.01	10	1	30	0.01
Jul-23	2	17	2	43	0.71	0.02	22	2	73	0.03
Aug-23	5	42	8	85	0.45	0.05	43	8	87	0.05
Sep-23	8	68	17	136	0.35	0.09	70	17	142	0.09
Oct-23	9	77	26	146	0.33	0.10	78	26	149	0.10
Nov-23	8	69	17	130	0.35	0.09	69	17	121	0.09
Jan-24	21	182	104	268	0.22	0.23	197	111	305	0.25
Feb-24	7	59	17	101	0.38	0.07	66	19	128	0.08

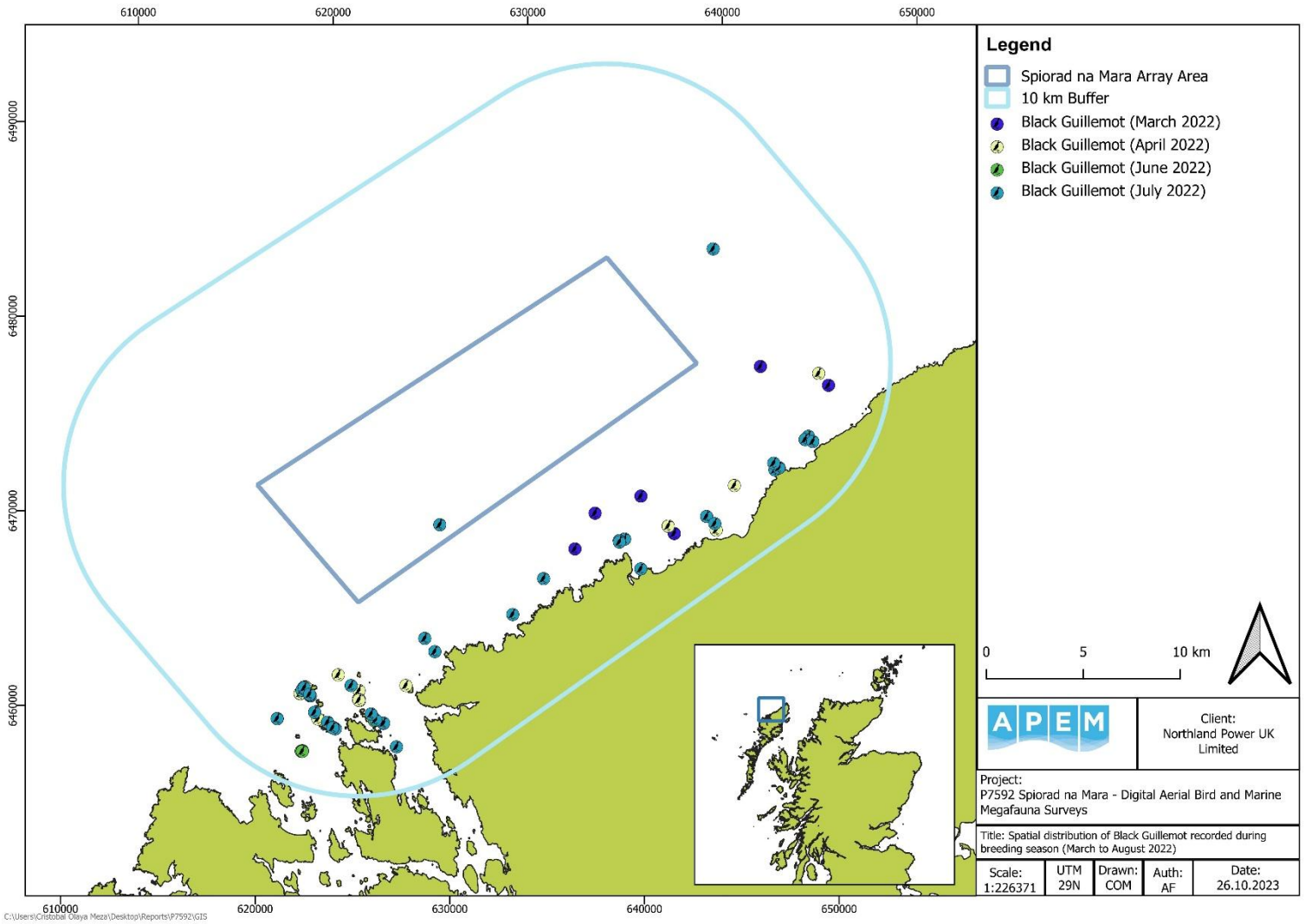


Figure 92 Distribution of black guillemot in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

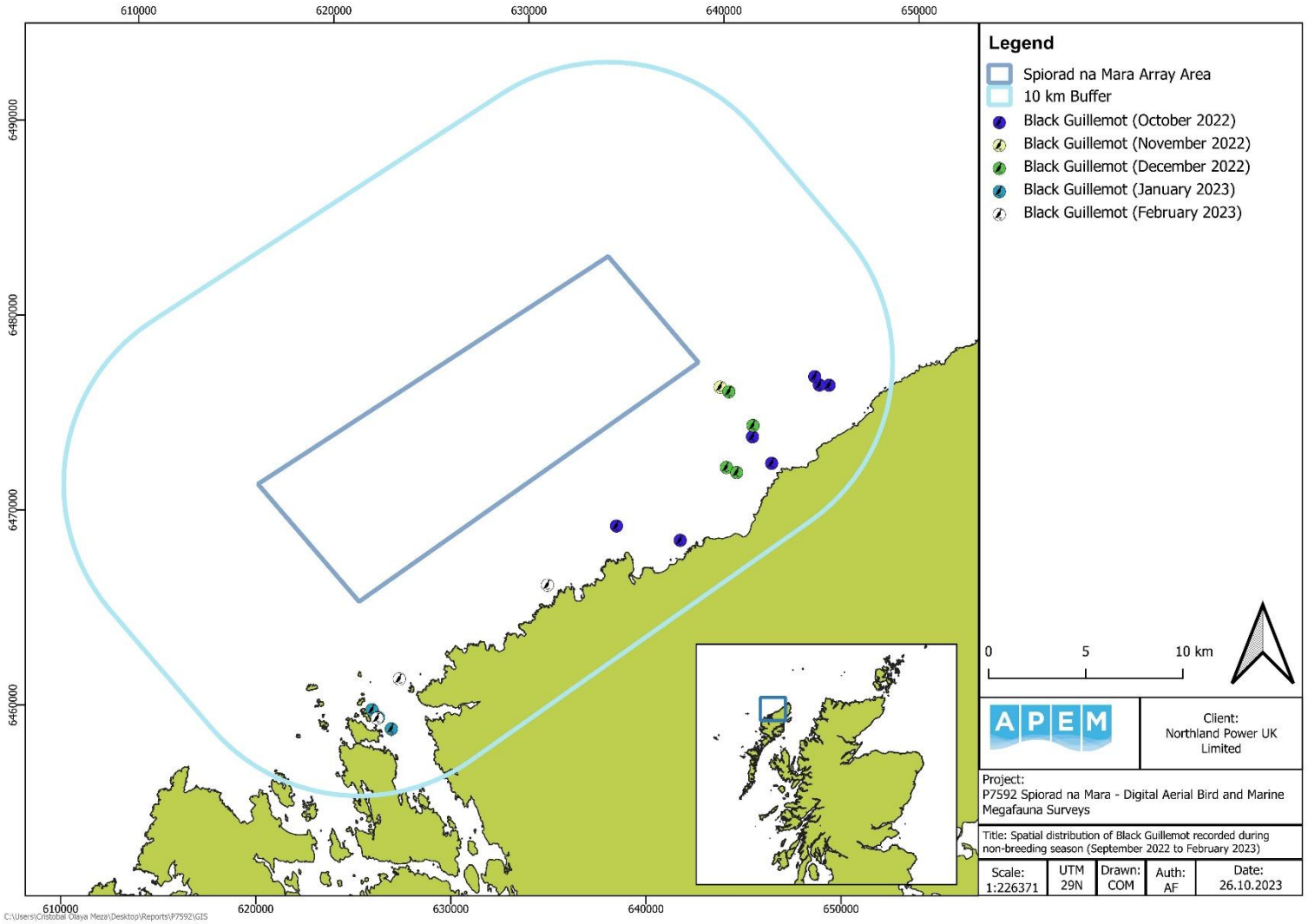


Figure 93 Distribution of black guillemot in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

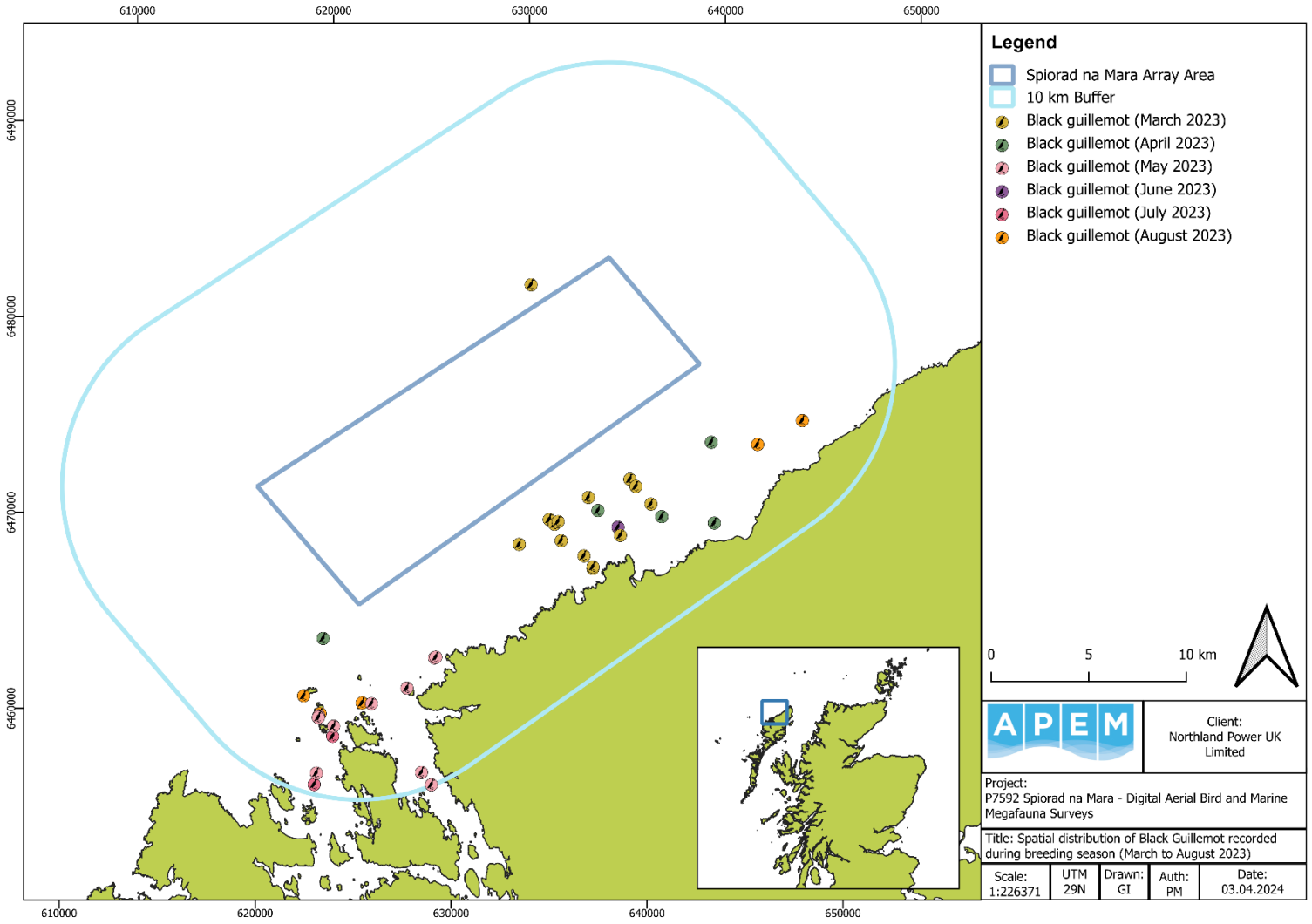


Figure 94 Distribution of black guillemot in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

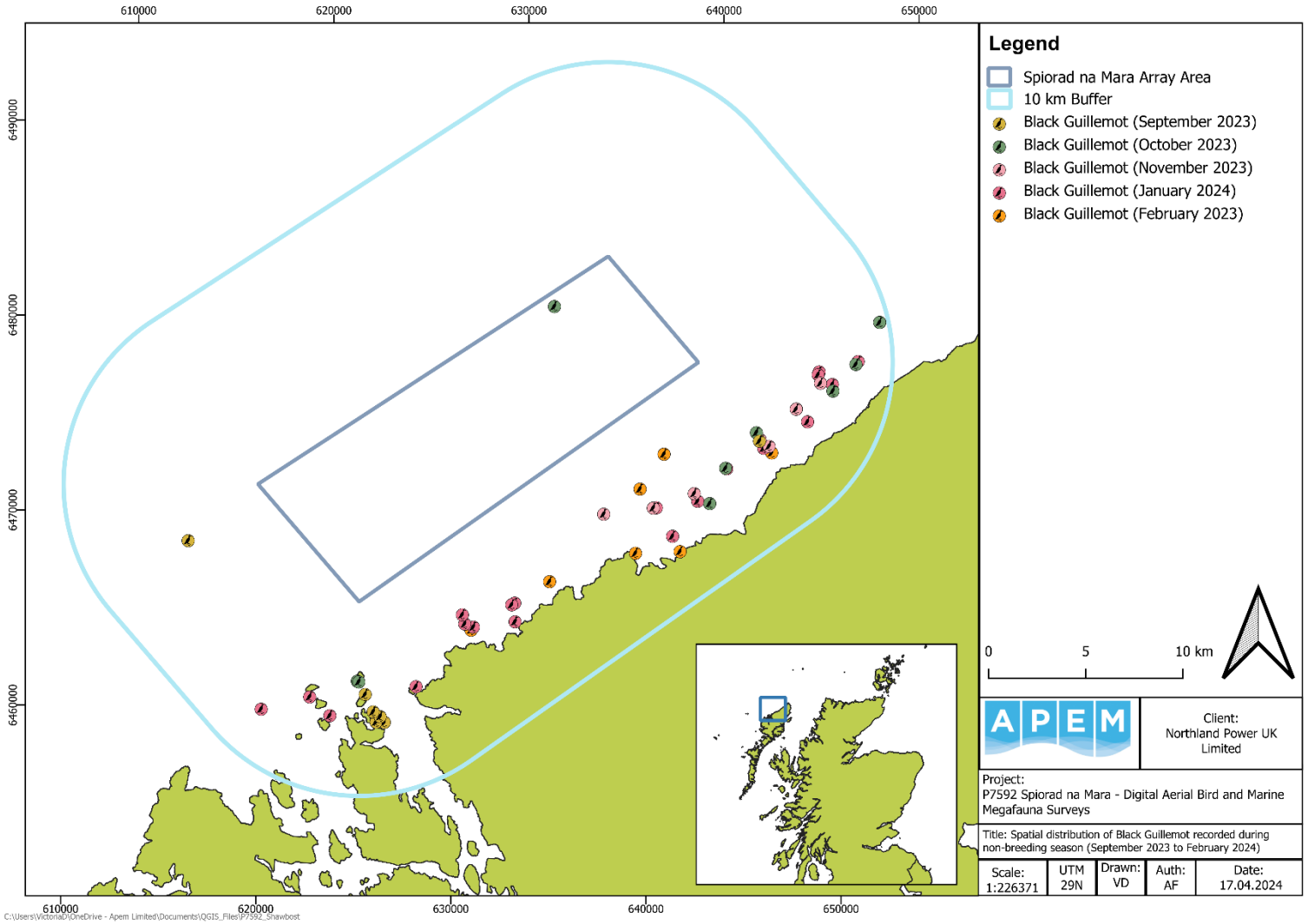


Figure 95 Distribution of black guillemot in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.30 Puffin - *Fratercula arctica*

Puffins were recorded in all months throughout the survey period, except for November 2022, and January, February, and December 2023. Peak abundance occurred in July 2022 with an estimate of 24,604 [95% CL: 18,191, 32,989] within the Survey Area equating to 25.66 birds/km^2 (**Table 40**). The number of puffins was notably higher during the breeding season.

Puffins were recorded across the Survey Area with higher densities occurring in the northeast during the 2022 breeding season and the 2022/23 non-breeding season (**Figure 96** and **Figure 97**). Similarly, during the 2023 breeding season, puffins were observed in higher concentrations in the northeast of the Survey Area as well as the southwest (**Figure 98**). In the 2023/24 non-breeding season, puffins were more loosely distributed with a shift in distribution towards the south and southwest of the 10 km Buffer (**Figure 99**).

In July 2022 and April 2023, a significant predominant direction of flight was recorded to the east-northeast and east (**Figure 100a-b**).

Table 40 Corrected apportioned abundance and density estimates (birds per km^2) of puffins in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	9	1	26	<1.00	0.01	11	1	33	0.01
Apr-22	60	520	304	763	0.13	0.54	605	278	1,034	0.63
May-22	4	34	4	86	0.50	0.04	40	5	102	0.04
Jun-22	2	17	2	51	0.71	0.02	20	2	60	0.02
Jul-22	2,339	20,092	16,536	24,259	0.02	20.92	24,657	18,045	32,506	25.66
Aug-22	19	163	77	258	0.23	0.17	201	91	335	0.21
Sep-22	126	1,082	773	1,434	0.09	1.13	1,529	1,081	2,044	1.60
Oct-22	11	96	35	166	0.30	0.10	119	42	209	0.12
Dec-22	10	87	43	148	0.32	0.09	103	41	179	0.11
Mar-23	6	51	9	103	0.41	0.05	60	10	133	0.06
Apr-23	63	547	313	808	0.13	0.57	601	267	1,021	0.63
May-23	12	104	43	164	0.29	0.11	124	29	247	0.13
Jun-23	74	655	407	964	0.12	0.68	844	472	1,331	0.88
Jul-23	109	946	659	1,267	0.10	0.99	1,198	696	1,781	1.25
Aug-23	253	2,167	1,713	2,629	0.06	2.26	2,553	2,044	3,149	2.66
Sep-23	95	814	643	1,003	0.10	0.85	980	748	1,205	1.02
Oct-23	57	493	346	657	0.13	0.51	597	410	812	0.62
Nov-23	11	96	44	157	0.30	0.10	112	51	183	0.12
Jan-24	5	44	9	87	0.45	0.05	55	11	101	0.06
Feb-24	4	34	4	68	0.50	0.04	44	11	90	0.05
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	9	1	36	<1.00	0.06	10	1	31	0.07

Apr-22	3	27	3	82	0.58	0.17	42	4	173	0.26
Jul-22	463	4,130	2,525	6,102	0.05	25.61	4,895	2,470	7,970	30.35
Aug-22	0	0	0	0	0.00	0.00	4	0	11	0.02
Sep-22	18	160	53	284	0.24	0.99	210	79	390	1.30
Oct-22	5	45	9	100	0.45	0.28	52	10	117	0.33
Apr-23	25	227	73	418	0.20	1.41	243	51	519	1.50
Jun-23	5	46	5	120	0.45	0.29	54	6	129	0.33
Jul-23	16	146	46	283	0.25	0.91	170	18	390	1.05
Aug-23	20	180	72	314	0.22	1.12	210	84	366	1.30
Sep-23	9	81	36	134	0.33	0.50	98	42	166	0.61
Oct-23	8	72	27	126	0.35	0.45	105	34	188	0.65
Nov-23	2	18	2	46	0.71	0.11	21	2	54	0.13

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	57	489	283	756	0.13	0.61	564	254	983	0.71
May-22	4	34	4	77	0.50	0.04	40	5	92	0.05
Jun-22	2	17	2	51	0.71	0.02	20	2	79	0.02
Jul-22	1,876	15,995	12,576	19,593	0.02	20.01	19,806	14,041	26,849	24.77
Aug-22	19	162	77	256	0.23	0.20	196	91	327	0.25
Sep-22	108	921	665	1,270	0.10	1.16	1,327	900	1,802	1.66
Oct-22	6	52	9	104	0.41	0.07	65	11	145	0.08
Dec-22	10	86	43	147	0.32	0.11	102	50	168	0.13
Mar-23	6	51	9	102	0.41	0.06	60	11	121	0.08
Apr-23	38	327	155	534	0.16	0.41	366	132	664	0.46
May-23	12	102	43	171	0.29	0.13	122	29	242	0.15
Jun-23	69	605	360	877	0.12	0.76	782	405	1,188	0.98
Jul-23	93	799	507	1,108	0.10	1.00	1,019	553	1,564	1.28
Aug-23	233	1,977	1,561	2,384	0.07	2.48	2,331	1,838	2,903	2.92
Sep-23	86	731	553	927	0.11	0.92	880	660	1,124	1.10
Oct-23	49	420	283	575	0.14	0.53	495	341	714	0.62
Nov-23	9	78	35	130	0.33	0.10	91	41	151	0.11
Jan-24	5	43	9	86	0.45	0.05	54	11	110	0.07
Feb-24	4	34	8	76	0.50	0.04	45	10	92	0.06

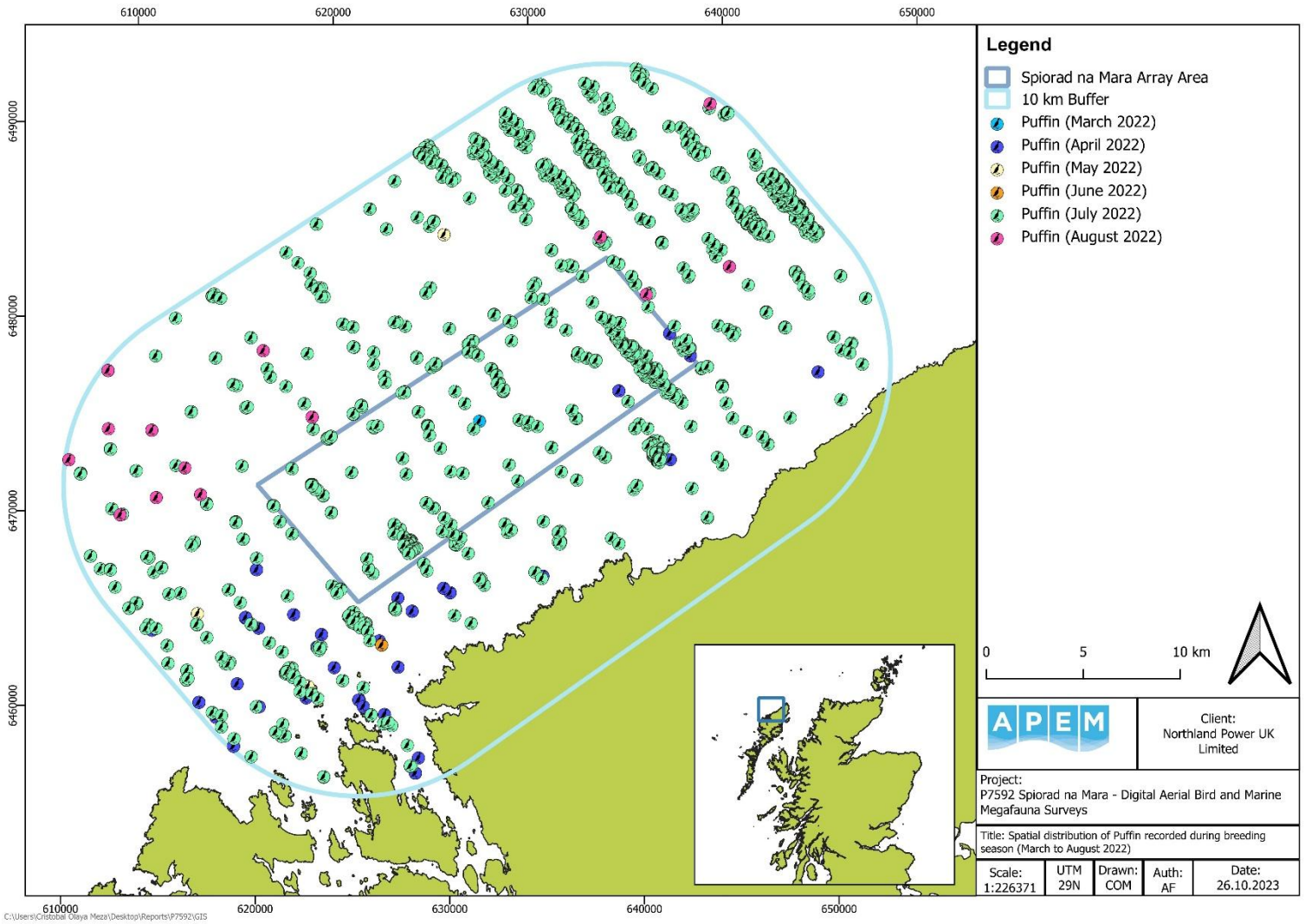


Figure 96 Distribution of puffin in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

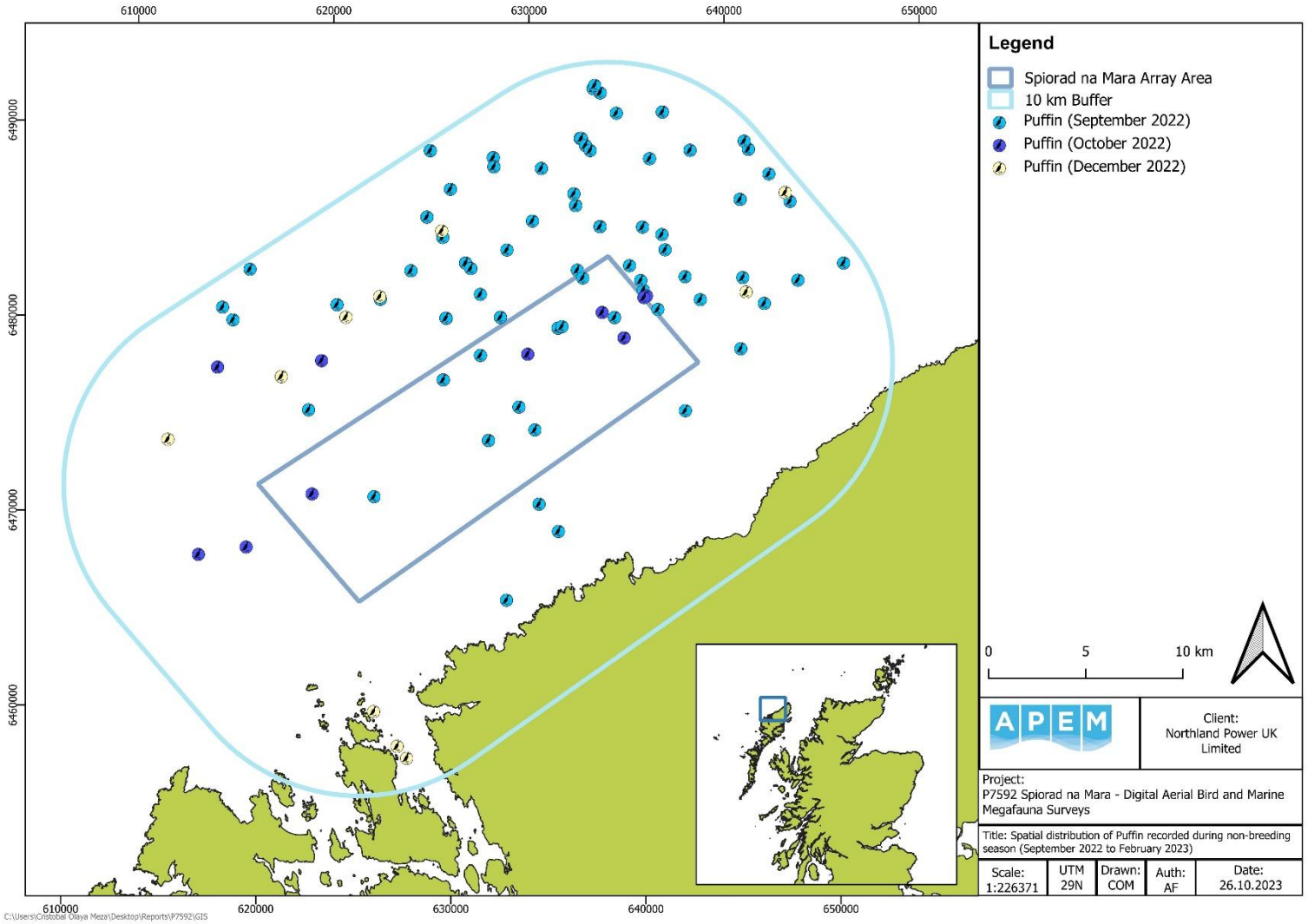


Figure 97 Distribution of puffin in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

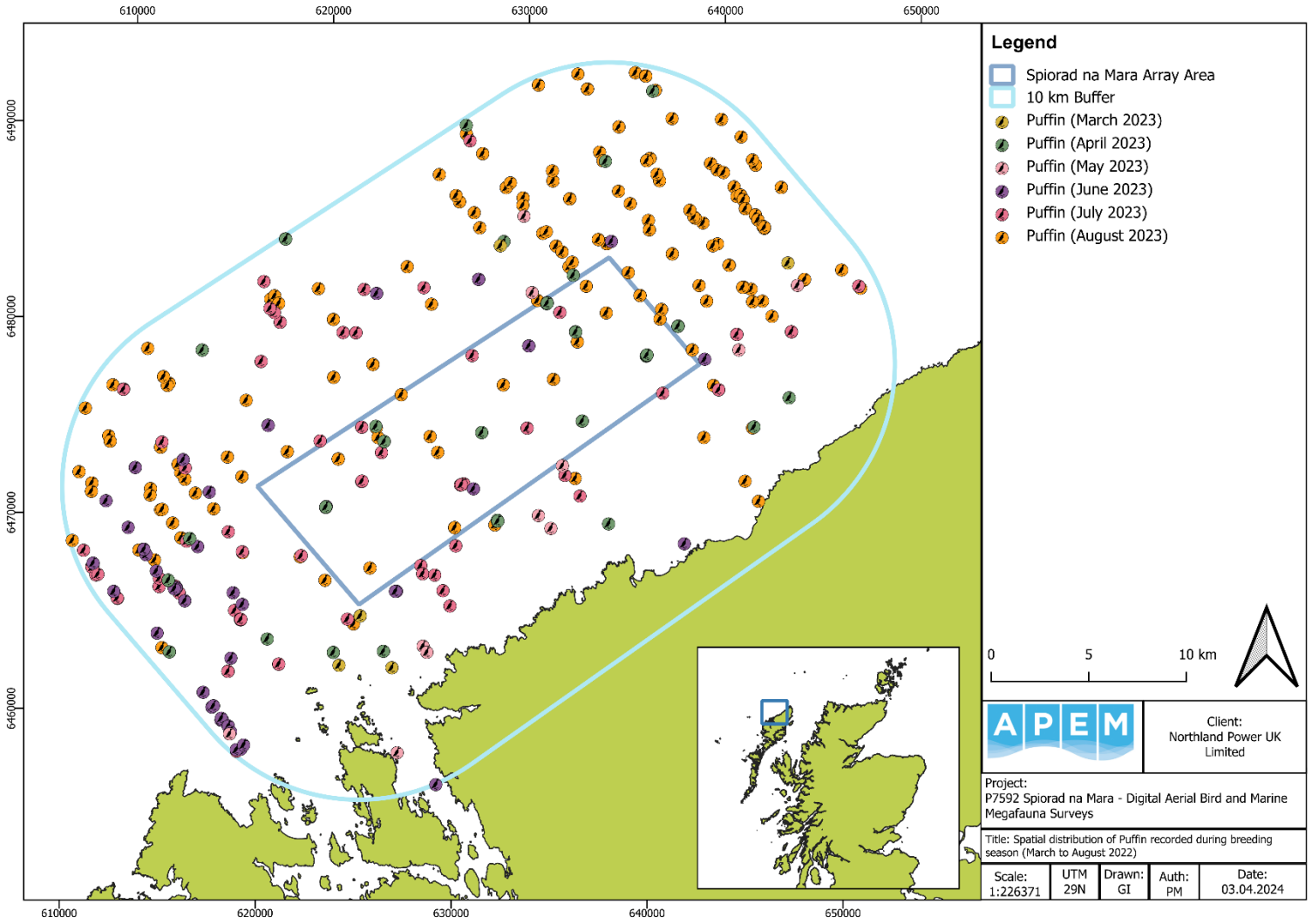


Figure 98 Distribution of puffin in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

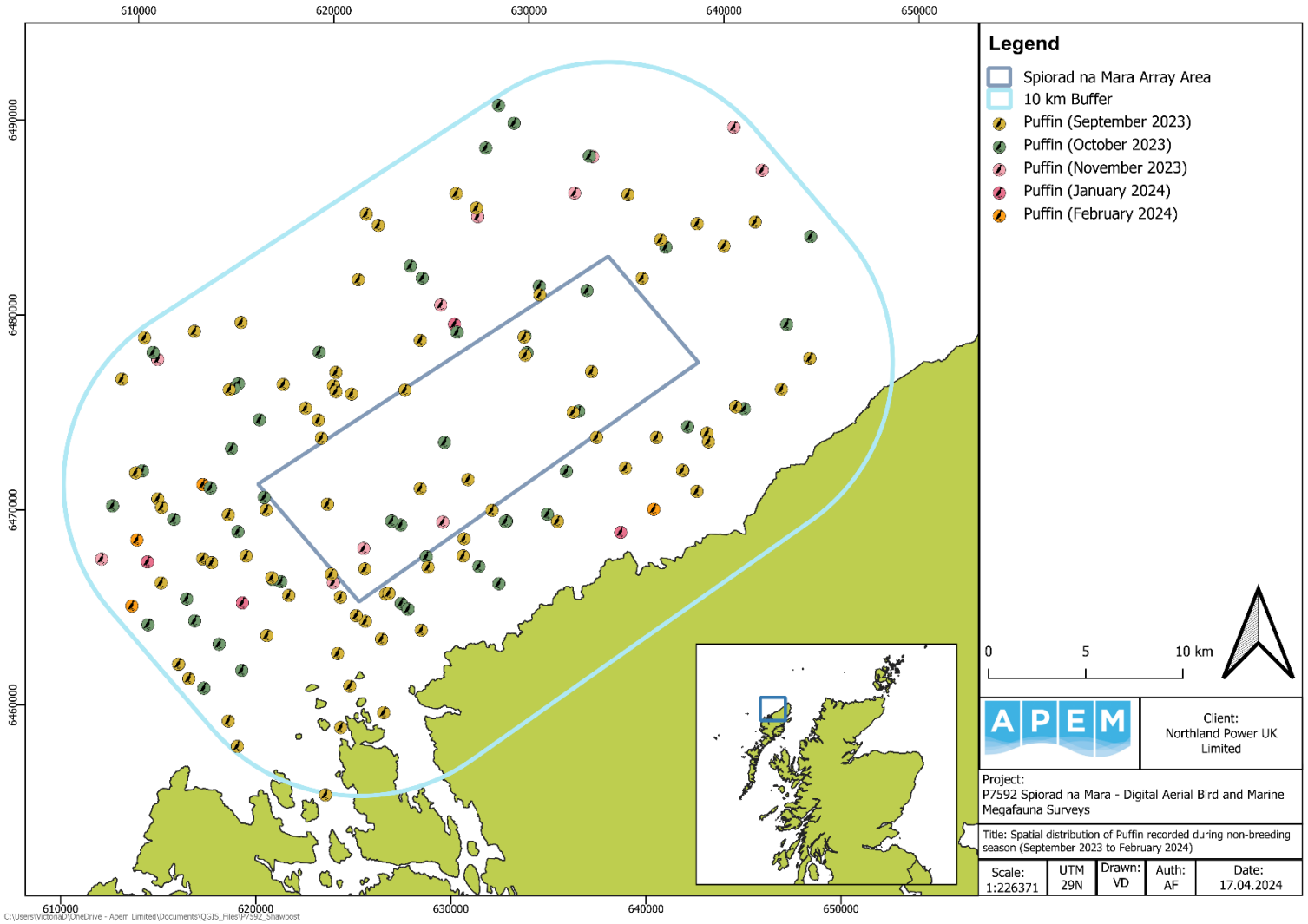
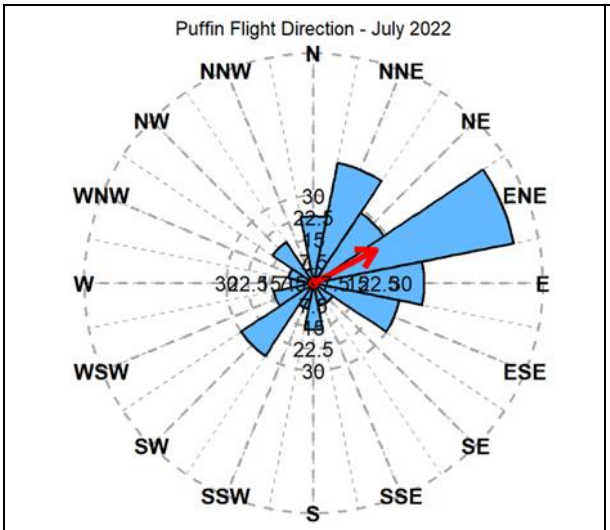
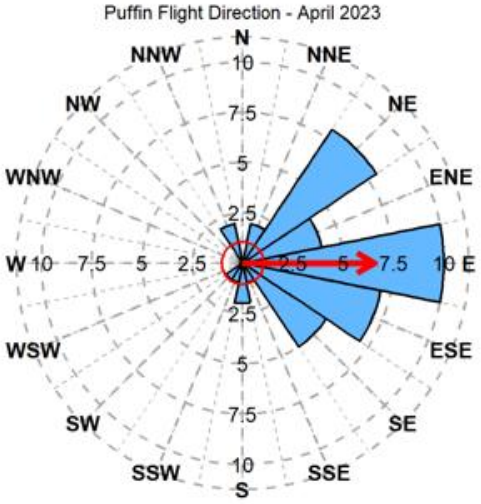


Figure 99 Distribution of puffin in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	356
Mean vector	62.631
Length of mean vector (r)	0.343
Rayleigh Test (Z)	41.826
Rayleigh Test (p)	<0.001
a. July 2022 (Survey 05)	



Number of Observations	43
Mean vector	90.580
Length of mean vector (r)	0.656
Rayleigh Test (Z)	18.503
Rayleigh Test (p)	<0.001
b. April 2023 (Survey 14)	

Figure 100 Summary of flight direction of puffin during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.31 Auk species - Unidentified

Auk species were recorded in 19 survey months throughout the survey period. Peak abundance occurred in September 2022 with an estimate of 1,407 [95% CL: 1,141, 1,707] within the Survey Area equating to 1.47 birds/km^2 (**Table 41**). During the breeding seasons, auk species were recorded in higher concentrations in the southwest of the 10km Buffer Zone, in close proximity to the coastline (**Figure 101** and **Figure 103**). In the non-breeding seasons, individuals were scattered across the Survey Area, except for September 2022 during which auk species were found concentrated in the northeast of the Survey Area (**Figure 102** and **Figure 104**).

No significant flight directions were recorded for auk species during the survey period.

Table 41 Apportioned abundance and density estimates (birds per km^2) of auk species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	34	291	146	463	0.17	0.30	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	22	191	95	295	0.21	0.20				
Jul-22	25	215	94	369	0.20	0.22				
Aug-22	3	26	3	60	0.58	0.03				
Sep-22	164	1,408	1,150	1,700	0.08	1.47				
Oct-22	7	61	17	114	0.38	0.06				
Dec-22	1	9	1	26	<1.00	0.01				
Jan-23	3	26	3	69	0.58	0.03				
Feb-23	7	60	9	136	0.38	0.06				
Mar-23	3	26	3	60	0.58	0.03				
Apr-23	4	35	9	70	0.50	0.04				
May-23	10	86	10	233	0.32	0.09				
Jun-23	3	27	3	71	0.58	0.03				
Aug-23	8	69	26	120	0.35	0.07				
Sep-23	30	257	163	360	0.18	0.27				
Oct-23	4	35	9	69	0.50	0.04				
Dec-23	3	26	3	60	0.58	0.03				
Jan-24	14	122	52	201	0.27	0.13				
Feb-24	21	179	77	307	0.22	0.19				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	27	3	73	0.58	0.17	None remaining as all abundance estimates apportioned into specific species.			
Jul-22	2	18	2	45	0.71	0.11				
Aug-22	1	9	1	27	<1.00	0.06				
Sep-22	21	187	98	302	0.22	1.16				
Feb-23	1	9	1	27	<1.00	0.06				

Sep-23	3	27	3	72	0.58	0.17				
Oct-23	3	27	3	63	0.58	0.17				

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	34	288	144	458	0.17	0.36	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	19	163	77	266	0.23	0.20				
Jul-22	23	196	77	350	0.21	0.24				
Aug-22	2	17	2	43	0.71	0.02				
Sep-22	143	1,219	972	1,492	0.08	1.53				
Oct-22	7	61	17	104	0.38	0.08				
Dec-22	1	9	1	26	<1.00	0.01				
Jan-23	3	25	3	68	0.58	0.03				
Feb-23	6	51	8	118	0.41	0.06				
Mar-23	3	26	3	60	0.58	0.03				
Apr-23	4	34	9	78	0.50	0.04				
May-23	10	85	10	222	0.32	0.11				
Jun-23	3	26	3	79	0.58	0.03				
Aug-23	8	68	25	119	0.35	0.09				
Sep-23	27	229	145	323	0.19	0.29				
Oct-23	1	9	1	26	<1.00	0.01				
Dec-23	3	26	3	60	0.58	0.03				
Jan-24	14	121	52	199	0.27	0.15				
Feb-24	21	177	85	304	0.22	0.22				

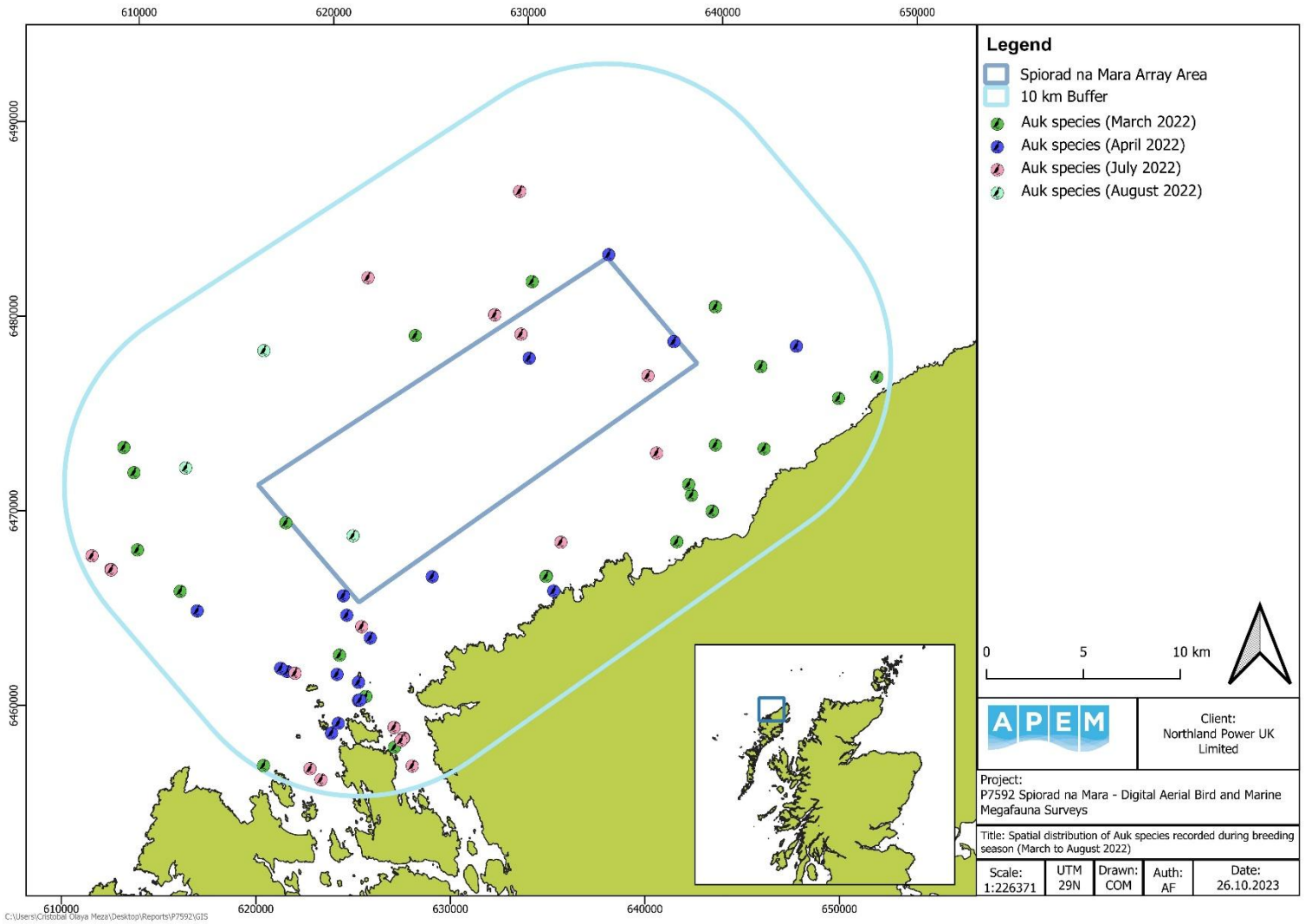


Figure 101 Distribution of auk species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

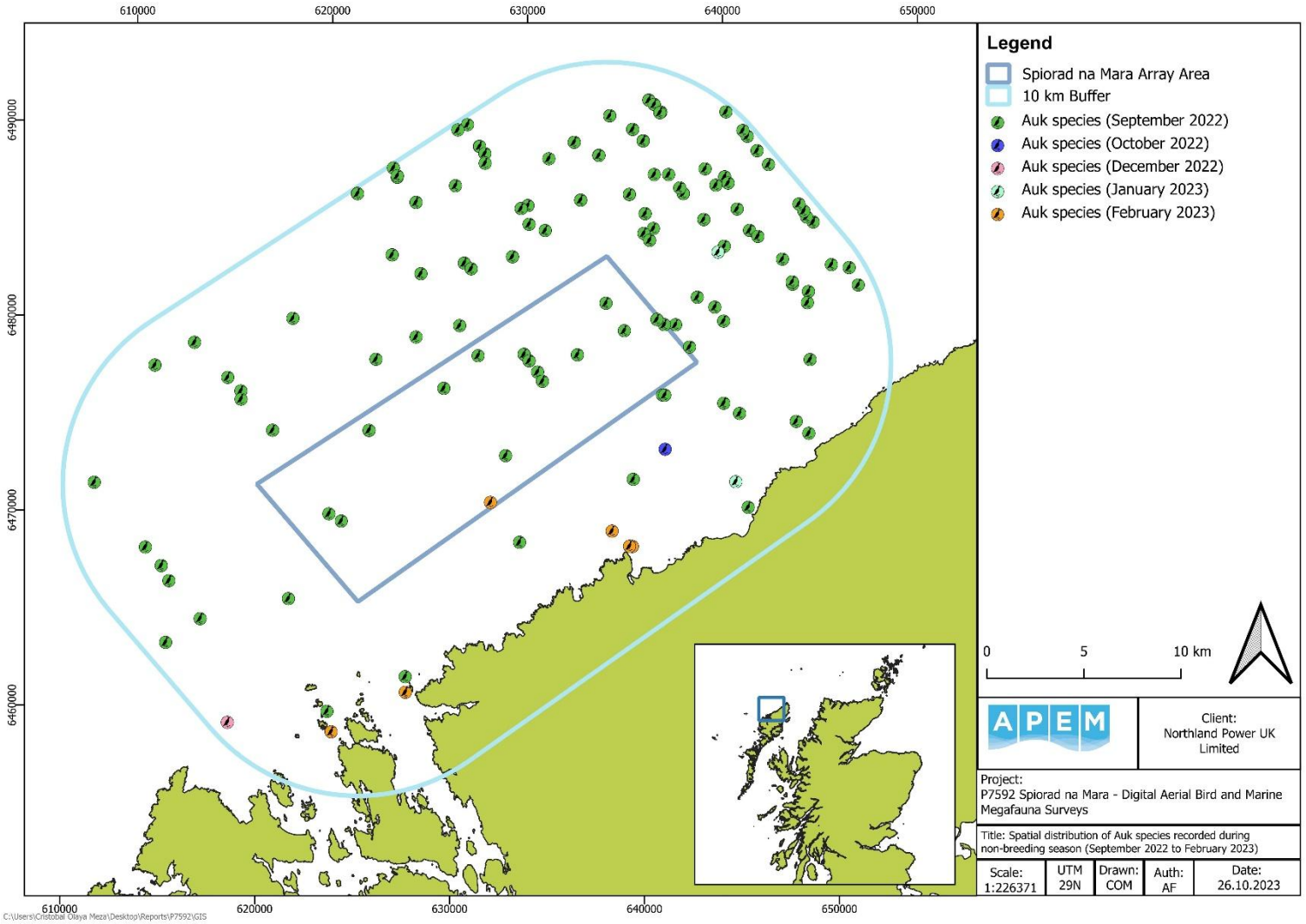


Figure 102 Distribution of auk species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

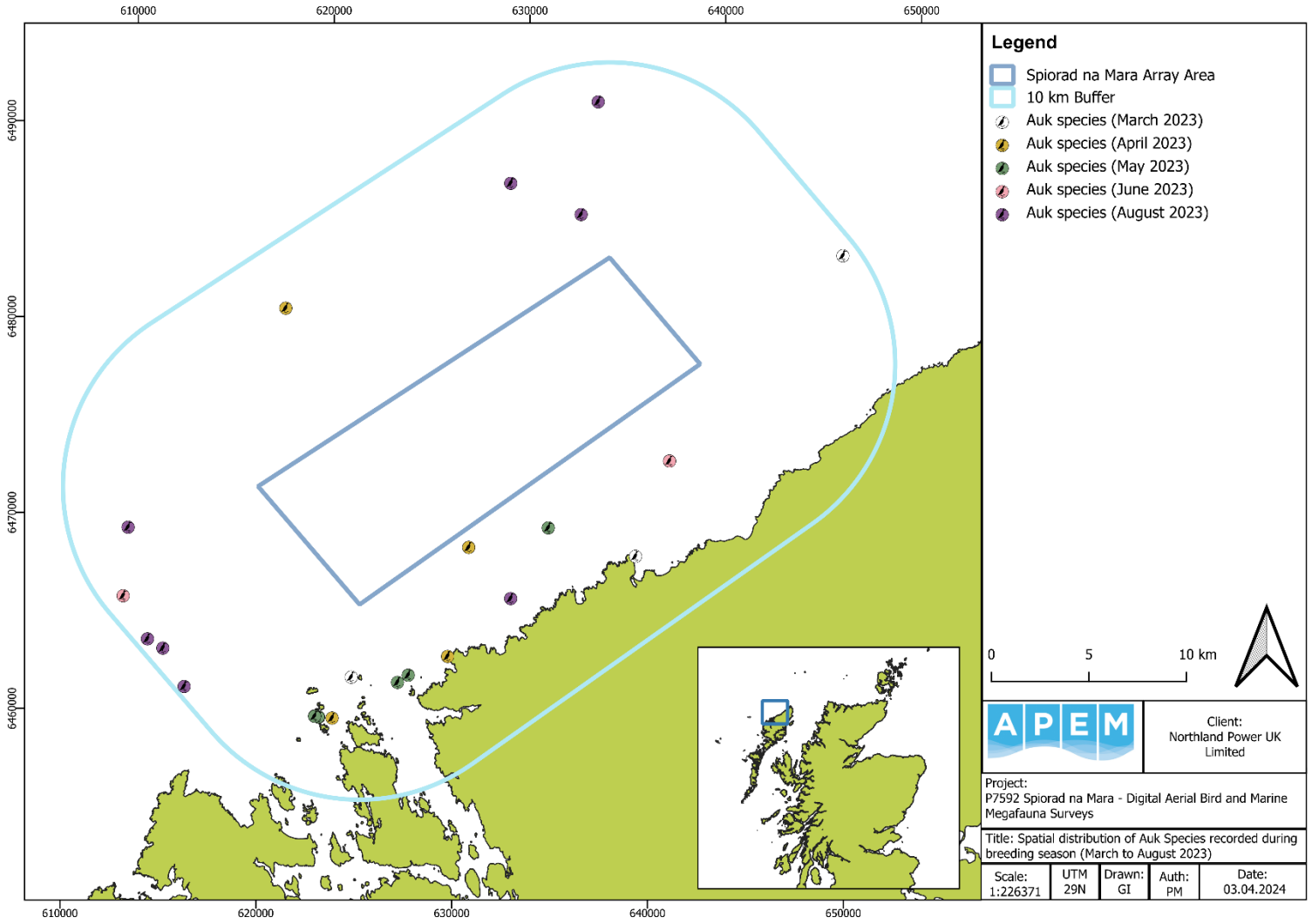


Figure 103 Distribution of auk species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

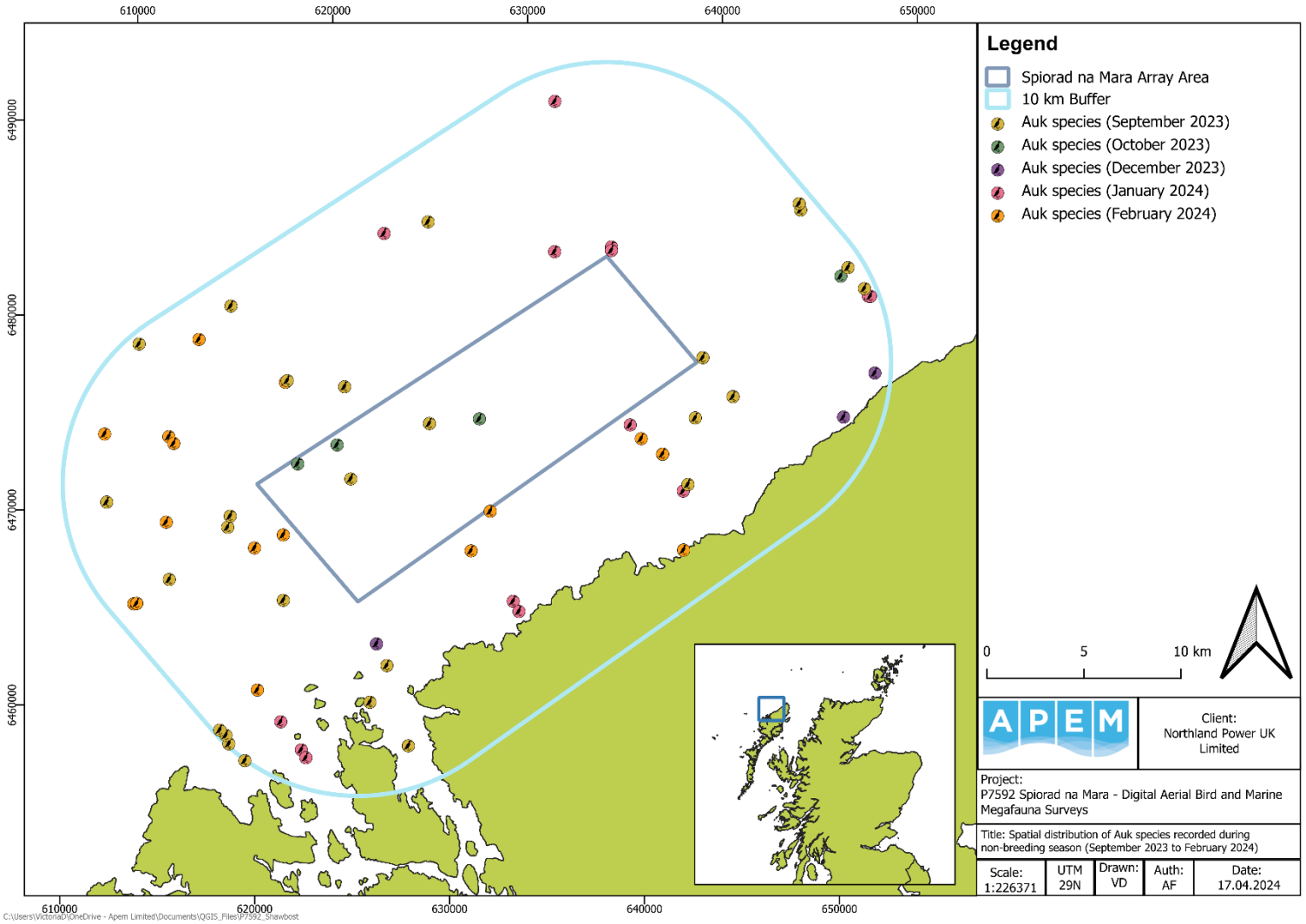


Figure 104 Distribution of auk species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.32 Red-throated diver - *Gavia stellata*

Red-throated divers were recorded in 16 months throughout the survey period. Peak abundance occurred in February 2024 with an estimate of 37 [95% CL: 9, 76] within the Survey Area equating to 0.04 birds/km^2 (**Table 42**). Red-throated divers were typically recorded in the south and east of the 10 km Buffer, in close proximity to the coastline (**Figure 105** to **Figure 108**). Three individuals were recorded flying, one in June 2022 and two in July 2023, all with a flight direction of east-northeast, although due to small sample size, the flight direction is not significant .

Table 42 Apportioned abundance and density estimates (birds per km^2) of red-throated diver in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	51	0.71	0.02	17	2	51	0.02
Apr-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-22	1	8	1	25	<1.00	0.01	8	1	25	0.01
Sep-22	4	34	9	69	0.50	0.04	34	9	69	0.04
Nov-22	1	9	1	26	<1.00	0.01	11	1	34	0.01
Dec-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Feb-23	2	17	2	43	0.71	0.02	21	2	57	0.02
Mar-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Apr-23	2	17	2	43	0.71	0.02	19	2	49	0.02
Jun-23	4	35	4	88	0.50	0.04	35	4	88	0.04
Jul-23	4	35	4	87	0.50	0.04	35	4	104	0.04
Oct-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Nov-23	4	35	4	87	0.50	0.04	35	4	87	0.04
Jan-24	3	26	3	70	0.58	0.03	28	3	79	0.03
Feb-24	4	34	9	68	0.50	0.04	37	9	76	0.04
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	51	0.71	0.02	17	2	51	0.02
Apr-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-22	1	8	1	25	<1.00	0.01	8	1	25	0.01
Sep-22	4	34	9	77	0.50	0.04	34	9	68	0.04
Nov-22	1	9	1	26	<1.00	0.01	11	1	34	0.01
Dec-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Feb-23	2	17	2	42	0.71	0.02	20	2	52	0.03
Mar-23	1	9	1	26	<1.00	0.01	9	1	34	0.01
Apr-23	2	17	2	43	0.71	0.02	19	2	49	0.02

Jun-23	4	35	4	88	0.50	0.04	35	4	88	0.04
Jul-23	4	34	4	86	0.50	0.04	34	4	104	0.04
Oct-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Nov-23	4	35	4	86	0.50	0.04	35	4	86	0.04
Jan-24	3	26	3	69	0.58	0.03	28	3	78	0.04
Feb-24	4	34	8	68	0.50	0.04	36	4	84	0.05

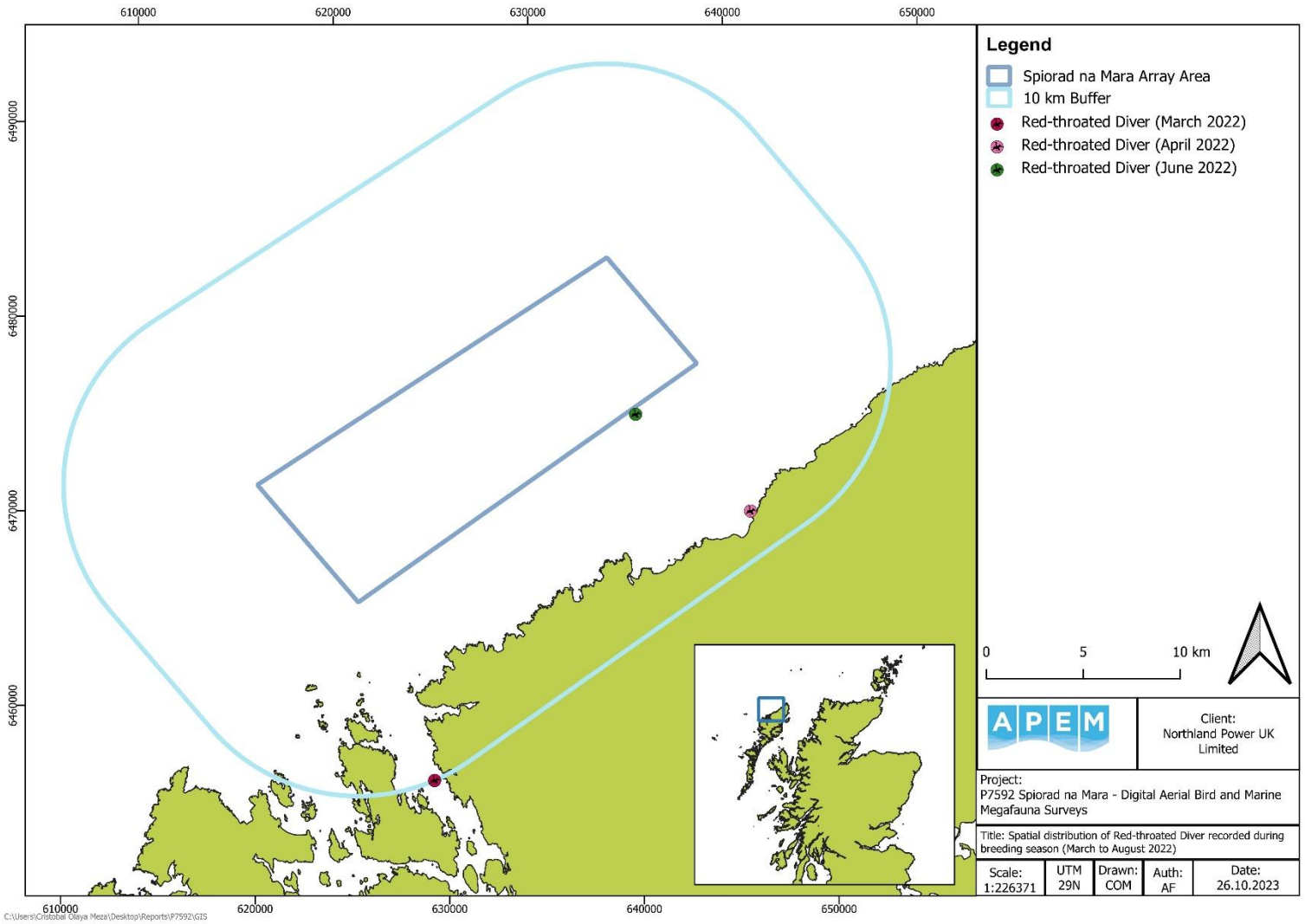


Figure 105 Distribution of red-throated diver in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

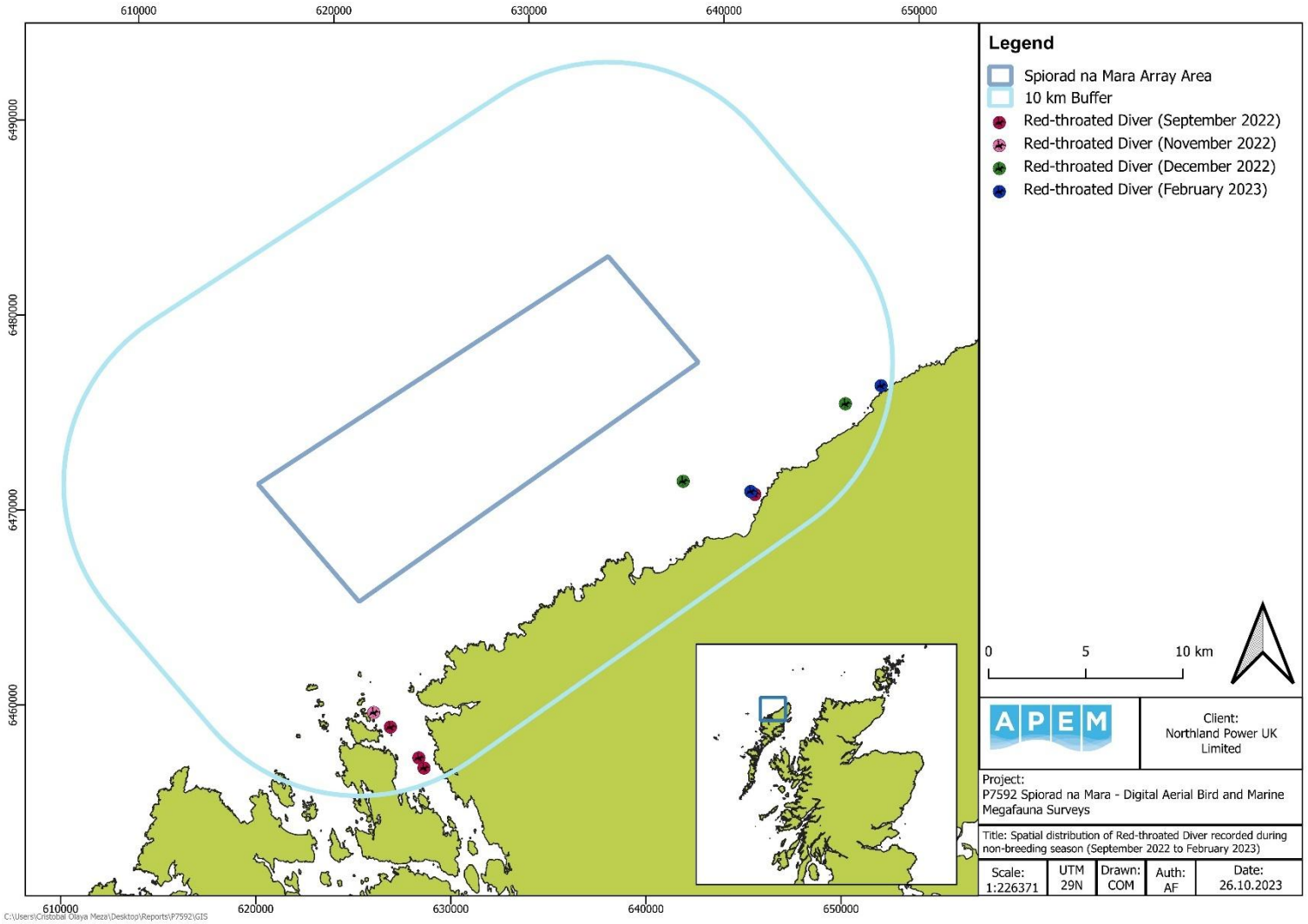


Figure 106 Distribution of red-throated diver in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

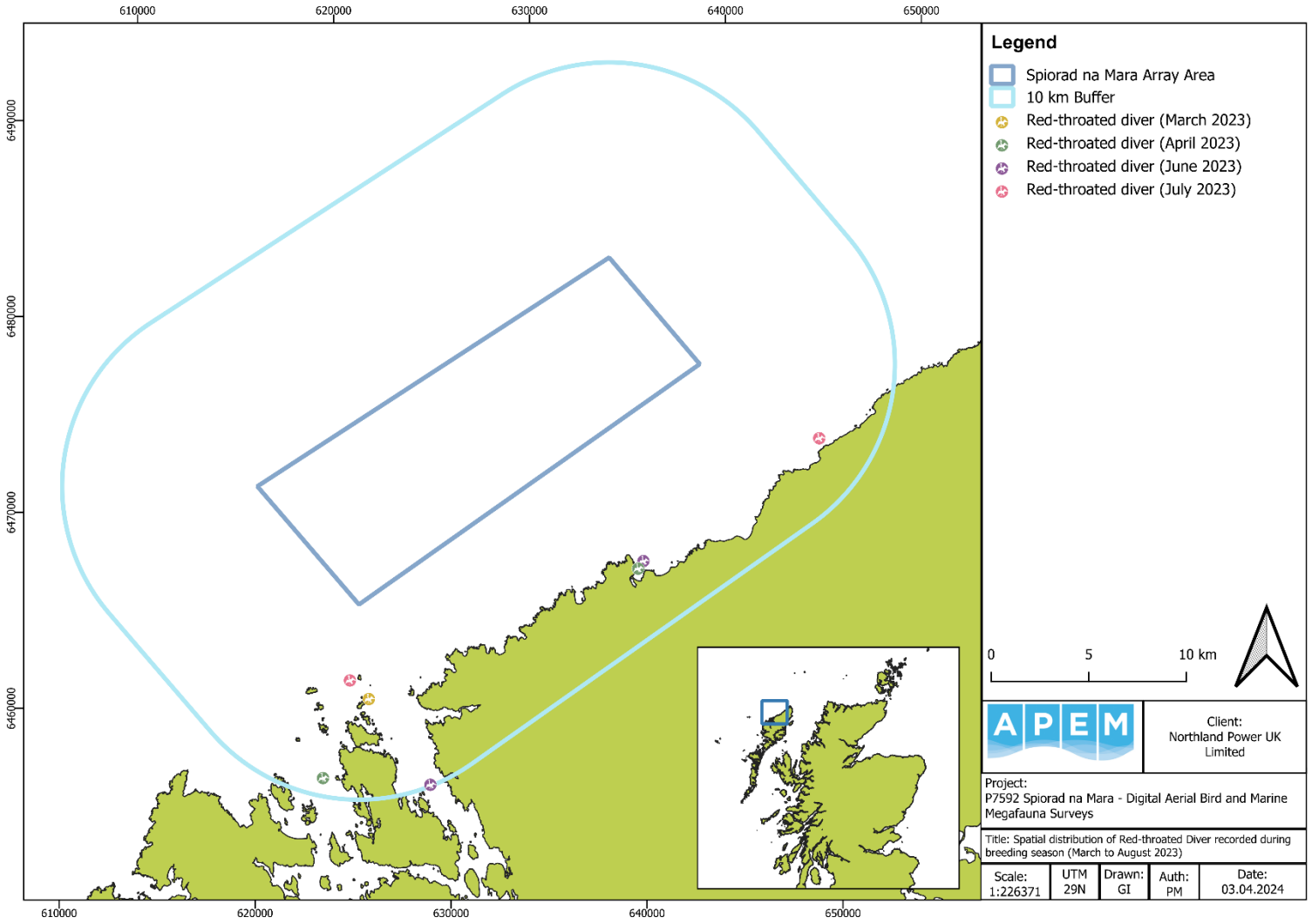


Figure 107 Distribution of red-throated diver in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

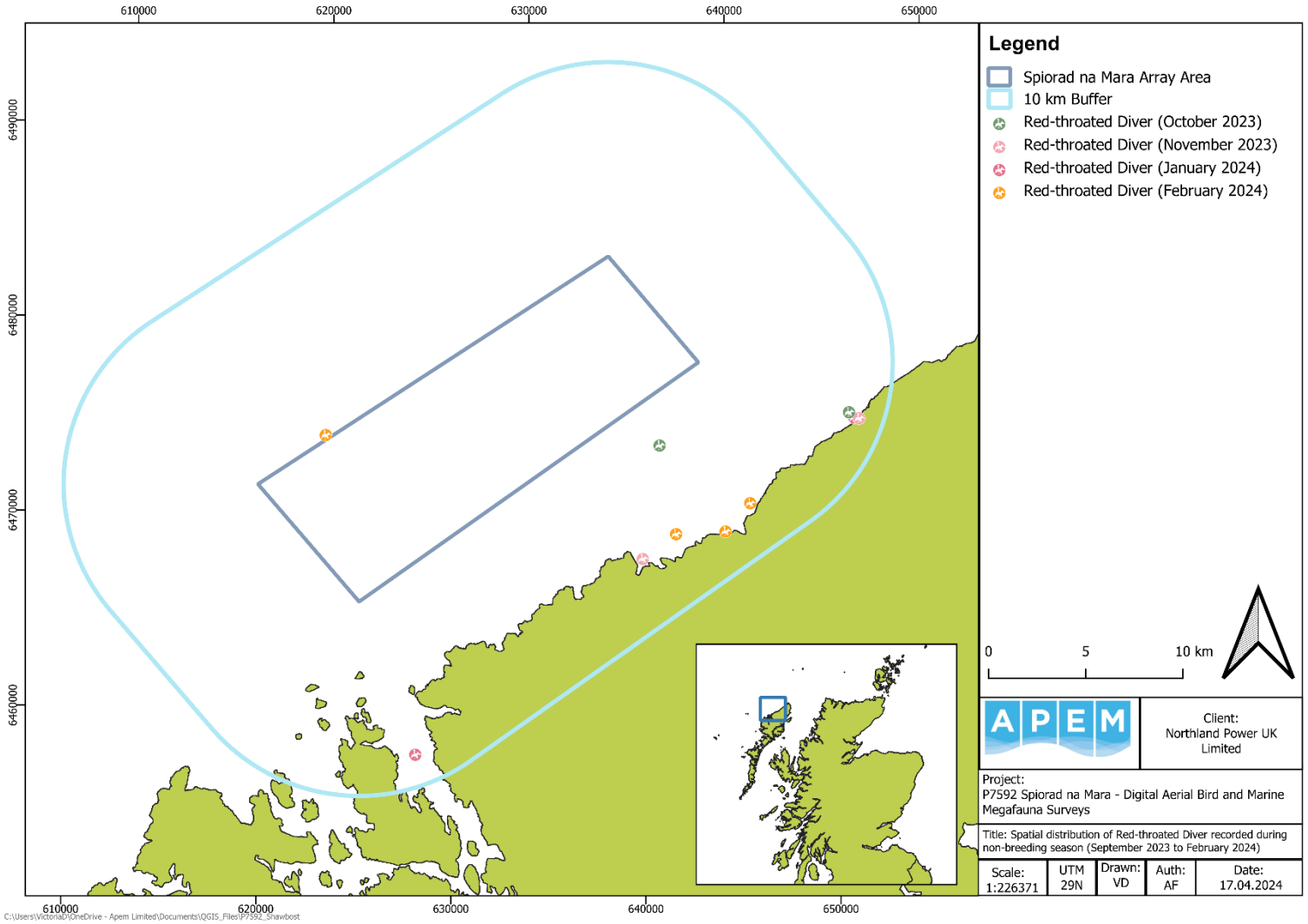


Figure 108 Distribution of red-throated diver in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.33 Great northern diver - *Gavia immer*

Great northern divers were recorded in most months throughout the survey period, except June and September 2022, and from June to September 2023. Peak abundance occurred in April 2022 with an estimate of 208 [95% CL: 95, 364] within the Survey Area equating to 0.22 birds/km^2 (**Table 43**).

Across both years, great northern divers were primarily recorded in the south and east of the 10 km Buffer during the breeding and non-breeding seasons (**Figure 109** to **Figure 112**).

No significant flight directions were recorded for Great Northern Divers during the survey period

Table 43 Apportioned abundance and density estimates (birds per km^2) of great northern diver in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	24	206	111	317	0.20	0.21	206	111	317	0.21
Apr-22	24	208	95	364	0.20	0.22	208	95	364	0.22
May-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Jul-22	2	17	2	52	0.71	0.02	17	2	69	0.02
Aug-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-22	4	35	4	87	0.50	0.04	35	4	87	0.04
Nov-22	3	26	3	60	0.58	0.03	33	4	78	0.03
Dec-22	9	78	35	130	0.33	0.08	78	35	130	0.08
Jan-23	1	9	1	26	<1.00	0.01	18	2	60	0.02
Feb-23	3	26	3	60	0.58	0.03	31	4	80	0.03
Mar-23	3	26	3	60	0.58	0.03	26	3	60	0.03
Apr-23	9	78	26	130	0.33	0.08	85	27	150	0.09
May-23	22	190	95	311	0.21	0.20	190	86	302	0.20
Oct-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Nov-23	12	105	26	209	0.29	0.11	105	18	235	0.11
Dec-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Jan-24	21	183	96	280	0.22	0.19	198	107	323	0.21
Feb-24	10	85	34	153	0.32	0.09	91	35	163	0.10
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	24	203	110	314	0.20	0.25	203	110	314	0.25
Apr-22	24	206	94	378	0.20	0.26	206	94	378	0.26
May-22	2	17	2	43	0.71	0.02	17	2	43	0.02
Jul-22	2	17	2	51	0.71	0.02	17	2	68	0.02

Aug-22	1	9	1	34	<1.00	0.01	9	1	26	0.01
Oct-22	4	35	4	78	0.50	0.04	35	4	78	0.04
Nov-22	3	26	3	60	0.58	0.03	33	4	78	0.04
Dec-22	9	78	34	138	0.33	0.10	78	34	129	0.10
Jan-23	1	9	1	26	<1.00	0.01	18	2	52	0.02
Feb-23	3	25	3	59	0.58	0.03	30	4	74	0.04
Mar-23	3	26	3	60	0.58	0.03	26	3	51	0.03
Apr-23	9	78	34	138	0.33	0.10	85	35	158	0.11
May-23	22	188	85	316	0.21	0.24	188	85	316	0.24
Oct-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Nov-23	12	104	26	216	0.29	0.13	104	26	242	0.13
Dec-23	2	17	2	43	0.71	0.02	17	2	43	0.02
Jan-24	21	182	104	268	0.22	0.23	197	106	302	0.25
Feb-24	10	85	34	144	0.32	0.11	91	35	169	0.11

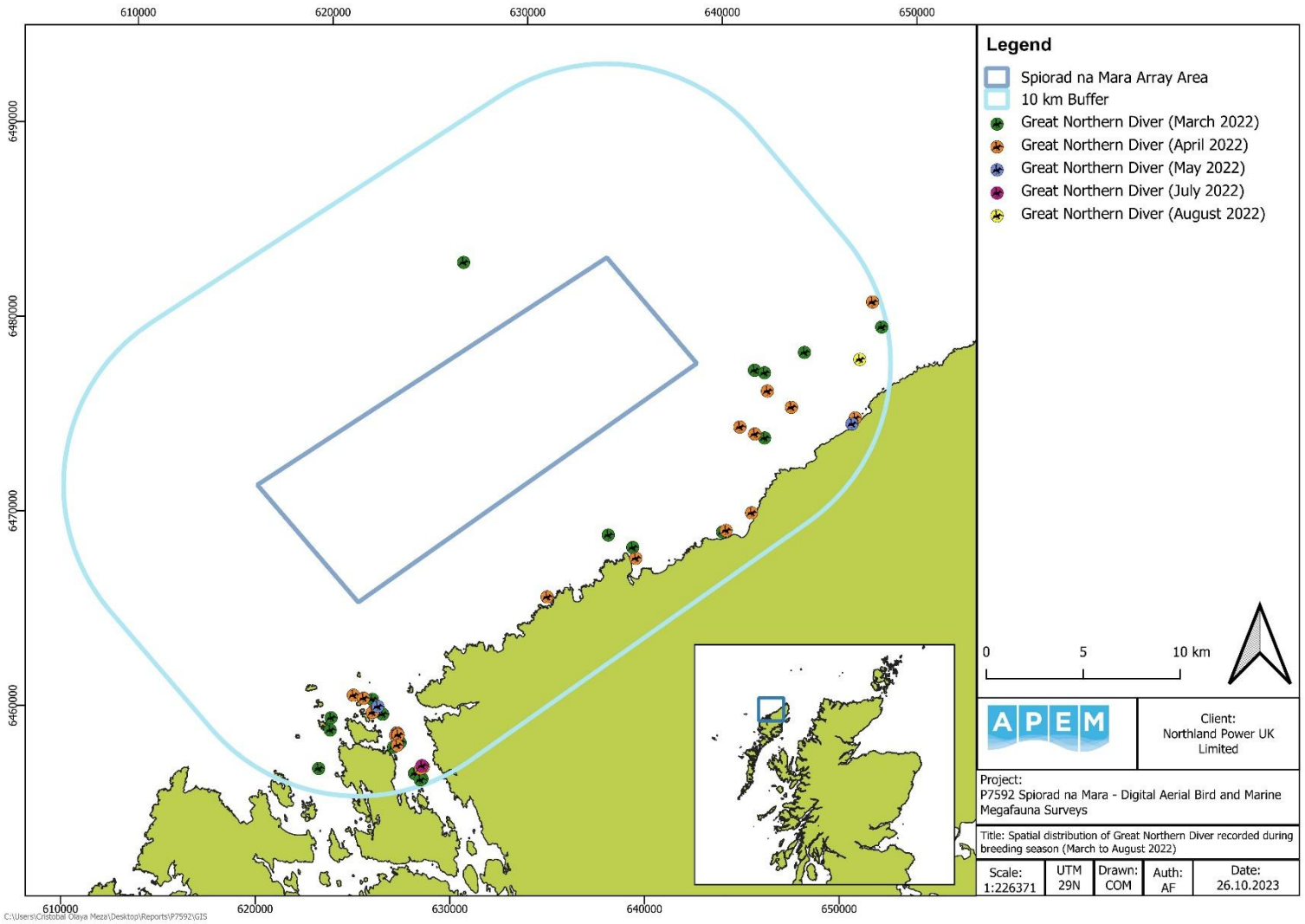


Figure 109 Distribution of great northern diver in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

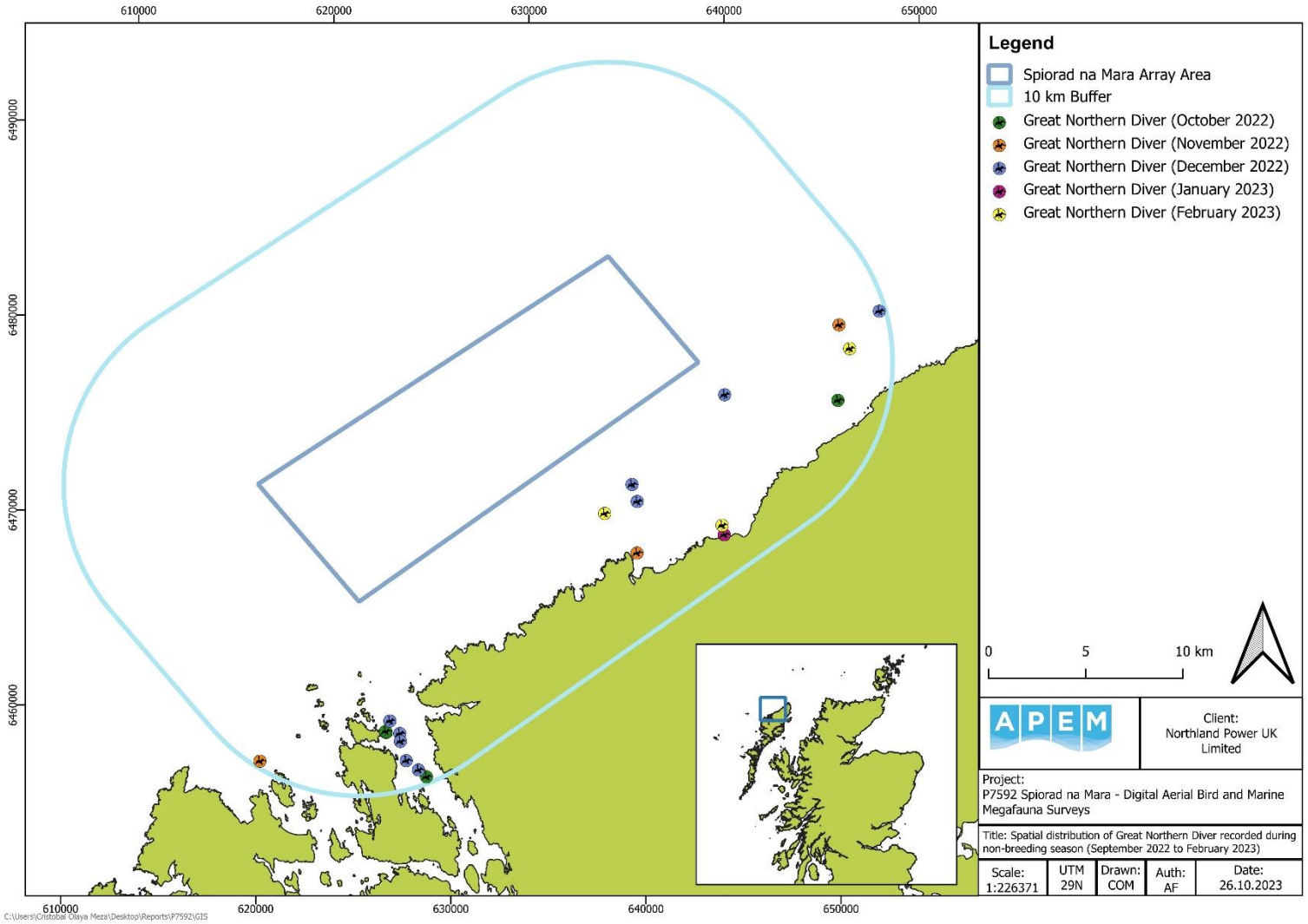


Figure 110 Distribution of great northern diver in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

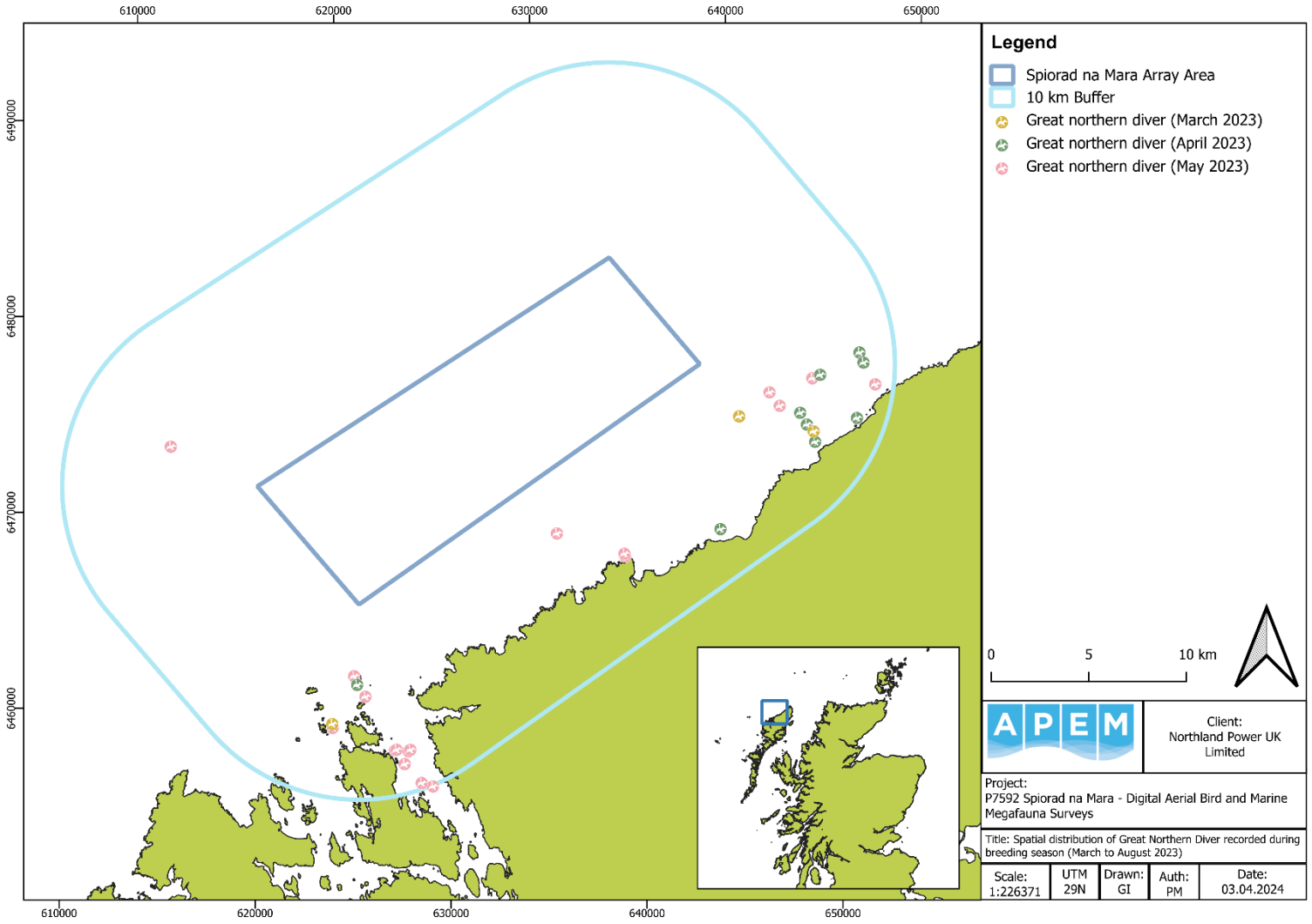


Figure 111 Distribution of great northern diver in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

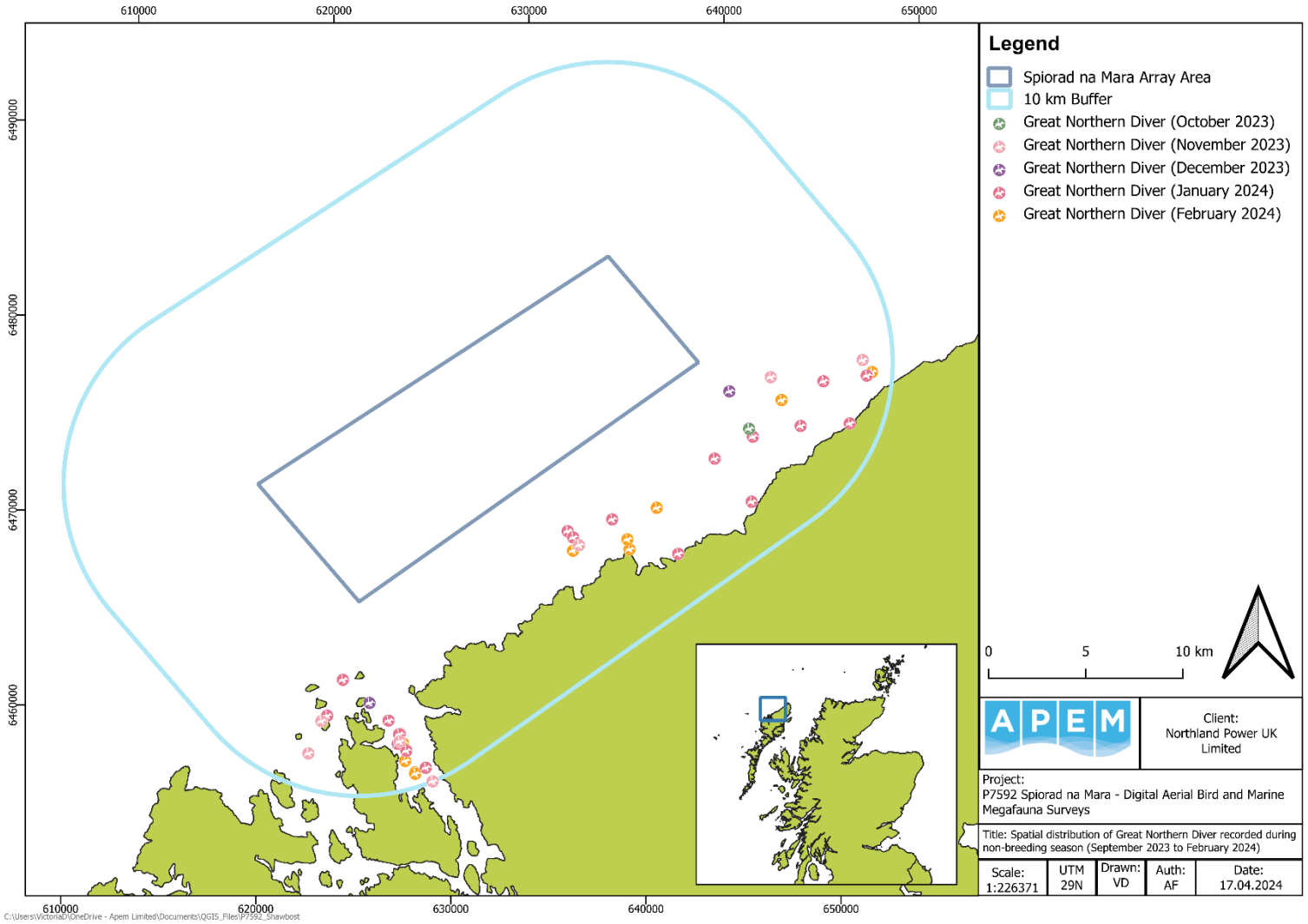


Figure 112 Distribution of great northern diver in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.34 Diver species - Unidentified

Diver species were recorded in six months throughout the survey period. Peak abundance occurred in January 2024 with an estimate of 17 [95% CL: 2, 52] within the Survey Area equating to 0.71 birds/km^2 (**Table 44**). During the breeding and non-breeding seasons, diver species were recorded in the southeast and southwest of the 10km Buffer Zone, in close proximity to the coastline (**Figure 113** to **Figure 115**).

No significant flight directions were recorded for diver species during the survey period.

Table 44 Apportioned abundance and density estimates (birds per km^2) of diver species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Nov-22	1	9	1	26	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Jan-23	1	9	1	26	<1.00	0.01				
Feb-23	1	9	1	26	<1.00	0.01				
Apr-23	1	9	1	26	<1.00	0.01				
Jan-24	2	17	2	52	0.71	0.02				
Feb-24	1	9	1	34	<1.00	0.01				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Nov-22	1	9	1	26	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Jan-23	1	9	1	26	<1.00	0.01				
Feb-23	1	8	1	25	<1.00	0.01				
Apr-23	1	9	1	34	<1.00	0.01				
Jan-24	2	17	2	43	0.71	0.02				
Feb-24	1	8	1	25	<1.00	0.01				

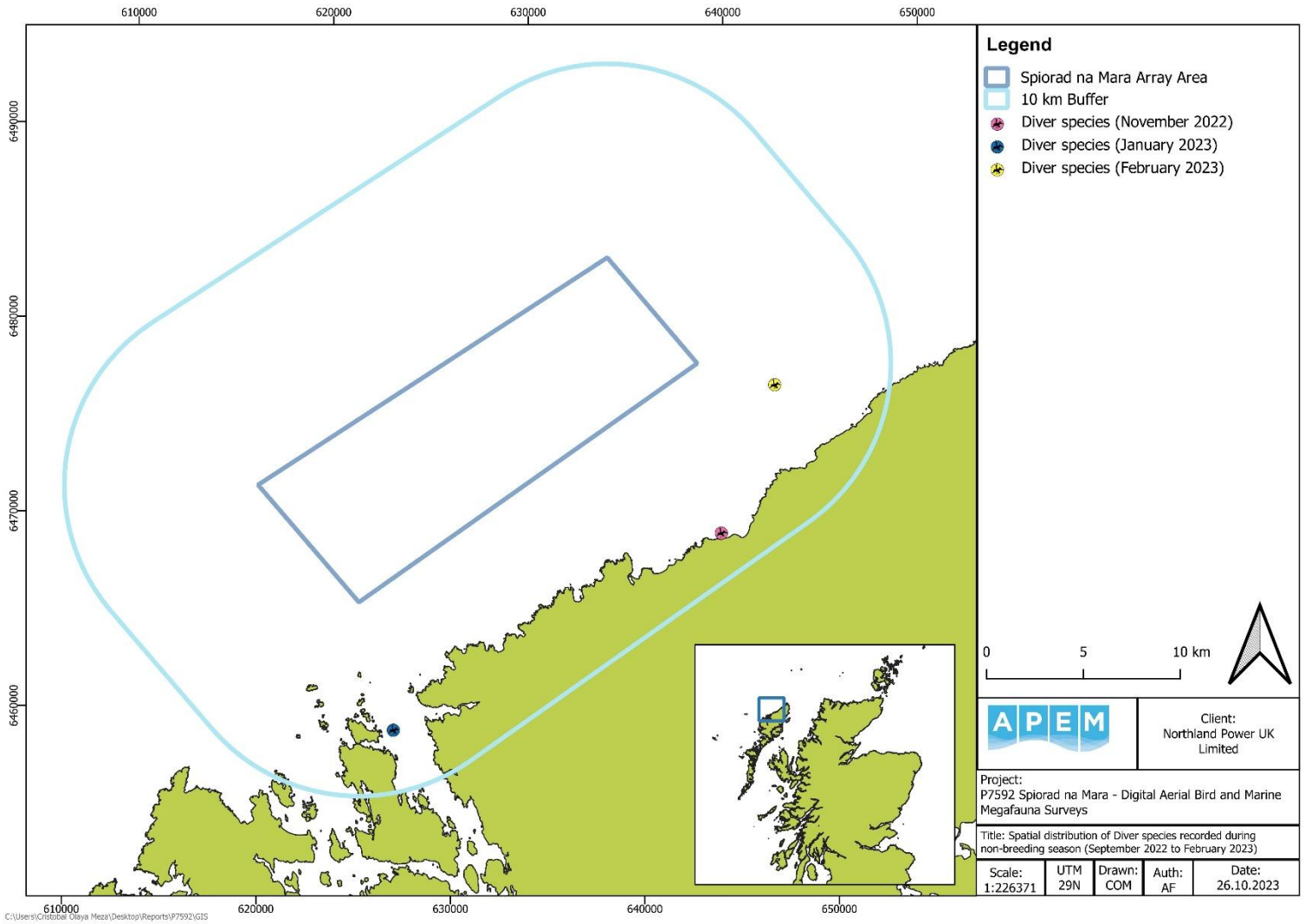


Figure 113 Distribution of diver species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

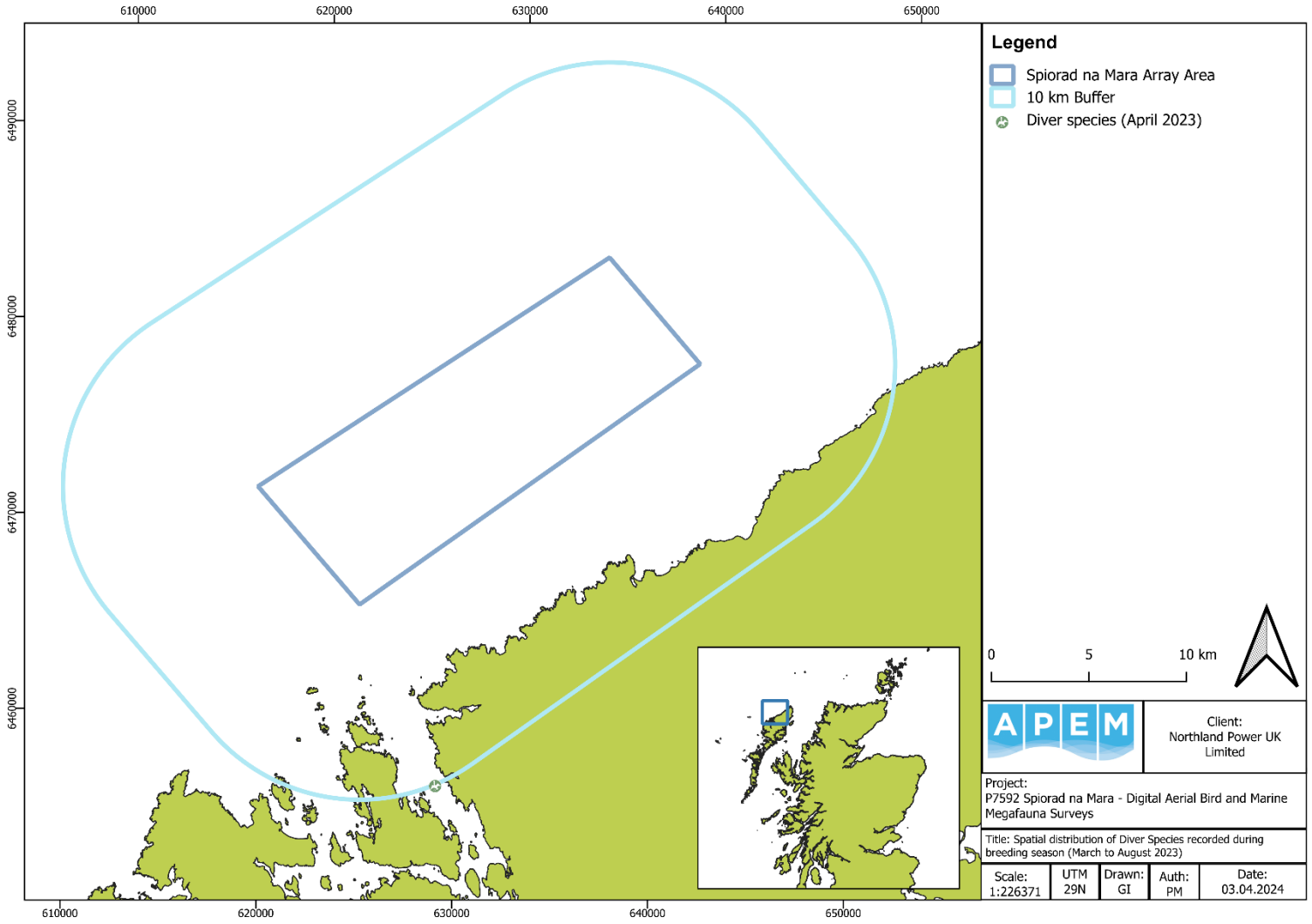


Figure 114 Distribution of diver species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

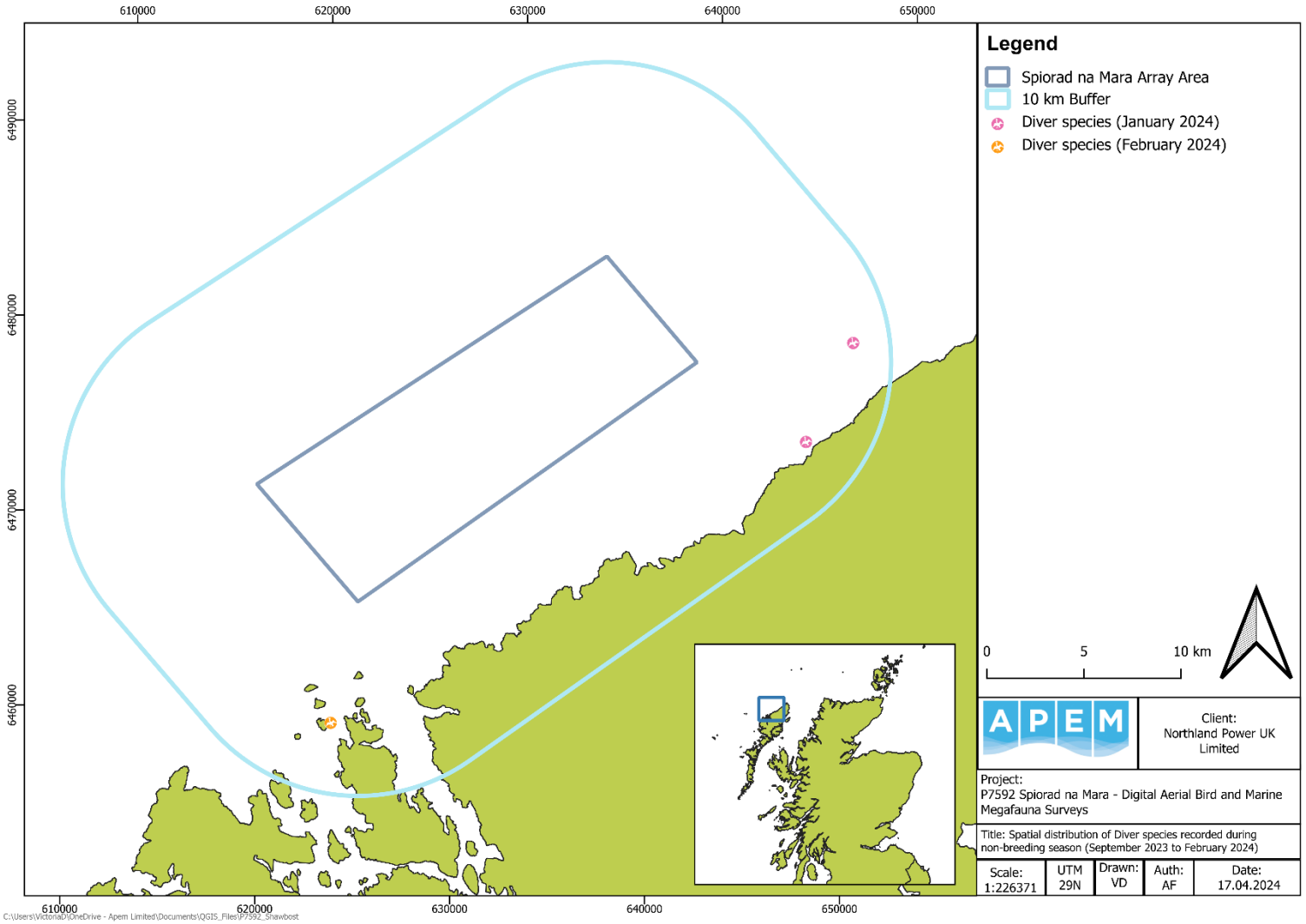


Figure 115 Distribution of diver species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.35 European storm petrel - *Hydrobates pelagicus*

A single European storm petrel was recorded flying west in September 2023, resulting in an estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 (**Table 45**). The European storm petrel was recorded in the east of the 10 km Buffer (**Figure 116**). It was recorded flying to the west, although this flight direction was not significant.

Table 45 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of European storm petrel in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Sep-23	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
None recorded.						
c) 10 km Buffer						
Month	**Raw Count**	**Abundance Estimate**	**LCL**	**UCL**	**Precision (CV)**	**Density (birds km^{-2})**
Sep-23	1	8	1	26	<1.00	0.01

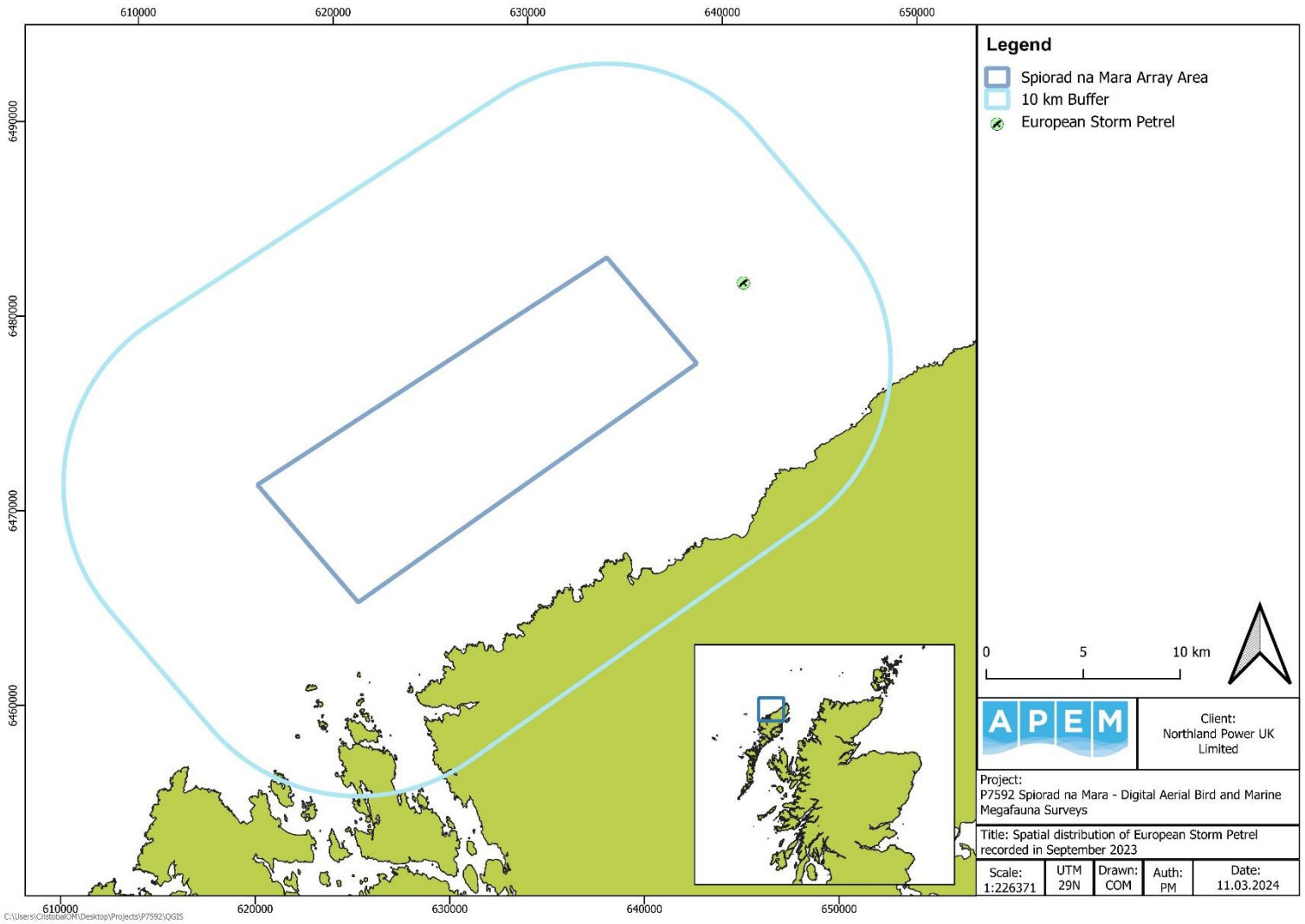


Figure 116 Distribution of European storm petrel in the Survey Area during September 2023

Note: Individuals in close proximity may appear overlapping

3.1.36 Storm petrel species - Unidentified

Storm petrel species were recorded in July and September 2022 as well as August and September 2023. Peak abundance occurred in September 2022 with an estimate of 146 [95% CL: 26, 309] within the Survey Area equating to 0.15 birds/km2 (**Table 46**). Storm petrel species were recorded in the central and eastern areas of the Survey Area (**Figure 118** and **Figure 120**) during the non-breeding seasons (September 2022/23), whilst individuals were observed in the west of the 10 km Buffer during the breeding season (July 2022 and August 2023) surveys (**Figure 117** and **Figure 119**). All 21 storm petrels were recorded flying with no significant direction.

Table 46 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of storm petrel species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01
Sep-22	17	146	26	300	0.24	0.15
Aug-23	1	9	1	26	<1.00	0.01
Sep-23	2	17	2	51	0.71	0.02
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-22	2	18	2	53	0.71	0.11
Aug-23	1	9	1	27	<1.00	0.06
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01
Sep-22	15	128	17	281	0.26	0.16
Sep-23	2	17	2	51	0.71	0.02

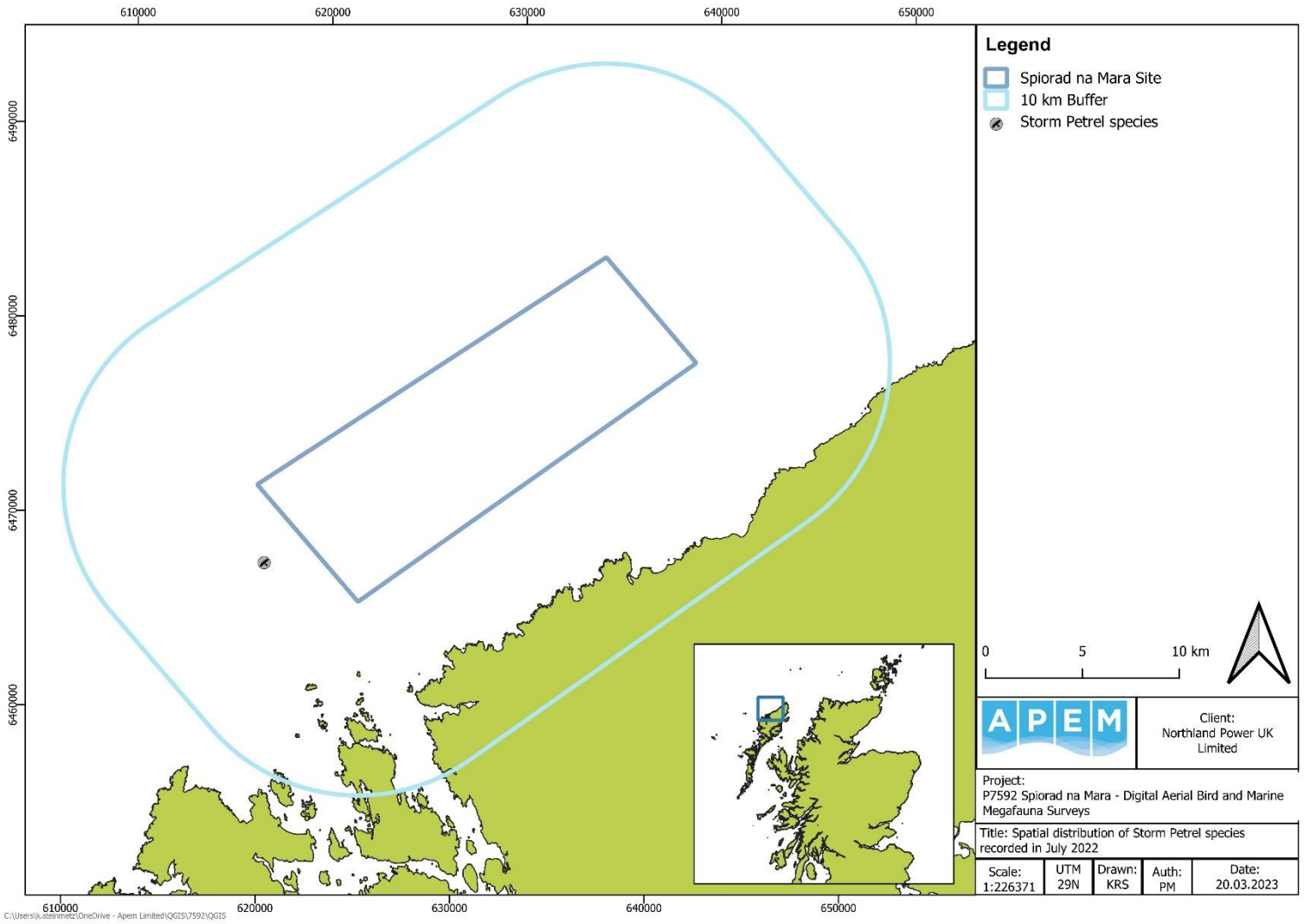


Figure 117 Distribution of storm petrel species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

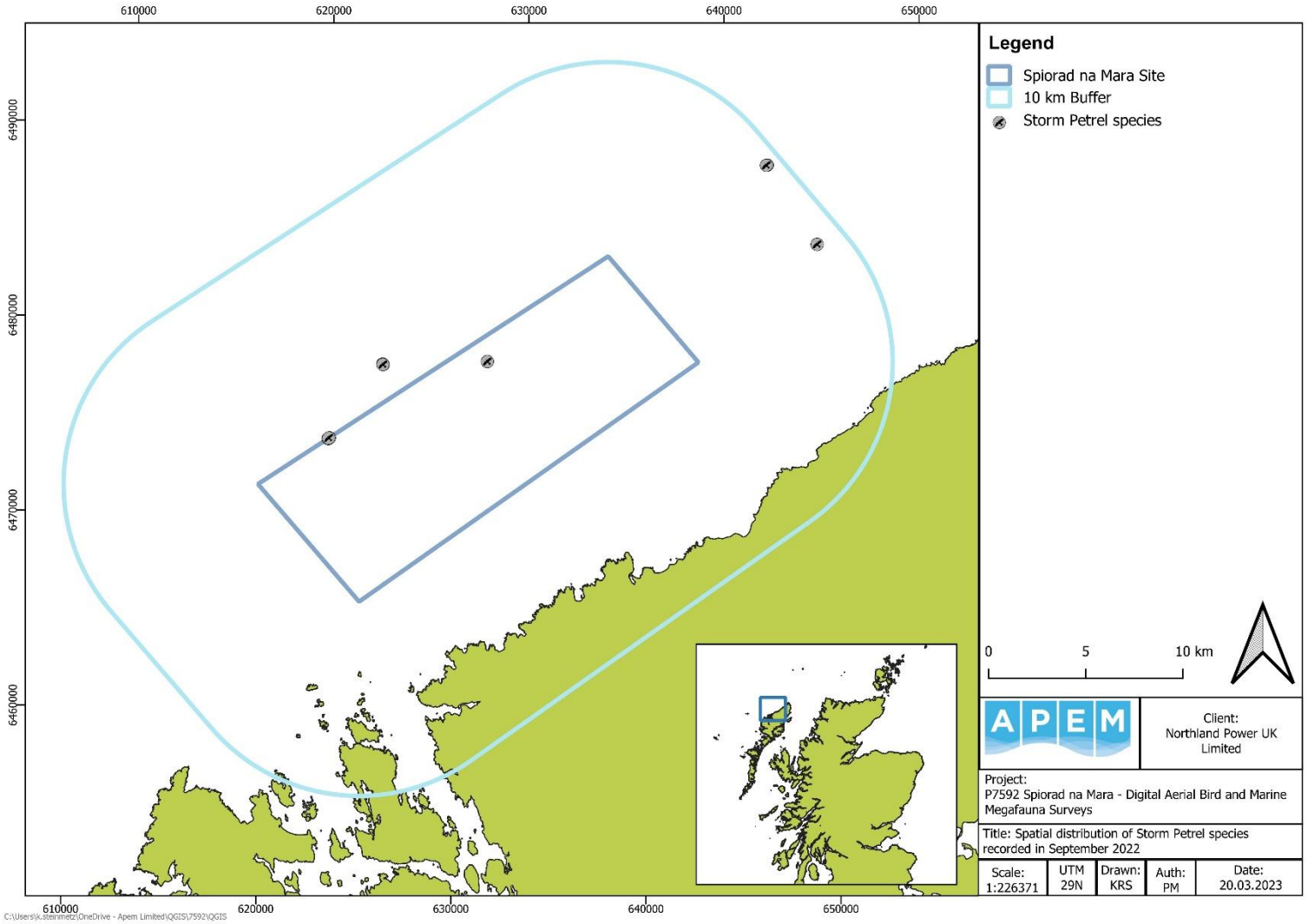


Figure 118 Distribution of storm petrel species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

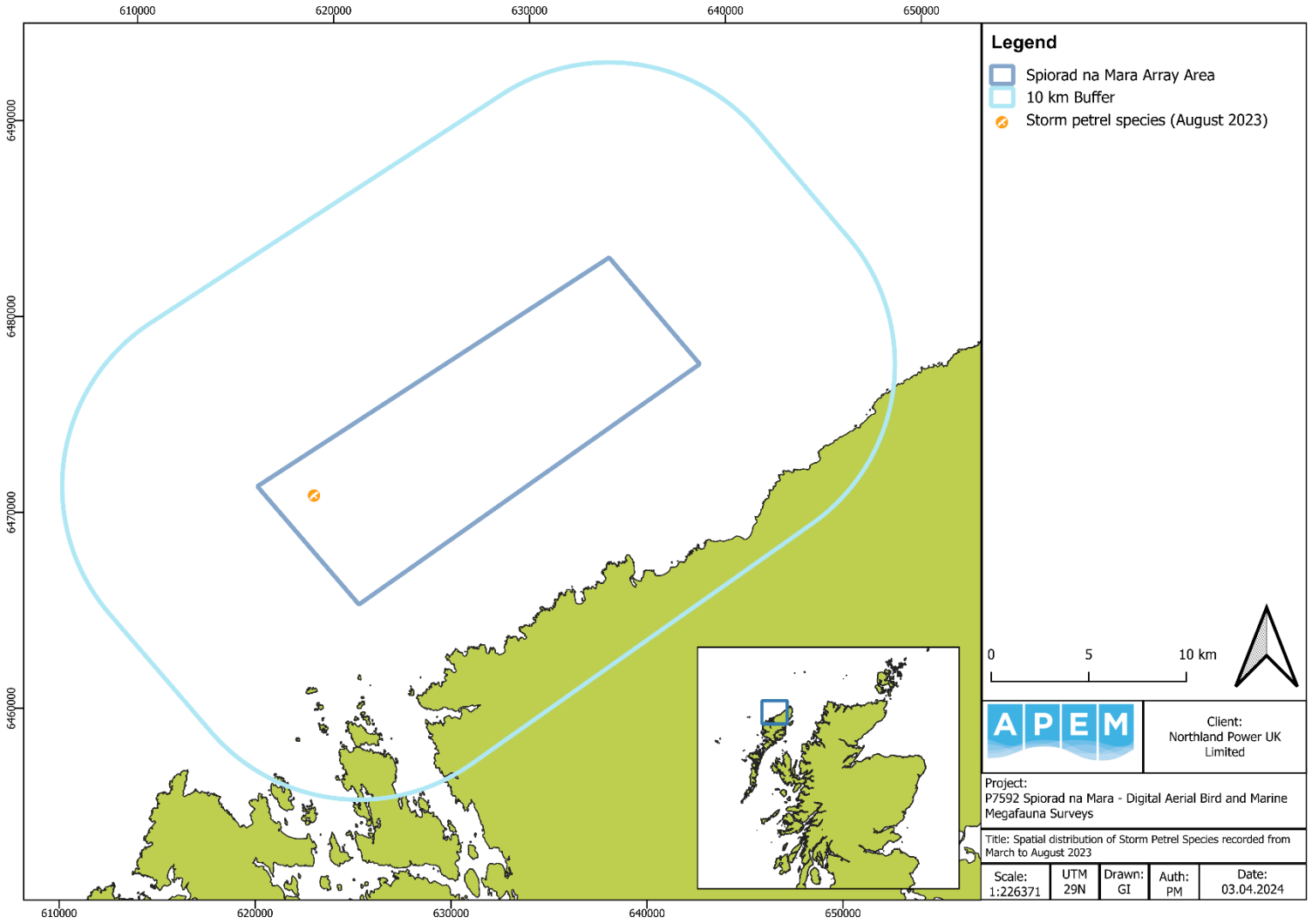


Figure 119 Distribution of storm petrel species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

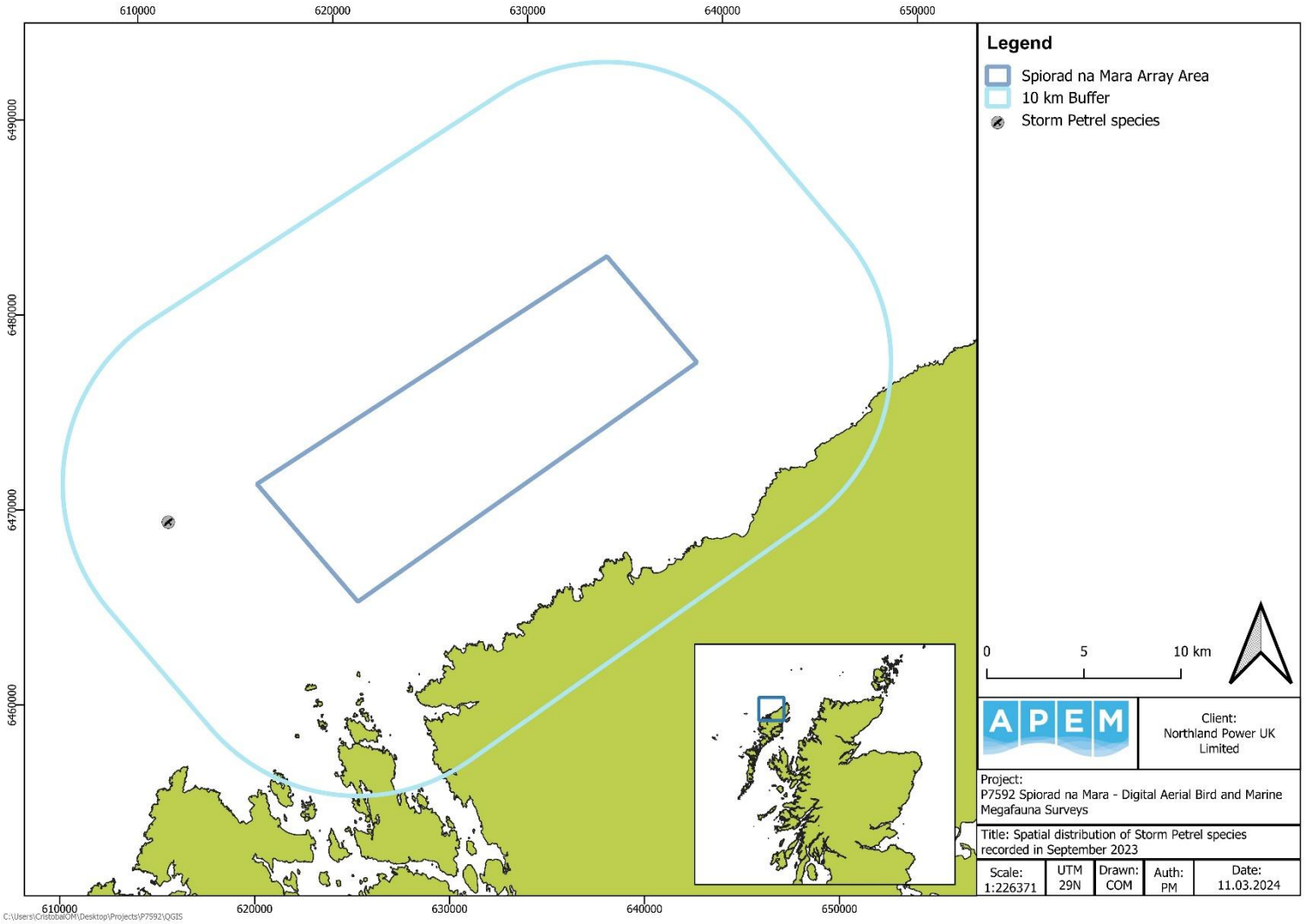


Figure 120 Distribution of storm petrel species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.37 Fulmar - *Fulmarus glacialis*

Fulmars were recorded in all survey months, except October and November 2023. Peak abundance occurred in March 2022 with an estimate of 1,963 [95% CL: 1,028, 3,231] within the Survey Area equating to 2.05 birds/km^2 (**Table 47**). Overall, fulmars were distributed across the Survey Area throughout the survey period. However, during the breeding seasons, fulmars were recorded in higher densities in the southwest of the Survey Area (**Figure 121** and **Figure 123**). During the non-breeding seasons, fulmars occurred in higher concentrations in the northern region of the Survey Area (**Figure 122** and **Figure 124**).

Fulmars exhibited varied significant flight directions in different months during the first year of surveys: west to west-northwest in March, July, and September 2022; west-northwest in April and December 2022; north to north-northeast in May and June 2022; west-southwest in August 2022; and northwest in February 2023 (**Figure 125a-i**). However, during the second year, fulmars displayed a more consistent trend in significant flight directions. Between March 2023 and January 2024, fulmars had a significant predominant direction of flight between the north and northwest (**Figure 125j-o**).

Table 47 Apportioned abundance and density estimates (birds per km^2) of fulmar in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	229	1,963	1,106	3,223	0.07	2.05	1,963	1,028	3,231	2.05
Apr-22	181	1,570	867	2,715	0.07	1.64	1,570	807	2,767	1.64
May-22	83	712	446	1,047	0.11	0.74	712	420	1,055	0.74
Jun-22	31	263	85	517	0.18	0.27	263	67	569	0.27
Jul-22	94	807	627	1,039	0.10	0.84	807	541	1,117	0.84
Aug-22	37	318	206	430	0.16	0.33	318	172	489	0.33
Sep-22	41	352	232	498	0.16	0.37	352	198	541	0.37
Oct-22	2	18	2	44	0.71	0.02	18	2	52	0.02
Nov-22	13	112	60	181	0.28	0.12	115	45	207	0.12
Dec-22	117	1,017	582	1,539	0.09	1.06	1,017	577	1,626	1.06
Jan-23	31	266	163	378	0.18	0.28	266	163	386	0.28
Feb-23	101	860	579	1,193	0.10	0.90	860	537	1,227	0.90
Mar-23	175	1,502	858	2,326	0.08	1.57	1,508	825	2,491	1.57
Apr-23	185	1,608	1,008	2,286	0.07	1.68	1,608	999	2,347	1.68
May-23	95	821	544	1,192	0.10	0.86	821	518	1,201	0.86
Jun-23	60	531	257	955	0.13	0.55	531	238	974	0.55
Jul-23	89	772	503	1,119	0.11	0.81	780	417	1,212	0.81
Aug-23	19	163	86	248	0.23	0.17	166	71	274	0.17
Sep-23	32	274	137	446	0.18	0.29	274	114	463	0.29
Dec-23	145	1,248	749	2,023	0.08	1.30	1,267	711	2,088	1.32
Jan-24	107	935	367	1,773	0.10	0.98	935	324	1,844	0.98
Feb-24	9	77	26	136	0.33	0.08	78	26	140	0.08
b) Spiorad na Mara Array Area										
Month		Total unapportioned					Total apportioned			

	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	182	64	336	0.22	1.13	182	73	345	1.13
Apr-22	6	55	18	100	0.41	0.34	55	11	128	0.34
May-22	4	36	9	71	0.50	0.22	36	4	89	0.22
Jul-22	29	258	134	410	0.19	1.61	258	98	482	1.60
Aug-22	4	36	9	80	0.50	0.22	36	4	89	0.22
Sep-22	9	80	27	151	0.33	0.50	80	27	151	0.50
Oct-22	1	9	1	27	<1.00	0.06	9	1	36	0.06
Nov-22	4	36	9	72	0.50	0.22	39	4	100	0.24
Dec-22	20	182	55	409	0.22	1.13	182	45	372	1.13
Jan-23	1	9	1	27	<1.00	0.06	9	1	27	0.06
Feb-23	14	125	45	241	0.27	0.78	125	36	259	0.77
Mar-23	38	341	161	583	0.16	2.11	341	145	574	2.11
Apr-23	22	200	45	399	0.21	1.24	200	45	409	1.24
May-23	8	73	28	138	0.35	0.45	73	28	138	0.45
Jun-23	1	9	1	28	<1.00	0.06	9	1	28	0.06
Jul-23	14	128	46	219	0.27	0.79	128	40	247	0.79
Aug-23	4	36	4	90	0.50	0.22	36	4	81	0.22
Sep-23	2	18	2	45	0.71	0.11	18	2	45	0.11
Dec-23	16	145	72	235	0.25	0.90	159	57	295	0.99
Jan-24	7	65	9	138	0.38	0.40	65	9	138	0.40

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	209	1,771	898	3,025	0.07	2.22	1,771	856	2,983	2.22
Apr-22	175	1,503	841	2,619	0.08	1.89	1,503	773	2,705	1.88
May-22	79	673	417	996	0.11	0.84	673	367	1,030	0.84
Jun-22	31	261	84	522	0.18	0.33	262	67	582	0.33
Jul-22	65	554	409	699	0.12	0.69	554	349	784	0.69
Aug-22	33	282	179	401	0.17	0.35	282	137	453	0.35
Sep-22	32	273	171	392	0.18	0.34	273	128	435	0.34
Oct-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Nov-22	9	77	34	128	0.33	0.10	78	27	151	0.10
Dec-22	97	836	465	1,396	0.10	1.05	836	425	1,405	1.05
Jan-23	30	255	162	366	0.18	0.32	255	162	357	0.32
Feb-23	87	734	481	1,038	0.11	0.92	734	455	1,097	0.92
Mar-23	137	1,165	587	2,025	0.09	1.46	1,172	495	2,103	1.47
Apr-23	163	1,404	844	2,076	0.08	1.76	1,404	801	2,162	1.76
May-23	87	743	469	1,093	0.11	0.93	743	427	1,143	0.93
Jun-23	59	517	254	877	0.13	0.65	517	228	930	0.65
Jul-23	75	644	395	953	0.12	0.81	652	336	1,077	0.82
Aug-23	15	127	68	195	0.26	0.16	130	53	228	0.16
Sep-23	30	255	119	408	0.18	0.32	255	114	443	0.32
Dec-23	129	1,100	622	1,893	0.09	1.38	1,104	591	1,948	1.38
Jan-24	100	864	294	1,625	0.10	1.08	864	260	1,729	1.08
Feb-24	9	76	25	135	0.33	0.10	77	25	148	0.10

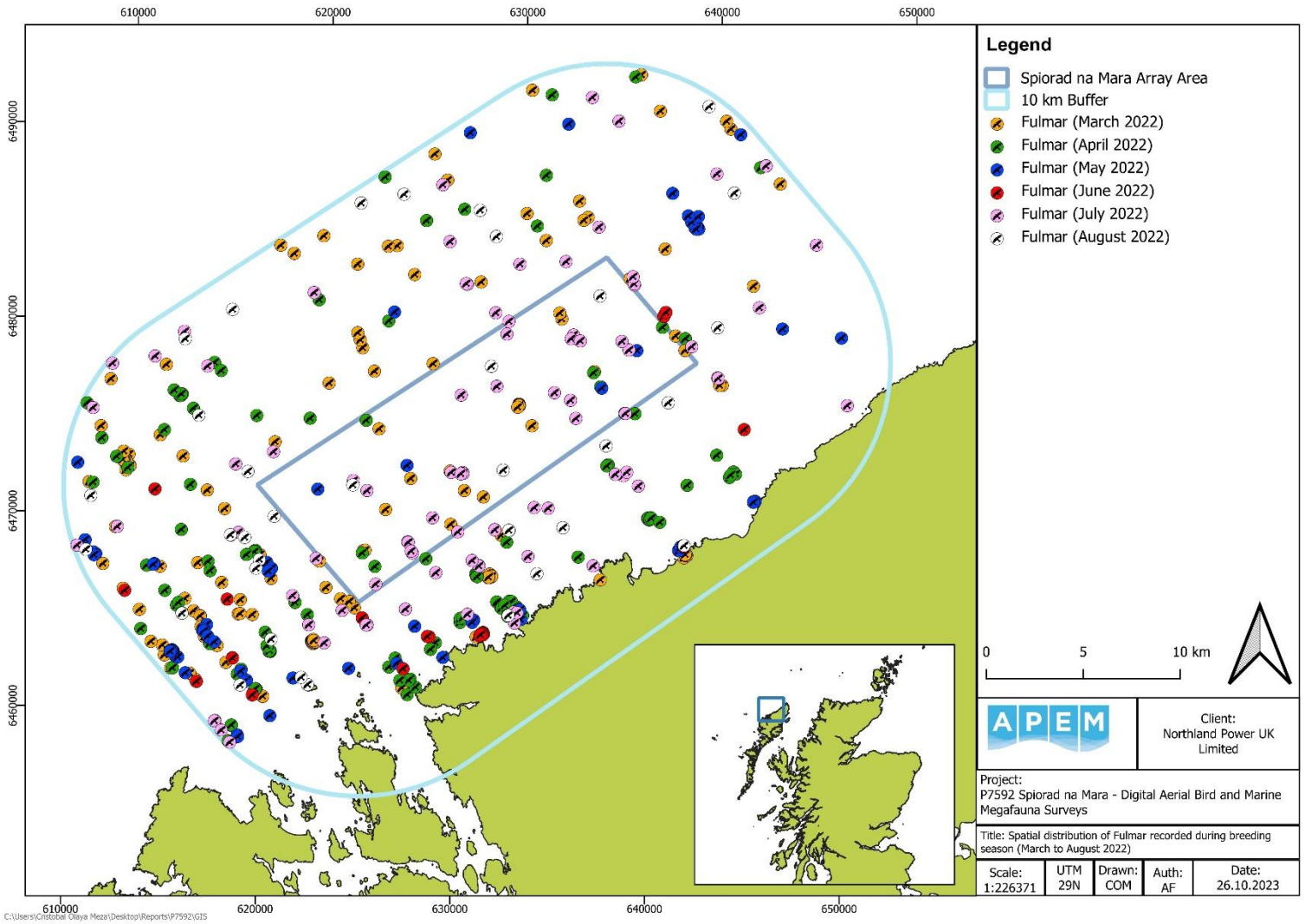


Figure 121 Distribution of fulmar in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

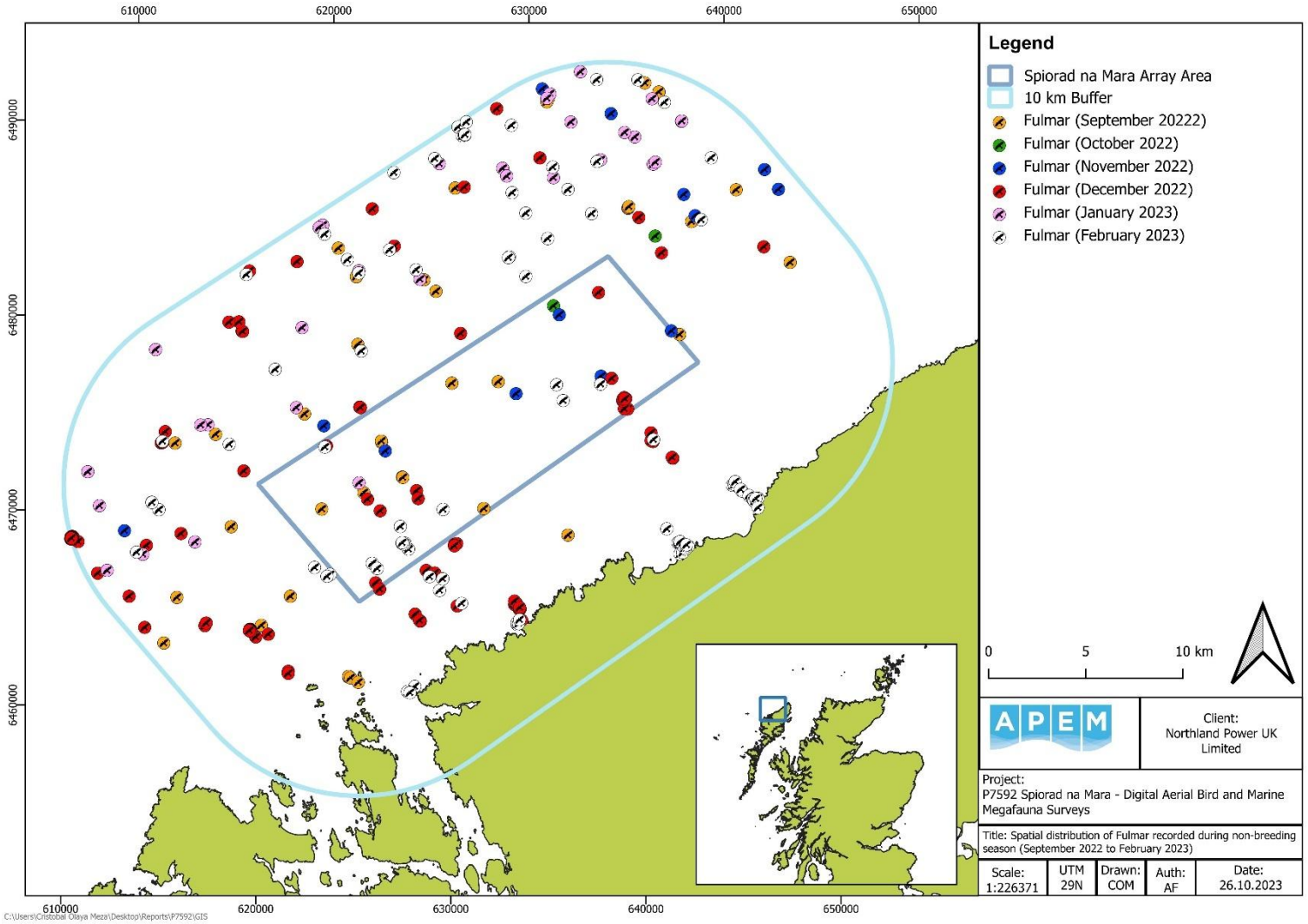


Figure 122 Distribution of fulmar in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

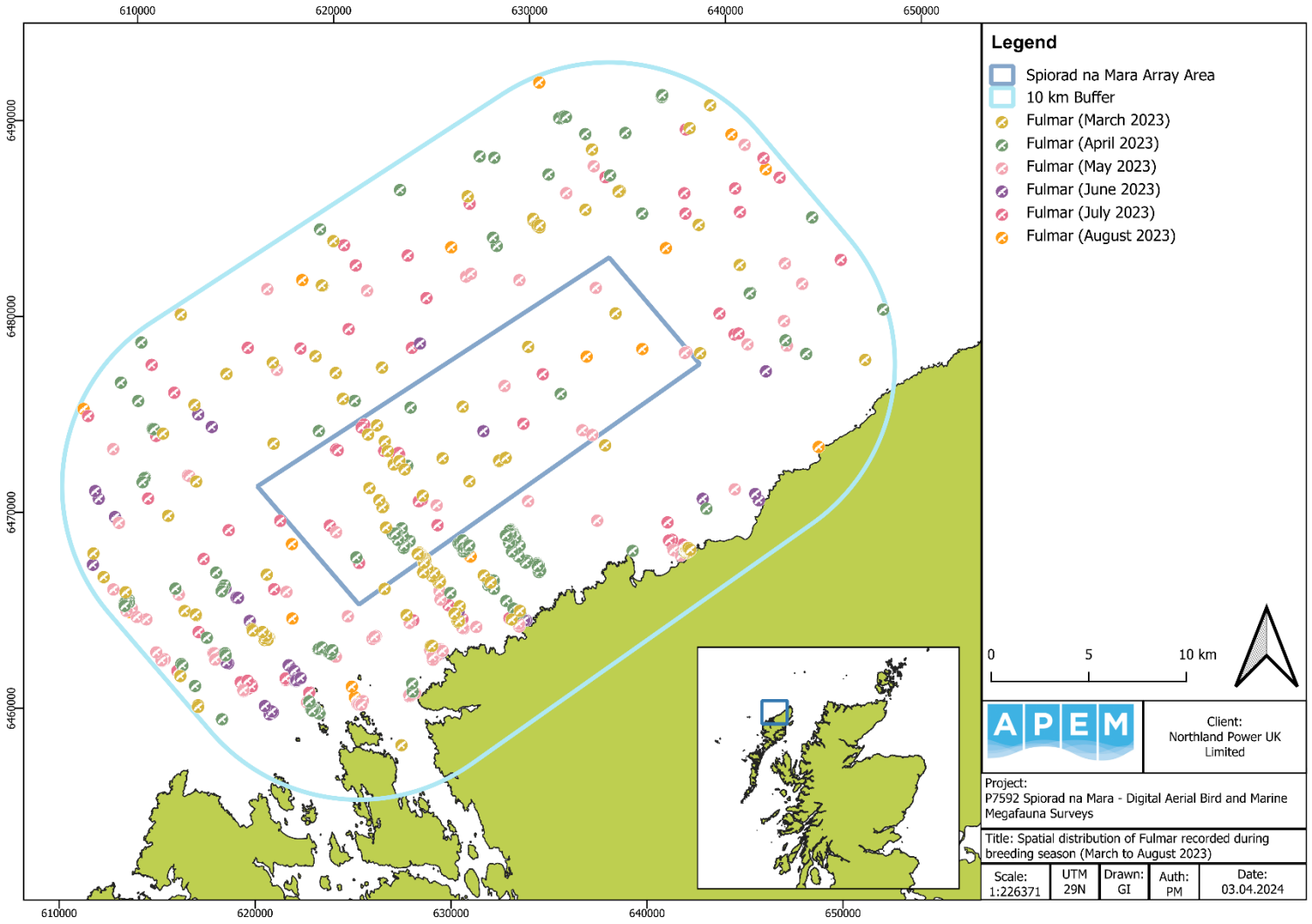


Figure 123 Distribution of fulmar in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

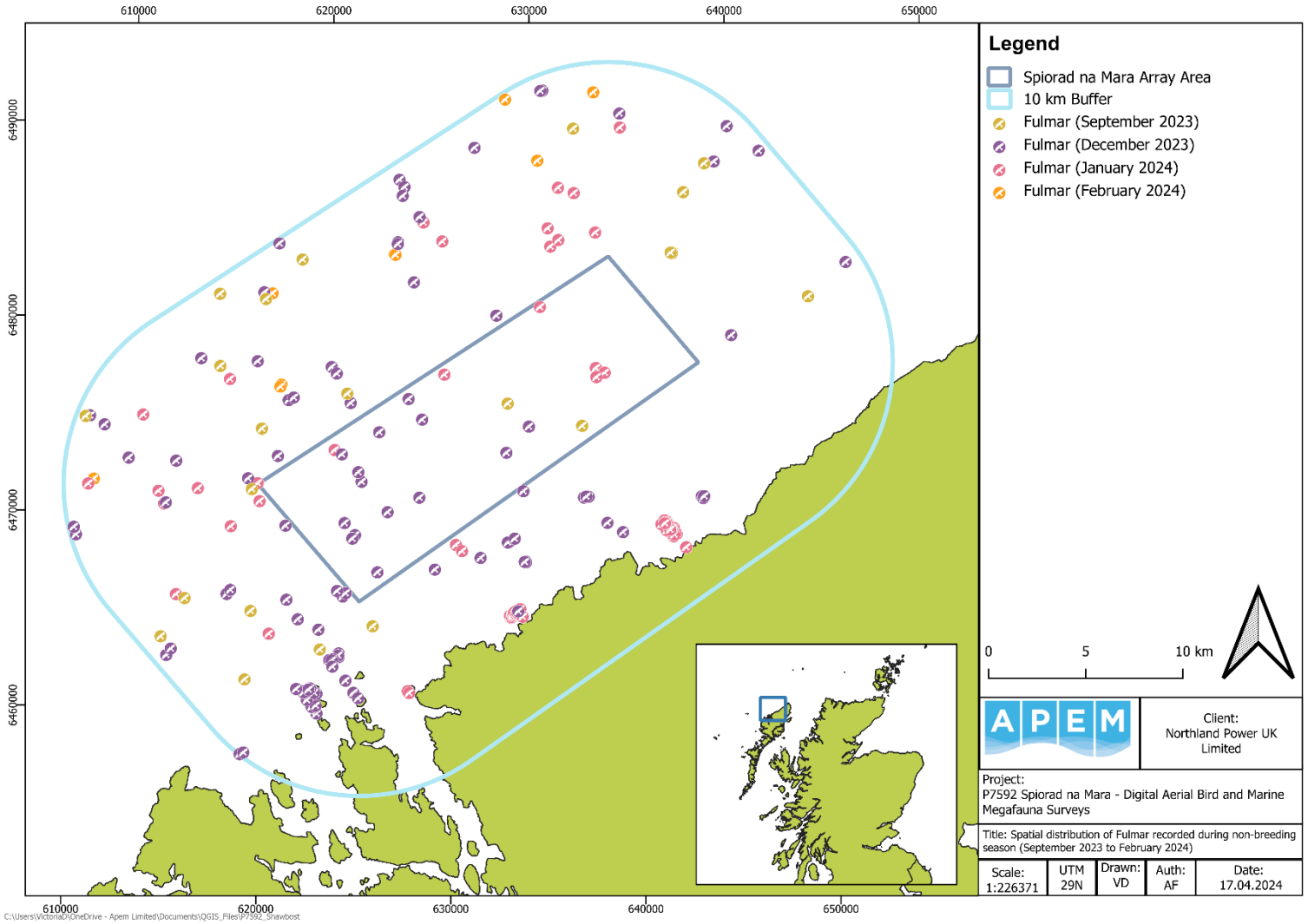
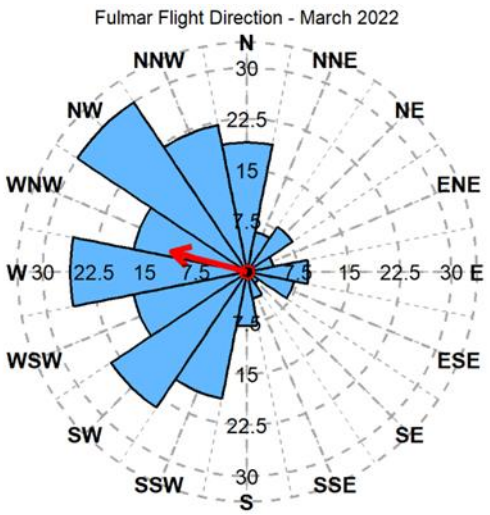


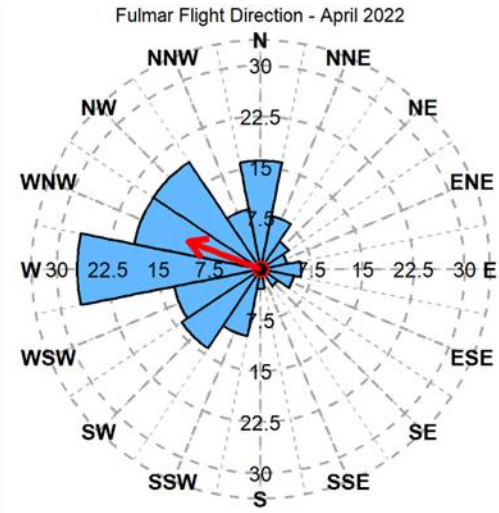
Figure 124 Distribution of fulmar in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



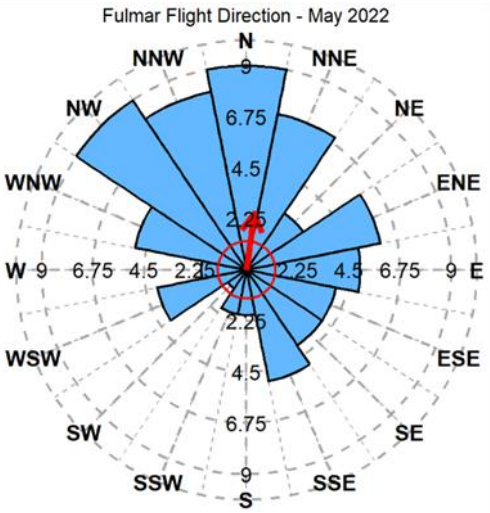
Number of Observations	222
Mean vector	285.413
Length of mean vector (r)	0.380
Rayleigh Test (Z)	32.114
Rayleigh Test (p)	<0.001

a. March 2022 (Survey 01)



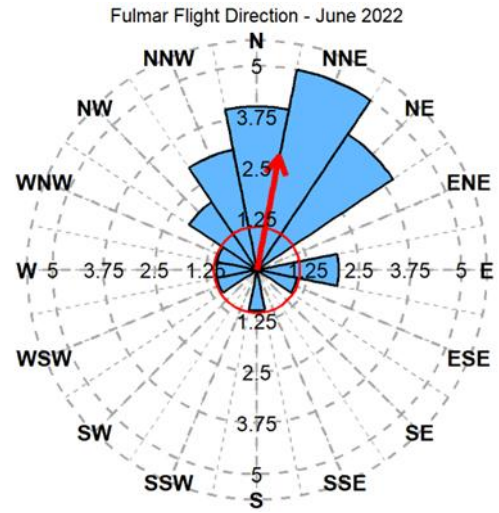
Number of Observations	162
Mean vector	291.958
Length of mean vector (r)	0.421
Rayleigh Test (Z)	28.667
Rayleigh Test (p)	<0.001

b. April 2022 (Survey 02)



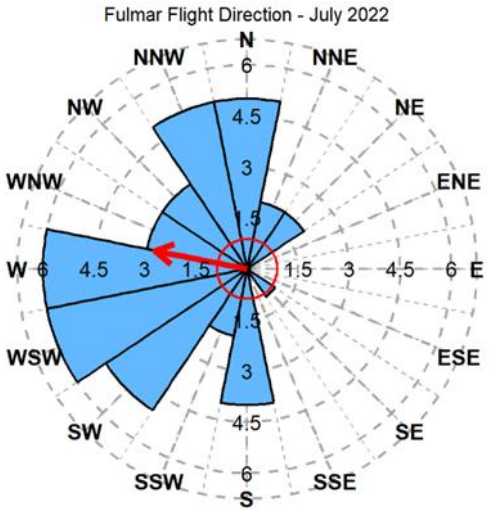
Number of Observations	76
Mean vector	8.368
Length of mean vector (r)	0.278
Rayleigh Test (Z)	5.875
Rayleigh Test (p)	0.003

c. May 2022 (Survey 03)



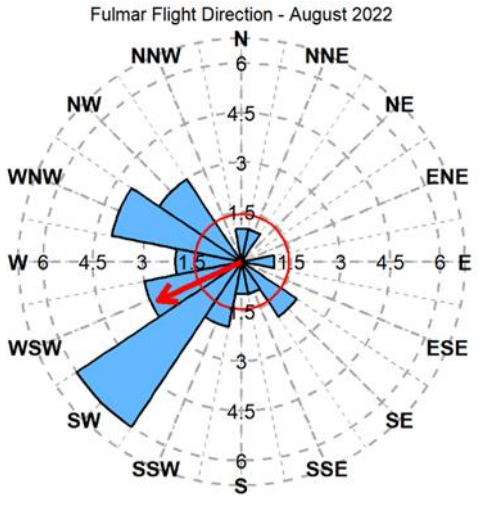
Number of Observations	25
Mean vector	11.035
Length of mean vector (r)	0.565
Rayleigh Test (Z)	7.976
Rayleigh Test (p)	<0.001

d. June 2022 (Survey 04)



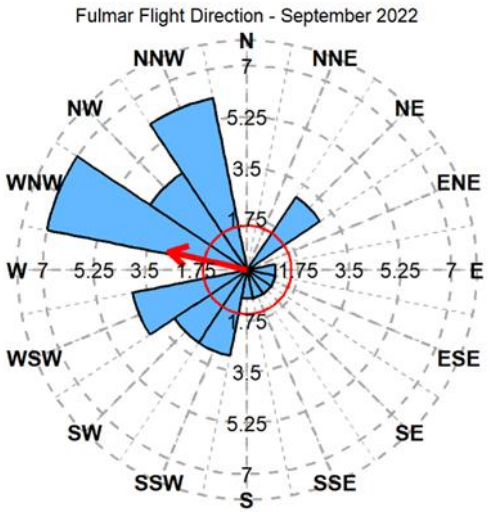
Number of Observations	44
Mean vector	281.840
Length of mean vector (r)	0.459
Rayleigh Test (Z)	9.281
Rayleigh Test (p)	<0.001

e. July 2022 (Survey 05)



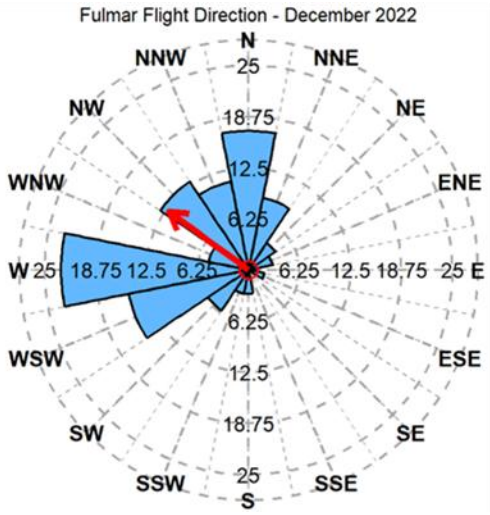
Number of Observations	27
Mean vector	245.940
Length of mean vector (r)	0.462
Rayleigh Test (Z)	5.769
Rayleigh Test (p)	0.002

f. August 2022 (Survey 06)



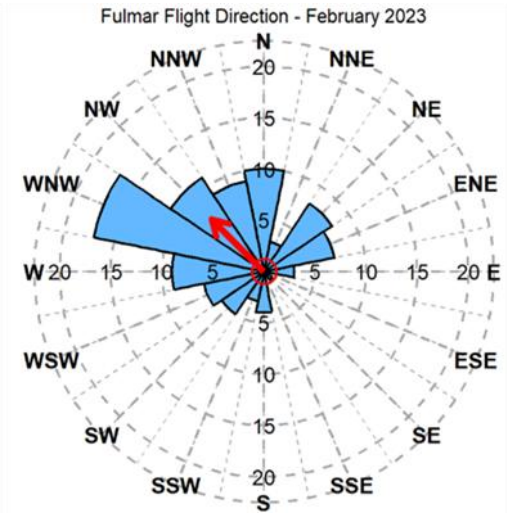
Number of Observations	35
Mean vector	283.557
Length of mean vector (r)	0.393
Rayleigh Test (Z)	5.401
Rayleigh Test (p)	0.004

g. September 2022 (Survey 07)



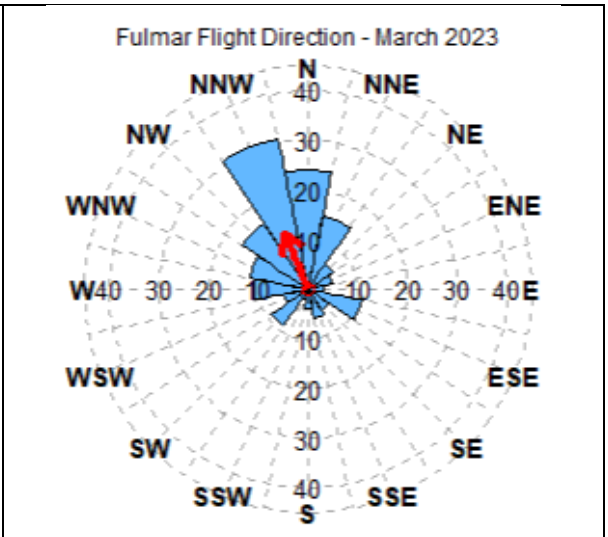
Number of Observations	114
Mean vector	306.565
Length of mean vector (r)	0.526
Rayleigh Test (Z)	31.535
Rayleigh Test (p)	<0.001

h. December 2022 (Survey 10)



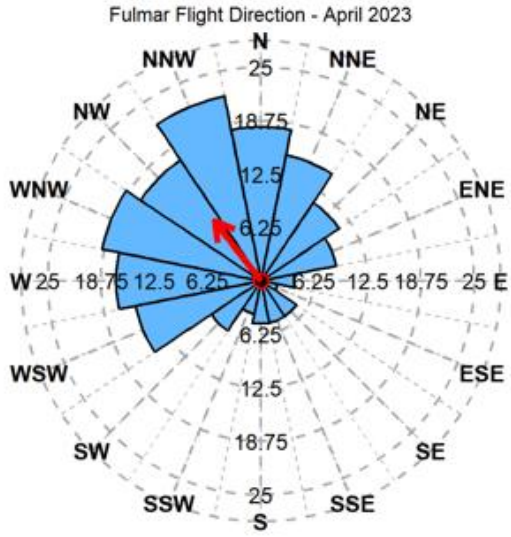
Number of Observations	96
Mean vector	315.908
Length of mean vector (r)	0.427
Rayleigh Test (Z)	17.488
Rayleigh Test (p)	<0.001

i. February 2023 (Survey 12)



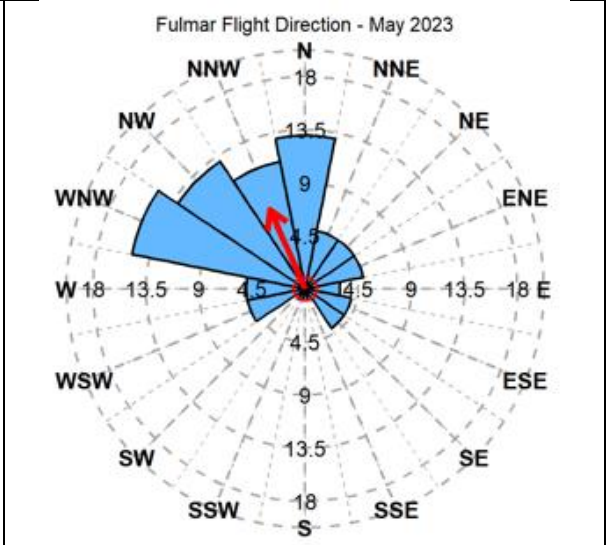
Number of Observations	165
Mean vector	337.583
Length of mean vector (r)	0.398
Rayleigh Test (Z)	26.140
Rayleigh Test (p)	<0.001

j. March 2023 (Survey 13)



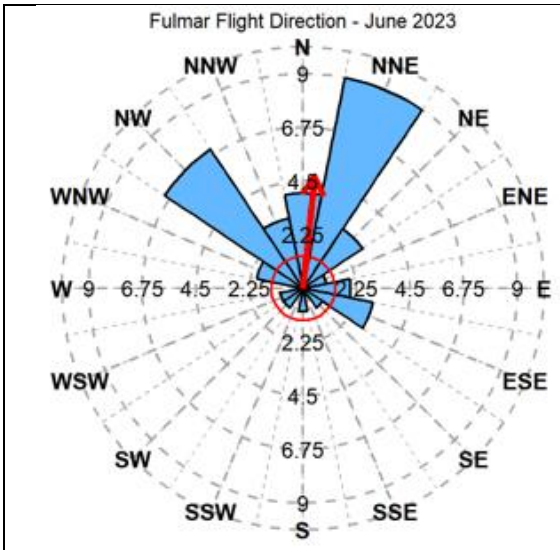
Number of Observations	175
Mean vector	322.075
Length of mean vector (r)	0.401
Rayleigh Test (Z)	28.125
Rayleigh Test (p)	<0.001

k. April 2023 (Survey 14)



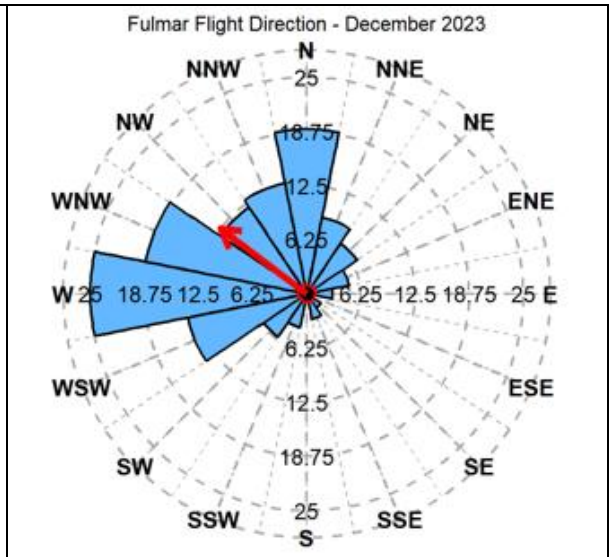
Number of Observations	90
Mean vector	336.069
Length of mean vector (r)	0.490
Rayleigh Test (Z)	21.617
Rayleigh Test (p)	<0.001

l. May 2023 (Survey 15)



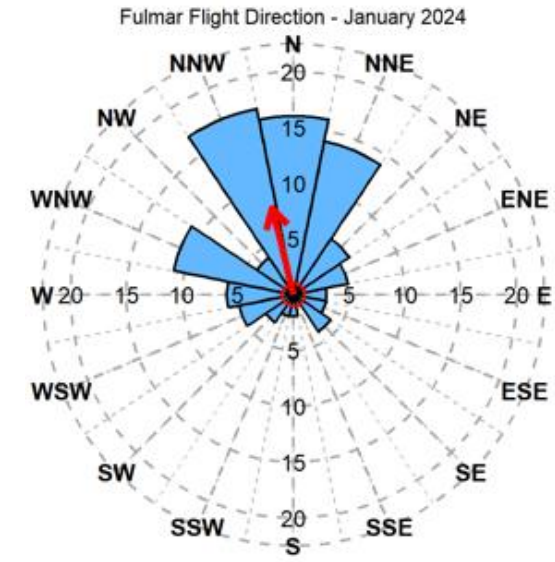
Number of Observations	38
Mean vector	6.935
Length of mean vector (r)	0.524
Rayleigh Test (Z)	10.418
Rayleigh Test (p)	<0.001

m. June 2023 (Survey 16)



Number of Observations	142
Mean vector	307.415
Length of mean vector (r)	0.499
Rayleigh Test (Z)	35.400
Rayleigh Test (p)	<0.001

n. December 2023 (Survey 22)



Number of Observations	101
Mean vector	346.697
Length of mean vector (r)	0.469
Rayleigh Test (Z)	22.229
Rayleigh Test (p)	<0.001

o. January 2024 (Survey 23)

Figure 125 Summary of flight direction of fulmar during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.38 Cory's shearwater - *Calonectris borealis*

A single Cory's shearwater was recorded flying in August 2022, resulting in an abundance estimate of nine [95% CL: 1, 26] within the Survey Area equating to 0.01 birds/km^2 (**Table 48**).

The Cory's shearwater was recorded in the north of the 10 km Buffer (**Figure 126**). It was recorded flying to the northwest, although this flight direction was not significant.

Table 48 Apportioned abundance and density estimates (birds per km^2) of Cory's shearwater in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total apportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Raw Count	Total apportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Raw Count	Total apportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	1	9	1	34	<1.00	0.01

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

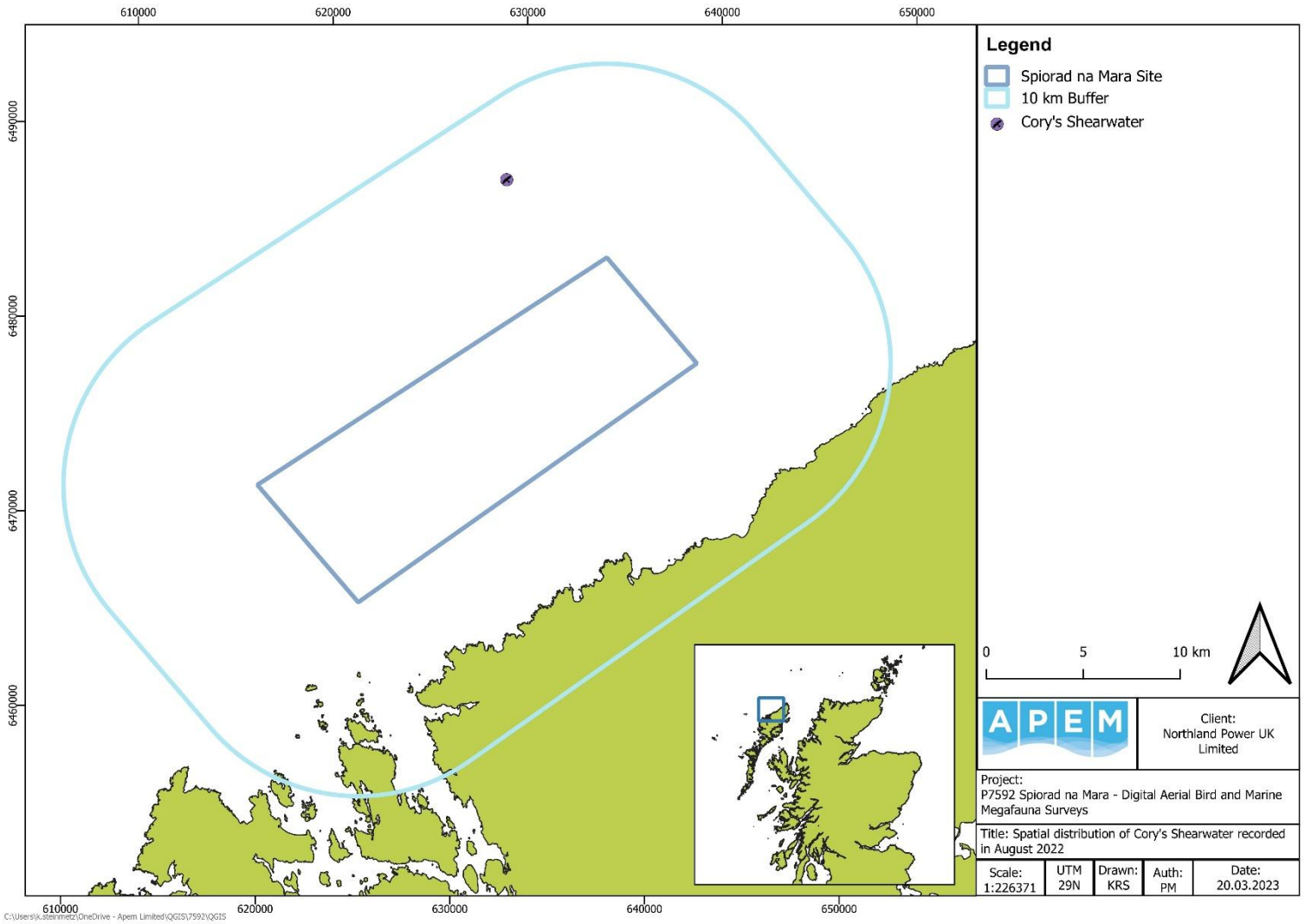


Figure 126 Distribution of Cory's shearwater in the Survey Area during August 2022

Note: Individuals in close proximity may appear overlapping

3.1.39 Sooty shearwater - *Ardenna grisea*

Sooty shearwaters were recorded in September 2022, and August to October 2023 during the survey period. Although a single identified Sooty shearwater was recorded each month, peak apportioned abundance occurred in October 2023 with an estimate of 12 [95% CL: 1, 36] within the Survey Area equating to 0.01 birds/km^2 (**Table 49**).

Sooty shearwaters were recorded in the central and western regions of the Survey Area (**Figure 127** to **Figure 129**). All sooty shearwater were recorded flying with no significant direction.

Table 49 Apportioned abundance and density estimates (birds per km^2) of sooty shearwater in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Sep-22	1	9	1	26	<1.00	0.01	11	1	34	0.01
Aug-23	1	9	1	26	<1.00	0.01	11	1	33	0.01
Sep-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
Oct-23	1	9	1	26	<1.00	0.01	12	1	36	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Sep-22	1	9	1	27	<1.00	0.06	9	1	27	0.06
Aug-23	1	9	1	36	<1.00	0.06	9	1	27	0.06
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Sep-23	1	8	1	26	<1.00	0.01	8	1	26	0.01
Oct-23	1	9	1	26	<1.00	0.01	12	1	36	0.02

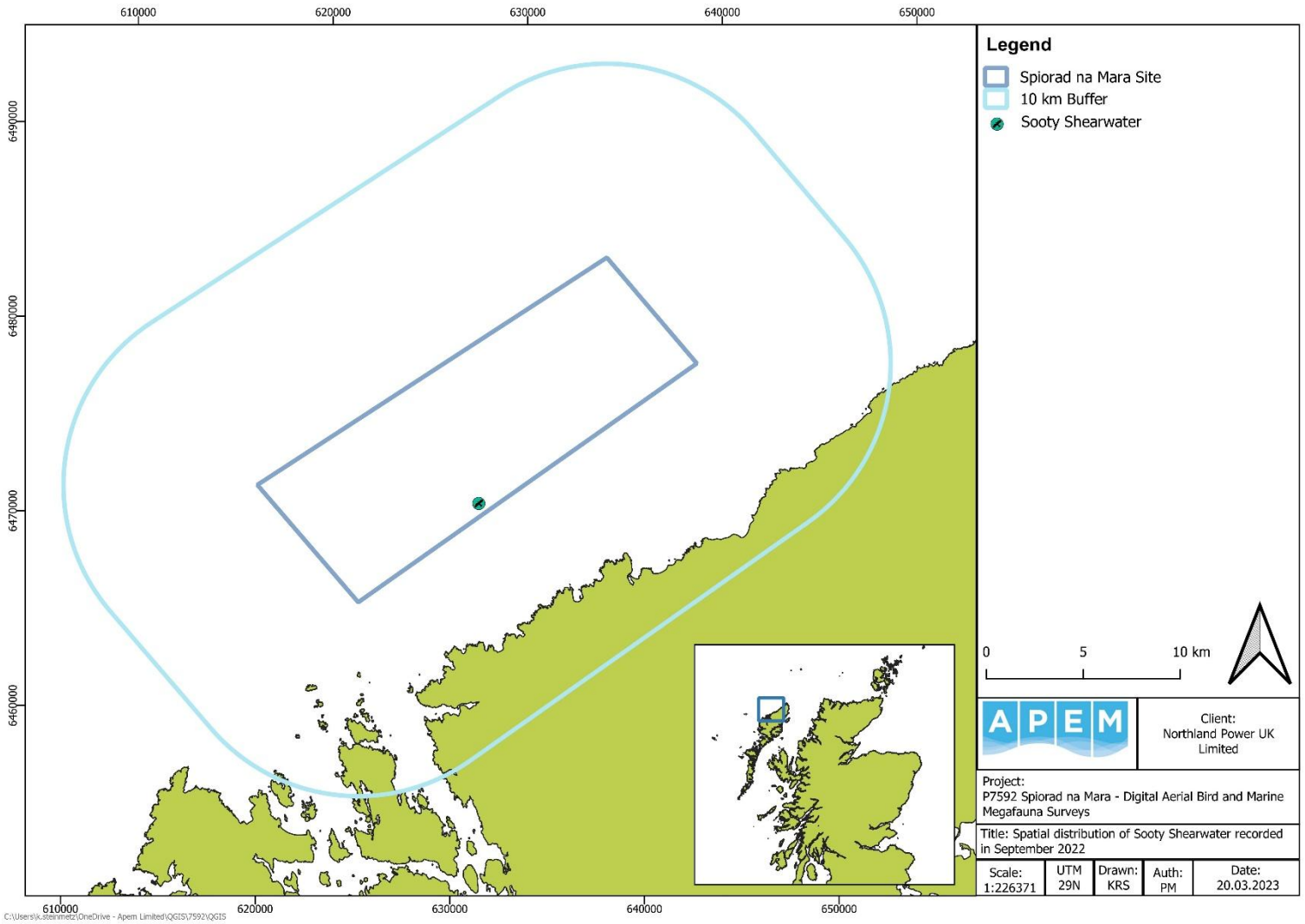


Figure 127 Distribution of sooty shearwater in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

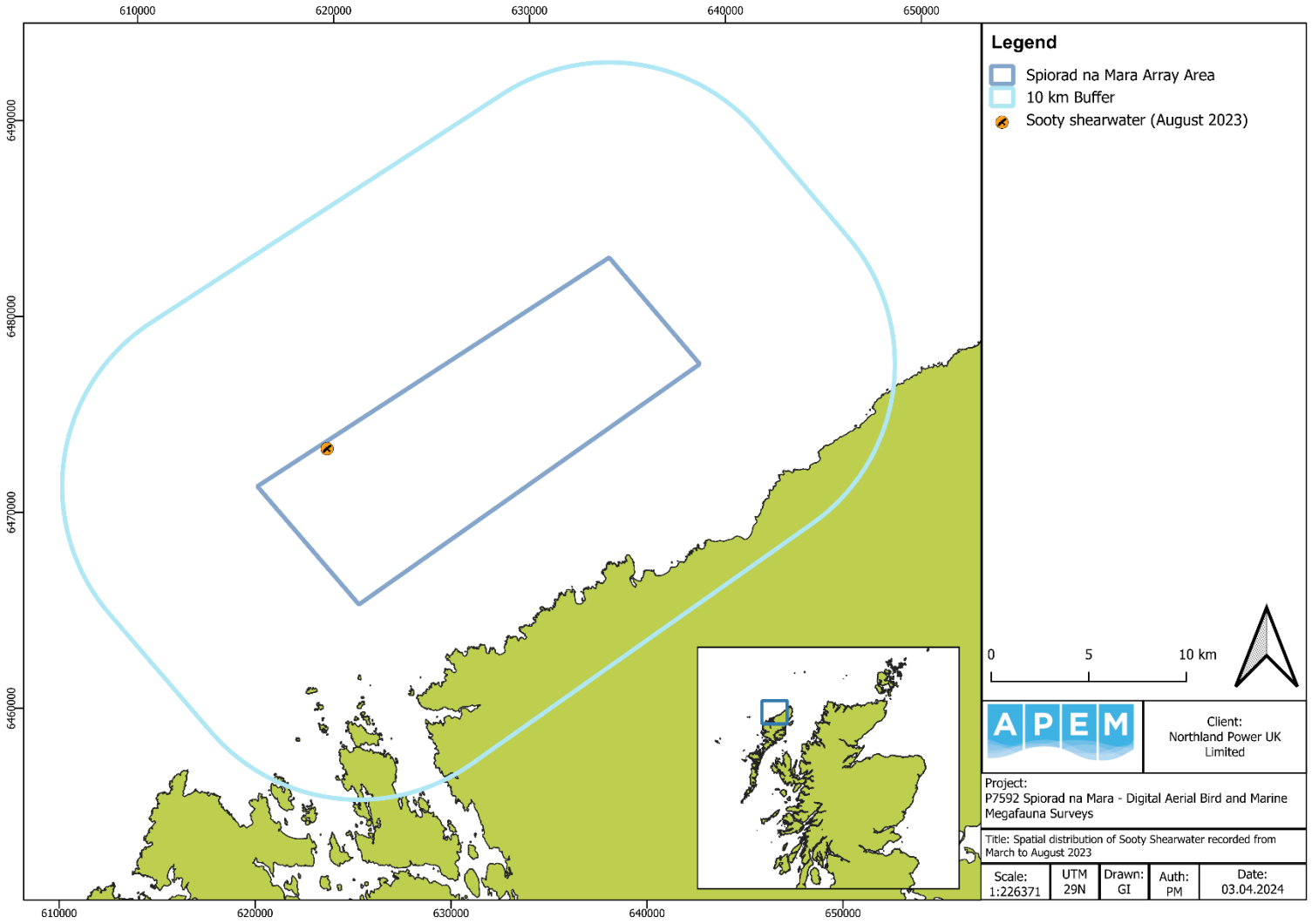


Figure 128 Distribution of sooty shearwater in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

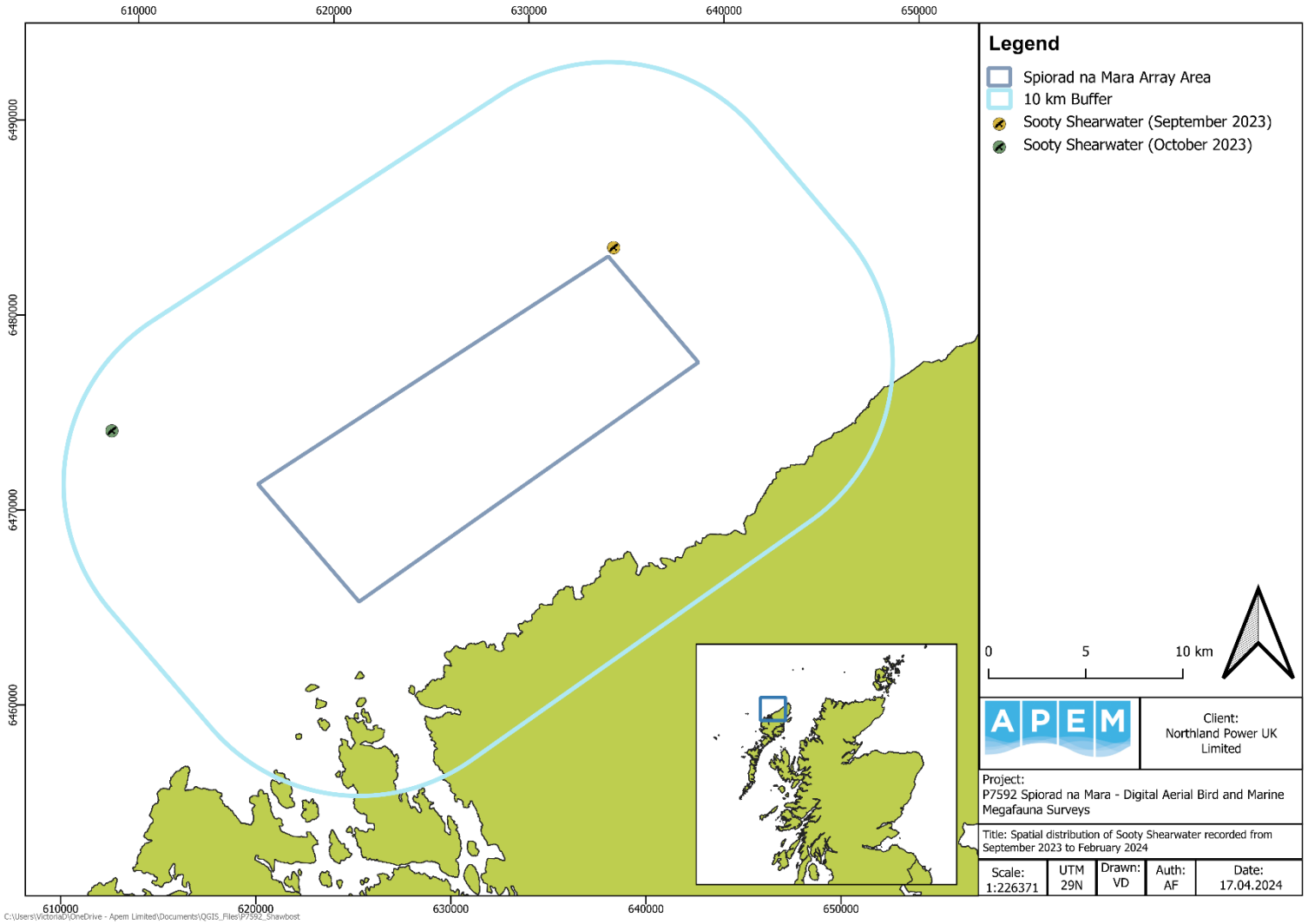


Figure 129 Distribution of sooty shearwater in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.40 Manx shearwater - *Puffinus puffinus*

Manx shearwaters were recorded predominantly during the breeding seasons from April to September 2022, and June to September 2023. Peak abundance occurred in July 2022 with an estimate of 3,928 [95% CL: 792, 9,258] within the Survey Area equating to 4.10 birds/km^2 (**Table 50**). Manx shearwaters were typically observed in the southern and eastern sections of the Survey Area during the breeding seasons, except for July 2022 when individuals were loosely distributed across the Survey Area (**Figure 130** and **Figure 132**). During the non-breeding seasons (September 2022/23), Manx shearwaters were recorded in the low numbers to the southwest, east, and north of the 10 km Buffer (**Figure 131** and **Figure 133**).

In July 2022 and August 2023, significant predominant directions of flight to the west and southwest were recorded (**Figure 134a-b**).

Table 50 Apportioned abundance and density estimates (birds per km^2) of Manx shearwater in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	2	17	2	43	0.71	0.02	18	2	46	0.02
May-22	2	17	2	51	0.71	0.02	17	2	44	0.02
Jun-22	2	17	2	51	0.71	0.02	18	2	54	0.02
Jul-22	397	3,410	979	7,130	0.05	3.58	3,913	777	8,746	4.10
Aug-22	2	17	2	43	0.71	0.02	51	11	112	0.05
Sep-22	29	249	29	670	0.19	0.26	280	32	749	0.29
Jun-23	15	133	15	380	0.26	0.14	155	17	469	0.16
Jul-23	39	338	87	651	0.16	0.35	427	82	919	0.45
Aug-23	3	26	3	69	0.58	0.03	42	5	114	0.04
Sep-23	1	9	1	26	<1.00	0.01	9	1	26	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	27	<1.00	0.06	11	1	34	0.07
Jul-22	50	446	50	1,169	0.14	2.77	504	64	1,778	3.13
Aug-22	0	0	0	0	0.00	0.00	18	2	44	0.11
Jul-23	3	27	3	64	0.58	0.17	38	4	107	0.23
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	26	<1.00	0.01	9	1	27	0.01
May-22	2	17	2	43	0.71	0.02	17	2	44	0.02
Jun-22	2	17	2	51	0.71	0.02	18	2	54	0.02
Jul-22	347	2,959	554	6,251	0.05	3.73	3,379	484	8,155	4.26
Aug-22	2	17	2	43	0.71	0.02	34	4	86	0.04
Sep-22	29	247	29	674	0.19	0.31	280	32	740	0.35

Jun-23	15	132	15	377	0.26	0.17	154	17	469	0.19
Jul-23	36	309	60	618	0.17	0.39	395	63	868	0.50
Aug-23	3	25	3	68	0.58	0.03	41	5	118	0.05
Sep-23	1	8	1	26	<1.00	0.01	8	1	26	0.01

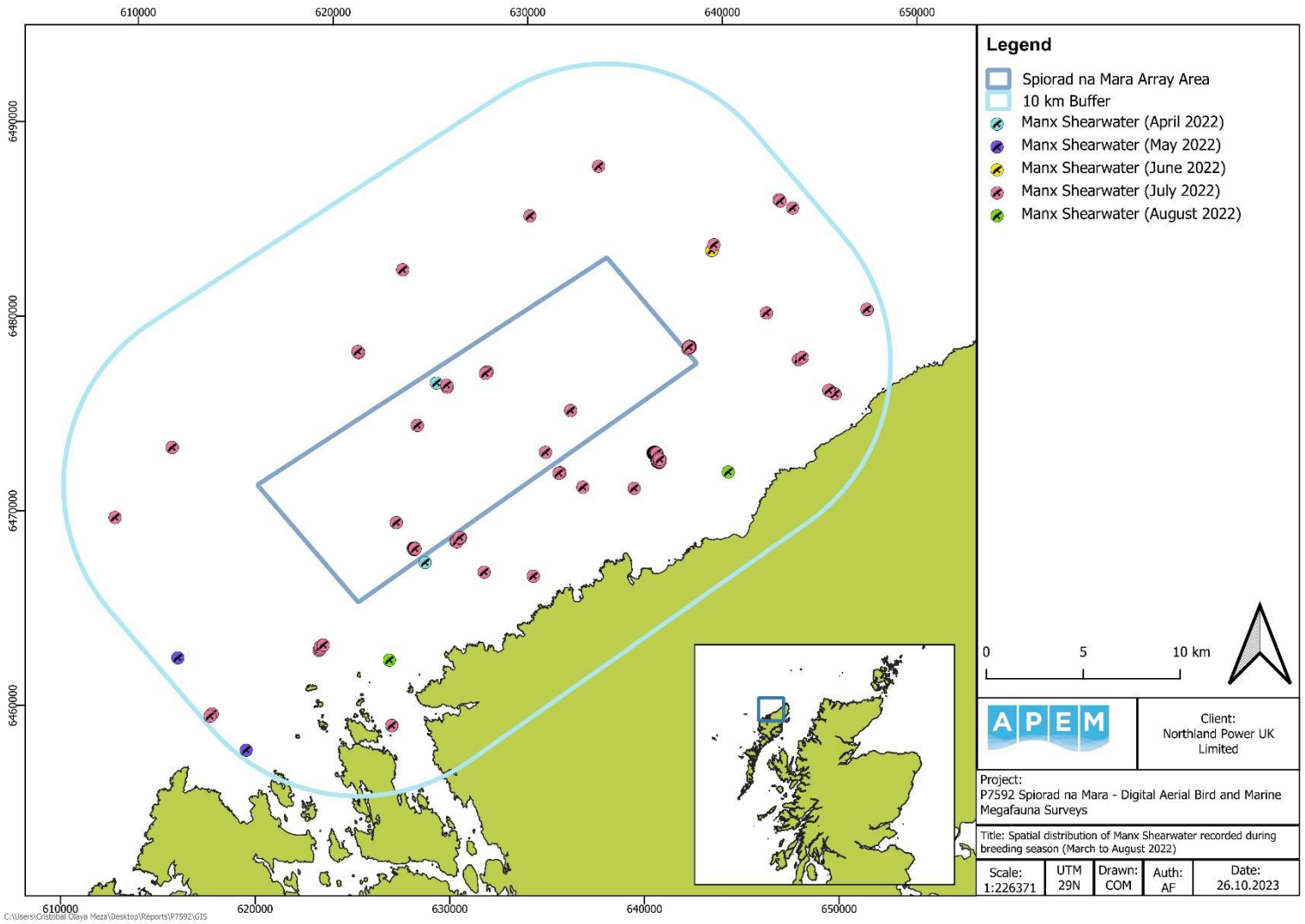


Figure 130 Distribution of Manx shearwater in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

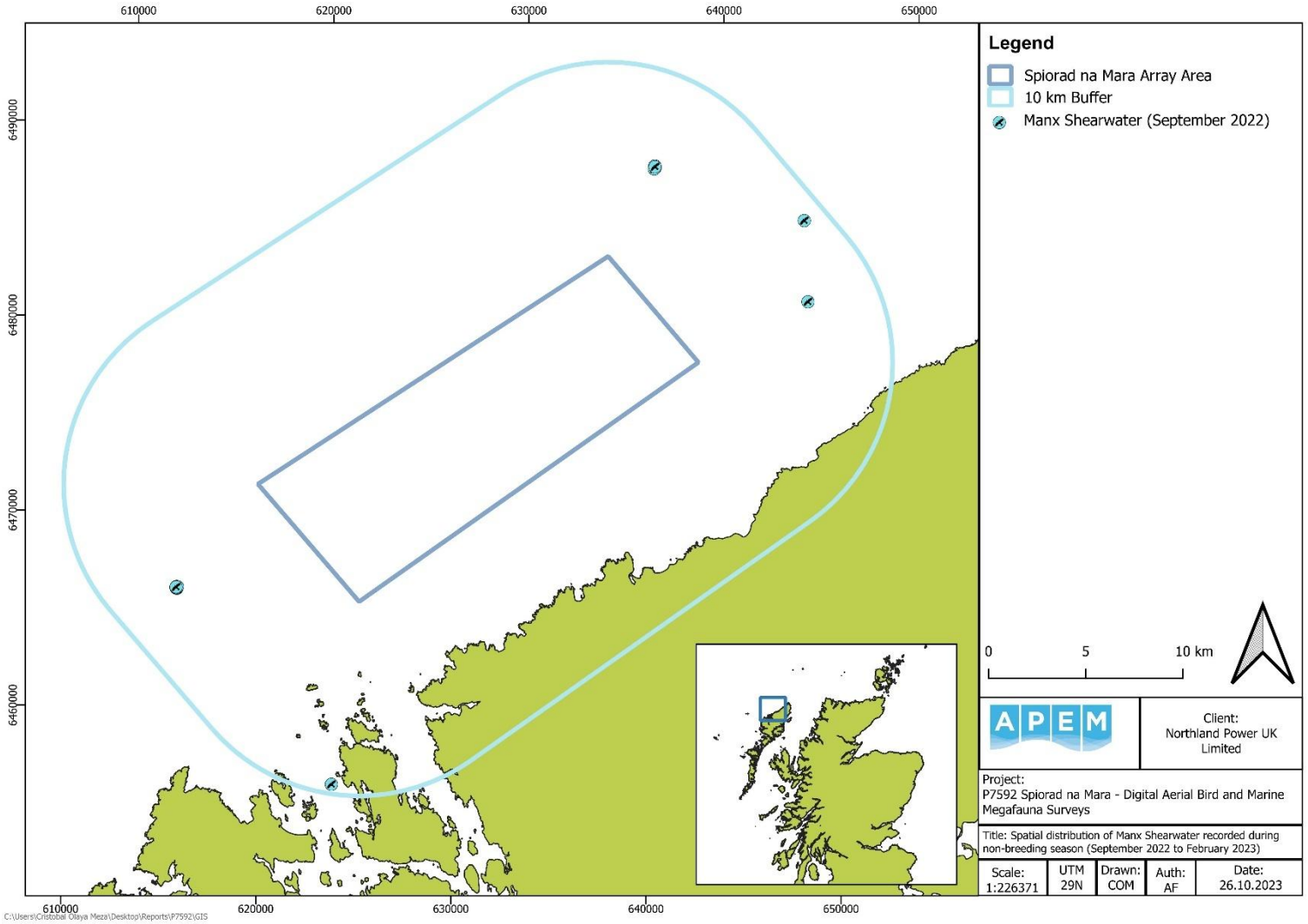


Figure 131 Distribution of Manx shearwater in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

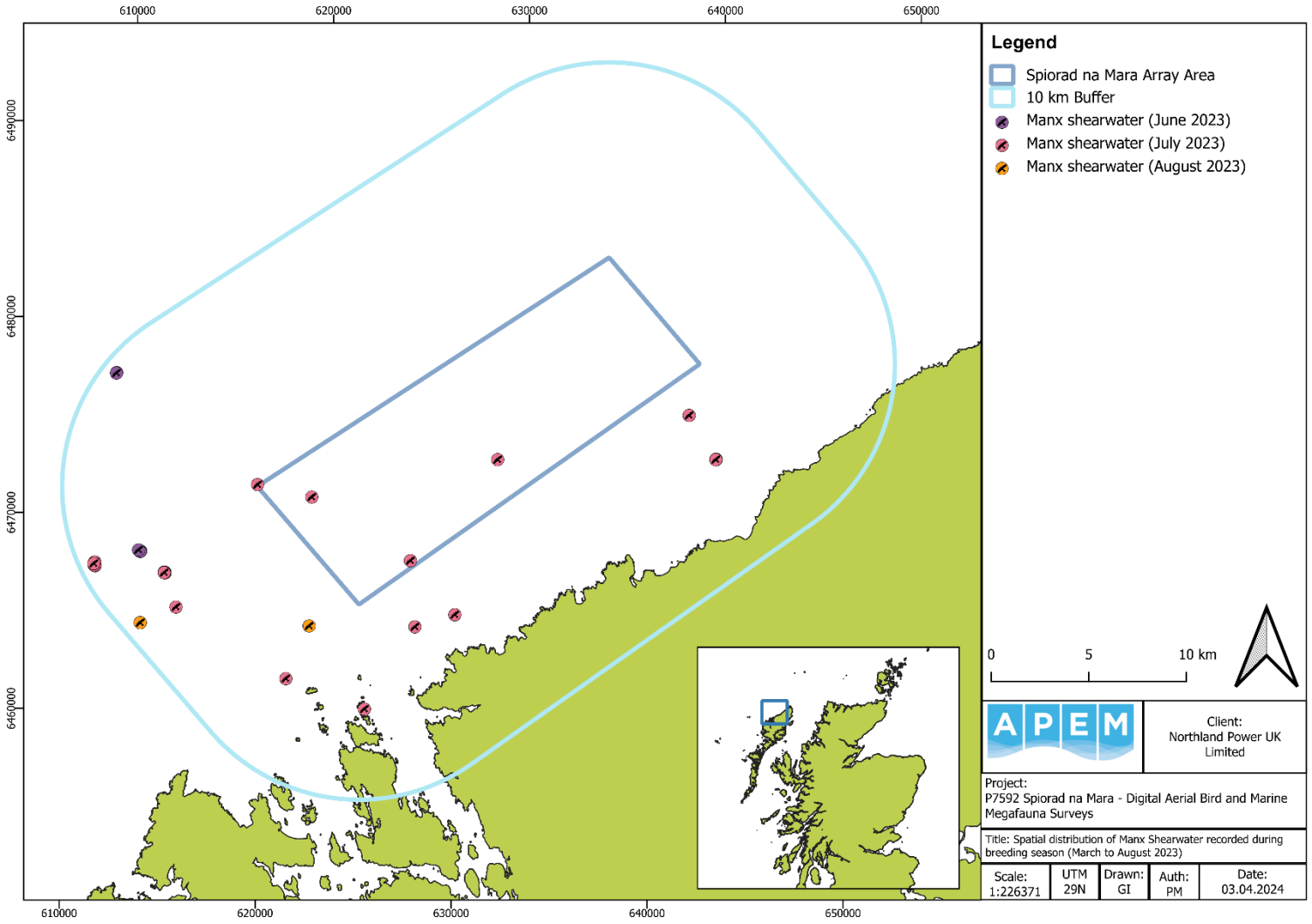


Figure 132 Distribution of Manx shearwater in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

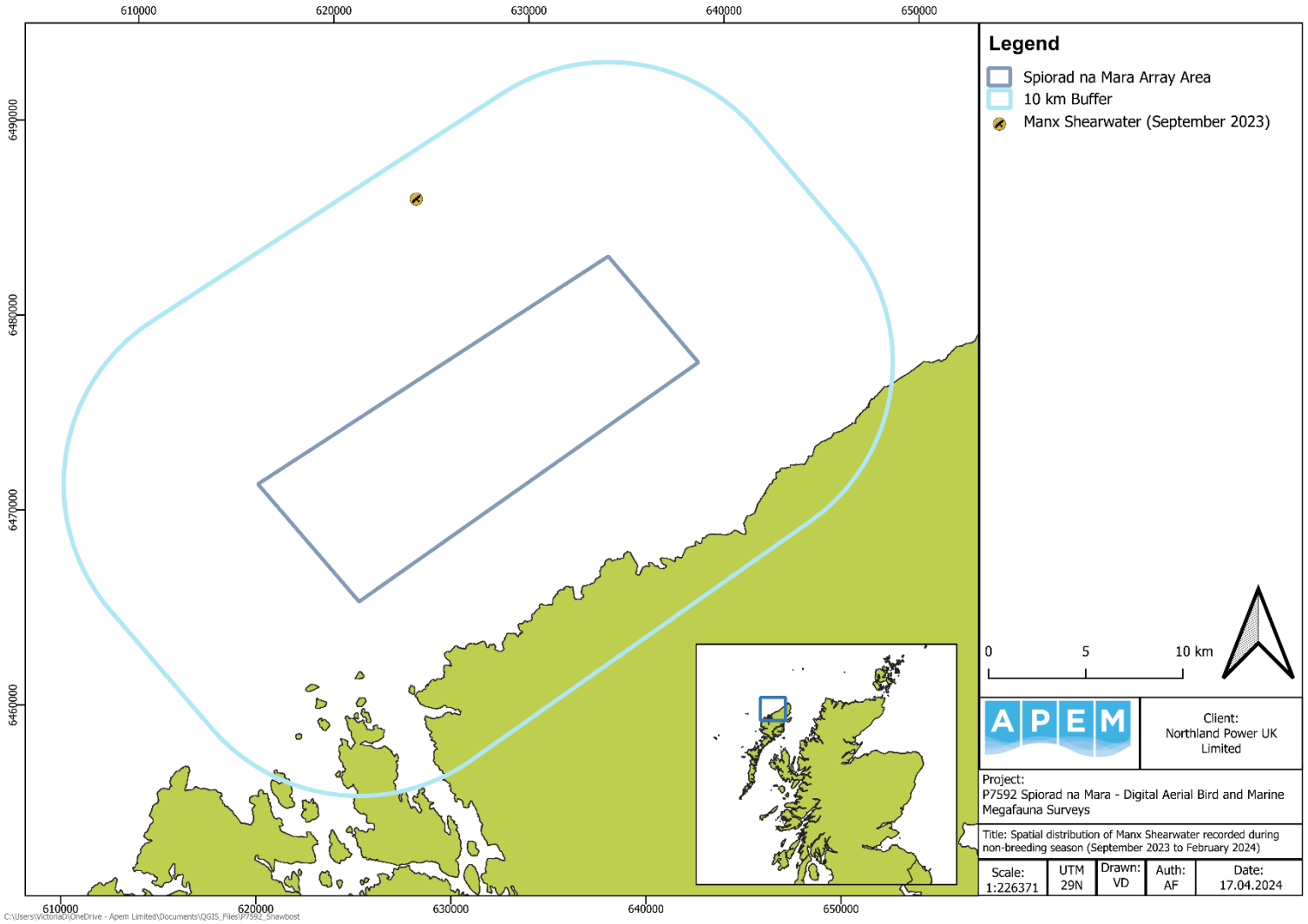
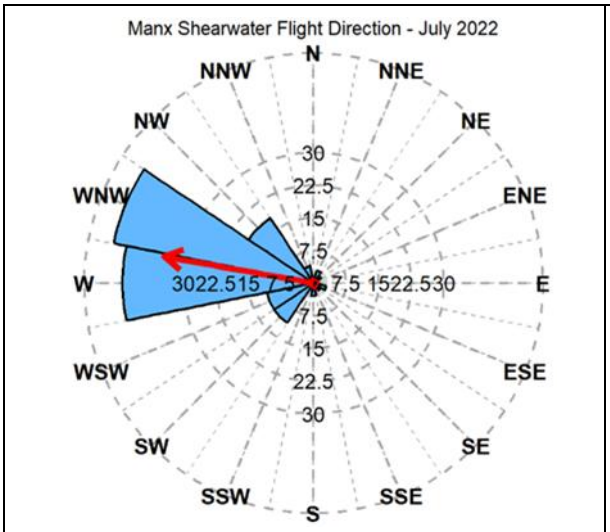
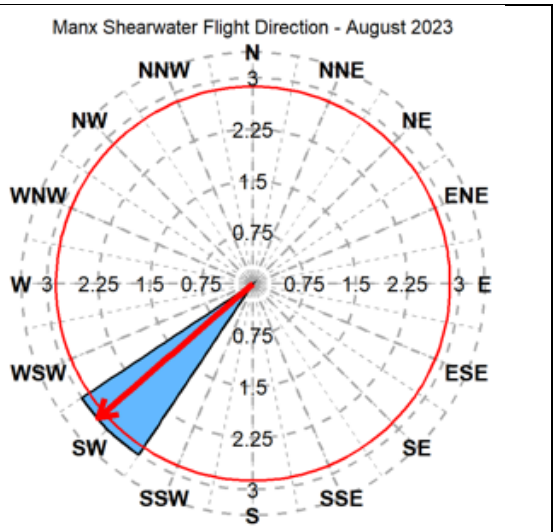


Figure 133 Distribution of Manx shearwater in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping





Number of Observations	153	Number of Observations	3
Mean vector	280.600	Mean vector	229.057
Length of mean vector (r)	0.743	Length of mean vector (r)	0.996
Rayleigh Test (Z)	84.493	Rayleigh Test (Z)	2.978
Rayleigh Test (p)	<0.001	Rayleigh Test (p)	0.035
a. July 2022 (Survey 05)		**b. August 2023 (Survey 18)**	

Figure 134 Summary of flight direction of Manx shearwater during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.41 Auk / Shearwater species - Unidentified

Auk/shearwater species were recorded in 13 months throughout the survey period. Peak abundance occurred in July 2022 with an estimate of 1,722 [95% CL:201, 4,627] within the Survey Area equating to 1.80 birds/km^2 (**Table 51**). During the 2022 breeding season, individuals were found scattered across the Survey Area, with a notable absence in the north (**Figure 135**). In the 2023 breeding season, auk/shearwaters were recorded throughout the Survey Area, with higher concentrations in the west of the 10km Buffer Zone (**Figure 137**). There was no discernible pattern of distribution during either-breeding seasons (**Figure 136** and **Figure 138**).

In September 2022, a significant predominant direction of flight was recorded to the southeast (**Figure 139**).

Table 51 Apportioned abundance and density estimates (birds per km^2) of auk / shearwater species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	9	1	34	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	17	147	52	260	0.24	0.15				
May-22	2	17	2	51	0.71	0.02				
Jun-22	2	17	2	42	0.71	0.02				
Jul-22	201	1,727	201	4,716	0.07	1.80				
Sep-22	17	146	43	300	0.24	0.15				
Apr-23	5	43	9	96	0.45	0.04				
May-23	1	9	1	35	<1.00	0.01				
Jun-23	23	204	71	363	0.21	0.21				
Jul-23	47	408	217	651	0.15	0.43				
Aug-23	3	26	3	69	0.58	0.03				
Sep-23	1	9	1	26	<1.00	0.01				
Oct-23	1	9	1	26	<1.00	0.01				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
Jul-22	29	259	29	571	0.19	1.61				
Sep-22	1	9	1	27	<1.00	0.06				
Apr-23	2	18	2	54	0.71	0.11				
May-23	1	9	1	28	<1.00	0.06				
Jun-23	1	9	1	28	<1.00	0.06				
Jul-23	2	18	2	46	0.71	0.11				
c) 10 km Buffer										
Month		Total unapportioned					Total apportioned			

	Raw Count	Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	8	1	25	<1.00	0.01	None remaining as all abundance estimates apportioned into specific species.			
Apr-22	16	137	52	240	0.25	0.17				
May-22	2	17	2	51	0.71	0.02				
Jun-22	2	17	2	42	0.71	0.02				
Jul-22	172	1,467	172	4,280	0.08	1.83				
Sep-22	16	136	34	290	0.25	0.17				
Apr-23	3	26	3	60	0.58	0.03				
Jun-23	22	193	70	342	0.21	0.24				
Jul-23	45	386	189	627	0.15	0.48				
Aug-23	3	25	3	68	0.58	0.03				
Sep-23	1	8	1	26	<1.00	0.01				
Oct-23	1	9	1	26	<1.00	0.01				

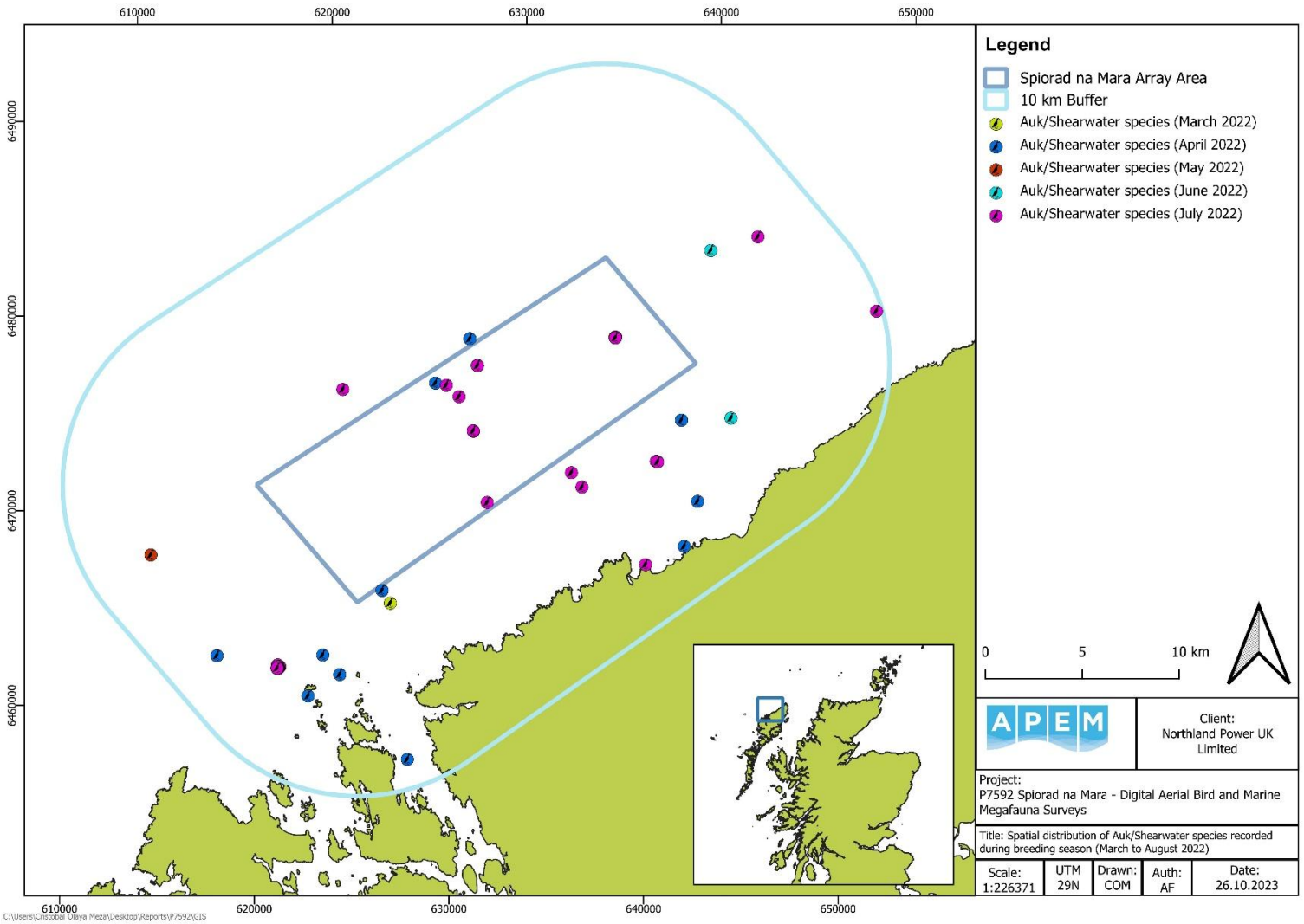


Figure 135 Distribution of auk / shearwater species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

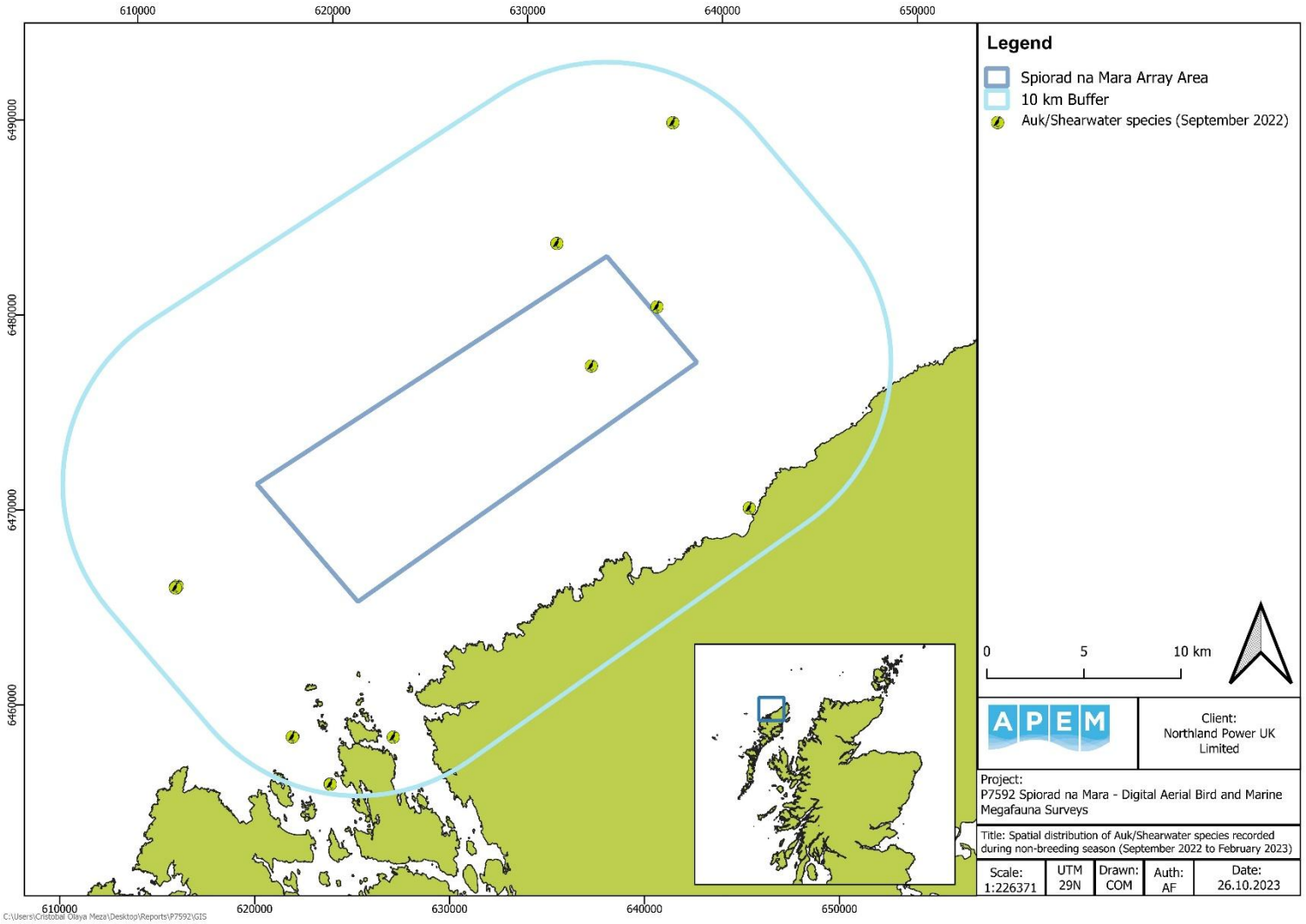


Figure 136 Distribution of auk / shearwater species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

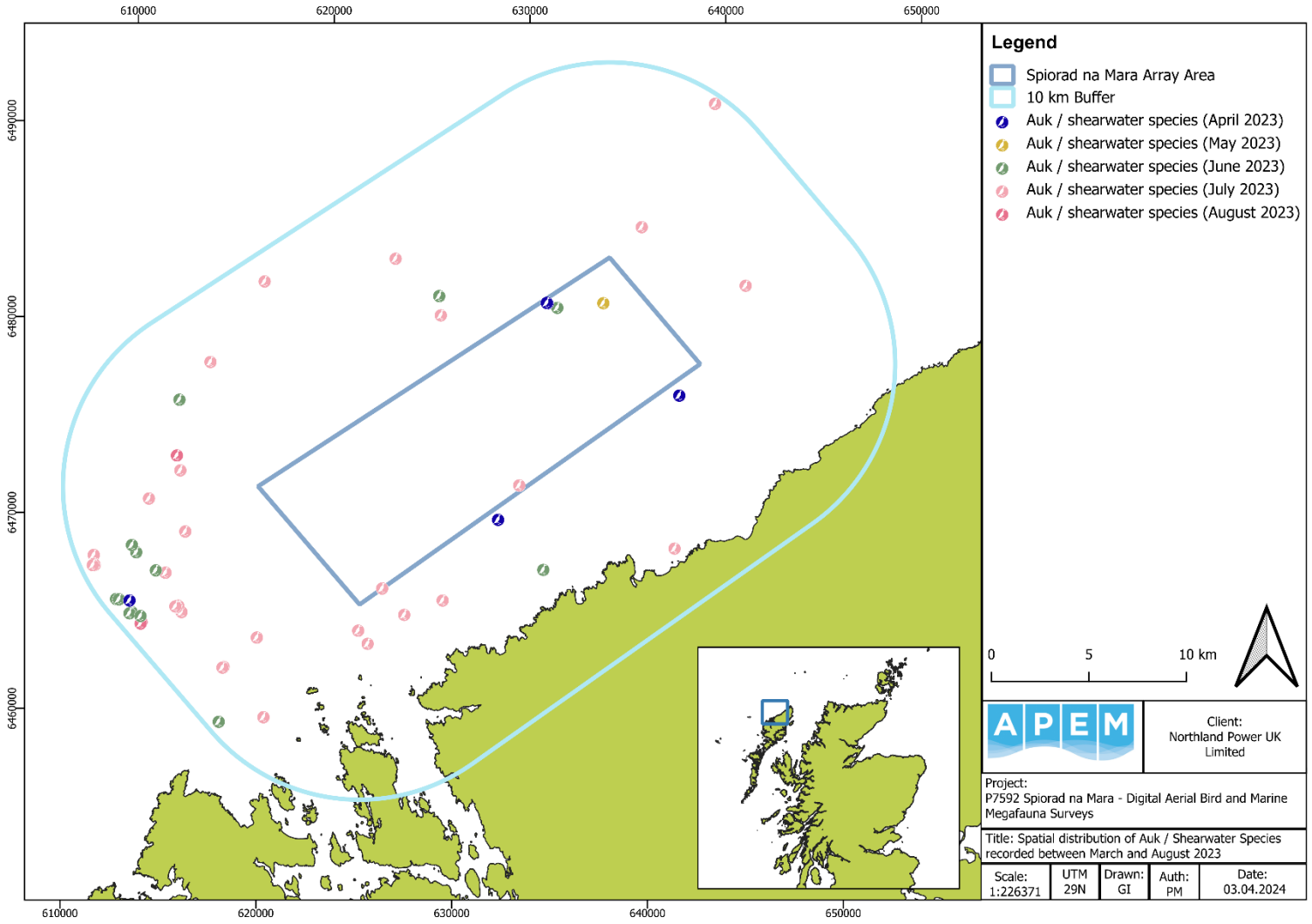


Figure 137 Distribution of auk / shearwater species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

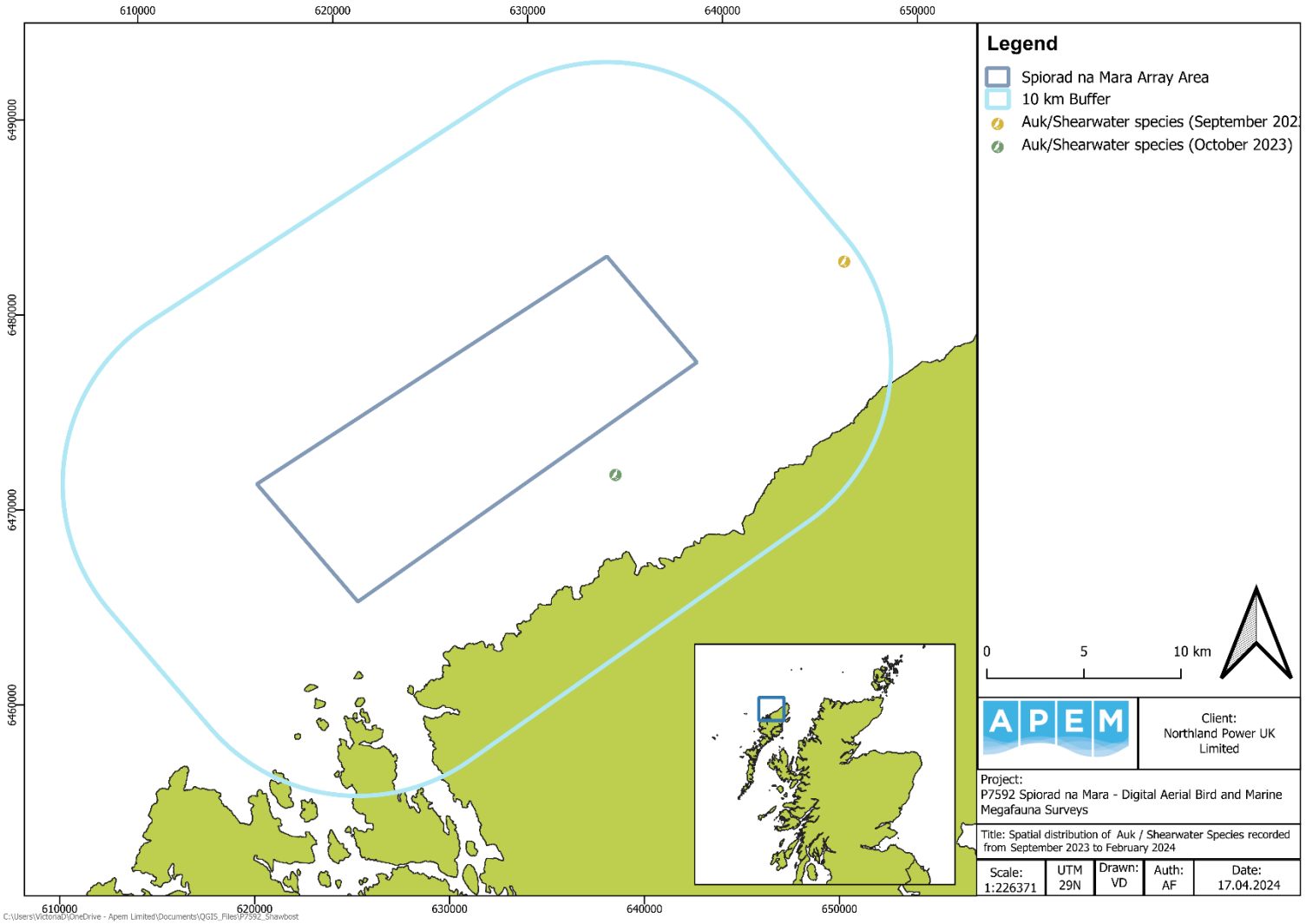
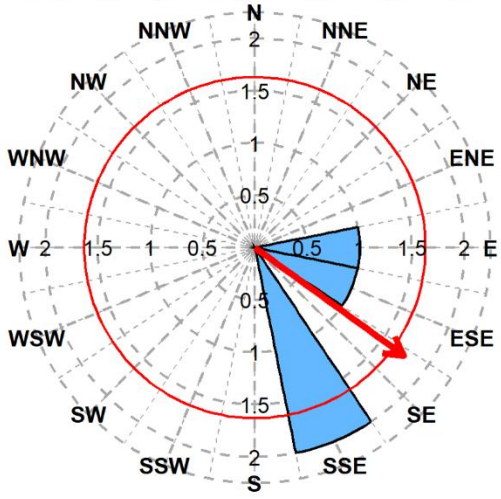


Figure 138 Distribution of auk / shearwater species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	4
Mean vector	126.445
Length of mean vector (r)	0.878
Rayleigh Test (Z)	3.080
Rayleigh Test (p)	0.034
a. September 2022 (Survey 07)	

Figure 139 Summary of flight direction of auk / shearwater species during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.42 Small Shearwater species - Unidentified

Small shearwater species were recorded in six months throughout the survey period. Peak abundance occurred in July 2022 with an estimate of 308 [95% CL: 69, 728] within the Survey Area equating to 0.32 birds/km^2 (**Table 52**). During the 2022 breeding season, small shearwater species were recorded in the northeast, south, and southwest of the Survey Area, with higher concentrations in close proximity to the coastline (**Figure 140**). During the non-breeding season in September 2022, an individual was recorded in the northeast of the 10km Buffer Zone (**Figure 141**). During the 2023 breeding season, small shearwater species were recorded in the west of the 10km Buffer Zone; however, an individual was recorded in the Spiorad na Mara Array Area (**Figure 142**).

In July 2022, a significant predominant direction of flight was recorded to the west-northwest (**Figure 143**).

Table 52 Apportioned abundance and density estimates (birds per km^2) of small shearwater species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	36	309	69	747	0.17	0.32	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	4	34	9	69	0.50	0.04				
Sep-22	1	9	1	26	<1.00	0.01				
Jun-23	1	9	1	27	<1.00	0.01				
Jul-23	2	17	2	43	0.71	0.02				
Aug-23	2	17	2	43	0.71	0.02				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	4	36	4	89	0.50	0.22	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	2	18	2	44	0.71	0.11				
Jul-23	1	9	1	27	<1.00	0.06				
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	32	273	43	674	0.18	0.34	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	2	17	2	43	0.71	0.02				
Sep-22	1	9	1	26	<1.00	0.01				
Jun-23	1	9	1	26	<1.00	0.01				
Jul-23	1	9	1	26	<1.00	0.01				
Aug-23	2	17	2	42	0.71	0.02				

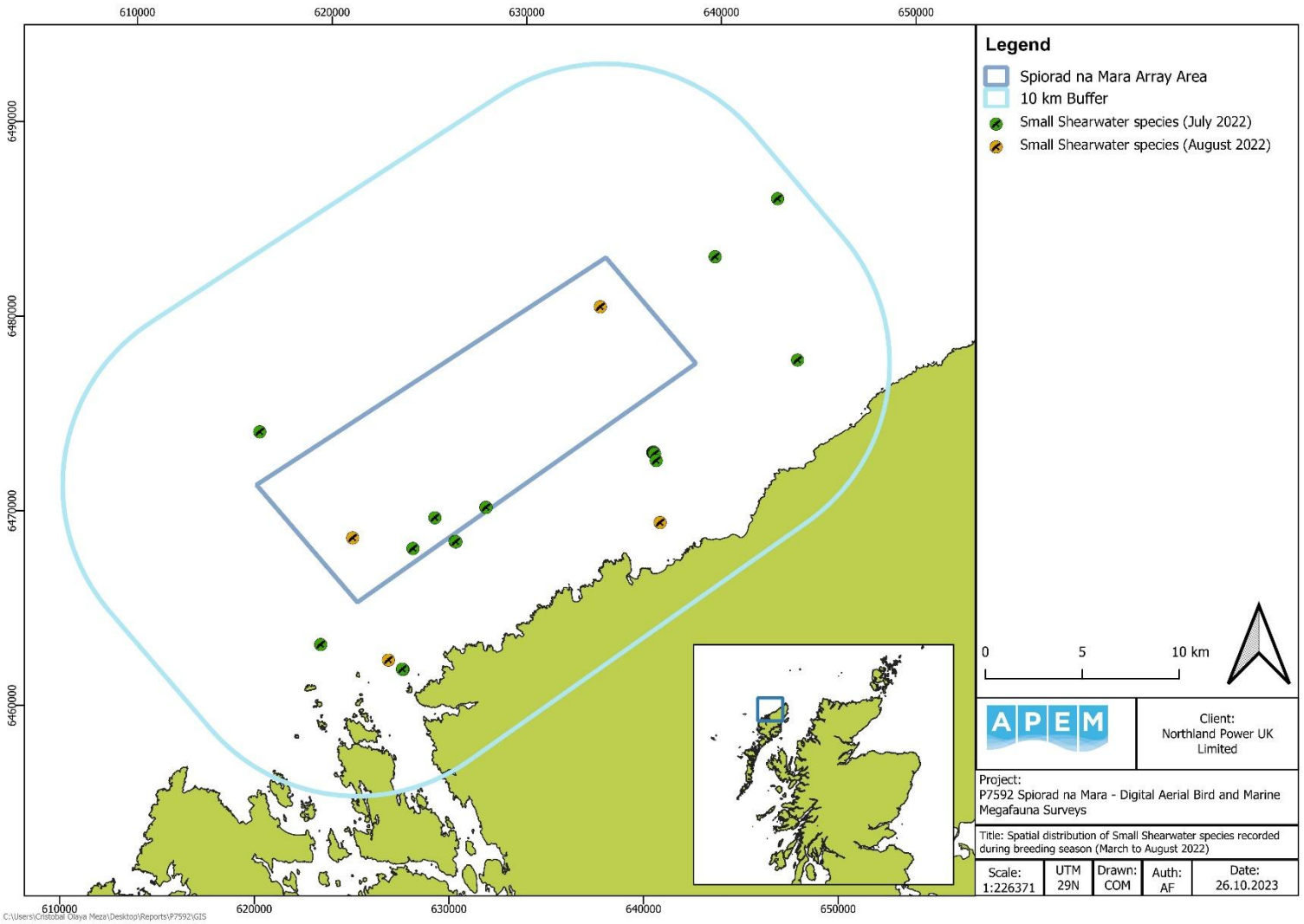


Figure 140 Distribution of small shearwater species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

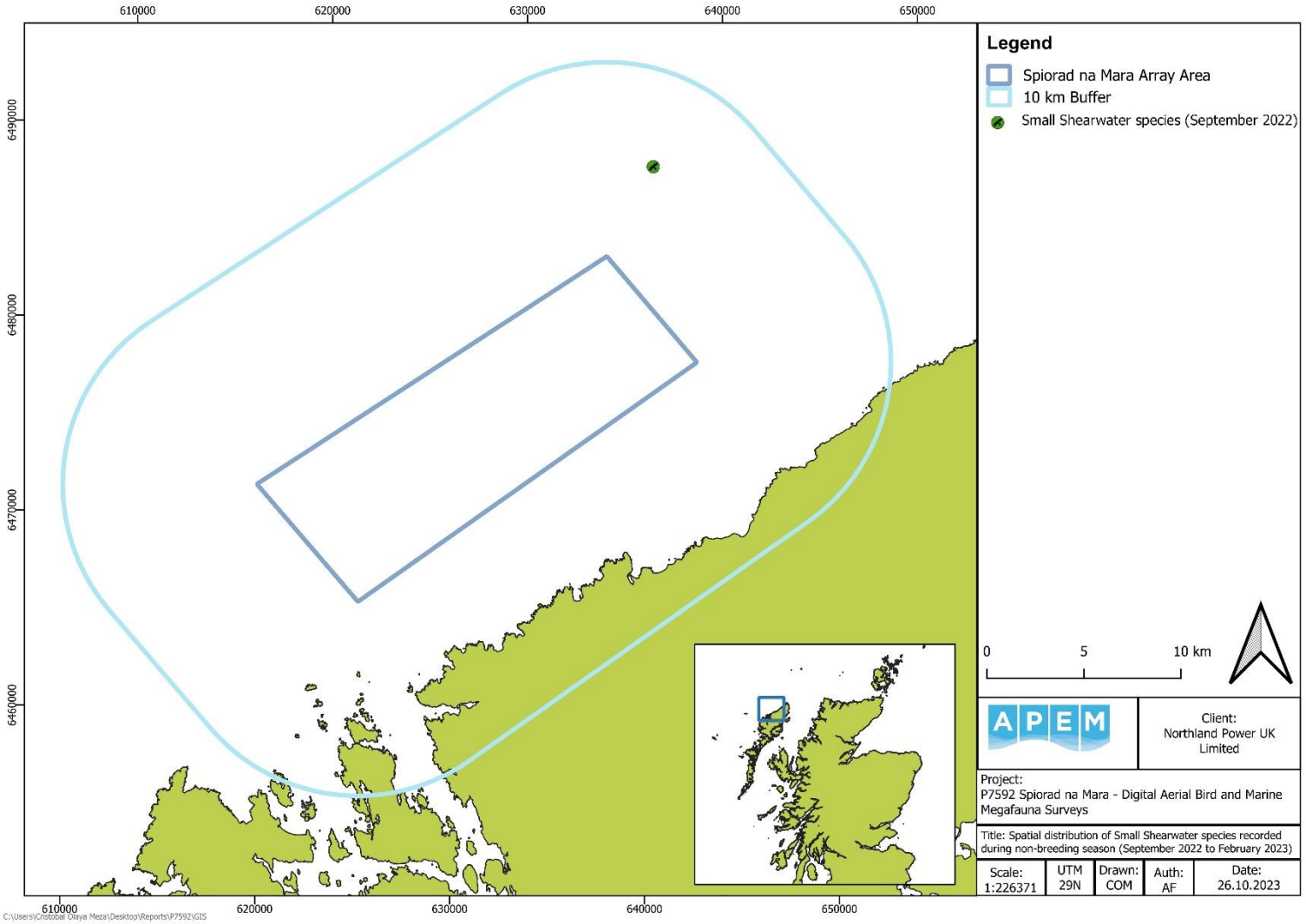


Figure 141 Distribution of small shearwater species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

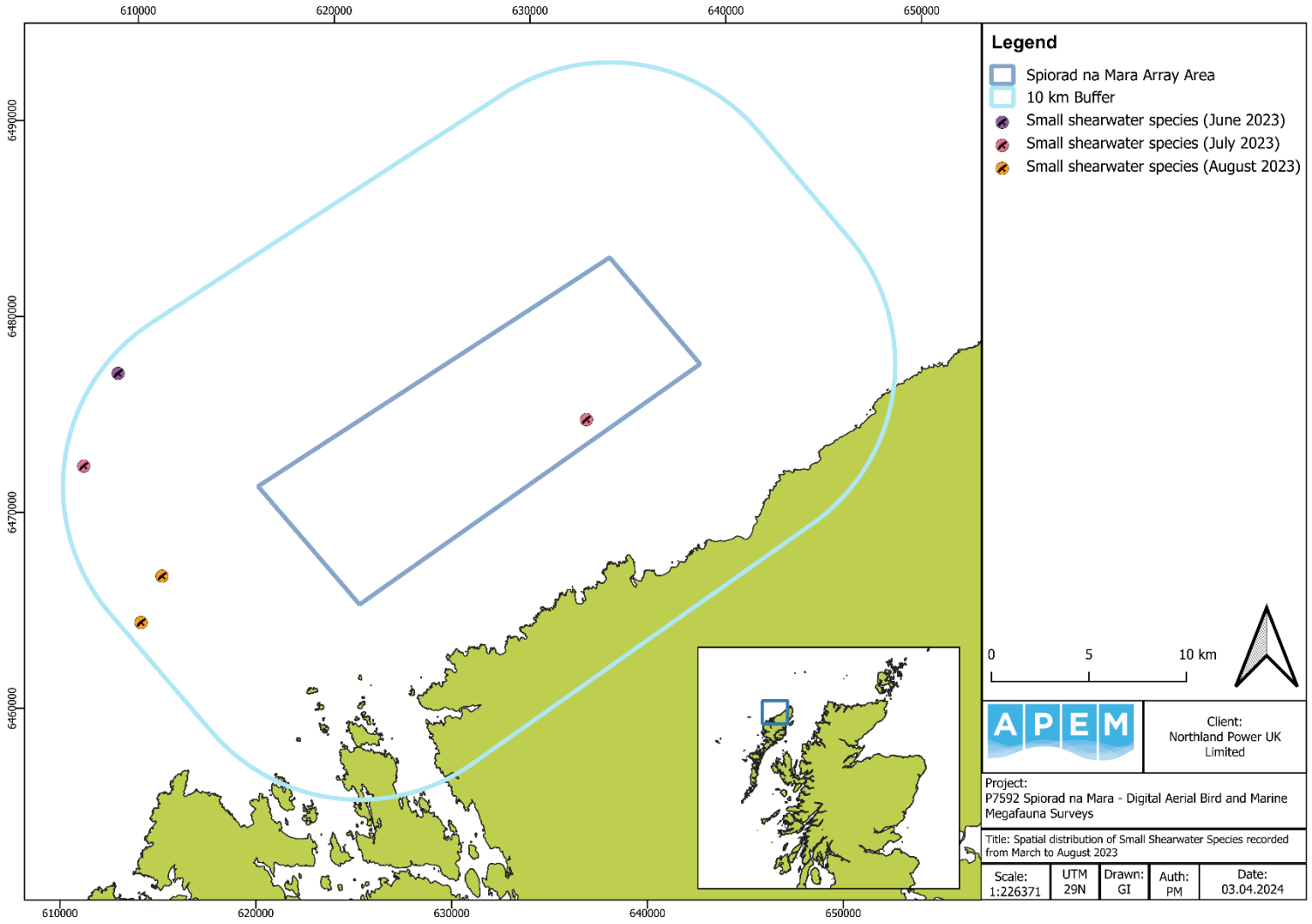
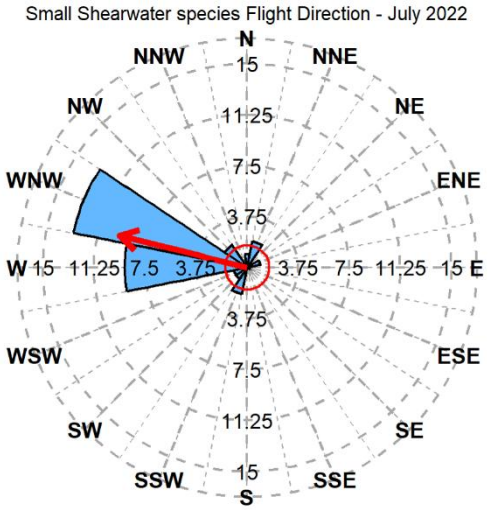


Figure 142 Distribution of small shearwater species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping



Number of Observations	32
Mean vector	284.520
Length of mean vector (r)	0.741
Rayleigh Test (Z)	17.570
Rayleigh Test (p)	<0.001
a. July 2022 (Survey 05)	

Figure 143 Summary of flight direction of small shearwater species during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.43 Gannet - *Morus bassanus*

Gannets were recorded in all months throughout the survey period, except December 2022. Peak abundance occurred in August 2022 with an estimate of 1,365 [95% CL: 635, 2,283] within the Survey Area equating to 1.42 birds/km^2 (**Table 53**). Gannets were recorded throughout most of the Survey Area during the breeding seasons with pockets of higher densities to the north, east and south (**Figure 144** and **Figure 146)**, whilst individuals were more sparsely distributed in lower numbers across the Survey Area during the non-breeding seasons (**Figure 145** and **Figure 147**).

Gannets displayed varied significant flight directions in each month during the first year of surveys: southwest in March 2022; northwest to north-northwest in May 2022; north-northwest to north in June 2022; west-northwest in July 2022; west-southwest to west in August 2022; and northwest in September 2022 (**Figure 148a-f**). Similarly, no uniform trend in significant flight directions was observed during the second year of surveys: west-northwest in May 2023; north-northeast in June 2023; west-southwest in September 2023; west-northwest in October 2023; and east-northeast in January 2024 (**Figure 148g-k**).

Table 53 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of gannet in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	19	163	77	274	0.23	0.17
Apr-22	136	1,180	945	1,431	0.09	1.23
May-22	48	412	232	626	0.14	0.43
Jun-22	53	450	280	670	0.14	0.47
Jul-22	137	1,177	833	1,563	0.09	1.23
Aug-22	159	1,366	679	2,251	0.08	1.42
Sep-22	80	687	446	1013	0.11	0.72
Oct-22	49	428	271	603	0.14	0.45
Nov-22	4	34	9	69	0.50	0.04
Jan-23	20	172	86	266	0.22	0.18
Feb-23	1	9	1	26	<1.00	0.01
Mar-23	20	172	69	309	0.22	0.18
Apr-23	38	330	217	443	0.16	0.34
May-23	29	250	164	346	0.19	0.26
Jun-23	74	655	425	938	0.12	0.68
Jul-23	68	590	390	824	0.12	0.62
Aug-23	46	394	223	634	0.15	0.41
Sep-23	129	1,106	626	1,612	0.09	1.15
Oct-23	8	69	17	147	0.35	0.07
Nov-23	5	44	9	87	0.45	0.05
Dec-23	1	9	1	26	<1.00	0.01
Jan-24	5	44	9	96	0.45	0.05
Feb-24	6	51	17	94	0.41	0.05
b) Spiorad na Mara Array Area						

Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	1	9	1	27	<1.00	0.06
Apr-22	20	183	100	274	0.22	1.13
May-22	2	18	2	45	0.71	0.11
Jun-22	10	88	35	158	0.32	0.55
Jul-22	14	125	45	232	0.27	0.78
Aug-22	13	115	13	293	0.28	0.71
Sep-22	7	62	18	124	0.38	0.38
Oct-22	33	300	155	464	0.17	1.86
Nov-22	1	9	1	27	<1.00	0.06
Jan-23	3	27	3	63	0.58	0.17
Mar-23	1	9	1	27	<1.00	0.06
Apr-23	6	54	18	100	0.41	0.33
May-23	8	73	28	129	0.35	0.45
Jun-23	10	92	37	157	0.32	0.57
Jul-23	14	128	37	238	0.27	0.79
Aug-23	3	27	3	63	0.58	0.17
Sep-23	5	45	9	98	0.45	0.28
Dec-23	1	9	1	36	<1.00	0.06
c) 10 km Buffer						
Month	**Raw Count**	**Total unapportioned**				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	18	153	68	271	0.24	0.19
Apr-22	116	996	756	1,245	0.09	1.25
May-22	46	392	213	596	0.15	0.49
Jun-22	43	362	211	565	0.15	0.45
Jul-22	123	1,049	733	1,398	0.09	1.32
Aug-22	146	1,246	580	2,125	0.08	1.56
Sep-22	73	622	392	912	0.12	0.78
Oct-22	16	139	69	225	0.25	0.17
Nov-22	3	26	3	60	0.58	0.03
Jan-23	17	145	68	238	0.24	0.18
Feb-23	1	8	1	25	<1.00	0.01
Mar-23	19	162	68	298	0.23	0.20
Apr-23	32	276	172	379	0.18	0.35
May-23	21	179	102	265	0.22	0.22
Jun-23	64	561	351	824	0.13	0.70
Jul-23	54	464	301	670	0.14	0.58
Aug-23	43	365	187	594	0.15	0.46
Sep-23	124	1,054	612	1,607	0.09	1.32
Oct-23	8	69	17	137	0.35	0.09
Nov-23	5	43	9	86	0.45	0.05
Jan-24	5	43	9	95	0.45	0.05
Feb-24	6	51	17	93	0.41	0.06

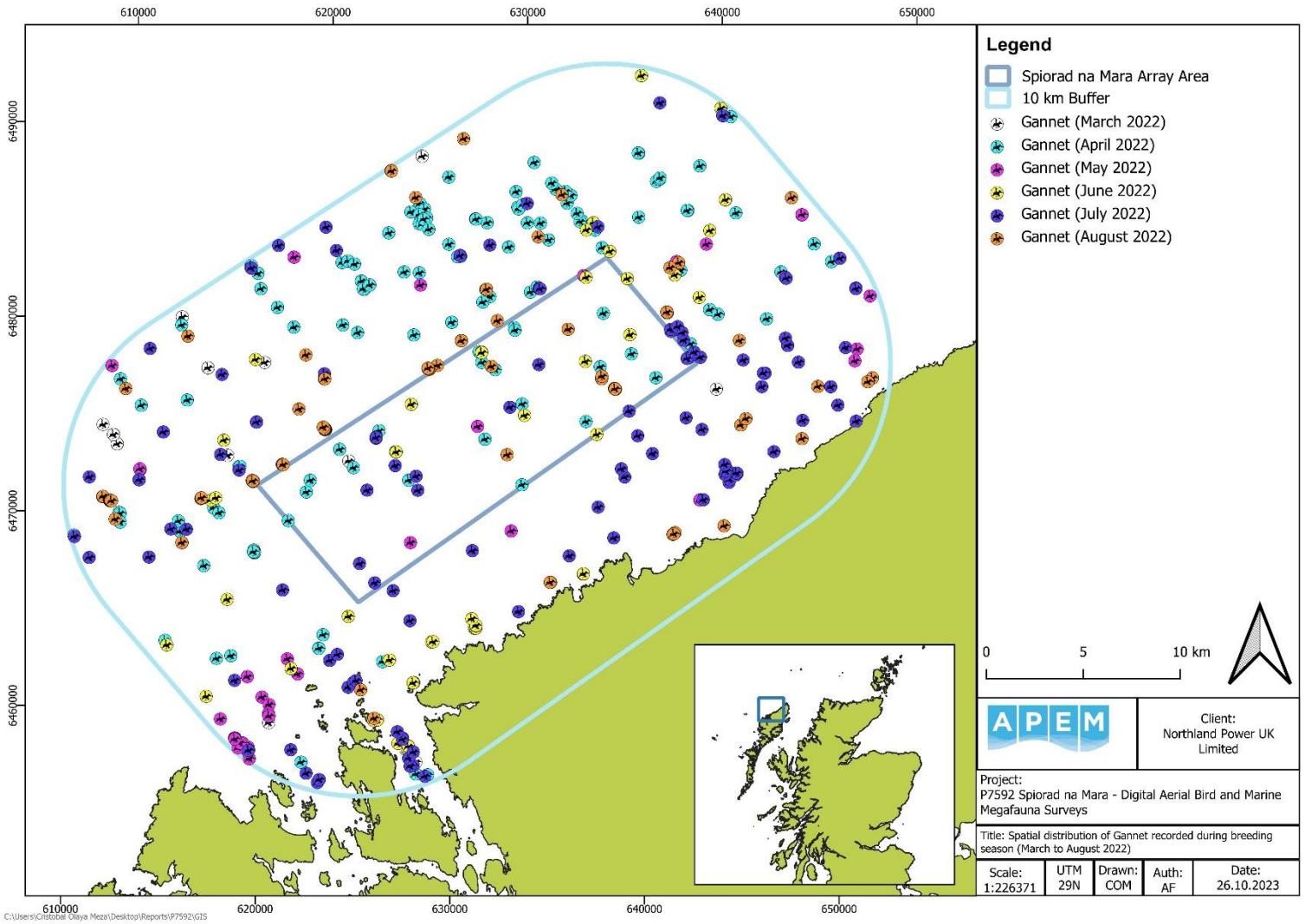


Figure 144 Distribution of gannet in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

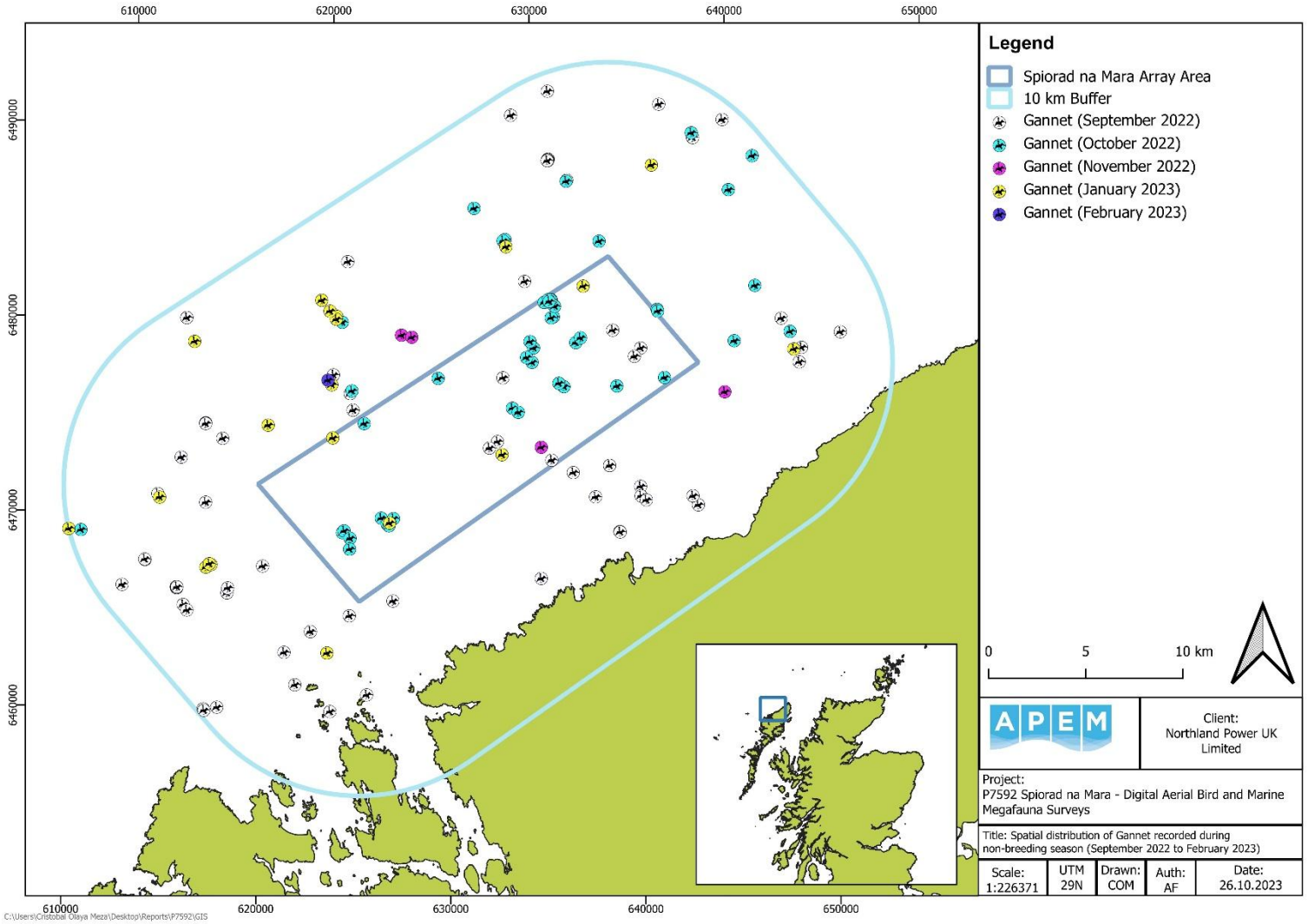


Figure 145 Distribution of gannet in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

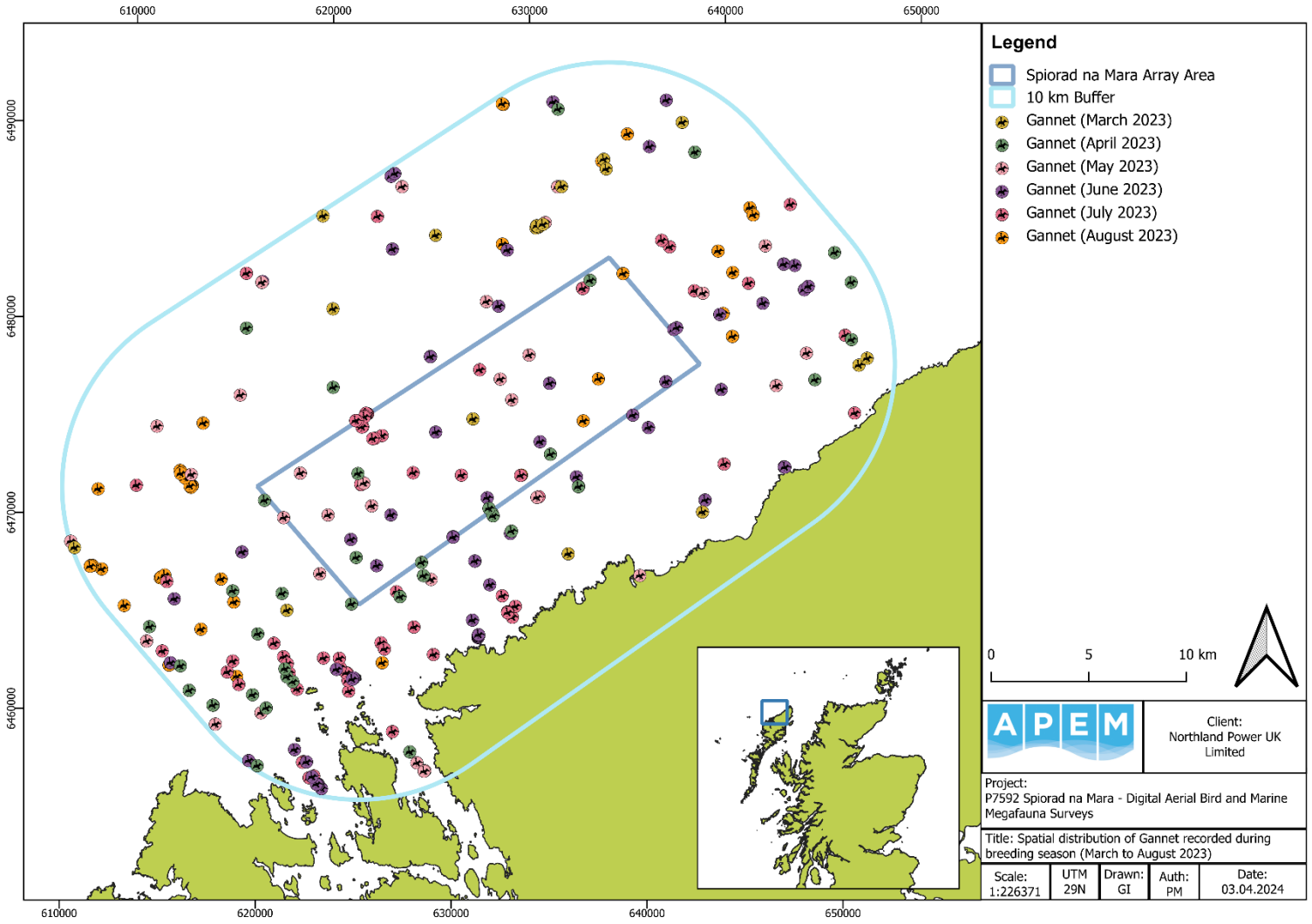


Figure 146 Distribution of gannet in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

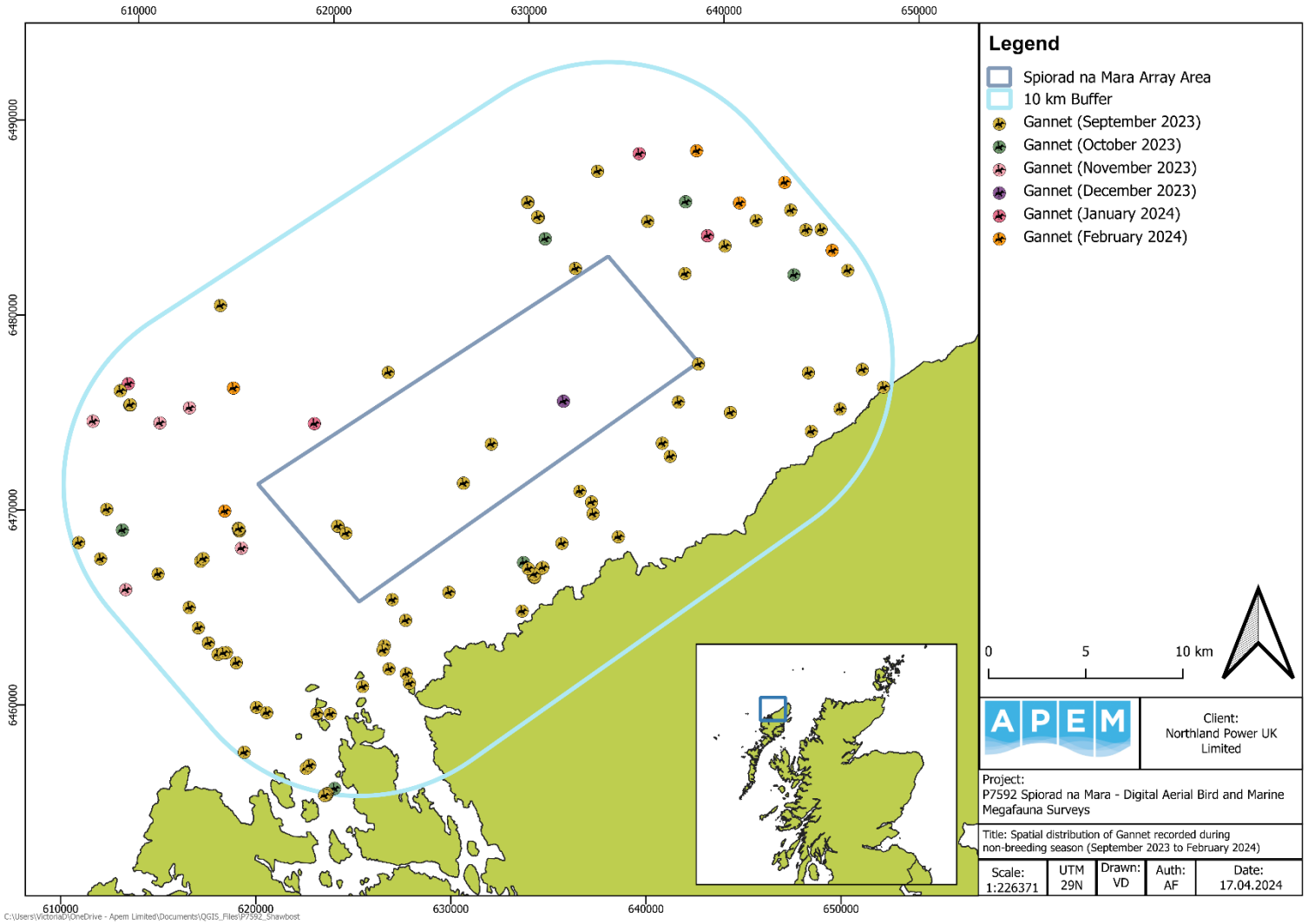
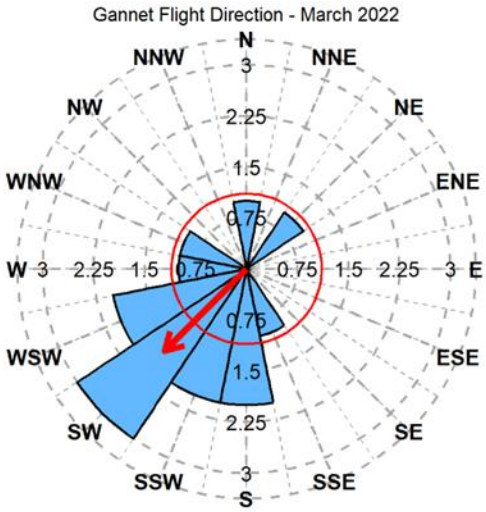


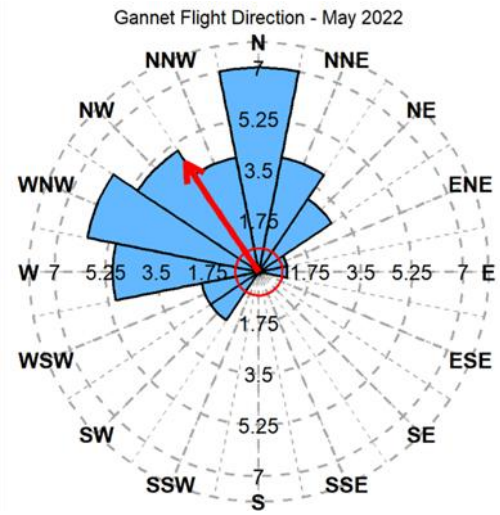
Figure 147 Distribution of gannet in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



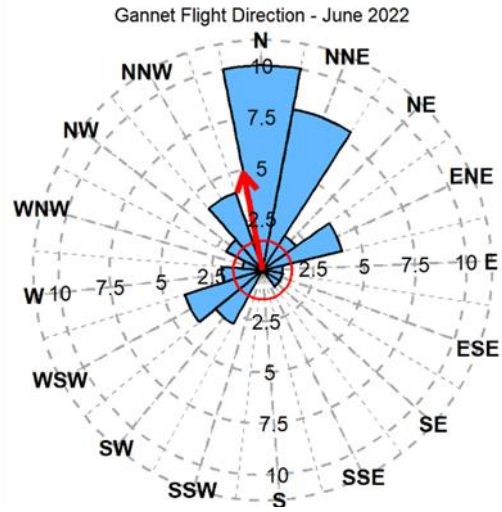
Number of Observations	14
Mean vector	225.387
Length of mean vector (r)	0.570
Rayleigh Test (Z)	4.550
Rayleigh Test (p)	<0.001

a. March 2022 (Survey 01)



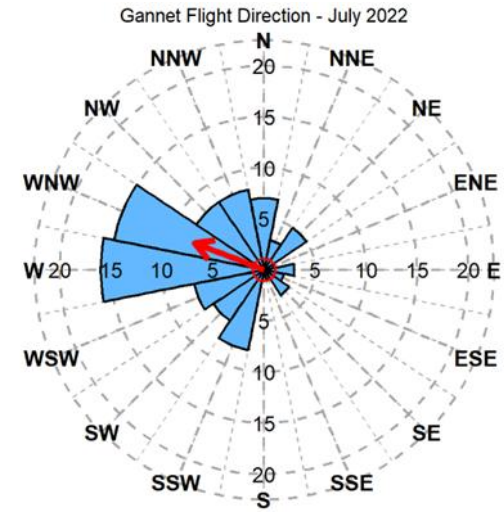
Number of Observations	40
Mean vector	326.994
Length of mean vector (r)	0.639
Rayleigh Test (Z)	16.343
Rayleigh Test (p)	<0.001

b. May 2022 (Survey 03)



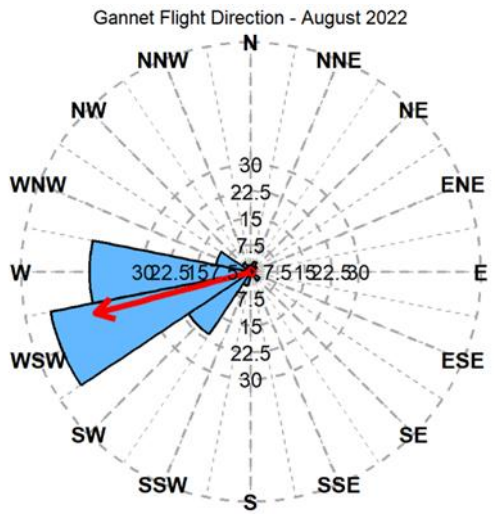
Number of Observations	43
Mean vector	357.461
Length of mean vector (r)	0.481
Rayleigh Test (Z)	9.949
Rayleigh Test (p)	<0.001

c. June 2022 (Survey 04)



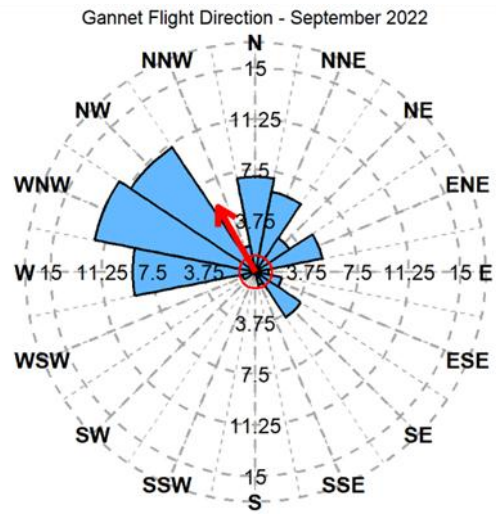
Number of Observations	93
Mean vector	291.101
Length of mean vector (r)	0.453
Rayleigh Test (Z)	19.061
Rayleigh Test (p)	<0.001

d. July 2022 (Survey 05)



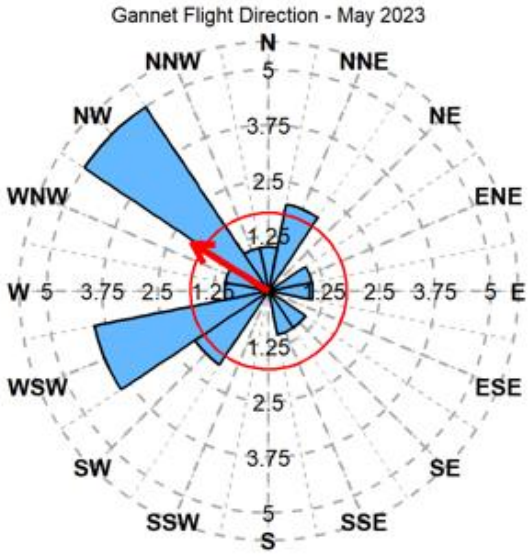
Number of Observations	157
Mean vector	255.842
Length of mean vector (r)	0.787
Rayleigh Test (Z)	97.333
Rayleigh Test (p)	<0.001

e. August 2022 (Survey 06)



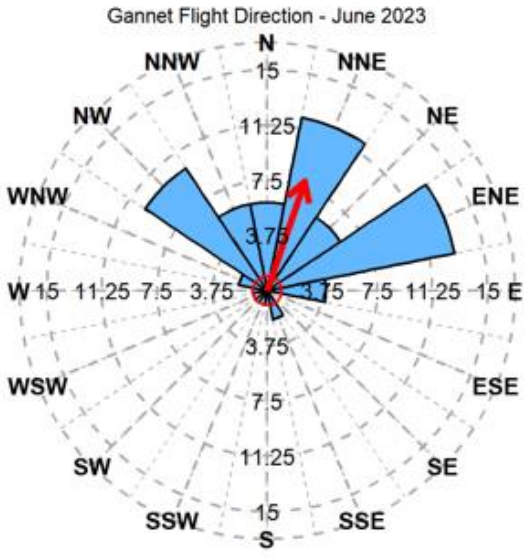
Number of Observations	64
Mean vector	330.844
Length of mean vector (r)	0.459
Rayleigh Test (Z)	13.478
Rayleigh Test (p)	<0.001

f. September 2022 (Survey 07)



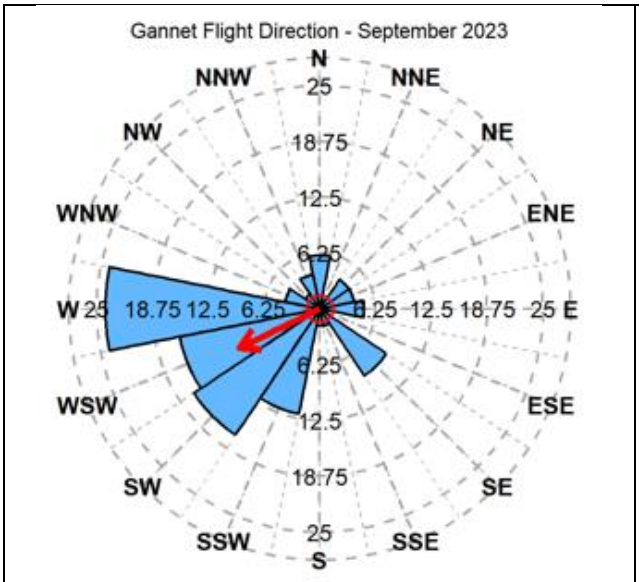
Number of Observations	21
Mean vector	302.408
Length of mean vector (r)	0.402
Rayleigh Test (Z)	3.397
Rayleigh Test (p)	0.031

g. May 2023 (Survey 15)



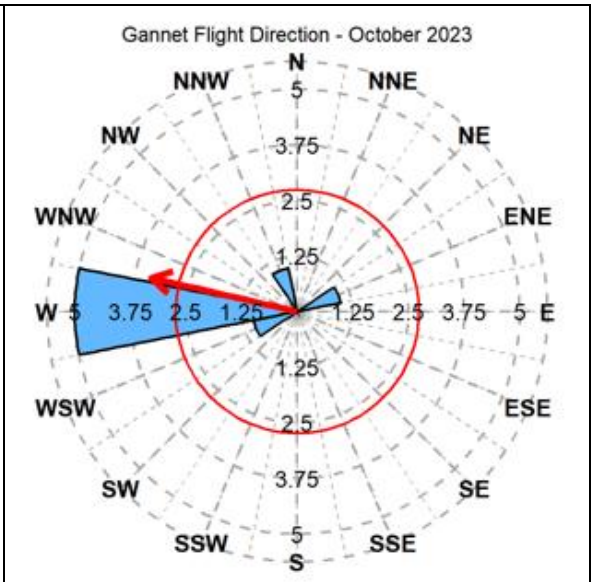
Number of Observations	64
Mean vector	19.822
Length of mean vector (r)	0.602
Rayleigh Test (Z)	23.169
Rayleigh Test (p)	<0.001

h. June 2023 (Survey 16)



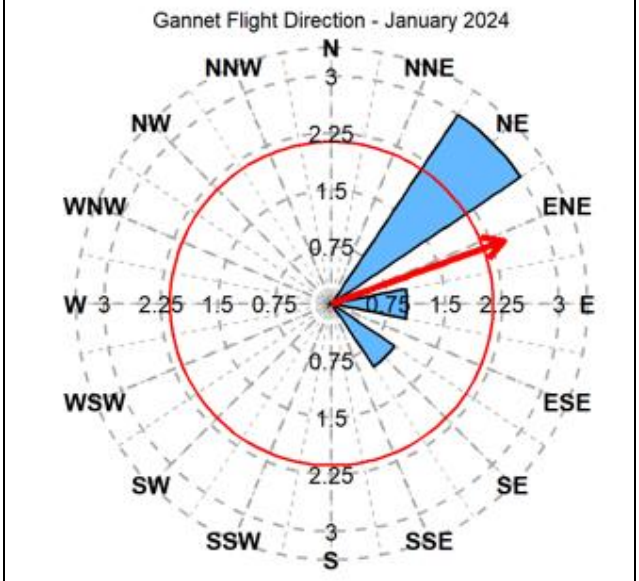
Number of Observations	113
Mean vector	244.766
Length of mean vector (r)	0.417
Rayleigh Test (Z)	19.619
Rayleigh Test (p)	<0.001

i. September 2023 (Survey 19)



Number of Observations	8
Mean vector	283.516
Length of mean vector (r)	0.672
Rayleigh Test (Z)	3.616
Rayleigh Test (p)	0.021

j. October 2023 (Survey 20)



Number of Observations	5
Mean vector	70.989
Length of mean vector (r)	0.805
Rayleigh Test (Z)	3.239
Rayleigh Test (p)	0.030

k. January 2024 (Survey 23)

Figure 148 Summary of flight direction of gannet during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.44 Cormorant - *Phalacrocorax carbo*

Cormorants were recorded in April and May 2022, February and March 2023, June to November 2023, and January 2024. Peak abundance occurred in January 2024 with an estimate of 175 [95% CL: 61, 306] within the Survey Area equating to 0.18 birds/km^2 (**Table 54**).

Cormorants were recorded in the south of the 10 km Buffer, adjacent to the coast during the breeding and non-breeding seasons (**Figure 149** and **Figure 150**). Two cormorants were recorded flying, one in April 2022 and one in September 2023, they had no significant flight direction.

Table 54 Apportioned abundance and density estimates (birds per km^2) of cormorant in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	26	<1.00	0.01	44	5	113	0.05
May-22	0	0	0	0	0.00	0.00	26	3	77	0.03
Feb-23	0	0	0	0	0.00	0.00	26	3	60	0.03
Mar-23	0	0	0	0	0.00	0.00	43	18	97	0.04
Jun-23	0	0	0	0	0.00	0.00	53	9	104	0.06
Jul-23	0	0	0	0	0.00	0.00	52	4	94	0.05
Aug-23	0	0	0	0	0.00	0.00	34	4	95	0.04
Sep-23	1	9	1	26	<1.00	0.01	35	27	199	0.04
Oct-23	1	9	1	26	<1.00	0.01	104	9	157	0.11
Nov-23	0	0	0	0	0.00	0.00	70	18	97	0.07
Jan-24	0	0	0	0	0.00	0.00	175	61	306	0.18
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	26	<1.00	0.01	43	5	103	0.05
May-22	0	0	0	0	0.00	0.00	26	3	77	0.03
Feb-23	0	0	0	0	0.00	0.00	25	3	59	0.03
Mar-23	0	0	0	0	0.00	0.00	43	5	119	0.05
Jun-23	0	0	0	0	0.00	0.00	53	18	96	0.07
Jul-23	0	0	0	0	0.00	0.00	25	3	68	0.03
Aug-23	0	0	0	0	0.00	0.00	34	4	93	0.04
Sep-23	1	8	1	26	<1.00	0.01	33	4	94	0.04
Oct-23	1	9	1	26	<1.00	0.01	103	27	206	0.13
Nov-23	0	0	0	0	0.00	0.00	69	9	156	0.09
Jan-24	0	0	0	0	0.00	0.00	173	61	303	0.22

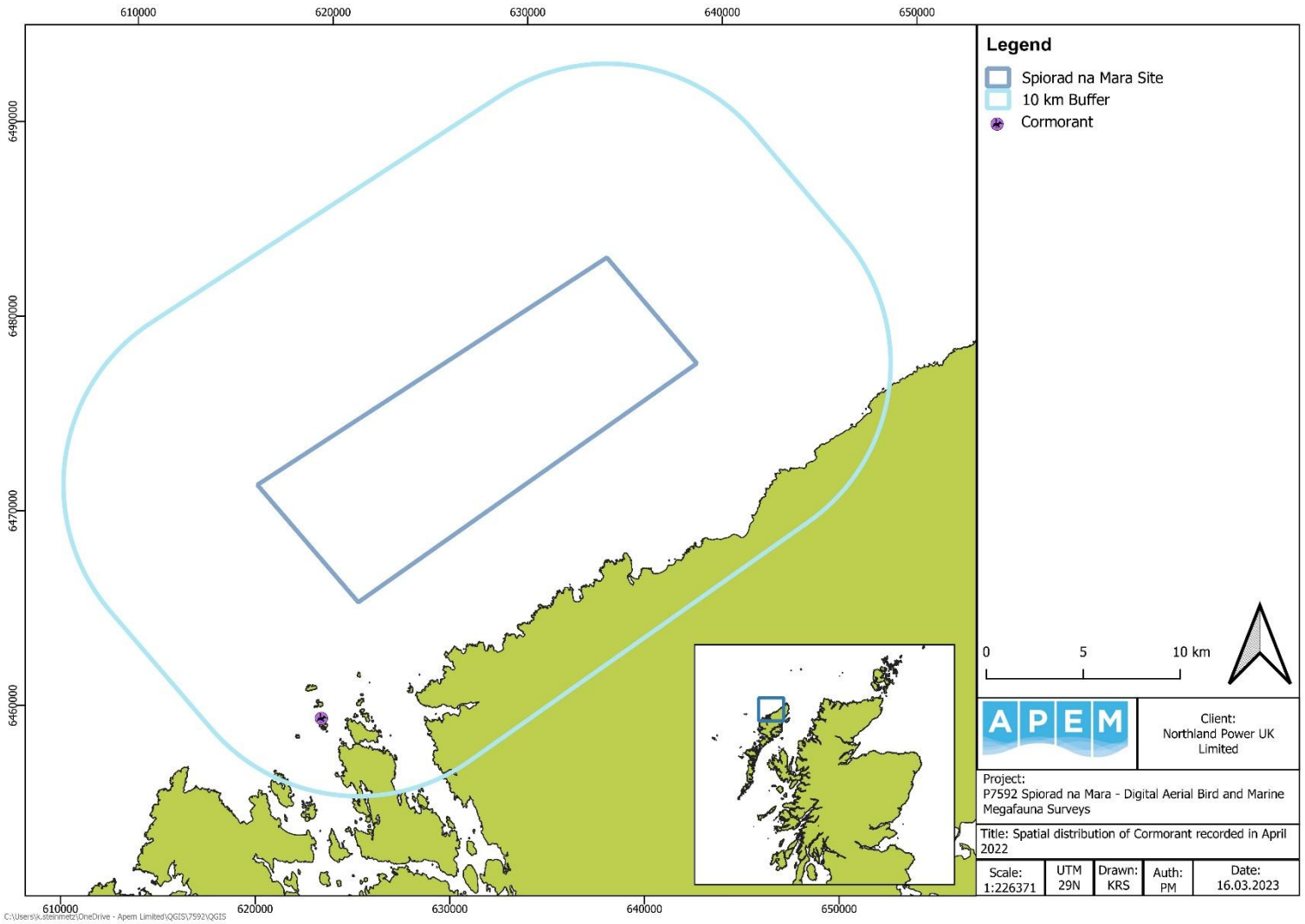


Figure 149 Distribution of cormorant in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

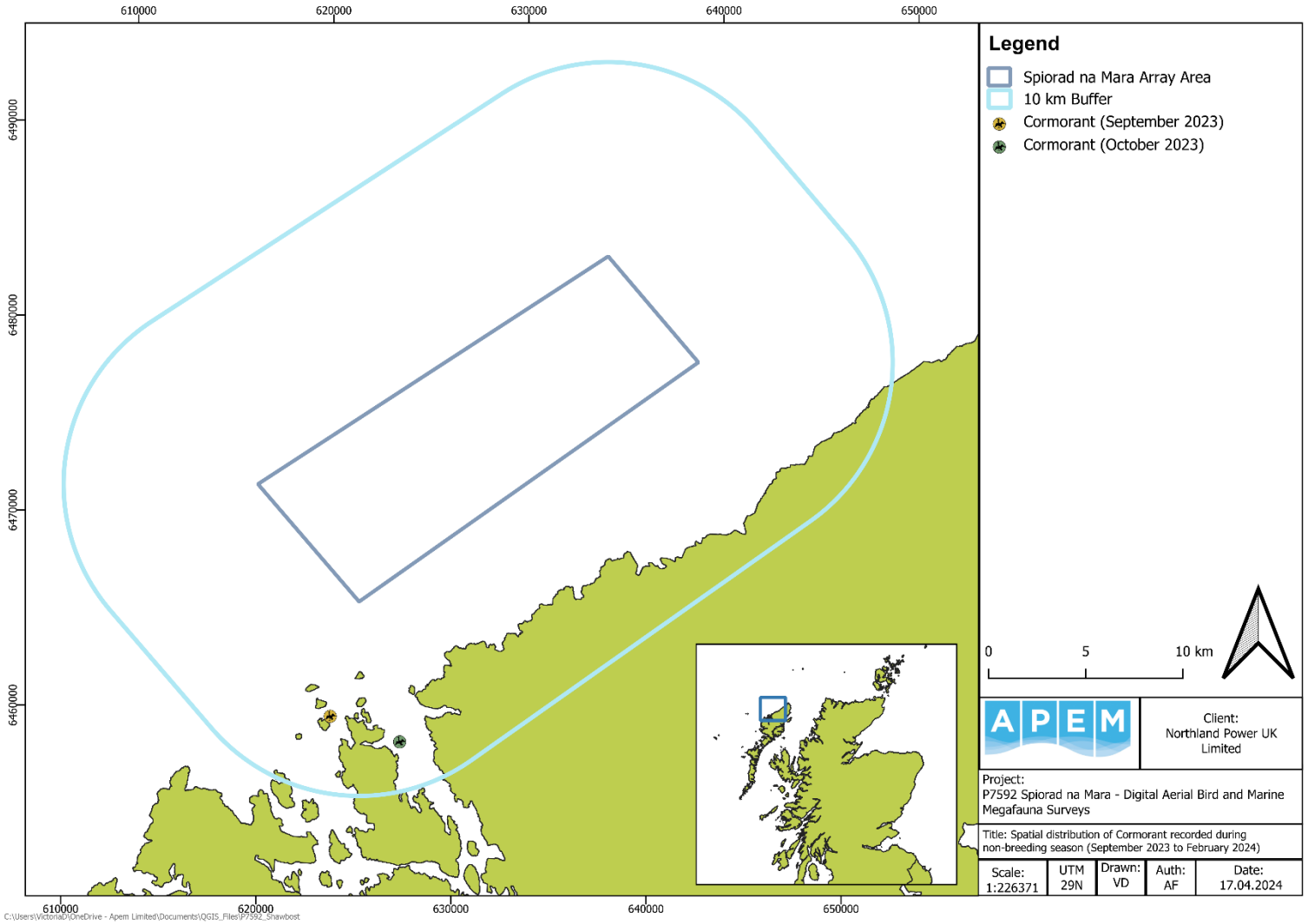


Figure 150 Distribution of cormorant in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.1.45 Shag - *Gulosus aristotelis*

Shags were recorded in 15 months throughout the survey period. Peak abundance occurred in September 2022 with an estimate of 900 [95% CL: 105, 2,402] within the Survey Area equating to 0.94 birds/km^2 (**Table 55**). Individuals were consistently recorded in the south and east of the 10 km Buffer adjacent to the coast across all survey months (**Figure 153** and **Figure 154**).

In March 2022, a significant predominant direction of flight was recorded to the south (Figure 155).

Table 55 Apportioned abundance and density estimates (birds per km^2) of shag in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	12	103	34	189	0.29	0.11	231	46	480	0.24
Apr-22	39	338	39	1,015	0.16	0.35	355	41	1,067	0.37
Jun-22	0	0	0	0	0.00	0.00	8	1	25	0.01
Jul-22	11	94	17	232	0.30	0.10	95	18	224	0.10
Aug-22	0	0	0	0	0.00	0.00	662	77	1,933	0.69
Sep-22	99	850	99	2,146	0.10	0.89	902	105	2,387	0.94
Oct-22	10	87	10	245	0.32	0.09	87	10	236	0.09
Jan-23	0	0	0	0	0.00	0.00	86	17	172	0.09
Feb-23	0	0	0	0	0.00	0.00	187	77	341	0.20
Mar-23	17	146	17	438	0.24	0.15	180	21	532	0.19
May-23	3	26	3	69	0.58	0.03	26	3	69	0.03
Jun-23	0	0	0	0	0.00	0.00	9	1	27	0.01
Aug-23	0	0	0	0	0.00	0.00	17	2	43	0.02
Sep-23	0	0	0	0	0.00	0.00	26	3	60	0.03
Feb-24	1	9	1	26	<1.00	0.01	137	69	222	0.14
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	0	0	0	0	0.00	0.00	9	1	27	0.06
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^2)	Abundance Estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	12	102	34	178	0.29	0.13	220	45	466	0.28
Apr-22	39	335	39	1,005	0.16	0.42	352	41	1,057	0.44
Jun-22	0	0	0	0	0.00	0.00	8	1	25	0.01
Jul-22	11	93	17	222	0.30	0.12	94	18	214	0.12
Aug-22	0	0	0	0	0.00	0.00	657	77	1,887	0.82
Sep-22	99	844	99	2,157	0.10	1.06	895	105	2,421	1.12
Oct-22	10	87	10	243	0.32	0.11	87	10	243	0.11
Jan-23	0	0	0	0	0.00	0.00	85	26	170	0.11
Feb-23	0	0	0	0	0.00	0.00	186	68	338	0.23

Mar-23	17	145	17	434	0.24	0.18	179	21	536	0.22
May-23	3	26	3	68	0.58	0.03	26	3	68	0.03
Jun-23	0	0	0	0	0.00	0.00	9	1	26	0.01
Aug-23	0	0	0	0	0.00	0.00	17	2	42	0.02
Sep-23	0	0	0	0	0.00	0.00	25	3	60	0.03
Feb-24	1	8	1	25	<1.00	0.01	135	60	228	0.17

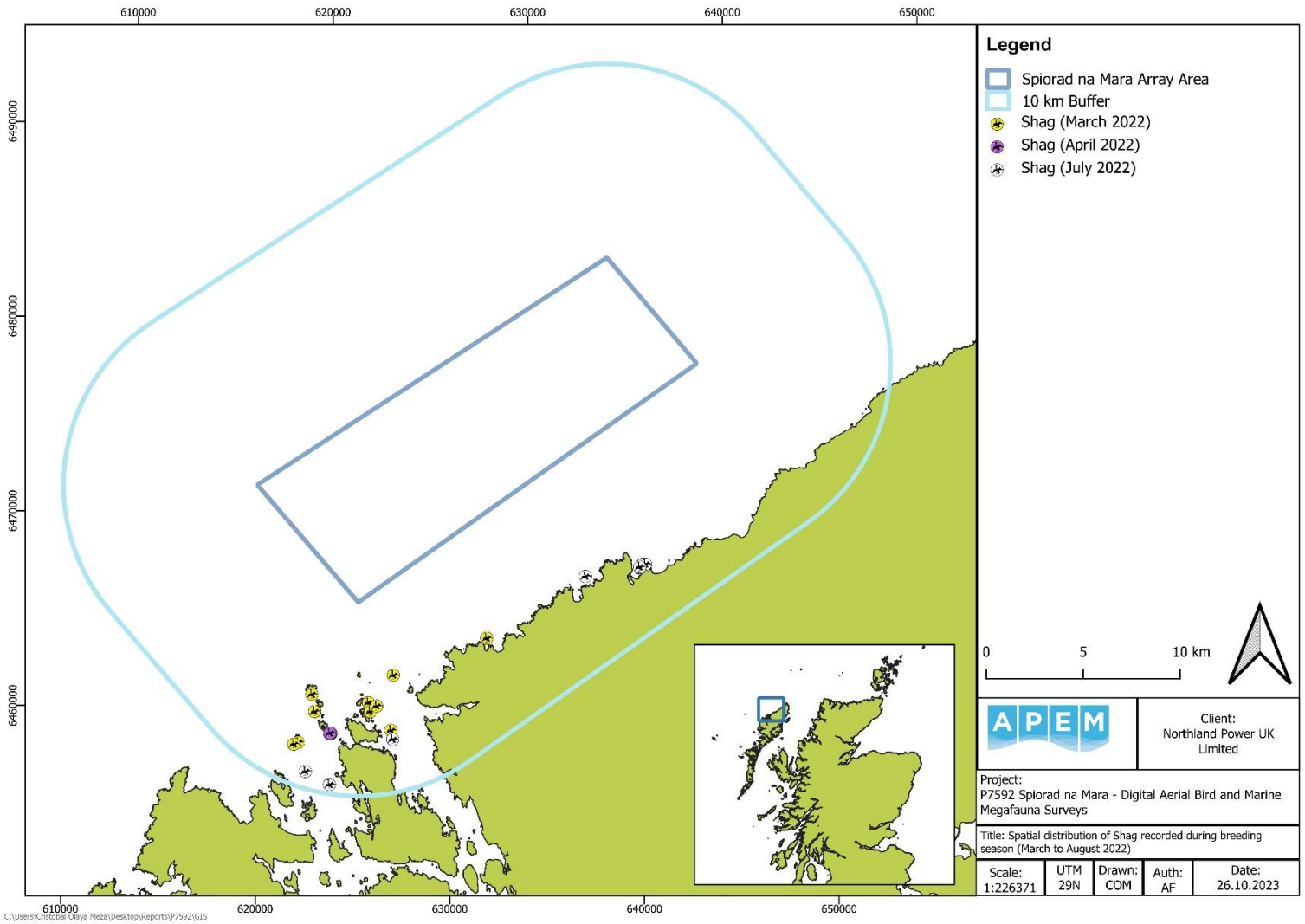


Figure 151 Distribution of shag in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

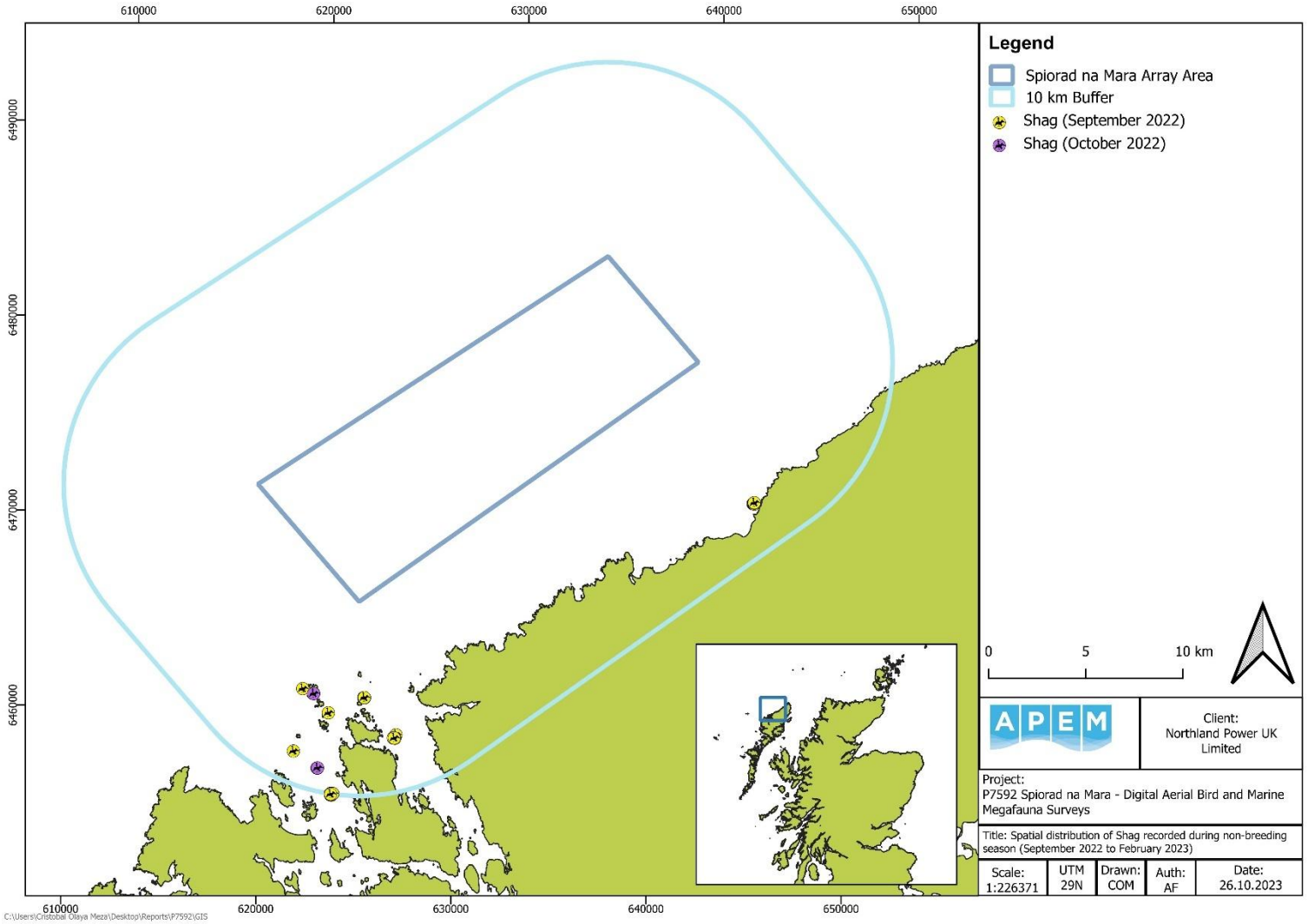


Figure 152 Distribution of shag in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

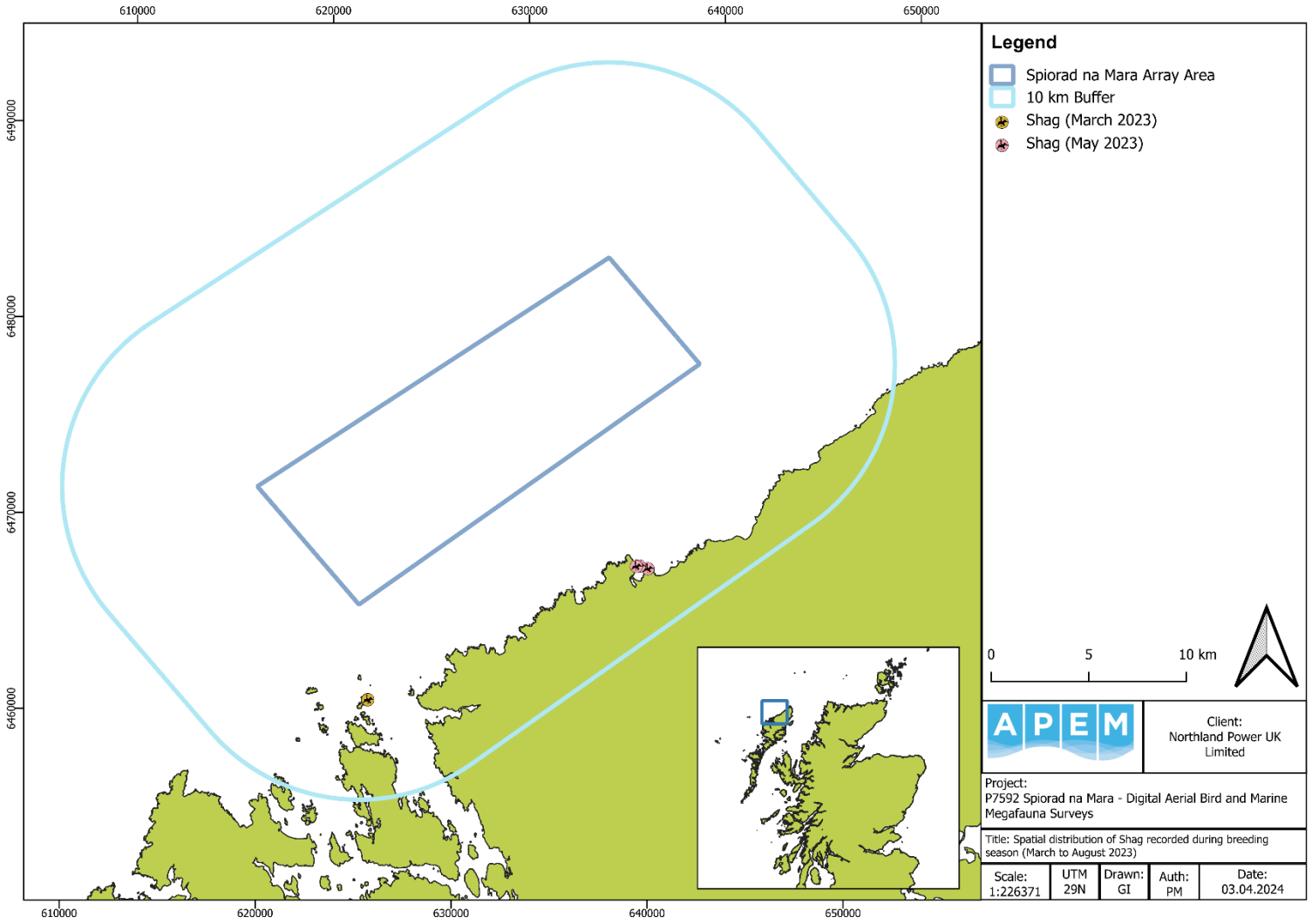


Figure 153 Distribution of shag in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

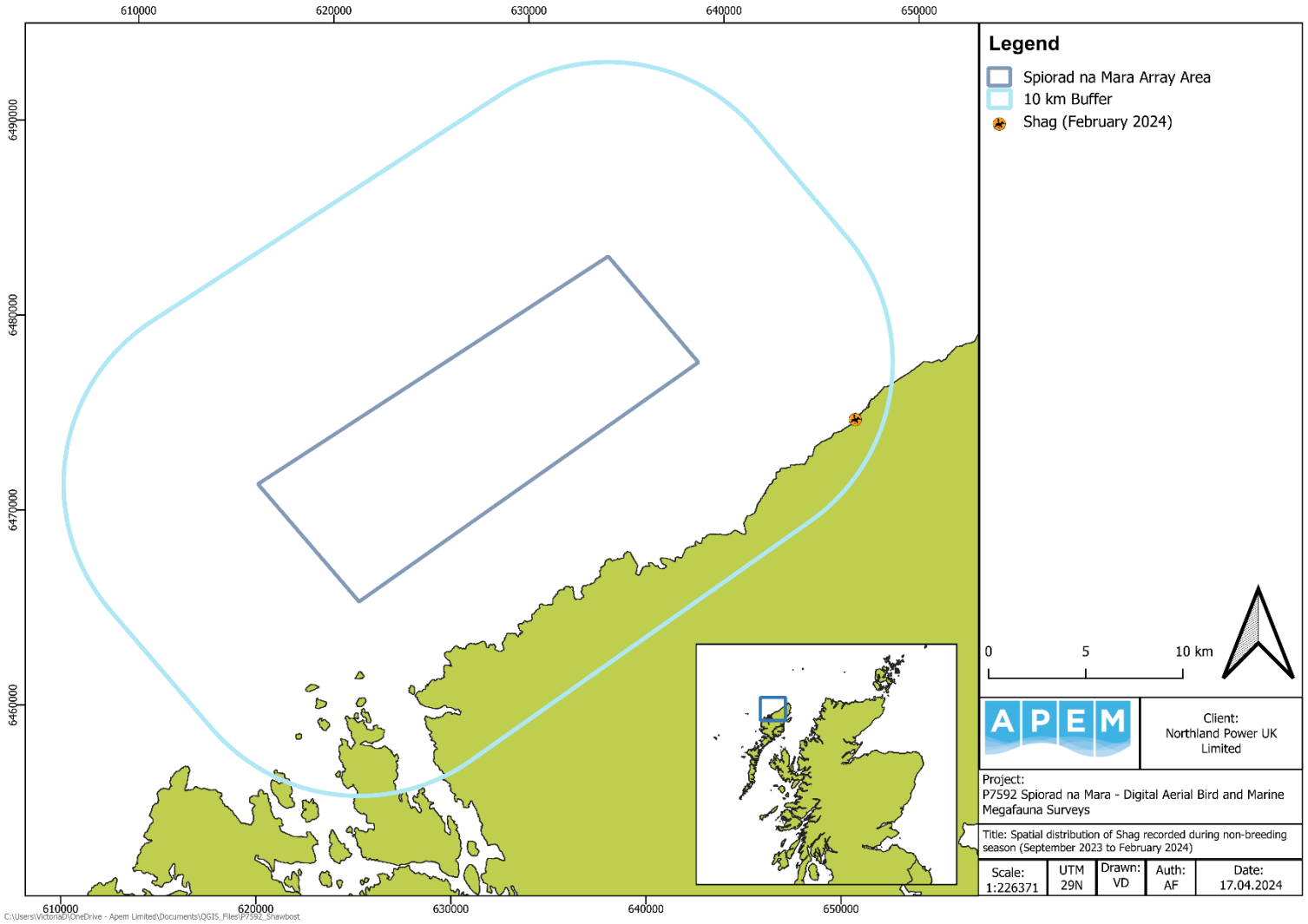
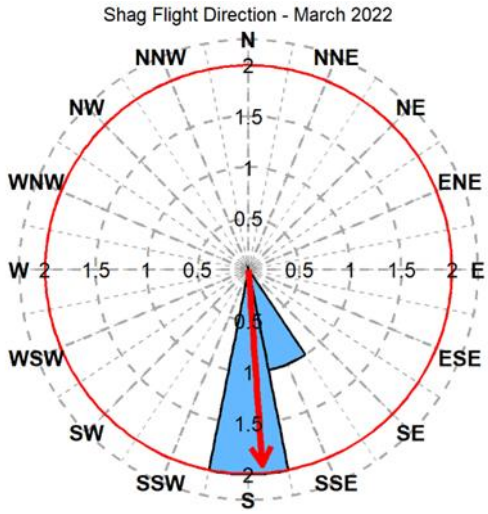


Figure 154 Distribution of shag in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	83
Mean vector	176.956
Length of mean vector (r)	0.956
Rayleigh Test (Z)	2.742
Rayleigh Test (p)	0.050
a. March 2022 (Survey 01)	

Figure 155 Summary of flight direction of shag during the survey period

Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.46 Cormorant / shag - *Phalacrocorax carbo / Gulosus aristotelis*

Cormorant / shags were recorded in October, November 2022, January, October, and November 2023, and January 2024. Peak abundance occurred in January 2024 with an estimate of 192 [95% CL: 79, 323] within the Survey Area equating to 0.20 birds/km^2 (**Table 56**). Individuals were predominantly recorded inshore on or in close proximity to the rocky coast during both the breeding and non-breeding seasons (**Figure 156** to **Figure 159**).

In June 2023, a significant predominant direction of flight towards the northwest was recorded (**Figure 160**).

Table 56 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of cormorant / shag in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01
Oct-22	1	9	1	26	<1.00	0.01
Nov-22	2	17	2	43	0.71	0.02
Jan-23	13	112	43	206	0.28	0.12
Oct-23	14	121	52	208	0.27	0.13
Nov-23	10	87	17	175	0.32	0.09
Jan-24	22	192	79	323	0.21	0.20
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jan-24	1	9	1	28	<1.00	0.06
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01
Oct-22	1	9	1	26	<1.00	0.01
Nov-22	2	17	2	43	0.71	0.02
Jan-23	13	111	43	213	0.28	0.14
Oct-23	14	120	51	206	0.27	0.15
Nov-23	10	86	26	173	0.32	0.11
Jan-24	21	182	78	311	0.22	0.23

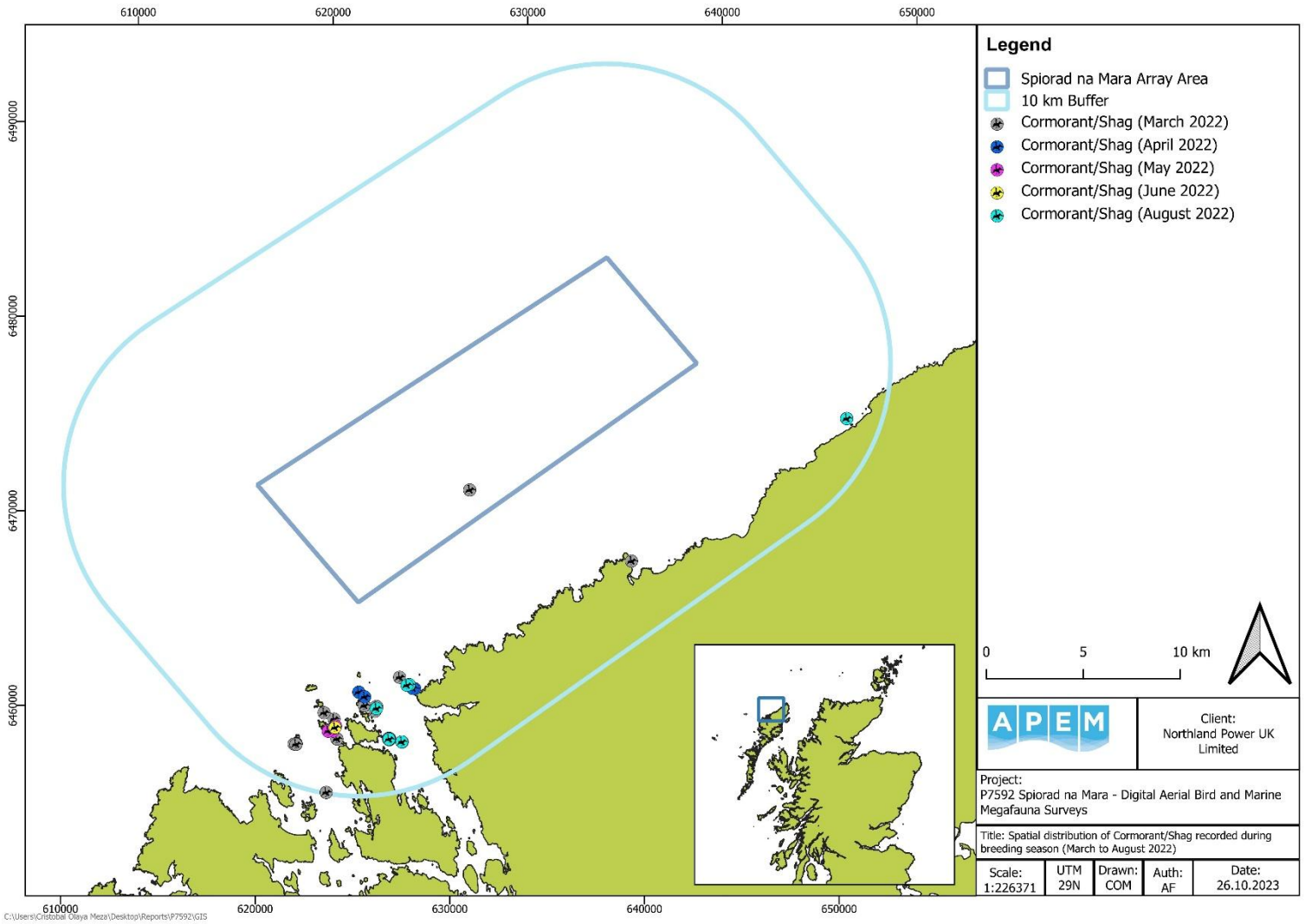


Figure 156 Distribution of cormorant / shag in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

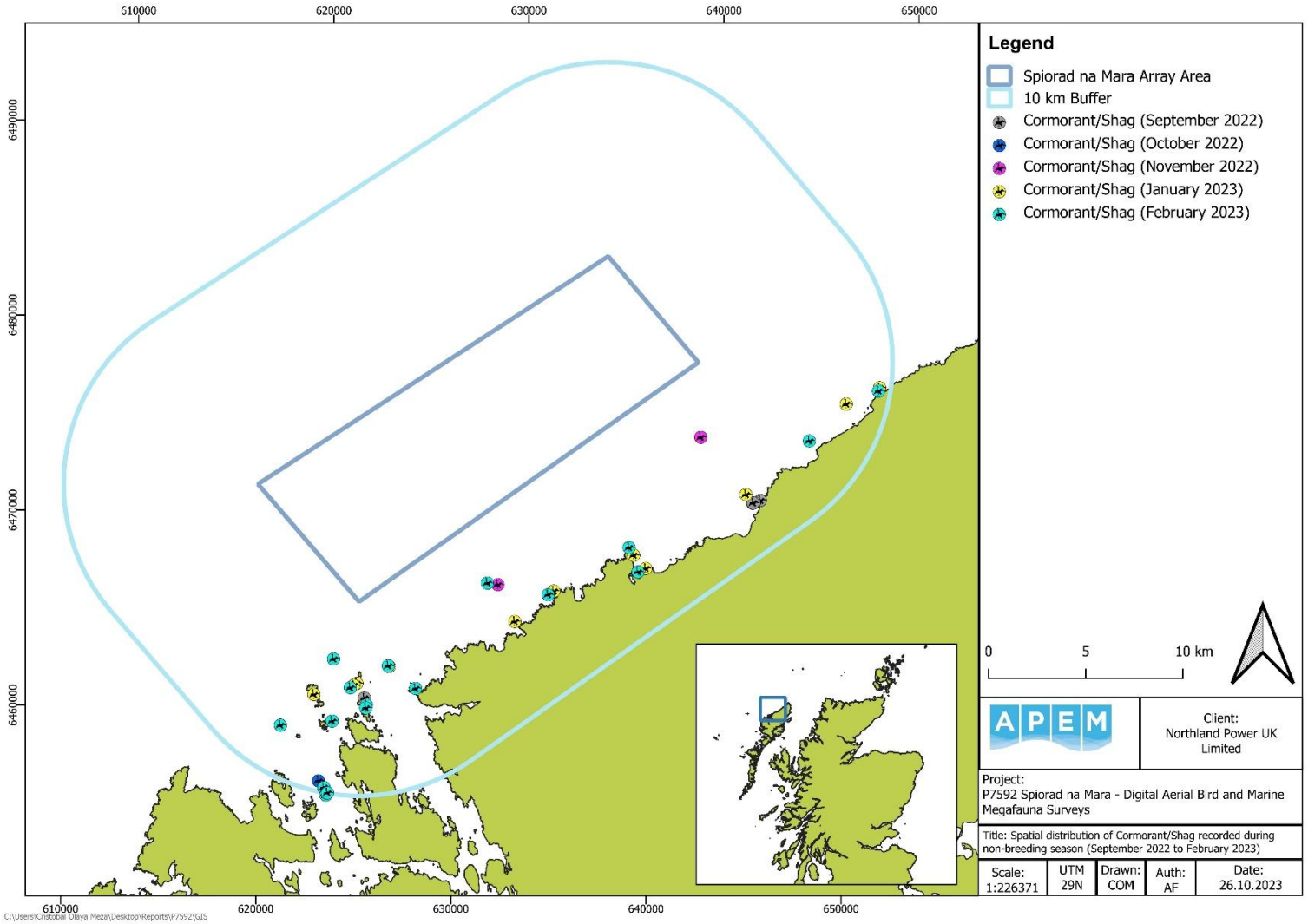


Figure 157 Distribution of cormorant / shag in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

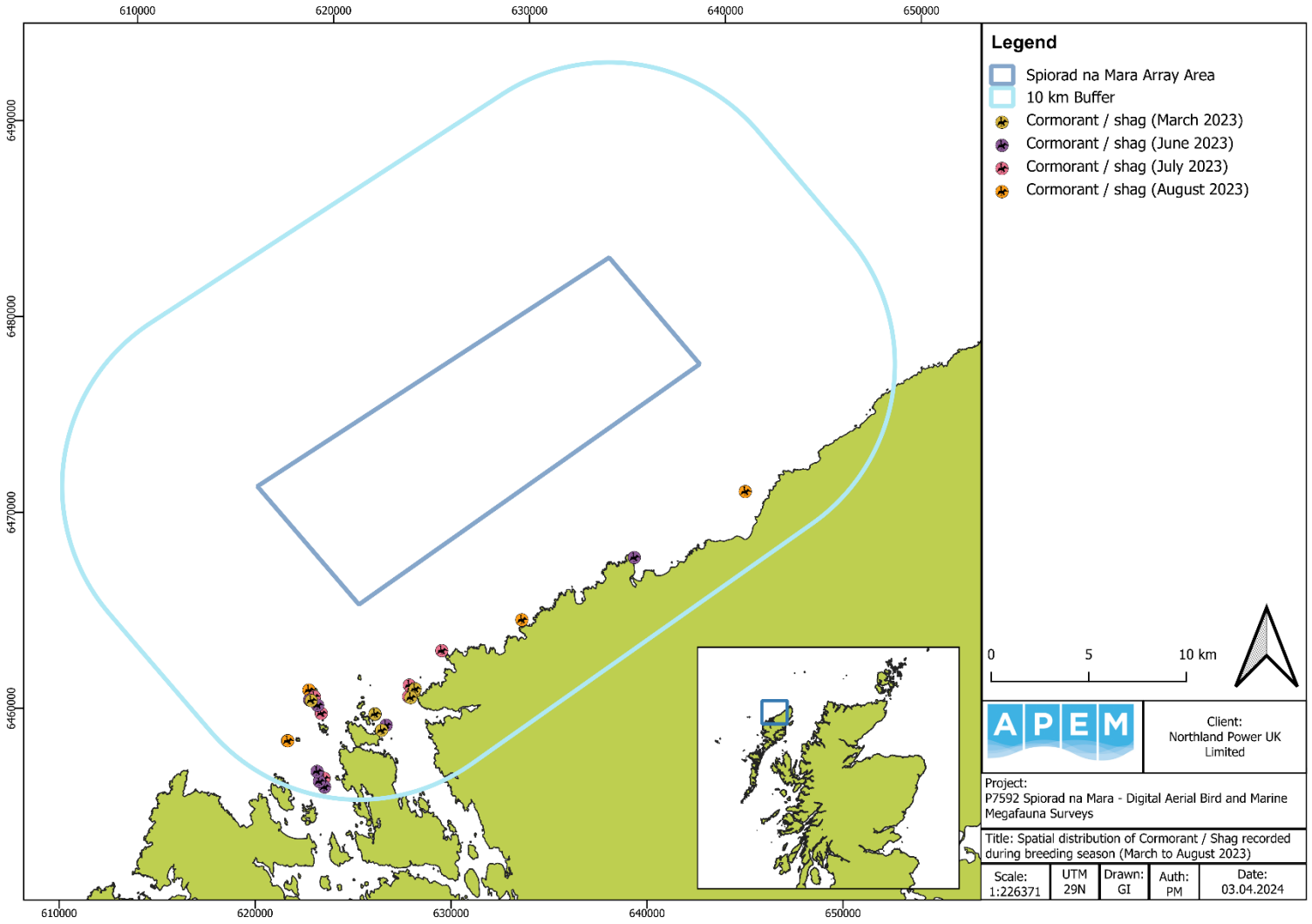


Figure 158 Distribution of cormorant / shag in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

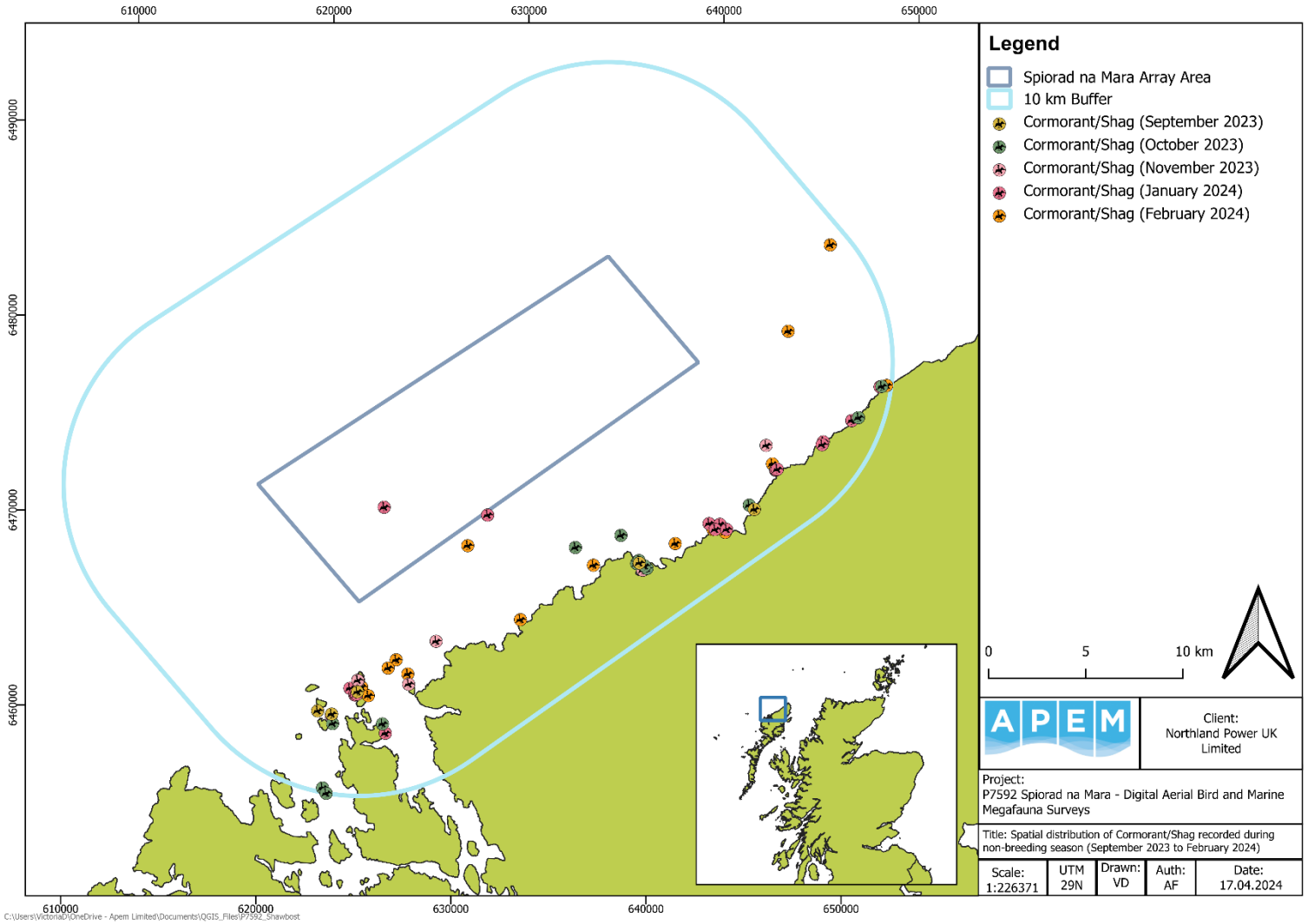
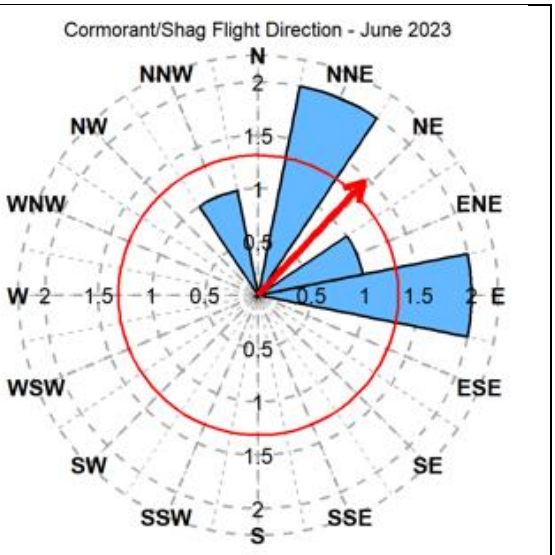


Figure 159 Distribution of cormorant / shag in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping



Number of Observations	6
Mean vector	43.098
Length of mean vector (r)	0.726
Rayleigh Test (Z)	3.165
Rayleigh Test (p)	0.035
a. June 2023 (Survey 16)	

Figure 160 Summary of flight direction of cormorant / shag during the survey period
Note: Non-significant results and months with only 1 or 2 individuals were not recorded

3.1.47 Passerine species - Unidentified

Passerine species were recorded in April 2023, resulting in an abundance estimate of 35 [95% CL: 4, 87] within the Survey Area equating to 0.04 birds/km^2 (**Table 57**).

Individuals were recorded in the south and southeast of the 10 km Buffer along the coast (**Figure 161**). They were recorded flying to the west, although this flight direction was not significant.

Table 57 Apportioned abundance and density estimates (birds per km^2) of passerine species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-2023	4	35	4	87	0.50	0.04
b) Spiorad na Mara Array Area						
Month	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Raw Count	Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-2023	4	34	4	86	0.50	0.04

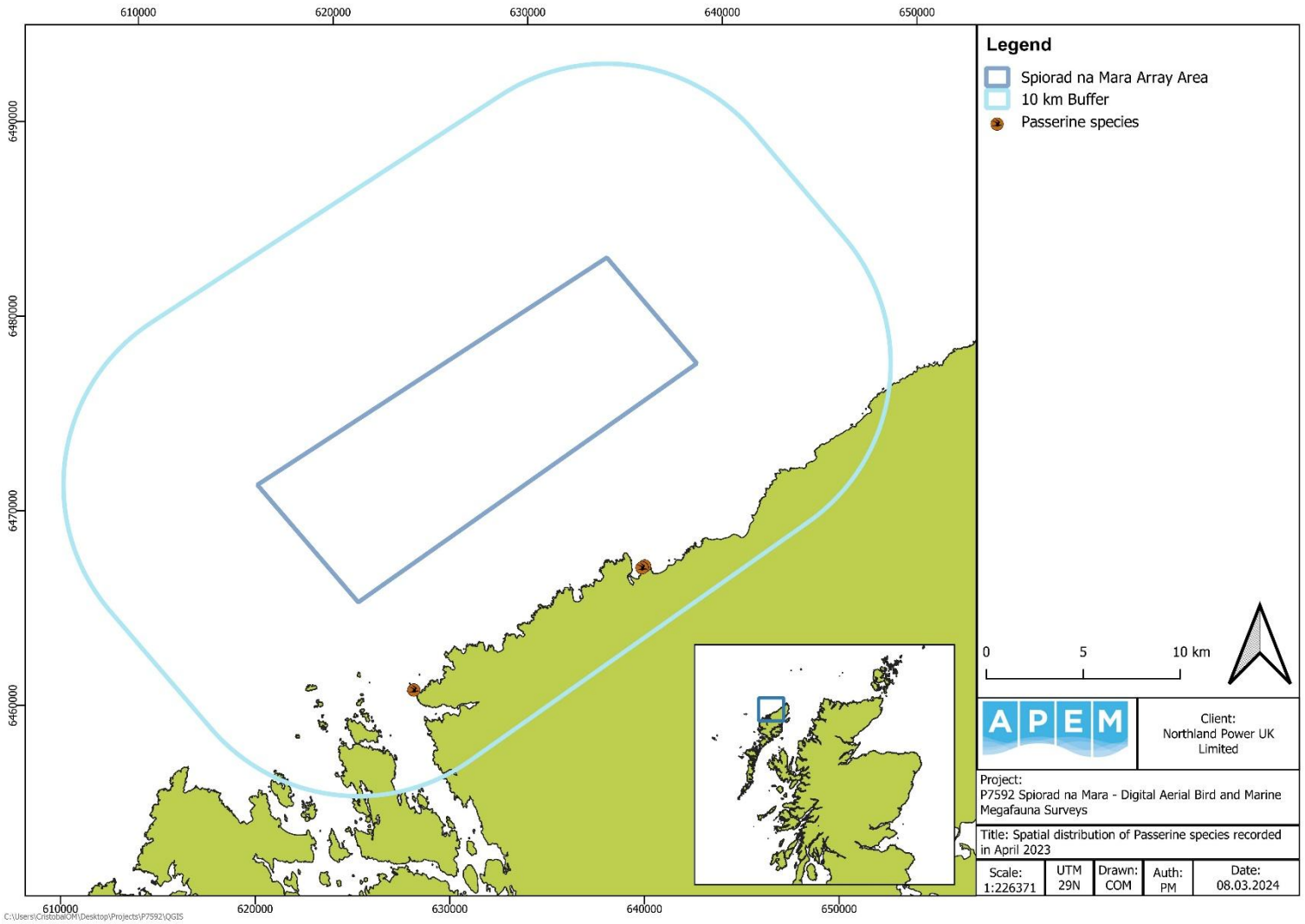


Figure 161 Distribution of passerine species in the Survey Area during April 2023

Note: Individuals in close proximity may appear overlapping

3.1.48 Bird species - Unidentified

Unidentified bird species were recorded with a scattered distribution (**Figure 162** to **Figure 165**) in all months throughout the survey period except, April, June, and December 2022. Peak abundance occurred in September 2022 with an estimate of 129 [95% CL: 60, 206] within the Survey Area equating to 0.13 birds/km^2 (**Table 58**). 14 individuals were recorded as flying, with no significant flight direction throughout the surveys.

Table 58 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated birds per km^2) of bird species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	10	86	34	146	0.32	0.09
May-22	3	26	3	69	0.58	0.03
Jul-22	3	26	3	60	0.58	0.03
Aug-22	3	26	3	60	0.58	0.03
Sep-22	15	129	69	206	0.26	0.13
Oct-22	3	26	3	61	0.58	0.03
Nov-22	4	34	4	95	0.50	0.04
Jan-23	4	34	9	77	0.50	0.04
Feb-23	10	85	34	145	0.32	0.09
Mar-23	8	69	26	120	0.35	0.07
Apr-23	7	61	7	174	0.38	0.06
May-23	4	35	9	69	0.50	0.04
Jul-23	1	9	1	26	<1.00	0.01
Aug-23	5	43	5	128	0.45	0.04
Sep-23	3	26	3	60	0.58	0.03
Oct-23	3	26	3	61	0.58	0.03
Nov-23	1	9	1	26	<1.00	0.01
Dec-23	2	17	2	52	0.71	0.02
Jan-24	7	61	17	114	0.38	0.06
Feb-24	5	43	9	85	0.45	0.04
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	2	18	2	45	0.71	0.11
May-22	1	9	1	36	<1.00	0.06
Aug-22	1	9	1	36	<1.00	0.06
Sep-22	2	18	2	44	0.71	0.11
Jan-23	1	9	1	27	<1.00	0.06
Apr-23	1	9	1	27	<1.00	0.06
Jul-23	1	9	1	27	<1.00	0.06
Feb-24	1	9	1	27	<1.00	0.06

c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance Estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	8	68	25	119	0.35	0.09
May-22	2	17	2	51	0.71	0.02
Jul-22	3	26	3	60	0.58	0.03
Aug-22	2	17	2	43	0.71	0.02
Sep-22	13	111	60	179	0.28	0.14
Oct-22	3	26	3	61	0.58	0.03
Nov-22	4	34	4	103	0.50	0.04
Jan-23	3	25	3	60	0.58	0.03
Feb-23	10	84	34	152	0.32	0.11
Mar-23	8	68	26	119	0.35	0.09
Apr-23	6	52	6	146	0.41	0.07
May-23	4	34	9	68	0.50	0.04
Aug-23	5	42	5	119	0.45	0.05
Sep-23	3	25	3	60	0.58	0.03
Oct-23	3	26	3	60	0.58	0.03
Nov-23	1	9	1	26	<1.00	0.01
Dec-23	2	17	2	51	0.71	0.02
Jan-24	7	61	26	104	0.38	0.08
Feb-24	4	34	8	68	0.50	0.04

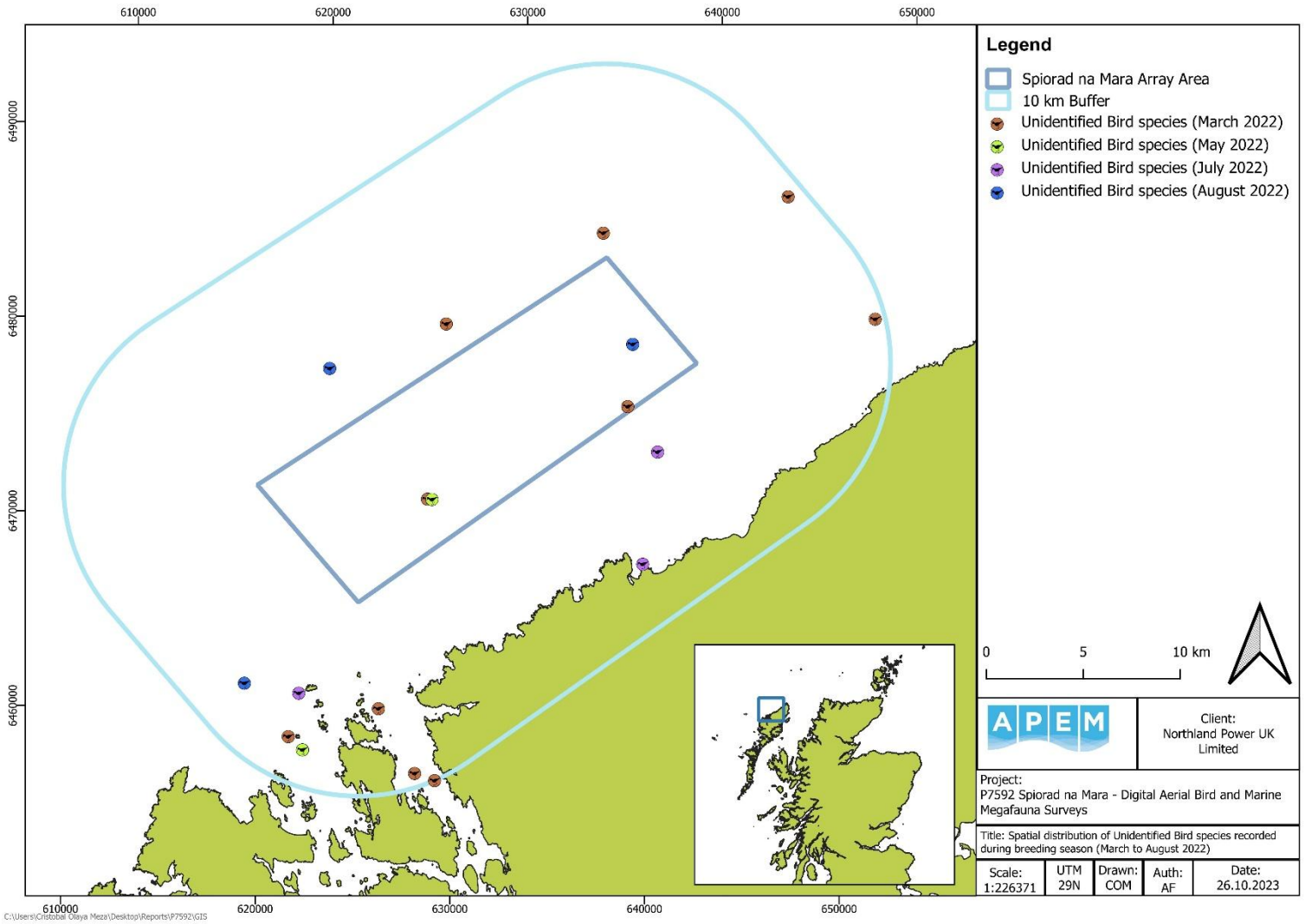


Figure 162 Distribution of unidentified bird species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

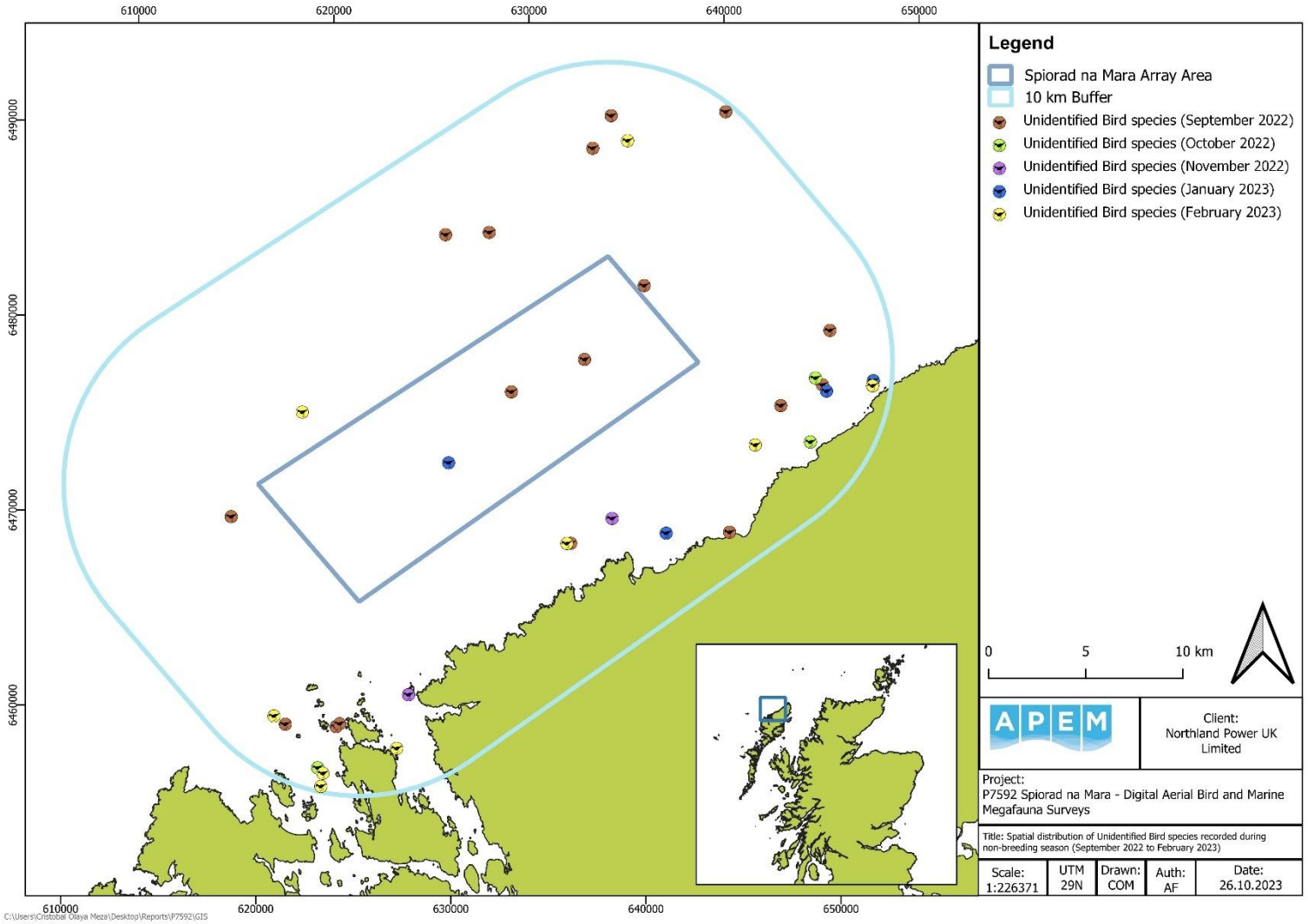


Figure 163 Distribution of unidentified bird species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

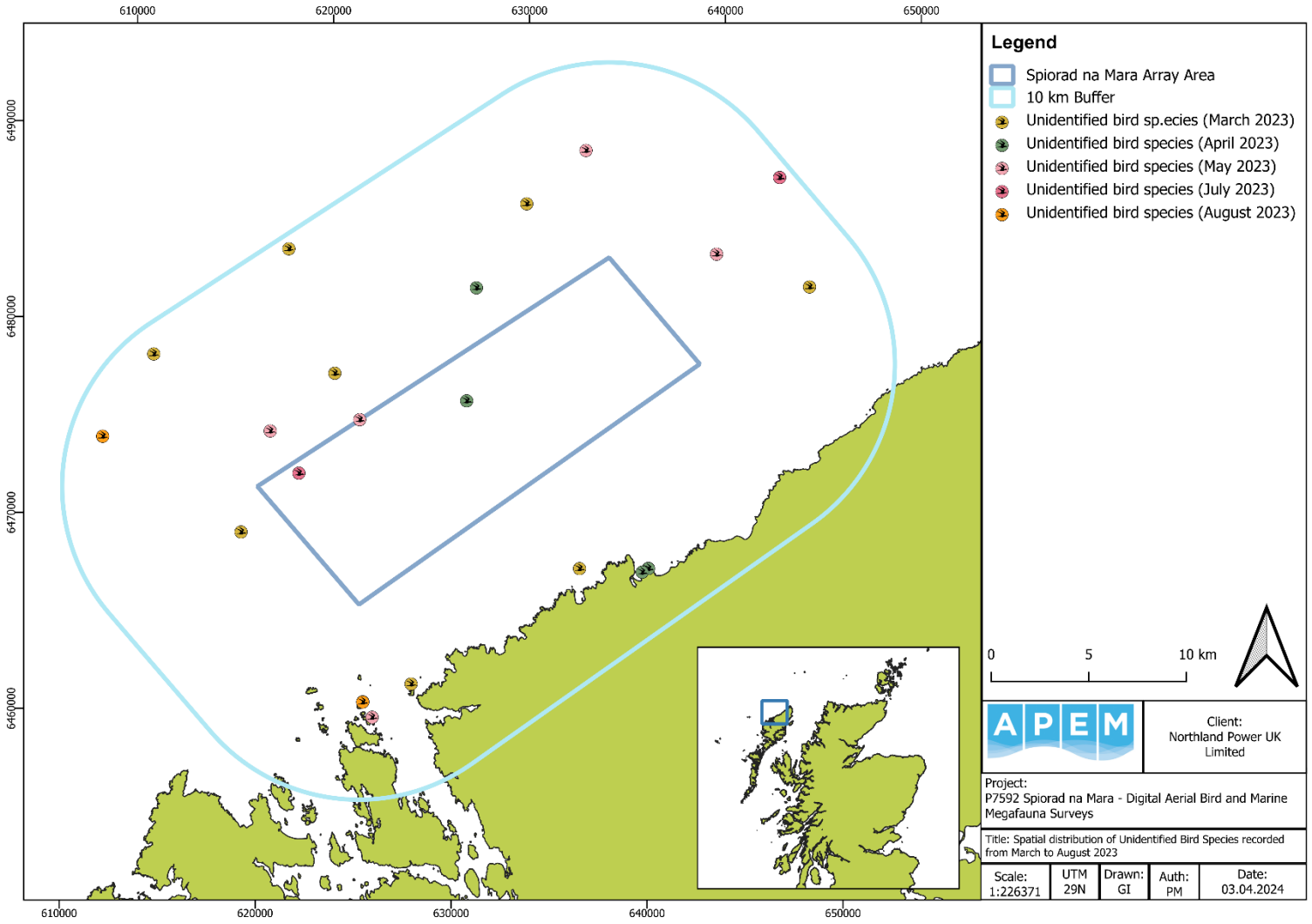


Figure 164 Distribution of unidentified bird species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

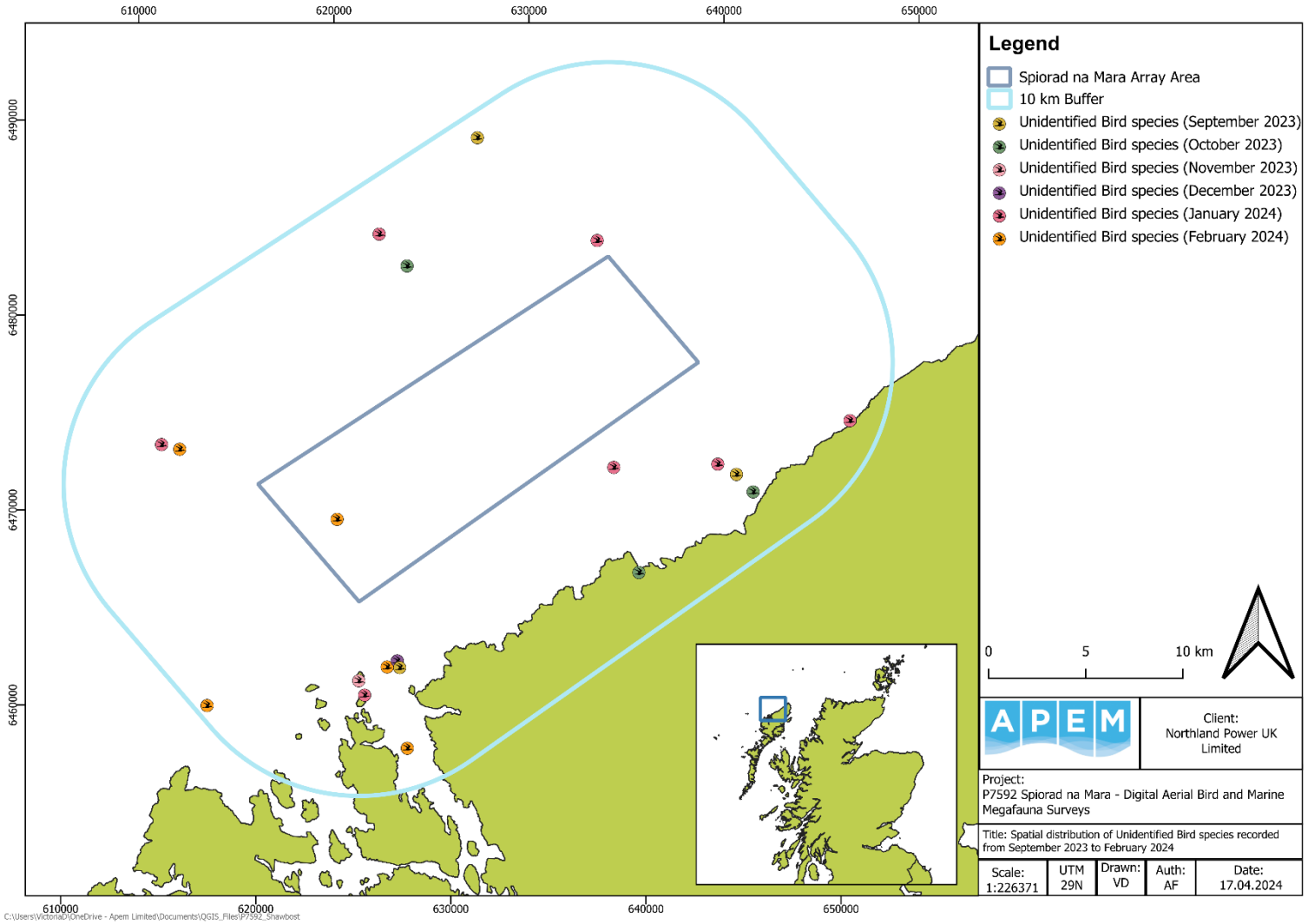


Figure 165 Distribution of unidentified bird species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2 Marine Megafauna

3.2.1 Grey seal – *Halichoerus grypus*

Grey seals were recorded in all months throughout the survey period, except May, December 2022, and March, June, July, December 2023. Peak abundance occurred in May 2023 with an estimate of 771 [95% CL: 93, 1,905] within the Survey Area, equating to 0.80 seals/km^2 (**Table 59**). Grey seals were primarily observed in southern and western areas of the Survey Area hauled out on rocky outcrops (**Figure 166** to **Figure 169**).

Table 59 Apportioned abundance and density estimates (marine mammals per km^2) of grey seal in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	3	26	3	60	0.58	0.03	53	6	149	0.06
Apr-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-22	10	85	10	254	0.32	0.09	100	12	287	0.10
Jul-22	5	43	5	129	0.45	0.04	52	6	155	0.05
Aug-22	4	34	4	77	0.50	0.04	44	5	129	0.05
Sep-22	4	34	9	69	0.50	0.04	120	38	215	0.13
Oct-22	3	26	3	70	0.58	0.03	54	6	148	0.06
Nov-22	2	17	2	43	0.71	0.02	43	5	112	0.04
Jan-23	2	17	2	43	0.71	0.02	26	3	69	0.03
Feb-23	6	51	9	102	0.41	0.05	85	18	170	0.09
Mar-23	0	0	0	0	0.00	0.00	9	1	26	0.01
Apr-23	1	9	1	26	<1.00	0.01	35	4	95	0.04
May-23	73	631	73	1,486	0.12	0.66	771	93	1,905	0.80
Jun-23	0	0	0	0	0.00	0.00	18	2	54	0.02
Aug-23	1	9	1	34	<1.00	0.01	9	1	26	0.01
Sep-23	1	9	1	26	<1.00	0.01	77	9	206	0.08
Oct-23	3	26	3	61	0.58	0.03	87	21	199	0.09
Nov-23	2	17	2	44	0.71	0.02	53	6	139	0.06
Dec-23	0	0	0	0	0.00	0.00	9	1	26	0.01
Jan-24	2	17	2	52	0.71	0.02	44	5	117	0.05
Feb-24	4	34	4	77	0.50	0.04	43	5	111	0.04
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	0	0	0	0	0.00	0.00	9	1	27	0.06
Aug-22	0	0	0	0	0.00	0.00	9	1	27	0.06
Oct-22	0	0	0	0	0.00	0.00	9	1	27	0.06
Nov-22	1	9	1	27	<1.00	0.06	9	1	27	0.06
Sep-23	1	9	1	27	<1.00	0.06	9	1	27	0.06

Oct-23	0	0	0	0	0.00	0.00	18	2	63	0.11
Feb-24	1	9	1	27	<1.00	0.06	18	2	54	0.11

c) 10 km Buffer

Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	3	25	3	59	0.58	0.03	43	5	112	0.05
Apr-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-22	10	84	10	270	0.32	0.11	100	12	286	0.13
Jul-22	5	43	5	128	0.45	0.05	50	6	154	0.06
Aug-22	4	34	4	85	0.50	0.04	34	4	111	0.04
Sep-22	4	34	9	68	0.50	0.04	119	43	213	0.15
Oct-22	3	26	3	69	0.58	0.03	43	5	121	0.05
Nov-22	1	9	1	26	<1.00	0.01	35	4	95	0.04
Jan-23	2	17	2	43	0.71	0.02	26	3	77	0.03
Feb-23	6	51	8	101	0.41	0.06	85	16	169	0.11
Mar-23	0	0	0	0	0.00	0.00	9	1	26	0.01
Apr-23	1	9	1	26	<1.00	0.01	35	4	95	0.04
May-23	73	623	73	1,588	0.12	0.78	761	93	1,858	0.95
Jun-23	0	0	0	0	0.00	0.00	18	2	52	0.02
Aug-23	1	8	1	25	<1.00	0.01	8	1	25	0.01
Sep-23	0	0	0	0	0.00	0.00	68	8	187	0.09
Oct-23	3	26	3	60	0.58	0.03	69	12	146	0.09
Nov-23	2	17	2	43	0.71	0.02	53	6	139	0.07
Dec-23	0	0	0	0	0.00	0.00	8	1	26	0.01
Jan-24	2	17	2	69	0.71	0.02	44	5	117	0.06
Feb-24	3	25	3	68	0.58	0.03	25	3	68	0.03

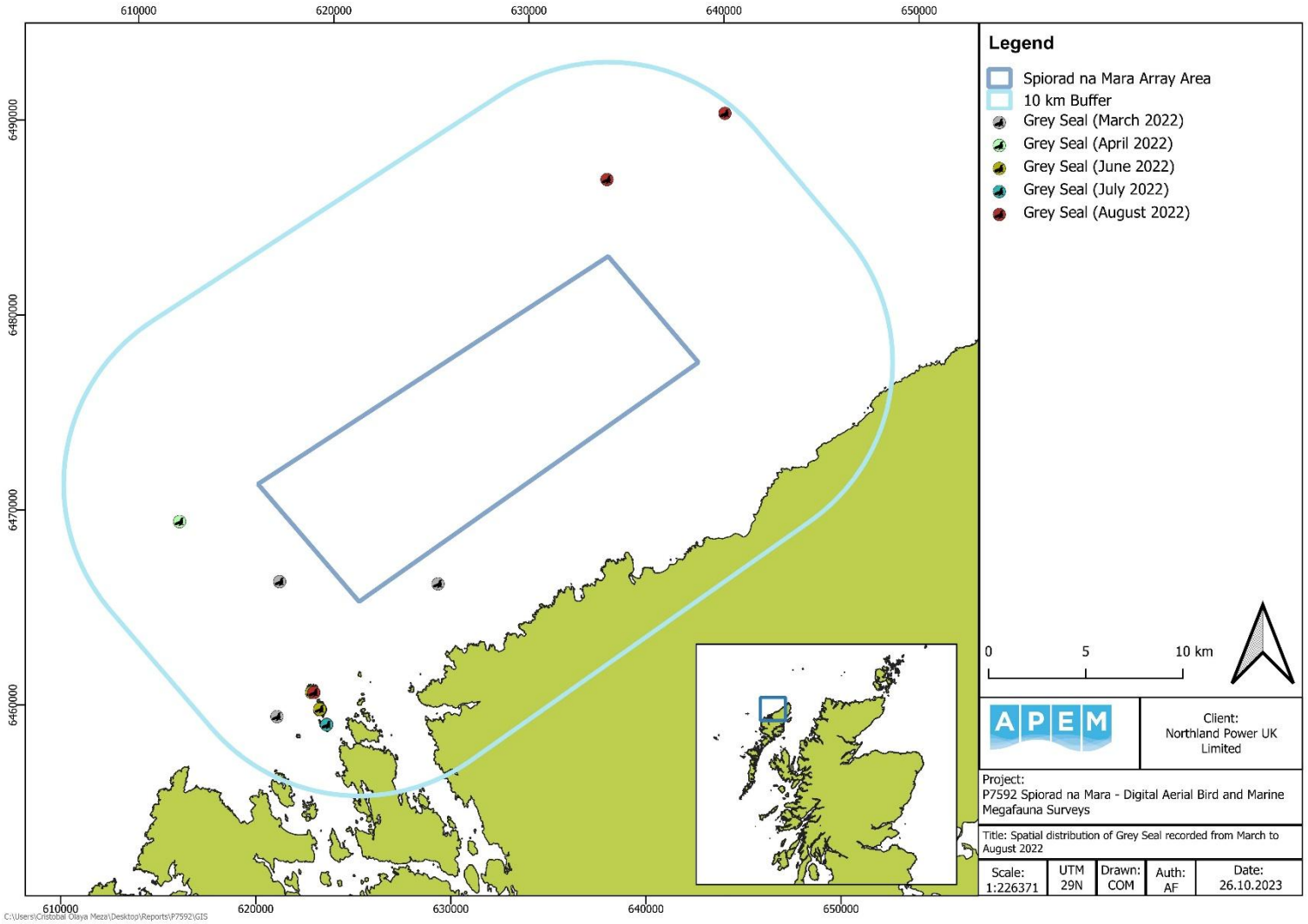


Figure 166 Distribution of grey seal in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

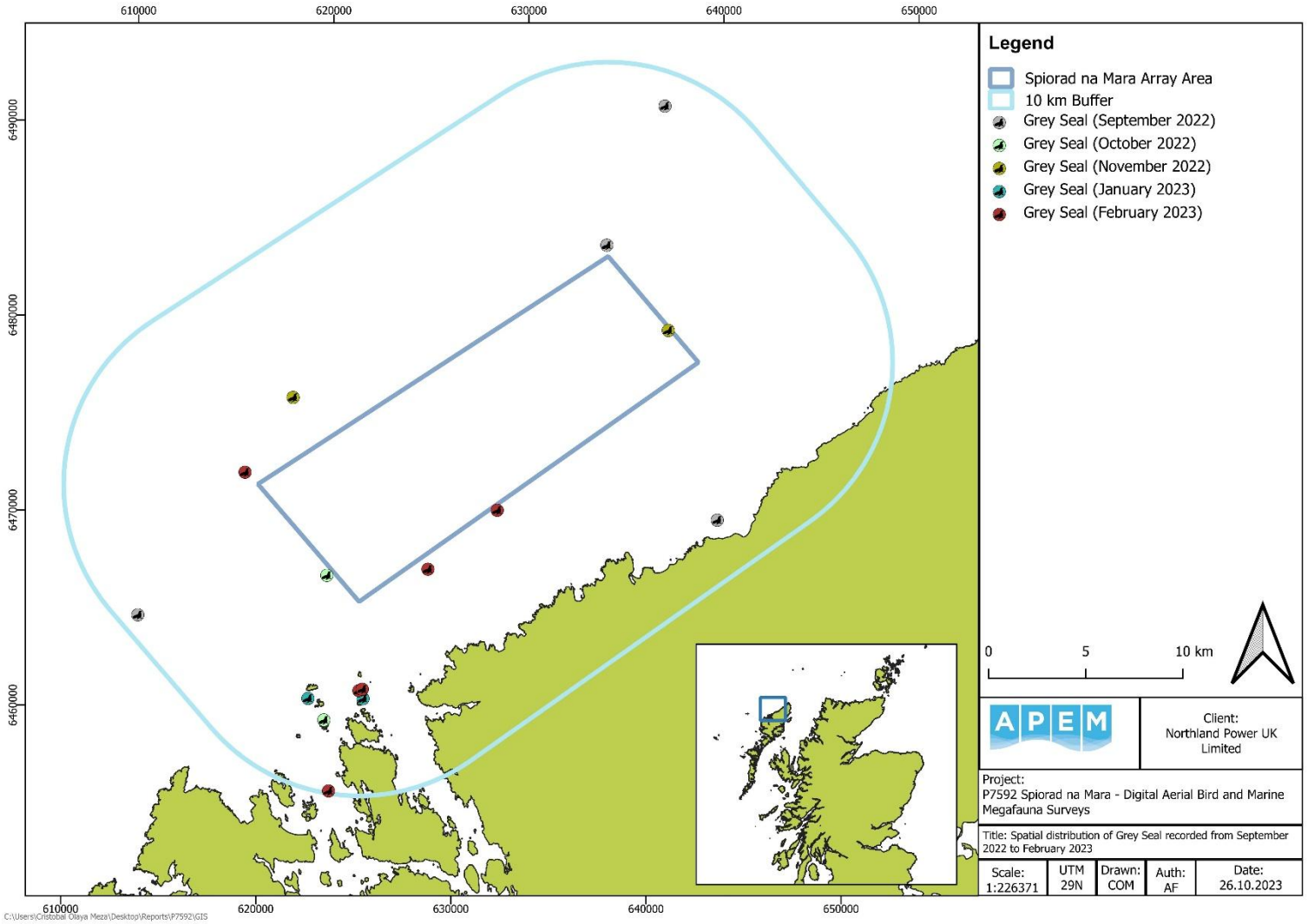


Figure 167 Distribution of grey seal in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

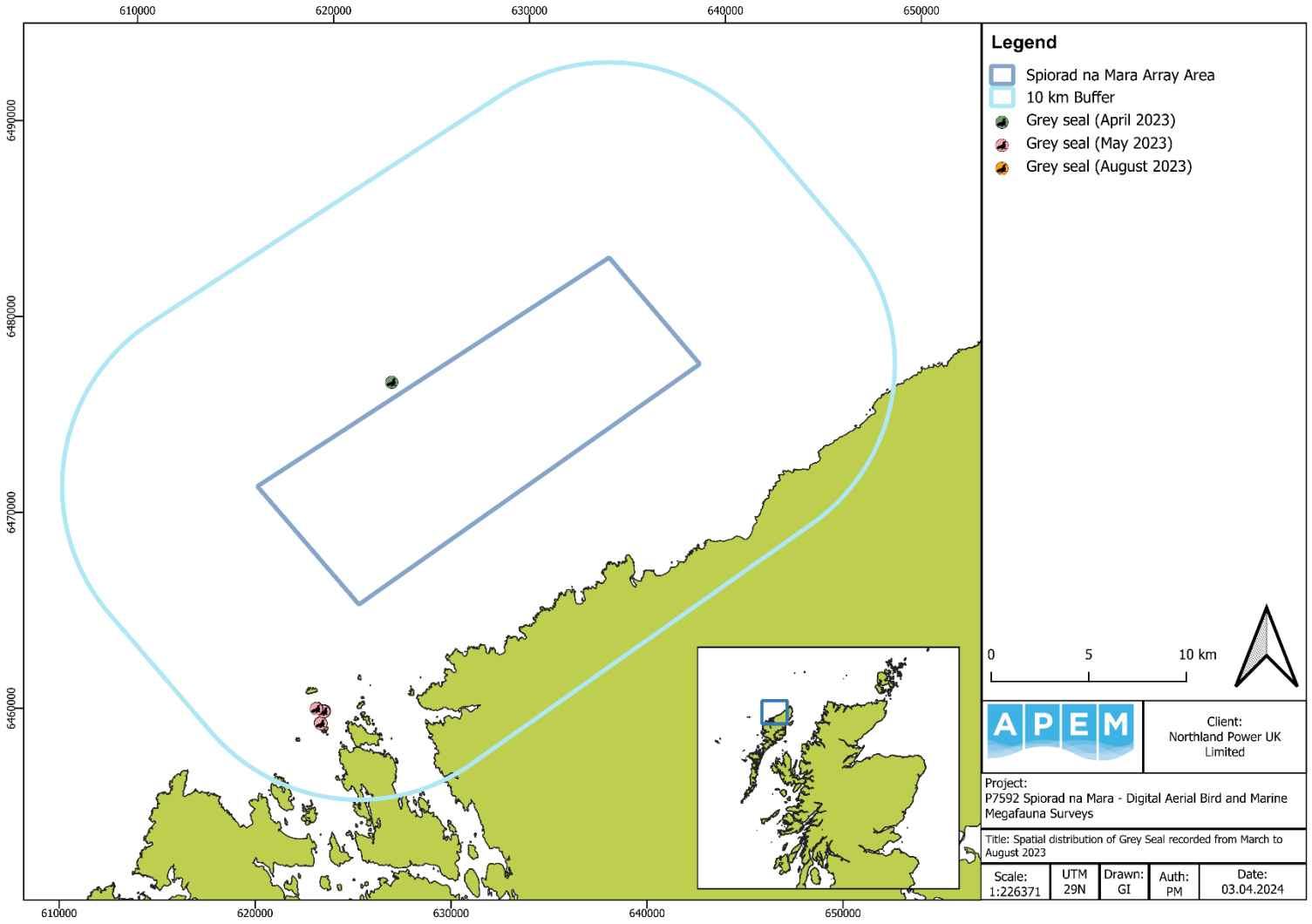


Figure 168 Distribution of grey seal in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

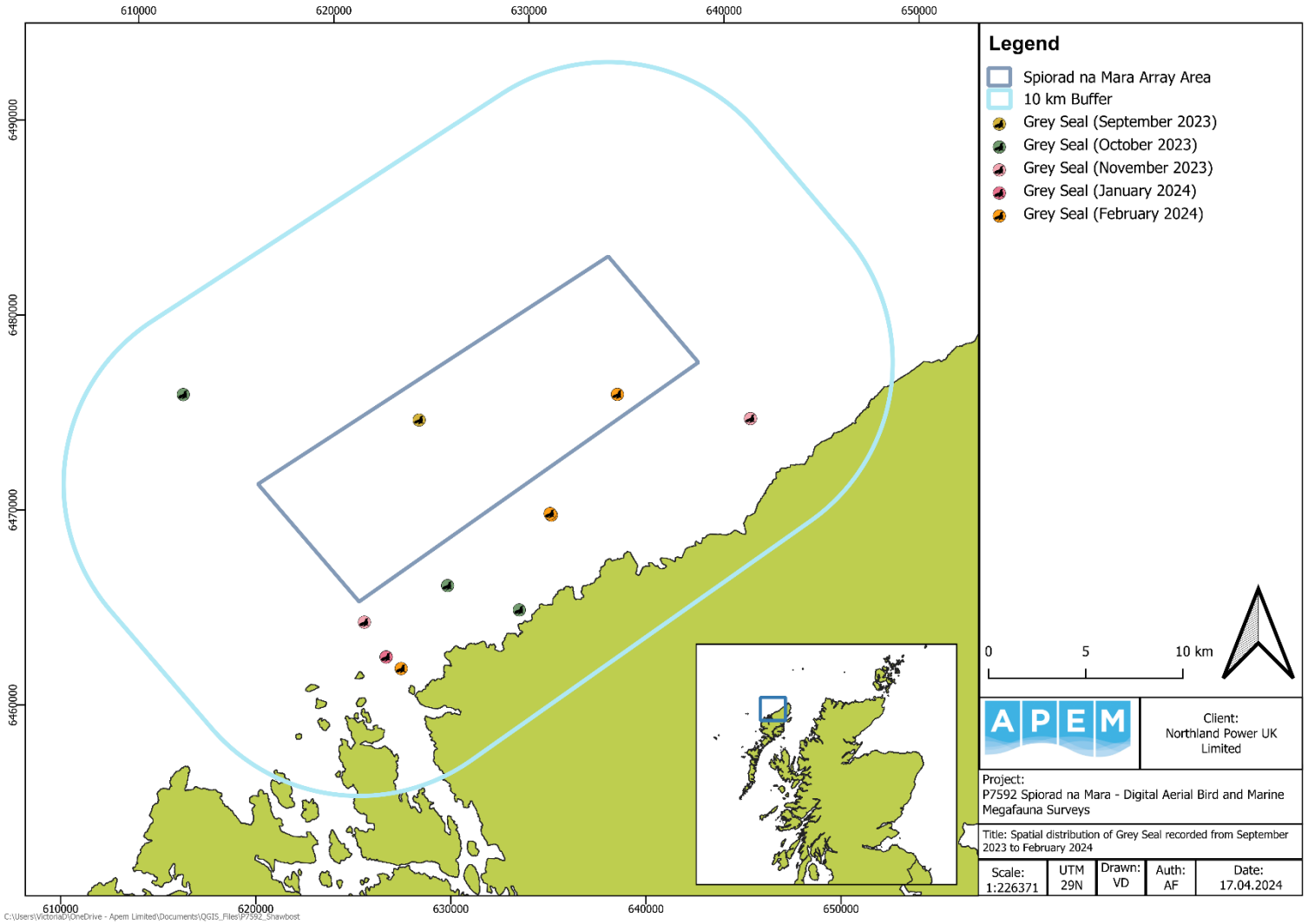


Figure 169 Distribution of grey seal in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.2 Common seal – *Phoca vitulina*

Common seals were recorded in May 2022 and from May to September 2023. Peak abundance occurred in September 2023 with an estimate of 86 [95% CL: 10, 257] within the Survey Area, equating to 0.09 seals/km^2 (**Table 60**). All individuals recorded were hauled out on the rocky islets of Bearasaigh and Flodaigh in the south of the 10 km Buffer (**Figure 170** to **Figure 172**).

Table 60 Apportioned abundance and density estimates (marine mammals per km^2) of common seal in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-22	8	69	8	206	0.35	0.07	69	8	206	0.07
May-23	5	43	5	112	0.45	0.04	50	6	142	0.05
Jun-23	2	18	2	53	0.71	0.02	18	2	53	0.02
Aug-23	0	0	0	0	0.00	0.00	9	1	26	0.01
Sep-23	1	9	1	26	<1.00	0.01	86	10	257	0.09
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-22	8	68	8	204	0.35	0.09	68	8	273	0.09
May-23	5	43	5	111	0.45	0.05	50	6	140	0.06
Jun-23	2	18	2	53	0.71	0.02	18	2	53	0.02
Aug-23	0	0	0	0	0.00	0.00	8	1	25	0.01
Sep-23	1	8	1	26	<1.00	0.01	85	10	256	0.11

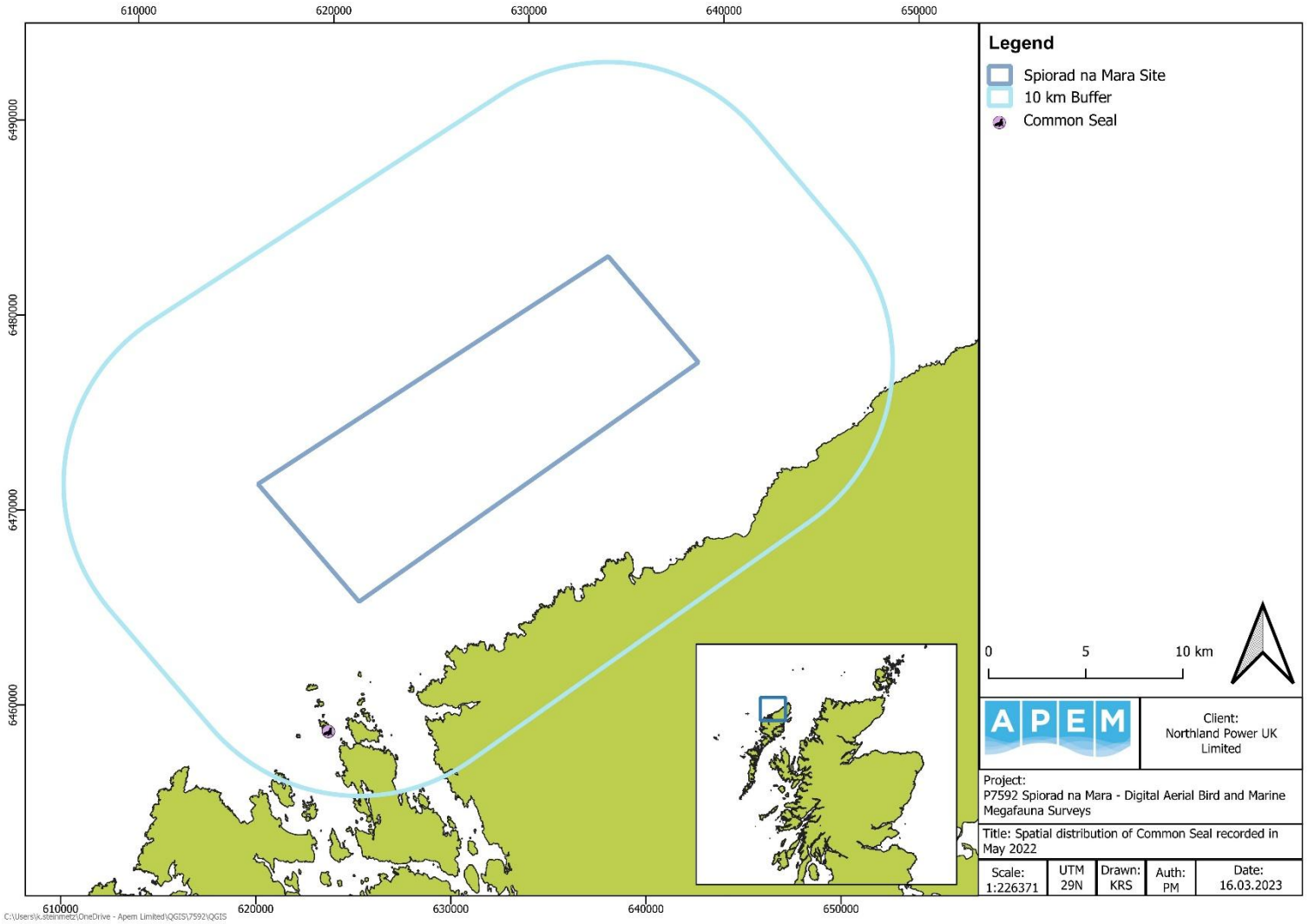


Figure 170 Distribution of common seal in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

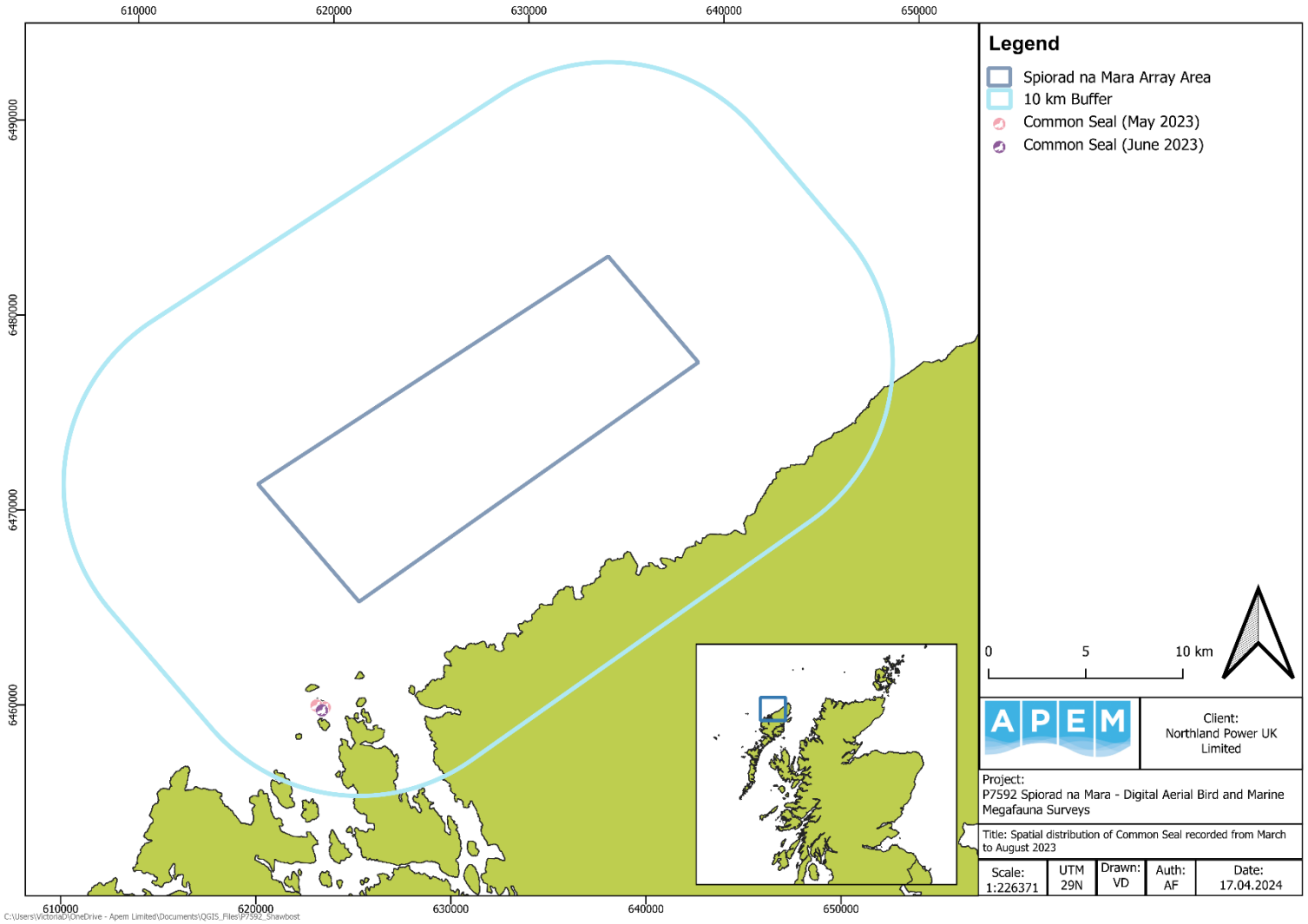


Figure 171 Distribution of common seal in the Survey Area during March 2022 to August 2023

Note: Individuals in close proximity may appear overlapping

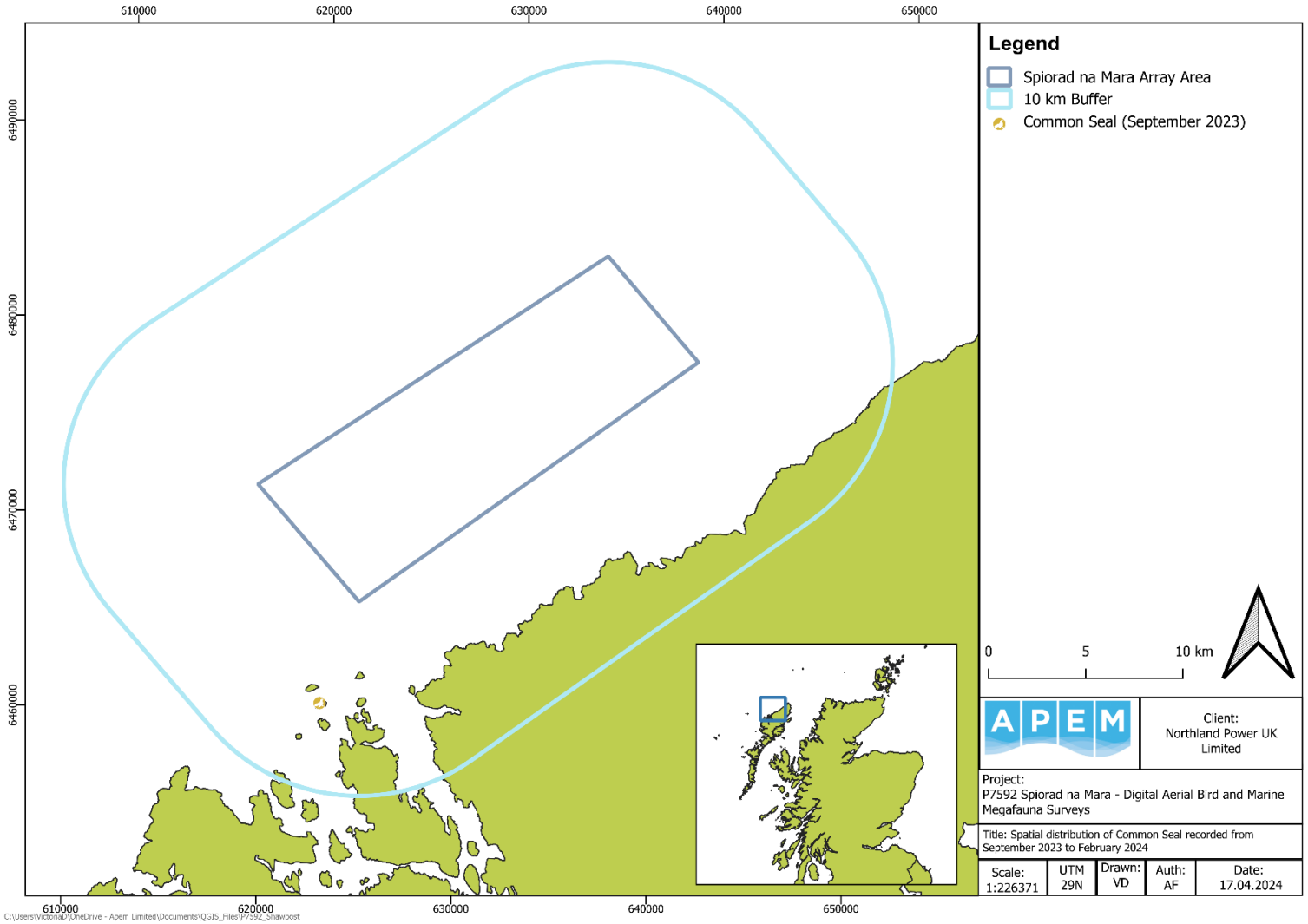


Figure 172 Distribution of common seal in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.3 Seal species - Unidentified

Seal species were recorded in all months throughout the survey period except April, May, December 2022, and July 2023. Peak abundance occurred in May 2023 with an estimate of 147 [95% CL: 17, 363] within the Survey Area equating to 0.24 seals/km^2 (**Table 61)**. Seal species were primarily observed in the southern and western areas of the Survey Area, with a high concentration of seal species hauled out on rocky outcrops, particularly in May 2023 (**Figure 173** to **Figure 176**).

Table 61 Apportioned abundance and density estimates (marine mammals per km^2) of seal species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	3	26	3	60	0.58	0.03	None remaining as all abundance estimates apportioned into specific species.			
Jun-22	2	17	2	51	0.71	0.02				
Jul-22	1	9	1	26	<1.00	0.01				
Aug-22	1	9	1	26	<1.00	0.01				
Sep-22	10	86	34	146	0.32	0.09				
Oct-22	2	18	2	44	0.71	0.02				
Nov-22	3	26	3	69	0.58	0.03				
Jan-23	1	9	1	26	<1.00	0.01				
Feb-23	4	34	9	68	0.50	0.04				
Mar-23	1	9	1	26	<1.00	0.01				
Apr-23	3	26	3	61	0.58	0.03				
May-23	17	147	17	363	0.24	0.15				
Jun-23	2	18	2	44	0.71	0.02				
Aug-23	1	9	1	26	<1.00	0.01				
Sep-23	17	146	17	351	0.24	0.15				
Oct-23	7	61	17	112	0.38	0.06				
Nov-23	4	35	9	70	0.50	0.04				
Dec-23	1	9	1	26	<1.00	0.01				
Jan-24	3	26	3	61	0.58	0.03				
Feb-24	1	9	1	26	<1.00	0.01				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	1	9	1	27	<1.00	0.06				
Oct-23	2	18	2	54	0.71	0.11				
Feb-24	1	9	1	27	<1.00	0.06				
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})

Mar-22	2	17	2	42	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.
Jun-22	2	17	2	51	0.71	0.02	
Jul-22	1	9	1	34	<1.00	0.01	
Sep-22	10	85	34	145	0.32	0.11	
Oct-22	2	17	2	43	0.71	0.02	
Nov-22	3	26	3	68	0.58	0.03	
Jan-23	1	9	1	26	<1.00	0.01	
Feb-23	4	34	8	68	0.50	0.04	
Mar-23	1	9	1	34	<1.00	0.01	
Apr-23	3	26	3	60	0.58	0.03	
May-23	17	145	17	333	0.24	0.18	
Jun-23	2	18	2	44	0.71	0.02	
Aug-23	1	8	1	25	<1.00	0.01	
Sep-23	17	145	17	366	0.24	0.18	
Oct-23	5	43	9	86	0.45	0.05	
Nov-23	4	35	9	69	0.50	0.04	
Dec-23	1	8	1	26	<1.00	0.01	
Jan-24	3	26	3	61	0.58	0.03	

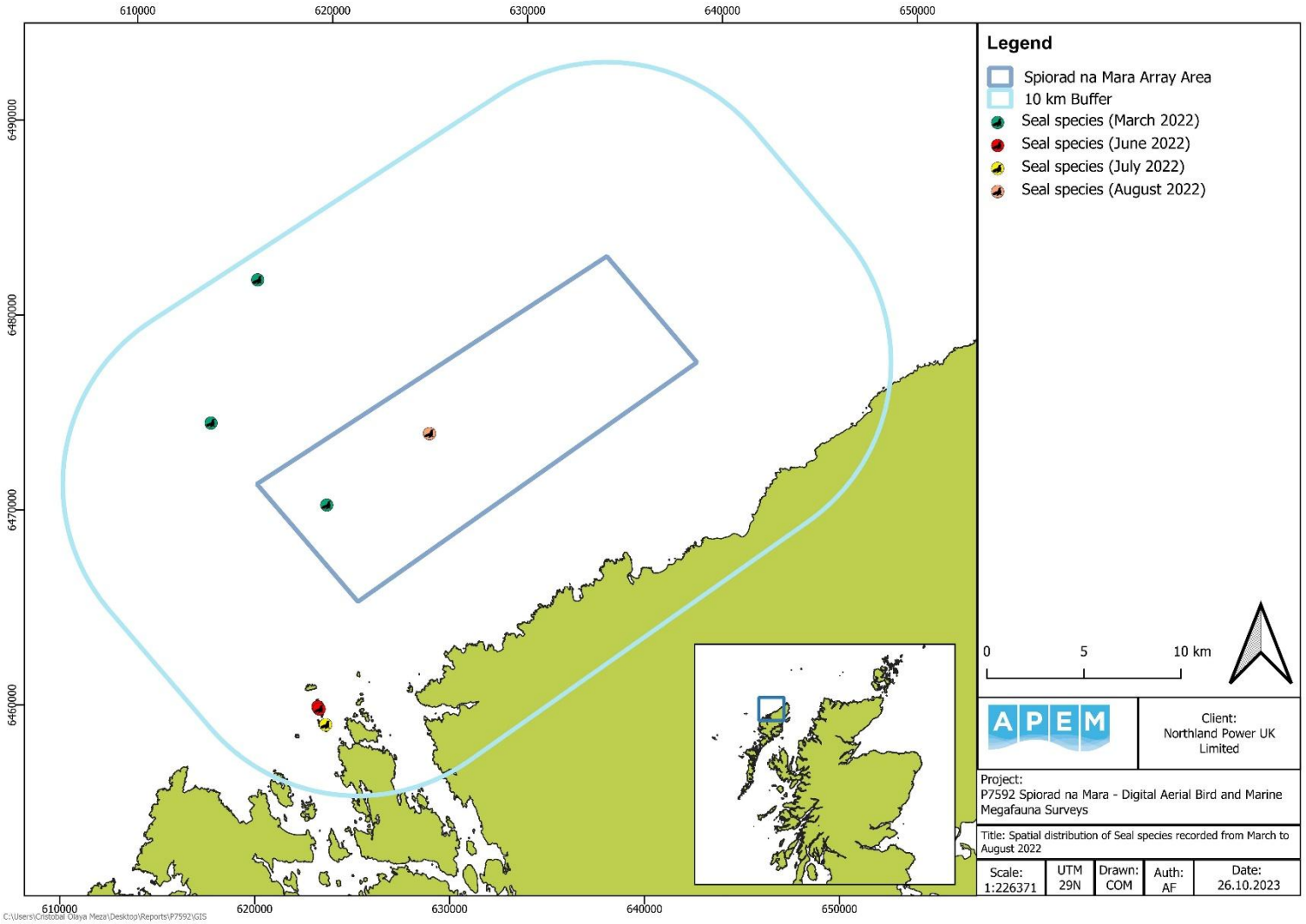


Figure 173 Distribution of seal species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

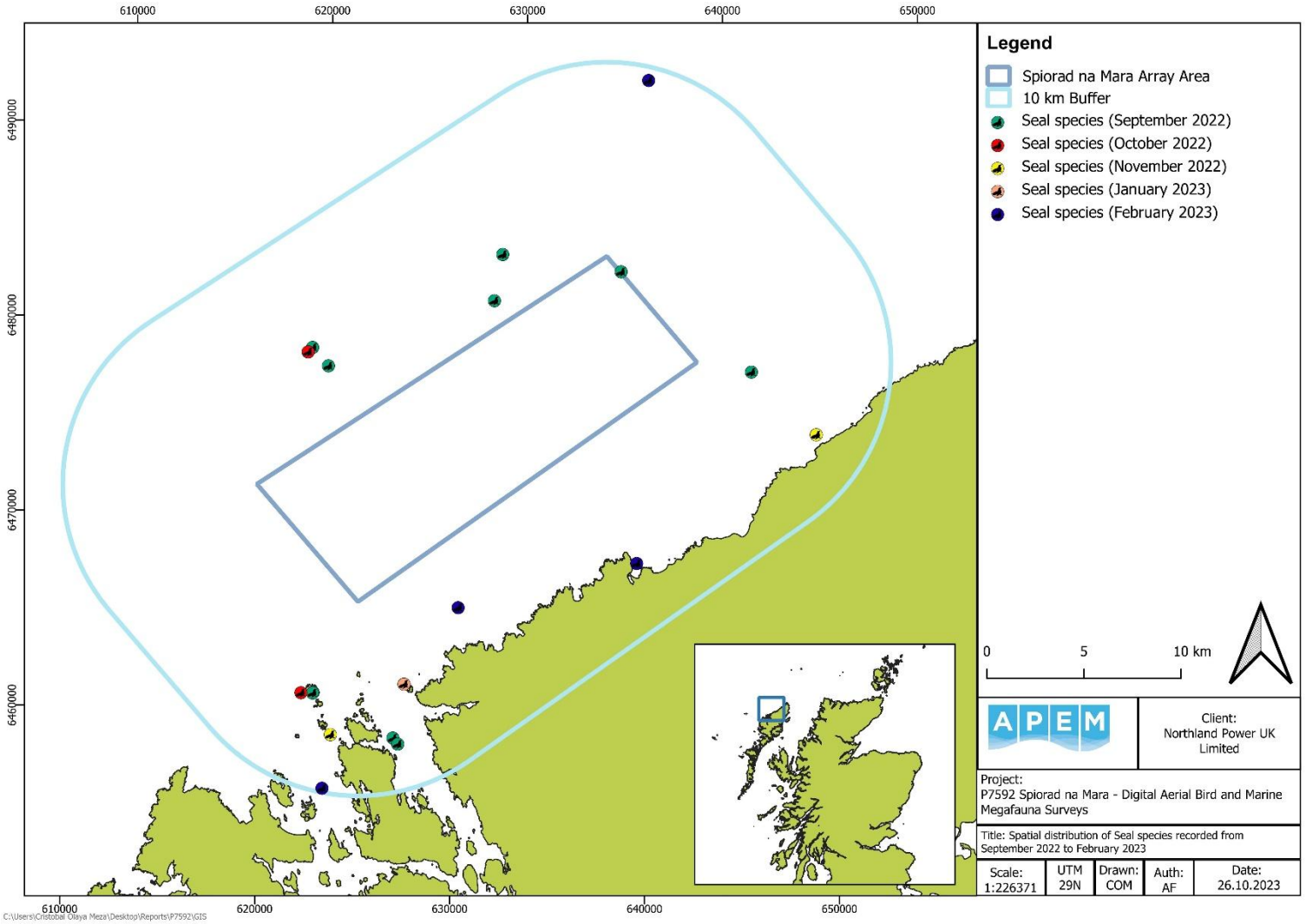


Figure 174 Distribution of seal species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

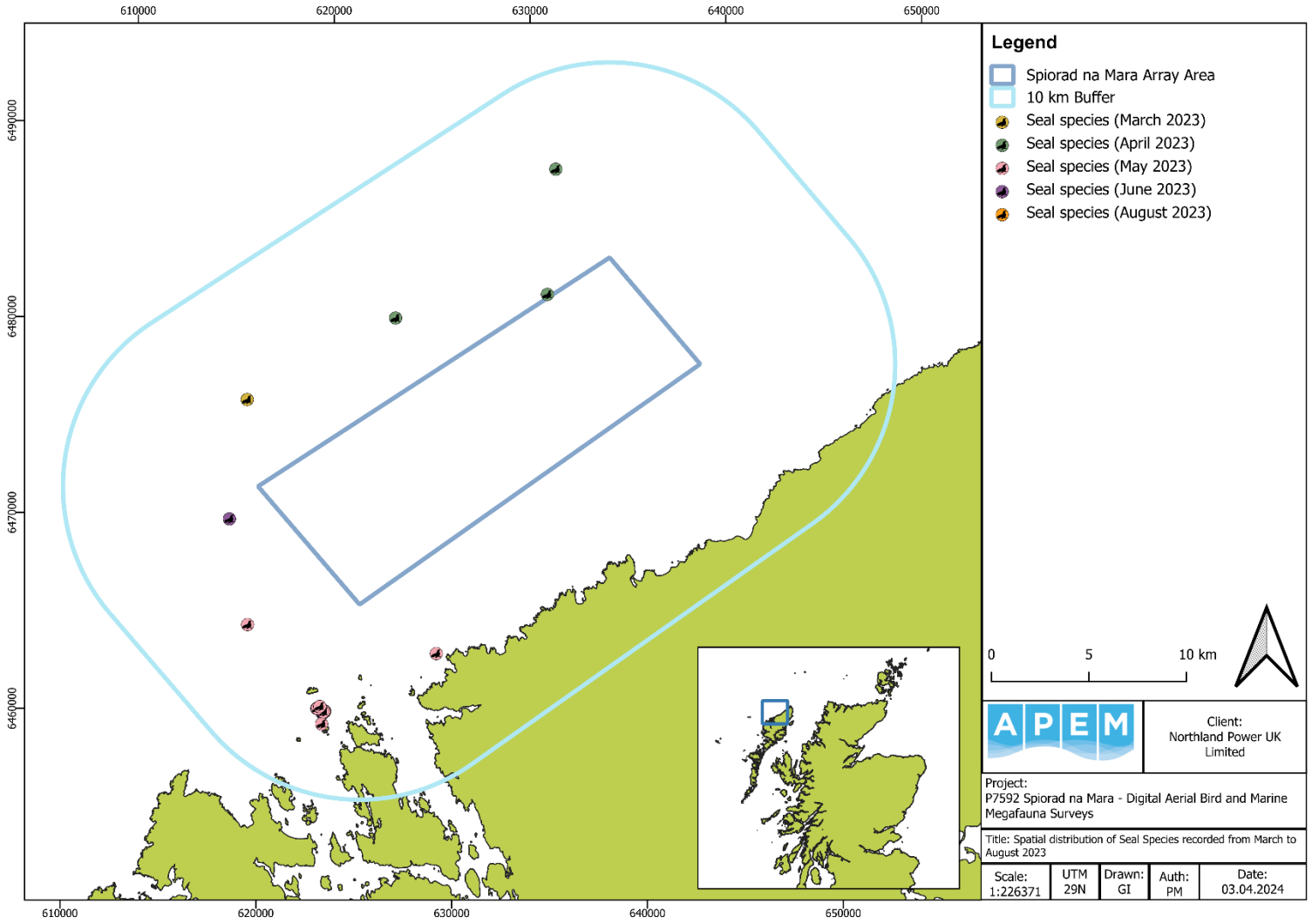


Figure 175 Distribution of seal species in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

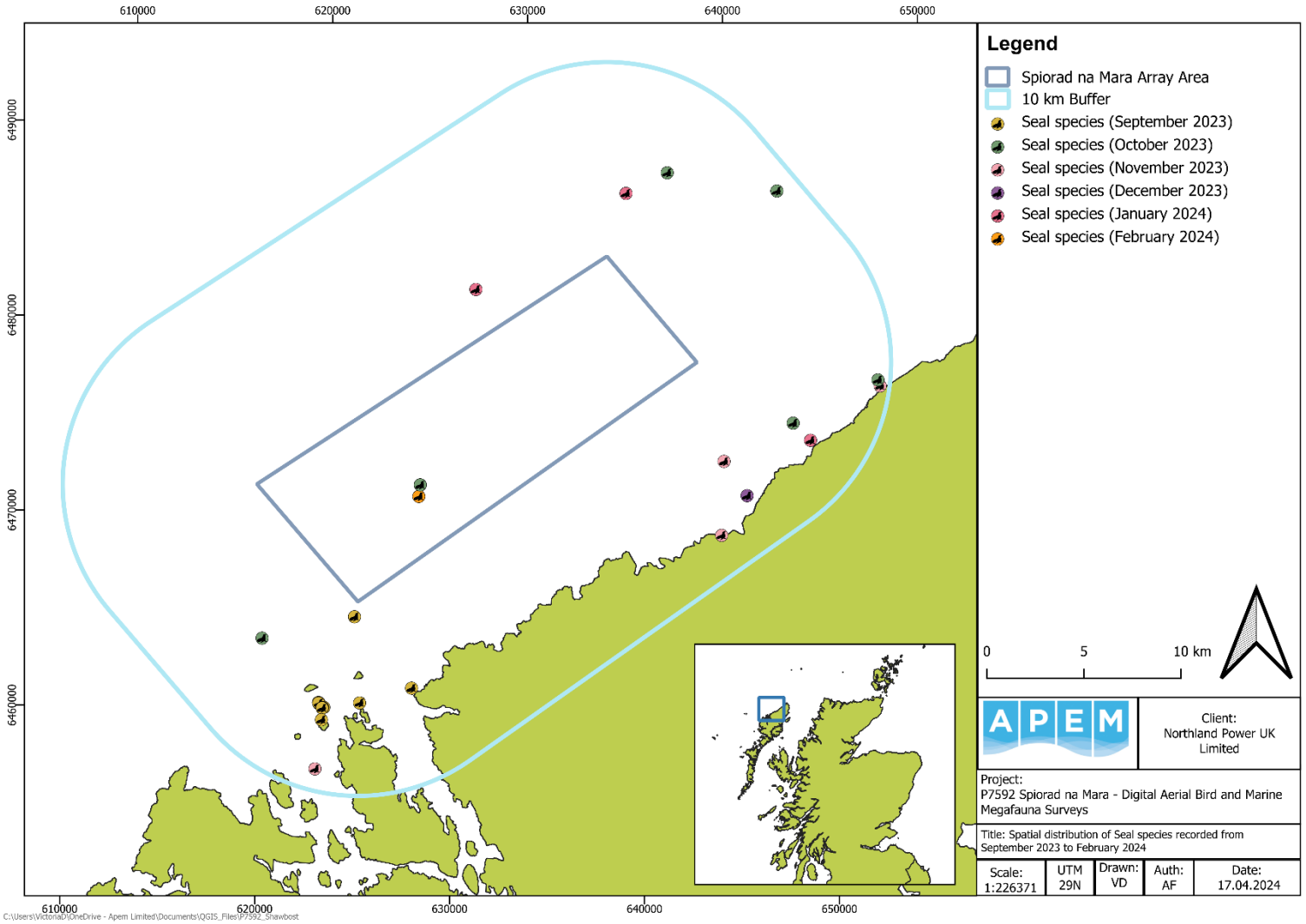


Figure 176 Distribution of seal species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.4 Minke whale – *Balaenoptera acutorostrata*

Minke whales were recorded in July 2023, resulting in an abundance estimate of nine [95% CL: 1, 35] within the Survey Area, equating to 0.01 whales/km^2 (**Table 62**).

The minke whale was recorded in the south of the 10 km Buffer in close proximity to the coastline (**Figure 177**).

Table 62 Apportioned abundance and density estimates (marine mammals per km^2) of minke whale in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total apportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jul-23	1	9	1	35	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Raw Count	Total apportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Raw Count	Total apportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jul-23	1	9	1	26	<1.00	0.01

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

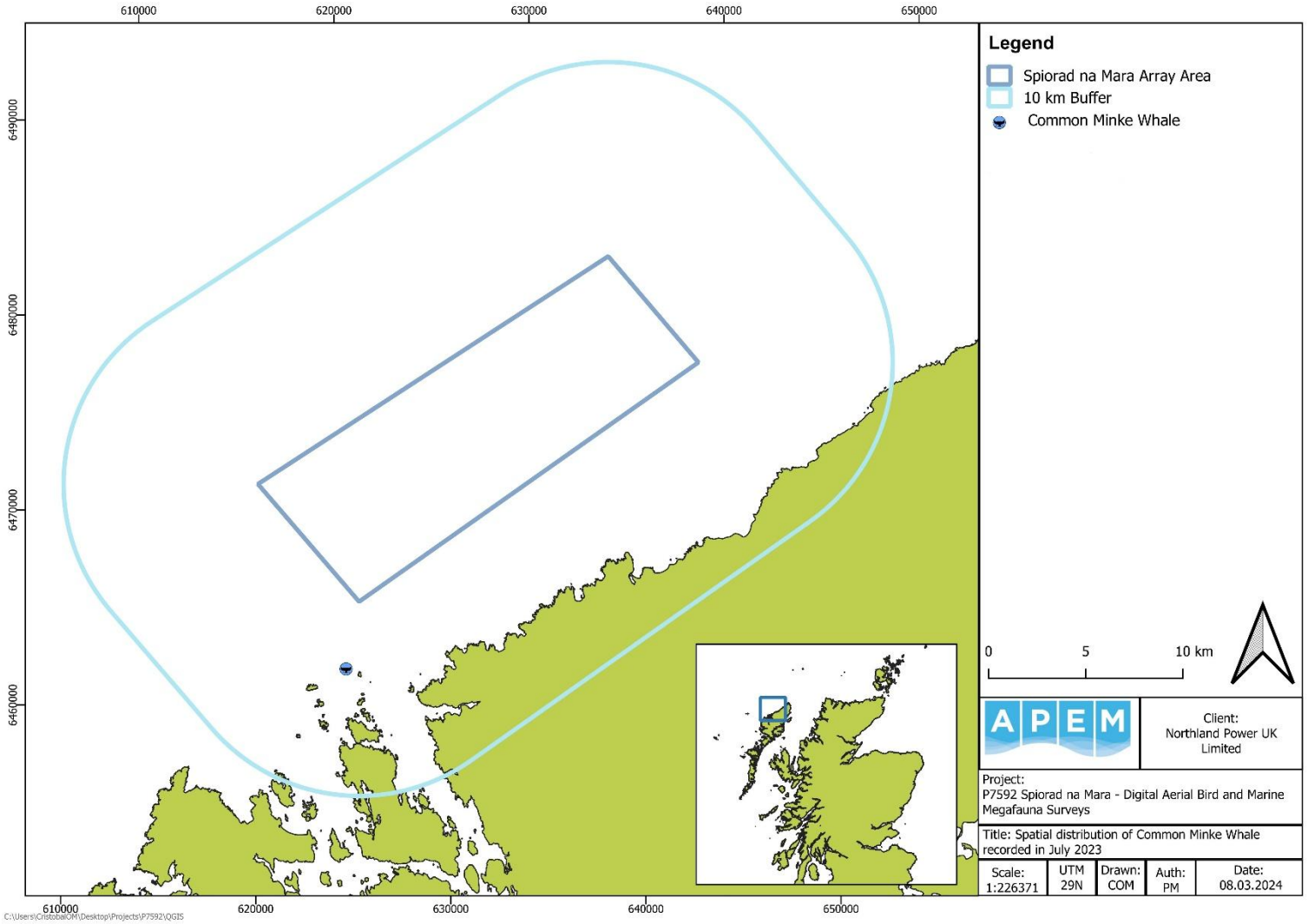


Figure 177 Distribution of Minke whale in the Survey Area during July 2023

Note: Individuals in close proximity may appear overlapping

3.2.5 Bottlenose dolphin – *Tursiops truncatus*

Bottlenose dolphins were recorded in July and August 2022. Peak abundance occurred in July 2022 with an estimate of nine [95% CL: 1, 26] within the Survey Area, equating to 0.01 dolphins/km^2 (**Table 63)**. The bottlenose dolphins were recorded in the south of the 10 km Buffer (**Figure 178**).

Table 63 Apportioned abundance and density estimates (marine mammals per km^2) of bottlenose dolphin in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Aug-22	0	0	0	0	0.00	0.00	5	1	13	0.01
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
None recorded.										
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	8	1	26	0.01
Aug-22	0	0	0	0	0.00	0.00	4	1	13	0.01

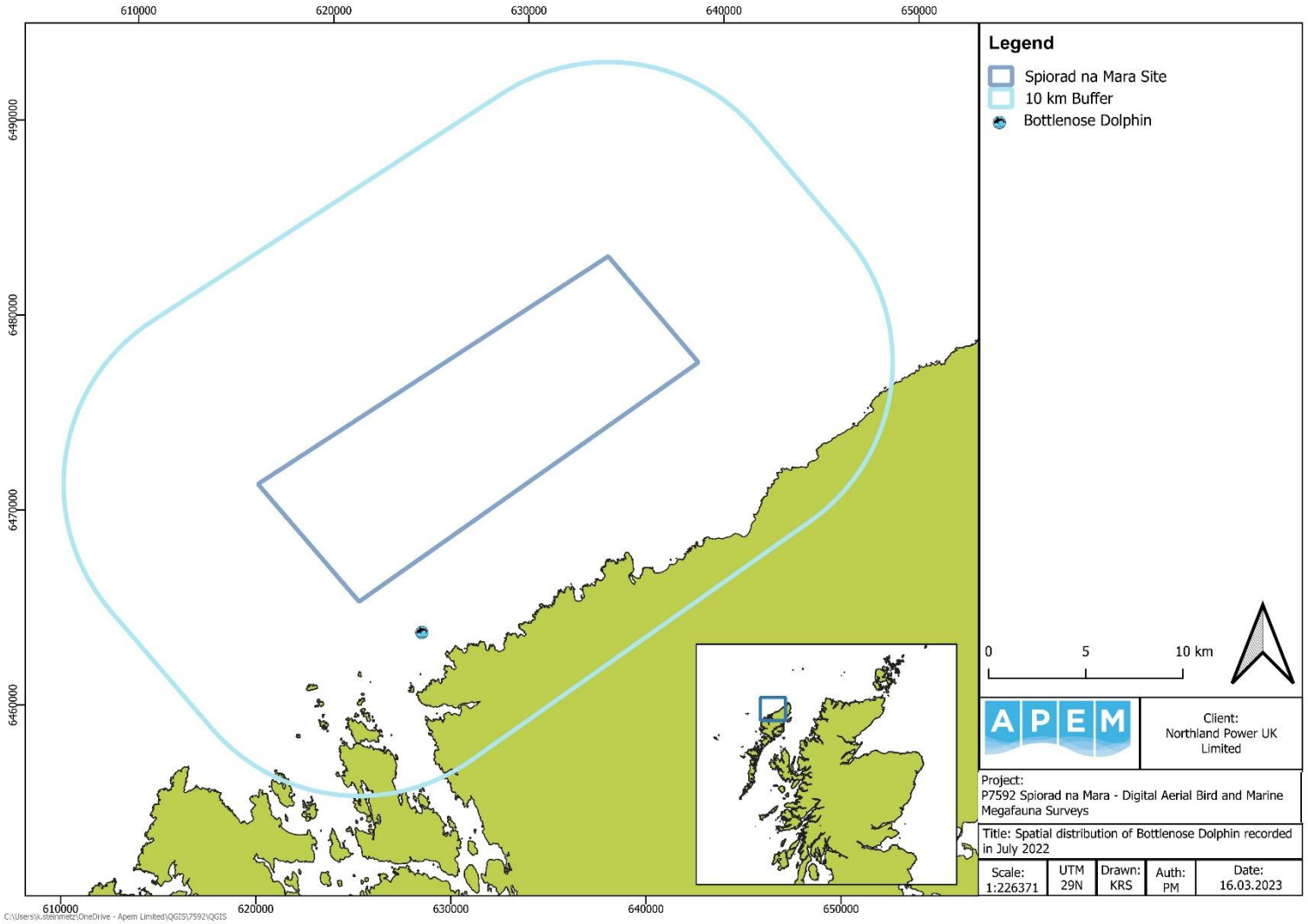


Figure 178 Distribution of bottlenose dolphin in the Survey Area during July 2022

Note: Individuals in close proximity may appear overlapping

3.2.6 Common dolphin – *Delphinus delphis*

Common dolphins were recorded in March and September 2022, February, August, September and October 2023, and January 2024. Peak abundance occurred in January 2024 with an estimate of 481 [95% CL: 124, 967] within the Survey Area, equating to 0.50 dolphins/km^2 (**Table 64**). Common dolphins exhibited a varied distributional pattern throughout the survey period. During the first survey year, common dolphins were observed sporadically in the southern, northern, and eastern areas of the Survey Area (**Figure 179** and **Figure 180**). In the second year, common dolphins were sparsely distributed to the west, north and south of the Survey Area (**Figure 181** and **Figure 182**).

Table 64 Apportioned abundance and density estimates (marine mammals per km^2) of common dolphin in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	9	77	9	197	0.33	0.08	107	12	291	0.11
Sep-22	29	249	29	567	0.19	0.26	257	30	606	0.27
Feb-23	8	68	8	204	0.35	0.07	76	9	223	0.08
Aug-23	7	60	7	146	0.38	0.06	60	7	146	0.06
Sep-23	0	0	0	0	0.00	0.00	85	10	219	0.09
Oct-23	20	173	20	458	0.22	0.18	281	32	751	0.29
Jan-24	34	297	61	603	0.17	0.31	481	124	967	0.50
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	36	4	109	0.50	0.22	40	4	121	0.25
Sep-22	0	0	0	0	0.00	0.00	8	1	24	0.05
Feb-23	8	72	8	215	0.35	0.45	80	9	239	0.50
Oct-23	0	0	0	0	0.00	0.00	9	1	27	0.06
Jan-24	0	0	0	0	0.00	0.00	52	5	145	0.32
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	5	42	5	127	0.45	0.05	72	8	270	0.09
Feb-23	29	247	29	562	0.19	0.31	247	29	562	0.31
Aug-23	7	59	7	144	0.38	0.07	59	7	153	0.07
Sep-23	0	0	0	0	0.00	0.00	83	10	233	0.10
Oct-23	20	172	20	455	0.22	0.22	271	31	725	0.34
Jan-24	34	294	61	588	0.17	0.37	428	92	852	0.54

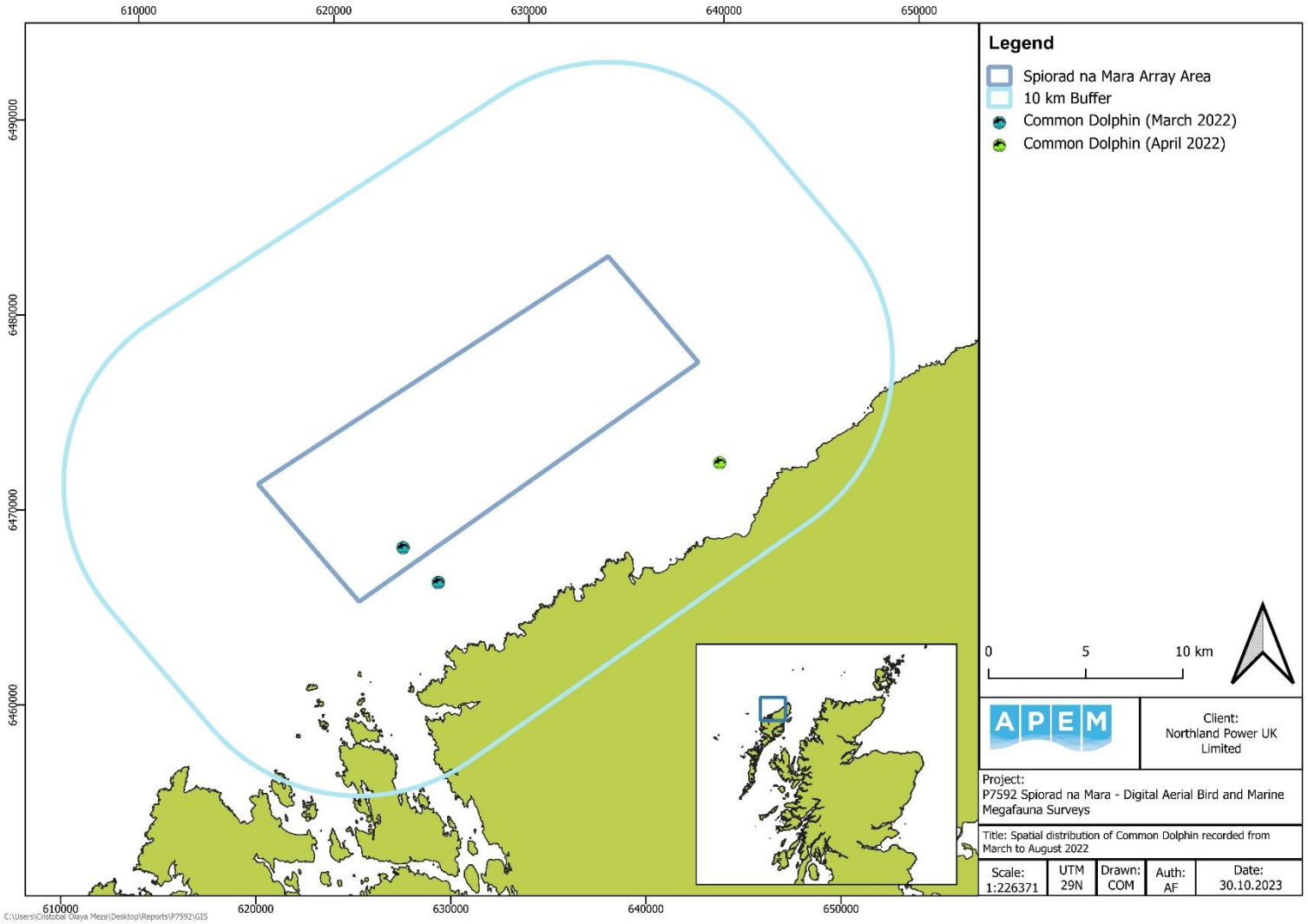


Figure 179 Distribution of common dolphin in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

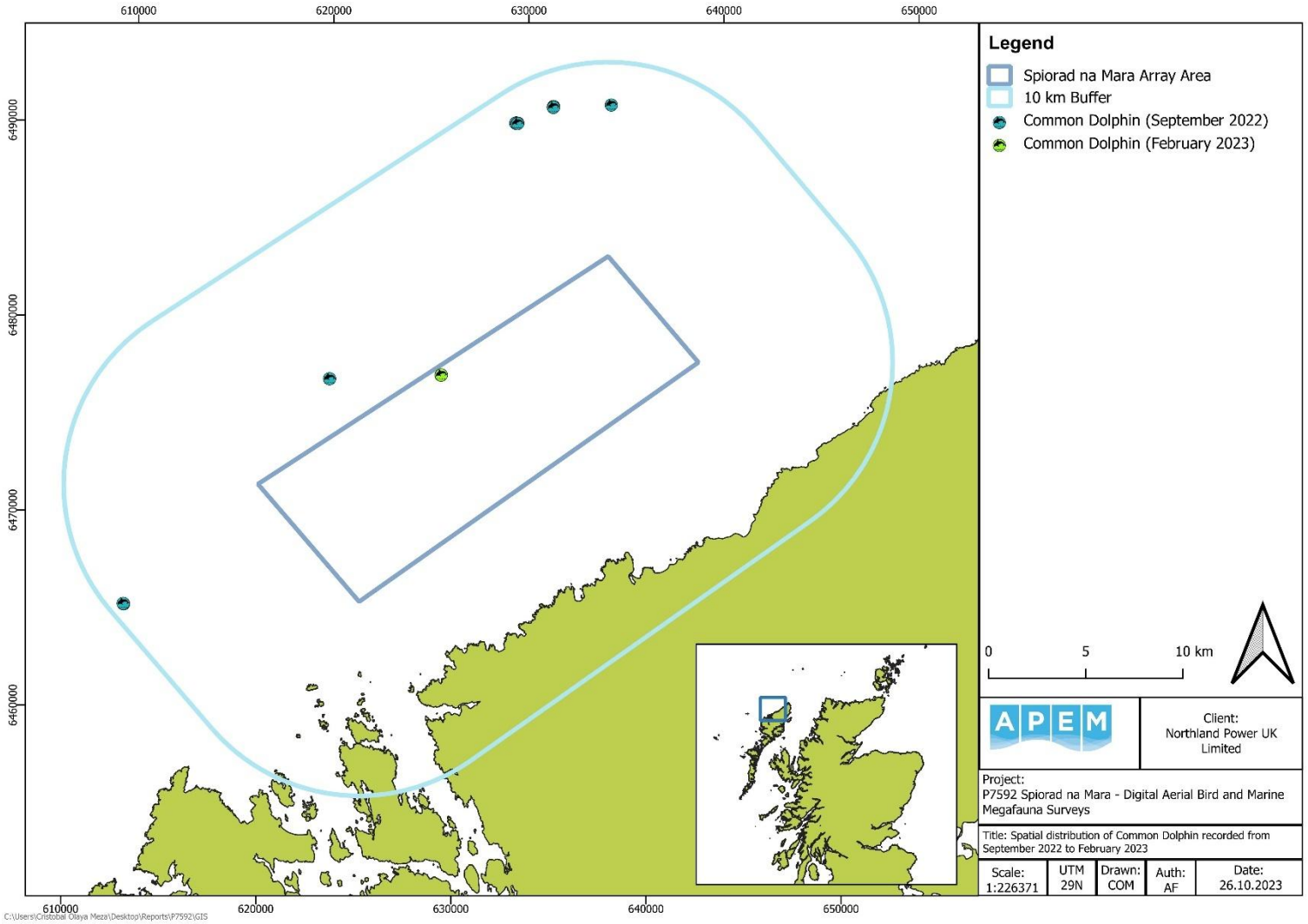


Figure 180 Distribution of common dolphin in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

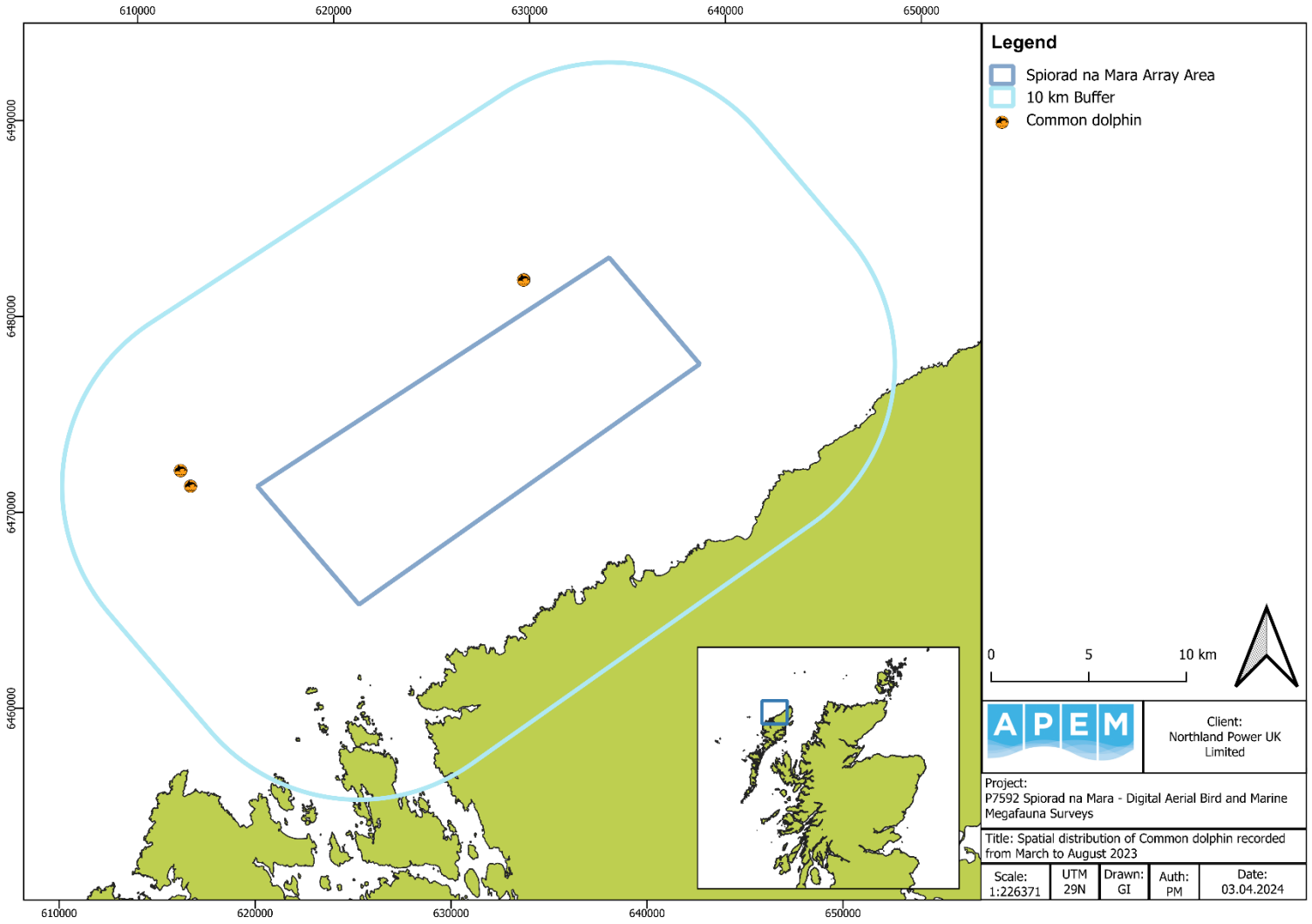


Figure 181 Distribution of common dolphin in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

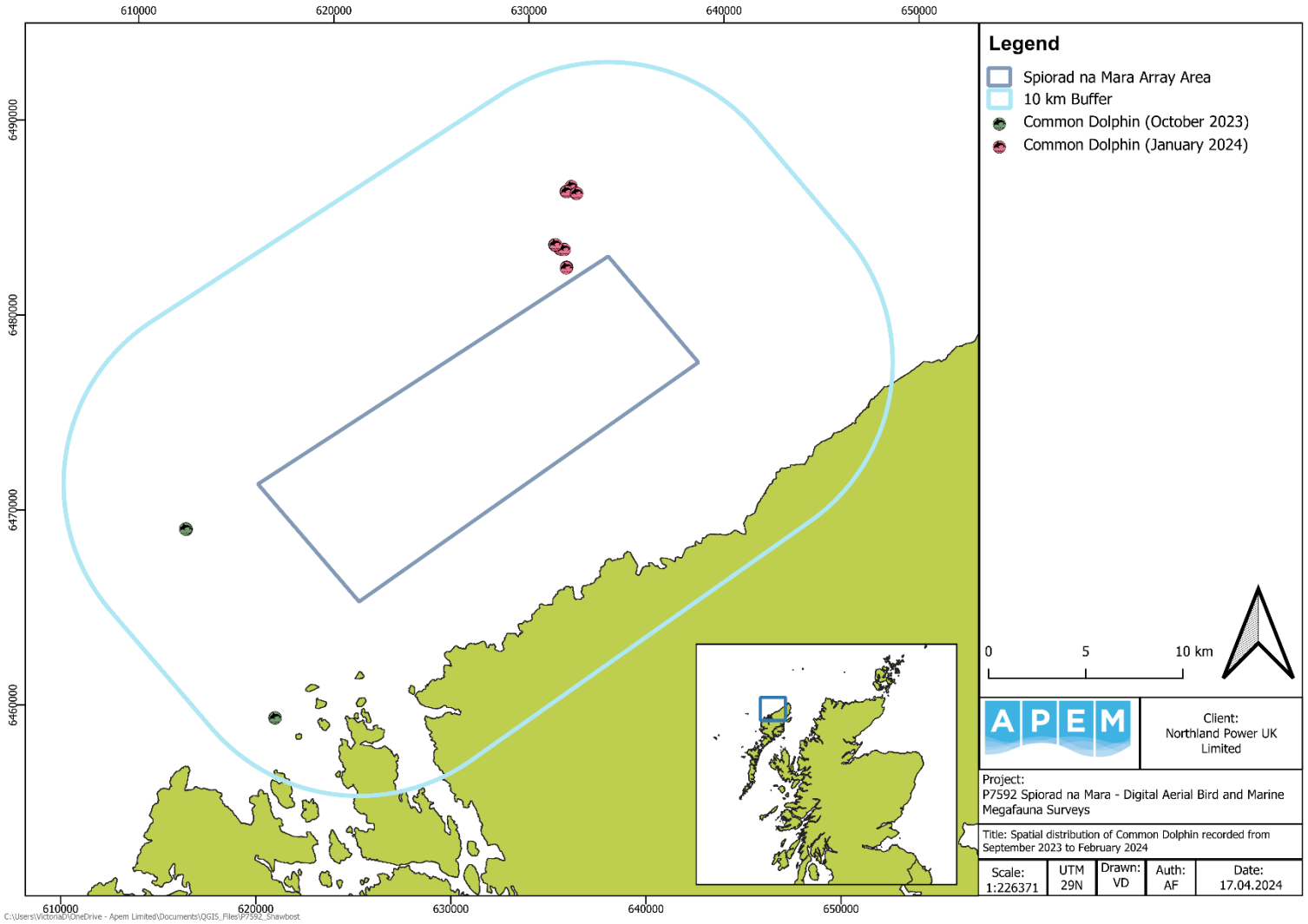


Figure 182 Distribution of common dolphin in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.7 Risso's dolphin – *Grampus griseus*

Risso's dolphins were recorded in March, April, June and August 2022, and July 2023. Peak abundance occurred in June 2022 with an estimate of 93 [95% CL: 11, 280] within the Survey Area, equating to 0.10 dolphins/km^2 (**Table 65**). In March and April 2022, Risso's dolphins were recorded around the centre of the Survey area, whilst in June 2022, they were recorded in the northeast of the Survey Area (**Figure 183**). In July 2023, Risso's dolphins were observed in the north of the 10 km Buffer (**Figure 184**).

Table 65 Apportioned abundance and density estimates (marine mammals per km^2) of Risso's dolphin in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	34	4	103	0.50	0.04	46	5	139	0.05
Apr-22	1	9	1	26	<1.00	0.01	9	1	26	0.01
Jun-22	11	93	11	280	0.30	0.10	93	11	280	0.10
Aug-22	0	0	0	0	0.00	0.00	8	1	24	0.01
Jul-23	2	17	2	69	0.71	0.02	22	3	65	0.02
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	36	4	109	0.50	0.22	40	4	121	0.25
Apr-22	1	9	1	27	<1.00	0.06	9	1	27	0.06
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jun-22	11	93	11	278	0.30	0.12	93	11	278	0.12
Aug-22	0	0	0	0	0.00	0.00	7	1	24	0.01
Jul-23	2	17	2	52	0.71	0.02	22	3	65	0.03

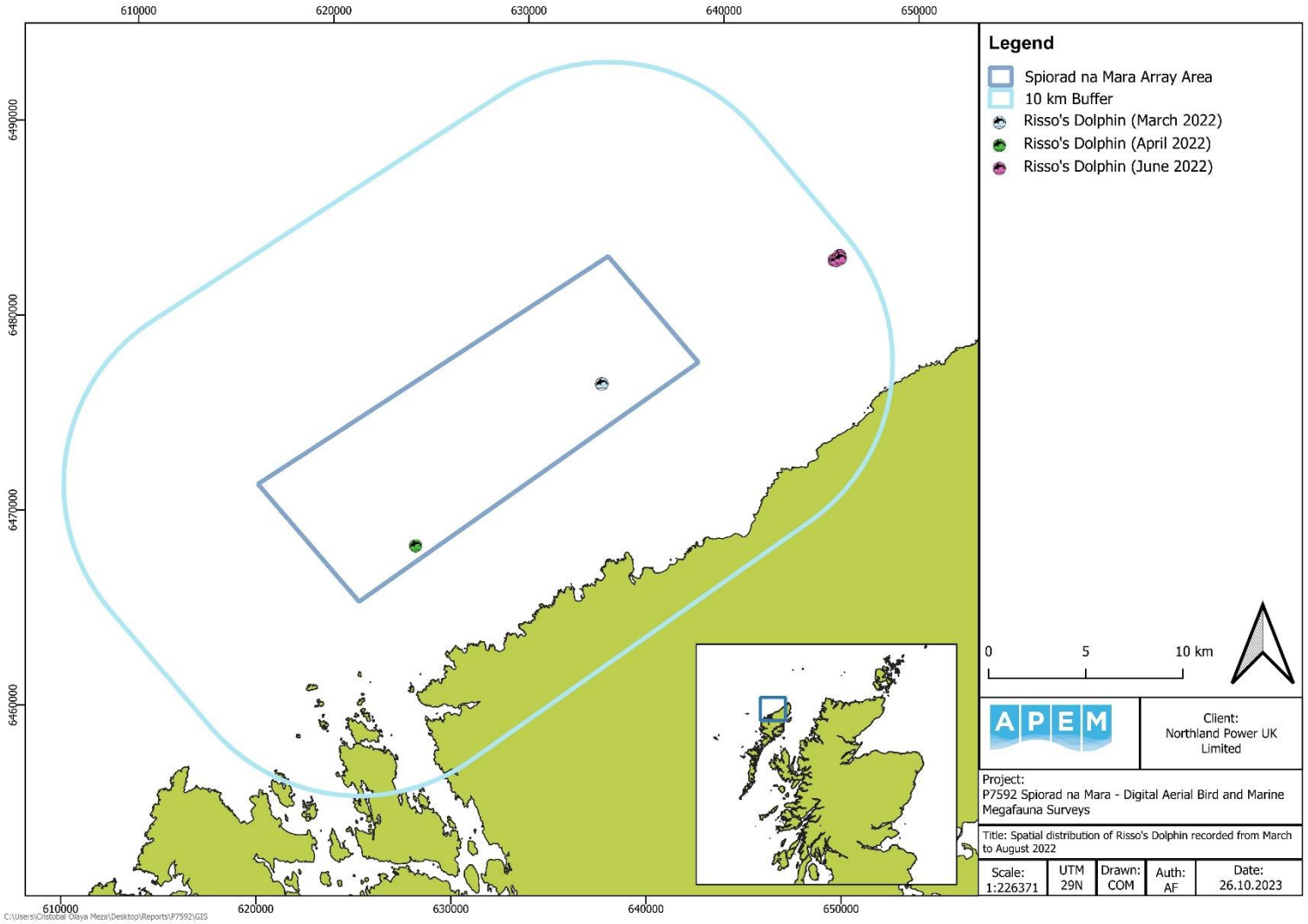


Figure 183 Distribution of Risso's dolphin in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

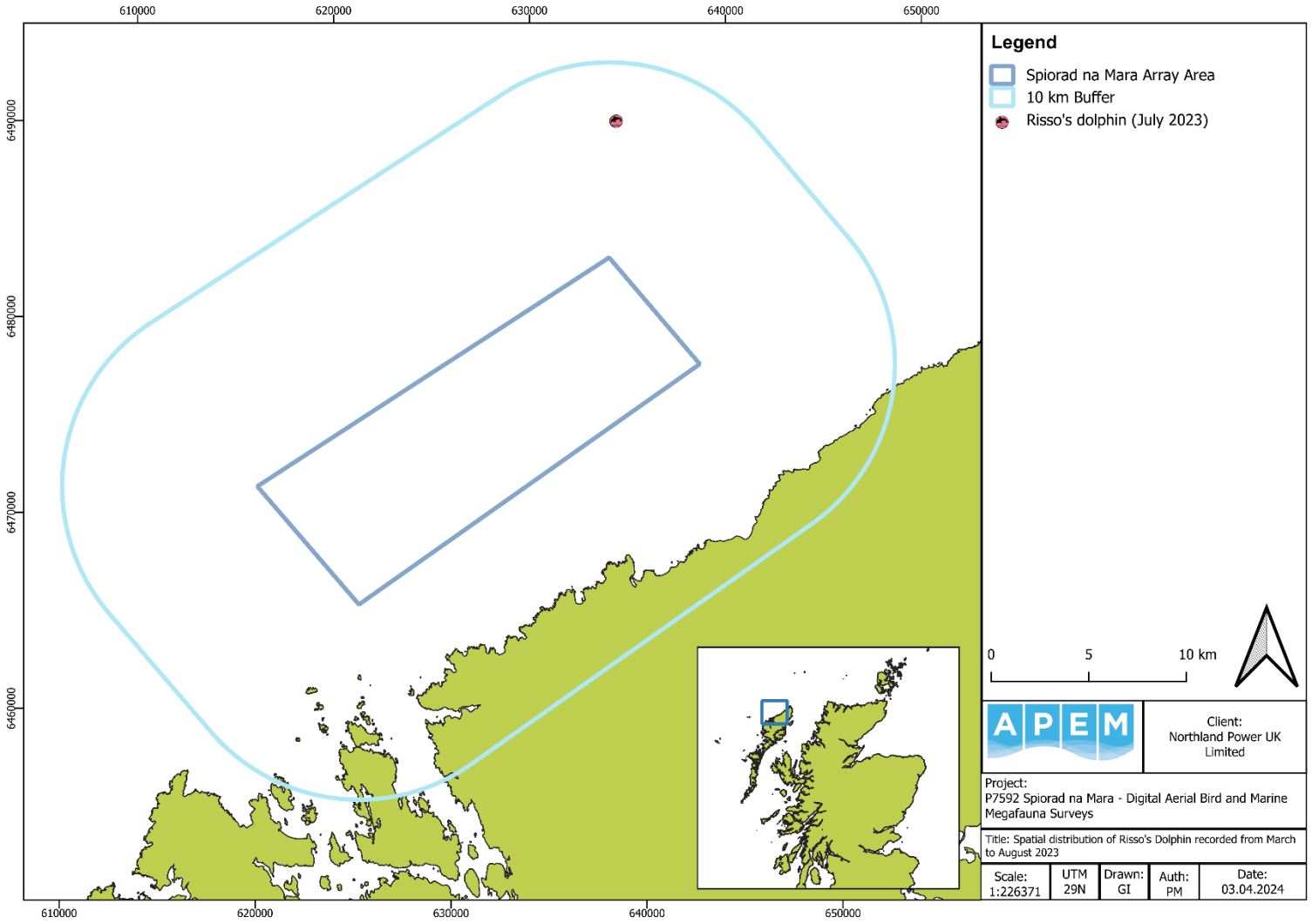


Figure 184 Distribution of Risso's dolphin in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

3.2.8 White-beaked dolphin – *Lagenorhynchus albirostris*

White-beaked dolphins were recorded in May 2023 and January 2024. Peak abundance occurred in May 2023 with an estimate of 52 [95% CL: 6, 155] within the Survey Area, equating to 0.05 dolphins/km^2 (**Table 66**).

Individuals were recorded in the north of the 10 km Buffer (**Figure 185** and **Figure 186**).

Table 66 Apportioned abundance and density estimates (marine mammals per km^2) of white-beaked dolphin in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-23	6	52	6	155	0.41	0.05	52	6	155	0.05
Jan-24	3	26	3	79	0.58	0.03	42	7	120	0.04
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jan-24	0	0	0	0	0	0	5	7	19	0.03
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-23	6	51	6	154	0.41	0.06	51	6	205	0.06
Jan-24	3	26	3	78	0.58	0.03	38	5	108	0.05

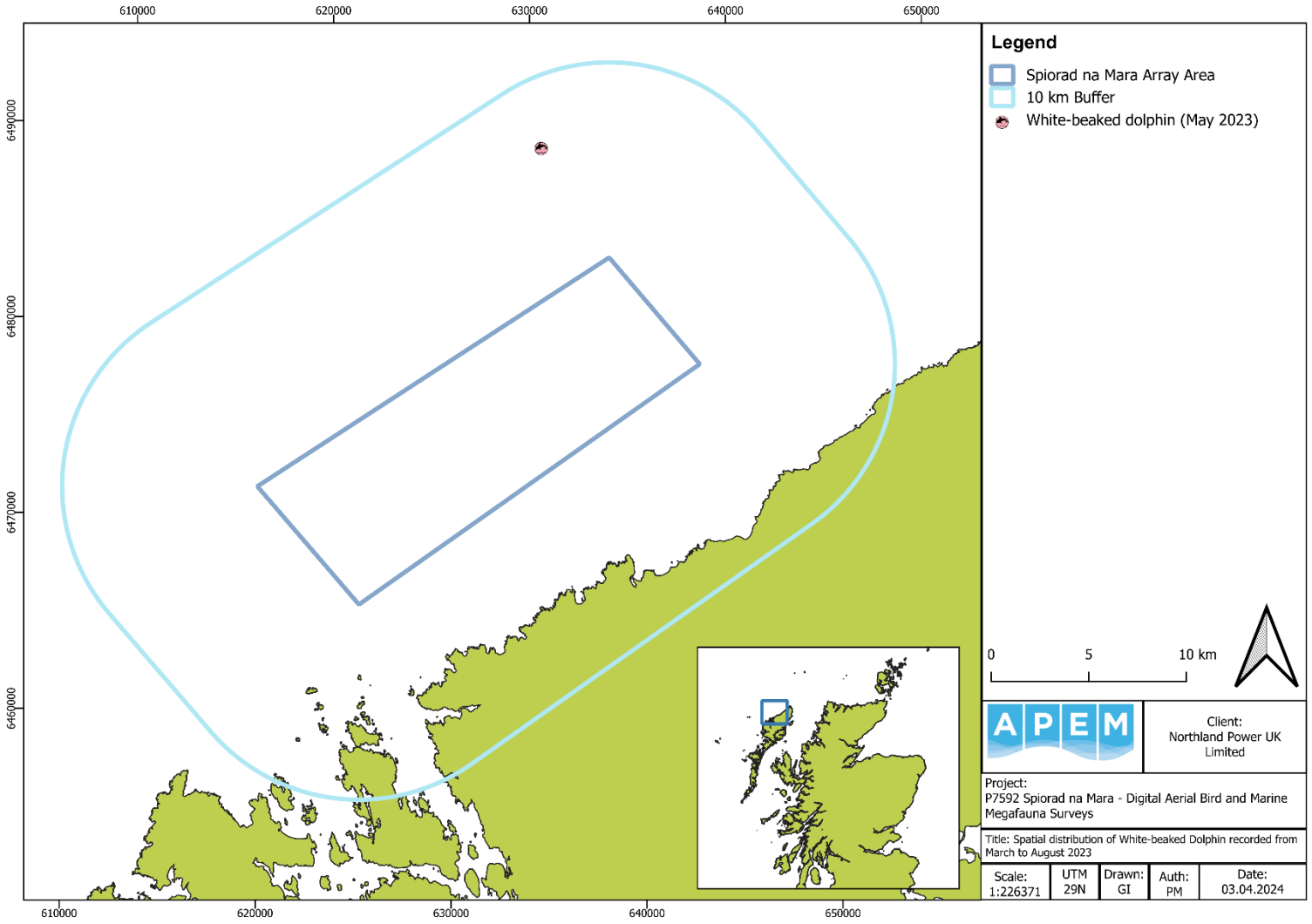


Figure 185 Distribution of white-beaked dolphin in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

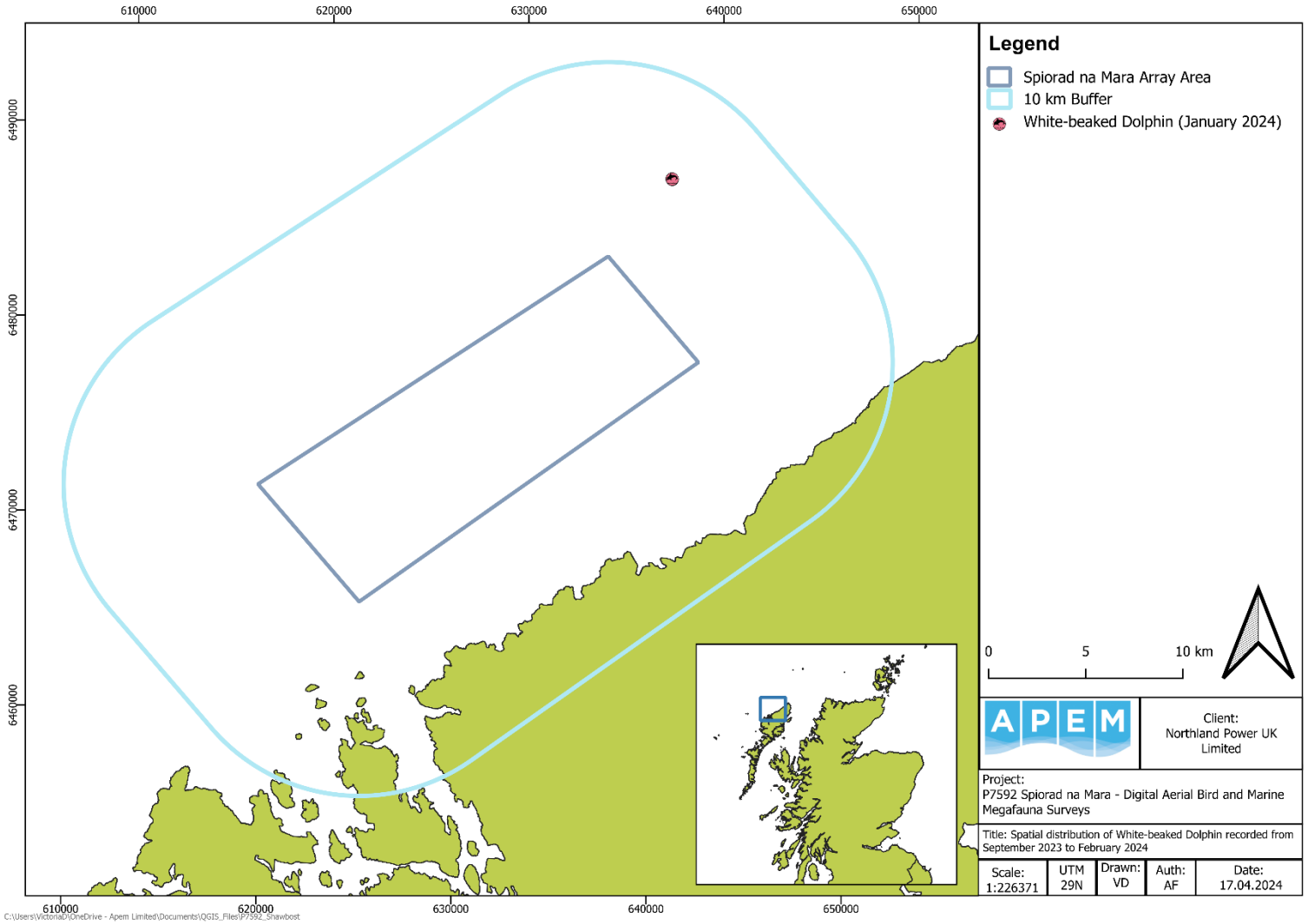


Figure 186 Distribution of white-beaked dolphin in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.9 Dolphin species - Unidentified

Dolphin species were recorded in March 2022, and September and October 2023. Peak abundance occurred in October 2023 with an estimate of 95 [95% CL: 11, 251] within the Survey Area, equating to 0.10 dolphins/km^2 (**Table 67**). In March 2022, individuals were recorded in the southwest of the 10 km Buffer Zone (**Figure 187**). In September and October 2023, dolphin species were found scattered across the Survey Area (**Figure 188**).

Table 67 Apportioned abundance and density estimates (marine mammals per km^2) of dolphin species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	2	17	2	51	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Sep-23	7	60	7	137	0.38	0.06				
Oct-23	11	95	11	251	0.30	0.10				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Oct-23	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	2	17	2	51	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Sep-23	7	60	7	136	0.38	0.08				
Oct-23	10	86	10	240	0.32	0.11				

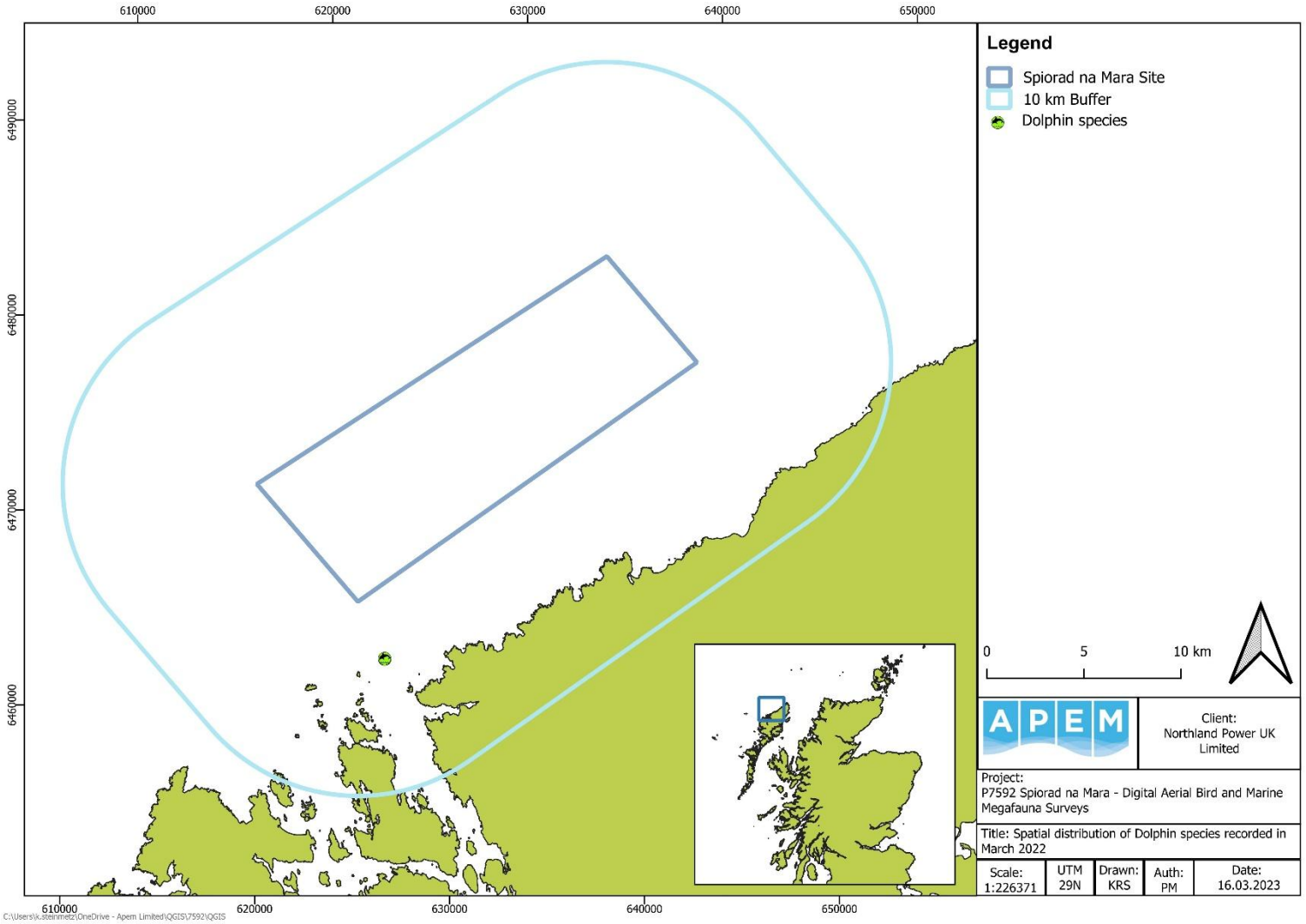


Figure 187 Distribution of dolphin species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

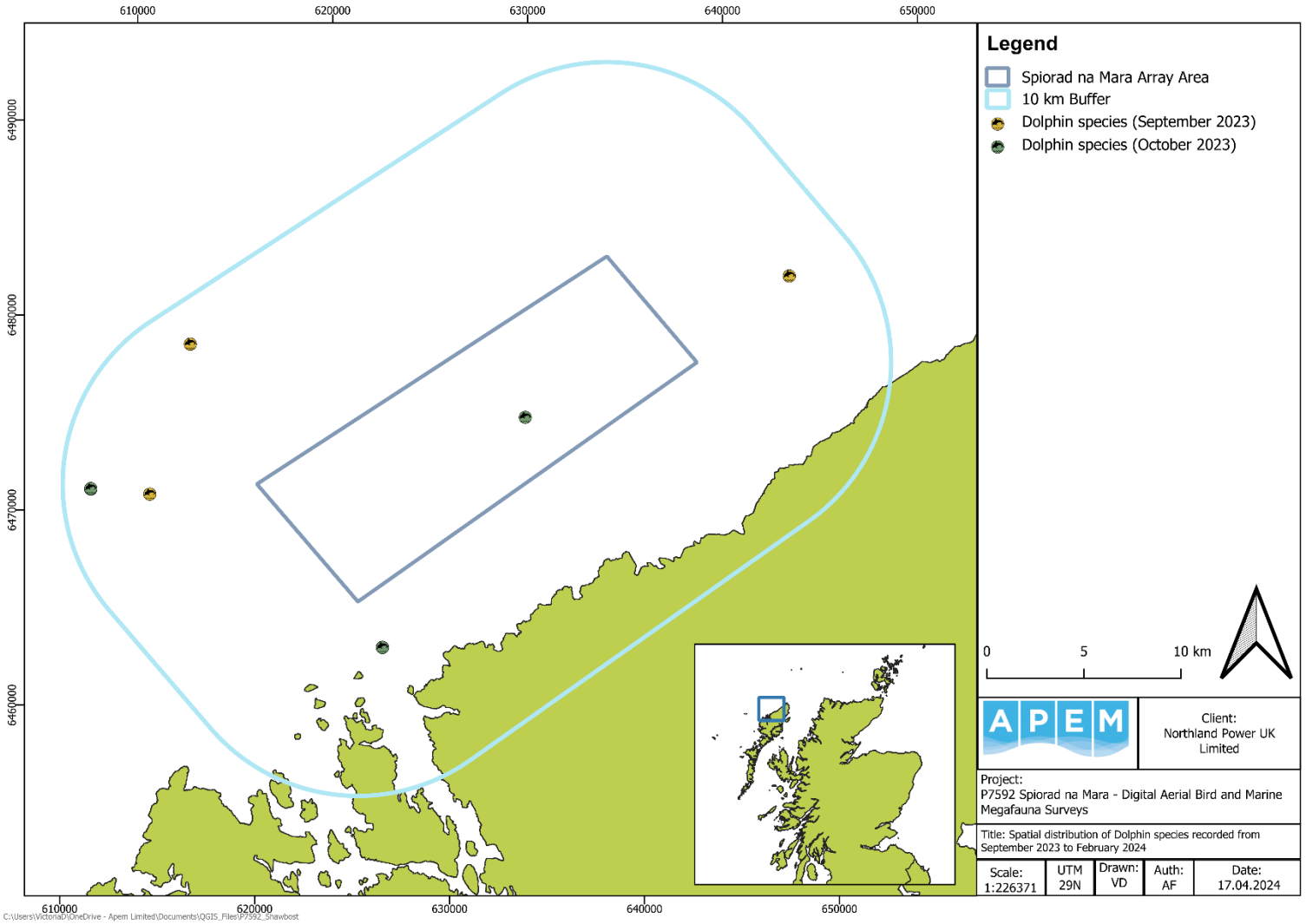


Figure 188 Distribution of dolphin species in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.10 Orca – *Orcinus orca*

Orcas were recorded in January 2023, resulting in an estimate of 60 [95% CL: 7, 172] within the Survey Area, equating to 0.06 dolphins/km^2 (**Table 68**). They were recorded near the centre of the Spiorad na Mara Array Area (**Figure 189**).

Table 68 Apportioned abundance and density estimates (marine mammals per km^2) of orca in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jan-23	7	60	7	172	0.38	0.06
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jan-23	7	63	7	180	0.38	0.39
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
None recorded.						

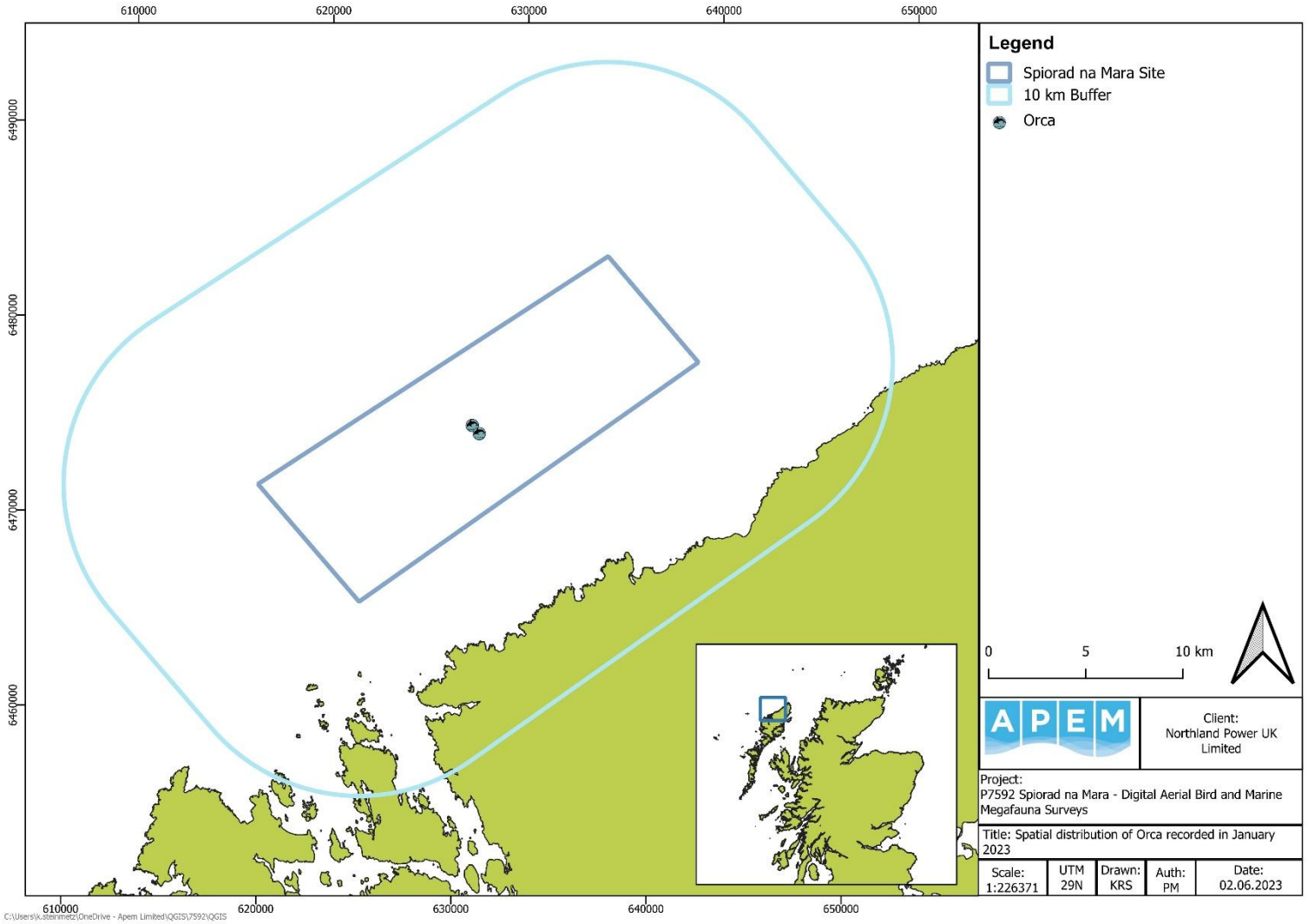


Figure 189 Distribution of orca in the Survey Area during January 2023

Note: Individuals in close proximity may appear overlapping

3.2.11 Harbour porpoise – *Phocoena phocoena*

Harbour porpoises were recorded from March to September 2022, January to July 2023, September to October 2023, and January to February 2024. Peak abundance occurred in January 2024 with an estimate of 1,331 [95% CL: 442, 2,479] within the Survey Area, equating to 1.39 porpoise/km^2 (**Table 69**). Harbour porpoise exhibited a varied and sporadic distribution pattern across the Survey Area. During the spring and summer, there was no obvious patterns in distribution (**Figure 190** and **Figure 192**), similarly in autumn and winter harbour porpoise showed no consistent trends in distributional patterns (**Figure 191** and **Figure 193**).

Table 69 Apportioned abundance and density estimates (marine mammals per km^2) of harbour porpoise in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	10	86	26	163	0.32	0.09	184	53	371	0.19
Apr-22	5	43	5	104	0.45	0.04	77	9	198	0.08
May-22	1	9	1	26	<1.00	0.01	16	2	46	0.02
Jun-22	3	25	3	59	0.58	0.03	46	5	122	0.05
Jul-22	1	9	1	26	<1.00	0.01	16	2	48	0.02
Aug-22	0	0	0	0	0.00	0.00	10	1	28	0.01
Sep-22	4	34	4	103	0.50	0.04	79	9	215	0.08
Jan-23	2	17	2	52	0.71	0.02	127	15	364	0.13
Feb-23	35	298	111	571	0.17	0.31	690	197	1,438	0.72
Mar-23	13	112	13	283	0.28	0.12	196	23	466	0.20
Apr-23	1	9	1	26	<1.00	0.01	16	2	46	0.02
May-23	3	26	3	69	0.58	0.03	46	5	121	0.05
Jun-23	11	97	35	186	0.30	0.10	212	40	468	0.22
Jul-23	3	26	3	61	0.58	0.03	71	8	167	0.07
Sep-23	1	9	1	26	<1.00	0.01	23	3	67	0.02
Oct-23	2	17	2	43	0.71	0.02	50	6	156	0.05
Jan-24	46	402	114	743	0.15	0.42	1,331	442	2,479	1.39
Feb-24	12	102	34	205	0.29	0.11	218	42	432	0.23
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	1	9	1	27	<1.00	0.06	18	2	54	0.11
Jun-22	1	9	1	26	<1.00	0.06	16	2	48	0.10
Sep-22	0	0	0	0	0.00	0.00	2	0	7	0.01
Feb-23	3	27	3	72	0.58	0.17	59	7	159	0.37
Jun-23	1	9	1	28	<1.00	0.06	16	2	51	0.10
Jan-24	0	0	0	0	0.00	0.00	114	15	277	0.71
Feb-24	2	18	2	53	0.71	0.11	38	4	112	0.24
c) 10 km Buffer										

Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	9	76	17	153	0.33	0.10	169	37	352	0.21
Apr-22	5	43	5	103	0.45	0.05	75	9	196	0.09
May-22	1	9	1	26	<1.00	0.01	16	2	46	0.02
Jun-22	2	17	2	42	0.71	0.02	29	4	91	0.04
Jul-22	1	9	1	26	<1.00	0.01	15	2	48	0.02
Aug-22	0	0	0	0	0.00	0.00	8	1	28	0.01
Sep-22	4	34	4	102	0.50	0.04	75	9	207	0.09
Jan-23	2	17	2	51	0.71	0.02	125	15	362	0.16
Feb-23	32	270	76	532	0.18	0.34	625	148	1,358	0.78
Mar-23	13	111	13	298	0.28	0.14	194	23	492	0.24
Apr-23	1	9	1	26	<1.00	0.01	16	2	46	0.02
May-23	3	26	3	77	0.58	0.03	46	5	119	0.06
Jun-23	10	88	26	167	0.32	0.11	194	40	466	0.24
Jul-23	3	26	3	60	0.58	0.03	71	8	165	0.09
Sep-23	1	8	1	26	<1.00	0.01	20	3	70	0.03
Oct-23	2	17	2	43	0.71	0.02	50	6	146	0.06
Jan-24	46	398	121	795	0.15	0.50	1,212	397	2,390	1.52
Feb-24	10	85	17	177	0.32	0.11	178	23	394	0.22

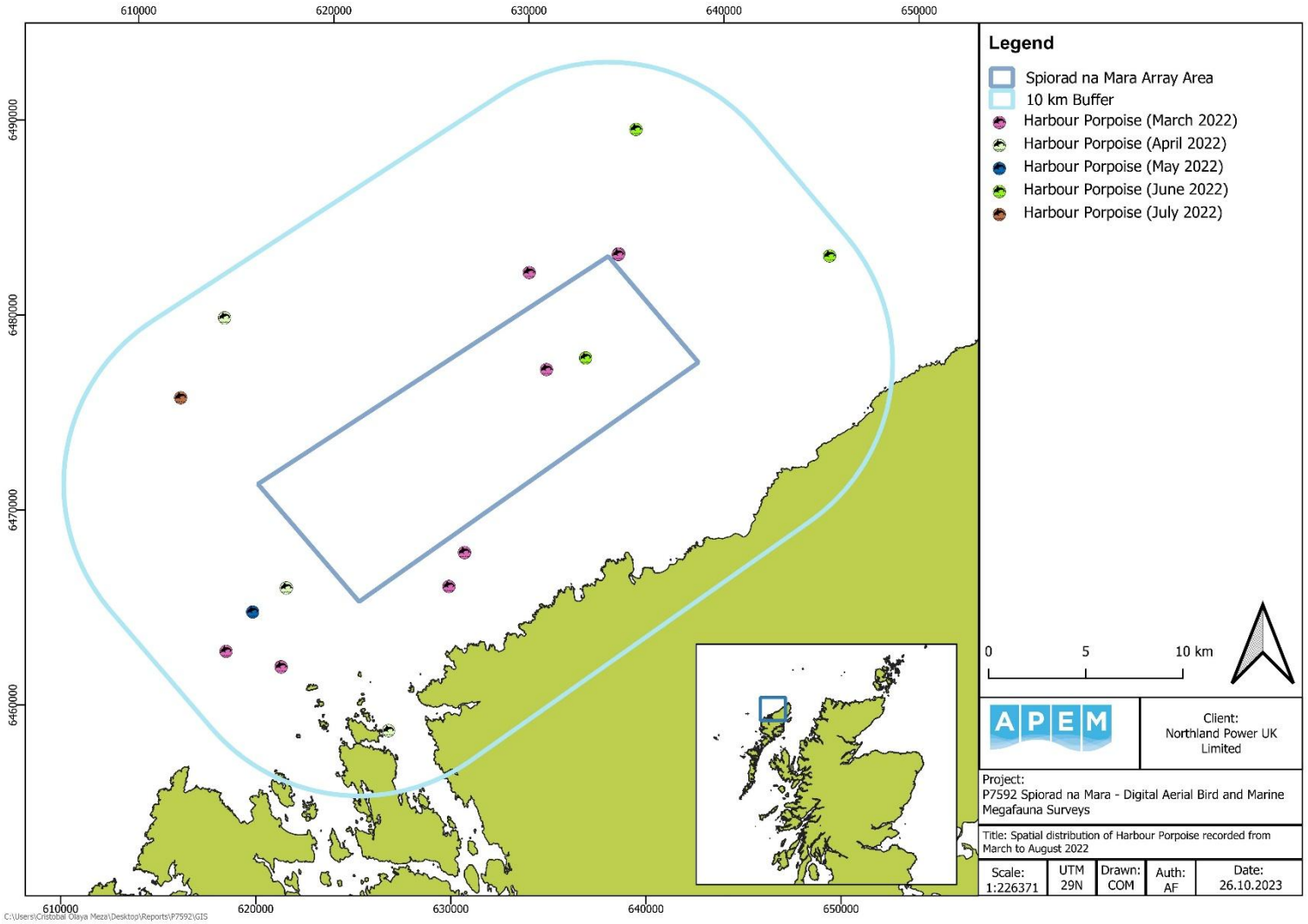


Figure 190 Distribution of harbour porpoise in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

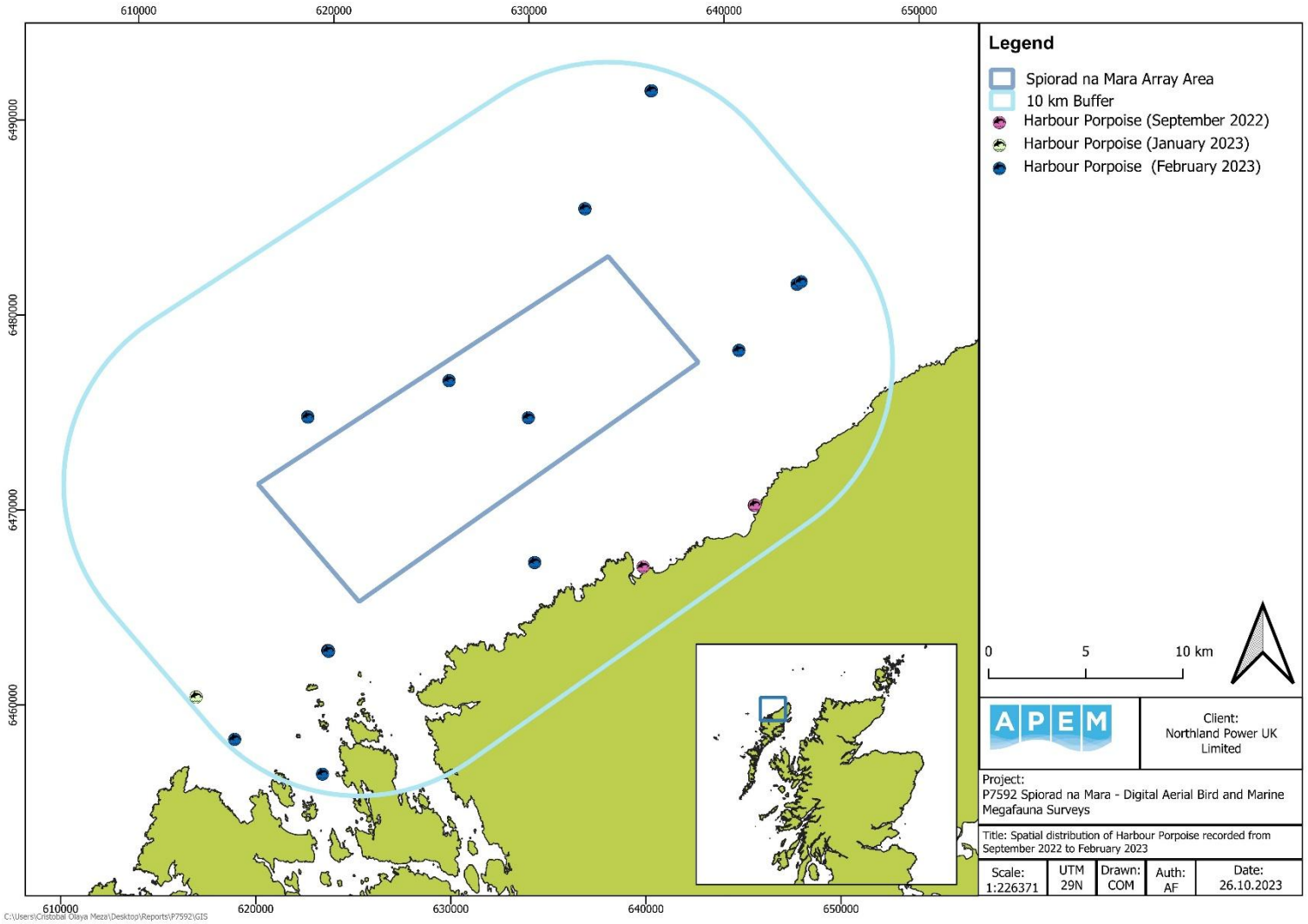


Figure 191 Distribution of harbour porpoise in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

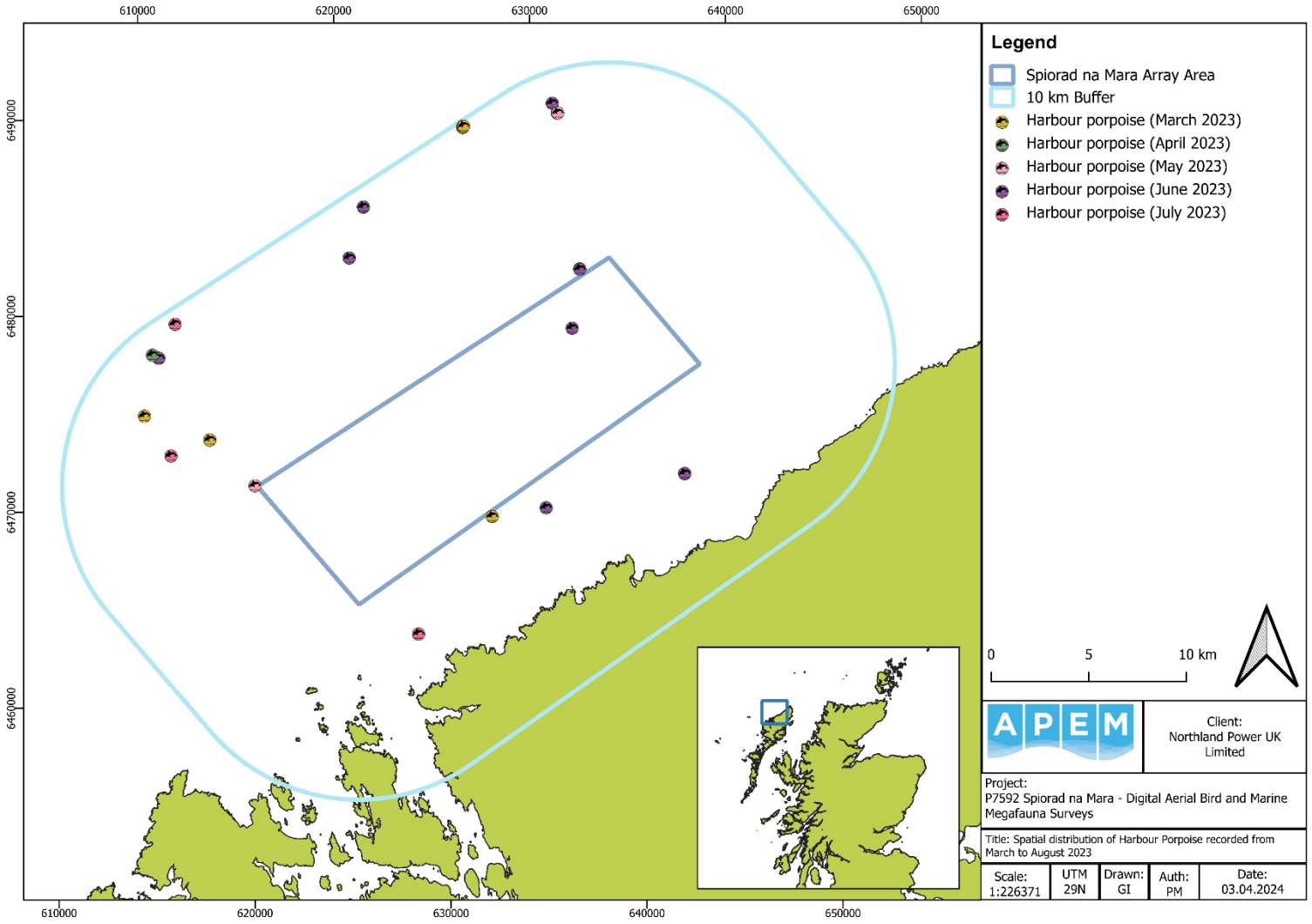


Figure 192 Distribution of harbour porpoise in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

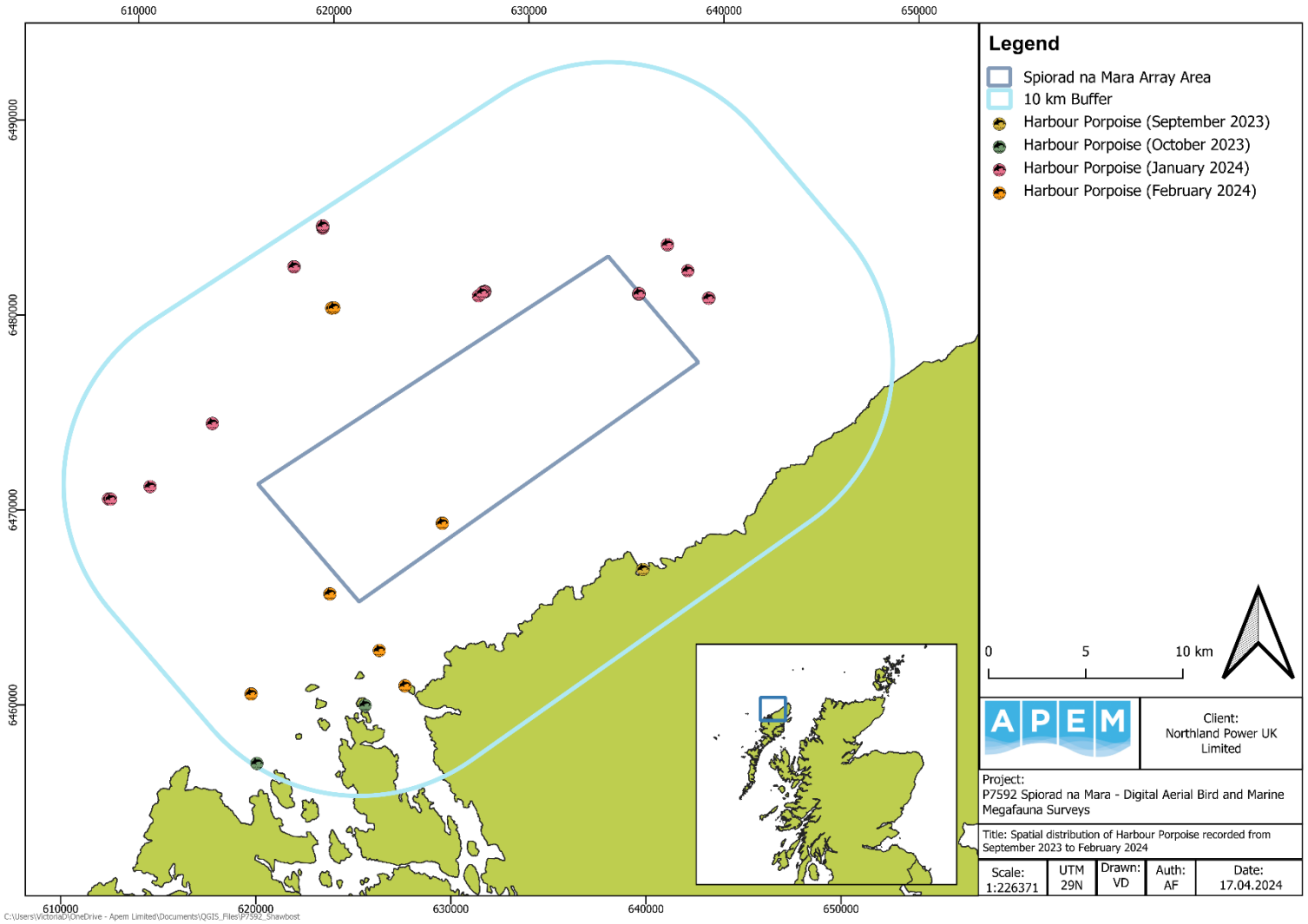


Figure 193 Distribution of harbour porpoise in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.12 Dolphin / porpoise

Dolphin/porpoises were recorded in March, August and September 2022, January, February, June, July, September and October 2023, and January 2024. Peak abundance occurred in January 2024 with an estimate of 419 [95% CL: 183, 716] within the Survey Area, equating to 0.44 cetaceans/km^2 (**Table 70**). Dolphin / porpoises were found scattered across the Survey Area (**Figure 194** to **Figure 197**), with higher concentrations recorded in the northwest during January 2024 (**Figure 197**).

Table 70 Apportioned abundance and density estimates (marine mammals per km^2) of dolphin / porpoise in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	3	26	3	69	0.58	0.03	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	2	17	2	52	0.71	0.02				
Sep-22	1	9	1	26	<1.00	0.01				
Jan-23	5	43	5	112	0.45	0.04				
Feb-23	4	34	9	68	0.50	0.04				
Jun-23	2	18	2	53	0.71	0.02				
Jul-23	2	17	2	43	0.71	0.02				
Sep-23	3	26	3	77	0.58	0.03				
Oct-23	2	17	2	43	0.71	0.02				
Jan-24	48	419	183	716	0.14	0.44				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
Sep-22	1	9	1	27	<1.00	0.06				
Feb-23	1	9	1	27	<1.00	0.06				
Jan-24	12	111	12	295	0.29	0.69				
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	2	17	2	51	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Aug-22	2	17	2	51	0.71	0.02				
Jan-23	5	43	5	102	0.45	0.05				
Feb-23	3	25	3	59	0.58	0.03				
Jun-23	2	18	2	53	0.71	0.02				
Jul-23	2	17	2	43	0.71	0.02				
Sep-23	3	25	3	102	0.58	0.03				
Oct-23	2	17	2	51	0.71	0.02				
Jan-24	36	311	130	527	0.17	0.39				

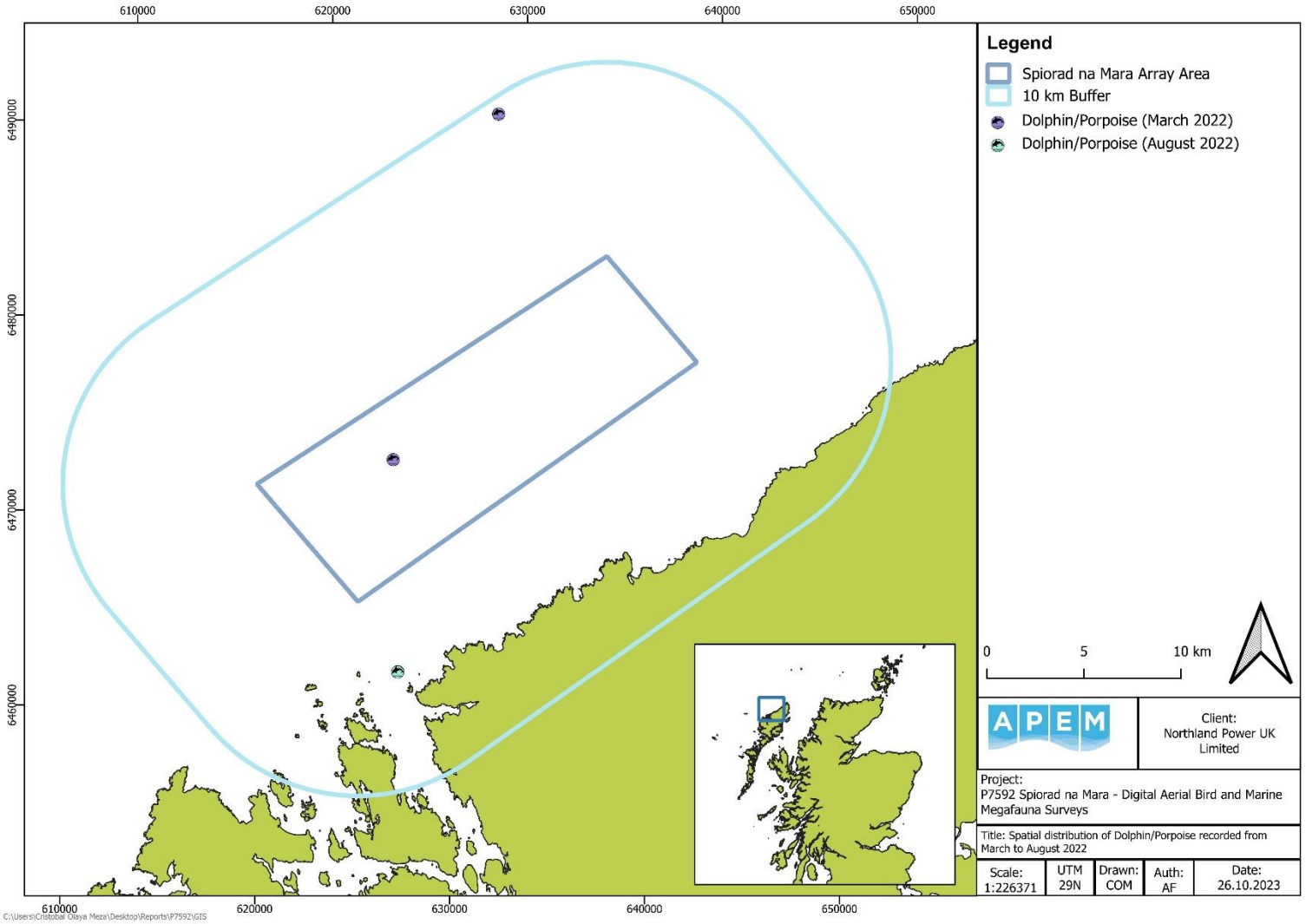


Figure 194 Distribution of dolphin / porpoise in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

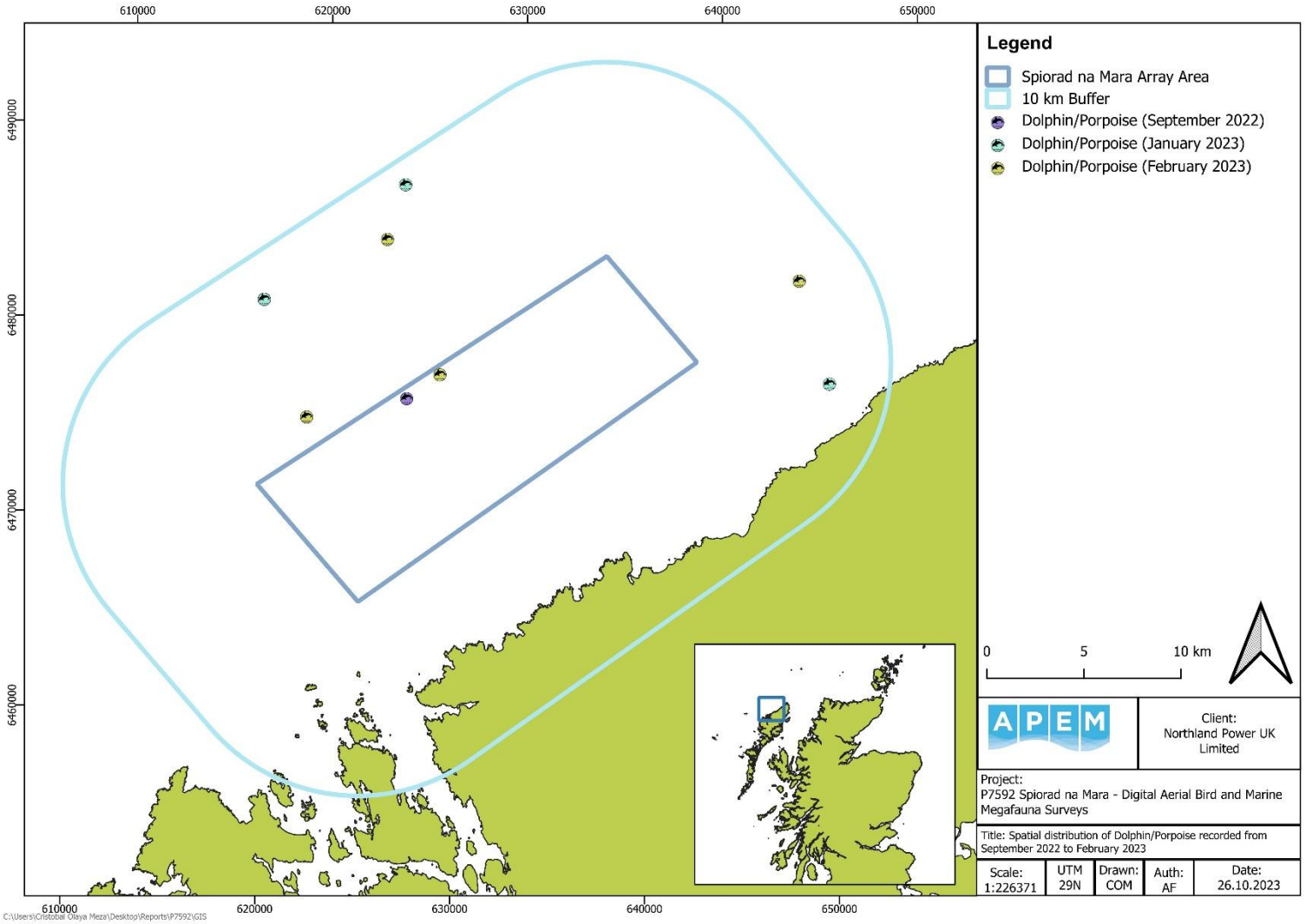


Figure 195 Distribution of dolphin / porpoise in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

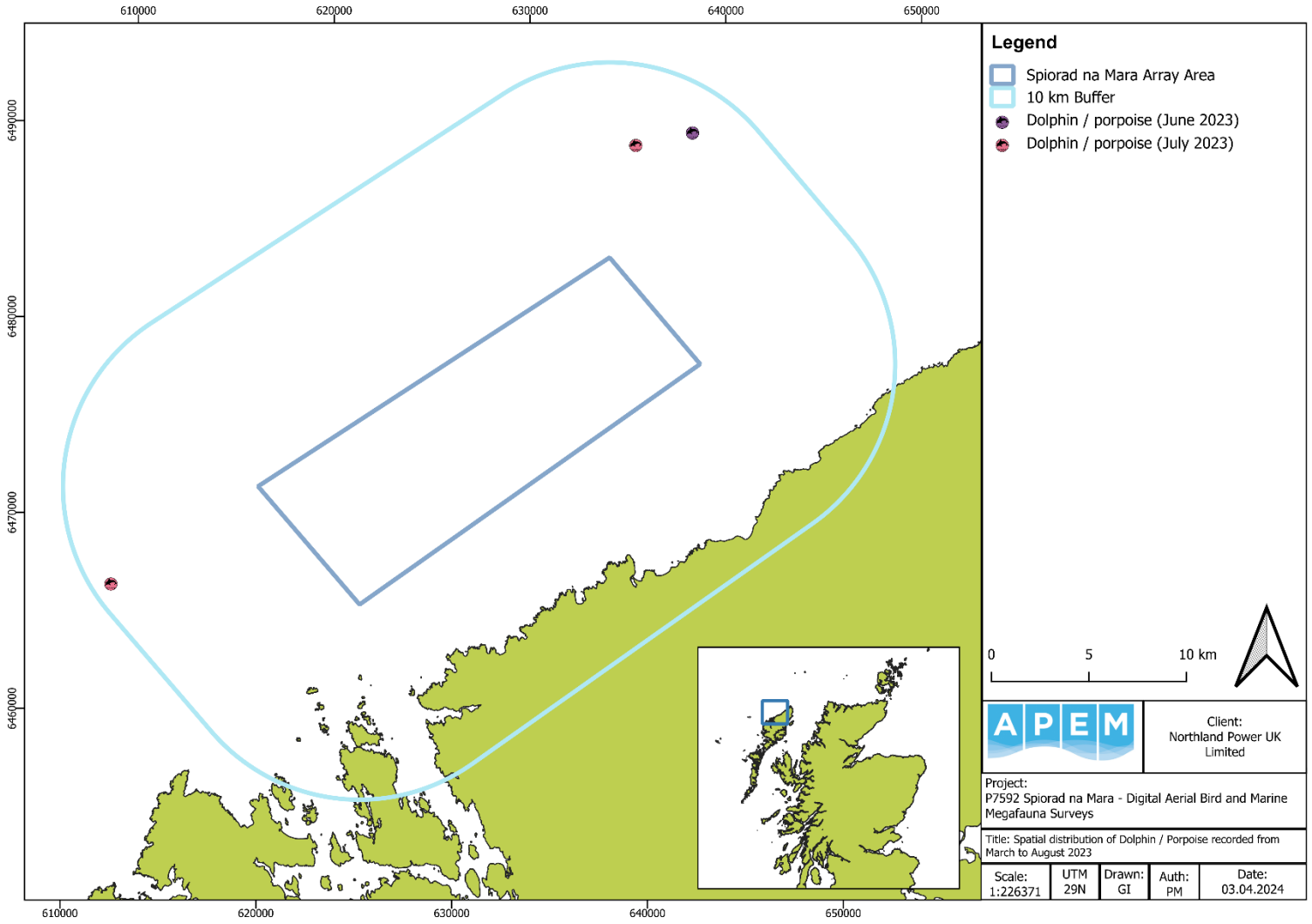


Figure 196 Distribution of dolphin / porpoise in the Survey Area during March 2023 to August 2023

Note: Individuals in close proximity may appear overlapping

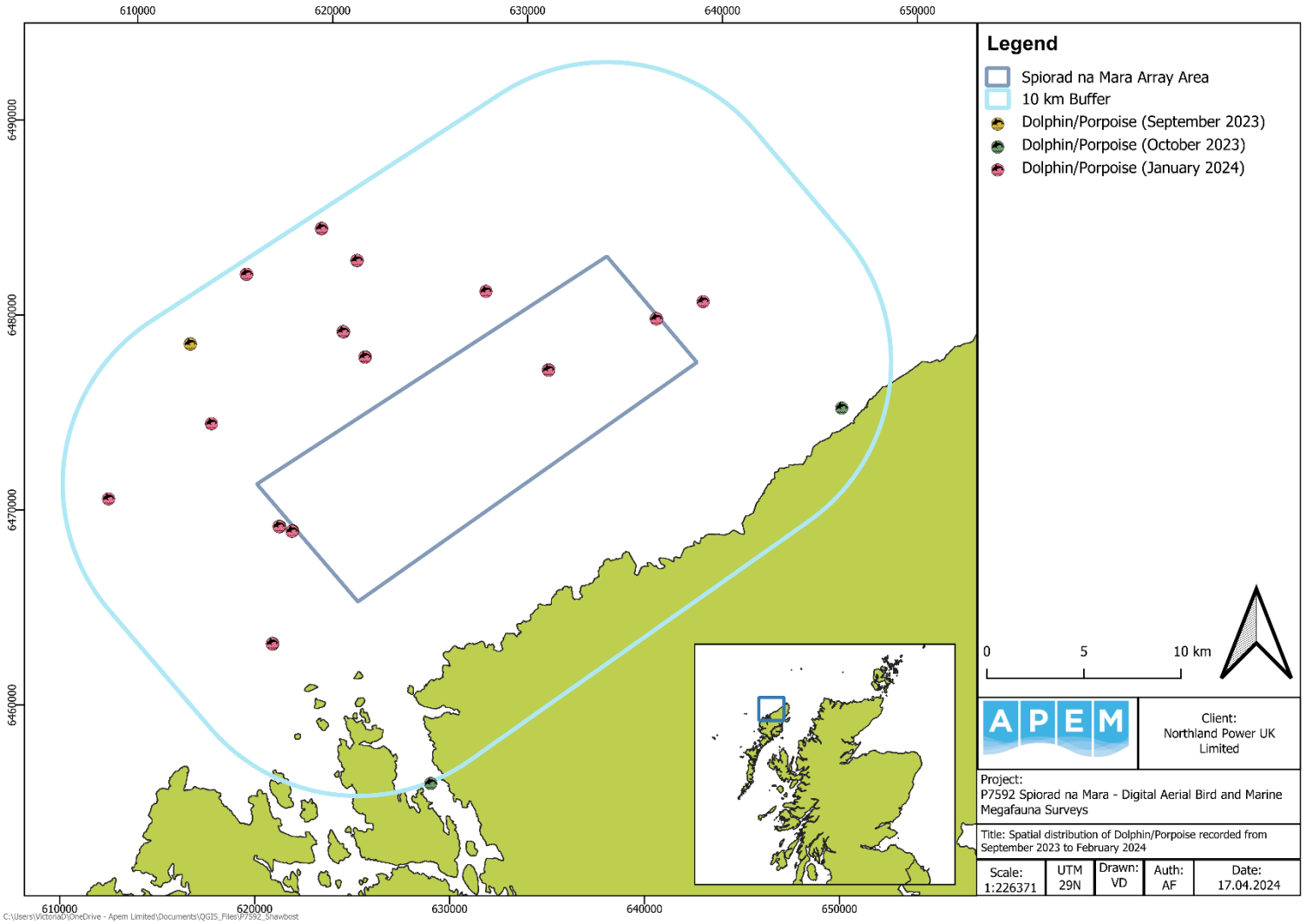


Figure 197 Distribution of dolphin / porpoise in the Survey Area during September 2023 to February 2024

Note: Individuals in close proximity may appear overlapping

3.2.13 Marine Mammal species - Unidentified

Marine mammal species were recorded March and October 2022, and January 2024. Peak abundance occurred in March 2022 with an estimate of 17 [95% CL: 2, 43] within the Survey Area, equating to 0.02 porpoise/km^2 (**Table 71**). In March 2022, marine mammal species were recorded in the west of the 10 km Buffer Zone (**Figure 198**). In October 2022, an individual was recorded in the southwest of the Spiorad na Mara Array Area (**Figure 199**). In January 2024, an individual was recorded in the northeast of the 10 km Buffer Zone (**Figure 200**).

Table 71 Apportioned abundance and density estimates (marine mammals per km^2) of marine mammal species in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	2	17	2	43	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Oct-22	1	9	1	26	<1.00	0.01				
Jan-24	1	9	1	26	<1.00	0.01				
b) Spiorad na Mara Array Area										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Oct-22	1	9	1	27	<1.00	0.06	None remaining as all abundance estimates apportioned into specific species.			
c) 10 km Buffer										
Month	Raw Count	Total unapportioned					Total corrected apportioned			
		Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	2	17	2	42	0.71	0.02	None remaining as all abundance estimates apportioned into specific species.			
Jan-24	1	9	1	26	<1.00	0.01				

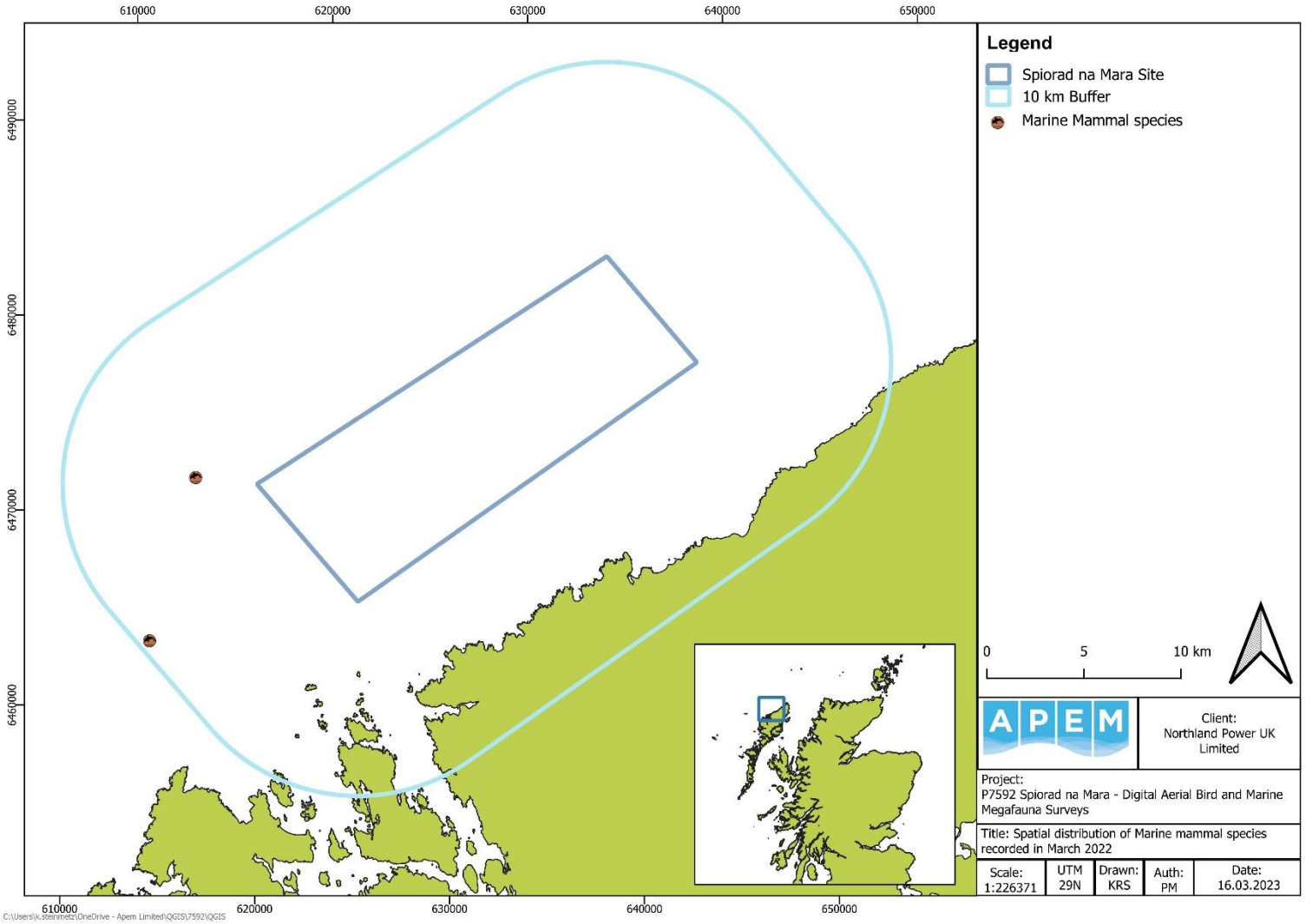


Figure 198 Distribution of marine mammal species in the Survey Area during March 2022 to August 2022

Note: Individuals in close proximity may appear overlapping

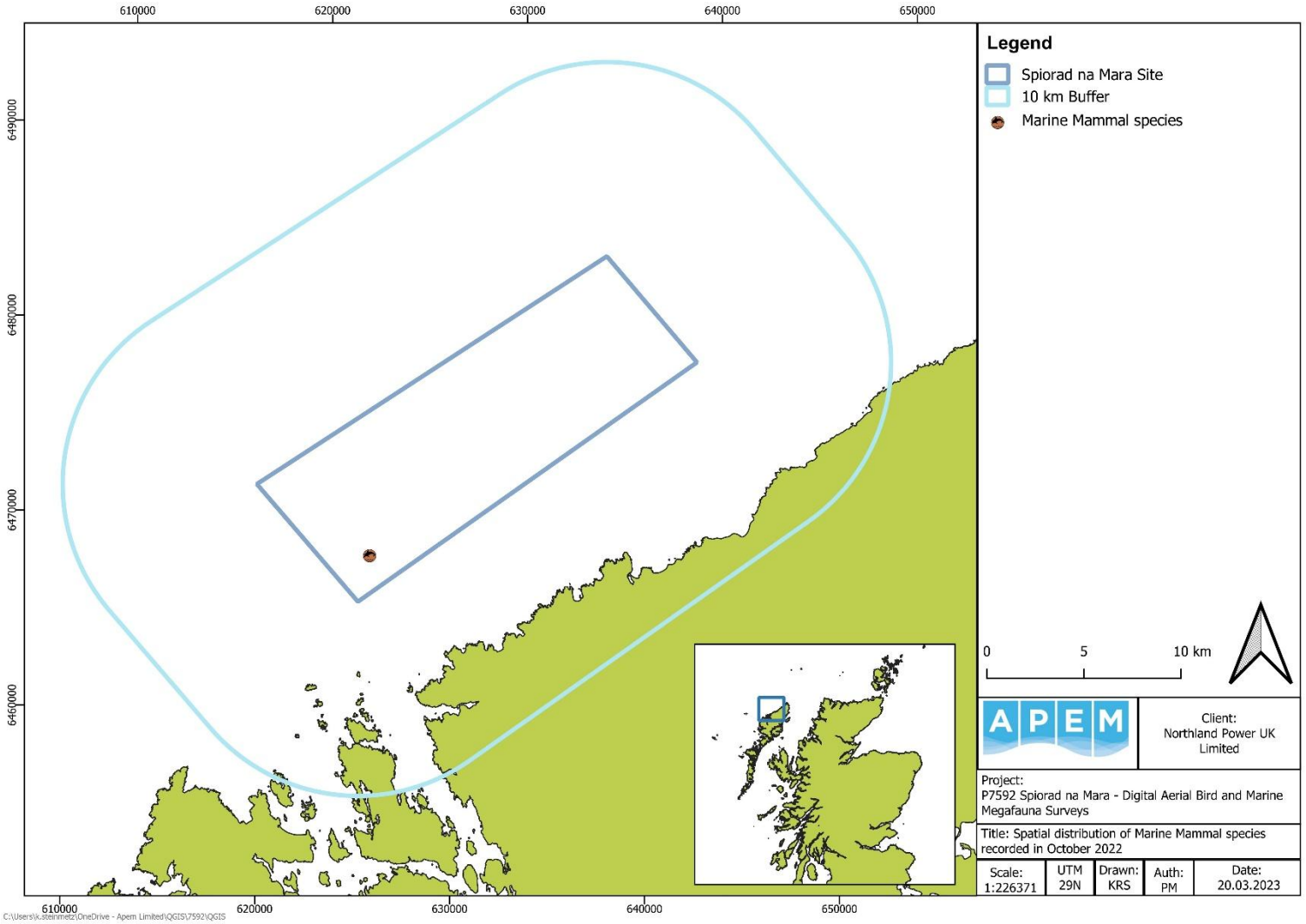


Figure 199 Distribution of marine mammal species in the Survey Area during September 2022 to February 2023

Note: Individuals in close proximity may appear overlapping

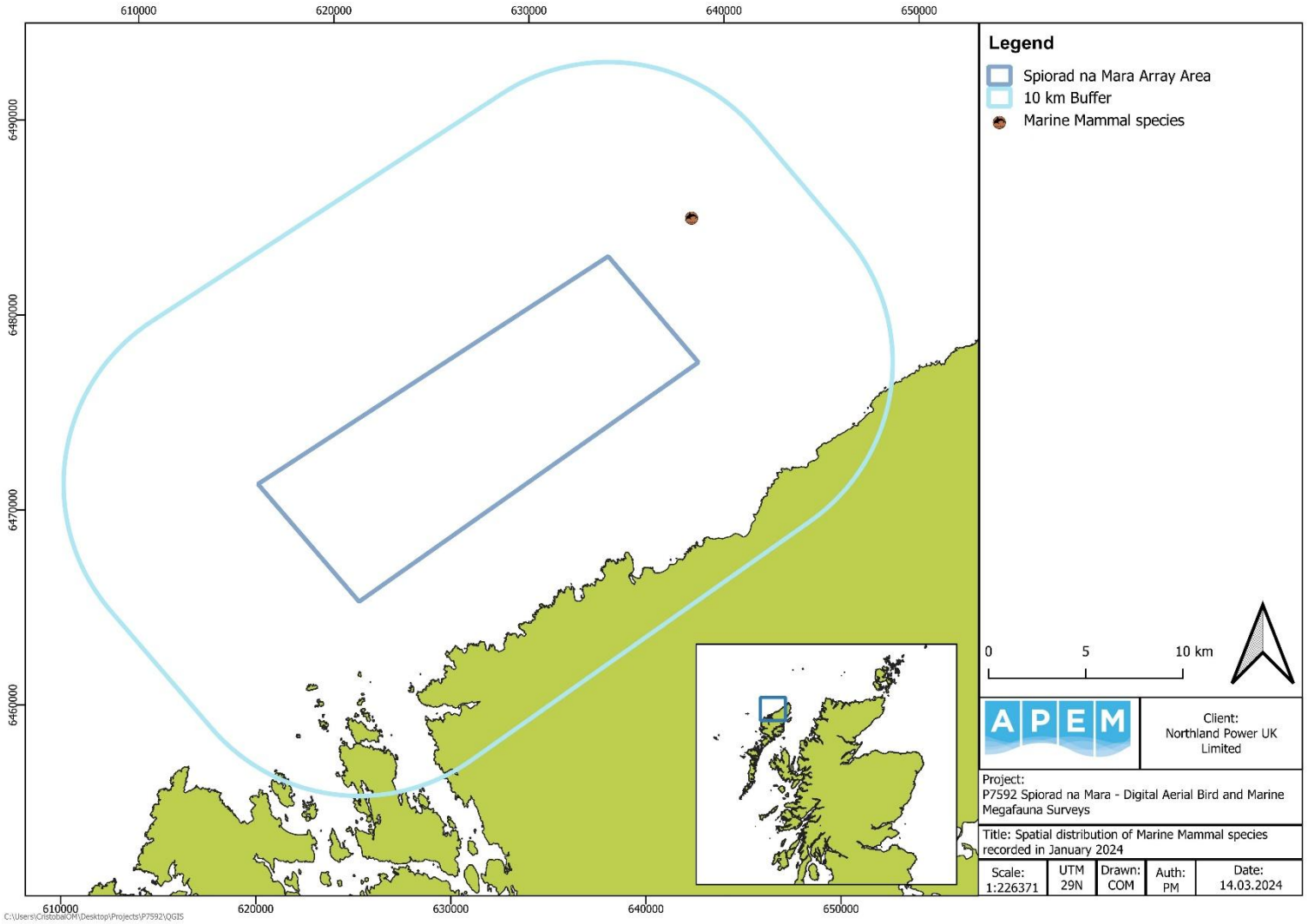


Figure 200 Distribution of marine mammal species in the Survey Area during September 2023 to January 2024

Note: Individuals in close proximity may appear overlapping

3.2.14 Blue shark – *Prionace glauca*

Blue sharks were recorded submerged in August and September 2022. Peak abundance occurred in September 2022 with an estimate of 214 [95% CL: 129, 292] within the Survey Area, equating to 0.22 sharks/km^2 (**Table 72**). Blue sharks were recorded in the northeast of the Spiorad na Mara array area in August 2022 (**Figure 201**) and were recorded in the highest numbers in the north of the 10 km Buffer in September 2022 (**Figure 202**).

Table 72 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of blue shark in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Aug-22	1	9	1	26	<1.00	0.01
Sep-22	25	215	129	300	0.20	0.22
b) Spiorad na Mara Array Area						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Aug-22	1	9	1	27	<1.00	0.06
Sep-22	3	27	3	62	0.58	0.17
c) 10 km Buffer						
Month	Raw Count	Total unapportioned				
		Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	22	188	111	273	0.21	0.24

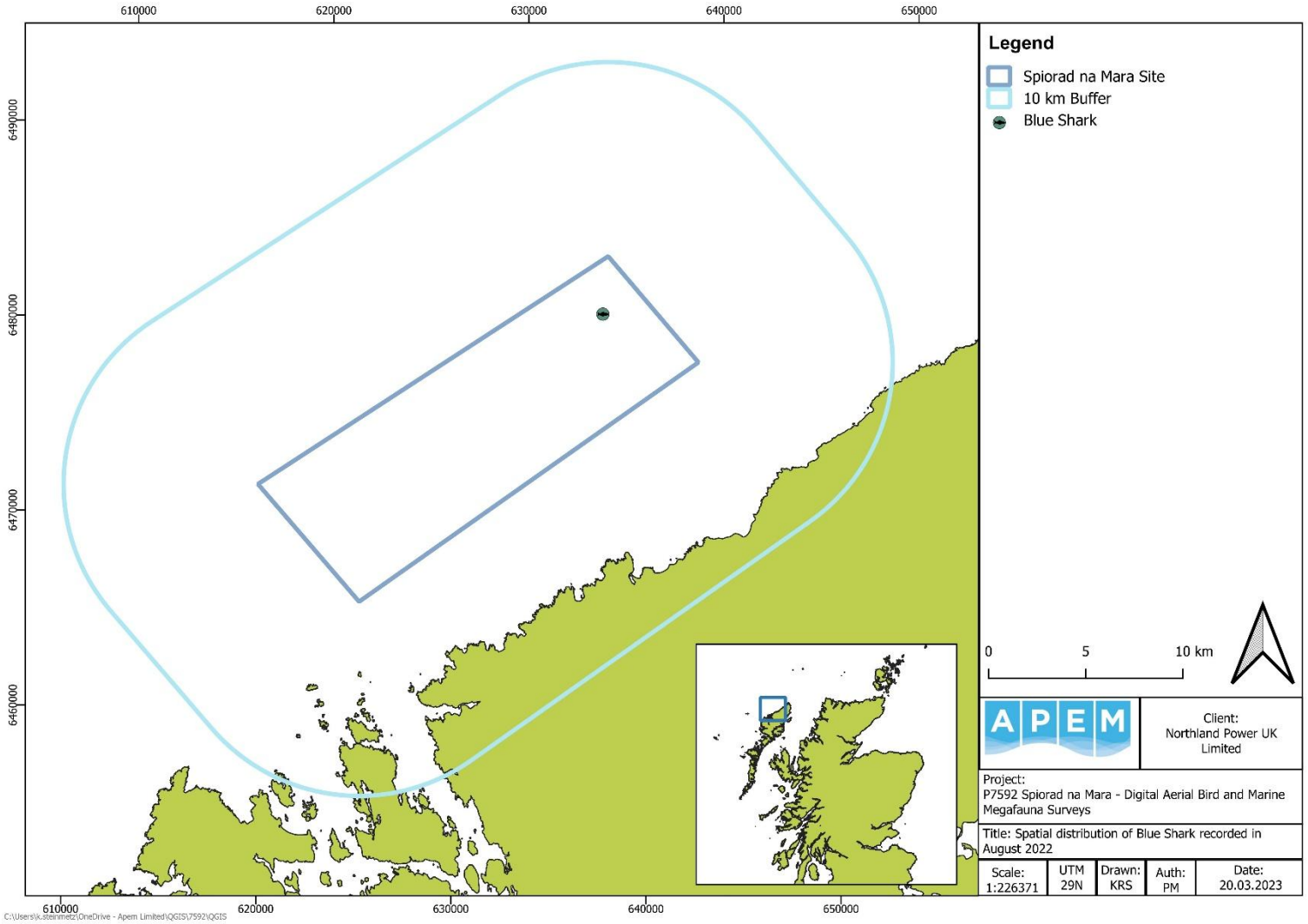


Figure 201 Distribution of blue shark in the Survey Area during August 2022

Note: Individuals in close proximity may appear overlapping

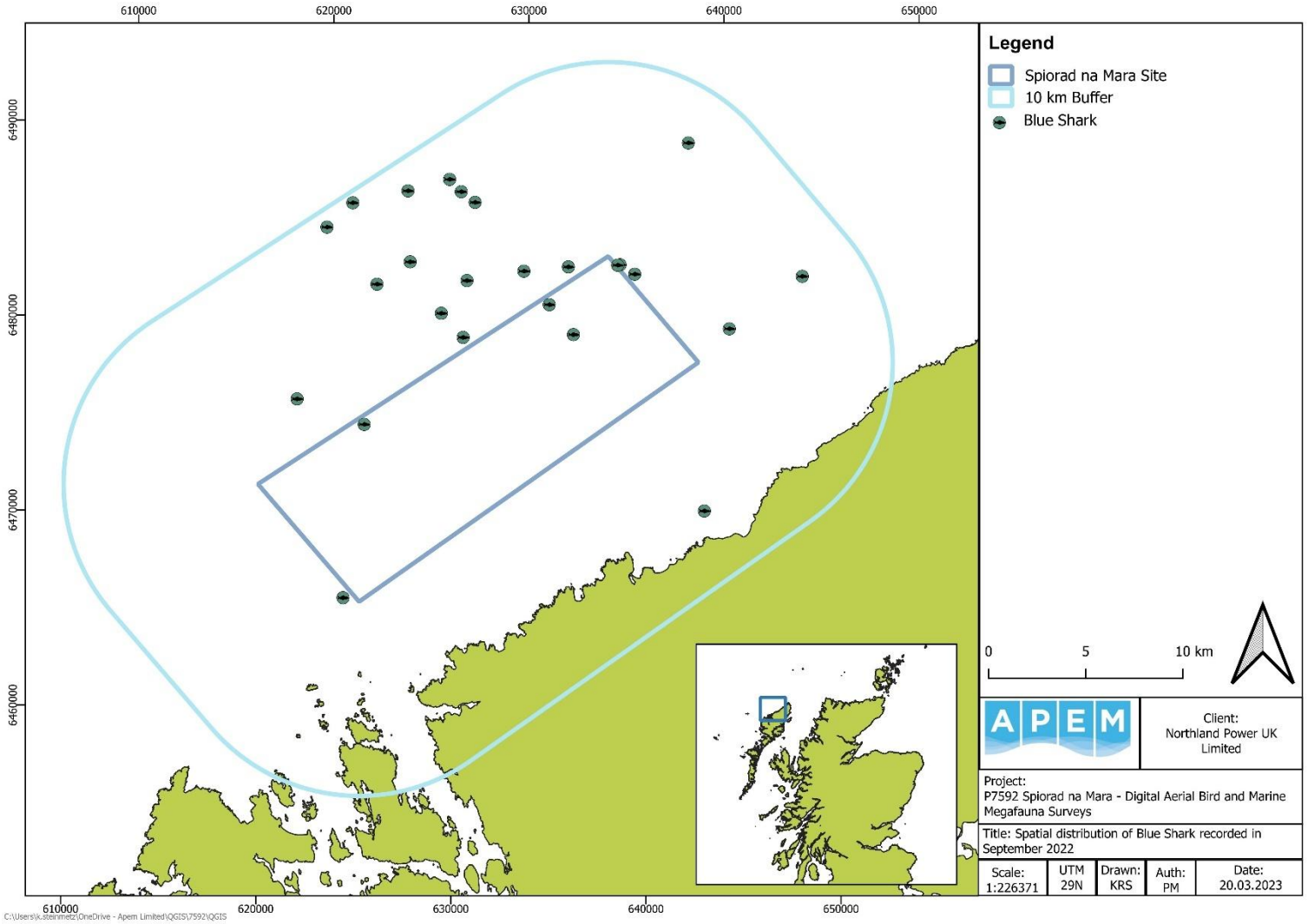


Figure 202 Distribution of blue shark in the Survey Area during September 2022

Note: Individuals in close proximity may appear overlapping

3.2.15 Basking shark – *Cetorhinus maximus*

Basking sharks were recorded in July 2023, resulting in an estimate of nine [95% CL: 1, 26] within the Survey Area, equating to 0.01 sharks/km^2 (**Table 73**). Basking sharks were observed in the northeast of the 10 km Buffer (**Figure 203**).

Table 73 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of basking shark in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-23	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-23	1	9	1	34	<1.00	0.01

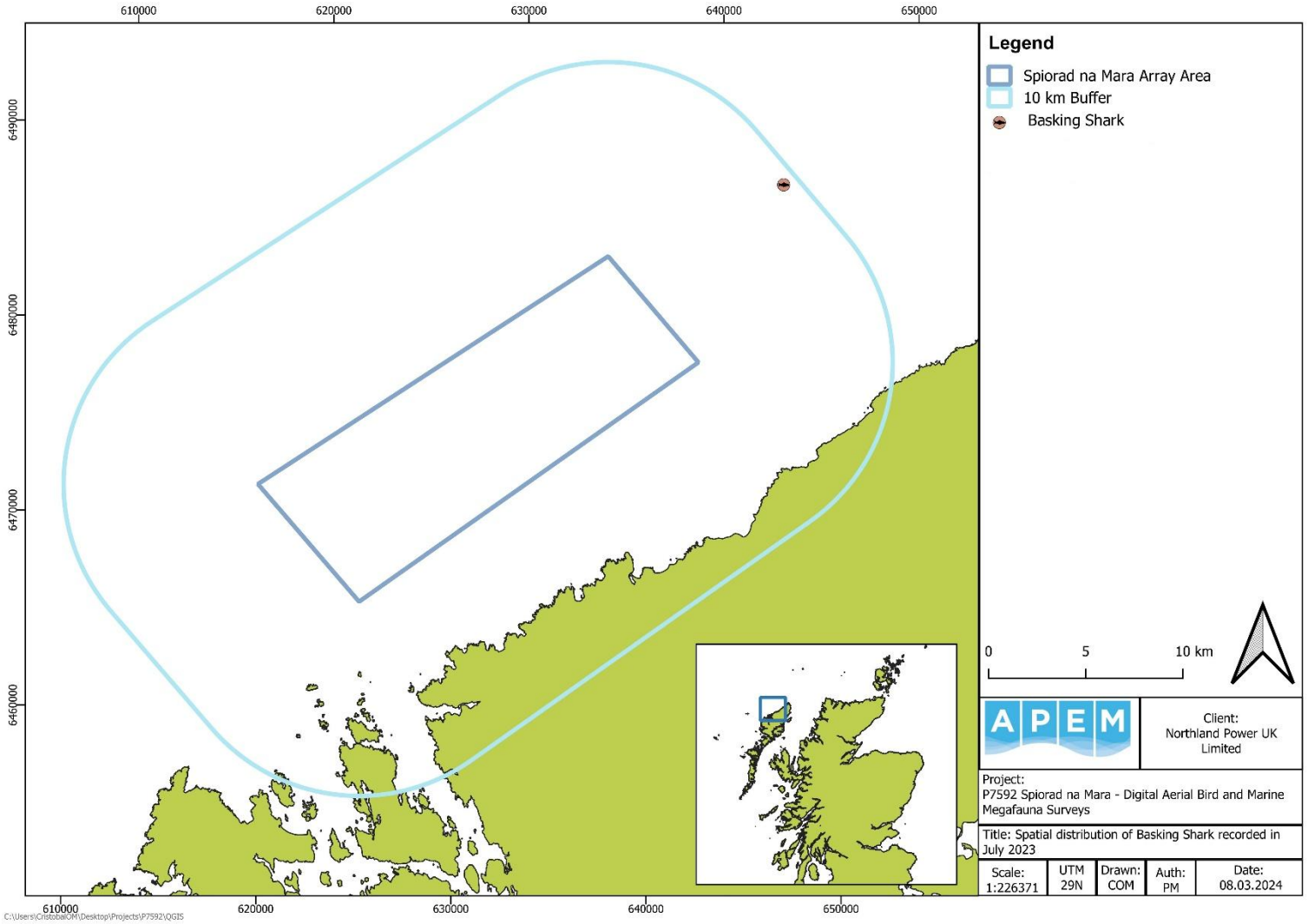


Figure 203 Distribution of basking shark in the Survey Area during July 2023

Note: Individuals in close proximity may appear overlapping

3.2.16 Ocean sunfish – *Mola mola*

Ocean sunfish were recorded submerged in September 2022 and August 2023 with an estimate of nine [95% CL: 1, 34] within the Survey Area, equating to 0.01 fish/km^2 (**Table 74**). They were recorded in the south and north of the Survey Area (**Figure 204** and **Figure 205**).

Table 74 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of ocean sunfish in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	1	9	1	26	<1.00	0.01
Aug-23	1	9	1	34	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	1	9	1	26	<1.00	0.01
Aug-23	1	8	1	25	<1.00	0.01

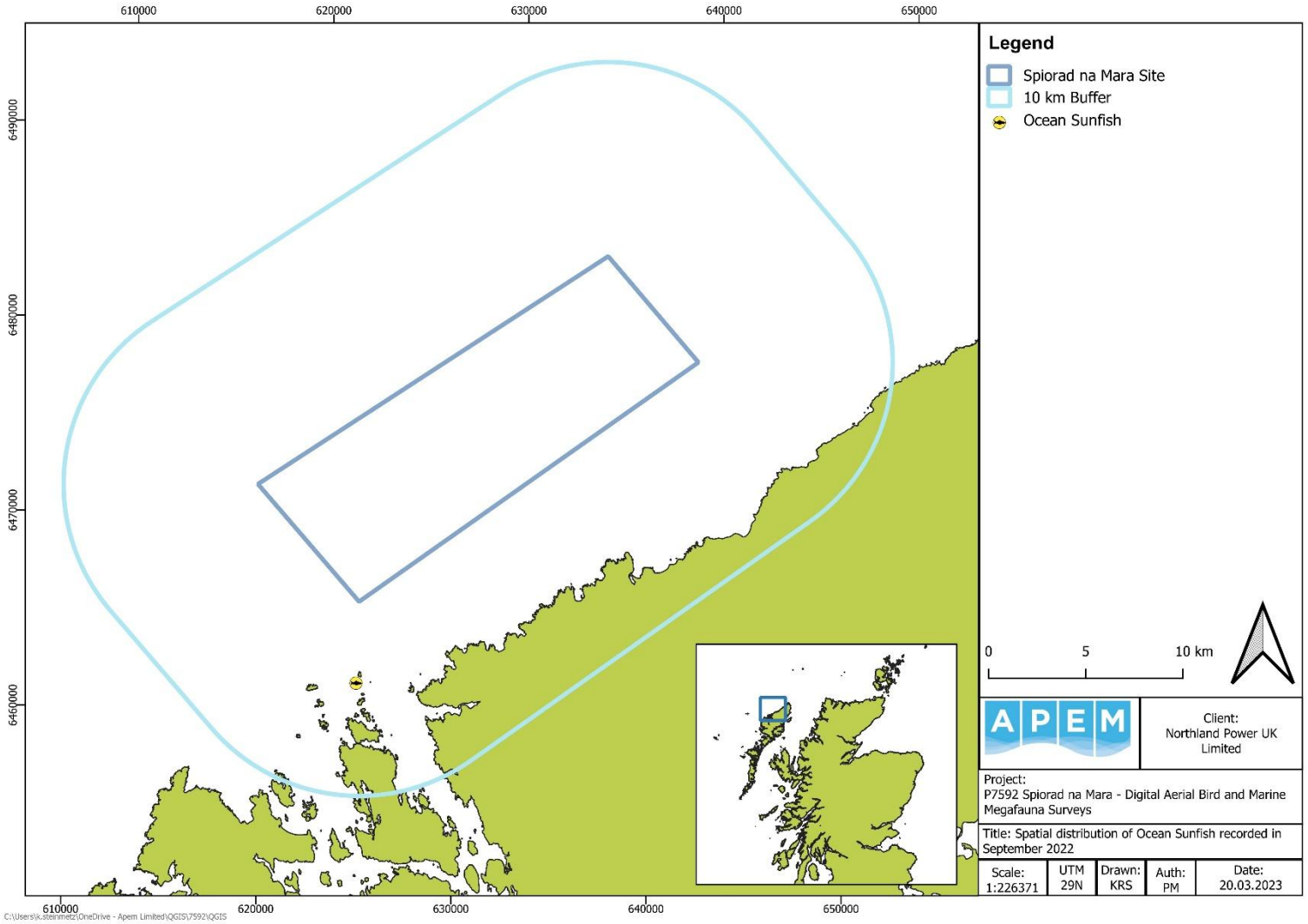


Figure 204 Distribution of ocean sunfish in the Survey Area during September 2022

Note: Individuals in close proximity may appear overlapping

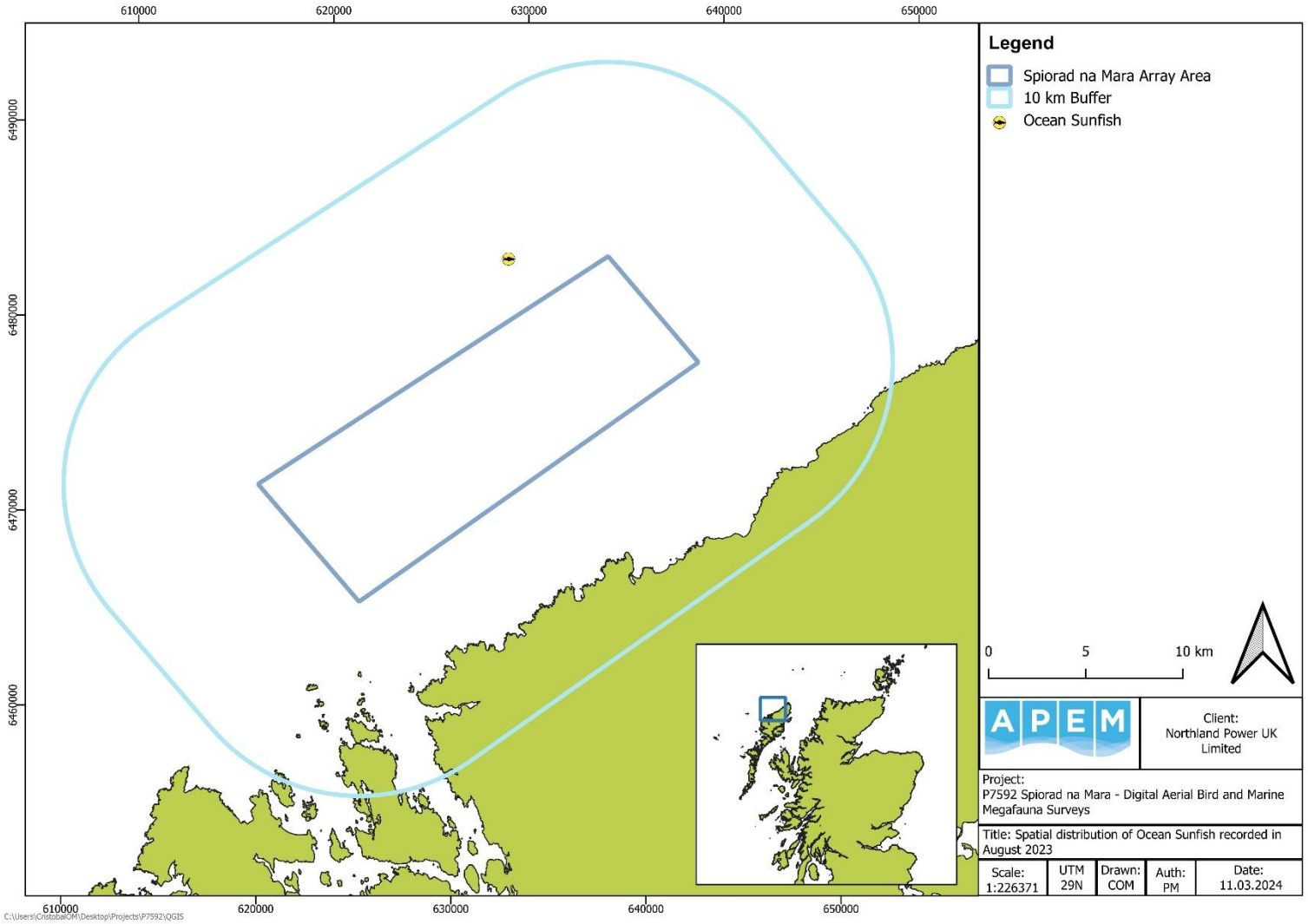


Figure 205 Distribution of ocean sunfish in the Survey Area during August 2023

Note: Individuals in close proximity may appear overlapping

3.2.17 Atlantic bluefin tuna – *Thunnus thynnus*

A single Atlantic bluefin tuna was recorded in November 2023, resulting in an estimate of nine [95% CL: 1, 26] within the Survey Area, equating to 0.01 fish/km^2 (**Table 75**). It was recorded in the east of the Survey Area (**Figure 206**).

Table 75 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of Atlantic bluefin tuna in a) Survey Area b) Spiorad na Mara Array Area and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Nov-2023	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Nov-2023	1	9	1	26	<1.00	0.01

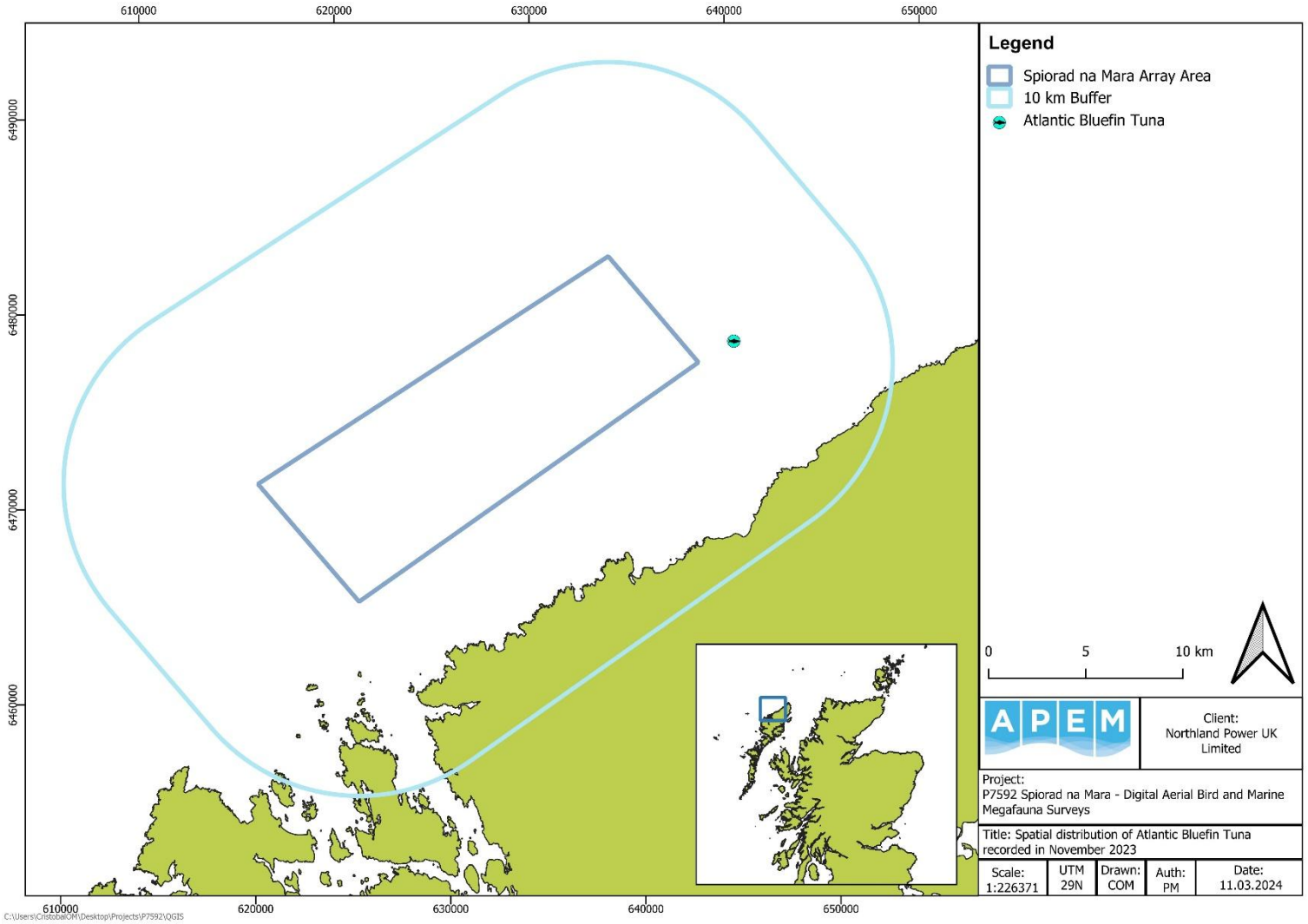


Figure 206 Distribution of Atlantic bluefin tuna in the Survey Area during November 2023

Note: Individuals in close proximity may appear overlapping

3.2.18 Fish species – Unidentified

Fish species were recorded submerged in July 2022 with an abundance estimate of 77 [95% CL: 9, 223] within the Survey Area, equating to 0.08 fish/km2 (**Table 76**). They were recorded in the east of the Survey Area (**Figure 207**).

Table 76 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of fish species in a) Survey Area b) Spiorad na Mara and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
July-22	9	77	9	223	0.33	0.08
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.						
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
July-22	9	77	9	222	0.33	0.10

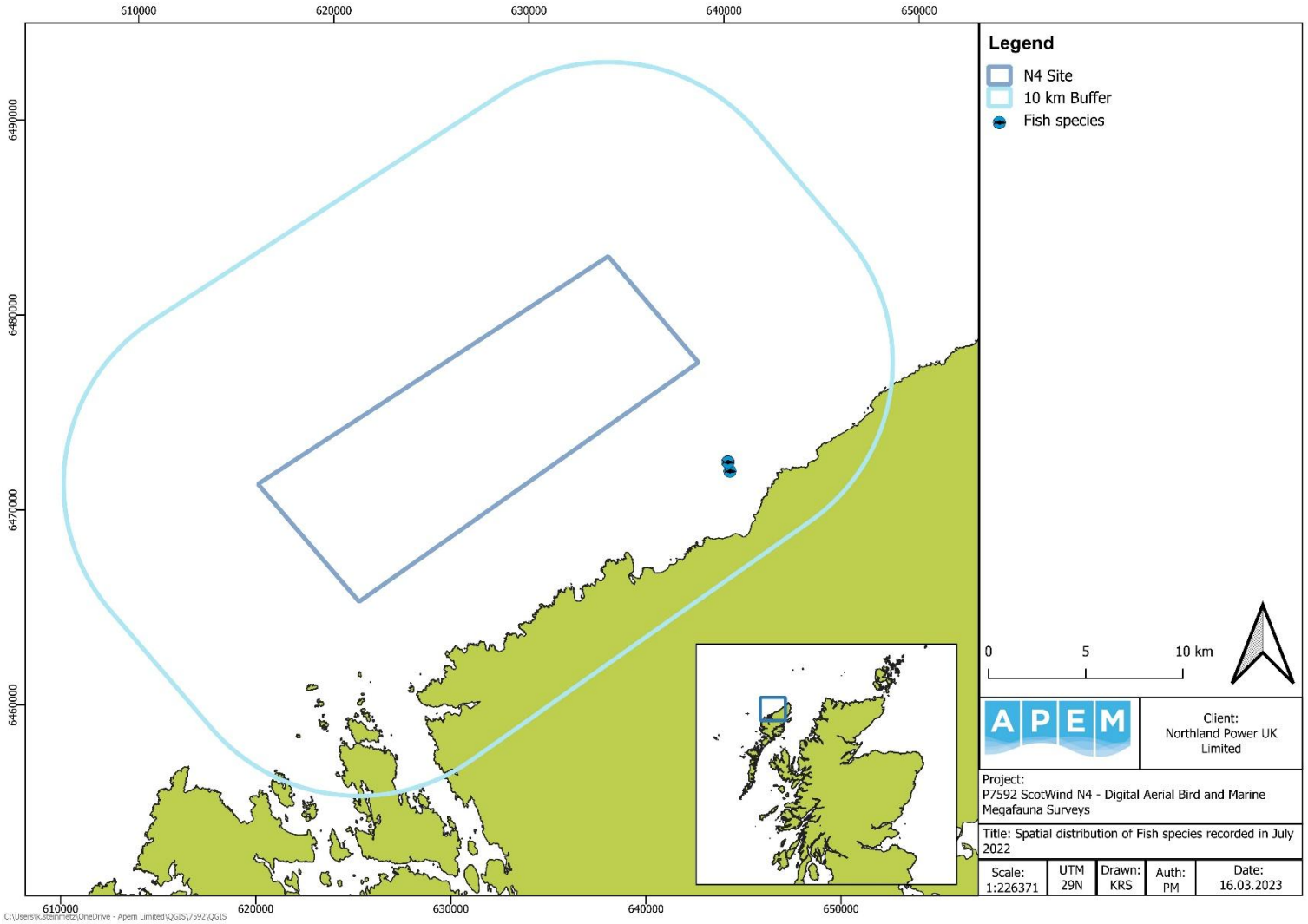


Figure 207 Distribution of fish species in the Survey Area during July 2022

Note: Individuals in close proximity may appear overlapping

3.2.19 Leatherback turtle – *Dermochelys coriacea*

A single leatherback turtle was recorded in October 2023, resulting in an estimate of nine [95% CL: 1, 26] within the Survey Area, equating to 0.01 individuals/km^2 (**Table 77**). The individual was recorded centrally within the Spiorad na Mara Array Area (**Figure 208**).

Table 77 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of leatherback turtle in a) Survey Area b) Spiorad na Mara and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
Oct-2023	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
Oct-2023	1	9	1	36	<1.00	0.06
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
None recorded.						

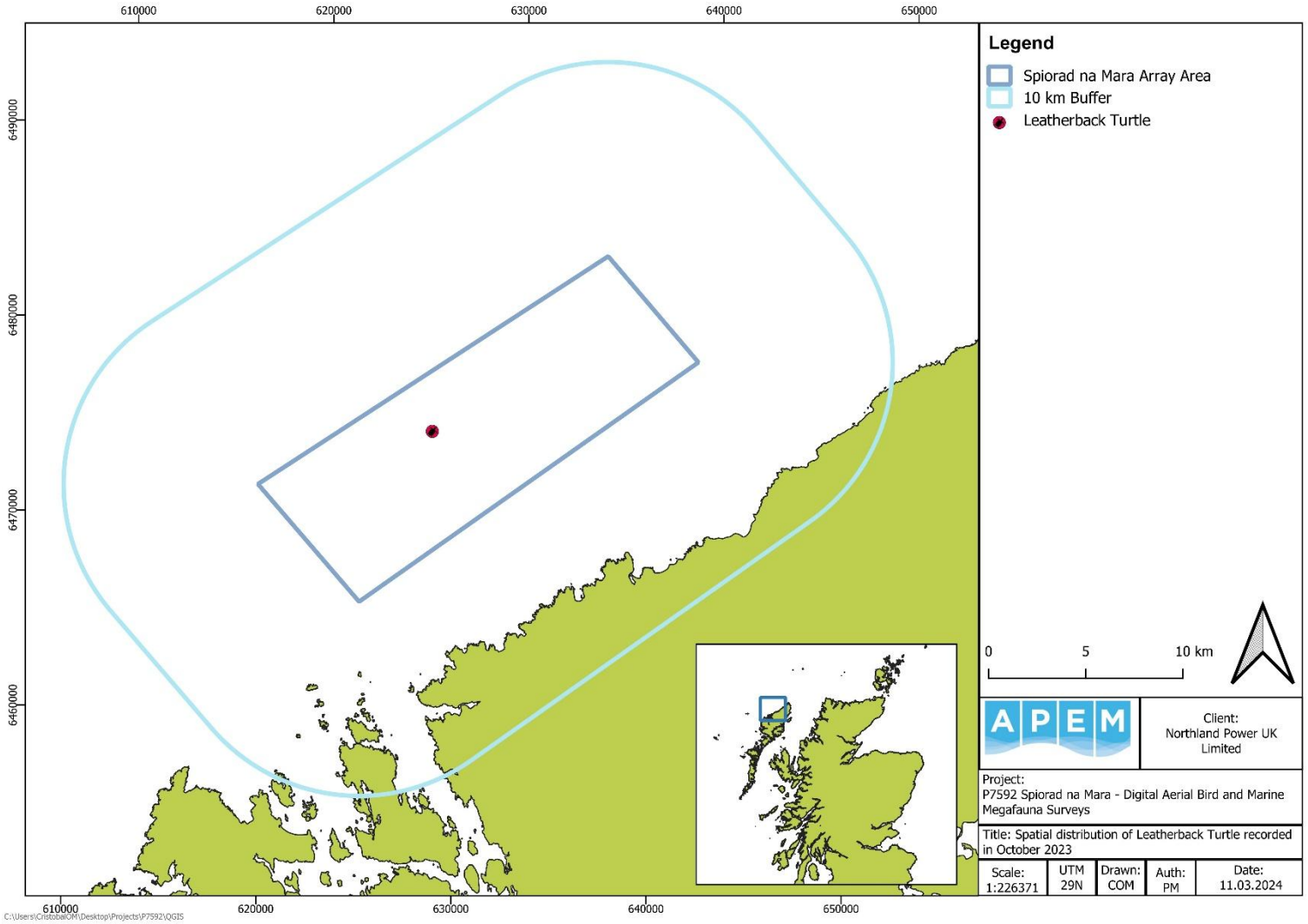


Figure 208 Distribution of leatherback turtle in the Survey Area during October 2023

Note: Individuals in close proximity may appear overlapping

3.2.20 Marine Organism - Unidentified

A single unidentified marine organism was recorded in December 2023, resulting in an abundance estimate of 26 [95% CL: 1, 9] within the Survey Area, equating to 0.01 organisms/km^2 (**Table 78**). The marine organism was recorded in the southwest of the Spiorad na Mara Array Area (**Figure 209**).

Table 78 Raw counts, abundance estimates, lower and upper 95% confidence limits (CL), coefficient of variation (precision), and density (estimated individuals per km^2) of unidentified marine organisms in a) Survey Area b) Spiorad na Mara and c) 10 km Buffer

a) Survey Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
Dec-23	1	9	1	26	<1.00	0.01
b) Spiorad na Mara Array Area						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
Dec-23	1	9	1	27	<1.00	0.06
c) 10 km Buffer						
Month	Total unapportioned					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (turtle km^{-2})
None recorded.						

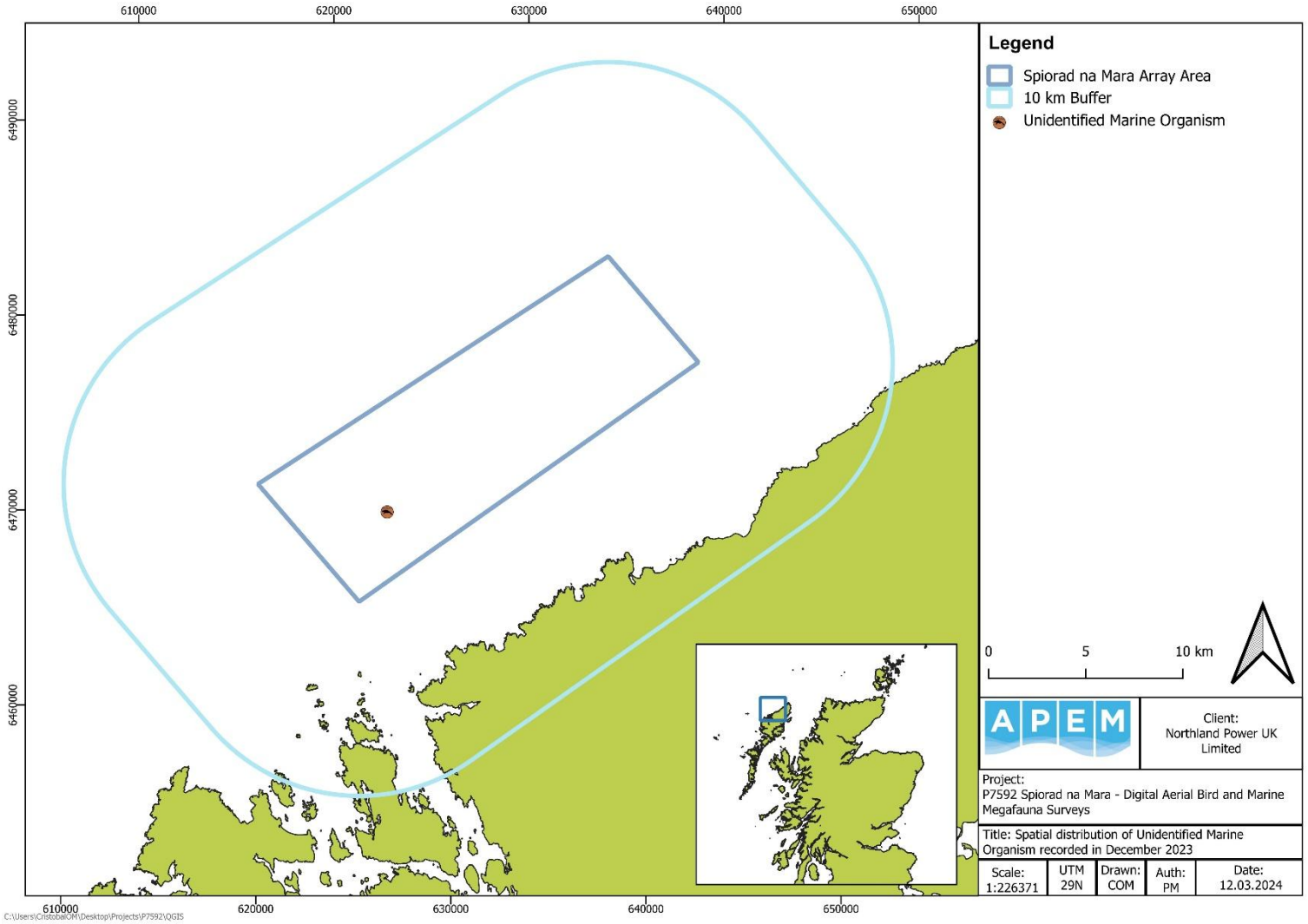


Figure 209 Distribution of unidentified marine organism in the Survey Area during December 2023

Note: Individuals in close proximity may appear overlapping

4 Avian Flight Heights

Of the 5,457 birds captured in flight during the 24 surveys, 925 were deemed suitable for flight height estimation (16.95%; **Figure 210**, **Table 79**). Flight heights are recorded as height above mean sea level (MSL).

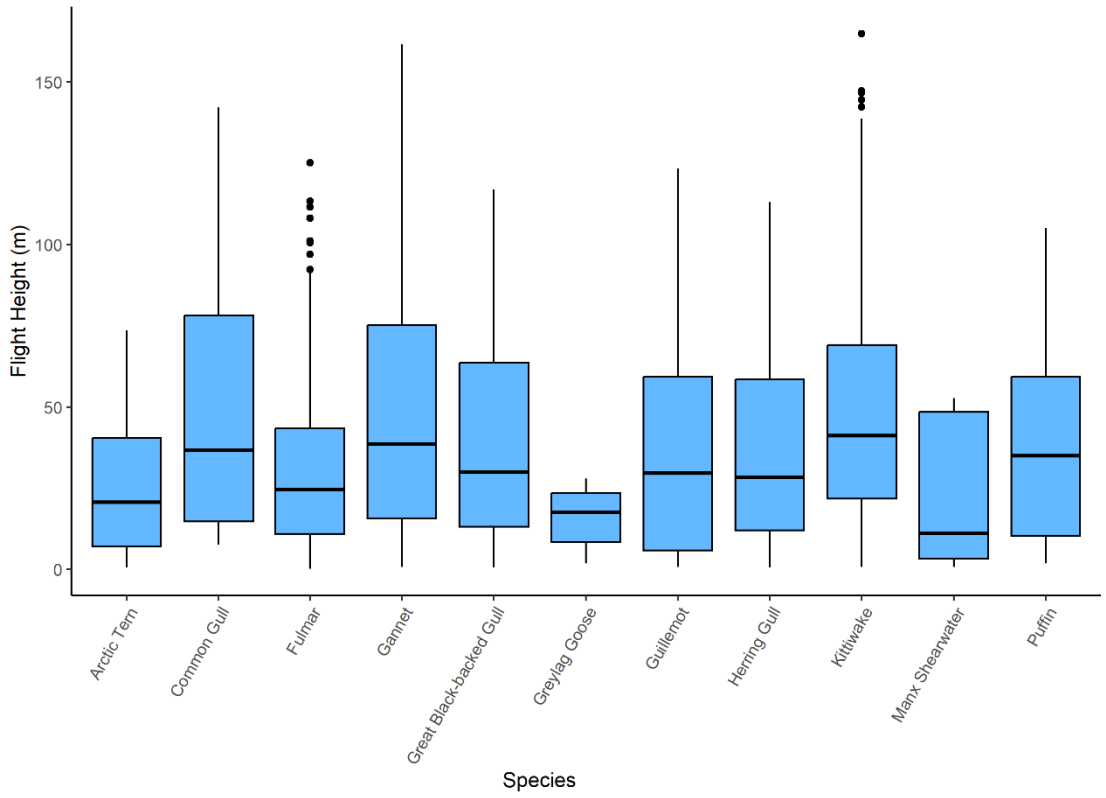


Figure 210 Flight heights (m) of avian species (n≥5) found during surveys between March 2022 and February 2024

Note: The 'box' is the interquartile range, with the middle bold line representing the median of the data. The 'whiskers' are the largest and smallest non-outliers. The range of the entire data includes the outliers represented by circles. Species with five or more flight heights have been presented in the graph.

Table 79 Median flight heights for all bird species identified in surveys between March 2022 and February 2024

Species	Raw count of suitable flying birds	Median flight height (above mean sea level, m)
Greylag goose	13	18
Curlew	3	15
Kittiwake	386	41
Common gull	16	37
Great black-backed gull	18	30
Herring gull	13	28
Arctic tern	25	21
Guillemot	13	30
Puffin	26	35
Fulmar	216	25
Manx shearwater	5	11
Gannet	191	39

5 Abiotic Structures and Observations

The following abiotic structures were observed during the survey period:

- In April 2022 (Survey 02), a single fishing vessel was recorded visually from the aircraft. No abiotic structures were recorded in the imagery.
- In June 2022 (Survey 04), a single fishing vessel was recorded visually from the aircraft. No abiotic structures were recorded in the imagery.
- In July 2022 (Survey 05), no abiotic structures were recorded visually from the aircraft. A miscellaneous vessel was recorded in the imagery.
- In August 2022 (Survey 06), a single cargo ship was recorded visually from the aircraft. No abiotic structures were recorded in the imagery.
- In September 2022 (Survey 07), two small fishing vessels were recorded visually from the aircraft. No abiotic structures were recorded in the imagery.
- In July 2023 (Survey 17), no abiotic structures were recorded visually from the aircraft. Two fishing vessels and one miscellaneous vessel were recorded in the imagery.
- In August 2023 (Survey 18), one fishing vessel and one cargo ship were recorded visually from the aircraft. Two cargo ships were recorded in the imagery.

No vessels or anthropogenic objects were recorded visually from the aircraft or within the imagery during March, May, October, November, and December 2022, or in January, February, March, April, May, June, September, October, November, and December 2023, or in January and February 2024.

6 Summary and Discussion

A summary of the main abundance findings and distribution patterns, where applicable, are presented below. For each species group, cross-referencing with relevant literature has been performed to inform the findings of the surveys, as well as form a basis for expectations of species occurrence and seasonality where applicable.

6.1 Seabirds

6.1.1 Wildfowl

Greylag geese and wigeon were recorded during the breeding season, whilst common eiders were recorded during both years of digital aerial surveys in the breeding and non-breeding seasons. All records of greylag geese, wigeon and common eiders were recorded within the 10 km Buffer.

These greylag geese may be associated with the resident breeding population of greylag geese in north-west Scotland, whose population is increasing. The adaptability of this species allows greylag geese to exploit breeding habitats outside of their preferred wetlands and marine islets (Mitchell *et al*, 2012).

Wigeon also have resident breeding populations in the Outer Hebrides but are more selective in their breeding sites preferring undisturbed freshwater marshes or lagoons (British Trust for Ornithology, 2024a). As the Loch Roag Lagoons, which are used by wigeons (NatureScot, 2021), are close to the Spiorad na Mara Development, this likely suggests that wigeons observed during the survey period were breeding in these areas.

Common eiders observed in the southwestern areas occurred inshore, outside the array area, regardless of seasonality and their occurrence is likely related to sea depth as well as proximity to roosting and foraging sites (NatureScot, 2022a). The species are listed as a qualifying feature at the West Coast of Outer Hebrides SPA, which supports approximately 5,100 individuals, representing 8.5% of the Great British population. Since the 1980's, Common Eider numbers have declined by 22.5% across Scotland (NatureScot, 2022a).

6.1.2 Waders

Black-tailed godwit were recorded in the northwest of the 10 km Buffer during the first year of digital aerial surveys; with records during the breeding season. Curlew and oystercatcher were recorded during both years of digital aerial surveys; with records in both breeding and non-breeding seasons. All oystercatchers records were observed in the 10 km Buffer.

Although very small populations of ground nesting black-tailed godwit have been recorded breeding in southern England, Orkney, and Shetland there is scarce evidence of them breeding in the Outer Hebrides (Goodship and Furness, 2022). It is likely that black-tailed godwits in this survey were commuting between roost and foraging sites or migrating (Balmer, 2013).

The UK is considered internationally important for both over-wintering and breeding populations of curlew, supporting an estimated 19-27% of the global breeding population (Brown *et al.,* 2015). However, curlews are facing UK wide declines, with all constituent countries exhibiting similar levels of declines over short- and long-term periods. In Scotland, curlews have decreased by 25% and 14% within 25 and 10 years, respectively (Austin *et al.,* 2023). Consequently, they are currently red listed

under the BoCC5 (Stanbury *et al.,* 2021), and are on the UK Biodiversity Action Plan Priority Species list (JNCC, 2007). Causes of population declines appear to be strongly linked with nest and chick survival failure as a result of increasing predation rates, as well as habitat destruction and climate change (Grant *et al.,* 1999; Franks *et al.,* 2017). Due to their international importance, curlews have also been named a UK conservation priority and as of 2019 there were 28 ongoing curlew breeding programmes (Brown *et al.,* 2015; Wilson *et al.,* 2019). Despite this, curlews are not listed as a qualifying feature for any SPA in close proximity to the Spiorad na Mara Development.

Oystercatchers are a widely distributed wader species, recorded across Britain year-round. They are found in higher densities across northern Britain, where they inhabit both coastal and inland regions (BTO, 2023). In the UK, oystercatchers have faced declines of 21% and 13% over the previous 25- and 10-year periods, with current populations estimated at 95,500 pairs and 305,000 individuals in the breeding and winter seasons, respectively (Austin *et al.,* 2023; Woodward *et al.,* 2020). In Scotland, populations have seen greater declines than the UK-wide trend with 37% over 25 years and 21% over 10 years (Austin *et al.,* 2023). Although, they have remained on the amber list of the BoCC5 (Stanbury *et al.,* 2021). Oystercatcher are listed as a qualifying feature within the North Uist Machair and Islands SPA which holds 600 breeding pairs, 0.2% of the Europe and Northern/Western Africa biogeographic population (JNCC, 2018).

Internationally important wader populations in the UK are declining. However, close to the Spiorad na Mara Development wader breeding abundance has increased since 1991 (British Trust for Ornithology, 2024b). This is likely due to conservation efforts to improve farming practises and reduce the impact of nest predation by invasive hedgehogs (Calladine *et al.,* 2017).

6.1.3 Small gulls

Kittiwakes, common gulls, and black-headed gulls were recorded during both years of digital aerial surveys, with records in both breeding and non-breeding seasons. Kittiwakes showed greater numbers during the non-breeding season, whilst common gull and black-headed gull were recorded in greater numbers during the breeding season. All black-headed gulls were recorded within the 10 km Buffer along the coastline.

As a cliff nesting species, kittiwake breeding colonies usually occur around the UK on coastal cliffs, but they have also been known to nest on man-made structures. During the non-breeding season, kittiwakes winter at sea (JNCC, 2021a). Declines in kittiwake numbers and breeding success have been recorded throughout the UK, with some of the greatest declines being observed in Scotland (Furness *et al.,* 2013). Important colonies on the Shiant Islands, approximately 52 km from the Spiorad Na Mara array, have reported declines of 46% over a period of 15 years (Taylor *et al.,* 2018). These declines have been linked to collapses in sandeel stocks which make up a crucial part of the kittiwake diet during the breeding season (Furness *et al.,* 2013). Further to this, the current highly pathogenic avian influenza (HPAI) outbreak, thought to have been introduced in the UK in 2021, has quickly taken a toll on seabirds populations, particularly those in Scotland (NatureScot, 2023d). Kittiwakes have been one of the species most highly impacted by the outbreak, with 3,367 mortalities recorded in Scotland during the 2023 summer period (NatureScot, 2023e).

Kittiwakes are known to raft on the sea near the coast during the breeding season (Balmer *et al.,* 2013). This may be reflected by more observations in the breeding season of kittiwakes in the southwestern area of the Buffer Zone, closer to the coast and peatland areas.

Common gulls are found widely throughout the UK and Ireland during the winter period due to migrants from Europe but breeds predominantly in Scotland (British Trust for Ornithology, 2024c). While the largest breeding colonies for common gulls are inland, there are also coastal nesting populations on the northwest coast of Scotland which have been increasing since 1970. Alternatively, the inland common gull colonies population has declined 21% predominantly in Scotland, however the cause is unknown (JNCC, 2021b). Further research is needed to understand the reasoning behind this population decline on the inland colonies.

Black-headed gulls are colonial breeders which nest on coastal and inland wetlands across the Britain and Ireland, including the Outer Hebrides (British Trust for Ornithology, 2024d). Despite there being severe declines in Scotland of 75% since the Seabird 2000 census, these declines have been notably less in coastal populations at 12%. The causes for these declines have been linked to predation pressure and changes in land use (NatureScot, 2024).

6.1.4 Large gulls

Great black-backed gulls and herring gulls were recorded during both years of digital aerial surveys, during both their breeding and non-breeding seasons. Great black-backed gulls were observed in with greater numbers during the non-breeding season, whilst herring gulls showed no discernible differences between the seasons. Lesser black-backed gulls were recorded solely in the south of the 10 km Buffer in the first year of digital aerial surveys during their breeding season.

The third largest population of great black-backed gulls globally can be found in the UK and Ireland; wintering birds are distributed throughout this range, though, they mainly breed on coastal cliffs in the Outer and Inner Hebrides (JNCC, 2021c). While the breeding population in Scotland has generally been stable, great black-backed gulls have declined throughout their British and Irish range, with Scotland's' populations being the most affected with a 63% decline (NatureScot, 2024). Great black-backed gull's foraging behaviour is sensitive to anthropogenic practices and declines are likely linked to decreased food availability on top of the recent avian flu outbreak (NatureScot, 2024; Borrmann *et al.,* 2019).

Up to 43% of the global population of herring gulls reside in the British Isles, where they breed predominantly in coastal areas and increasingly nest on man-made structures inland (NatureScot, 2024; JNCC, 2021d). Nesting populations of herring gull on the north and west coasts of Scotland have shown extensive declines of 42% in the population between Operation Seafarer and the Seabird Colony Register, with a further 23% decline by Seabird 2000. However, roof nesting numbers in urban areas have continued to increase from only 55 pairs in 1976 to 3,568 pairs in 1995 and 5,843 pairs in 2022 (JNCC, 2021d; Nager and O'Hanlon, 2016).

Although a migratory species, lesser black-backed gulls are resident populations in the UK and both migratory and resident populations breed in Scotland (JNCC, 2021e). Migratory and resident populations of lesser black-backed gull breed in low-lying coastal areas on the Isle of Lewis, close to the survey site (British Trust for Ornithology, 2024e). Lesser black-backed gulls are not discriminative in their nesting and breed in a wide range of urban, coastal, and freshwater habitats (Allen *et al*., 2018). In Scotland, populations have fluctuated between 3% and 48% below the 1986 baseline of 19,524 AONs, and the current trend indicates a decline in coastal breeding sites. However, inland nesting sites have increased considerably from 1,346 AON in 1993-95 surveys to 3,846 AON during Seabird 2000 (NatureScot, 2024; Nager and O'Hanlon, 2016).

6.1.5 Terns

Arctic terns, common terns, and 'commic' terns were recorded in both years of digital aerial surveys during the breeding season, with the exception of 'commic' terns that also had a record in their non-breeding season. All common tern records were observed within the southwest of the 10 km Buffer.

Tern species travel from their wintering habitats on the western coast of Africa and are passage migrants through Britain and Ireland, although many also breed along the UK coast in summer (Sterry and Stancliffe, 2015).

Arctic terns are long distance migrants who breed in coastal habitats predominantly on the north and west coast of Scotland during the summer (British Trust for Ornithology, 2024f). Arctic terns display the lowest breeding productivity of any Scottish breeding seabird with annual productivity at or below 0.20 chicks per pair each year. In 2019, the population had experienced declines of 57% below the 1986 baseline of 71,178. These declines are being attributed to crashes in sandeel stocks and predation by American mink (JNCC, 2021f).

Common terns are a migratory ground nesting species with important breeding colonies on the coast of Scotland and the Outer Hebrides but unlike Arctic terns they commonly breed inland as well (British Trust for Ornithology, 2024g). Common tern populations in Scotland are currently regarded as stable (JNCC, 2021g).

6.1.6 Skuas

Great skuas were only recorded during the first year of digital aerial surveys, in both the breeding and non-breeding season. The single Arctic skuas recorded in surveys was seen in the southwest of the 10 km Buffer during the second year of digital aerial surveys, in the breeding season.

Great skuas are a summer breeding visitor, favouring Orkney and Shetland (Woodward *et al.,* 2020; Waggit *et al.* 2020), although also known to nest along the northern and western coasts of mainland Scotland and nearby islands, as well as along the northern and western Irish coasts (Balmer *et al.,* 2013). Approximately 9,600 pairs nest in the UK annually in loose colonies, on coastal moorland adjacent to seabird cliffs (Woodward *et al.,* 2020). Great skuas migrate along the eastern coast of the UK in late summer and early autumn, migrating to wintering grounds along the western European coast as far south as northwest Africa (Balmer *et al.,* 2013; Magnusdottir *et al.,* 2011).

Arctic skuas are a passage migrant for most of the UK and Ireland, however they do breed in Scotland with key sites in the Shetlands and Orkney islands, though some may also be seen in the west of Scotland (RSPB, 2024). In recent years, Arctic skua populations have declined in the UK and Ireland. Great skuas have had a direct negative impact on Arctic skuas numbers by depredating their chicks and occupying their territories, often killing adult Arctic skuas in the process (Mitchell *et al.,*2004). The Arctic skuas recorded in the Survey Area were observed in autumn, suggesting the birds were likely on passage.

6.1.7 Auks

Guillemots, razorbills, black guillemots, and puffins were recorded during both years of digital aerial surveys; with records throughout the majority of the reporting period. All auk species were recorded

during the breeding and non-breeding season, with higher densities typically observed during the breeding season.

Guillemots are one of the most abundant seabirds of the Northern Hemisphere and the northeast Atlantic with a breeding distribution that extends from Portugal to Svalbard (Cummins *et al.,* 2019). The Scottish coastline is one such area where guillemots breed in dense colonies on cliff-faces or the top of stacks (Woodward *et al.,* 2020). The species are listed as a qualifying feature for Handa, Shiant Isles, and Mingulay and Berneray SPA within the Minch, which hold internationally important breeding populations. All the colonies within these SPAs have experienced significant declines in recent years, particularly Handa SPA which has declined by 51% between 2001 and 2017, however the SPA still supports 54,664 individuals (JNCC, 2021h). Guillemots spend the non-breeding season almost exclusively at sea and are rarely encountered in inshore waters during the winter months (Woodward *et al.,* 2020; Waggit *et al.,* 2020).

Like guillemots, razorbills also return to their breeding colonies between March and April and depart in August, spending the non-breeding season at sea. Razorbills are not as widespread as guillemots and nest in more secluded sites such as screes and fissures in cliffs. During the breeding season, razorbills typically remain within 26 km of their breeding sites for foraging purposes, though longer trips have also been observed (Isaksson *et al.,* 2019). Razorbills are listed as a qualifying feature for Handa, Shiant Isles, and Mingulay and Berneray SPA within the Minch. While the breeding colonies at Handa and, Mingulay and Bernersay SPA have decreased by 52% and 24% between 2001 and 2017 respectively, the Shiant Isles SPA colony remains stable, although Mingulay and Berneray still hosts 17,400 individuals (JNCC, 2021i). Outside of the breeding season, they use offshore waters along the UK North Sea coast for foraging, although wintering areas can vary between years and individuals may also leave the North Sea during winter, unlike other auk species (Glew *et al*., 2019).

Black guillemots nest in natural cavities found in boulder fields, rock crevices and even man-made structures such as harbour walls, making them particularly difficult to census. Their global distribution ranges from the northern coasts of Russia to as far south as the Irish Sea (BirdLife, 2023). In Scotland, the vast majority of black guillemots breed in Shetland, with the remainder of sites located mainly in the north and west. The black guillemot population in Scotland was stable between the Seabird Colony Register and Seabird 2000 censuses with approximately 37,000 individuals recorded by each census. The data from the most recent census suggests a 15% increase in the Scottish population since Seabird 2000 (JNCC, 2020).

Puffins breed from April to August, where they come onshore and create burrows in which to nest (Cummins *et al.,* 2019; Waggitt *et al.,* 2020). In Scotland, breeding puffins are concentrated on the north and west coasts but undergo long post-breeding migrations from Scotland to Newfoundland to take advantage of the high abundance of spawning capelin, before returning the following breeding season (Mitchell *et al.,* 2004; Jessopp *et al.,* 2013). Puffin populations fluctuate according to food availability, and breeding success is heavily dependent on sand eel availability in the Northeast Atlantic (Mitchell *et al.,* 2004). The main colonies of relevance to the Survey area are located within the St. Kilda, Flannan Isles and Berneray SPAs, with St Kilda supporting the largest breeding population estimated at 154,001 AOBs (Apparently Occupied Burrows) (JNCC, 2021j).

6.1.8 Divers

Red-throated divers and great northern divers were recorded during both years of digital aerial surveys, in both the breeding and non-breeding seasons. Great northern divers occurred in higher numbers during the breeding months, whilst red-throated divers were recorded in similar numbers

throughout the seasons. Both red-throated divers and great northern divers were recorded within the 10 km Buffer, typically along the coastline.

Red-throated divers are 'marine waterbirds', usually breeding in freshwater wetlands but spending the non-breeding season at sea, and typically breed further north than the UK and Ireland (Allen *et al.,* 2020). However, red-throated divers have a restricted breeding range in Scotland with a stronghold in Shetland and Orkney. During the winter months, however, the species can be found all around Scotland with individuals generally moving south in August/September, reaching a peak in October, and moving back north in March/April (RSPB, 2023). The winter population for Scotland is estimated to be approximately 789 individuals (Austin *et al.,* 2017), and red-throated diver is listed as a qualifying feature within the West Coast of the Outer Hebrides SPA, which supports 4.5% of the UK breeding population.

Great northern divers are a winter visitor to the UK that breeds in Iceland, Greenland, and Canada (Horswill and Robinson, 2015; Frost *et al.,* 2017). During the stormy Irish and British winter months, great northern divers typically head to inland waterbodies for shelter (Frost *et al.,* 2017). They are usually seen occupying open coasts, estuaries, bays, and sea lochs; and such habitats are particularly important for the species (Frost *et al.,* 2017). The UK population is estimated to be approximately 4,300 great northern divers, with Scotland supporting 4,000 individuals. Great northern divers are a species of conservation interest within the West Coast of the Outer Hebrides SPA, which sustains a wintering population of European importance constituting 52% of the UK population (NatureScot, 2022b).

6.1.9 Storm petrels

European storm petrels were recorded during the second year of digital aerial surveys, whilst unidentified storm petrel species were recorded in both years of surveys. European storm petrels were recorded during the non-breeding season only and unidentified storm petrel species were observed during both the breeding and non-breeding season. All records of European storm petrels were recorded in the east of the 10 km Buffer.

They are a pelagic species, spending the majority of time at sea, returning to land to breed. Nesting in burrows, natural crevices, boulder fields and man-made structures such as drystone walls, they are particularly vulnerable to Development on nesting sites, invasive species, and mammalian predators (Bolton *et al.,* 2017). To reduce the risk of predation, European storm petrels will usually only return to land during the hours of darkness. This behaviour, combined with often inaccessible nest sites, make accurate population estimates difficult. The European storm petrel is the most abundant of the two species of storm petrel found to breed along the Western Isles coastline, with 1,833 AON reported between 1999 and 2002 (Mitchell *et al.,* 2004).

6.1.10 Fulmars

Fulmars were recorded during both years of digital aerial surveys, during both the breeding and non-breeding period.

Fulmars mainly breed near the top of grassy sea cliffs along wide ledges, but may also nest on level ground, on buildings and in burrows. A highly pelagic species, fulmars spend the majority of their non-breeding period at sea but are a familiar sight in Scottish waters, both offshore and making landfall at coastal cliff sites throughout the year. At around 500,000 breeding pairs, the UK holds around 8% of the species global breeding population (Mitchell *et al.,* 2004; Cordes *et al.,* 2015). The UK population has declined since the late 1990s and fulmars are now on the amber list of Birds of Conservation

Concern (Cordes *et al.,* 2015; Stanbury *et al.,* 2021). The foraging range of fulmars is 1,200 km. Within this distance from the Survey Area, there are 25 Scottish SPAs in which fulmars are a species of interest. The closest SPAs to the Survey Area include Shiant Isles SPA, Flannan Isles SPA, Mingulay and Berneray SPA, St Kilda SPA, and the Seas off St Kilda SPA. The fulmar breeding population has declined across most SPAs, with the exception of St Kilda which has increased by 9% (Mitchell *et al.,* 2004).

6.1.11 Shearwaters

Cory's, Sooty, and Manx shearwaters were recorded across both years of digital aerial surveys; whilst Cory's shearwaters were recorded in the breeding season, sooty and Manx shearwaters were observed during both the breeding and non-breeding season. Cory's shearwaters were recorded in the north of the 10 km Buffer.

They are a scarce passage migrant in Scotland (British Trust for Ornithology, 2024h), typically observed from select sites along the North Sea coast between July and August. They breed colonially on inaccessible rocky islets in the Mediterranean as well as the Azores and Canary Islands, which they leave in late August. They are considered least concern on the IUCN red list; however very little information is recorded in the UK about the population size due to the scarcity of this species (Balmer *et al.,* 2013).

They are passage migrants in Scotland, typically seen between August and November, consistent with the results of this survey. They are mostly observed off the Western Isles, with occasional sightings off the coast of Aberdeen in the east. They are reported as near threatened by the IUCN red list and population estimates are scarce (Balmer *et al.,* 2013). Sooty shearwaters undertake a clockwise migration through the western Atlantic towards wintering grounds in the North Atlantic. The breeding grounds of sooty shearwaters are found on islands in the South Atlantic and Pacific (Balmer *et al.,* 2013).

Manx shearwaters are common summer visitors to Scottish coastlines and are typically observed between March and August (Mitchell *et al.,* 2004). They are primarily distributed over the continental shelf but can also be recorded over deeper waters at greater distances from the coast, with the Irish Sea being a hotspot for the species (Rogan *et al.,* 2018). The Seabird 2000 census reported a population estimate of 126,545 apparently occupied sites (AOS) in Scotland, with no data available for estimates prior to 1998 (Mitchell *et al.,* 2004). Manx shearwaters mostly breed in large numbers on steep grassy slopes on offshore islands away from mammalian predators. From September to October, Manx shearwaters start their migration to the South Atlantic and return to the Scottish coast in May (Fayet *et al.,* 2020). The largest breeding colony in the West of Scotland occurs on the Isle of Rum SPA, which supports over 100,000 breeding pairs, representing almost 25% of the global population. A further 4,803 AOS were recorded on the St Kilda island group (JNCC, 2021k).

6.1.12 Gannets

Gannets were recorded during both years of digital aerial surveys, in both breeding and non-breeding seasons.

Gannets are the largest seabird of the North Atlantic with breeding birds occurring mainly in the temperate waters of the North Atlantic up to the Arctic fringe (Cummins *et al.,* 2019). They exhibit breeding site fidelity with most 'gannetries' occupied for decades or longer (Mitchell *et al.,* 2004). Breeding sites are primarily located on isolated sea stacks, small uninhabited islands and inaccessible cliffs on large islands (Cummins *et al.,* 2019). Gannets are present around the Scottish coast year-round; however, they are primarily found foraging at sea during the non-breeding season (Hume *et*

al., 2016) and return to land to breed in early March. While breeding colonies in Scotland are largely located in the southeast, which hosts the world's largest colony at Bass Rock, there are significant breeding colonies in proximity to the Survey Area. Gannets are listed as a species of conservation interest within St Kilda SPA, which hosts approximately 60,290 AOS, and Flannan Isles SPA, which supports 5,280 AOS (Murray *et al.,* 2015).

6.1.13 Cormorants and shags

Cormorants and shags were recorded during both years of digital aerial surveys, with cormorants and shags observed during the breeding and non-breeding periods, whilst cormorant/shags were recorded in the non-breeding season. Both cormorants and shags were recorded in the 10 km Buffer, along the coastline, with the majority of records in the southwest.

Cormorants are resident around the UK coastline all year round and breed primarily in coastal habitats, typically on stacks, rocky islets, cliffs, or rocky promontories. In the Western Isles, a total of 445 AONs were recorded by the Seabird 2000 census (Mitchell *et al.,* 2004). The latest published census data reports a Scottish breeding population estimate of 738 breeding pairs across 10 coastal colonies (JNCC, 2021l). However, cormorants exhibit a low degree of site faithfulness between years which may impact on national population estimates derived from survey data over several years (Cummins *et al.,* 2019).

European shags share much of its habitat with cormorants, and as such is an inshore species, which disperses widely in their first and second years of life from natal colonies that are usually sited on cliffs or offshore islands (Mitchell *et al.,* 2004). Compared to cormorants, shags are more strictly birds of coastal areas, with inland records being very scarce in all seasons and with no inland breeding recorded (Cummins *et al.,* 2019). Scotland holds approximately 80% of the UK breeding shag population, however the Seabird Monitoring Programme 2019 abundance index suggests long term population declines of 47% below the 1986 baseline. Shags are listed as a qualifying interest in several SPAs around the Western Isles including Mingulay and Berneray, Shiant Isles and Scapa flow (JNCC, 2021m).

6.1.14 Other avian species

Unidentified bird species were recorded during both years of digital aerial surveys, in the breeding and non-breeding season. Passerine species were recorded in the 10 km Buffer during the second year of digital aerial surveys, in the breeding season.

6.2 Marine Megafauna

6.2.1 Seals

Both grey and common seals were recorded across both years of digital aerial surveys. Grey seals occurred in winter, spring, and summer. Whereas, common seals were present in spring, summer and autumn. Common seals were recorded as hauled out on the Isles of of Bearasaigh and Flodaigh in the south of the 10 km Buffer.

The grey seal is found in continental shelf habitats along North Atlantic coasts. Their distribution varies throughout the year, spending time offshore while foraging and returning to haul-out sites during crucial periods of their life cycle, mainly during moulting (November to April) and breeding (September to December) seasons (Tadeo *et al*., 2021). The most recent estimates of the UK grey seal population is approximately 162,000, with Scotland supporting 129,100 of the total (SCOS, 2022). In Scotland,

critical haul-out periods occur from December to April and from August to December, corresponding to the moulting and breeding season, respectively, and are when grey seal numbers peak (SCOS, 2022). The pupping season in north and west Scotland occurs between September and late November. They typically breed on remote, uninhabited islands or coasts and in small numbers in caves. Approximately 35% of the world's grey seals breed in the UK, with 80% of these seals breeding at colonies in Scotland, particularly in the Outer Hebrides or Orkney. Breeding colonies were recorded within the Monach Islands SAC, and North Rona SAC situated nearby, with the former SAC listing grey seals as designated features. High grey seal densities are estimated at sea off the southwest of Inner Hebrides and west of Outer Hebrides (Carter *et al.,* 2022).

The total UK common seal population is estimated at approximately 42,900 individuals, with Scotland being an important stronghold for the species considering that an estimated 36,600 individuals in Scotland represent 85% of the UK population (SCOS, 2022). Common seals are widespread along the coastlines of the Inner and Outer Hebrides, especially during pupping season between June and July, and moulting season in August. Common seal distribution is believed to be strongly linked to their haul-out locations, which typically consist of sheltered bays, often on sandbanks, estuaries, and rocky outcrops. This species is recognised as a designated feature of the nearby Sound of Barra SAC, where the population has undergone significant declines, however the current trends suggest the population is stable (SCOS, 2022). Similarly, to grey seals, higher densities are estimated at sea throughout the Inner and Outer Hebrides (Carter *et al.,* 2022).

6.2.2 Dolphins and porpoises

Common dolphins, Risso's dolphin and harbour porpoise were recorded across both years of digital aerial surveys with records throughout the survey period. Common dolphin occurred in autumn and winter in both years, and in spring and summer in the first and second year, respectively. Risso's dolphins were recorded during the spring and summer months, while harbour porpoise occurred all seasons. Comparatively, bottlenose dolphin and orca were recorded in the first year of surveys during the summer and winter season, respectively, and white-beaked dolphins were observed in the second year of surveys in the spring and winter. Bottlenose dolphins and white-beaked dolphins both occurred exclusively within 10 km Buffer. Contrastingly, orcas were recorded within the Spiorad na Mara array area.

Bottlenose dolphins are found in all oceans at temperate and tropical latitudes, typically in coastal shallow ecosystems, with Scottish waters containing several small localized coastal populations that can be observed year-round (Gilles *et al.,* 2023). On the west coast of Scotland, bottlenose dolphins appear to form two distinct communities (Thompson *et al.,* 2011), with previous sightings aggregated around the Hebrides, particularly Barra Sound, Mull, Coll, Tiree, Islay and between Arisaig and Skye (HWDT, 2018). This population is estimated to consist of approximately 45 individuals. During the SCANS-IV survey (2023), bottlenose dolphins were typically concentrated in the inshore waters of the Hebrides while higher densities were estimated in the coastal waters of the southern Hebrides, aligning with distribution patterns observed by HWDT (2018) and within this survey. Bottlenose dolphins are a UKBAP priority species and are protected under the European Union (EU) Habitats Directive (1992), which requires strict protection of these species of community interest and their habitats across their entire range within the EU (Carmen *et al*, 2021).

The common dolphin is one of the most abundant and widespread cetacean species in the Northeastern Atlantic, inhabiting both continental shelf and offshore waters, although it is mainly found in deeper waters (Murphy *et al.,* 2021). Its ecology and spatial distributions are still poorly understood for most of its range (Lambert *et al.,* 2022). Common dolphins are seasonal visitors to Scottish waters; however, they are most frequently sighted on the west coast of Scotland, particularly

between May and December, peaking in October. During the autumn and winter months, common dolphins typically keep to coastal waters, and then venture out to offshore waters during the summer months to exploit higher ocean productivity (Lambert *et al.,* 2022).

Risso's dolphin is a widespread species that occurs in all major ocean basins between latitudes of ~64°N to 45°S (Weir *et al*., 2019). This species demonstrates a strong preference for mid-temperate waters of continental shelfs and slopes, with a concentration of the species found on the Northeast Atlantic shelf (<200m deep) around the waters of the UK and Ireland (Weir *et al.,* 2019). Risso's dolphins are observed year-round in UK waters; however, sightings are most frequently reported along the west coast of Scotland and Outer Hebrides between May and September (NatureScot, 2020b). Around the Isle of Lewis, re-sightings of the same individuals suggest semi-residency (Weir *et al.,* 2019). As a result, Risso's dolphins have been designated a protected feature of the North-east Lewis MPA (NatureScot, 2020c). High abundance and frequent sightings (especially during summer and autumn periods) of mother-calf pairs and groups of juveniles (Paxton *et al.,* 2014), indicate the waters around Lewis are potentially important feeding, breeding, and nursery grounds for the species. There were, however, no mother-calf pairs identified within these surveys.

White-beaked dolphins occur year-round in British waters, although sightings peak during the summer months when the species can be found in shallow shelf waters between 50-100 m depth (Canning *et al.,* 2008). Historically, white-beaked dolphins were one of the most abundant cetacean species in UK waters, however, as the species exhibit a strong preference for cooler ocean temperatures, sightings have decreased in recent years due to shifts in sea surface temperature (Martin *et al.,* 2023; Williamson *et al.,* 2021). Although the temperate waters off the west coast of Scotland appear to be a hotspot for the species, with high concentrations to the west of the Hebrides from South Uist to Barra Head (Calderan *et al.,* 2013), this was not reflected in these surveys, in which white-beaked dolphins were only observed in low numbers on two occasions.

There is a small, critically endangered population of orca, consisting of eight individuals, which occurs in the waters surrounding mainland Scotland and the Hebrides. This population forms the resident West Coast Community, a genetically distinct ecotype within the Northeast Atlantic known for its distinctive vocalizations (HWDT, 2018).

Harbour Porpoises are the most common cetacean species on the west coast of Scotland, where they occur year-round (Booth *et al.,* 2013). Harbour porpoises are a European Protected Species under the EU Habitats Directive and are predominantly found over the UK continental shelf in waters less than 200 m in depth (IAMMWG, Camphuysen and Siemensma, 2015). They favour inshore waters and frequent shallow bays, estuaries, fjords, tidal channels, and harbours (Carwardine, 2020). The Inner Hebrides and the Minches SAC is designated for harbour porpoises, deemed as a protected feature within, considering the very high number of porpoise sightings in the area (JNCC, 2019).

6.2.3 Whales

Common minke whale were recorded in the second year of digital aerial surveys, during the summer season. All minke whale records were observed in the south of the 10 km Buffer.

Minke whales occur in relatively high numbers in the North Atlantic, however, relatively little is known about their seasonal movements or the location of their breeding and calving grounds (Kavanagh *et al.,* 2018). As a result of their high abundance, they are currently listed as a species of Least Concern under the IUCN Red List (Kavanagh *et al.,* 2018). Recent minke whale abundance estimates suggest there are approximately 18,958 individuals in European Atlantic shelf waters (Kavanagh *et al.,* 2018).

Summer sightings of minke whales in the waters surrounding the British Isles and Ireland suggest those waters are used as important feeding grounds for the species (Kavanagh *et al.,* 2018).

6.2.4 Sharks

Blue sharks were recorded during the first year of digital aerial surveys, in summer and autumn, whilst basking sharks were recorded in the second year of surveys during the summer season. Basking sharks were observed in the northeast of the 10 km Buffer.

Blue sharks are considered to be one of the most abundant and widely distributed pelagic shark species, ranging from 60°N to 50°S in tropical and temperate waters (Nykänen *et al.,* 2018). Data from tagging studies suggest that blue sharks are highly migratory, potentially undertaking trips of tens of thousands of kilometres (Vandeperre *et al.,* 2014). Despite their wide distribution, blue sharks are regarded as Near Threatened by the IUCN with a decreasing population trend in the North Atlantic (IUCN, 2024). Within the UK, they are primarily observed off the west coast of Scotland, although due to most of their time being spent at depth, surface recording of the species is limited (Nykänen *et al.,* 2018). Limited sightings of the shark in winter compared to summer also suggest that the species does not occur in large numbers in Scottish waters during this time, and that they likely migrate to warmer lower-latitude waters during the winter across the Atlantic (Doyle *et al.,* 2015; Nykänen *et al.,* 2018).

The basking shark has a global distribution (Dolton *et al.,* 2020), and individuals are capable of transoceanic migrations. Three hotspots have been identified within the North Atlantic Ocean, including the coastal waters of Ireland, the UK, and the USA (Johnston *et al.,* 2019). Basking sharks have a history of over-exploitation in the Northeast Atlantic leading to a depletion of local stocks and are listed as Endangered in this region by the IUCN (Doherty *et al.,* 2017). In Scotland, basking sharks have legal protection under the Conservation of Offshore Marine Habitats and Species Regulations 2017. The Islands of Hyskeir and Canna in the Sea of the Hebrides, and Island of Coll in the Inner Hebrides, are two possible hotspots for the species (Speedie *et al.,* 2009), as mating behaviours are frequently recorded at the Hyskeir and Canna sites, and courtship behaviours are frequently recorded in the Coll hotspot. The Sea of the Herbrides MPA lists basking shark as a designated feature, with the sharks mostly sighted feeding at the surface during the summer months between June and late October, before heading south for overwintering (Witt *et al.,* 2012).

6.2.5 Teleost fish

Ocean sunfish were recorded in both years of digital aerial surveys, during the autumn and summer seasons. Atlantic bluefin tuna were recorded in the winter during the second year of surveys, and unidentified fish species were recorded in the summer during the first year of surveys. Both ocean sunfish and Atlantic bluefin tuna were exclusively recorded within the 10 km Buffer.

The ocean sunfish is a large pelagic species distributed worldwide in both temperate and tropical oceans. However, little is known about its ecology (Potter and Howell, 2011; Sousa *et al*., 2016). Sunfish are commonly sighted in the offshore waters of the Northwest Atlantic during the spring and summer months, with an estimated summer population of 18,000 individuals (Potter and Howell, 2011; Sousa *et al.,* 2016).

Atlantic bluefin tuna are large, endothermic predators that range throughout the Atlantic Ocean, from polar waters in the North through subtropical waters of the Gulf of Mexico and Caribbean Seas, and into cold temperate waters of the South Atlantic (Horton *et al.,* 2021). The Northeast Atlantic is a feeding ground for Atlantic bluefin tuna between August and December, and while feeding, tuna spend the majority of their time in surface waters (Horton *et al.,* 2021). They were once frequently

encountered along the western coast of Scotland until 2005, before becoming regionally scarce (Horton *et al.,* 2020). However, in recent years, Atlantic bluefin tuna seem to be increasing in occurrence in UK and Irish waters, with catch indices from Japanese longline fleets working in the Northeast Atlantic also indicating a positive change in catchability (Horton *et al.,* 2020, 2021).

6.2.6 Turtles

A leatherback turtle was recorded in autumn of the second year of digital aerial surveys, recorded in the central of the Spiorad na Mara Array Area.

Adult leatherback turtles seasonally frequent waters around the UK and Ireland during the boreal summer and autumn whilst foraging for jellyfish (Botterell *et al.,* 2020), however sightings occur throughout the year. The highest number of sightings are typically between June and October, with the majority of leatherback turtle strandings and sightings occurring on the West coast of the UK and the entire Irish coastline (Botterell *et al*., 2020). The decadal trend of records in the UK and Ireland for leatherback turtles generally increased to a peak in the 1990s with approximately 40 confirmed sightings, from which it has since decreased to 15 in 2010 (Botterell *et al.,* 2020). It is possible that as a result of regional warming the thermal niche of leatherback turtles has expanded so the waters surrounding the UK are a more favourable temperature for longer periods over the boreal summer and autumn and over a larger area (Botterell *et al.,* 2020).

6.2.7 Other Marine Megafauna

A single unidentified marine organism was recorded in the southwest of the Spiorad na Mara Array Area in the winter season.

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Appendix I Scientific Names and Taxonomy

Common Name	Scientific Name	Family	Class
Greylag goose	*Anser anser*	Anatidae	Aves
Common eider	*Somateria mollissima*	Anatidae	Aves
Wigeon	*Mareca penelope*	Anatidae	Aves
Black-tailed godwit	*Limosa limosa*	Scolopacidae	Aves
Curlew	*Numenius arquata*	Scolopacidae	Aves
Oystercatcher	*Haematopus ostralegus*	Haematopodidae	Aves
Rock dove	*Coulmba livia*	Columbidae	Aves
Kittiwake	*Rissa tridactyla*	Laridae	Aves
Common gull	*Larus canus*	Laridae	Aves
Black-headed gull	*Chroicocephalus ridibunus*	Laridae	Aves
Great black-backed gull	*Larus marinus*	Laridae	Aves
Herring gull	*Larus argentatus*	Laridae	Aves
Lesser black-backed gull	*Larus fuscus*	Laridae	Aves
Arctic tern	*Sterna paradisaea*	Laridae	Aves
Common tern	*Sterna hirundo*	Laridae	Aves
Great skua	*Stercorarius skua*	Stercorariidae	Aves
Arctic skua	*Stercorarius parasiticus*	Stercorariidae	Aves
Guillemot	*Uria aalge*	Alcidae	Aves
Razorbill	*Alca torda*	Alcidae	Aves
Black guillemot	*Cepphus grylle*	Alcidae	Aves
Puffin	*Fratercula arctica*	Alcidae	Aves
Red-throated diver	*Gavia stellata*	Gaviidae	Aves
Great northern diver	*Gavia immer*	Gaviidae	Aves
European storm petrel	*Hydrobates pelagicus*	Hydrobatidae	Aves
Fulmar	*Fulmarus glacialis*	Procellariidae	Aves
Cory's shearwater	*Calonectris borealis*	Procellariidae	Aves
Sooty shearwater	*Ardenna grisea*	Procellariidae	Aves
Manx shearwater	*Puffinus puffinus*	Procellariidae	Aves
Gannet	*Morus bassanus*	Sulidae	Aves
Cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	Aves
Shag	*Gulosus aristotelis*	Phalacrocoracidae	Aves
Grey seal	*Halichoerus grypus*	Phocidae	Mammalia
Common seal	*Phoca vitulina*	Phocidae	Mammalia
Common minke whale	*Balaenoptera acutorostrata*	Balaenopteridae	Mammalia
Bottlenose dolphin	*Tursiops truncates*	Delphinidae	Mammalia
Common dolphin	*Delphinus delphis*	Delphinidae	Mammalia
Risso's dolphin	*Grampus griseus*	Delphinidae	Mammalia
White-beaked dolphin	*Lagenorhynchus albirostris*	Delphinidae	Mammalia
Orca	*Orcinus orca*	Delphinidae	Mammalia
Harbour porpoise	*Phocoena phocoena*	Phocoenidae	Mammalia
Blue shark	*Prionace glauca*	Carcharhinidae	Chondrichthyes
Basking shark	*Cetorhinus maximus*	Cetorhinidae	Elasmobranchii
Ocean sunfish	*Mola mola*	Molidae	Actinopterygii
Atlantic bluefin tuna	*Thunnus thynnus*	Scombridae	Actinopteri

Common Name	Scientific Name	Family	Class
Leatherback turtle	*Dermochelys coriacea*	Dermochelyidae	Reptilia

Appendix II JNCC Species and Taxa Grouping Level Codes of Seabirds and Marine Megafauna

Scientific names and taxonomy, including JNCC categories, for all species can be found in the accompanying appendix document.

JNCC Code	Grouping	Species Code	Species
1569	Anser species	1610	Greylag goose
2269	Duck species	2060	Common eider
		1790	Wigeon
5659	Wader species	5320	Black-tailed godwit
		5410	Curlew
		4500	Oystercatcher
6999	Dove / pigeon	6650	Rock dove
94003	Small gull species	6020	Kittiwake
		5900	Common gull
		5820	Black-headed gull
95034	Large gull species	6000	Great black-backed gull
		5920	Herring gull
		5910	Lesser black-backed gull
95037	Tern species	6160	Arctic tern
		6150	Common tern
95038	'Commic' tern (common or Arctic tern)	6160	Arctic tern
		6150	Common tern
95032	Skua species	5690	Great skua
		5670	Arctic skua
95040	Auk species	6340	Guillemot
		6360	Razorbill
		6380	Black guillemot
		6540	Puffin
95003	Diver species	20	Red-throated diver
		40	Great northern diver
95034	Petrel species	520	European storm petrel
220	Fulmar	220	Fulmar
469	Shearwater species	35970	Cory's shearwater
		430	Sooty shearwater
		460	Manx shearwater
710	Gannet	710	Gannet
95009	Cormorant / Shag	720	Cormorant
		800	Shag
70000	Seal species	70010	Grey seal

		64330	Common seal
81000	Whale species	81050	Common minke whale
82000	Dolphin species	63190	Bottlenose dolphin
		82540	Common dolphin
		63400	Risso's dolphin
		82520	White-beaked dolphin
		63020	Orca
8000	Porpoise species	82410	Harbour porpoise
6000	Shark species	61030	Blue shark
		61030	Basking shark
62000	Fish species	62000	Ocean sunfish
		-	Atlantic bluefin tuna
5000	Turtle species	-	Leatherback turtle

Appendix III Raw Data Abundance and Density

Species raw counts, abundance estimates (plus lower and upper confidence limits [LCL; UCL], density estimates and standard deviation for all behaviours are provided here:

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A3.1 Seabirds

A3.1.1 Anser species

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	35	300	35	900	0.17	0.31	0	0	0	0	0.00	0.00	0.00	35	300	35	900	0.17	0.31
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	35	318	35	954	0.17	1.97	0	0	0	0	0.00	0.00	0.00	35	318	35	954	0.17	1.97
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			

A3.1.2 Greylag goose

Total Apportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	26	221	26	662	0.19612	0.23	26	221	26	881	0.19612	0.23	0.22	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	26	219	26	657	0.19612	0.27	26	219	26	876	0.19612	0.27	0.27	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.3 Common eider

Total Unapportioned																			
Month	a) Survey Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	50	429	50	977	0.14	0.45	0	0	0	0	0.00	0.00	0.00	50	429	51	994	0.14	0.45
Apr-22	27	234	27	599	0.19	0.24	0	0	0	0	0.00	0.00	0.00	27	234	27	607	0.19	0.24
May-22	2	17	2	51	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	51	0.71	0.02
Jun-22	4	34	4	136	0.50	0.04	0	0	0	0	0.00	0.00	0.00	4	34	4	102	0.50	0.04
Oct-22	3	26	3	70	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	79	0.58	0.03
Nov-22	29	250	29	690	0.19	0.26	0	0	0	0	0.00	0.00	0.00	29	250	29	690	0.19	0.26
Jan-23	18	155	18	412	0.24	0.16	0	0	0	0	0.00	0.00	0.00	18	155	18	412	0.24	0.16
Feb-23	22	187	22	426	0.21	0.20	0	0	0	0	0.00	0.00	0.00	22	187	22	426	0.21	0.20
Mar-23	30	257	30	669	0.18	0.27	0	0	0	0	0.00	0.00	0.00	30	257	30	635	0.18	0.27
Apr-23	6	52	6	139	0.41	0.05	0	0	0	0	0.00	0.00	0.00	6	52	6	139	0.41	0.05
May-23	81	700	86	1,451	0.11	0.73	2	17	2	43	0.71	0.02	0.01	79	682	79	1,469	0.11	0.71
Jun-23	5	44	5	124	0.45	0.05	0	0	0	0	0.00	0.00	0.00	2	18	2	53	0.71	0.02
Sep-23	13	111	13	317	0.28	0.12	0	0	0	0	0.00	0.00	0.00	13	111	13	334	0.28	0.12
Oct-23	39	337	39	951	0.16	0.35	0	0	0	0	0.00	0.00	0.00	39	337	39	1,107	0.16	0.35
Dec-23	20	172	20	499	0.22	0.18	0	0	0	0	0.00	0.00	0.00	20	172	20	499	0.22	0.18
Jan-24	32	280	32	699	0.18	0.29	0	0	0	0	0.00	0.00	0.00	32	280	32	804	0.18	0.29
Feb-24	3	26	3	77	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	77	0.58	0.03
Month	b) Spiorad na Mara Array Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																		

	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	50	424	51	949	0.14	0.53	0	0	0	0	0.00	0.00	0.00	50	424	50	966	0.14	0.53
Apr-22	27	232	27	575	0.19	0.29	0	0	0	0	0.00	0.00	0.00	27	232	27	550	0.19	0.29
May-22	2	17	2	51	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	51	0.71	0.02
Jun-22	4	34	4	135	0.50	0.04	0	0	0	0	0.00	0.00	0.00	4	34	4	101	0.50	0.04
Oct-22	3	26	3	69	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	69	0.58	0.03
Nov-22	29	248	29	684	0.19	0.31	0	0	0	0	0.00	0.00	0.00	29	248	29	649	0.19	0.31
Jan-23	18	153	18	391	0.24	0.19	0	0	0	0	0.00	0.00	0.00	18	153	18	408	0.24	0.19
Feb-23	22	186	22	405	0.21	0.23	0	0	0	0	0.00	0.00	0.00	22	186	22	422	0.21	0.23
Mar-23	30	255	30	681	0.18	0.32	0	0	0	0	0.00	0.00	0.00	30	255	30	681	0.18	0.32
Apr-23	6	52	6	138	0.41	0.07	0	0	0	0	0.00	0.00	0.00	6	52	6	138	0.41	0.07
May-23	81	691	85	1,434	0.11	0.87	2	17	2	43	0.71	0.02	0.01	79	674	79	1,545	0.11	0.85
Jun-23	5	44	5	114	0.45	0.06	0	0	0	0	0.00	0.00	0.00	2	18	2	70	0.71	0.02
Sep-23	13	110	13	366	0.28	0.14	0	0	0	0	0.00	0.00	0.00	13	110	13	315	0.28	0.14
Oct-23	39	335	39	944	0.16	0.42	0	0	0	0	0.00	0.00	0.00	39	335	39	1,004	0.16	0.42
Dec-23	20	170	20	495	0.22	0.21	0	0	0	0	0.00	0.00	0.00	20	170	20	563	0.22	0.21
Jan-24	32	277	32	761	0.18	0.35	0	0	0	0	0.00	0.00	0.00	32	277	32	743	0.18	0.35
Feb-24	3	25	3	101	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	25	3	76	0.58	0.03

A3.1.4 Wigeon

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Coun	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	6	52	6	155	0.40825	0.05	6	52	6	155	0.40825	0.05	0.04	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	6	51	6	154	0.40825	0.06	6	51	6	154	0.40825	0.06	0.05	0	0	0	0	0.00	0.00

A3.1.5 Black-tailed godwit

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	8	69	8	206	0.35355	0.07	8	69	8	206	0.35355	0.07	-0.02	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	8	68	8	205	0.35355	0.09	8	68	8	205	0.35355	0.09	-0.02	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.6 Curlew

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	0	137	16	412	0.14	0	137	16	412	0.14	0.41	0	0	0	0	0.00
Aug-22	4	43	5	111	0.04	4	43	5	111	0.04	0.11	0	0	0	0	0.00
Sep-22	0	17	2	52	0.02	0	17	2	52	0.01	0.05	0	0	0	0	0.00
Jan-23	8	69	8	215	0.07	8	69	8	215	0.07	0.22	0	0	0	0	0.00
May-23	2	17	2	52	0.02	2	17	2	52	0.02	0.05	0	0	0	0	0.00
Sep-23	0	43	5	129	0.04	0	53	5	129	0.04	0.13	0	0	0	0	0.00
Nov-23	3	26	3	105	0.03	3	26	3	105	0.03	0.11	0	0	0	0	0.00
Feb-24	2	17	2	51	0.02	2	17	2	51	0.02	0.05	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-23	2	18	2	55	0.01	2	18	2	55	0.01	0.08	0	0	0	0	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	0	136	16	409	0.17	0	136	16	409	0.17	0.12	0	0	0	0	0.00
Aug-22	4	43	5	112	0.05	4	43	5	112	0.05	0.03	0	0	0	0	0.00
Sep-22	0	17	2	51	0.02	0	17	2	51	0.02	0.02	0	0	0	0	0.00
Jan-23	8	68	8	204	0.09	8	68	8	204	0.09	0.06	0	0	0	0	0.00
Sep-23	0	42	5	128	0.05	0	42	5	128	0.05	0.04	0	0	0	0	0.00
Nov-23	3	26	3	78	0.03	3	26	3	78	0.03	0.02	0	0	0	0	0.00
Feb-24	2	17	2	51	0.02	2	17	2	51	0.02	0.02	0	0	0	0	0.00

A3.1.7 Oystercatcher

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Feb-23	2	17	2	51	0.02	2	17	2	51	0.02	0.01	0	0	0	0	0.00
Mar-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
May-23	4	35	4	95	0.04	3	26	3	69	0.03	0.02	1	9	1	26	0.01
Jul-23	1	44	5	130	0.05	1	44	5	130	0.05	0.03	0	0	0	0	0.00
Dec-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Feb-23	2	79	2	51	0.02	2	17	2	51	0.02	0.02	0	0	0	0	0.00
Mar-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
May-23	4	34	4	94	0.04	3	26	3	68	0.03	0.02	1	9	1	26	0.01
Jul-23	1	43	5	163	0.05	1	43	5	163	0.05	0.05	0	0	0	0	0.00
Dec-23	1	8	1	26	0.01	1	8	1	26	0.01	0.01	0	0	0	0	0.00

A3.1.8 Rock dove

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00

A3.1.9 Kittiwake

Month	Total Apportioned															
	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	171	94	266	0.18	19	163	94	240	0.17	0.04	1	9	1	26	0.01
Apr-22	36	312	68	989	0.33	11	95	43	156	0.10	0.03	25	217	25	833	0.23
May-22	39	335	127	618	0.35	32	275	120	472	0.29	0.09	7	60	7	146	0.06
Jun-22	30	262	31	576	0.27	7	59	7	144	0.06	0.04	23	203	24	432	0.21
Jul-22	23	241	65	515	0.25	8	78	27	146	0.08	0.03	15	163	38	369	0.17
Aug-22	2	30	3	105	0.03	1	9	1	34	0.01	0.01	1	21	2	71	0.02
Sep-22	16	138	16	378	0.14	13	112	13	318	0.12	0.08	3	26	3	60	0.03
Oct-22	83	734	455	1088	0.77	63	551	384	752	0.57	0.10	20	183	71	336	0.19
Nov-22	69	598	416	813	0.62	67	578	414	750	0.60	0.09	2	20	2	63	0.02
Dec-22	15	138	61	209	0.14	15	130	61	209	0.14	0.04	0	0	0	0	0.00
Jan-23	244	2,095	1,683	2,568	2.19	208	1,786	1,494	2,104	1.86	0.16	36	309	189	464	0.32
Feb-23	369	3,160	2,455	3,950	3.30	270	2,309	1,892	2,777	2.41	0.23	99	851	563	1,173	0.89
Mar-23	146	1,256	446	2,461	1.31	69	595	352	899	0.62	0.14	77	661	94	1,562	0.69
Apr-23	6	52	9	122	0.05	5	43	9	96	0.04	0.02	1	9	1	26	0.01
May-23	22	190	86	328	0.20	22	190	86	328	0.20	0.06		0	0	0	0.00
Jun-23	12	109	24	263	0.11	7	65	19	130	0.07	0.03	5	44	5	133	0.05
Jul-23	21	183	35	394	0.19	16	139	26	304	0.14	0.07	5	44	9	90	0.05
Aug-23	2	17	2	51	0.02	2	17	2	51	0.02	0.01	0	0	0	0	0.00
Sep-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Oct-23	21	212	83	423	0.22	15	130	69	208	0.14	0.04	6	82	14	215	0.09
Nov-23	16	141	62	238	0.15	15	131	61	209	0.14	0.04	1	10	1	29	0.01
Dec-23	14	129	61	215	0.13	14	121	60	192	0.13	0.03	0	8	1	22	0.01
Jan-24	7	67	12	147	0.07	5	44	9	87	0.05	0.02	2	23	3	60	0.02
Feb-24	284	2,470	1,664	3,521	2.58	208	1,805	1,236	2,558	1.88	0.34	76	665	428	963	0.69

Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	27	3	73	0.17	2	18	2	46	0.11	0.07	1	9	1	27	0.06
May-22	4	36	4	107	0.22	1	9	1	27	0.06	0.04	3	27	3	80	0.17
Jul-22	0	27	3	81	0.17	0	9	1	27	0.06	0.04	0	18	2	54	0.11
Aug-22	0	3	0	12	0.02	0	0	0	0	0.00	0.00	0	3	0	12	0.02
Sep-22	1	9	1	27	0.06	0	0	0	0	0.00	0.00	1	9	1	27	0.06
Oct-22	31	282	109	510	1.75	22	200	100	328	1.24	0.35	9	82	9	182	0.51
Nov-22	21	181	108	289	1.17	21	189	108	289	1.17	0.28	0	0	0	0	0.00
Dec-22	5	45	9	100	0.28	5	45	9	100	0.28	0.14	0	0	0	0	0.00
Jan-23	63	567	378	792	3.52	53	477	351	612	2.96	0.40	10	90	27	180	0.56
Feb-23	17	152	67	268	0.94	13	116	63	188	0.72	0.19	4	36	4	80	0.22
Mar-23	25	224	29	637	1.39	5	45	9	99	0.28	0.14	20	179	20	538	1.11
Apr-23	2	18	2	63	0.11	1	9	1	36	0.06	0.05	1	9	1	27	0.06
Oct-23	2	18	2	45	0.11	2	18	2	45	0.11	0.07	0	0	0	0	0.00
Nov-23	4	37	4	82	0.23	4	37	4	82	0.23	0.12	0	0	0	0	0.00
Dec-23	3	30	3	72	0.18	3	30	3	72	0.18	0.11	0	0	0	0	0.00
Jan-24	1	9	1	28	0.06	1	9	1	28	0.06	0.04	0	0	0	0	0.00
Feb-24	14	125	39	240	0.77	11	98	36	178	0.61	0.22	3	27	3	62	0.17
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	169	93	271	0.21	19	161	93	237	0.20	0.05	1	8	1	34	0.01
Apr-22	33	283	50	961	0.35	9	77	26	137	0.10	0.03	24	206	24	824	0.26
May-22	35	298	115	545	0.37	31	264	111	443	0.33	0.10	4	34	4	102	0.04
Jun-22	30	261	31	606	0.33	7	59	7	143	0.07	0.04	23	202	24	463	0.25
Jul-22	23	213	62	434	0.27	8	68	26	119	0.09	0.03	15	145	36	315	0.18

Aug-22	2	27	3	78	0.03	1	9	1	26	0.01	0.01	1	18	2	52	0.02
Sep-22	15	128	15	316	0.16	13	111	13	273	0.14	0.08	2	17	2	43	0.02
Oct-22	52	457	261	705	0.57	41	355	234	494	0.45	0.08	11	102	27	211	0.13
Nov-22	48	412	267	617	0.52	46	393	265	538	0.49	0.09	2	19	2	60	0.02
Dec-22	10	86	34	138	0.11	10	86	34	138	0.11	0.03	0	0	0	0	0.00
Jan-23	181	1,540	1,166	1,948	1.93	155	1,319	1,038	1,616	1.65	0.18	26	221	128	332	0.28
Feb-23	352	2,986	2,348	3,734	3.74	257	2,177	1,807	2,573	2.73	0.24	95	809	541	1,161	1.01
Mar-23	121	1,032	363	2,152	1.29	64	547	306	850	0.69	0.17	57	485	57	1,302	0.61
Apr-23	4	34	4	78	0.04	4	34	4	78	0.04	0.02	0	0	0	0	0.00
May-23	22	188	68	324	0.24	22	188	68	324	0.24	0.08	0	0	0	0	0.00
Jun-23	12	108	24	261	0.14	7	64	19	129	0.08	0.03	5	44	5	132	0.06
Jul-23	21	181	35	407	0.23	16	137	26	309	0.17	0.09	5	44	9	98	0.06
Aug-23	2	17	2	42	0.02	2	17	2	42	0.02	0.01	0	0	0	0	0.00
Sep-23	1	8	1	26	0.01	1	8	1	26	0.01	0.01	0	0	0	0	0.00
Oct-23	19	192	65	385	0.24	13	112	51	180	0.14	0.04	6	80	14	205	0.10
Nov-23	12	105	44	177	0.13	11	95	43	147	0.12	0.03	1	10	1	30	0.01
Dec-23	11	101	35	175	0.13	11	94	34	153	0.12	0.04	0	7	1	22	0.01
Jan-24	6	58	12	128	0.07	4	35	9	69	0.04	0.02	2	23	3	59	0.03
Feb-24	270	2,330	1,548	3,340	2.92	197	1,696	1,149	2,402	2.13	0.39	73	634	399	938	0.80

A3.1.10 Common gull

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	26	3	61	0.03	3	26	3	61	0.03	0.02	0	0	0	0	0.00
May-22	4	34	9	69	0.04	4	34	9	69	0.04	0.02	0	0	0	0	0.00
Jun-22	1	8	1	25	0.01	1	8	1	25	0.01	0.01	0	0	0	0	0.00
Aug-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Oct-22	4	35	4	87	0.04	4	35	4	87	0.04	0.02	0	0	0	0	0.00
Nov-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Dec-22	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
Feb-23	3	26	3	61	0.03	3	26	3	60	0.03	0.01	0	0	0	0	0.00
Apr-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
May-23	3	26	3	78	0.03	3	26	3	78	0.03	0.02	0	0	0	0	0.00
Jun-23	37	342	38	822	0.36	34	315	35	751	0.33	0.19	3	27	3	71	0..03
Aug-23	1	11	1	40	0.01	0	0	0	0	0.05	0.00	1	11	1	40	0.01
Oct-23	7	66	19	131	0.07	6	52	17	95	0.06	0.02	1	14	2	36	0.01
Nov-23	7	61	17	113	0.06	7	61	17	113	0.04	0.03	0	0	0	0	0.00
Dec-23	4	36	9	74	0.04	4	34	9	70	0.02	0.02	0	1	0	4	<0.01
Jan-24	3	29	3	80	0.03	2	17	2	44	0.01	0.01	1	12	1	36	0.01
Feb-24	1	9	1	27	0.01	1	9	1	27	0.05	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Nov-23	1	9	1	27	0.06	1	9	1	27	0.06	0.04	0	0	0	0	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				

	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	3	26	3	69	0.03	3	26	3	69	0.03	0.02	0	0	0	0	0.00
May-22	4	34	9	68	0.04	4	34	9	68	0.04	0.02	0	0	0	0	0.00
Jun-22	1	8	1	25	0.01	1	8	1	25	0.01	0.01	0	0	0	0	0.00
Aug-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Oct-22	4	35	4	87	0.04	4	35	4	87	0.04	0.03	0	0	0	0	0.00
Nov-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Dec-22	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
Feb-23	3	25	3	60	0.03	3	25	3	59	0.03	0.02	0	0	0	0	0.00
Apr-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
May-23	3	26	3	68	0.03	3	26	3	68	0.03	0.02	0	0	0	0	0.00
Jun-23	37	338	38	822	0.42	34	312	35	752	0.39	0.22	3	26	3	70	0.03
Aug-23	1	9	1	30	0.01	0	0	0	0	0.00	0.00	1	9	1	30	0.01
Oct-23	7	65	19	130	0.08	6	51	17	94	0.06	0.02	1	14	2	36	0.02
Nov-23	6	52	17	95	0.07	6	52	17	95	0.07	0.02	0	0	0	0	0.00
Dec-23	4	35	9	72	0.04	4	34	9	68	0.04	0.02	0	1	0	4	<0.01
Jan-24	3	29	3	79	0.04	2	17	2	43	0.02	0.01	1	12	1	36	0.02
Feb-24	1	8	1	26	0.01	1	8	1	26	0.01	0.01	0	0	0	0	0.00

A3.1.11 Black-headed gull

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Jun-23	4	37	4	102	0.04	4	37	4	102	0.04	0.03	0	0	0	0	0.00
Oct-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Oct-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Jun-23	4	37	4	110	0.05	4	37	4	110	0.05	0.03	0	0	0	0	0.00
Oct-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00

A3.1.12 Great black-backed gull

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	3	32	4	93	0.03	1	9	1	34	0.01	0.01	2	23	3	59	0.02
Apr-22	6	52	6	147	0.05	0	0	0	0	0.00	0.00	6	52	6	147	0.05
Jun-22	2	16	2	50	0.02	1	8	1	25	0.01	0.01	1	8	1	25	0.01
Jul-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Sep-22	2	18	2	60	0.02	1	9	1	26	0.01	0.01	1	9	1	34	0.01
Oct-22	6	58	12	128	0.06	2	22	2	53	0.02	0.01	4	37	9	75	0.04
Nov-22	18	175	64	316	0.18	5	43	9	86	0.04	0.02	13	132	55	230	0.14
Dec-22	11	95	26	192	0.10	6	52	17	96	0.05	0.02	5	43	9	96	0.05
Jan-23	12	116	31	227	0.12	9	77	26	137	0.08	0.03	3	39	5	90	0.04
Feb-23	15	129	15	310	0.13	9	77	9	179	0.08	0.04	6	52	6	131	0.05
Mar-23	1	9	1	34	0.01	1	9	1	34	0.01	0.01	0	0	0	0	0.00
Apr-23	8	69	31	174	0.07	2	17	2	43	0.02	0.01	3	26	3	61	0.03
May-23	4	35	4	95	0.04	2	17	2	43	0.02	0.01	2	17	2	52	0.02
Jun-23	4	35	4	80	0.04	3	27	3	53	0.03	0.01	1	9	1	27	0.01
Jul-23	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
Sep-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Oct-23	7	66	11	143	0.07	1	9	1	26	0.01	0.01	6	57	10	117	0.06
Nov-23	11	110	22	224	0.11	3	26	3	61	0.03	0.02	8	84	19	163	0.09
Dec-23	8	73	19	148	0.08	6	53	17	97	0.05	0.02	2	20	2	52	0.02
Jan-24	6	52	10	131	0.06	5	44	9	105	0.05	0.03	1	9	1	26	0.01
Feb-24	6	51	6	130	0.05	3	26	3	62	0.03	0.02	3	26	3	68	0.03
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})

Oct-22	1	9	1	27	0.06	0	0	0	0	0.00	0.00	1	9	1	27	0.06
Nov-22	3	33	4	89	0.20	1	9	1	27	0.06	0.04	2	24	3	62	0.15
Oct-23	1	9	1	27	0.06	0	0	0	0	0.00	0.00	1	9	1	27	0.06
Nov-23	2	18	2	46	0.11	0	0	0	0	0.00	0.00	2	18	2	46	0.11
Dec-23	2	19	2	58	0.12	1	10	1	31	0.06	0.05	1	9	1	27	0.06

Month	c) 10 km Buffer														
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	3	30	4	83	0.04	1	8	1	25	0.01	0.01	2	22	3	58	0.03
Apr-22	6	52	6	146	0.07	0	0	0	0	0.00	0.00	6	52	6	146	0.07
Jun-22	2	16	2	59	0.02	1	8	1	34	0.01	0.01	1	8	1	25	0.01
Jul-22	1	9	1	26	0.01	1	9	1	28	0.01	0.01	0	0	0	0	0.00
Sep-22	2	18	2	52	0.02	1	8	1	26	0.01	0.01	1	9	1	26	0.01
Oct-22	5	48	6	120	0.06	2	21	2	52	0.03	0.02	3	28	3	67	0.04
Nov-22	15	141	45	259	0.18	4	34	9	68	0.04	0.02	11	107	36	191	0.13
Dec-22	11	95	26	190	0.12	6	52	17	95	0.07	0.02	5	43	9	95	0.05
Jan-23	12	115	39	218	0.14	9	77	34	128	0.10	0.03	3	38	5	90	0.05
Feb-23	15	127	15	306	0.16	9	76	9	186	0.10	0.06	6	51	6	120	0.06
Mar-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Apr-23	8	69	31	172	0.09	2	17	2	43	0.02	0.01	3	26	3	60	0.03
May-23	4	34	4	94	0.04	2	17	2	43	0.02	0.01	2	17	2	51	0.02
Jun-23	4	35	4	87	0.04	3	26	3	61	0.03	0.02	1	9	1	26	0.01
Jul-23	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
Sep-23	1	8	1	26	0.01	0	0	0	0	0.00	0.00	1	8	1	26	0.01
Oct-23	6	57	11	132	0.07	1	9	1	26	0.01	0.01	5	48	10	106	0.06
Nov-23	9	91	14	197	0.11	3	26	3	61	0.03	0.02	6	65	11	136	0.08
Dec-23	6	53	10	118	0.07	5	43	9	85	0.05	0.02	1	10	1	33	0.01
Jan-24	6	52	10	121	0.07	5	43	9	95	0.05	0.03	1	9	1	26	0.01
Feb-24	6	51	6	129	0.06	3	25	3	61	0.03	0.02	3	25	3	68	0.03

A3.1.13 Herring gull

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	21	2	62	0.02	1	9	1	26	0.01	0.01	1	12	1	36	0.01
Apr-22	10	87	10	217	0.09	3	26	3	61	0.03	0.02	7	61	7	156	0.06
May-22	4	34	4	86	0.04	3	26	3	60	0.03	0.01	1	9	1	26	0.01
Jun-22	5	42	9	93	0.04	4	34	8	68	0.04	0.02	1	8	1	25	0.01
Jul-22	16	137	16	352	0.14	4	34	4	77	0.04	0.02	12	103	12	275	0.11
Aug-22	2	23	3	58	0.02	0	0	0	0	0.00	0.00	2	23	3	58	0.02
Sep-22	9	77	11	189	0.08	2	17	2	43	0.02	0.01	7	60	9	146	0.06
Oct-22	3	31	4	96	0.03	3	31	4	96	0.03	0.02	0	0	0	0	0.00
Nov-22	4	34	9	78	0.04	4	34	9	78	0.04	0.02	0	0	0	0	0.00
Jan-23	4	39	5	99	0.04	3	26	3	60	0.03	0.01	1	13	2	39	0.01
Feb-23	3	26	3	78	0.03	1	9	1	34	0.01	0.01	2	17	2	44	0.02
Mar-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	0	0	0	0	0.00
Apr-23	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
May-23	3	26	3	69	0.03	2	17	2	43	0.02	0.01	1	9	1	26	0.01
Jun-23	2	18	2	54	0.02	1	9	1	27	0.01	0.01	1	9	1	27	0.01
Jul-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Aug-23	3	31	4	81	0.03	0	0	0	0	0.00	0.00	3	31	4	81	0.03
Sep-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Oct-23	10	90	14	220	0.09	5	43	9	95	0.04	0.02	5	47	5	125	0.05
Nov-23	7	64	11	183	0.07	5	44	9	96	0.05	0.02	2	20	2	87	0.02
Dec-23	2	20	2	58	0.02	1	9	1	26	0.01	0.01	1	11	1	31	0.01
Jan-24	3	26	3	70	0.03	1	9	1	26	0.01	0.01	2	17	2	44	0.02
Feb-24	4	34	4	96	0.04	3	26	3	62	0.03	0.02	1	9	1	34	0.01
Month	b) Spiorad na Mara Array Area															

	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Aug-22	0	6	1	15	0.04	0	0	0	0	0.00	0.00	0	6	1	15	0.04
Nov-23	3	27	3	82	0.17	3	27	3	82	0.17	0.12	0	0	0	0	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	19	2	59	0.02	1	8	1	25	0.01	0.01	1	11	1	34	0.01
Apr-22	10	86	10	215	0.11	3	26	3	60	0.03	0.02	7	60	7	155	0.08
May-22	4	34	4	86	0.04	3	26	3	60	0.03	0.02	1	9	1	26	0.01
Jun-22	5	42	9	92	0.05	4	34	8	67	0.04	0.02	1	8	1	25	0.01
Jul-22	16	136	16	350	0.17	4	34	4	77	0.04	0.02	12	102	12	273	0.13
Aug-22	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Sep-22	9	77	11	179	0.10	2	17	2	43	0.02	0.01	7	60	9	136	0.08
Oct-22	3	31	4	95	0.04	3	31	4	95	0.04	0.03	0	0	0	0	0.00
Nov-22	4	34	5	68	0.04	4	34	4	68	0.04	0.02	0	0	0	0	0.00
Jan-23	4	39	5	99	0.05	3	25	3	60	0.03	0.02	1	14	2	39	0.02
Feb-23	3	25	3	68	0.03	1	8	1	25	0.01	0.01	2	17	2	43	0.02
Mar-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	0	0	0	0	0.00
Apr-23	2	17	2	43	0.02	2	17	2	43	0.02	0.01	0	0	0	0	0.00
May-23	3	26	3	69	0.03	2	17	2	43	0.02	0.01	1	9	1	26	0.01
Jun-23	2	18	2	61	0.02	1	9	1	35	0.01	0.01	1	9	1	26	0.01
Jul-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Aug-23	3	29	4	81	0.04	0	0	0	0	0.00	0.00	3	29	4	81	0.04
Sep-23	1	8	1	26	0.01	0	0	0	0	0.00	0.00	1	8	1	26	0.01
Oct-23	10	91	14	211	0.11	5	43	9	94	0.05	0.03	5	48	5	117	0.06
Nov-23	4	38	4	111	0.05	2	17	2	43	0.02	0.01	2	21	2	68	0.03
Dec-23	2	18	2	59	0.02	1	8	1	26	0.01	0.01	1	10	1	33	0.01
Jan-24	3	26	3	69	0.03	1	9	1	26	0.01	0.01	2	17	2	43	0.02

Feb-24	4	34	4	86	0.04	3	25	3	61	0.03	0.02	1	8	1	25	0.01

A3.1.14 Lesser black-backed gull

Total Apportioned																			
Month	a) Survey Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	1	8	1	25	<1.00	0.01	0.01	0	0	0	00	0.00	0.00
Aug-22	1	7	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jun-22	1	8	1	25	<1.00	0.01	1	8	1	25	<1.00	0.01	0.01	0	0	0	00	0.00	0.00
Aug-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.15 Arctic tern

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	46	395	112	807	0.41	46	395	112	807	0.41	0.18	0	0	0	0	0.00
Jun-22	4	40	5	95	0.04	4	40	5	95	0.04	0.02	0	0	0	0	0.00
Jul-22	144	1,237	618	2,053	1.29	144	1,236	618	2,053	1.29	0.37	0	0	0	0	0.00
May-23	5	43	9	95	0.04	5	43	9	95	0.04	0.02	0	0	0	0	0.00
Jun-23	50	442	203	725	0.46	50	442	203	725	0.46	0.14	0	0	0	0	0.00
Jul-23	114	989	599	1,501	1.03	114	989	564	1,501	1.03	0.24	0	0	0	0	0.00
Aug-23	25	214	60	394	0.22	25	214	60	394	0.22	0.09	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	23	205	23	588	1.27	23	205	23	588	1.27	0.88	0	0	0	0.00	0.00
Jun-22	2	18	2	53	0.11	2	18	2	53	0.11	0.08	0	0	0	0.00	0.00
Jul-22	31	277	45	624	1.72	31	277	45	624	1.72	0.90	0	0	0	0.00	0.00
Jul-23	3	27	3	64	0.17	3	27	3	64	0.17	0.09	0	0	0	0.00	0.00
Aug-23	1	9	1	27	0.06	1	9	1	27	0.06	0.04	0	0	0	0.00	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	23	196	77	349	0.25	23	196	77	349	0.25	0.09	0	0	0	0	0.00
Jun-22	2	22	3	58	0.03	2	22	3	58	0.03	0.02	0	0	0	0	0.00
Jul-22	113	963	375	1,825	1.21	113	963	375	1,825	1.21	0.45	0	0	0	0	0.00
May-23	5	43	5	94	0.05	5	43	5	94	0.05	0.03	0	0	0	0	0.00
Jun-23	50	438	210	710	0.55	50	438	210	710	0.55	0.16	0	0	0	0	0.00

Jul-23	111	953	532	1,485	1.20	111	953	532	1,485	1.20	0.30	0	0	0	0	0.00
Aug-23	24	204	59	407	0.26	24	204	59	407	0.26	0.11	0	0	0	0	0.00

A3.1.16 Common tern

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	5	43	5	112	0.04	5	43	5	112	0.04	0.03	0	0	0	0	0.00
Jun-22	1	10	1	31	0.01	1	10	1	31	0.01	0.01	0	0	0	0	0.00
Jun-23	2	18	2	53	0.02	2	18	2	53	0.02	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
May-22	5	43	5	102	0.05	5	43	5	102	0.05	0.03	0	0	0	0	0.00
Jun-22	1	11	1	34	0.01	1	11	1	34	0.01	0.01	0	0	0	0	0.00
Jun-23	2	18	2	53	0.02	2	18	2	53	0.02	0.01	0	0	0	0	0.00

A3.1.17 'Commic' tern

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
May-22	7	60	9	129	0.38	0.06	7	60	9	129	0.38	0.06	0.03	0	0	0	0	0.00	0.00
Jun-22	10	85	17	178	0.32	0.09	10	85	17	178	0.31623	0.09	0.04	0	0	0	0	0.00	0.00
Jul-22	33	283	120	481	0.17	0.30	29	249	103	446	0.18	0.26	0.09	4	34	4	77	0.50	0.04
Aug-22	2	17	2	69	0.71	0.02	2	17	2	52	0.70711	0.02	0.01	0	0	0	0	0.00	0.00
Sep-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Jun-23	20	177	20	416	0.22	0.18	15	133	15	345	0.26	0.14	0.09	5	44	5	133	0.45	0.05
Jul-23	21	182	87	321	0.22	0.19	21	182	87	321	0.22	0.19	0.06	0	0	0	0	0.00	0.00
Aug-23	8	69	17	146	0.35	0.07	8	69	17	146	0.35	0.07	0.03	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	8	71	8	178	0.35	0.44	5	45	5	107	0.45	0.28	0.16	3	27	3	71	0.58	0.17
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
May-22	7	60	9	128	0.38	0.08	7	60	9	128	0.38	0.08	0.04	0	0	0	0	0.00	0.00
Jun-22	10	84	17	177	0.32	0.11	10	84	17	177	0.31623	0.11	0.00	0	0	0	0	0.00	0.00
Jul-22	25	213	60	401	0.20	0.27	24	205	68	392	0.20	0.26	0.10	1	9	1	26	<1.00	0.01
Aug-22	2	17	2	51	0.71	0.02	2	17	2	51	0.70711	0.02	0.02	0	0	0	0	0.00	0.00
Sep-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Jun-23	20	175	20	403	0.22	0.22	15	132	15	351	0.26	0.17	0.11	5	44	5	132	0.45	0.06

Jul-23	21	180	69	309	0.22	0.23	21	180	77	318	0.22	0.23	0.08	0	0	0	0	0.00	0.00
Aug-23	8	68	8	144	0.35	0.09	8	68	17	144	0.35	0.09	0.04	0	0	0	0	0.00	0.00

A3.1.18 Great skua

Total Unapportioned																			
Month	a) Survey Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-22	3	26	3	69	0.58	0.03	3	26	3	69	0.58	0.03	0.02	0	0	0	0	0.00	0.00
Aug-22	1	9	1	34	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Oct-22	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00	0.00	1	9	1	26	<1.00	0.01
Month	b) Spiorad na Mara Array Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Oct-22	1	9	1	27	<1.00	0.06	0	0	0	0	0.00	0.00	0.00	1	9	1	27	<1.00	0.06
Month	c) 10 km Buffer																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-22	3	26	3	69	0.58	0.03	3	26	3	69	0.58	0.03	0.02	0	0	0	0	0.00	0.00
Aug-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.19 Arctic skua

Total Unapportioned																			
Month	a) Survey Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-23	1	8	1	26	<1.00	0.01	1	8	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.20 Guillemot

Total corrected Apportioned																				
Month	a) Survey Area																			
	All Behaviours					Flying						Sitting					Diving				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	292	4,424	3,351	5,642	4.61	24	261	127	422	0.27	0.08	268	4,163	3,224	5,220	4.34	0	0	0	0	0.00
Apr-22	294	4,108	2,597	6,020	4.29	23	294	122	510	0.31	0.10	271	3,815	2,475	5,510	3.98	0	0	0	0	0.00
May-22	181	2,041	1,429	2,767	2.13	6	52	9	112	0.05	0.03	175	1,989	1,420	2,655	2.07	0	0	0	0	0.00
Jun-22	111	1,309	484	2,345	1.37	17	151	18	353	0.16	0.09	94	1,158	466	1,992	1.21	0	0	0	0	0.00
Jul-22	188	2,655	1,336	4,526	2.77	29	309	110	601	0.32	0.13	159	2,347	1,226	3,925	2.45	0	0	0	0	0.00
Aug-22	29	716	403	1,093	0.75	2	17	2	43	0.02	0.01	27	699	401	1,050	0.73	0	0	0	0	0.00
Sep-22	603	11,159	9,319	13,106	11.64	6	74	12	160	0.08	0.04	597	11,079	9,306	12,928	11.56	0	7	1	18	0.01
Oct-22	110	1,441	936	2,012	1.50	21	183	79	323	0.19	0.06	89	1,258	857	1,689	1.31	0	0	0	0	0.00
Nov-22	17	234	67	436	0.25	5	43	5	86	0.04	0.02	12	191	62	350	0.20	0	0	0	0	0.00
Dec-22	36	484	264	752	0.50	1	9	1	35	0.01	0.01	35	475	263	717	0.50	0	0	0	0	0.00
Jan-23	87	1,408	941	1,935	1.47	2	28	3	66	0.03	0.02	85	1,380	938	1,869	1.44	0	0	0	0	0.00
Feb-23	140	1,837	1,386	2,371	1.92	4	34	4	85	0.04	0.02	136	1,803	1,382	2,286	1.88	0	0	0	0	0.00
Mar-23	274	3,196	2,557	3,931	3.33	2	17	2	43	0.02	0.01	272	3,179	2,555	3,888	3.32	0	0	0	0	0.00
Apr-23	148	1,864	1,302	2,475	1.94	23	234	108	380	0.24	0.07	125	1,630	1,194	2,096	1.70	0	0	0	0	0.00
May-23	81	1,079	558	1,779	1.13	29	258	113	472	0.27	0.09	52	821	445	1,308	0.86	0	0	0	0	0.00
Jun-23	116	1,510	751	2,569	1.58	10	100	11	260	0.10	0.06	106	1,410	740	2,309	1.47	0	0	0	0	0.00
Jul-23	94	1,315	684	2,124	1.37	50	534	213	989	0.56	0.20	44	781	471	1,135	0.81	0	0	0	0	0.00
Aug-23	345	4,215	3,387	5,088	4.40	0	9	1	26	0.01	0.01	345	4,206	3,386	5,062	4.39	0	0	0	0	0.00
Sep-23	640	7,966	6,616	9,516	8.31	2	26	3	65	0.03	0.02	638	7,941	6,613	9,451	8.28	0	0	0	0	0.00
Oct-23	29	522	317	775	0.54	2	23	3	59	0.02	0.01	27	499	314	716	0.52	0	0	0	0	0.00
Nov-23	27	339	169	559	0.35	4	35	4	87	0.04	0.02	23	304	165	472	0.32	0	0	0	0	0.00
Dec-23	30	543	311	824	0.57	4	43	10	95	0.04	0.02	26	500	301	729	0.52	0	0	0	0	0.00

Jan-24	110	1,918	1,434	2,470	2.00	1	9	1	26	0.01	0.01	109	1,909	1,433	2,444	1.99	0	0	0	0	0.00
Feb-24	106	1,858	1,422	2,348	1.94	1	9	1	26	0.01	0.01	105	1,849	1,421	2,322	1.93	0	0	0	0	0.00

Month	b) Spiorad na Mara Array Area																			
	All Behaviours					Flying						Sitting					Diving			
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	45	822	423	1,334	5.09	10	136	45	255	0.84	0.33	35	686	378	1,079	4.25	0	0	0	0	0.00
Apr-22	9	190	37	410	1.18	3	34	4	102	0.21	0.15	6	156	34	308	0.97	0	0	0	0	0.00
May-22	13	152	59	269	0.94	0	0	0	0	0.00	0.00	13	152	59	269	0.94	0	0	0	0	0.00
Jun-22	1	12	1	34	0.07	0	0	0	0	0.00	0.00	1	12	1	34	0.07	0	0	0	0	0.00
Jul-22	16	244	38	600	1.51	7	113	12	336	0.70	0.50	9	131	26	264	0.81	0	0	0	0	0.00
Aug-22	0	35	4	80	0.22	0	0	0	0	0.00	0.00	0	35	4	80	0.22	0	0	0	0	0.00
Sep-22	136	2,622	1,842	3,512	16.26	0	14	2	35	0.08	0.05	136	2,609	1,841	3,477	16.17	0	0	0	0	0.00
Oct-22	16	214	73	396	1.33	4	36	9	73	0.22	0.10	12	178	64	323	1.11	0	0	0	0	0.00
Nov-22	3	27	3	72	0.17	3	27	3	72	0.17	0.11	0	0	0	0	0.00	0	0	0	0	0.00
Dec-22	3	47	5	108	0.29	0	0	0	0	0.00	0.00	3	47	5	108	0.29	0	0	0	0	0.00
Jan-23	10	118	35	224	0.73	0	0	0	0	0.00	0.00	10	118	35	224	0.73	0	0	0	0	0.00
Feb-23	8	120	39	227	0.74	0	0	0	0	0.00	0.00	8	120	39	227	0.74	0	0	0	0	0.00
Mar-23	27	326	179	519	2.02	1	9	1	27	0.06	0.04	26	317	178	492	1.96	0	0	0	0	0.00
Apr-23	16	218	61	457	1.35	5	54	10	125	0.34	0.18	11	163	51	332	1.01	0	0	0	0	0.00
May-23	8	134	20	316	0.83	3	37	4	111	0.23	0.17	5	97	16	205	0.60	0	0	0	0	0.00
Jun-23	7	85	24	157	0.53	0	0	0	0	0.00	0.00	7	85	24	157	0.53	0	0	0	0	0.00
Jul-23	11	149	31	326	0.92	4	40	4	90	0.25	0.13	7	109	27	236	0.68	0	0	0	0	0.00
Aug-23	29	355	190	549	2.20	0	0	0	0	0.00	0.00	29	355	190	549	2.20	0	0	0	0	0.00
Sep-23	62	816	434	1,296	5.06	0	0	0	0	0.00	0.00	62	816	434	1,296	5.06	0	0	0	0	0.00
Oct-23	2	61	6	142	0.38	0	0	0	0	0.00	0.00	2	61	6	142	0.38	0	0	0	0	0.00
Nov-23	1	12	1	35	0.07	0	0	0	0	0.00	0.00	1	12	1	35	0.07	0	0	0	0	0.00
Dec-23	2	42	5	125	0.26	1	18	2	54	0.11	0.08	1	24	3	71	0.15	0	0	0	0	0.00

Jan-24	11	174	53	328	1.08	0	0	0	0	0.00	0.00	11	174	53	328	1.08	0	0	0	0	0.00
Feb-24	9	139	45	261	0.86	0	0	0	0	0.00	0.00	9	139	45	261	0.86	0	0	0	0	0.00

Month	c) 10 km Buffer																				
	All Behaviours					Flying						Sitting					Diving				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	247	3,568	2,599	4,619	4.47	14	137	45	254	0.17	0.07	233	3,431	2,555	4,365	4.30	0	0	0	0	0.00
Apr-22	285	3,921	2,424	5,829	4.92	20	258	102	443	0.32	0.11	265	3,663	2,321	5,386	4.59	0	0	0	0	0.00
May-22	168	1,880	1,317	2,575	2.36	6	51	9	119	0.06	0.03	162	1,829	1,308	2,456	2.29	0	0	0	0	0.00
Jun-22	110	1,289	482	2,420	1.62	17	150	18	376	0.19	0.11	93	1,139	464	2,044	1.43	0	0	0	0	0.00
Jul-22	172	2,410	1,190	4,240	3.02	22	200	69	369	0.25	0.09	150	2,210	1,121	3,870	2.77	0	0	0	0	0.00
Aug-22	29	378	366	1,052	0.85	2	17	2	43	0.02	0.01	27	661	364	1,009	0.83	0	0	0	0	0.00
Sep-22	467	8,559	7,021	10,273	10.73	6	60	10	126	0.08	0.04	461	8,492	7,010	10,129	10.65	0	7	1	18	0..01
Oct-22	94	1,227	767	1,781	1.54	17	147	52	277	0.18	0.07	77	1,080	715	1,504	1.35	0	0	0	0	0.00
Nov-22	14	208	64	376	0.26	2	17	2	43	0.02	0.01	12	191	62	333	0.24	0	0	0	0	0.00
Dec-22	33	435	239	669	0.55	1	9	1	26	0.01	0.01	32	426	238	643	0.53	0	0	0	0	0.00
Jan-23	77	1,276	853	1,723	1.60	2	28	3	63	0.04	0.02	75	1,248	850	1,660	1.57	0	0	0	0	0.00
Feb-23	132	1,706	1,256	2,195	2.14	4	34	4	84	0.04	0.03	128	1,672	1,252	2,111	2.10	0	0	0	0	0.00
Mar-23	247	2,861	2,266	3,569	3.59	1	9	1	26	0.01	0.01	246	2,852	2,265	3,543	3.58	0	0	0	0	0.00
Apr-23	132	1,642	1,140	2,228	2.06	18	180	81	311	0.23	0.07	114	1,463	1,059	1,917	1.83	0	0	0	0	0.00
May-23	73	947	435	1,599	1.19	26	222	77	393	0.28	0.10	47	725	358	1,206	0.91	0	0	0	0	0.00
Jun-23	109	1,411	677	2,476	1.77	10	96	11	242	0.12	0.07	99	1,315	666	2,233	1.65	0	0	0	0	0.00
Jul-23	83	1,162	572	1,955	1.46	46	491	183	941	0.62	0.24	37	671	389	1,014	0.84	0	0	0	0	0.00
Aug-23	316	3,840	3,060	4,675	4.82	0	8	1	25	0.01	0.01	316	3,832	3,059	4,650	4.81	0	0	0	0	0.00
Sep-23	578	7,126	5,721	8,644	8.94	2	26	3	65	0.03	0.02	576	7,100	5,718	8,579	8.90	0	0	0	0	0.00
Oct-23	27	455	261	700	0.57	2	23	3	59	0.03	0.02	25	432	259	641	0.54	0	0	0	0	0.00
Nov-23	26	324	156	533	0.41	4	35	4	86	0.04	0.03	22	289	152	447	0.36	0	0	0	0	0.00
Dec-23	28	499	272	774	0.63	3	26	3	60	0.03	0.02	25	473	269	714	0.59	0	0	0	0	0.00

Jan-24	99	1,729	1,261	2,191	2.17	1	9	1	26	0.01	0.01	98	1,720	1,260	2,165	2.16	0	0	0	0	0.00
Feb-24	97	1,731	1,299	2,221	2.17	1	8	1	25	0.01	0.01	96	1,723	1,298	2,196	2.16	0	0	0	0	0.00

A3.1.21 Razorbill

Total corrected Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	228	3,251	1,839	5,179	3.39	6	65	11	144	0.07	0.03	222	3,186	1,828	5,035	3.32
Apr-22	389	5,056	3,026	7,887	5.27	6	76	8	182	0.08	0.05	383	4,979	3,018	7,705	5.19
May-22	17	179	73	308	0.19	0	0	0	0	0.00	0.00	17	179	73	308	0.19
Jun-22	44	500	124	1,011	0.52	0	0	0	0	0.00	0.00	44	500	124	1,011	0.52
Jul-22	101	1,374	632	2,573	1.43	1	11	1	36	0.01	0.01	100	1,363	631	2,538	1.42
Aug-22	6	145	28	294	0.15	0	0	0	0	0.00	0.00	6	145	28	294	0.15
Sep-22	103	1,755	1,252	2,296	1.83	2	24	3	81	0.03	0.02	101	1,731	1,249	2,215	1.81
Nov-22	5	73	15	146	0.08	0	0	0	0	0.00	0.00	5	73	15	146	0.08
Jan-23	16	237	48	537	0.25	4	57	7	157	0.06	0.04	12	180	42	380	0.19
Feb-23	38	454	224	768	0.47	3	26	3	77	0.03	0.02	35	428	221	691	0.45
Mar-23	31	335	200	507	0.35	0	0	0	0	0.00	0.00	31	335	200	507	0.35
Apr-23	14	167	57	322	0.17	1	11	1	32	0.01	0.01	13	157	56	289	0.16
May-23	26	380	132	744	0.40	0	0	0	0	0.00	0.00	26	380	132	744	0.40
Jun-23	20	241	83	456	0.25	2	20	2	52	0.02	0.01	18	221	81	404	0.23
Jul-23	2	32	3	85	0.03	0	0	0	0	0.00	0.00	2	32	3	85	0.03
Aug-23	393	4,425	3,370	5,646	4.62	0	0	0	0	0.00	0.00	393	4,425	3370	5646	4.62
Sep-23	188	2,165	1,621	2,834	2.26	2	26	3	65	0.03	0.02	186	2,139	1618	2,770	2.23
Oct-23	10	170	69	295	0.18	0	0	0	0	0.00	0.00	10	170	69	295	0.18
Nov-23	4	45	5	118	0.05	1	9	1	26	0.01	0.01	3	36	4	92	0.04
Dec-23	4	70	17	150	0.07	0	0	0	0	0.00	0.00	4	70	17	150	0.07
Jan-24	47	753	427	1,114	0.79	1	9	1	26	0.01	0.01	46	744	426	1,088	0.78
Feb-24	80	1,278	784	1,876	1.33	3	26	3	68	0.03	0.02	77	1,252	781	1,808	1.31
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				

	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	52	940	487	1,458	5.83	0	0	0	0	0.00	0.00	52	940	487	1,458	5.83
May-22	3	33	4	86	0.20	0	0	0	0	0.00	0.00	3	33	4	86	0.20
Jul-22	1	14	1	53	0.08	0	0	0	0	0.00	0.00	1	14	1	43	0.08
Aug-22	0	7	0	22	0.04	0	0	0	0	0.00	0.00	0	7	0	22	0.04
Sep-22	20	359	157	621	2.23	0	4	0	18	0.03	0.03	20	355	156	603	2.20
Feb-23	3	42	4	106	0.26	0	0	0	0	0.00	0.00	3	42	4	106	0.26
Mar-23	1	11	1	35	0.07	0	0	0	0	0.00	0.00	1	11	1	35	0.07
Apr-23	1	11	1	45	0.07	1	11	1	45	0.07	0.07	0	0	0	0	0.00
Jun-23	2	29	3	90	0.18	1	18	2	56	0.00	0.08	1	11	1	34	0.07
Jul-23	1	14	1	63	0.09	0	0	0	0	0.11	0.00	1	14	1	63	0.09
Aug-23	44	498	230	841	3.09	0	0	0	0	0.00	0.00	44	498	230	841	3.09
Sep-23	10	121	58	201	0.75	0	0	0	0	0.00	0.00	10	121	58	201	0.75
Oct-23	1	28	3	79	0.17	0	0	0	0	0.00	0.00	1	28	3	79	0.17
Jan-24	2	29	3	76	0.18	0	0	0	0	0.00	0.00	2	29	3	76	0.18
Feb-24	19	270	110	470	1.68	0	0	0	0	0.00	0.00	19	270	110	470	1.68
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	176	2,372	1,005	4,240	2.97	6	59	8	127	0.07	0.04	170	2,314	997	4,113	2.90
Apr-22	389	4,968	2,846	7,458	6.23	6	78	8	182	0.10	0.05	383	4,890	2,838	7,277	6.13
May-22	14	146	41	306	0.18	0	0	0	0	0.00	0.00	14	146	41	306	0.18
Jun-22	44	498	113	996	0.62	0	0	0	0	0.00	0.00	44	498	113	996	0.62
Jul-22	100	1,357	625	2,463	1.7	1	10	1	29	0.01	0.01	99	1,347	624	2,435	1.69
Aug-22	6	135	27	259	0.17	0	0	0	0	0.00	0.00	6	135	27	259	0.17
Sep-22	83	1,399	946	1,886	1.75	2	20	2	63	0.03	0.02	81	1,379	943	1,823	1.73
Nov-22	5	73	15	146	0.09	0	0	0	0	0.00	0.00	5	73	15	146	0.09
Jan-23	16	241	50	600	0.30	4	57	7	201	0.07	0.06	12	184	44	400	0.23
Feb-23	35	411	184	717	0.52	3	25	3	76	0.03	0.02	32	386	181	641	0.48

Mar-23	30	321	178	481	0.40	0	0	0	0	0.00	0.00	30	321	178	481	0.40
Apr-23	13	154	56	285	0.19	0	0	0	0	0.00	0.00	13	154	56	285	0.19
May-23	26	371	115	717	0.46	0	0	0	0	0.00	0.00	26	371	115	717	0.46
Jun-23	18	218	71	429	0.27	1	10	1	29	0.01	0.01	17	208	70	401	0.26
Jul-23	1	18	2	52	0.02	0	0	0	0	0.00	0.00	1	18	2	52	0.02
Aug-23	349	3,910	2,892	5,035	4.90	0	0	0	0	0.00	0.00	349	3,910	2,892	5,035	4.90
Sep-23	178	2,030	1,470	2,599	2.54	2	26	3	65	0.03	0.02	176	2,004	1,467	2,534	2.51
Oct-23	9	144	63	241	0.18	0	0	0	0	0.00	0.00	9	144	63	241	0.18
Nov-23	4	46	5	117	0.06	1	9	1	26	0.01	0.01	3	37	4	91	0.05
Dec-23	4	70	7	146	0.09	0	0	0	0	0.00	0.00	4	70	7	146	0.09
Jan-24	45	722	399	1,124	0.90	1	9	1	26	0.01	0.01	44	713	398	1,098	0.89
Feb-24	61	987	563	1,525	1.24	3	25	3	68	0.03	0.02	58	962	560	1,457	1.21

A3.1.22 Puffin

Total corrected Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	11	1	33	0.01	0	0	0	0	0.00	0.00	1	11	1	33	0.01
Apr-22	60	605	278	1,034	0.63	21	192	27	437	0.20	0.11	39	413	251	597	0.43
May-22	4	40	5	102	0.04	0	0	0	0	0.00	0.00	4	40	5	102	0.04
Jun-22	2	20	2	60	0.02	0	0	0	0	0.00	0.00	2	20	2	60	0.02
Jul-22	2,339	24,657	18,045	32,506	25.72	356	3,173	2,284	4,138	3.31	0.48	1,983	21,484	15,761	28,368	22.41
Aug-22	19	201	91	335	0.21	0	0	0	0	0.00	0.00	19	201	91	335	0.21
Sep-22	126	1,529	1,081	2,044	1.60	0	0	0	0	0.00	0.00	126	1,529	1081	2,044	1.60
Oct-22	11	119	42	209	0.12	0	0	0	0	0.00	0.00	11	119	42	209	0.12
Dec-22	10	103	41	179	0.11	0	0	0	0	0.00	0.00	10	103	41	179	0.11
Mar-23	6	60	10	133	0.06	0	0	0	0	0.00	0.00	6	60	10	133	0.06
Apr-23	63	601	267	1,021	0.63	43	391	185	657	0.41	0.12	20	210	82	364	0.22
May-23	12	124	29	247	0.13	4	36	9	72	0.04	0.02	8	88	20	175	0.09
Jun-23	74	844	472	1,331	0.88	5	46	5	153	0.05	0.04	69	798	466	1,178	0.83
Jul-23	109	1,198	696	1,781	1.25	65	581	326	880	0.61	0.14	44	617	370	901	0.64
Aug-23	253	2,553	2,044	3,149	2.66	0	0	0	0	0.00	0.00	253	2553	2044	3,149	2.66
Sep-23	95	980	748	1,205	1.02	0	0	0	0	0.00	0.00	95	980	748	1,205	1.02
Oct-23	57	597	410	812	0.62	0	0	0	0	0.00	0.00	57	597	410	812	0.62
Nov-23	11	112	51	183	0.12	0	0	0	0	0.00	0.00	11	112	51	183	0.12
Jan-24	5	55	11	101	0.06	0	0	0	0	0.00	0.00	5	55	11	101	0.06
Feb-24	4	44	11	90	0.05	0	0	0	0	0.00	0.00	4	44	11	90	0.05
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	1	10	1	31	0.07	0	0	0	0	0.00	0.00	1	10	1	31	0.07

Apr-22	3	42	4	173	0.26	0	0	0	0	0.00	0.00	3	42	4	173	0.26
Jul-22	463	4,895	2,470	7,970	30.35	125	1,218	610	1,979	7.55	2.12	338	3677	1,860	5,992	22.80
Aug-22	0	4	0	11	0.02	0	0	0	0	0.00	0.00	0	4	0	11	0.02
Sep-22	18	210	79	390	1.30	0	0	0	0	0.00	0.00	18	210	79	390	1.30
Oct-22	5	52	10	117	0.33	0	0	0	0	0.00	0.00	5	52	10	117	0.33
Apr-23	25	243	51	519	1.50	21	198	46	392	1.23	0.54	4	45	5	128	0.28
Jun-23	5	54	6	129	0.33	0	0	0	0	0.00	0.00	5	54	6	129	0.33
Jul-23	16	170	18	390	1.05	7	69	8	151	0.43	0.22	9	101	11	239	0.62
Aug-23	20	210	84	366	1.30	0	0	0	0	0.00	0.00	20	210	84	366	1.30
Sep-23	9	98	42	166	0.61	0	0	0	0	0.00	0.00	9	98	42	166	0.61
Oct-23	8	105	34	188	0.65	0	0	0	0	0.00	0.00	8	105	34	188	0.65
Nov-23	2	21	2	54	0.13	0	0	0	0	0.00	0.00	2	21	2	54	0.13
Month	**c) 10 km Buffer**															
	All Behaviours					**Flying**						**Sitting**				
	Raw Count	**Abundance estimate**	**LCL**	**UCL**	**Density (birds km^{-2})**	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Density (birds km^{-2})**	**Standard Deviation**	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Density (birds km^{-2})**
Apr-22	57	564	254	983	0.71	21	187	26	436	0.23	0.13	36	377	227	547	0.47
May-22	4	40	5	92	0.05	0	0	0	0	0.00	0.00	4	40	5	92	0.05
Jun-22	2	20	2	79	0.02	0	0	0	0	0.00	0.00	2	20	2	79	0.02
Jul-22	1,876	19,806	14,041	26,849	24.84	231	2,009	1,403	2,695	2.52	0.41	1,645	17,797	12,637	24,153	22.32
Aug-22	19	196	91	327	0.25	0	0	0	0	0.00	0.00	19	196	91	3,27	0.25
Sep-22	108	1,327	900	1,802	1.66	0	0	0	0	0.00	0.00	108	1,327	900	1,802	1.66
Oct-22	6	65	11	145	0.08	0	0	0	0	0.00	0.00	6	65	11	145	0.08
Dec-22	10	102	50	168	0.13	0	0	0	0	0.00	0.00	10	102	50	168	0.13
Mar-23	6	60	11	121	0.08	0	0	0	0	0.00	0.00	6	60	11	121	0.08
Apr-23	38	366	132	664	0.46	22	199	61	378	0.25	0.10	16	166	71	286	0.21
May-23	12	122	29	242	0.15	4	34	9	68	0.04	0.02	8	88	20	174	0.11
Jun-23	69	782	405	1,188	0.98	5	44	5	114	0.06	0.03	64	738	400	1074	0.93
Jul-23	93	1,019	553	1,564	1.28	58	510	260	816	0.64	0.17	35	509	293	748	0.64
Aug-23	233	2,331	1,838	2,903	2.92	0	0	0	0	0.00	0.00	233	2331	1,838	2903	2.92
Sep-23	86	880	660	1,124	1.10	0	0	0	0	0.00	0.00	86	880	660	1124	1.10

Oct-23	49	495	341	714	0.62	0	0	0	0	0.00	0.00	49	495	341	714	0.62
Nov-23	9	91	41	151	0.11	0	0	0	0	0.00	0.00	9	91	41	151	0.11
Jan-24	5	54	11	110	0.07	0	0	0	0	0.00	0.00	5	54	11	110	0.07
Feb-24	4	45	10	92	0.06	0	0	0	0	0.00	0.00	4	45	10	92	0.06

A3.1.1 Black guillemot

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	7	64	18	130	0.07	0	0	0	0	0.00	0.00	7	64	18	130	0.07
Apr-22	34	310	56	742	0.32	2	18	2	56	0.02	0.01	32	292	54	686	0.30
Jun-22	12	103	12	300	0.11	0	0	0	0	0.00	0.00	12	103	12	300	0.11
Jul-22	45	419	210	684	0.44	0	0	0	0	0.00	0.00	45	419	210	684	0.44
Oct-22	7	65	17	114	0.07	0	0	0	0	0.00	0.00	7	65	17	114	0.07
Nov-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Dec-22	4	36	9	73	0.04	0	0	0	0	0.00	0.00	4	36	9	73	0.04
Jan-23	3	27	3	63	0.03	0	0	0	0	0.00	0.00	3	27	3	63	0.03
Feb-23	3	27	3	64	0.03	0	0	0	0	0.00	0.00	3	27	3	64	0.03
Mar-23	14	121	60	200	0.13	0	0	0	0	0.00	0.00	14	121	60	200	0.13
Apr-23	5	45	9	92	0.05	0	0	0	0	0.00	0.00	5	45	9	92	0.05
May-23	14	133	36	269	0.14	0	0	0	0	0.00	0.00	14	133	36	269	0.14
Jun-23	1	10	1	31	0.01	0	0	0	0	0.00	0.00	1	10	1	31	0.01
Jul-23	2	22	2	63	0.02	1	9	1	27	0.01	0.01	1	12	1	36	0.01
Aug-23	5	43	9	88	0.05	0	0	0	0	0.00	0.00	5	43	9	88	0.05
Sep-23	8	71	17	143	0.07	0	0	0	0	0.00	0.00	8	71	17	143	0.07
Oct-23	10	89	36	165	0.09	0	0	0	0	0.00	0.00	10	89	36	165	0.09
Nov-23	8	70	26	131	0.07	0	0	0	0	0.00	0.00	8	70	26	131	0.07
Jan-24	21	197	110	297	0.21	0	0	0	0	0.00	0.00	21	197	110	297	0.21
Feb-24	7	67	18	127	0.07	0	0	0	0	0.00	0.00	7	67	18	127	0.07
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Jul-22	1	9	1	29	0.06	0	0	0	0	0.00	0.00	1	9	1	29	0.06

Oct-23	1	11	1	35	0.07	0	0	0	0	0.00	0.00	1	11		35	0.07
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	7	64	18	120	0.08	0	0	0	0	0.00	0.00	7	64	18	120	0.08
Apr-22	34	305	46	706	0.38	2	18	2	55	0.02	0.02	32	288	44	651	0.36
Jun-22	12	102	12	298	0.13	0	0	0	0	0.00	0.00	12	102	12	298	0.13
Jul-22	44	408	200	675	0.51	0	0	0	0	0.00	0.00	44	408	200	675	0.51
Oct-22	7	66	18	125	0.08	0	0	0	0	0.00	0.00	7	66	18	125	0.08
Nov-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Dec-22	4	35	9	72	0.04	0	0	0	0	0.00	0.00	4	35	9	72	0.04
Jan-23	3	26	3	64	0.03	0	0	0	0	0.00	0.00	3	26	3	64	0.03
Feb-23	3	26	3	63	0.03	0	0	0	0	0.00	0.00	3	26	3	63	0.03
Mar-23	14	120	60	190	0.15	0	0	0	0	0.00	0.00	14	120	60	190	0.15
Apr-23	5	44	9	91	0.06	0	0	0	0	0.00	0.00	5	44	9	91	0.06
May-23	14	133	35	259	0.17	0	0	0	0	0.00	0.00	14	133	35	259	0.17
Jun-23	1	10	1	30	0.01	0	0	0	0	0.00	0.00	1	10	1	30	0.01
Jul-23	2	22	2	73	0.03	1	9	1	35	0.01	0.01	1	13	1	37	0.02
Aug-23	5	43	8	87	0.05	0	0	0	0	0.00	0.00	5	43	8	87	0.05
Sep-23	8	70	17	142	0.09	0	0	0	0	0.00	0.00	8	70	17	142	0.09
Oct-23	9	78	26	149	0.10	0	0	0	0	0.00	0.00	9	78	26	149	0.10
Nov-23	8	69	17	121	0.09	0	0	0	0	0.00	0.00	8	69	17	121	0.09
Jan-24	21	197	111	305	0.25	0	0	0	0	0.00	0.00	21	197	111	305	0.25
Feb-24	7	66	19	128	0.08	0	0	0	0	0.00	0.00	7	66	19	128	0.08

A3.1.2 Red-throated diver

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	51	0.02	0	0	0	0	0.00	0.00	2	17	2	51	0.02
Apr-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Jun-22	1	8	1	25	0.01	1	8	1	25	0.01	0.01	0	0	0	0	0.00
Sep-22	4	34	9	69	0.04	0	0	0	0	0.00	0.00	4	34	9	69	0.04
Nov-22	1	11	1	34	0.01	0	0	0	0	0.00	0.00	1	11	1	34	0.01
Dec-22	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Feb-23	2	21	2	57	0.02	0	0	0	0	0.00	0.00	2	21	2	57	0.02
Mar-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Apr-23	2	19	2	49	0.02	0	0	0	0	0.00	0.00	2	19	2	49	0.02
Jun-23	4	35	4	88	0.04	0	0	0	0	0.00	0.00	4	35	4	88	0.04
Jul-23	4	35	4	104	0.04	2	17	2	52	0.02	0.01	2	17	2	52	0.02
Oct-23	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Nov-23	4	35	4	87	0.04	0	0	0	0	0.00	0.00	4	35	4	87	0.04
Jan-24	3	28	3	79	0.03	0	0	0	0	0.00	0.00	3	28	3	79	0.03
Feb-24	4	37	9	76	0.04	0	0	0	0	0.00	0.00	4	37	9	76	0.04
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	2	17	2	51	0.02	0	0	0	0	0.00	0.00	2	17	2	51	0.02

Apr-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Jun-22	1	8	1	25	0.01	1	8	1	25	0.01	0.01	0	0	0	0	0.00
Sep-22	4	34	9	68	0.04	0	0	0	0	0.00	0.00	4	34	9	68	0.04
Nov-22	1	11	1	34	0.01	0	0	0	0	0.00	0.00	1	11	1	34	0.01
Dec-22	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Feb-23	2	20	2	52	0.03	0	0	0	0	0.00	0.00	2	20	2	52	0.03
Mar-23	1	9	1	34	0.01	0	0	0	0	0.00	0.00	1	9	1	34	0.01
Apr-23	2	19	2	49	0.02	0	0	0	0	0.00	0.00	2	19	2	49	0.02
Jun-23	4	35	4	88	0.04	0	0	0	0	0.00	0.00	4	35	4	88	0.04
Jul-23	4	34	4	104	0.04	2	17	2	52	0.02	0.02	2	17	2	52	0.02
Oct-23	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Nov-23	4	35	4	86	0.04	0	0	0	0	0.00	0.00	4	35	4	86	0.04
Jan-24	3	28	3	78	0.04	0	0	0	0	0.00	0.00	3	28	3	78	0.04
Feb-24	4	36	4	84	0.05	0	0	0	0	0.00	0.00	4	36	4	84	0.05

A3.1.3 Great northern diver

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	24	206	111	317	0.21	0	0	0	0	0.00	0.00	24	206	111	317	0.21
Apr-22	24	208	95	364	0.22	0	0	0	0	0.00	0.00	24	208	95	364	0.22
May-22	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Jul-22	2	17	2	69	0.02	0	0	0	0	0.00	0.00	2	17	2	69	0.02
Aug-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Oct-22	4	35	4	87	0.04	0	0	0	0	0.00	0.00	4	35	4	87	0.04
Nov-22	3	33	4	78	0.03	0	0	0	0	0.00	0.00	3	33	4	78	0.03
Dec-22	9	78	35	130	0.08	0	0	0	0	0.00	0.00	9	78	35	130	0.08
Jan-23	1	18	2	60	0.02	0	0	0	0	0.00	0.00	1	18	2	60	0.02
Feb-23	3	31	4	80	0.03	0	0	0	0	0.00	0.00	3	31	4	80	0.03
Mar-23	3	26	3	60	0.03	0	0	0	0	0.00	0.00	3	26	3	60	0.03
Apr-23	9	85	27	150	0.09	0	0	0	0	0.00	0.00	9	85	27	150	0.09
May-23	22	190	86	302	0.20	0	0	0	0	0.00	0.00	22	190	86	302	0.20
Oct-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Nov-23	12	105	18	235	0.11	1	9	1	26	0.01	0.01	11	96	17	209	0.10
Dec-23	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Jan-24	21	198	107	323	0.21	0	0	0	0	0.00	0.00	21	198	107	323	0.21
Feb-24	10	91	35	163	0.10	0	0	0	0	0.00	0.00	10	91	35	163	0.10
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				

	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Counts	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	24	203	110	314	0.25	0	0	0	0	0.00	0.00	24	203	110	314	0.25
Apr-22	24	206	94	378	0.26	0	0	0	0	0.00	0.00	24	206	94	378	0.26
May-22	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Jul-22	2	17	2	68	0.02	0	0	0	0	0.00	0.00	2	17	2	68	0.02
Aug-22	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Oct-22	4	35	4	78	0.04	0	0	0	0	0.00	0.00	4	35	4	78	0.04
Nov-22	3	33	4	78	0.04	0	0	0	0	0.00	0.00	3	33	4	78	0.04
Dec-22	9	78	34	129	0.10	0	0	0	0	0.00	0.00	9	78	34	129	0.10
Jan-23	1	18	2	52	0.02	0	0	0	0	0.00	0.00	1	18	2	52	0.02
Feb-23	3	30	4	74	0.04	0	0	0	0	0.00	0.00	3	30	4	74	0.04
Mar-23	3	26	3	51	0.03	0	0	0	0	0.00	0.00	3	26	3	51	0.03
Apr-23	9	85	35	158	0.11	0	0	0	0	0.00	0.00	9	85	35	158	0.11
May-23	22	188	85	316	0.24	0	0	0	0	0.00	0.00	22	188	85	316	0.24
Oct-23	1	9	1	26	0.01	0	0	0	0	0.00	0.00	1	9	1	26	0.01
Nov-23	12	104	26	242	0.13	1	9	1	26	0.01	0.01	11	95	25	216	0.12
Dec-23	2	17	2	43	0.02	0	0	0	0	0.00	0.00	2	17	2	43	0.02
Jan-24	21	197	106	302	0.25	0	0	0	0	0.00	0.00	21	197	106	302	0.25
Feb-24	10	91	35	169	0.11	0	0	0	0	0.00	0.00	10	91	35	169	0.11

A3.1.4 European storm petrel

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-23	1	26	1	9	<1.00	0.01	1	26	1	9	<1.00	0.01	0.00	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-23	1	26	1	8	<1.00	0.01	1	26	1	8	<1.00	0.01	0.00	0	0	0	0	0.00	0.00

A3.1.5 Storm petrel species

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Sep-22	17	146	26	300	0.24	0.15	17	146	26	300	0.24	0.15	0.07	0	0	0	0	0.00	0.00
Aug-23	1	26	1	9	<1.00	0.01	1	26	1	9	<1.00	0.01	0.00	0	0	0	0	0.00	0.00
Sep-23	2	51	2	17	0.71	0.02	2	51	2	17	0.71	0.02	0.00	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Sep-22	2	18	2	53	0.71	0.11	2	18	2	53	0.71	0.11	0.08	0	0	0	0	0.00	0.00
Aug-23	1	27	1	9	<1.00	0.06	1	27	1	9	<1.00	0.06	0.01	0	0	0	0	0.00	0.00
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jul-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Sep-22	15	128	17	281	0.26	0.16	15	128	15	273	0.26	0.16	0.08	0	0	0	0	0.00	0.00
Sep-23	2	51	2	17	0.71	0.02	2	51	2	17	0.71	0.02	0.00	0	0	0	0	0.00	0.00

A3.1.6 Fulmar

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	229	1,963	1,028	3,231	2.05	222	1,903	1,011	3,120	1.98	0.55	7	60	17	111	0.06
Apr-22	181	1,570	807	2,767	1.64	162	1,405	746	2,489	1.47	0.45	19	165	61	278	0.17
May-22	83	712	420	1,055	0.74	77	661	403	961	0.69	0.15	6	52	17	94	0.05
Jun-22	31	263	67	569	0.27	25	212	59	467	0.22	0.11	6	51	8	102	0.05
Jul-22	94	807	541	1,117	0.84	44	378	258	507	0.39	0.06	50	429	283	610	0.45
Aug-22	37	318	172	489	0.33	27	232	146	326	0.24	0.05	10	86	26	163	0.09
Sep-22	41	352	198	541	0.37	35	301	189	429	0.31	0.06	6	52	9	112	0.05
Oct-22	2	18	2	52	0.02	1	9	1	26	0.01	0.01	1	9	1	26	0.01
Nov-22	13	115	45	207	0.12	11	95	43	155	0.10	0.03	2	20	2	52	0.02
Dec-22	117	1,017	577	1,626	1.06	114	991	574	1,548	1.03	0.25	3	26	3	78	0.03
Jan-23	31	266	163	386	0.28	31	266	163	386	0.28	0.06	0	0	0	0	0.00
Feb-23	101	860	537	1,227	0.90	96	818	528	1,133	0.85	0.16	5	43	9	94	0.04
Mar-23	175	1,508	825	2,491	1.57	165	1,422	808	2,319	1.48	0.39	10	86	17	172	0.09
Apr-23	185	1,608	999	2,347	1.68	175	1,521	973	2,164	1.59	0.31	10	87	26	183	0.09
May-23	95	821	518	1,201	0.86	89	769	501	1,097	0.80	0.16	6	52	17	104	0.05
Jun-23	60	531	238	974	0.55	39	345	150	664	0.36	0.13	21	186	88	310	0.19
Jul-23	89	780	417	1,212	0.81	47	408	269	547	0.43	0.07	42	372	148	665	0.39
Aug-23	19	166	71	274	0.17	17	146	69	223	0.15	0.04	2	20	2	51	0.02
Sep-23	32	274	114	463	0.29	29	249	111	403	0.26	0.08	3	26	3	60	0.03
Dec-23	145	1,267	711	2,088	1.32	142	1,236	708	2,016	1.29	0.34	3	31	4	72	0.03
Jan-24	107	935	324	1,844	0.98	100	874	315	1,695	0.91	0.36	7	61	9	149	0.06
Feb-24	9	78	26	140	0.08	9	78	26	140	0.08	0.03	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				

	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	20	182	73	345	1.13	20	182	73	345	1.13	0.42	0	0	0	0	0.00
Apr-22	6	55	11	128	0.34	4	37	9	73	0.23	0.10	2	18	2	55	0.11
May-22	4	36	4	89	0.22	3	27	3	62	0.17	0.09	1	9	1	27	0.06
Jul-22	29	258	98	482	1.60	9	80	27	152	0.50	0.19	20	178	71	330	1.10
Aug-22	4	36	4	89	0.22	3	27	3	62	0.17	0.09	1	9	1	27	0.06
Sep-22	9	80	27	151	0.50	9	80	27	151	0.50	0.19	0	0	0	0	0.00
Oct-22	1	9	1	36	0.06	0	0	0	0	0.00	0.00	1	9	1	36	0.06
Nov-22	4	39	4	100	0.24	3	27	3	63	0.17	0.09	1	12	1	37	0.07
Dec-22	20	182	45	372	1.13	20	182	45	372	1.13	0.51	0	0	0	0	0.00
Jan-23	1	9	1	27	0.06	1	9	1	27	0.06	0.04	0	0	0	0	0.00
Feb-23	14	125	36	259	0.77	14	125	36	259	0.77	0.35	0	0	0	0	0.00
Mar-23	38	341	145	574	2.11	37	332	144	547	2.06	0.62	1	9	1	27	0.06
Apr-23	22	200	45	409	1.24	22	200	45	409	1.24	0.56	0	0	0	0	0.00
May-23	8	73	28	138	0.45	8	73	28	138	0.45	0.17	0	0	0	0	0.00
Jun-23	1	9	1	28	0.06	1	9	1	28	0.06	0.04	0	0	0	0	0.00
Jul-23	14	128	40	247	0.79	11	101	37	183	0.63	0.23	3	27	3	64	0.17
Aug-23	4	36	4	81	0.22	4	36	4	81	0.22	0.12	0	0	0	0	0.00
Sep-23	2	18	2	45	0.11	2	18	2	45	0.11	0.07	0	0	0	0	0.00
Dec-23	16	159	57	295	0.99	15	150	56	268	0.93	0.33	1	9	1	27	0.06
Jan-24	7	65	9	138	0.40	7	65	9	138	0.40	0.20	0	0	0	0	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	209	1,771	856	2,983	2.22	202	1,712	839	2,873	2.15	0.64	7	59	17	110	0.07
Apr-22	175	1,503	773	2,705	1.88	158	1,357	730	2,430	1.70	0.53	17	146	43	275	0.18
May-22	79	673	367	1,030	0.84	74	630	358	945	0.79	0.18	5	43	9	85	0.05
Jun-22	31	262	67	582	0.33	25	211	59	472	0.26	0.13	6	51	8	110	0.06
Jul-22	65	554	349	784	0.69	35	298	196	409	0.37	0.07	30	256	153	357	0.32

Aug-22	33	282	137	453	0.35	24	205	111	299	0.26	0.06	9	77	26	154	0.10
Sep-22	32	273	128	435	0.34	26	222	119	324	0.28	0.06	6	51	9	111	0.06
Oct-22	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Nov-22	9	78	27	151	0.10	8	68	26	120	0.09	0.03	1	10	1	31	0.01
Dec-22	97	836	425	1,405	1.05	94	810	422	1,327	1.02	0.28	3	26	3	78	0.03
Jan-23	30	255	162	357	0.32	30	255	162	357	0.32	0.06	0	0	0	0	0.00
Feb-23	87	734	455	1,097	0.92	82	692	447	1,004	0.87	0.17	5	42	8	93	0.05
Mar-23	137	1,172	495	2,103	1.47	128	1,095	486	1,941	1.37	0.46	9	77	9	162	0.10
Apr-23	163	1,404	801	2,162	1.76	153	1,318	784	1,990	1.65	0.38	10	86	17	172	0.11
May-23	87	743	427	1,143	0.93	81	691	418	1,041	0.87	0.20	6	51	9	102	0.06
Jun-23	59	517	228	930	0.65	38	333	140	623	0.42	0.15	21	184	88	307	0.23
Jul-23	75	652	336	1,077	0.82	36	309	206	429	0.39	0.07	39	343	130	648	0.43
Aug-23	15	130	53	228	0.16	13	110	51	178	0.14	0.04	2	20	2	50	0.02
Sep-23	30	255	114	443	0.32	27	229	111	383	0.29	0.09	3	25	3	60	0.03
Dec-23	129	1,104	591	1,948	1.38	127	1,083	588	1,893	1.36	0.41	2	21	3	55	0.03
Jan-24	100	864	260	1,729	1.08	93	804	251	1,582	1.01	0.42	7	61	9	147	0.08
Feb-24	9	77	25	148	0.10	9	77	25	148	0.10	0.04	0	0	0	0	0.00

A3.1.7 Cory's shearwater

Total Apportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Aug-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.1.8 Sooty shearwater

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Sep-22	1	11	1	34	0.01	1	11	1	34	0.01	0.01	0	0	0	0	0.00
Aug-23	1	11	1	33	0.01	1	11	1	33	0.01	0.01	0	0	0	0	0.00
Sep-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Oct-23	1	12	1	36	0.01	1	12	1	36	0.01	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Sep-22	1	9	1	27	0.06	1	9	1	27	0.06	0.04	0	0	0	0	0.00
Aug-23	1	9	1	27	0.06	1	9	1	27	0.06	0.04	0	0	0	0	0.00
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Sep-23	1	8	1	26	0.01	1	8	1	26	0.01	0.01	0	0	0	0	0.00
Oct-23	1	12	1	36	0.02	1	12	1	36	0.02	0.01	0	0	0	0	0.00

A3.1.9 Manx shearwater

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	2	18	2	46	0.02	2	18	2	46	0.02	0.01	0	0	0	0	0.00
May-22	2	17	2	44	0.02	0	0	0	0	0.00	0.00	2	17	2	44	0.02
Jun-22	2	18	2	54	0.02	2	18	2	54	0.02	0.01	0	0	0	0	0.00
Jul-22	397	3,913	777	8,746	4.10	153	1,602	338	3,601	1.69	0.91	247	439	482	5,145	2.41
Aug-22	2	51	11	112	0.05	2	51	11	112	0.05	0.03	0	0	0	0	0.00
Sep-22	29	280	32	749	0.29	14	149	17	379	0.16	0.90	15	131	15	369	0.14
Jun-23	15	155	17	469	0.16	2	28	3	84	0.03	0.02	13	127	14	385	0.13
Jul-23	39	427	82	919	0.45	19	187	55	376	0.19	0.08	20	240	27	543	0.25
Aug-23	3	42	5	114	0.04	3	33	4	88	0.03	0.02	0	9	1	26	0.01
Sep-23	1	9	1	26	0.01	1	9	1	26	0.01	0.01	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	11	1	34	0.07	1	11	1	34	0.07	0.05	0	0	0	0	0.00
Jul-22	50	504	64	1,778	3.13	9	105	20	254	0.65	0.36	41	399	43	1,524	2.47
Aug-22	0	18	2	44	0.11	0	18	2	44	0.11	0.07	0	0	0	0	0.00
Jul-23	3	38	4	107	0.23	2	28	3	78	0.18	0.12	1	9	1	29	0.06
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	9	1	27	0.01	1	9	1	27	0.01	0.01	0	0	0	0	0.00
May-22	2	17	2	44	0.02	0	0	0	0	0.00	0.00	2	17	2	44	0.02
Jun-22	2	18	2	54	0.02	2	18	2	54	0.02	0.02	0	0	0	0	0.00

Jul-22	347	3,379	484	8,151	4.24	141	1,467	239	3,406	1.84	0.99	206	1,911	244	4,749	2.4
Aug-22	2	34	4	86	0.04	2	34	4	86	0.04	0.03	0	0	0	0	0.00
Sep-22	29	280	32	740	0.35	14	150	17	373	0.19	0.11	15	130	15	367	0.16
Jun-23	15	154	17	469	0.19	2	27	3	88	0.03	0.03	13	127	14	381	0.16
Jul-23	36	395	63	868	0.50	17	159	35	337	0.20	0.09	19	237	28	531	0.30
Aug-23	3	41	5	118	0.05	3	33	4	93	0.04	0.03	0	8	1	25	0.01
Sep-23	1	8	1	26	0.01	1	8	1	26	0.01	0.01	0	0	0	0	0.00

A3.1.10 Gannet

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	19	163	77	274	0.23	0.17	14	120	43	214	0.27	0.13	0.04	5	43	9	77	0.45	0.04
Ap-22	136	1,180	945	1,431	0.09	1.23	58	503	364	642	0.13	0.52	0.07	78	677	503	876	0.11	0.71
May-22	48	412	232	626	0.14	0.43	40	343	197	549	0.16	0.36	0.09	8	69	9	137	0.35	0.07
Jun-22	53	450	280	670	0.13736	0.47	43	365	204	568	0.1525	0.38	0.09	10	85	42	136	0.32	0.09
Jul-22	138	1,177	833	1,563	0.09	1.23	93	790	567	1,022	0.10	0.83	0.12	45	386	180	660	0.15	0.40
Aug-22	159	1,366	679	2,251	0.078	1.43	157	1349	687	2,208	0.078	1.41	0.40	2	17	2	43	0.71	0.02
Sep-22	80	687	446	1,013	0.11	0.72	64	549	335	850	0.125	0.57	0.13	16	137	60	232	0.25	0.14
Oct-22	49	428	271	603	0.14	0.45	36	315	175	463	0.17	0.33	0.08	13	114	44	210	0.28	0.12
Nov-22	4	34	9	69	0.50	0.04	3	26	3	60	0.58	0.03	0.01	1	9	1	26	<1.00	0.01
Jan-23	20	172	86	266	0.22	0.18	20	172	94	266	0.22	0.18	0.04	0	0	0	0	0.00	0.00
Feb-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Mar-23	20	172	69	309	0.22	0.18	11	94	43	154	0.30	0.10	0.03	9	77	9	189	0.33	0.08
Apr-23	38	330	217	443	0.16	0.34	28	243	148	348	0.19	0.25	0.05	10	87	35	139	0.32	0.09
May-23	29	250	164	346	0.19	0.26	21	181	104	259	0.22	0.19	0.04	8	69	26	121	0.35	0.07
Jun-23	74	655	425	938	0.12	0.68	64	566	345	840	0.13	0.59	0.13	10	88	35	159	0.32	0.09
Jul-23	68	590	390	824	0.12	0.62	55	477	330	642	0.13	0.50	0.08	13	113	26	226	0.28	0.12
Aug-23	46	394	223	634	0.15	0.41	32	274	163	411	0.18	0.29	0.06	14	120	26	240	0.27	0.13
Sep-23	129	1,106	626	1,612	0.09	1.15	113	969	532	1,517	0.09	1.01	0.26	16	137	60	231	0.25	0.14
Oct-23	8	69	17	147	0.35	0.07	8	69	17	138	0.35	0.07	0.03	0	0	0	0	0.00	0.00
Nov-23	5	44	9	87	0.45	0.05	3	26	3	61	0.58	0.03	0.02	2	17	2	44	0.71	0.02
Dec-23	1	9	1	26	<1.00	0.01	1	9	1	34	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Jan-24	5	44	9	96	0.45	0.05	5	44	9	96	0.45	0.05	0.02	0	0	0	0	0.00	0.00
Feb-24	6	51	17	94	0.41	0.05	2	17	2	43	0.71	0.02	0.01	4	34	9	77	0.50	0.04

Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	1	9	1	27	<1.00	0.06	1	9	1	36	<1.00	0.06	0.05	0	0	0	0	0.00	0.00
Apr-22	20	183	100	274	0.22	1.13	11	100	46	155	0.30	0.62	0.17	9	82	27	146	0.33	0.51
May-22	2	18	2	45	0.71	0.11	2	18	2	45	0.71	0.11	0.07	0	0	0	0	0.00	0.00
Jun-22	10	88	35	158	0.31623	0.55	6	53	9	114	0.40825	0.33	0.16	4	35	9	70	0.50	0.22
Jul-22	14	125	45	232	0.27	0.78	13	116	36	223	0.28	0.72	0.29	1	9	1	27	<1.00	0.06
Aug-22	13	115	13	293	0.28	0.71	13	115	13	293	0.28	0.71	0.43	0	0	0	0	0.00	0.00
Sep-22	7	62	18	124	0.38	0.38	4	36	4	80	0.50	0.22	0.12	3	27	3	62	0.58	0.17
Oct-22	33	300	155	464	0.17	1.86	24	218	100	382	0.20	1.35	0.44	9	82	27	164	0.33	0.51
Nov-22	1	9	1	27	<1.00	0.06	1	9	1	27	<1.00	0.06	0.04	0	0	0	0	0.00	0.00
Jan-23	3	27	3	63	0.58	0.17	3	27	3	63	0.58	0.17	0.09	0	0	0	0	0.00	0.00
Mar-23	1	9	1	27	<1.00	0.06	1	9	1	27	<1.00	0.06	0.04	0	0	0	0	0.00	0.00
Apr-23	6	54	18	100	0.41	0.33	4	36	9	82	0.50	0.22	0.11	2	18	2	45	0.71	0.11
May-23	8	73	28	129	0.35	0.45	5	46	9	92	0.45	0.29	0.13	3	28	3	64	0.58	0.17
Jun-23	10	92	37	157	0.32	0.57	9	83	28	148	0.33	0.51	0.19	1	9	1	28	<1.00	0.06
Jul-23	14	128	37	238	0.27	0.79	12	110	46	201	0.29	0.68	0.24	2	18	2	55	0.71	0.11
Aug-23	3	27	3	63	0.58	0.17	3	27	3	63	0.58	0.17	0.09	0	0	0	0	0.00	0.00
Sep-23	5	45	9	98	0.45	0.28	4	36	4	89	0.50	0.22	0.13	1	9	1	27	<1.00	0.06
Dec-23	1	9	1	36	<1.00	0.06	1	9	1	27	<1.00	0.06	0.04	0	0	0	0	0.00	0.00

Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	18	153	68	271	0.24	0.19	13	110	34	212	0.28	0.14	0.06	5	42	8	85	0.45	0.05
Apr-22	116	996	756	1,245	0.09	1.25	47	404	275	532	0.15	0.51	0.08	69	592	421	773	0.12	0.74
May-22	46	392	213	596	0.15	0.49	38	324	179	502	0.16	0.41	0.10	8	68	9	145	0.35	0.09

Jun-22	43	362	211	565	0.1525	0.45	37	311	169	497	0.1644	0.39	0.10	6	51	17	93	0.40825	0.06
Jul-22	123	1,049	733	1,393	0.09	1.32	80	674	460	912	0.11	0.85	0.14	44	374	170	646	0.15	0.47
Aug-22	146	1,246	580	2,125	0.08	1.56	144	1,229	555	2,057	0.08	1.54	0.47	2	17	2	43	0.71	0.02
Sep-22	73	622	392	912	0.11	0.78	60	512	290	802	0.13	0.64	0.16	13	111	34	196	0.28	0.14
Oct-22	16	139	69	225	0.25	0.17	12	104	43	165	0.29	0.13	0.04	4	35	4	78	0.50	0.04
Nov-22	3	26	3	60	0.58	0.03	2	17	2	43	0.71	0.02	0.01	1	9	1	26	<1.00	0.01
Jan-23	17	145	68	238	0.24	0.18	17	145	68	238	0.24	0.18	0.05	0	0	0	0	0.00	0.00
Feb-23	1	8	1	25	<1.00	0.01	1	8	1	25	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Mar-23	19	162	68	298	0.23	0.20	10	85	34	145	0.32	0.11	0.03	9	77	9	179	0.33	0.10
Apr-23	32	276	172	379	0.18	0.35	24	207	129	310	0.20	0.26	0.06	8	69	26	121	0.35	0.09
May-23	21	179	102	265	0.22	0.22	16	137	77	213	0.25	0.17	0.04	5	43	9	85	0.45	0.05
Jun-23	64	561	351	824	0.13	0.70	55	482	272	754	0.13	0.60	0.15	9	79	35	140	0.33	0.10
Jul-23	54	464	301	670	0.14	0.58	43	369	232	524	0.15	0.46	0.09	11	94	17	206	0.30	0.12
Aug-23	43	365	187	594	0.15	0.46	29	246	136	390	0.19	0.31	0.08	14	119	25	229	0.27	0.15
Sep-23	124	1,054	612	1,607	0.09	1.32	109	927	493	1,454	0.10	1.16	0.30	15	127	51	230	0.26	0.16
Oct-23	8	69	17	137	0.35	0.09	8	69	17	137	0.35	0.09	0.04	0	0	0	0	0.00	0.00
Nov-23	5	43	9	86	0.45	0.05	3	26	3	61	0.58	0.03	0.02	2	17	2	43	0.71	0.02
Jan-24	5	43	9	95	0.45	0.05	5	43	9	95	0.45	0.05	0.03	0	0	0	0	0.00	0.00
Feb-24	6	51	17	93	0.41	0.06	2	17	2	42	0.71	0.02	0.01	4	34	8	68	0.50	0.04

A3.1.11 Cormorant

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	44	5	113	0.05	1	44	5	113	0.05	0.03	0	0	0	0	0.00
May-22	0	26	3	77	0.03	0	26	3	77	0.03	0.02	0	0	0	0	0.00
Feb-23	0	26	3	60	0.03	0	26	3	60	0.03	0.01	0	0	0	0	0.00
Mar-23	0	43	18	97	0.04	0	43	18	97	0.04	0.02	0	0	0	0	0.00
Jun-23	0	53	9	104	0.06	0	53	9	104	0.06	0.02	0	0	0	0	0.00
Jul-23	0	52	4	94	0.05	0	52	4	94	0.05	0.02	0	0	0	0	0.00
Aug-23	0	34	4	95	0.04	0	34	4	95	0.04	0.02	0	0	0	0	0.00
Sep-23	1	35	27	199	0.04	1	35	27	199	0.04	0.04	0	0	0	0	0.00
Oct-23	1	104	9	157	0.11	0	0	0	0	0.00	0.00	1	104	9	157	0.11
Nov-23	0	70	18	97	0.07	0	0	0	0	0.00	0.00	0	70	18	97	0.07
Jan-24	0	175	61	306	0.18	0	0	0	0	0.00	0.00	0	175	61	306	0.18
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
None recorded.																
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Apr-22	1	43	5	103	0.05	1	43	5	103	0.05	0.03	0	0	0	0	0.00
May-22	0	26	3	77	0.03	0	26	3	77	0.03	0.02	0	0	0	0	0.00
Feb-23	0	25	3	59	0.03	0	25	3	59	0.03	0.02	0	0	0	0	0.00
Mar-23	0	43	5	119	0.05	0	43	5	119	0.05	0.04	0	0	0	0	0.00
Jun-23	0	53	18	96	0.07	0	53	18	96	0.07	0.02	0	0	0	0	0.00

Jul-23	0	25	3	68	0.03	0	25	3	68	0.03	0.02	0	0	0	0	0.00
Aug-23	0	34	4	93	0.04	0	34	4	93	0.04	0.03	0	0	0	0	0.00
Sep-23	1	33	4	94	0.04	1	33	4	94	0.04	0.03	0	0	0	0	0.00
Oct-23	1	103	27	206	0.13	0	0	0	0	0.00	0.00	1	103	27	206	0.13
Nov-23	0	69	9	156	0.09	0	0	0	0	0.00	0.00	0	69	9	156	0.09
Jan-24	0	173	61	303	0.22	0	0	0	0	0.00	0.00	0	173	61	303	0.22

A3.1.12 Shag

Total Apportioned																
Month	a) Survey Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	12	231	46	480	0.24	3	60	12	129	0.06	0.03	9	171	34	351	0.18
Apr-22	39	355	41	1,067	0.37	0	0	0	0	0.00	0.00	39	355	41	1,067	0.37
Jun-22	0	8	1	25	0.01	0	0	0	0	0.00	0.00	0	8	1	25	0.01
Jul-22	11	94	11	214	0.10	10	86	17	198	0.09	0.05	1	9	1	26	0.01
Aug-22	0	662	77	1,933	0.69	0	576	67	1,701	0.60	0.43	0	86	10	232	0.09
Sep-22	99	902	105	2,387	0.94	2	17	2	43	0.02	0.01	97	885	103	2,344	0.92
Oct-22	10	87	10	236	0.09	0	0	0	0	0.00	0.00	10	87	10	236	0.09
Jan-22	0	86	17	172	0.09	0	0	0	0	0.00	0.00	0	86	17	172	0.09
Feb-22	0	187	77	341	0.20	0	0	3	60	0.00	0.01	0	187	77	341	0.20
Mar-23	17	180	21	532	0.19	0	0	0	0	0.00	0.00	17	180	21	532	0.19
May-23	3	26	3	69	0.03	0	0	0	0	0.00	0.00	3	26	3	69	0.03
Jun-23	0	9	1	27	0.01	0	0	0	0	0.00	0.00	0	9	1	27	0.01
Aug-23	0	17	2	43	0.02	0	0	0	0	0.00	0.00	0	17	2	43	0.02
Sep-23	0	26	3	60	0.03	0	0	0	0	0.00	0.00	0	26	3	60	0.03
Feb-24	1	137	69	222	0.14	0	0	0	0	0.00	0.00	1	137	69	222	0.14
Month	b) Spiorad na Mara Array Area															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	0	9	1	27	0.06	0	0	0	0	0.00	0.00	0	9	1	27	0.06
Month	c) 10 km Buffer															
	All Behaviours					Flying						Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Density (birds km^{-2})
Mar-22	12	220	45	466	0.28	3	59	11	127	0.07	0.04	9	161	34	339	0.20

Apr-22	39	352	41	1,057	0.44	0	0	0	0	0.00	0.00	39	352	41	1,057	0.44
Jun-22	0	8	1	25	0.01	0	0	0	0	0.00	0.00	0	8	1	25	0.01
Jul-22	11	94	18	214	0.12	10	85	17	188	0.11	0.06	1	8	1	26	0.01
Aug-22	0	657	77	1,886	0.82	0	572	67	1,656	0.72	0.50	0	85	10	230	0.11
Sep-22	99	895	105	2,421	1.12	2	17	2	43	0.02	0.01	97	878	103	2,378	1.10
Oct-22	10	87	10	243	0.11	0	0	0	0	0.00	0.00	10	87	10	243	0.11
Jan-23	0	85	26	170	0.11	0	0	0	0	0.00	0.00	0	85	26	170	0.11
Feb-23	0	186	68	338	0.23	0	0	0	0	0.00	0.00	0	186	68	338	0.23
Mar-23	17	179	21	536	0.22	0	0	0	0	0.00	0.00	17	179	21	536	0.22
May-23	3	26	3	68	0.03	0	0	0	0	0.00	0.00	3	26	3	68	0.03
Jun-23	0	9	1	26	0.01	0	0	0	0	0.00	0.00	0	9	1	26	0.01
Aug-23	0	17	2	42	0.02	0	0	0	0	0.00	0.00	0	17	2	42	0.02
Sep-23	0	25	3	60	0.03	0	0	0	0	0.00	0.00	0	25	3	60	0.03
Feb-24	1	135	60	228	0.17	0	0	0	0	0.00	0.00	1	135	60	228	0.17

A3.1.13 Cormorant / shag

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Oct-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Nov-22	2	17	2	43	0.71	0.02	2	17	2	43	0.71	0.02	0.01	0	0	0	0	0.00	0.00
Jan-23	13	112	43	206	0.28	0.12	3	26	3	60	0.58	0.03	0.01	10	86	17	172	0.32	0.09
Oct-23	14	121	52	208	0.27	0.13	3	26	3	61	0.58	0.03	0.02	11	95	26	173	0.30	0.10
Nov-23	10	87	17	175	0.32	0.09	2	17	2	44	0.71	0.02	0.01	8	70	9	157	0.35	0.07
Jan-24	22	192	79	323	0.21	0.20	2	17	2	44	0.71	0.02	0.01	20	175	61	306	0.22	0.18
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Jan-24	1	9	1	28	<1.00	0.06	1	9	1	28	<1.00	0.06	0.04	0	0	0	0	0.00	0.00
Month	c) 10 km Buffer																	
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Oct-22	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0.01	0	0	0	0	0.00	0.00
Nov-22	2	17	2	43	0.71	0.02	2	17	2	43	0.71	0.02	0.01	0	0	0	0	0.00	0.00
Jan-23	13	111	43	213	0.28	0.14	3	25	3	51	0.58	0.03	0.02	10	85	26	170	0.32	0.11
Oct-23	14	120	51	206	0.27	0.15	3	26	3	60	0.58	0.03	0.02	11	94	26	180	0.30	0.12
Nov-23	10	86	26	173	0.32	0.11	2	17	2	43	0.71	0.02	0.01	8	69	9	156	0.35	0.09
Jan-24	21	182	78	311	0.22	0.23	1	9	1	26	<1.00	0.01	0.01	20	173	61	303	0.22	0.22

A3.1.14 Passerine species

Total Unapportioned																			
Month	a) Survey Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-23	4	35	4	87	0.50	0.04	4	35	4	87	0.50	0.04	0.02	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
None recorded.																			
Month	c) 10 km Buffer																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Apr-23	4	34	4	86	0.50	0.04	4	34	4	86	0.50	0.04	0.03	0	0	0	0	0.00	0.00

A3.1.15 Unidentified bird species

Month	Total Unapportioned																	
	a) Survey Area																	
	All Behaviours						Flying							Sitting				
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	10	86	34	146	0.32	0.09	1	9	1	26	<1.00	0.01	0.01	9	77	34	129	0.33	0.08
May-22	3	26	3	69	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	69	0.58	0.03
Jul-22	3	26	3	60	0.58	0.03	2	17	2	43	0.71	0.02	0.01	1	9	1	34	<1.00	0.01
Aug-22	3	26	3	60	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	60	0.58	0.03
Sep-22	15	129	69	206	0.26	0.13	2	17	2	43	0.71	0.02	0.01	13	112	52	180	0.28	0.12
Oct-22	3	26	3	61	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	61	0.58	0.03
Nov-22	4	34	4	95	0.50	0.04	0	0	0	0	0.00	0.00	0.00	4	34	4	95	0.50	0.04
Jan-23	4	34	9	77	0.50	0.04	1	9	1	26	<1.00	0.01	0.01	3	26	3	60	0.58	0.03
Feb-23	10	85	34	145	0.32	0.09	0	0	0	0	0.00	0.00	0.00	10	85	34	153	0.32	0.09
Mar-23	8	69	26	120	0.35	0.07	1	9	1	26	<1.00	0.01	0.01	7	60	17	103	0.38	0.06
Apr-23	7	61	7	174	0.38	0.06	3	26	3	61	0.58	0.03	0.02	4	35	4	104	0.50	0.04
May-23	4	35	9	69	0.50	0.04	2	17	2	43	0.71	0.02	0.01	2	17	2	43	0.71	0.02
Jul-23	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00	0.00	1	9	1	26	<1.00	0.01
Aug-23	5	43	5	128	0.45	0.04	0	0	0	0	0.00	0.00	0.00	5	43	5	137	0.45	0.04
Sep-23	3	26	3	60	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	60	0.58	0.03
Oct-23	3	26	3	61	0.58	0.03	2	17	2	43	0.71	0.02	0.01	1	9	1	26	<1.00	0.01
Nov-23	1	9	1	26	1.00	0.01	0	0	0	0	0.00	0.00	0.00	1	9	1	26	<1.00	0.01
Dec-23	2	17	2	52	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	52	0.71	0.02
Jan-24	7	61	17	114	0.38	0.06	0	0	0	0	0.00	0.00	0.00	7	61	17	105	0.38	0.06
Feb-24	5	43	9	85	0.45	0.04	0	0	0	0	0.00	0.00	0.00	5	43	9	85	0.45	0.04
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Flying							Sitting				

	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	2	18	2	45	0.71	0.11	1	9	1	27	<1.00	0.06	0.04	1	9	1	36	<1.00	0.06
May-22	1	9	1	36	<1.00	0.06	0	0	0	0	0.00	0.00	0.00	1	9	1	27	<1.00	0.06
Aug-22	1	9	1	36	<1.00	0.06	0	0	0	0	0.00	0.00	0.00	1	9	1	27	<1.00	0.06
Sep-22	2	18	2	44	0.71	0.11	0	0	0	0	0.00	0.00	0.00	2	18	2	44	0.71	0.11
Jan-23	1	9	1	27	<1.00	0.06	1	9	1	27	<1.00	0.06	0.04	0	0	0	0	0.00	0.00
Apr-23	1	9	1	27	<1.00	0.06	1	9	1	27	<1.00	0.06	0.04	0	0	0	0	0.00	0.00
Jul-23	1	9	1	27	<1.00	0.06	0	0	0	0	0.00	0.00	0.00	1	9	1	27	<1.00	0.06
Feb-24	1	9	1	27	<1.00	0.06	0	0	0	0	0.00	0.00	0.00	1	9	1	36	<1.00	0.06
Month	c) 10 km Buffer																		
	All Behaviours						Flying							Sitting					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})	Standard Deviation	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (birds km^{-2})
Mar-22	8	68	25	119	0.35	0.09	0	0	0	0	0.00	0.00	0.00	8	68	25	119	0.35	0.09
May-22	2	17	2	51	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	51	0.71	0.02
Jul-22	3	26	3	60	0.58	0.03	2	17	2	43	0.71	0.02	0.01	1	8	1	26	<1.00	0.01
Aug-22	2	17	2	43	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	43	0.71	0.02
Sep-22	13	111	60	179	0.28	0.14	2	17	2	43	0.71	0.02	0.01	11	94	43	153	0.30	0.12
Oct-22	3	26	3	61	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	26	3	61	0.58	0.03
Nov-22	4	34	4	103	0.50	0.04	0	0	0	0	0.00	0.00	0.00	4	34	4	94	0.50	0.04
Jan-23	3	25	3	60	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	25	3	60	0.58	0.03
Feb-23	10	84	34	152	0.32	0.11	0	0	0	0	0.00	0.00	0.00	10	84	34	152	0.32	0.11
Mar-23	8	68	26	119	0.35	0.09	1	9	1	34	<1.00	0.01	0.01	7	60	17	102	0.38	0.08
Apr-23	6	52	6	146	0.41	0.07	2	17	2	43	0.71	0.02	0.01	4	34	4	103	0.50	0.04
May-23	4	34	9	68	0.50	0.04	2	17	2	43	0.71	0.02	0.01	2	17	2	43	0.71	0.02
Aug-23	5	42	5	119	0.45	0.05	0	0	0	0	0.00	0.00	0.00	5	42	5	136	0.45	0.05
Sep-23	3	25	3	60	0.58	0.03	0	0	0	0	0.00	0.00	0.00	3	25	3	60	0.58	0.03
Oct-23	3	26	3	60	0.58	0.03	2	17	2	43	0.71	0.02	0.01	1	9	1	26	<1.00	0.01

Nov-23	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00	0.00	1	9	1	35	<1.00	0.01
Dec-23	2	17	2	51	0.71	0.02	0	0	0	0	0.00	0.00	0.00	2	17	2	51	0.71	0.02
Jan-24	7	61	26	104	0.38	0.08	0	0	0	0	0.00	0.00	0.00	7	61	17	104	0.38	0.08
Feb-24	4	34	8	68	0.50	0.04	0	0	0	0	0.00	0.00	0.00	4	34	8	76	0.50	0.04

A3.2 Marine Megafauna

A3.2.1 Grey seal

Month	Total Apportioned																			
	a) Survey Area																			
	All Behaviours					Submerged					Surfacing					Hauled out				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	3	53	6	149	0.06	1	27	3	72	0.03	2	26	3	77	0.03	0	0	0	0	0.00
Apr-22	1	9	1	26	0.01	0	0	0	0	0.00	1	9	1	26	0.01	0	0	0	0	0.00
Jun-22	10	100	12	287	0.10	0	0	0	0	0.00	3	33	4	101	0.03	7	67	8	186	0.07
Jul-22	5	52	6	155	0.05	1	18	2	52	0.02	0	0	0	0	0.00	4	34	4	103	0.04
Aug-22	4	44	5	129	0.05	1	18	2	52	0.02	1	9	1	26	0.01	2	17	2	51	0.02
Sep-22	4	120	38	215	0.13	0	0	0	0	0.00	4	120	38	215	0.13	0	0	0	0	0.00
Oct-22	3	54	6	148	0.06	1	9	1	26	0.01	2	45	5	122	0.05	0	0	0	0	0.00
Nov-22	2	43	5	112	0.04	0	9	1	26	0.01	2	34	4	86	0.04	0	0	0	0	0.00
Jan-23	2	26	3	69	0.03	2	26	3	69	0.03	0	0	0	0	0.00	0	0	0	0	0.00
Feb-23	6	85	18	170	0.09	0	0	0	0	0.00	6	85	18	170	0.09	0	0	0	0	0.00
Mar-23	0	9	1	26	0.01	0	0	0	0	0.00	0	9	1	26	0.01	0	0	0	0	0.00
Apr-23	1	35	4	95	0.04	0	17	2	43	0.02	1	18	2	52	0.02	0	0	0	0	0.00
May-23	73	771	93	1,905	0.80	0	0	0	0	0.00	0	43	9	95	0.04	73	728	84	1,810	0.76
Jun-23	0	18	2	54	0.02	0	9	1	27	0.01	0	9	1	27	0.01	0	0	0	0	0.00
Aug-23	1	9	1	26	0.01	1	9	1	26	0.01	0	0	0	0	0.00	0	0	0	0	0.00
Sep-23	1	77	9	206	0.08	1	43	5	112	0.04	0	34	4	94	0.04	0	0	0	0	0.00
Oct-23	3	87	21	199	0.09	1	18	2	52	0.02	2	69	19	147	0.07	0	0	0	0	0.00
Nov-23	2	53	6	139	0.06	1	18	2	52	0.02	1	35	4	87	0.04	0	0	0	0	0.00
Dec-23	0	9	1	26	0.01	0	9	1	26	0.01	0	0	0	0	0.00	0	0	0	0	0.00
Jan-24	2	44	5	117	0.05	0	0	0	0	0.00	2	44	5	117	0.05	0	0	0	0	0.00

Feb-24	4	43	5	111	0.04	0	0	0	0	0.00	4	43	5	111	0.04	0	0	0	0	0.00

Month	b) Spiorad na Mara Array Area																		
	All Behaviours					Submerged					Surfacing					Hauled out			
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km-2)
Mar-22	0	9	1	27	0.06	0	0	0	0	0.00	0	9	1	27	0.06	0	0	0	0	0.00
Aug-22	0	9	1	27	0.06	0	9	1	27	0.06	0	0	0	0	0.00	0	0	0	0	0.00
Oct-22	0	9	1	27	0.06	0	0	0	0	0.00	0	9	1	27	0.06	0	0	0	0	0.00
Nov-22	1	9	1	27	0.06	0	0	0	0	0.00	1	9	1	27	0.06	0	0	0	0	0.00
Sep-23	1	9	1	27	0.06	1	9	1	27	0.06	0	0	0	0	0.00	0	0	0	0	0.00
Oct-23	0	18	2	63	0.11	0	9	1	27	0.06	0	9	1	36	0.06	0	0	0	0	0.00
Feb-24	1	18	2	54	0.11	0	0	0	0	0.00	1	18	2	54	0.11	0	0	0	0	0.00

Month	c) 10 km Buffer																		
	All Behaviours					Submerged					Surfacing					Hauled out			
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km-2)
Mar-22	3	43	5	112	0.05	1	26	3	70	0.03	2	17	2	42	0.02	0	0	0	0	0.00
Apr-22	1	9	1	26	0.01	0	0	0	0	0.00	1	9	1	26	0.01	0	0	0	0	0.00
Jun-22	10	100	12	286	0.13	0	0	0	0	0.00	3	33	4	101	0.04	7	67	8	185	0.08
Jul-22	5	50	6	154	0.06	1	16	2	52	0.02	0	0	0	0	0.00	4	34	4	102	0.04
Aug-22	4	34	4	111	0.04	1	8	1	34	0.01	1	8	1	26	0.01	2	17	2	51	0.02
Sep-22	4	119	43	213	0.15	0	0	0	0	0.00	4	119	43	213	0.15	0	0	0	0	0.00
Oct-22	3	43	5	121	0.05	1	9	1	26	0.01	2	34	4	95	0.04	0	0	0	0	0.00
Nov-22	1	35	4	95	0.04	0	9	1	26	0.01	1	26	3	69	0.03	0	0	0	0	0.00
Jan-23	2	26	3	77	0.03	2	26	3	77	0.03	0	0	0	0	0.00	0	0	0	0	0.00
Feb-23	6	85	16	169	0.11	0	0	0	0	0.00	6	85	16	169	0.11	0	0	0	0	0.00
Mar-23	0	9	1	26	0.01	0	0	0	0	0.00	0	9	1	26	0.01	0	0	0	0	0.00
Apr-23	1	35	4	95	0.04	0	17	2	43	0.02	1	18	2	52	0.02	0	0	0	0	0.00
May-23	73	761	93	1,858	0.95	0	0	0	0	0.00	0	43	9	94	0.05	73	718	84	1,764	0.90
Jun-23	0	18	2	52	0.02	0	9	1	26	0.01	0	9	1	26	0.01	0	0	0	0	0.00

Aug-23	1	8	1	25	0.01	1	8	1	25	0.01	0	0	0	0	0.00	0	0	0	0	0.00
Sep-23	0	68	8	187	0.09	0	34	4	85	0.04	0	34	4	102	0.04	0	0	0	0	0.00
Oct-23	3	69	12	146	0.09	1	9	1	26	0.01	2	60	11	120	0.08	0	0	0	0	0.00
Nov-23	2	53	6	139	0.07	1	18	2	52	0.02	1	35	4	87	0.04	0	0	0	0	0.00
Dec-23	0	8	1	26	0.01	0	8	1	26	0.01	0	0	0	0	0.00	0	0	0	0	0.00
Jan-24	2	44	5	117	0.06	0	0	0	0	0.00	2	44	5	117	0.06	0	0	0	0	0.00
Feb-24	3	25	3	68	0.03	0	0	0	0	0.00	3	25	3	68	0.03	0	0	0	0	0.00

A3.2.2 Common seal

Total Apportioned																				
Month	a) Survey Area																			
	All Behaviours					Submerged					Surfacing					Hauled out				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-22	8	69	8	206	0.07	0	0	0	0	0.00	0	0	0	0	0.00	8	69	8	206	0.07
May-23	5	50	6	142	0.05	0	0	0	0	0.00	0	0	0	0	0.00	5	50	6	142	0.05
Jun-23	2	18	2	53	0.02	0	0	0	0	0.00	0	0	0	0	0.00	2	18	2	53	0.02
Aug-23	0	9	1	26	0.01	0	0	0	0	0.00	0	0	0	0	0.00	0	9	1	26	0.01
Sep-23	1	86	10	257	0.09	0	0	0	0	0.00	0	0	0	0	0.00	1	86	10	257	0.09
Month	b) Spiorad na Mara Array Area																			
	All Behaviours					Submerged					Surfacing					Hauled out				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km-2)
None recorded.																				
Month	c) 10 km Buffer																			
	All Behaviours					Submerged					Surfacing					Hauled out				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km-2)
May-22	8	68	8	273	0.09	0	0	0	0	0.00	0	0	0	0	0.00	8	68	8	273	0.09
May-23	5	50	6	140	0.06	0	0	0	0	0.00	0	0	0	0	0.00	5	50	6	140	0.06
Jun-23	2	18	2	53	0.02	0	0	0	0	0.00	0	0	0	0	0.00	2	18	2	53	0.02
Aug-23	0	8	1	25	0.01	0	0	0	0	0.00	0	0	0	0	0.00	0	8	1	25	0.01
Sep-23	1	85	10	256	0.11	0	0	0	0	0.00	0	0	0	0	0.00	1	85	10	256	0.11

A3.2.3 Minke whale

Total Aapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jul-23	1	9	1	35	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jul-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00

Note: Apportioning calculations were carried out, however there was nothing apportioned to this species therefore the apportioned figures are the same as the original abundance estimates.

A3.2.4 Bottlenose dolphin

Total Apportioned															
Month	a) Survey Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jul-22	1	9	1	26	0.01	0	0	0	0	0.00	1	9	1	26	0.01
Aug-22	0	5	1	13	0.01	0	0	0	0	0.00	0	5	1	13	0.01
Month	b) Spiorad na Mara Array Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
None recorded.															
Month	c) 10 km Buffer														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jul-22	1	8	1	26	0.01	0	0	0	0	0.00	1	8	1	26	0.01
Aug-22	0	4	1	13	0.01	0	0	0	0	0.00	0	4	1	13	0.01

A3.2.5 Common dolphin

Total Apportioned															
Month	a) Survey Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	9	107	12	291	0.11	8	98	11	265	0.10	1	9	1	26	0.01
Sep-22	29	257	30	606	0.27	28	248	29	580	0.26	1	9	1	26	0.01
Feb-23	8	76	9	223	0.08	8	76	9	223	0.08	0	0	0	0	0.00
Aug-23	7	60	7	146	0.06	7	60	7	146	0.06	0	0	0	0	0.00
Sep-23	0	85	10	219	0.09	0	68	8	176	0.07	0	17	2	43	0.02
Oct-23	20	281	32	751	0.29	19	268	31	708	0.28	1	14	2	44	0.01
Jan-24	34	481	124	967	0.50	33	469	123	931	0.49	1	12	1	37	0.01
Month	b) Spiorad na Mara Array Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	40	4	121	0.25	3	31	3	94	0.19	1	9	1	27	0.06
Sep-22	0	8	1	24	0.05	0	8	1	24	0.05	0	0	0	0	0.00
Feb-23	8	80	9	239	0.50	8	80	9	239	0.50	0	0	0	0	0.00
Oct-23	0	9	1	27	0.06	0	9	1	27	0.06	0	0	0	0	0.00
Jan-24	0	52	5	145	0.32	0	52	5	145	0.32	0	0	0	0	0.00
Month	c) 10 km Buffer														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	5	72	8	270	0.09	5	72	8	270	0.09	0	0	0	0	0.00
Feb-23	29	247	29	562	0.31	28	238	28	537	0.30	1	8	1	26	0.01
Aug-23	7	59	7	153	0.07	7	59	7	153	0.07	0	0	0	0	0.00

Sep-23	0	83	10	233	0.10	0	66	8	190	0.08	0	17	2	43	0.02
Oct-23	20	271	31	725	0.34	19	258	30	686	0.32	1	14	2	39	0.02
Jan-24	34	428	92	852	0.54	33	415	91	815	0.52	1	12	1	36	0.02

A3.2.6 Risso's dolphin

Total Apportioned															
Month	a) Survey Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	46	5	139	0.05	3	37	4	113	0.04	1	9	1	26	0.01
Apr-22	1	9	1	26	0.01	0	0	0	0	0.00	1	9	1	26	0.01
Jun-22	11	93	11	280	0.10	11	93	11	280	0.10	0	0	0	0	0.00
Aug-22	0	8	1	24	0.01	0	8	1	24	0.01	0	0	0	0	0.00
Jul-23	2	22	3	65	0.02	1	13	2	39	0.01	1	9	1	26	0.01
Month	b) Spiorad na Mara Array Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	4	40	4	121	0.25	3	31	3	94	0.19	1	9	1	27	0.06
Apr-22	1	9	1	27	0.06	0	0	0	0	0.00	1	9	1	27	0.06
Month	c) 10 km Buffer														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Jun-22	11	93	11	278	0.12	11	93	11	278	0.12	0	0	0	0	0.00
Aug-22	0	7	1	24	0.01	0	7	1	24	0.01	0	0	0	0	0.00
Jul-23	2	22	3	65	0.03	1	13	2	39	0.02	1	9	1	26	0.01

A3.2.7 White-beaked dolphin

Total Apportioned															
Month	a) Survey Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-23	6	52	6	155	0.05	52	6	155	0.05	52	0	0	0	0	0.00
Jan-24	3	42	7	120	0.04	42	7	120	0.04	42	0	0	0	0	0.00
Month	b) Spiorad na Mara Array Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
None recorded.															
Month	c) 10 km Buffer														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
May-23	6	51	6	205	0.06	6	51	6	205	0.06	0	0	0	0	0.00
Jan-24	3	38	5	108	0.05	3	38	5	108	0.05	0	0	0	0	0.00

A3.2.8 Orca

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jan-23	7	60	7	172	0.38	0.06	5	43	5	112	0.45	0.04	2	17	2	69	0.71	0.02
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
Jan-23	7	63	7	180	0.38	0.39	5	45	5	117	0.45	0.28	2	18	2	54	0.71	0.11
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (MM's km^{-2})
None recorded.																		

A3.2.9 Harbour porpoise

Total corrected Apportioned															
Month	a) Survey Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	10	184	53	371	0.19	9	168	52	325	0.18	1	16	2	46	0.02
Apr-22	5	77	9	198	0.08	4	61	7	152	0.06	1	16	2	46	0.02
May-22	1	16	2	46	0.02	1	16	2	46	0.02	0	0	0	0	0.00
Jun-22	3	46	5	122	0.05	1	15	2	46	0.02	2	31	4	77	0.03
Jul-22	1	16	2	48	0.02	0	0	0	0	0.00	1	16	2	48	0.02
Aug-22	0	10	1	28	0.01	0	1	0	4	0.00	0	8	1	24	0.01
Sep-22	4	79	9	215	0.08	3	59	7	158	0.06	1	20	2	57	0.02
Jan-23	2	127	15	364	0.13	2	91	11	273	0.10	0	36	4	91	0.04
Feb-23	35	690	197	1,438	0.72	28	562	161	1186	0.59	7	127	36	252	0.13
Mar-23	13	196	23	466	0.20	10	151	18	345	0.16	3	46	5	121	0.05
Apr-23	1	16	2	46	0.02	1	16	2	46	0.02	0	0	0	0	0.00
May-23	3	46	5	121	0.05	3	46	5	121	0.05	0	0	0	0	0.00
Jun-23	11	212	40	468	0.22	9	179	37	371	0.19	2	33	4	97	0.03
Jul-23	3	71	8	167	0.07	3	71	8	167	0.07	0	0	0	0	0.00
Sep-23	1	23	3	67	0.02	0	3	0	10	0.00	1	20	2	57	0.02
Oct-23	2	50	6	156	0.05	1	21	2	60	0.02	1	30	3	96	0.03
Jan-24	46	1,331	442	2,479	1.39	34	1,025	396	1,772	1.07	12	306	46	707	0.32
Feb-24	12	218	42	432	0.23	9	163	36	324	0.17	3	55	6	108	0.06
Month	b) Spiorad na Mara Array Area														
	All Behaviours					Submerged					Surfacing				
	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Density (MM's km^{-2})
Mar-22	1	18	2	54	0.11	1	18	2	54	0.11	0	0	0	0	0.00

Jun-22	1	16	2	48	0.10	0	0	0	0	0.00	1	16	2	48	0.10
Sep-22	0	2	0	7	0.01	0	2	0	7	0.01	0	0	0	0	0.00
Feb-23	3	59	7	159	0.37	1	21	2	64	0.13	2	38	4	95	0.24
Jun-23	1	16	2	51	0.10	1	16	2	51	0.10	0	0	0	0	0.00
Jan-24	0	114	15	277	0.71	0	114	15	277	0.71	0	0	0	0	0.00
Feb-24	2	38	4	112	0.24	2	38	4	112	0.24	0	0	0	0	0.00
Month	**c) 10 km Buffer**														
	All Behaviours					**Submerged**					**Surfacing**				
	Raw Count	**Abundance estimate**	**LCL**	**UCL**	**Density (MM's km^{-2})**	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Density (MM's km^{-2})**	**Raw Count**	**Abundance estimate**	**LCL**	**UCL**	**Density (MM's km^{-2})**
Mar-22	9	169	37	352	0.21	8	155	35	308	0.19	1	14	2	44	0.02
Apr-22	5	75	9	196	0.09	4	60	7	151	0.07	1	16	2	46	0.02
May-22	1	16	2	46	0.02	1	16	2	46	0.02	0	0	0	0	0.00
Jun-22	2	29	4	91	0.04	1	15	2	46	0.02	1	15	2	46	0.02
Jul-22	1	15	2	48	0.02	0	0	0	0	0.00	1	15	2	48	0.02
Aug-22	0	8	1	28	0.01	0	1	0	4	0.00	0	7	1	24	0.01
Sep-22	4	75	9	207	0.09	3	57	7	149	0.07	1	18	2	57	0.02
Jan-23	2	125	15	362	0.16	2	89	11	271	0.11	0	0	4	91	0.00
Feb-23	32	625	148	1,358	0.78	27	536	131	1,161	0.67	5	89	17	197	0.11
Mar-23	13	194	23	492	0.24	10	149	11	373	0.19	3	46	5	119	0.06
Apr-23	1	16	2	46	0.02	1	16	131	46	0.02	0	0	0	0	0.00
May-23	3	46	5	119	0.06	3	46	18	119	0.06	0	0	0	0	0.00
Jun-23	10	194	40	466	0.24	8	161	2	369	0.20	2	33	4	97	0.04
Jul-23	3	71	8	165	0.09	3	71	5	165	0.09	0	0	0	0	0.00
Sep-23	1	20	3	70	0.03	0	3	0	13	0.00	1	18	2	57	0.02
Oct-23	2	50	6	146	0.06	1	21	2	60	0.03	1	30	3	86	0.04
Jan-24	46	1,212	397	2,390	1.52	34	908	352	1,651	1.14	12	304	46	739	0.38
Feb-24	10	178	23	394	0.22	7	125	17	269	0.16	3	53	6	125	0.07

A3.2.10 Blue shark

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Aug-22	1	9	1	34	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Sep-22	25	214	129	292	0.20	0.22	25	214	129	309	0.20	0.22	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Aug-22	1	9	1	27	<1.00	0.06	1	9	1	36	<1.00	0.06	0	0	0	0	0.00	0.00
Sep-22	3	27	3	62	0.58	0.17	3	27	3	62	0.58	0.17	0	0	0	0	0.00	0.00
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	22	187	111	281	0.21	0.23	22	187	111	273	0.21	0.23	0	0	0	0	0.00	0.00

A3.2.11 Basking shark

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-23	1	9	1	34	<1.00	0.01	1	9	1	34	<1.00	0.01	0	0	0	0	0.00	0.00

A3.2.12 Ocean sunfish

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	1	9	1	34	<1.00	0.01	0	0	0	0	0.00	0.00	1	9	1	26	<1.00	0.01
Aug-23	1	9	1	34	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Sep-22	1	8	1	26	<1.00	0.01	0	0	0	0	0.00	0.00	1	8	1	26	<1.00	0.01
Aug-23	1	8	1	25	<1.00	0.01	1	8	1	25	<1.00	0.01	0	0	0	0	0.00	0.00

A3.2.13 Atlantic bluefin tuna

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Nov-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Nov-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00

A3.2.14 Fish species

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-22	9	77	9	223	0.33	0.08	9	77	9	223	0.33	0.08	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Jul-22	9	76	9	221	0.33	0.10	9	76	9	221	0.33	0.10	0	0	0	0	0.00	0.00

A3.2.1 Leatherback turtle

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Oct-23	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00	1	9	1	26	<1.00	0.01
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
None recorded.																		
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (fish km^{-2})
Oct-23	1	9	1	36	<1.00	0.06	0	0	0	0	0.00	0.00	1	9	1	27	<1.00	0.06

A3.2.2 Unidentified marine organism

Total Unapportioned																		
Month	a) Survey Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})
Dec-23	1	9	1	26	<1.00	0.01	1	9	1	26	<1.00	0.01	0	0	0	0	0.00	0.00
Month	b) Spiorad na Mara Array Area																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})
Dec-23	1	9	1	27	<1.00	0.06	1	9	1	27	<1.00	0.06	0	0	0	0	0.00	0.00
Month	c) 10 km Buffer																	
	All Behaviours						Submerged						Surfacing					
	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})	Raw Count	Abundance estimate	LCL	UCL	Precision (CV)	Density (organism km^{-2})
None recorded.																		

Appendix IV Distribution Maps

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Figure 370 Distribution of auk / shearwater species in April 2022 859
Figure 371 Distribution of auk / shearwater species in May 2022 860
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Figure 387 Distribution of gannet in August 2022 876
Figure 388 Distribution of gannet in September 2022 877
Figure 389 Distribution of gannet in October 2022 878
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Figure 391 Distribution of gannet in January 2023 880
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Figure 394 Distribution of gannet in April 2023 883
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Figure 400 Distribution of gannet in October 2023 889
Figure 401 Distribution of gannet in November 2023 890
Figure 402 Distribution of gannet in December 2023 891
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Figure 416 Distribution of cormorant / shag in March 2022 905
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Figure 431 Distribution of cormorant / shag in October 2023 920

Figure 432 Distribution of cormorant / shag in November 2023 921
Figure 433 Distribution of cormorant / shag in January 2024 922
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Figure 437 Distribution of unidentified bird species in May 2022 926
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Figure 441 Distribution of unidentified bird species in October 2022 930
Figure 442 Distribution of unidentified bird species in November 2022 931
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Figure 447 Distribution of unidentified bird species in May 2023 936

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Figure 450 Distribution of unidentified bird species in September 2023 939
Figure 451 Distribution of unidentified bird species in October 2023 940
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Figure 453 Distribution of unidentified bird species in December 2023 942
Figure 454 Distribution of unidentified bird species in January 2024 943
Figure 455 Distribution of unidentified bird species in February 2024 944
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Figure 457 Distribution of grey seal in April 2022 946
Figure 458 Distribution of grey seal in June 2022 947
Figure 459 Distribution of grey seal in July 2022 948
Figure 460 Distribution of grey seal in August 2022 949
Figure 461 Distribution of grey seal in September 2022 950
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Figure 463 Distribution of grey seal in November 2022 952

Figure 464 Distribution of grey seal in January 2023 953
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Figure 468 Distribution of grey seal in August 2023 957
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Figure 470 Distribution of grey seal in October 2023 959
Figure 471 Distribution of grey seal in November 2023 960
Figure 472 Distribution of grey seal in January 2024 961
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Figure 475 Distribution of common seal in May 2023 964
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Figure 490 Distribution of seal species in June 2023 979
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Figure 495 Distribution of seal species in December 2023 984

Figure 496 Distribution of seal species in January 2024 985
Figure 497 Distribution of seal species in February 2024 986
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Figure 504 Distribution of common dolphin in February 2023 993
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Figure 506 Distribution of common dolphin in October 2023 995
Figure 507 Distribution of common dolphin in January 2024 996
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Figure 510 Distribution of Risso's dolphin in June 2022 999
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Figure 512 Distribution of white-beaked dolphin in May 2023 1001
Figure 513 Distribution of white-beaked dolphin in January 2024 1002
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Figure 518 Distribution of harbour porpoise in March 2022 1007
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Figure 520 Distribution of harbour porpoise in May 2022 1009
Figure 521 Distribution of harbour porpoise in June 2022 1010
Figure 522 Distribution of harbour porpoise in July 2022 1011
Figure 523 Distribution of harbour porpoise in September 2022 1012
Figure 524 Distribution of harbour porpoise in January 2023 1013
Figure 525 Distribution of harbour porpoise in February 2023 1014
Figure 526 Distribution of harbour porpoise in March 2023 1015
Figure 527 Distribution of harbour porpoise in April 2023 1016

Figure 528 Distribution of harbour porpoise in May 2023 1017
Figure 529 Distribution of harbour porpoise in June 2023 1018
Figure 530 Distribution of harbour porpoise in July 2023 1019
Figure 531 Distribution of harbour porpoise in September 2023 1020
Figure 532 Distribution of harbour porpoise in October 2023 1021
Figure 533 Distribution of harbour porpoise in January 2024 1022
Figure 534 Distribution of harbour porpoise in February 2024 1023
Figure 535 Distribution of dolphin / porpoise species in March 2022 1024
Figure 536 Distribution of dolphin / porpoise species in August 2022 1025
Figure 537 Distribution of dolphin / porpoise species in September 2022 1026
Figure 538 Distribution of dolphin / porpoise species in January 2023 1027
Figure 539 Distribution of dolphin / porpoise species in February 2023 1028
Figure 540 Distribution of dolphin / porpoise species in June 2023 1029
Figure 541 Distribution of dolphin / porpoise species in July 2023 1030
Figure 542 Distribution of dolphin / porpoise species in September 2023 1031
Figure 543 Distribution of dolphin / porpoise species in October 2023 1032

Figure 544 Distribution of dolphin / porpoise species in January 2024 1033
Figure 545 Distribution of marine mammal species in March 2022 1034
Figure 546 Distribution of marine mammal species in October 2022 1035
Figure 547 Distribution of marine mammal species in January 2024 1036
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Figure 549 Distribution of blue shark in September 2022 1038
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Figure 551 Distribution of ocean sunfish in September 2022 1040
Figure 552 Distribution of ocean sunfish in August 2023 1041
Figure 553 Distribution of Atlantic bluefin tuna in November 2023 1042
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Figure 555 Distribution of leatherback turtle in October 2023 1044
Figure 556 Distribution of unidentified marine organism in December 2023 1045

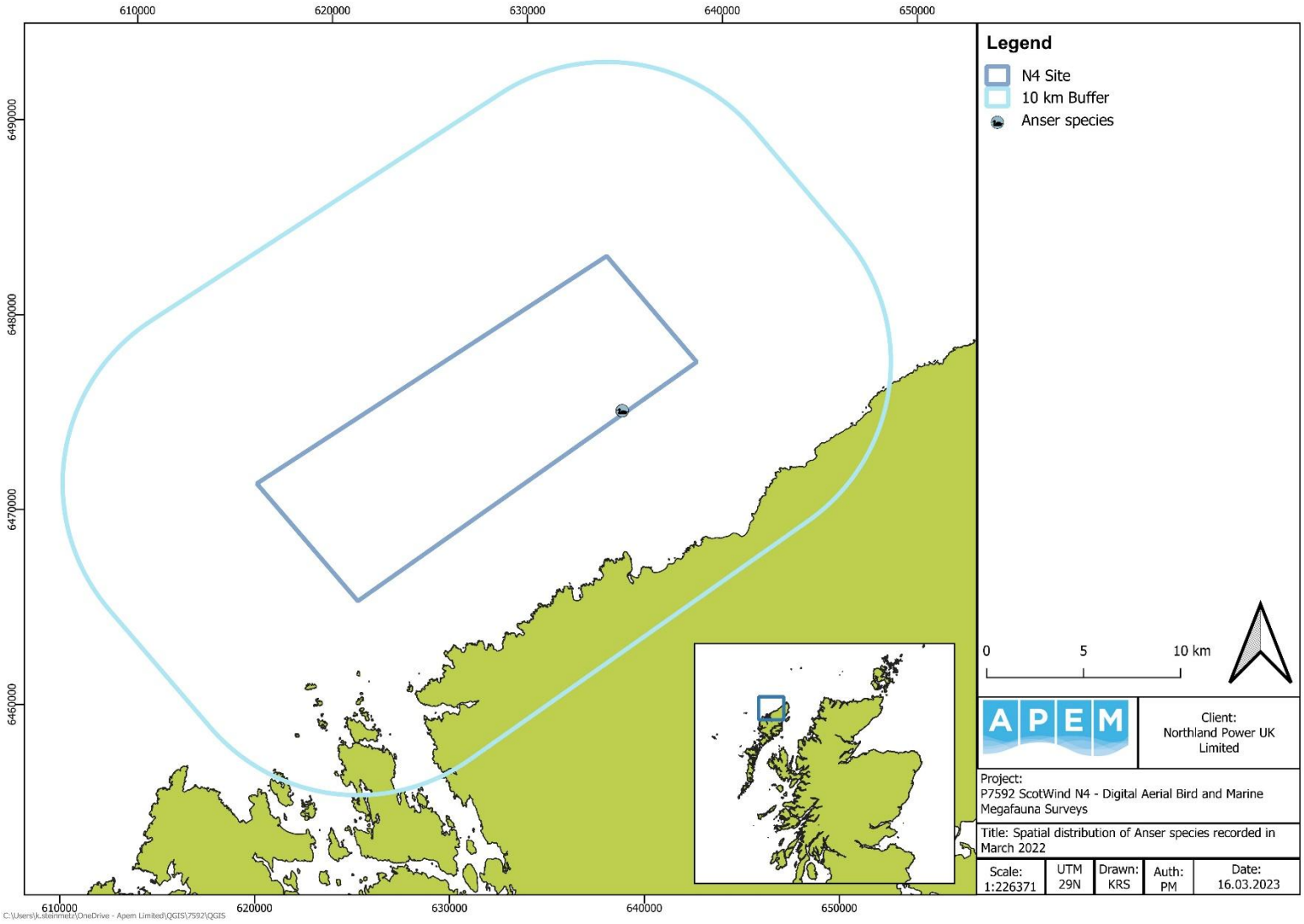


Figure 1 Distribution of anser species in March 2022

*Note that individuals in close proximity may appear overlaying.

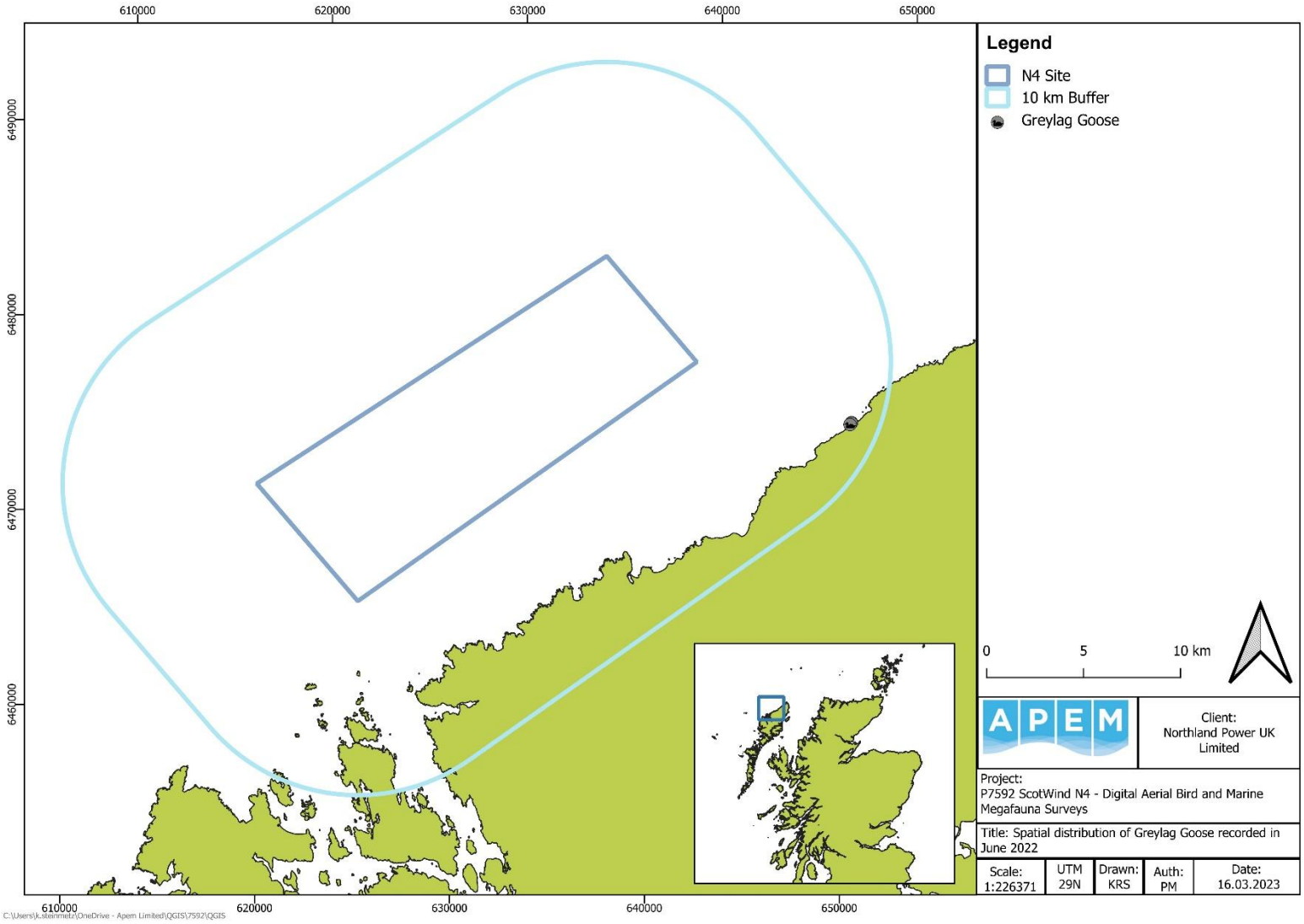


Figure 2 Distribution of greylag goose in June 2022

*Note that individuals in close proximity may appear overlaying.

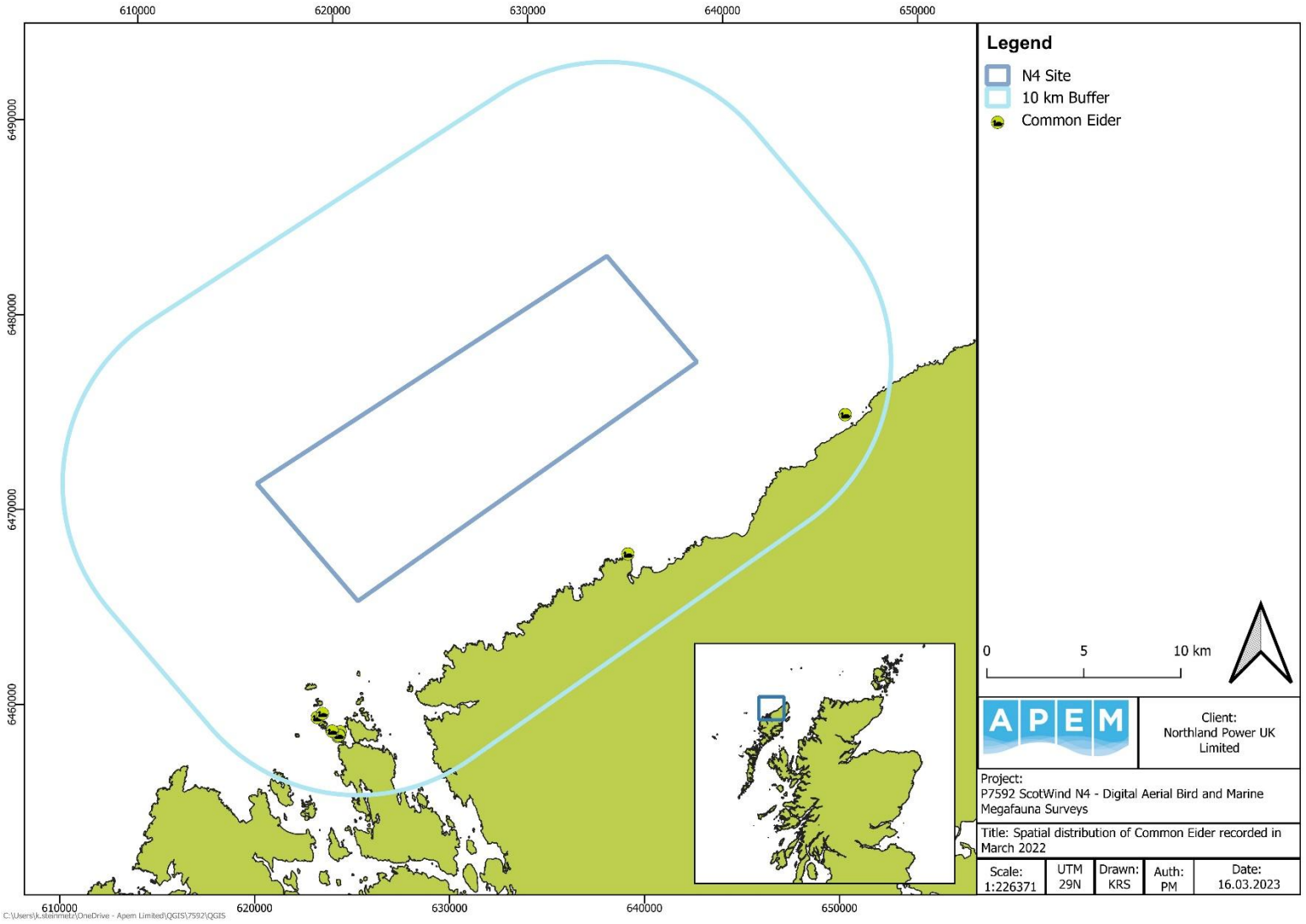


Figure 3 Distribution of common eider in March 2022

*Note that individuals in close proximity may appear overlaying.

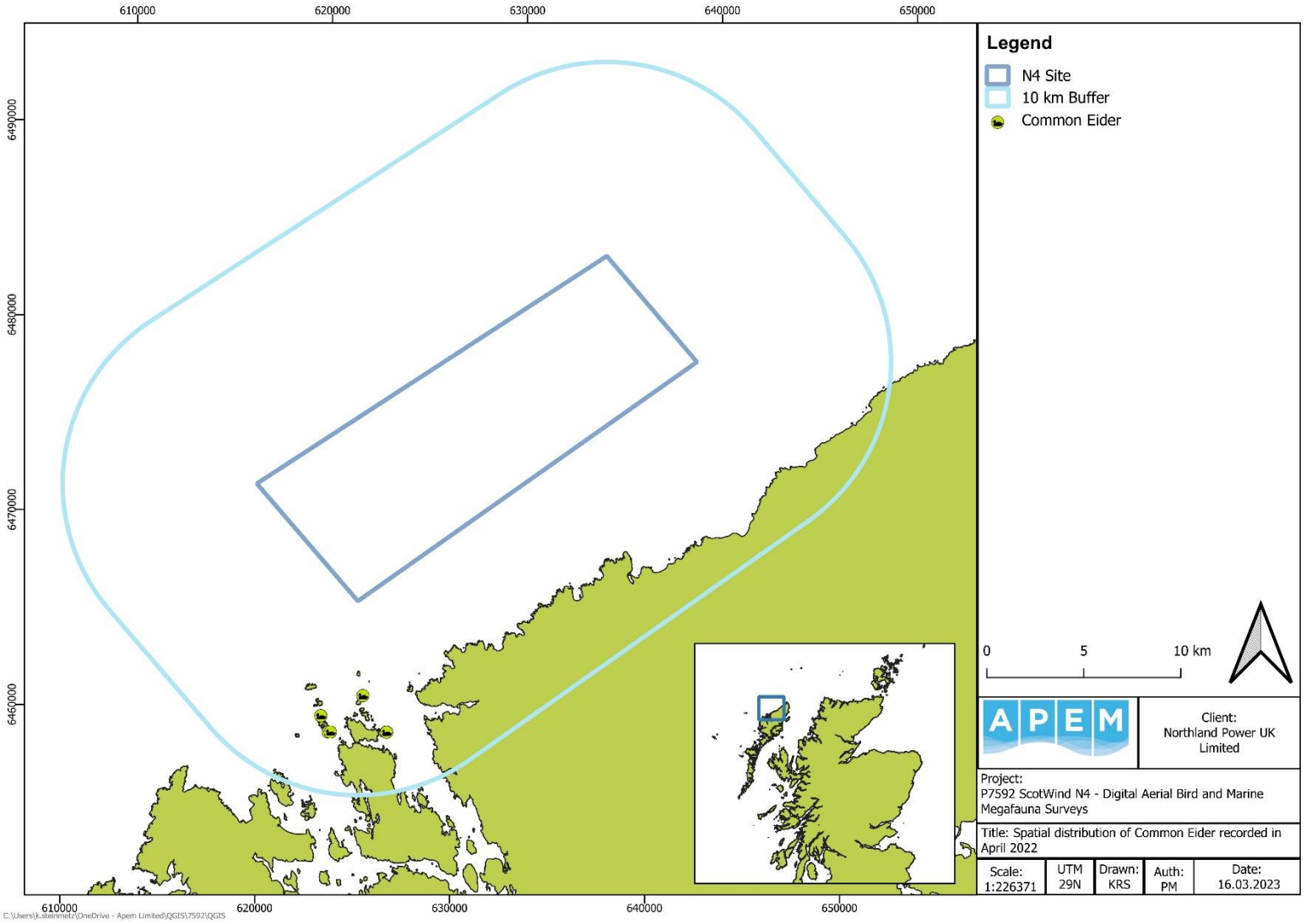


Figure 4 Distribution of common eider in April 2022

*Note that individuals in close proximity may appear overlaying.

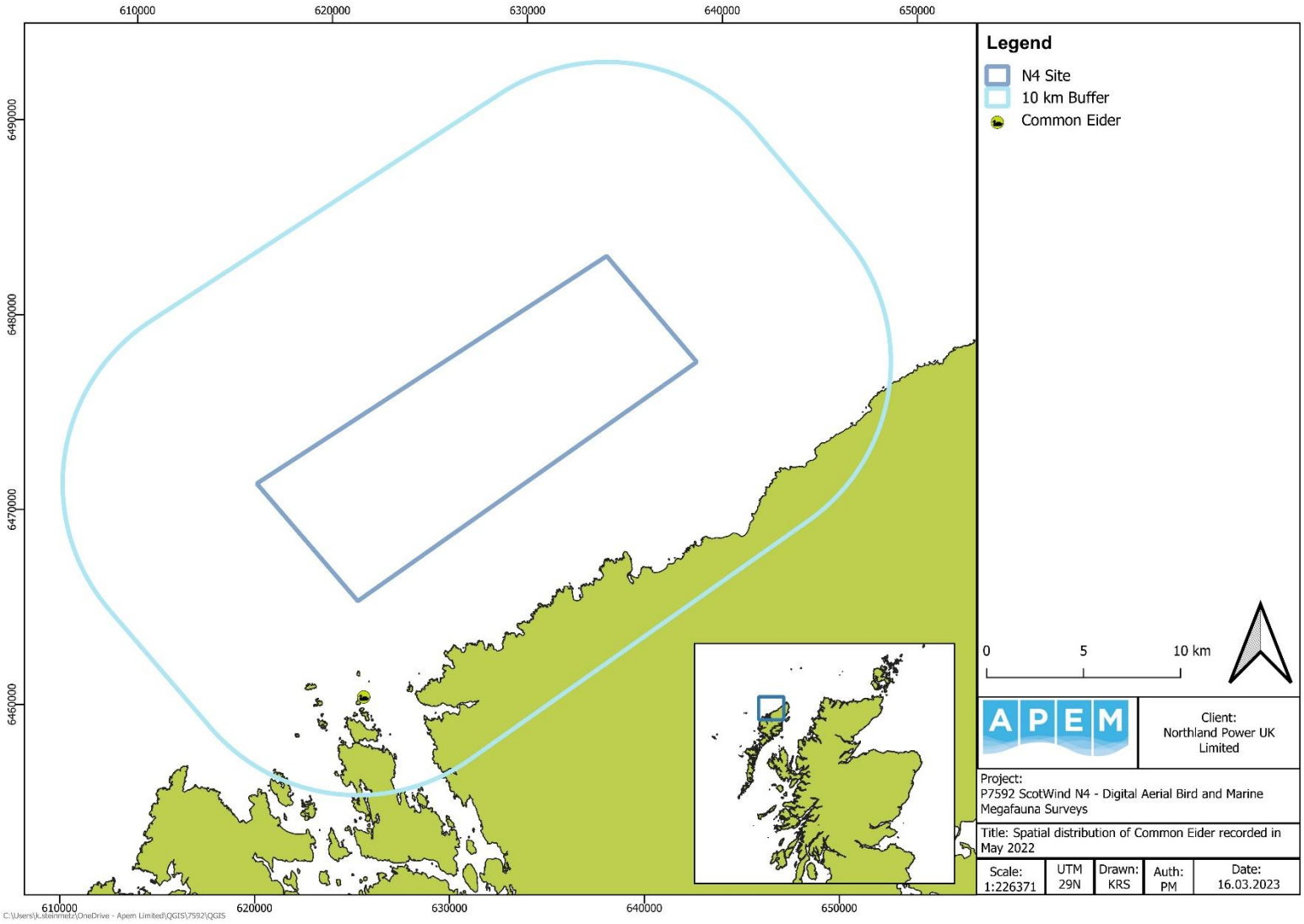


Figure 5 Distribution of common eider in May 2022

*Note that individuals in close proximity may appear overlaying.

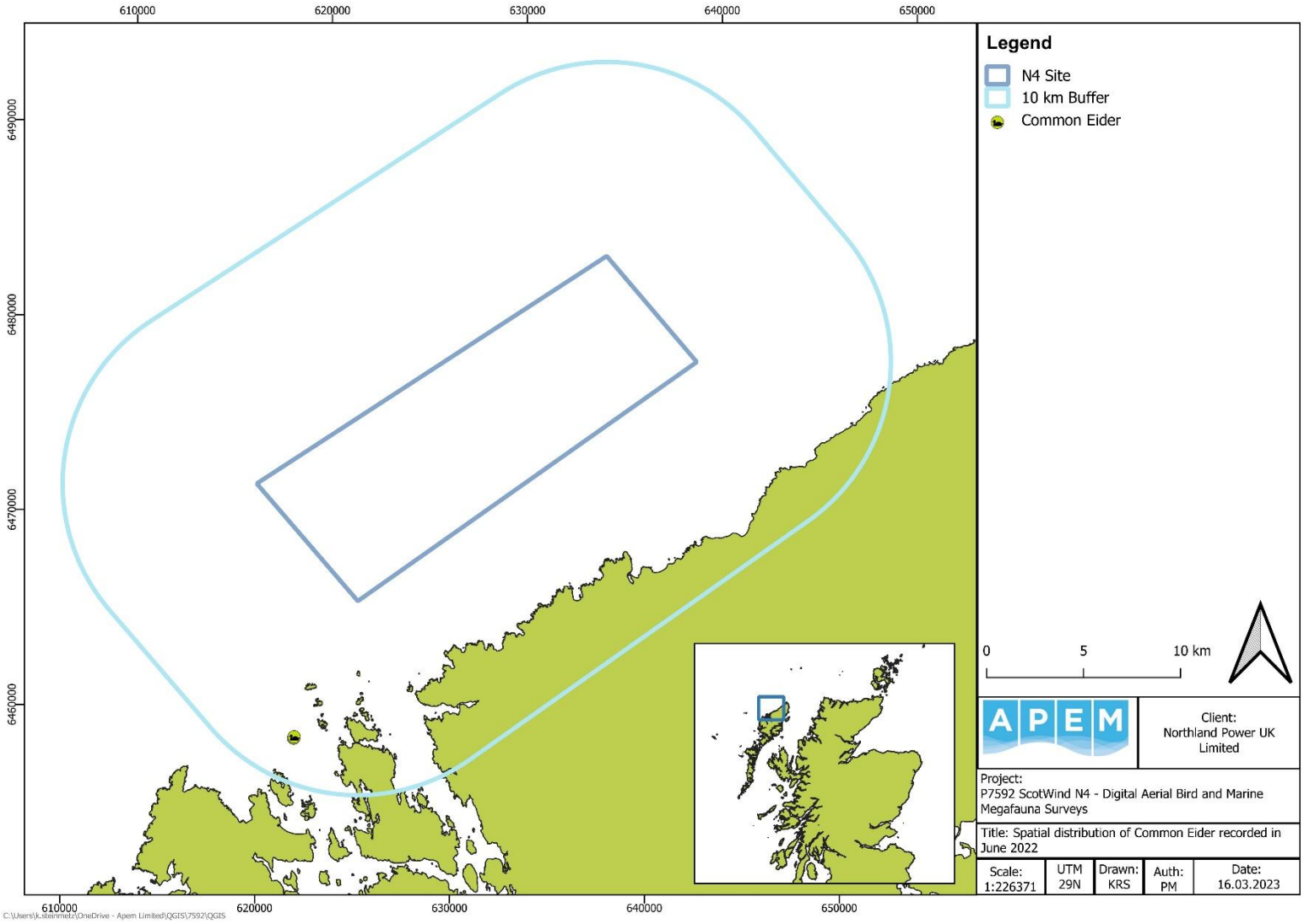


Figure 6 Distribution of common eider in June 2022

*Note that individuals in close proximity may appear overlaying.

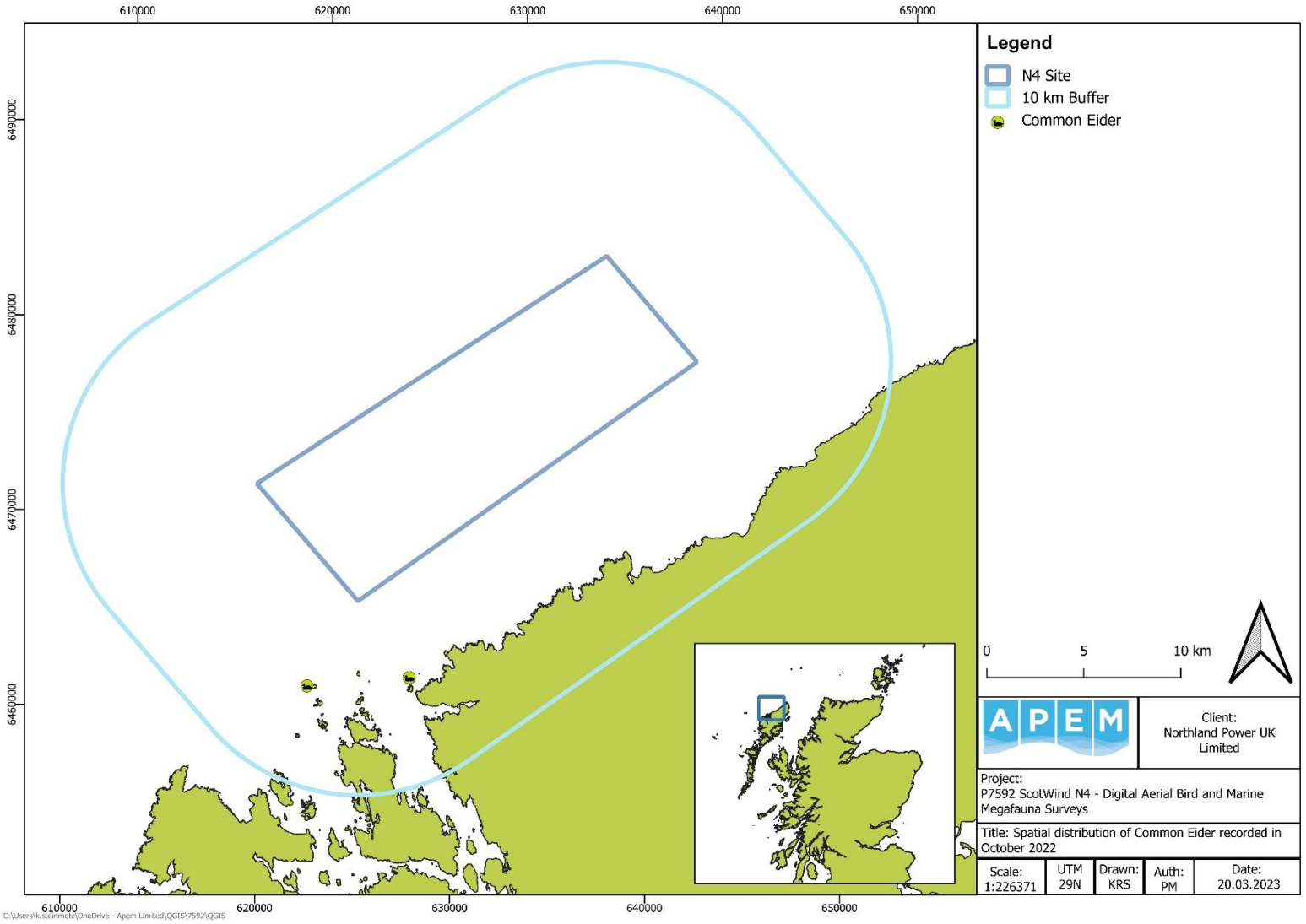


Figure 7 Distribution of common eider in October 2022

*Note that individuals in close proximity may appear overlaying.

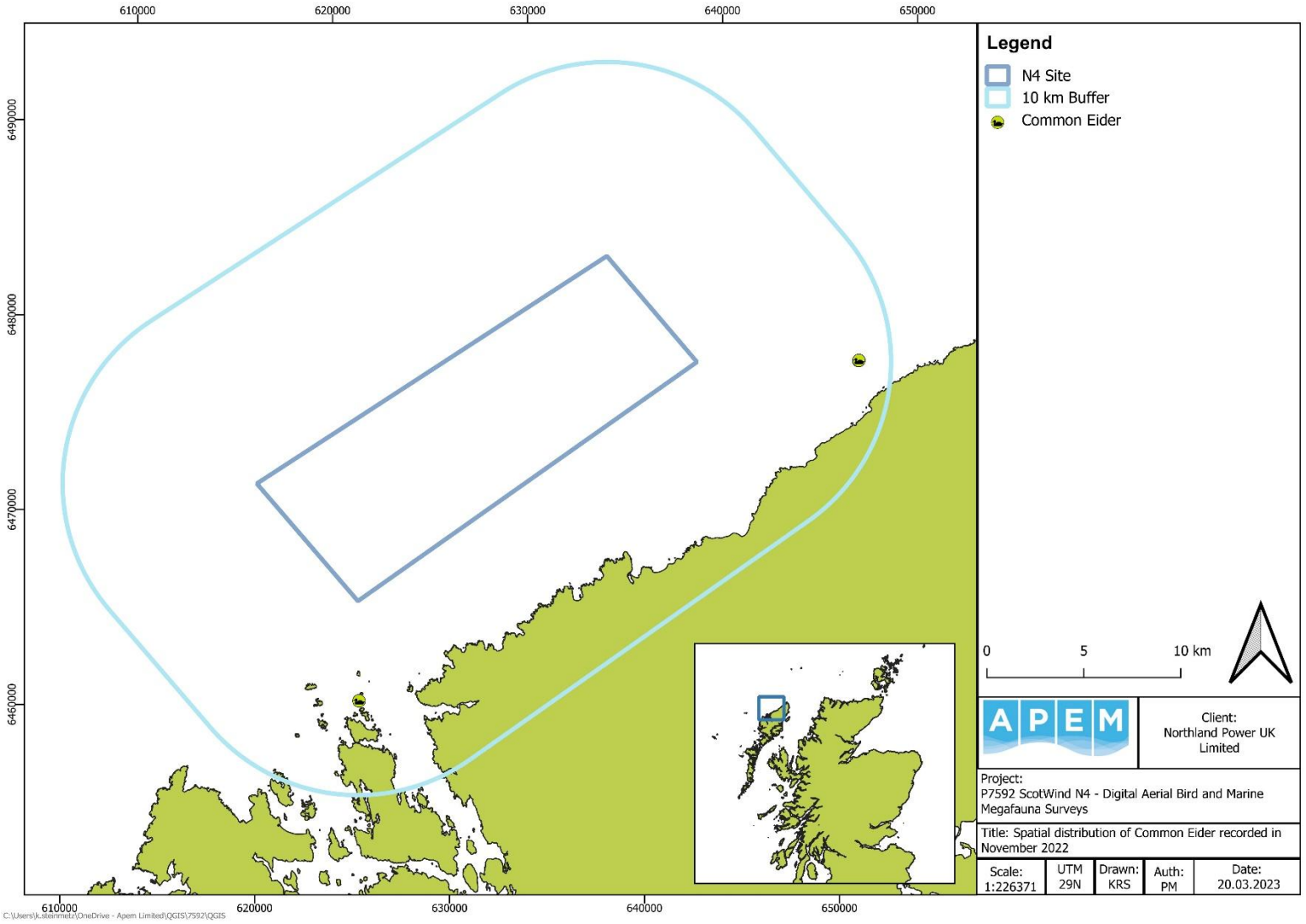


Figure 8 Distribution of common eider in November 2022

*Note that individuals in close proximity may appear overlaying.

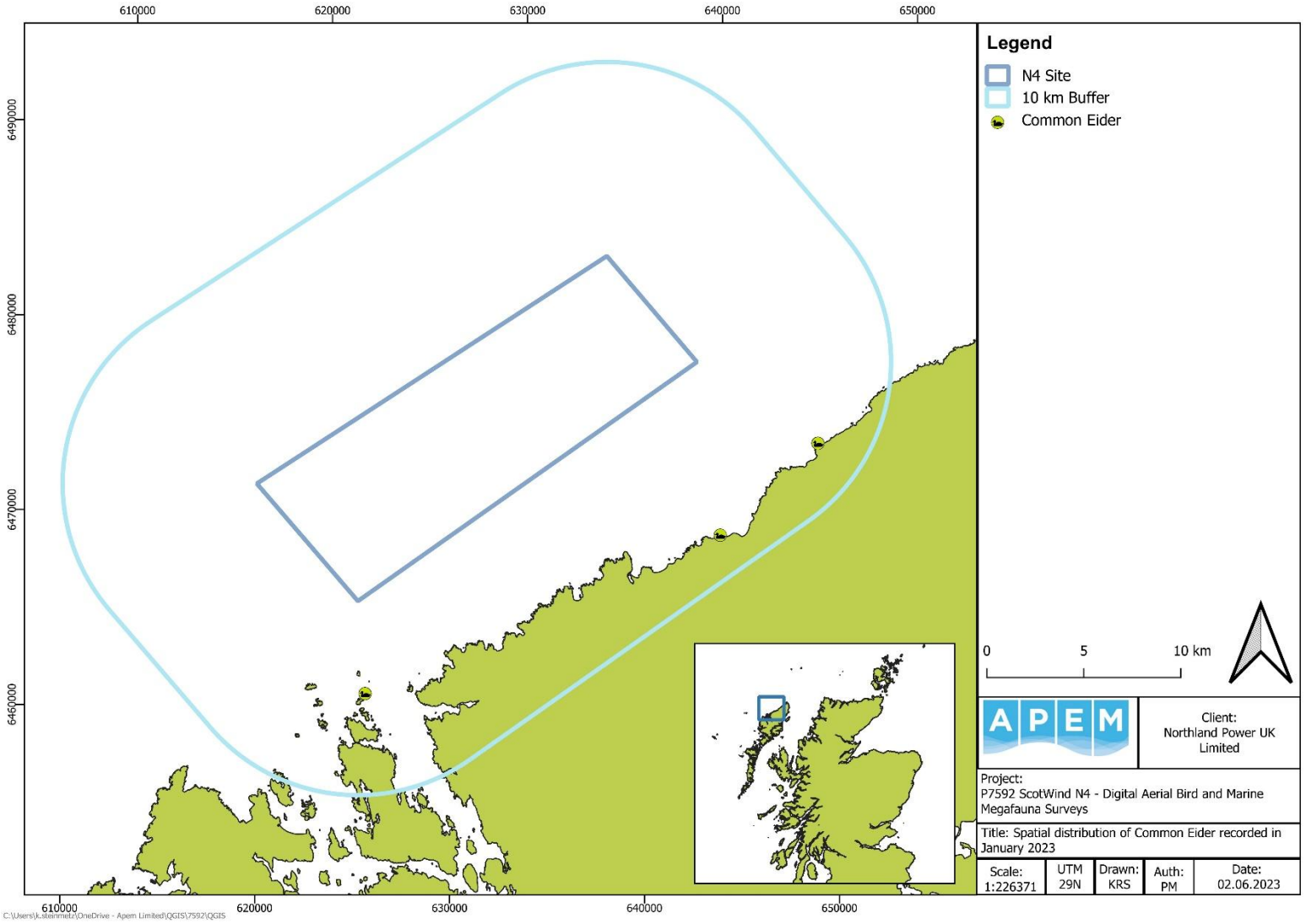


Figure 9 Distribution of common eider in January 2023

*Note that individuals in close proximity may appear overlaying.

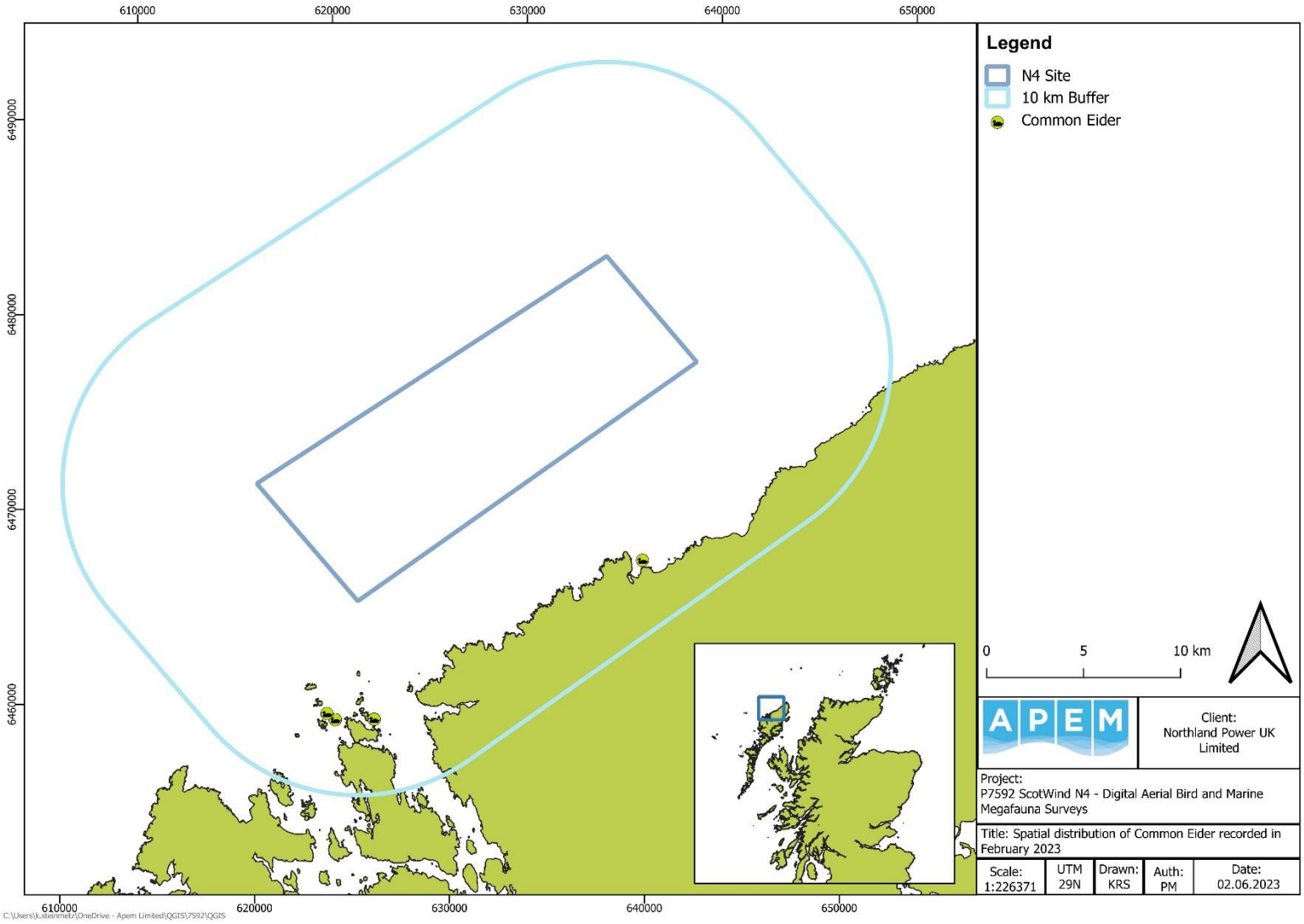


Figure 10 Distribution of common eider in February 2023

*Note that individuals in close proximity may appear overlaying.

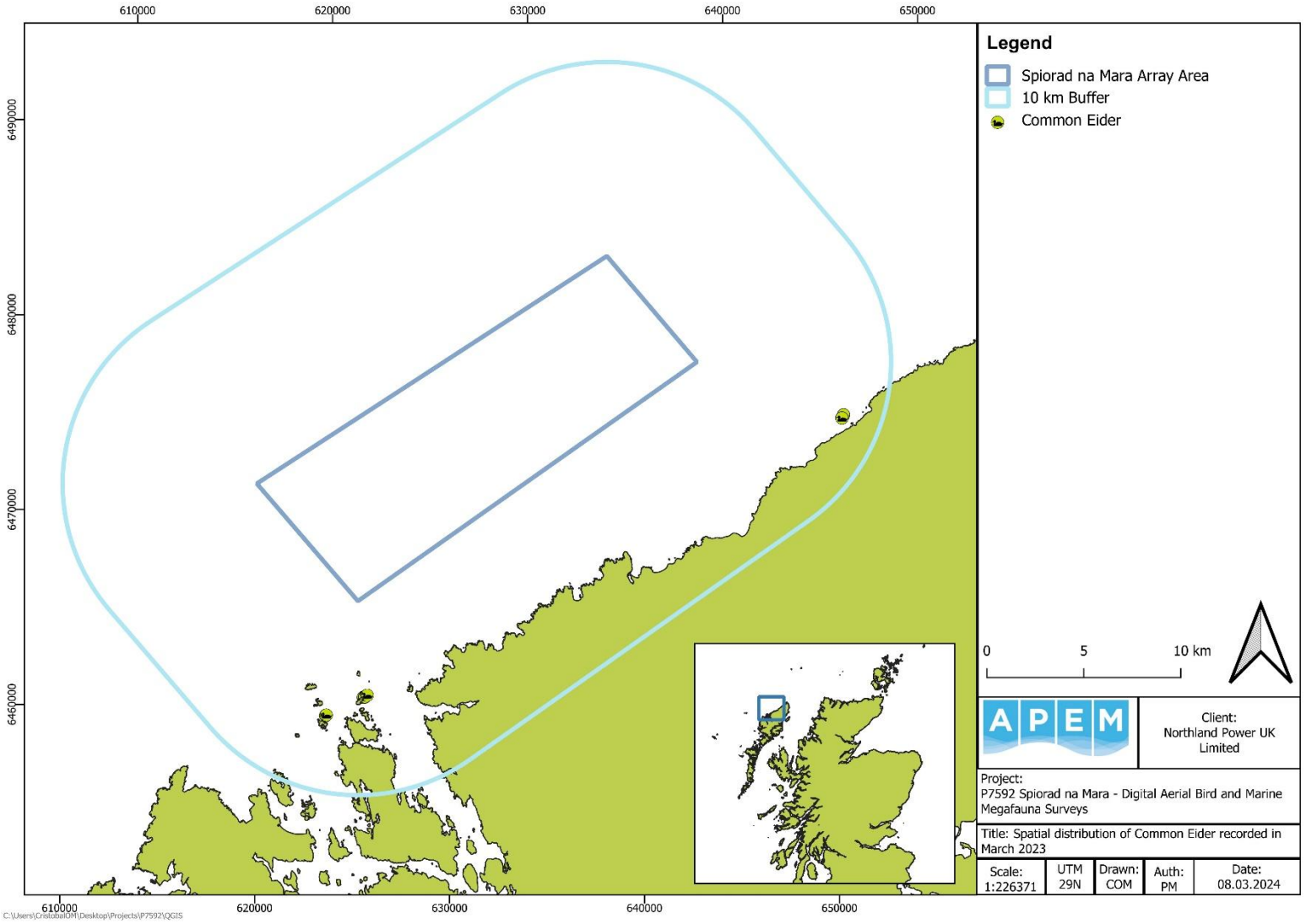


Figure 11 Distribution of common eider in March 2023

*Note that individuals in close proximity may appear overlaying.

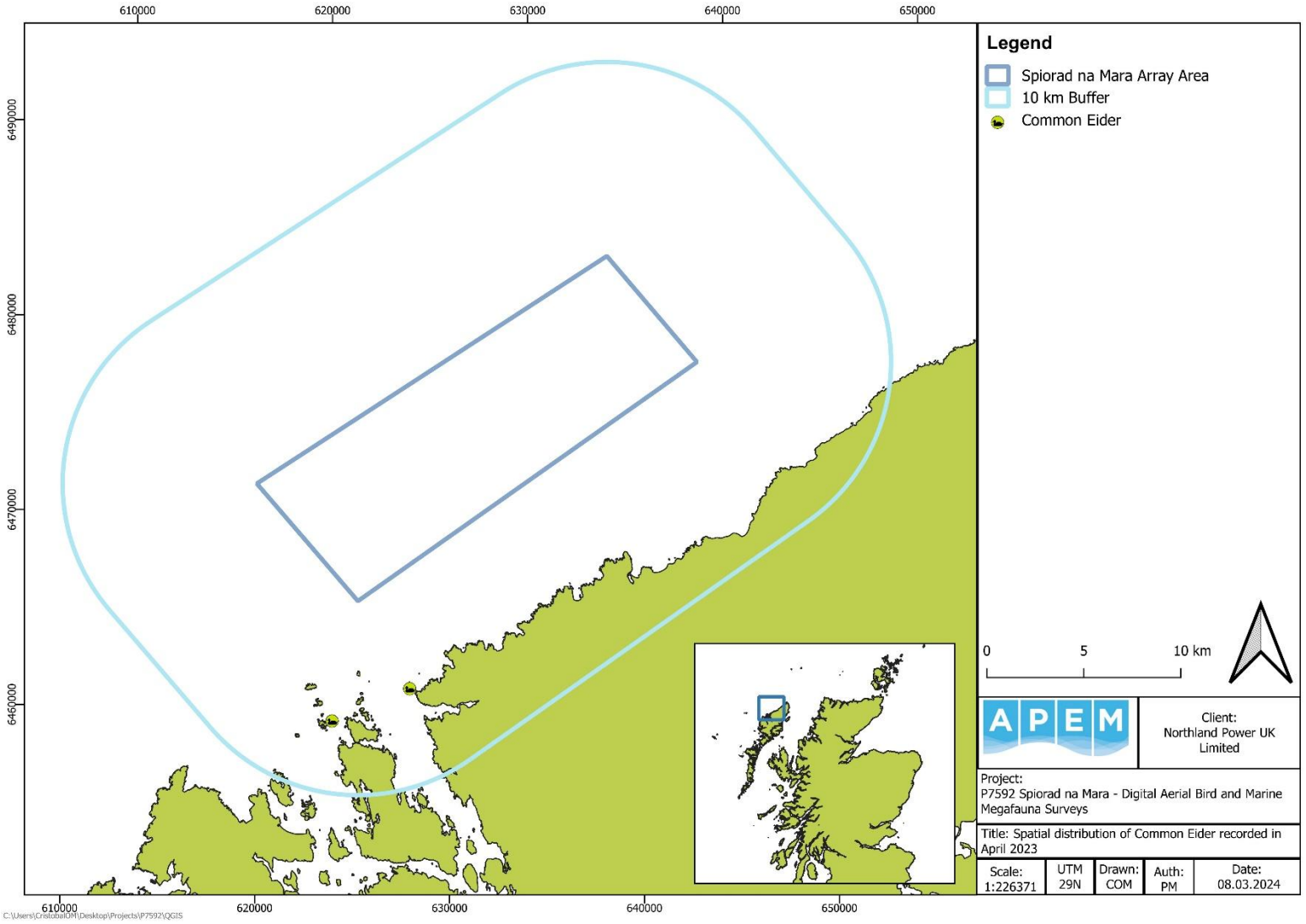


Figure 12 Distribution of common eider in April 2023

*Note that individuals in close proximity may appear overlaying.

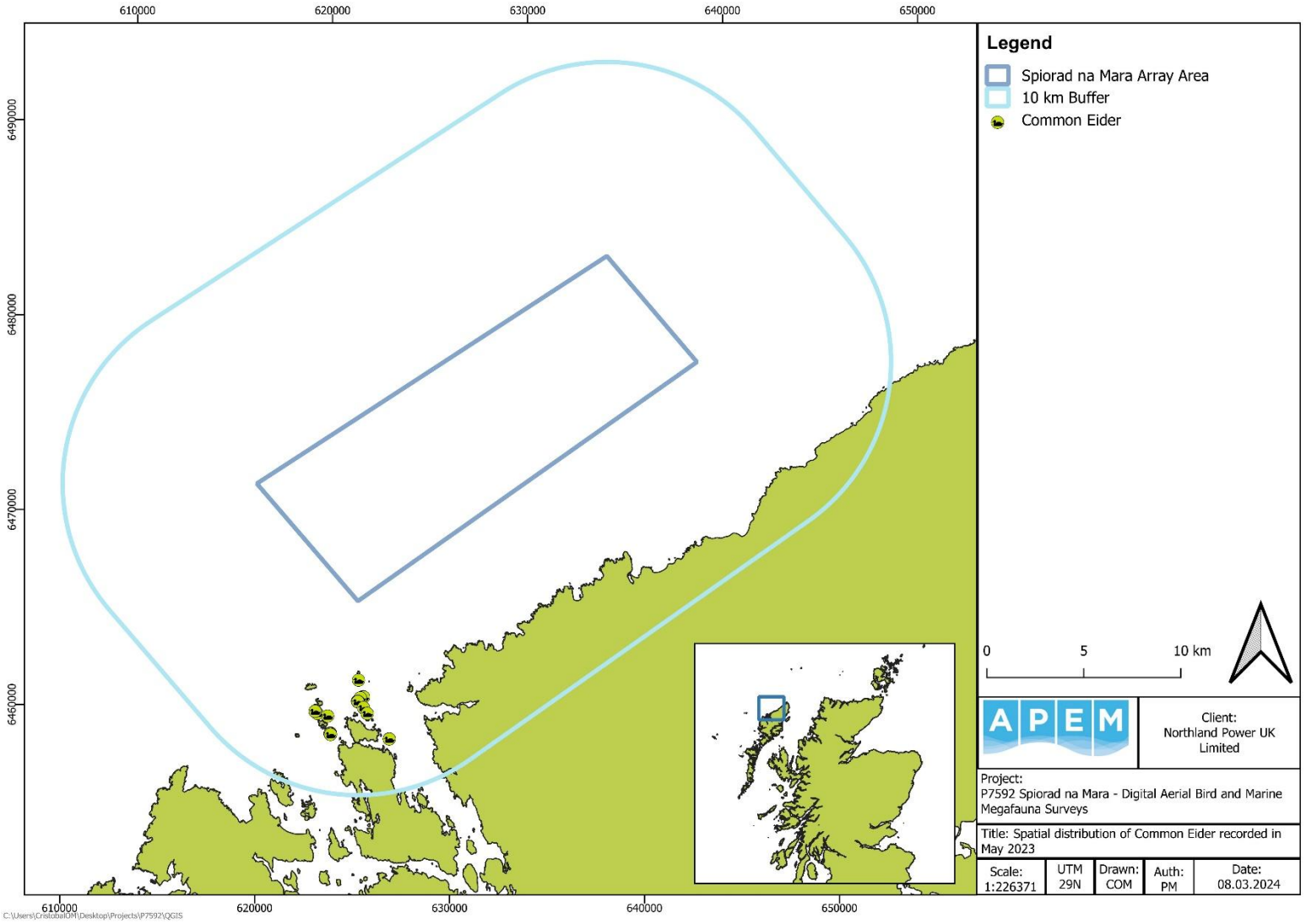


Figure 13 Distribution of common eider in May 2023

*Note that individuals in close proximity may appear overlaying.

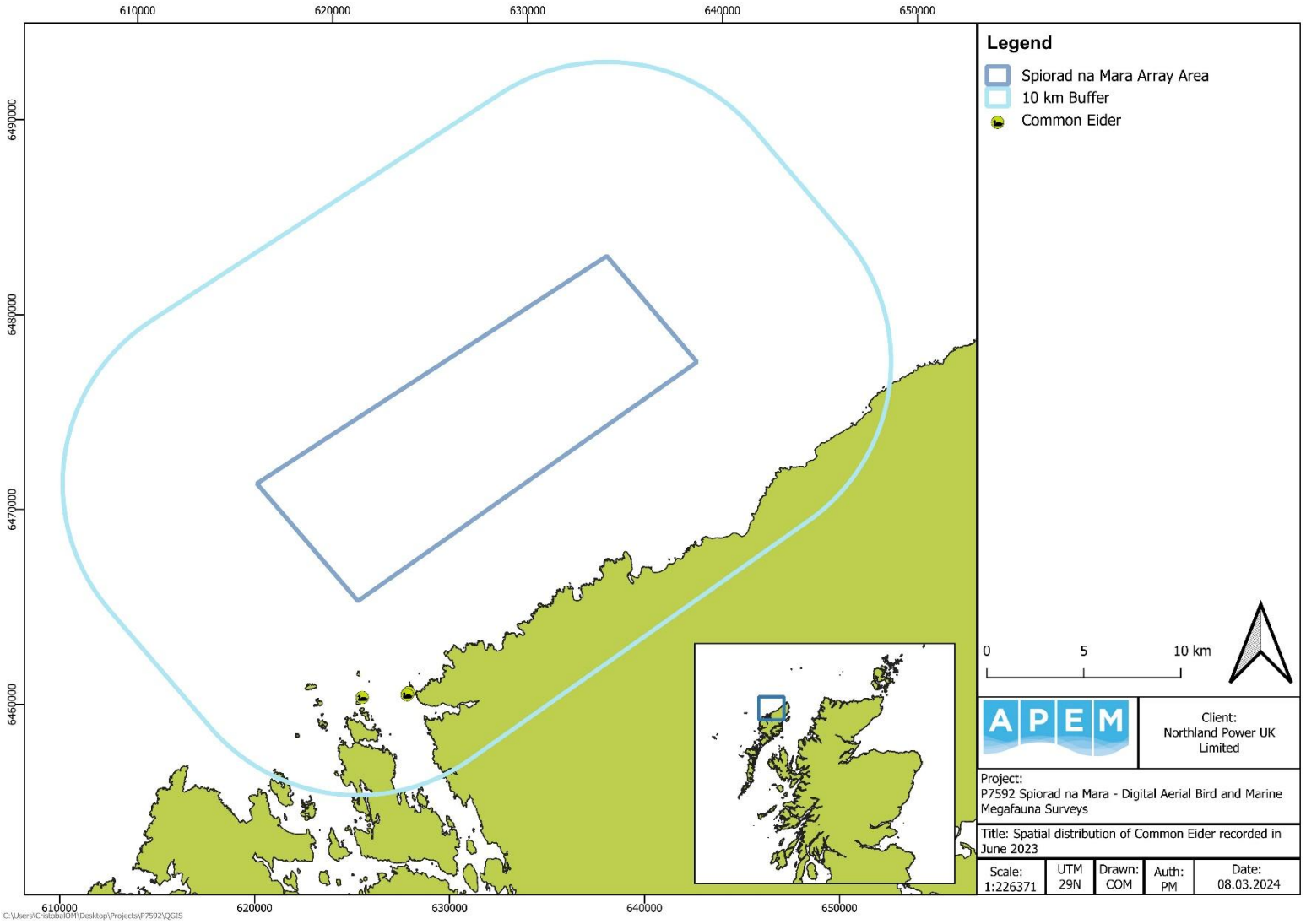


Figure 14 Distribution of common eider in June 2023

*Note that individuals in close proximity may appear overlaying.

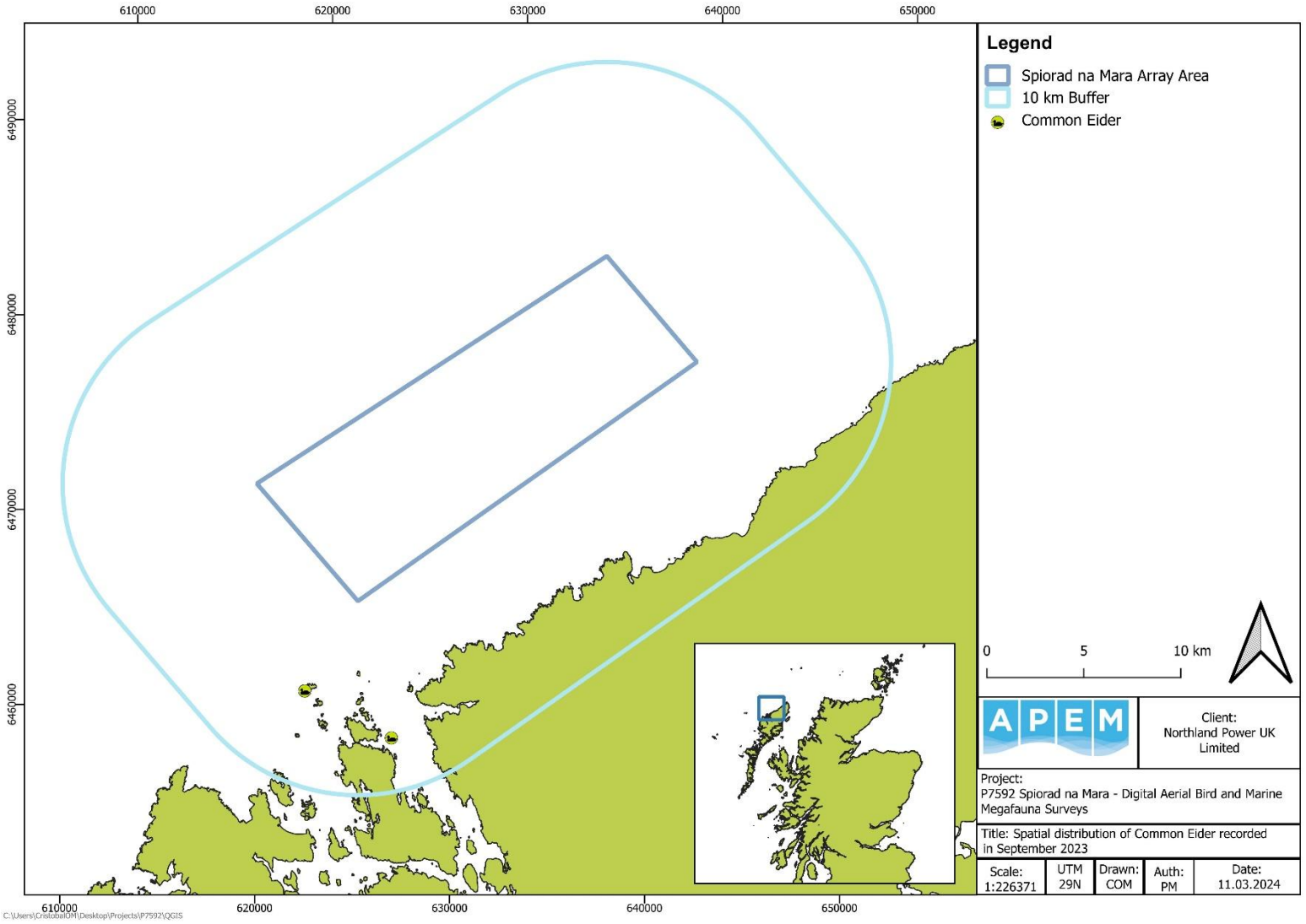


Figure 15 Distribution of common eider in September 2023

*Note that individuals in close proximity may appear overlaying.

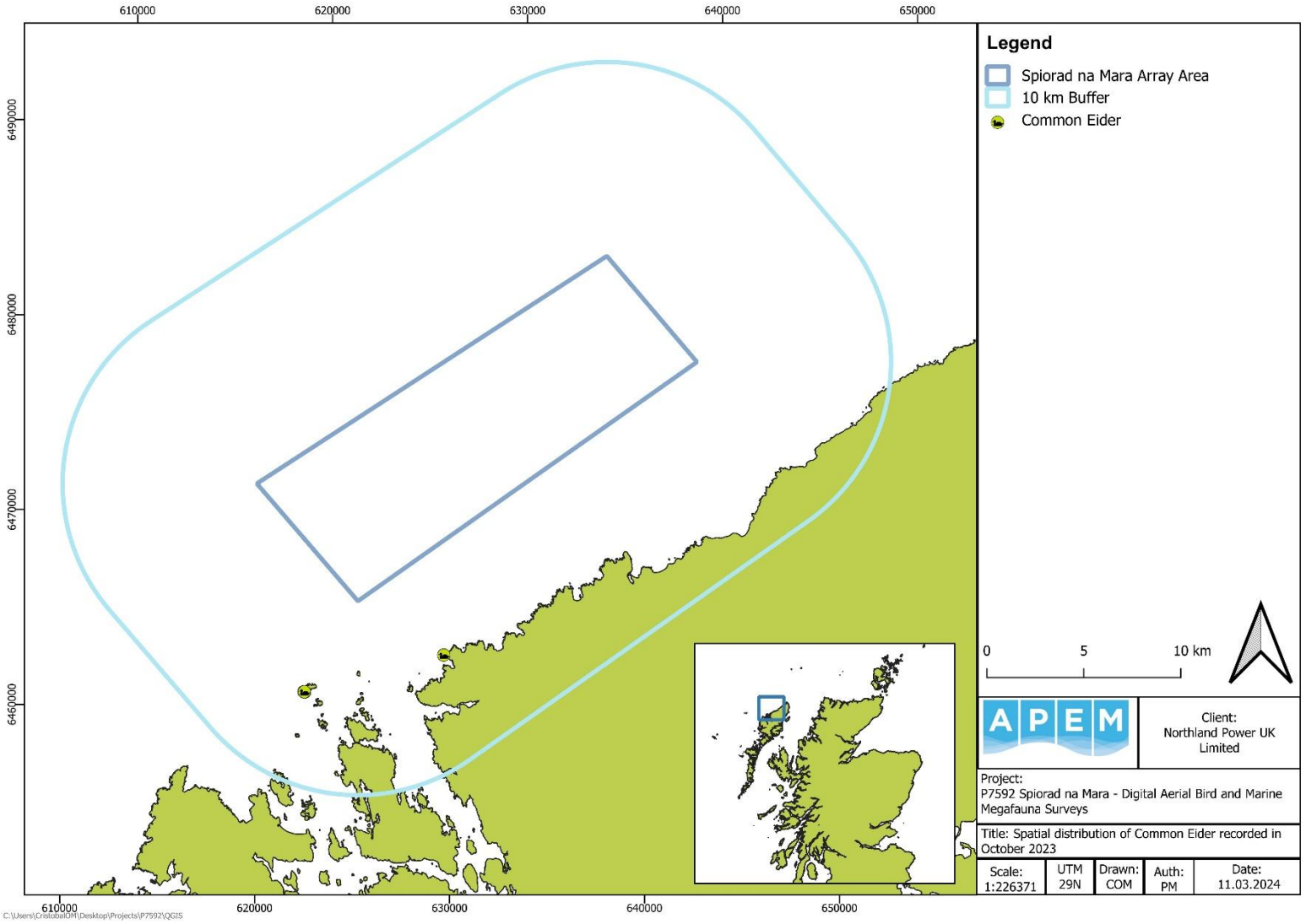


Figure 16 Distribution of common eider in October 2023

*Note that individuals in close proximity may appear overlaying.

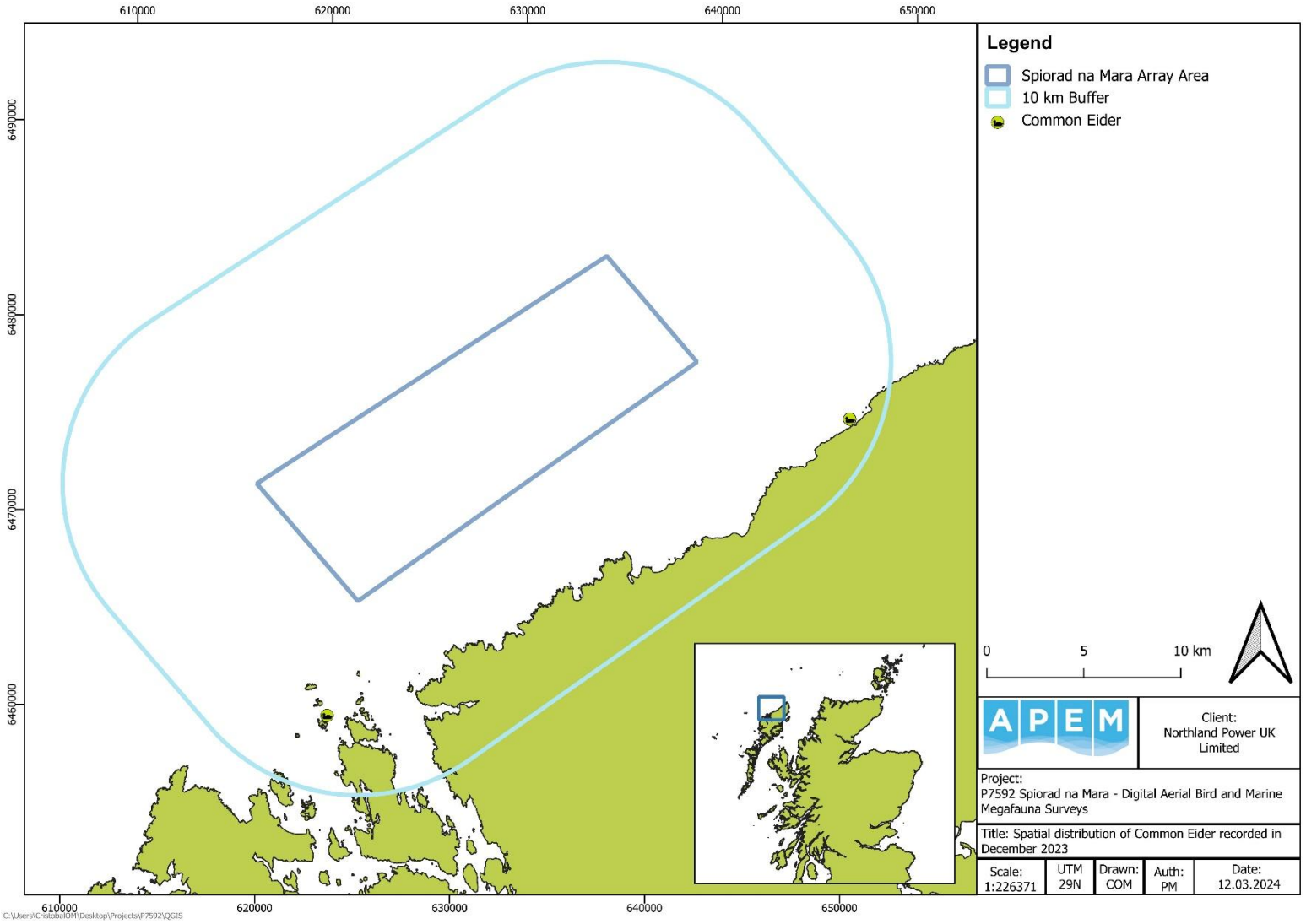


Figure 17 Distribution of common eider in December 2023

*Note that individuals in close proximity may appear overlaying.

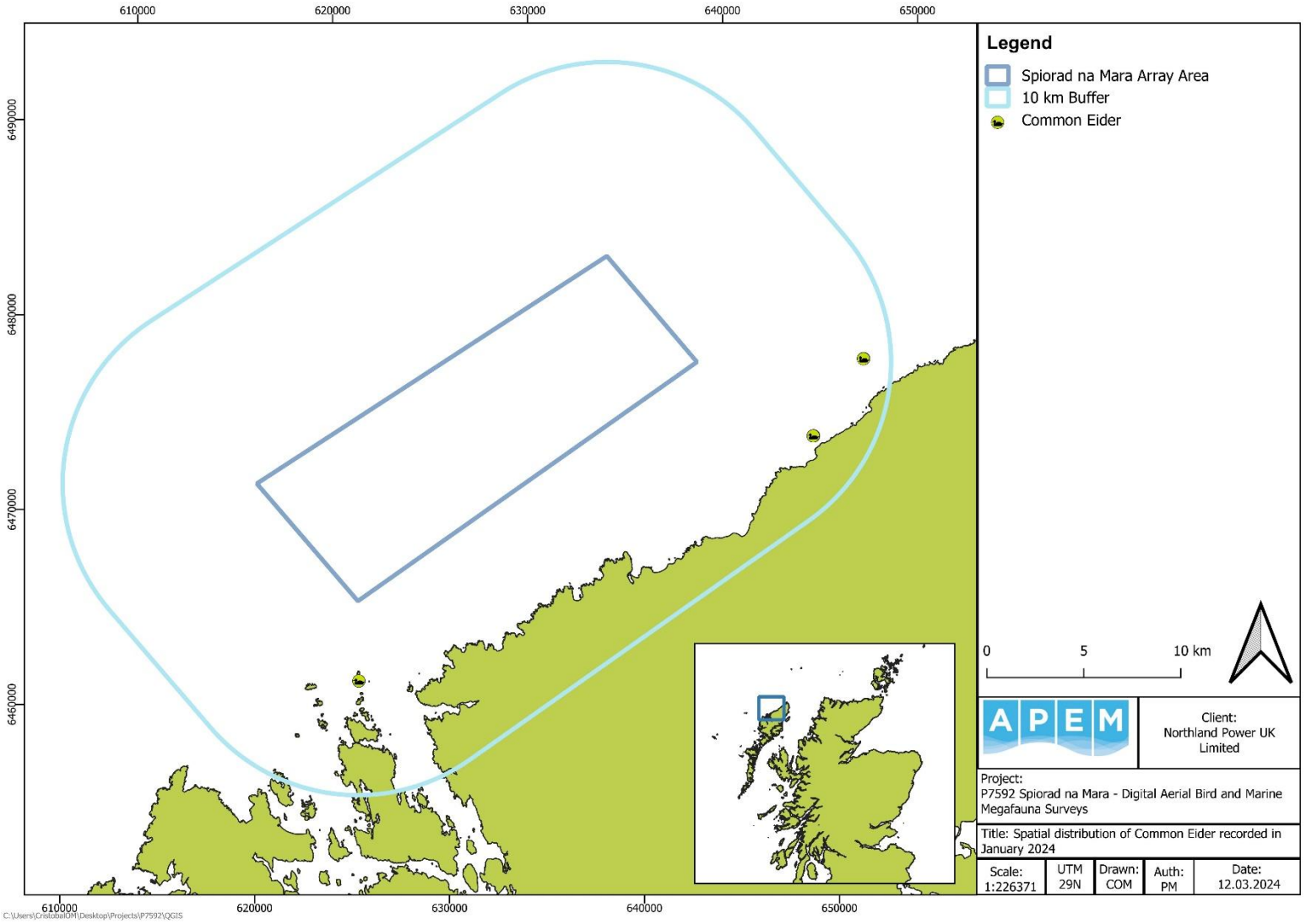


Figure 18 Distribution of common eider in January 2024

*Note that individuals in close proximity may appear overlaying.

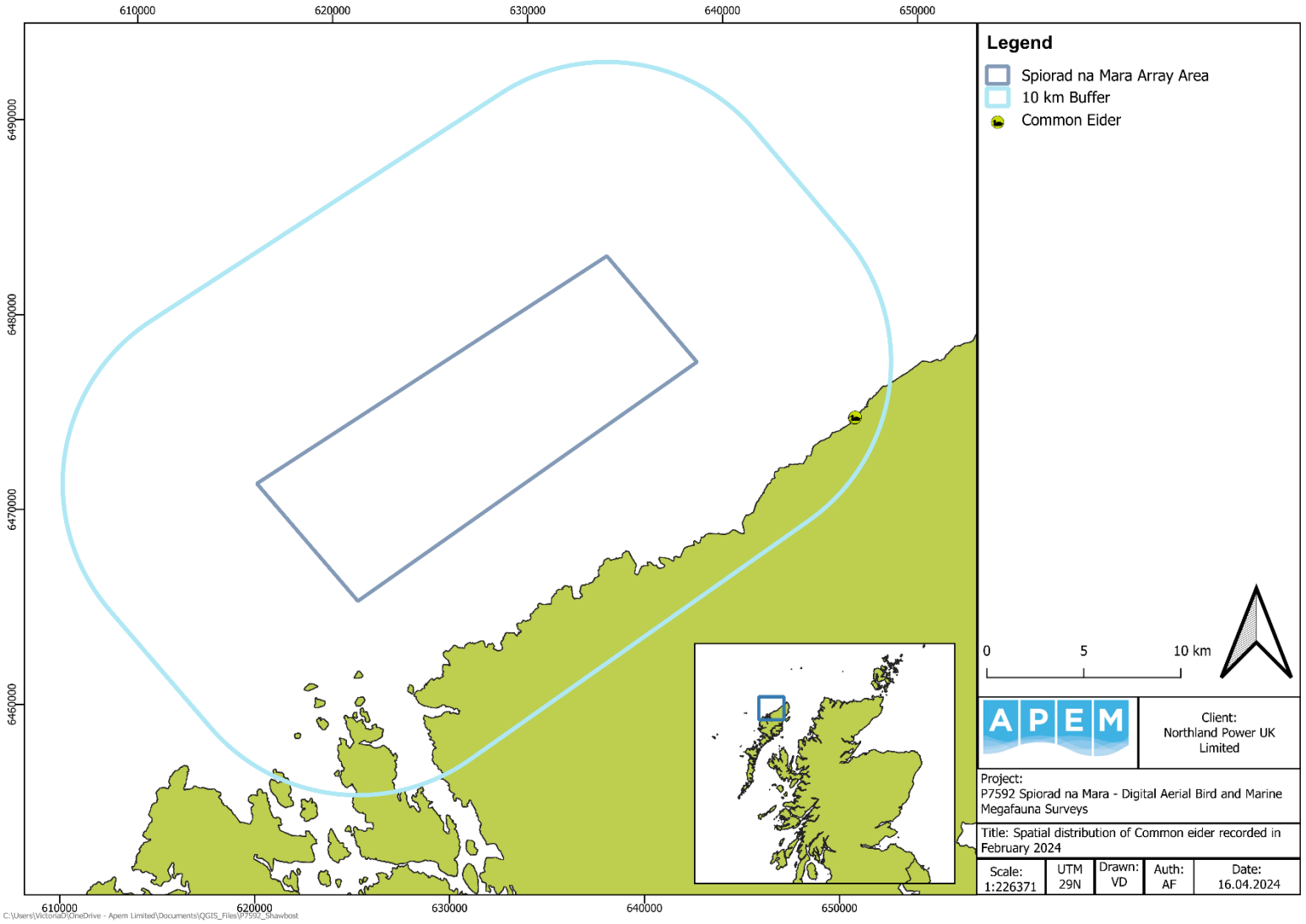


Figure 19 Distribution of common eider in February 2024

*Note that individuals in close proximity may appear overlaying.

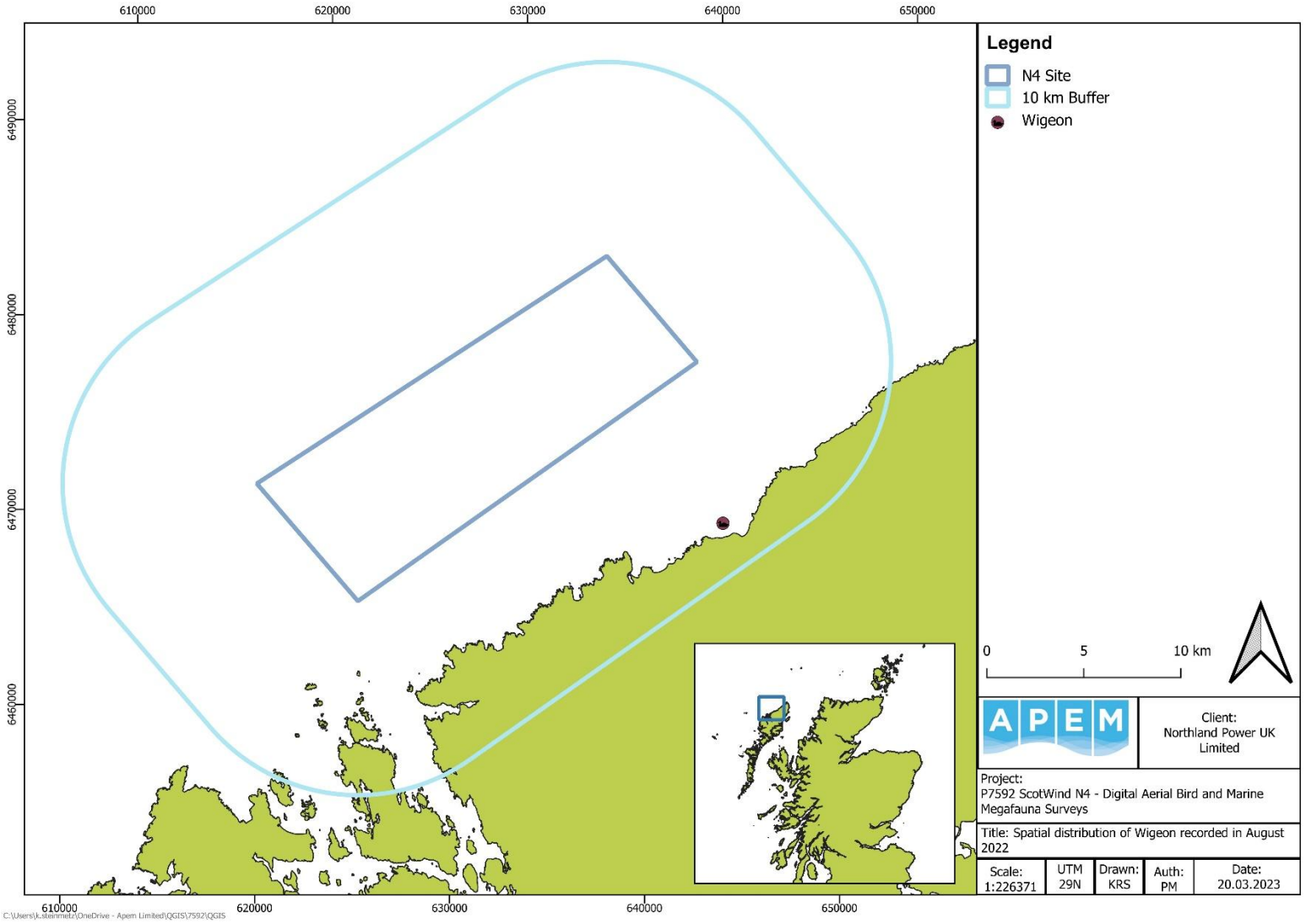


Figure 20 Distribution of wigeon in August 2022
*Note that individuals in close proximity may appear overlaying.

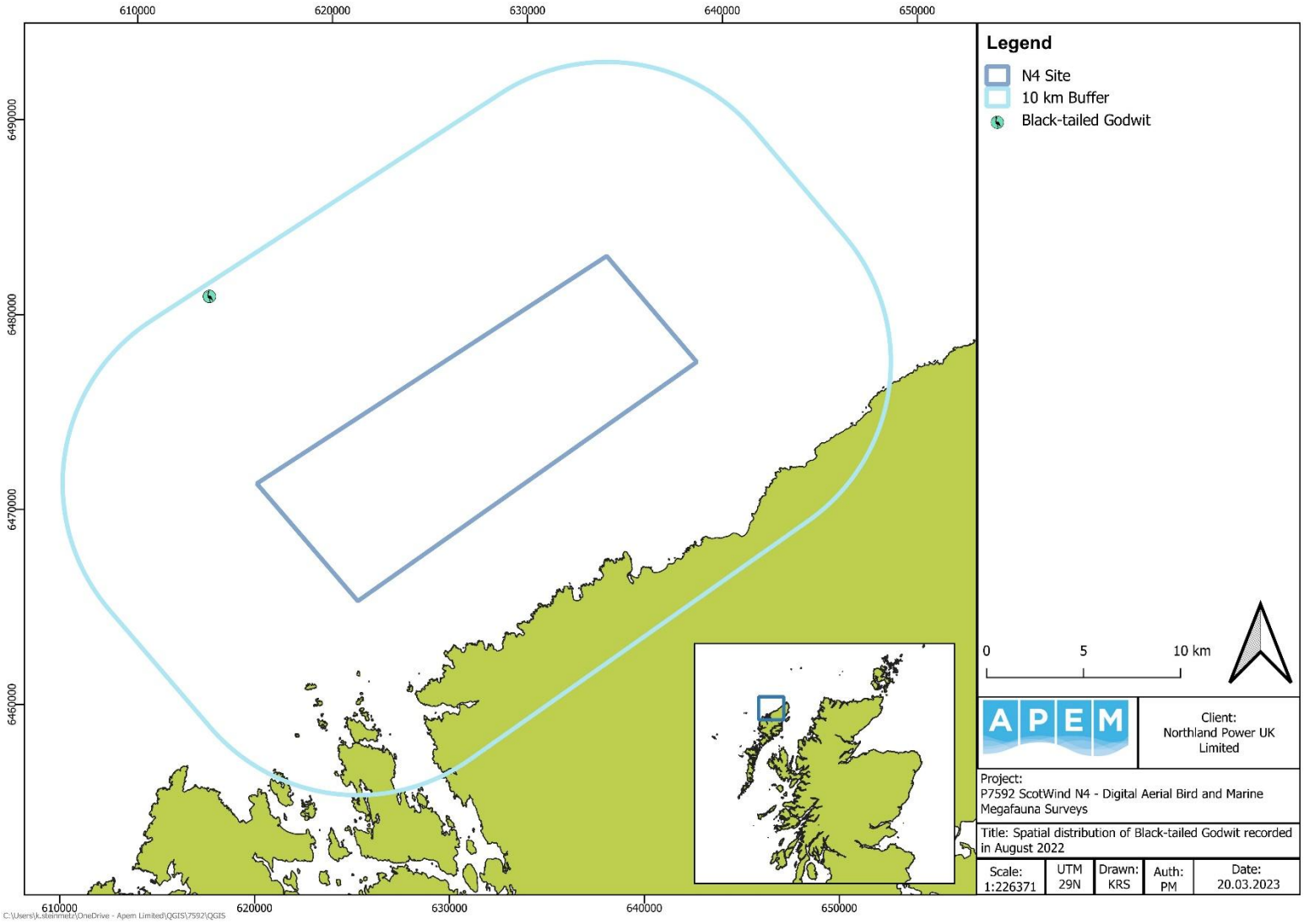


Figure 21 Distribution of black-tailed godwit in August 2022
*Note that individuals in close proximity may appear overlaying.

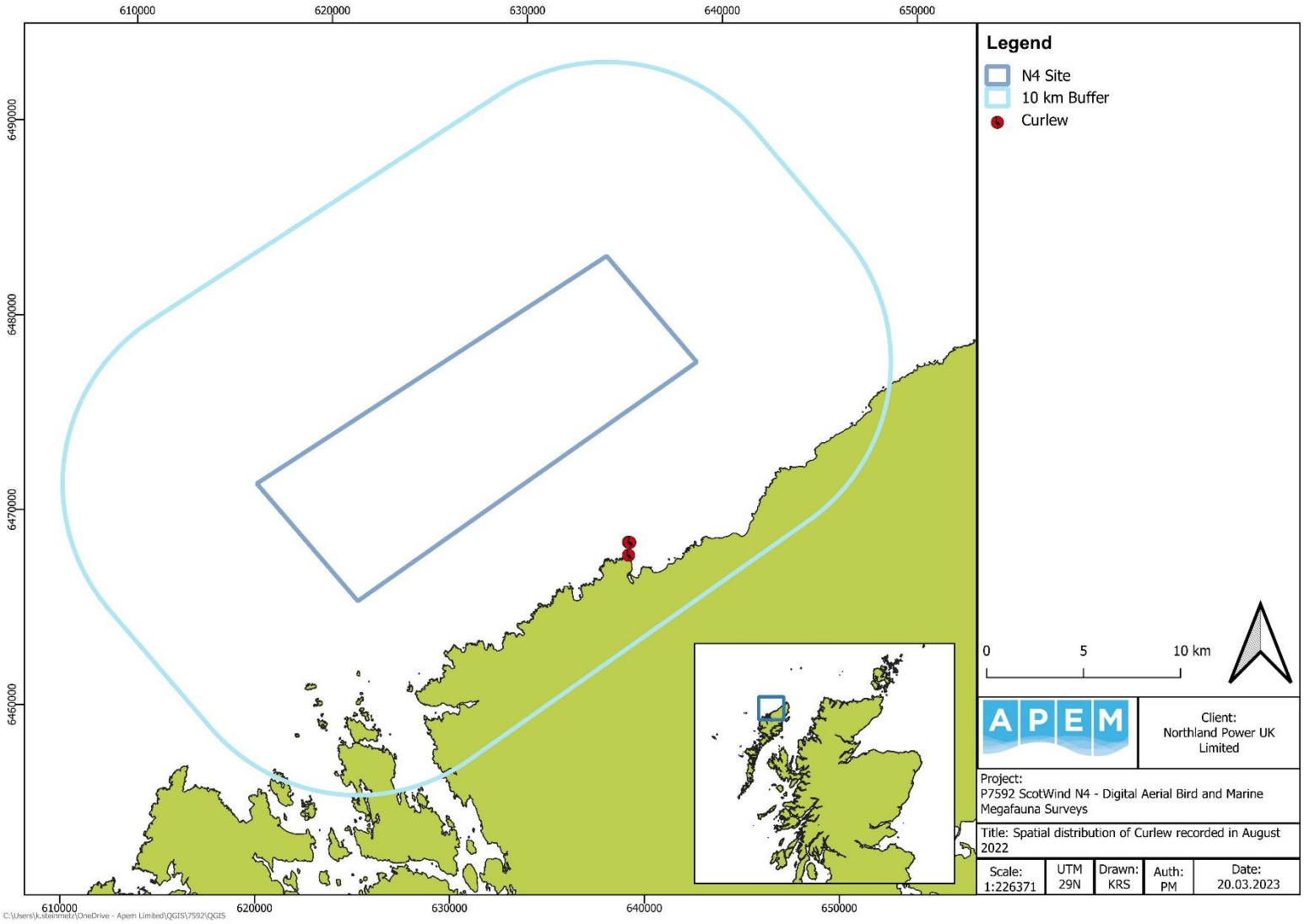


Figure 22 Distribution of curlew in August 2022
*Note that individuals in close proximity may appear overlaying.

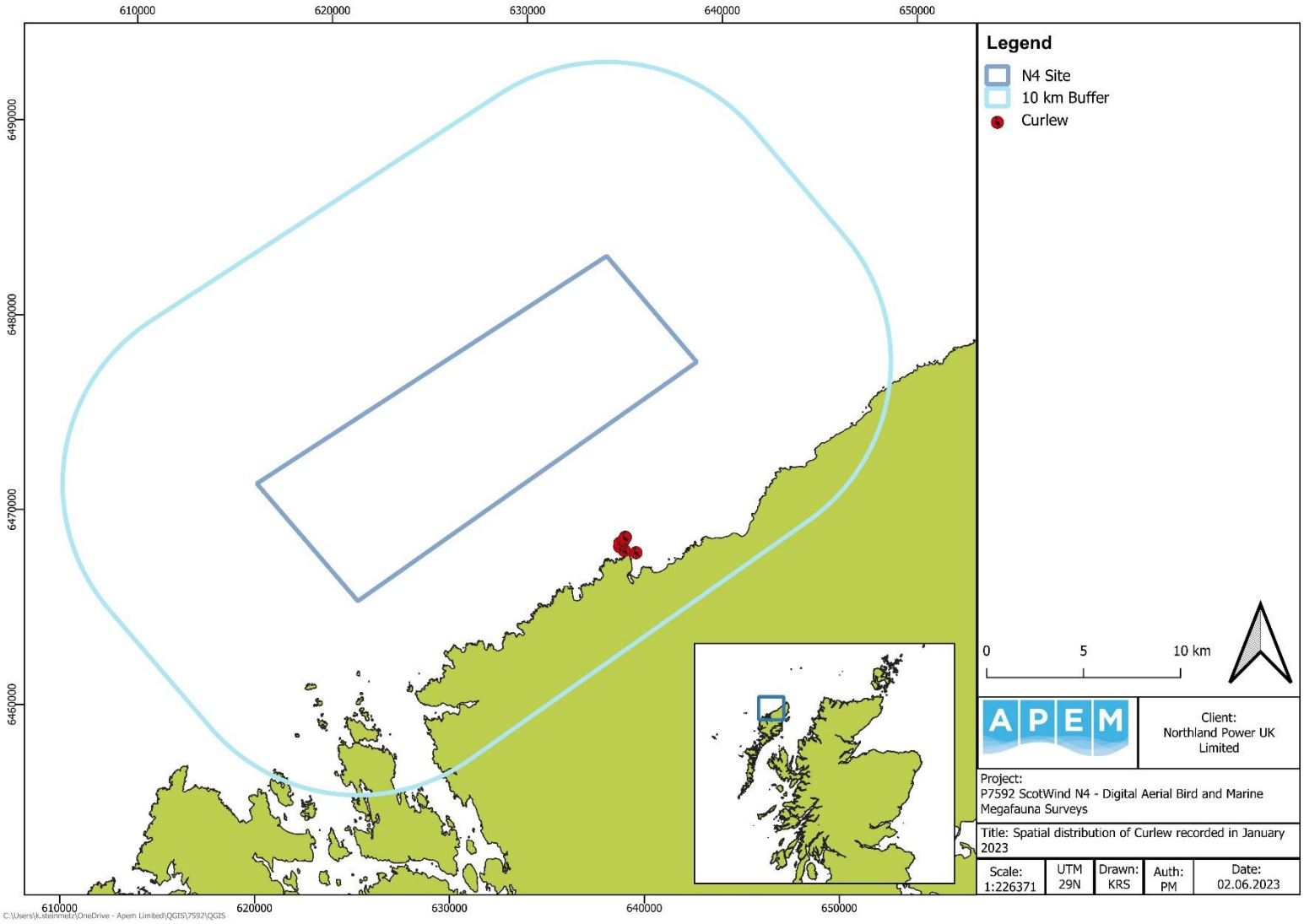


Figure 23 Distribution of curlew in January 2023
*Note that individuals in close proximity may appear overlaying.

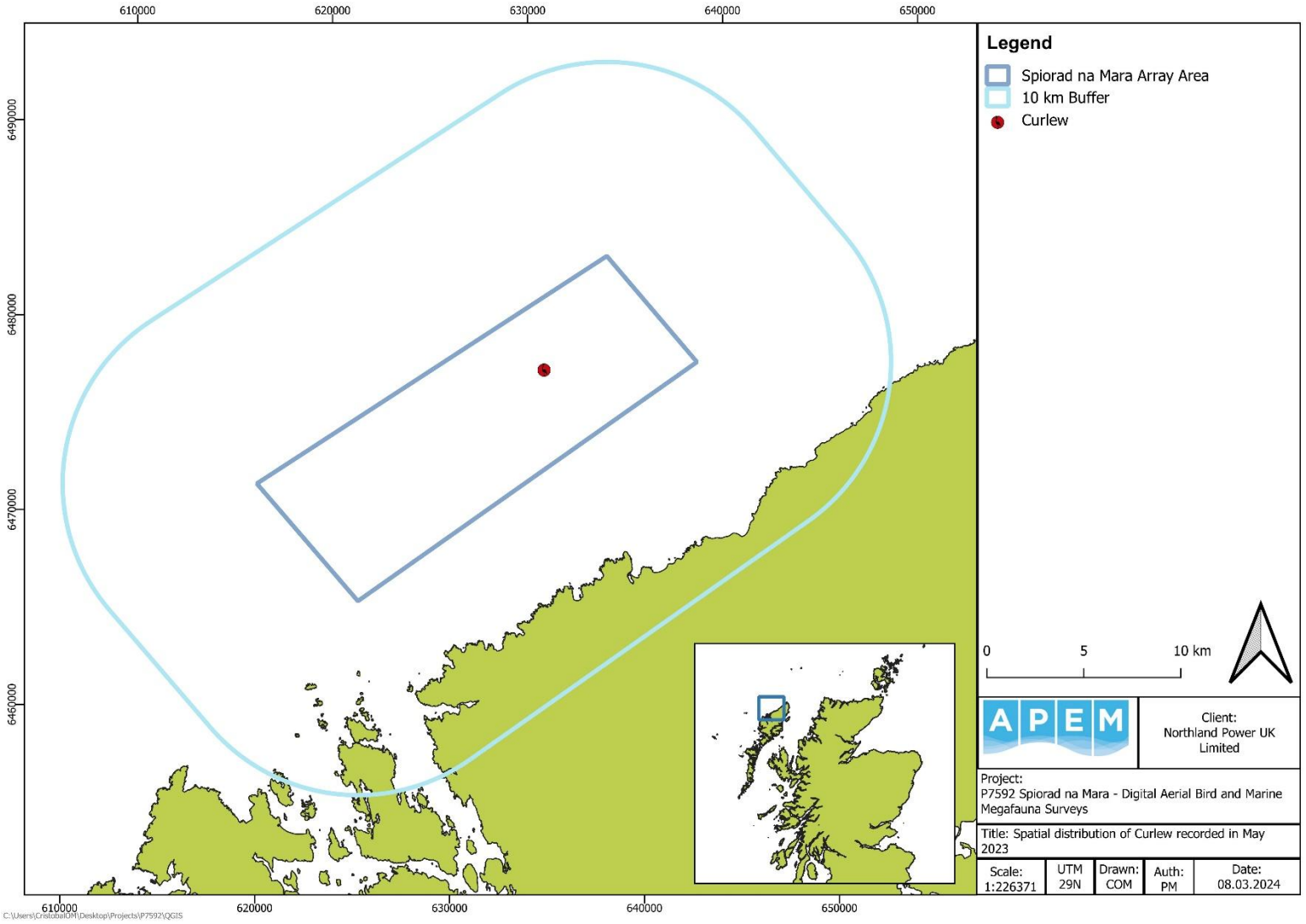


Figure 24 Distribution of curlew in May 2023
*Note that individuals in close proximity may appear overlaying.

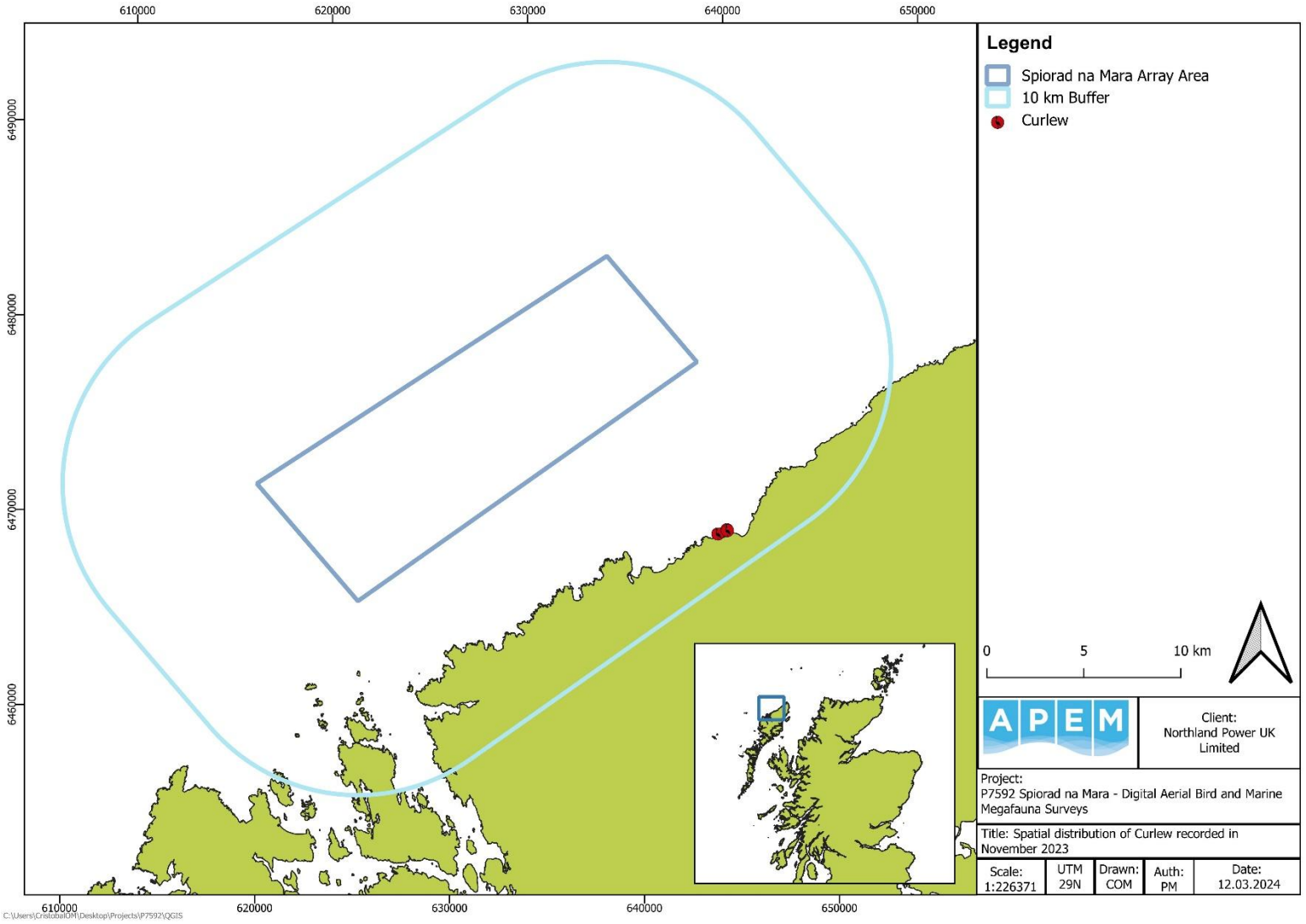


Figure 25 Distribution of curlew in November 2023

*Note that individuals in close proximity may appear overlaying.

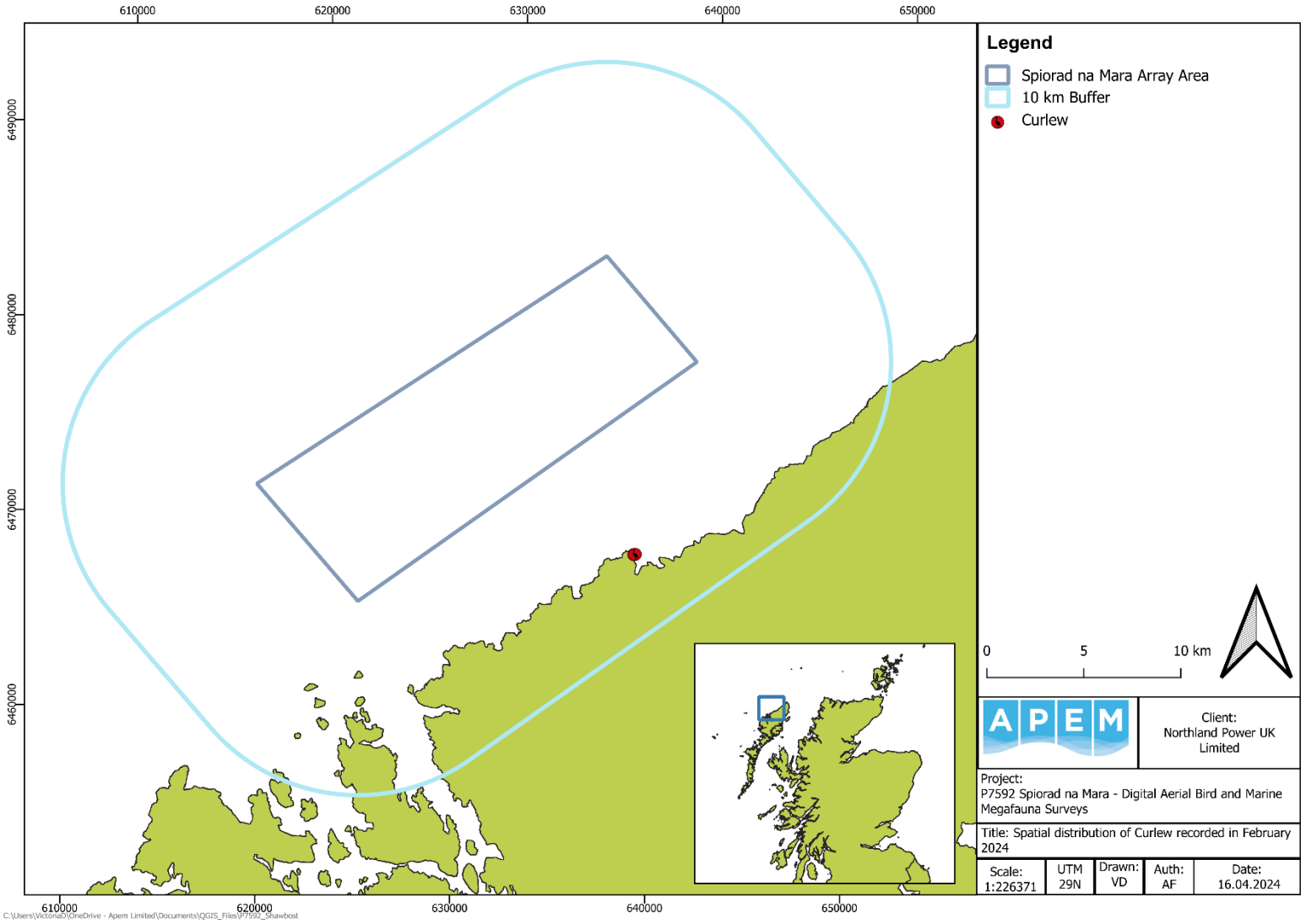


Figure 26 Distribution of curlew in February 2024

*Note that individuals in close proximity may appear overlaying.

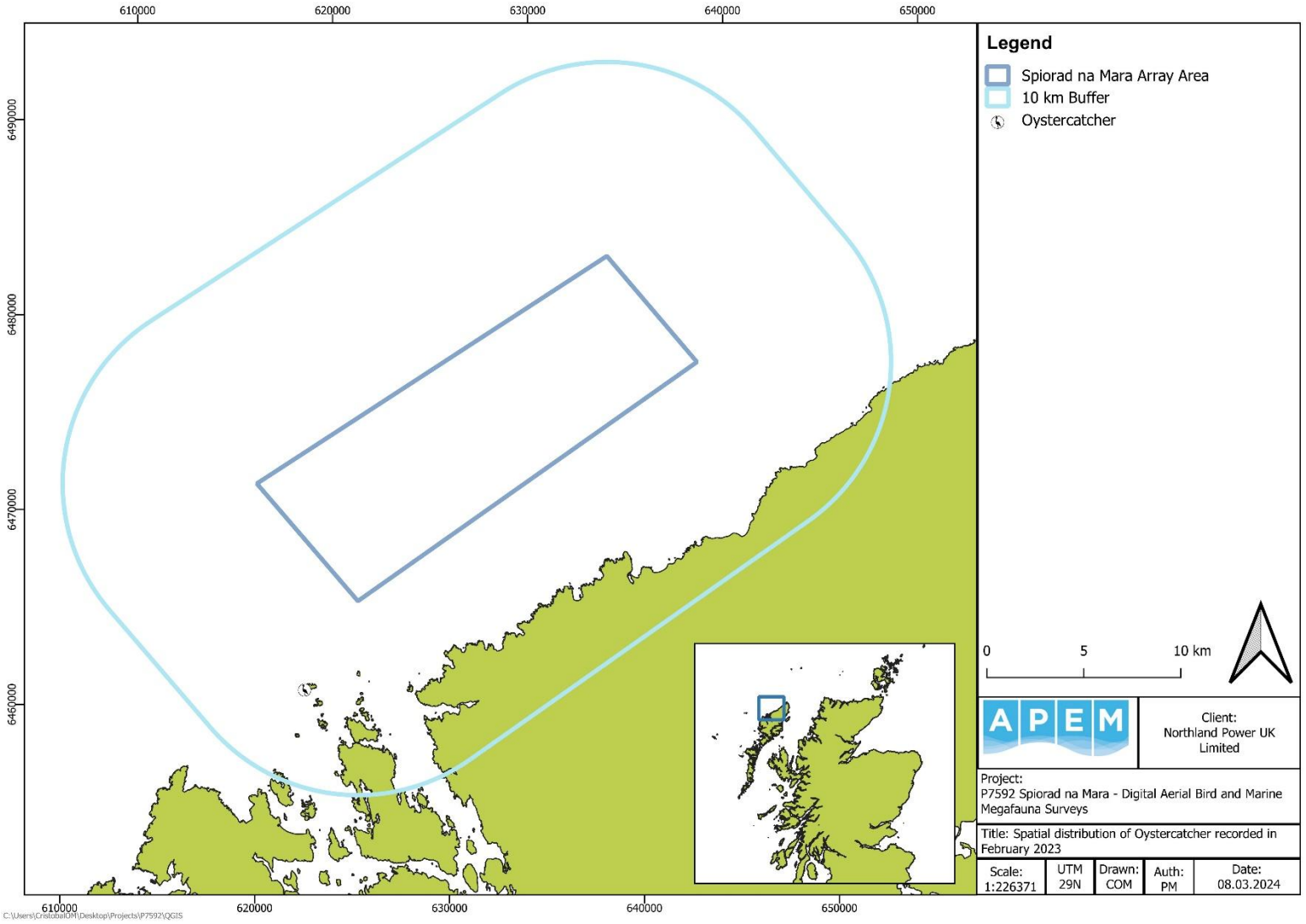


Figure 27 Distribution of oystercatcher in February 2023

*Note that individuals in close proximity may appear overlaying.

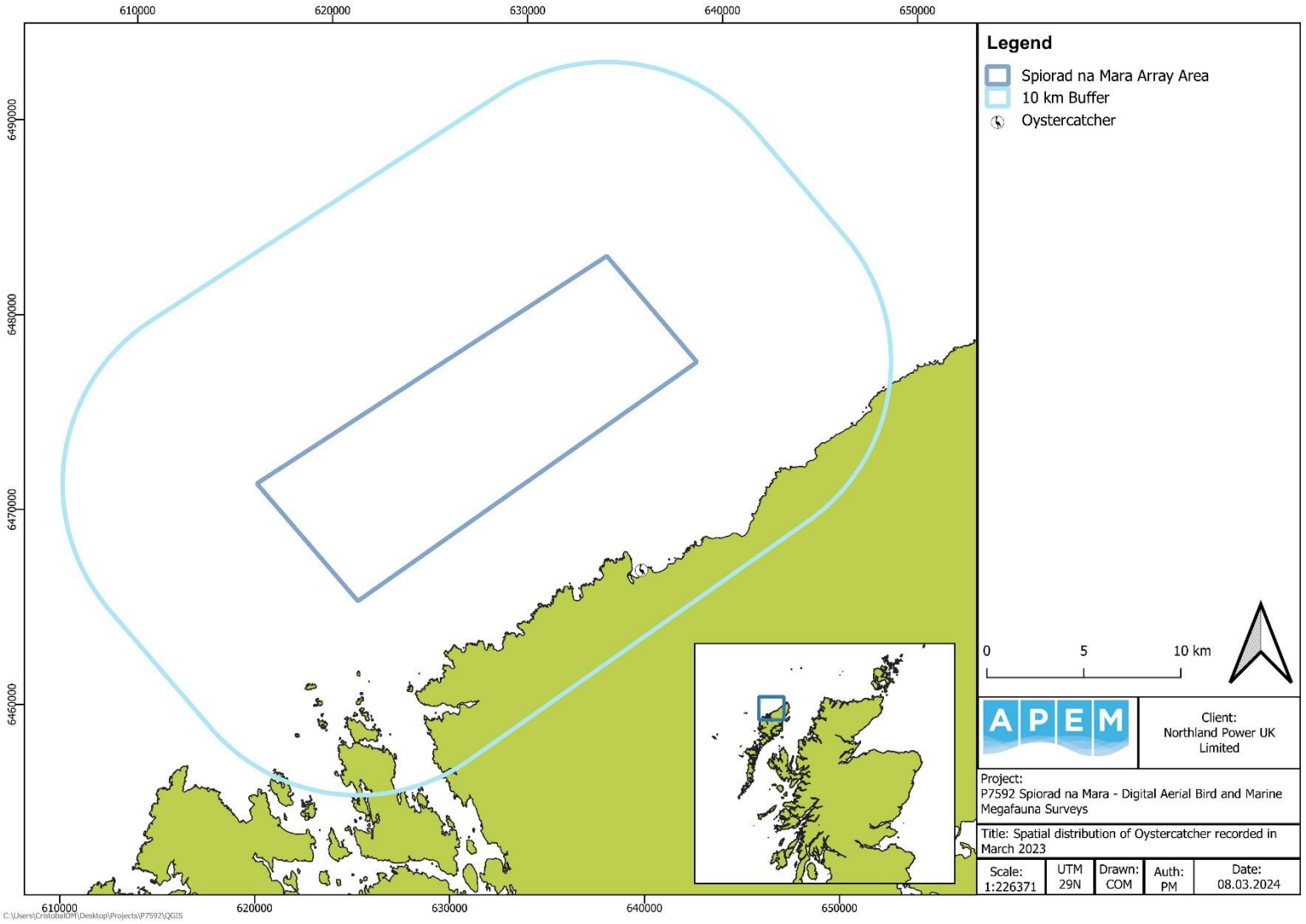


Figure 28 Distribution of oystercatcher in March 2023

*Note that individuals in close proximity may appear overlaying.

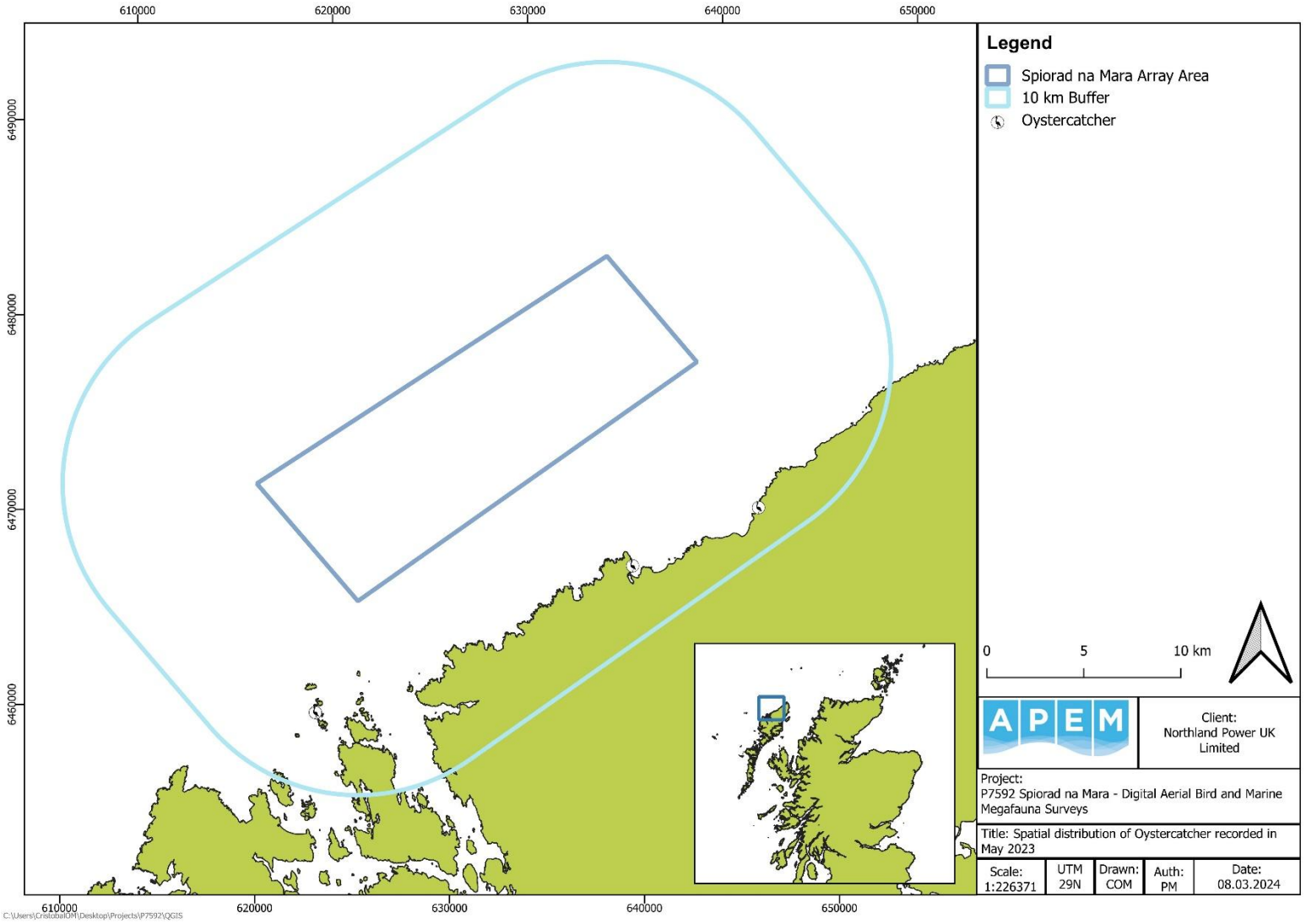


Figure 29 Distribution of oystercatcher in May 2023

*Note that individuals in close proximity may appear overlaying.

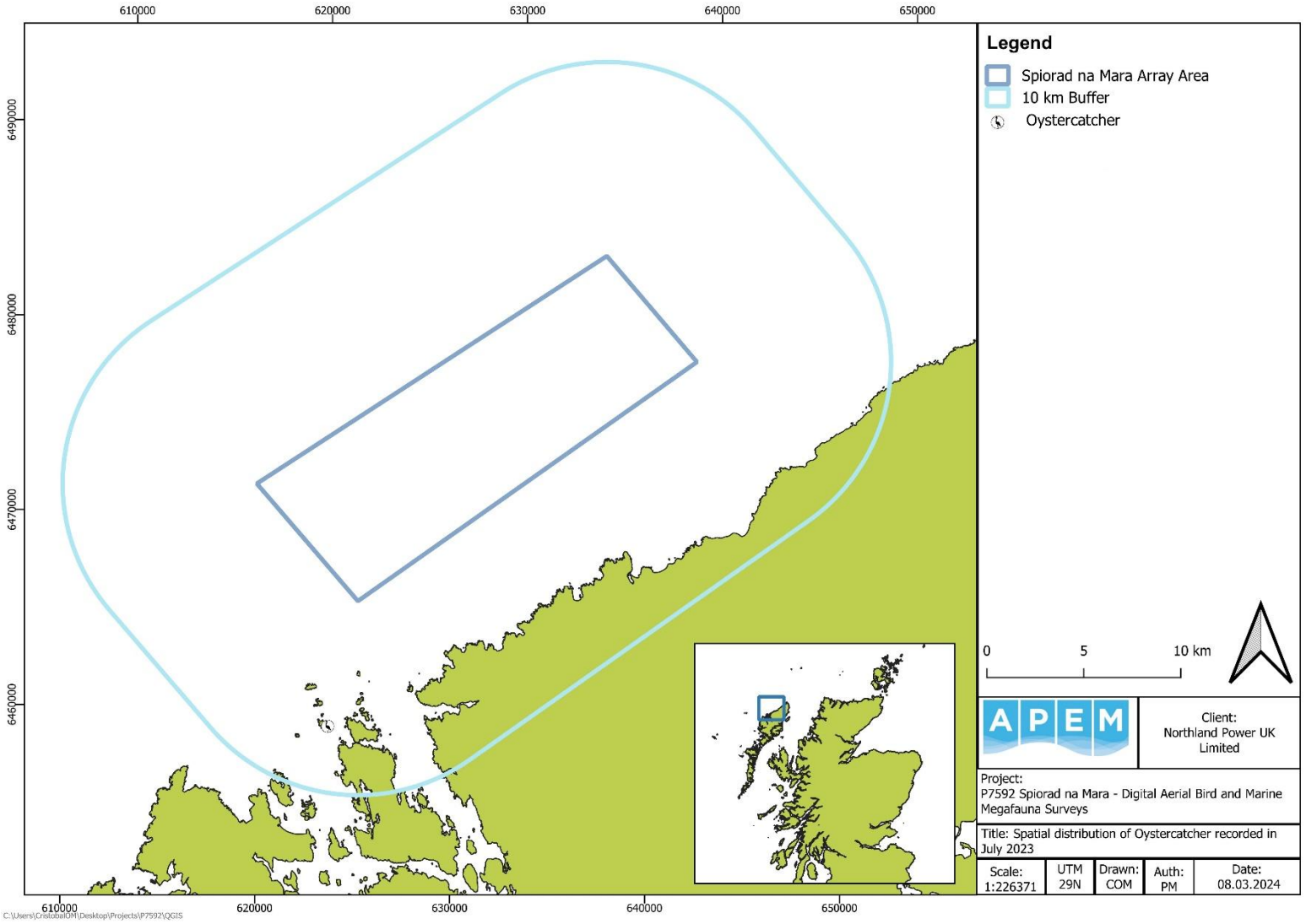


Figure 30 Distribution of oystercatcher in July 2023

*Note that individuals in close proximity may appear overlaying.

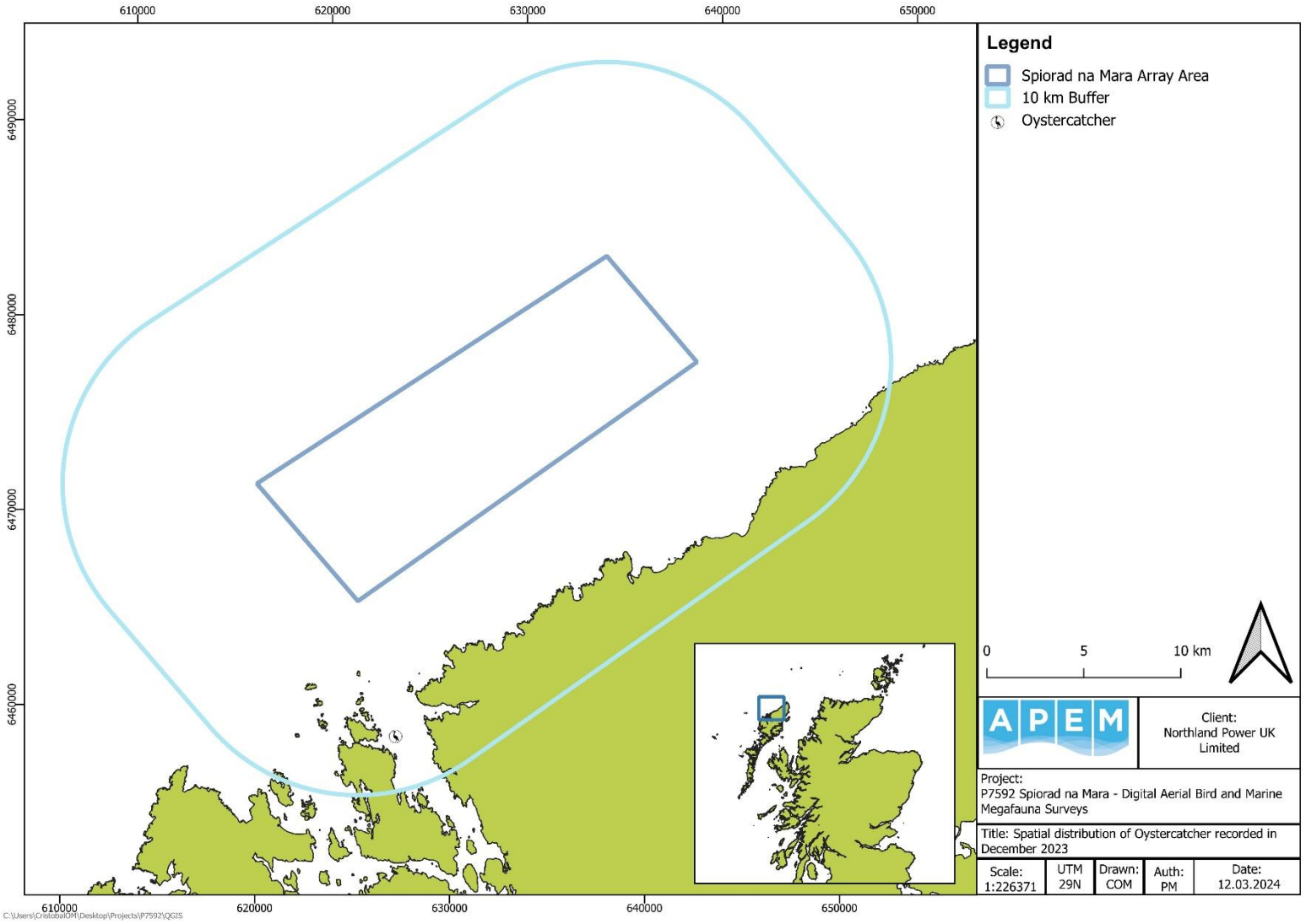


Figure 31 Distribution of oystercatcher in December 2023

*Note that individuals in close proximity may appear overlaying.

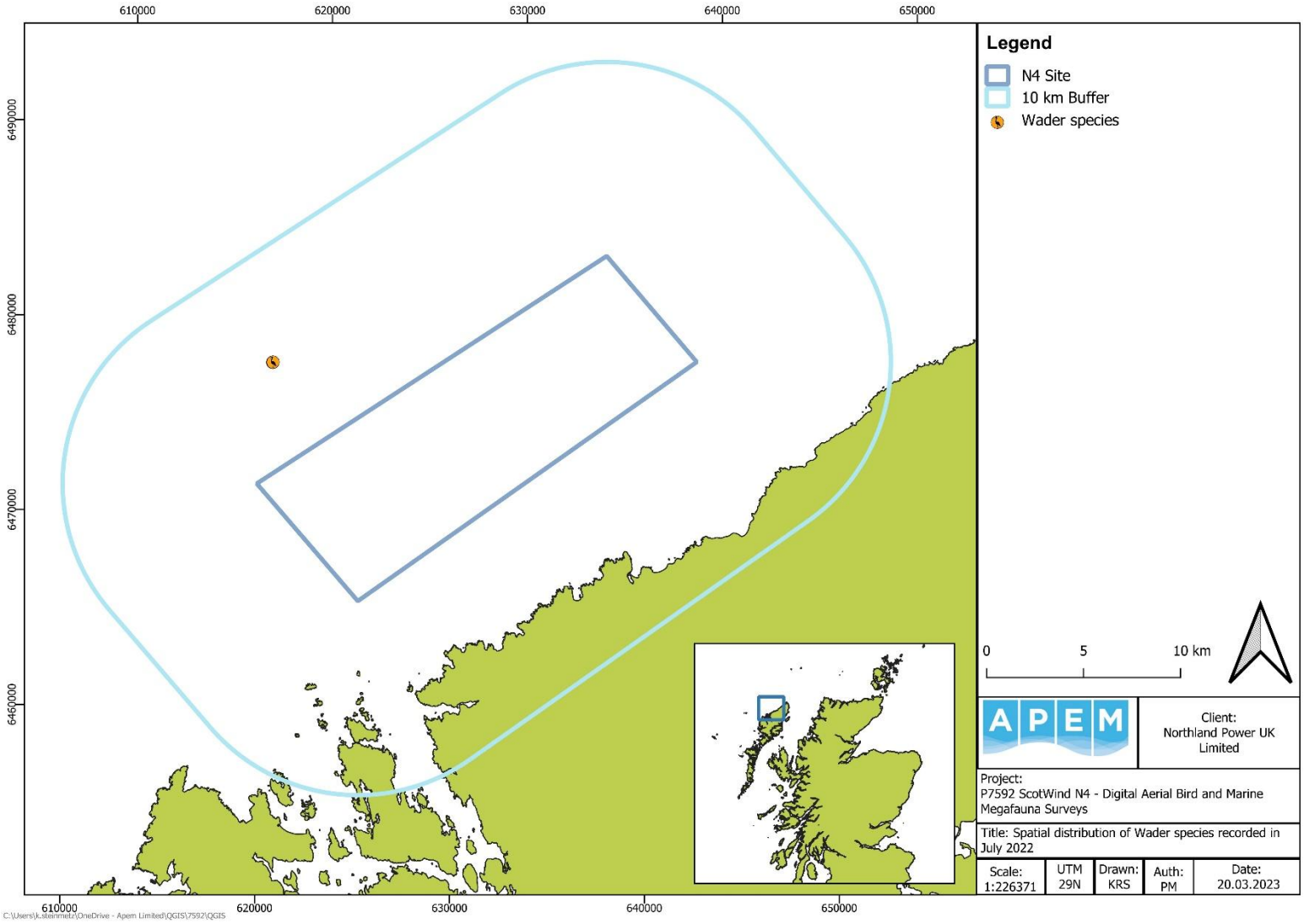


Figure 32 Distribution of wader species in July 2022

*Note that individuals in close proximity may appear overlaying.

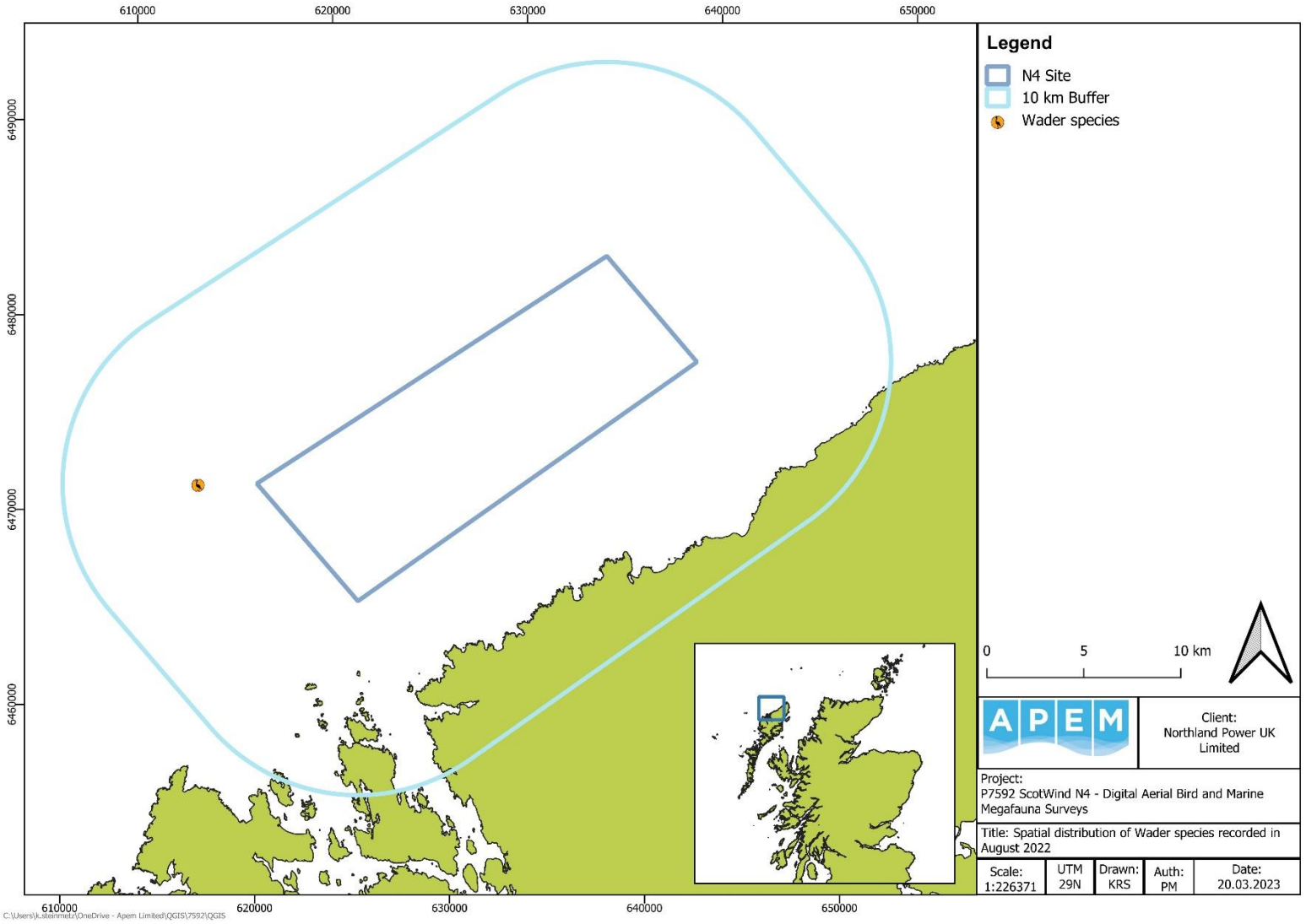


Figure 33 Distribution of wader species in August 2022

*Note that individuals in close proximity may appear overlaying.

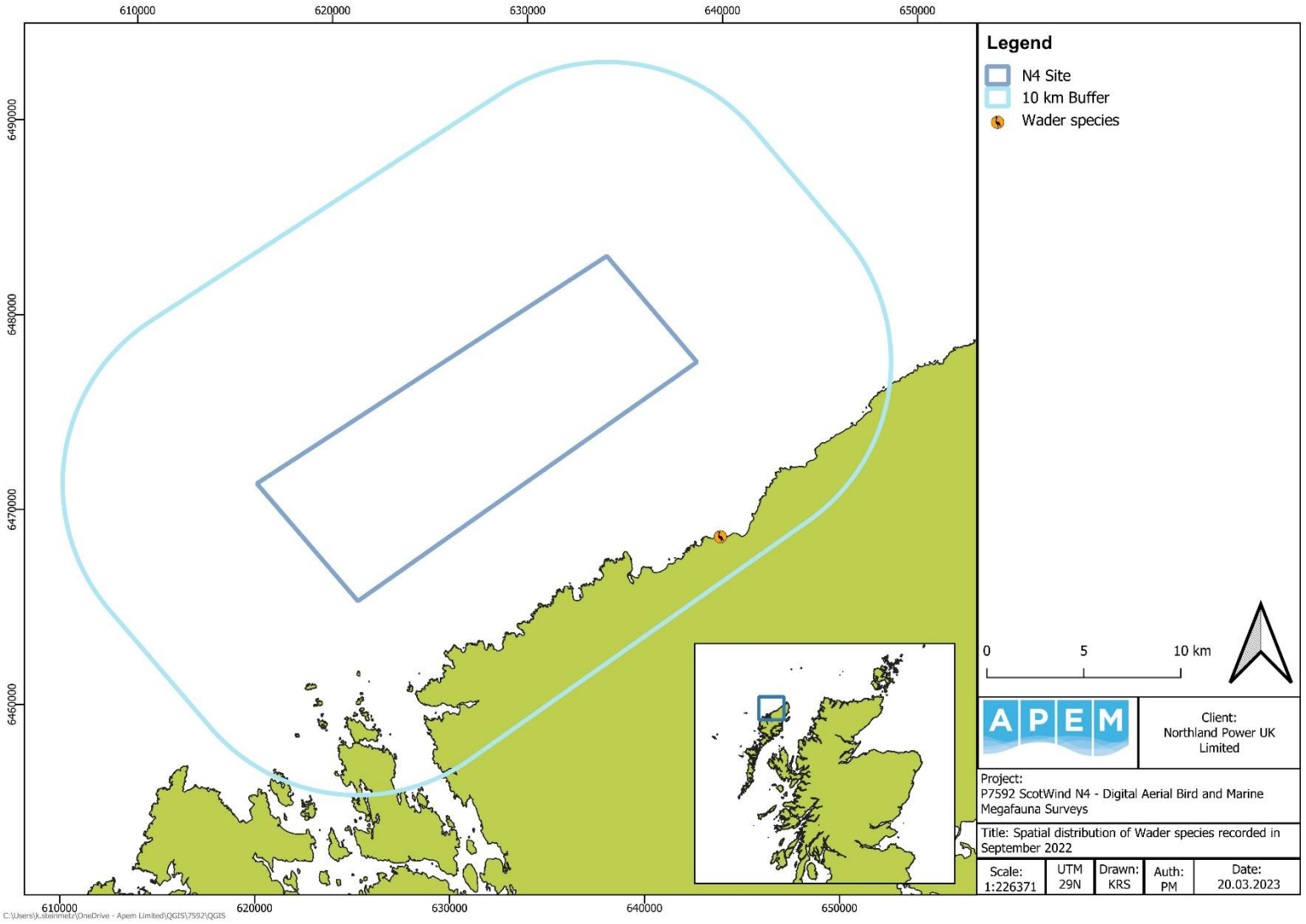


Figure 34 Distribution of wader species in September 2022

*Note that individuals in close proximity may appear overlaying.

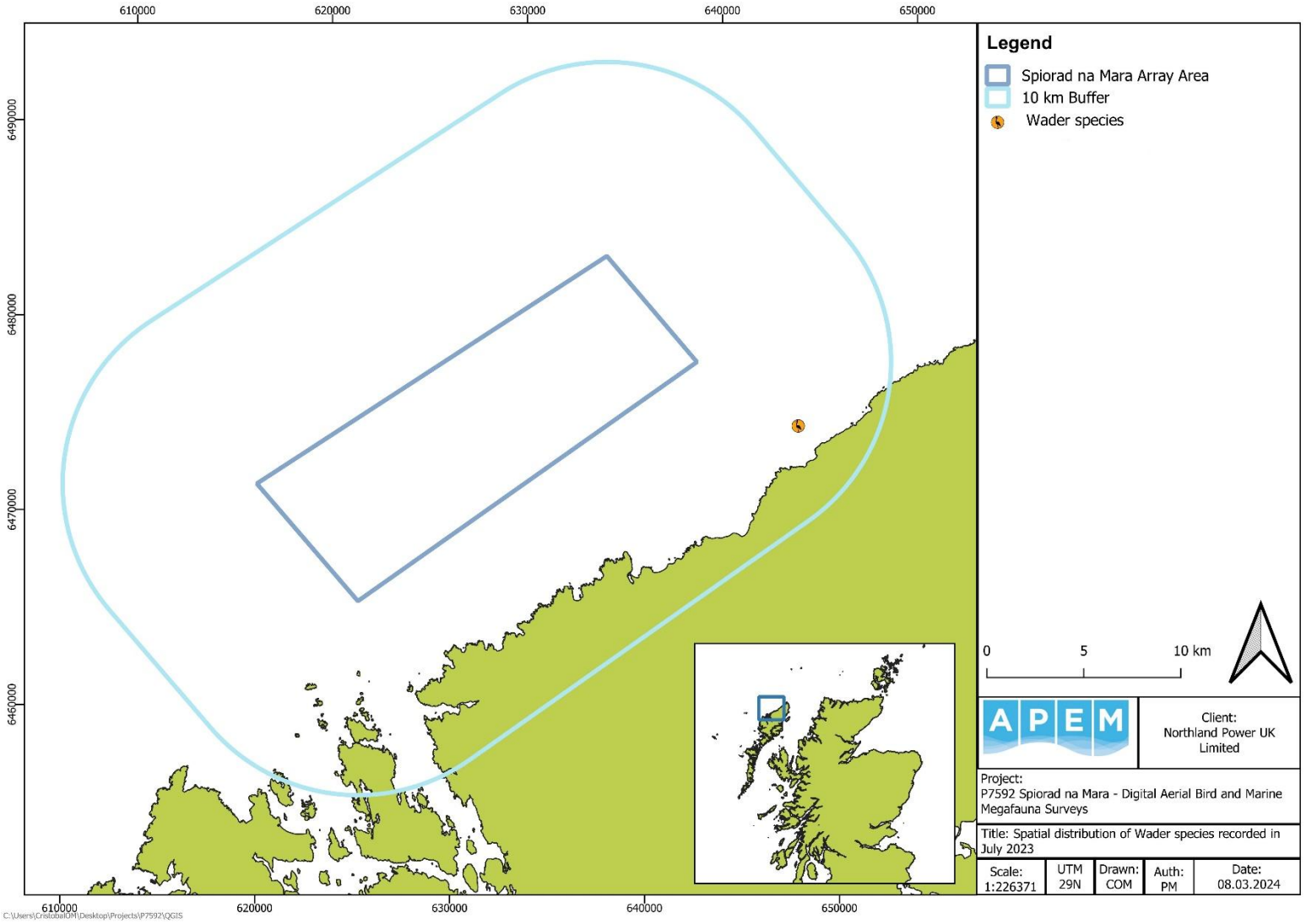


Figure 35 Distribution of wader species in July 2023

*Note that individuals in close proximity may appear overlaying.

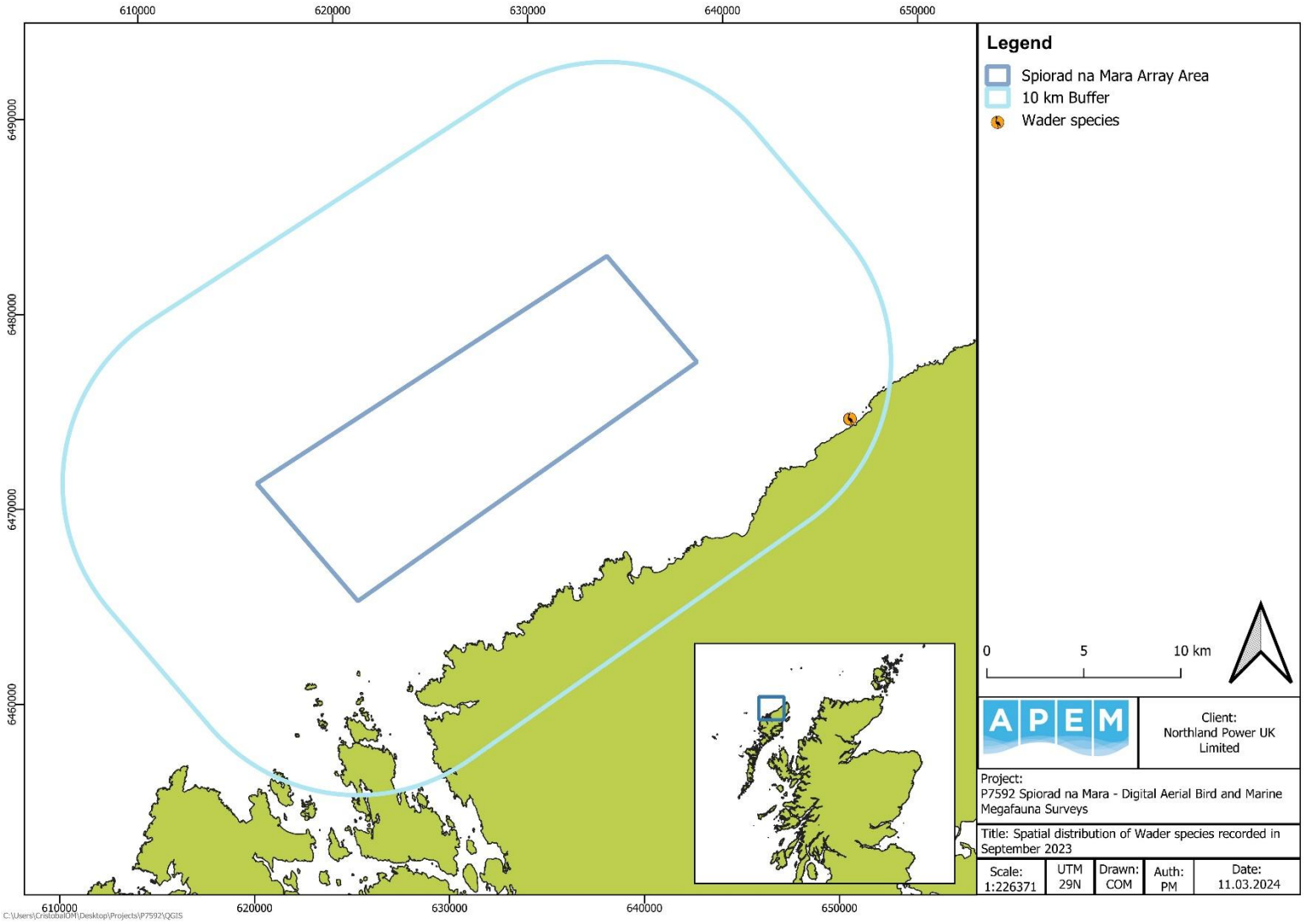


Figure 36 Distribution of wader species in September 2023

*Note that individuals in close proximity may appear overlaying.

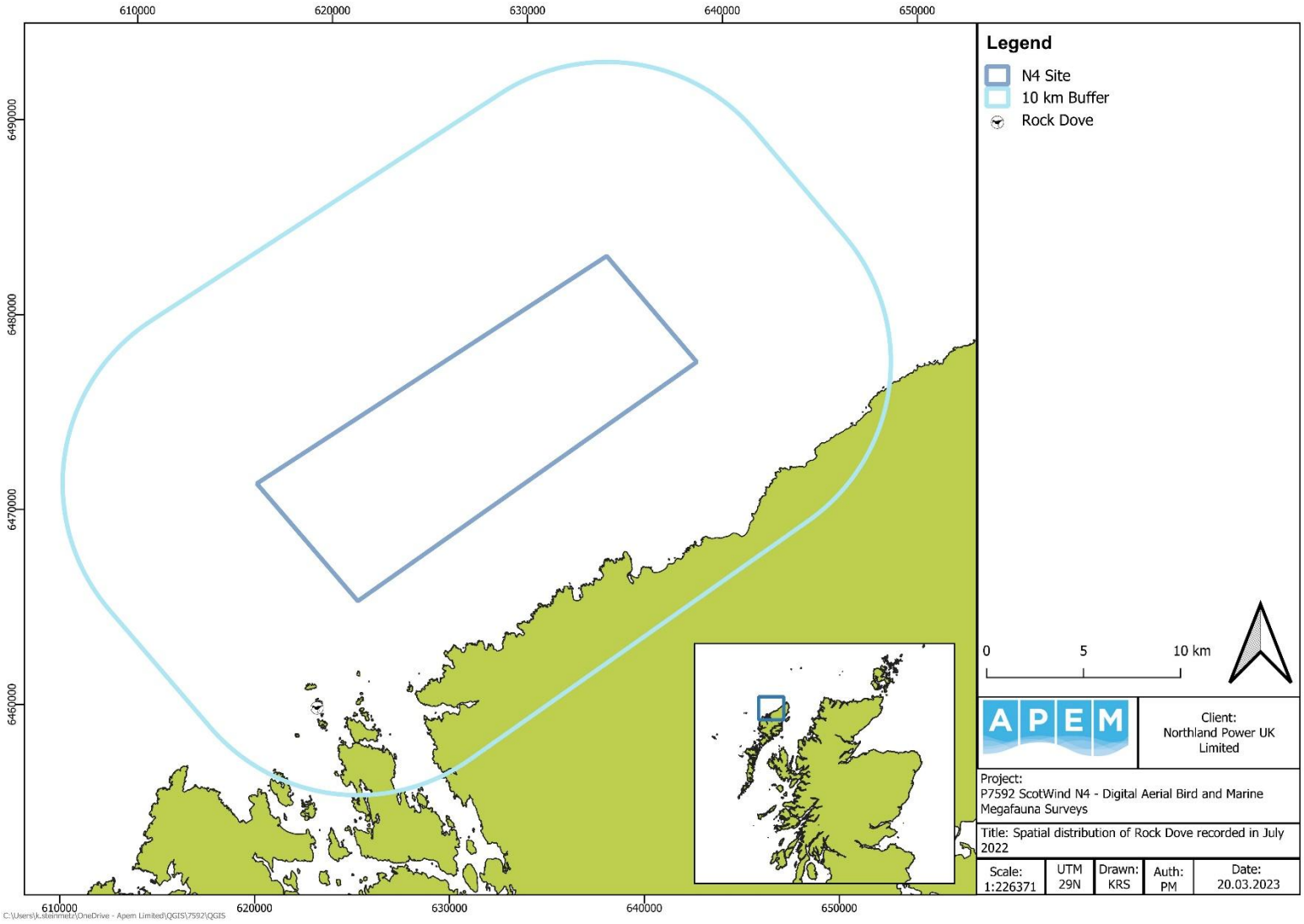


Figure 37 Distribution of rock dove in July 2022
*Note that individuals in close proximity may appear overlaying.

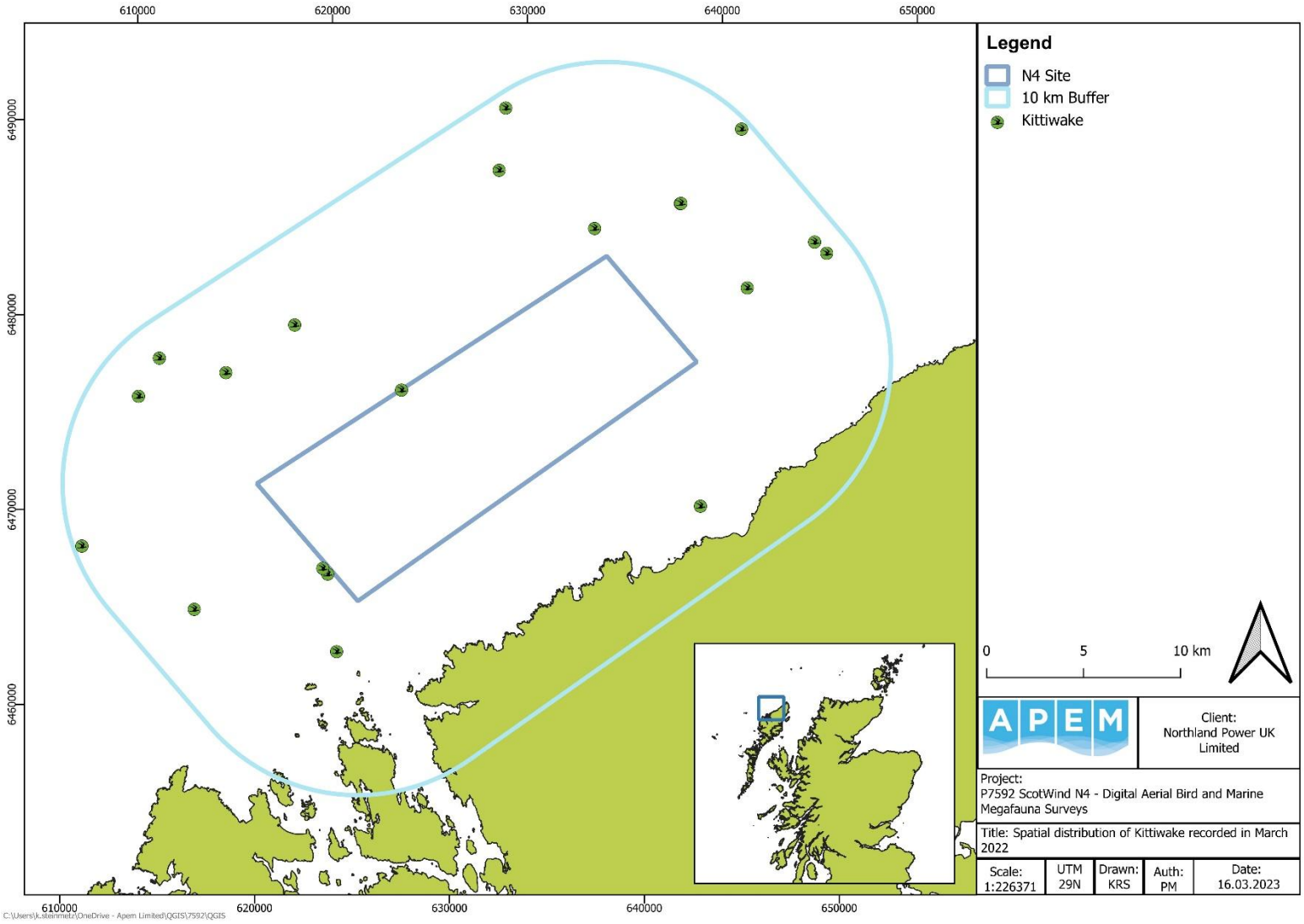


Figure 38 Distribution of kittiwake in March 2022
*Note that individuals in close proximity may appear overlaying.

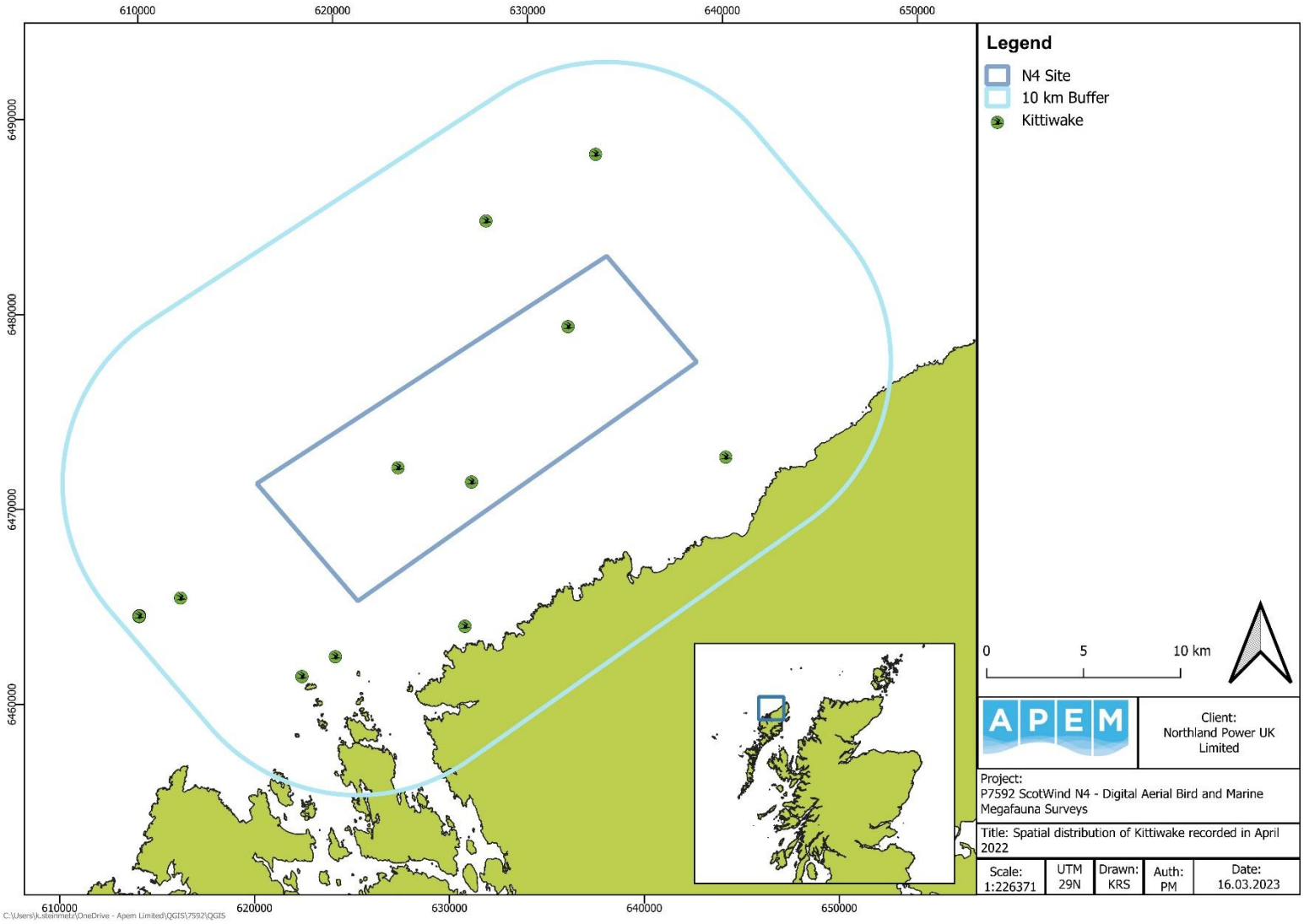


Figure 39 Distribution of kittiwake in April 2022
*Note that individuals in close proximity may appear overlaying.

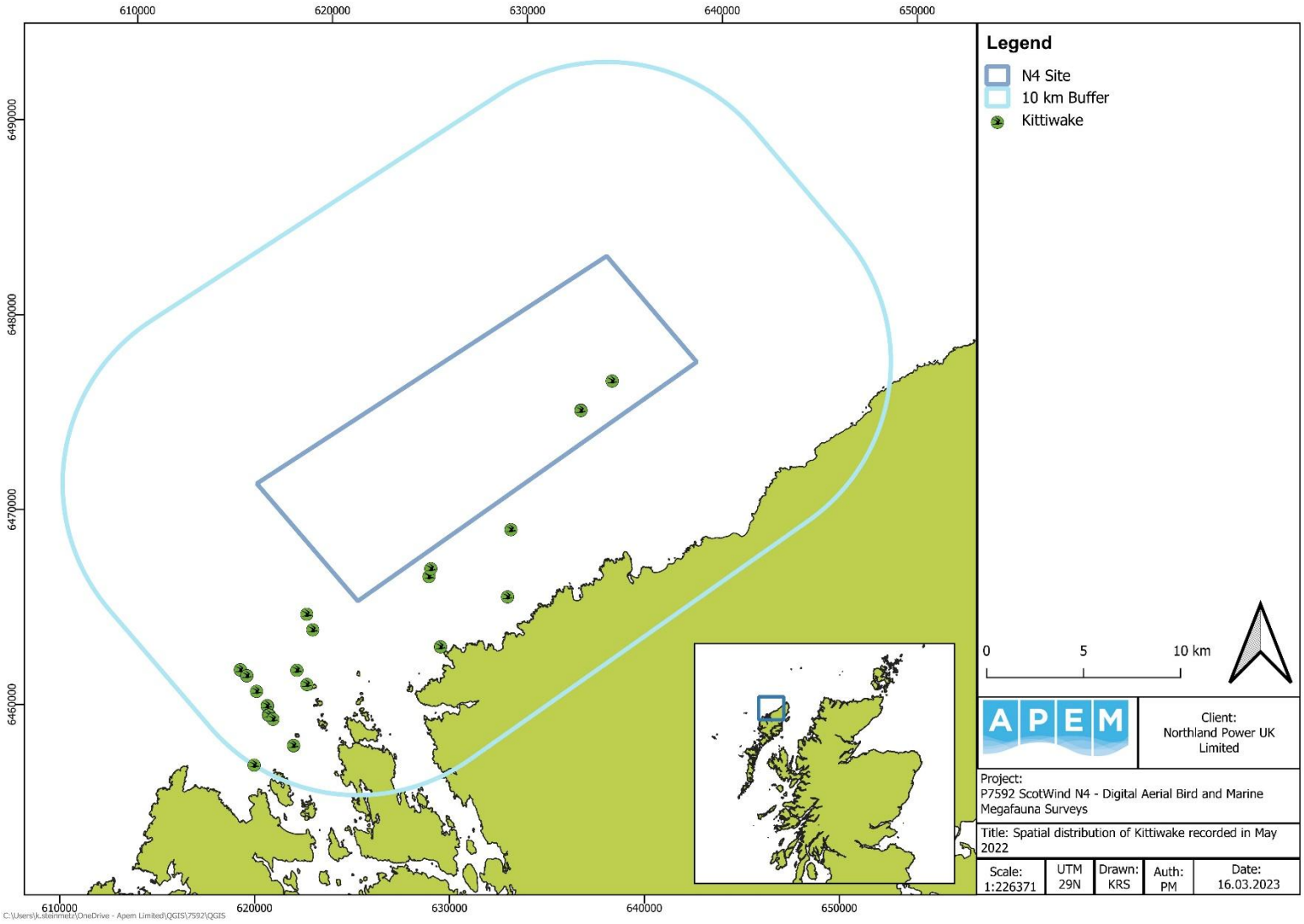


Figure 40 Distribution of kittiwake in May 2022
*Note that individuals in close proximity may appear overlaying.

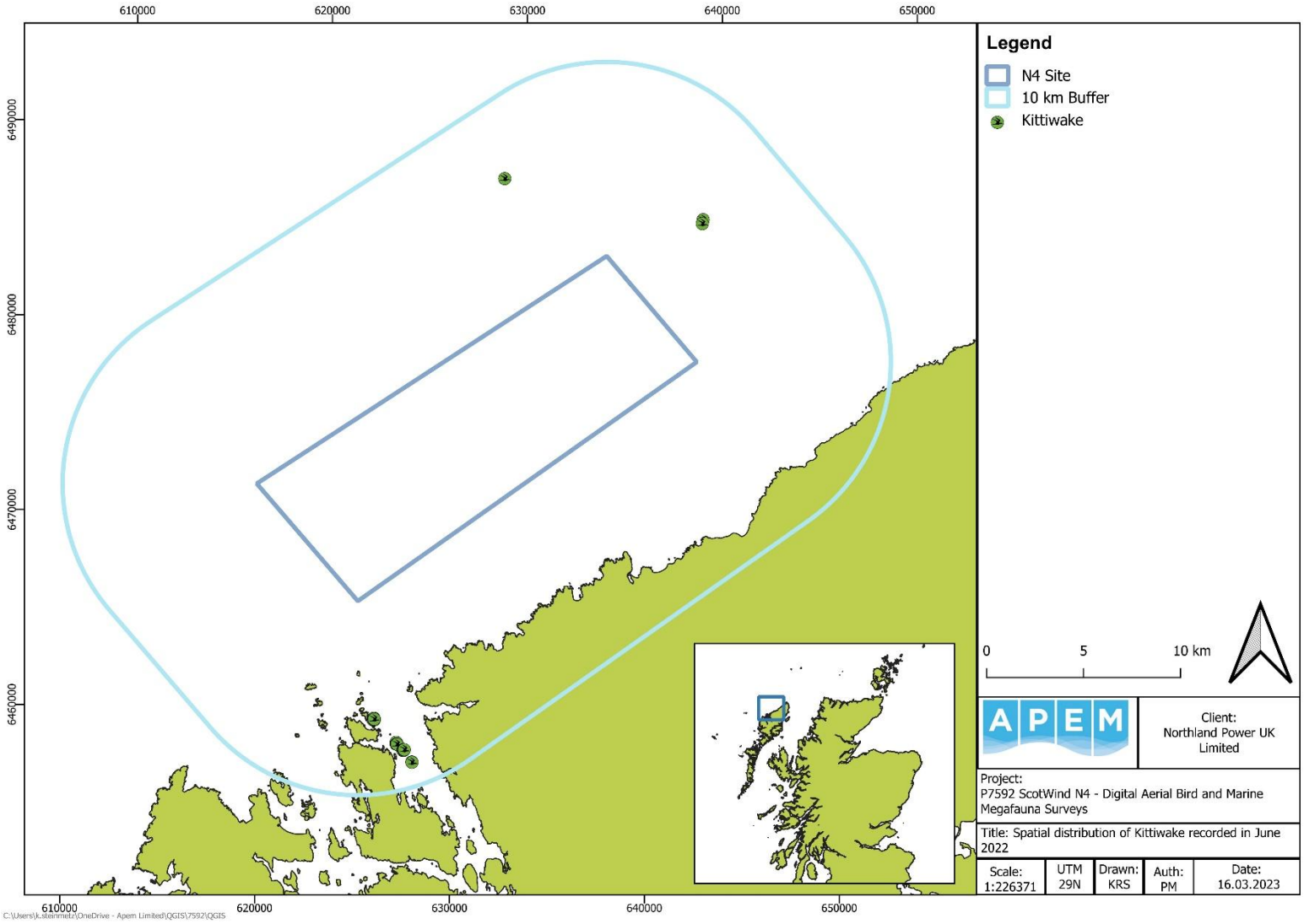


Figure 41 Distribution of kittiwake in June 2022
*Note that individuals in close proximity may appear overlaying.

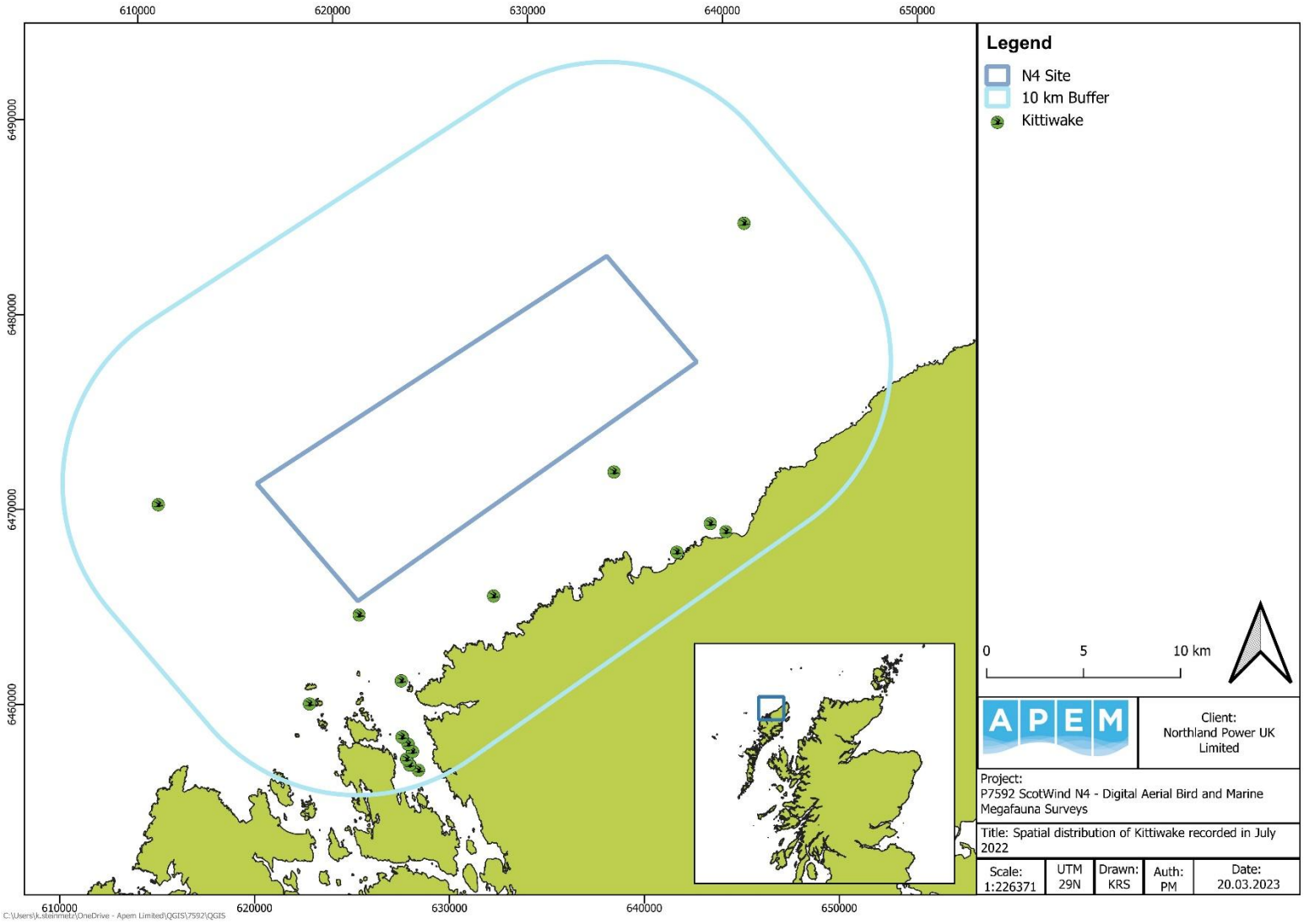


Figure 42 Distribution of kittiwake in July 2022
*Note that individuals in close proximity may appear overlaying.

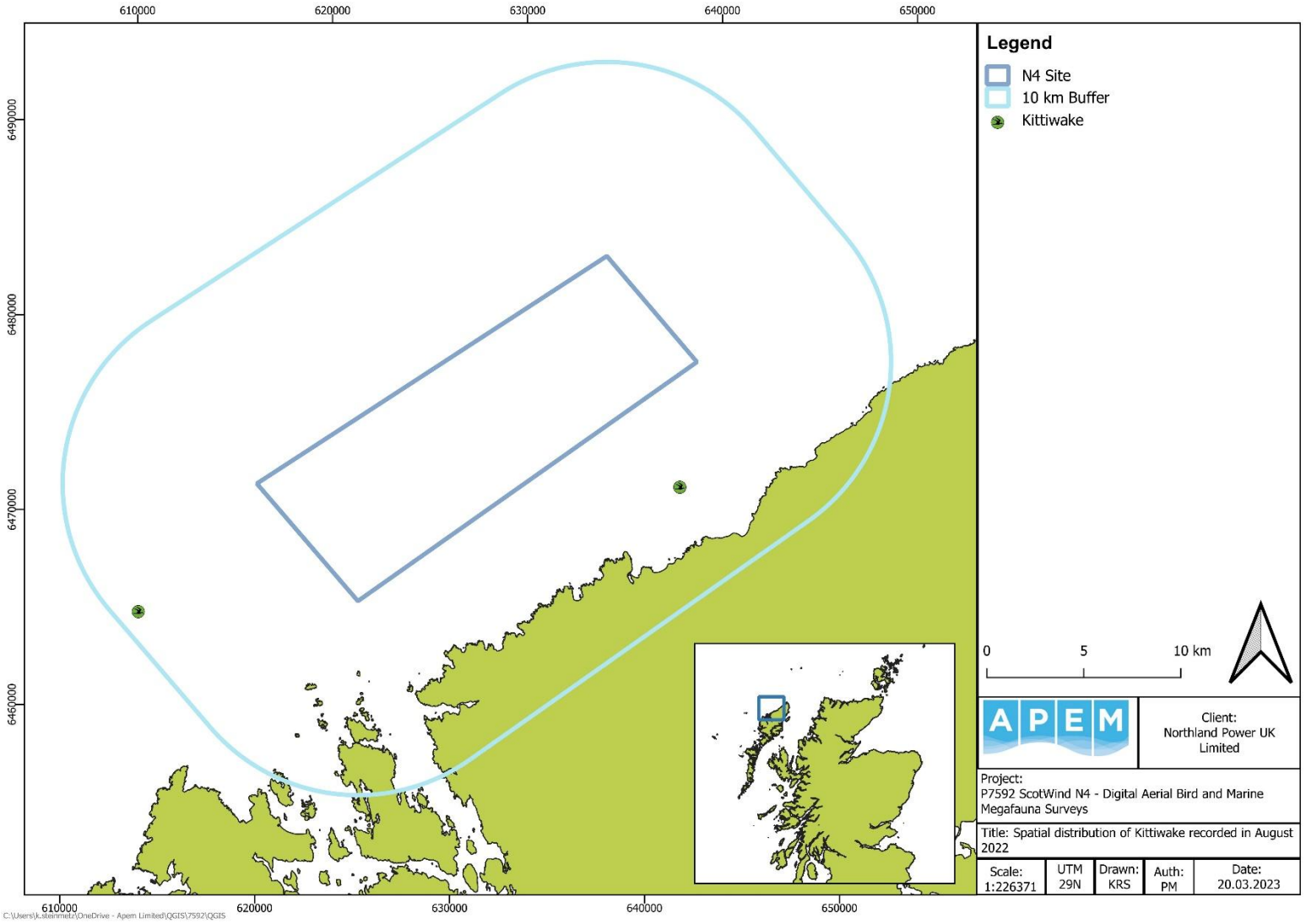


Figure 43 Distribution of kittiwake in August 2022
*Note that individuals in close proximity may appear overlaying.

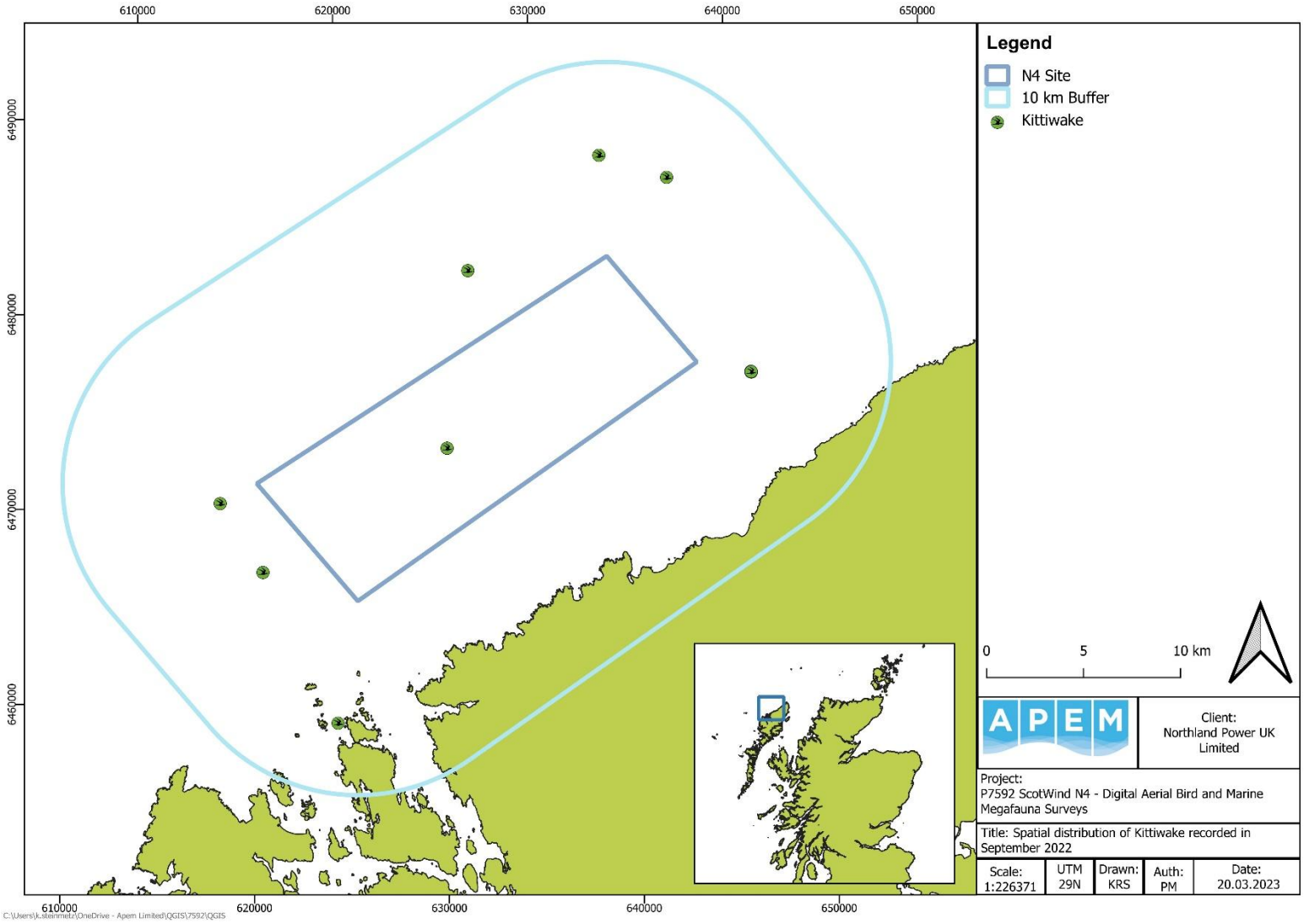


Figure 44 Distribution of kittiwake in September 2022

*Note that individuals in close proximity may appear overlaying.

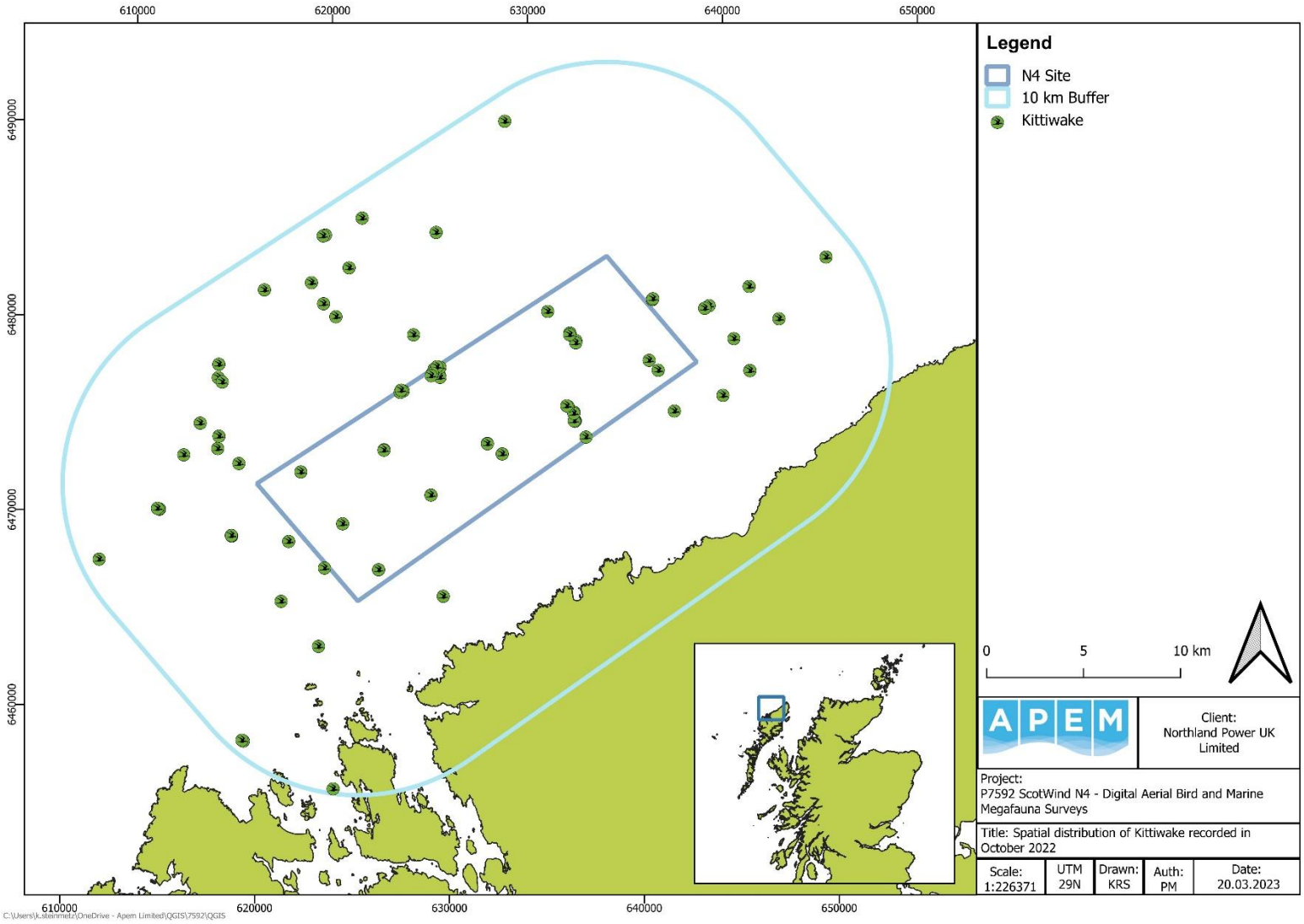


Figure 45 Distribution of kittiwake in October 2022

*Note that individuals in close proximity may appear overlaying.

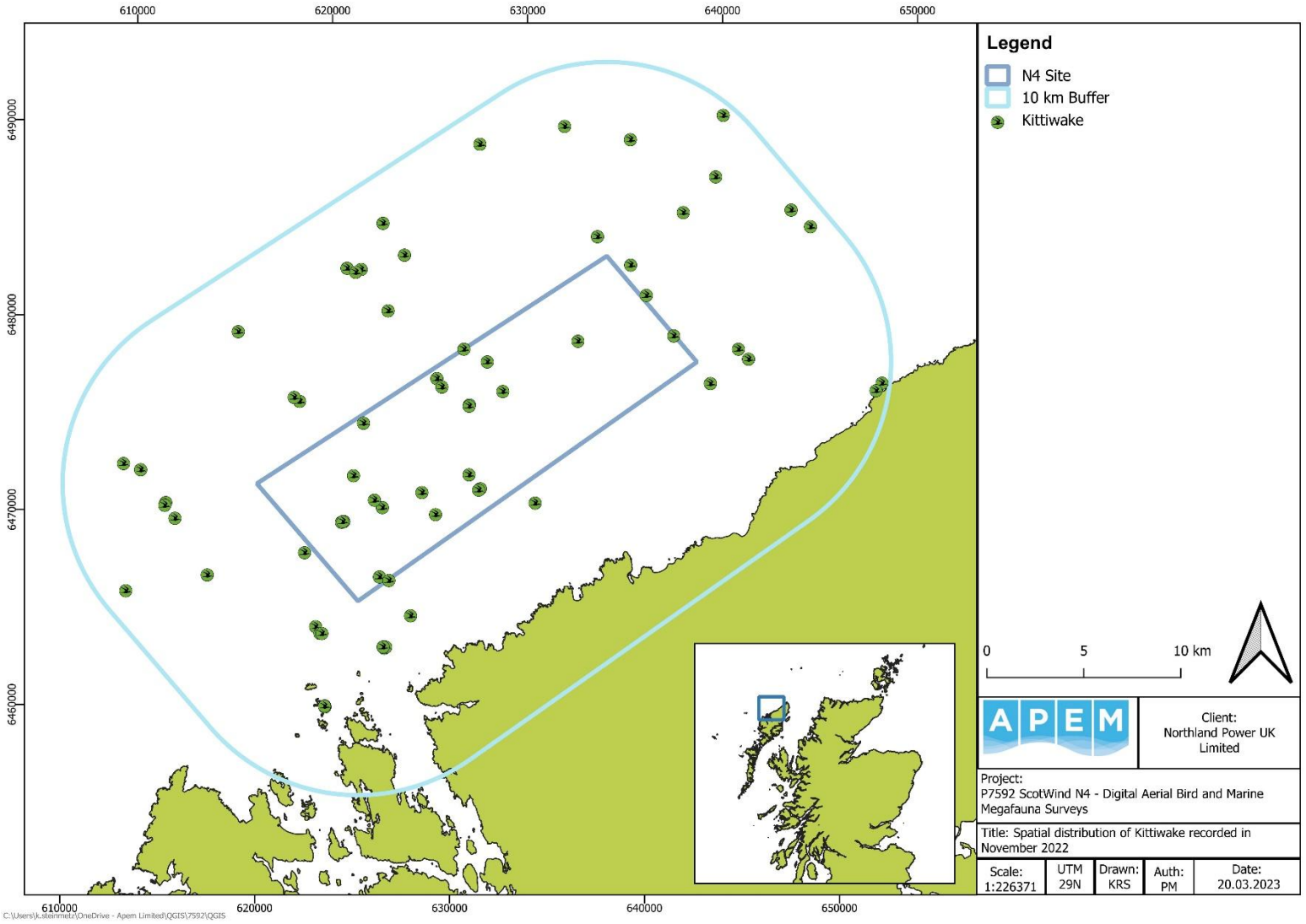


Figure 46 Distribution of kittiwake in November 2022

*Note that individuals in close proximity may appear overlaying.

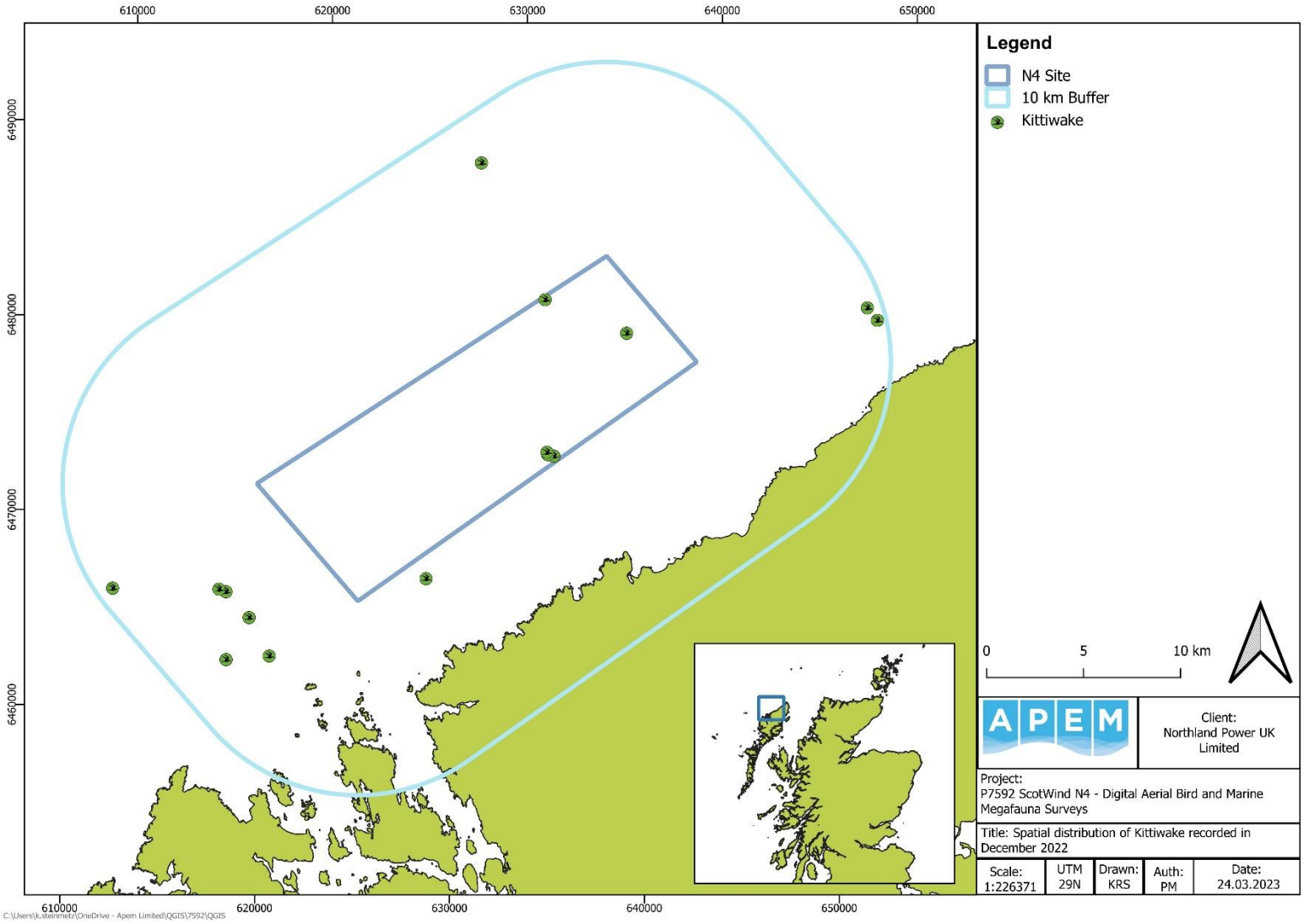


Figure 47 Distribution of kittiwake in December 2022

*Note that individuals in close proximity may appear overlaying.

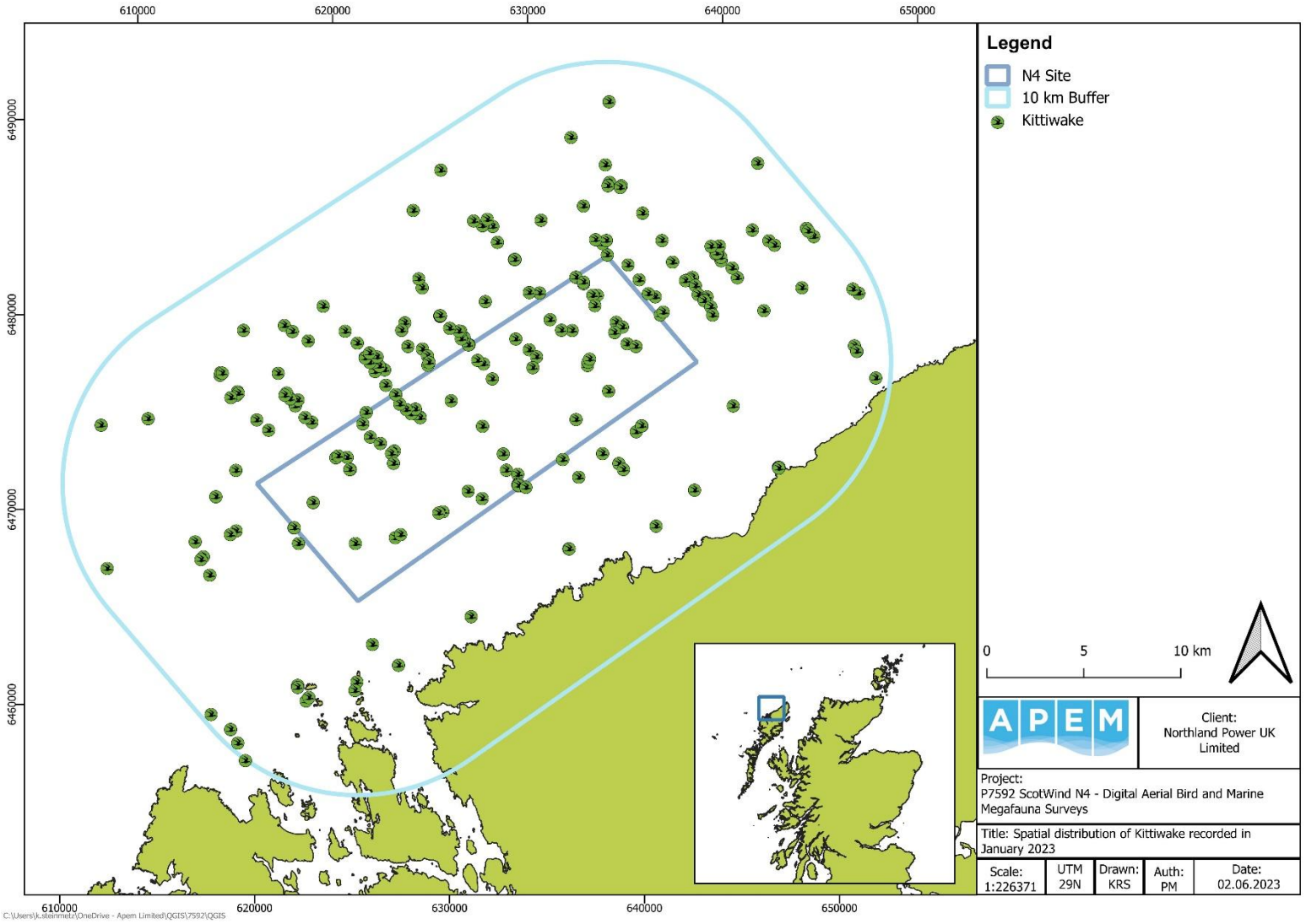


Figure 48 Distribution of kittiwake in January 2023

*Note that individuals in close proximity may appear overlaying.

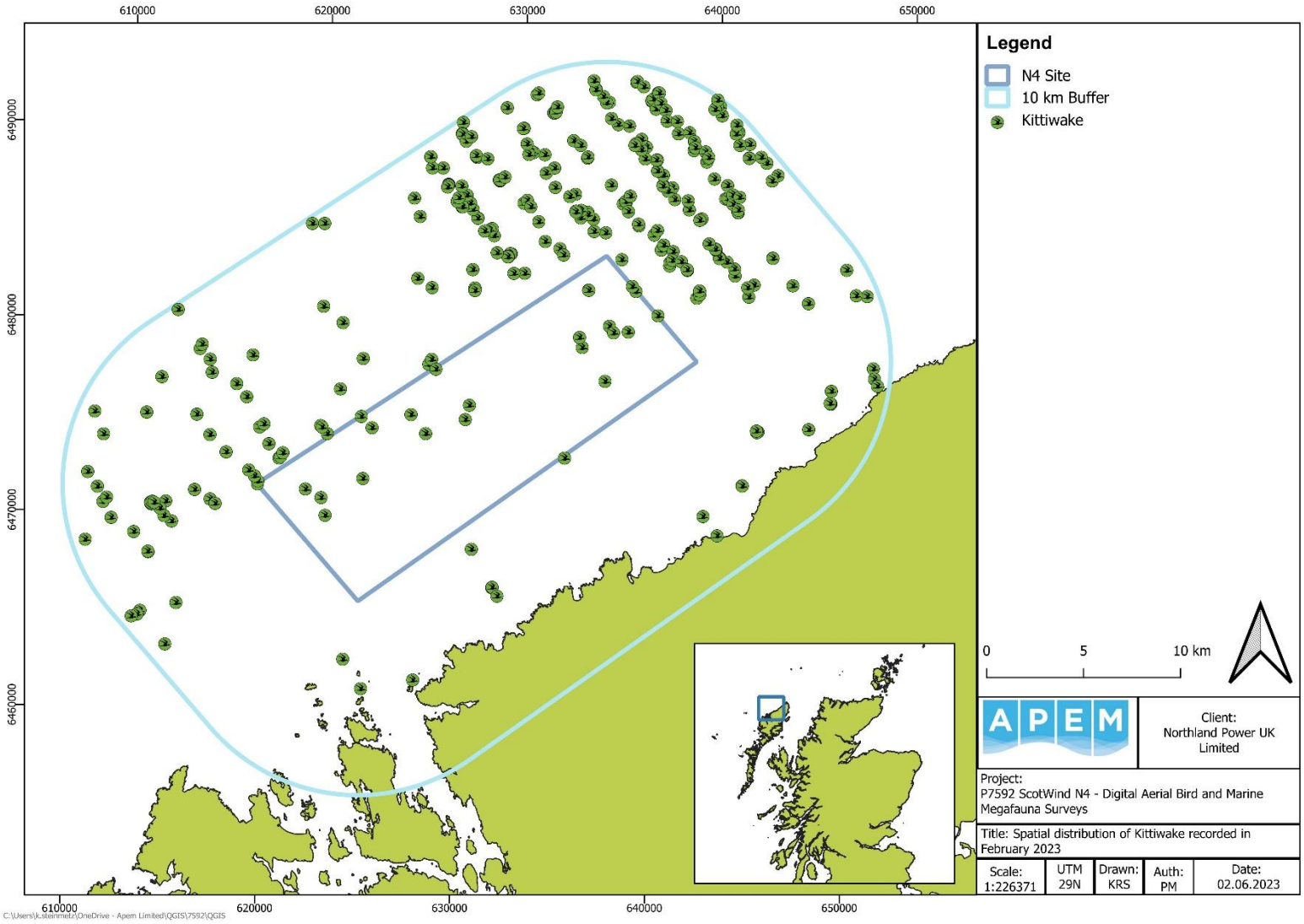


Figure 49 Distribution of kittiwake in February 2023

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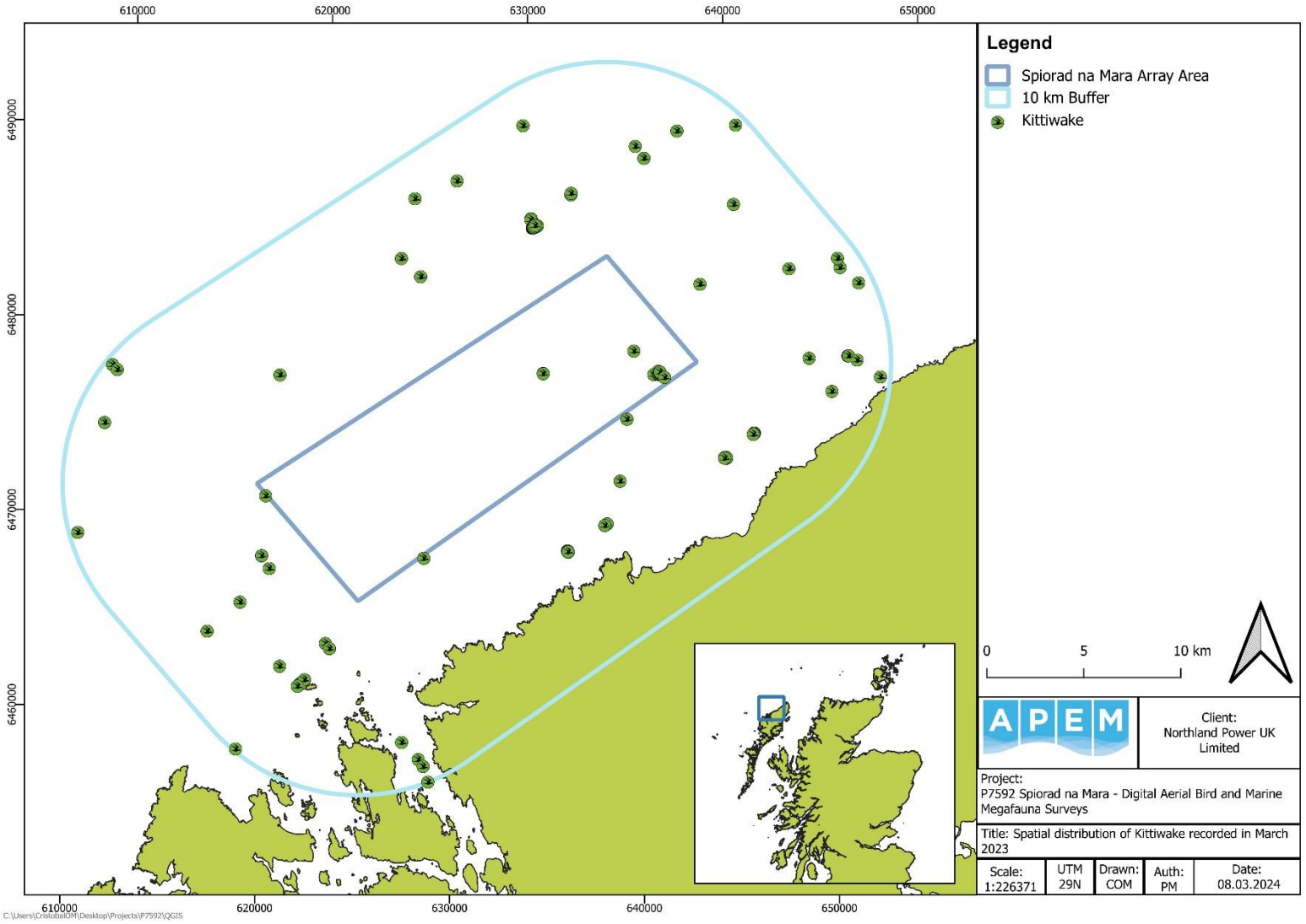


Figure 50 Distribution of kittiwake in March 2023

*Note that individuals in close proximity may appear overlaying.

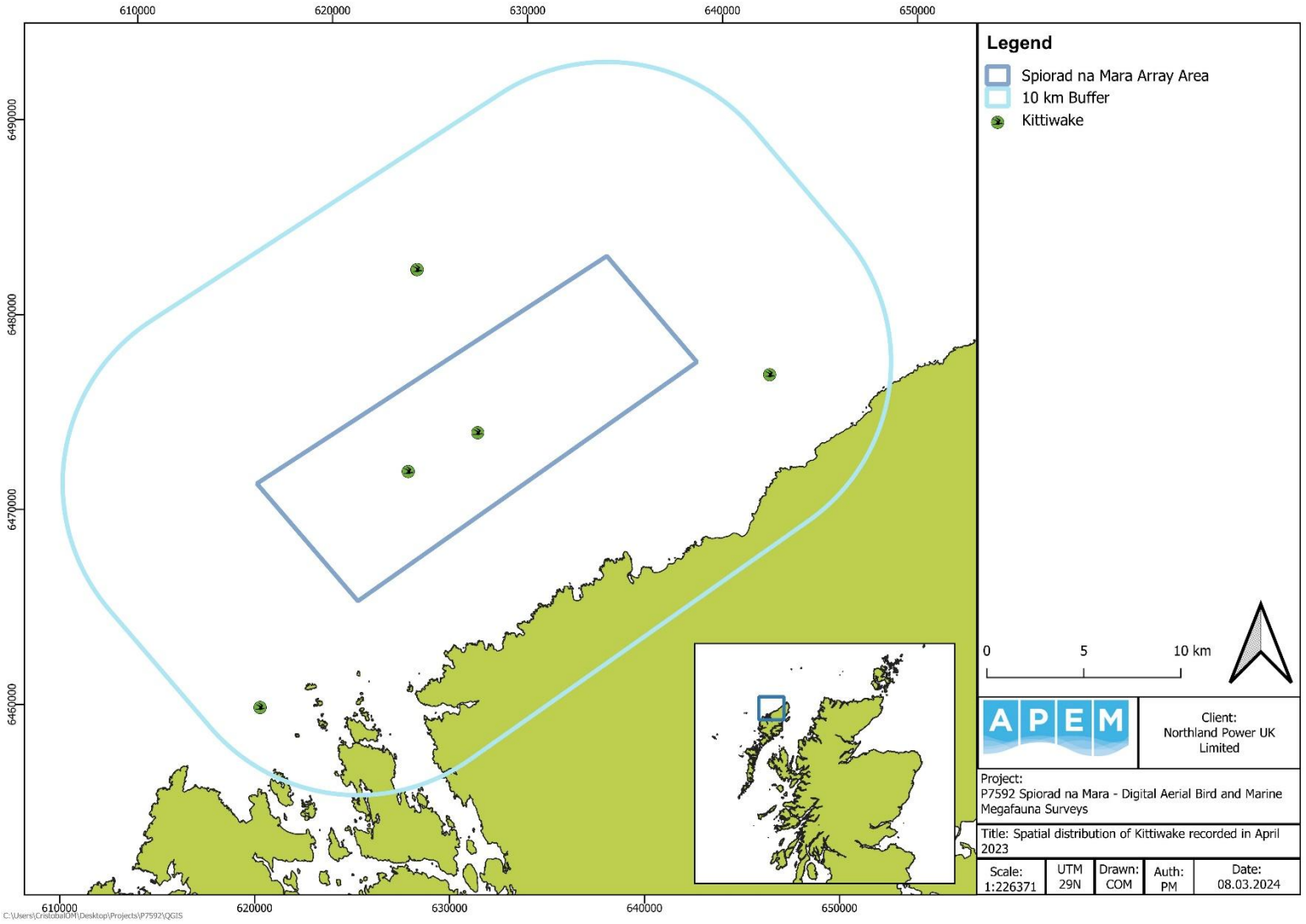


Figure 51 Distribution of kittiwake in April 2023
*Note that individuals in close proximity may appear overlaying.

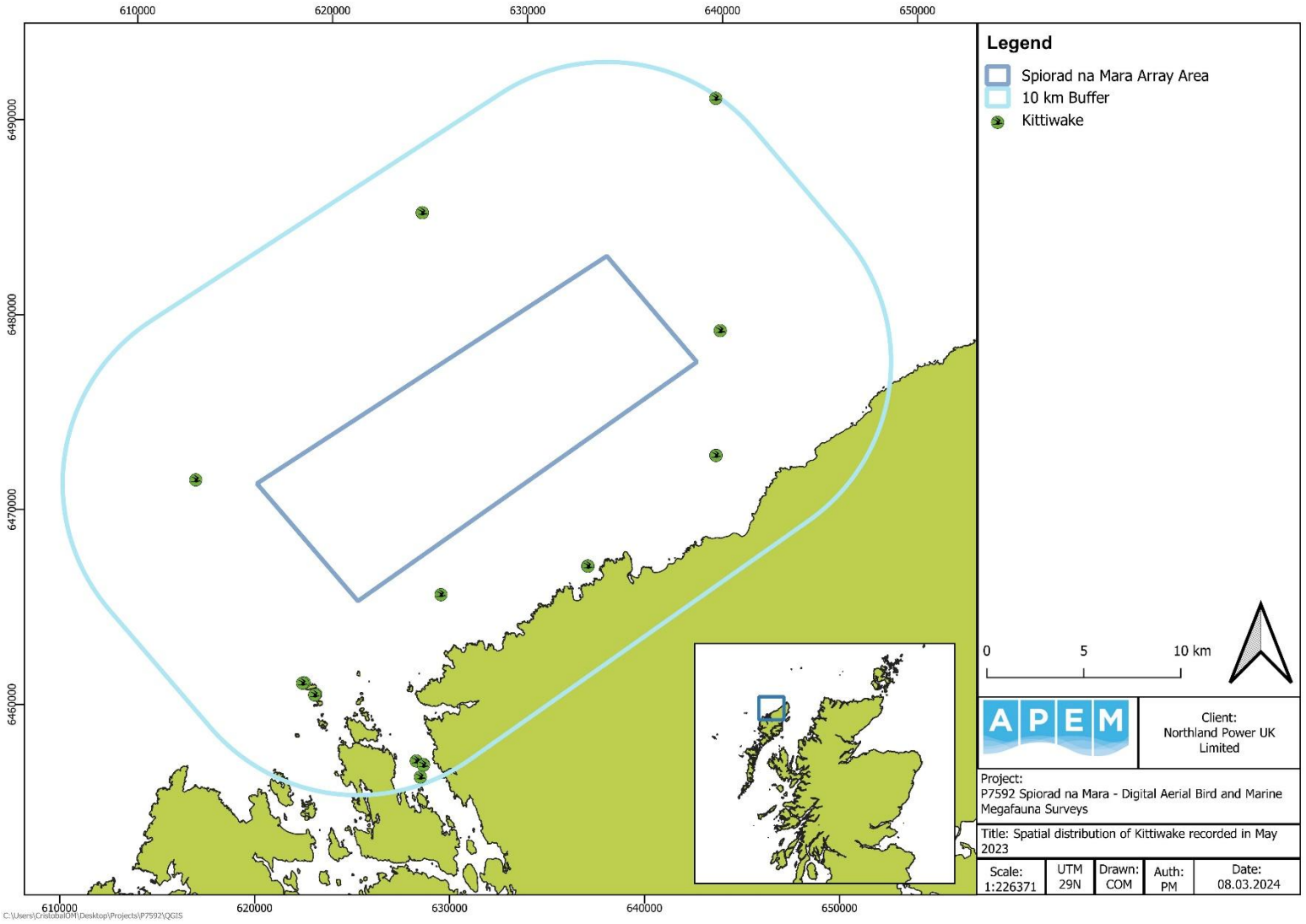


Figure 52 Distribution of kittiwake in May 2023
*Note that individuals in close proximity may appear overlaying.

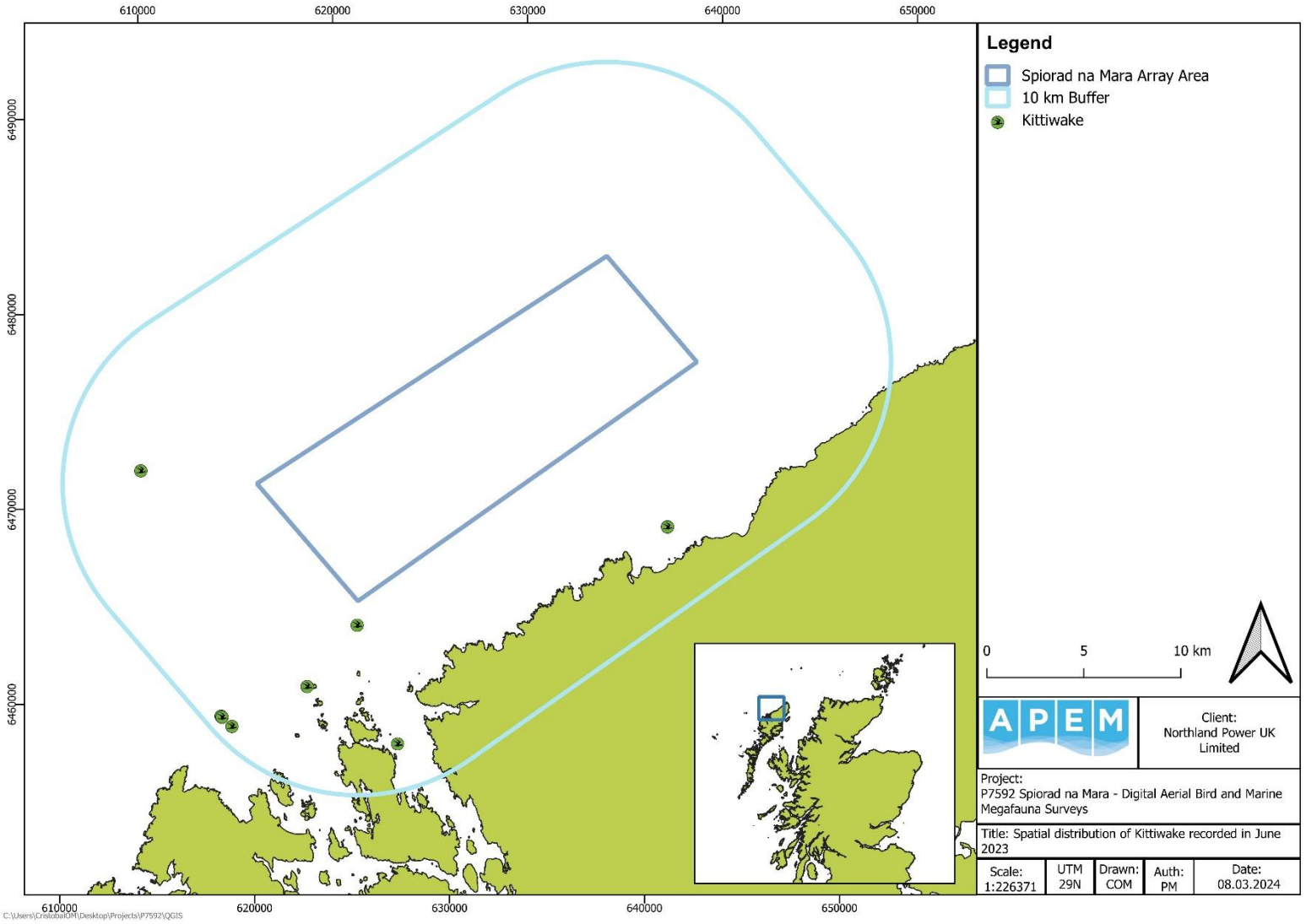


Figure 53 Distribution of kittiwake in June 2023
*Note that individuals in close proximity may appear overlaying.

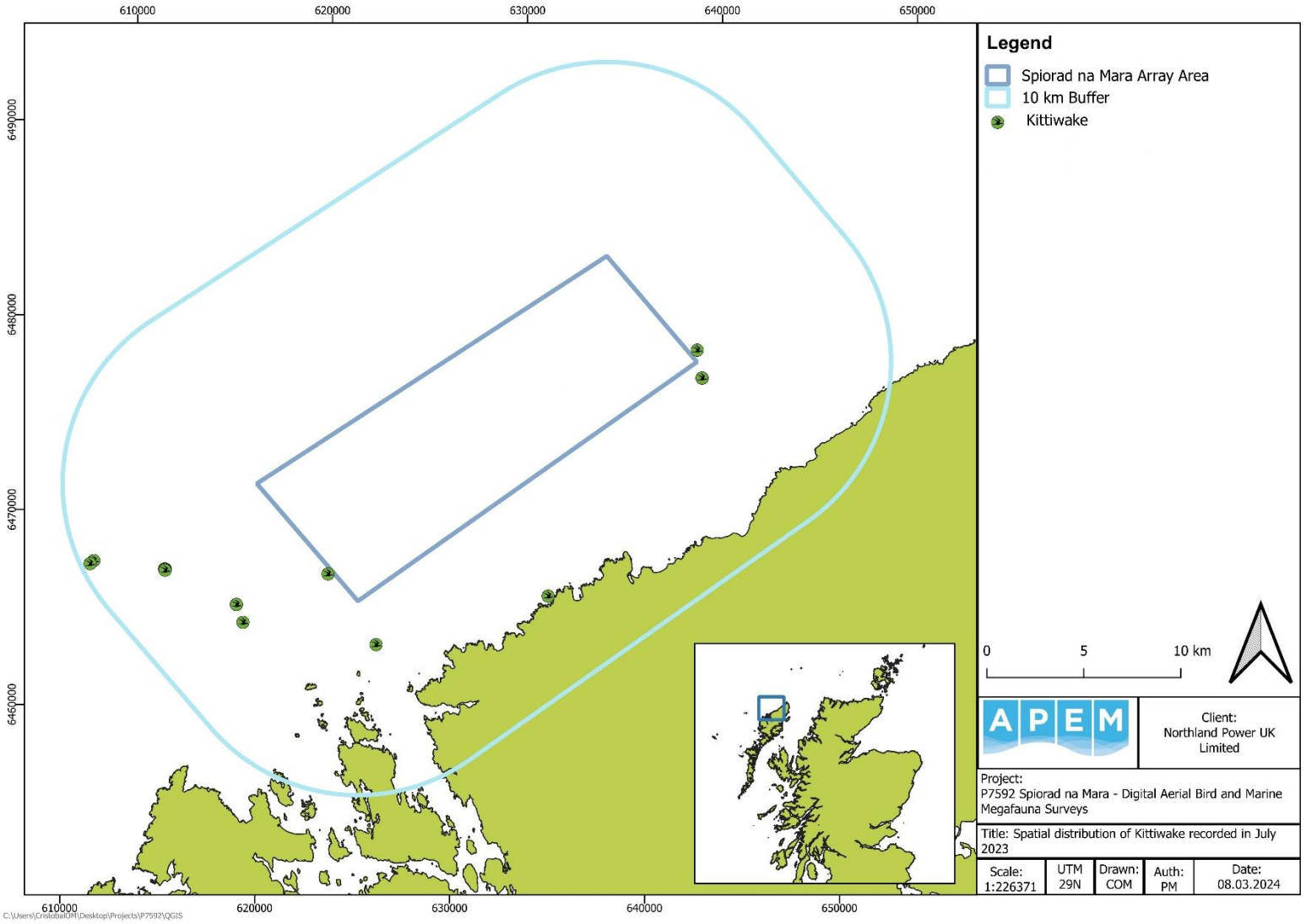


Figure 54 Distribution of kittiwake in July 2023
*Note that individuals in close proximity may appear overlaying.

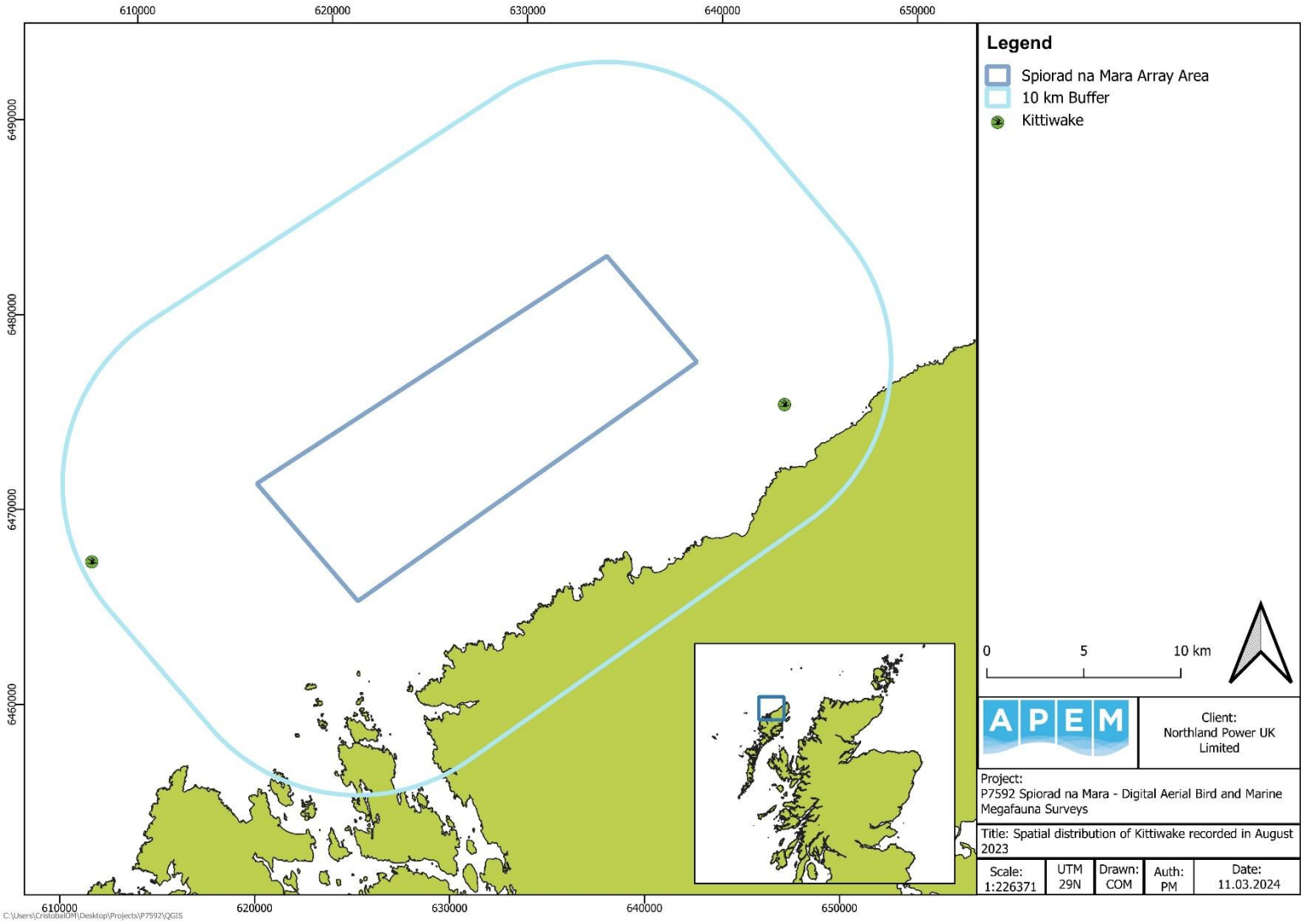


Figure 55 Distribution of kittiwake in August 2023

*Note that individuals in close proximity may appear overlaying.

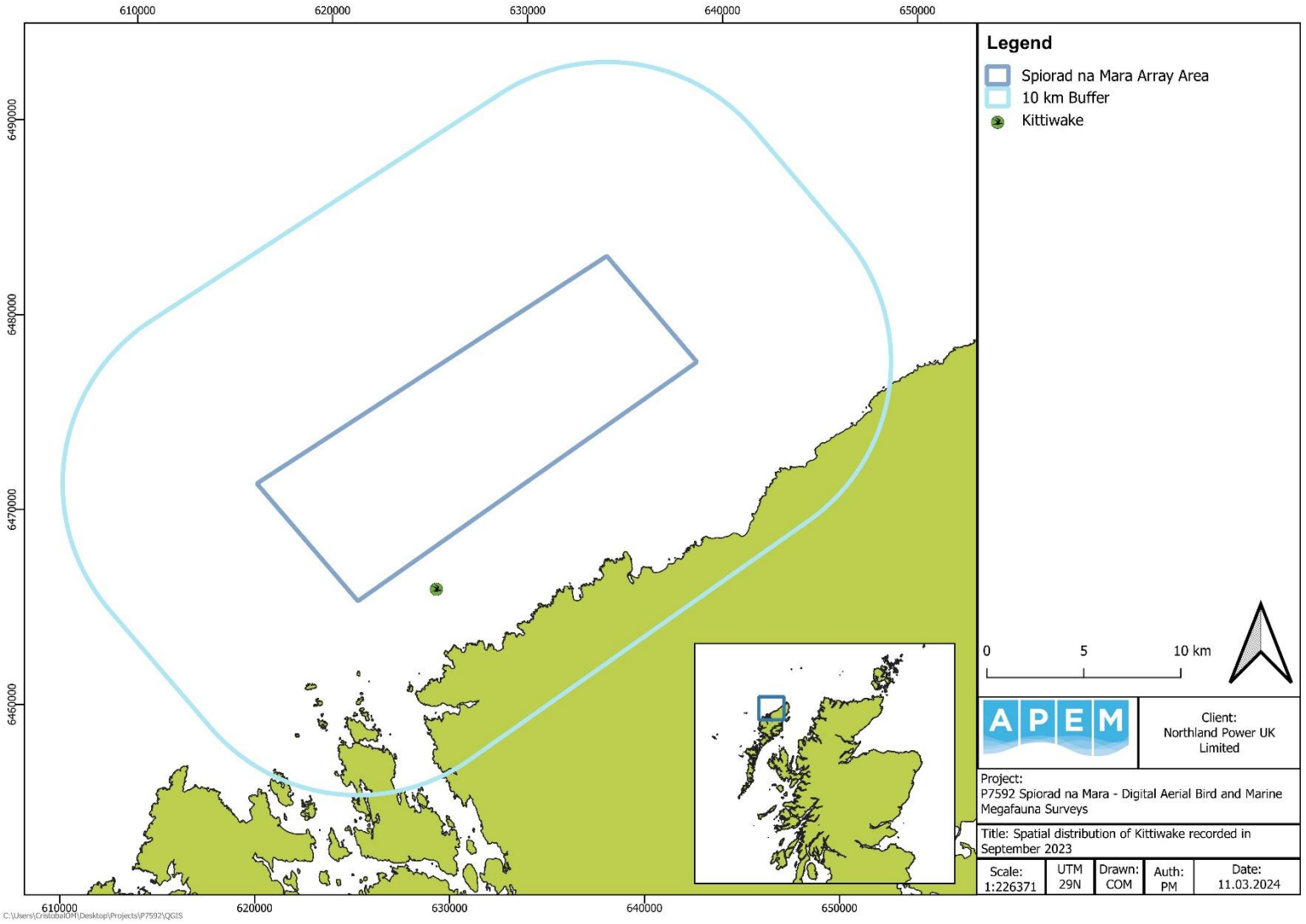


Figure 56 Distribution of kittiwake in September 2023

*Note that individuals in close proximity may appear overlaying.

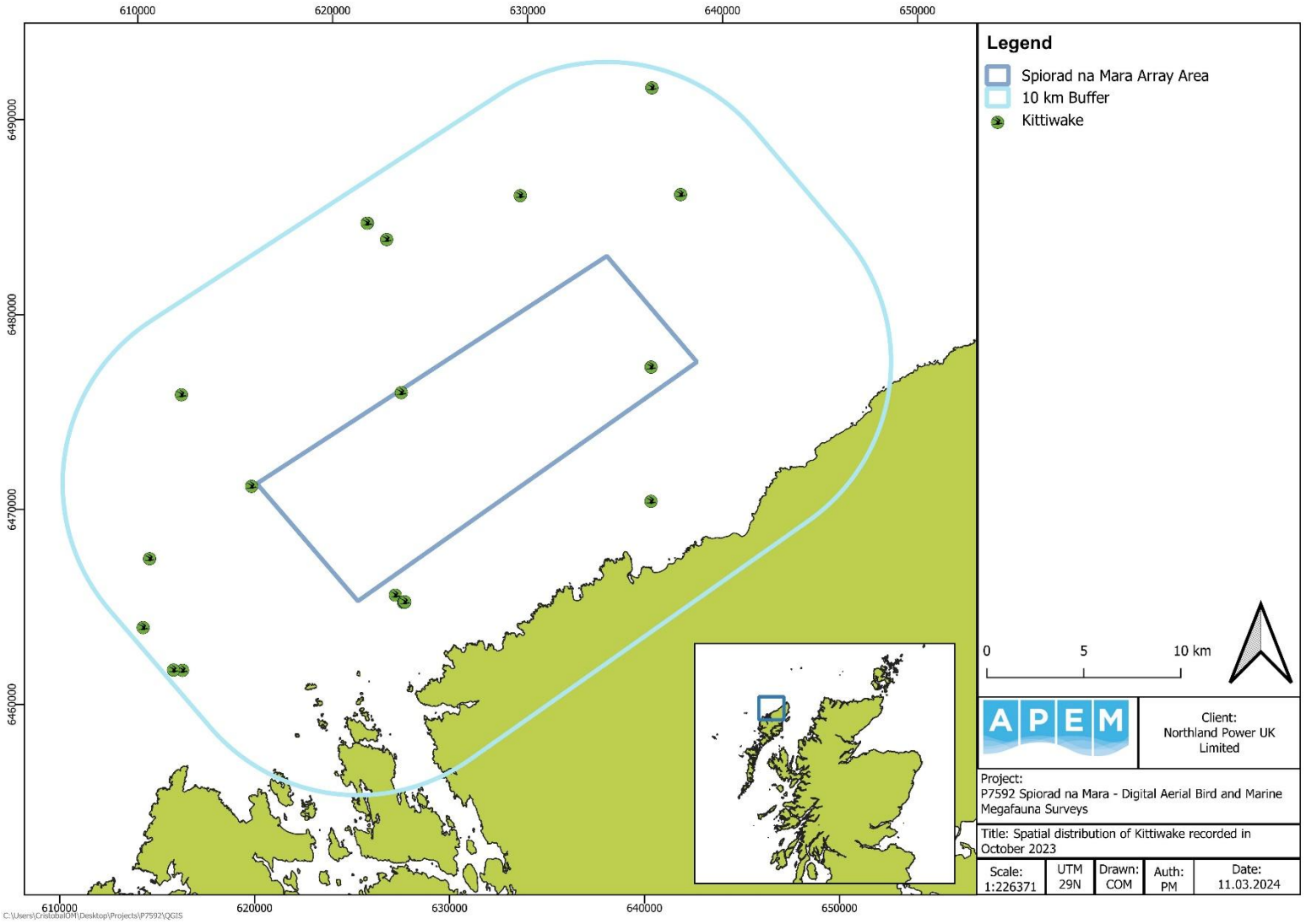


Figure 57 Distribution of kittiwake in October 2023

*Note that individuals in close proximity may appear overlaying.

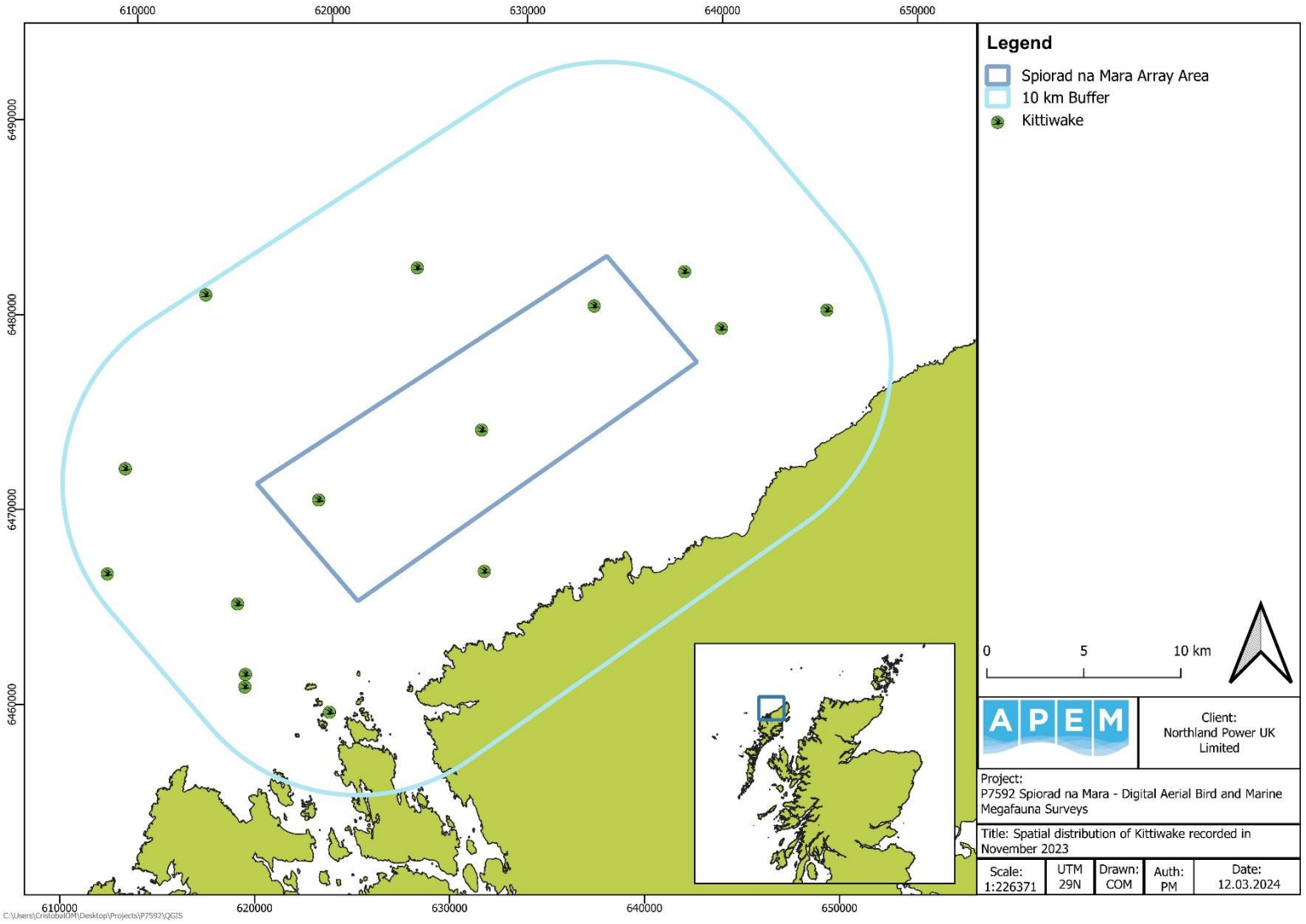


Figure 58 Distribution of kittiwake in November 2023

*Note that individuals in close proximity may appear overlaying.

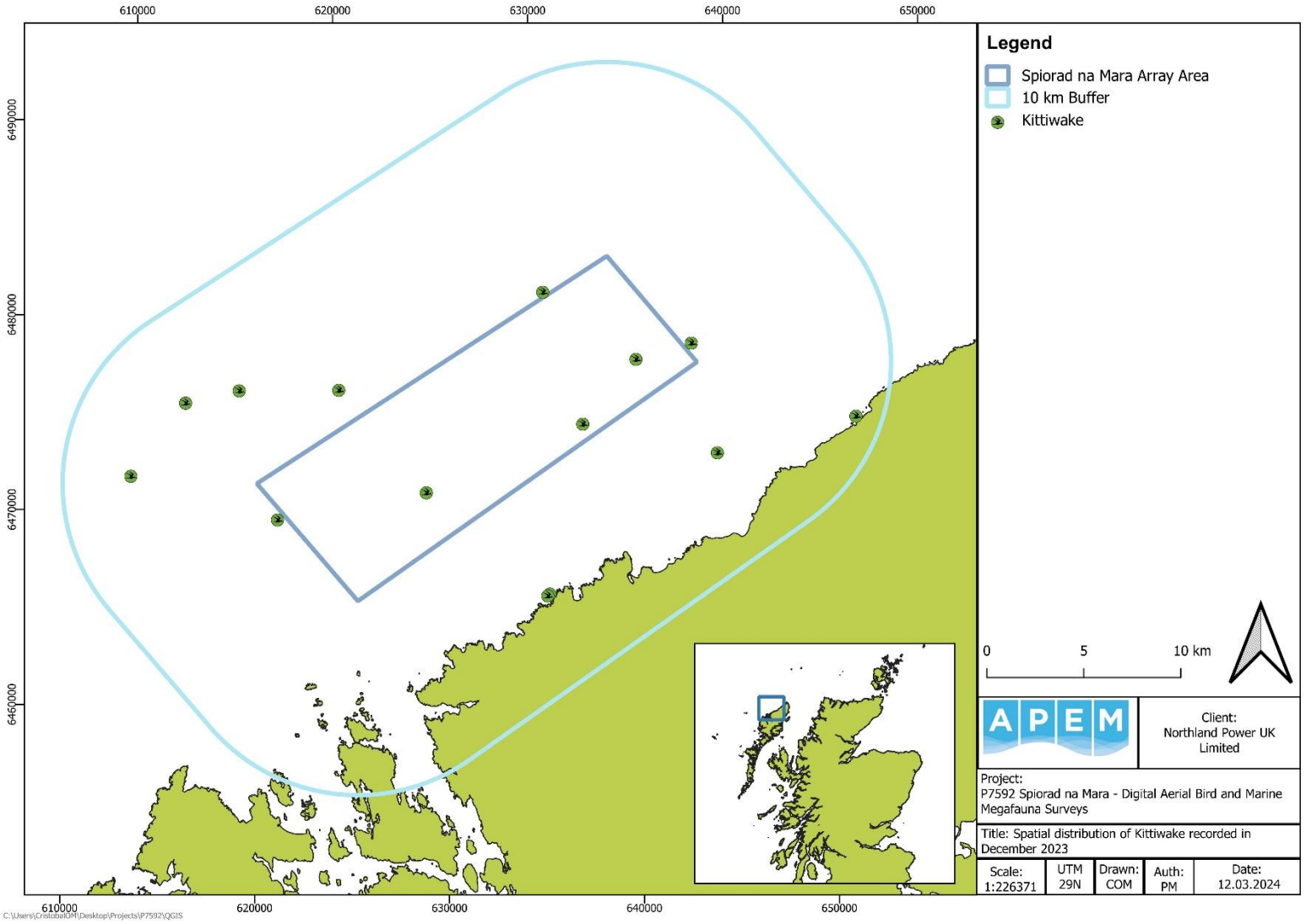


Figure 59 Distribution of kittiwake in December 2023

*Note that individuals in close proximity may appear overlaying.

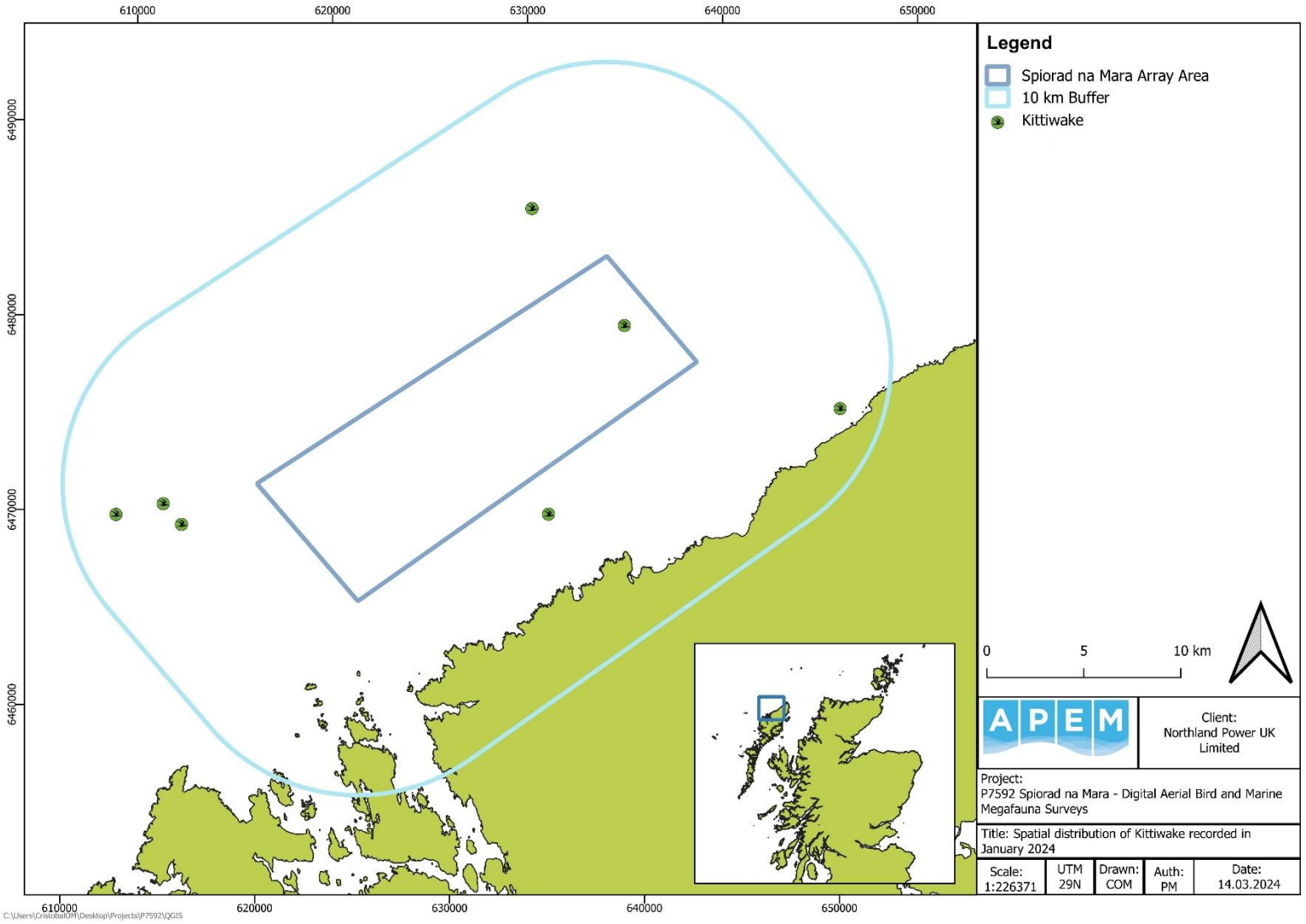


Figure 60 Distribution of kittiwake in January 2024

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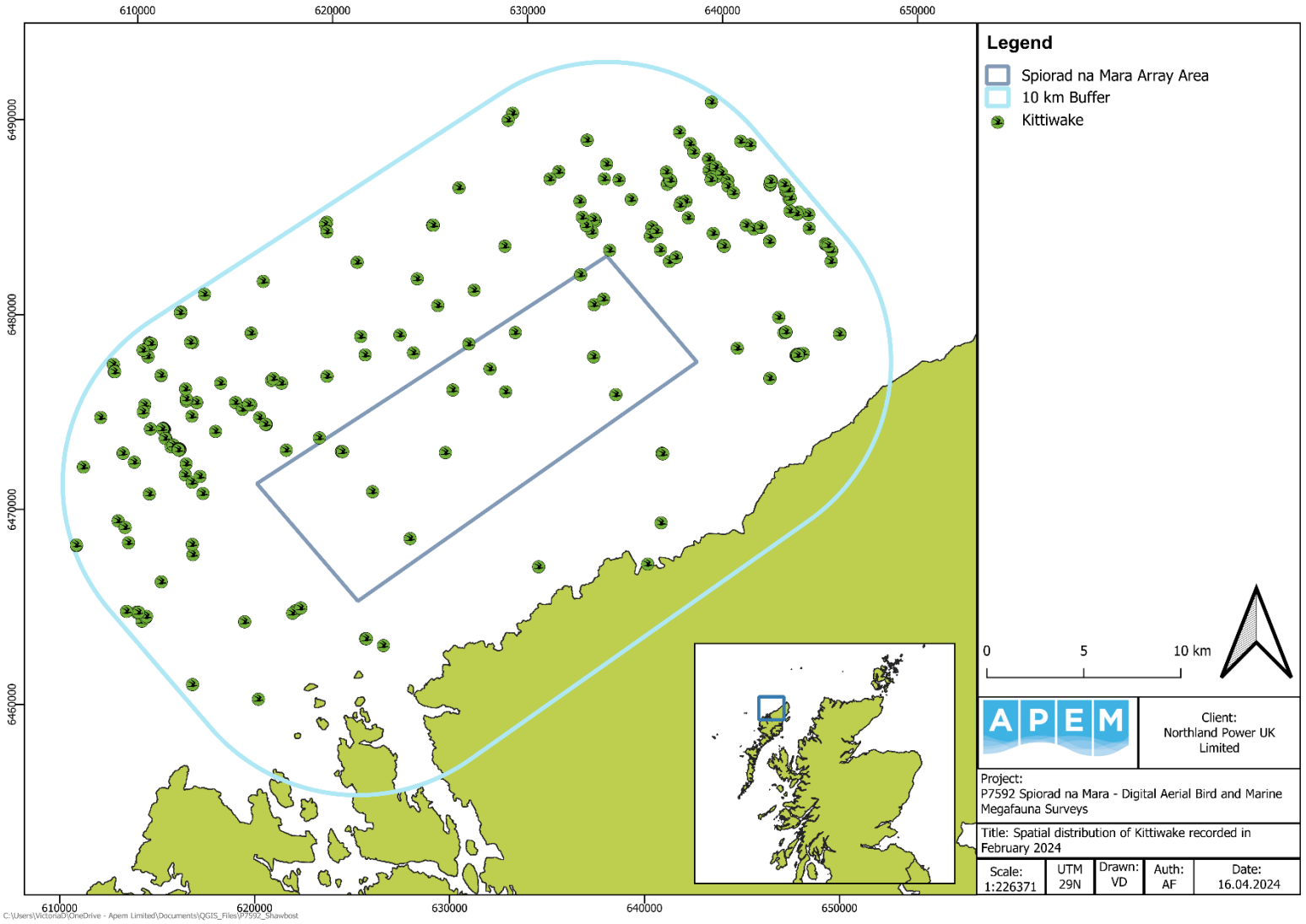


Figure 61 Distribution of kittiwake in February 2024

*Note that individuals in close proximity may appear overlaying.

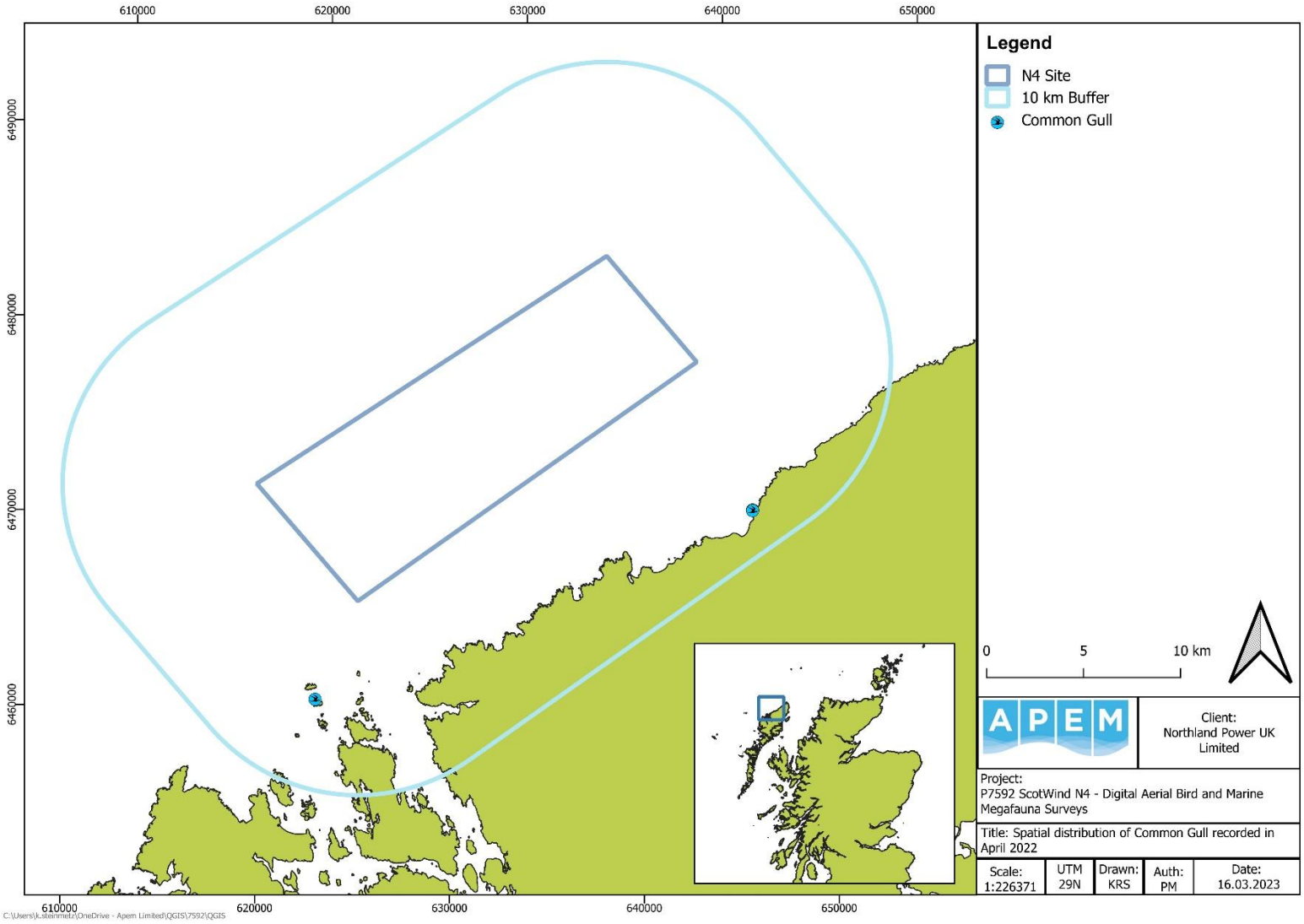


Figure 62 Distribution of common gull in April 2022

*Note that individuals in close proximity may appear overlaying.

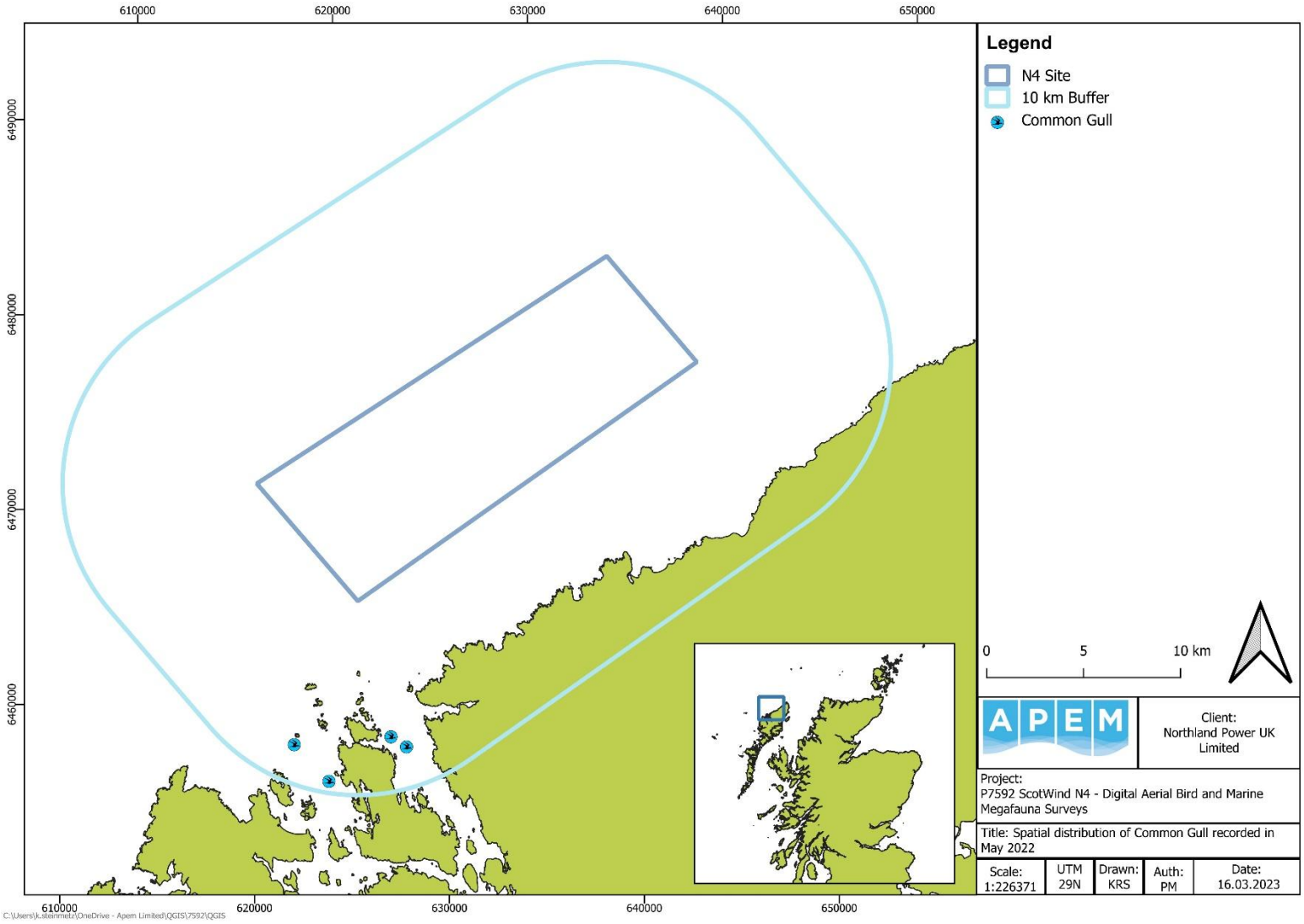


Figure 63 Distribution of common gull in May 2022

*Note that individuals in close proximity may appear overlaying.

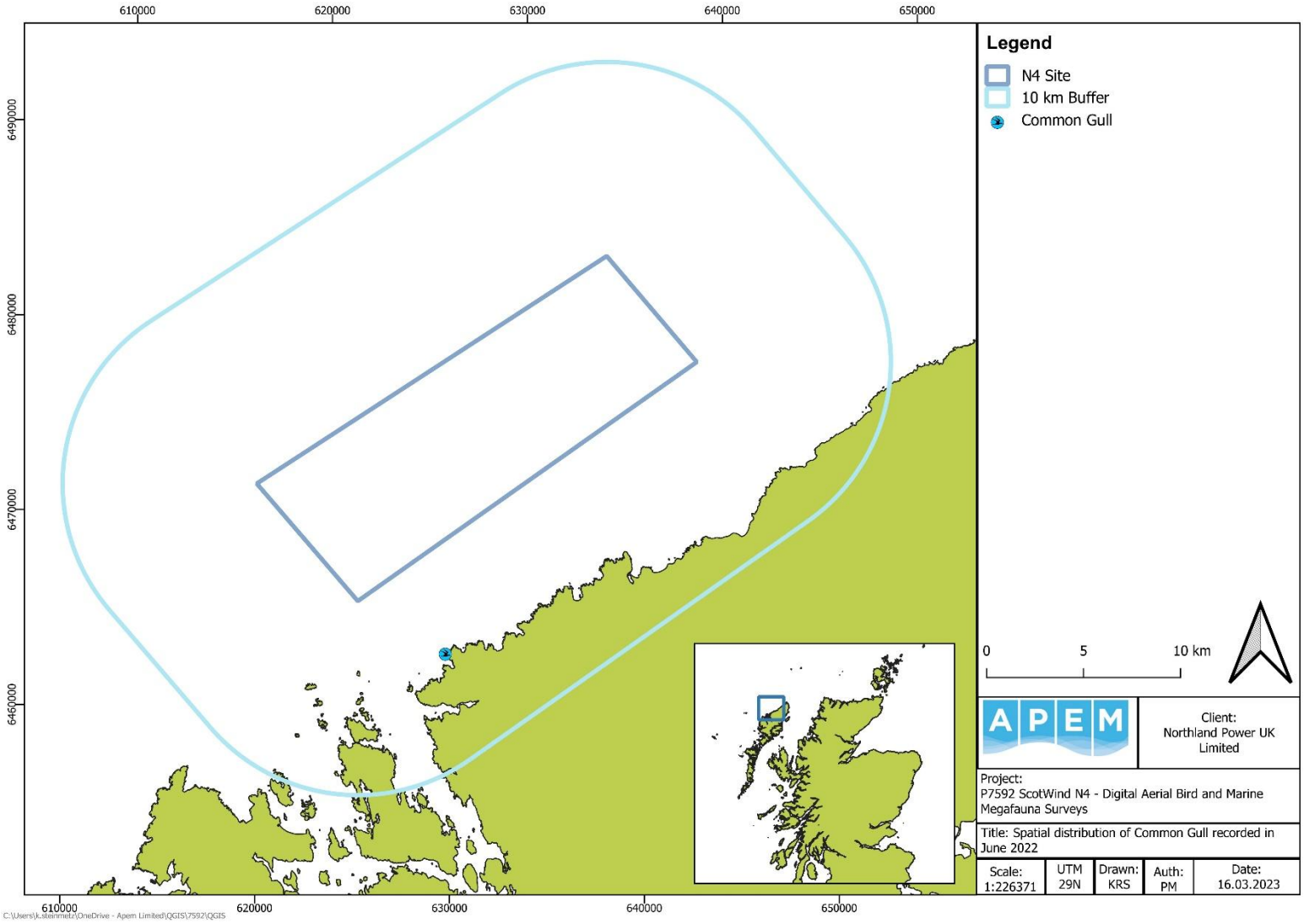


Figure 64 Distribution of common gull in June 2022

*Note that individuals in close proximity may appear overlaying.

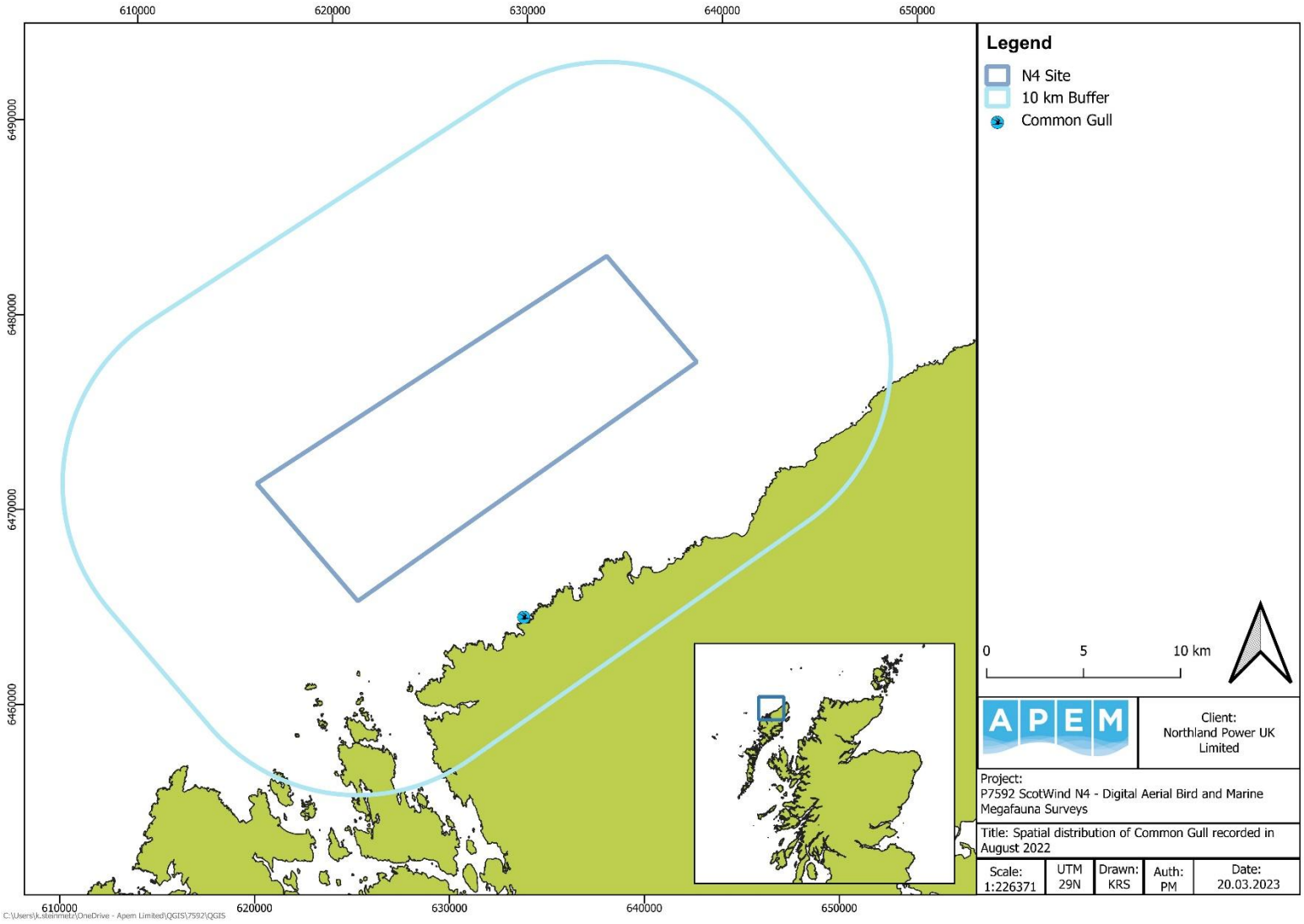


Figure 65 Distribution of common gull in August 2022

*Note that individuals in close proximity may appear overlaying.

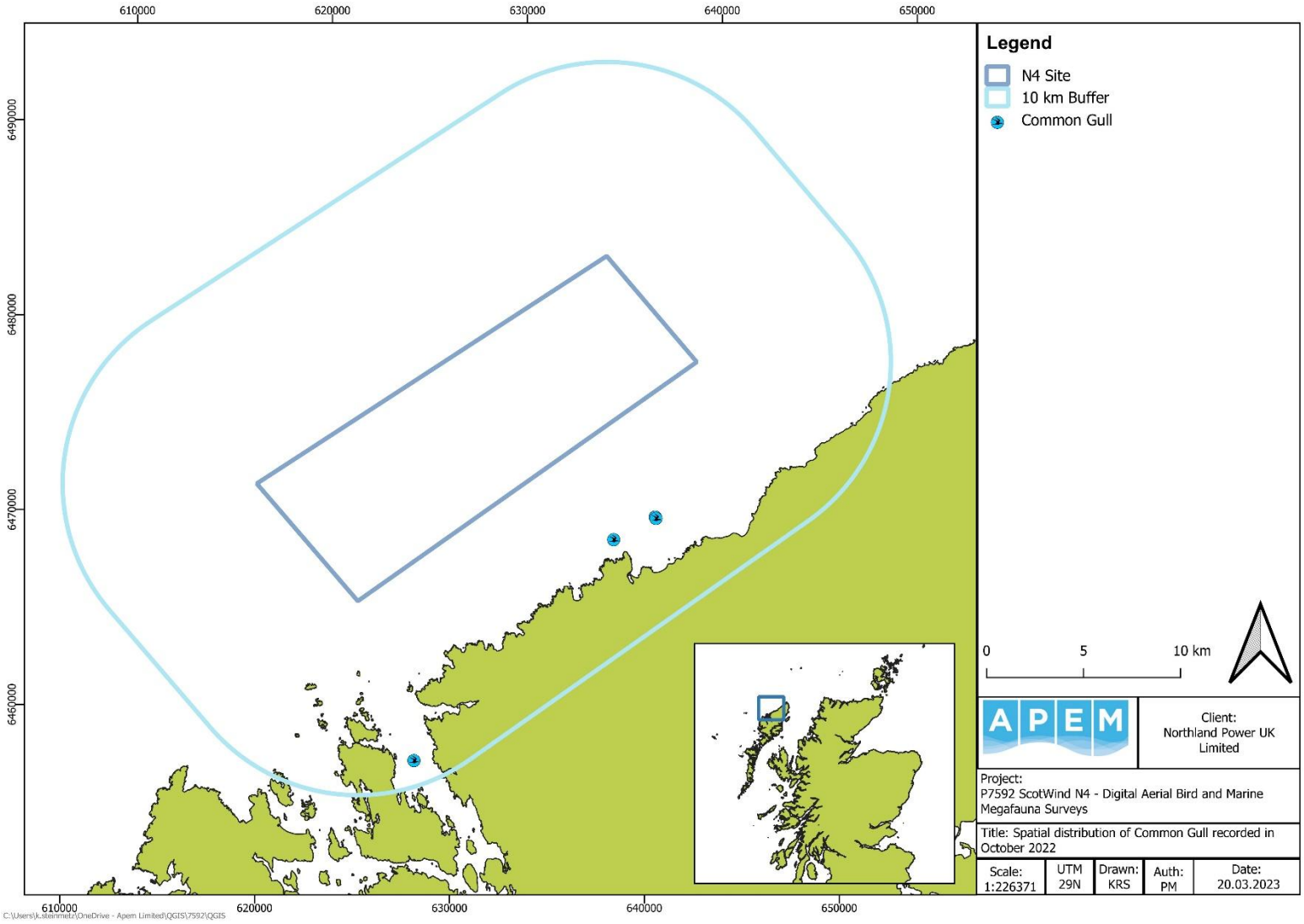


Figure 66 Distribution of common gull in October 2022

*Note that individuals in close proximity may appear overlaying.

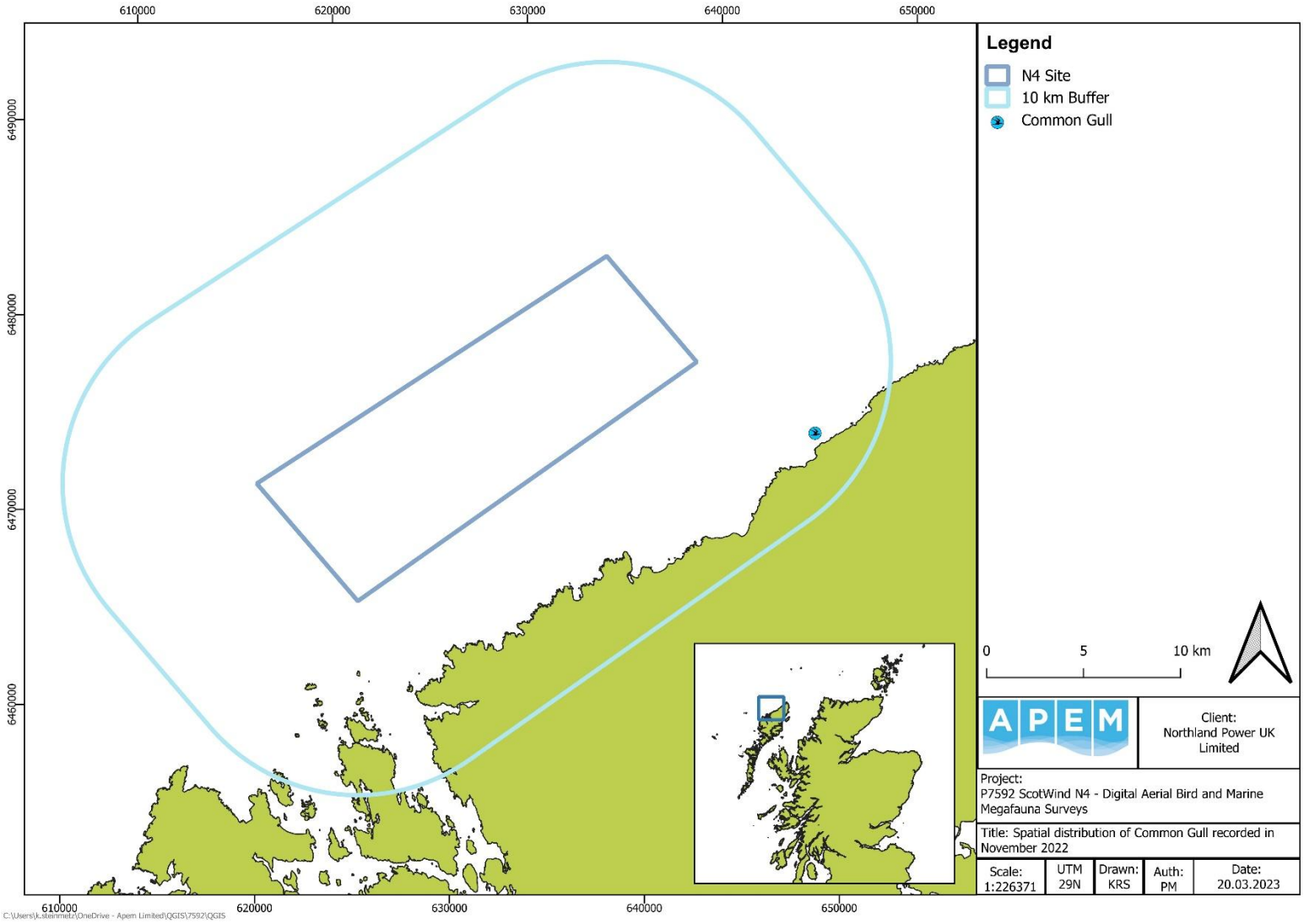


Figure 67 Distribution of common gull in November 2022

*Note that individuals in close proximity may appear overlaying.

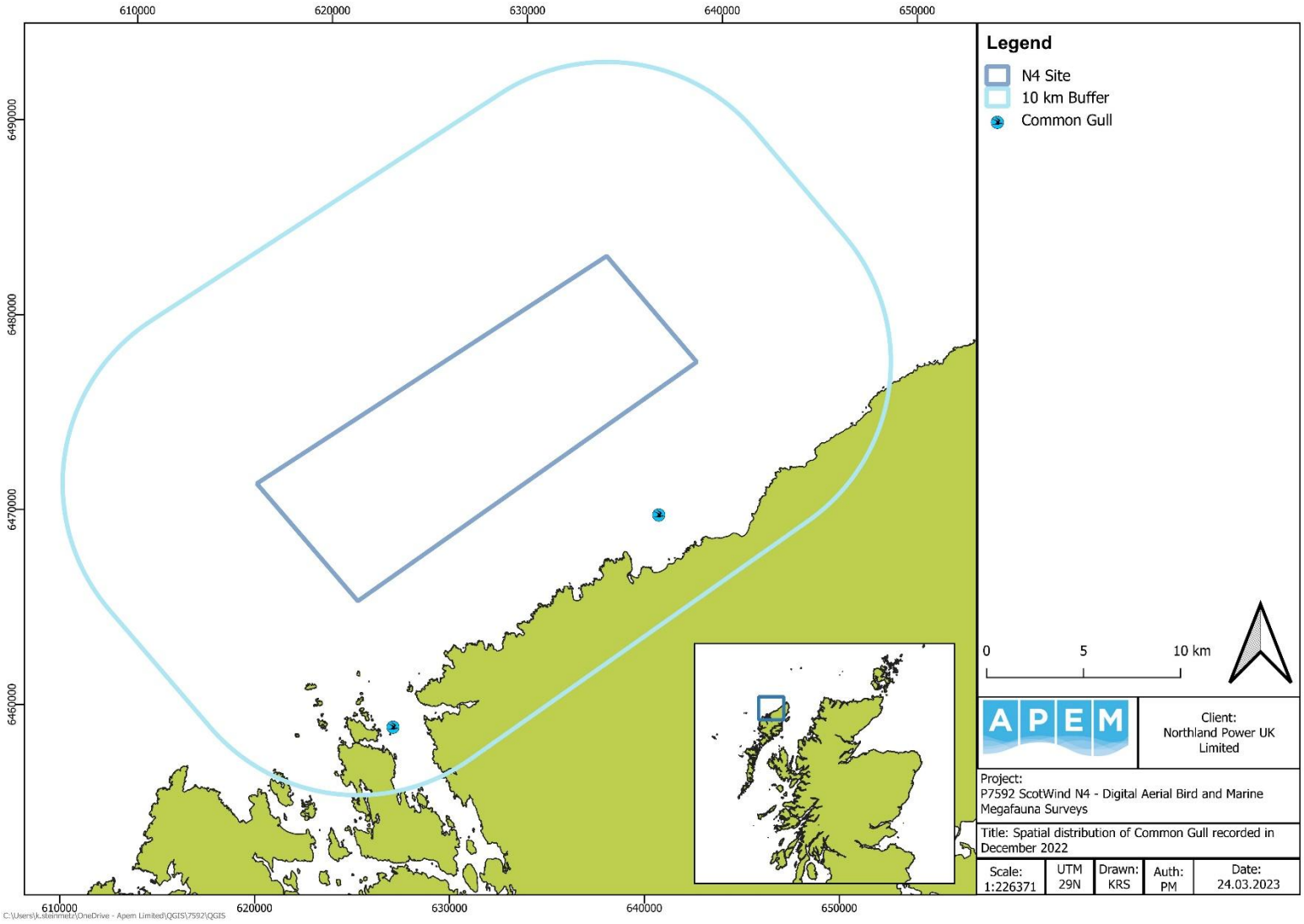


Figure 68 Distribution of common gull in December 2022

*Note that individuals in close proximity may appear overlaying.

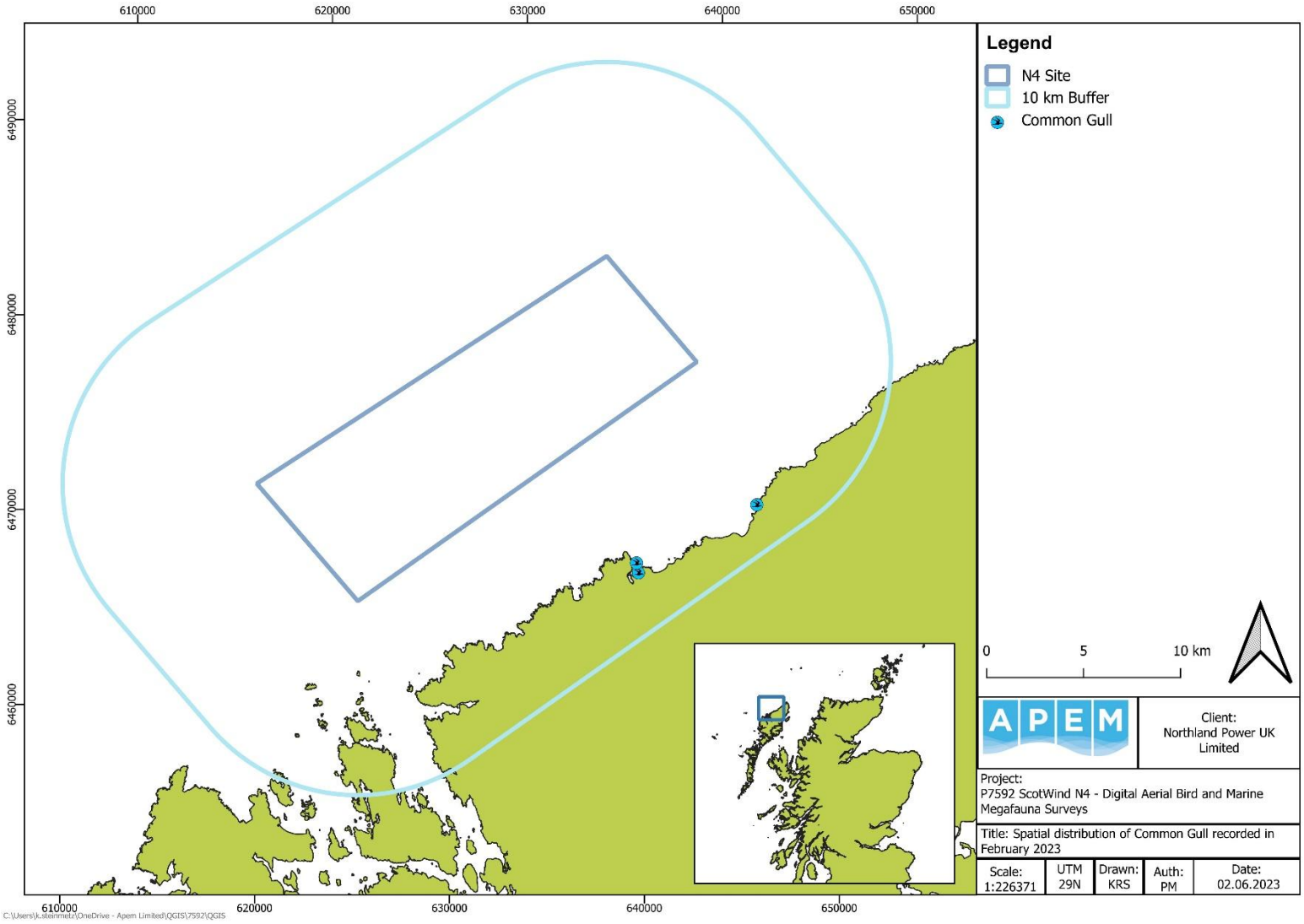


Figure 69 Distribution of common gull in February 2023

*Note that individuals in close proximity may appear overlaying.

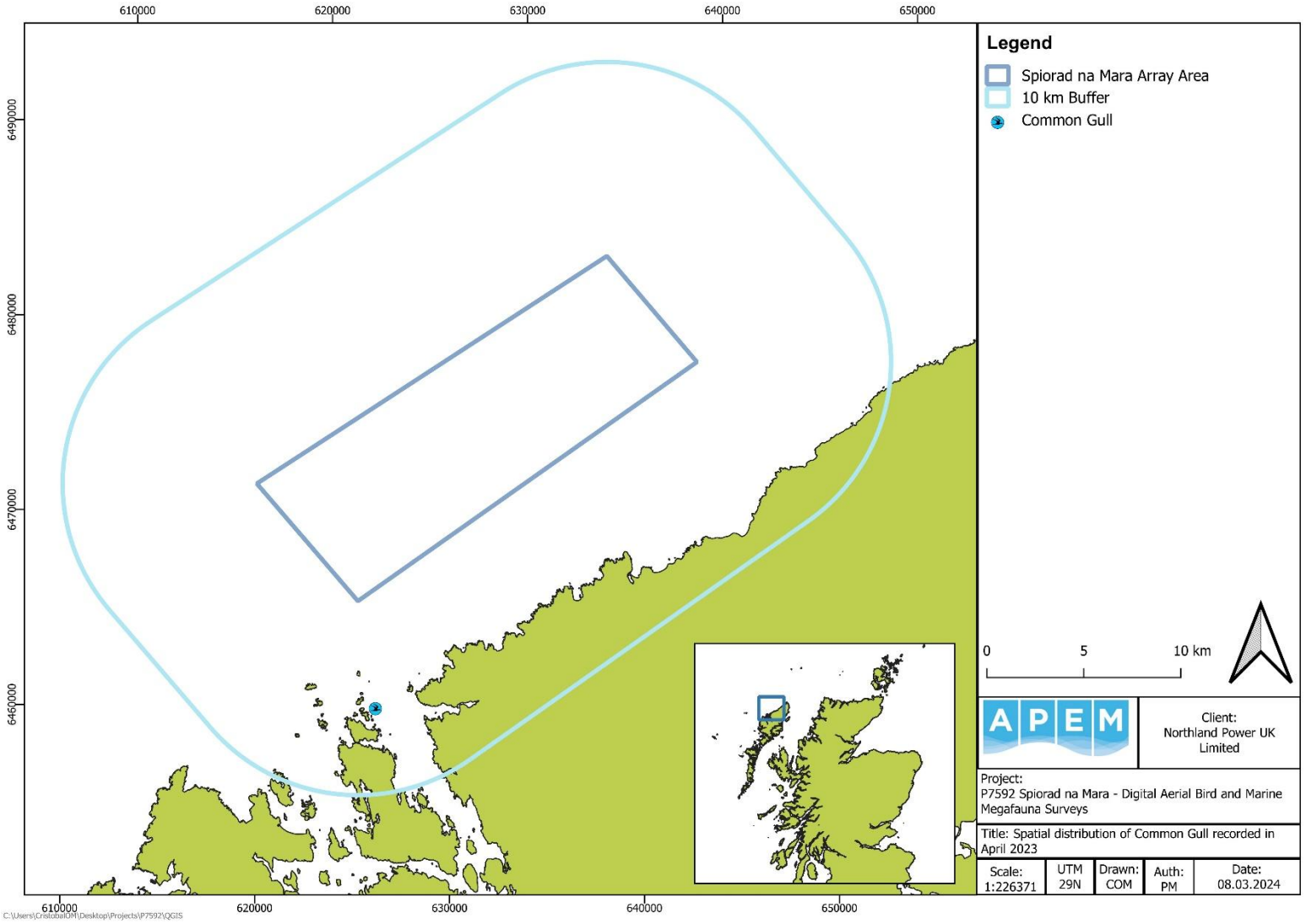


Figure 70 Distribution of common gull in April 2023

*Note that individuals in close proximity may appear overlaying.

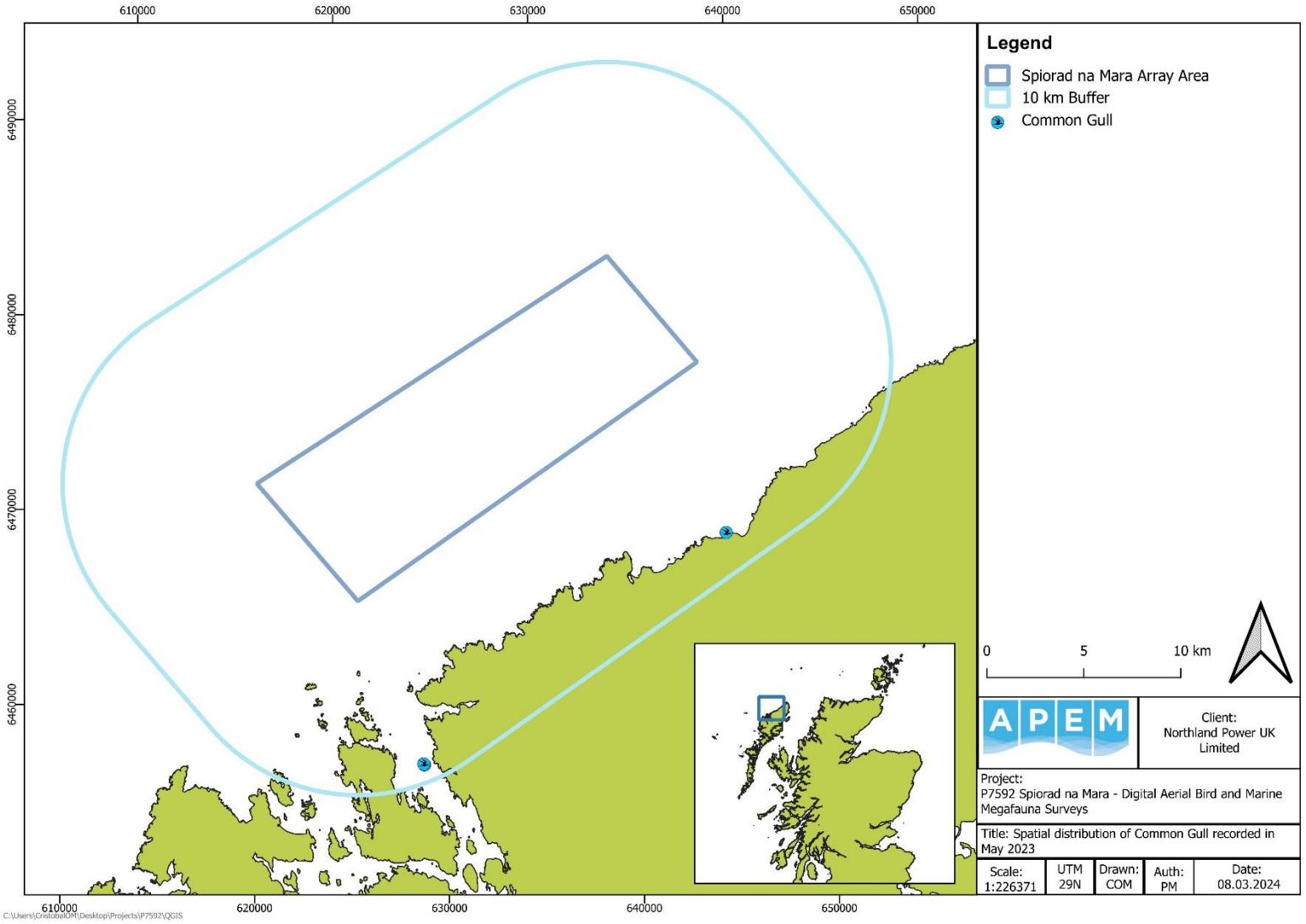


Figure 71 Distribution of common gull in May 2023

*Note that individuals in close proximity may appear overlaying.

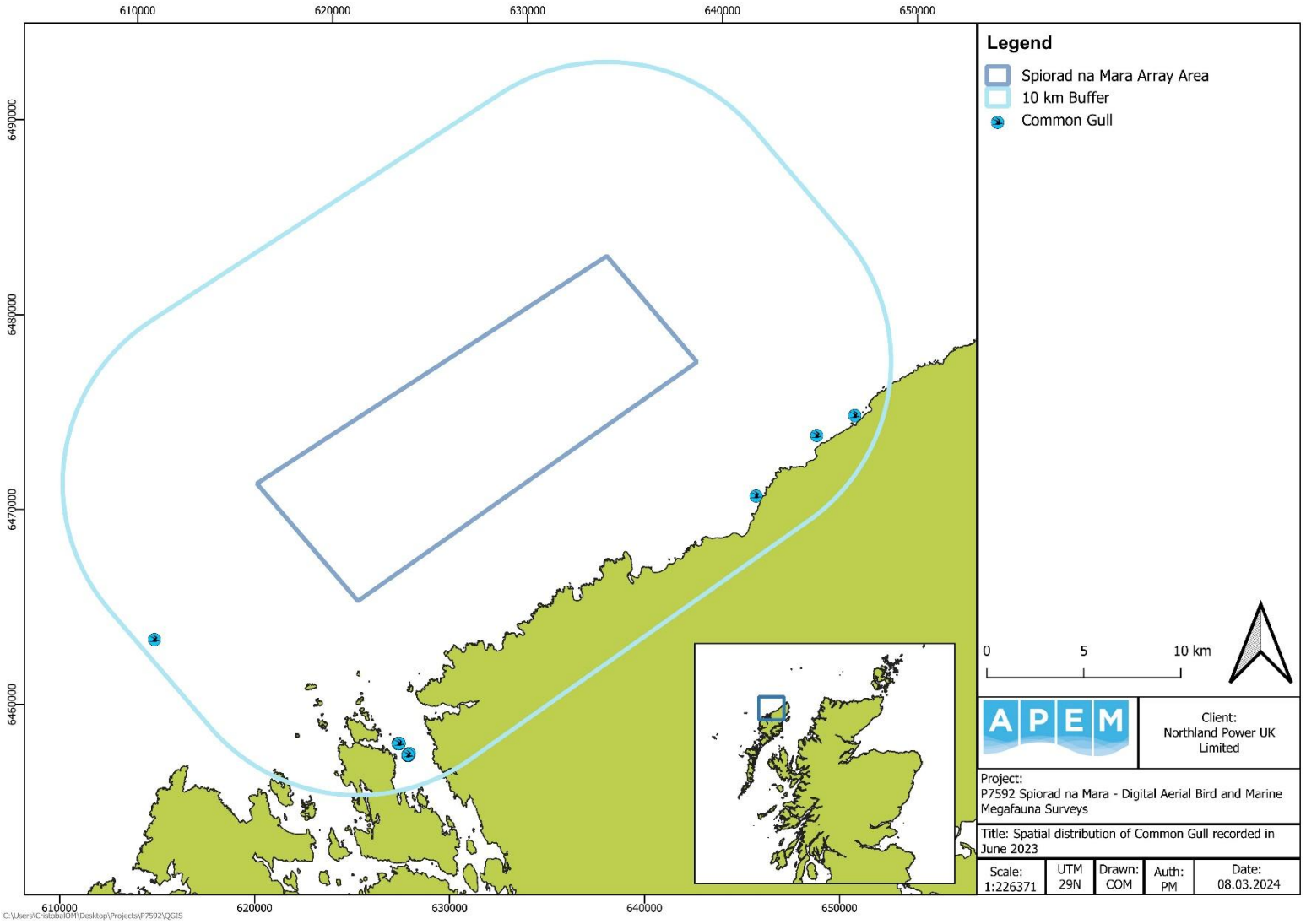


Figure 72 Distribution of common gull in June 2023

*Note that individuals in close proximity may appear overlaying.

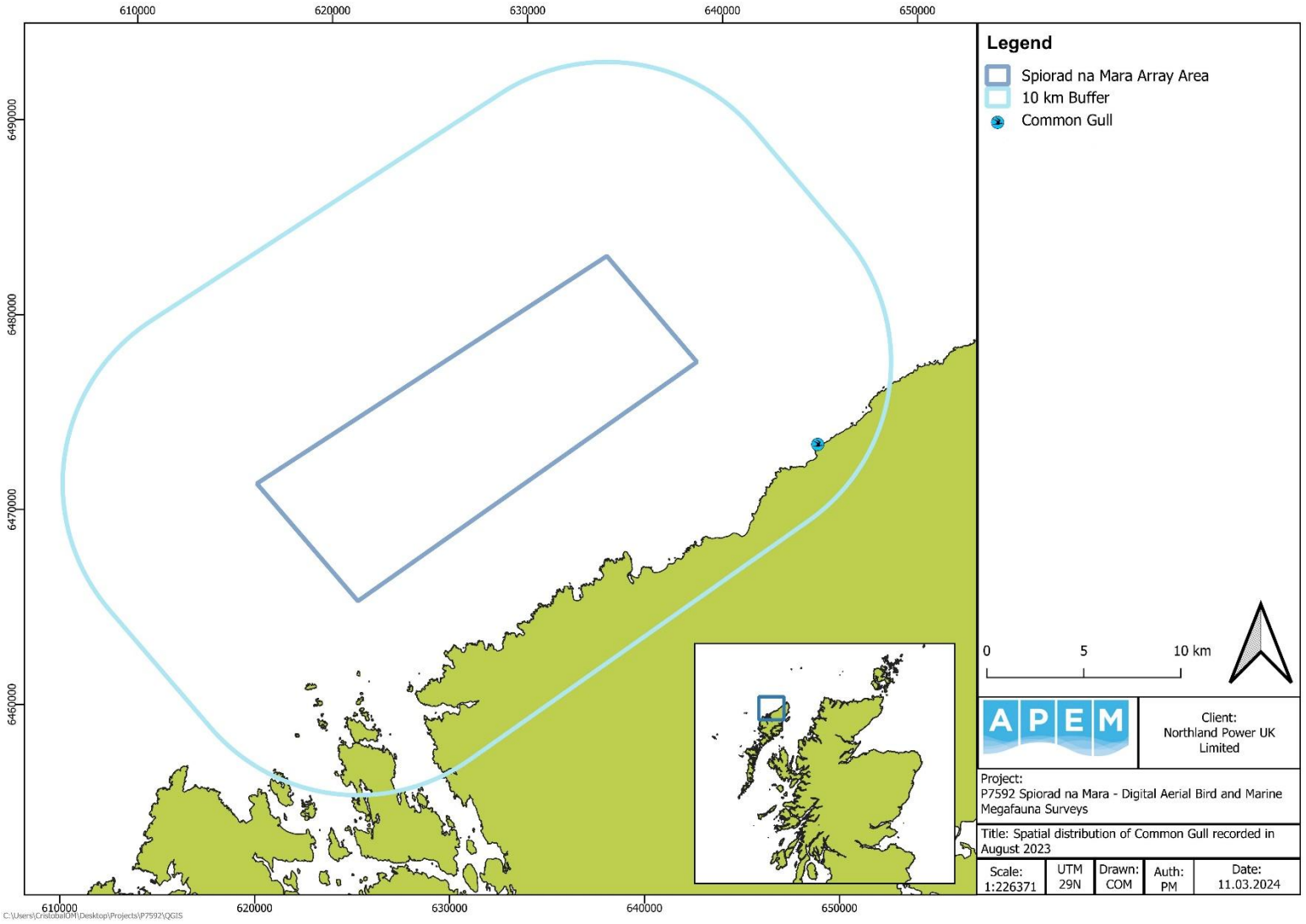


Figure 73 Distribution of common gull in August 2023

*Note that individuals in close proximity may appear overlaying.

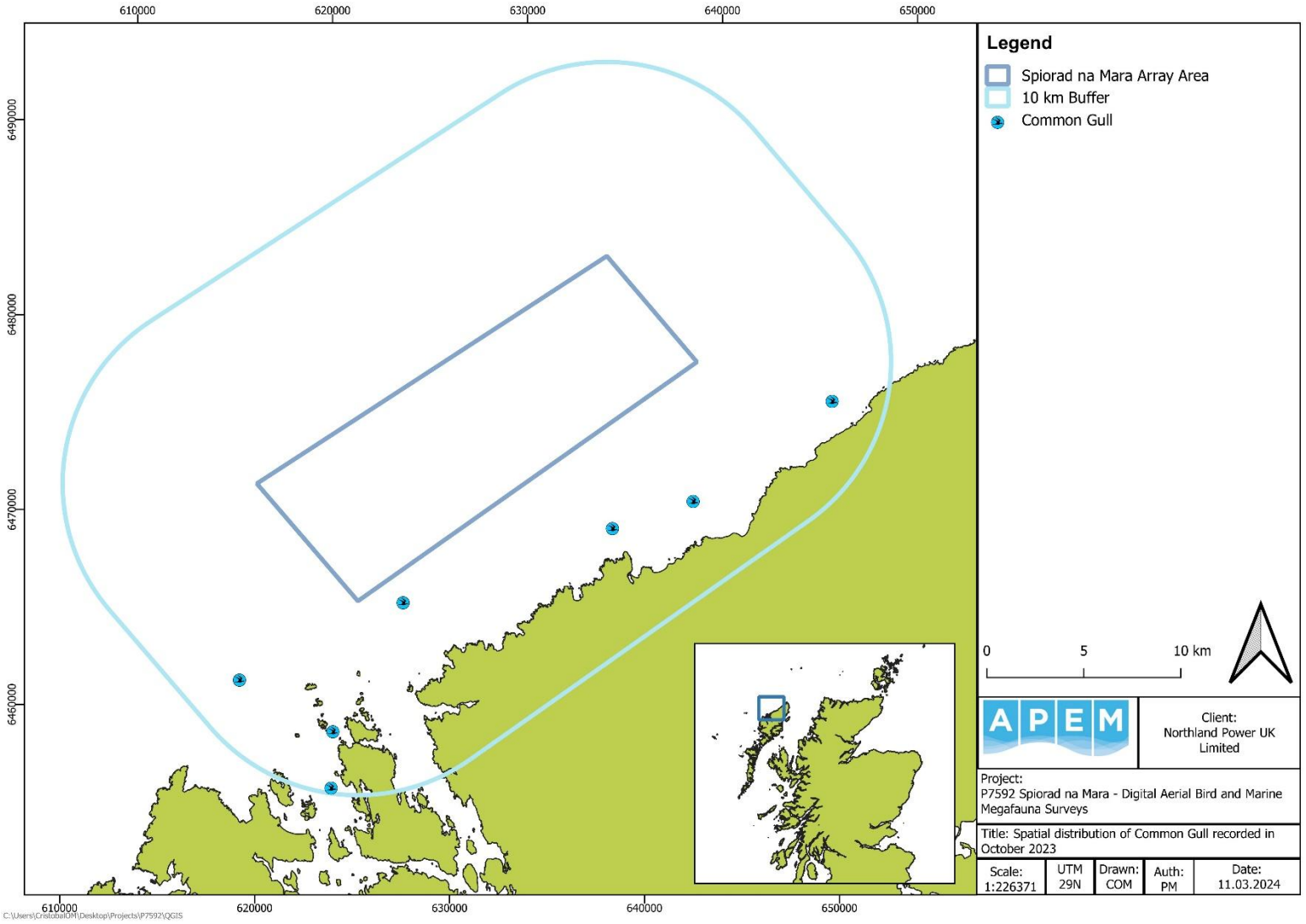


Figure 74 Distribution of common gull in October 2023

*Note that individuals in close proximity may appear overlaying.

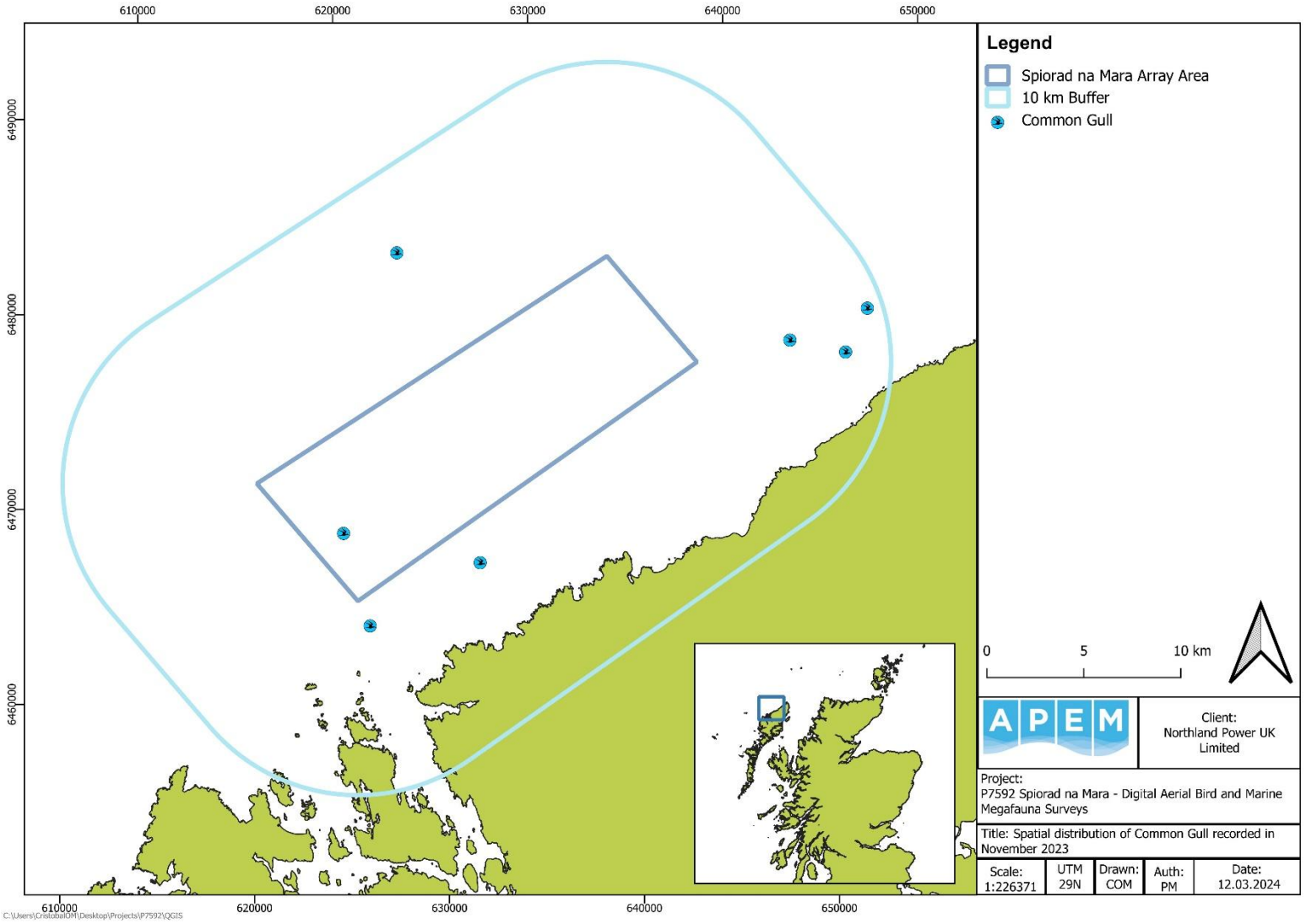


Figure 75 Distribution of common gull in November 2023

*Note that individuals in close proximity may appear overlaying.

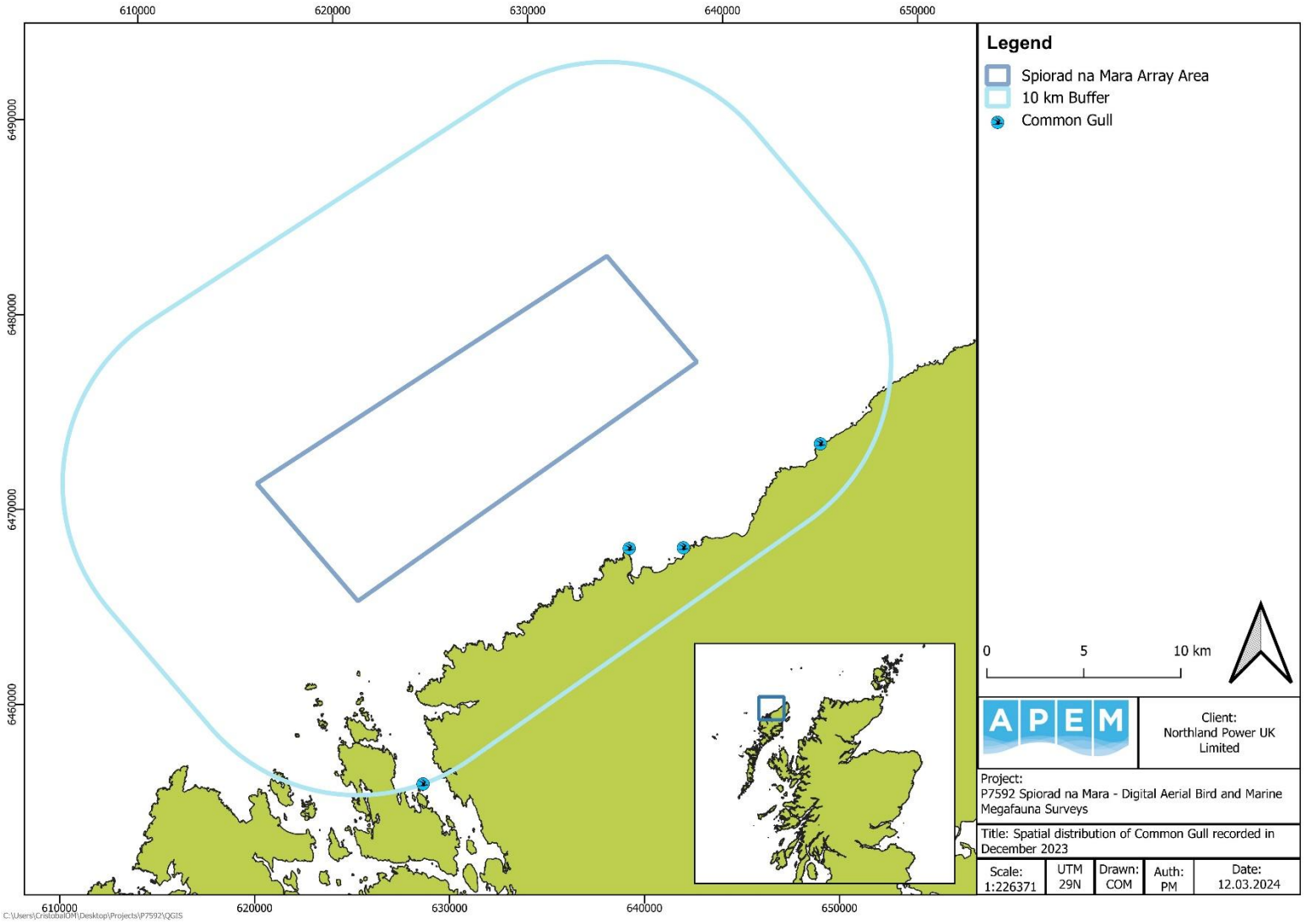


Figure 76 Distribution of common gull in December 2023

*Note that individuals in close proximity may appear overlaying.

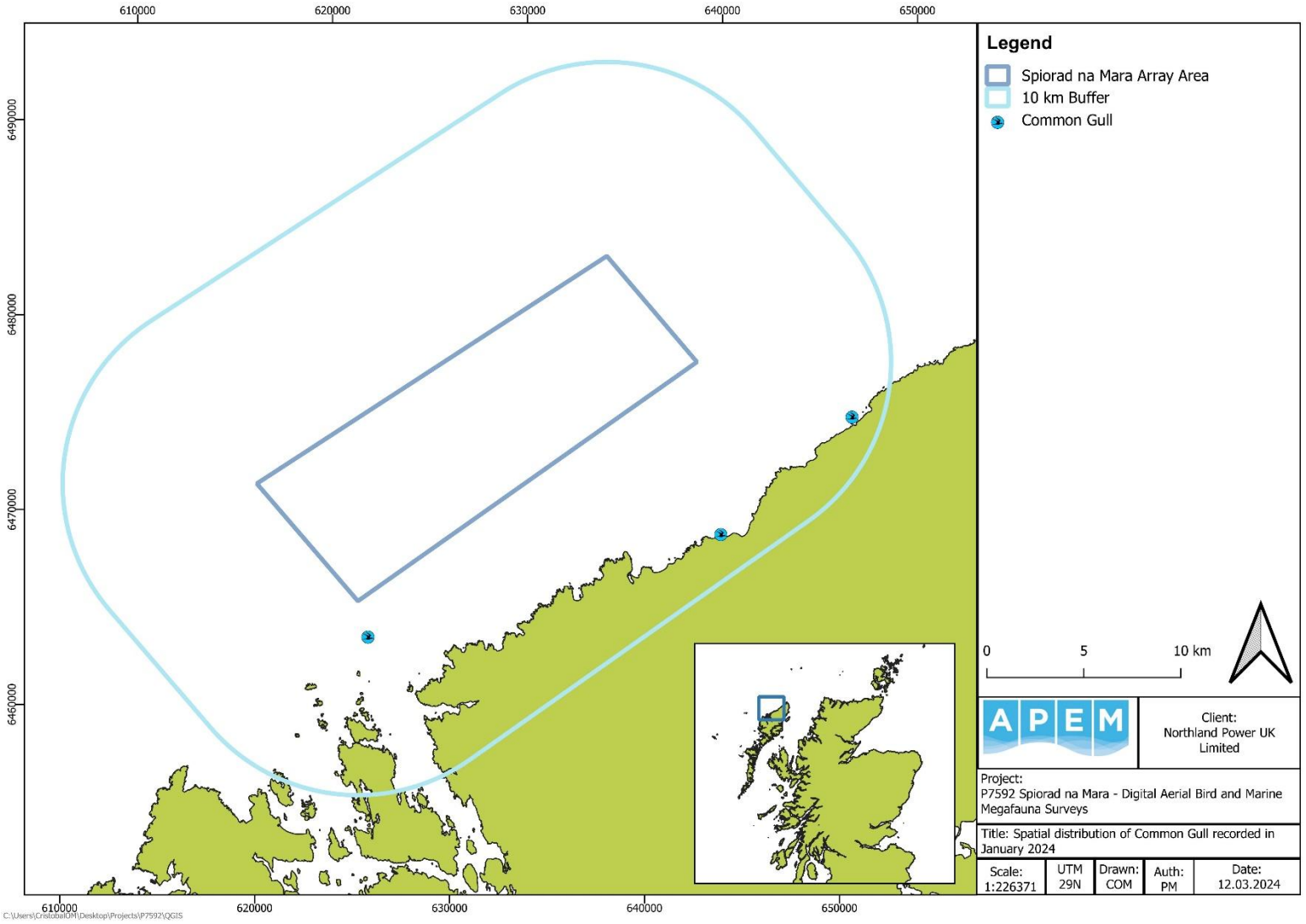


Figure 77 Distribution of common gull in January 2024

*Note that individuals in close proximity may appear overlaying.

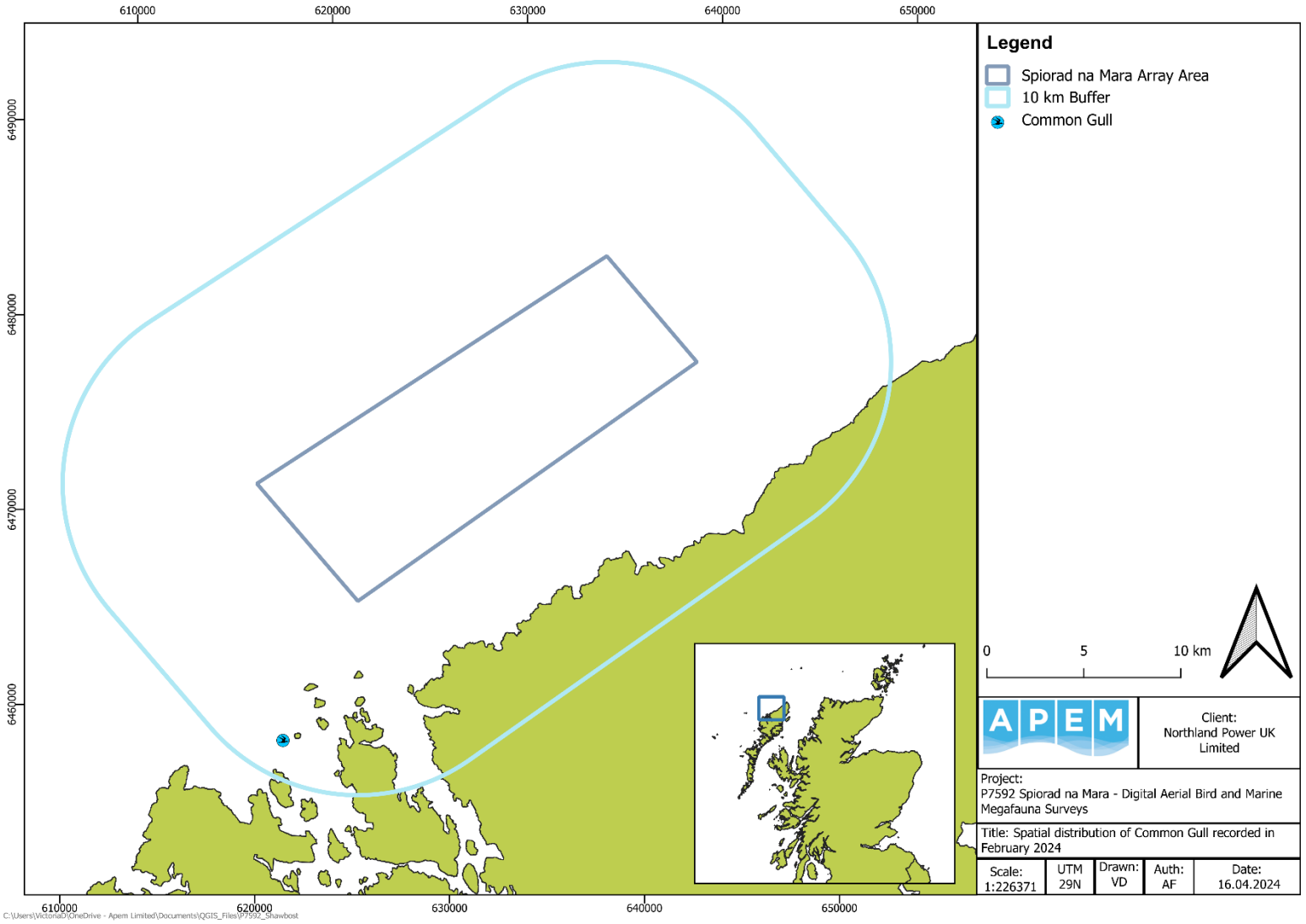


Figure 78 Distribution of common gull in February 2024

*Note that individuals in close proximity may appear overlaying.

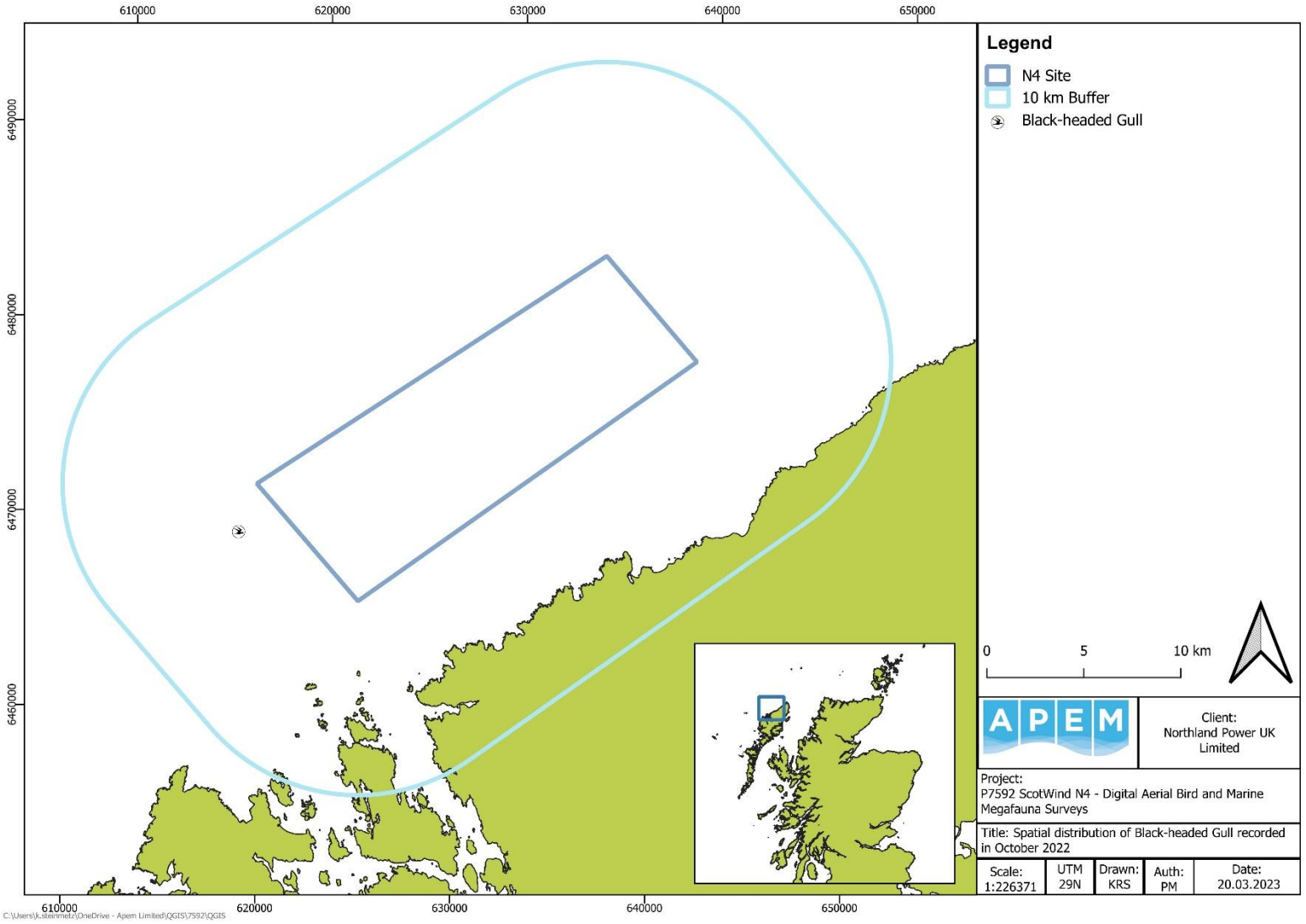


Figure 79 Distribution of black-headed gull in October 2022

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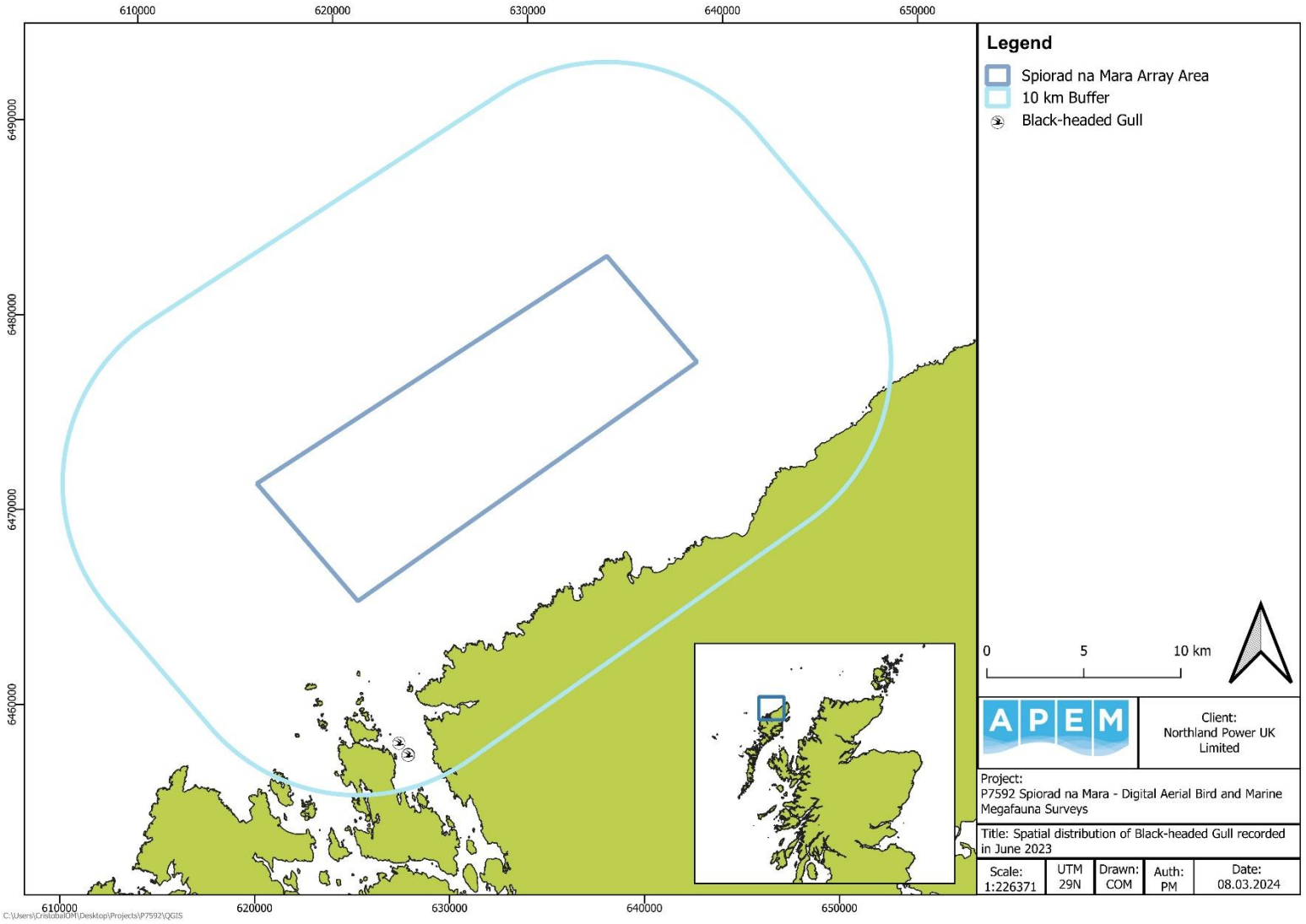


Figure 80 Distribution of black-headed gull in June 2023

*Note that individuals in close proximity may appear overlaying.

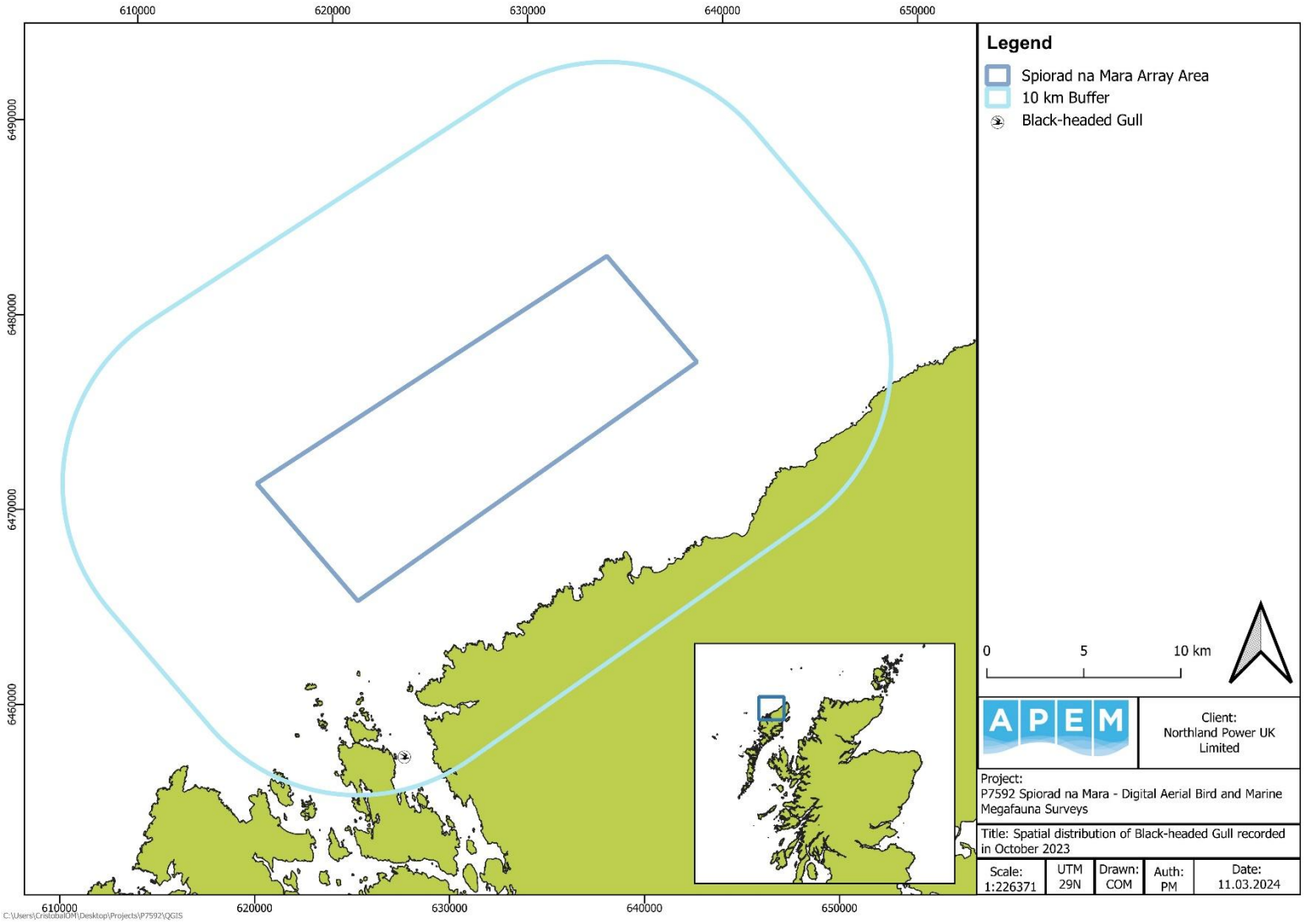


Figure 81 Distribution of black-headed gull in October 2023
*Note that individuals in close proximity may appear overlaying.

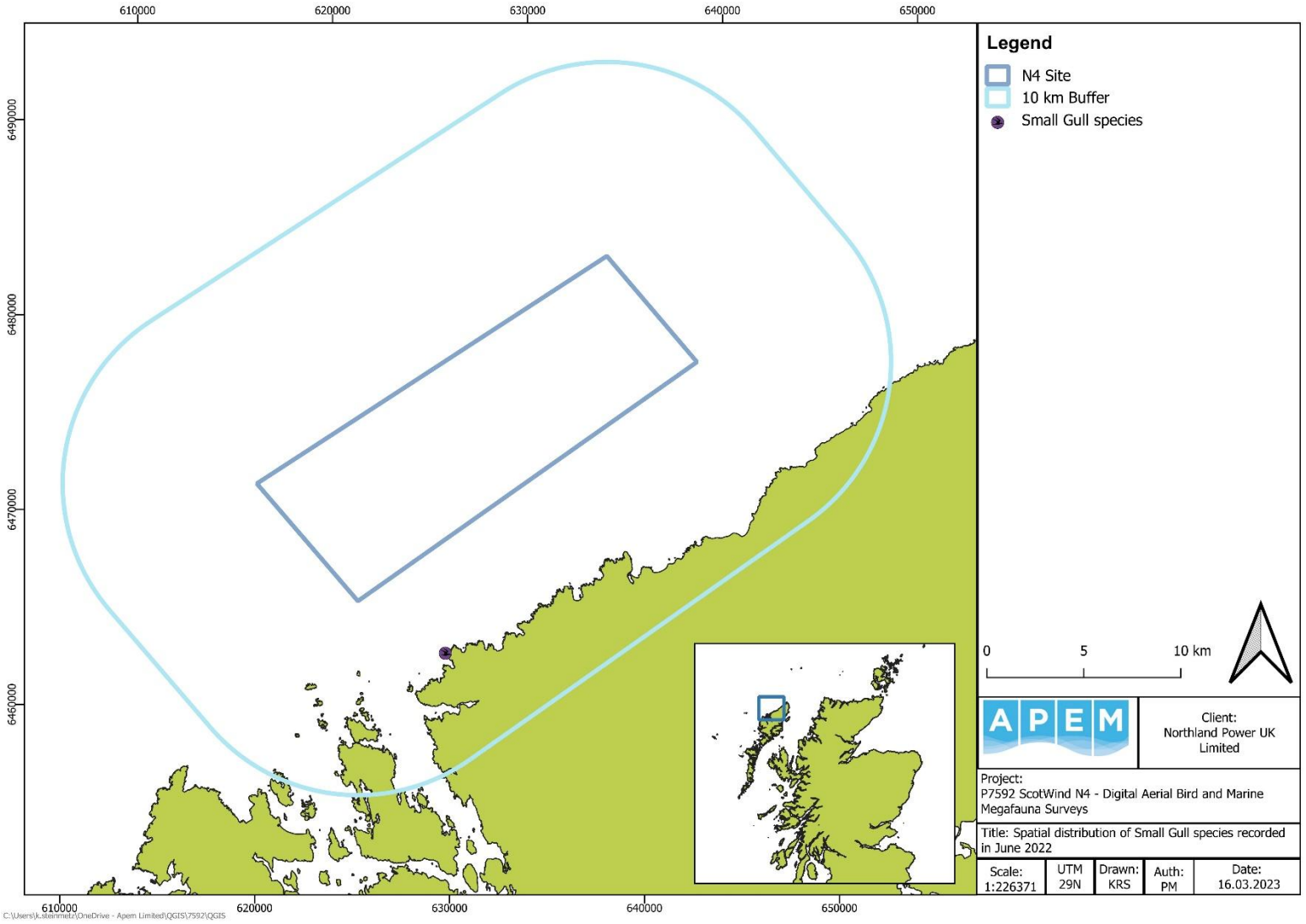


Figure 82 Distribution of small gull species in June 2022
*Note that individuals in close proximity may appear overlaying.

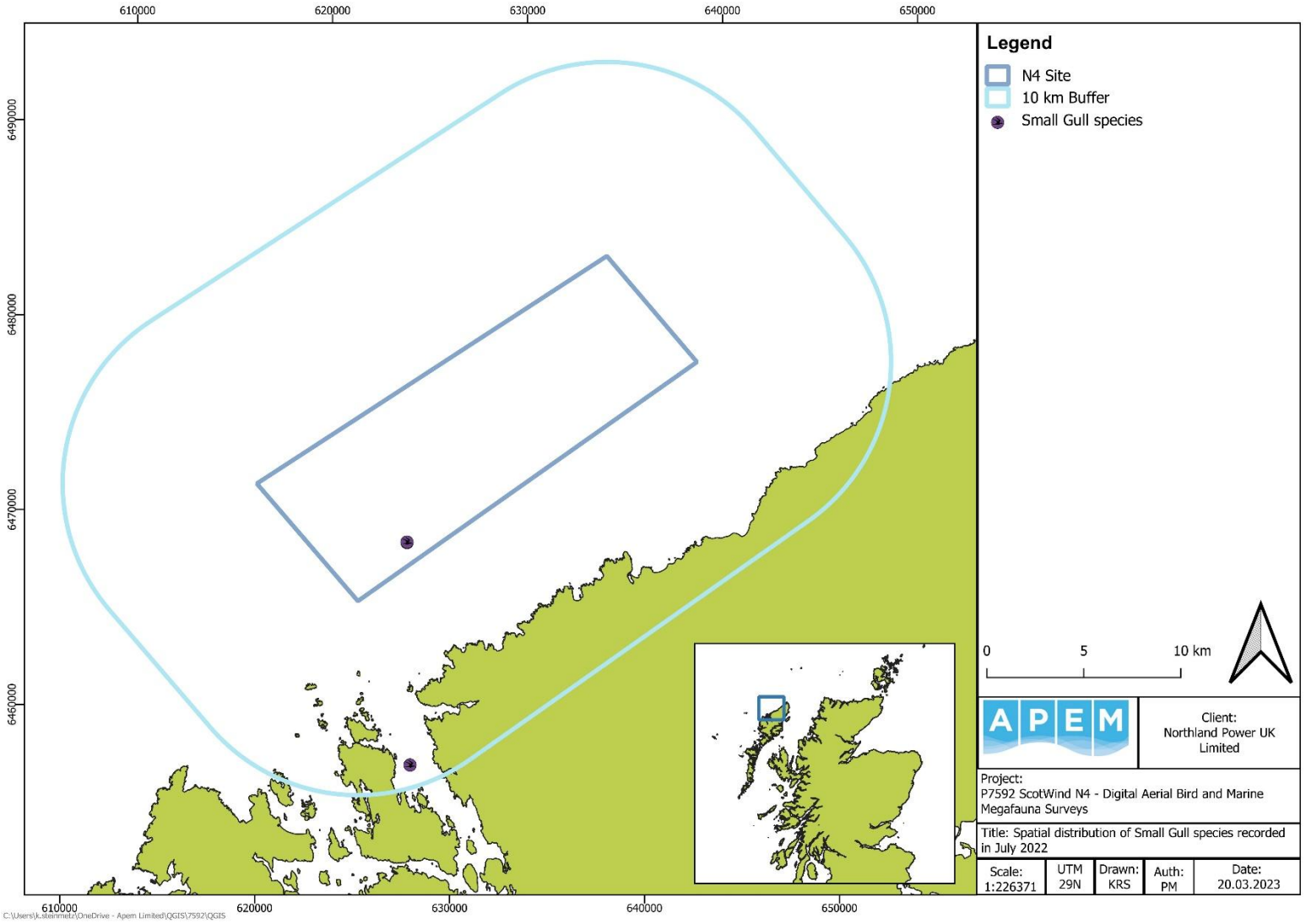


Figure 83 Distribution of small gull species in July 2022

*Note that individuals in close proximity may appear overlaying.

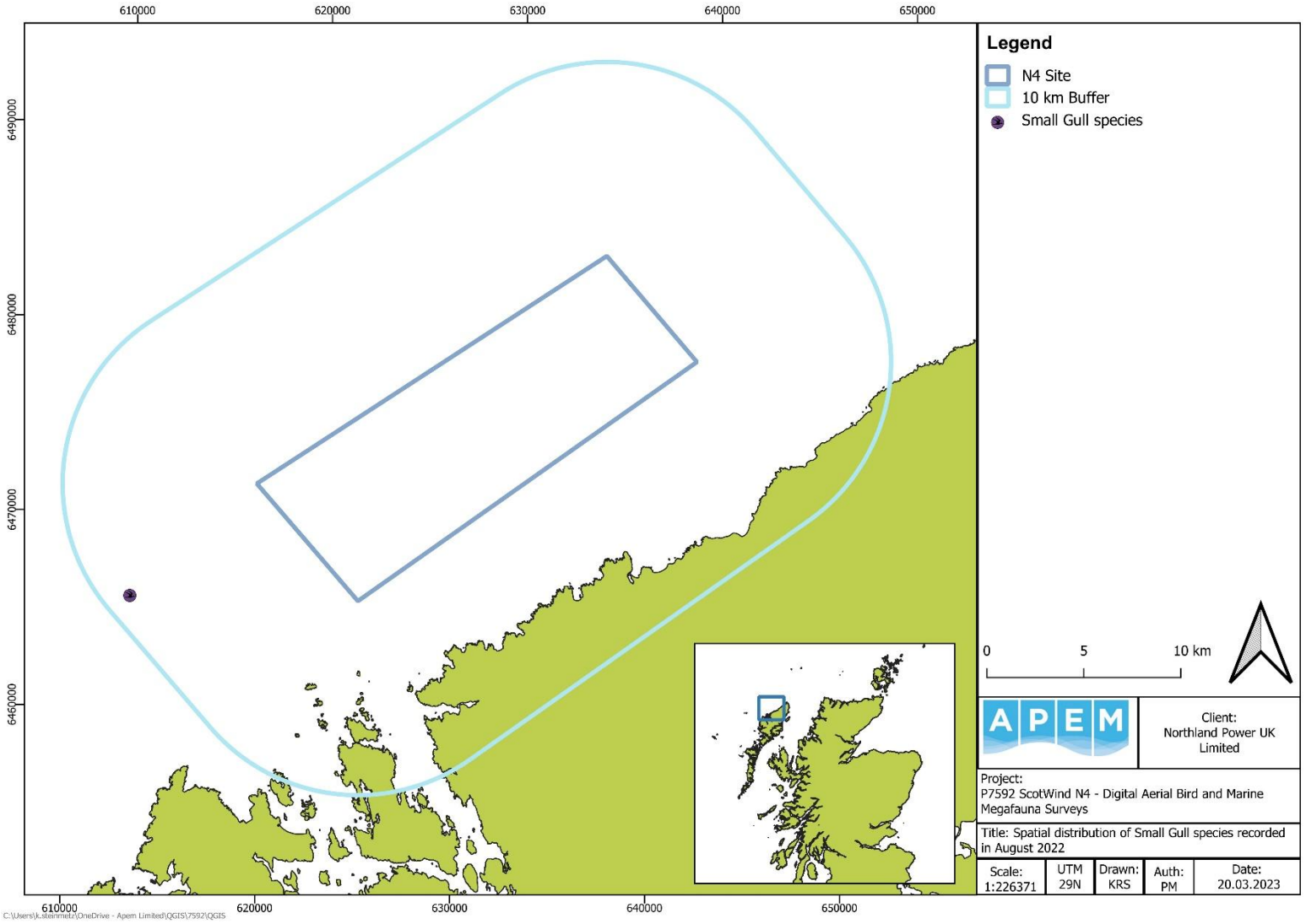


Figure 84 Distribution of small gull species in August 2022

*Note that individuals in close proximity may appear overlaying.

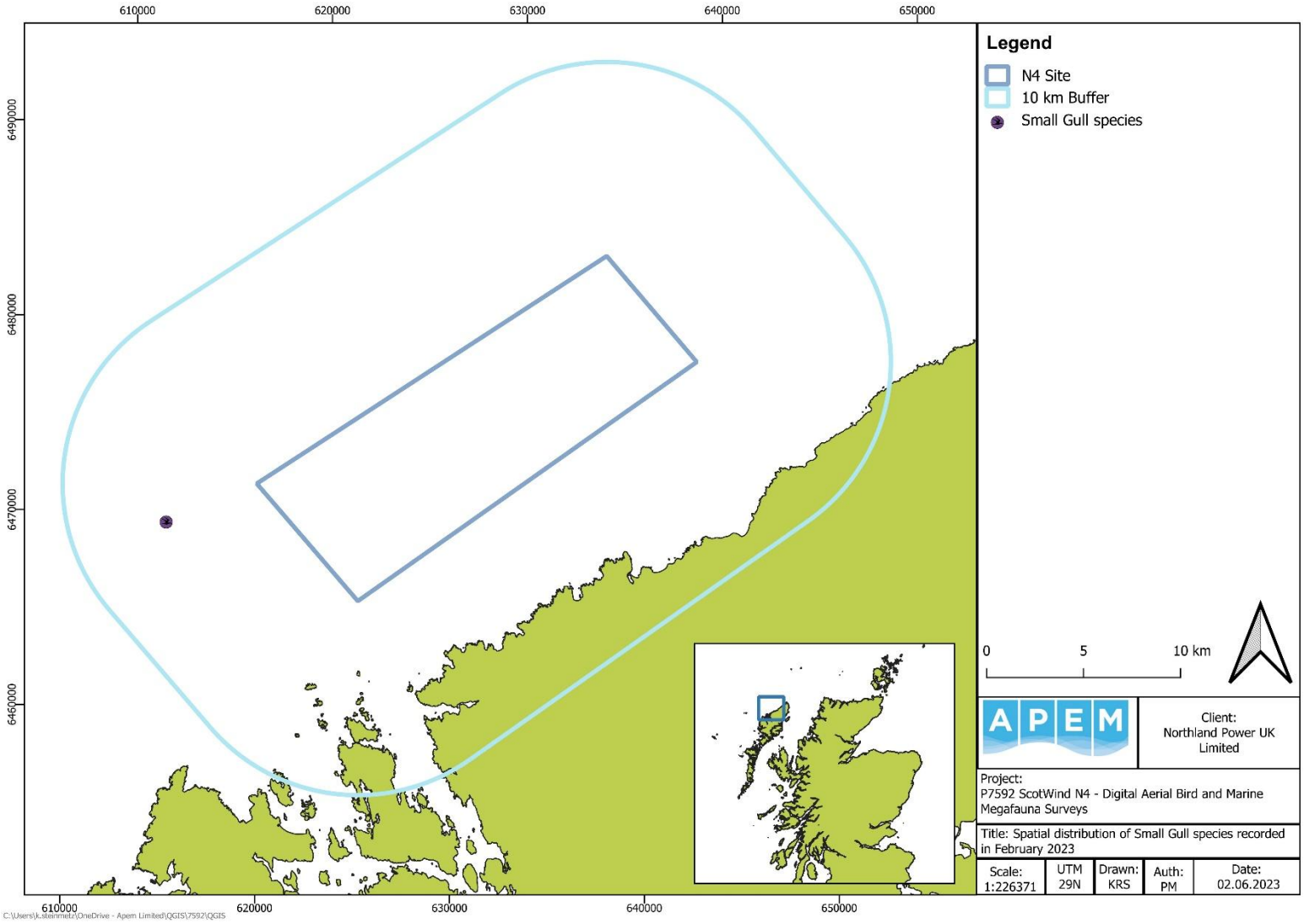


Figure 85 Distribution of small gull species in February 2023

*Note that individuals in close proximity may appear overlaying.

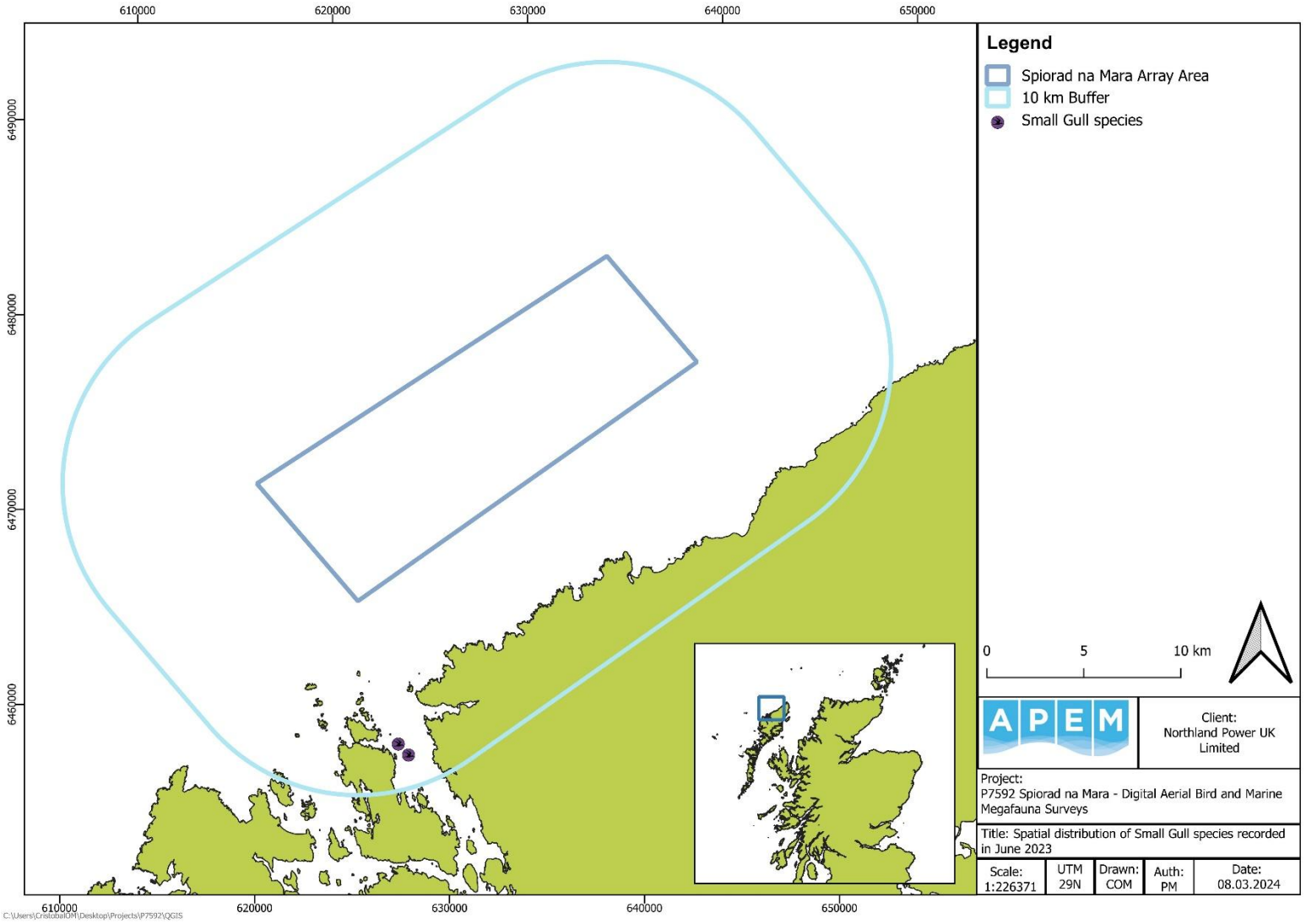


Figure 86 Distribution of small gull species in June 2023

*Note that individuals in close proximity may appear overlaying.

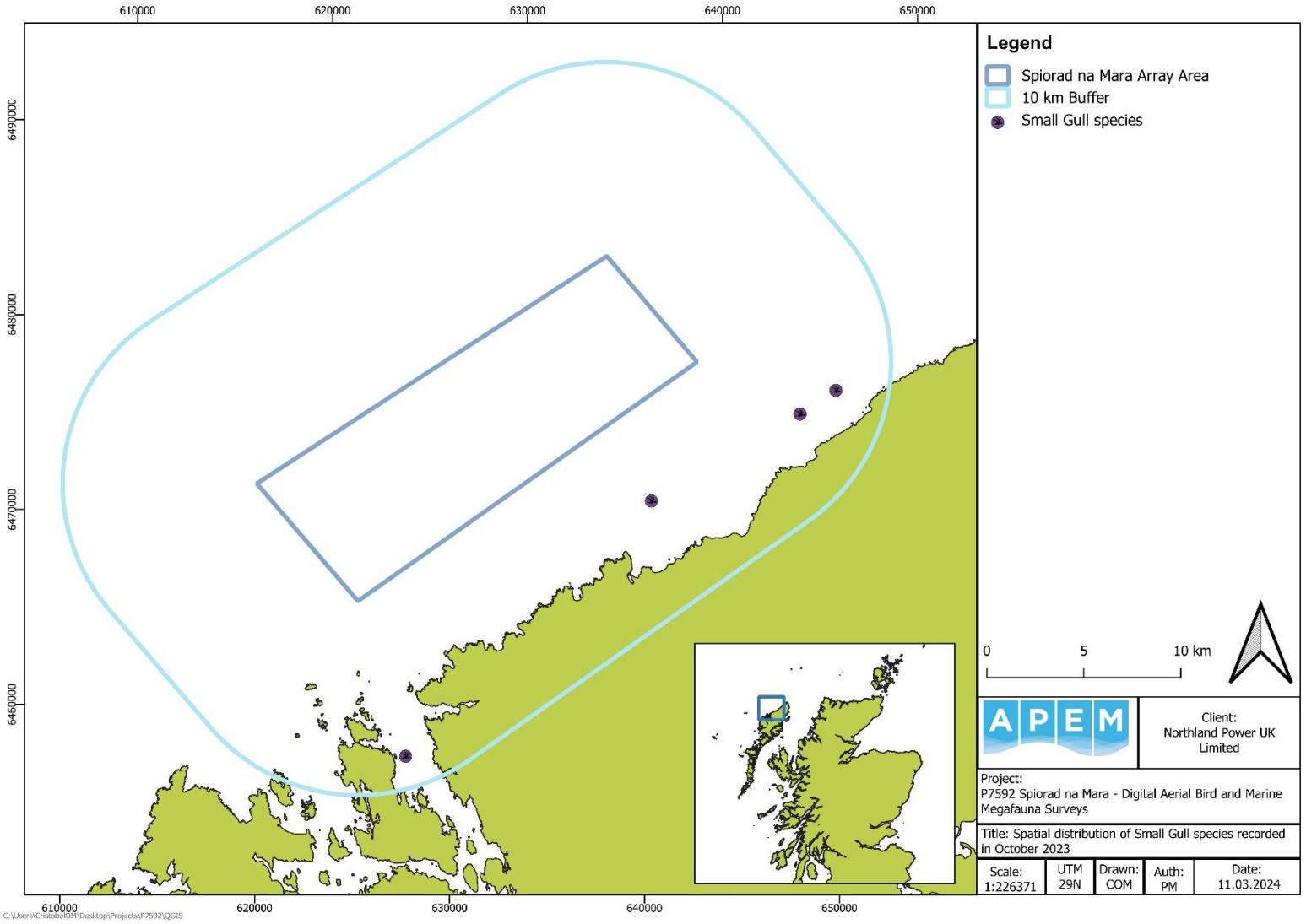


Figure 87 Distribution of small gull species in October 2023

*Note that individuals in close proximity may appear overlaying.

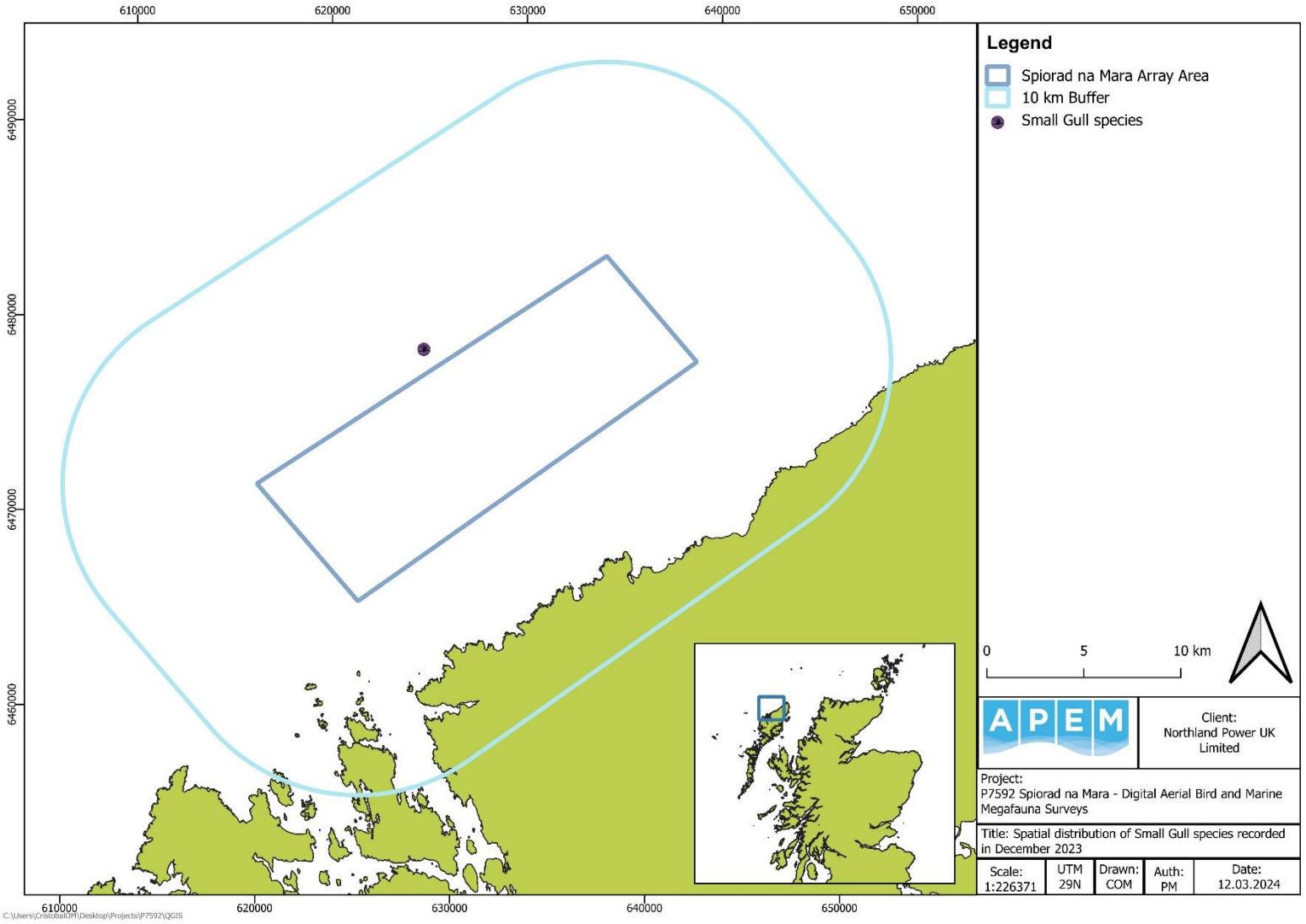


Figure 88 Distribution of small gull species in December 2023

*Note that individuals in close proximity may appear overlaying.

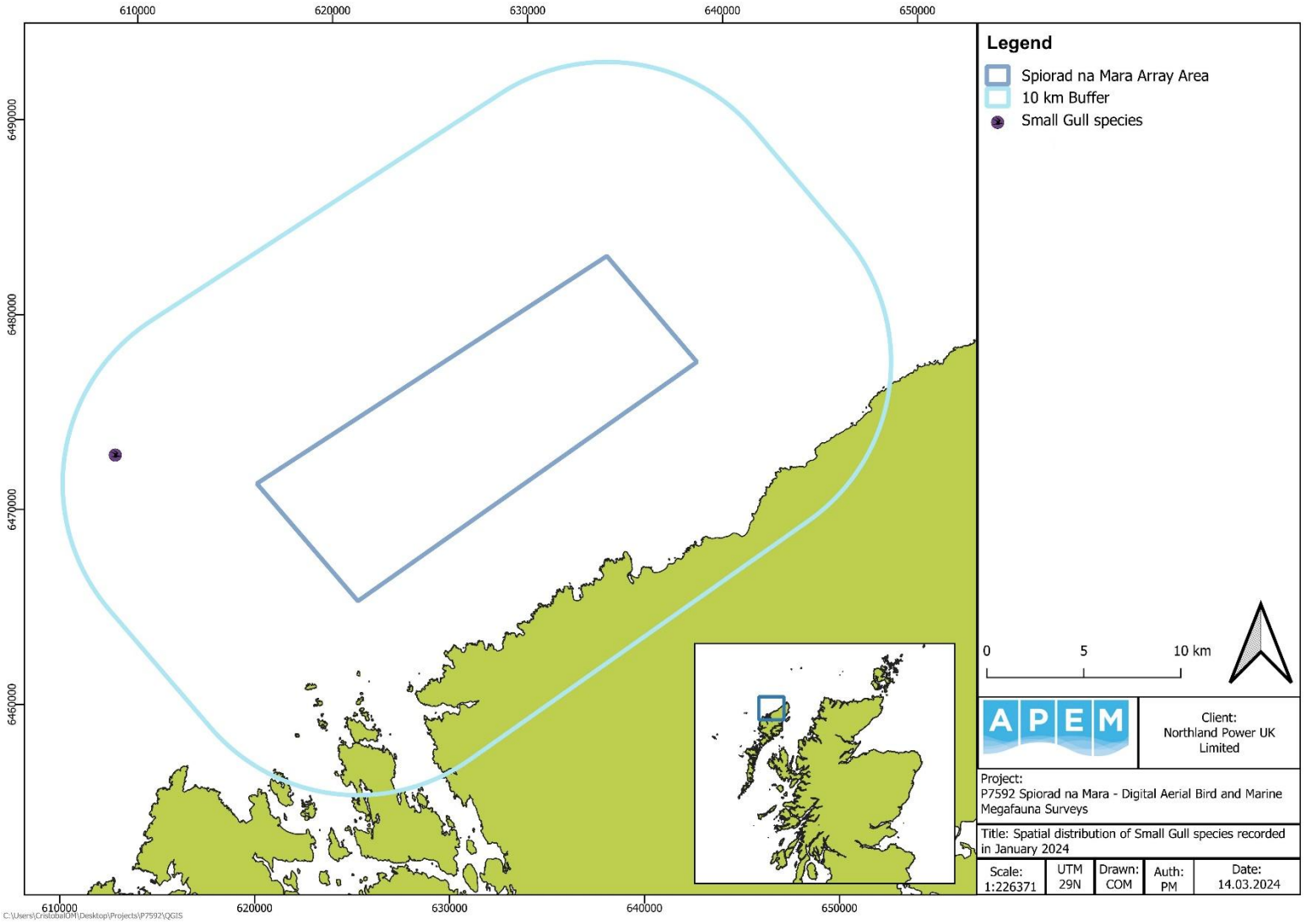


Figure 89 Distribution of small gull species in January 2024

*Note that individuals in close proximity may appear overlaying.

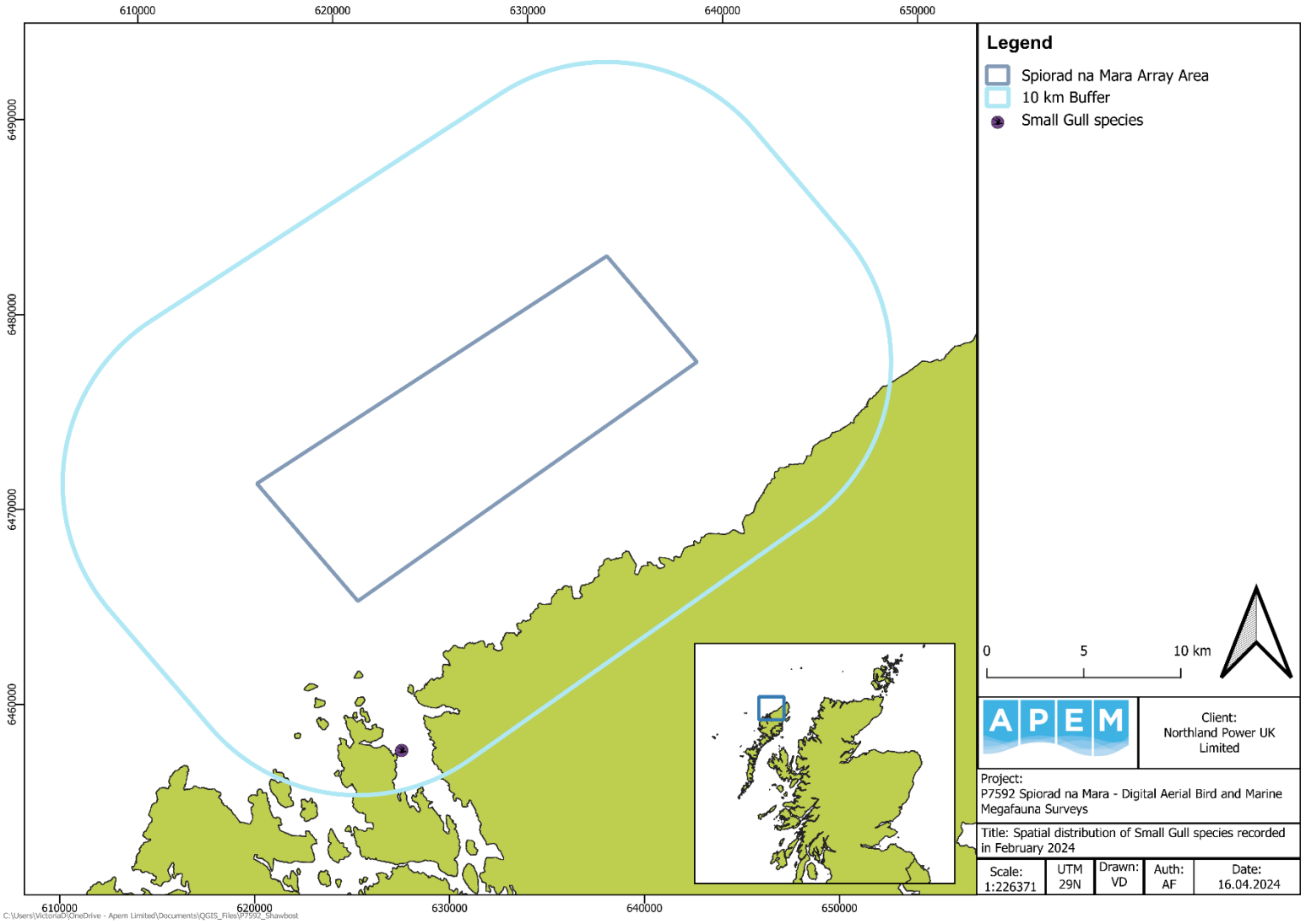


Figure 90 Distribution of small gull species in February 2024

*Note that individuals in close proximity may appear overlaying.

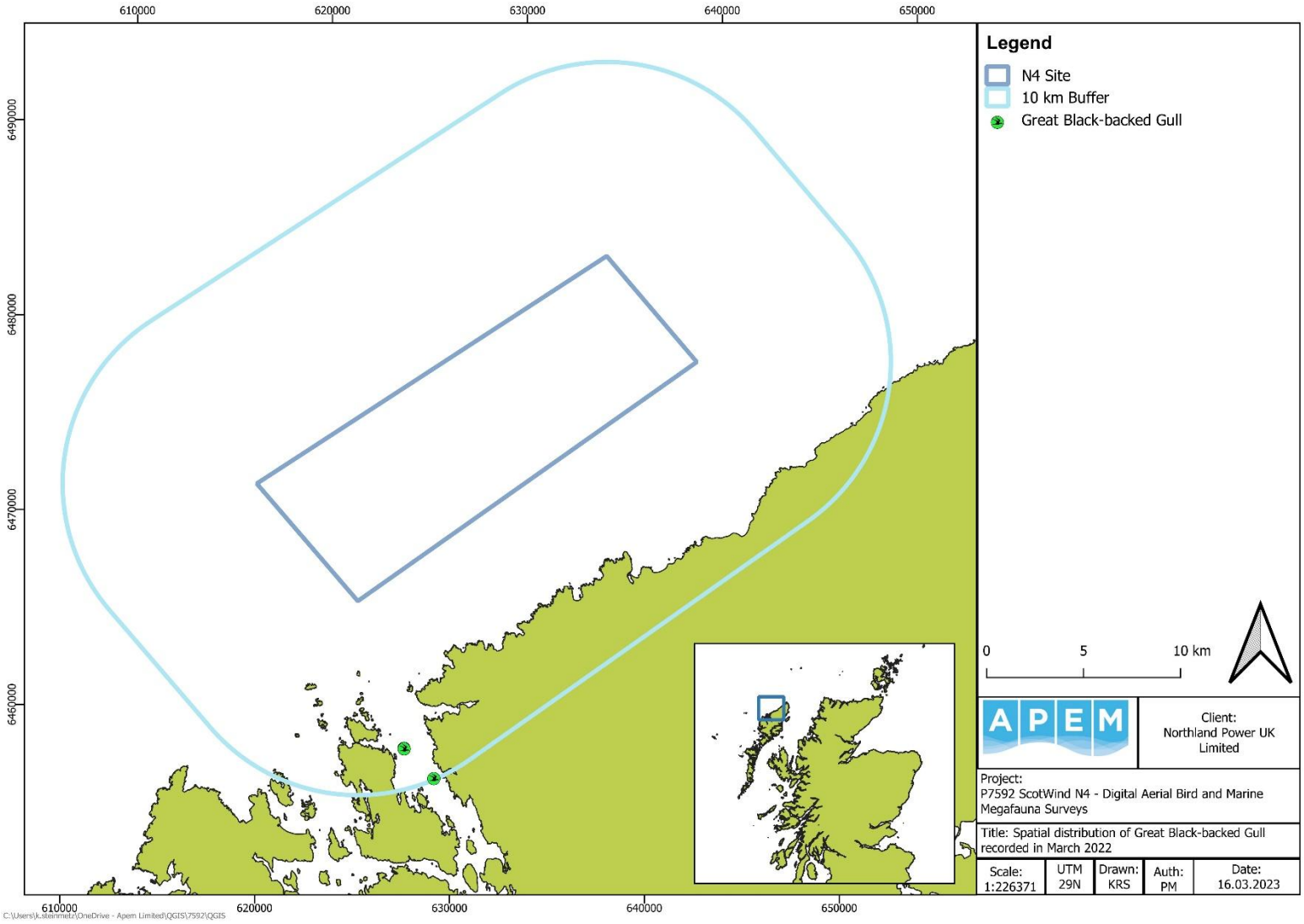


Figure 91 Distribution of great black-backed gull in March 2022

*Note that individuals in close proximity may appear overlaying.

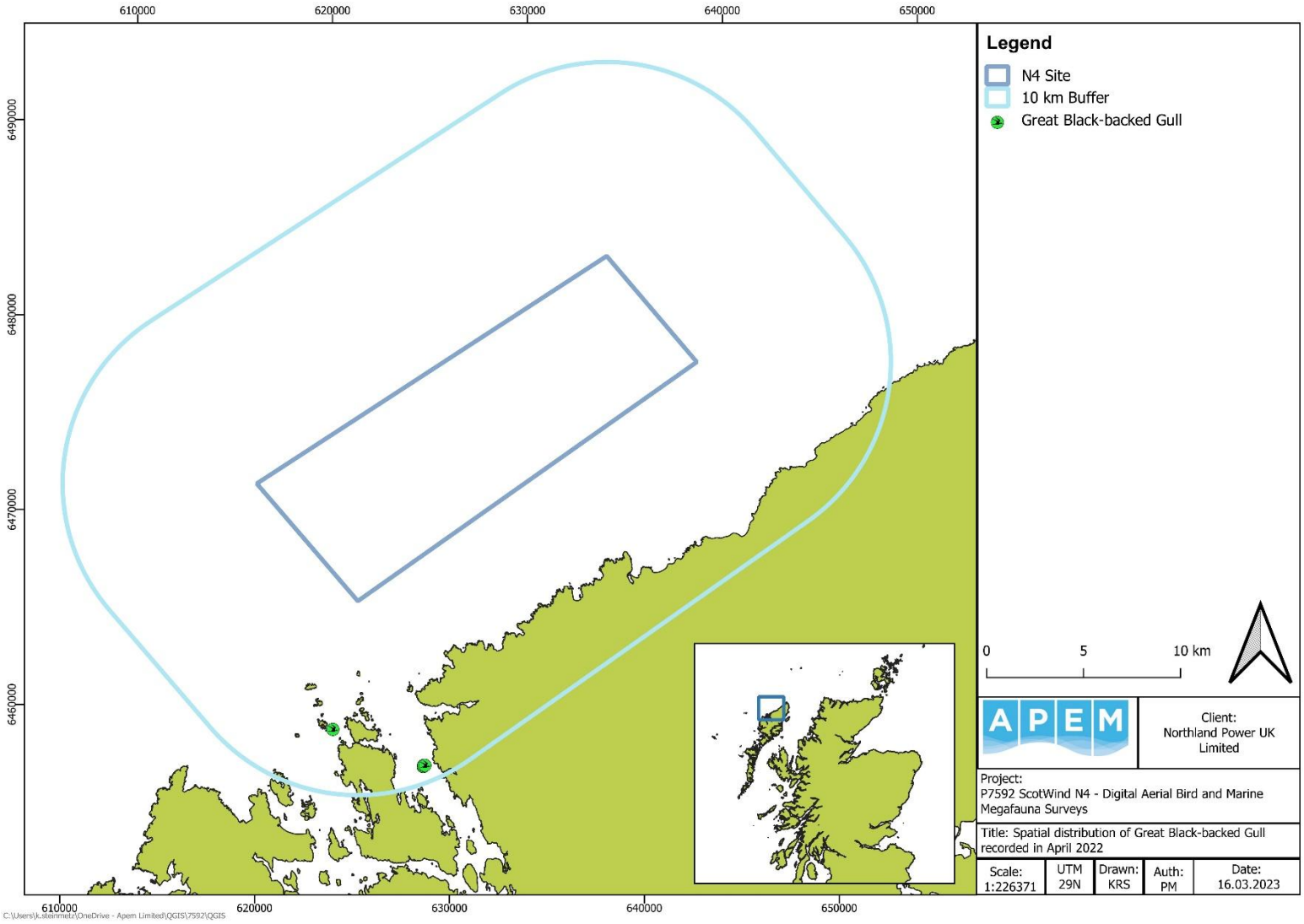


Figure 92 Distribution of great black-backed gull in April 2022

*Note that individuals in close proximity may appear overlaying.

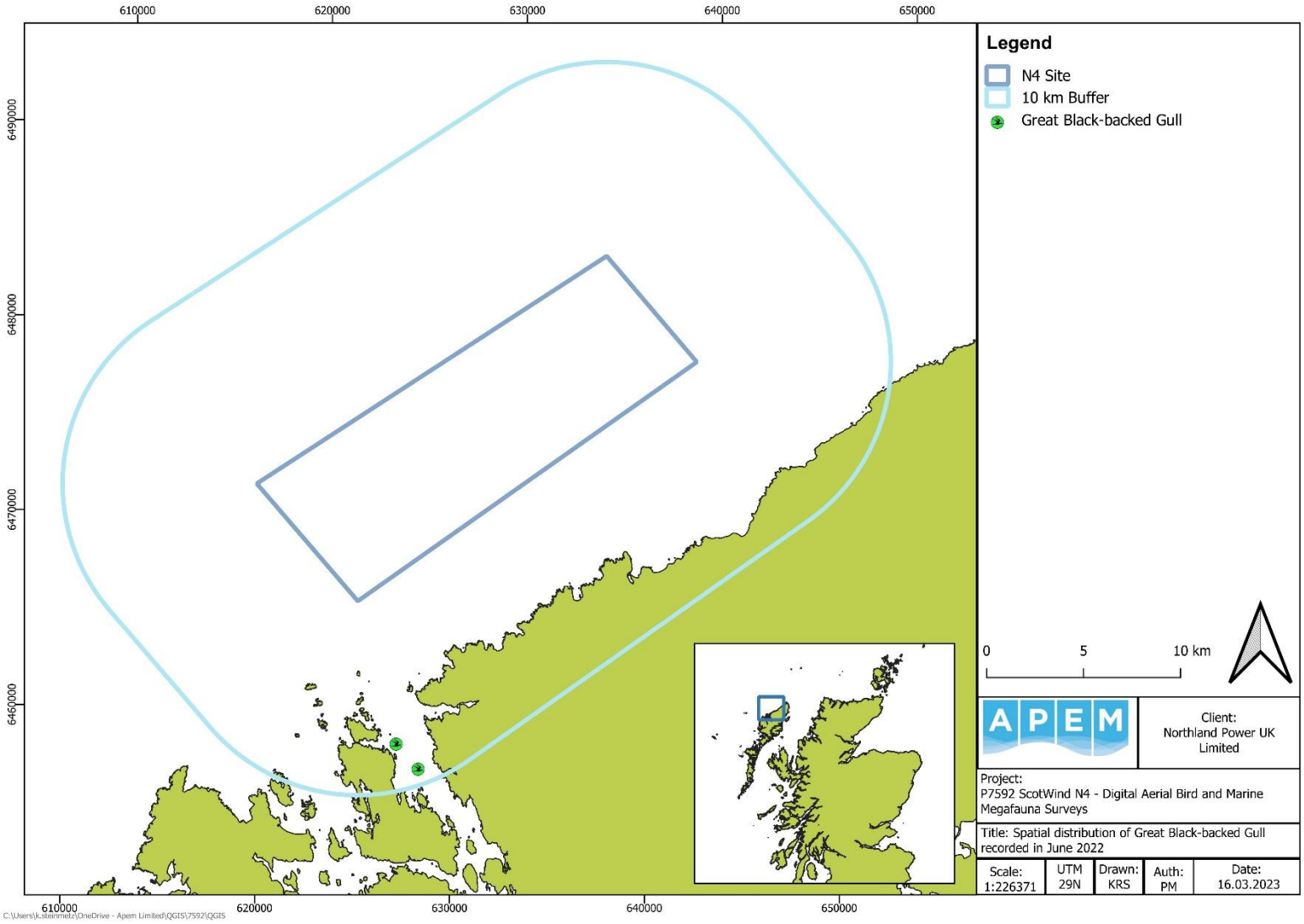


Figure 93 Distribution of great black-backed gull in June 2022

*Note that individuals in close proximity may appear overlaying.

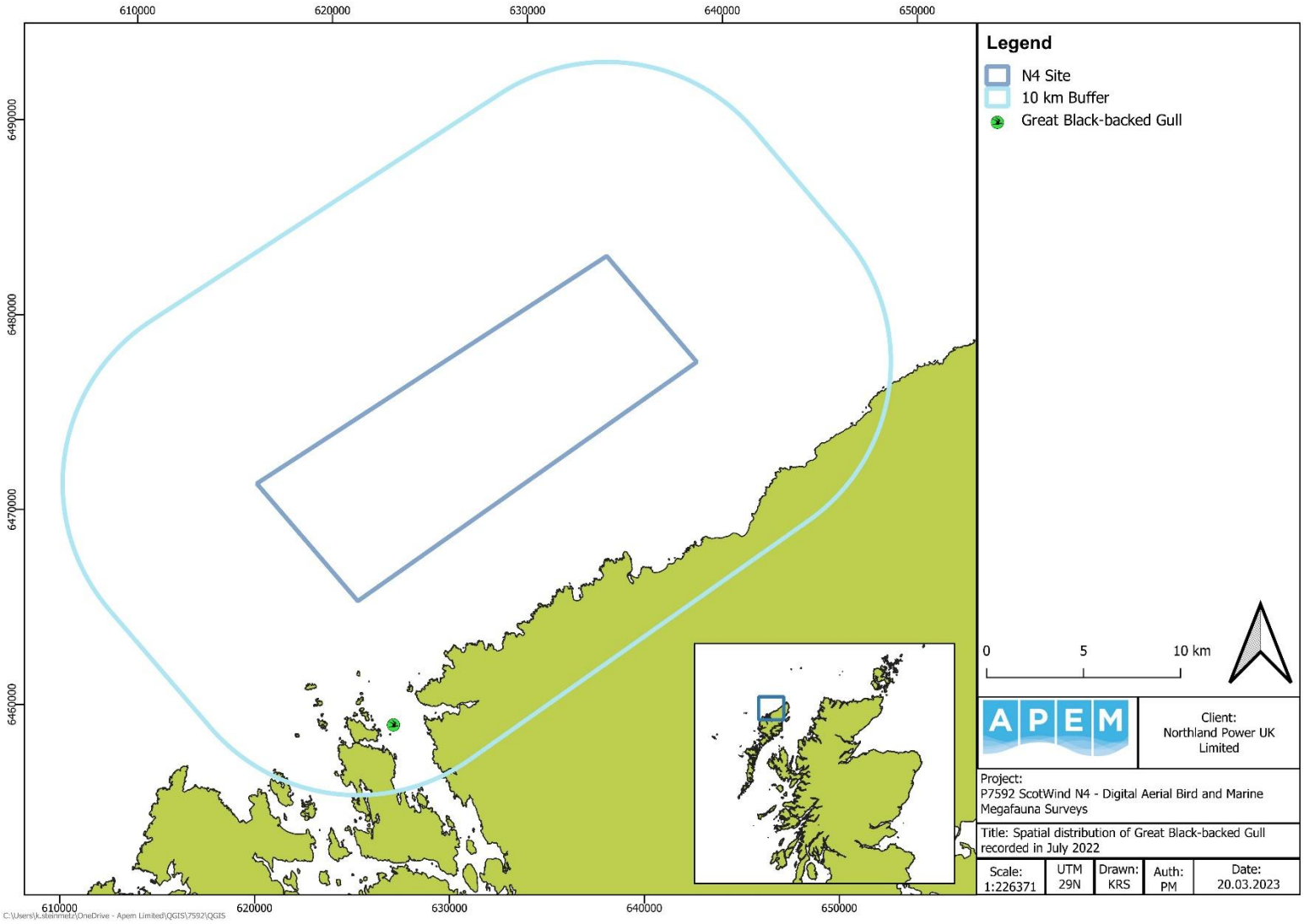


Figure 94 Distribution of great black-backed gull in July 2022
*Note that individuals in close proximity may appear overlaying.

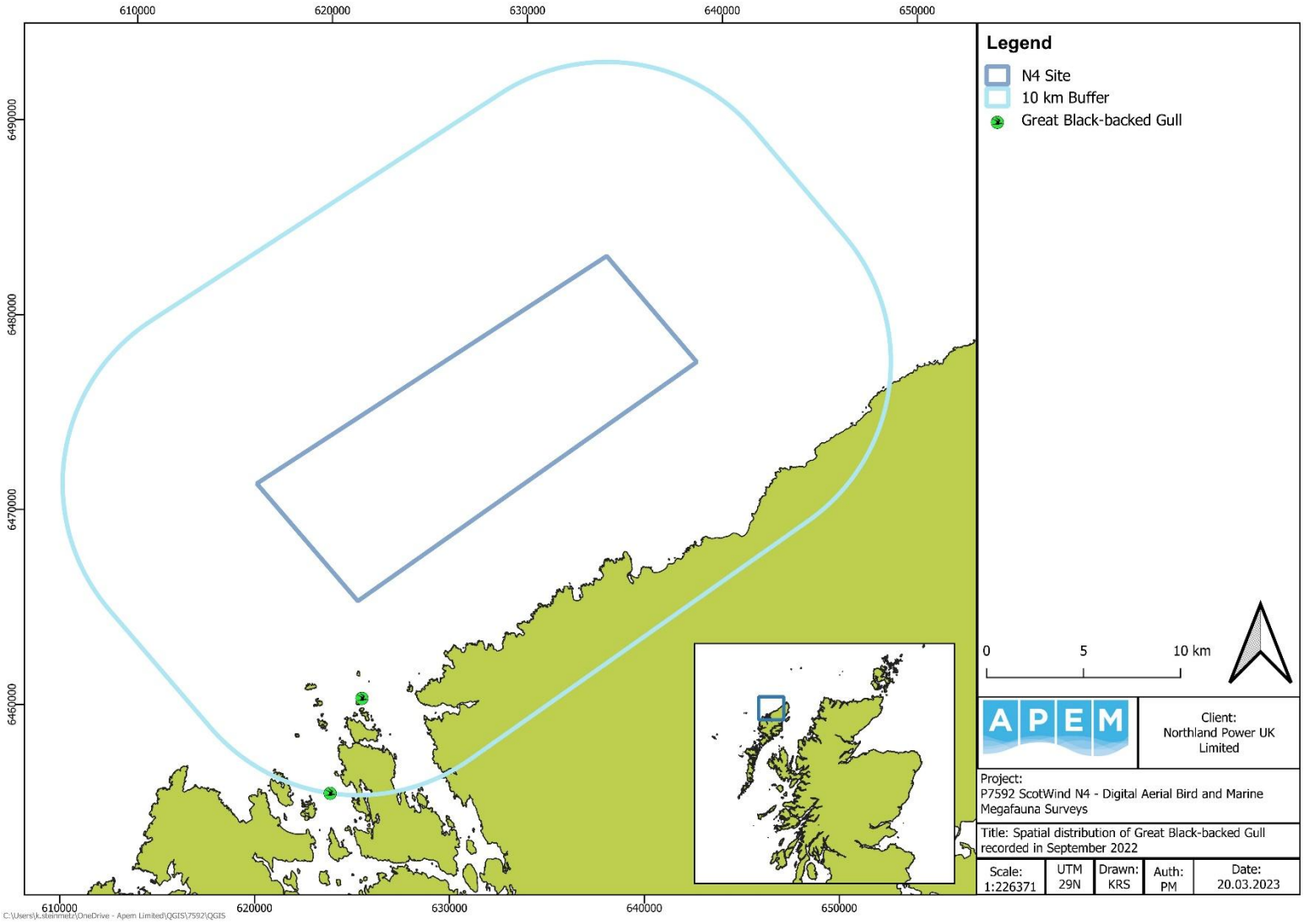


Figure 95 Distribution of great black-backed gull in September 2022
*Note that individuals in close proximity may appear overlaying.

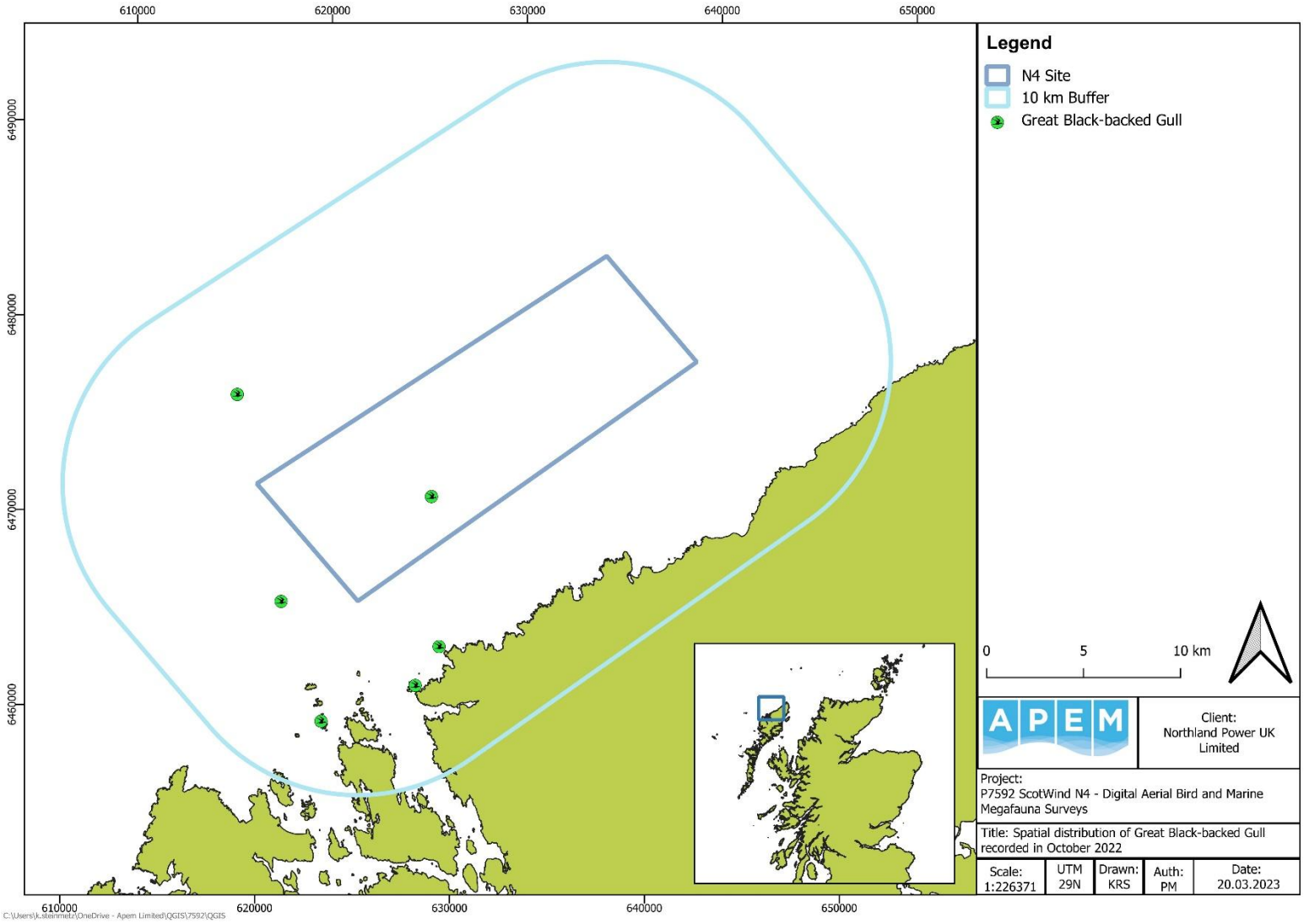


Figure 96 Distribution of great black-backed gull in October 2022

*Note that individuals in close proximity may appear overlaying.

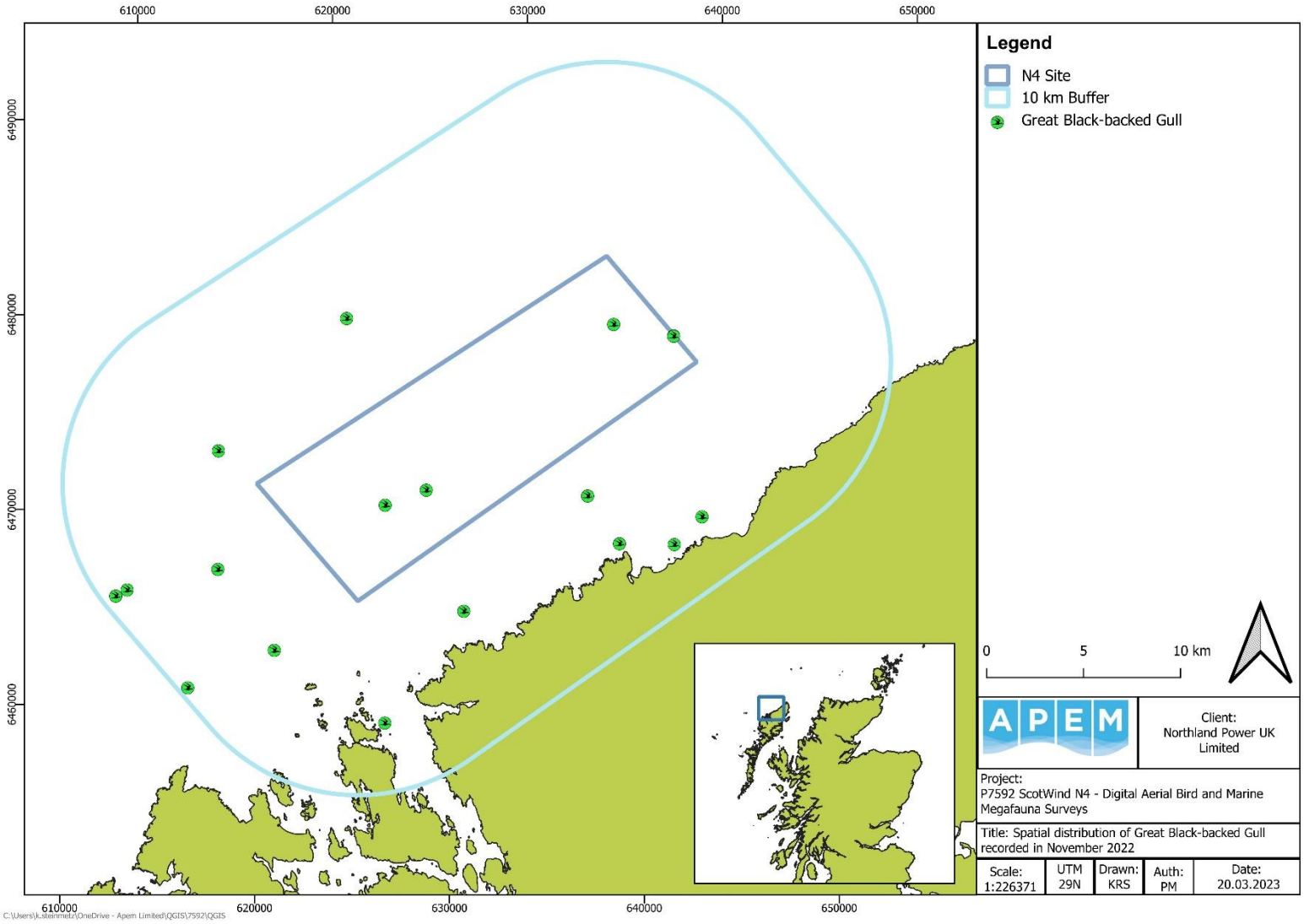


Figure 97 Distribution of great black-backed gull in November 2022
*Note that individuals in close proximity may appear overlaying.

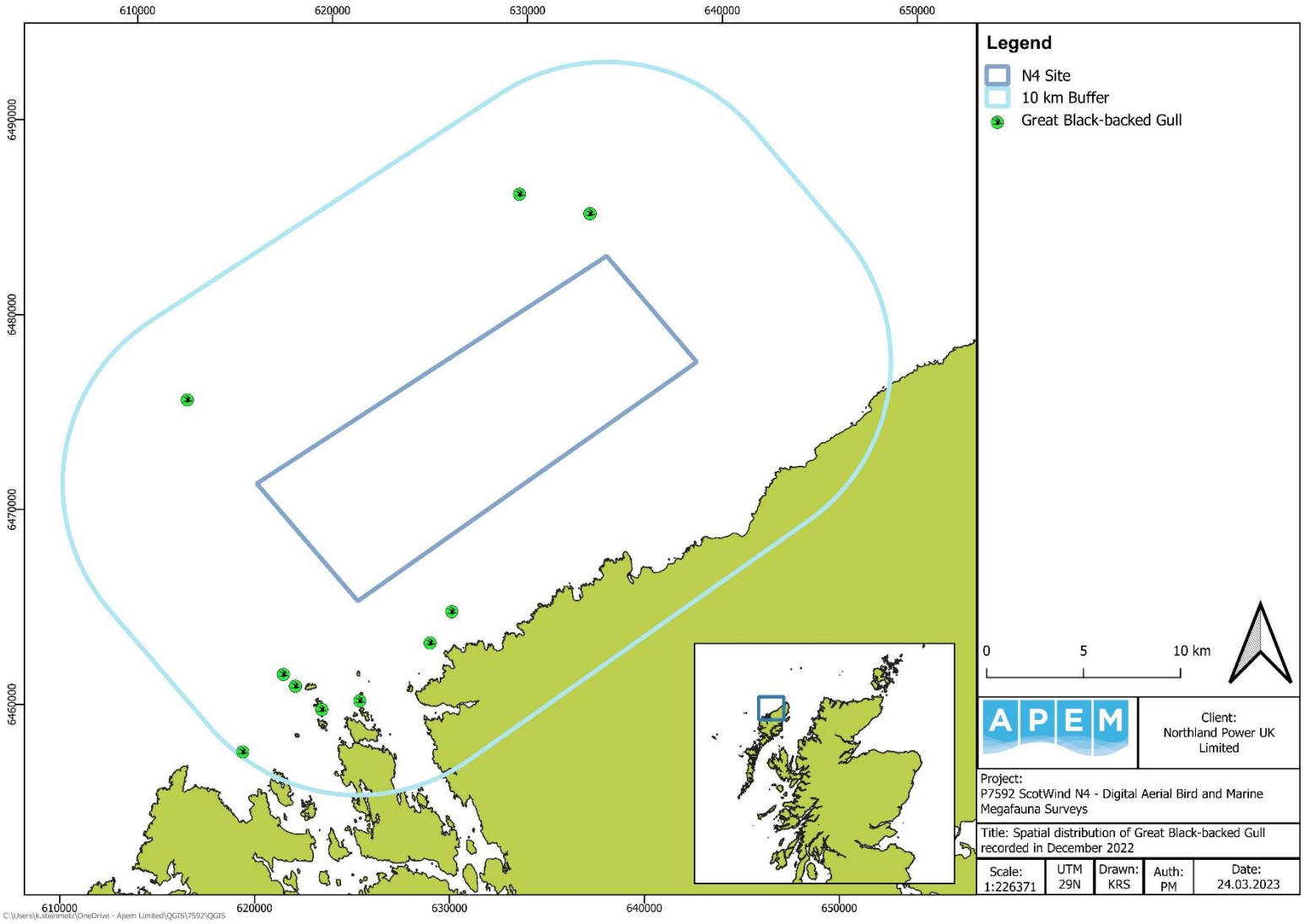


Figure 98 Distribution of great black-backed gull in December 2022
*Note that individuals in close proximity may appear overlaying.

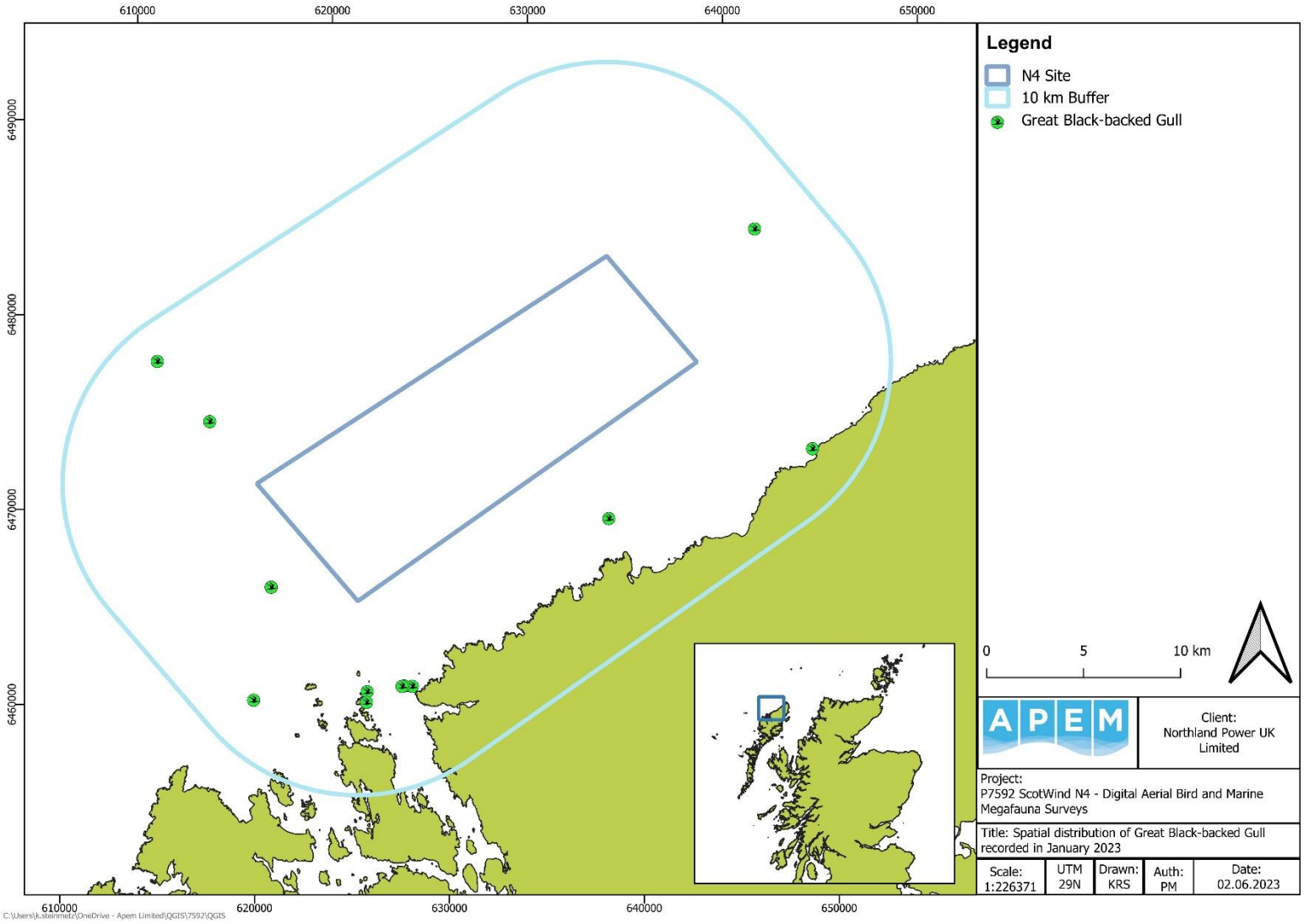


Figure 99 Distribution of great black-backed gull in January 2023
*Note that individuals in close proximity may appear overlaying.

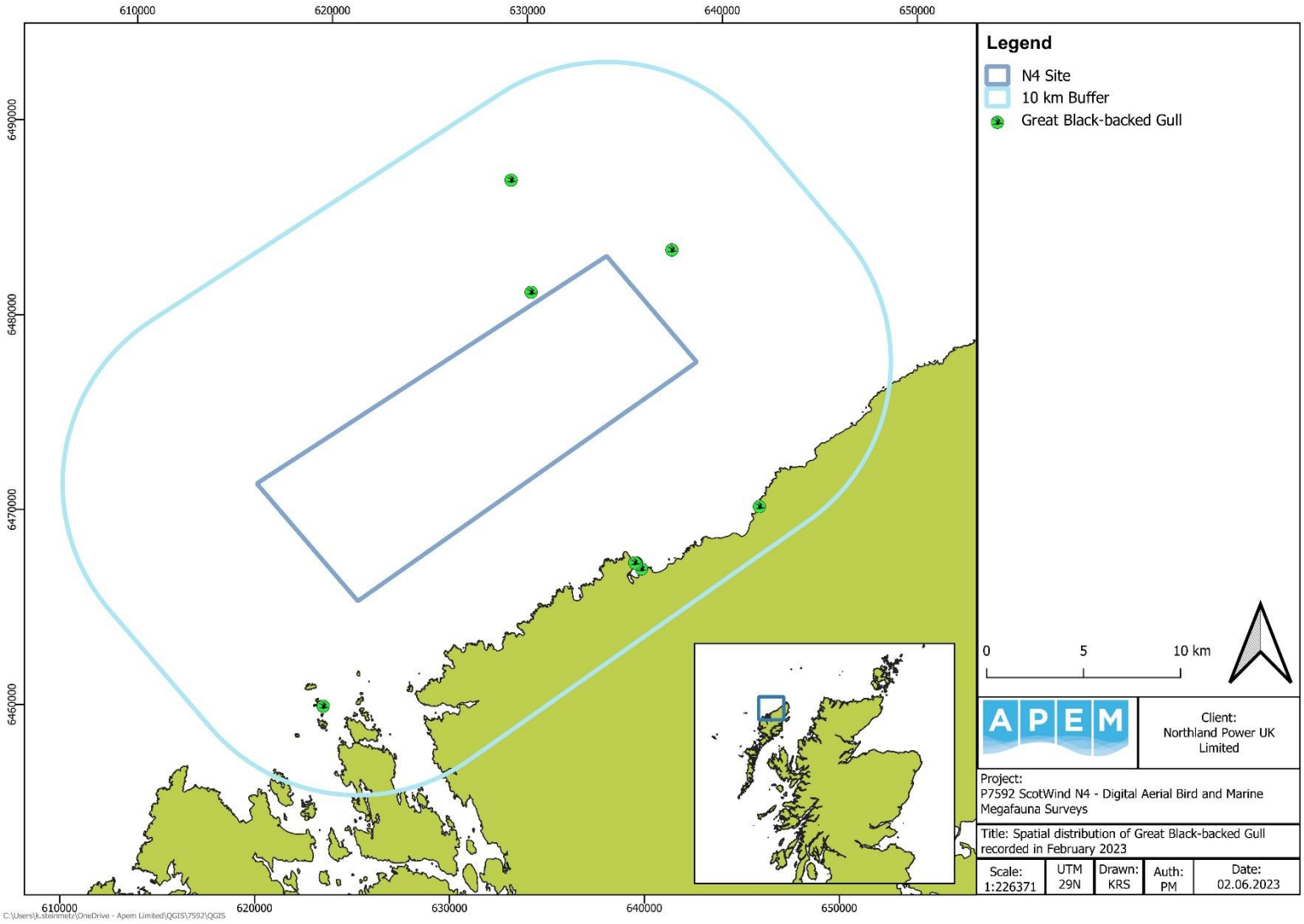


Figure 100 Distribution of great black-backed gull in February 2023

*Note that individuals in close proximity may appear overlaying.

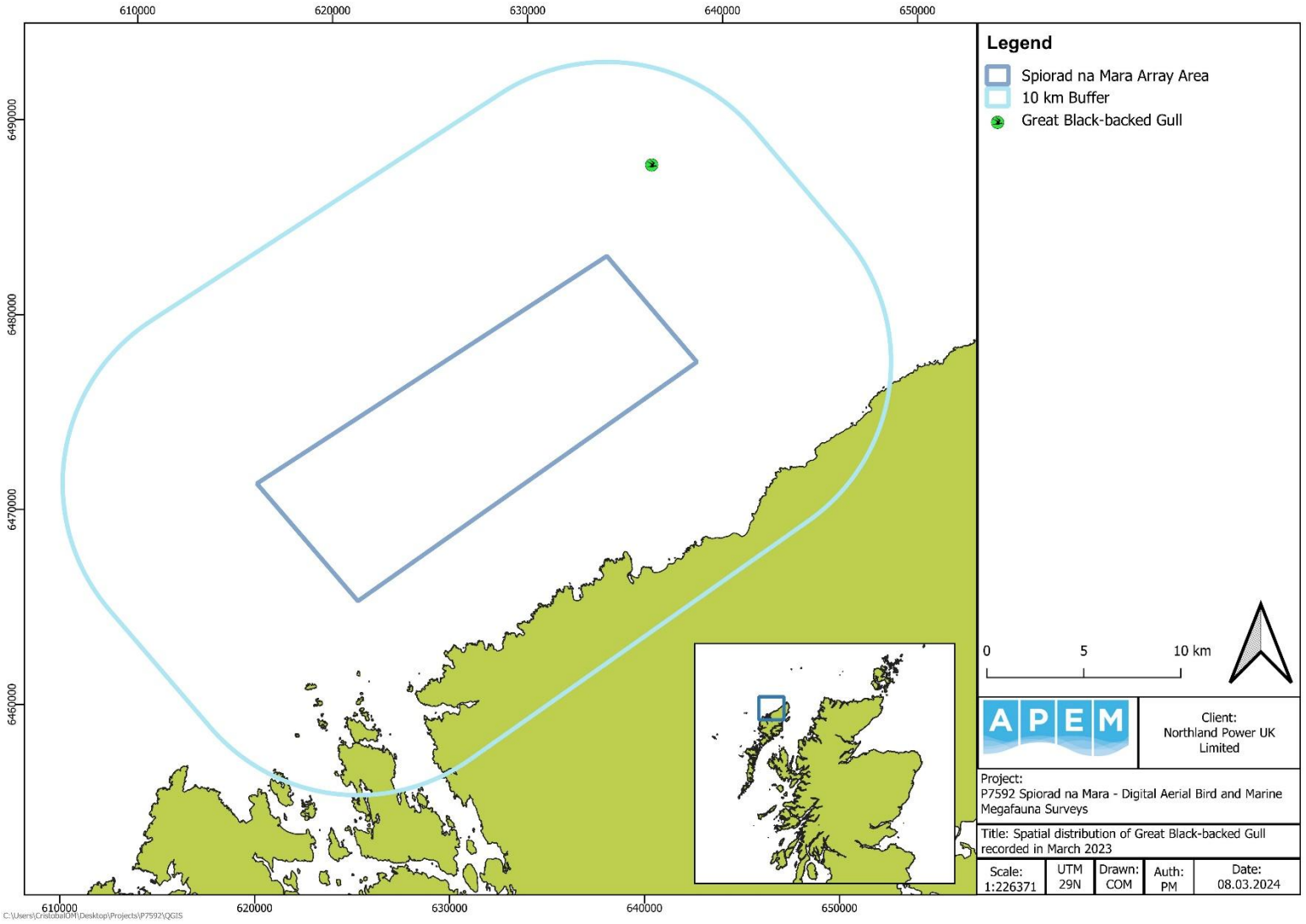


Figure 101 Distribution of great black-backed gull in March 2023

*Note that individuals in close proximity may appear overlaying.

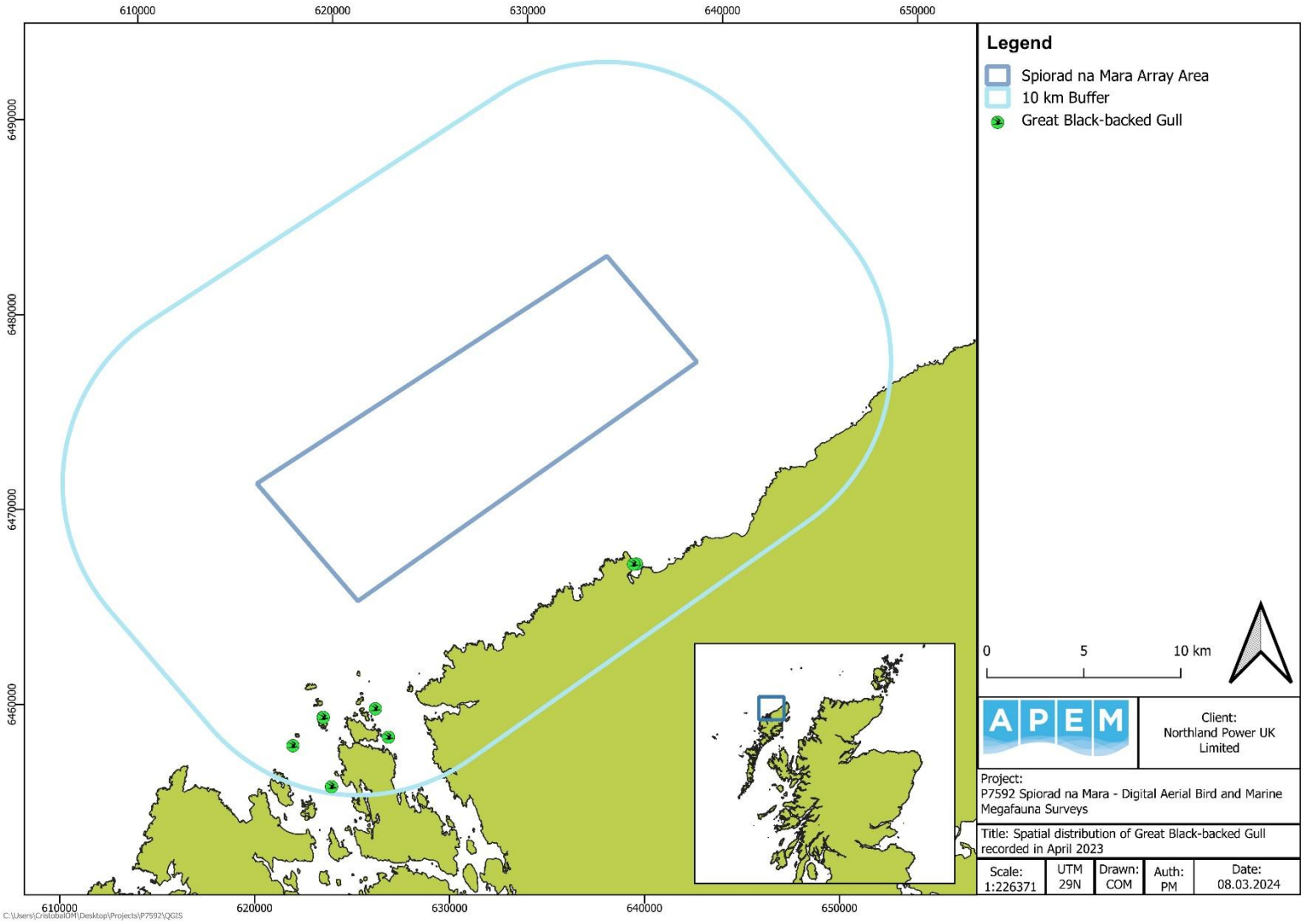


Figure 102 Distribution of great black-backed gull in April 2023
*Note that individuals in close proximity may appear overlaying.

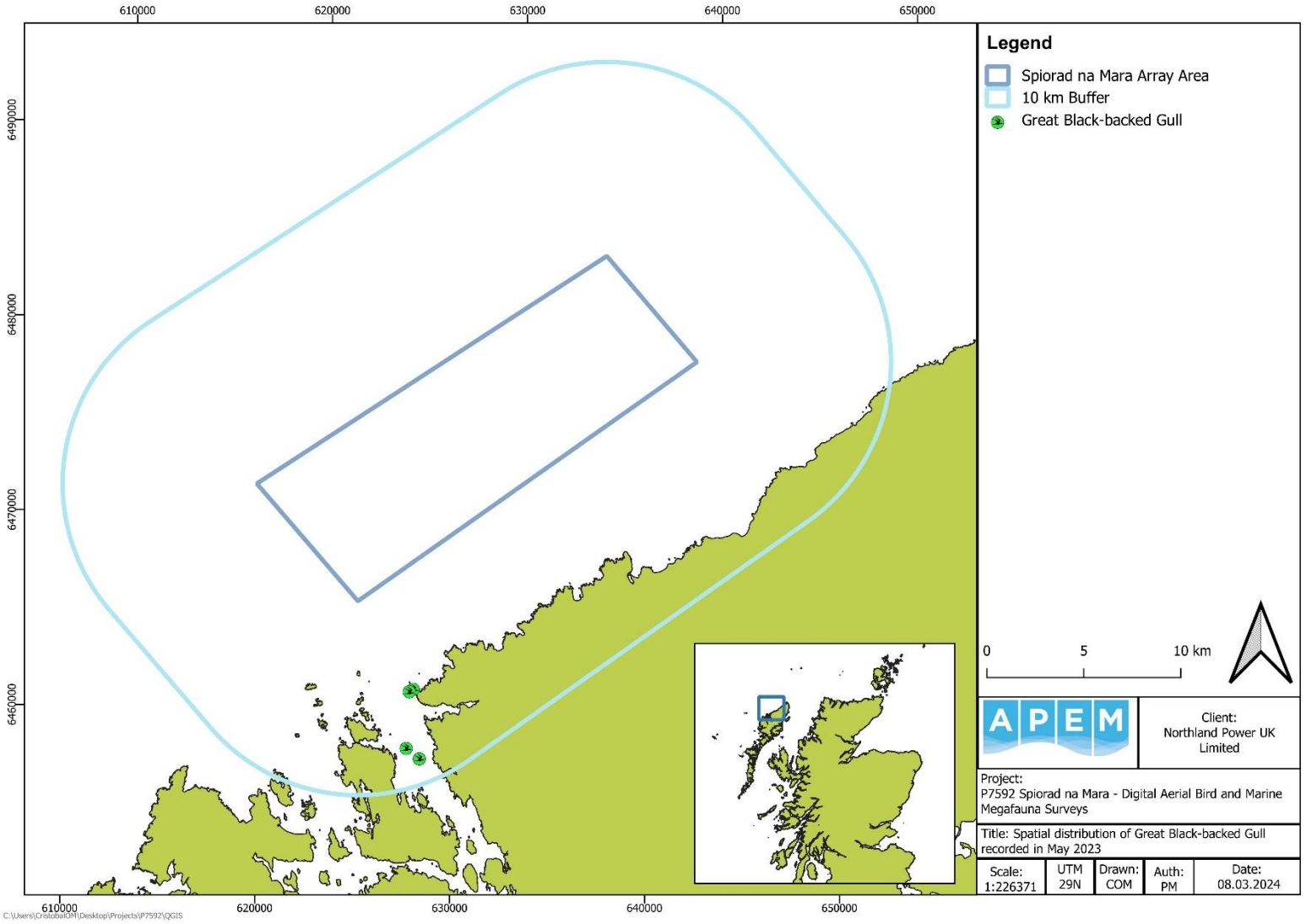


Figure 103 Distribution of great black-backed gull in May 2023

*Note that individuals in close proximity may appear overlaying.

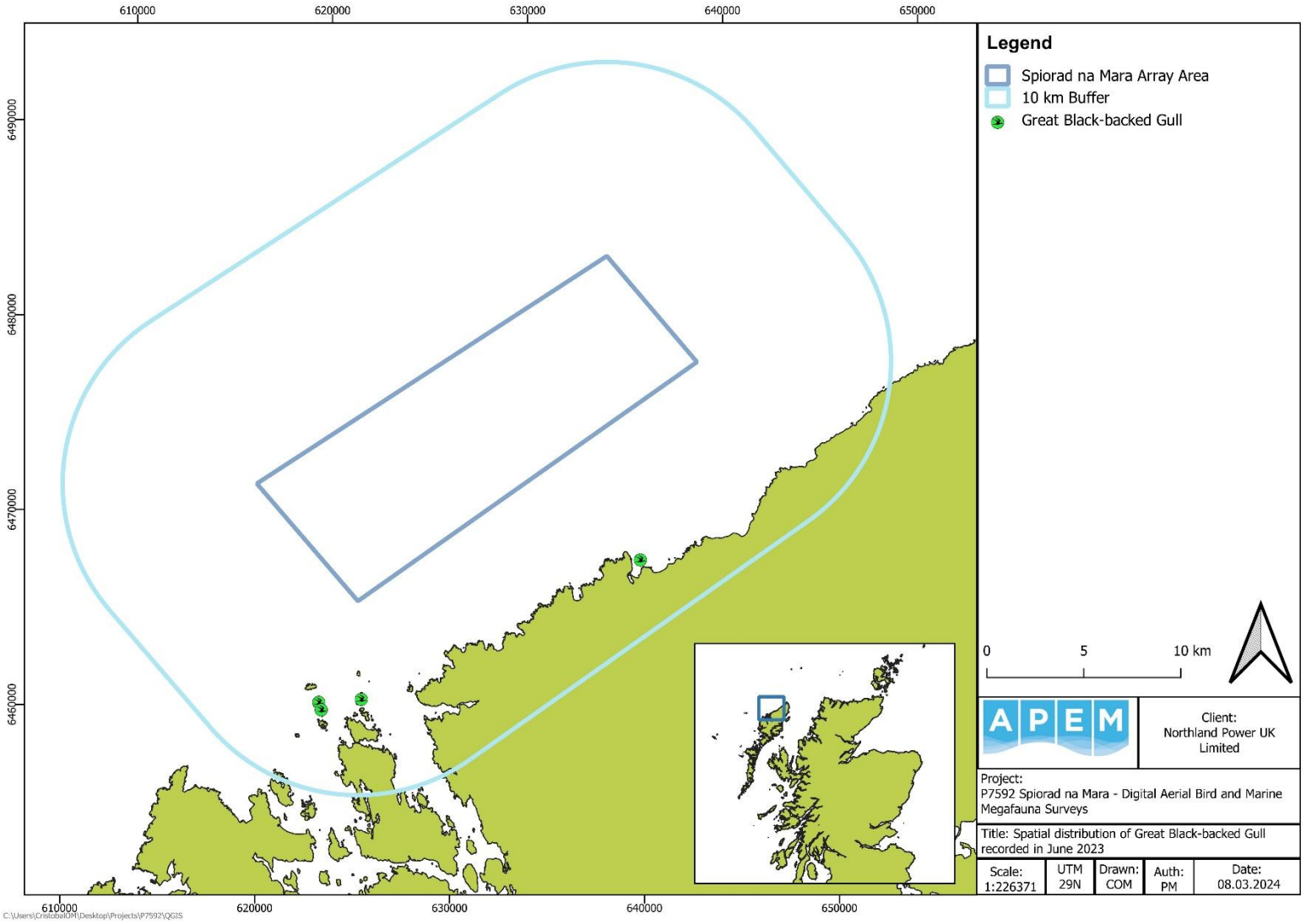


Figure 104 Distribution of great black-backed gull in June 2023

*Note that individuals in close proximity may appear overlaying.

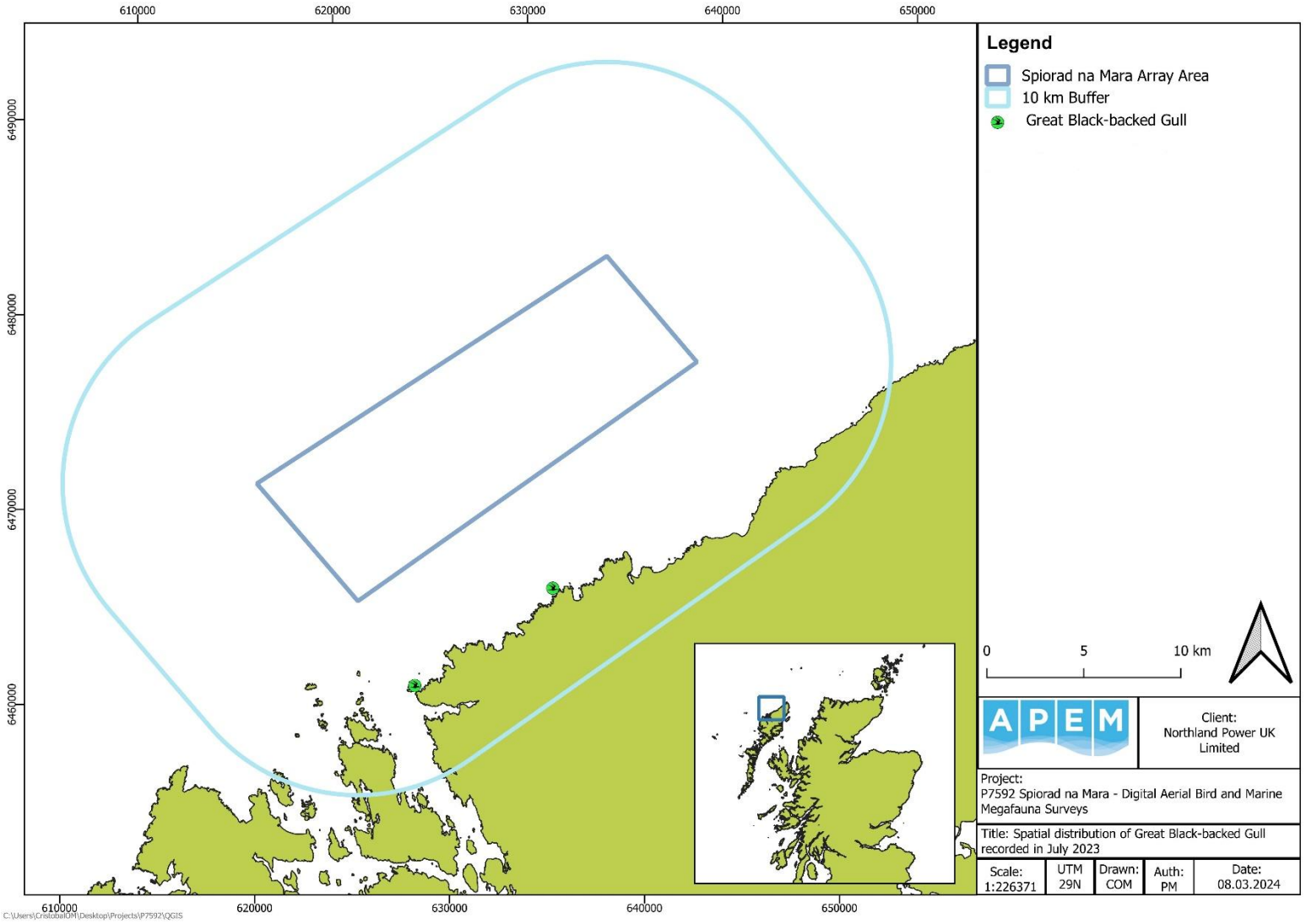


Figure 105 Distribution of great black-backed gull in July 2023

*Note that individuals in close proximity may appear overlaying.

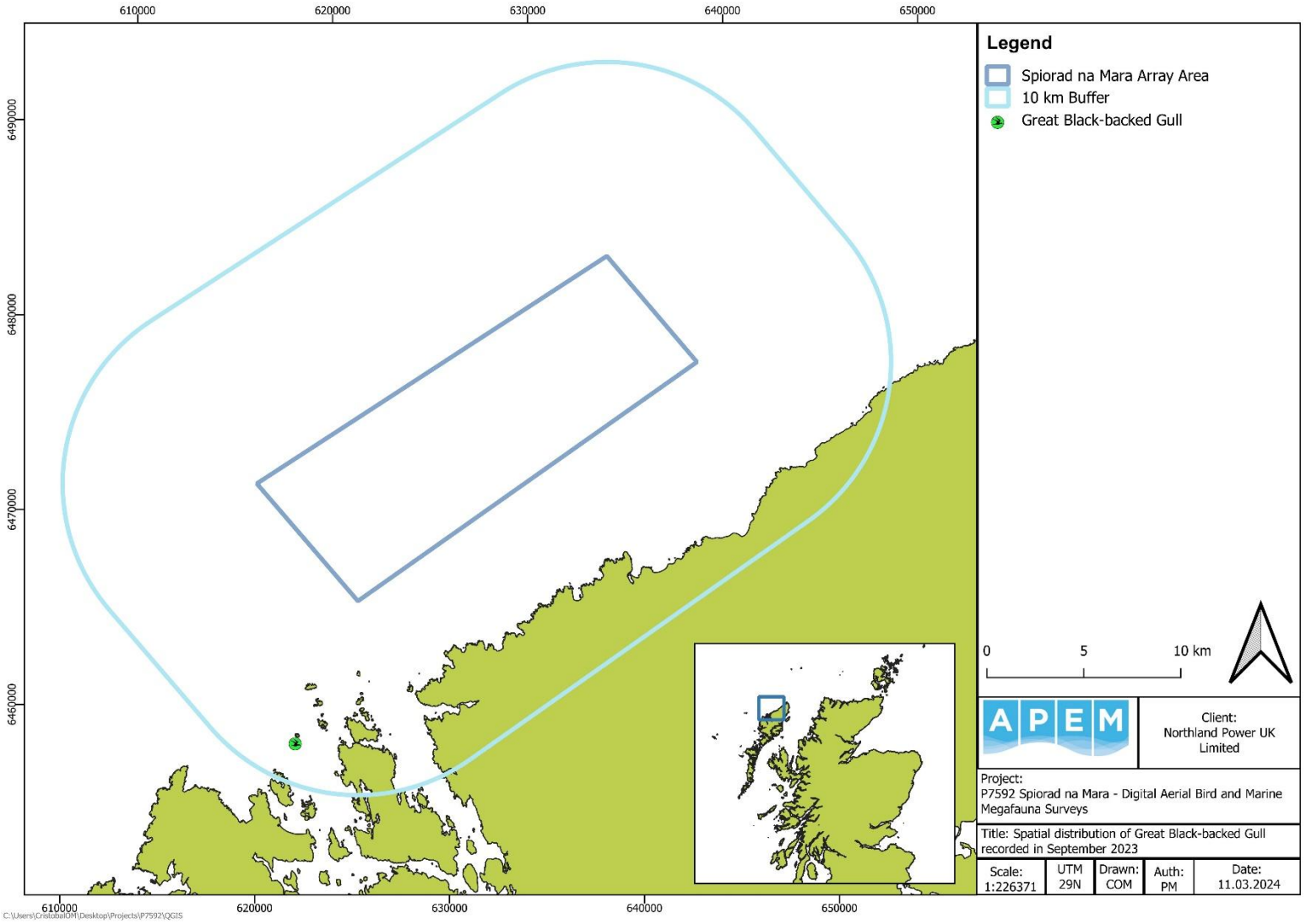


Figure 106 Distribution of great black-backed gull in September 2023
*Note that individuals in close proximity may appear overlaying.

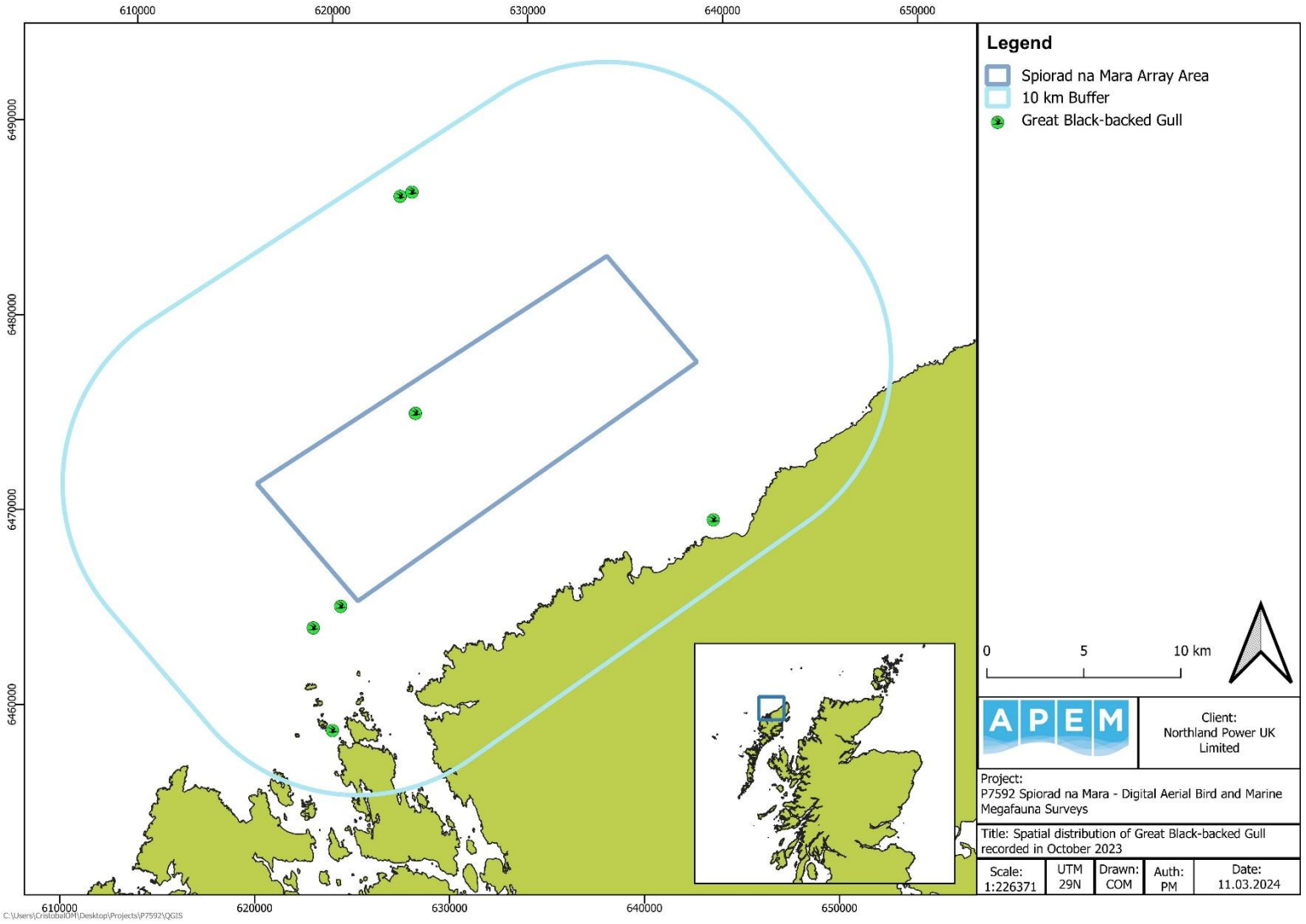


Figure 107 Distribution of great black-backed gull in October 2023

*Note that individuals in close proximity may appear overlaying.

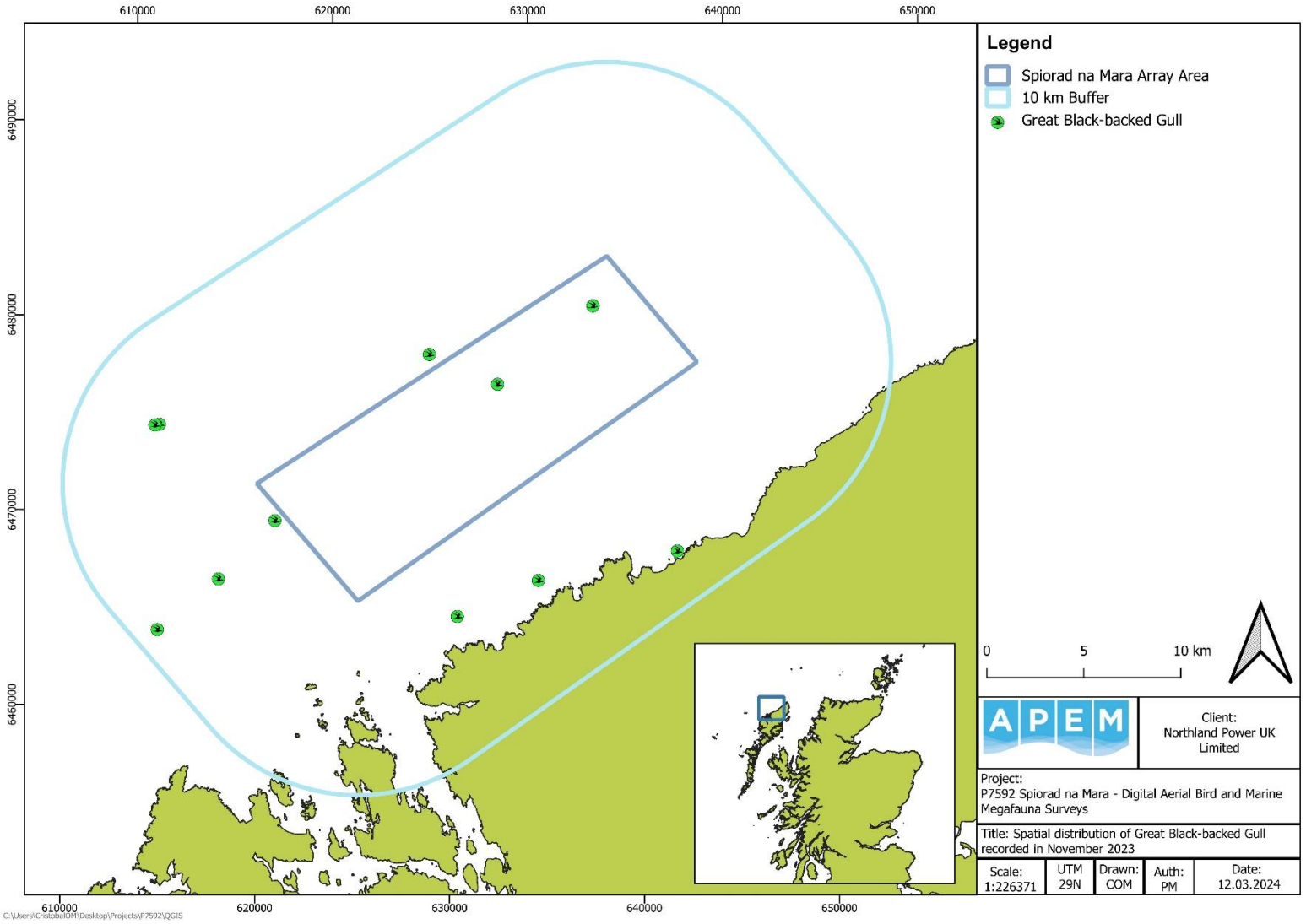


Figure 108 Distribution of great black-backed gull in November 2023
*Note that individuals in close proximity may appear overlaying.

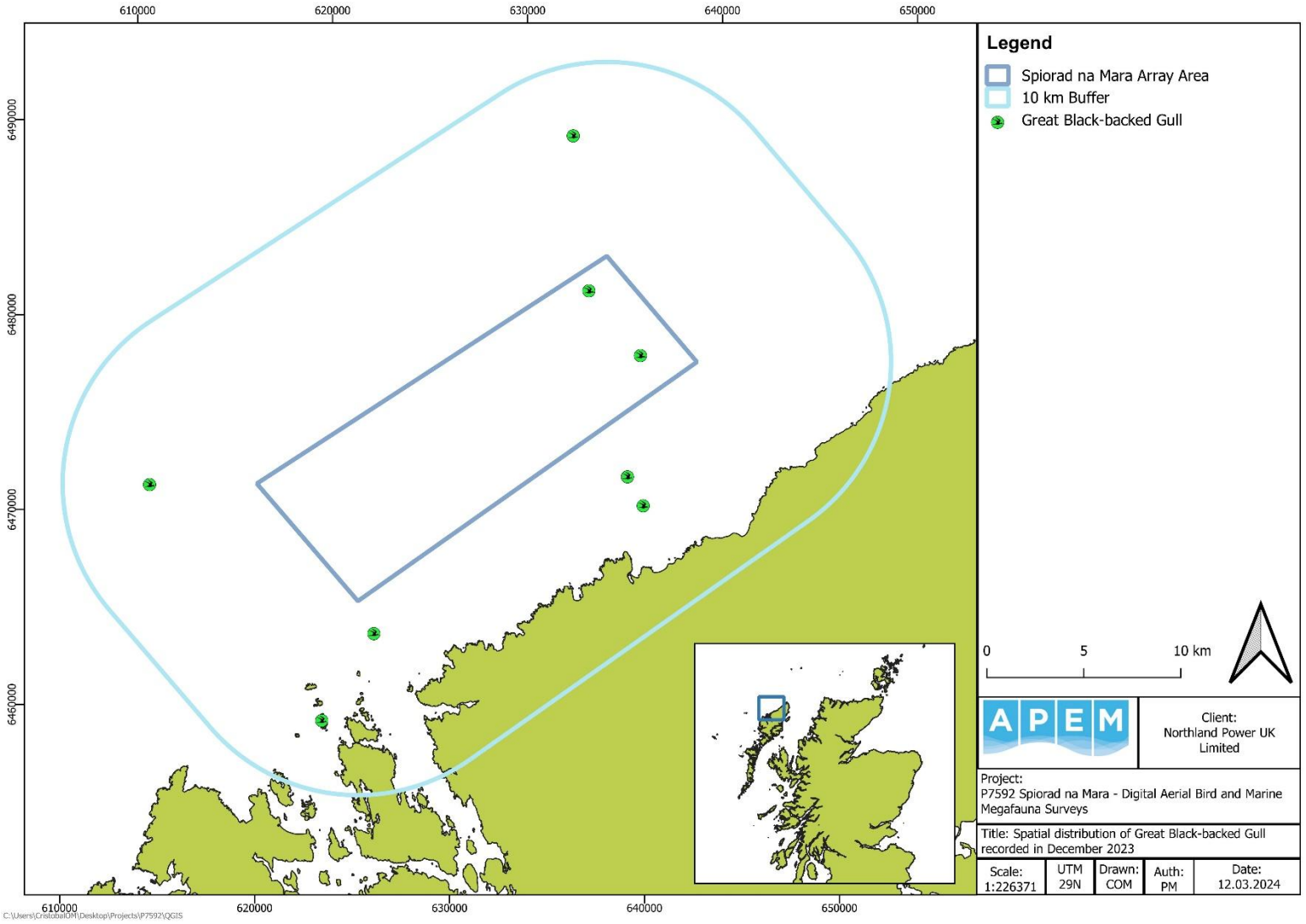


Figure 109 Distribution of great black-backed gull in December 2023
*Note that individuals in close proximity may appear overlaying.

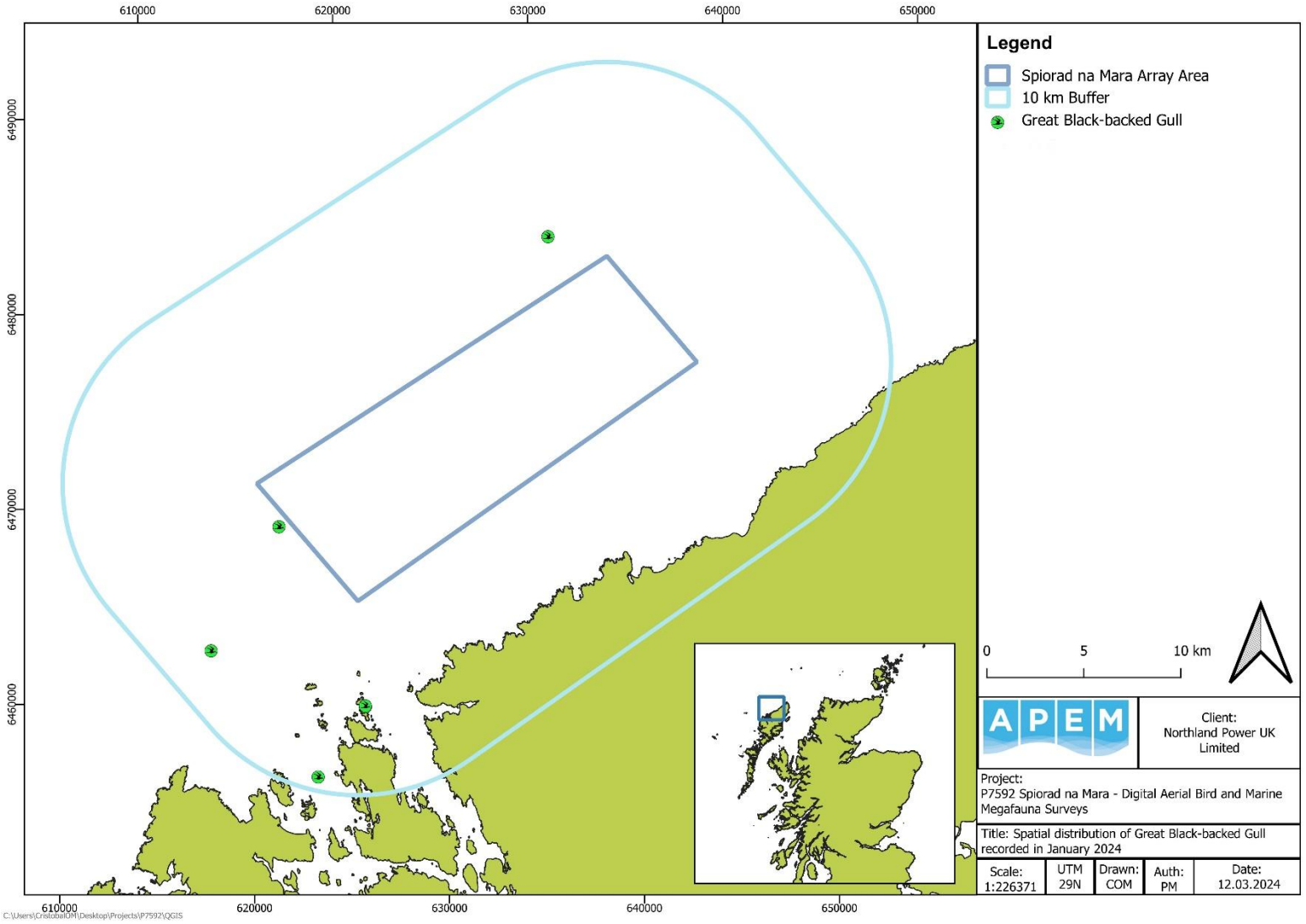


Figure 110 Distribution of great black-backed gull in January 2024

*Note that individuals in close proximity may appear overlaying.

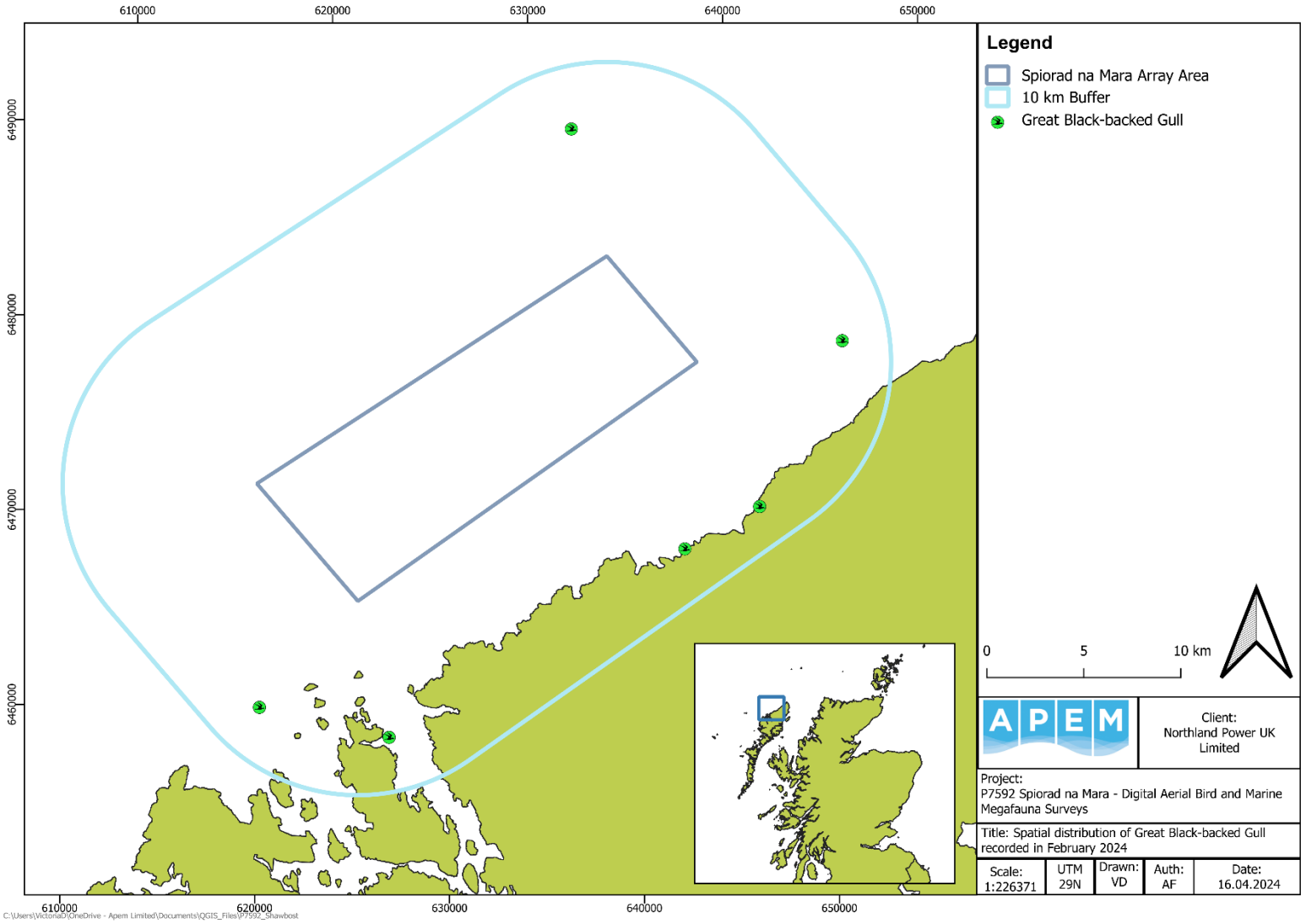


Figure 111 Distribution of great black-backed gull in February 2024

*Note that individuals in close proximity may appear overlaying.

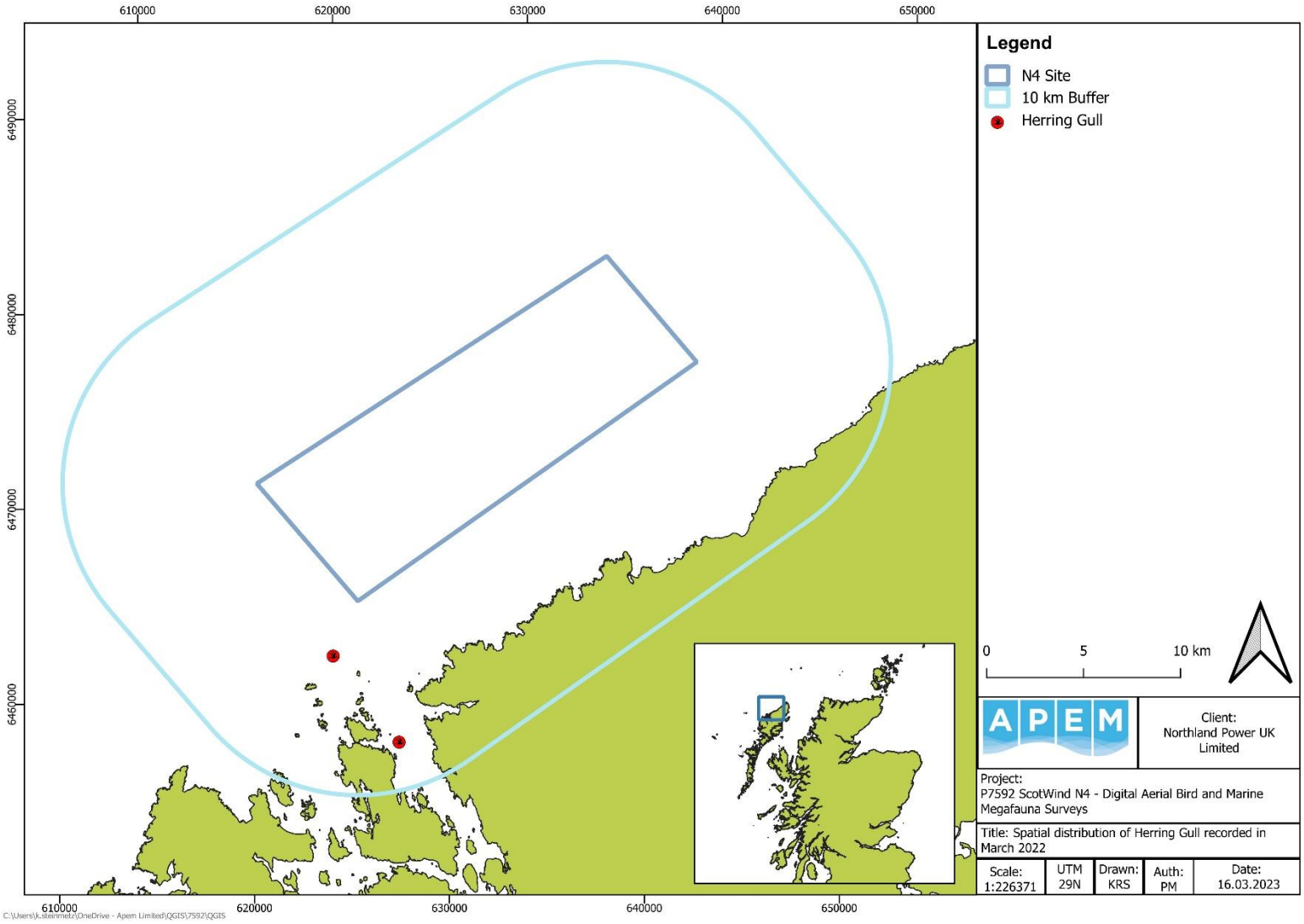


Figure 112 Distribution of herring gull in March 2022
*Note that individuals in close proximity may appear overlaying.

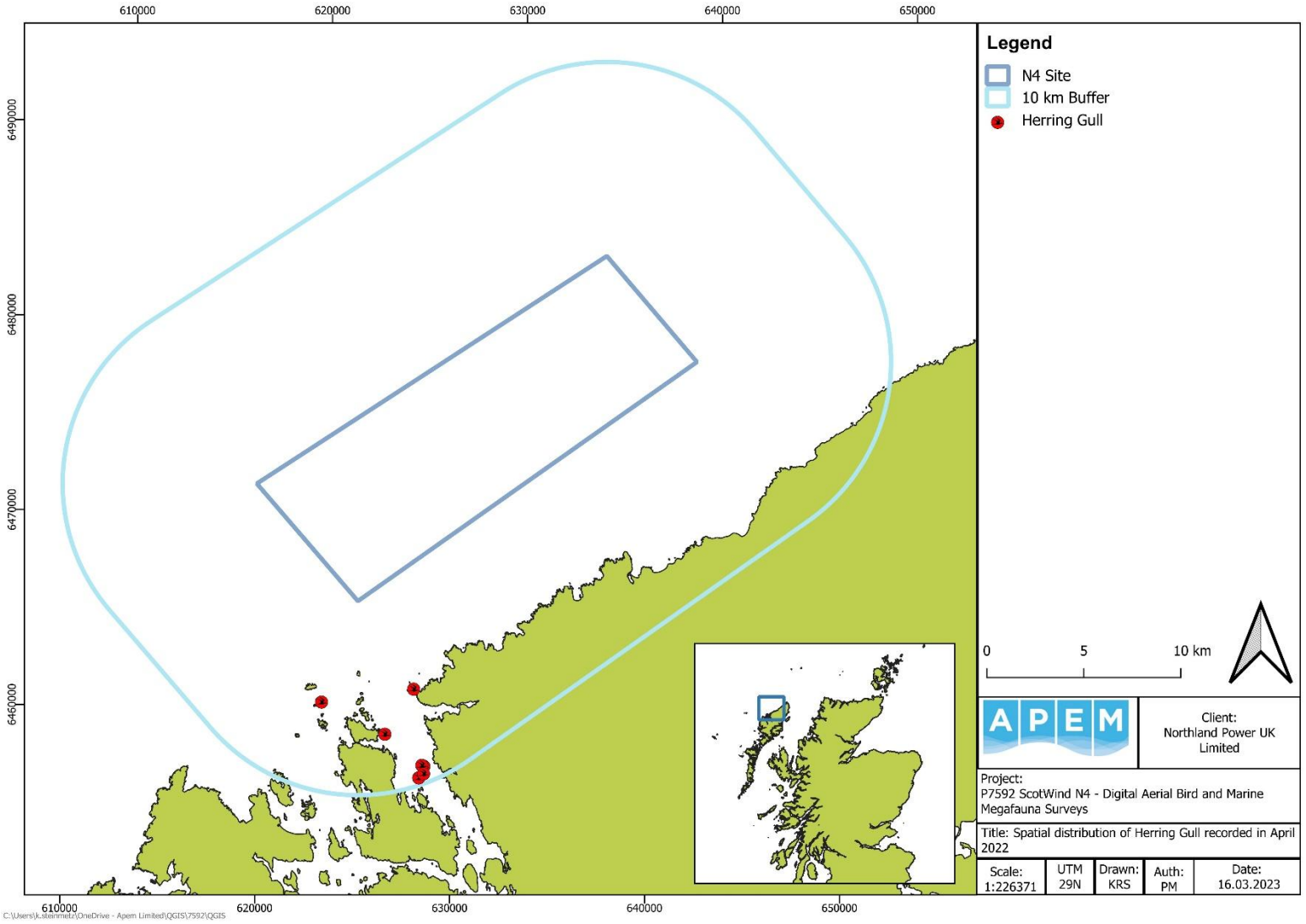


Figure 113 Distribution of herring gull in April 2022
*Note that individuals in close proximity may appear overlaying.

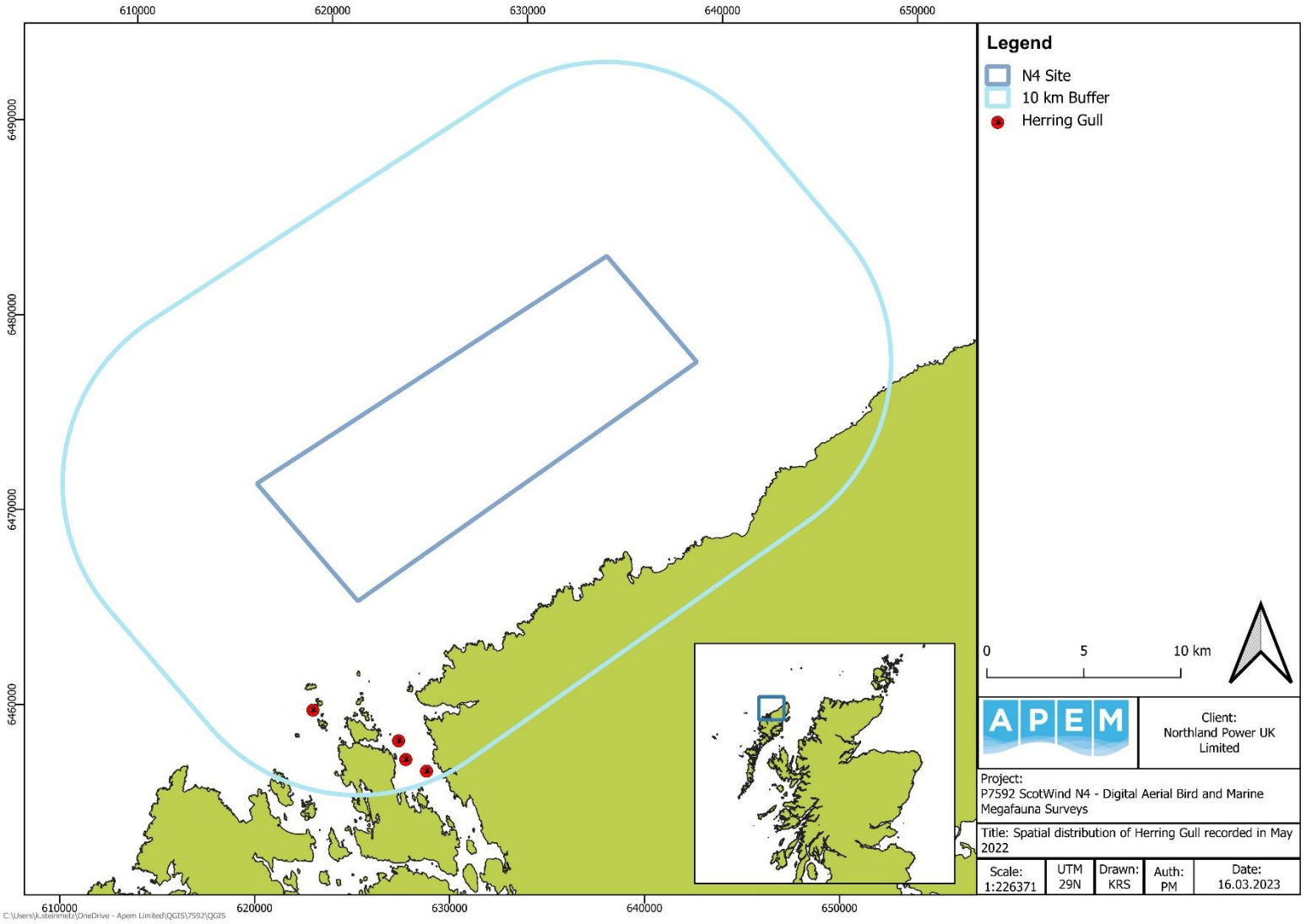


Figure 114 Distribution of herring gull in May 2022
*Note that individuals in close proximity may appear overlaying.

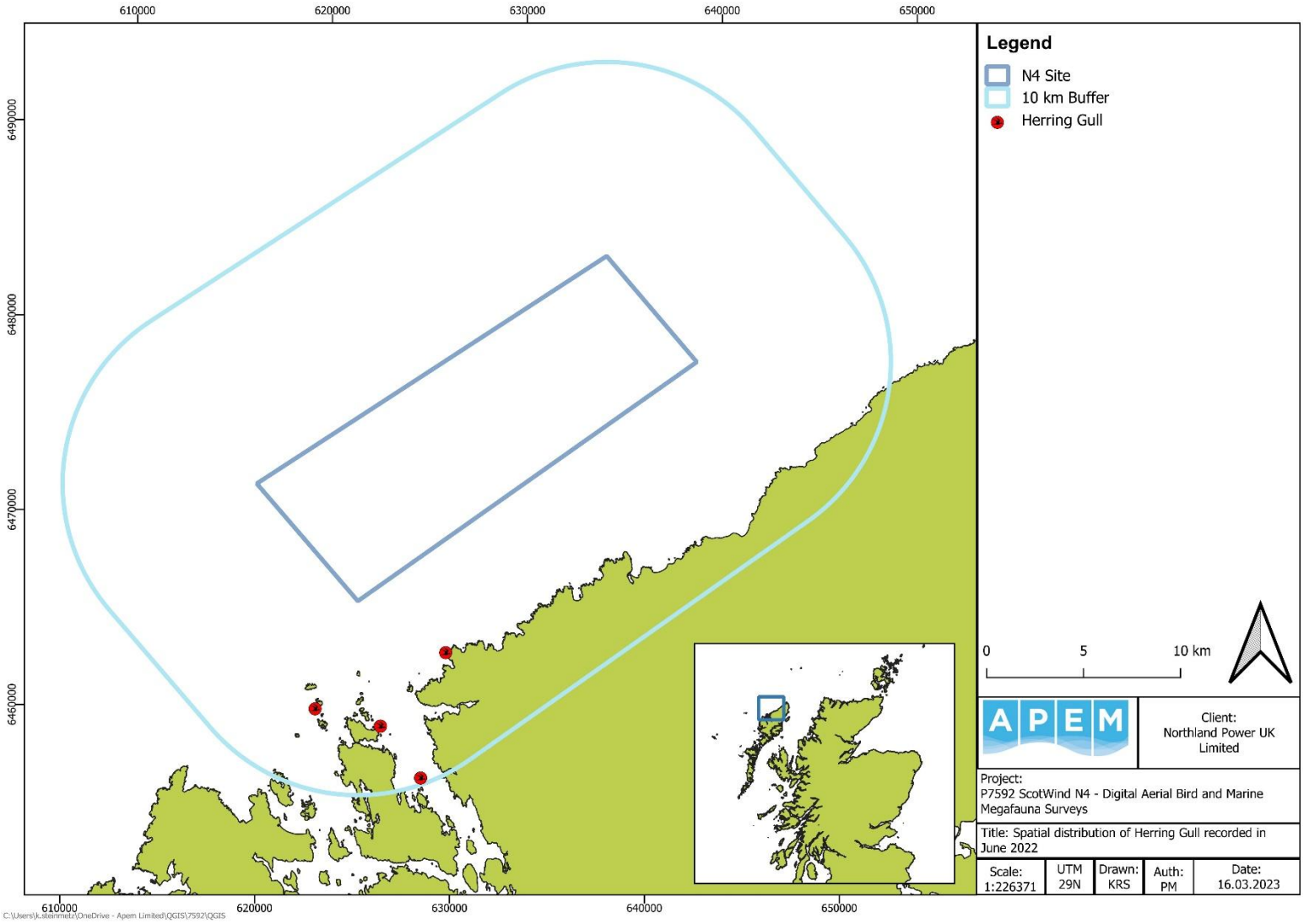


Figure 115 Distribution of herring gull in June 2022
*Note that individuals in close proximity may appear overlaying.

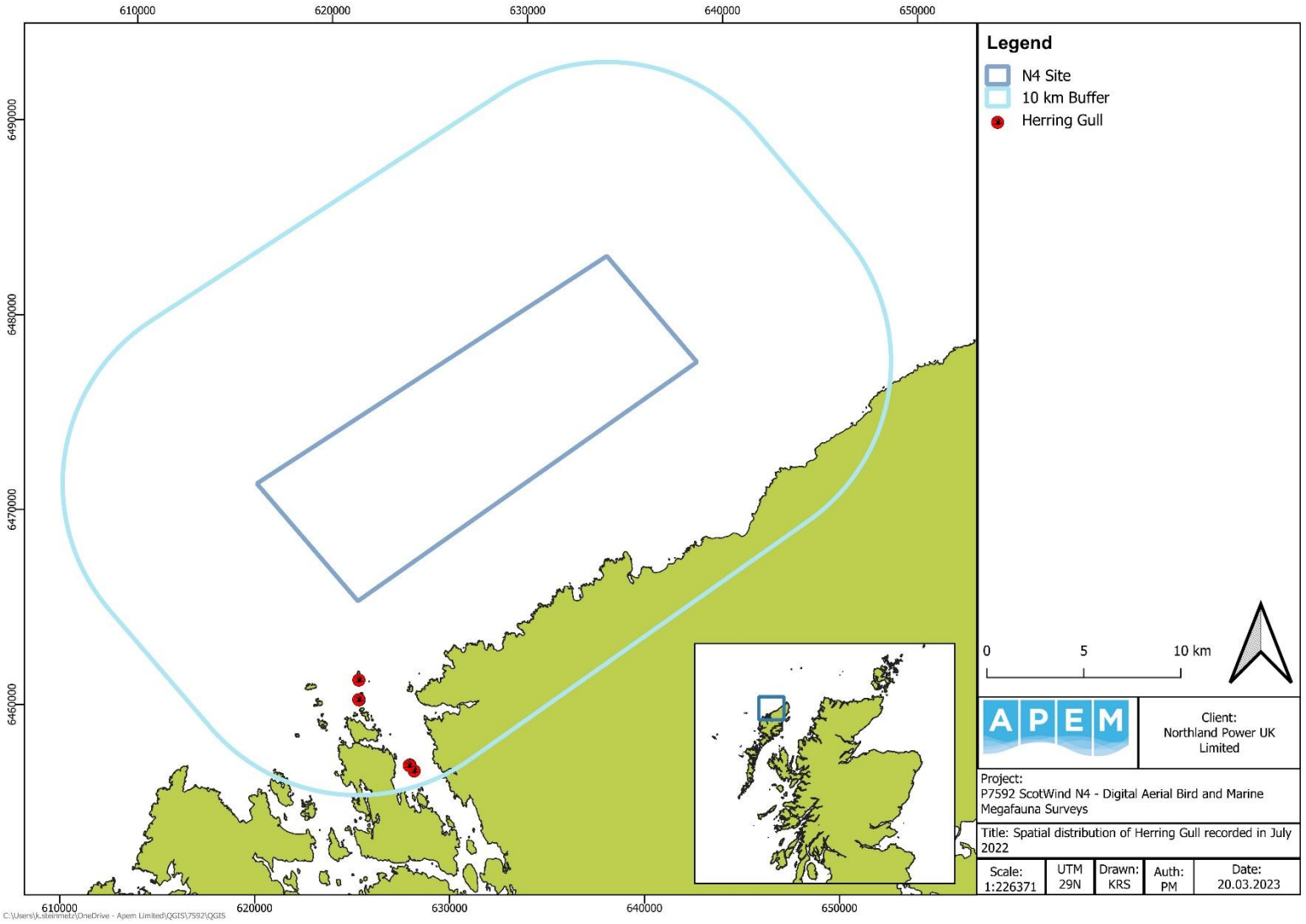


Figure 116 Distribution of herring gull in July 2022
*Note that individuals in close proximity may appear overlaying.

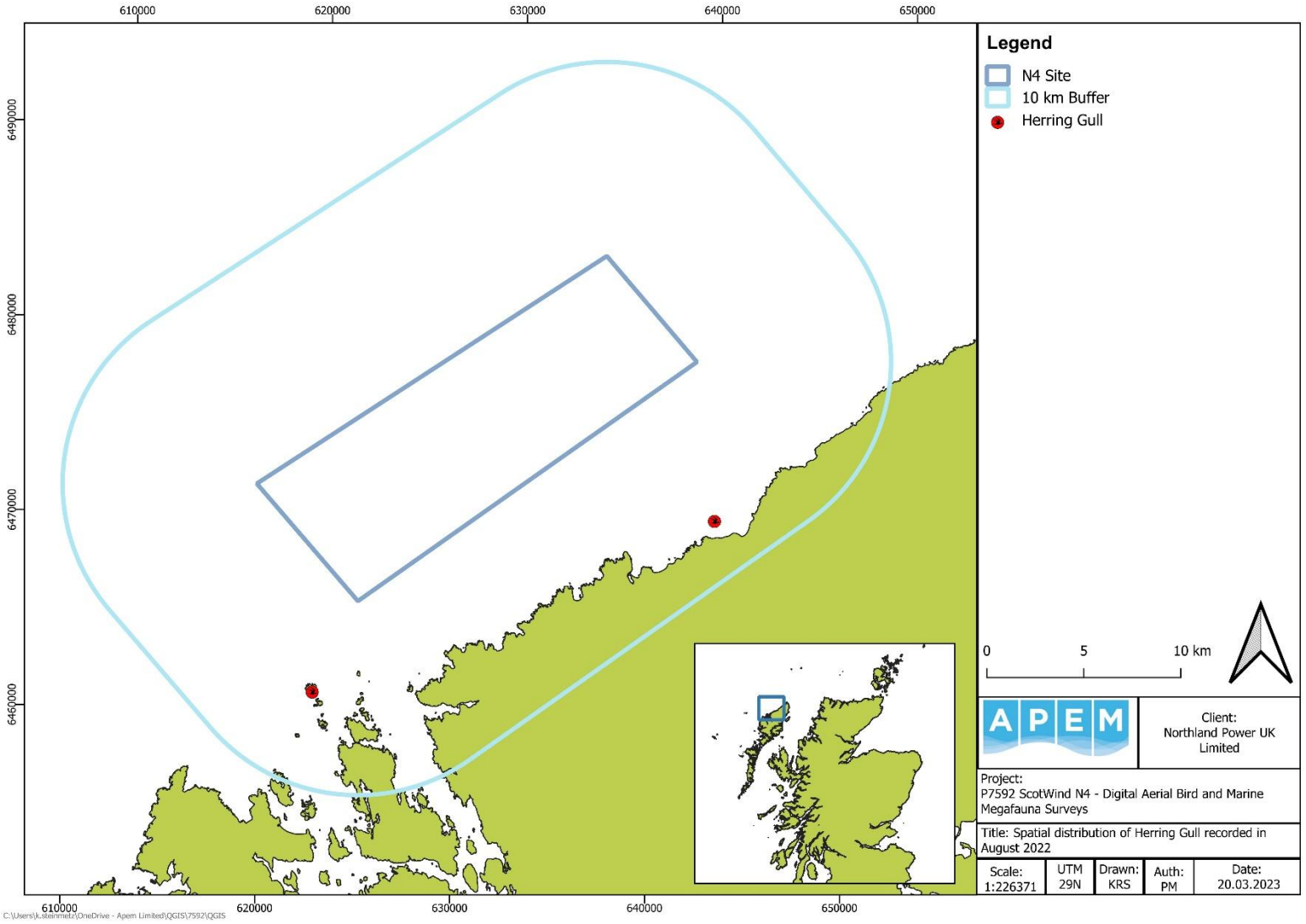


Figure 117 Distribution of herring gull in August 2022
*Note that individuals in close proximity may appear overlaying.

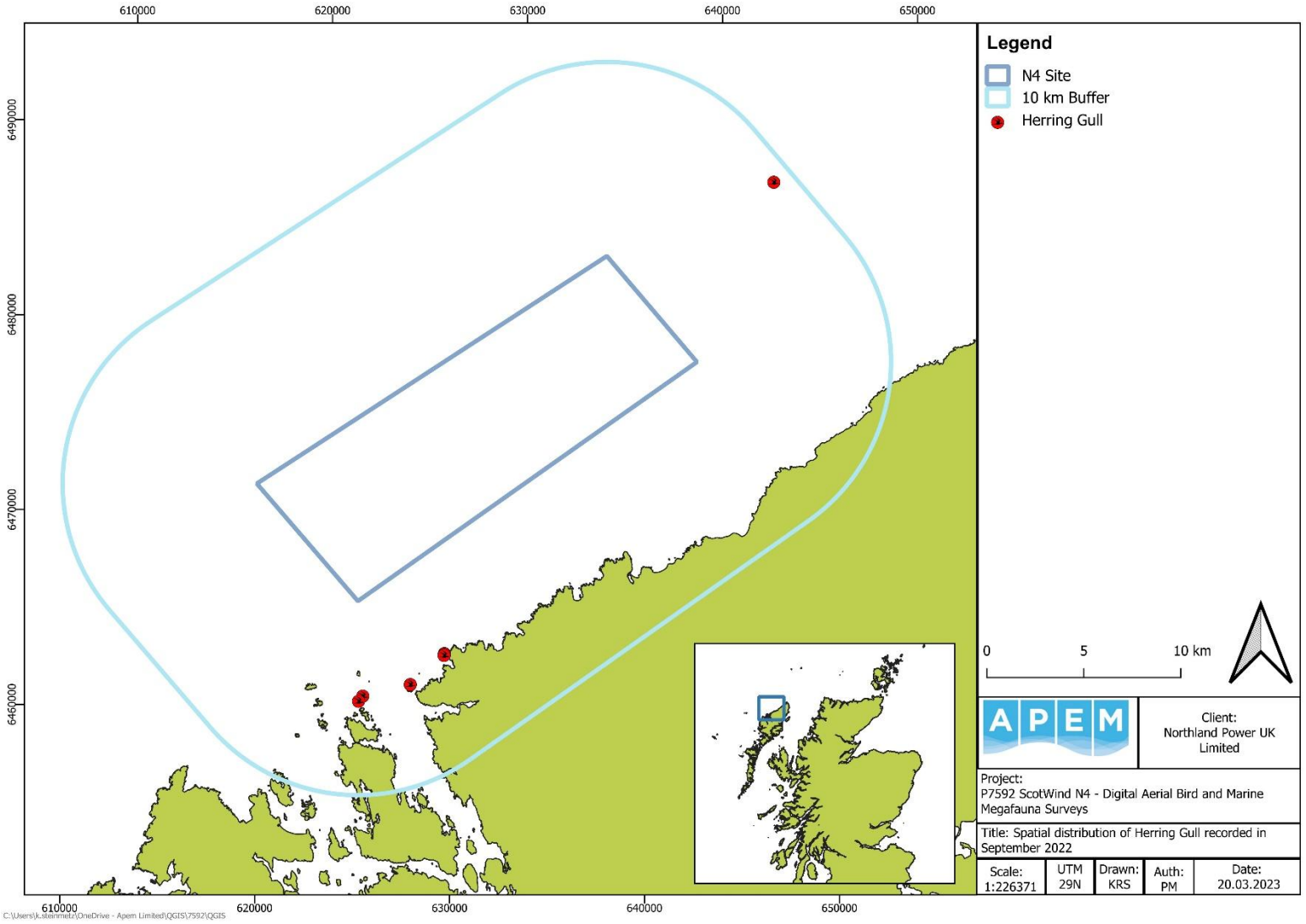


Figure 118 Distribution of herring gull in September 2022

*Note that individuals in close proximity may appear overlaying.

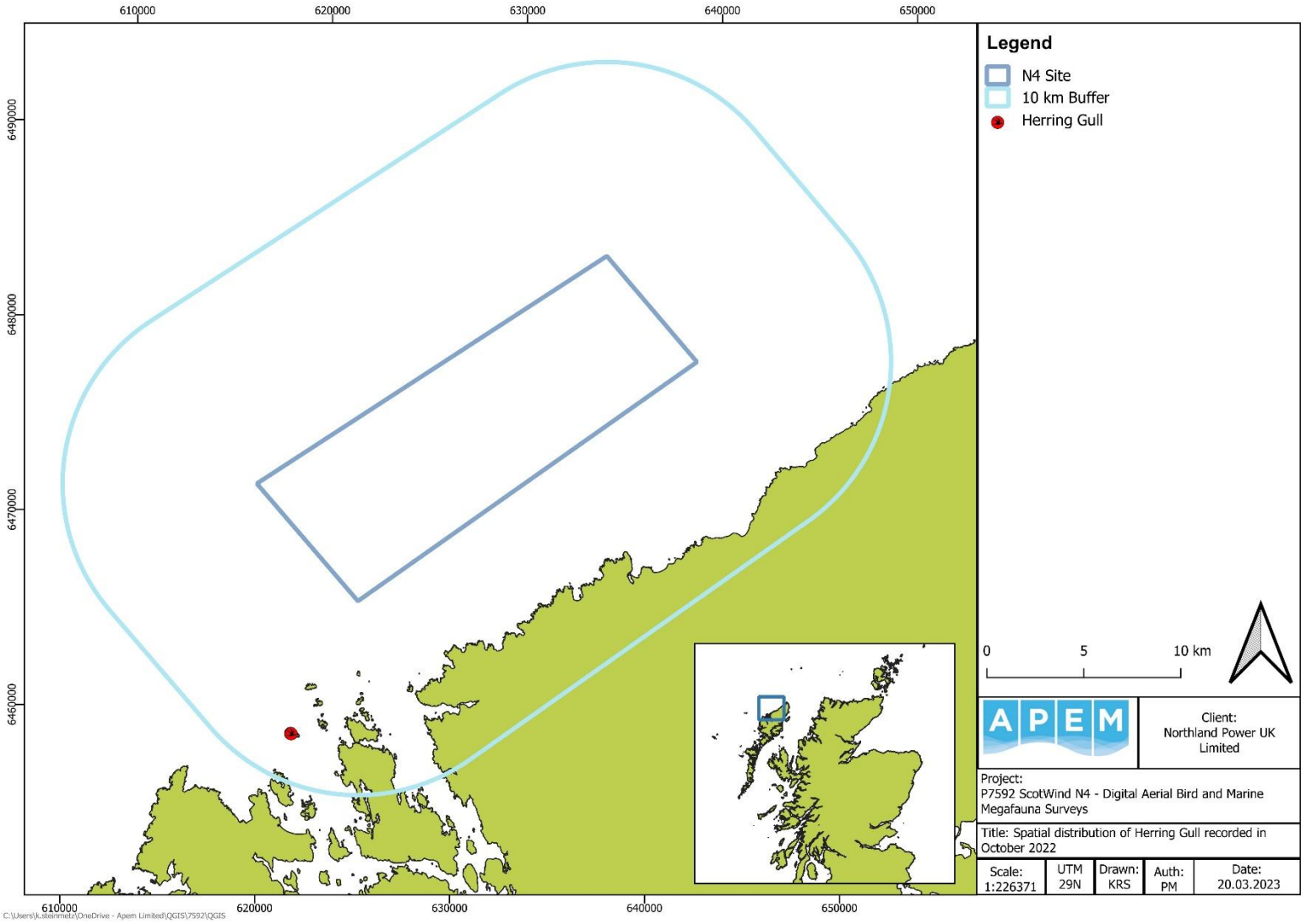


Figure 119 Distribution of herring gull in October 2022

*Note that individuals in close proximity may appear overlaying.

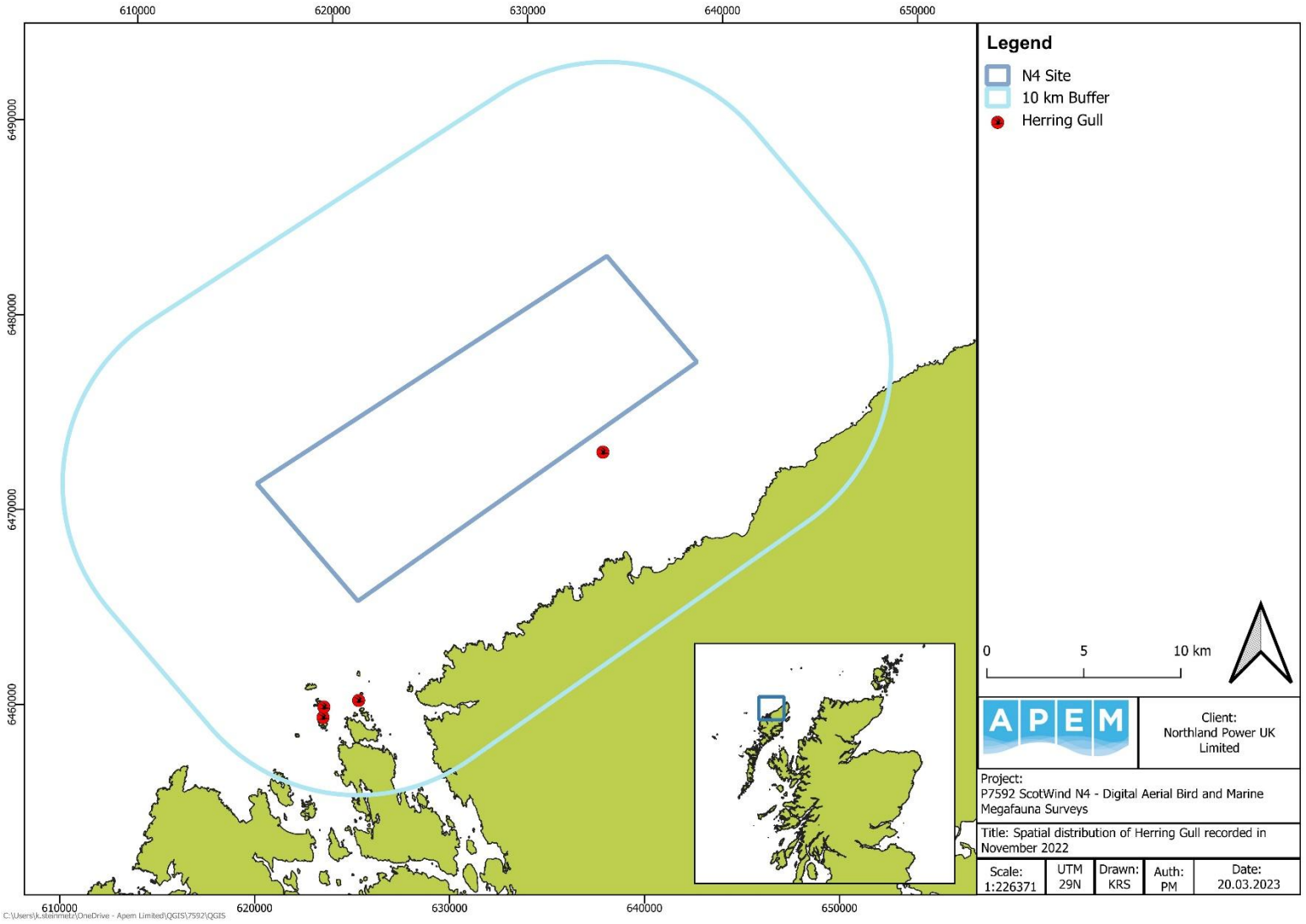


Figure 120 Distribution of herring gull in November 2022
*Note that individuals in close proximity may appear overlaying.

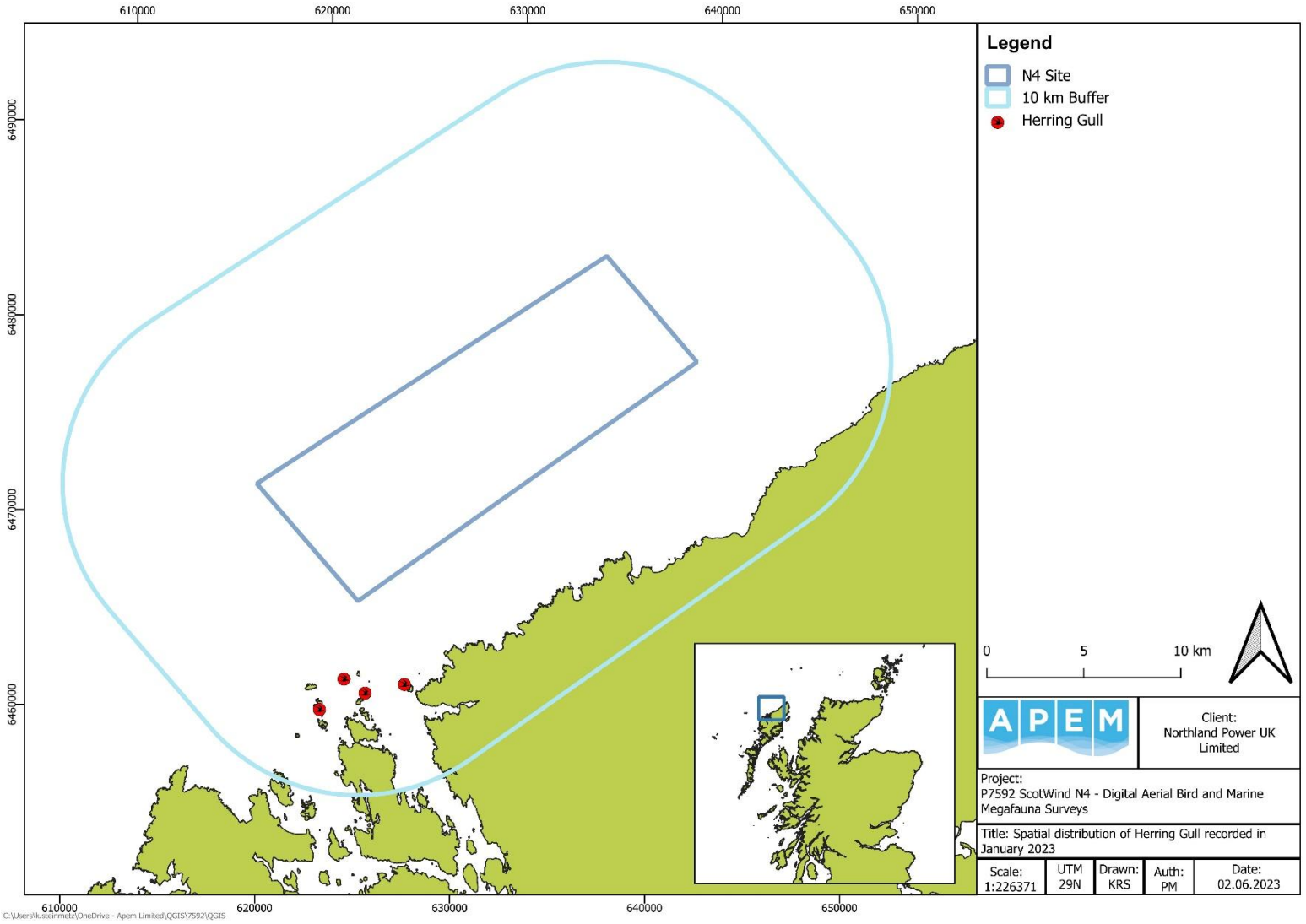


Figure 121 Distribution of herring gull in January 2023

*Note that individuals in close proximity may appear overlaying.

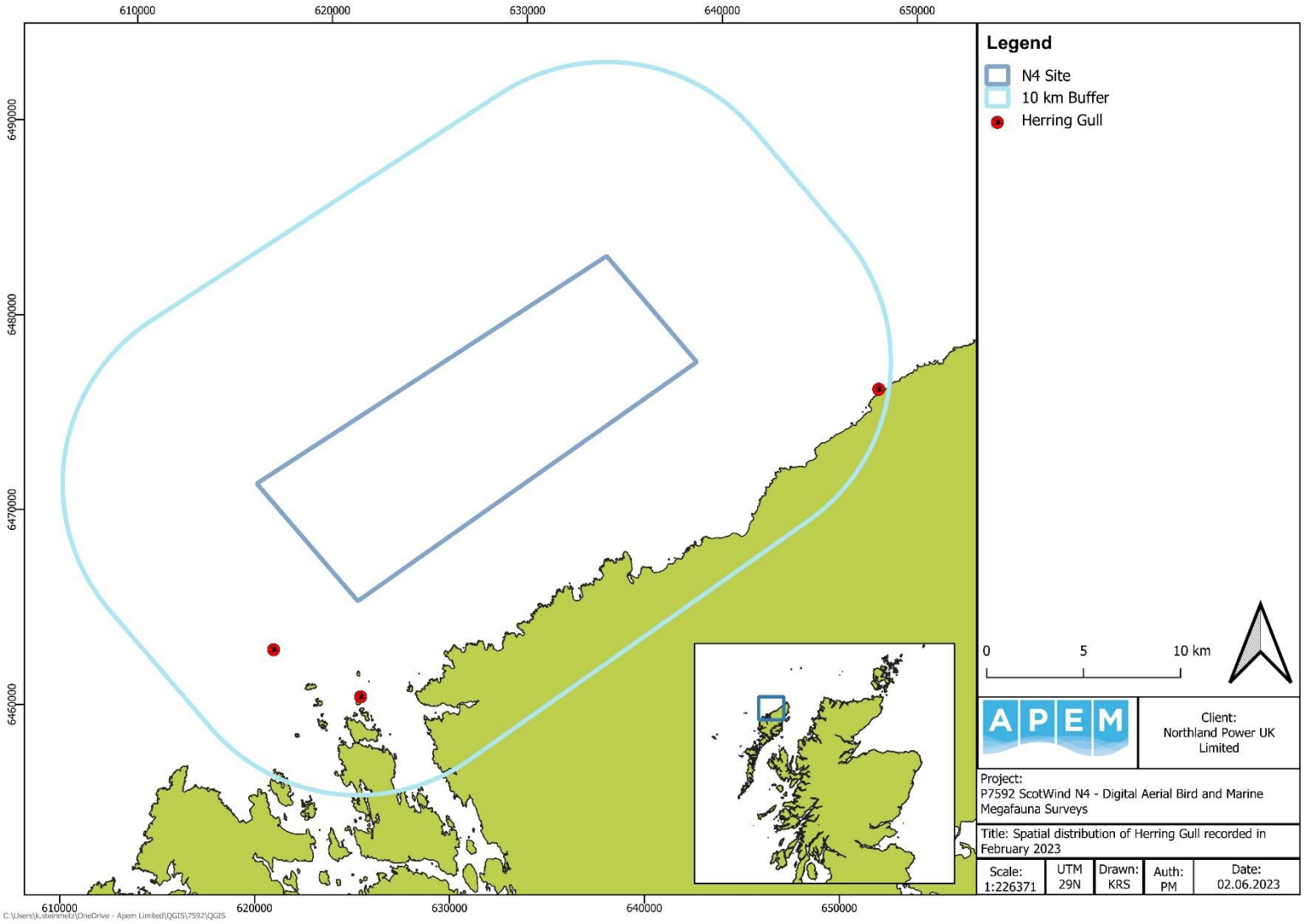


Figure 122 Distribution of herring gull in February 2023
*Note that individuals in close proximity may appear overlaying.

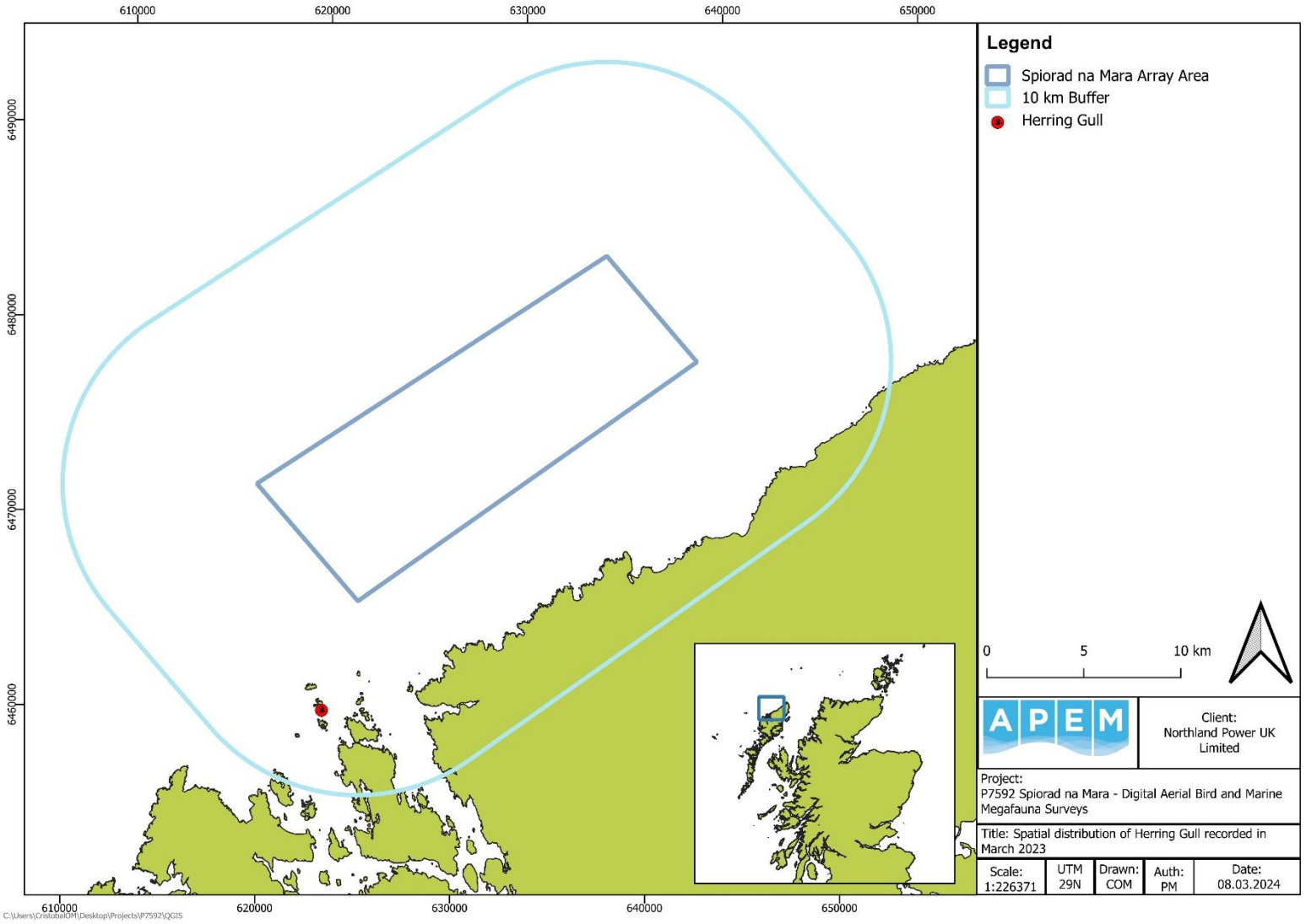


Figure 123 Distribution of herring gull in March 2023

*Note that individuals in close proximity may appear overlaying.

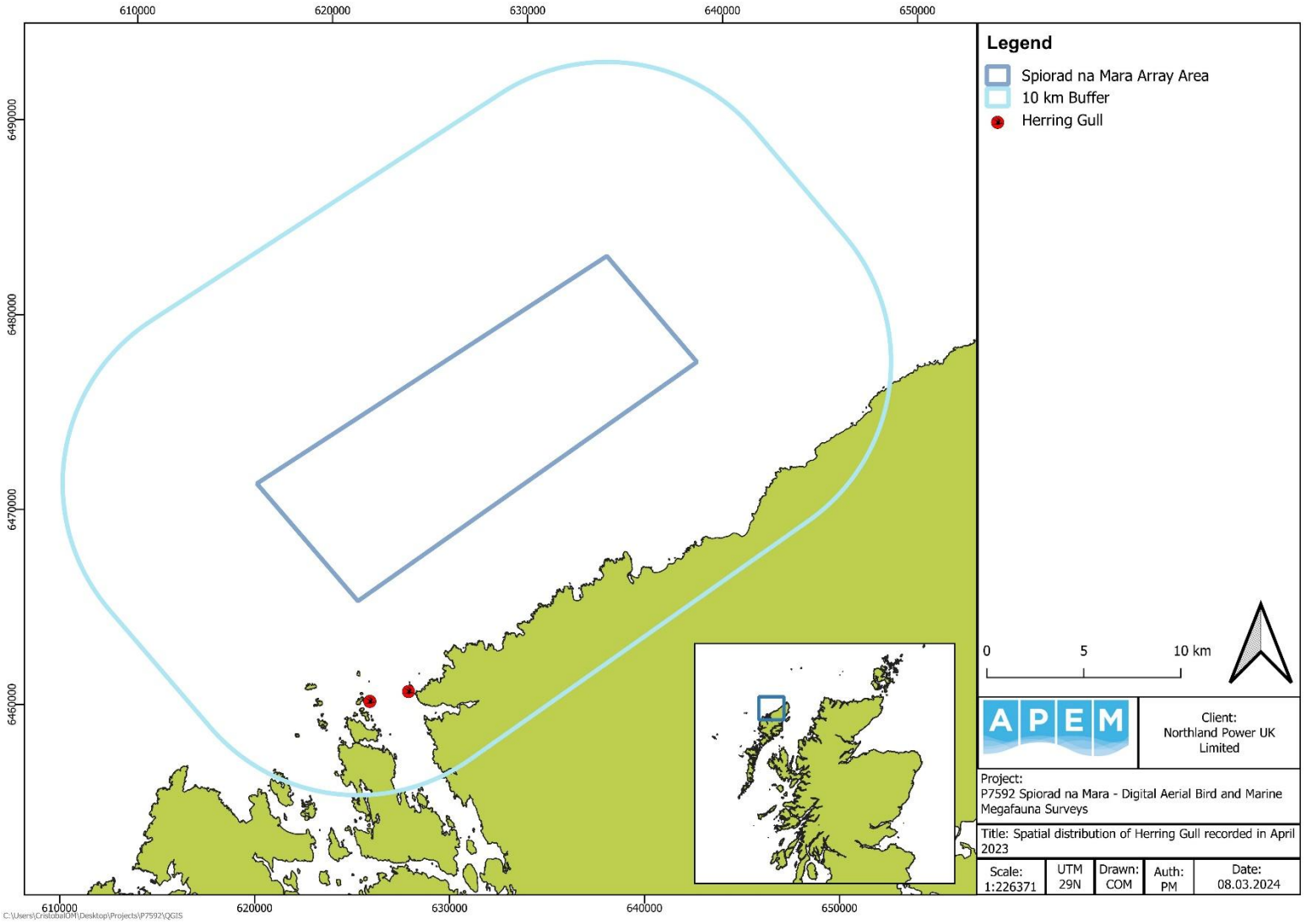


Figure 124 Distribution of herring gull in April 2023
*Note that individuals in close proximity may appear overlaying.

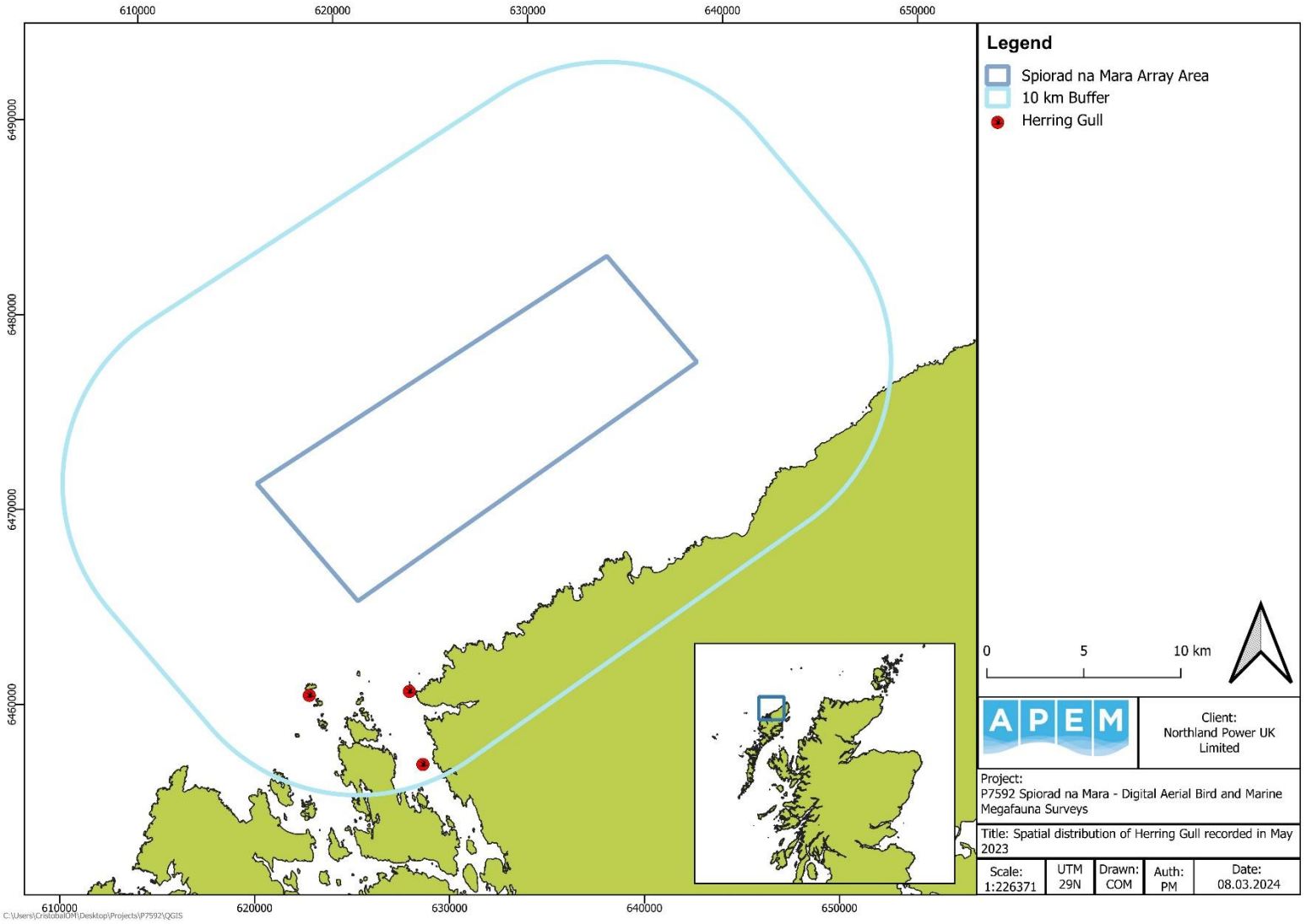


Figure 125 Distribution of herring gull in May 2023
*Note that individuals in close proximity may appear overlaying.

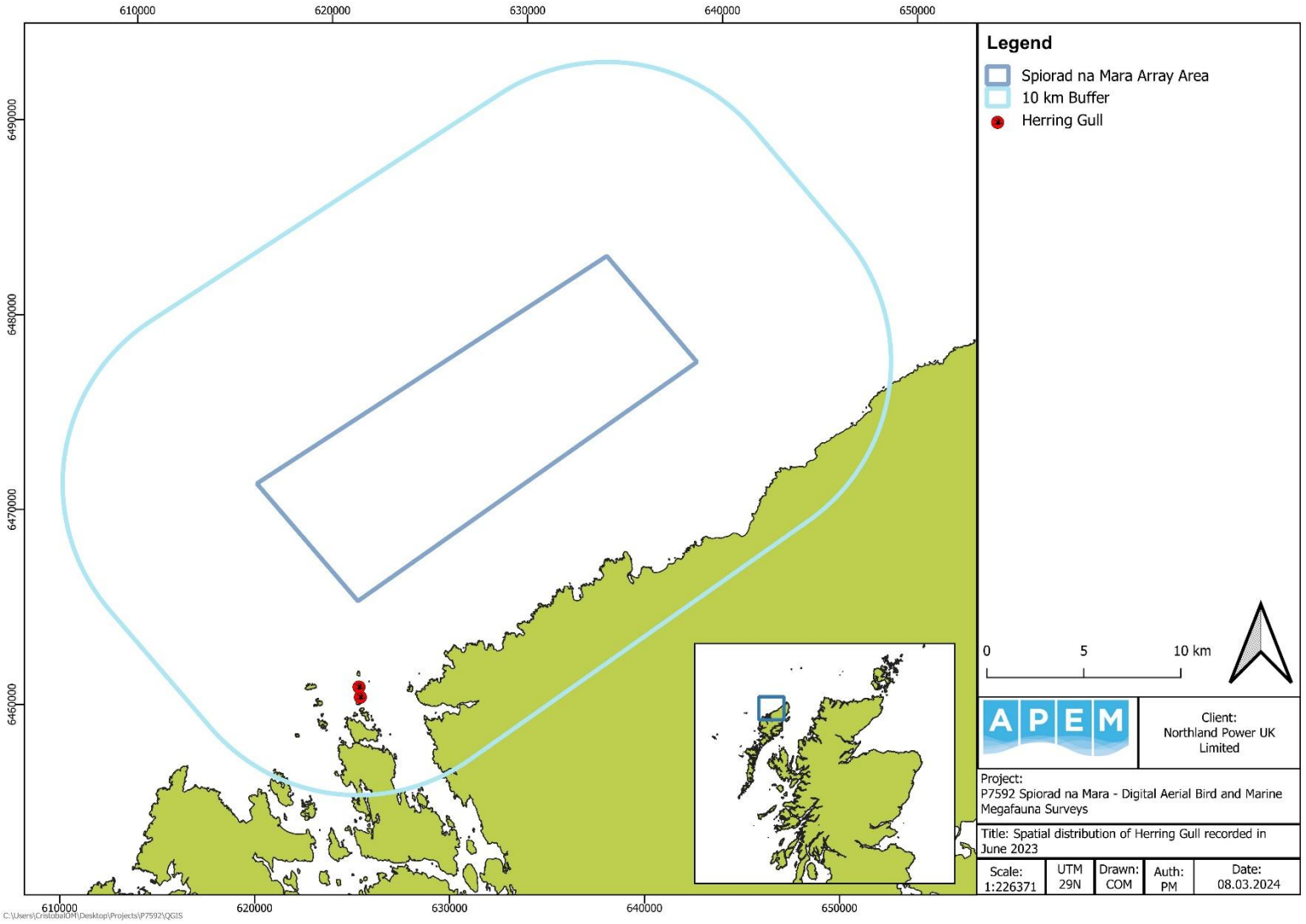


Figure 126 Distribution of herring gull in June 2023
*Note that individuals in close proximity may appear overlaying.

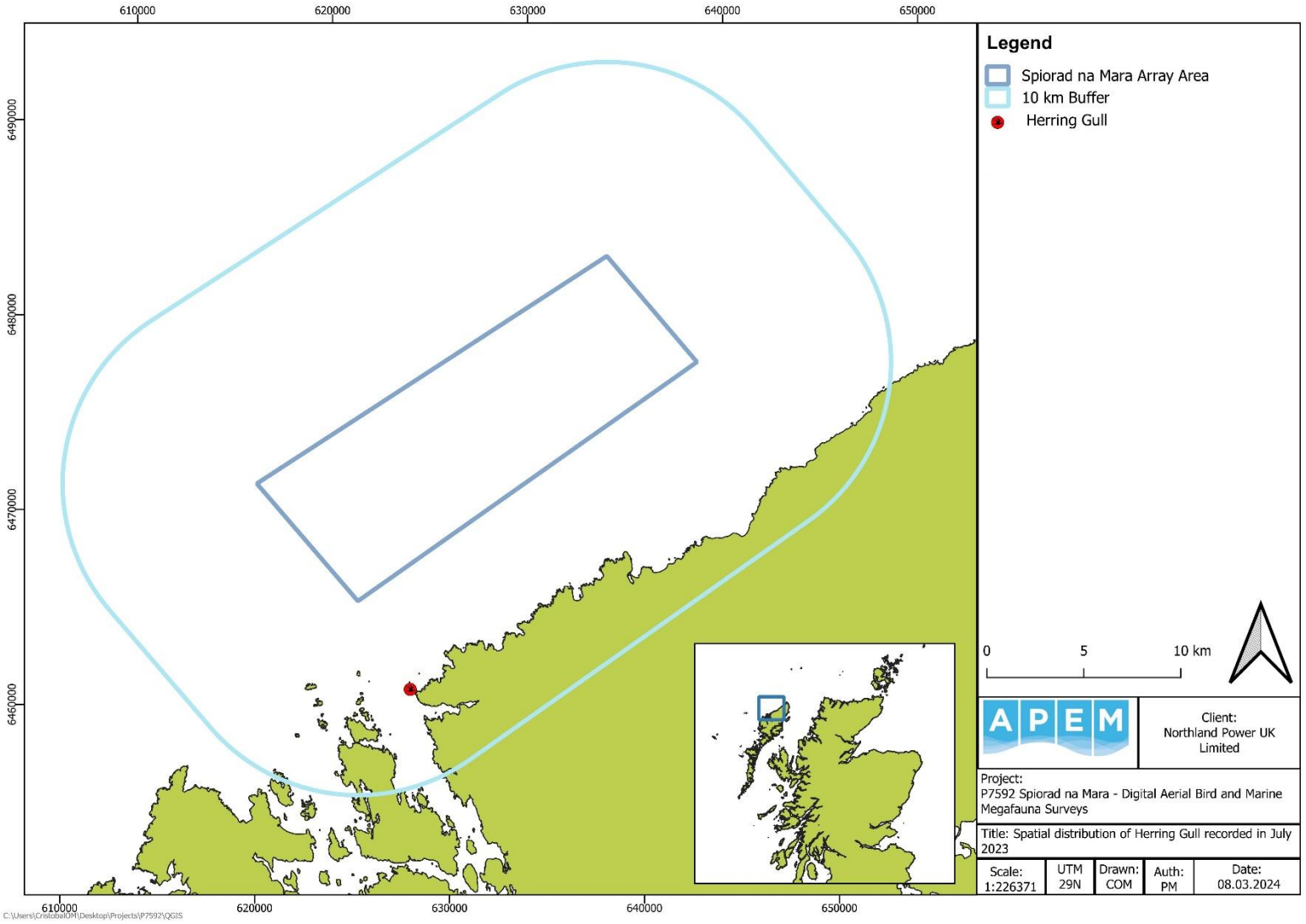


Figure 127 Distribution of herring gull in July 2023
*Note that individuals in close proximity may appear overlaying.

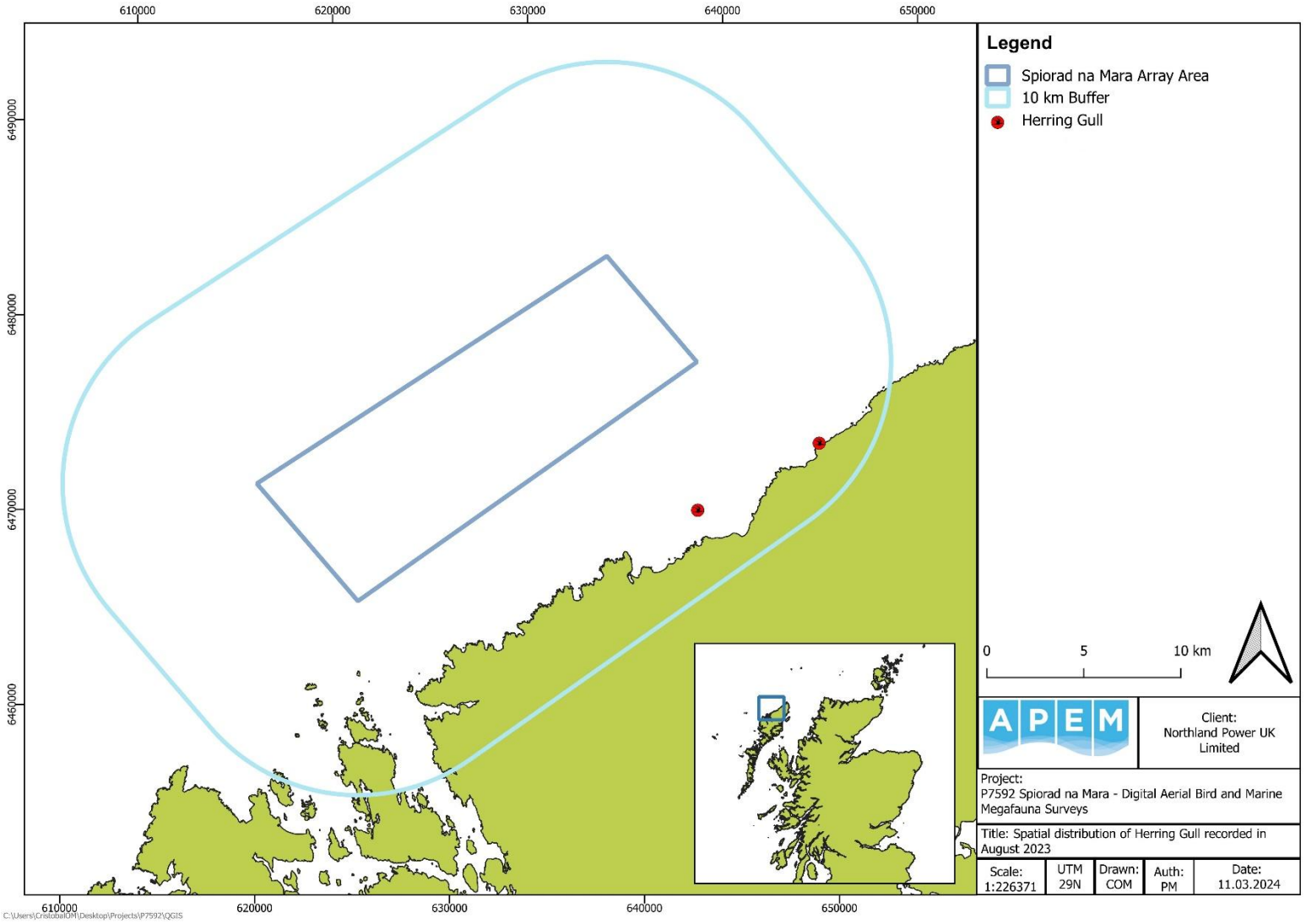


Figure 128 Distribution of herring gull in August 2023

*Note that individuals in close proximity may appear overlaying.

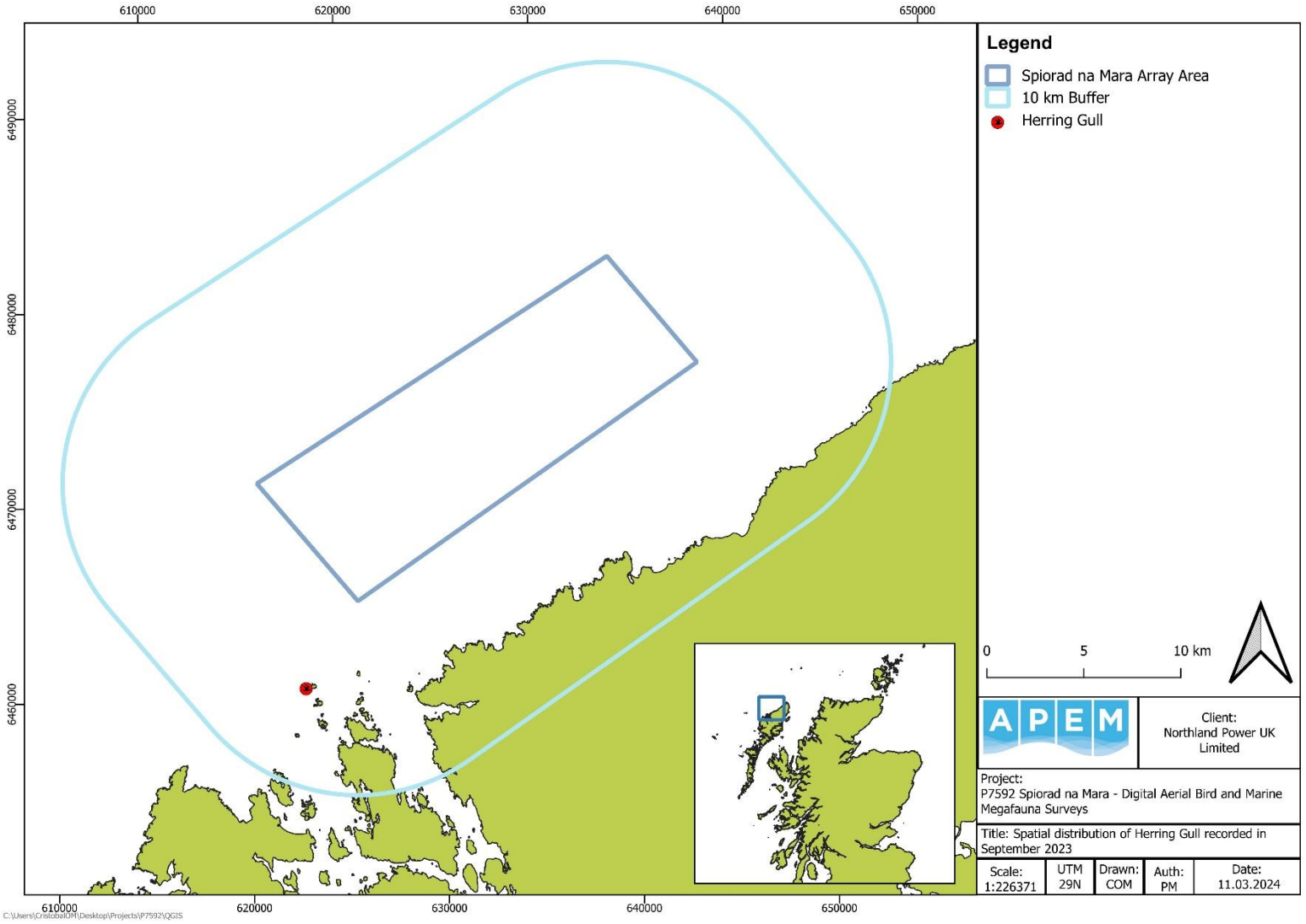


Figure 129 Distribution of herring gull in September 2023
*Note that individuals in close proximity may appear overlaying.

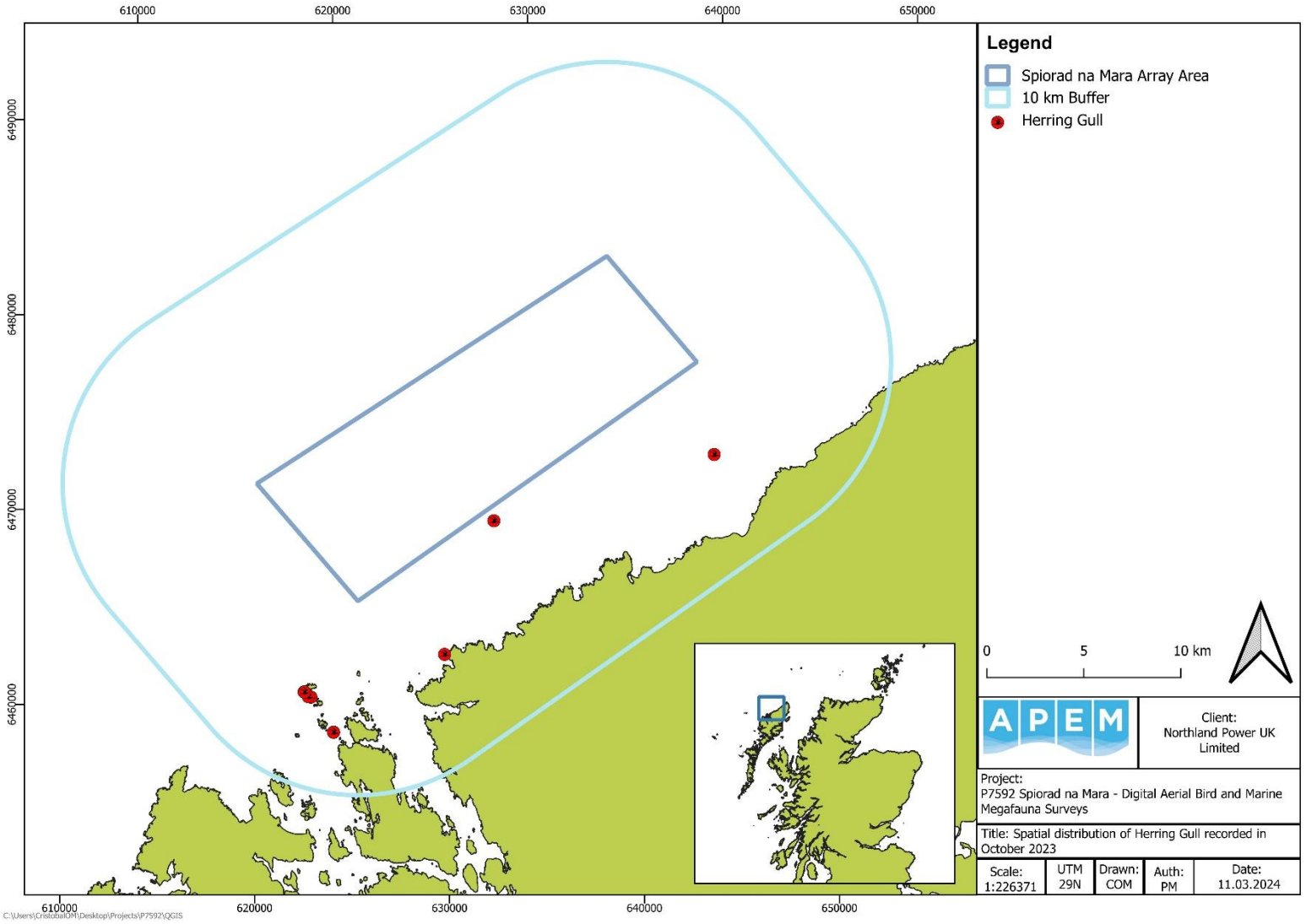


Figure 130 Distribution of herring gull in October 2023

*Note that individuals in close proximity may appear overlaying.

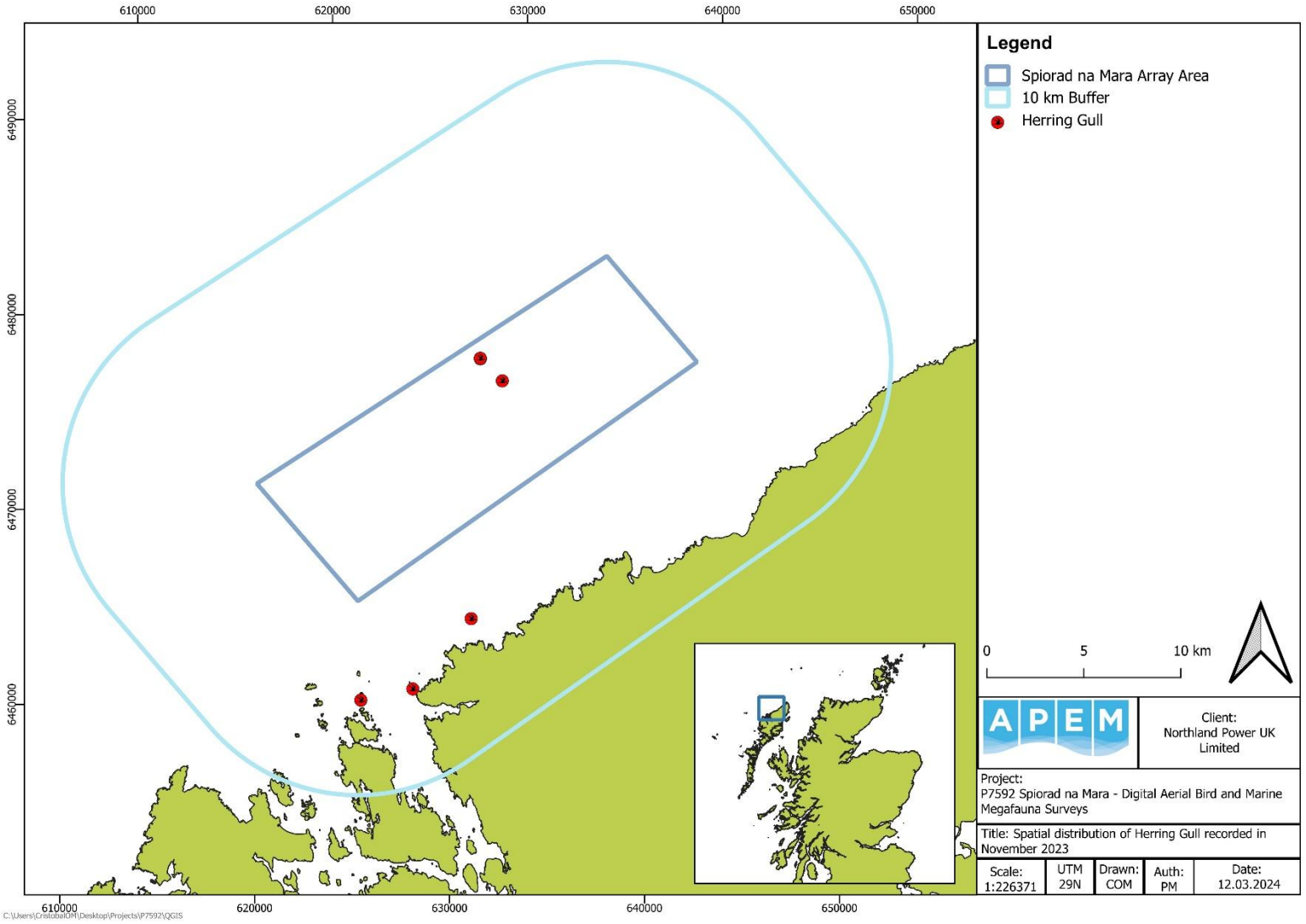


Figure 131 Distribution of herring gull in November 2023

*Note that individuals in close proximity may appear overlaying.

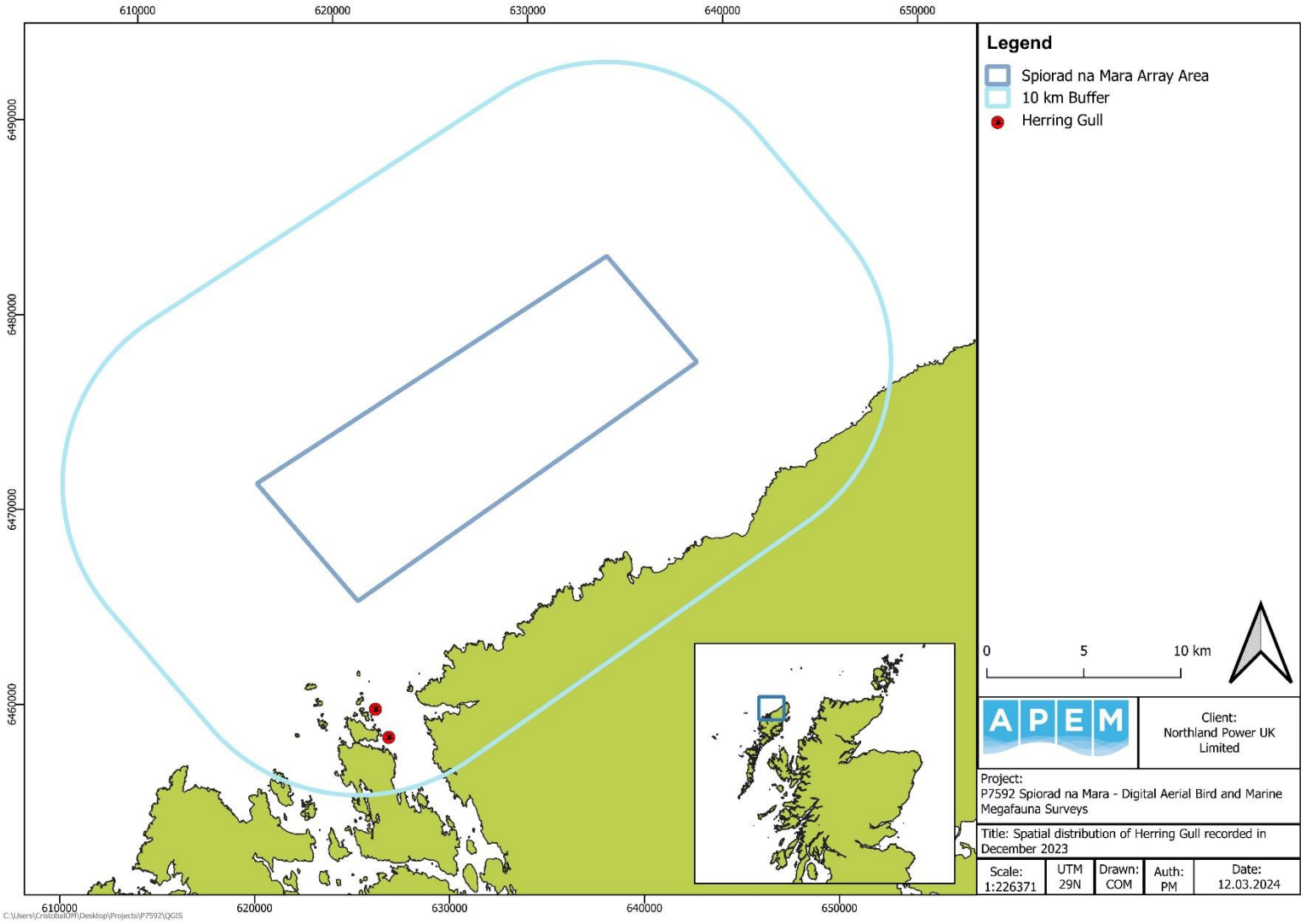


Figure 132 Distribution of herring gull in December 2023

*Note that individuals in close proximity may appear overlaying.

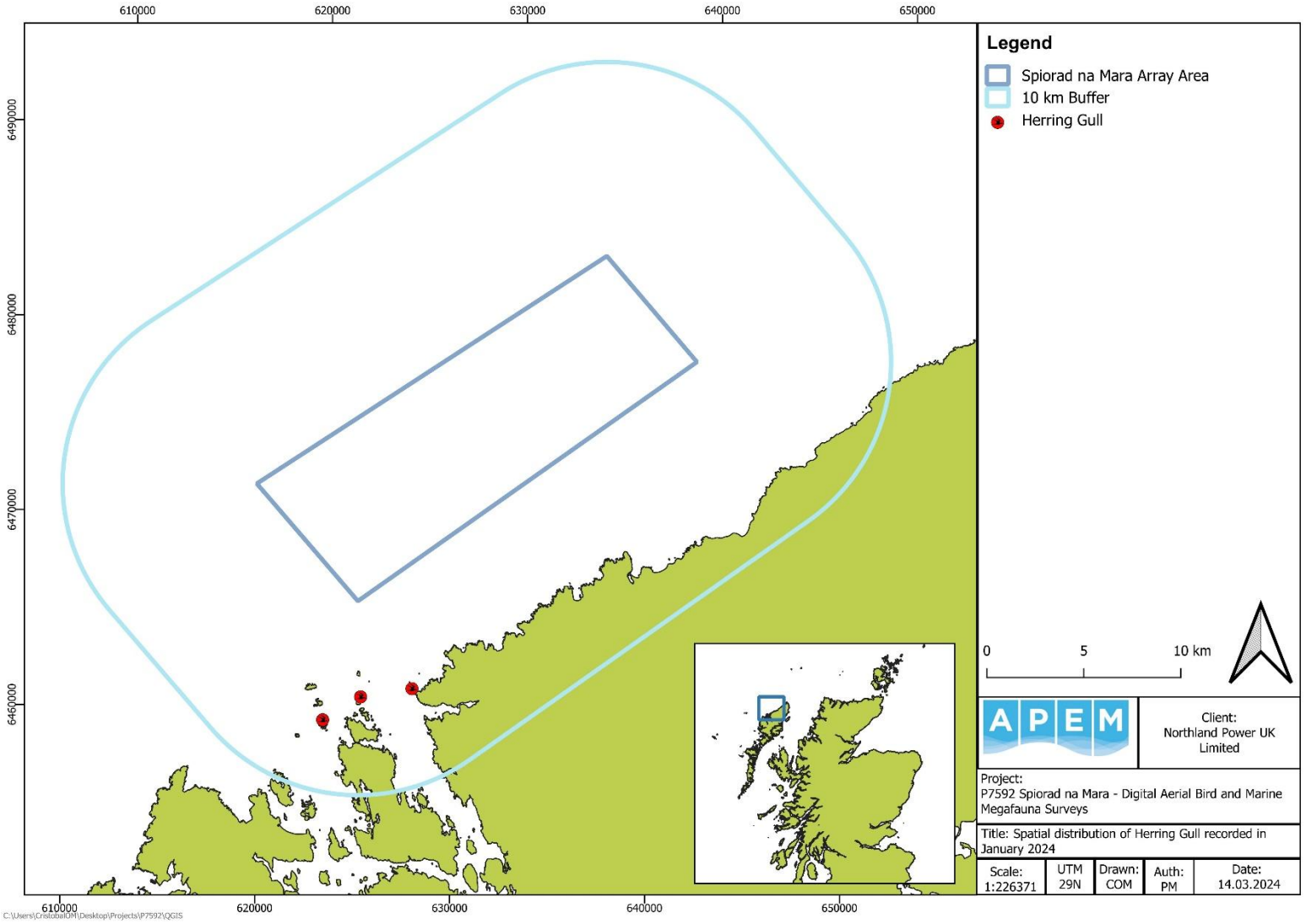


Figure 133 Distribution of herring gull in January 2024

*Note that individuals in close proximity may appear overlaying.

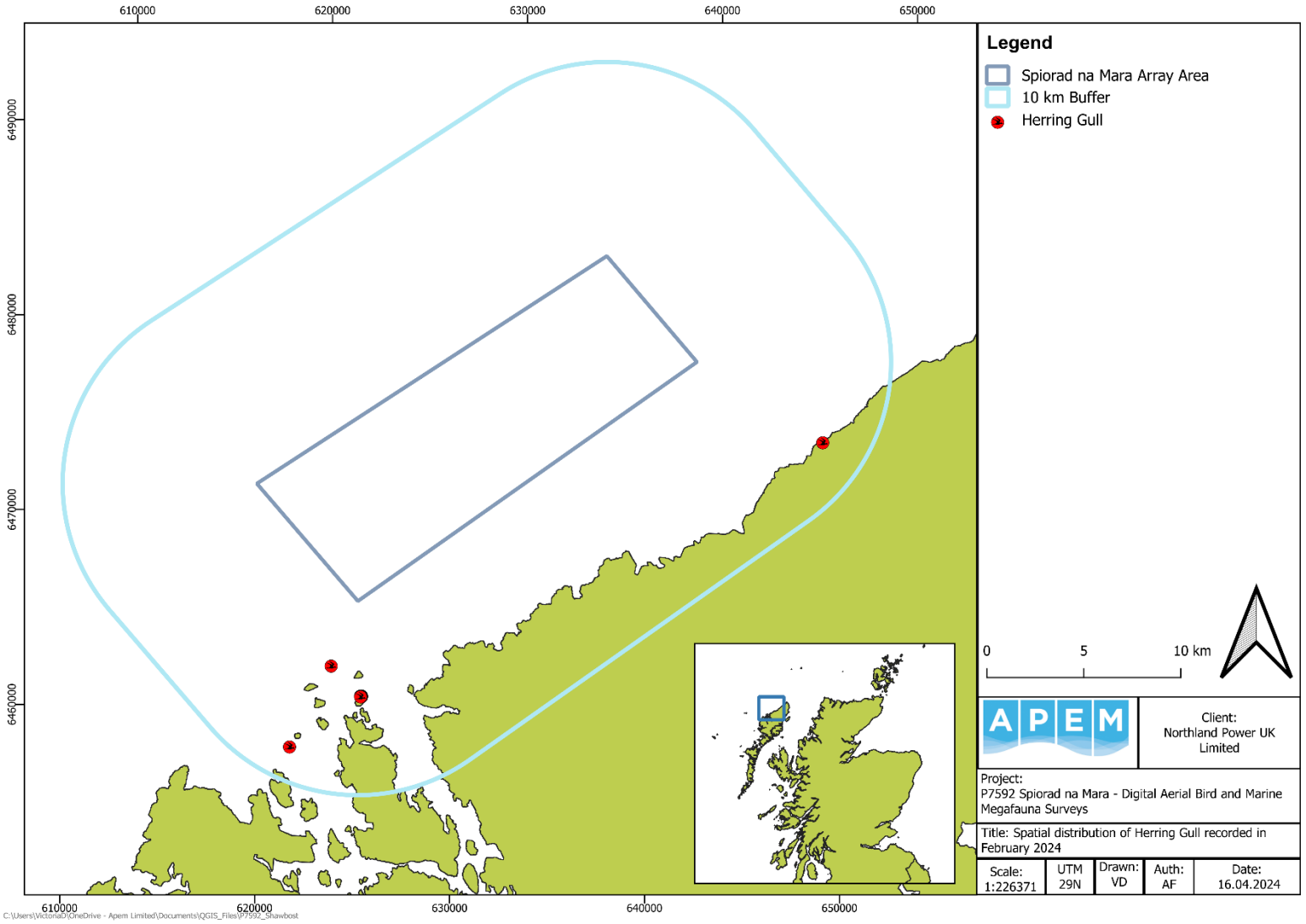


Figure 134 Distribution of herring gull in February 2024

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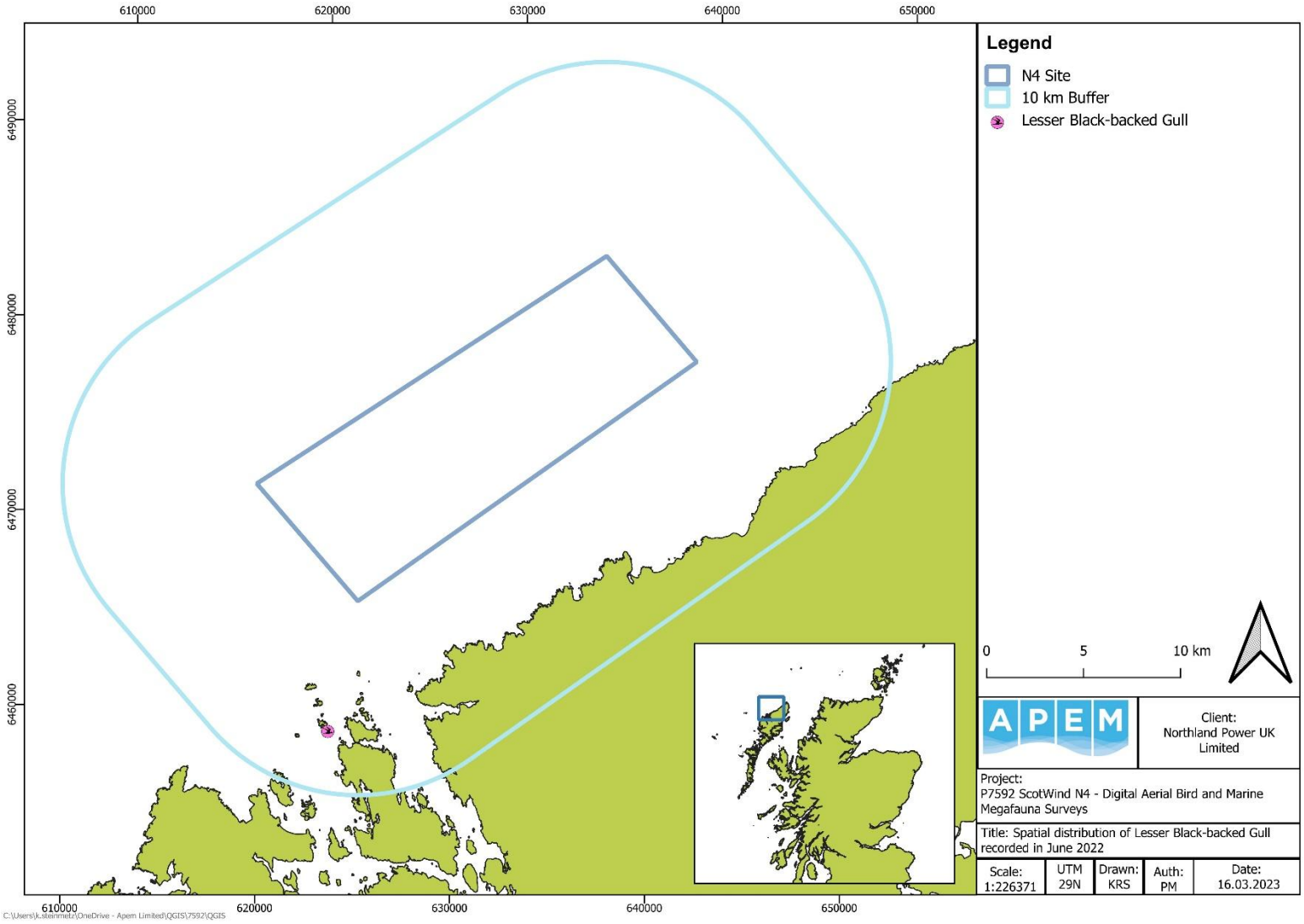


Figure 135 Distribution of lesser black-backed gull in June 2022

*Note that individuals in close proximity may appear overlaying.

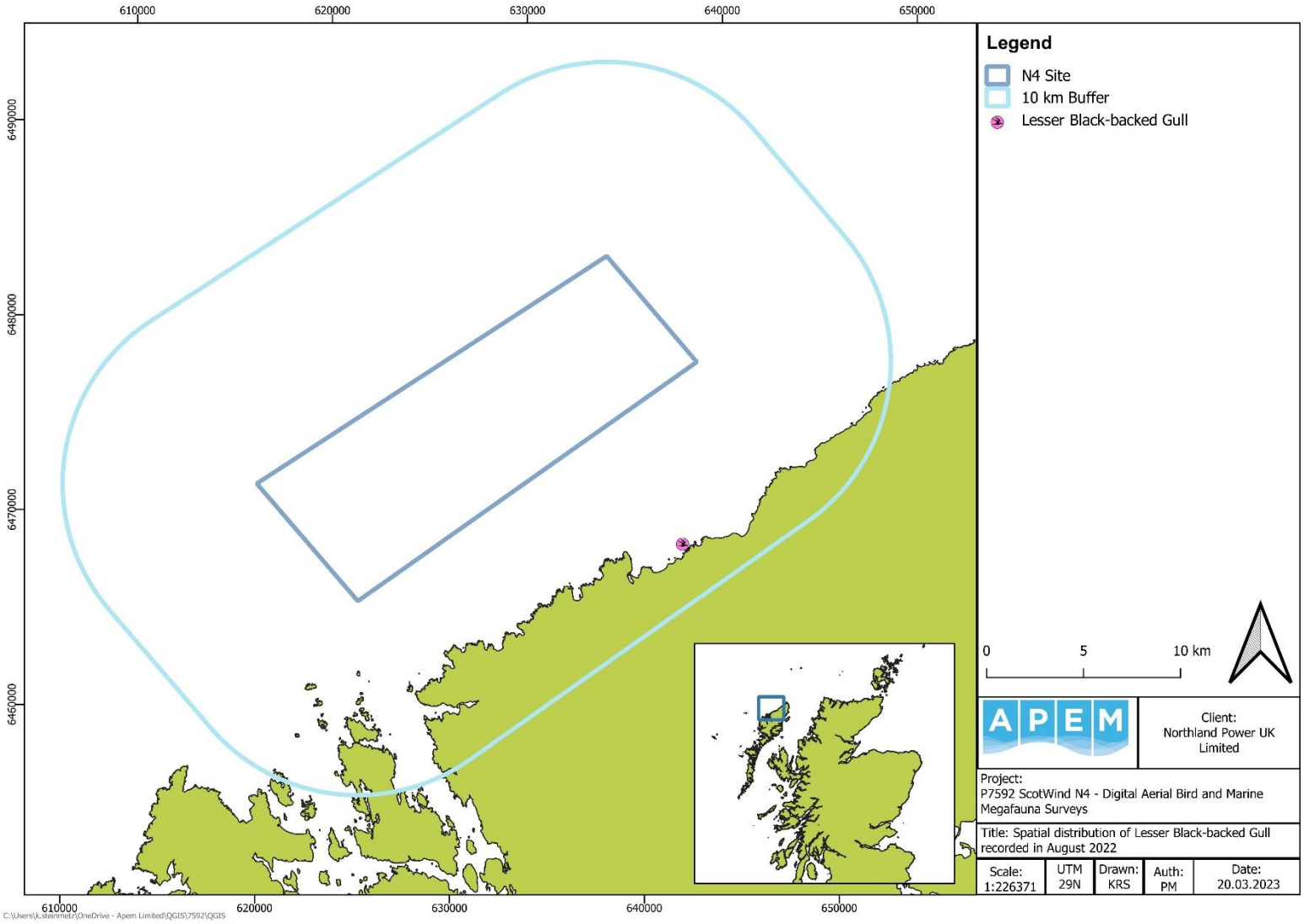


Figure 136 Distribution of lesser black-backed gull in August 2022
*Note that individuals in close proximity may appear overlaying.

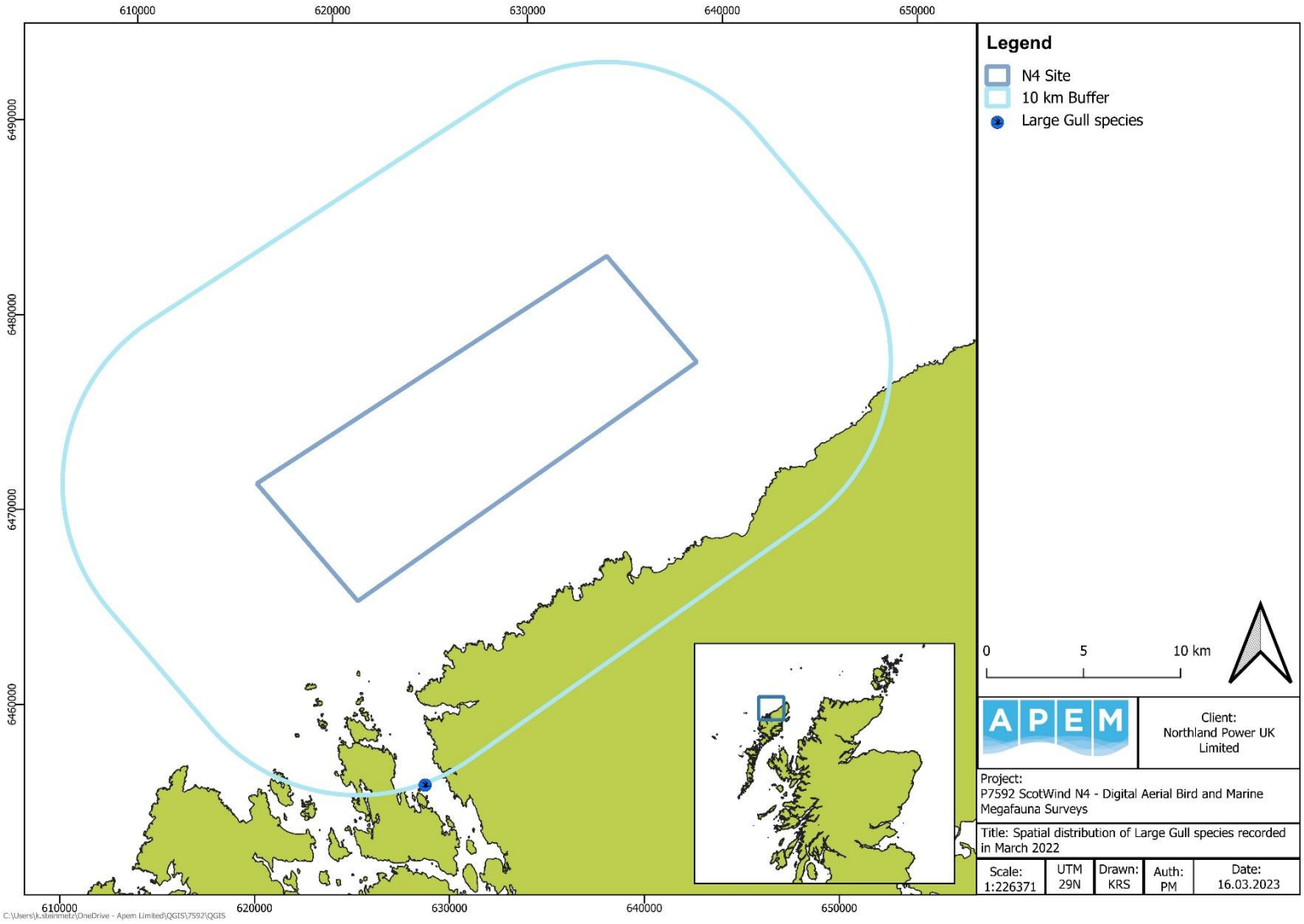


Figure 137 Distribution of large gull species in March 2022
*Note that individuals in close proximity may appear overlaying.

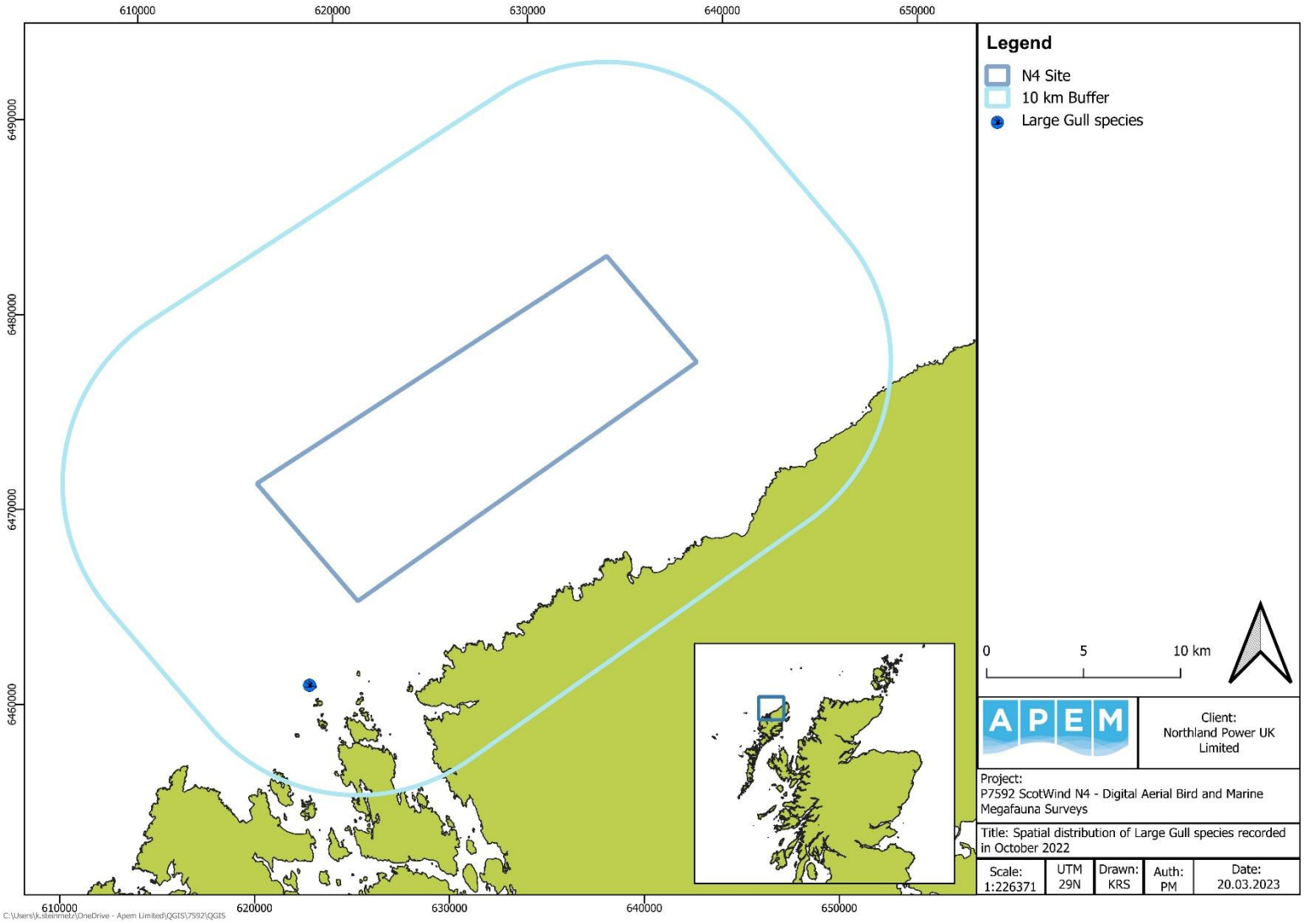


Figure 138 Distribution of large gull species in October 2022

*Note that individuals in close proximity may appear overlaying.

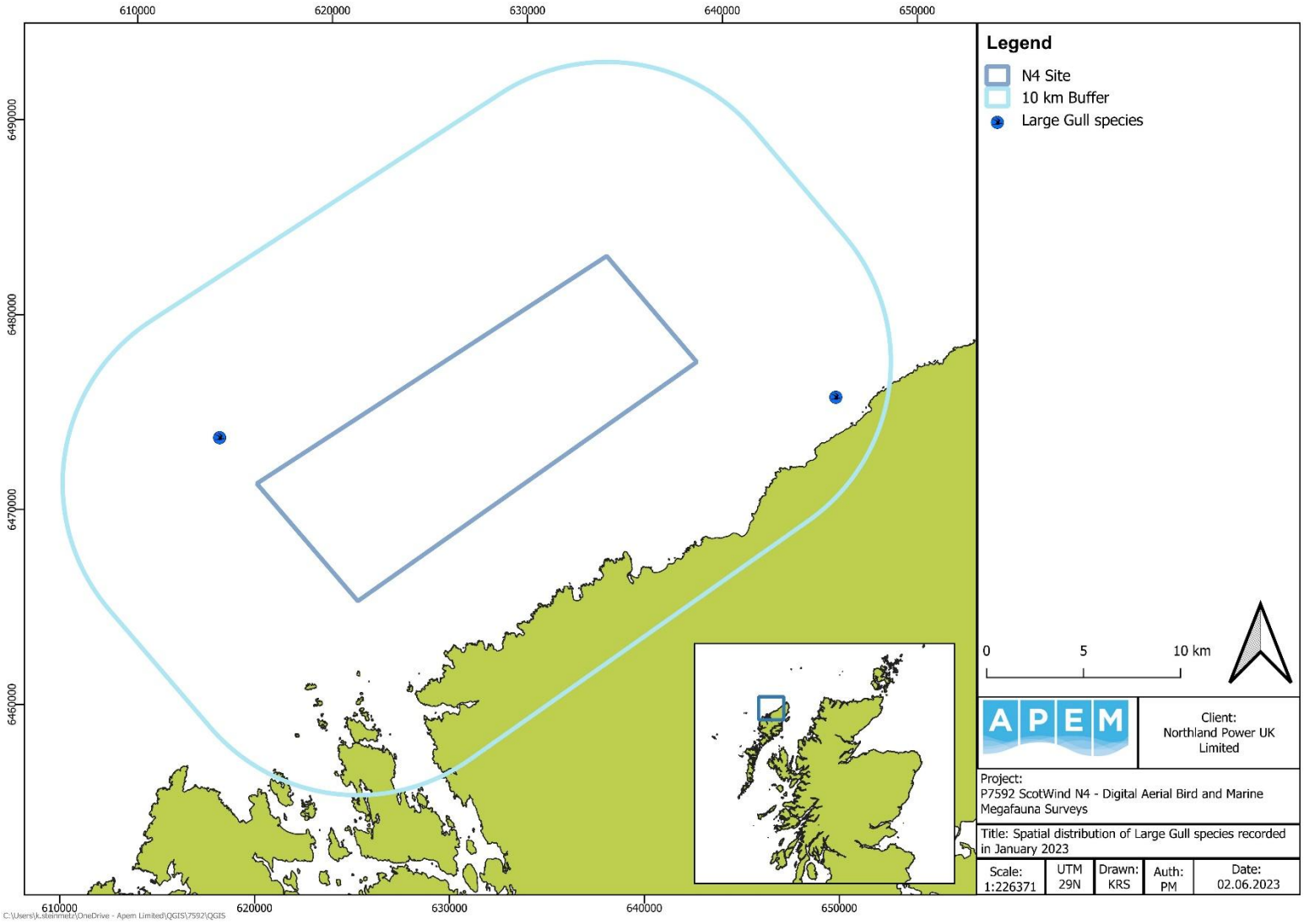


Figure 139 Distribution of large gull species in January 2023
*Note that individuals in close proximity may appear overlaying.

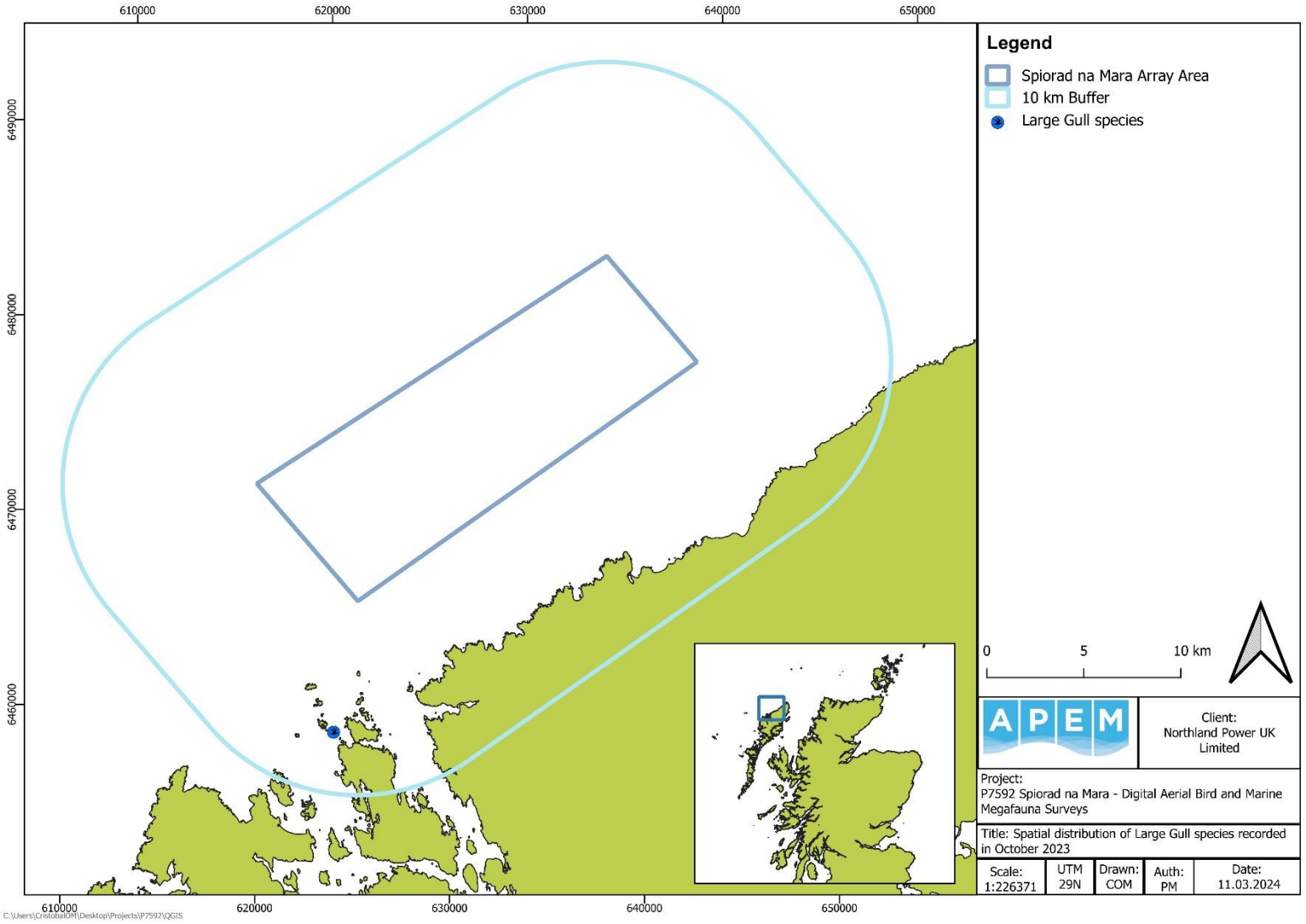


Figure 140 Distribution of large gull species in October 2023

*Note that individuals in close proximity may appear overlaying.

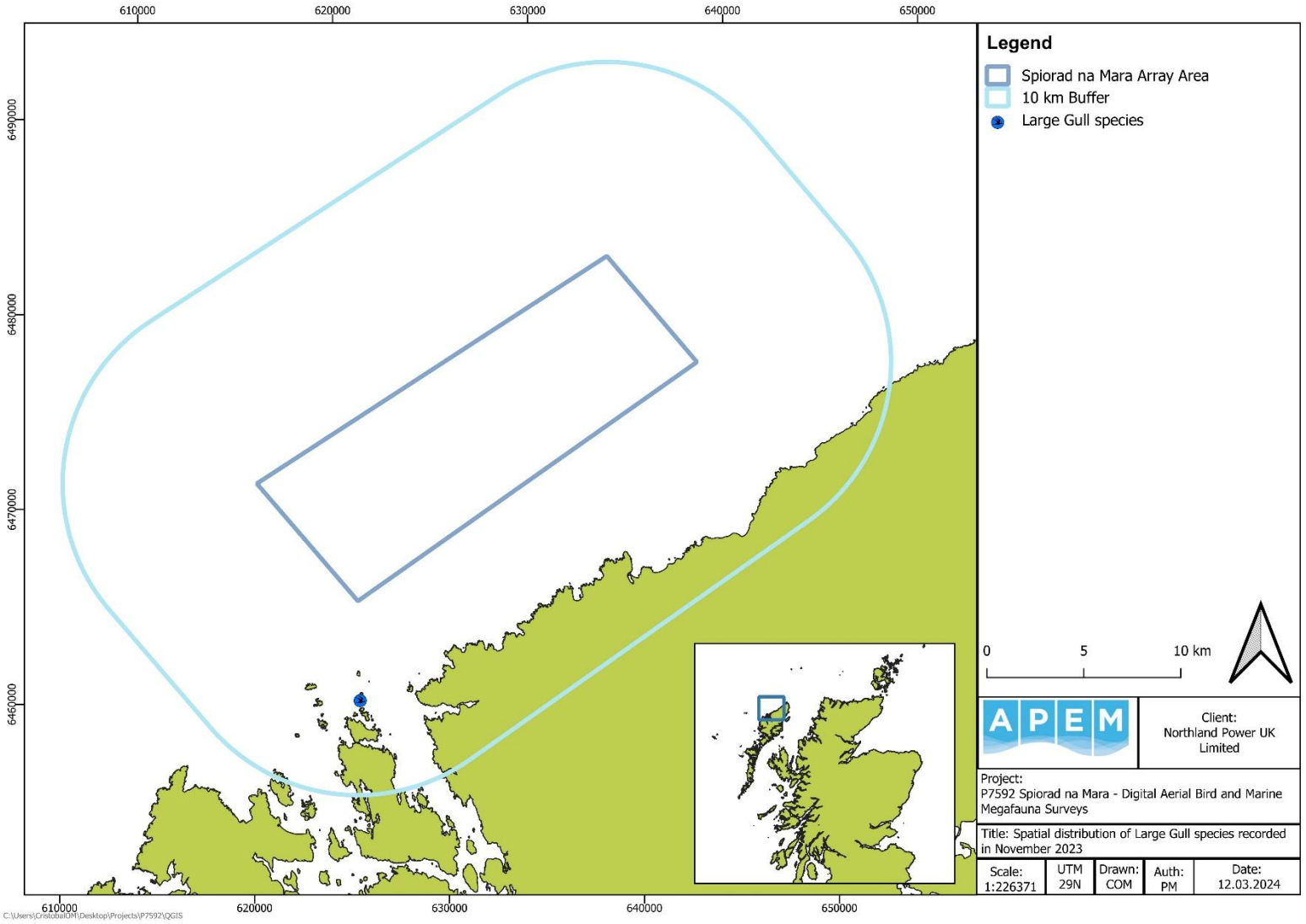


Figure 141 Distribution of large gull species in November 2023

*Note that individuals in close proximity may appear overlaying.

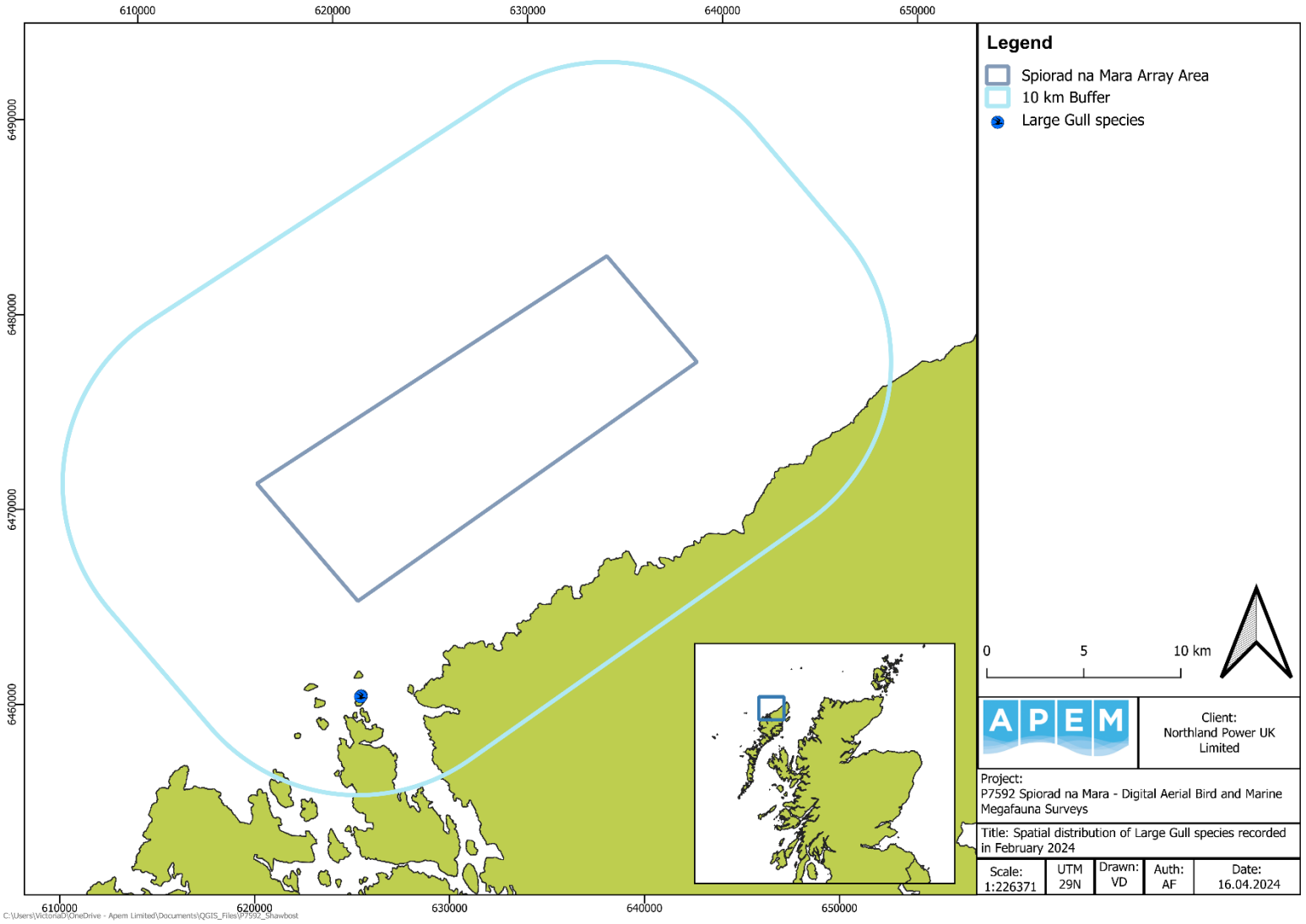


Figure 142 Distribution of large gull species in February 2024
*Note that individuals in close proximity may appear overlaying.

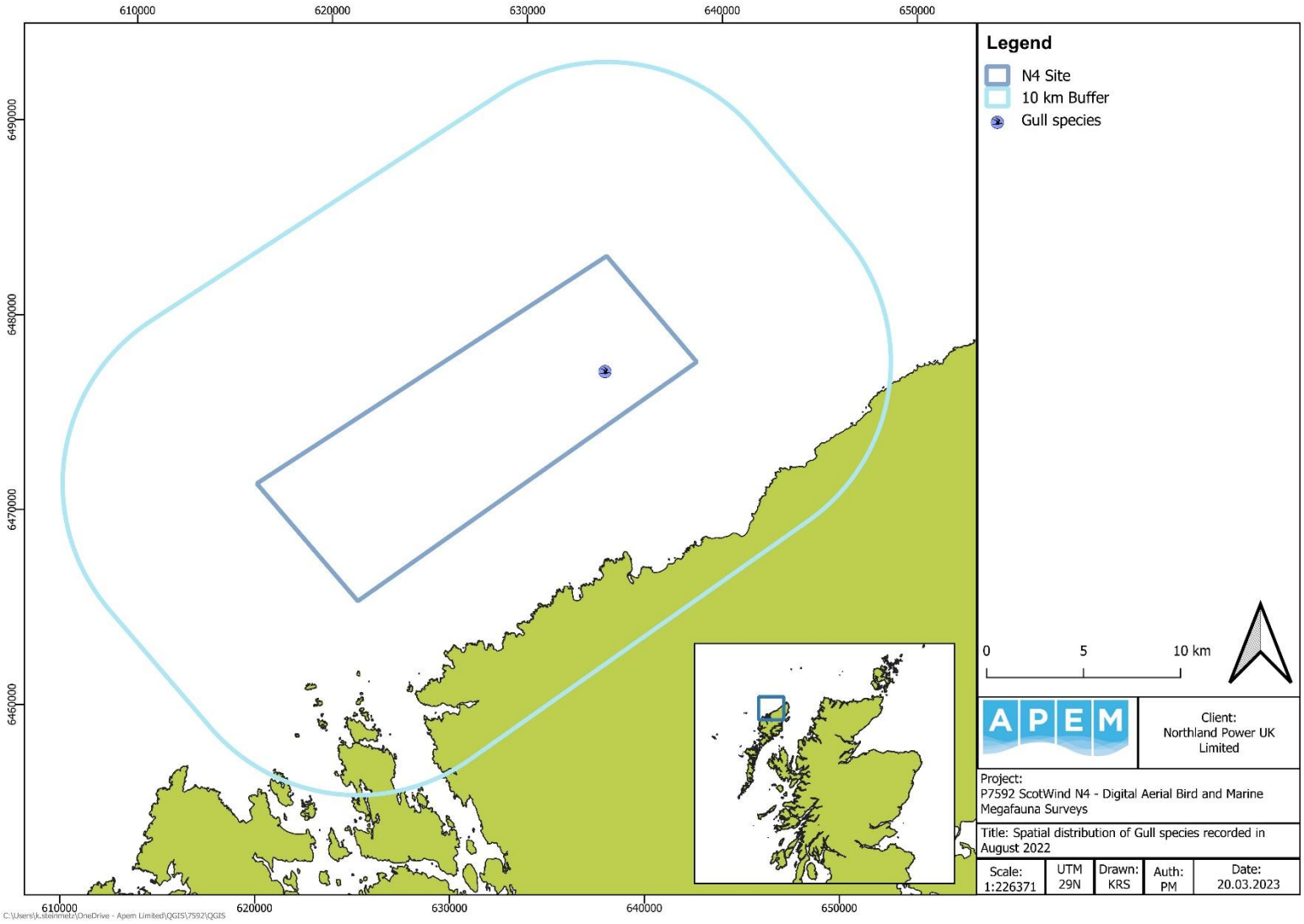


Figure 143 Distribution of gull species in August 2022

*Note that individuals in close proximity may appear overlaying.

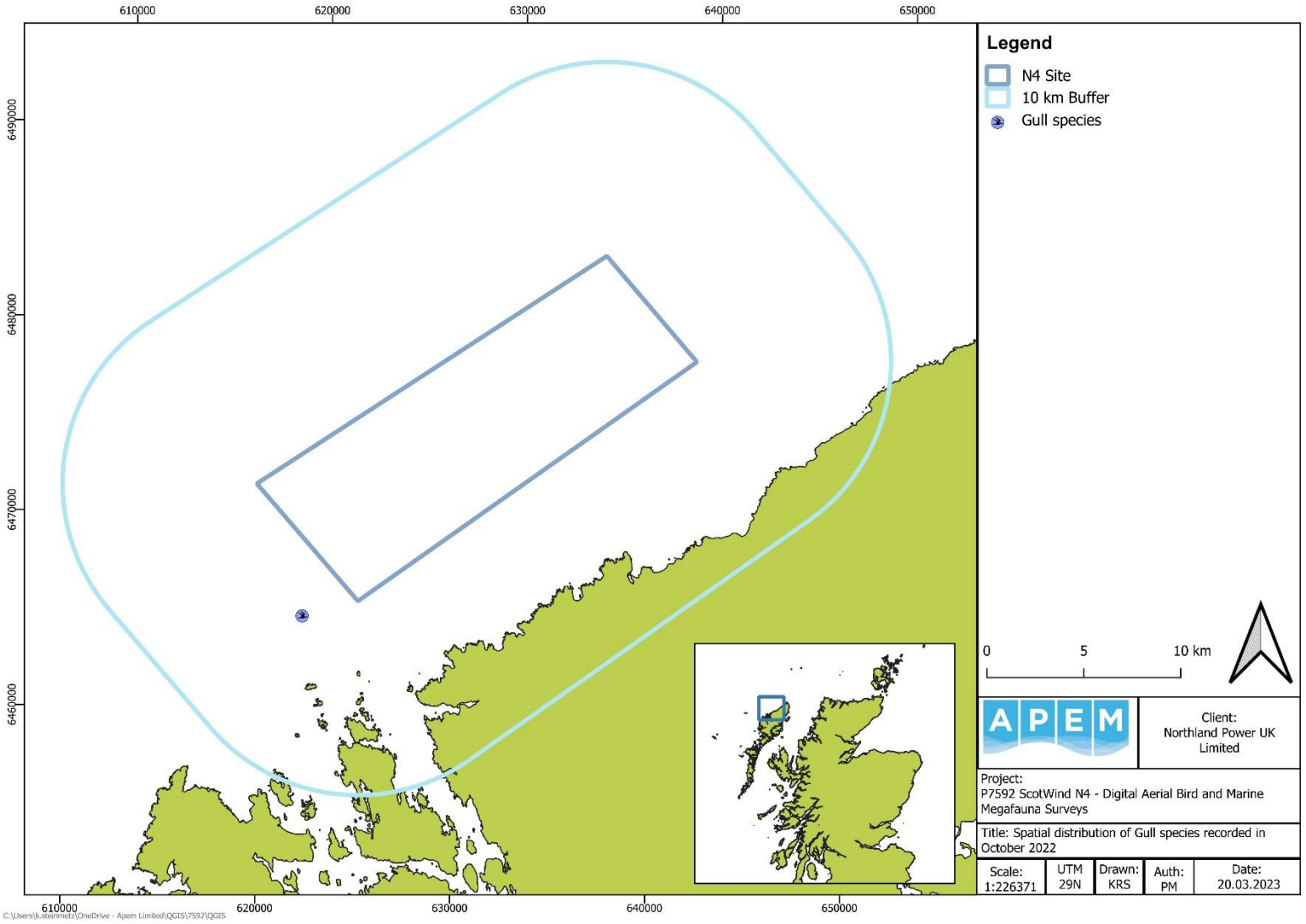


Figure 144 Distribution of gull species in October 2022

*Note that individuals in close proximity may appear overlaying.

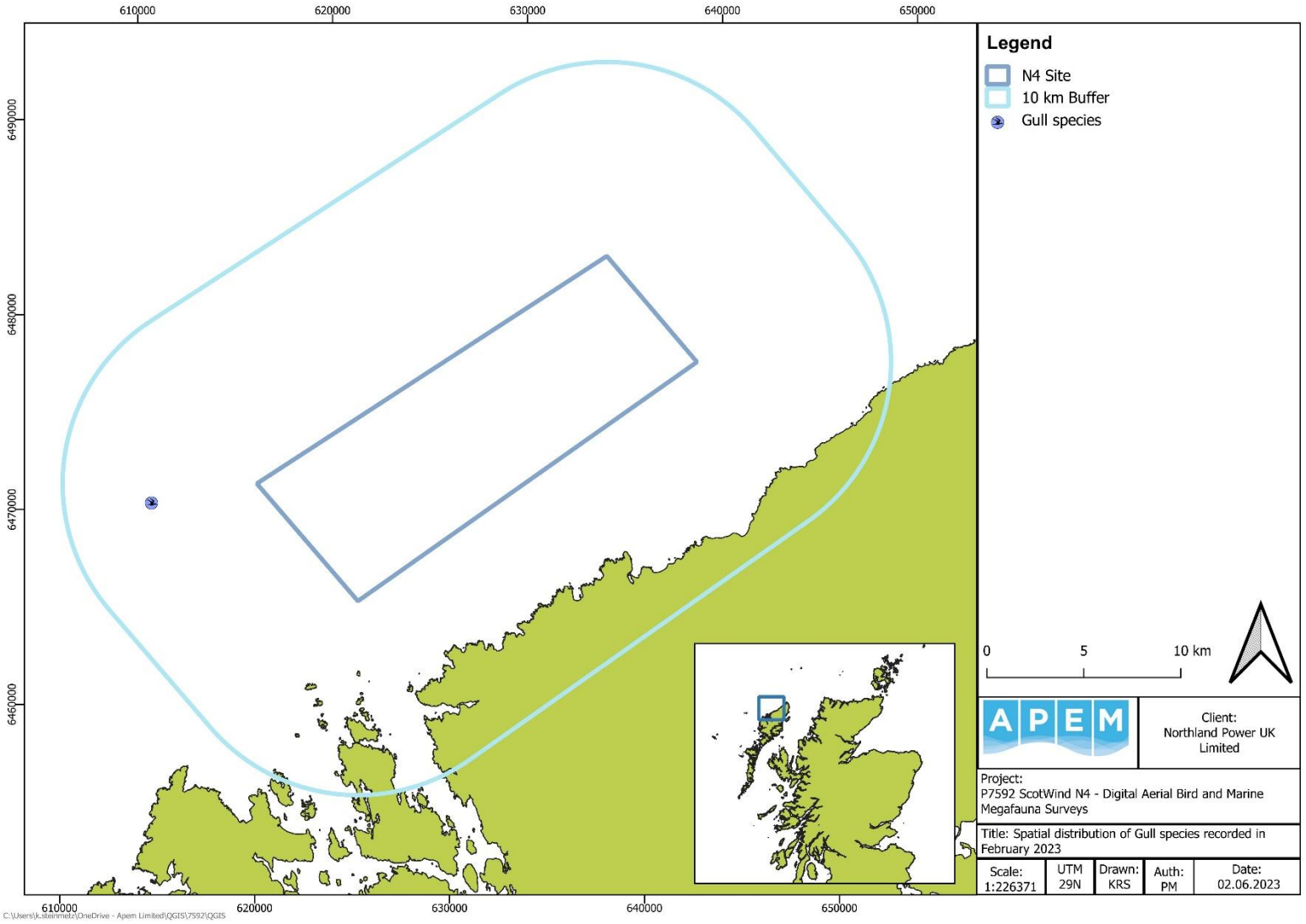


Figure 145 Distribution of gull species in February 2023
*Note that individuals in close proximity may appear overlaying.

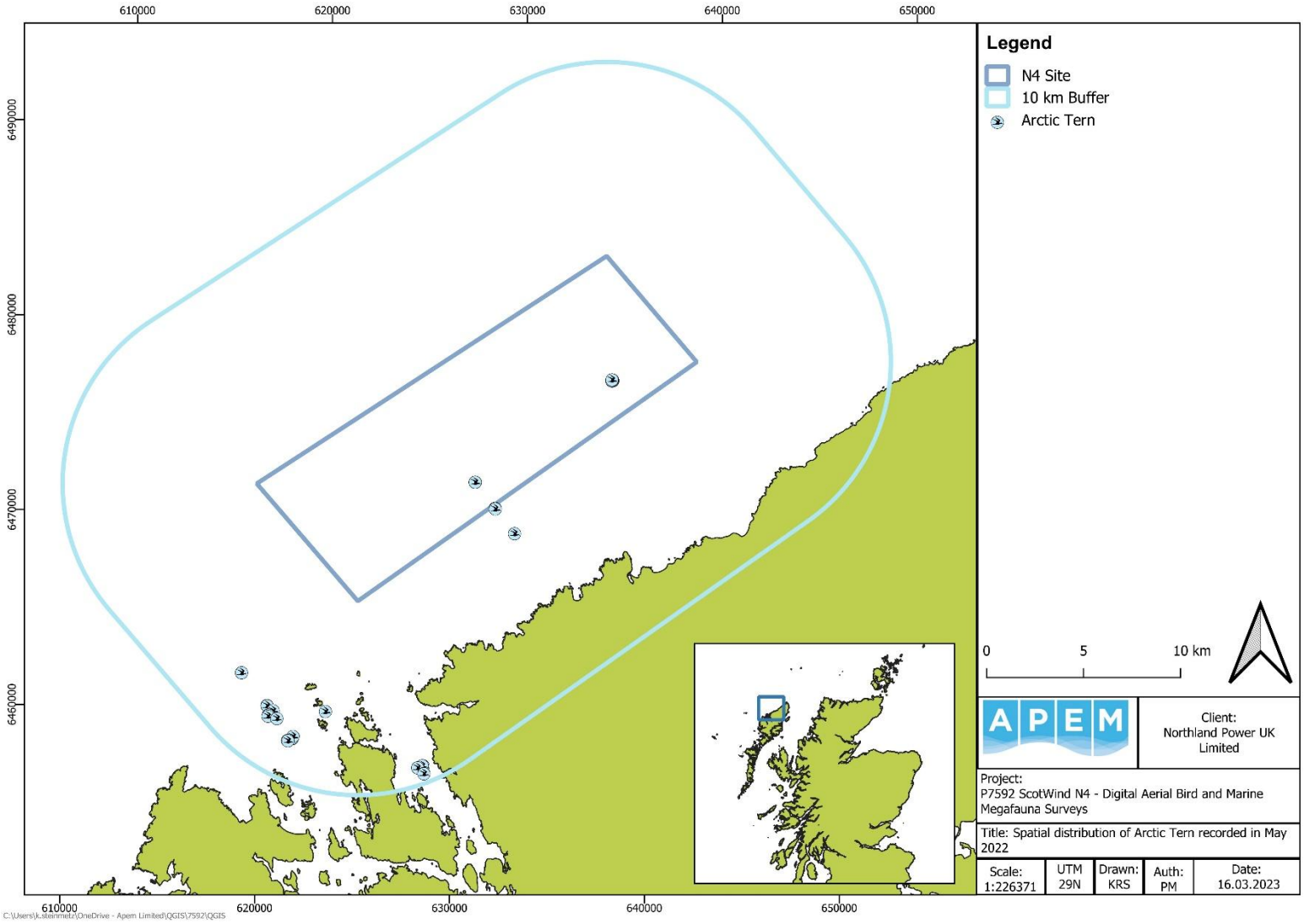


Figure 146 Distribution of Arctic tern in May 2022
*Note that individuals in close proximity may appear overlaying.

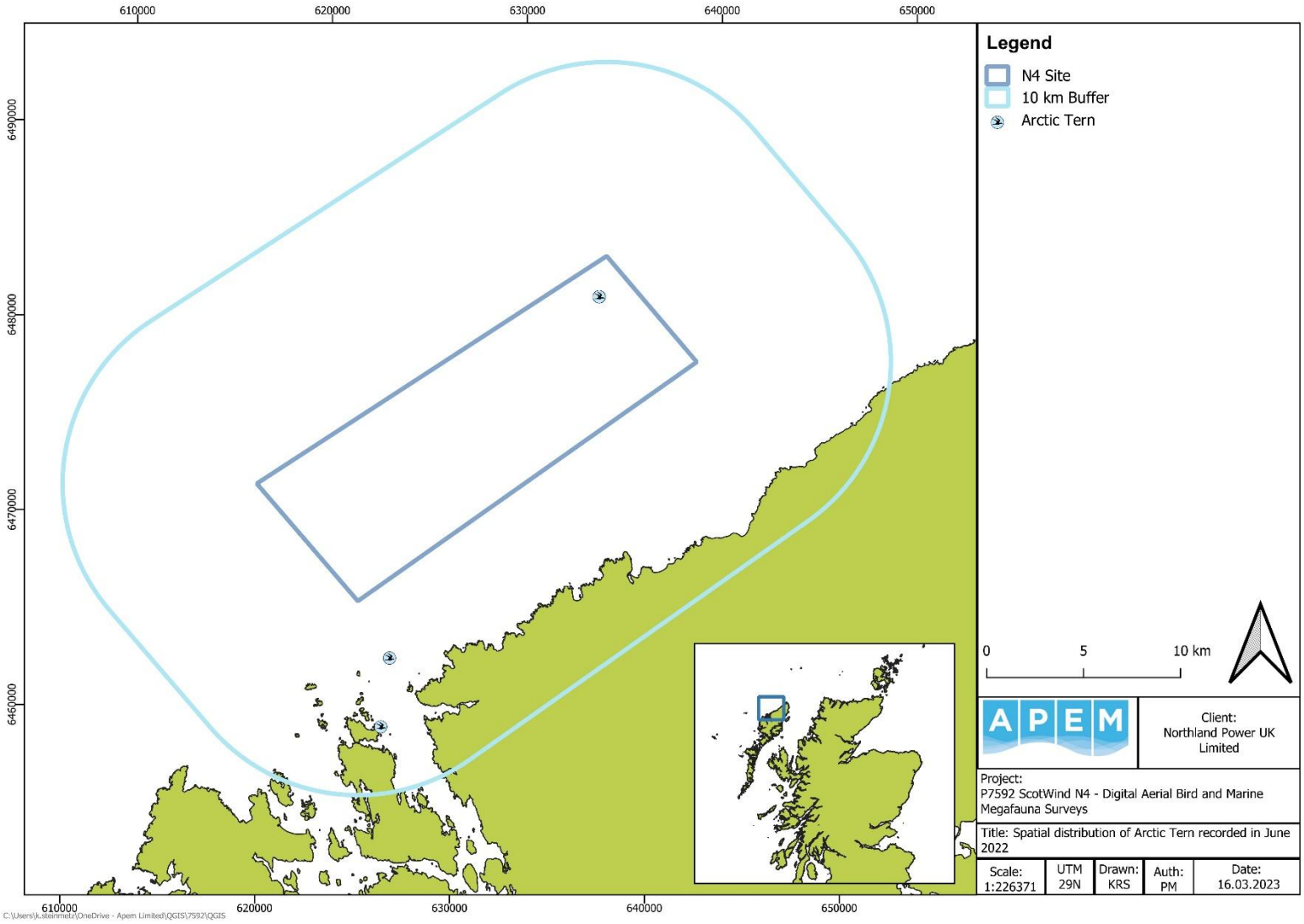


Figure 147 Distribution of Arctic tern in June 2022
*Note that individuals in close proximity may appear overlaying.

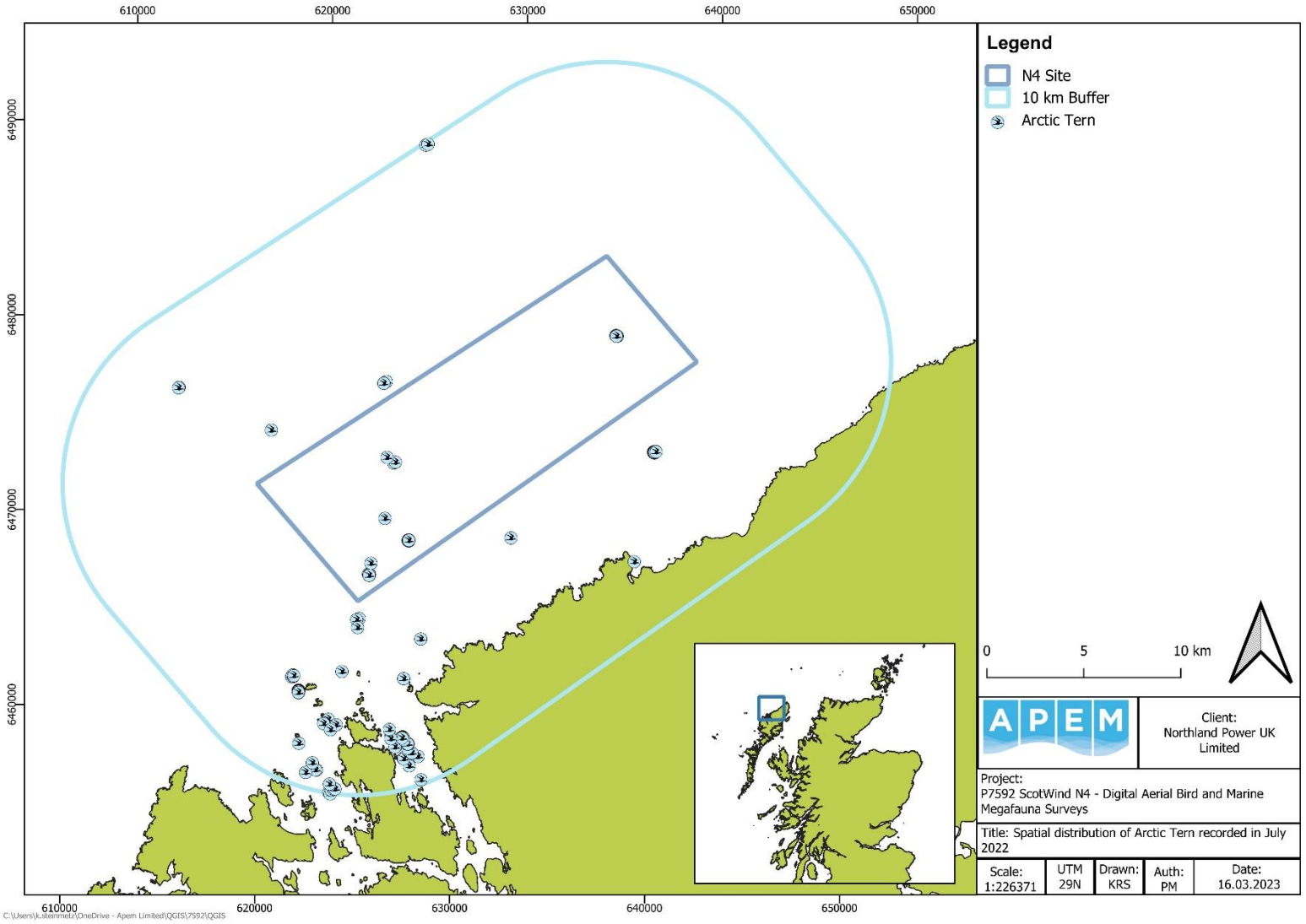


Figure 148 Distribution of Arctic tern in July 2022
*Note that individuals in close proximity may appear overlaying.

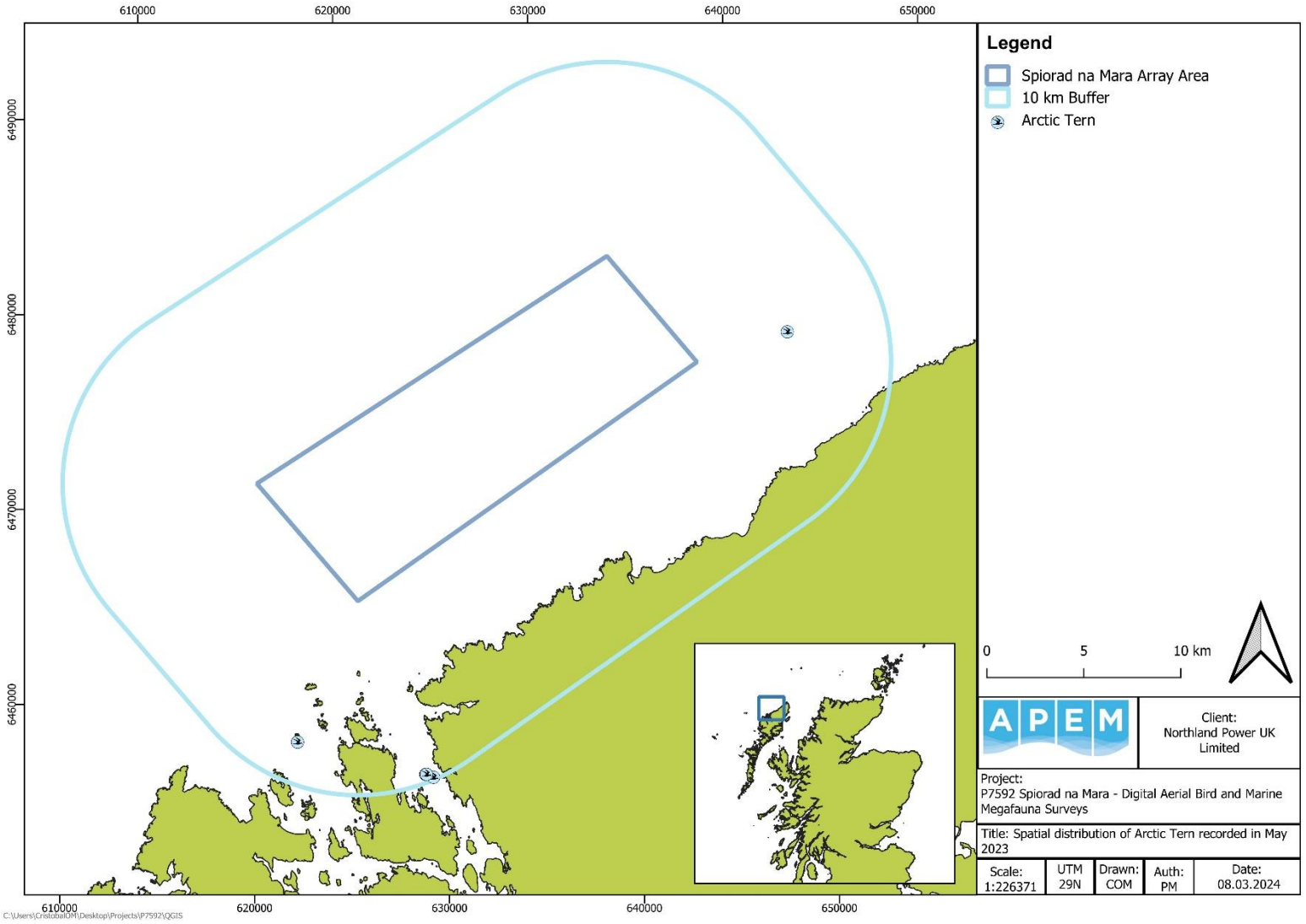


Figure 149 Distribution of Arctic tern in May 2023

*Note that individuals in close proximity may appear overlaying.

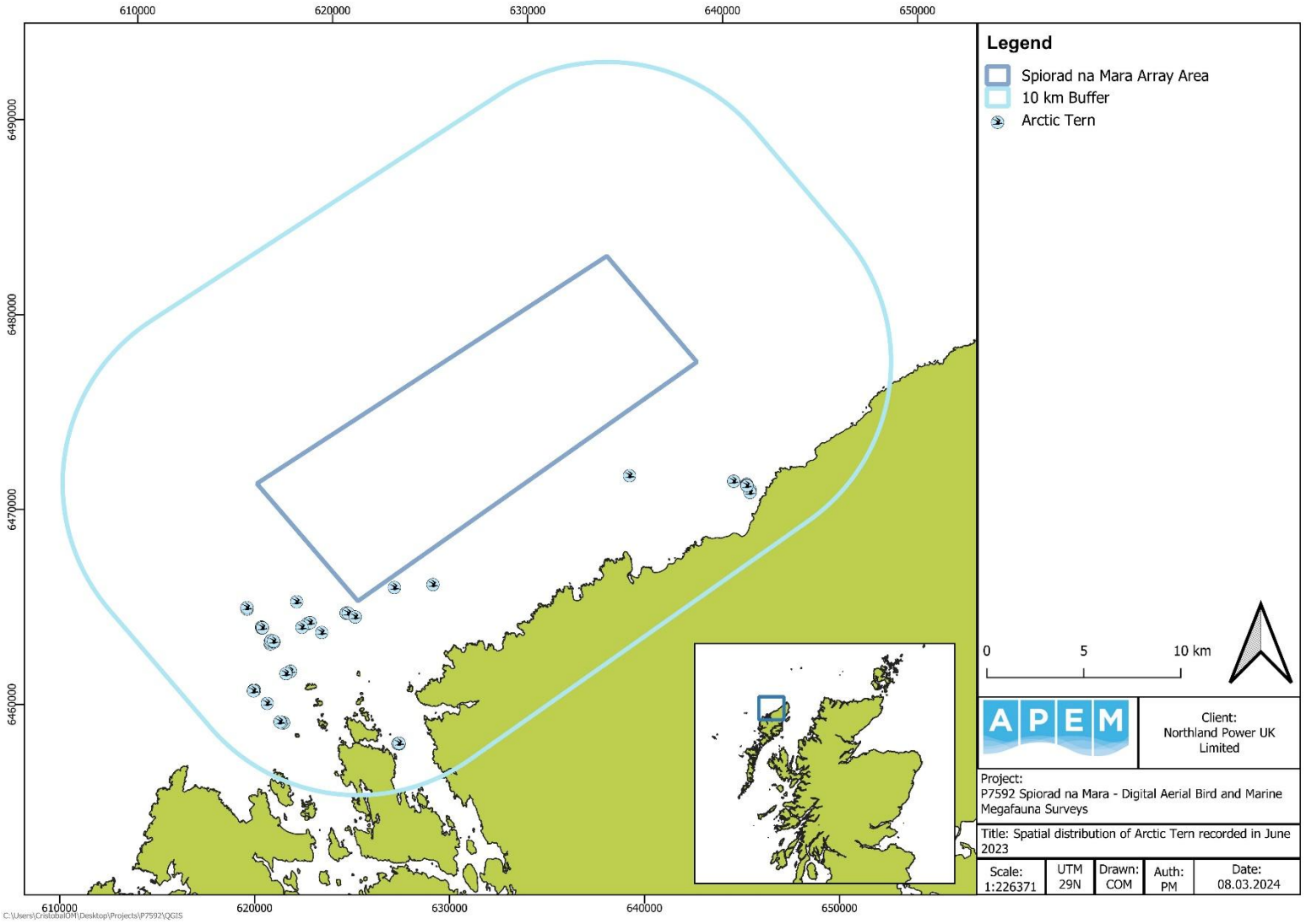


Figure 150 Distribution of Arctic tern in June 2023

*Note that individuals in close proximity may appear overlaying.

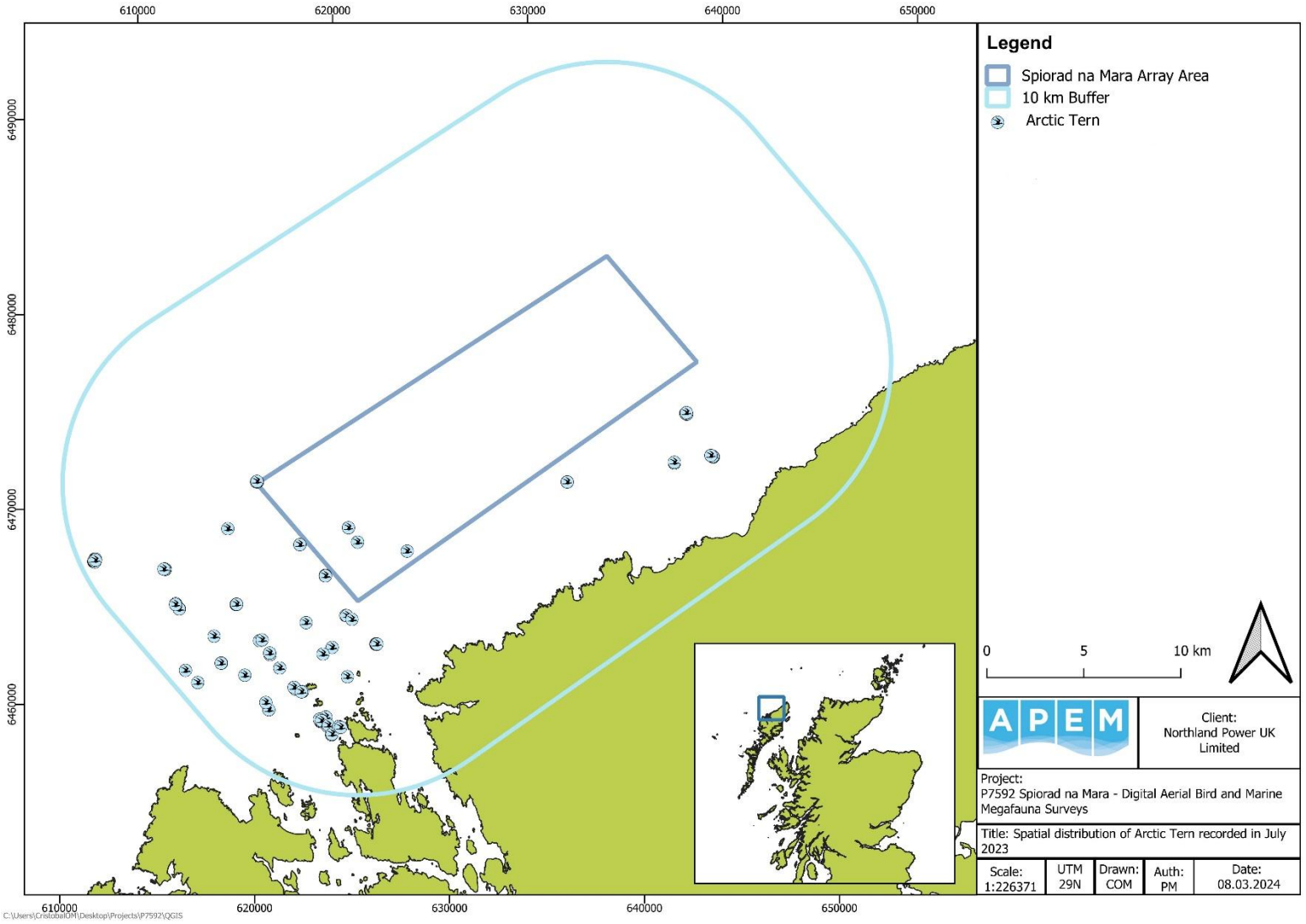


Figure 151 Distribution of Arctic tern in July 2023
*Note that individuals in close proximity may appear overlaying.

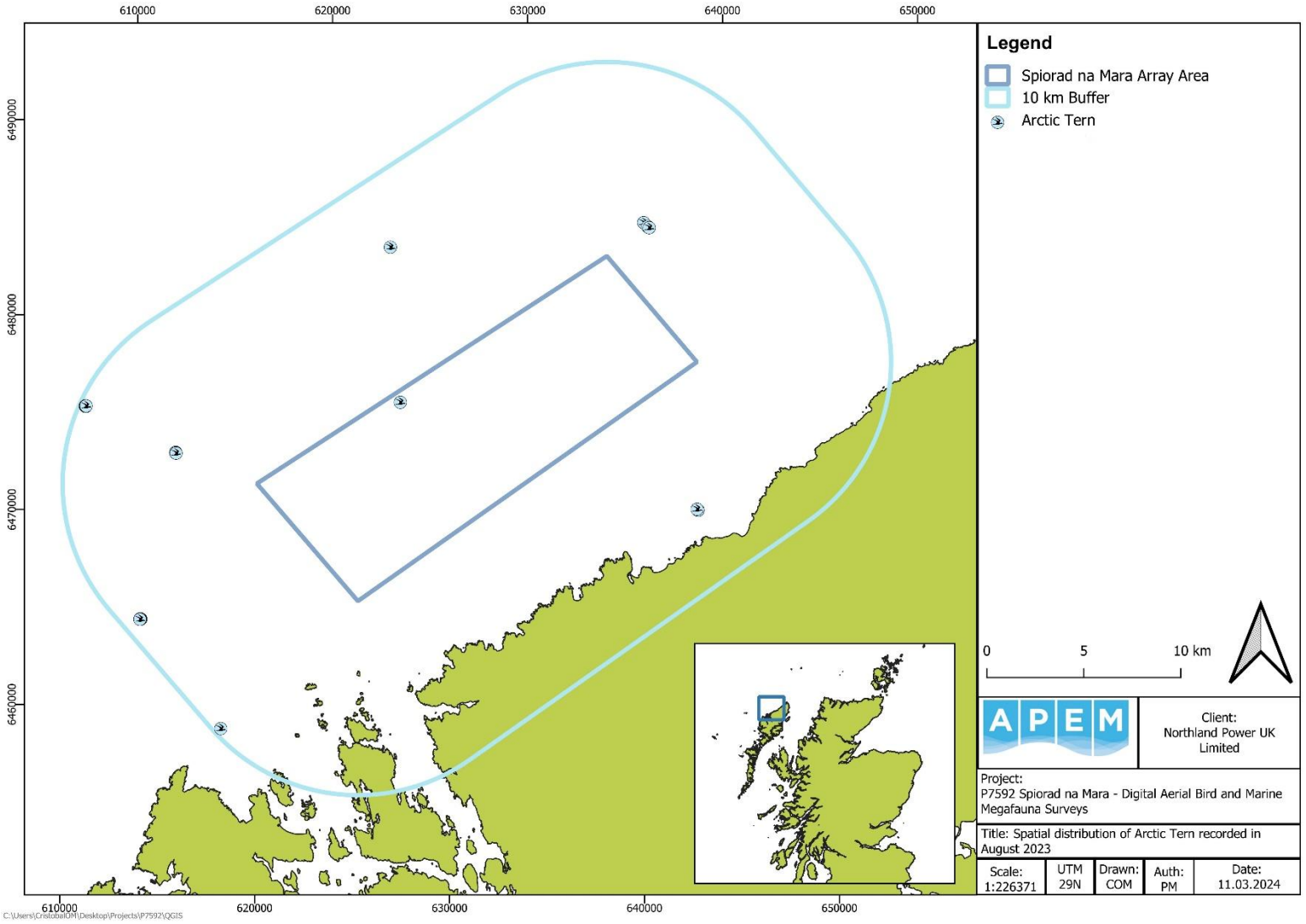


Figure 152 Distribution of Arctic tern in August 2023
*Note that individuals in close proximity may appear overlaying.

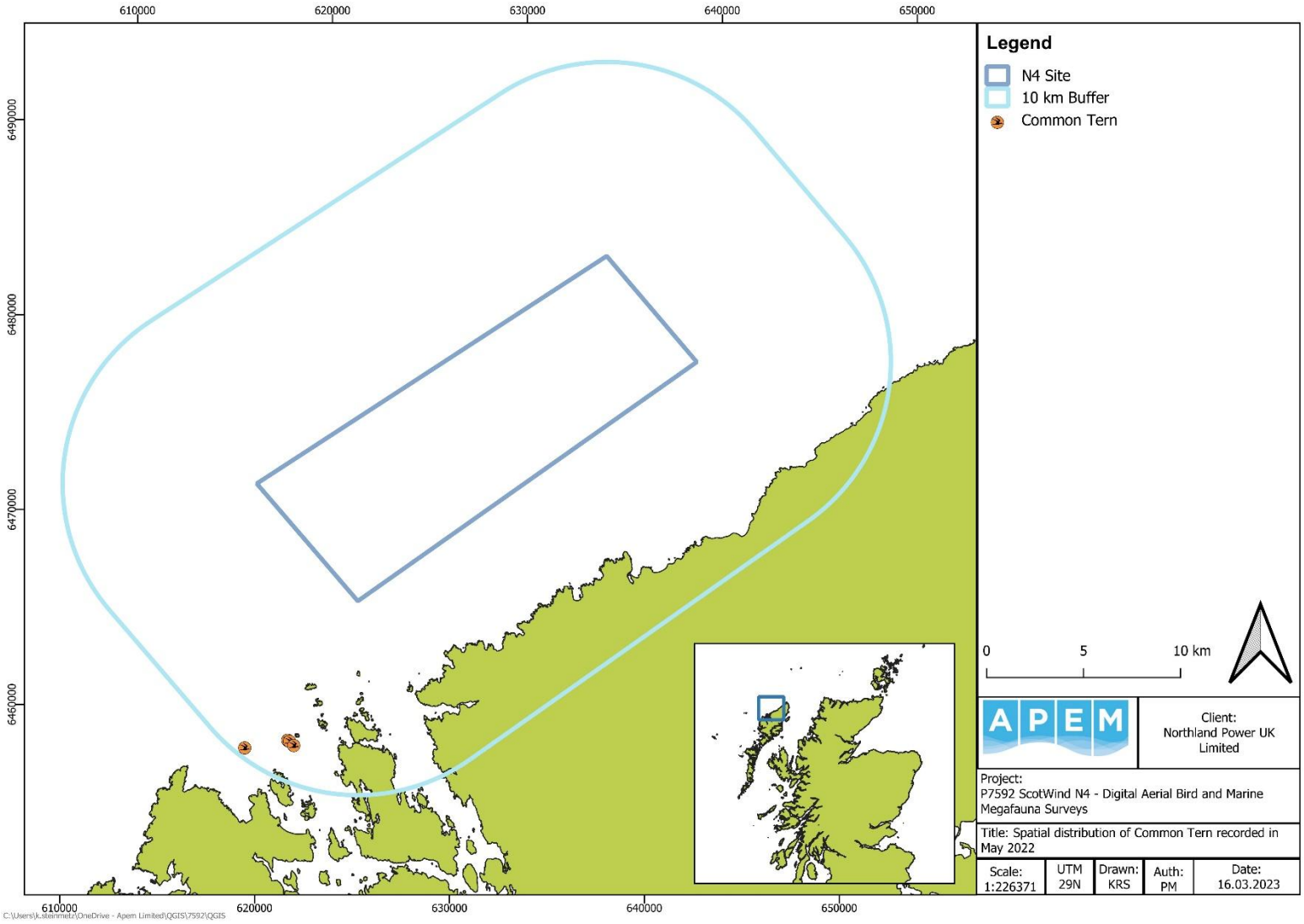


Figure 153 Distribution of common tern in May 2022

*Note that individuals in close proximity may appear overlaying.

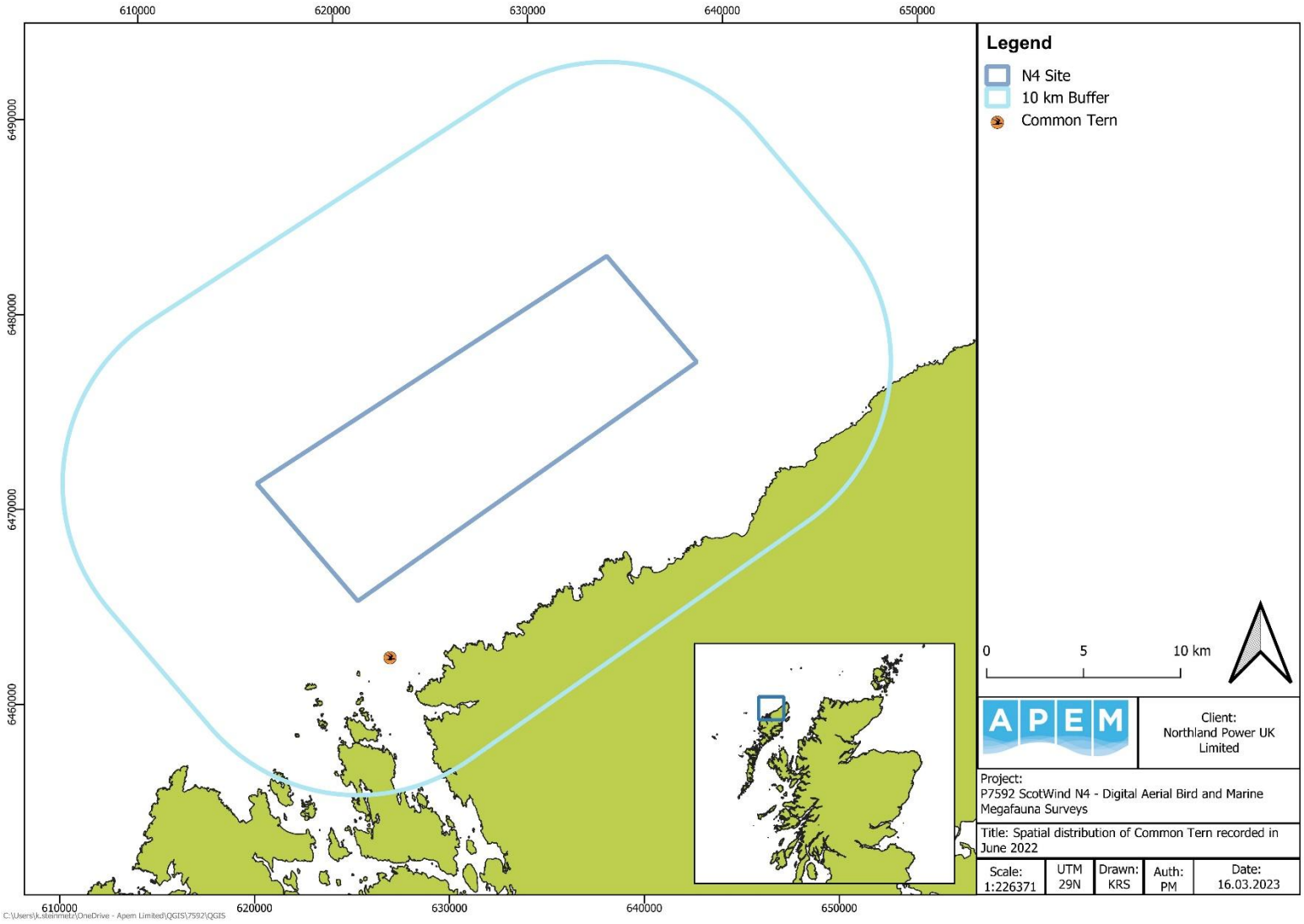


Figure 154 Distribution of common tern in June 2022

*Note that individuals in close proximity may appear overlaying.

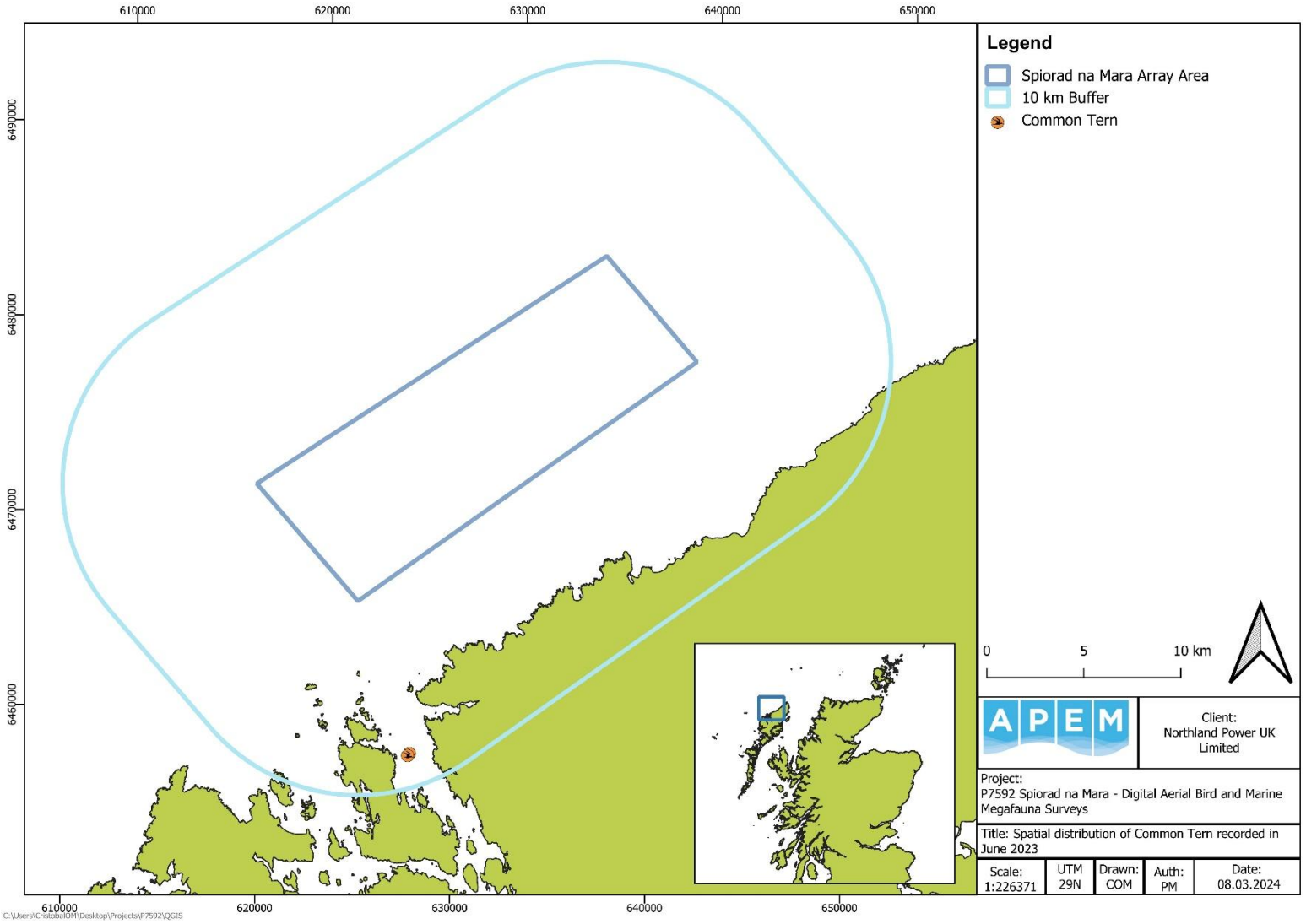


Figure 155 Distribution of common tern in June 2023

*Note that individuals in close proximity may appear overlaying.

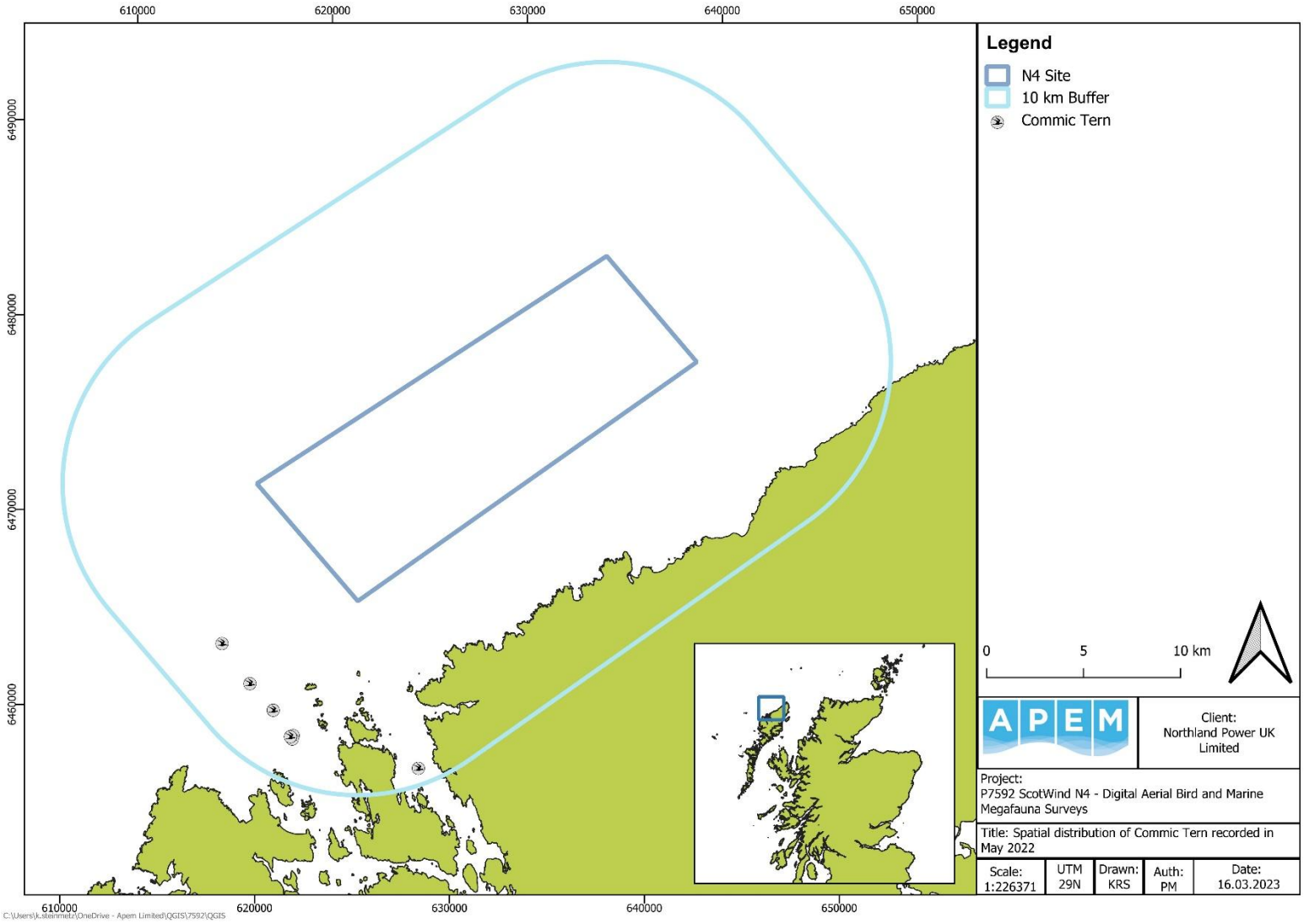


Figure 156 Distribution of 'commic' tern in May 2022

*Note that individuals in close proximity may appear overlaying.

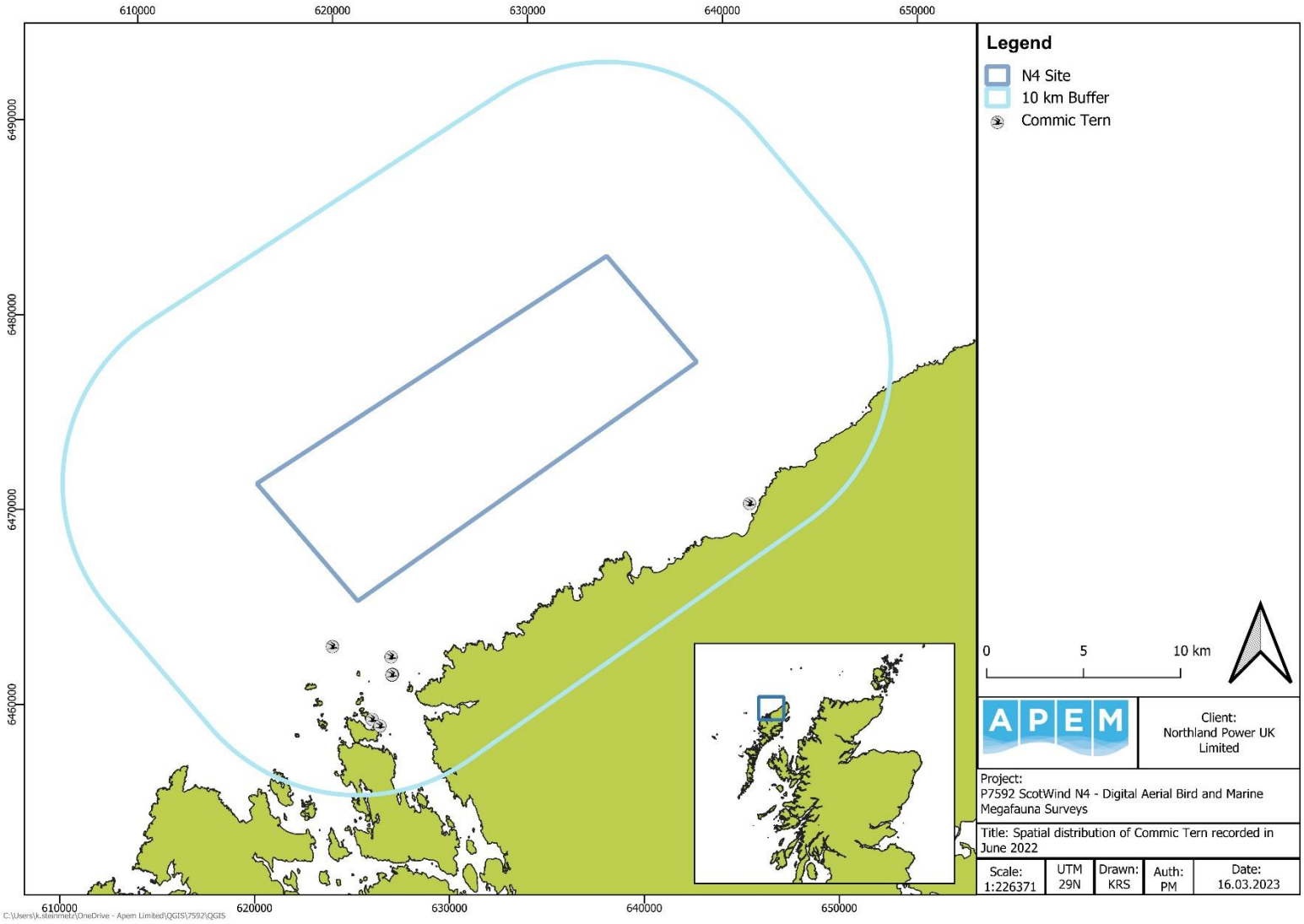


Figure 157 Distribution of 'commic' tern in June 2022

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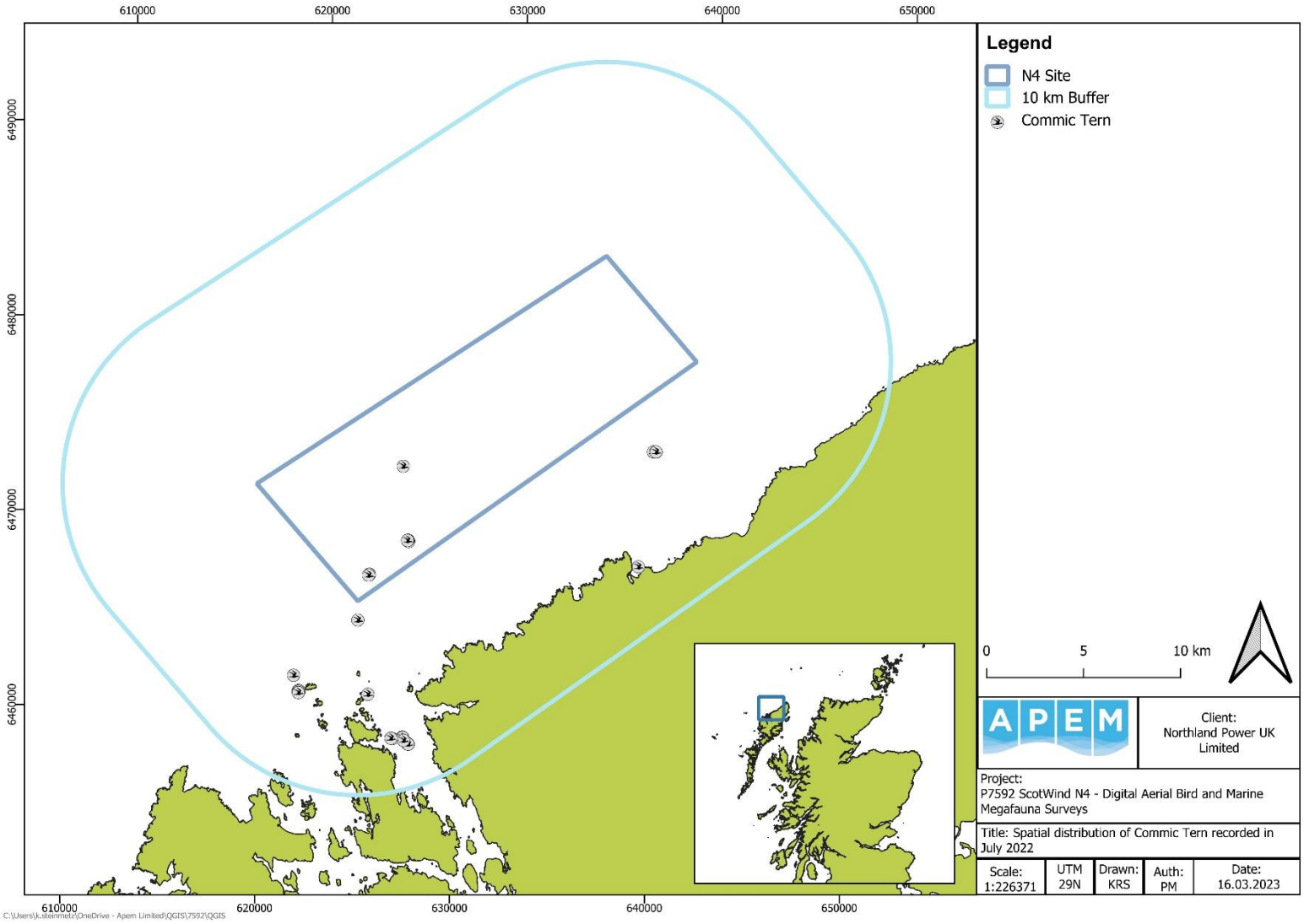


Figure 158 Distribution of 'commic' tern in July 2022

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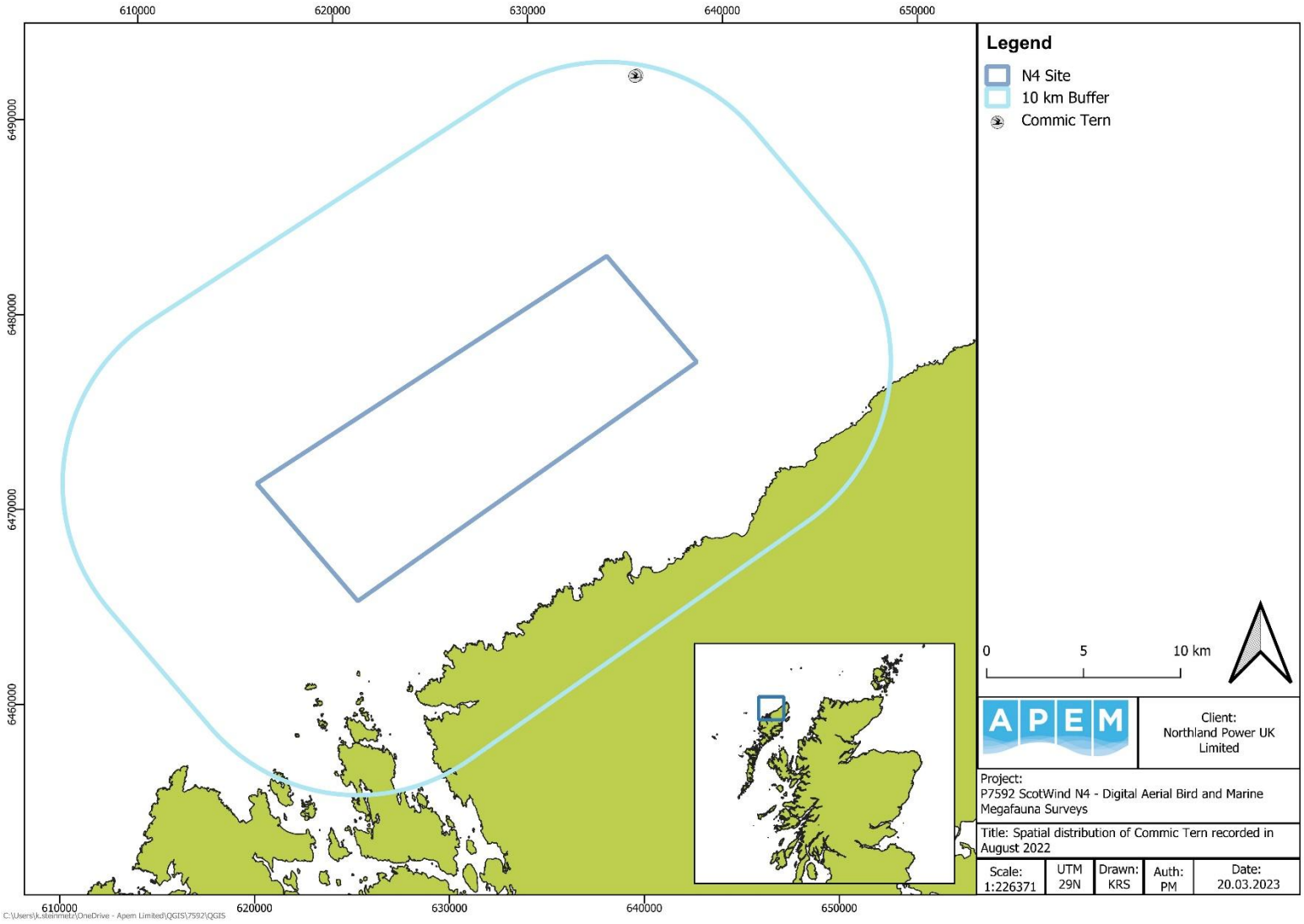


Figure 159 Distribution of 'commic' tern in August 2022

*Note that individuals in close proximity may appear overlaying.

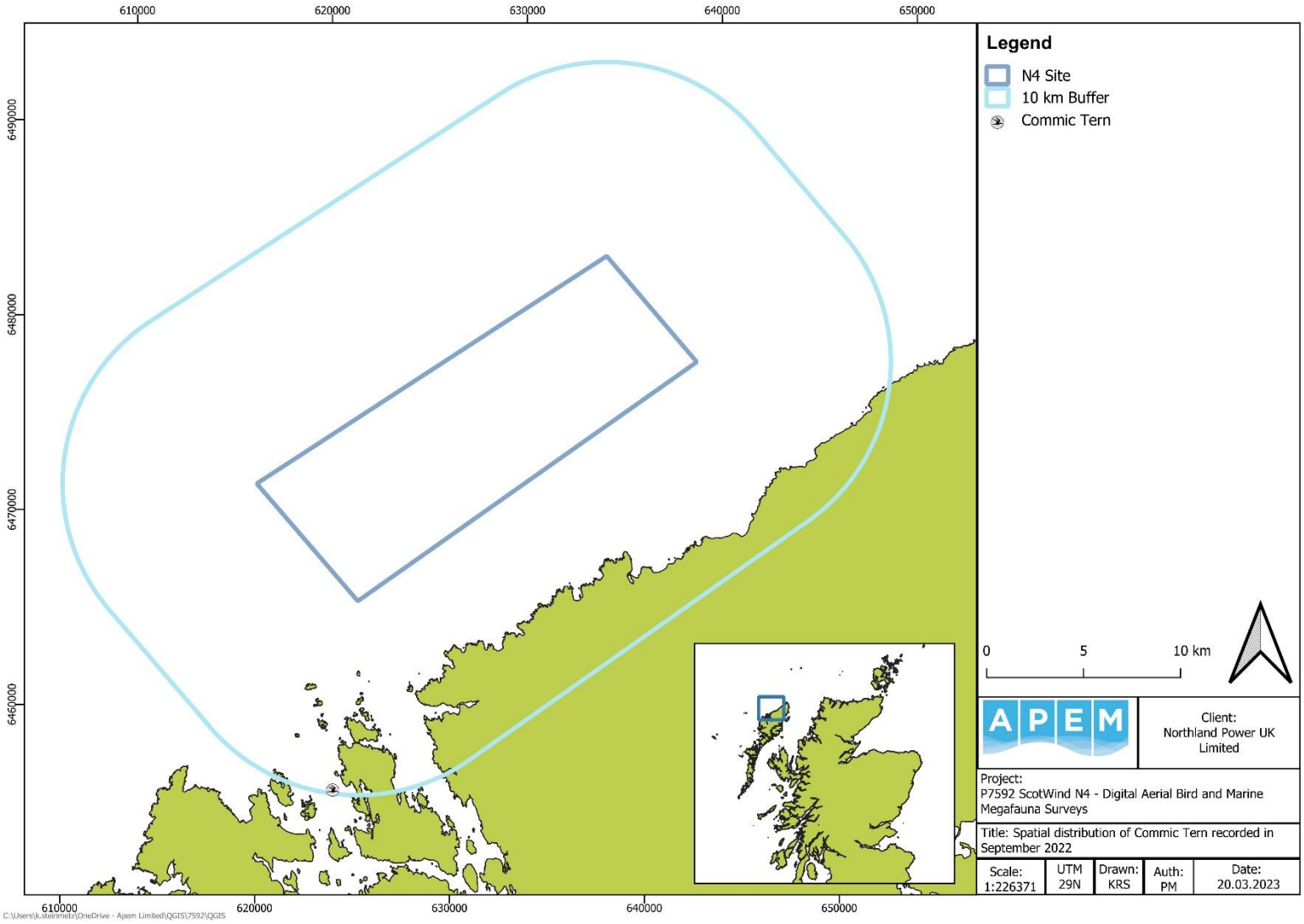


Figure 160 Distribution of 'commic' tern in September 2022
*Note that individuals in close proximity may appear overlaying.

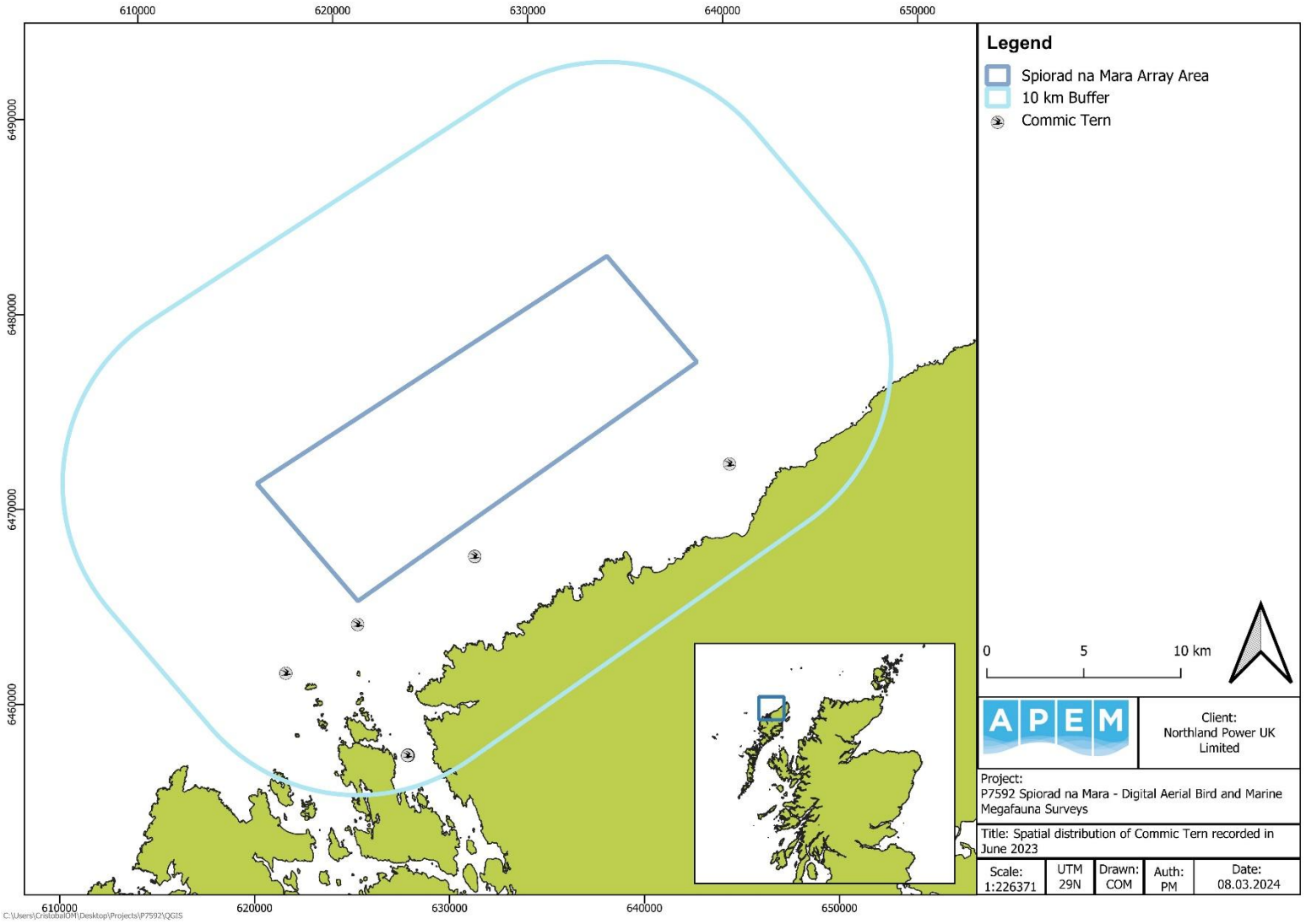


Figure 161 Distribution of 'commic' tern in June 2023

*Note that individuals in close proximity may appear overlaying.

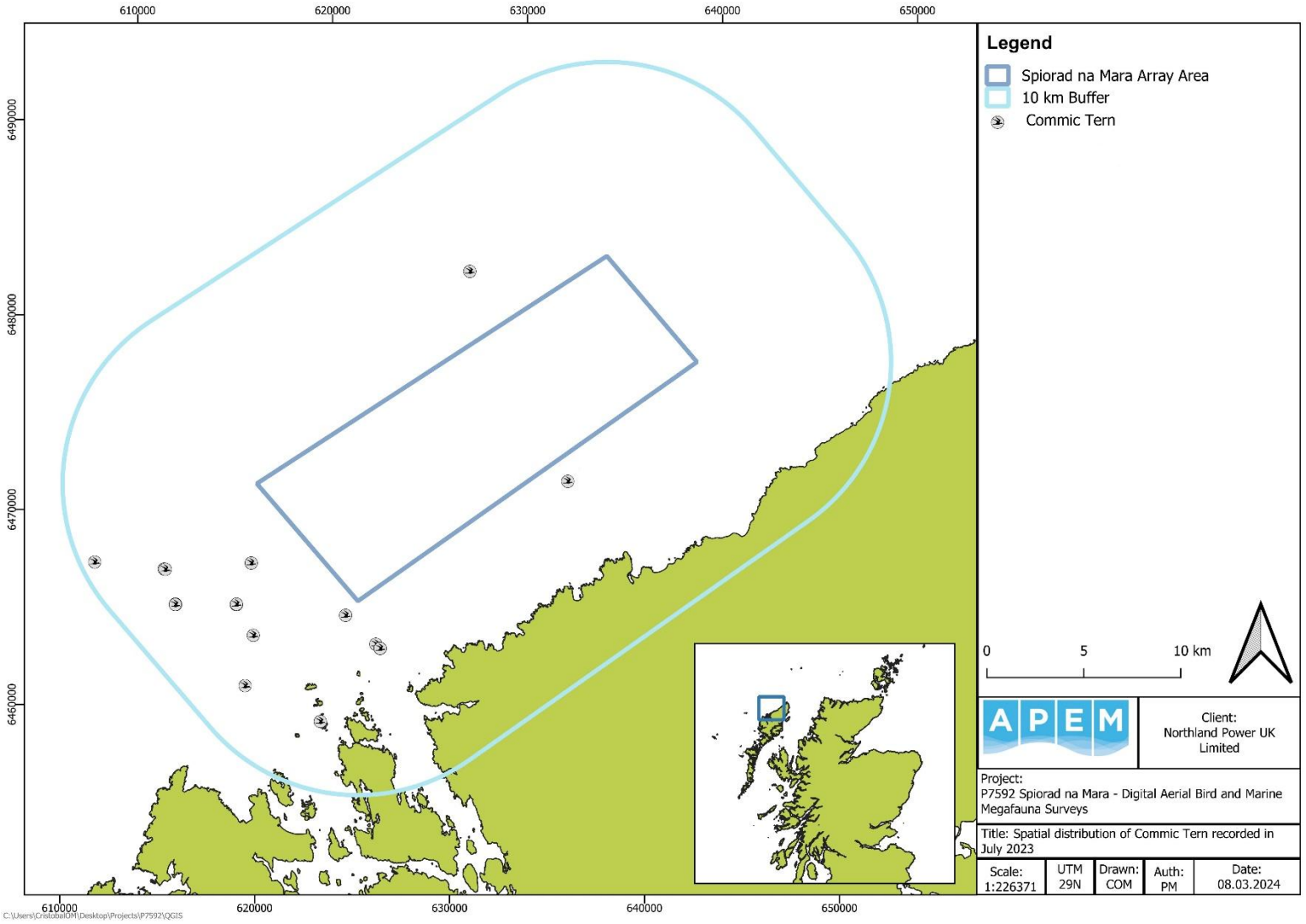


Figure 162 Distribution of 'commic' tern in July 2023
*Note that individuals in close proximity may appear overlaying.

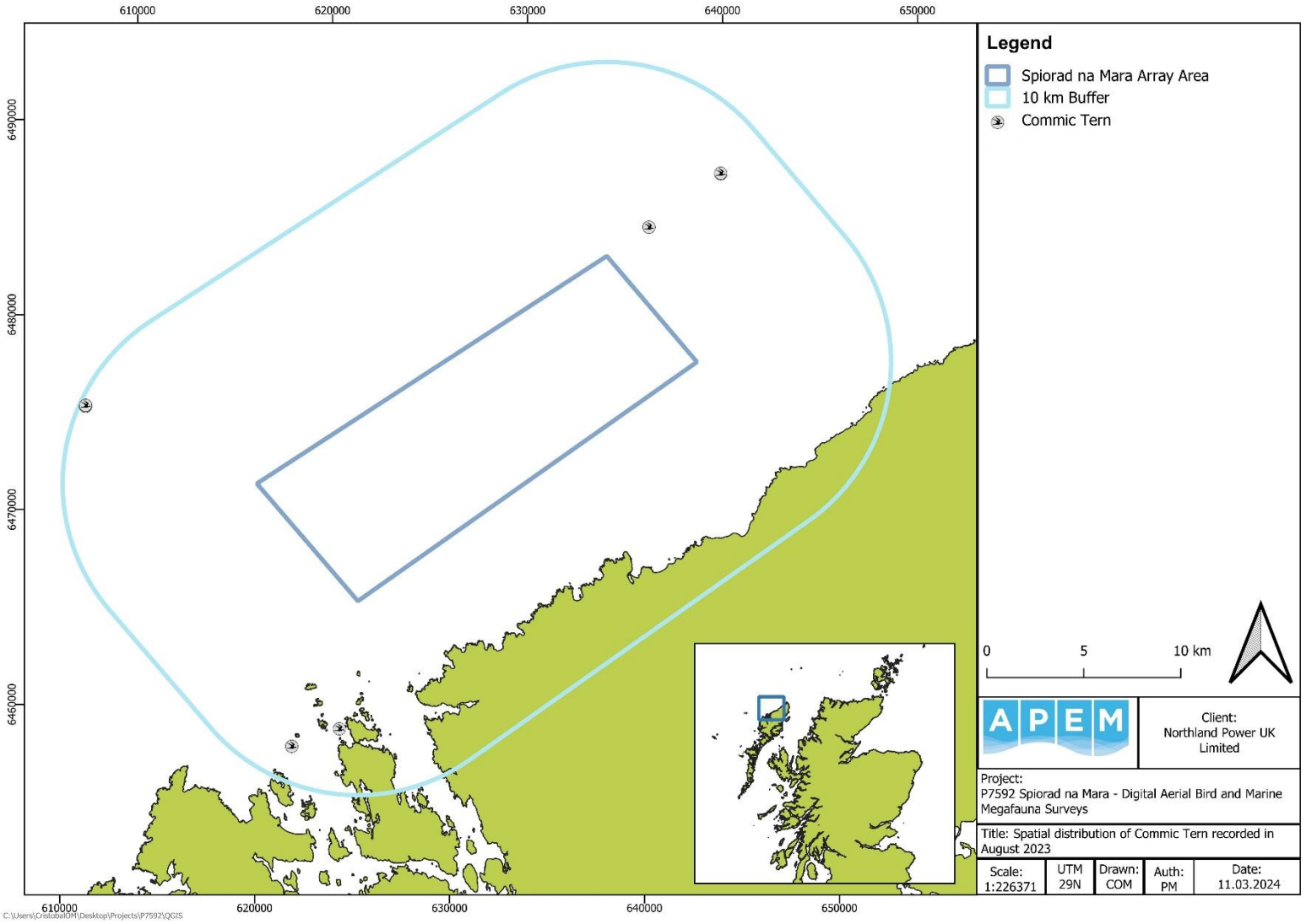


Figure 163 Distribution of 'commic' tern in August 2023

*Note that individuals in close proximity may appear overlaying.

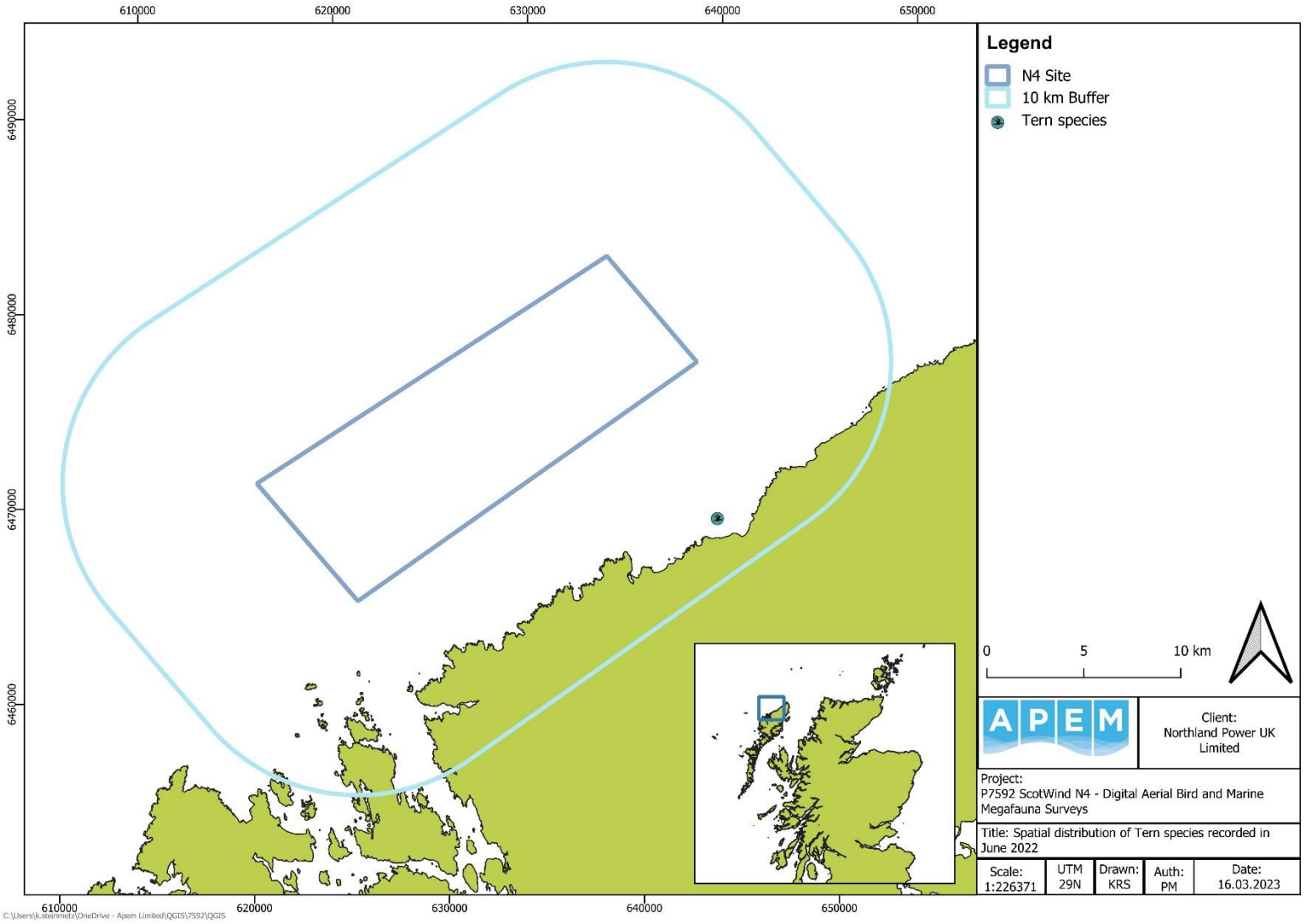


Figure 164 Distribution of tern species in June 2022

*Note that individuals in close proximity may appear overlaying.

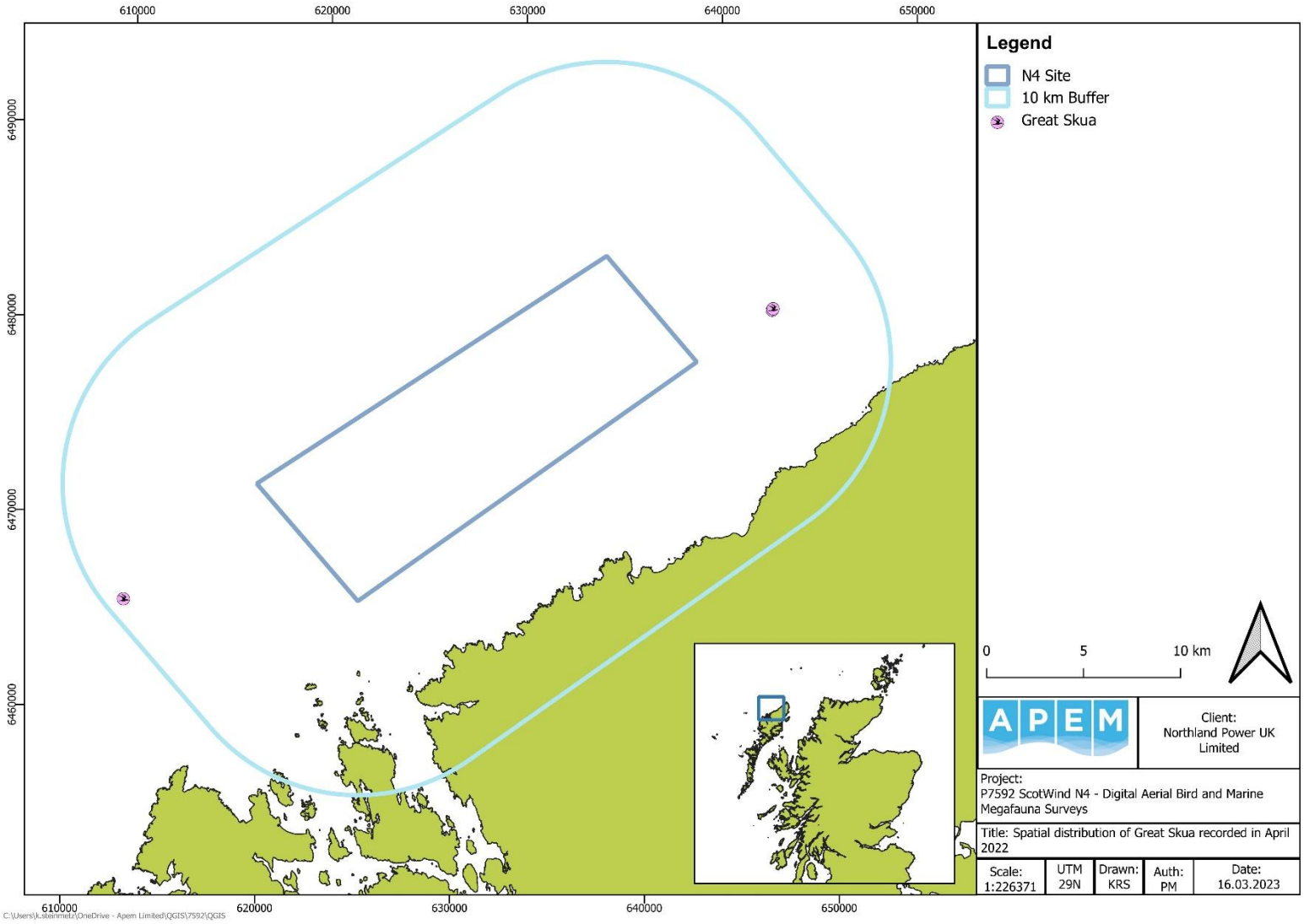


Figure 165 Distribution of great skua in April 2022
*Note that individuals in close proximity may appear overlaying.

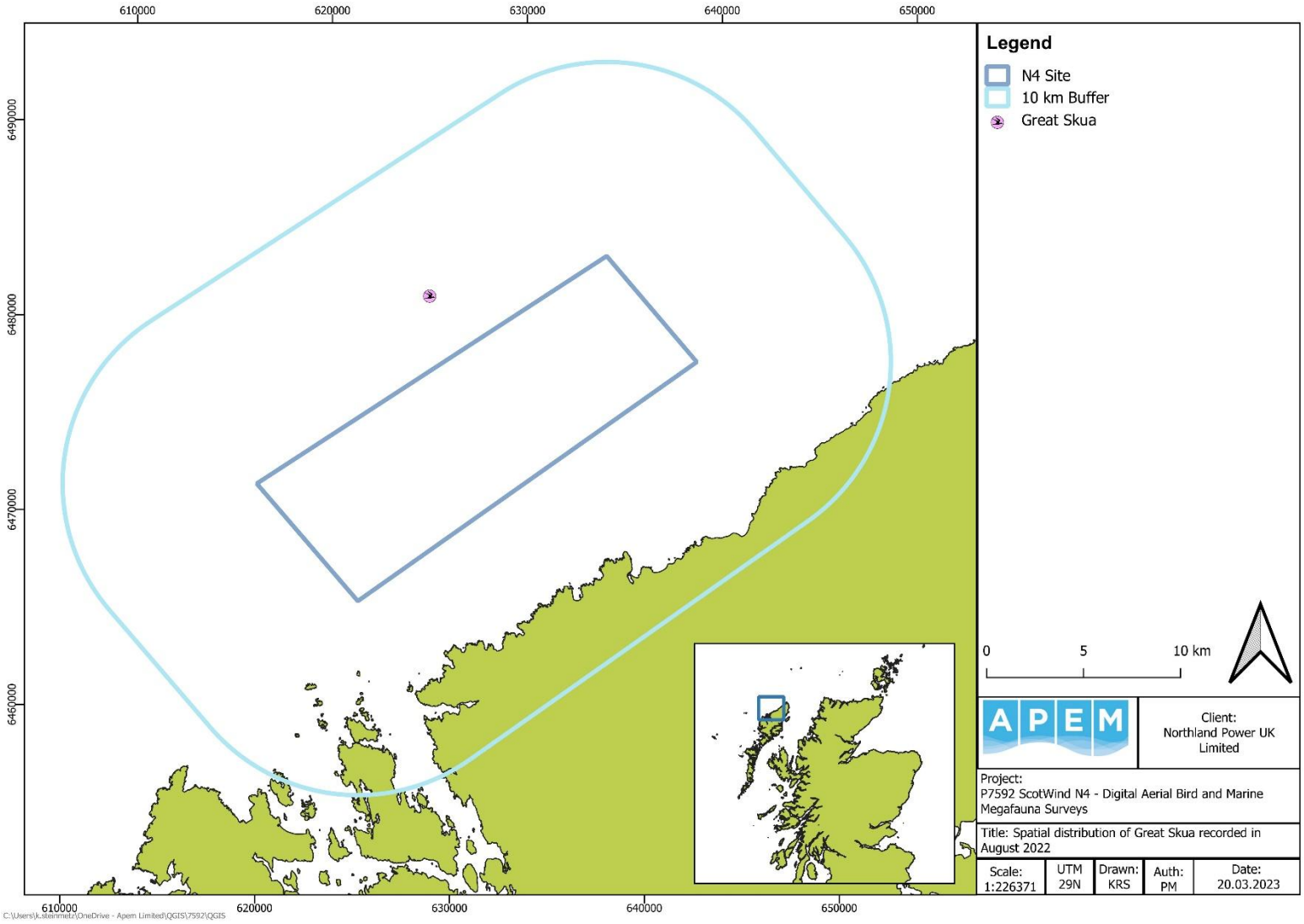


Figure 166 Distribution of great skua in August 2022
*Note that individuals in close proximity may appear overlaying.

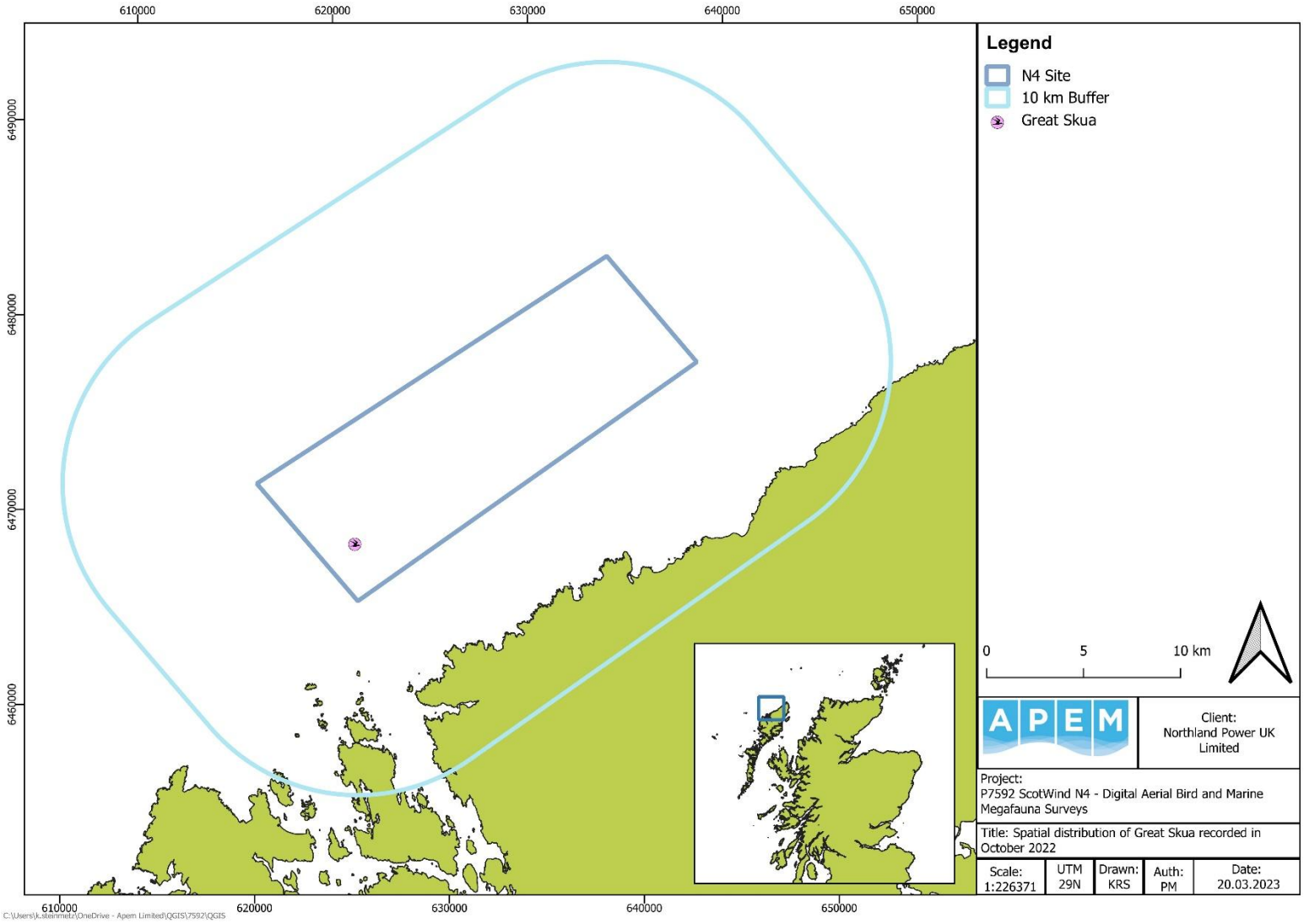


Figure 167 Distribution of great skua in October 2022
*Note that individuals in close proximity may appear overlaying.

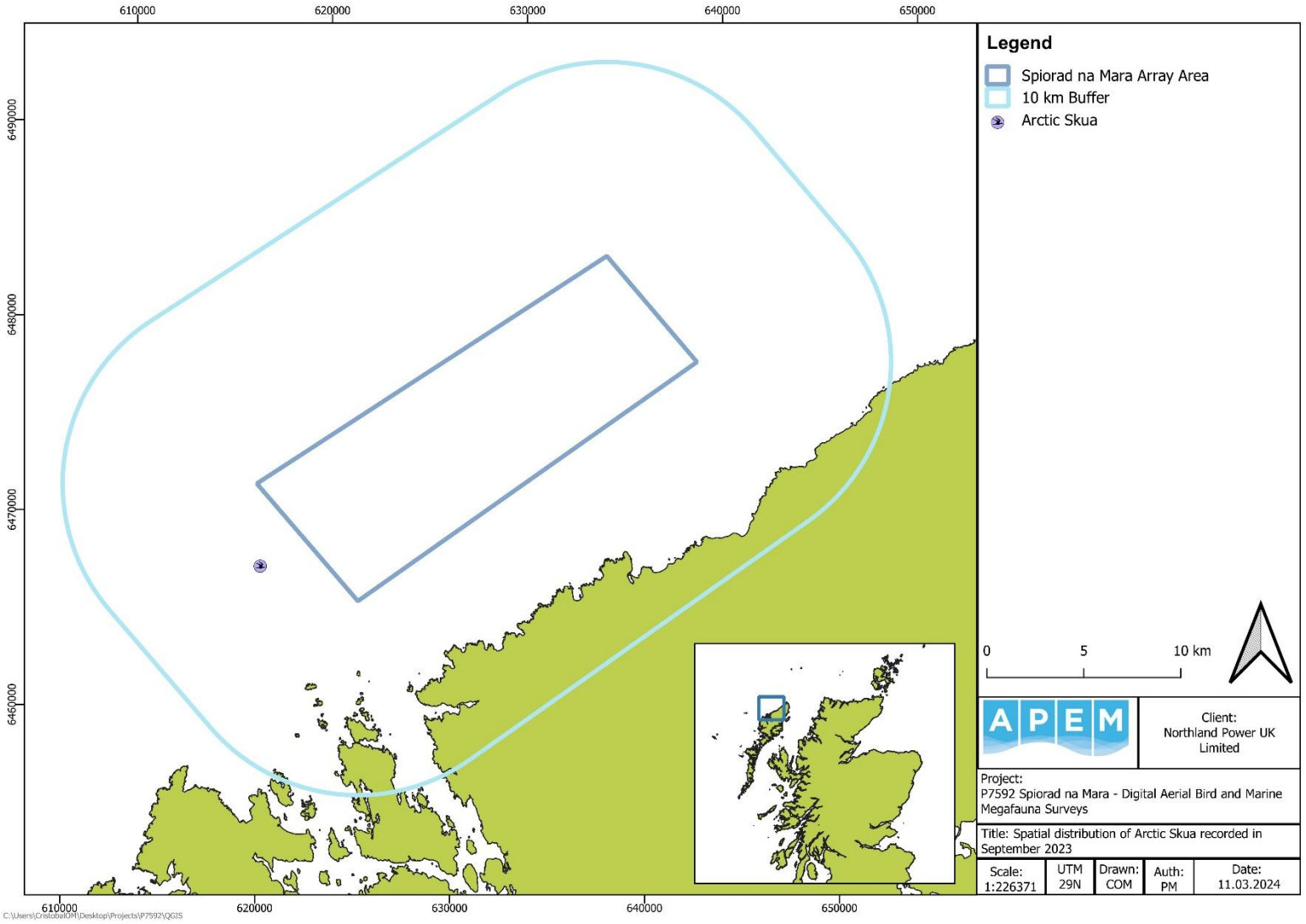


Figure 168 Distribution of Arctic skua in September 2023

*Note that individuals in close proximity may appear overlaying.

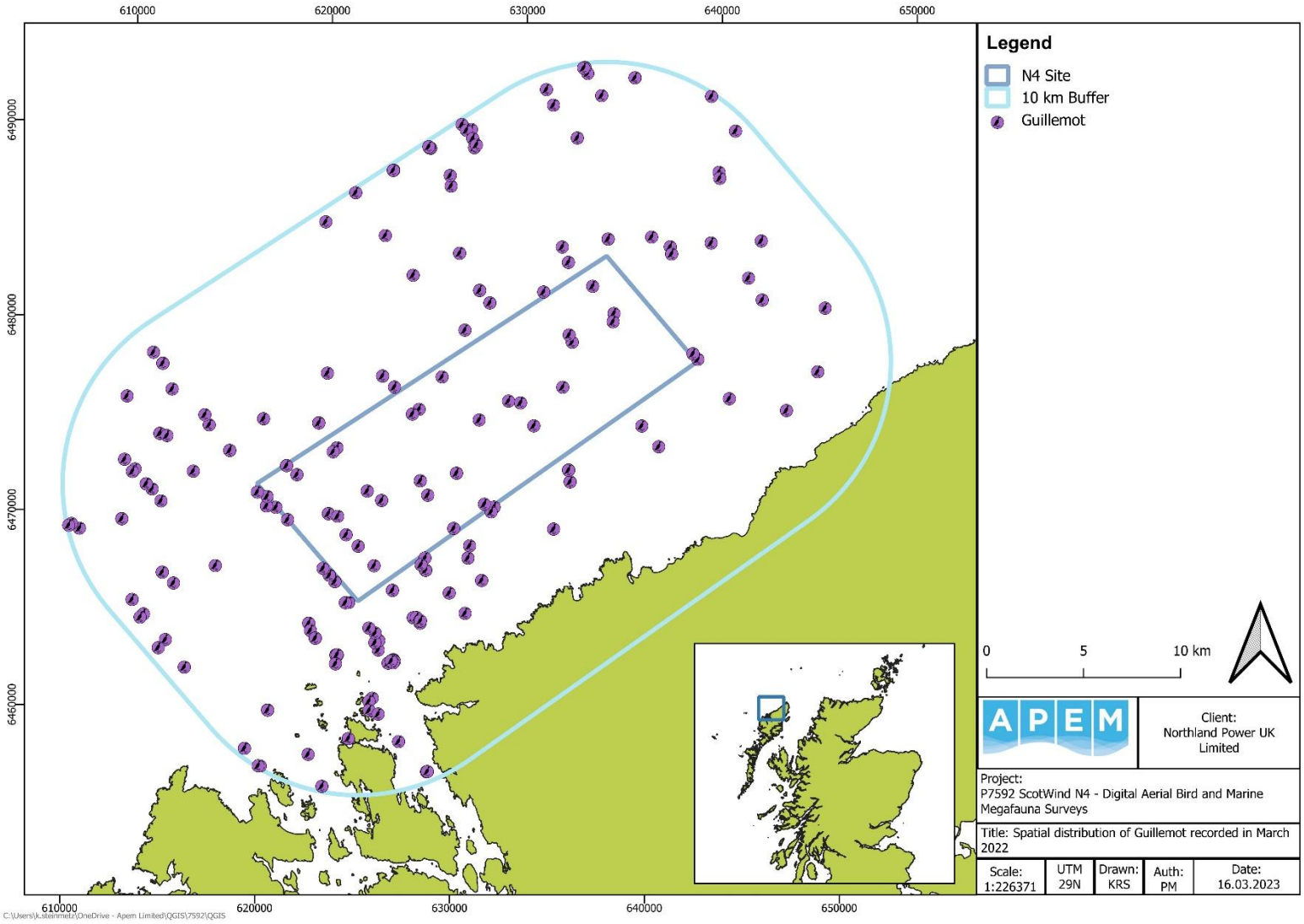


Figure 169 Distribution of guillemot in March 2022
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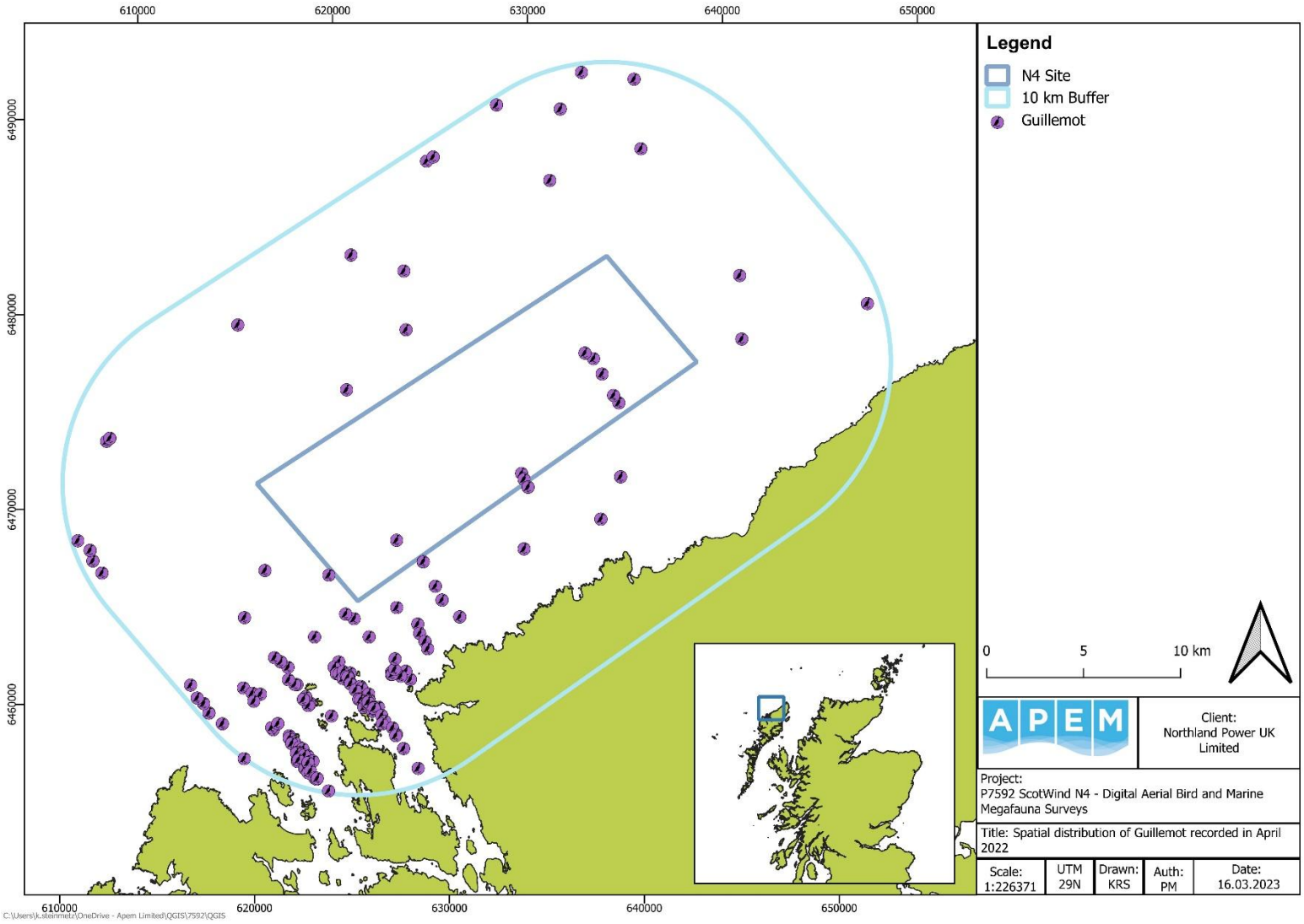


Figure 170 Distribution of guillemot in April 2022
*Note that individuals in close proximity may appear overlaying.

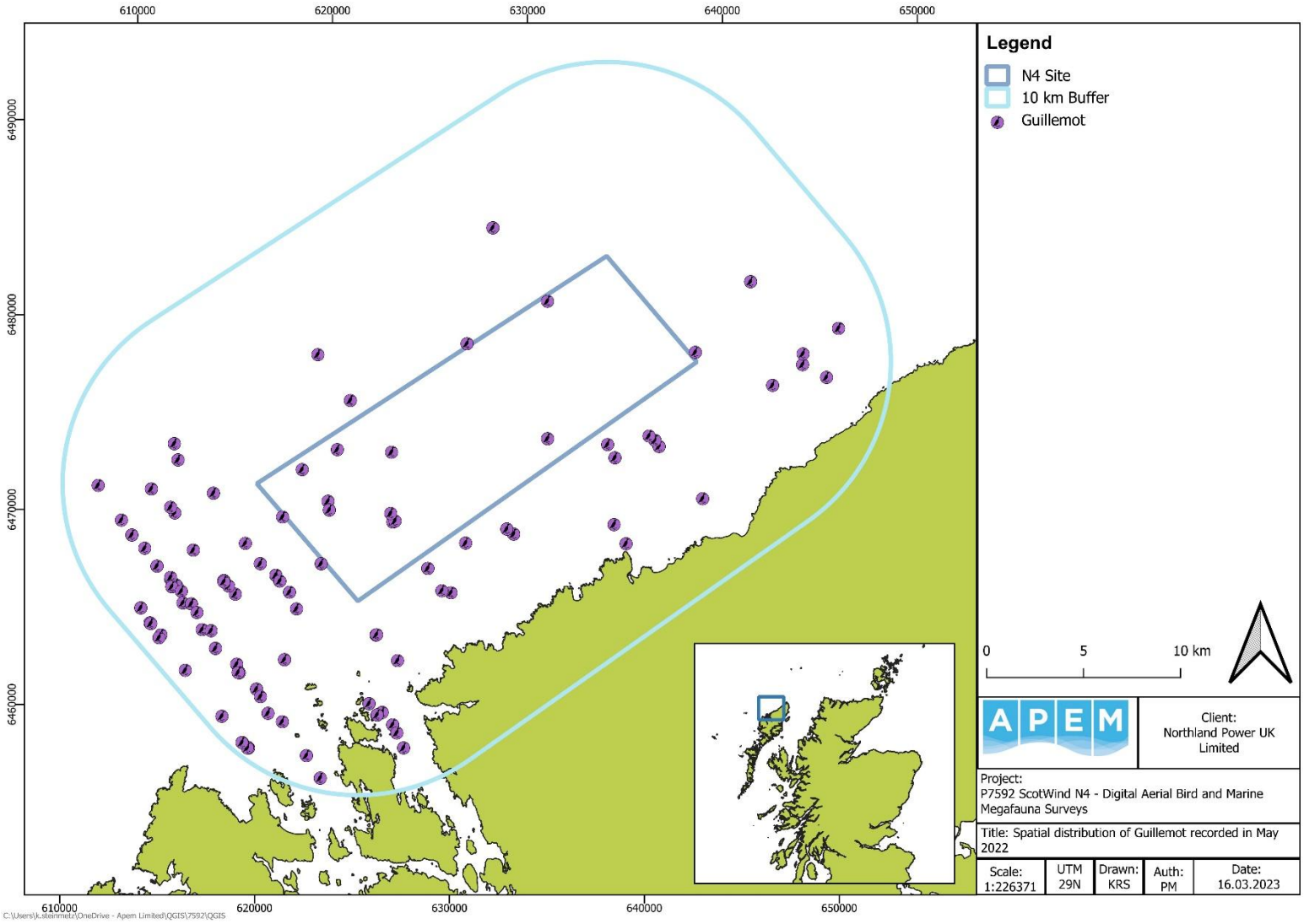


Figure 171 Distribution of guillemot in May 2022
*Note that individuals in close proximity may appear overlaying.

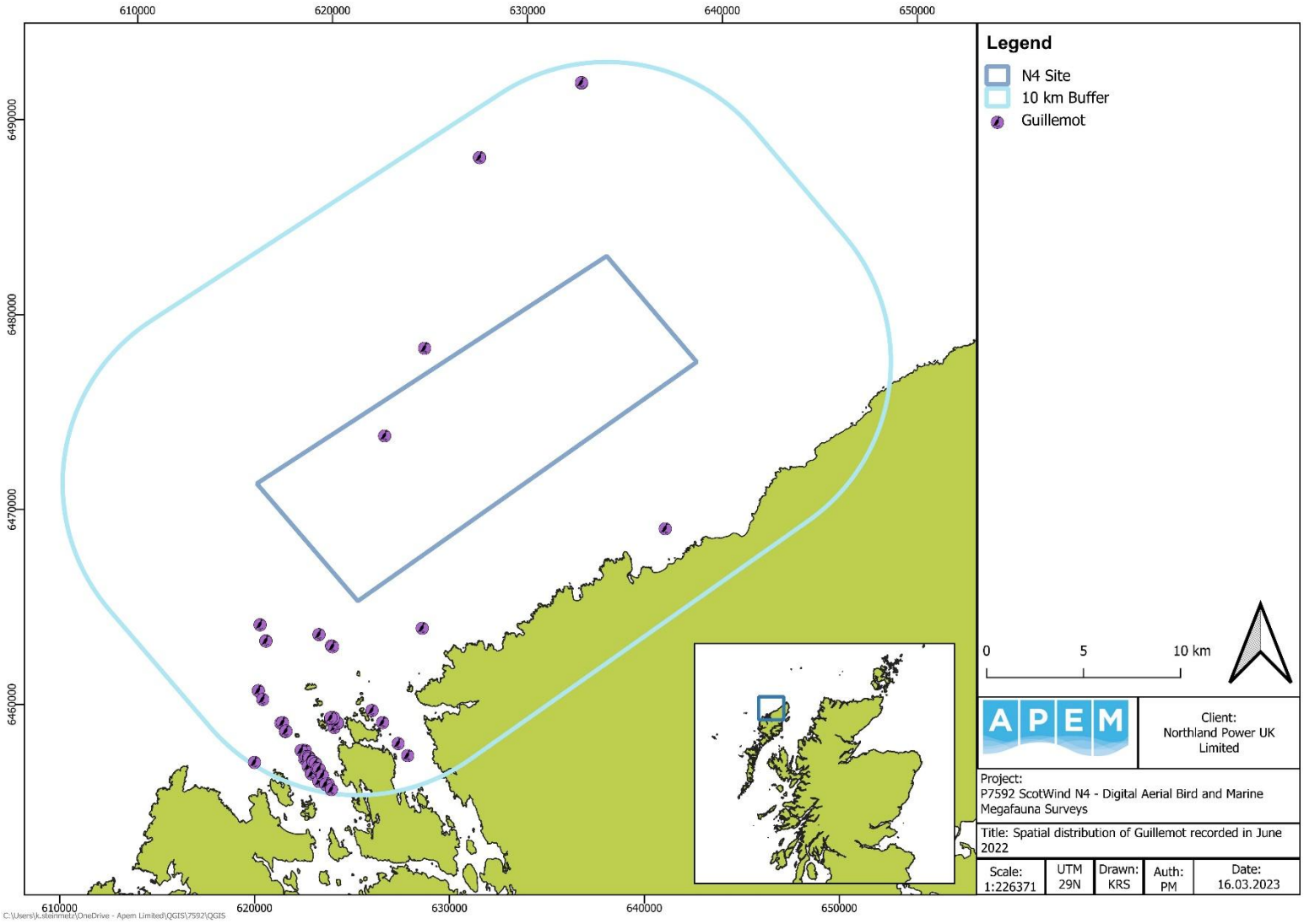


Figure 172 Distribution of guillemot in June 2022
*Note that individuals in close proximity may appear overlaying.

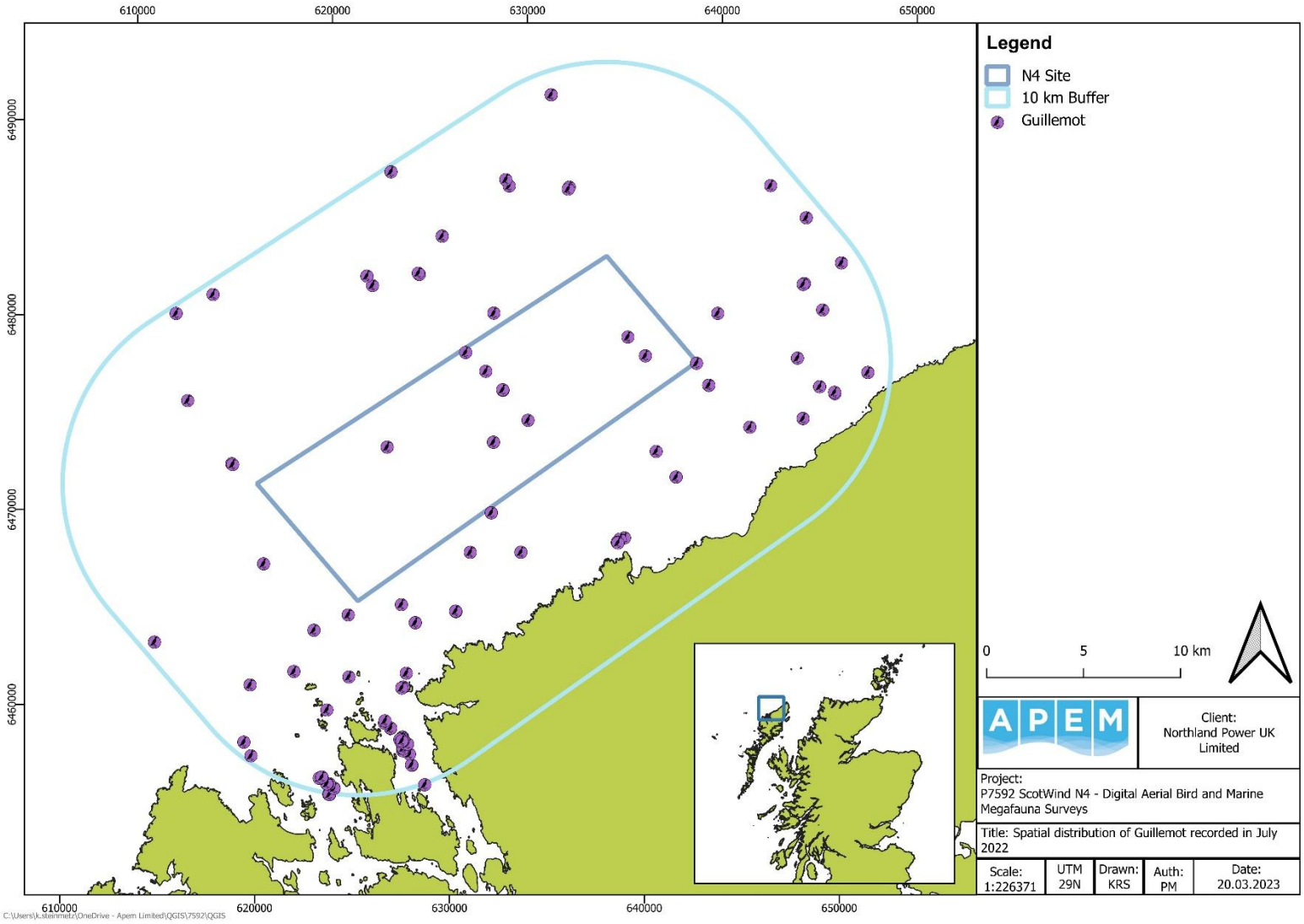


Figure 173 Distribution of guillemot in July 2022
*Note that individuals in close proximity may appear overlaying.

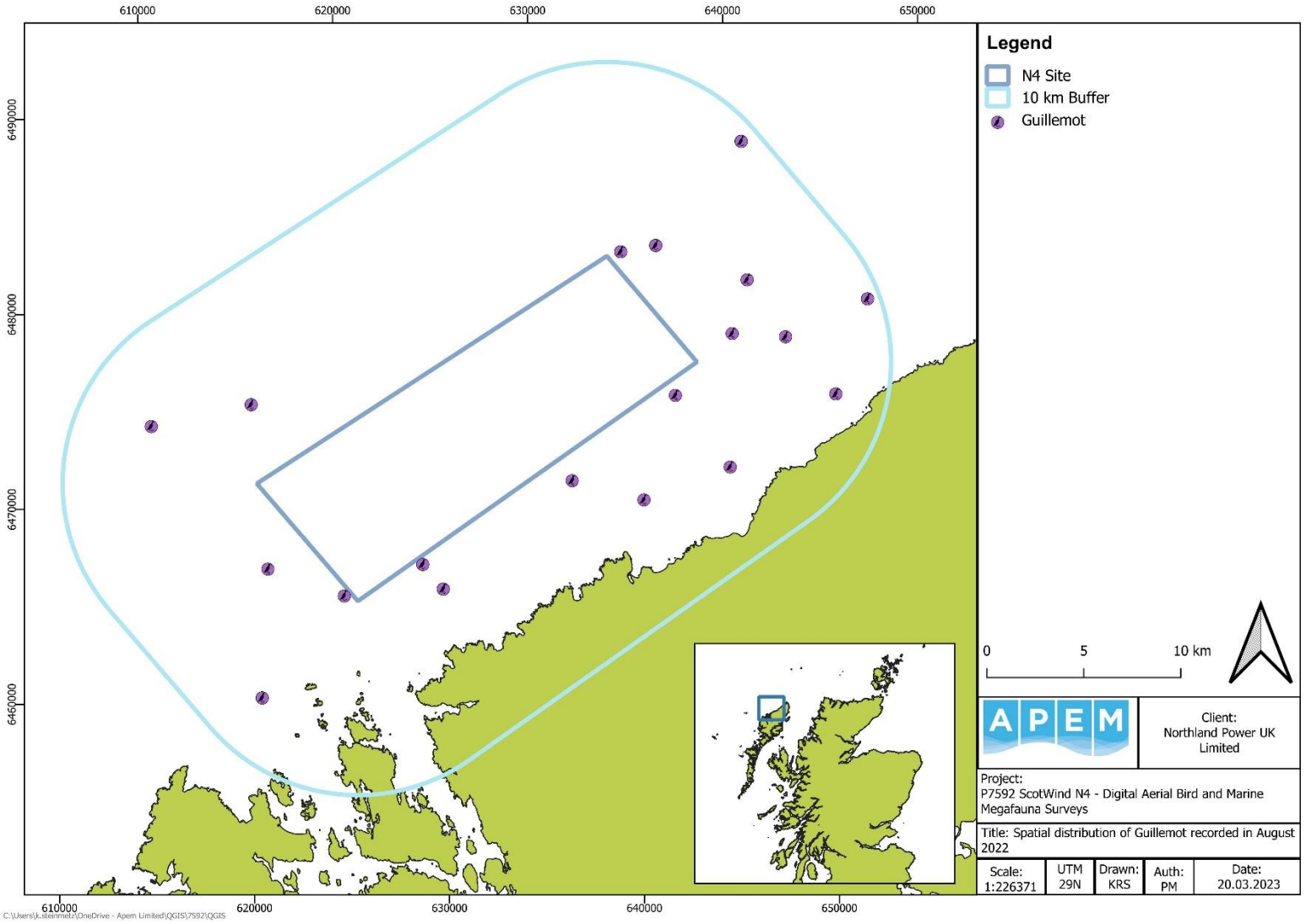


Figure 174 Distribution of guillemot in August 2022

*Note that individuals in close proximity may appear overlaying.

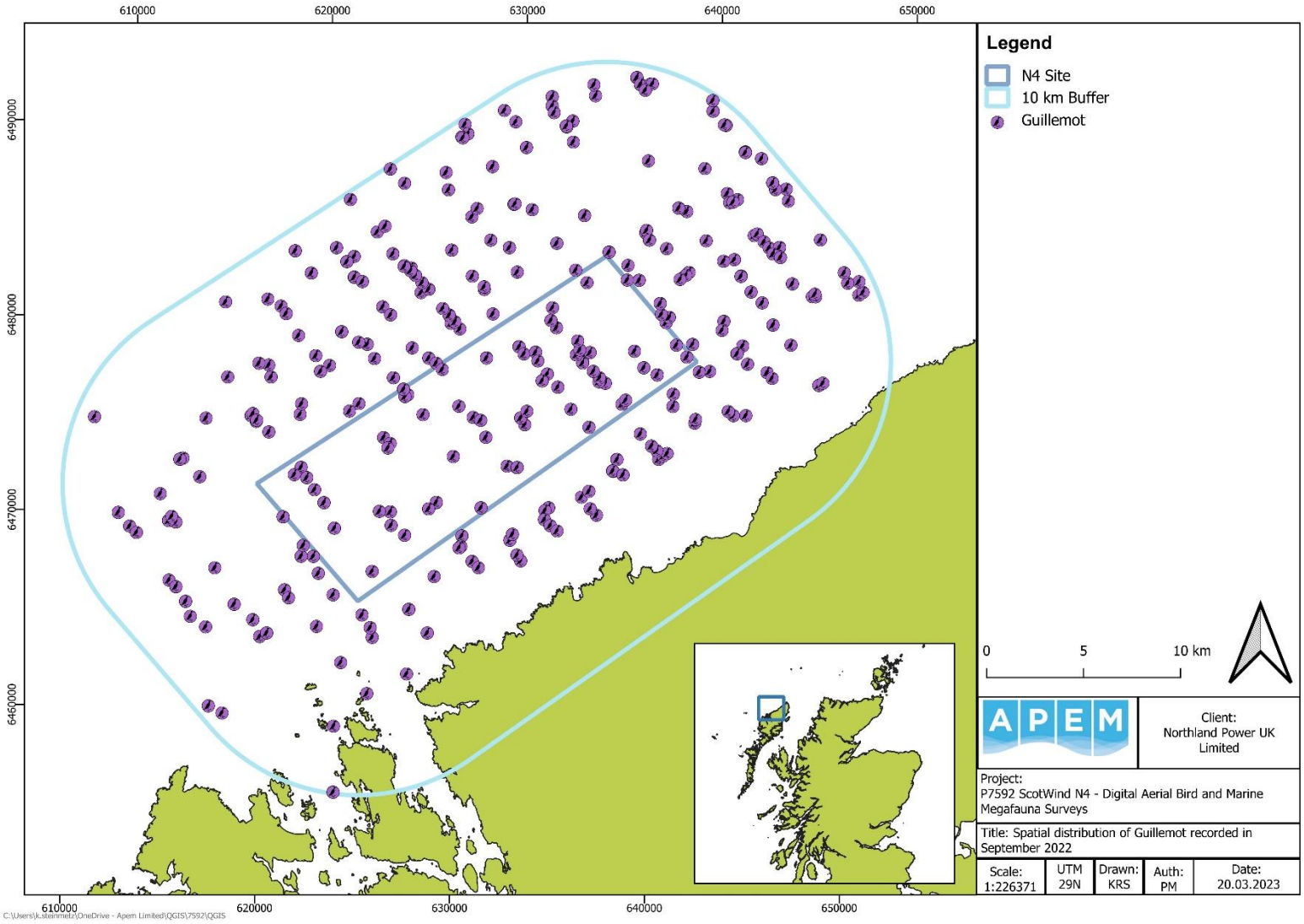


Figure 175 Distribution of guillemot in September 2022

*Note that individuals in close proximity may appear overlaying.

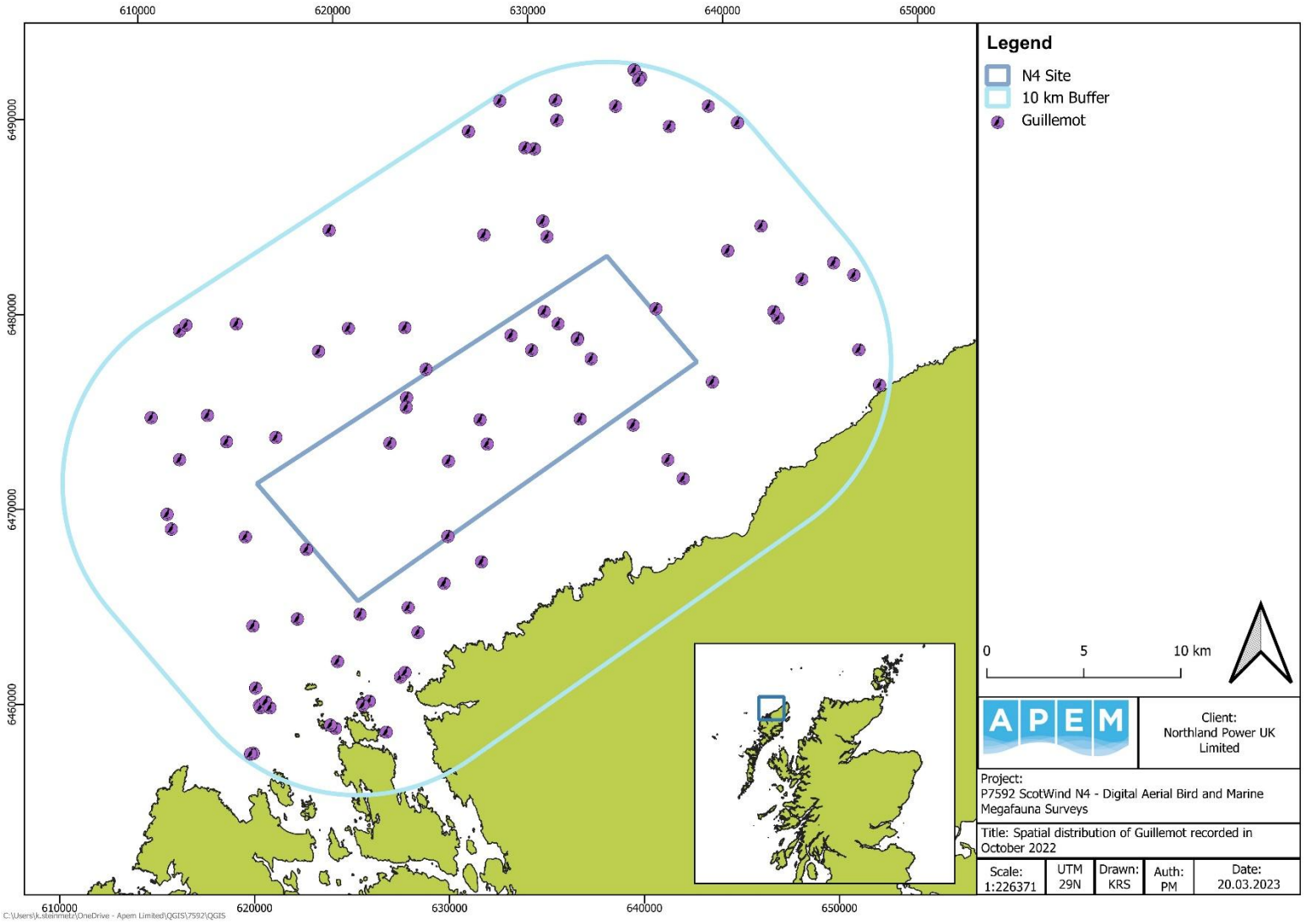


Figure 176 Distribution of guillemot in October 2022

*Note that individuals in close proximity may appear overlaying.

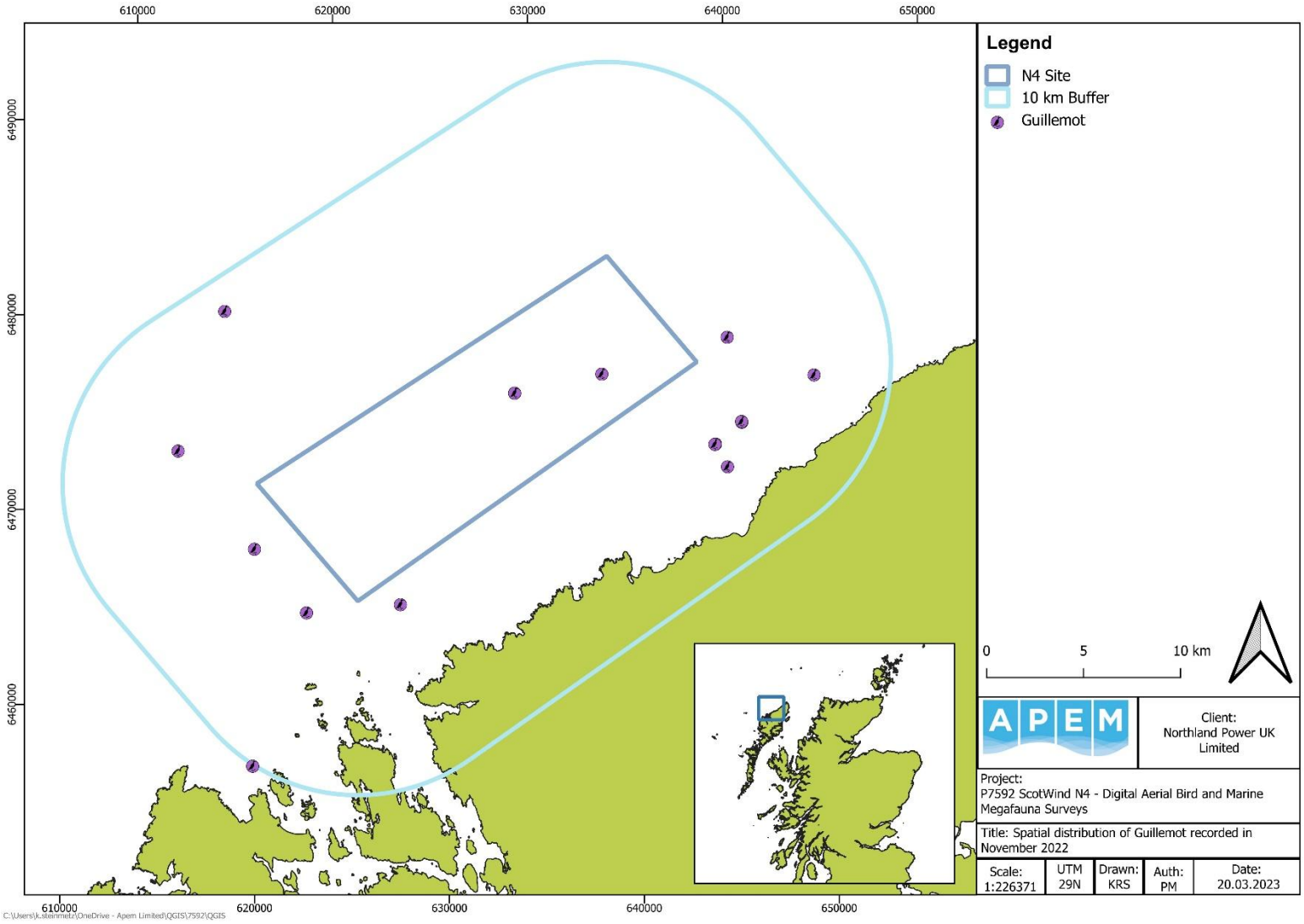


Figure 177 Distribution of guillemot in November 2022

*Note that individuals in close proximity may appear overlaying.

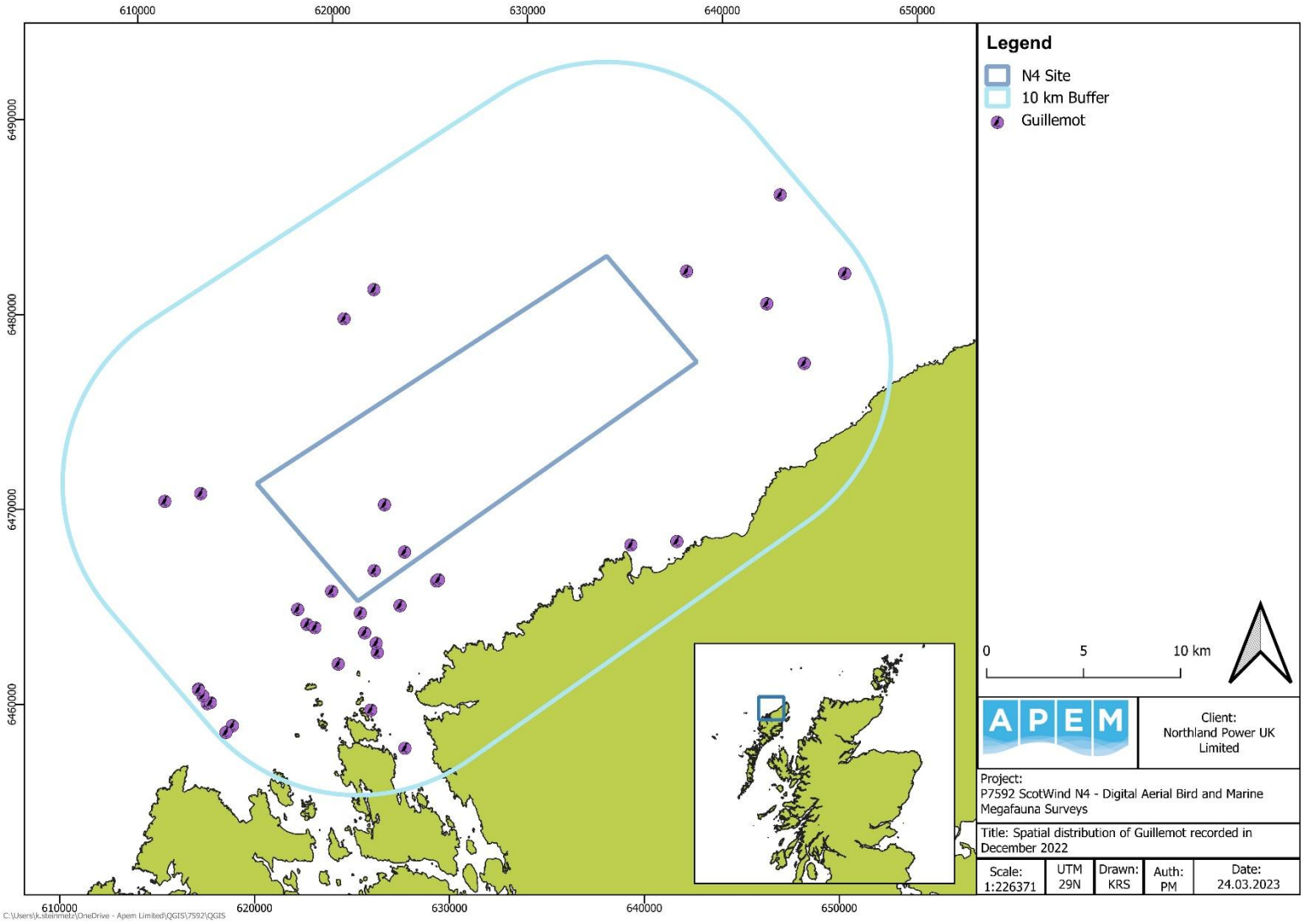


Figure 178 Distribution of guillemot in December 2022

*Note that individuals in close proximity may appear overlaying.

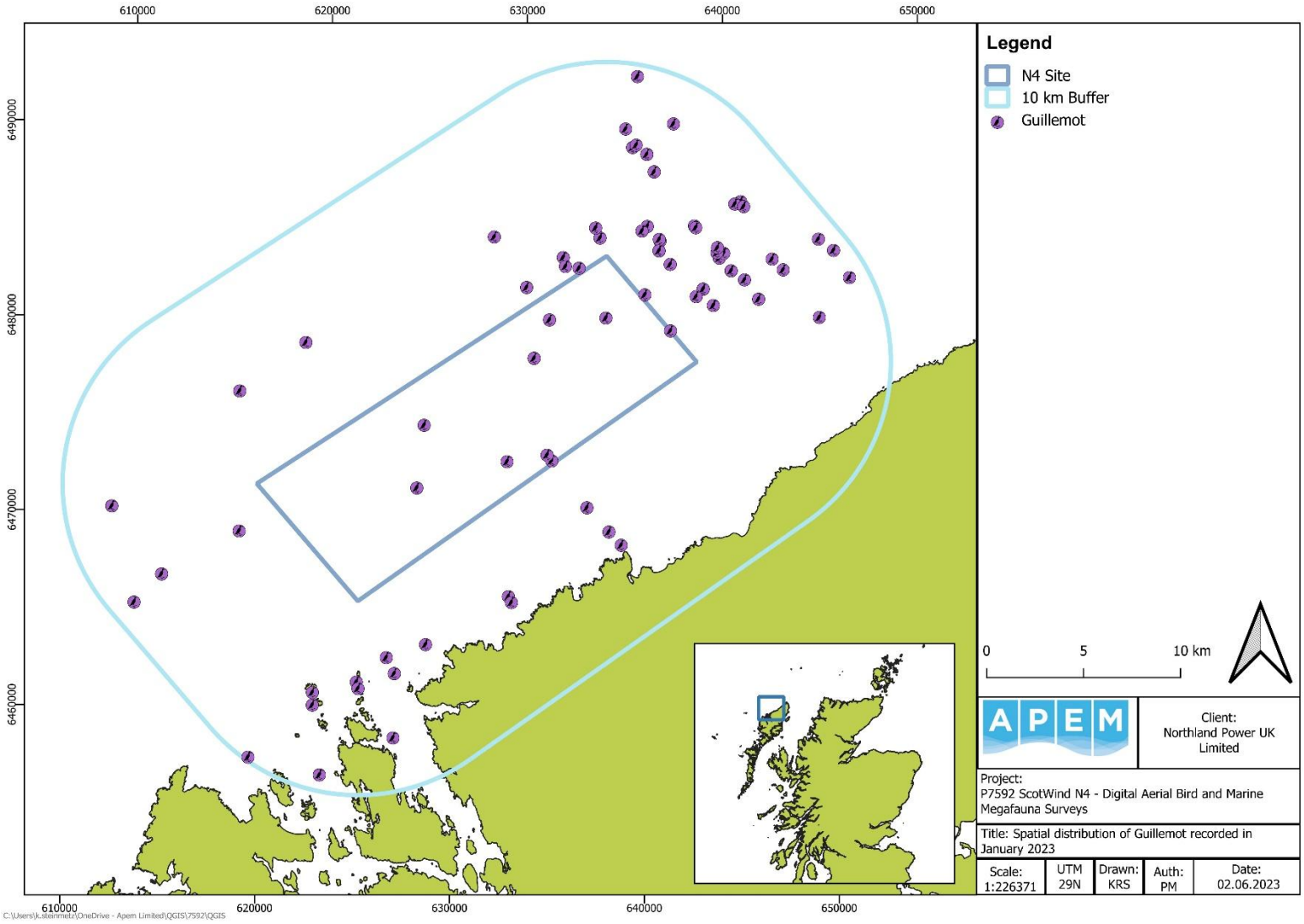


Figure 179 Distribution of guillemot in January 2023

*Note that individuals in close proximity may appear overlaying.

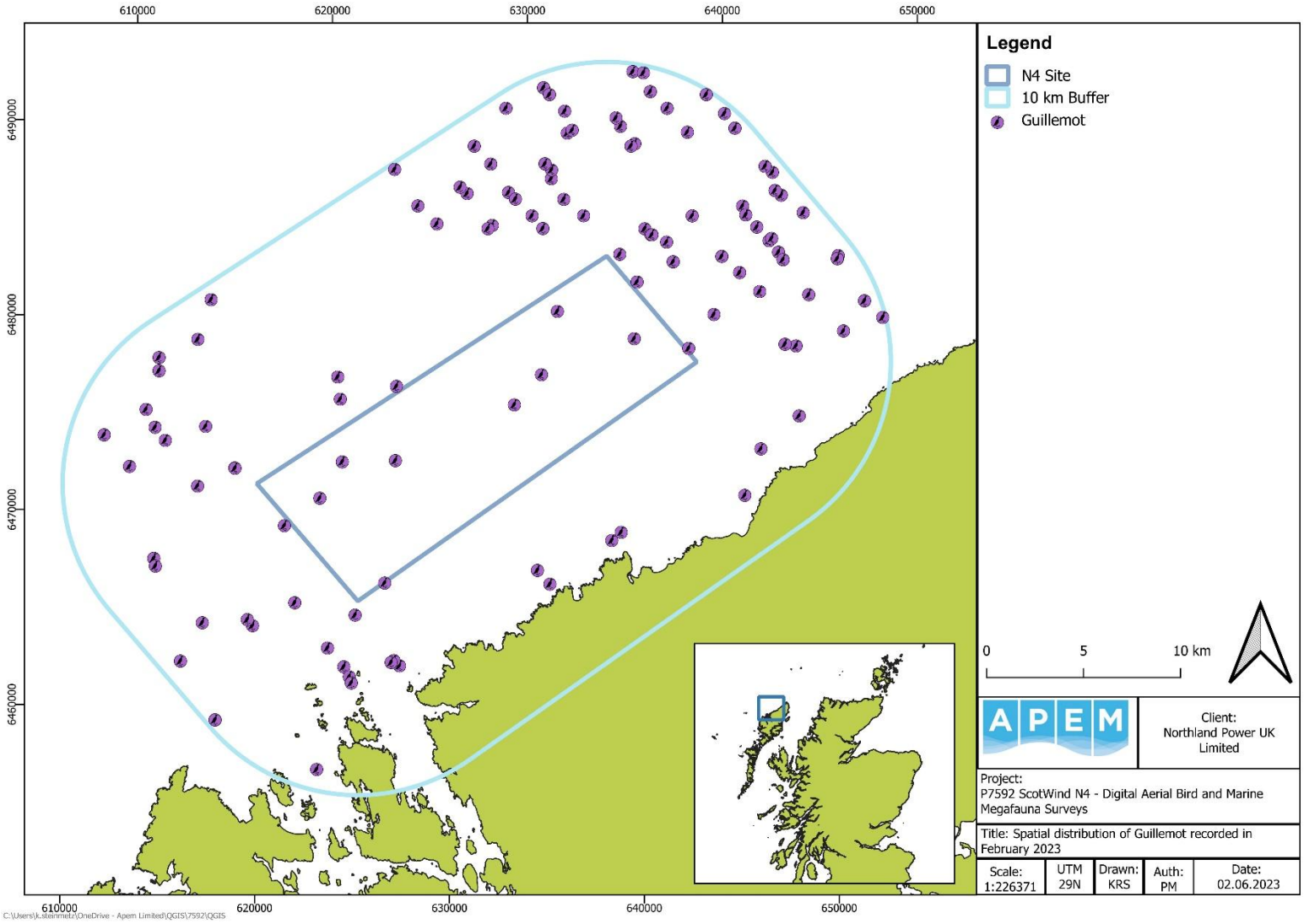


Figure 180 Distribution of guillemot in February 2023
*Note that individuals in close proximity may appear overlaying.

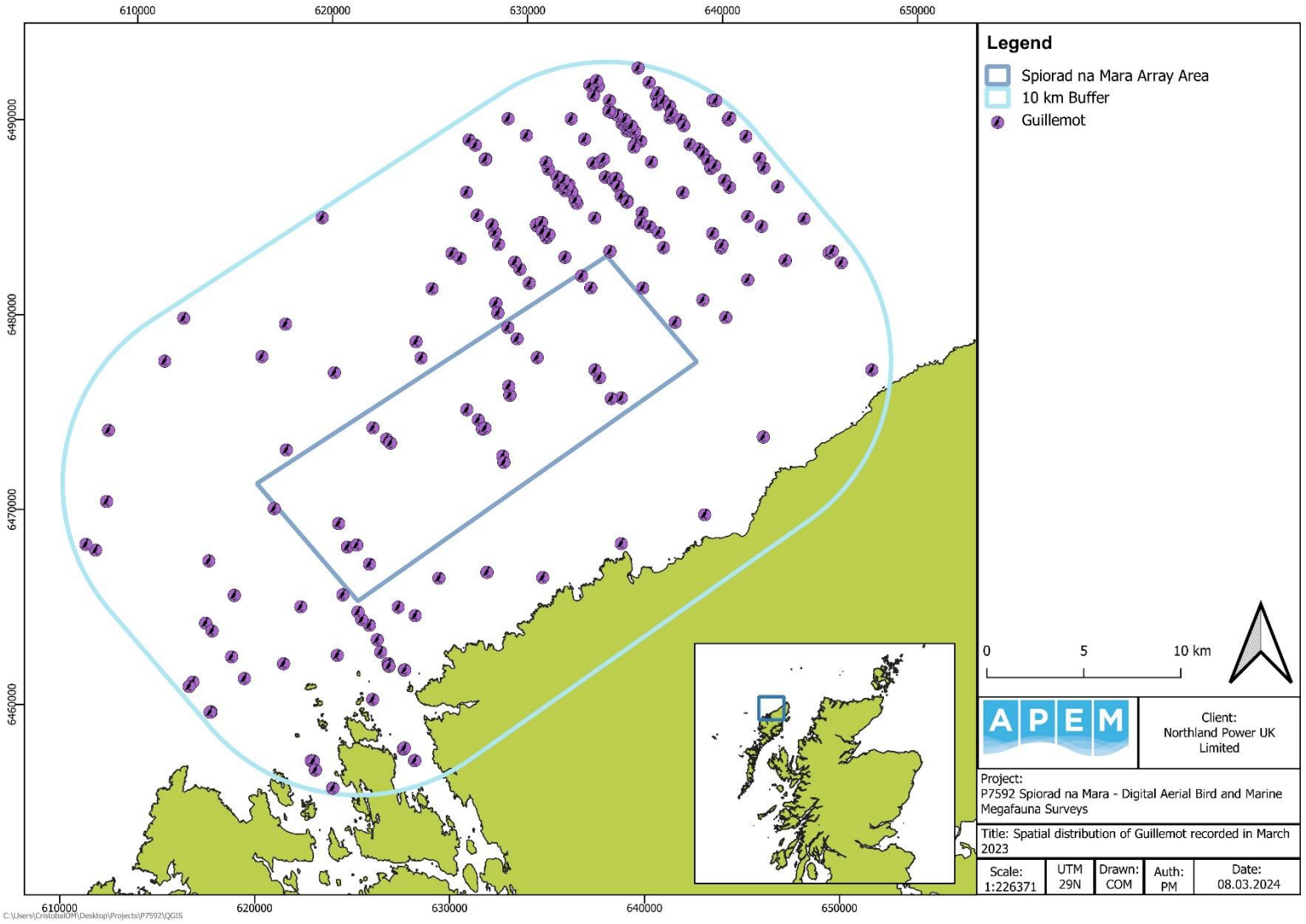


Figure 181 Distribution of guillemot in March 2023
*Note that individuals in close proximity may appear overlaying.

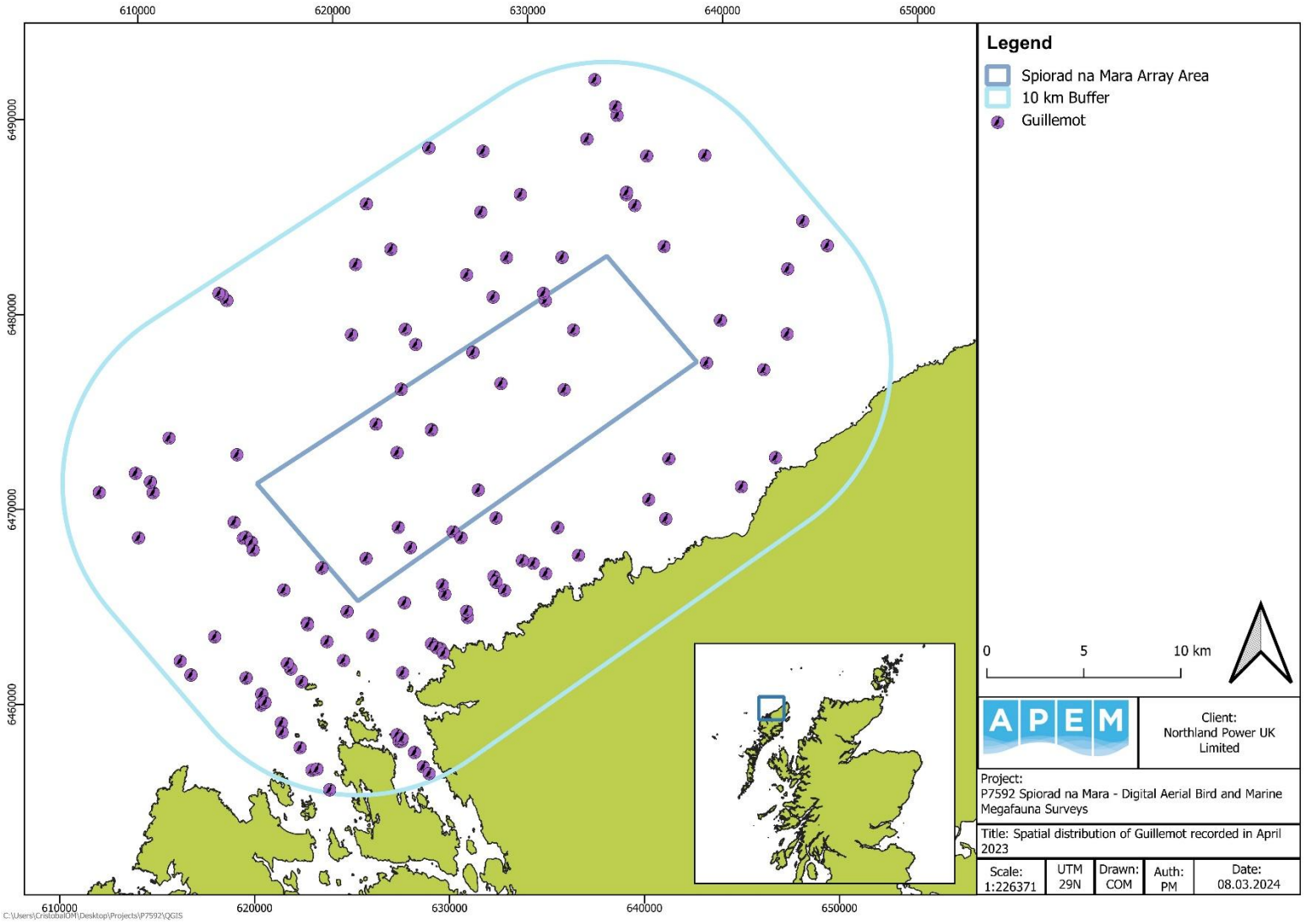


Figure 182 Distribution of guillemot in April 2023
*Note that individuals in close proximity may appear overlaying.

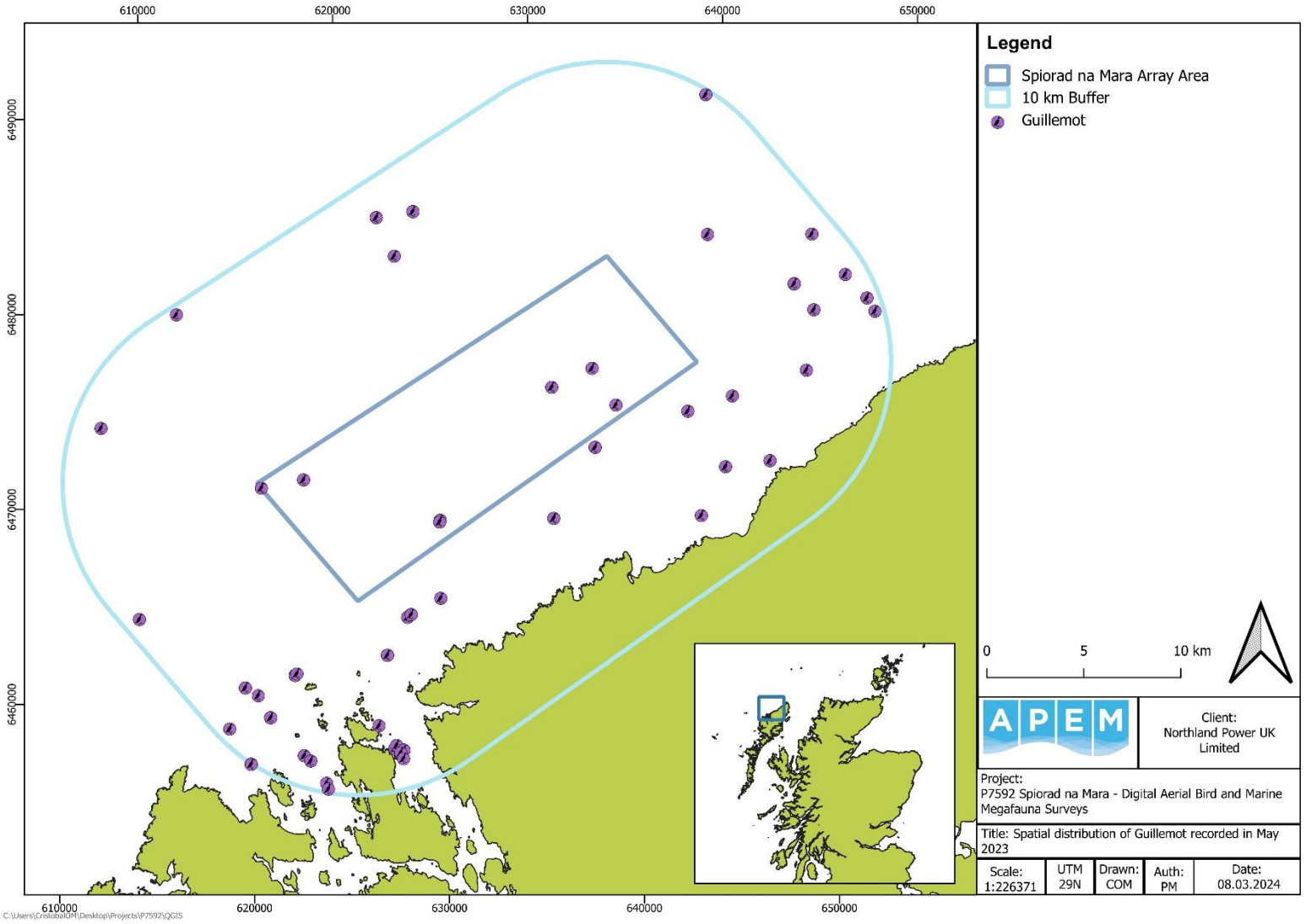


Figure 183 Distribution of guillemot in May 2023
*Note that individuals in close proximity may appear overlaying.

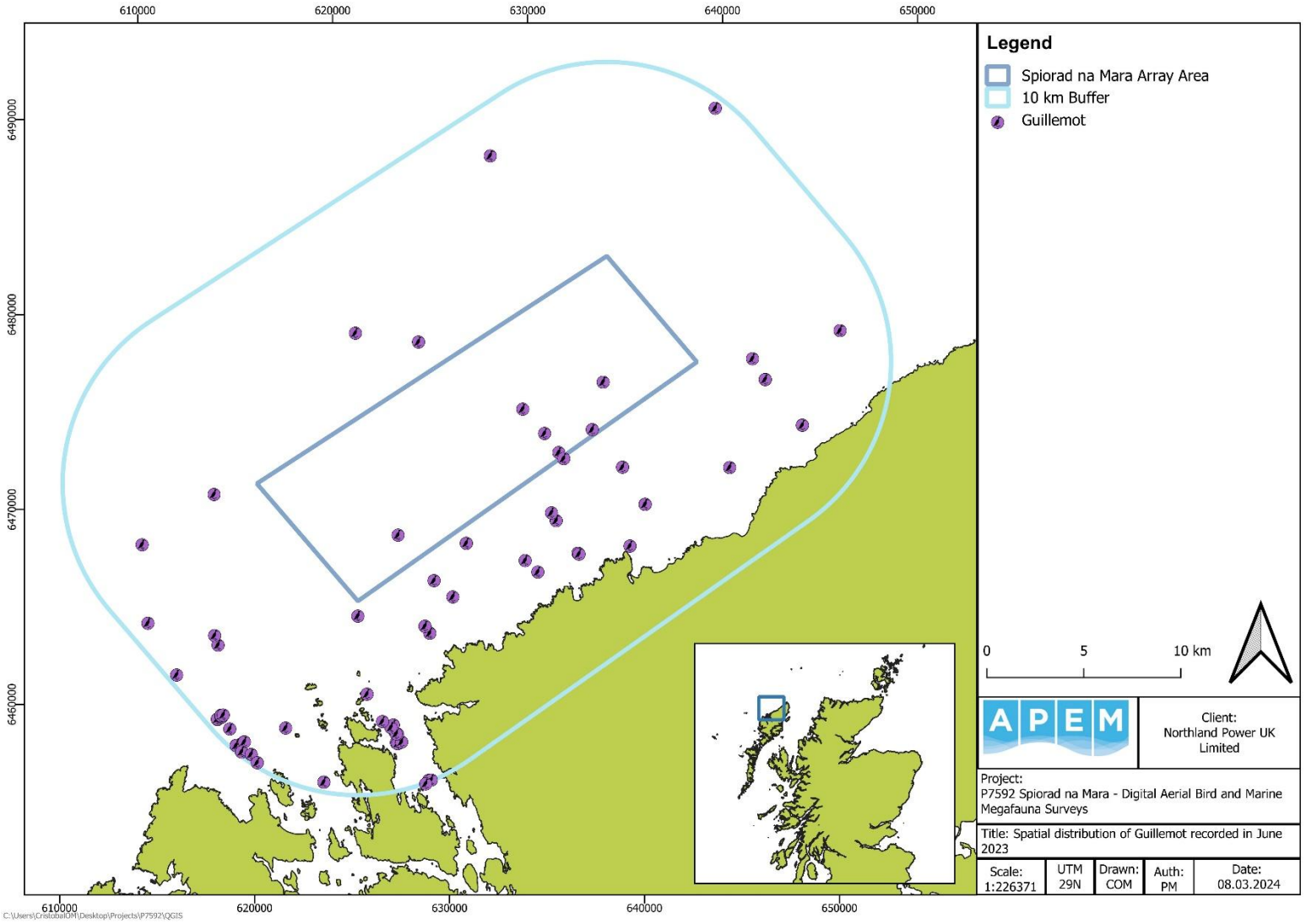


Figure 184 Distribution of guillemot in June 2023
*Note that individuals in close proximity may appear overlaying.

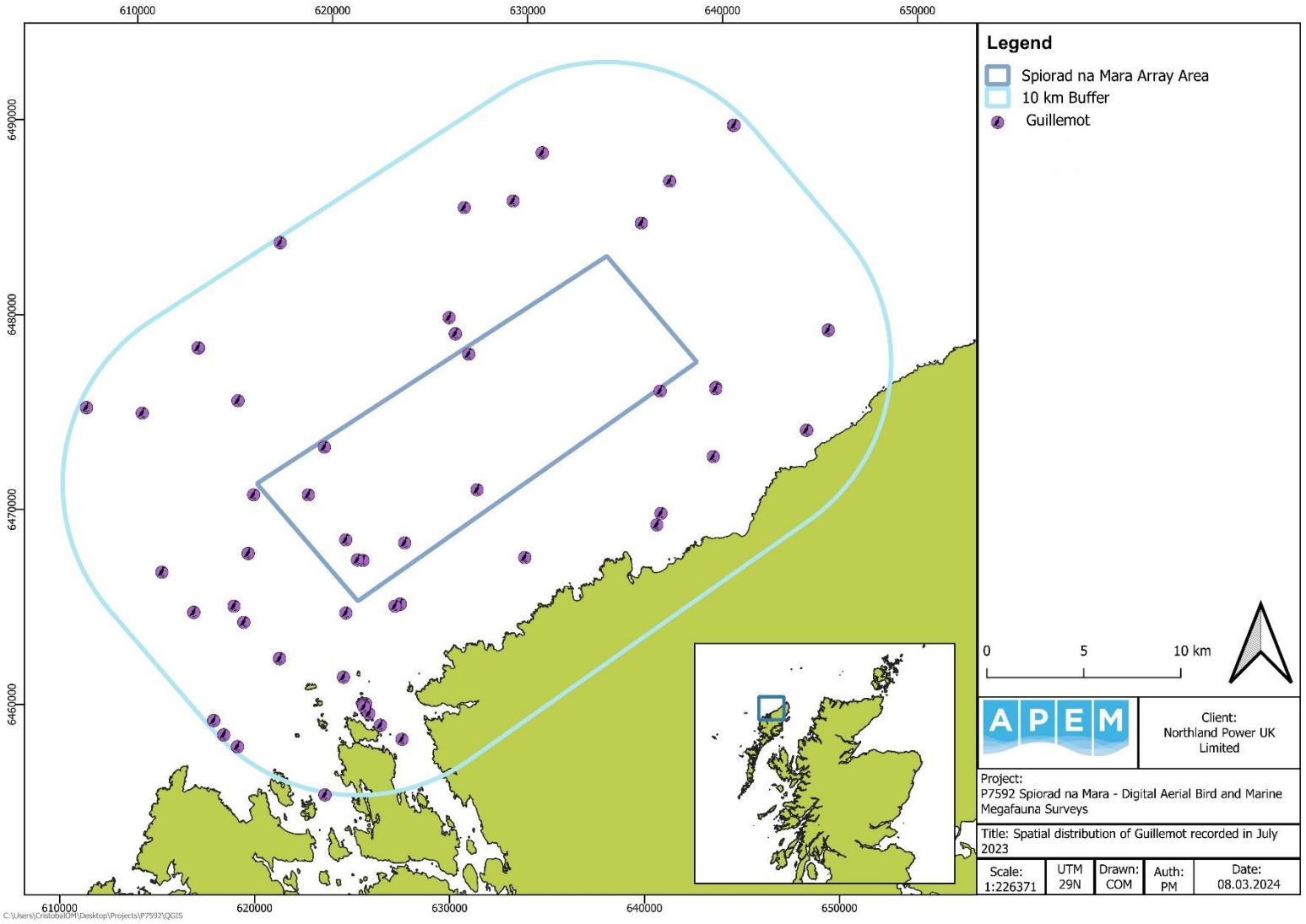


Figure 185 Distribution of guillemot in July 2023
*Note that individuals in close proximity may appear overlaying.

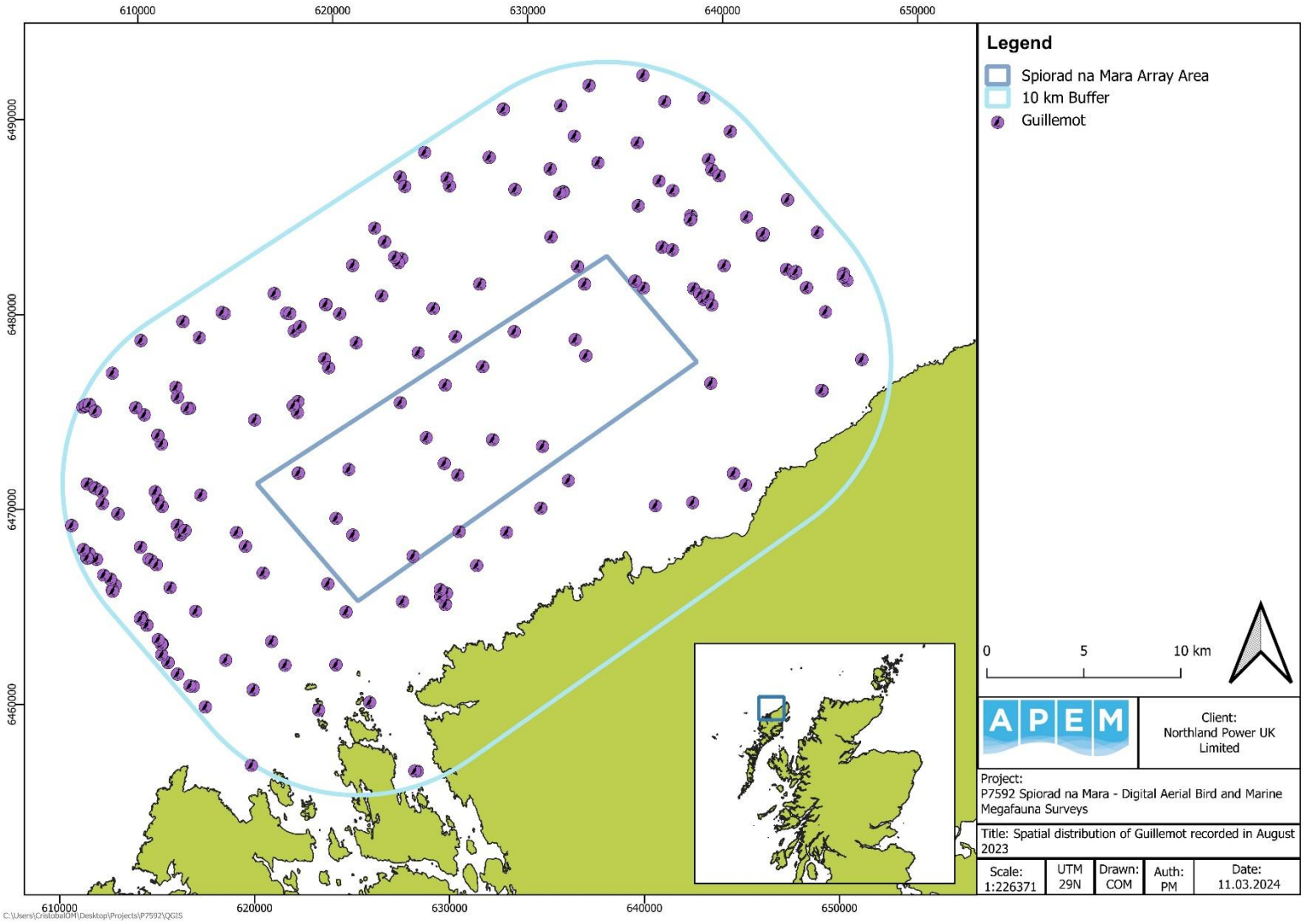


Figure 186 Distribution of guillemot in August 2023
*Note that individuals in close proximity may appear overlaying.

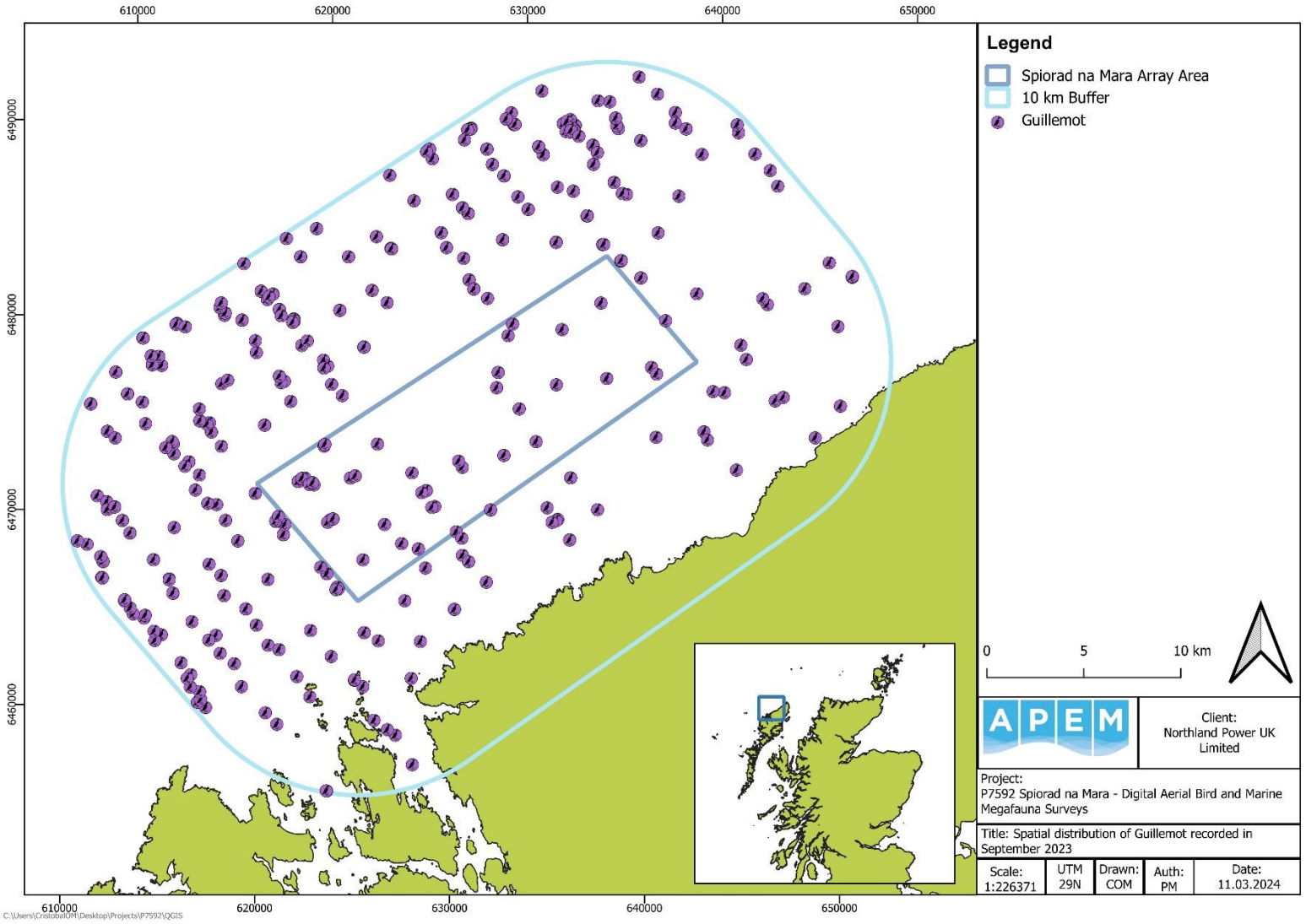


Figure 187 Distribution of guillemot in September 2023
*Note that individuals in close proximity may appear overlaying.

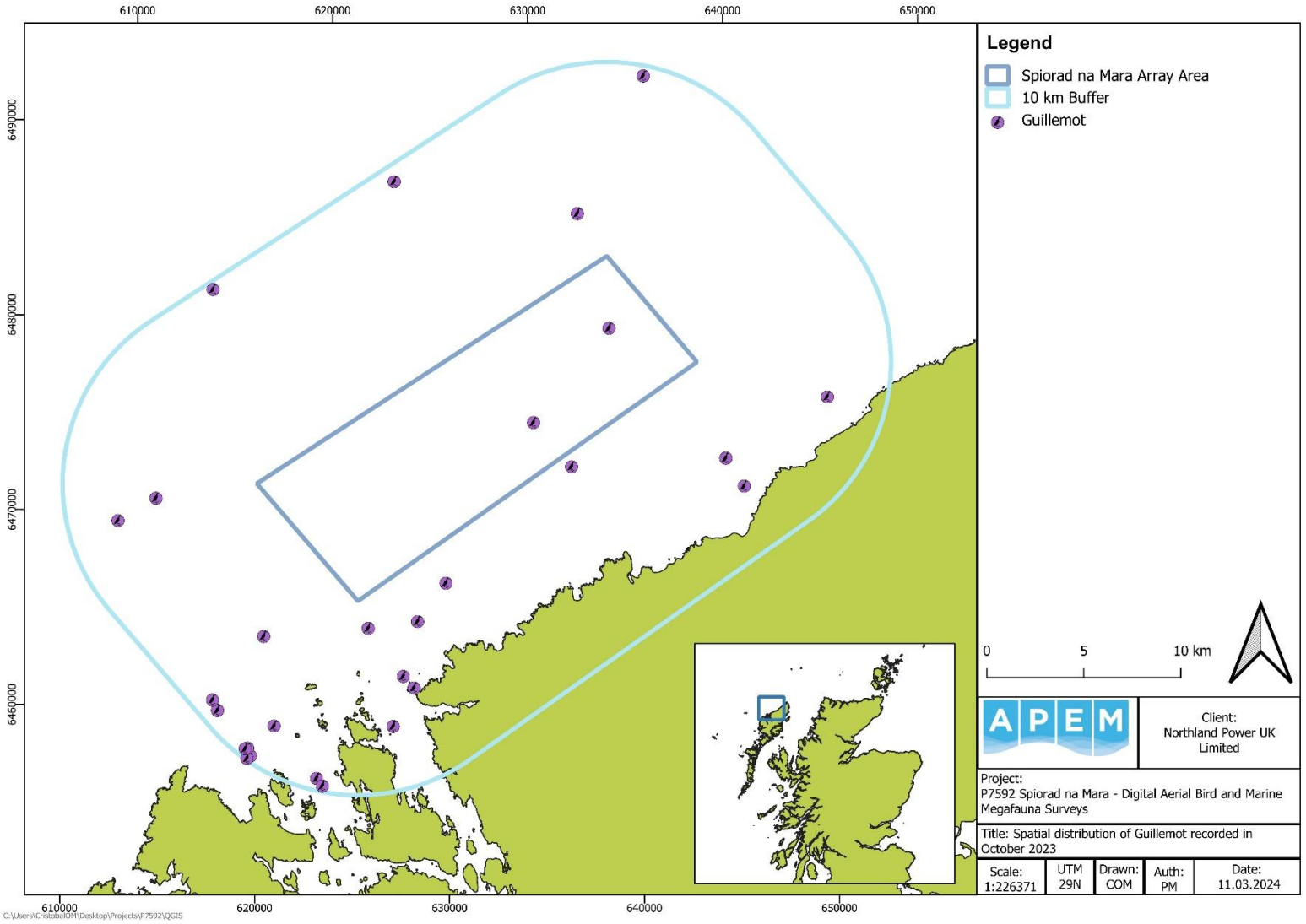


Figure 188 Distribution of guillemot in October 2023

*Note that individuals in close proximity may appear overlaying.

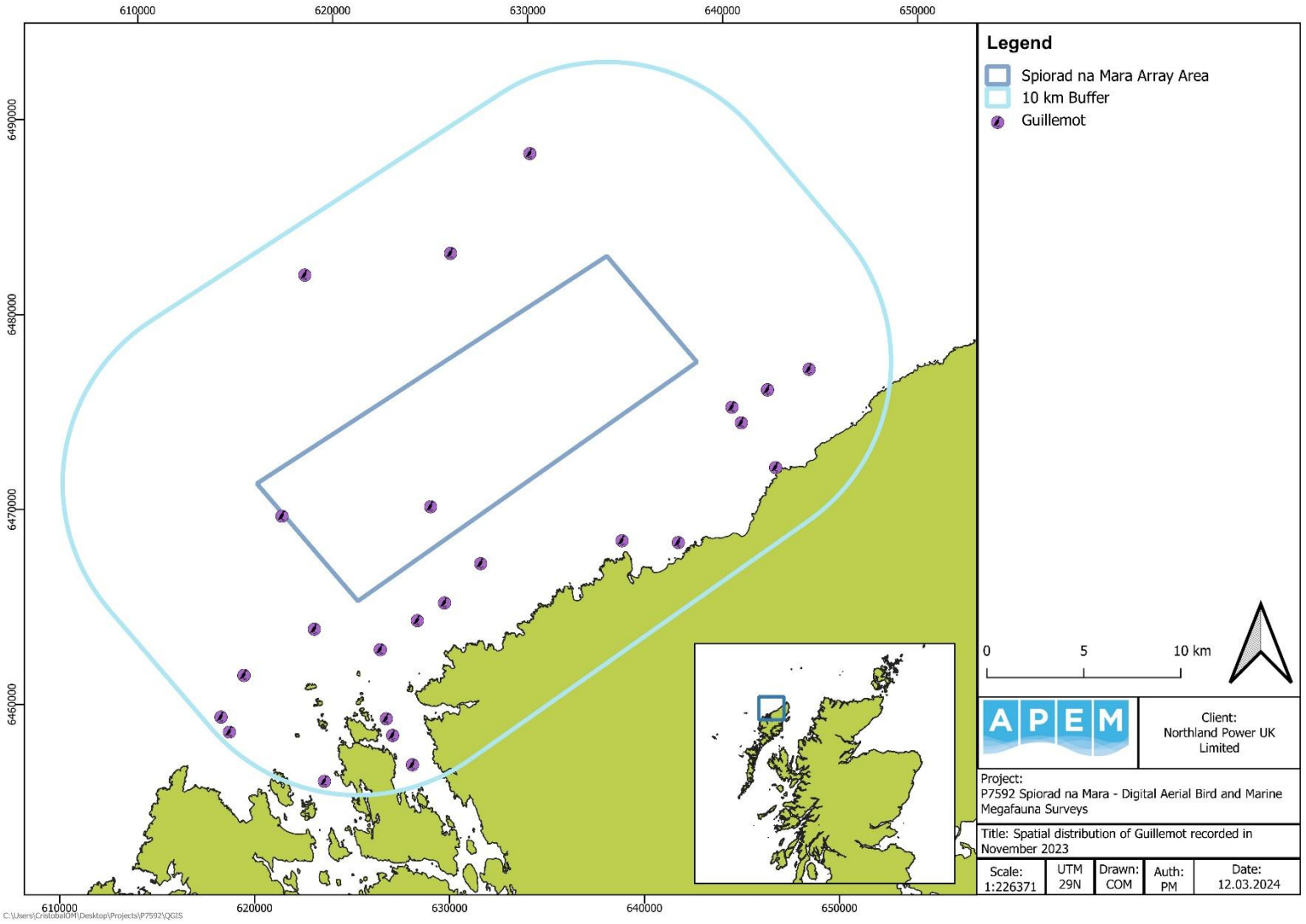


Figure 189 Distribution of guillemot in November 2023

*Note that individuals in close proximity may appear overlaying.

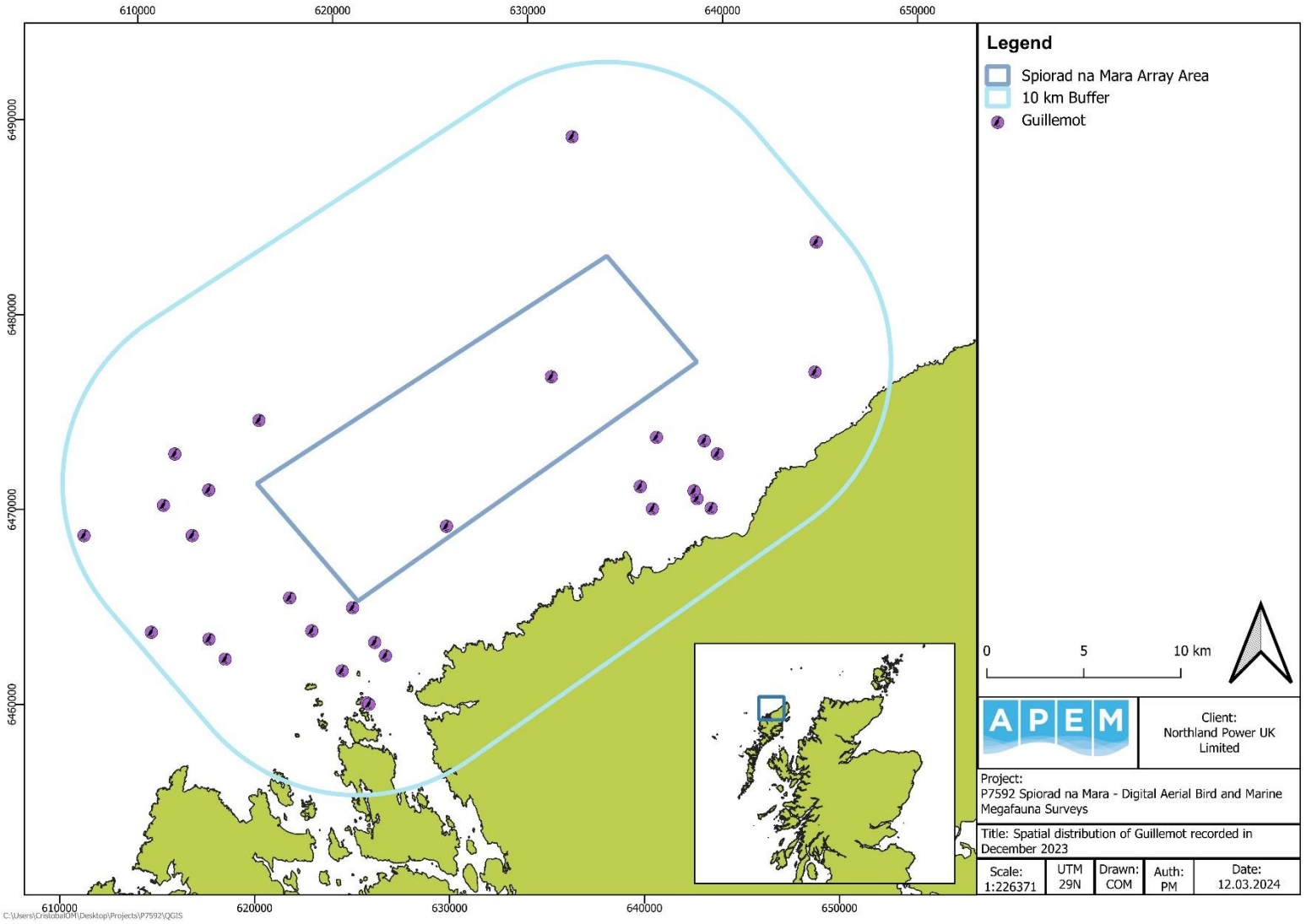


Figure 190 Distribution of guillemot in December 2023

*Note that individuals in close proximity may appear overlaying.

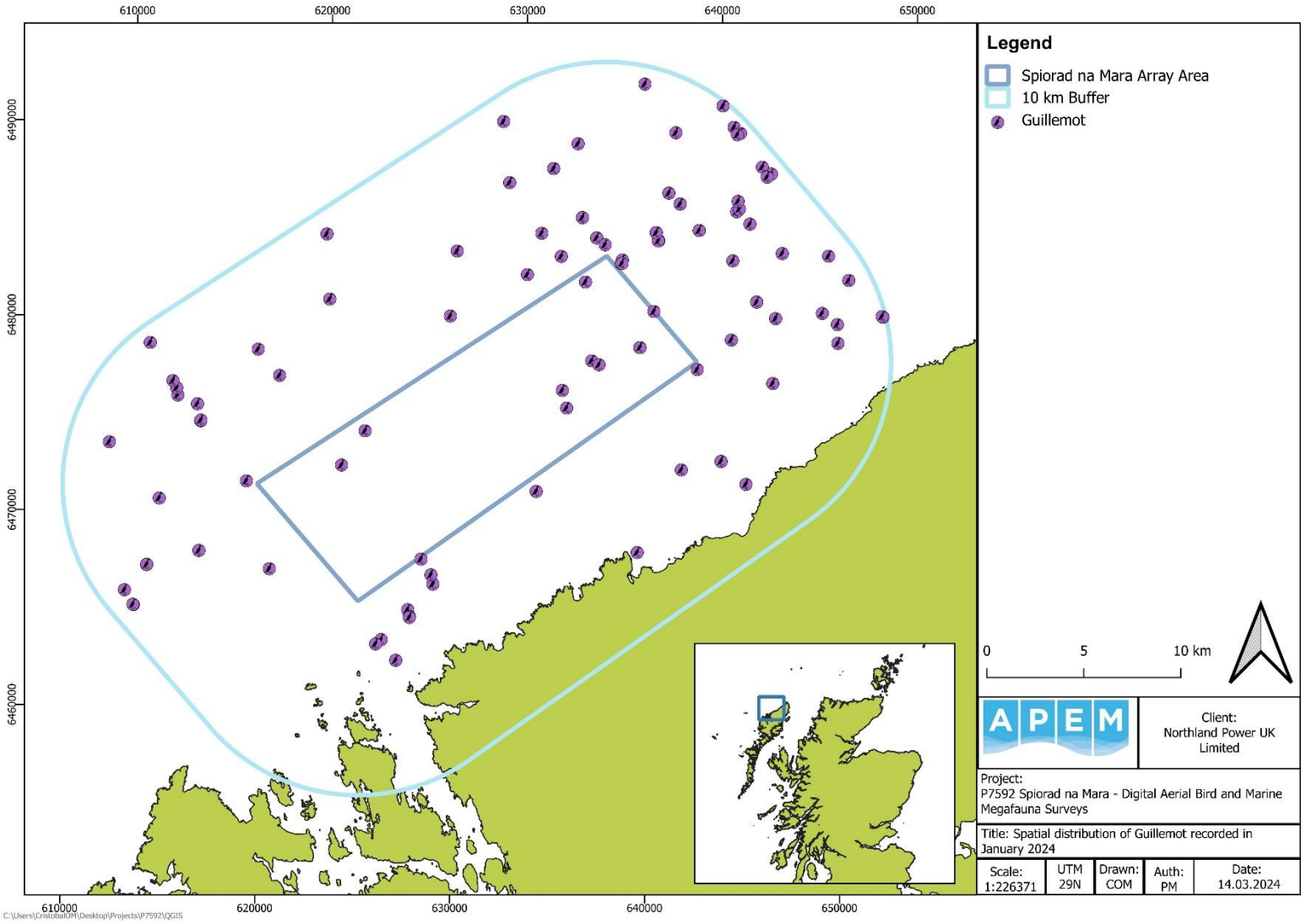


Figure 191 Distribution of guillemot in January 2024
*Note that individuals in close proximity may appear overlaying.

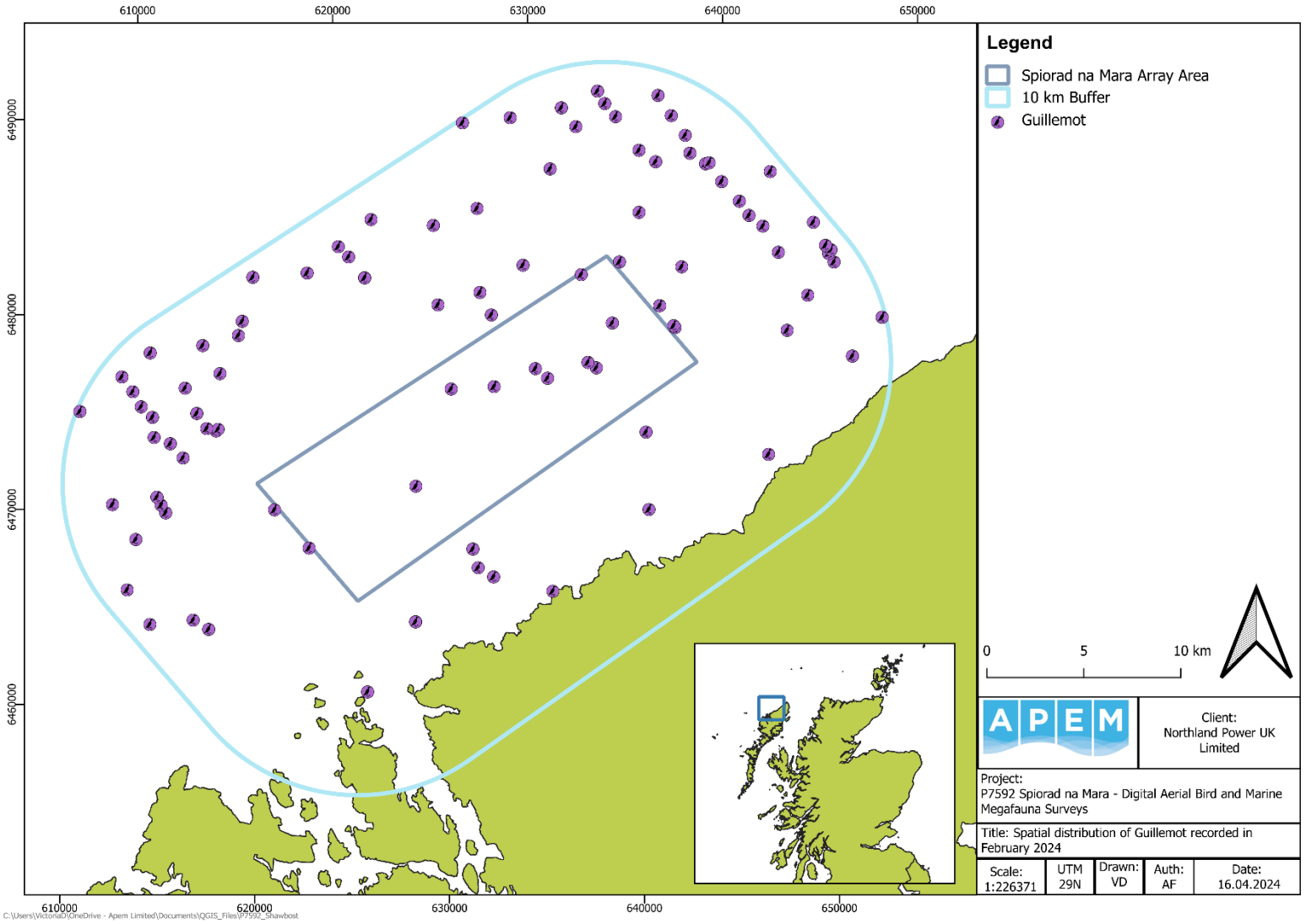


Figure 192 Distribution of guillemot in February 2024
*Note that individuals in close proximity may appear overlaying.

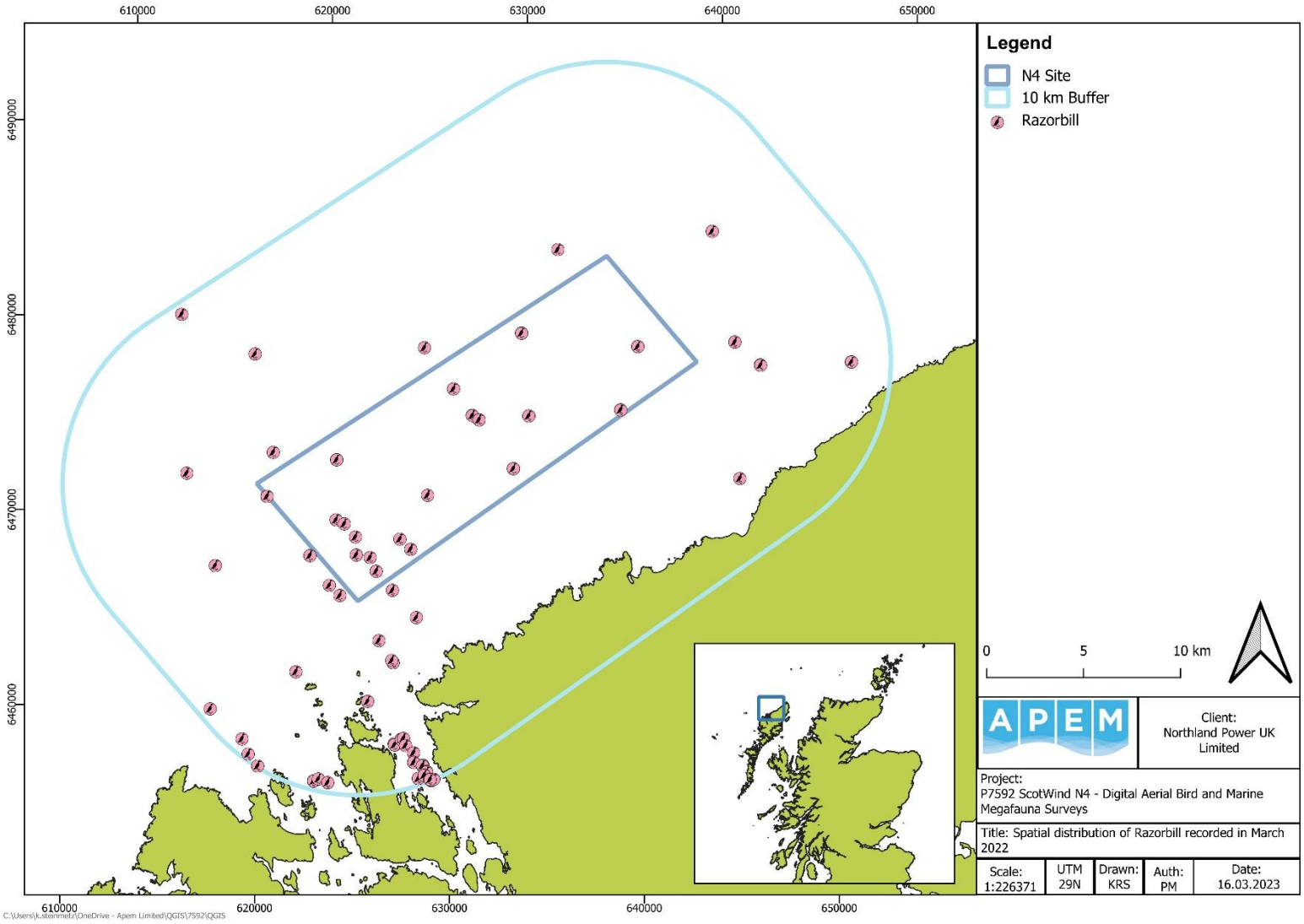


Figure 193 Distribution of razorbill in March 2022
*Note that individuals in close proximity may appear overlaying.

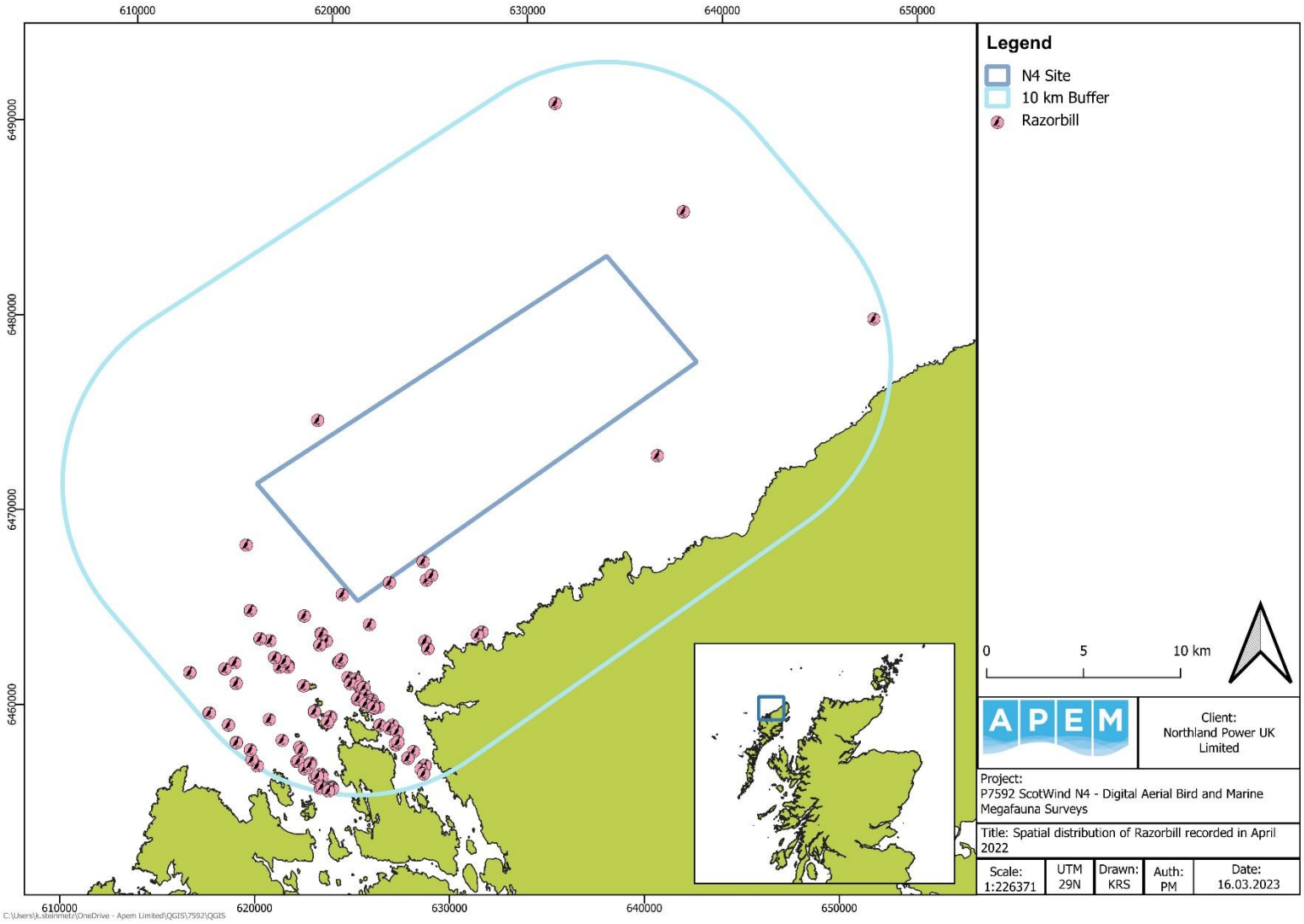


Figure 194 Distribution of razorbill in April 2022
*Note that individuals in close proximity may appear overlaying.

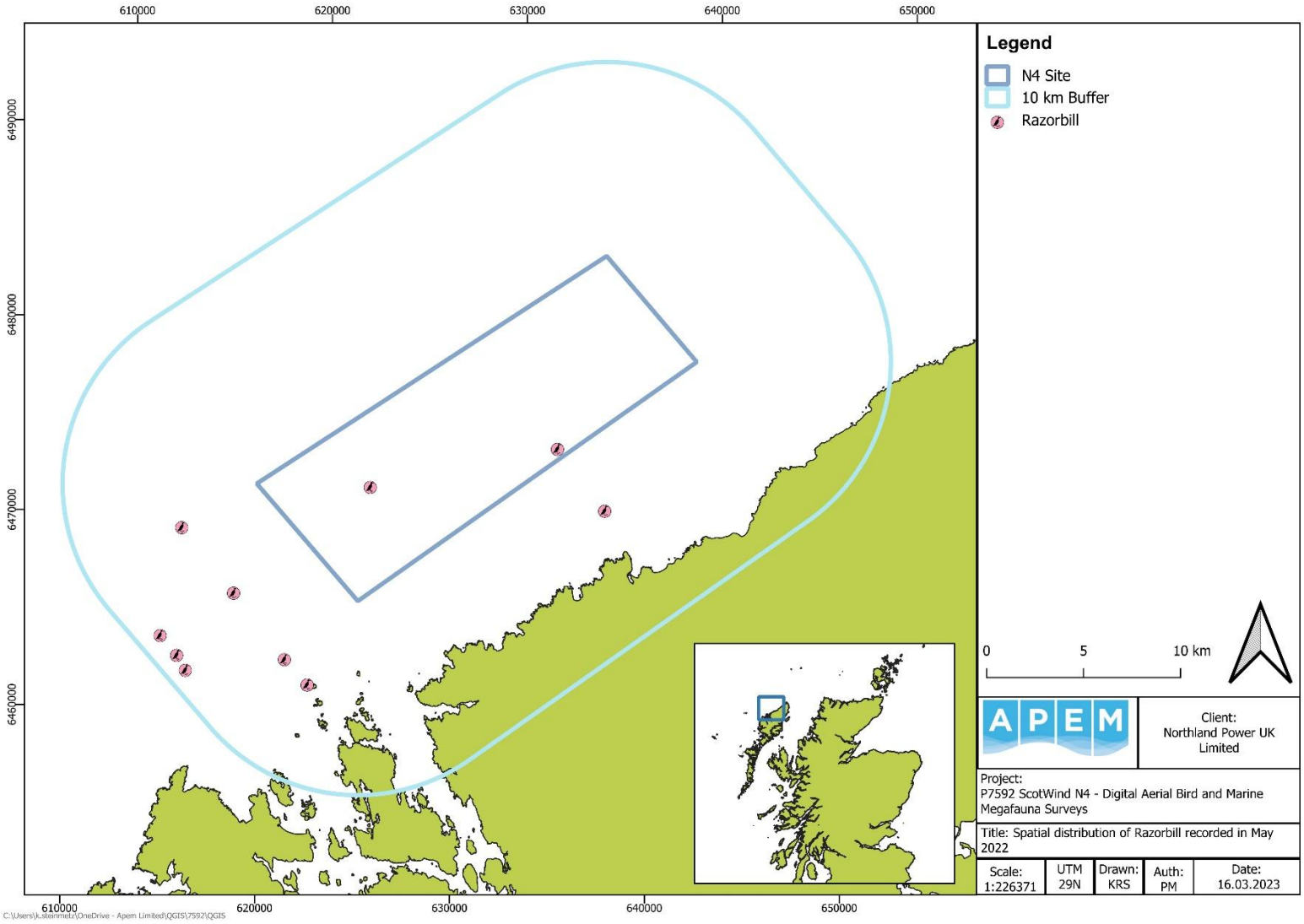


Figure 195 Distribution of razorbill in May 2022
*Note that individuals in close proximity may appear overlaying.

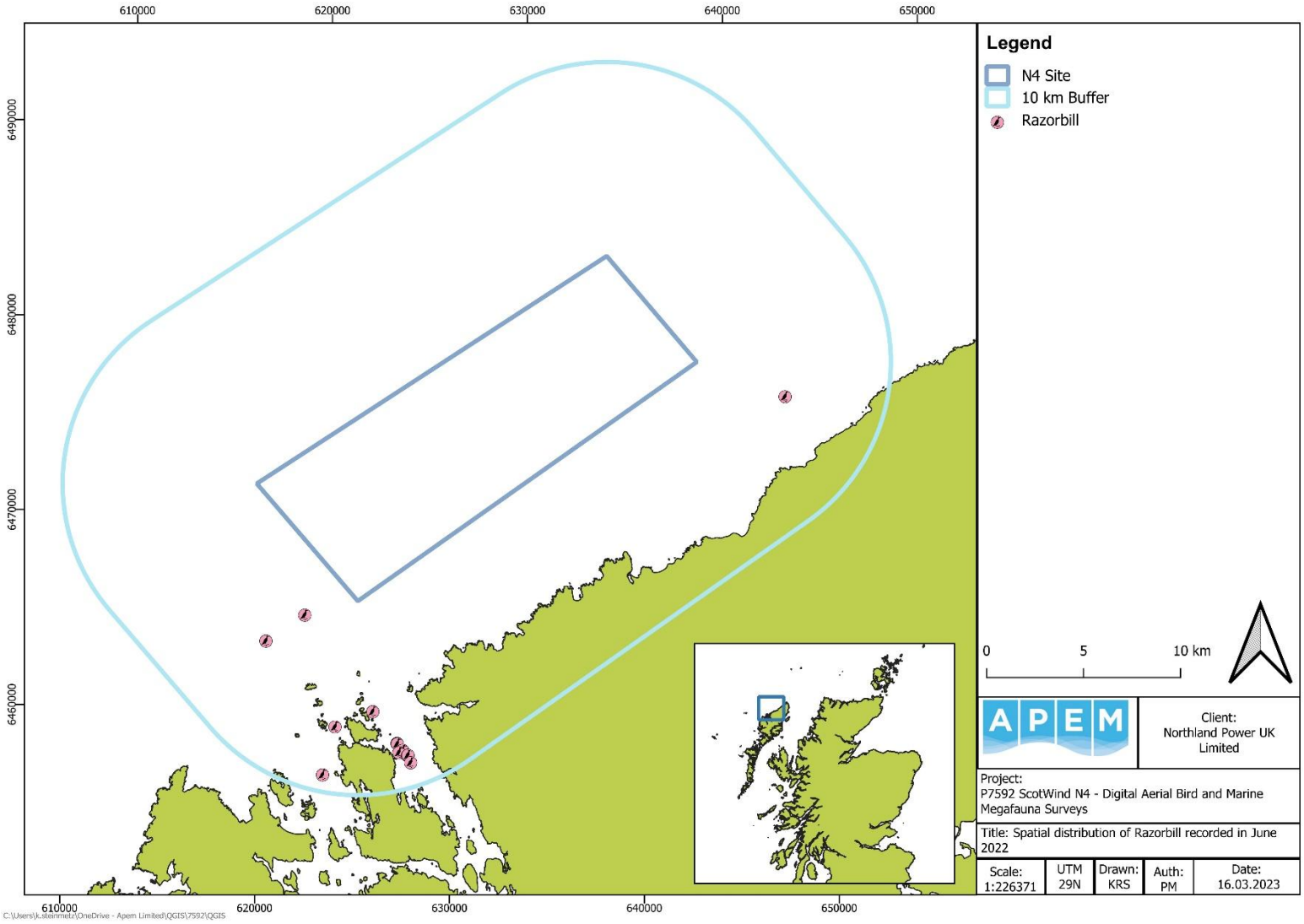


Figure 196 Distribution of razorbill in June 2022
*Note that individuals in close proximity may appear overlaying.

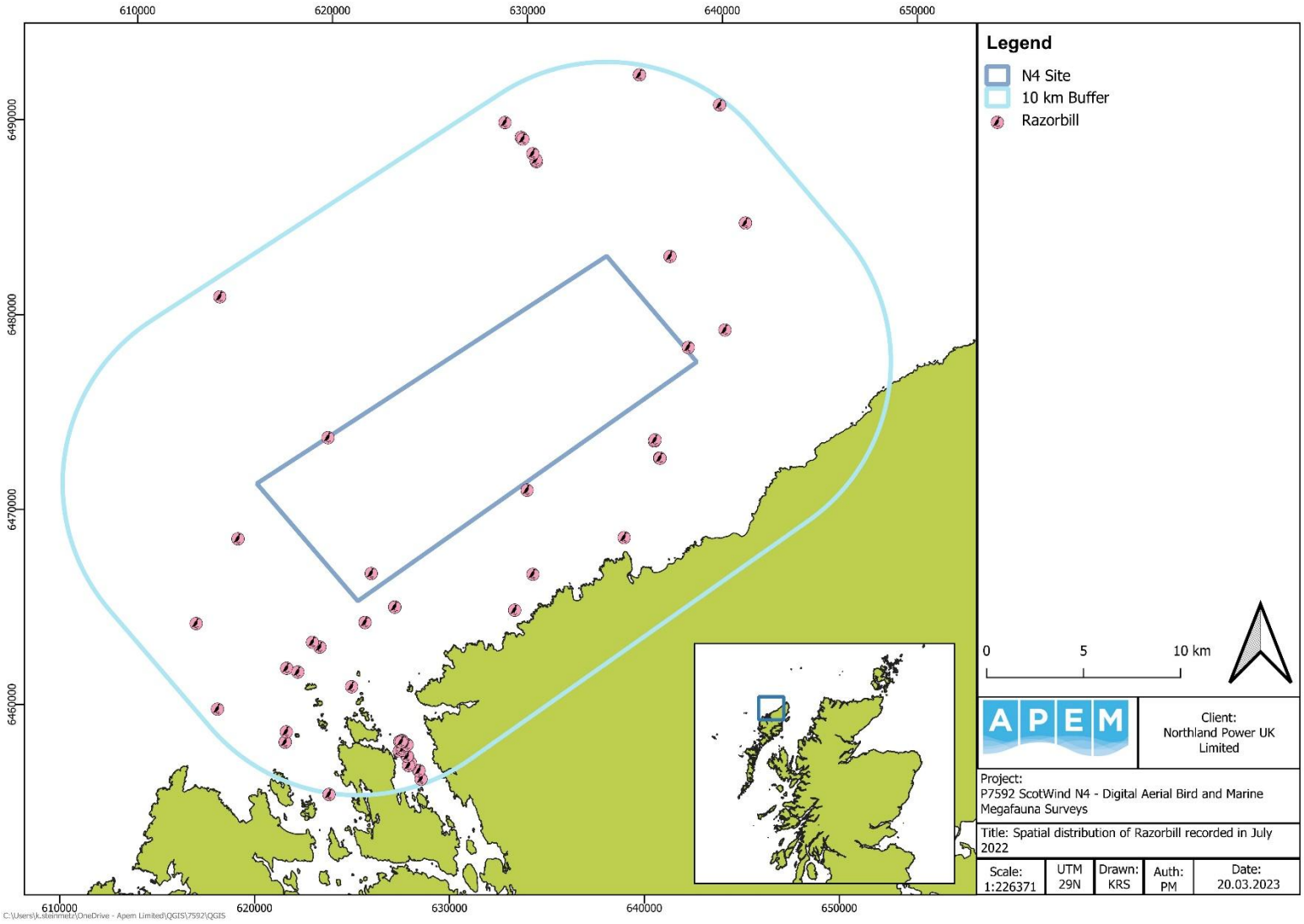


Figure 197 Distribution of razorbill in July 2022
*Note that individuals in close proximity may appear overlaying.

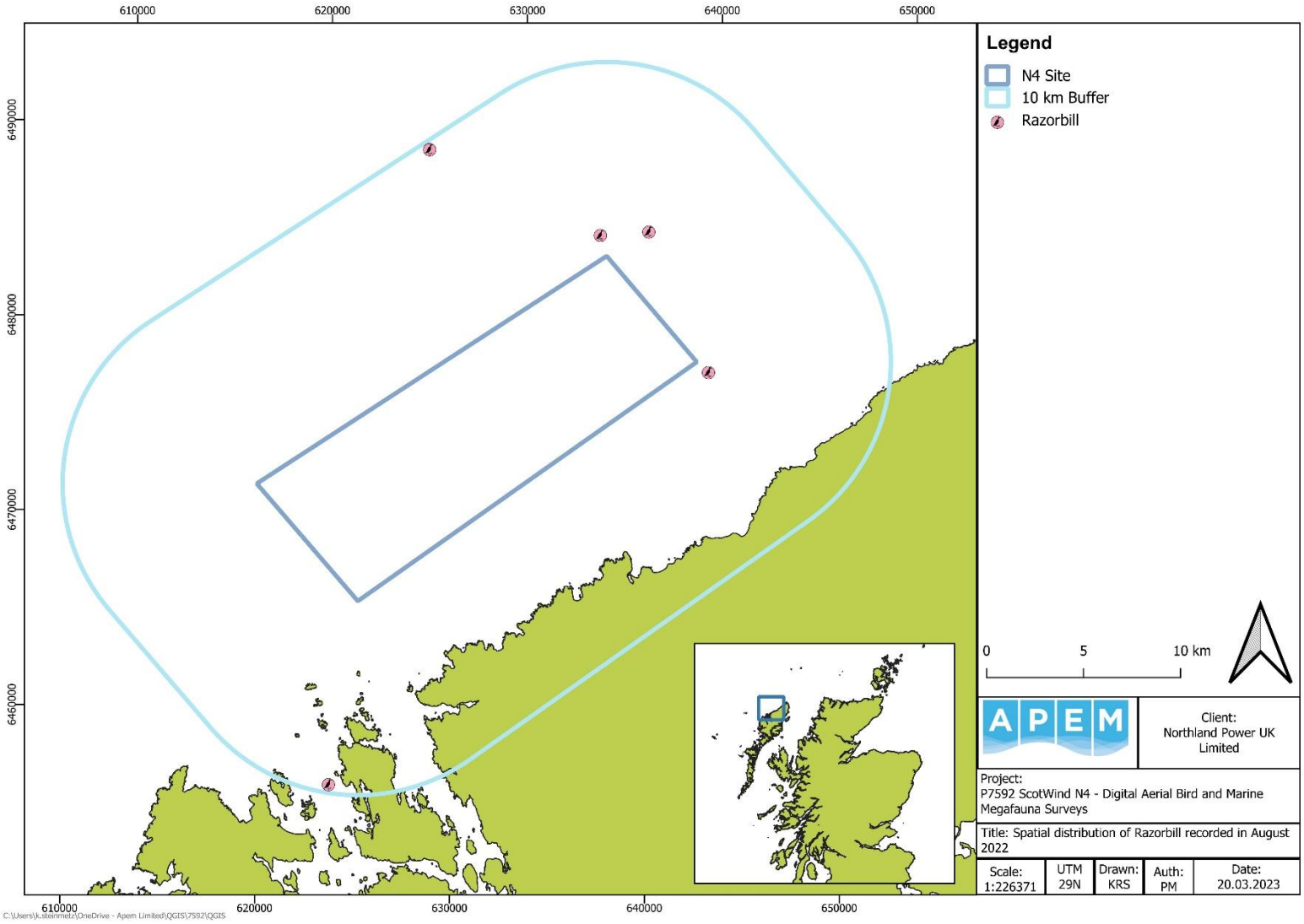


Figure 198 Distribution of razorbill in August 2022
*Note that individuals in close proximity may appear overlaying.

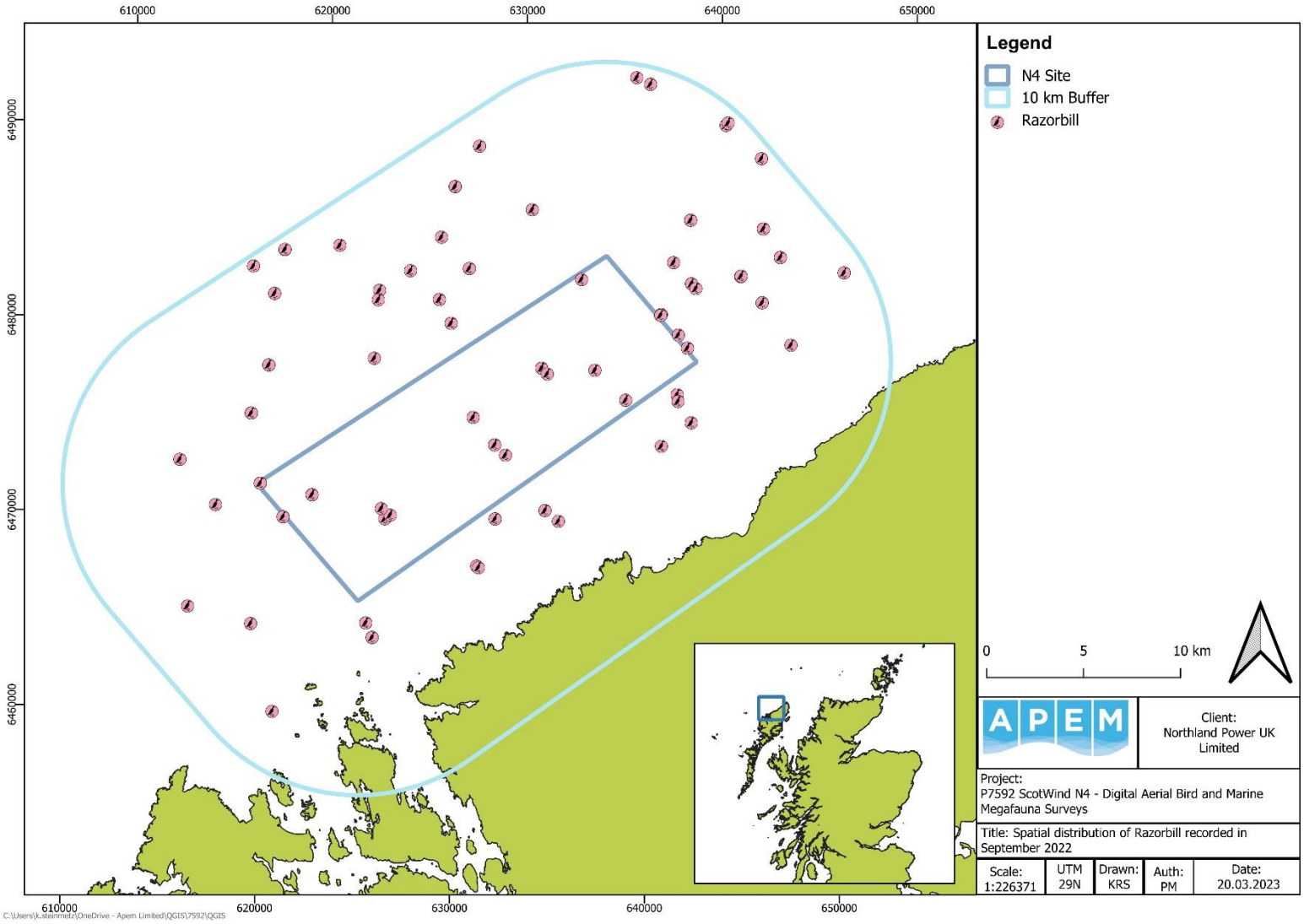


Figure 199 Distribution of razorbill in September 2022

*Note that individuals in close proximity may appear overlaying.

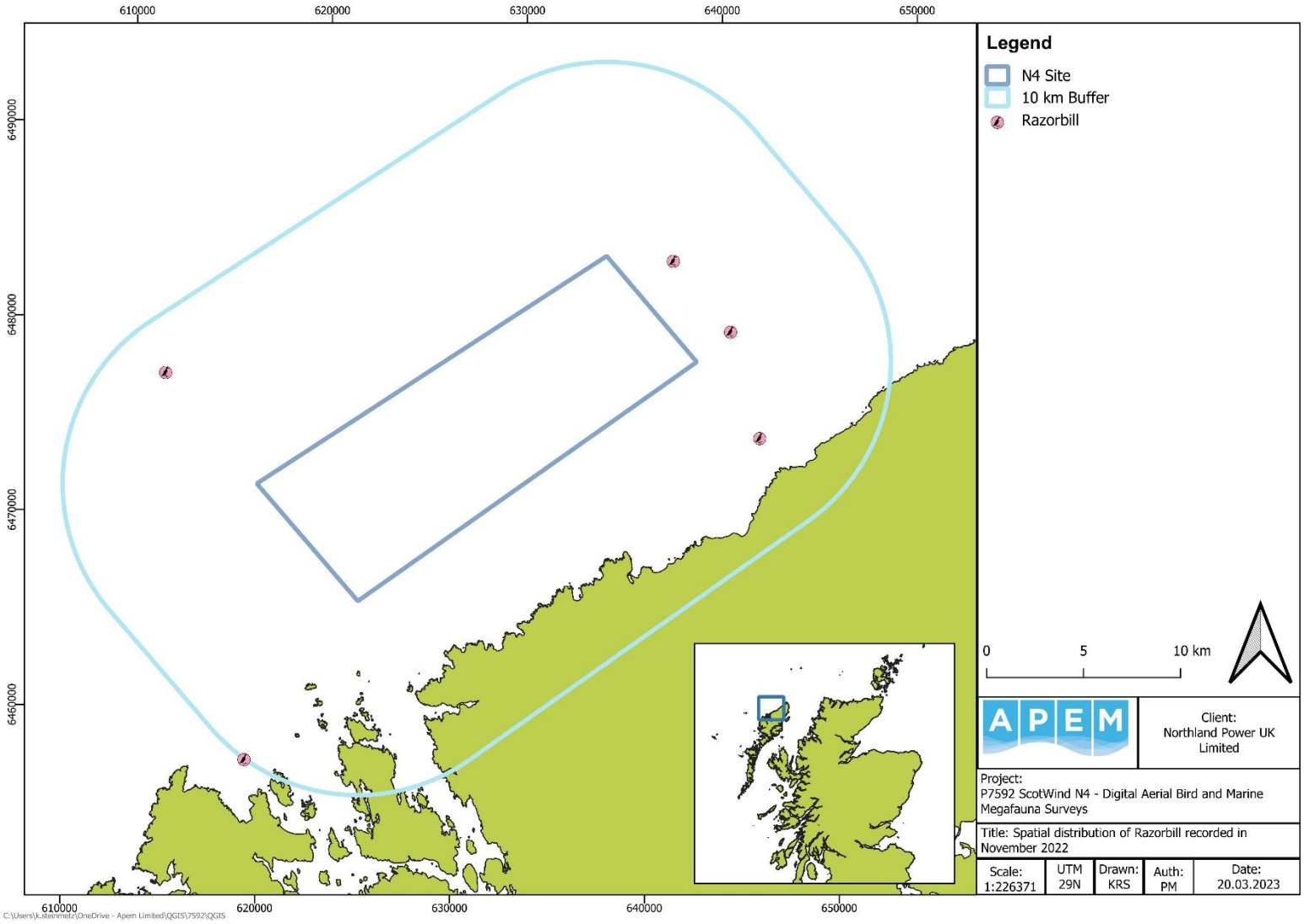


Figure 200 Distribution of razorbill in November 2022

*Note that individuals in close proximity may appear overlaying.

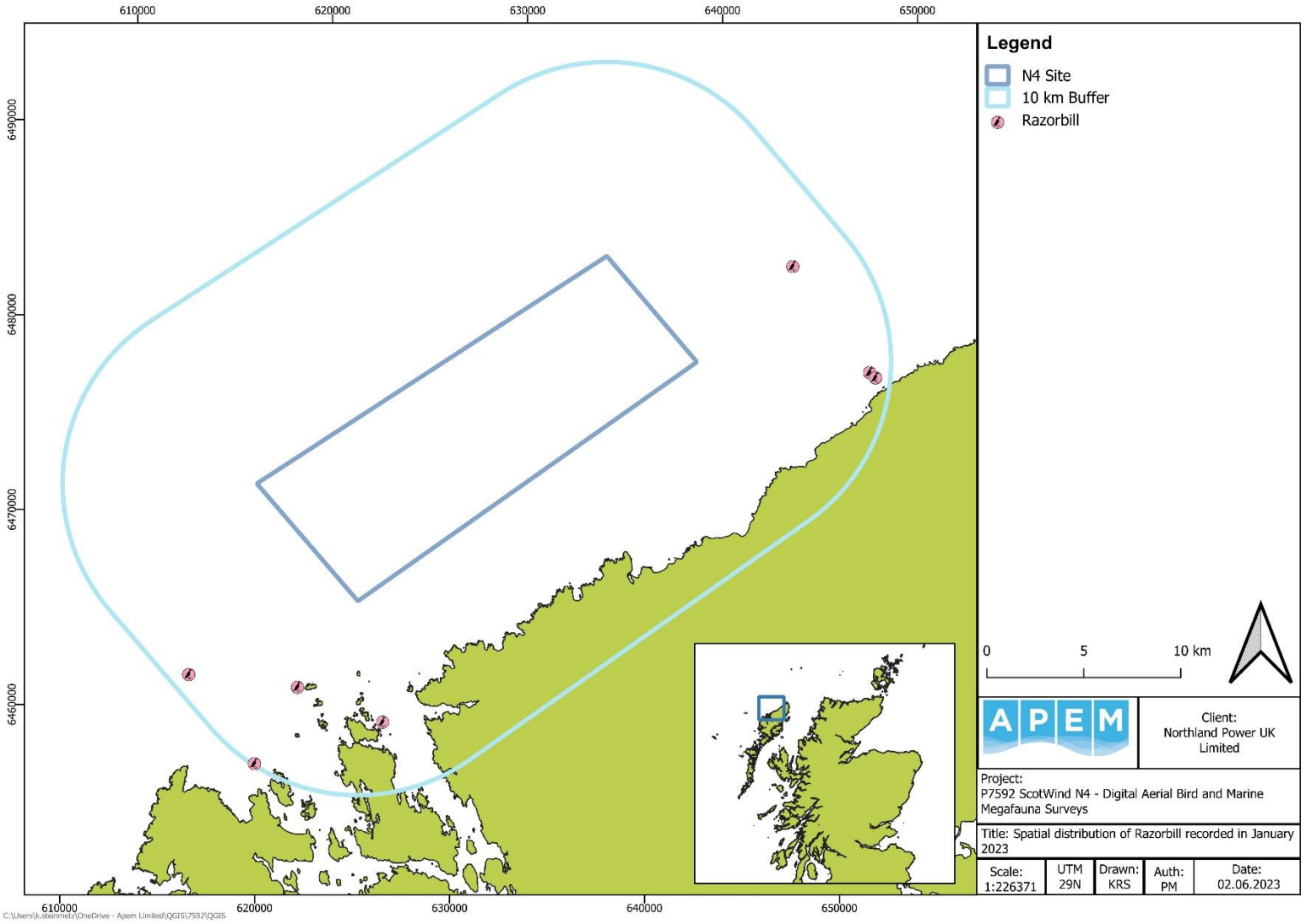


Figure 201 Distribution of razorbill in January 2023
*Note that individuals in close proximity may appear overlaying.

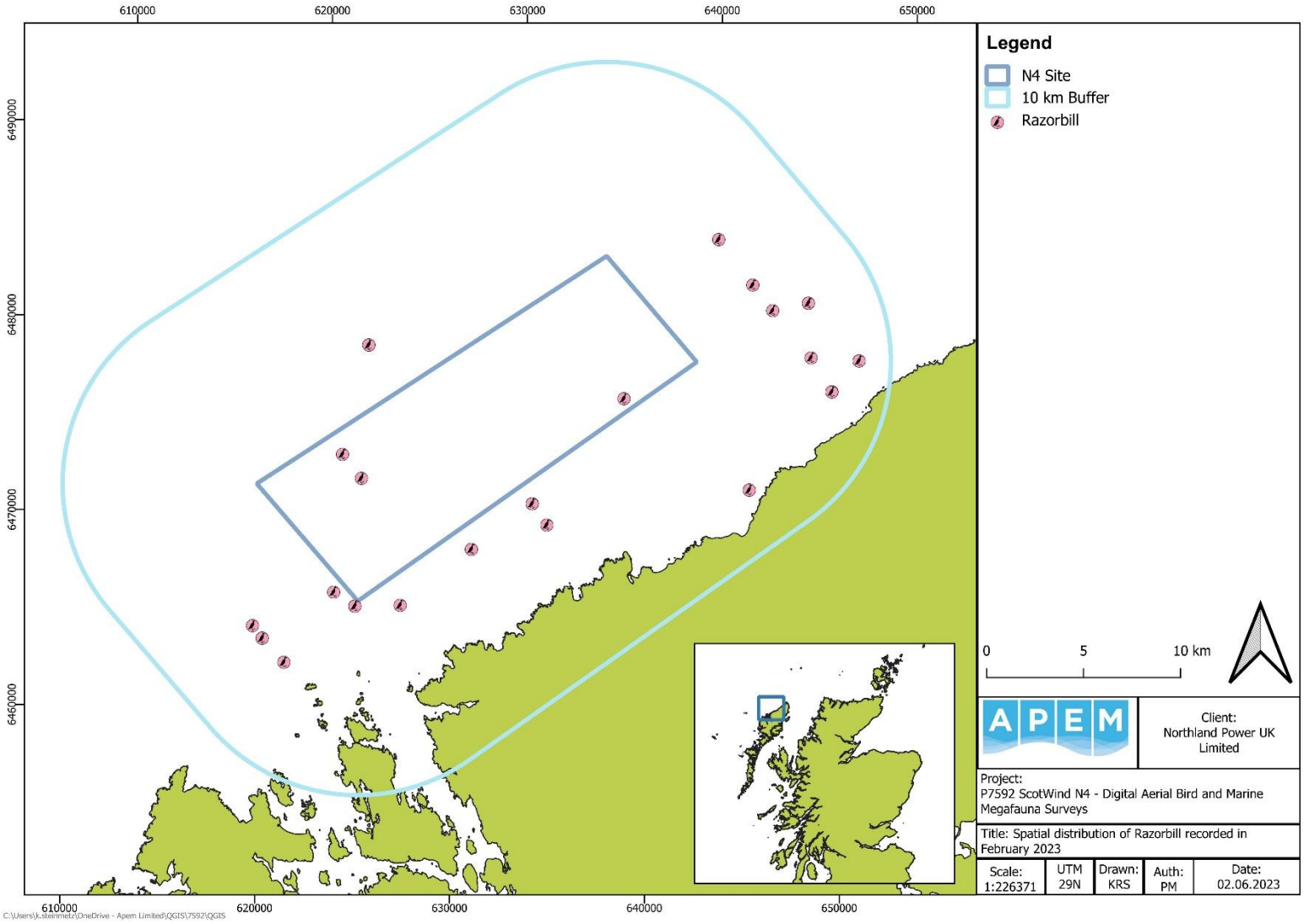


Figure 202 Distribution of razorbill in February 2023

*Note that individuals in close proximity may appear overlaying.

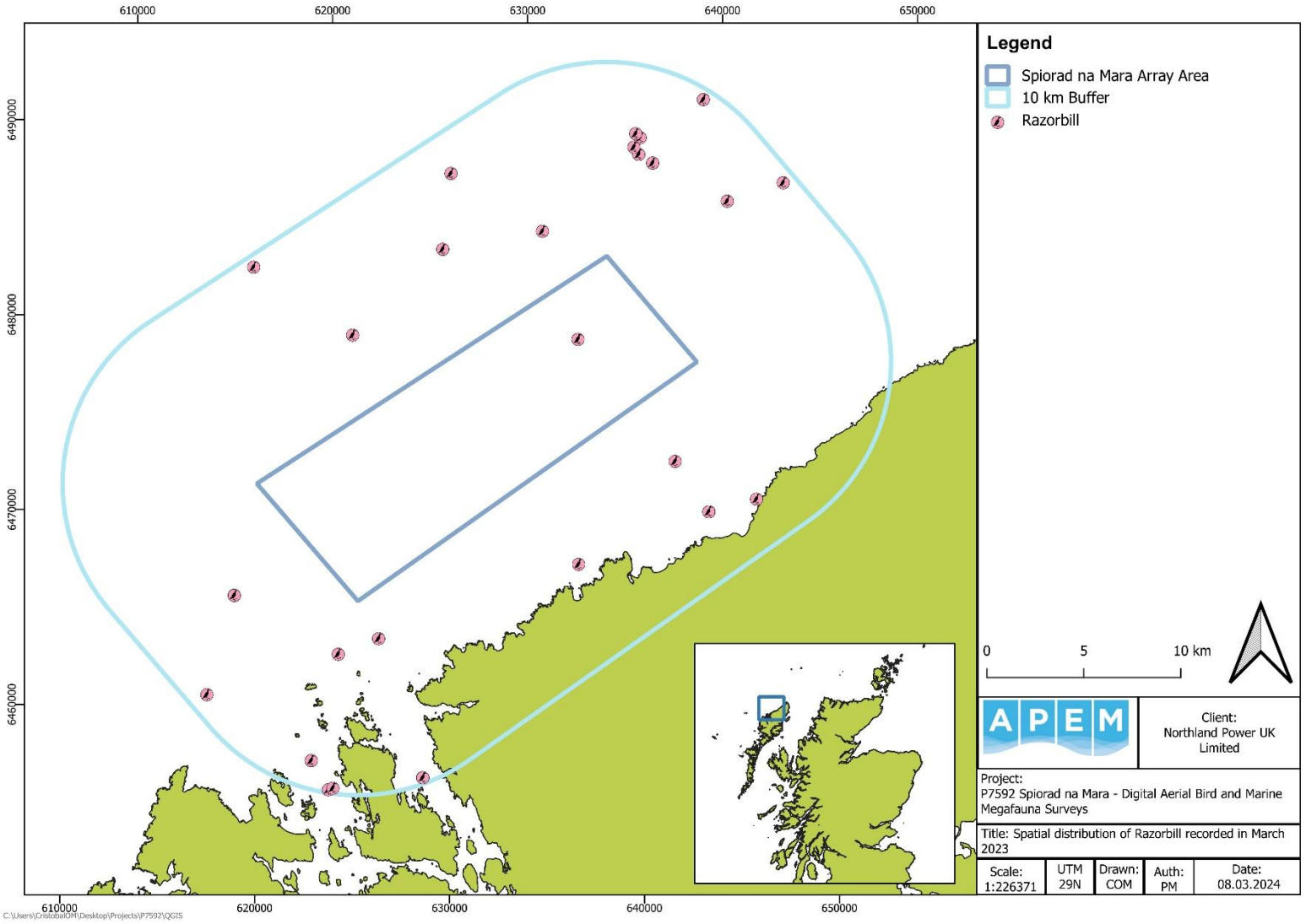


Figure 203 Distribution of razorbill in March 2023

*Note that individuals in close proximity may appear overlaying.

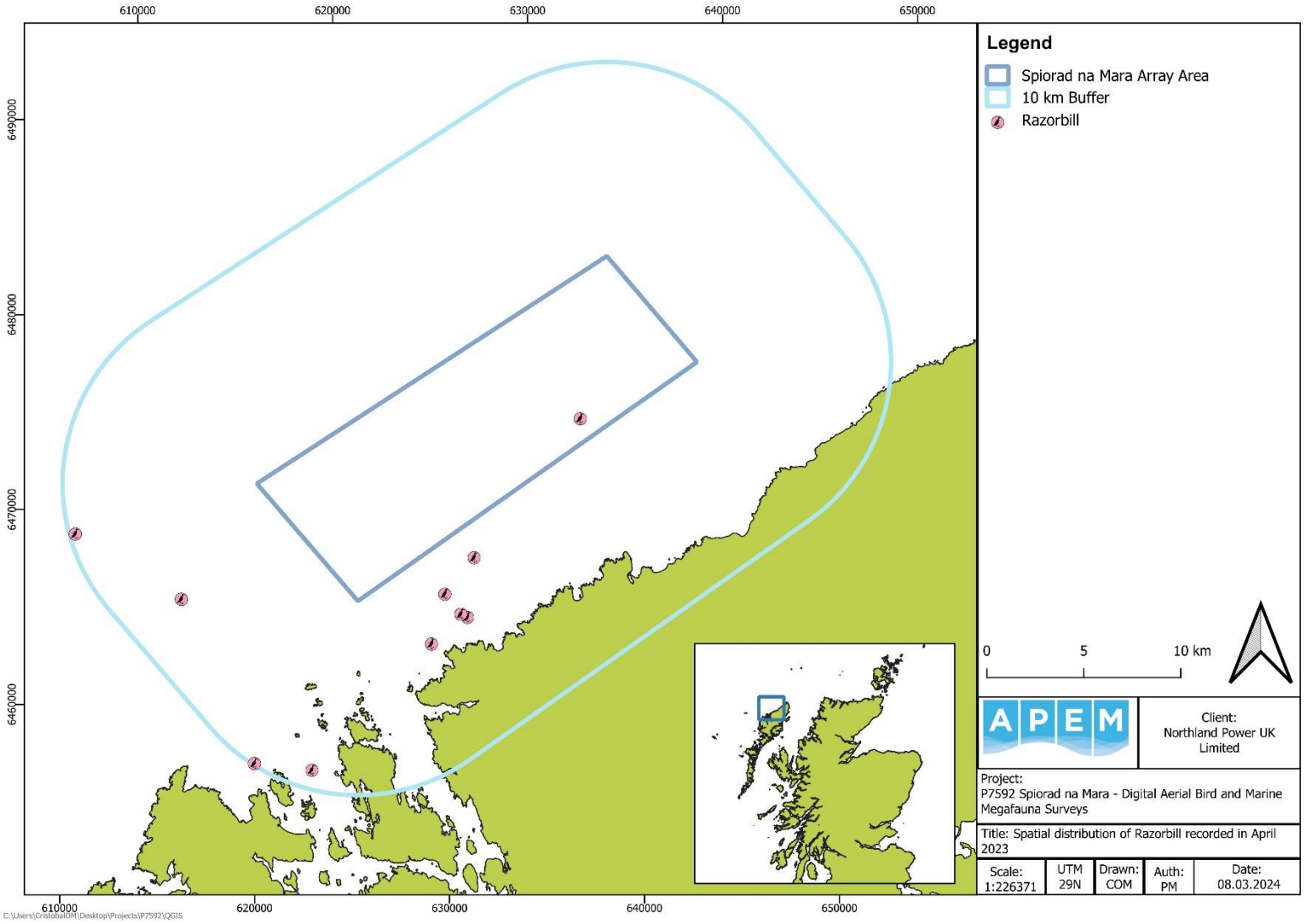


Figure 204 Distribution of razorbill in April 2023
*Note that individuals in close proximity may appear overlaying.

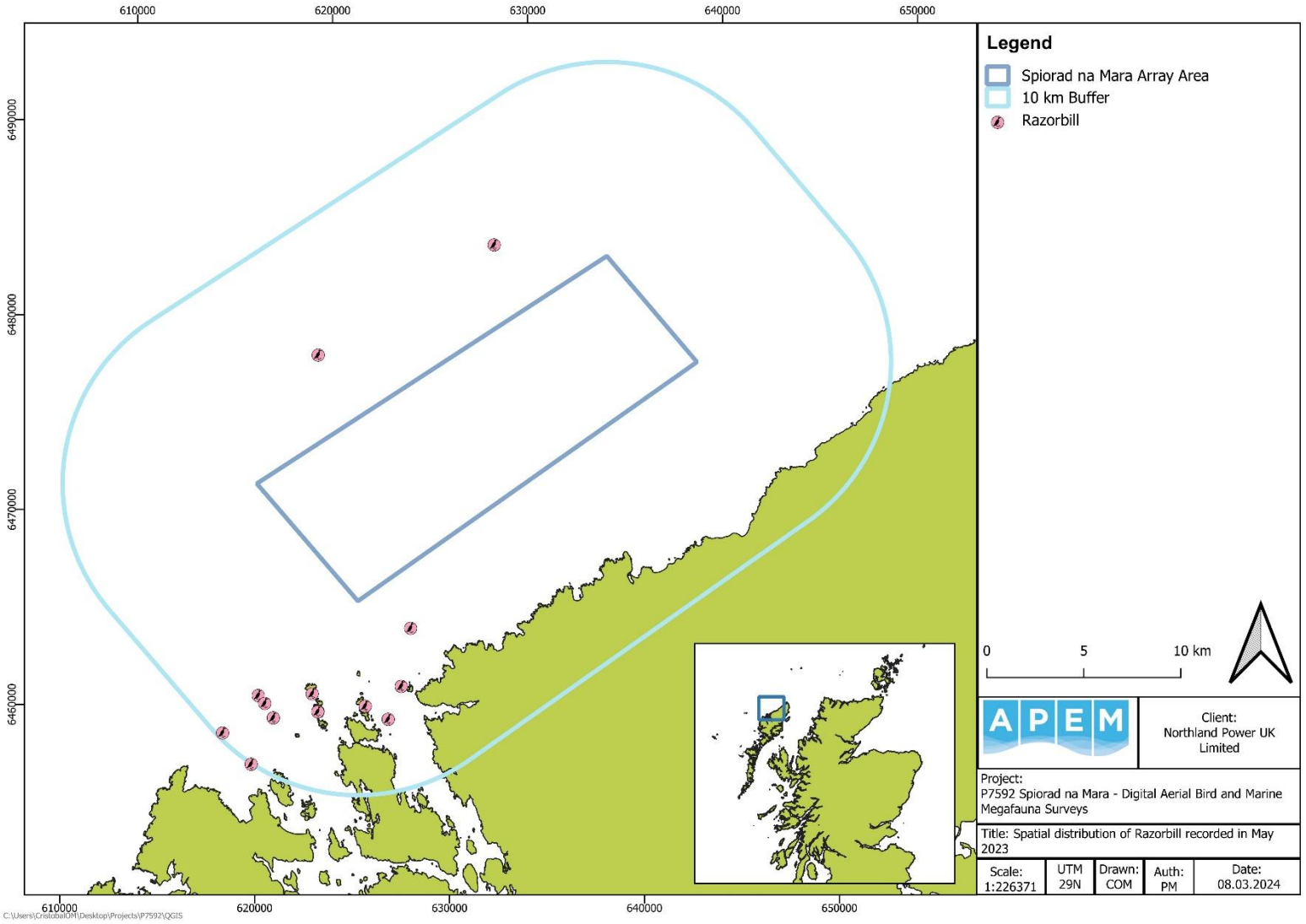


Figure 205 Distribution of razorbill in May 2023
*Note that individuals in close proximity may appear overlaying.

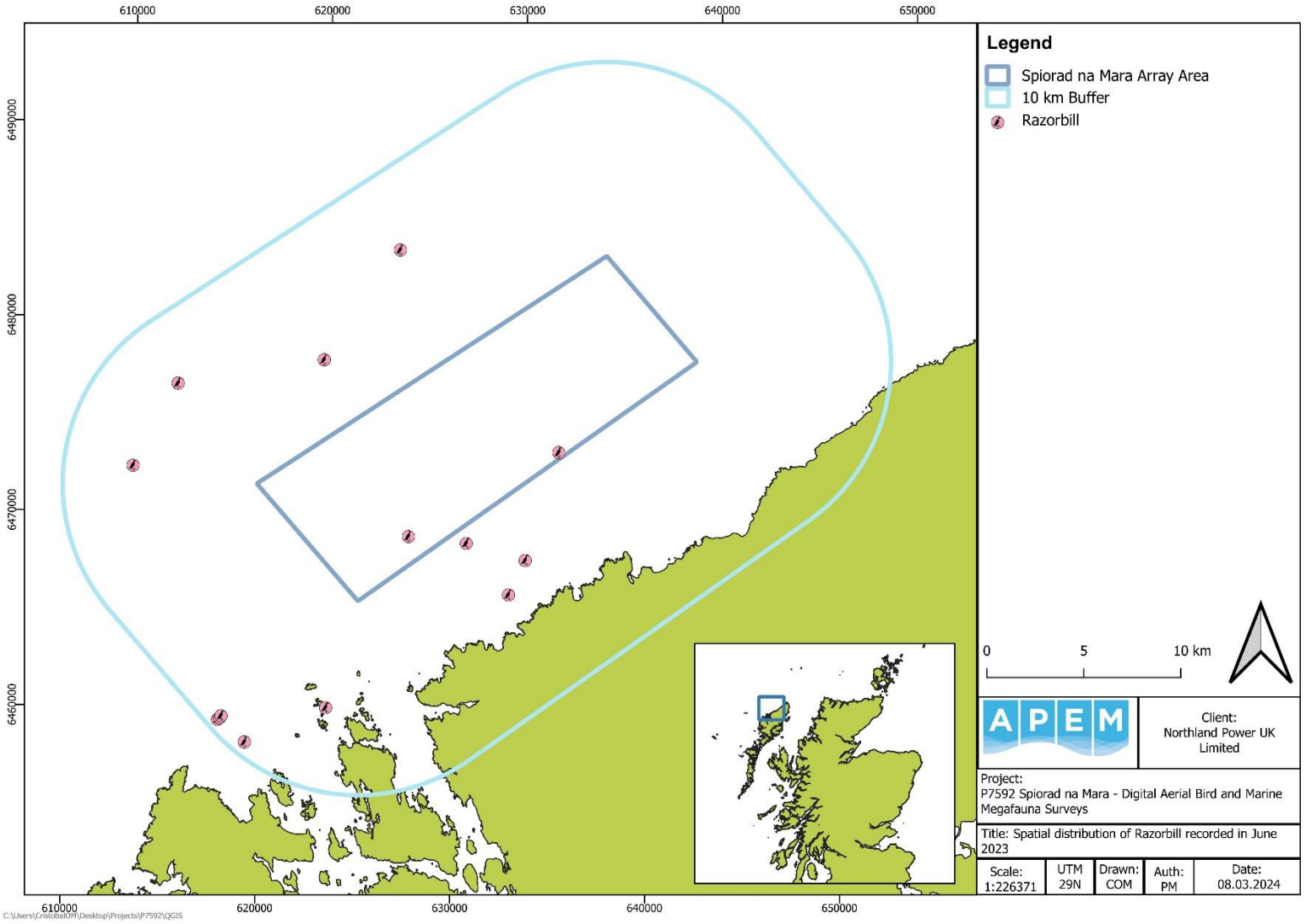


Figure 206 Distribution of razorbill in June 2023
*Note that individuals in close proximity may appear overlaying.

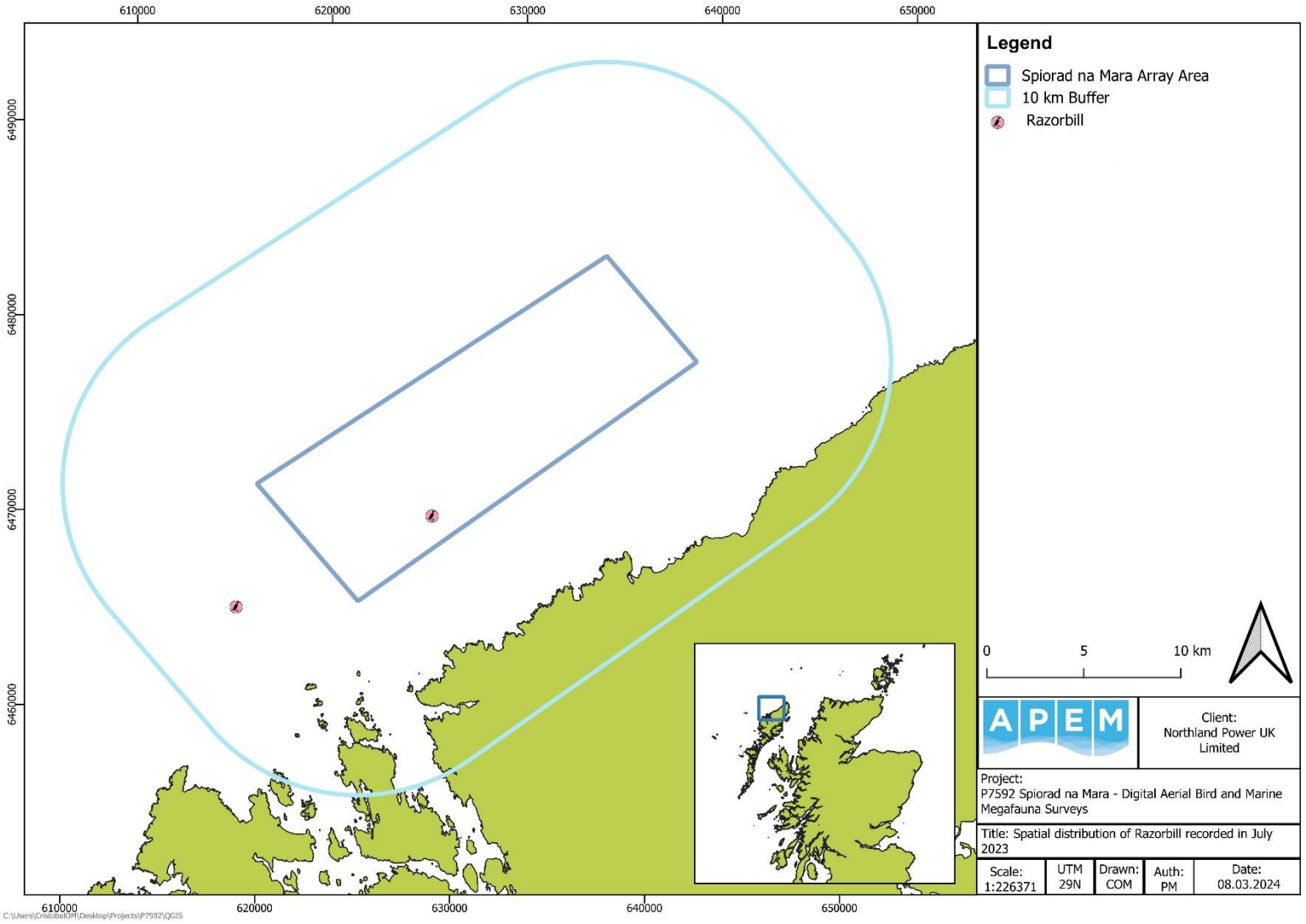


Figure 207 Distribution of razorbill in July 2023
*Note that individuals in close proximity may appear overlaying.

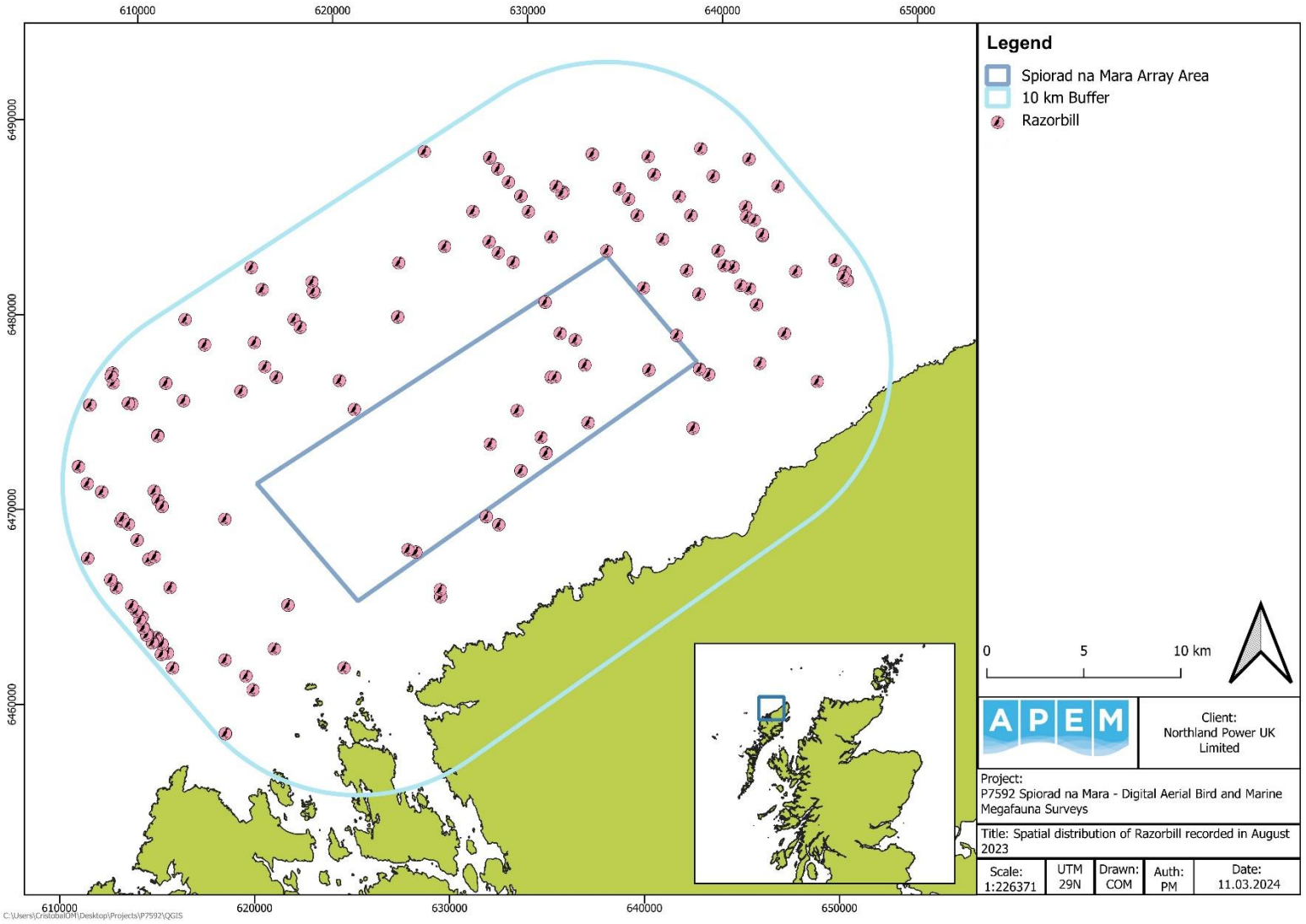


Figure 208 Distribution of razorbill in August 2023
*Note that individuals in close proximity may appear overlaying.

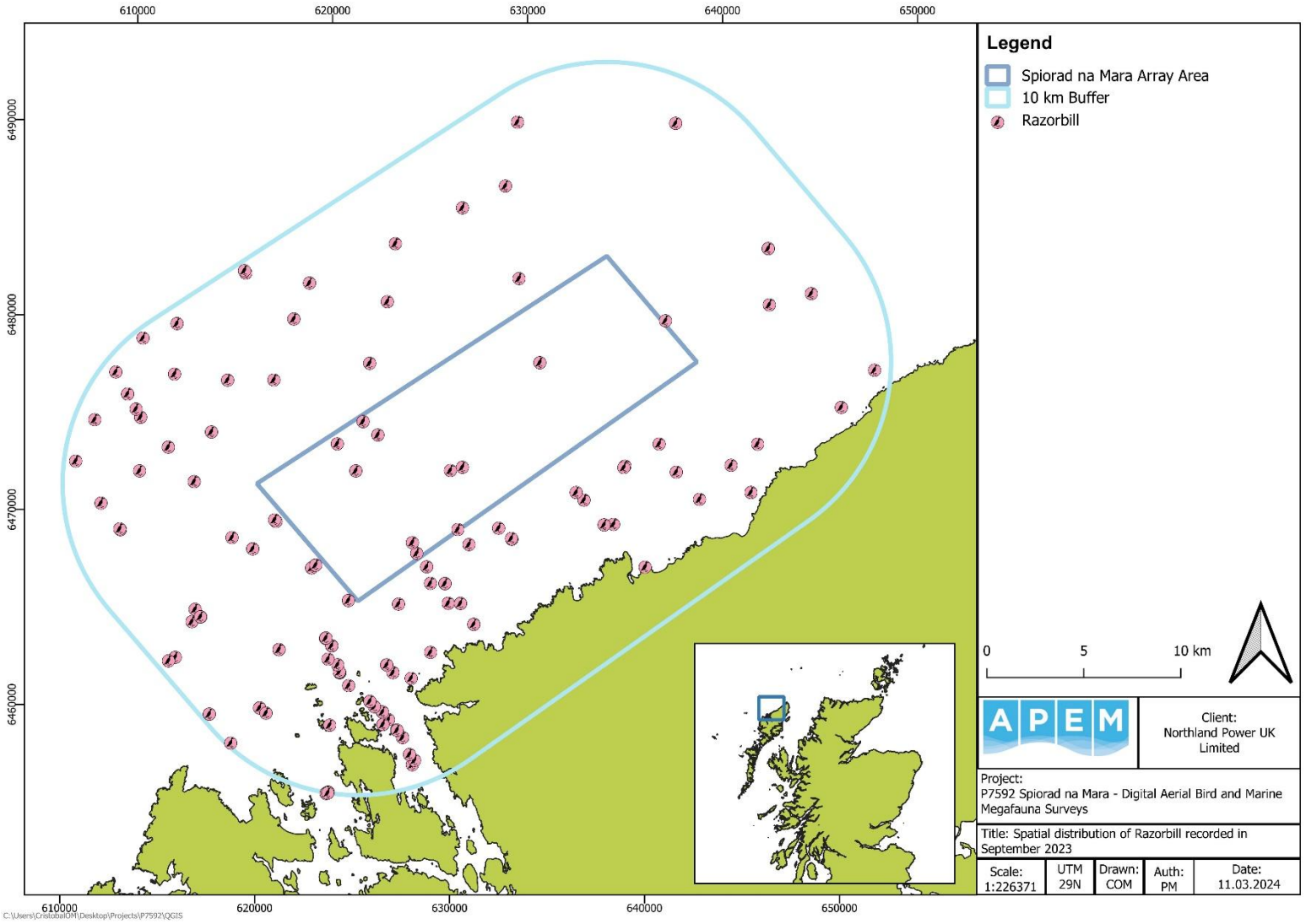


Figure 209 Distribution of razorbill in September 2023

*Note that individuals in close proximity may appear overlaying.

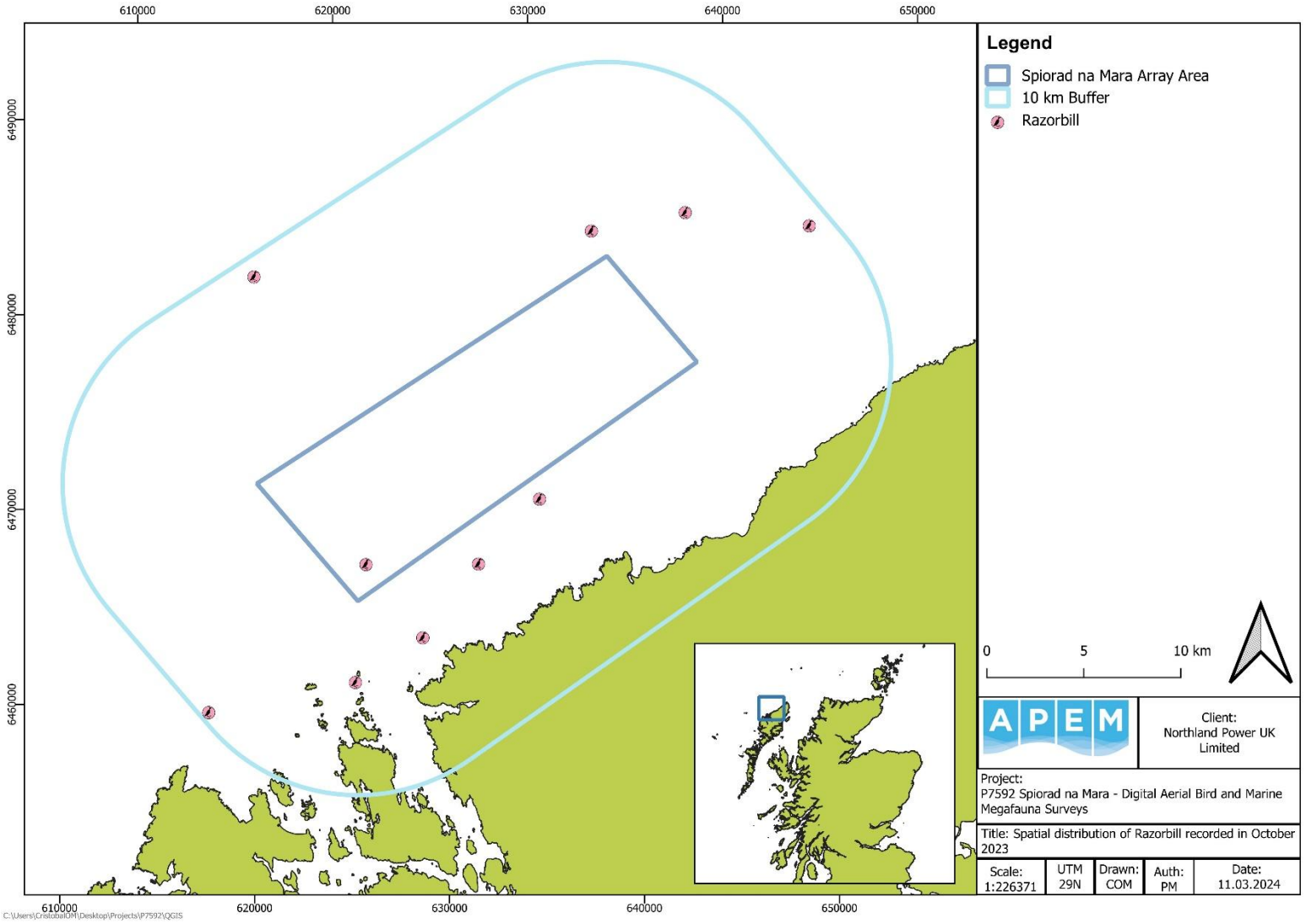


Figure 210 Distribution of razorbill in October 2023

*Note that individuals in close proximity may appear overlaying.

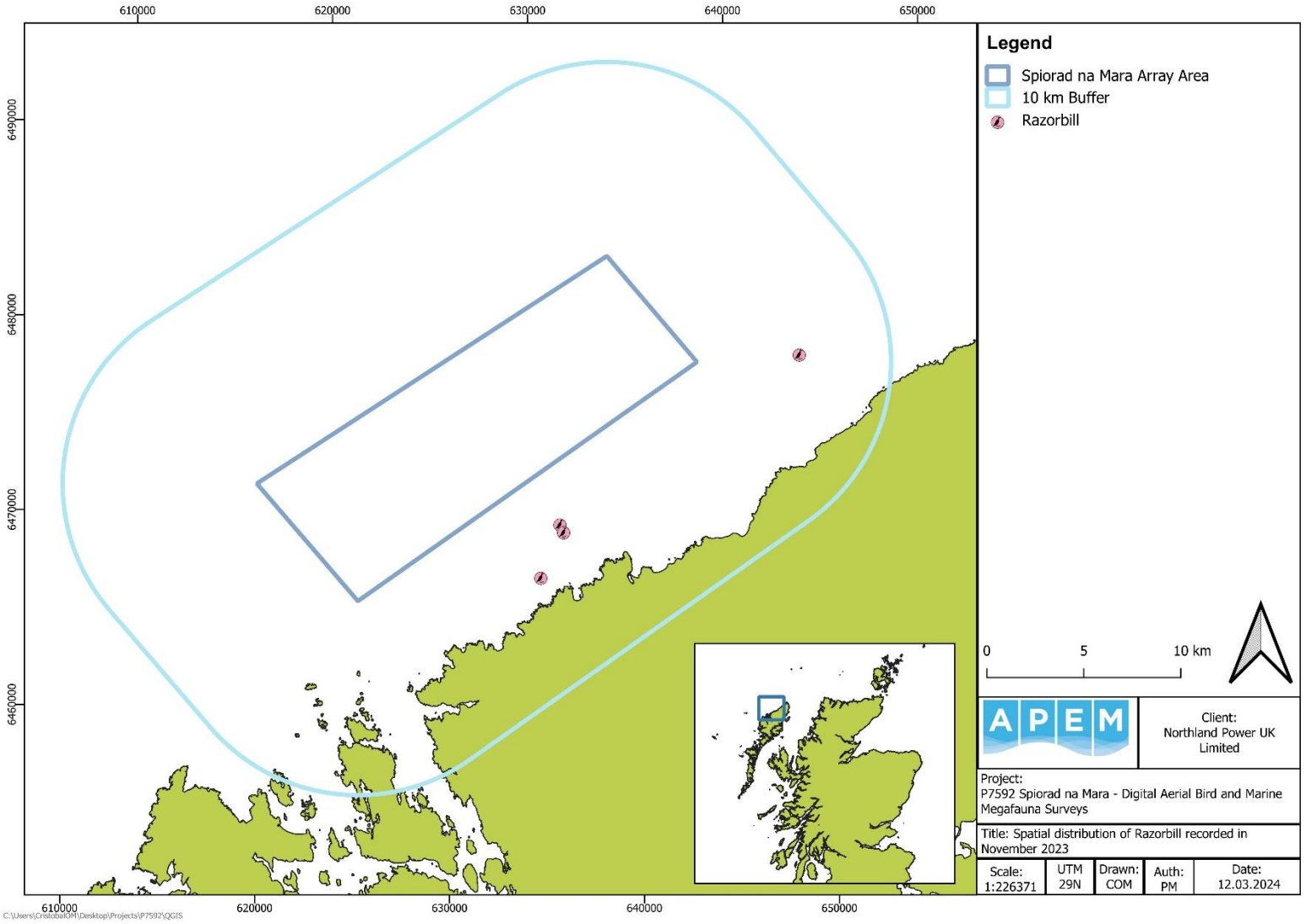


Figure 211 Distribution of razorbill in November 2023

*Note that individuals in close proximity may appear overlaying.

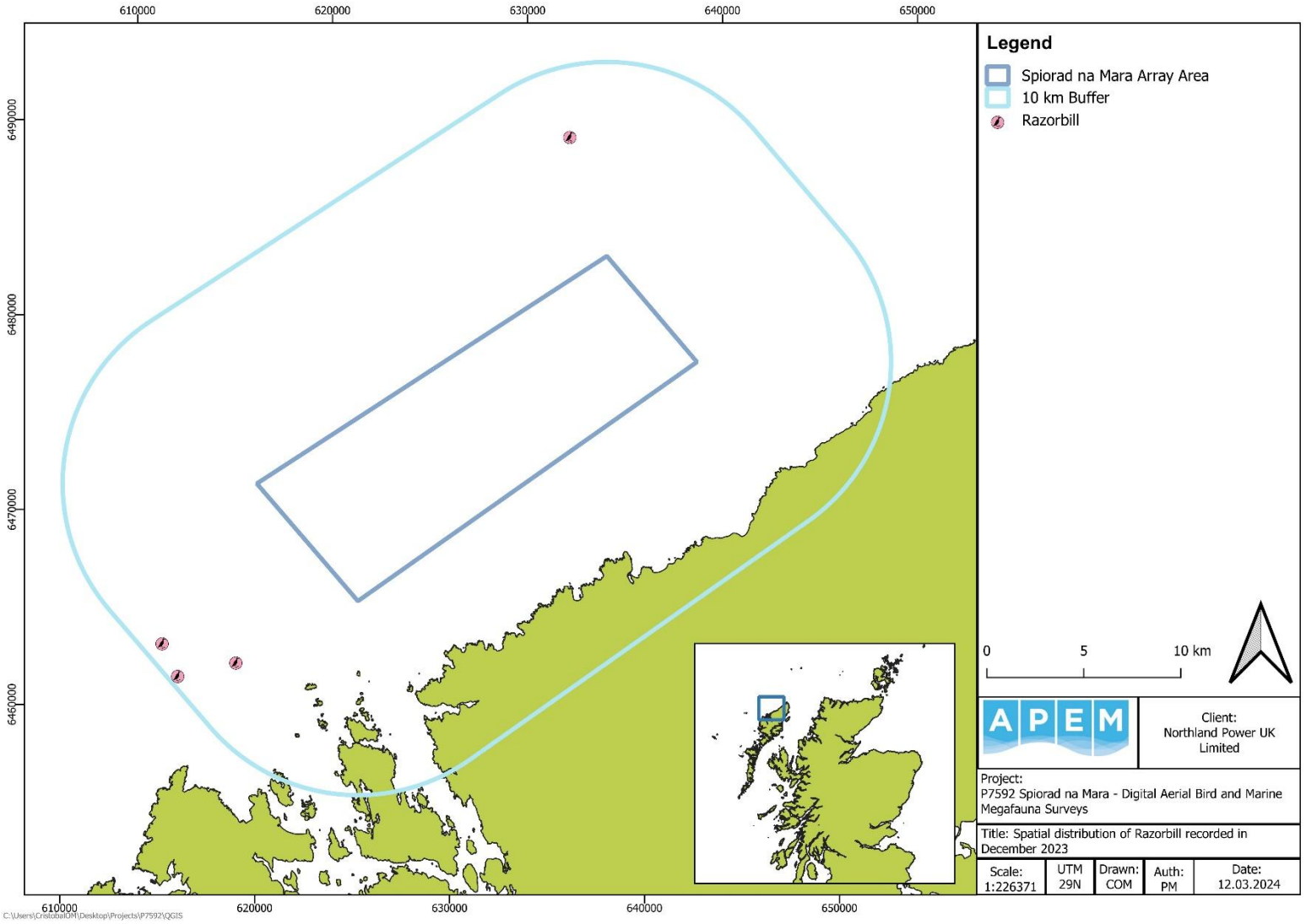


Figure 212 Distribution of razorbill in December 2023

*Note that individuals in close proximity may appear overlaying.

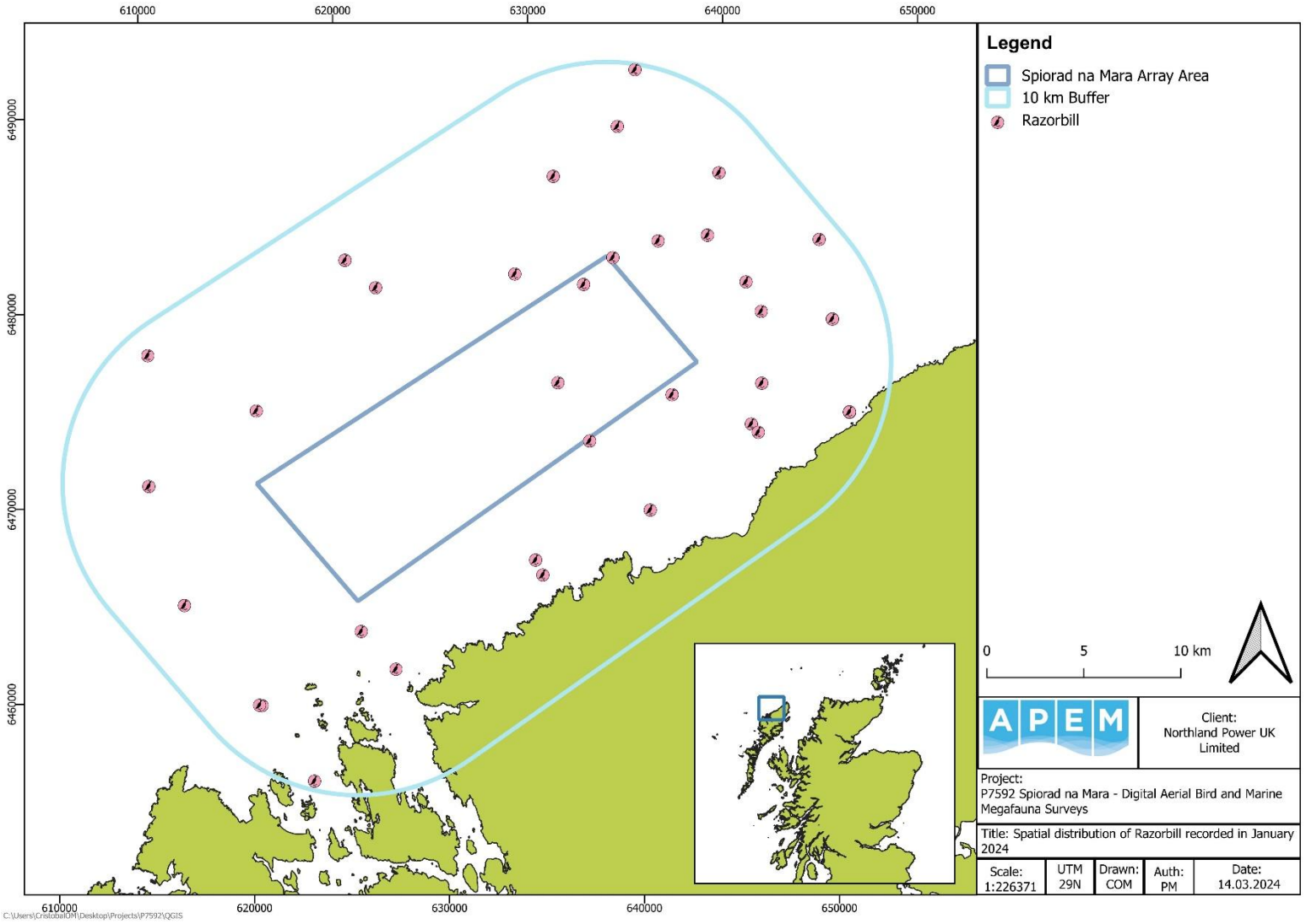


Figure 213 Distribution of razorbill in January 2024

*Note that individuals in close proximity may appear overlaying.

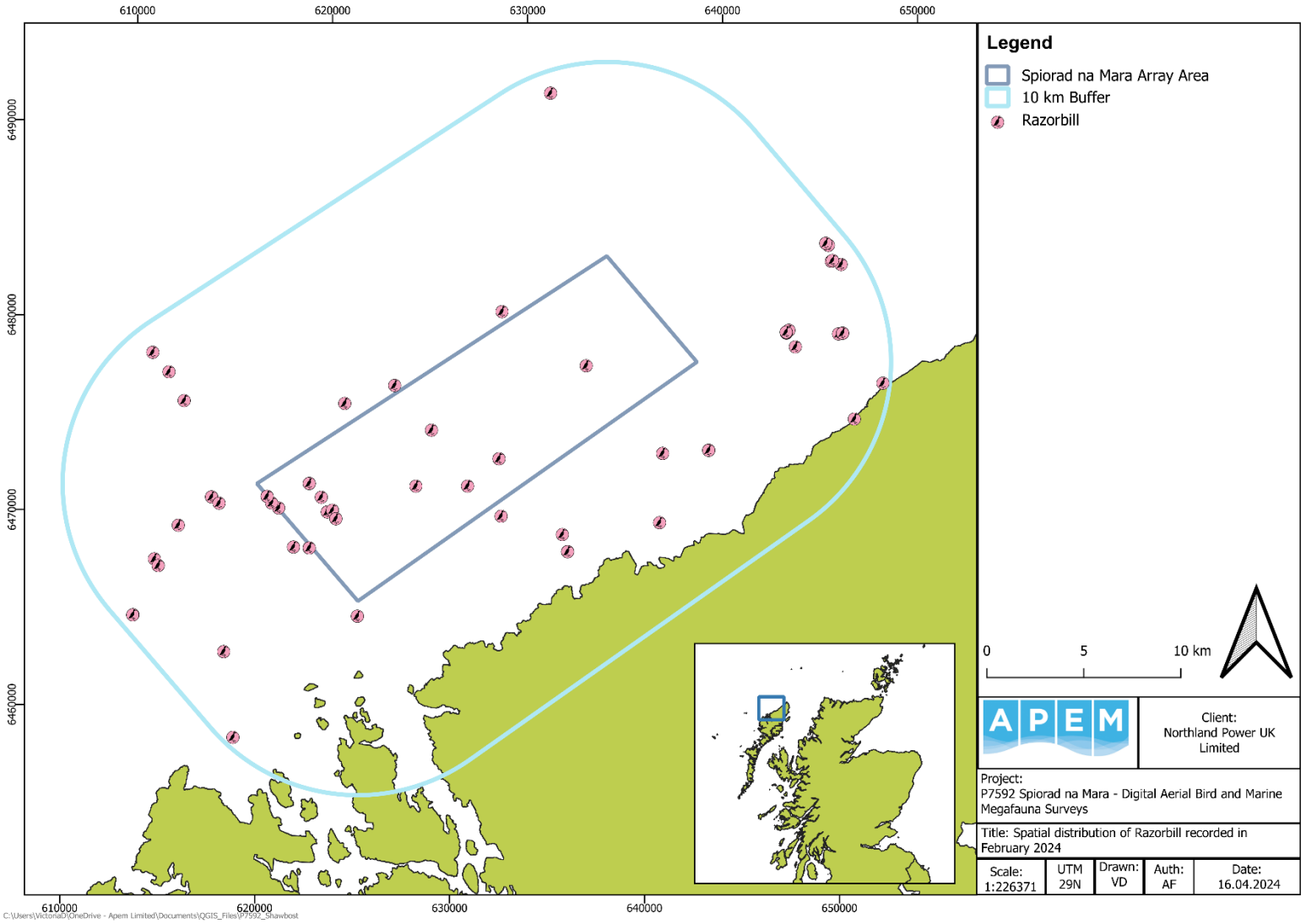


Figure 214 Distribution of razorbill in February 2024
*Note that individuals in close proximity may appear overlaying.

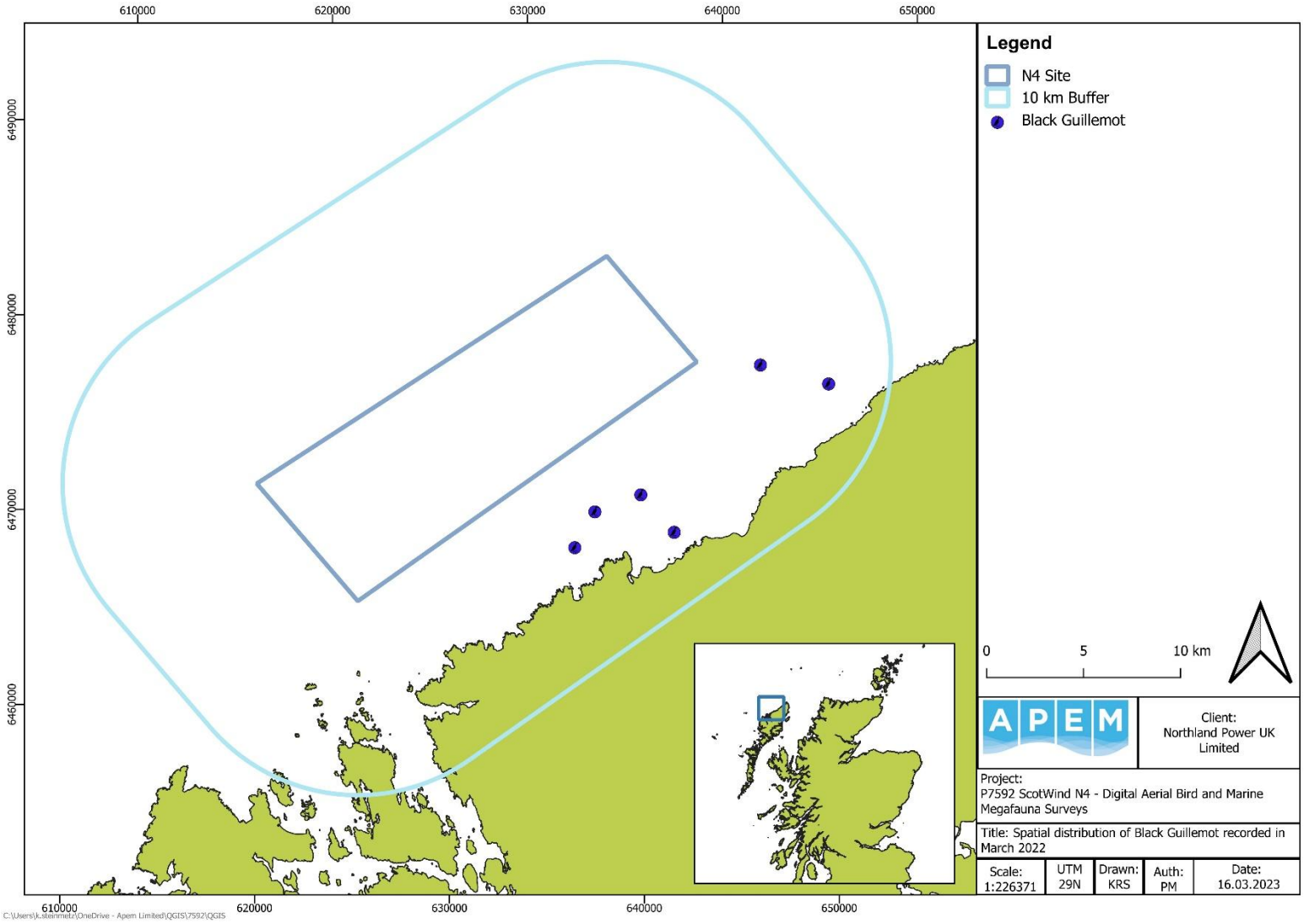


Figure 215 Distribution of black guillemot in March 2022

*Note that individuals in close proximity may appear overlaying.

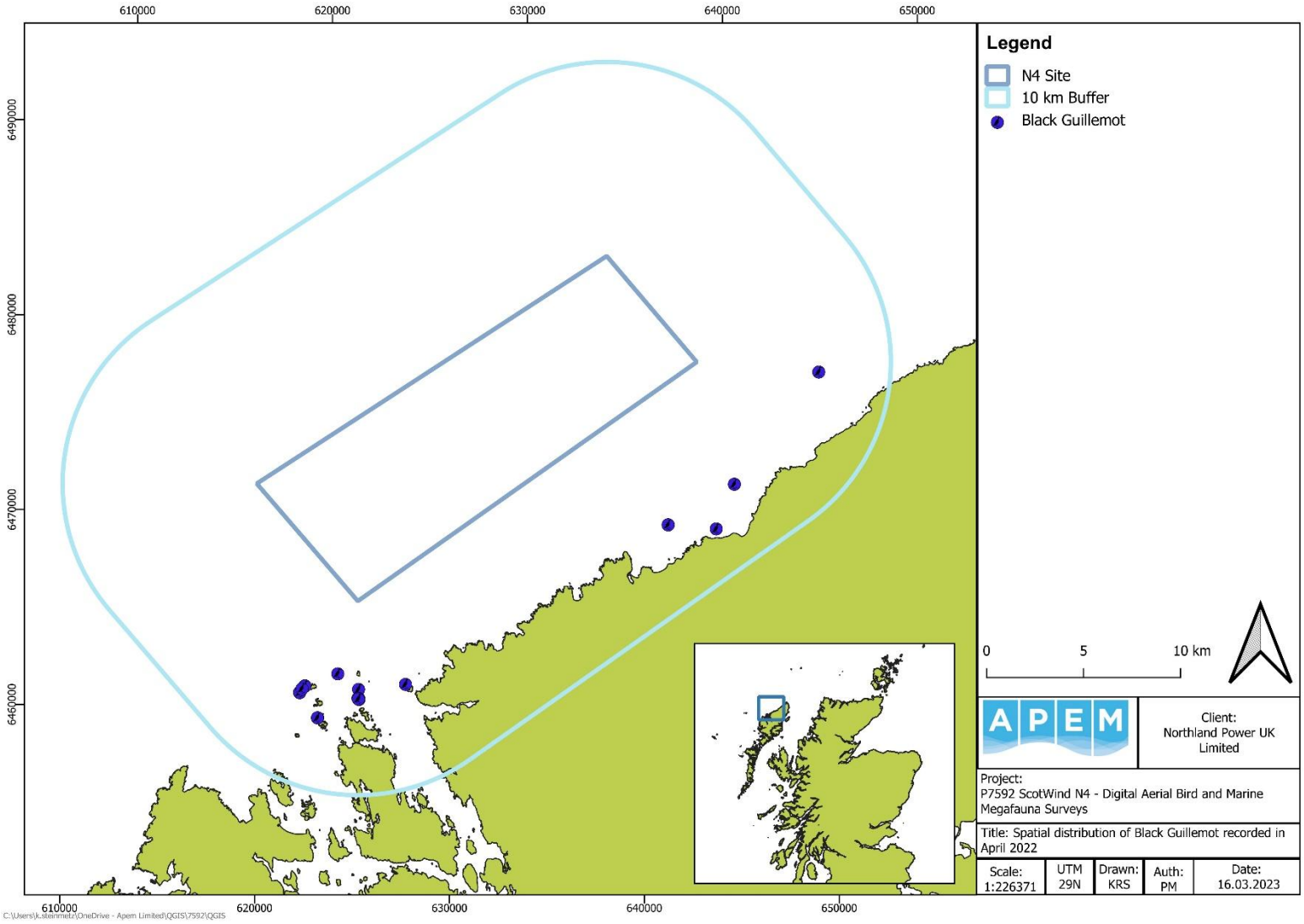


Figure 216 Distribution of black guillemot in April 2022

*Note that individuals in close proximity may appear overlaying.

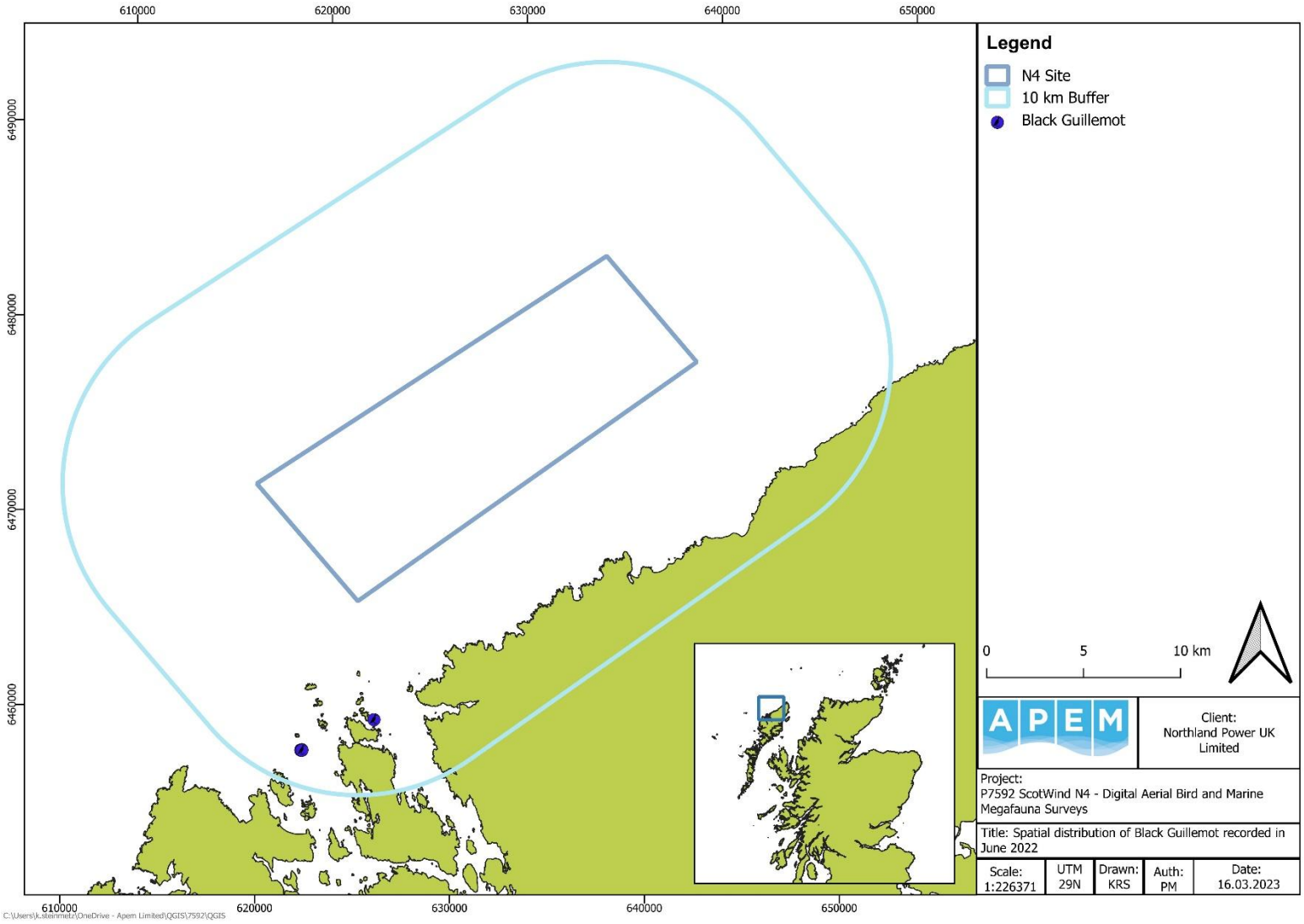


Figure 217 Distribution of black guillemot in June 2022

*Note that individuals in close proximity may appear overlaying.

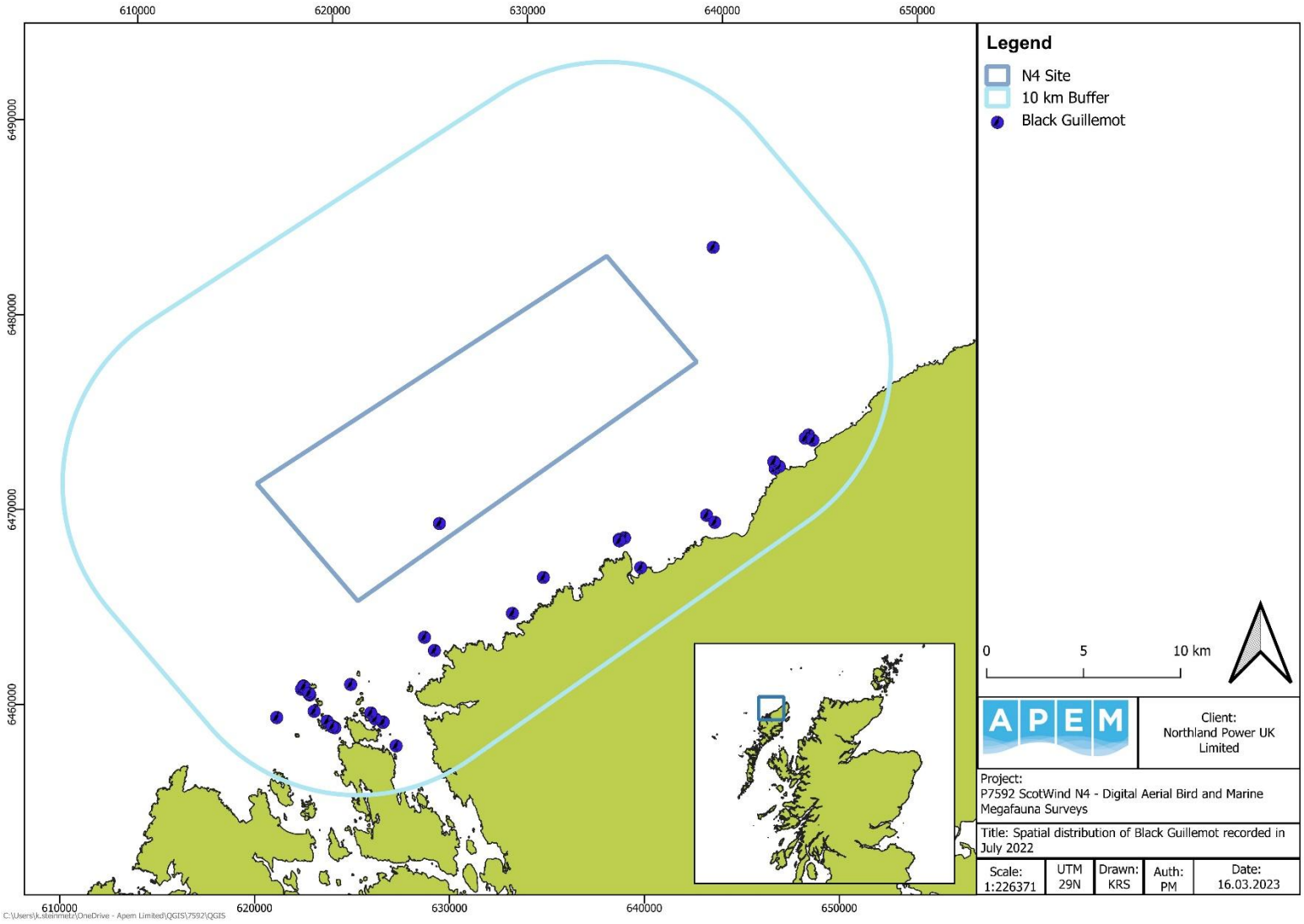


Figure 218 Distribution of black guillemot in July 2022

*Note that individuals in close proximity may appear overlaying.

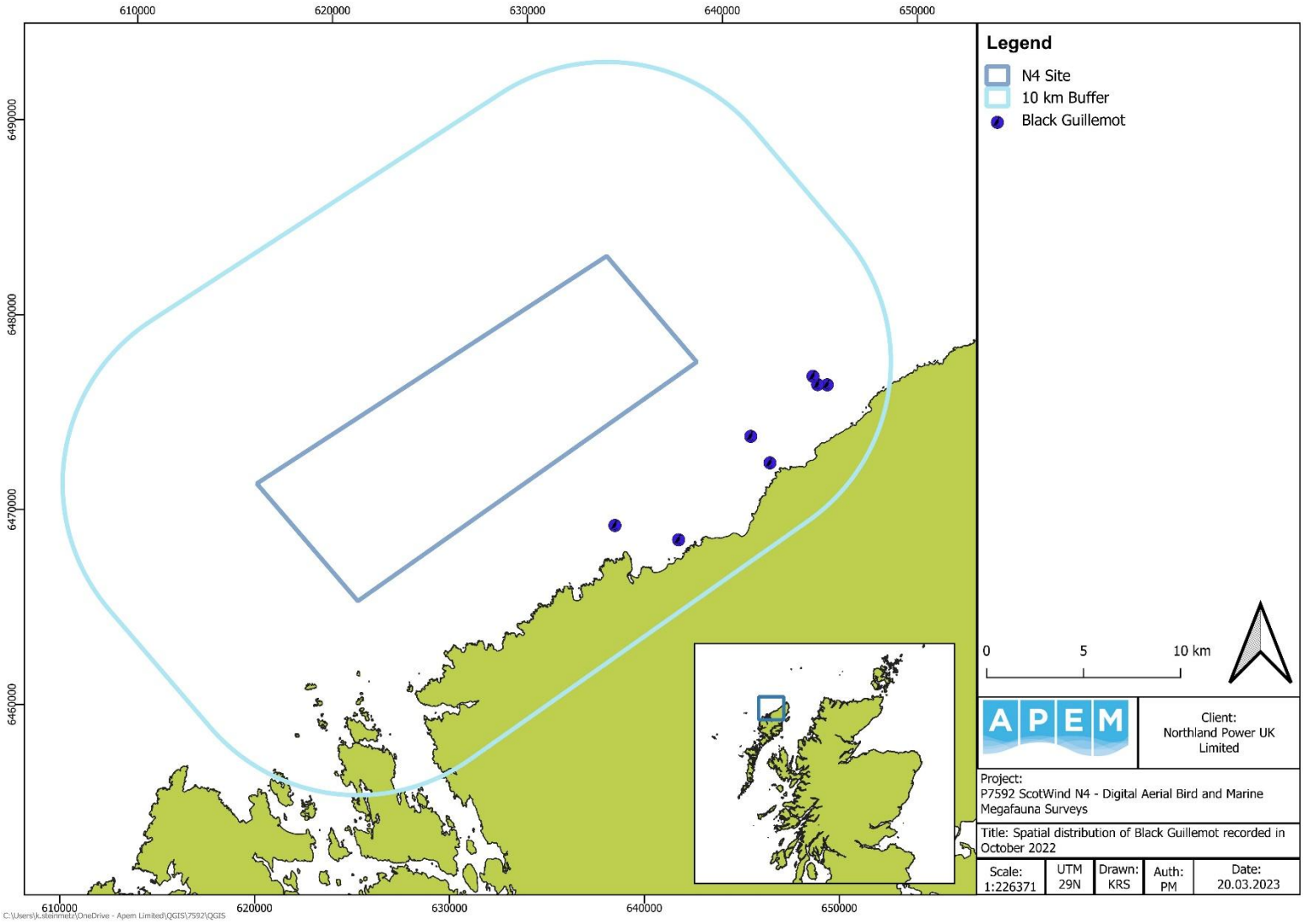


Figure 219 Distribution of black guillemot in October 2022
*Note that individuals in close proximity may appear overlaying.

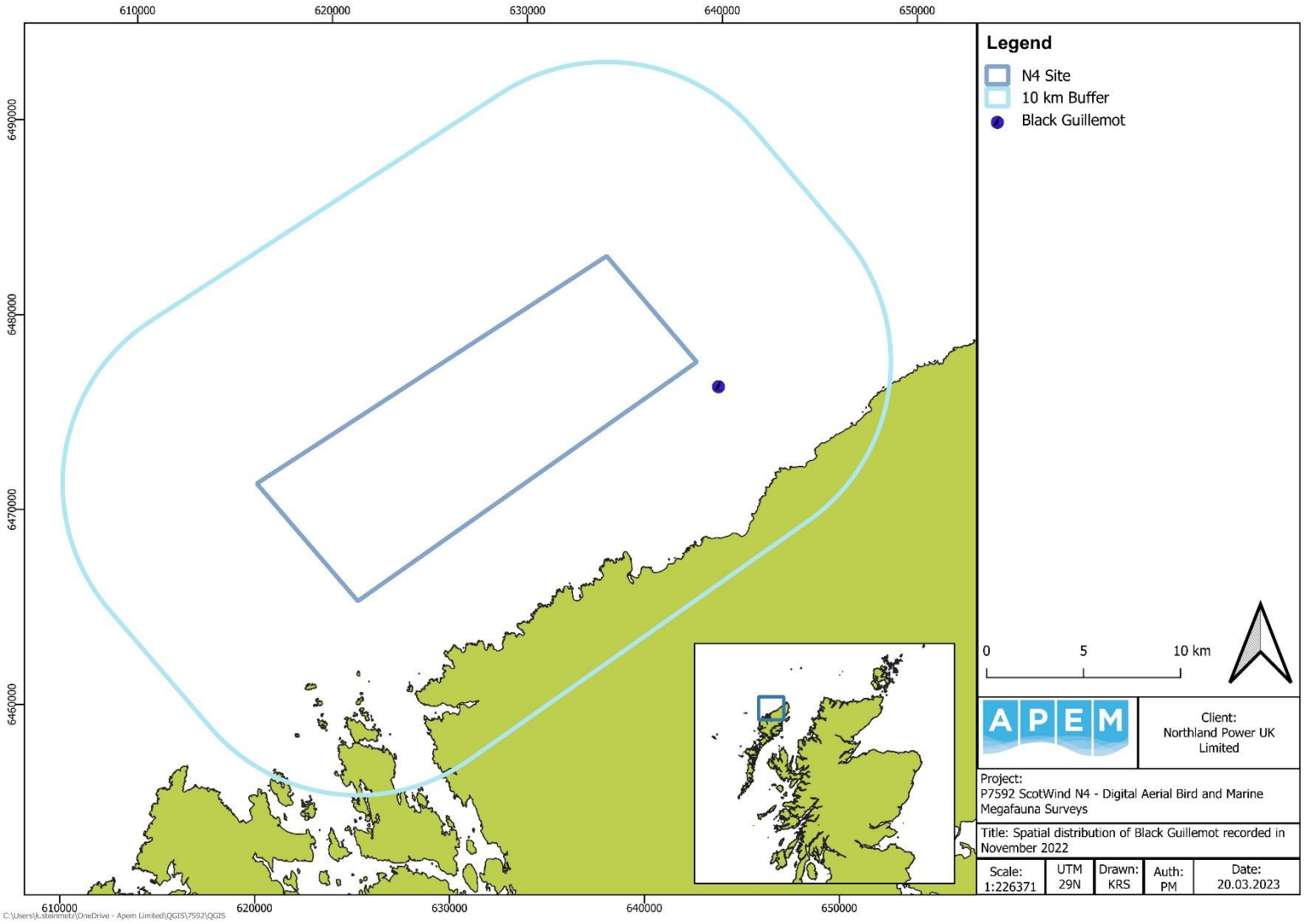


Figure 220 Distribution of black guillemot in November 2022

*Note that individuals in close proximity may appear overlaying.

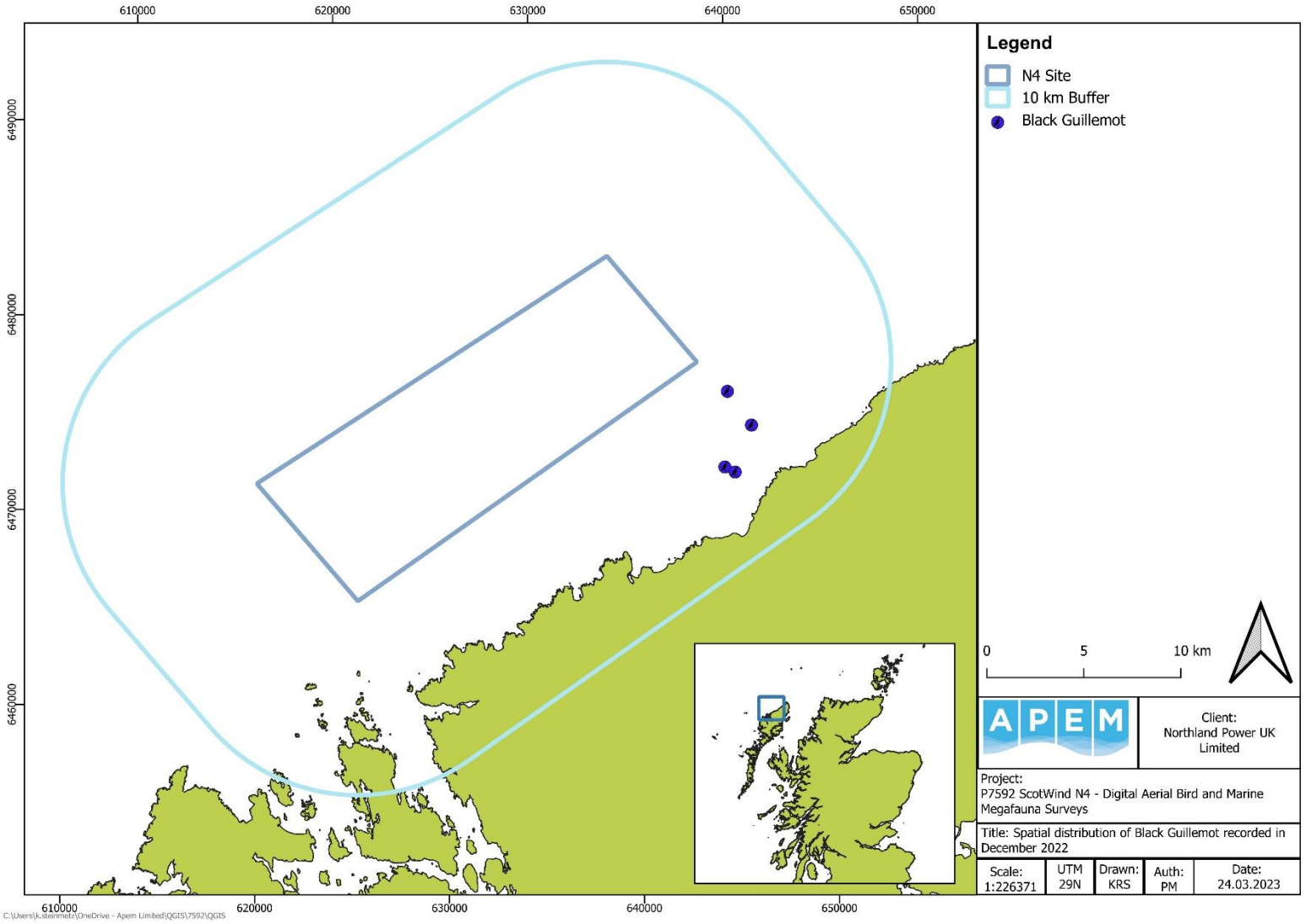


Figure 221 Distribution of black guillemot in December 2022

*Note that individuals in close proximity may appear overlaying.

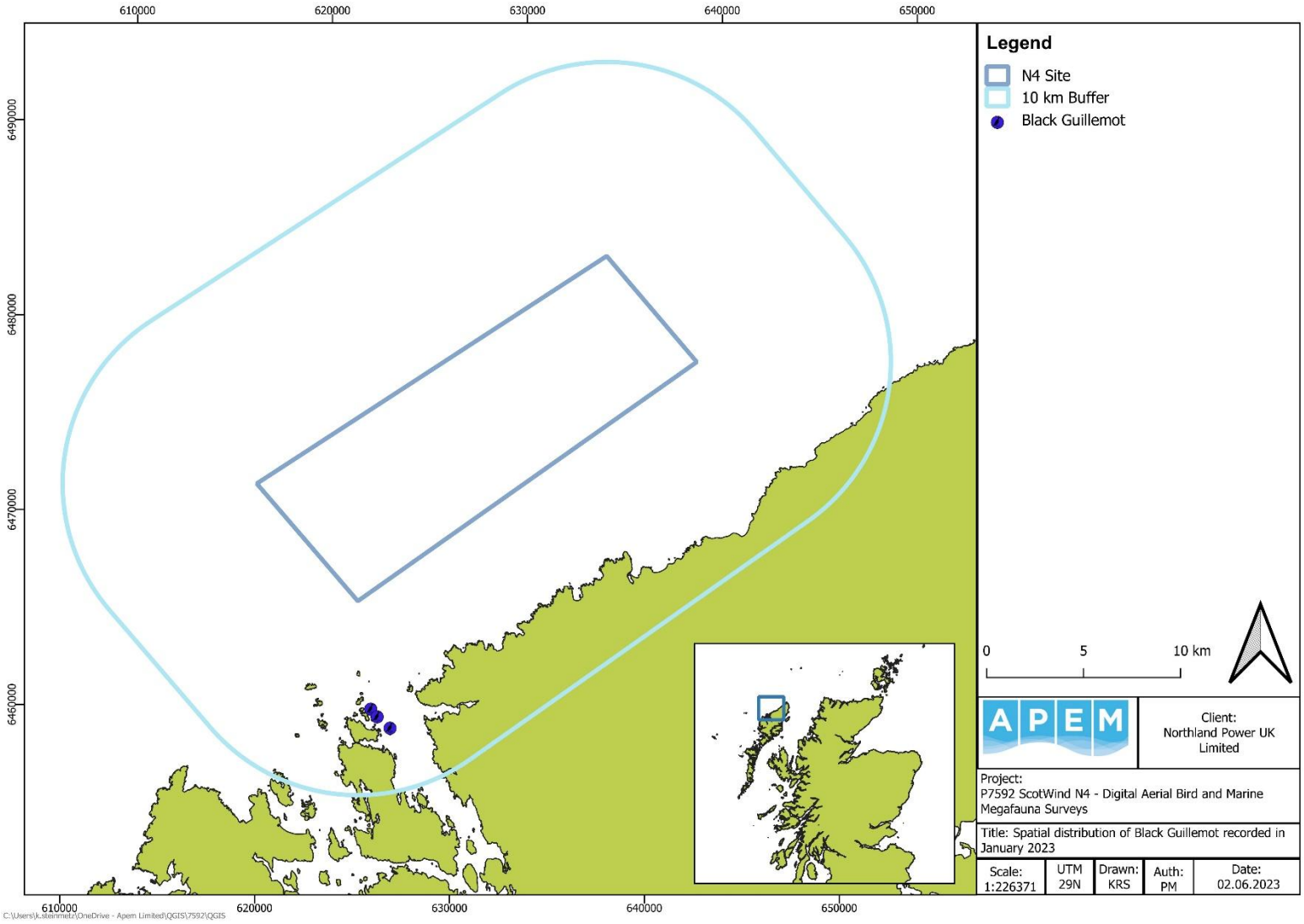


Figure 222 Distribution of black guillemot in January 2023
*Note that individuals in close proximity may appear overlaying.

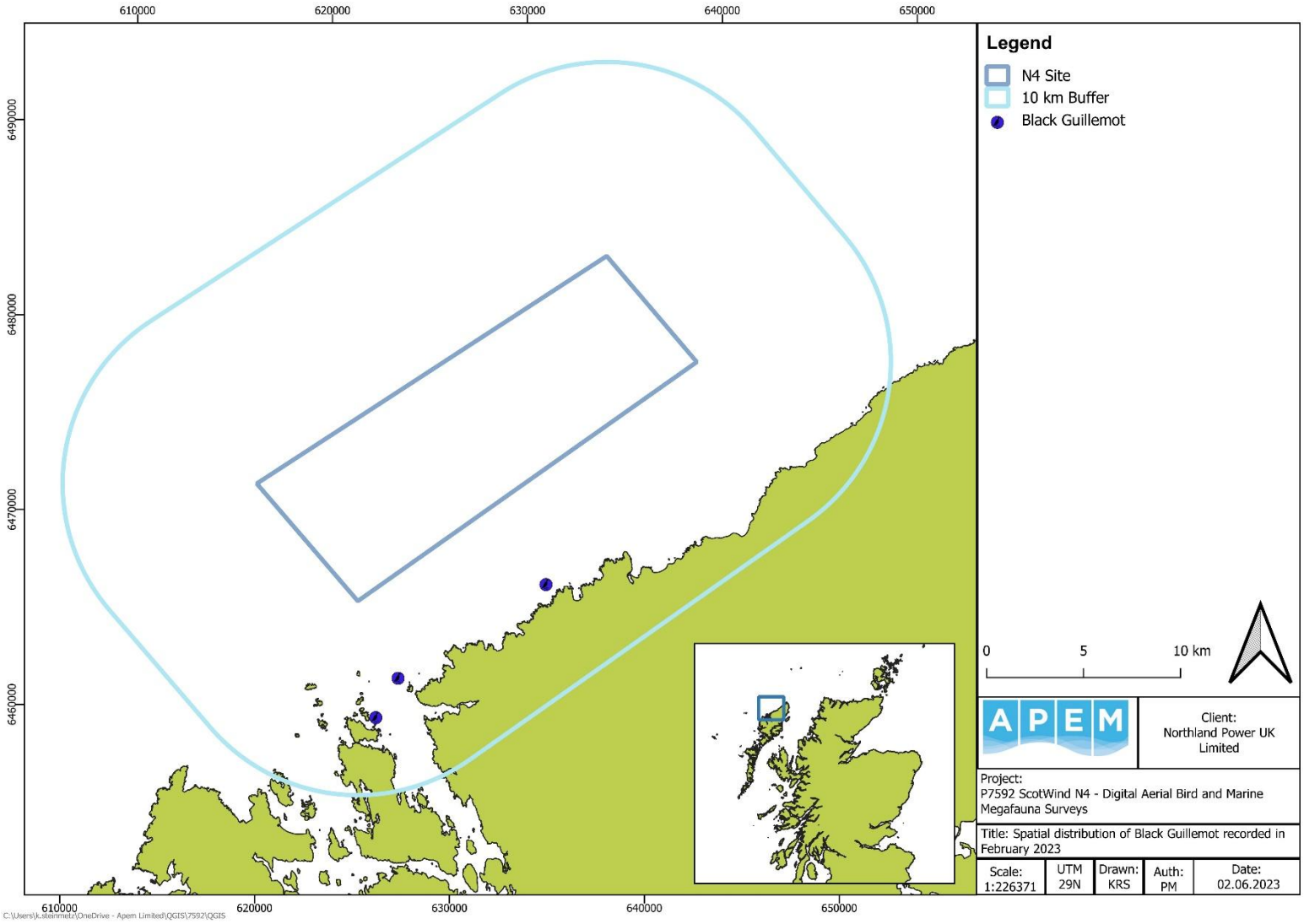


Figure 223 Distribution of black guillemot in February 2023

*Note that individuals in close proximity may appear overlaying.

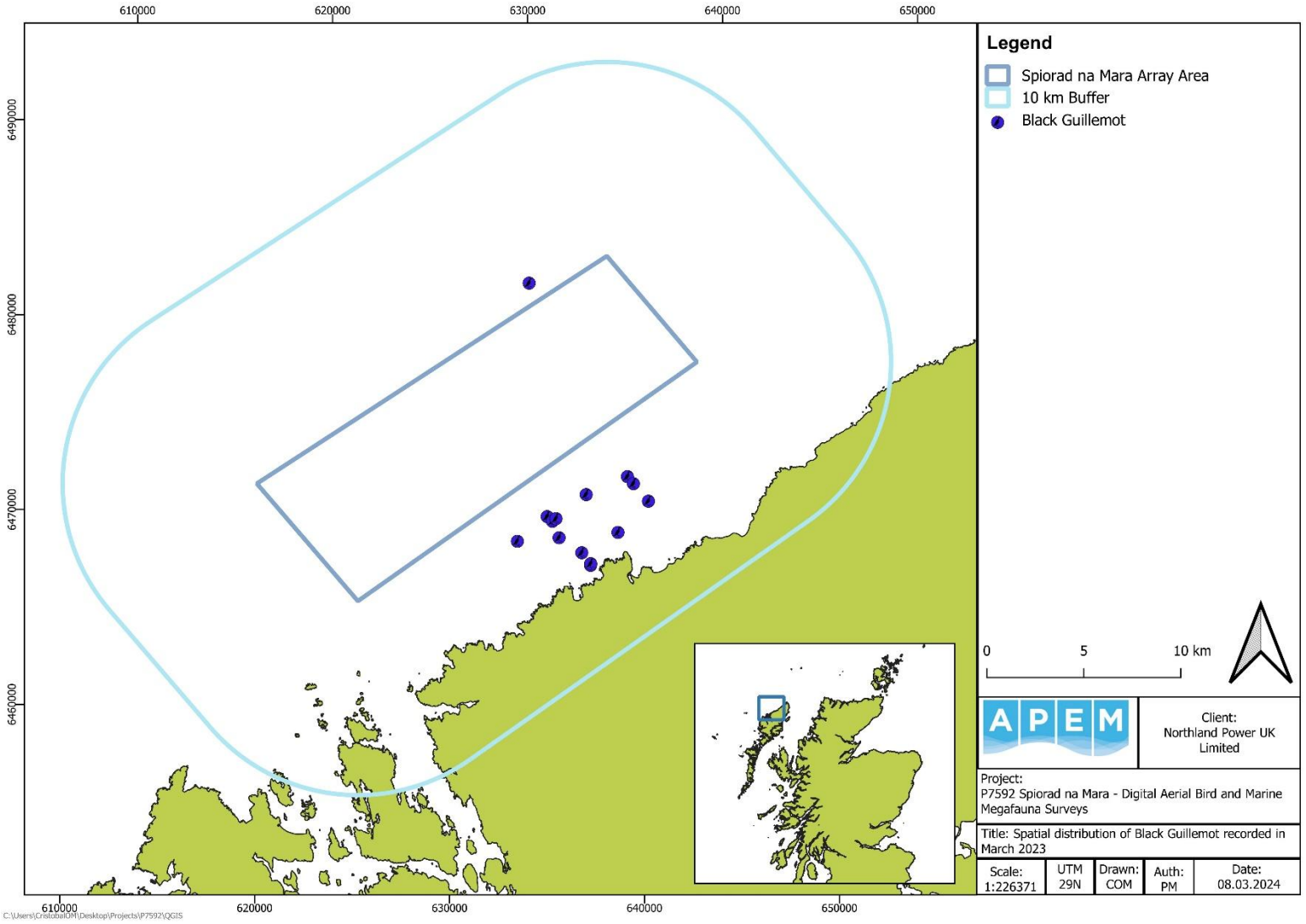


Figure 224 Distribution of black guillemot in March 2023

*Note that individuals in close proximity may appear overlaying.

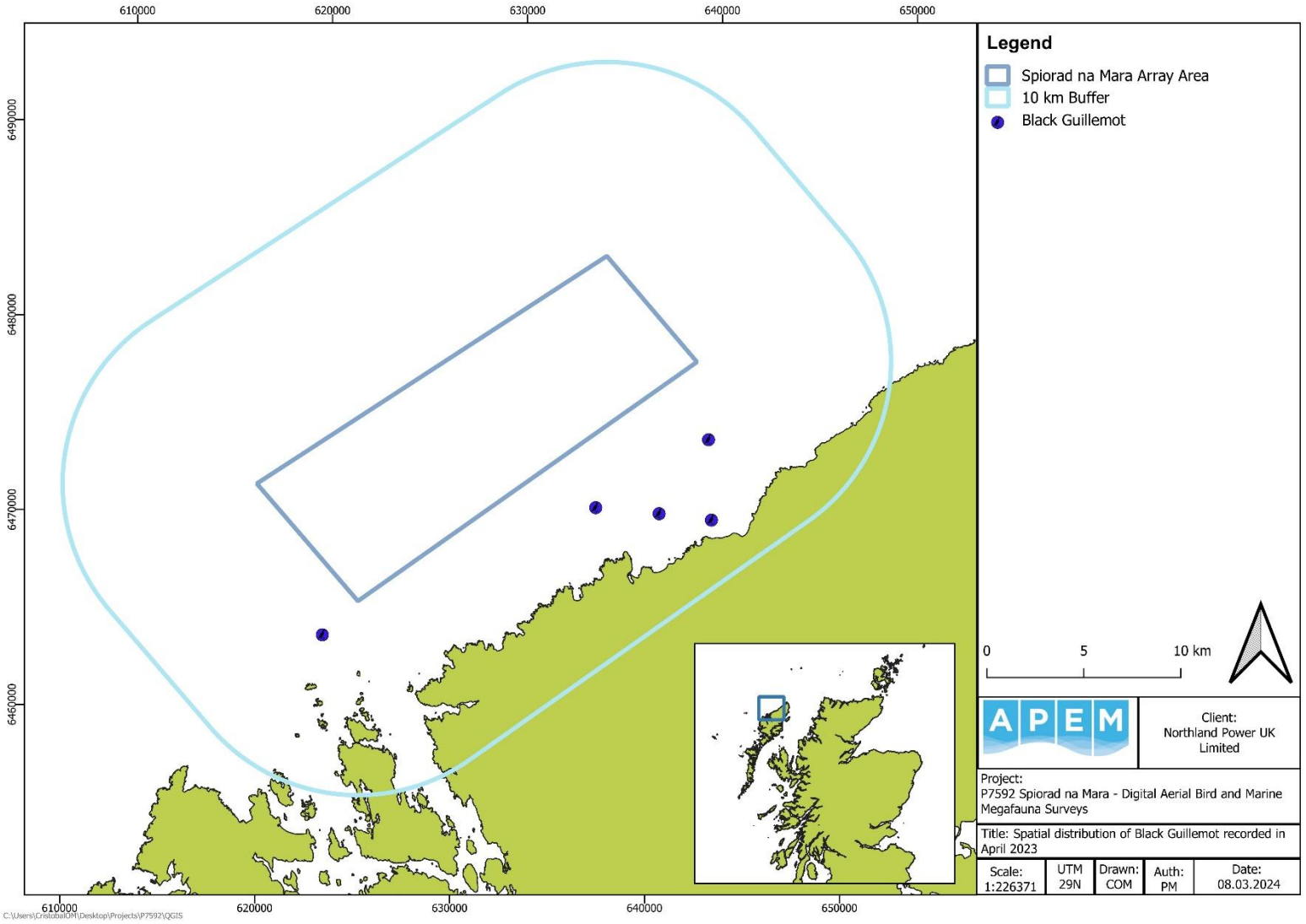


Figure 225 Distribution of black guillemot in April 2023

*Note that individuals in close proximity may appear overlaying.

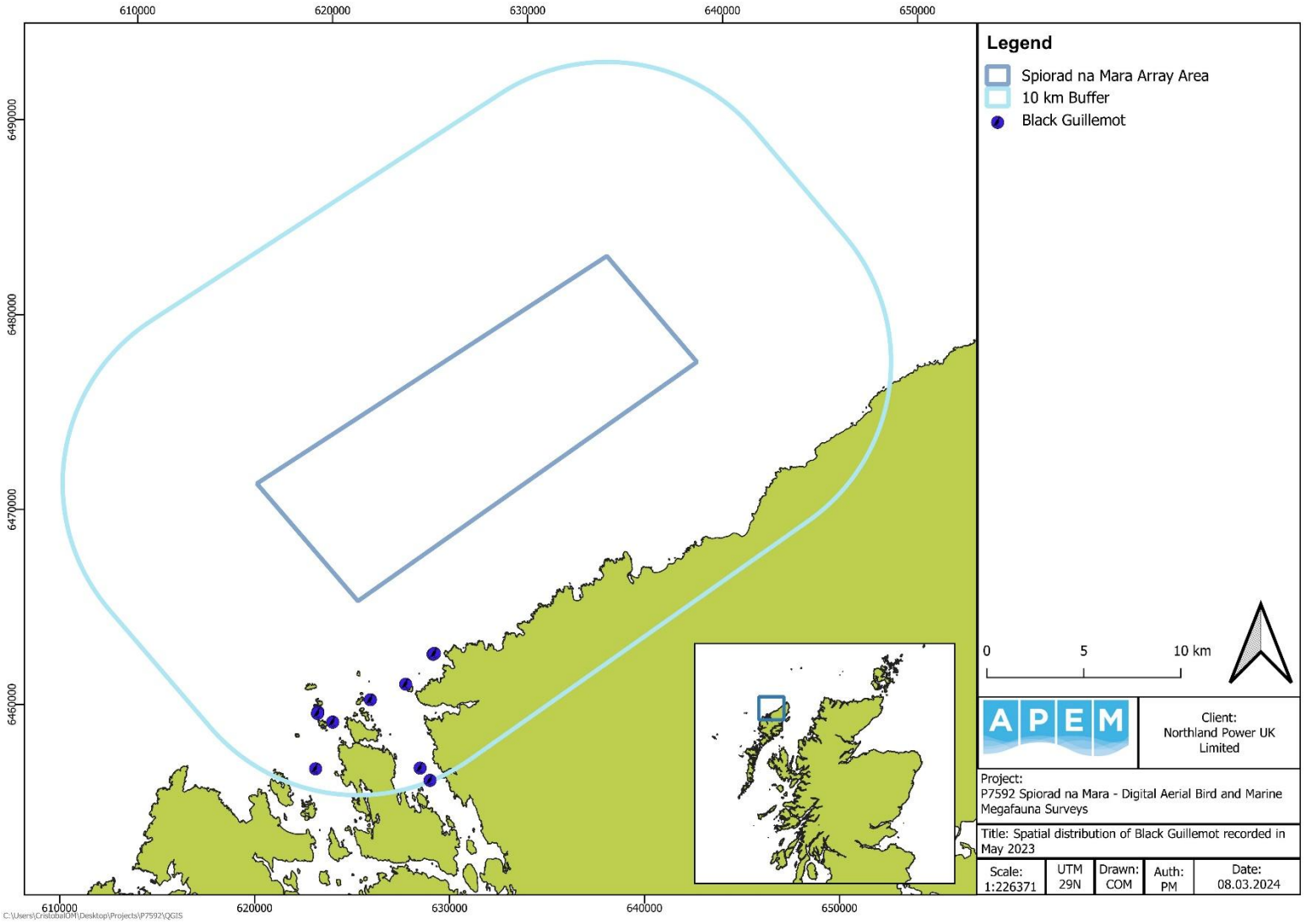


Figure 226 Distribution of black guillemot in May 2023

*Note that individuals in close proximity may appear overlaying.

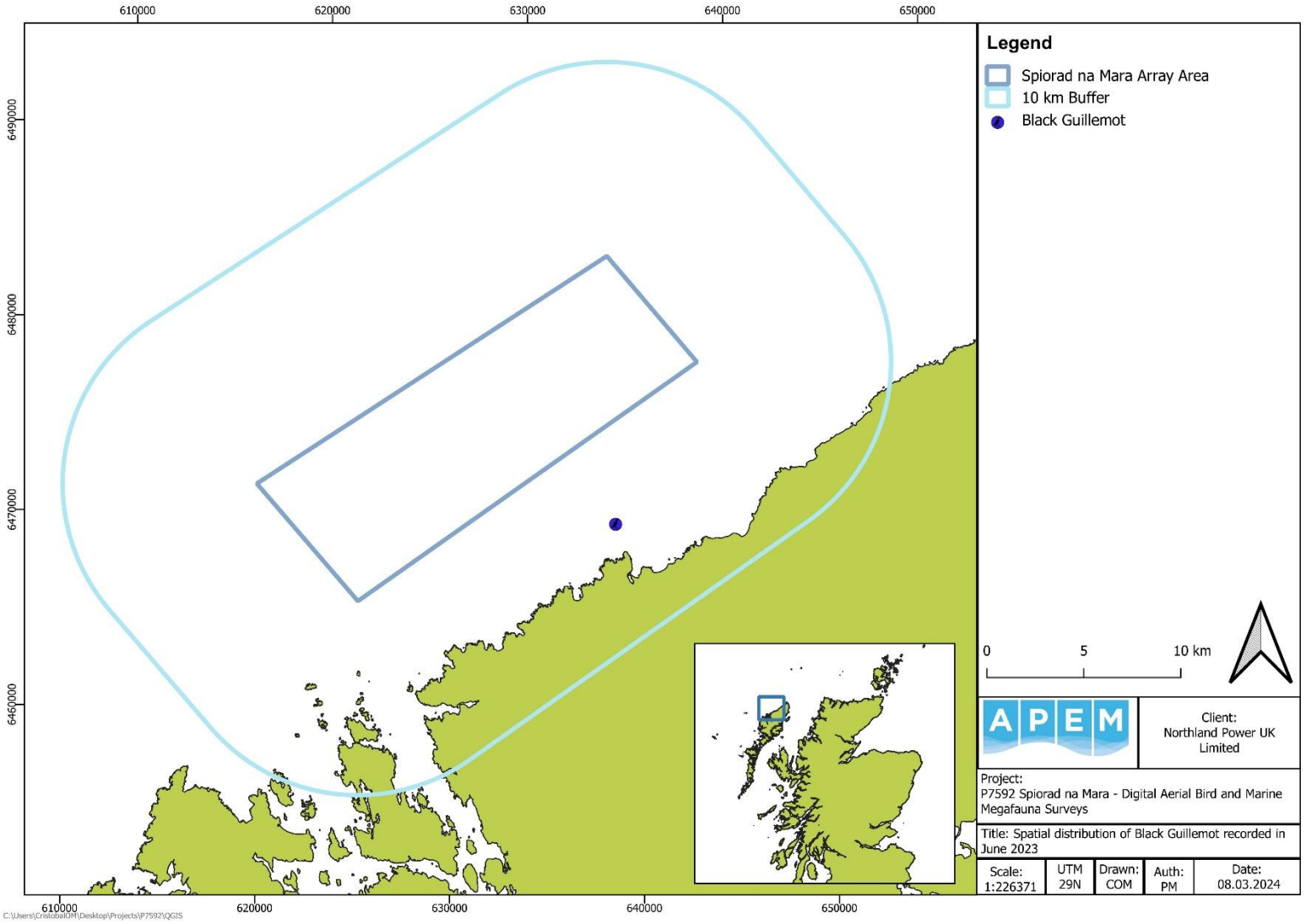


Figure 227 Distribution of black guillemot in June 2023

*Note that individuals in close proximity may appear overlaying.

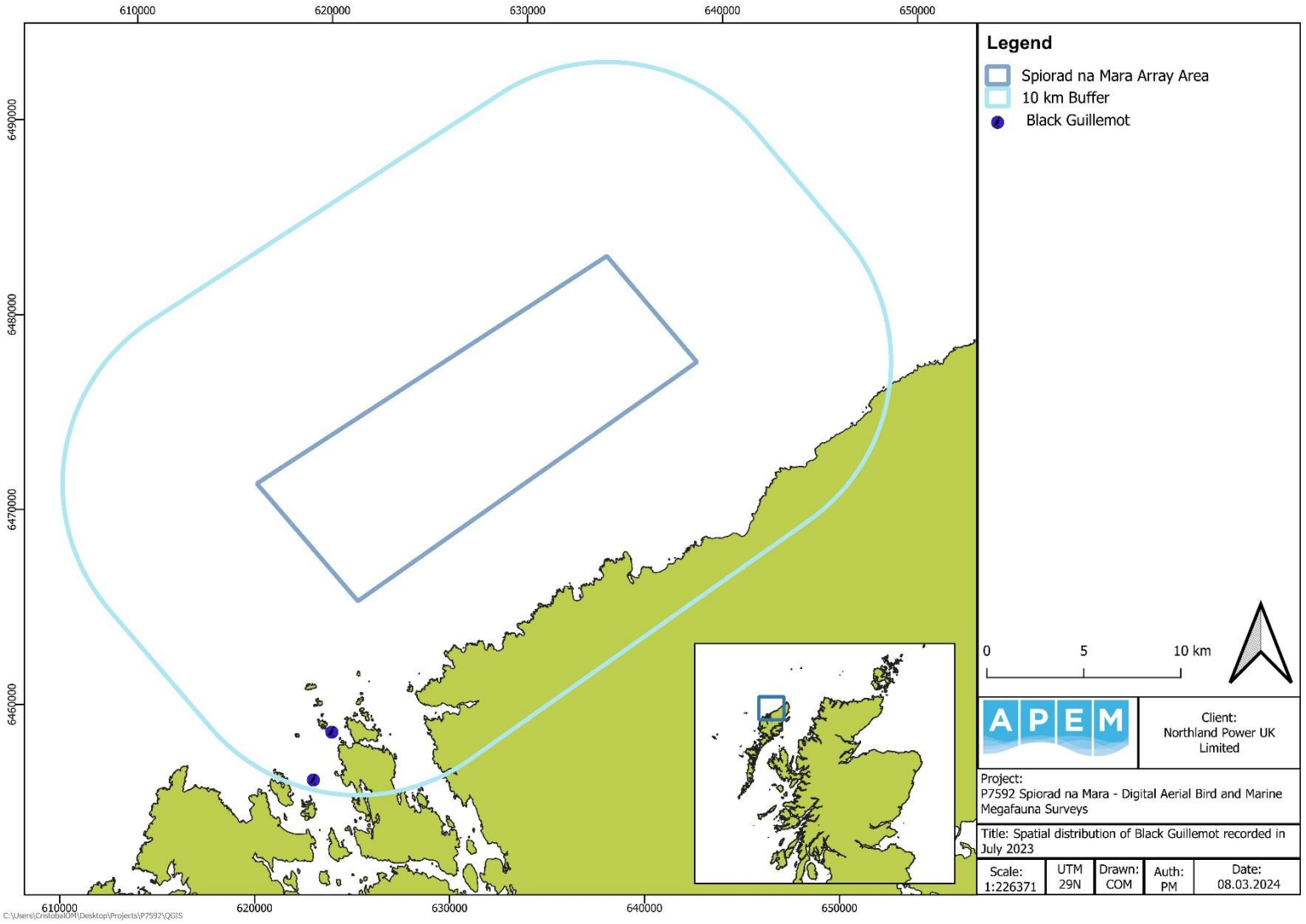


Figure 228 Distribution of black guillemot in July 2023

*Note that individuals in close proximity may appear overlaying.

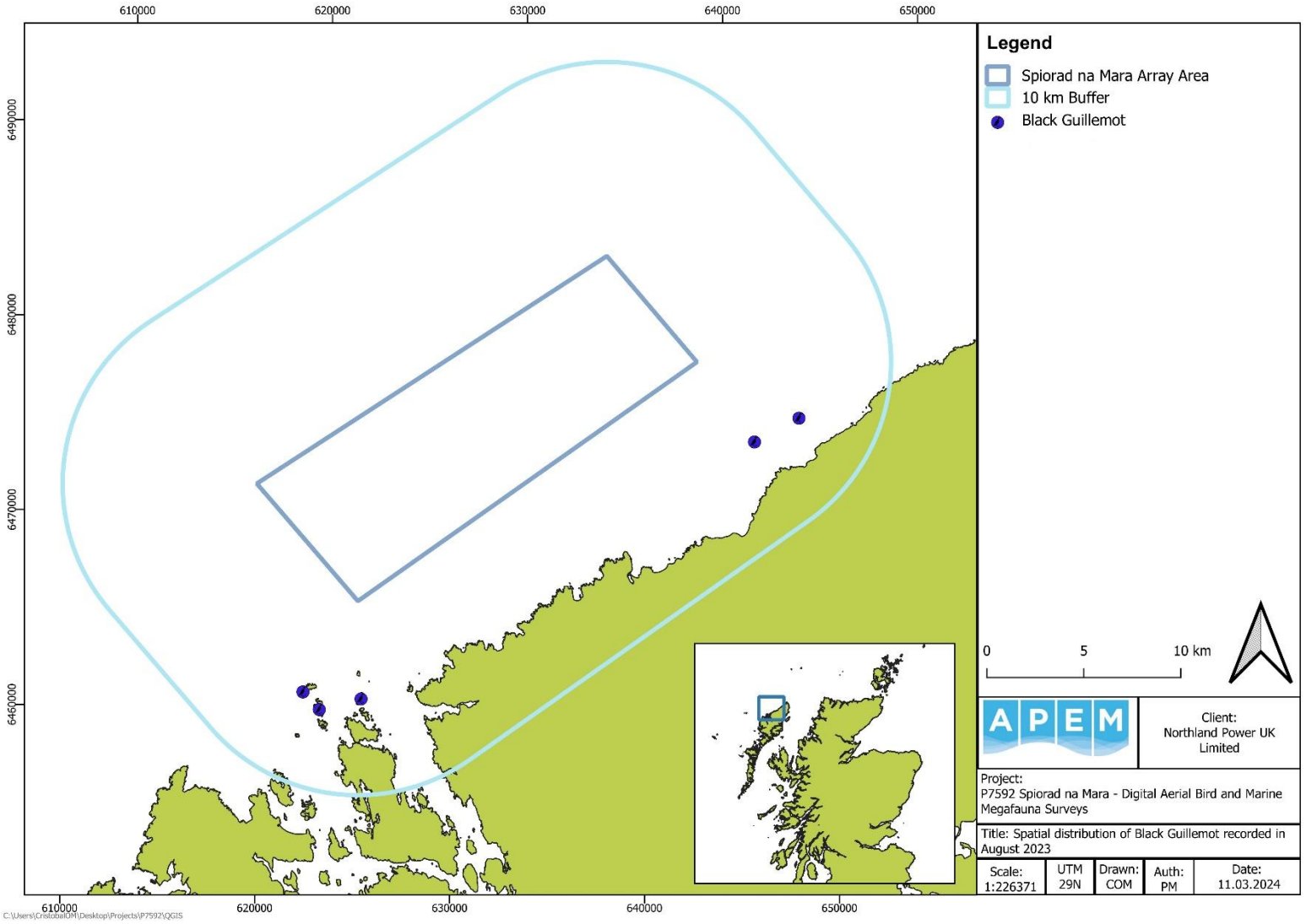


Figure 229 Distribution of black guillemot in August 2023

*Note that individuals in close proximity may appear overlaying.

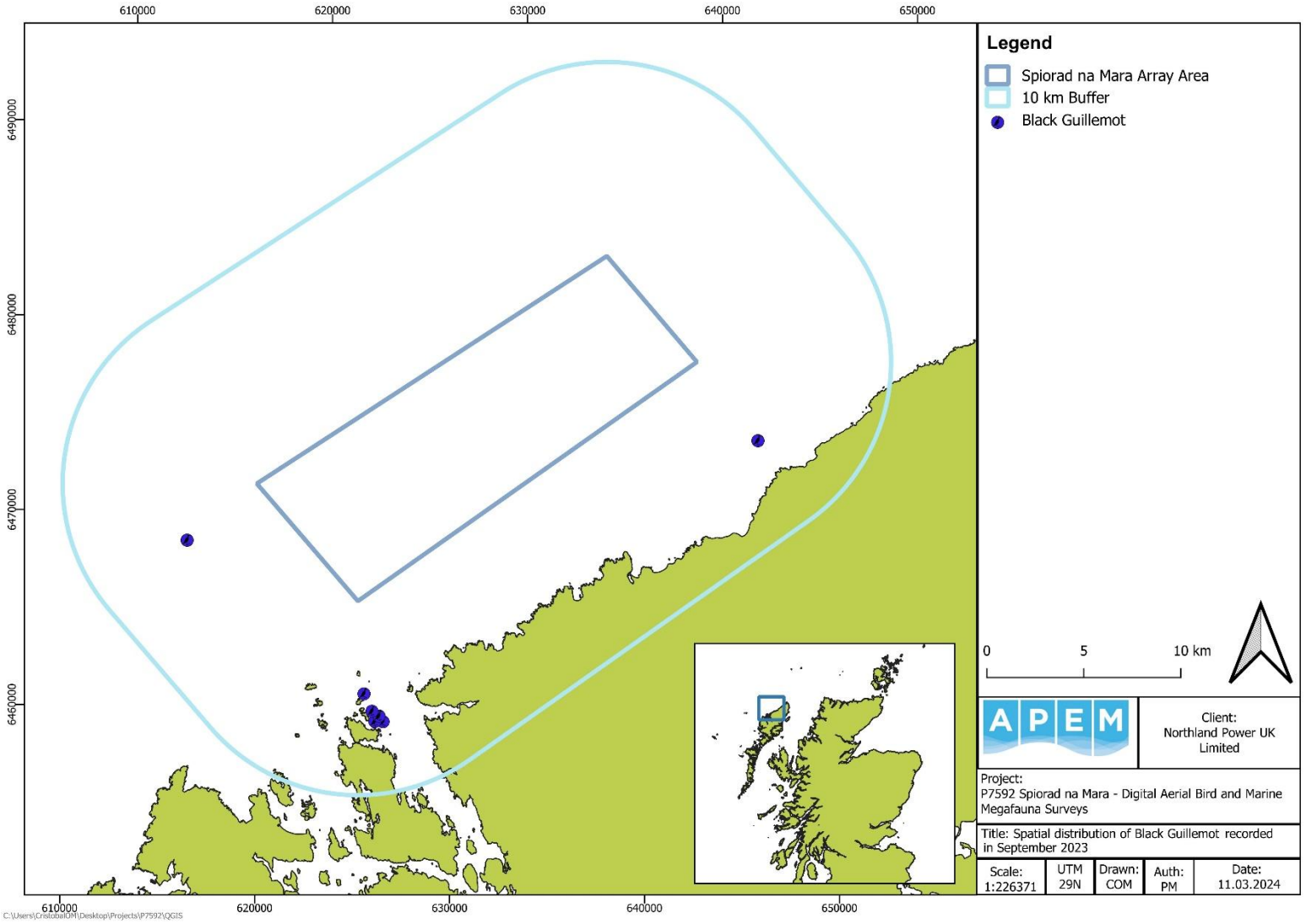


Figure 230 Distribution of black guillemot in September 2023

*Note that individuals in close proximity may appear overlaying.

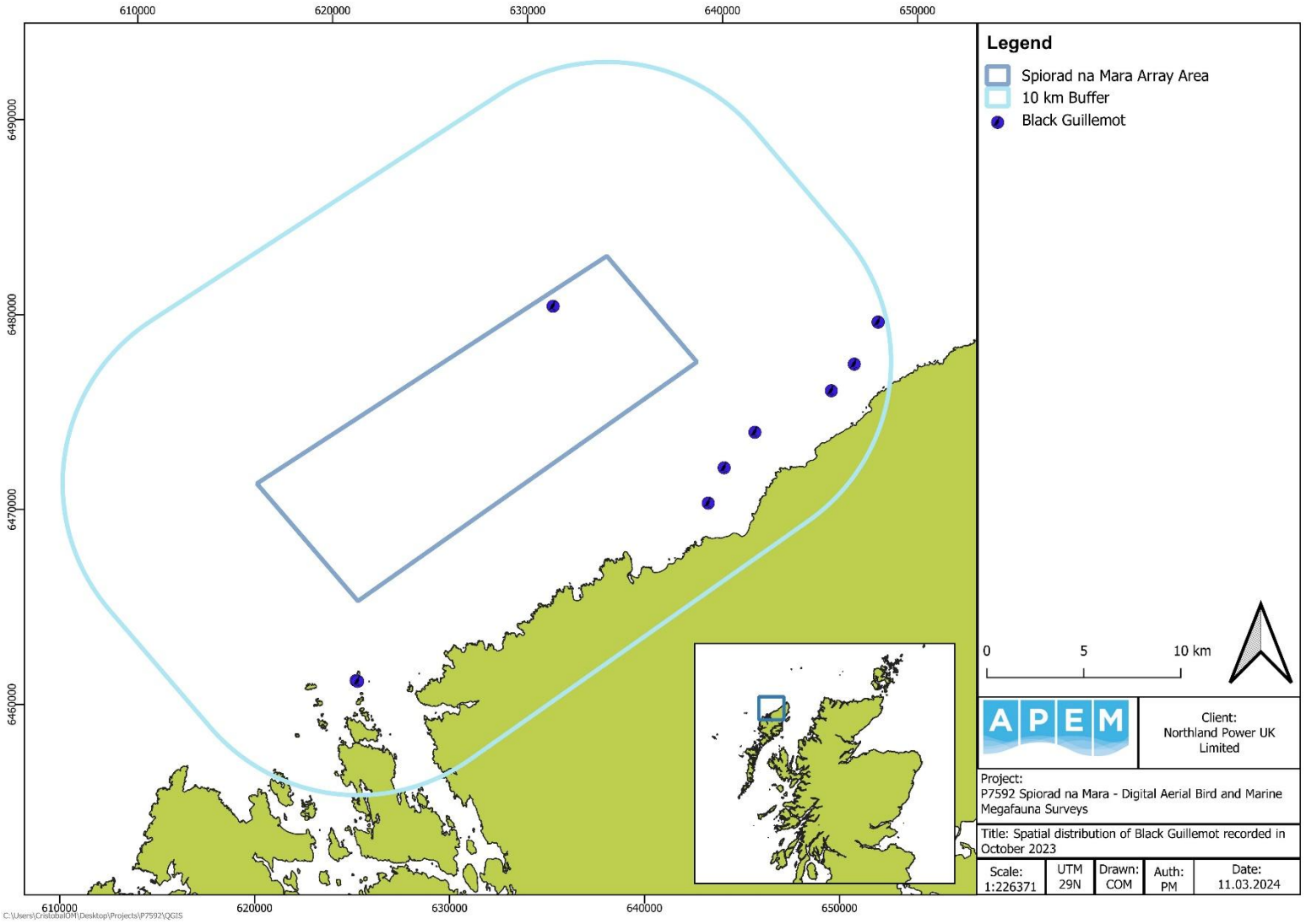


Figure 231 Distribution of black guillemot in October 2023

*Note that individuals in close proximity may appear overlaying.

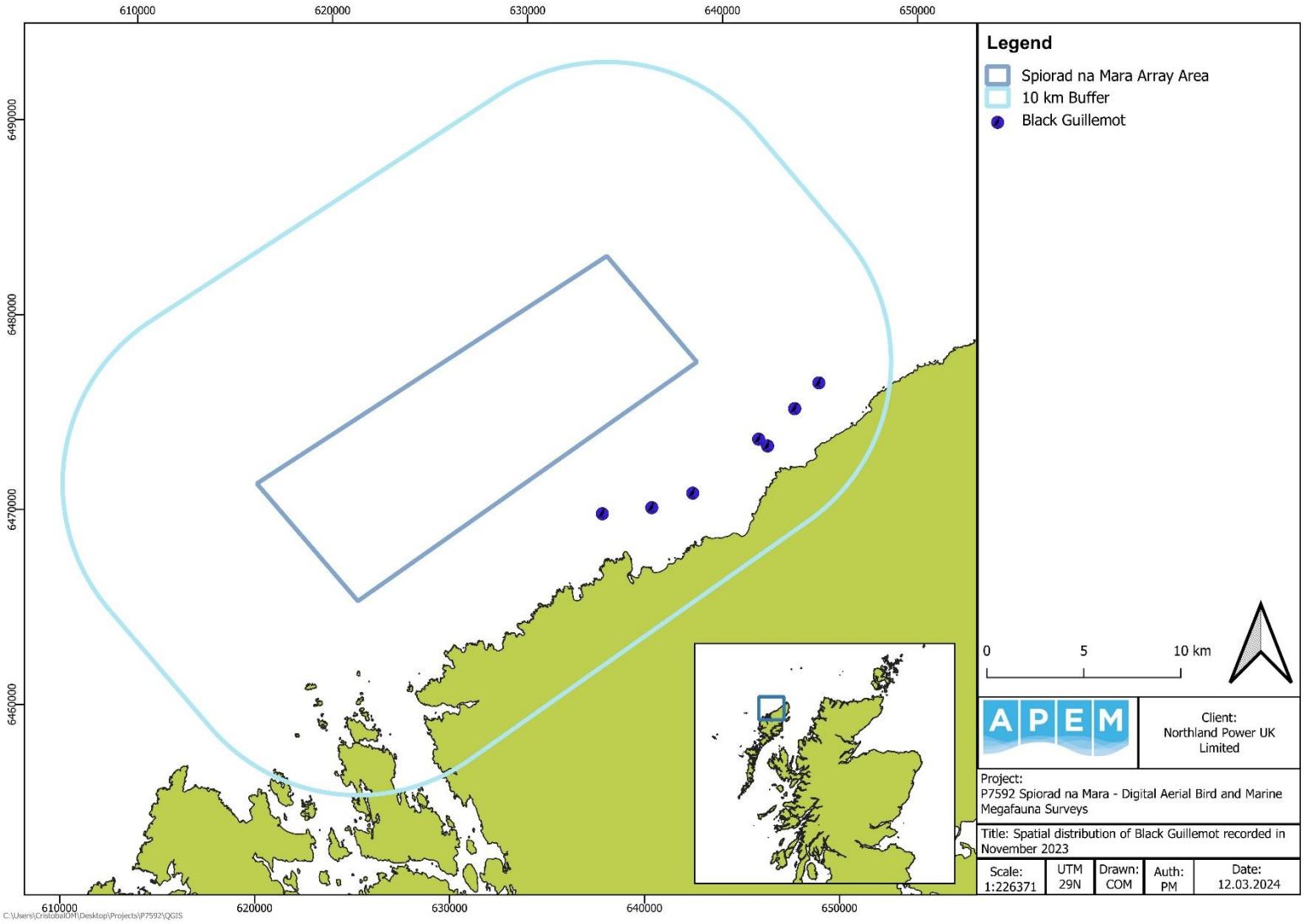


Figure 232 Distribution of black guillemot in November 2023

*Note that individuals in close proximity may appear overlaying.

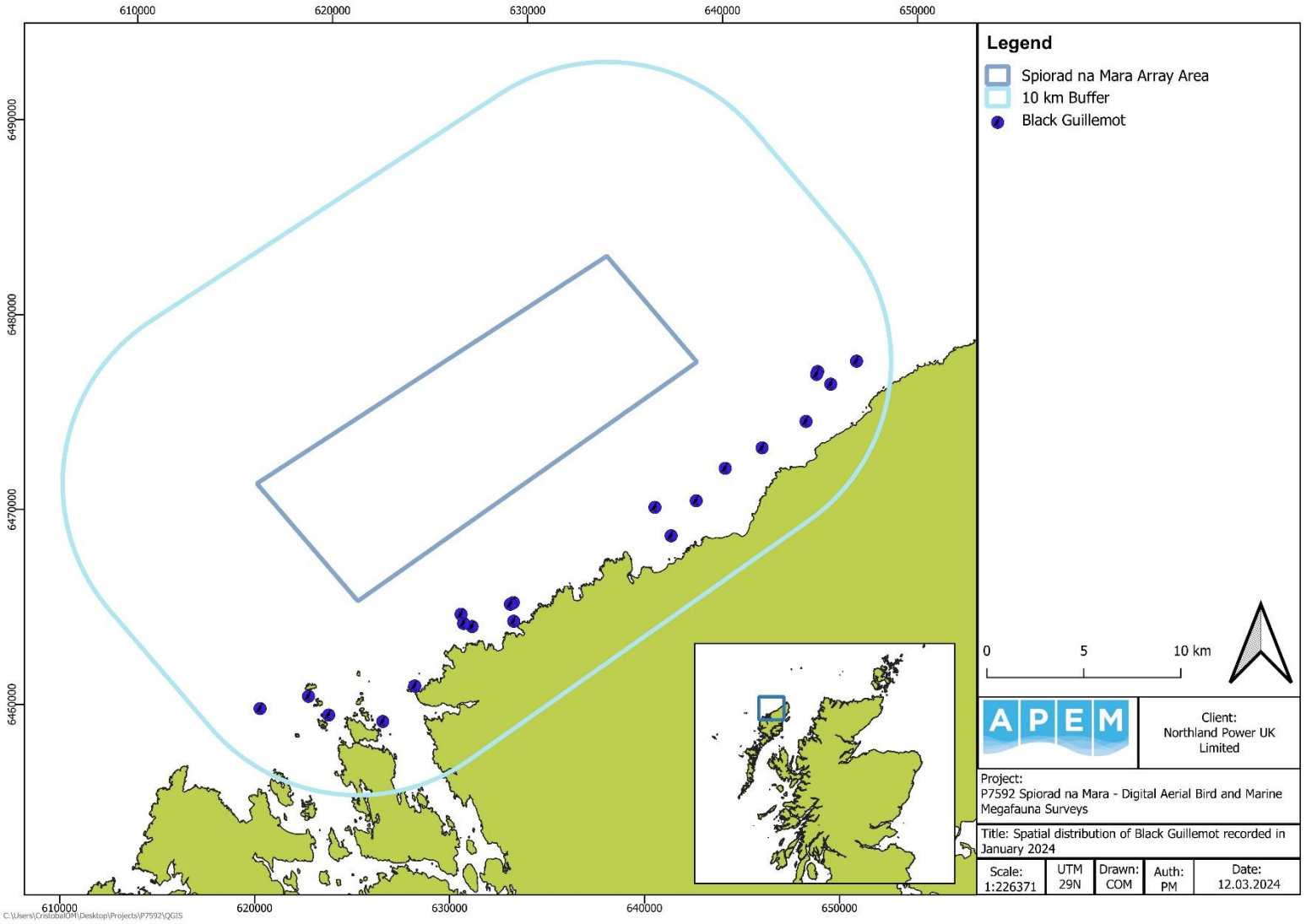


Figure 233 Distribution of black guillemot in January 2024

*Note that individuals in close proximity may appear overlaying.

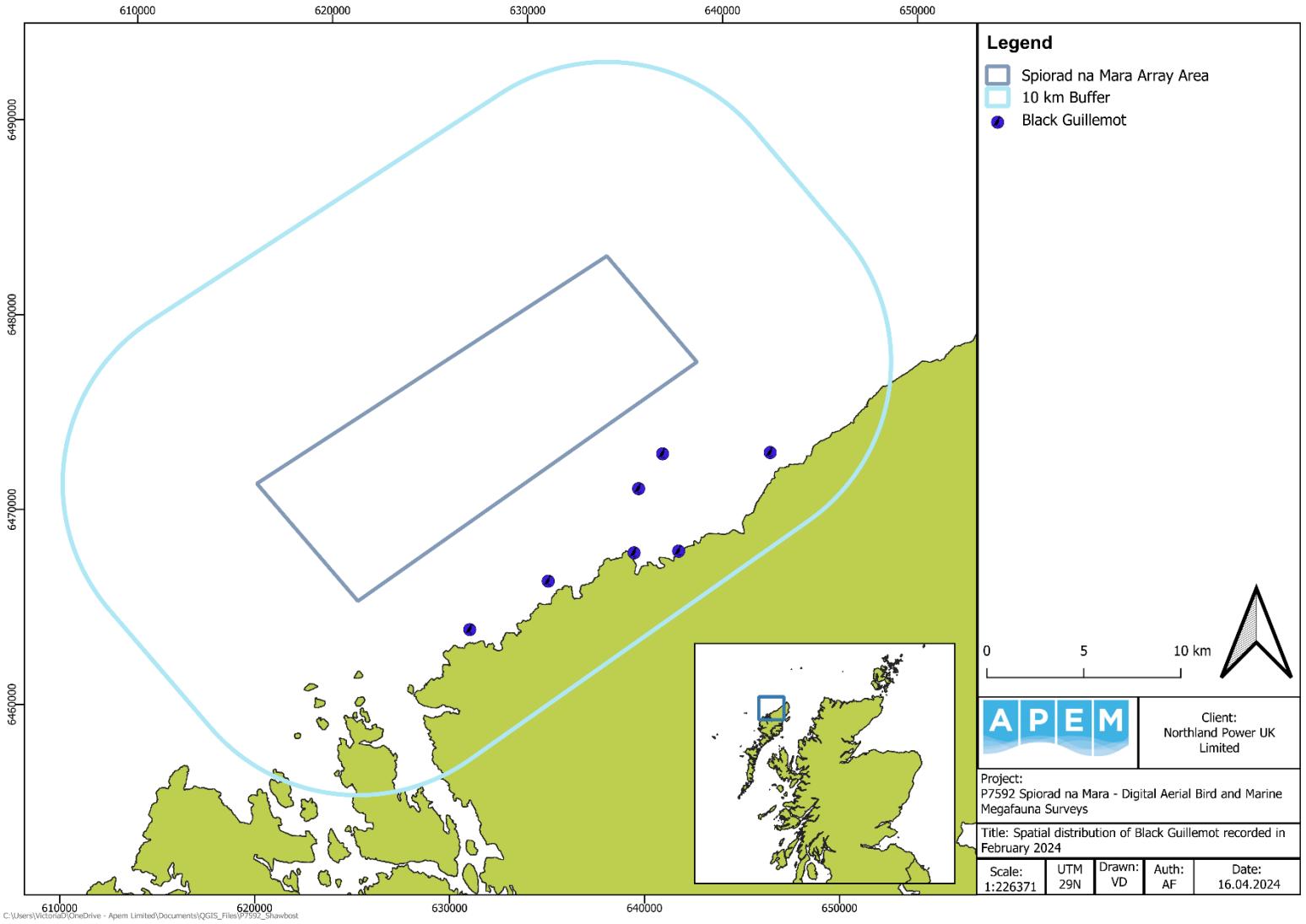


Figure 234 Distribution of black guillemot in February 2024

*Note that individuals in close proximity may appear overlaying.

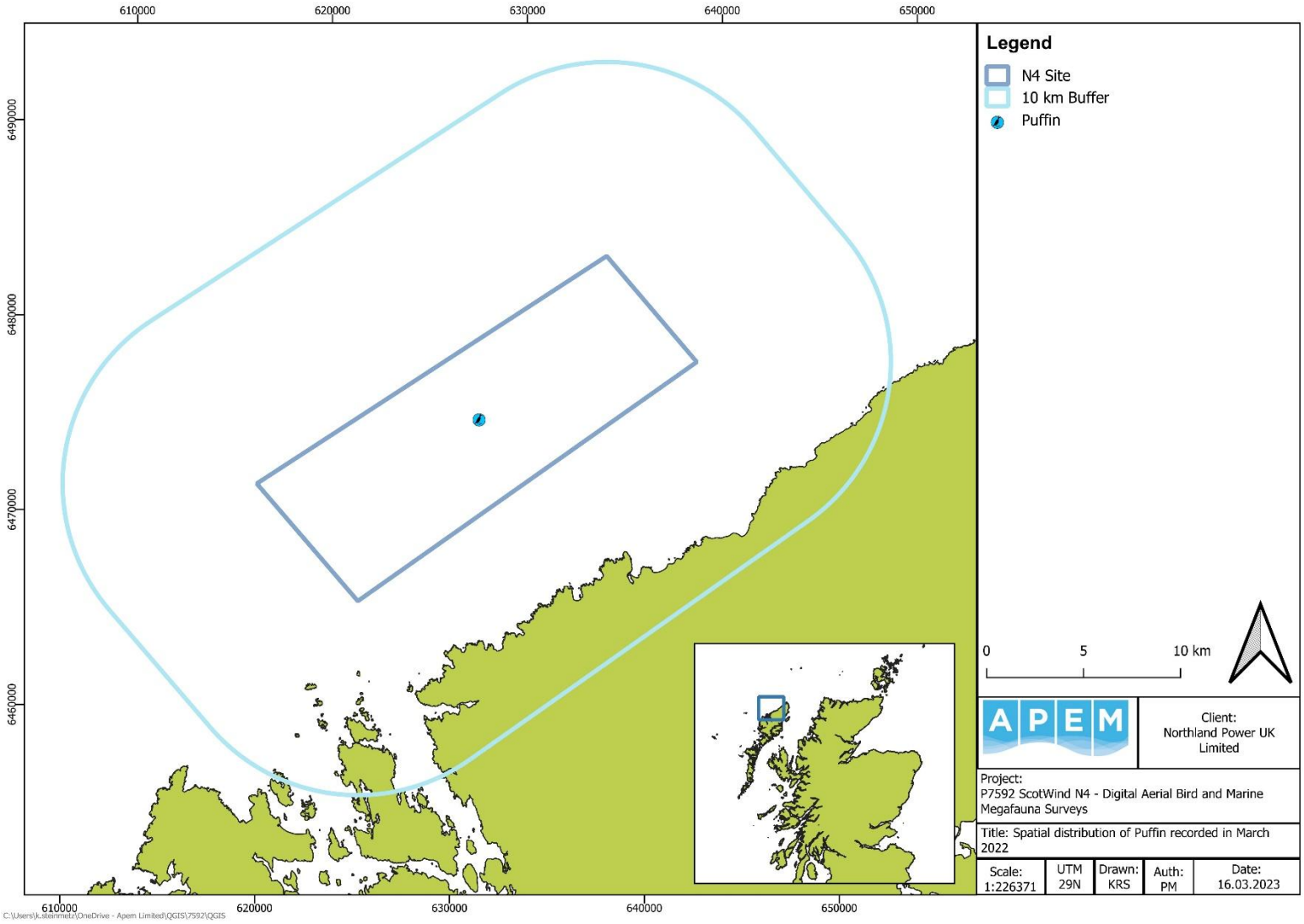


Figure 235 Distribution of puffin in March 2022
*Note that individuals in close proximity may appear overlaying.

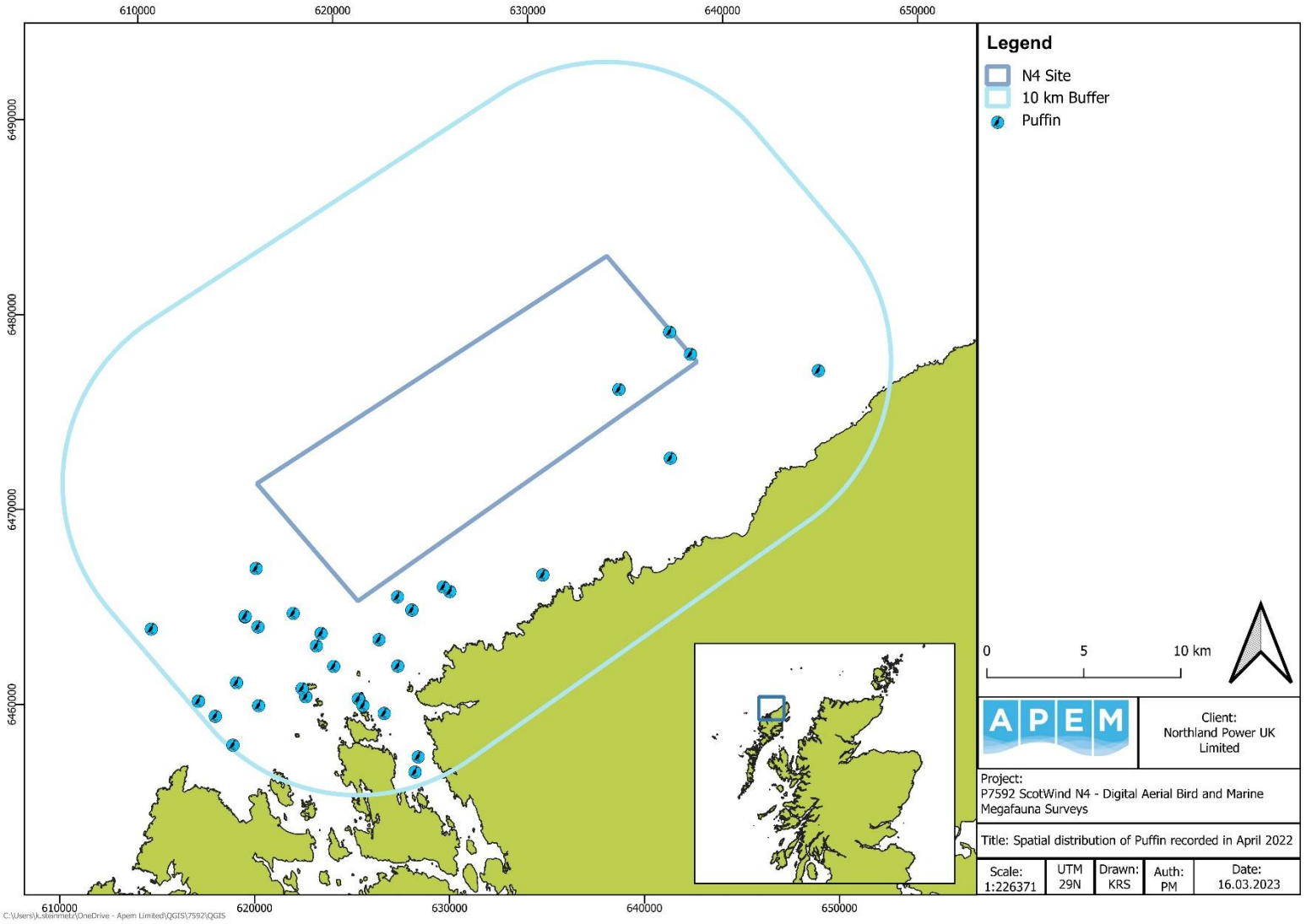


Figure 236 Distribution of puffin in April 2022
*Note that individuals in close proximity may appear overlaying.

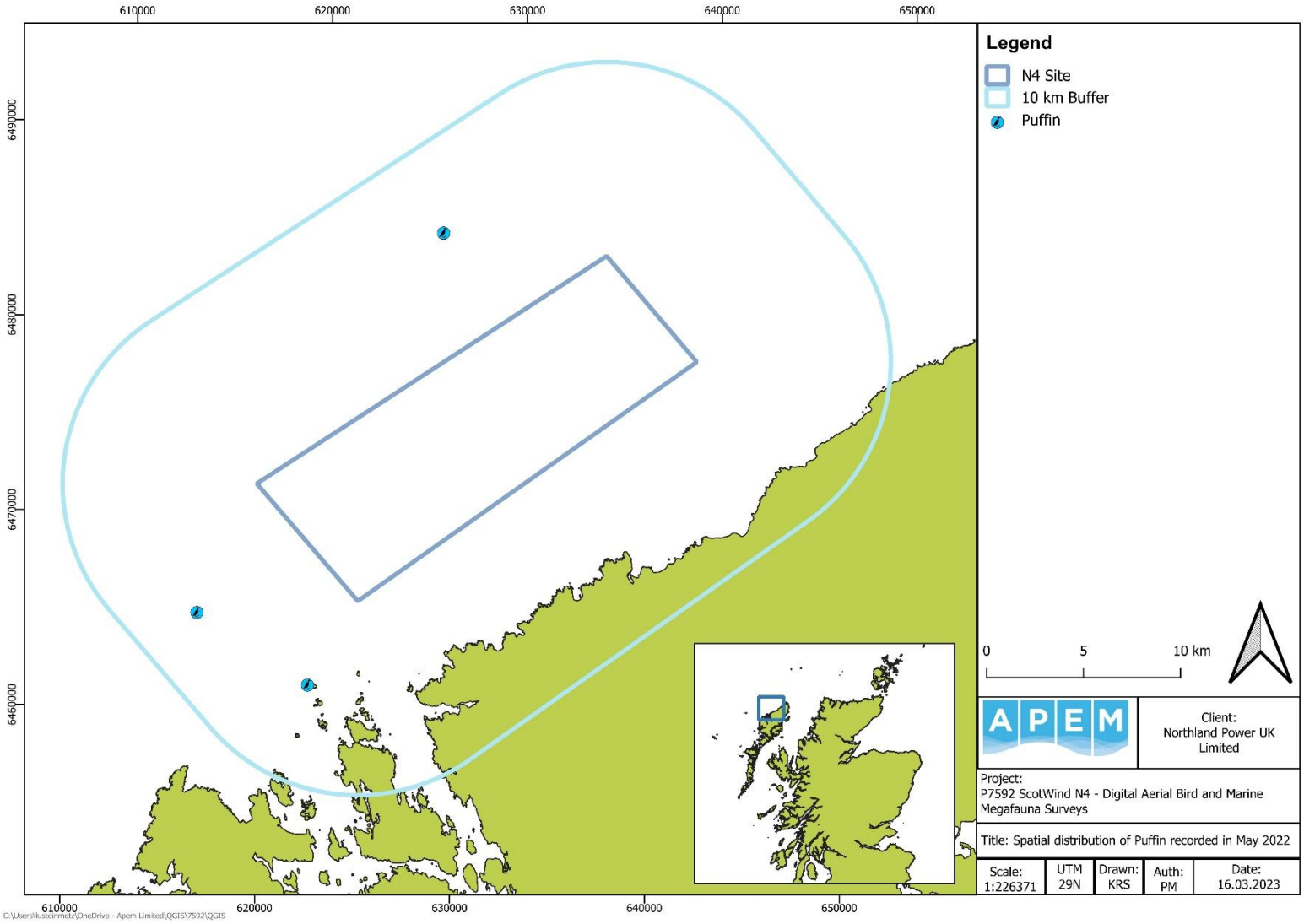


Figure 237 Distribution of puffin in May 2022
*Note that individuals in close proximity may appear overlaying.

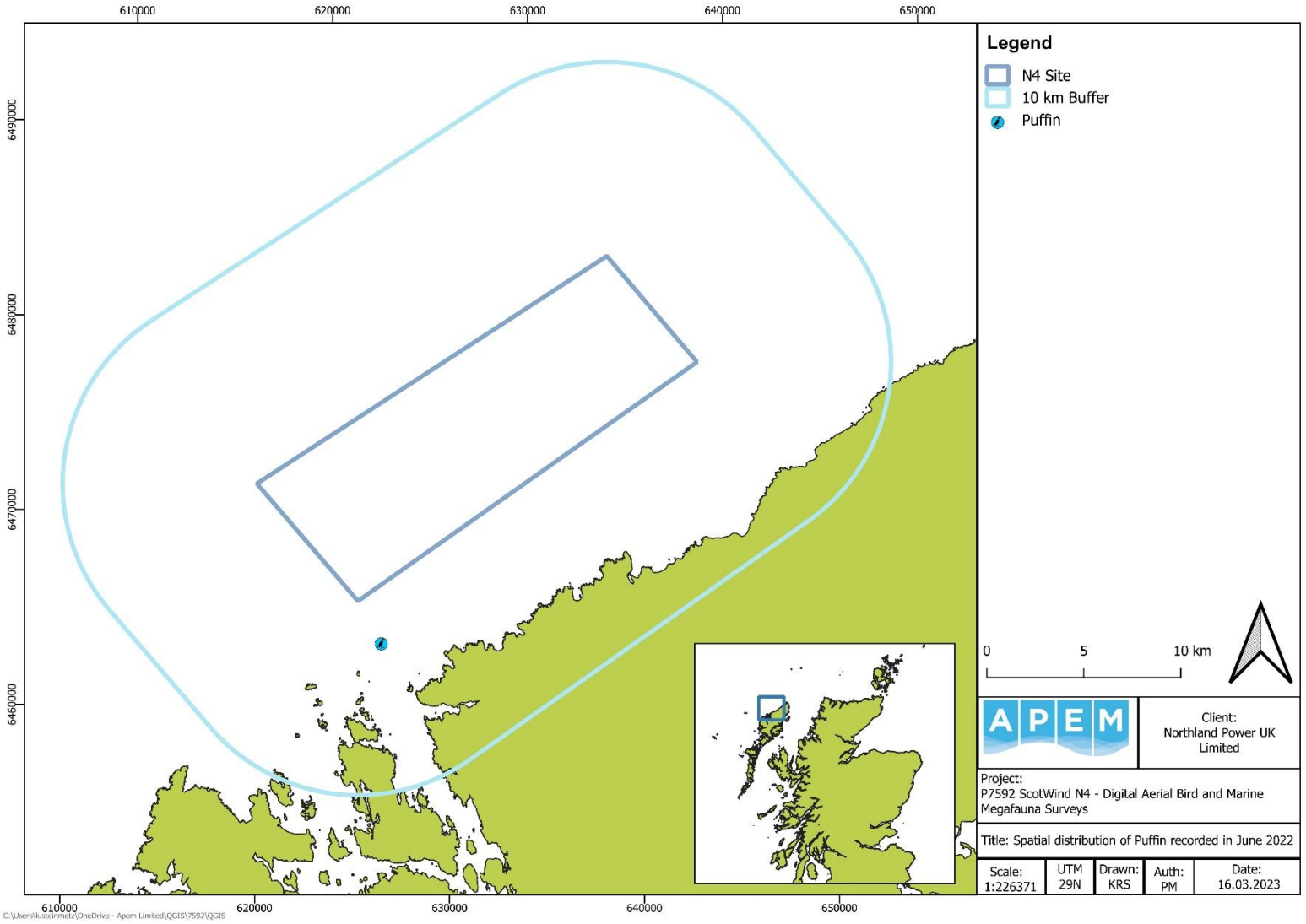


Figure 238 Distribution of puffin in June 2022
*Note that individuals in close proximity may appear overlaying.

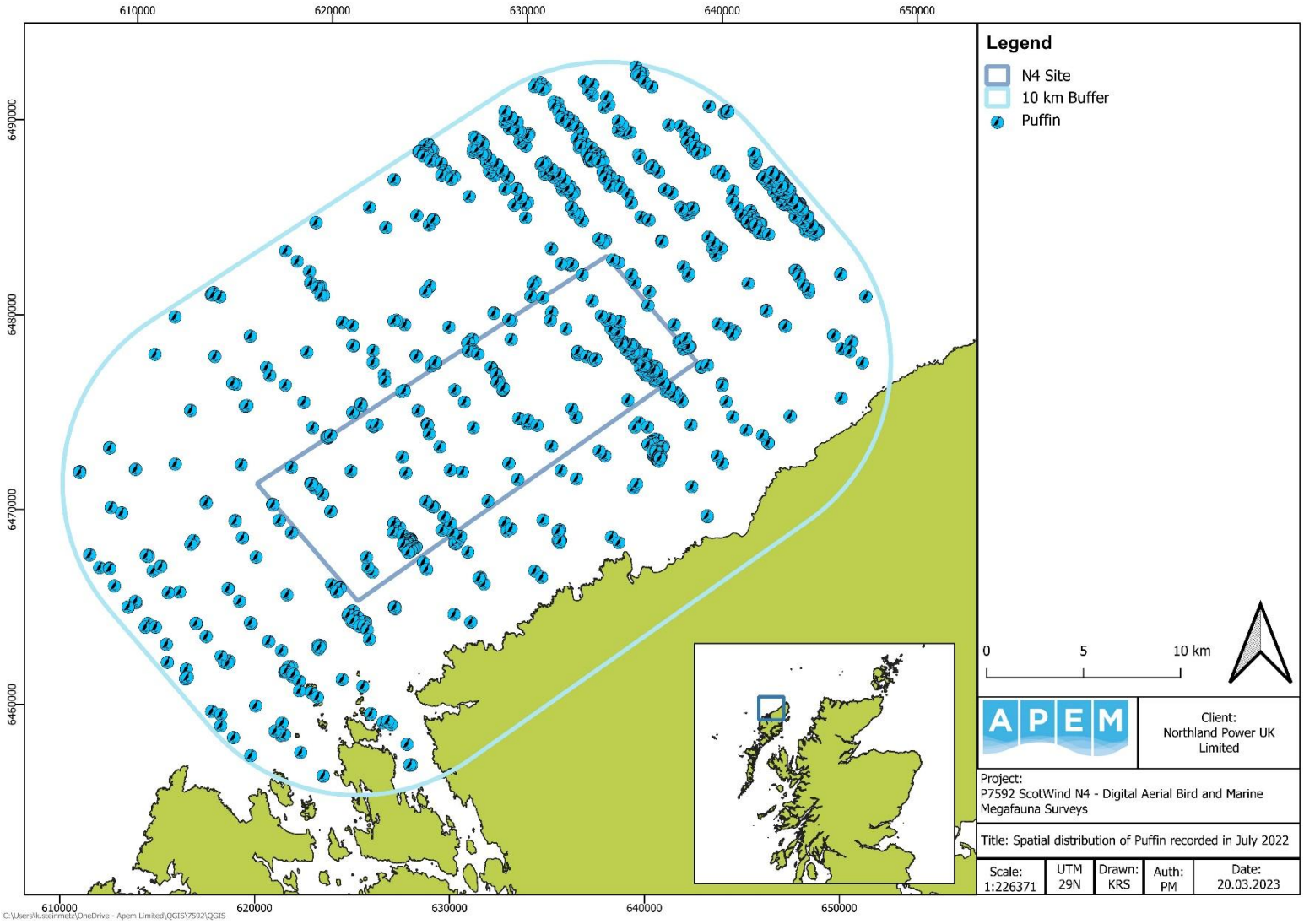


Figure 239 Distribution of puffin in July 2022
*Note that individuals in close proximity may appear overlaying.

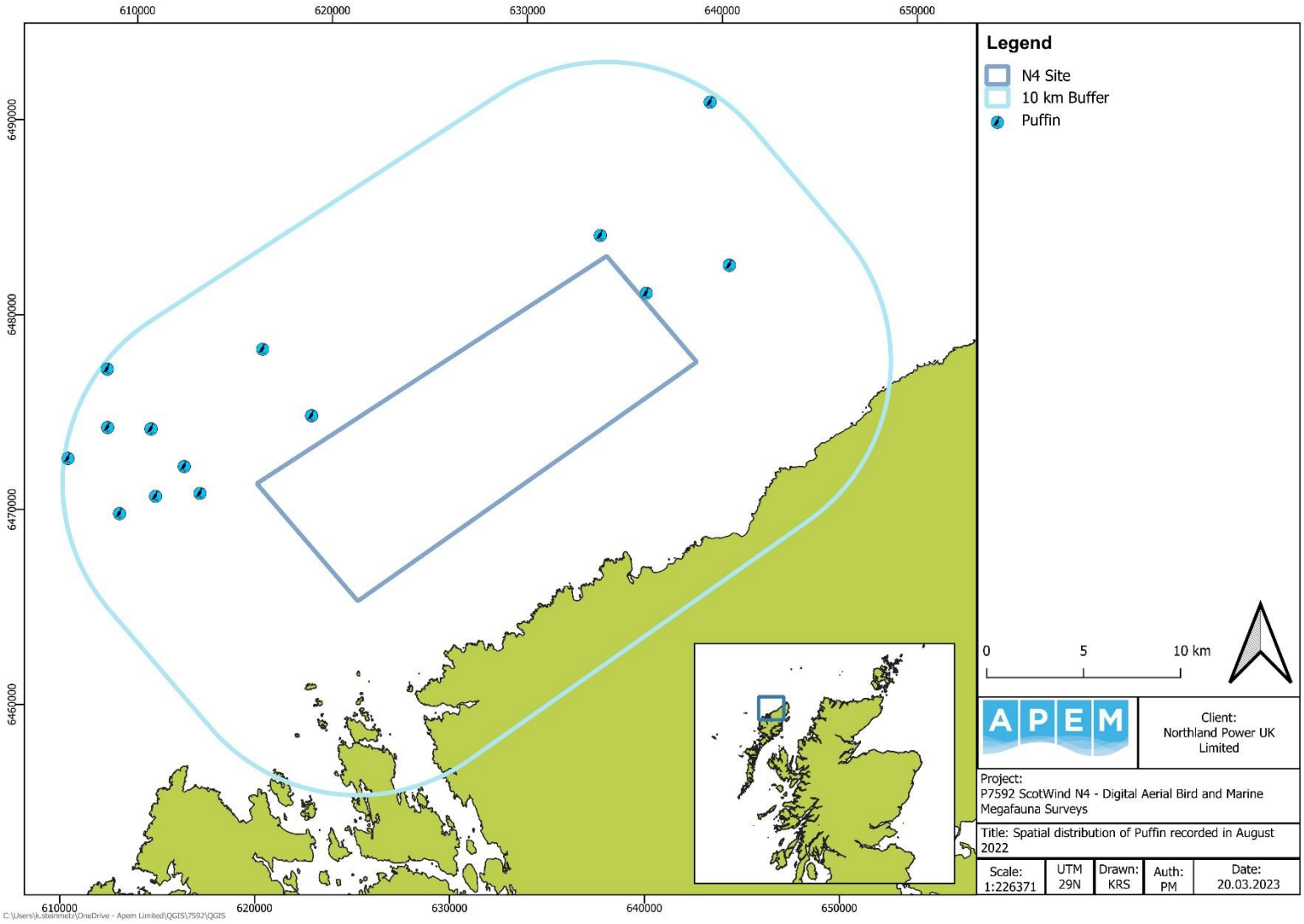


Figure 240 Distribution of puffin in August 2022
*Note that individuals in close proximity may appear overlaying.

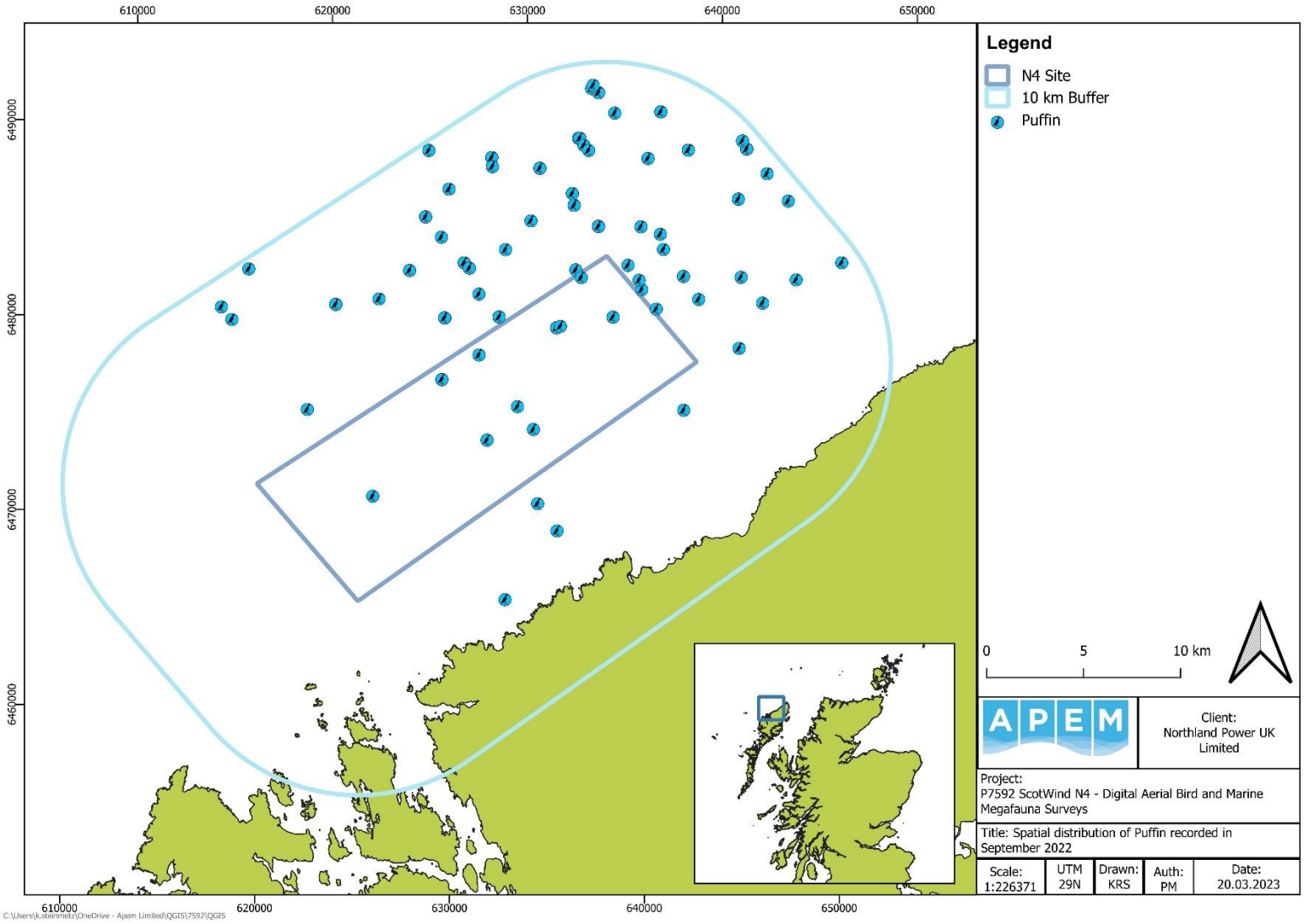


Figure 241 Distribution of puffin in September 2022

*Note that individuals in close proximity may appear overlaying.

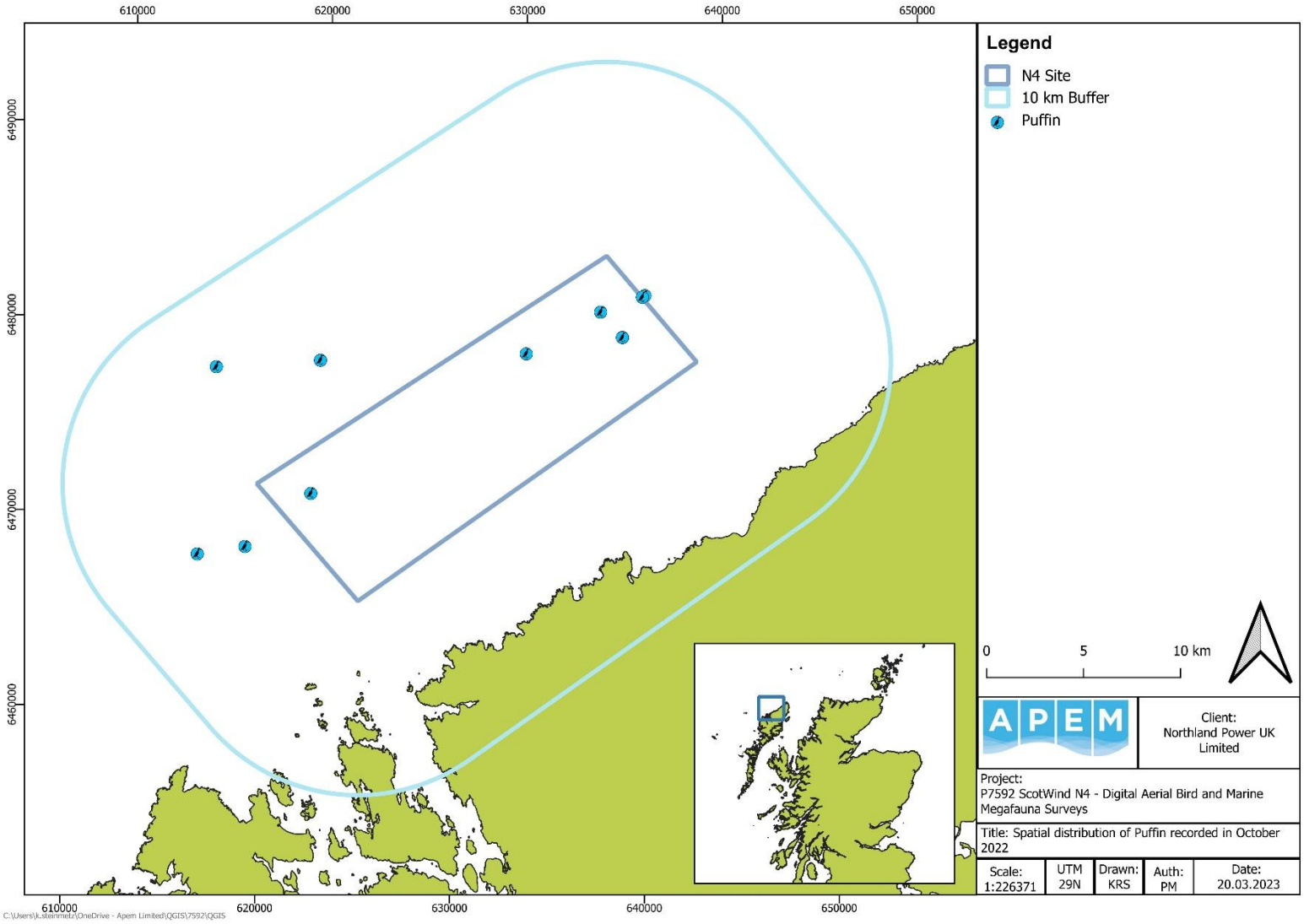


Figure 242 Distribution of puffin in October 2022
*Note that individuals in close proximity may appear overlaying.

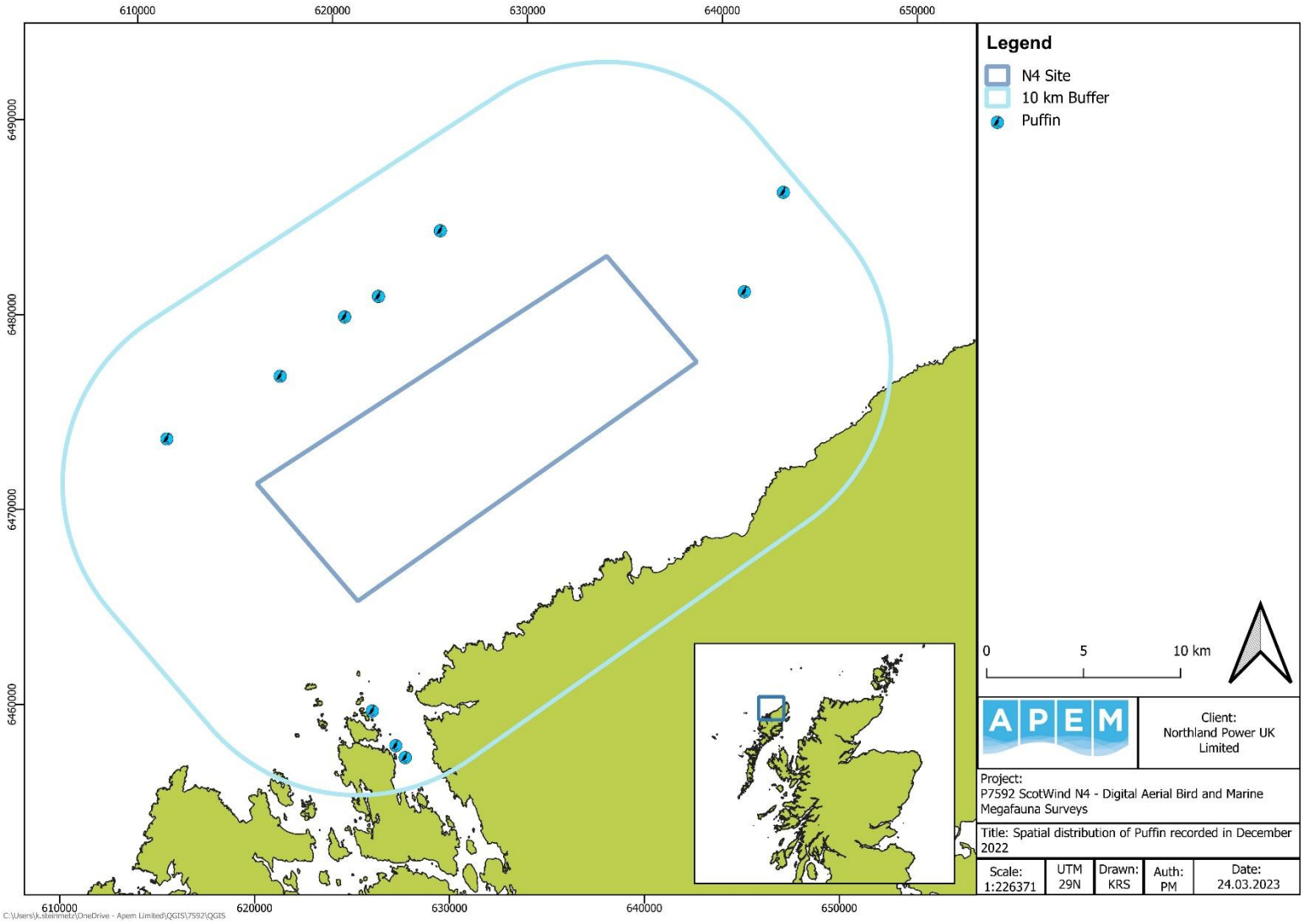


Figure 243 Distribution of puffin in December 2022
*Note that individuals in close proximity may appear overlaying.

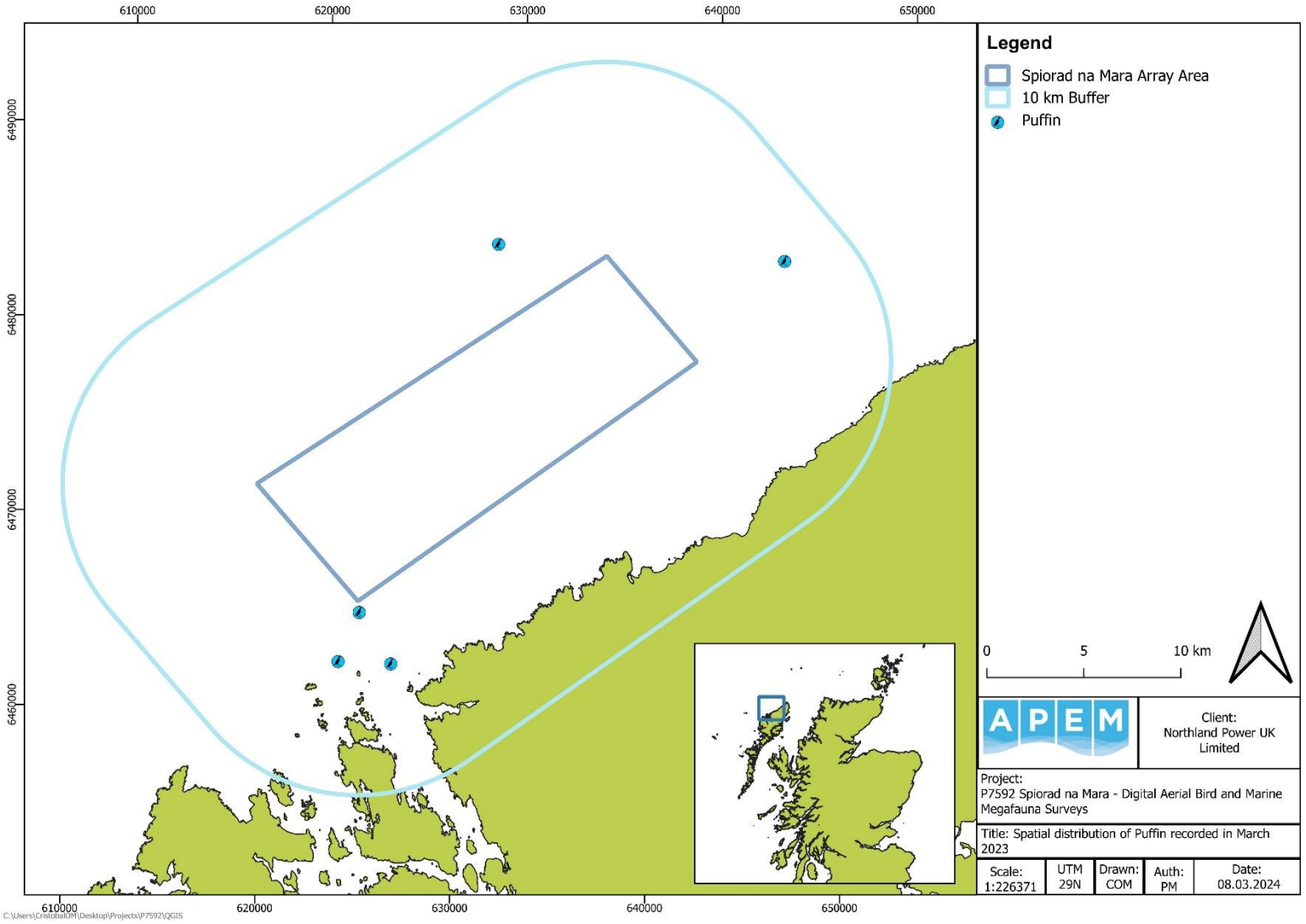


Figure 244 Distribution of puffin in March 2023
*Note that individuals in close proximity may appear overlaying.

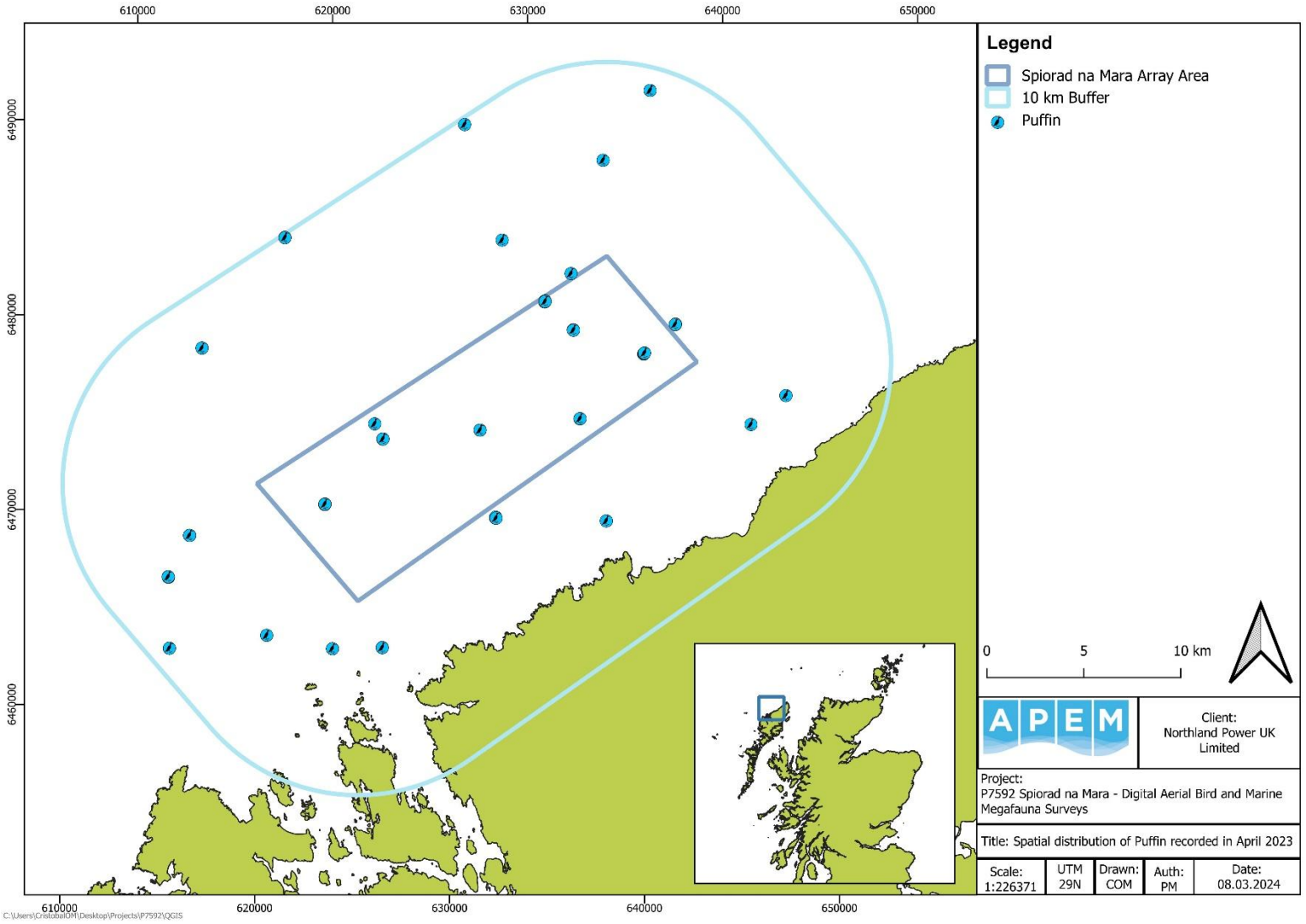


Figure 245 Distribution of puffin in April 2023
*Note that individuals in close proximity may appear overlaying.

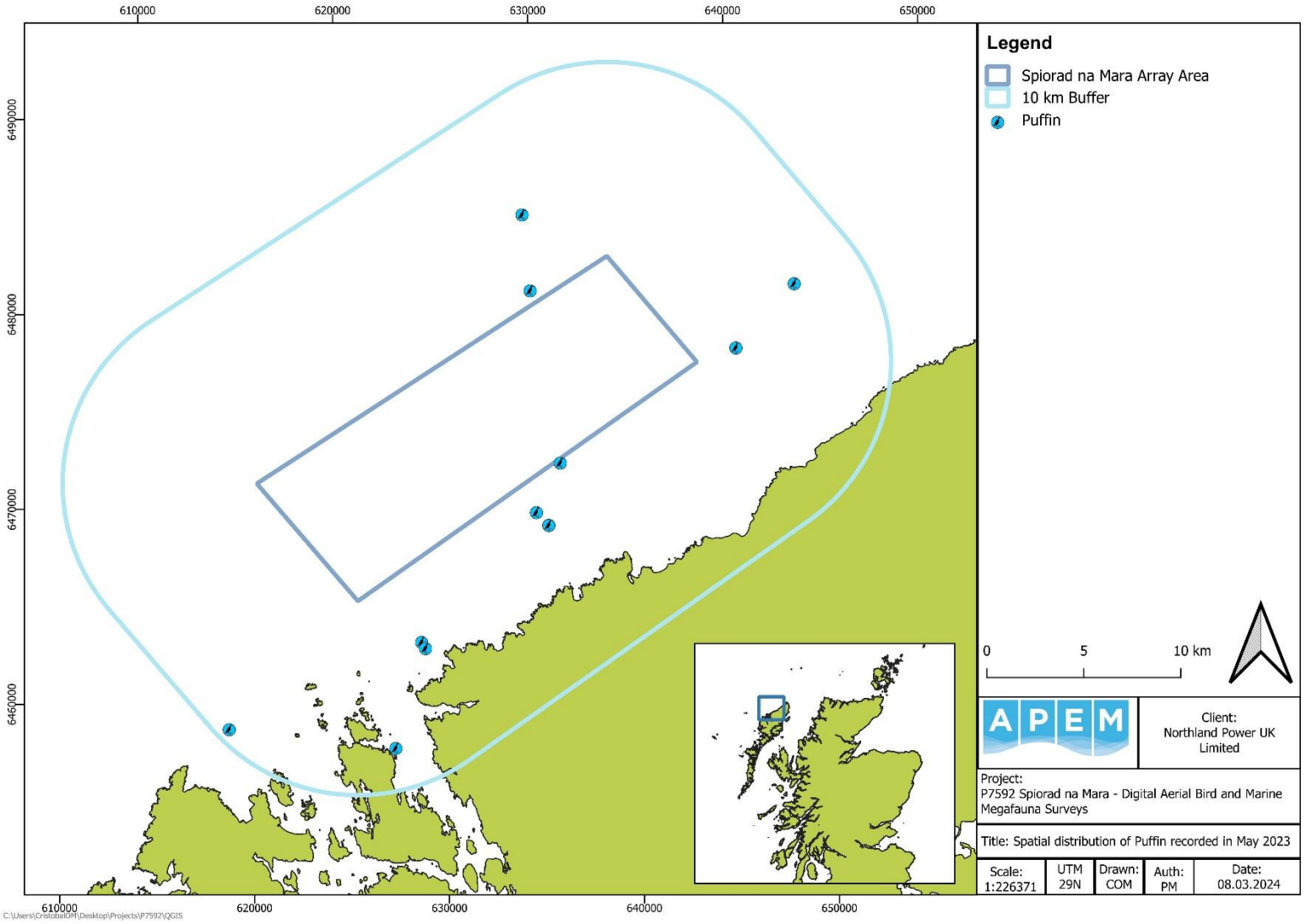


Figure 246 Distribution of puffin in May 2023
*Note that individuals in close proximity may appear overlaying.

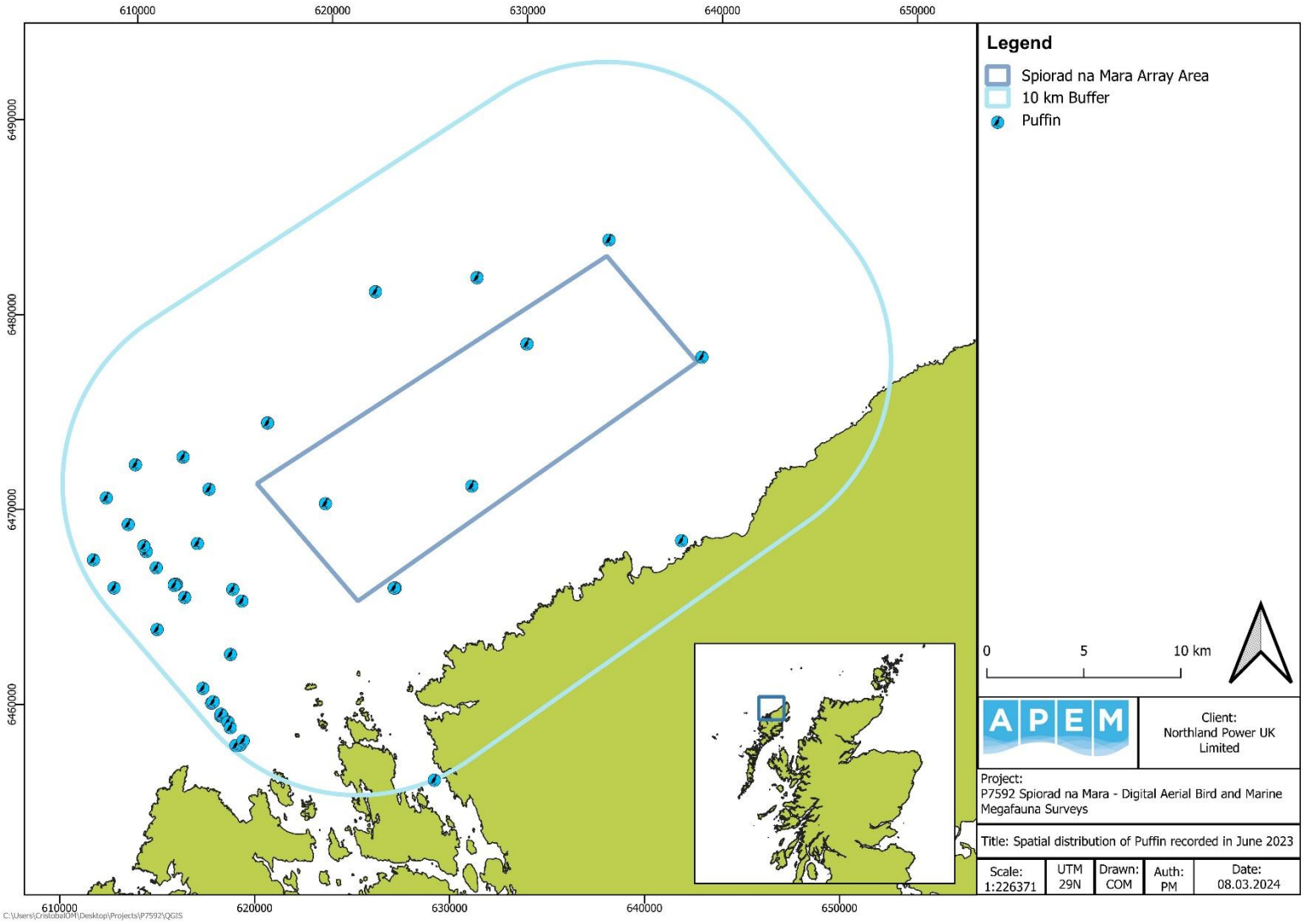


Figure 247 Distribution of puffin in June 2023
*Note that individuals in close proximity may appear overlaying.

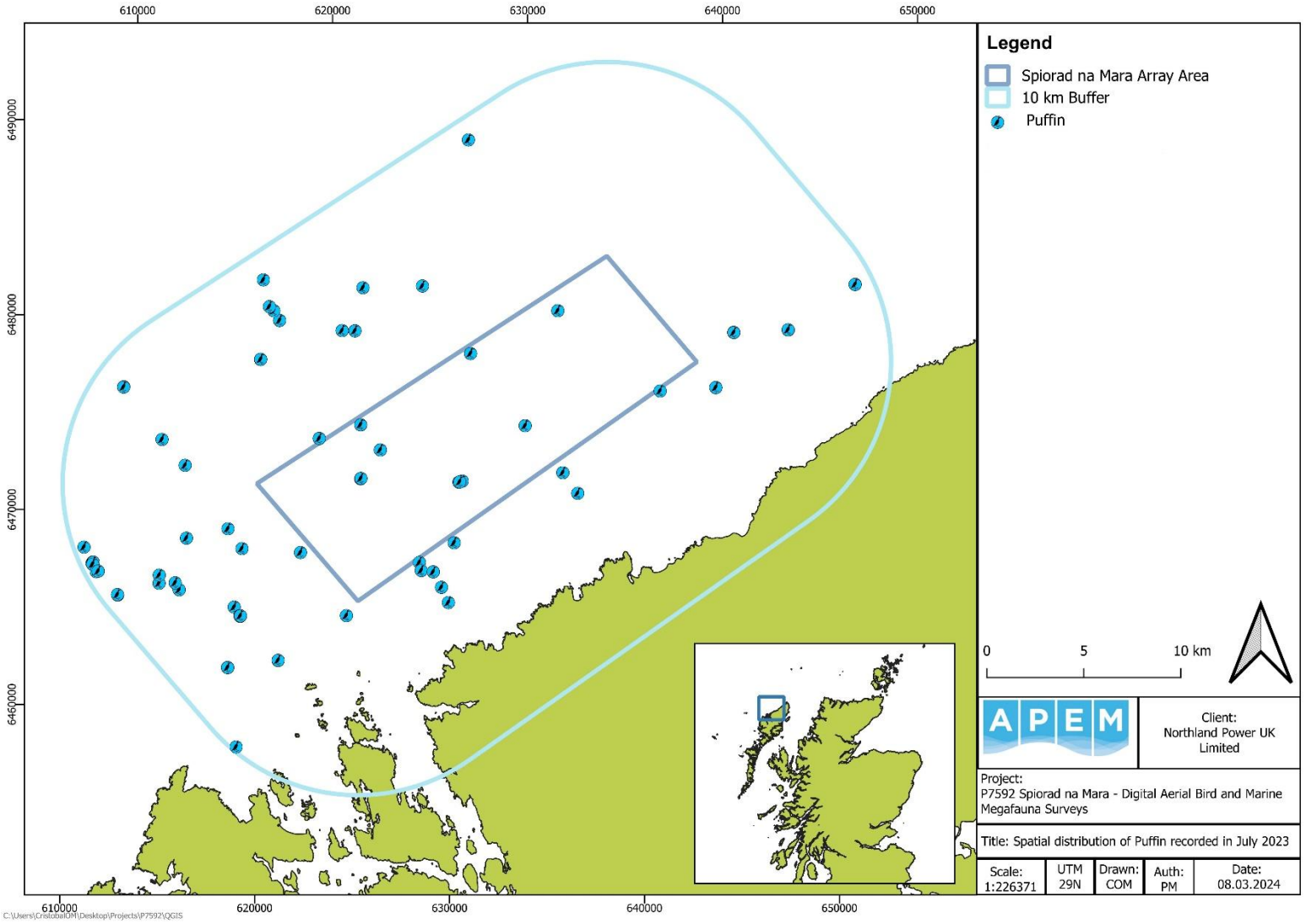


Figure 248 Distribution of puffin in July 2023
*Note that individuals in close proximity may appear overlaying.

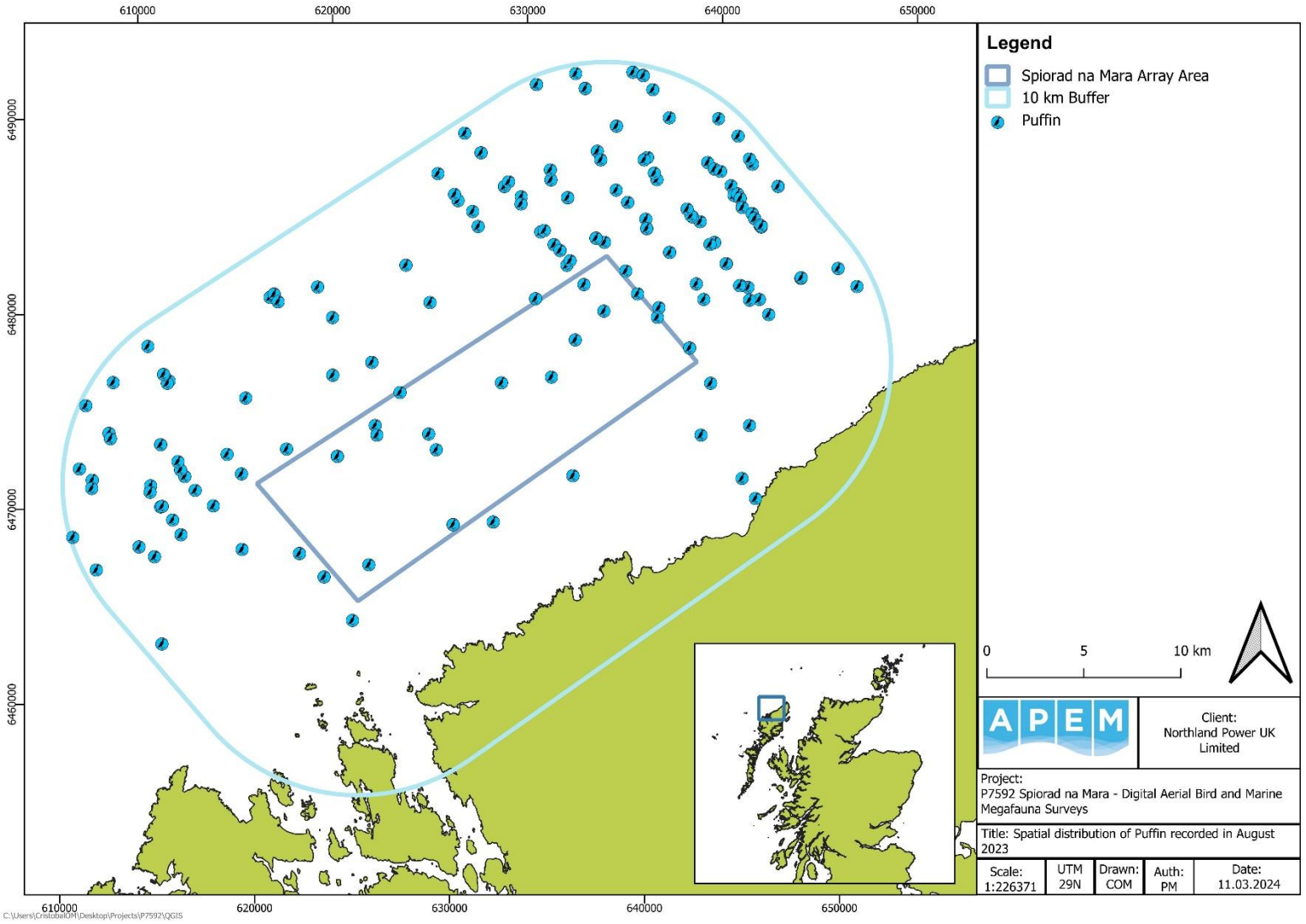


Figure 249 Distribution of puffin in August 2023
*Note that individuals in close proximity may appear overlaying.

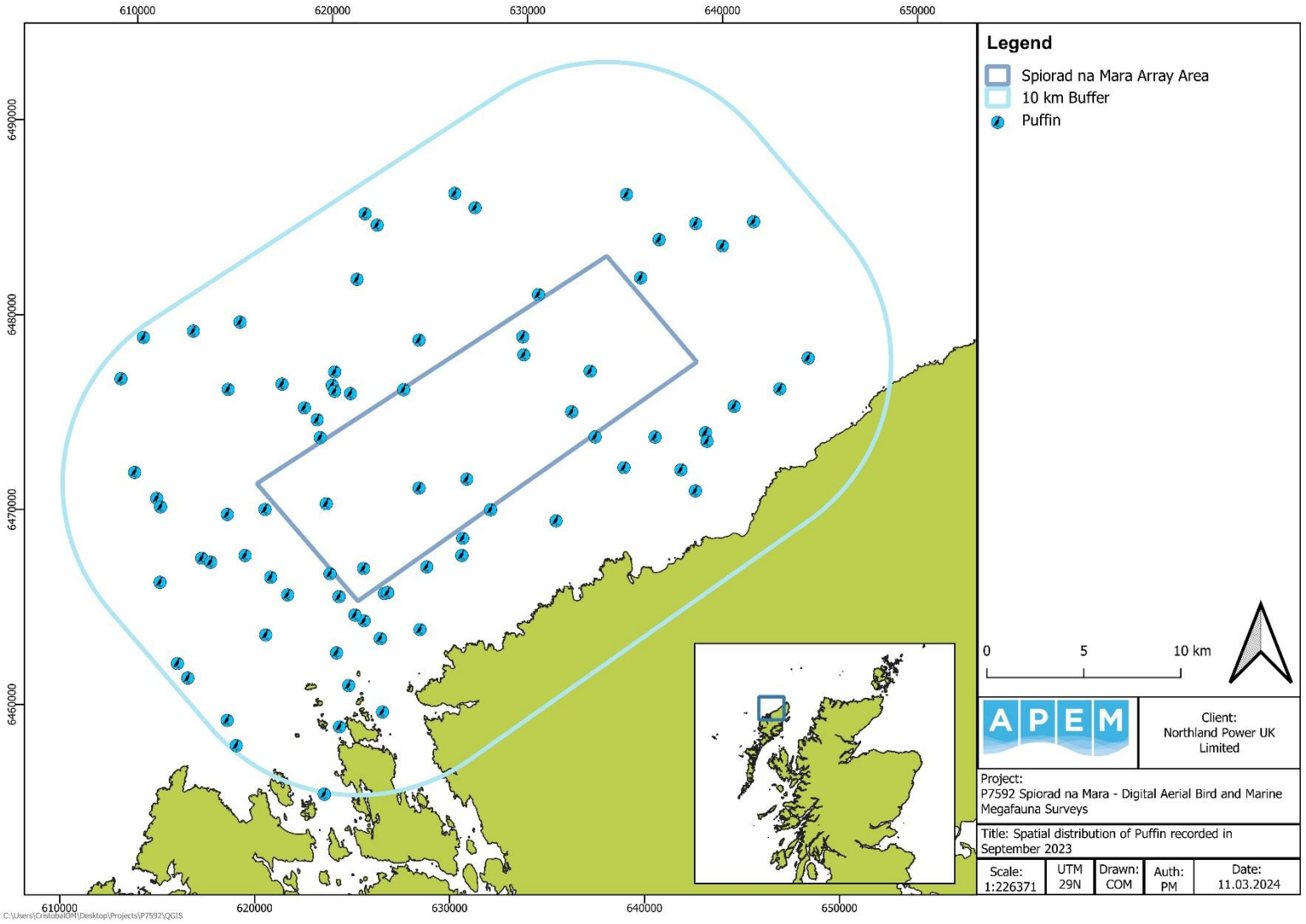


Figure 250 Distribution of puffin in September 2023

*Note that individuals in close proximity may appear overlaying.

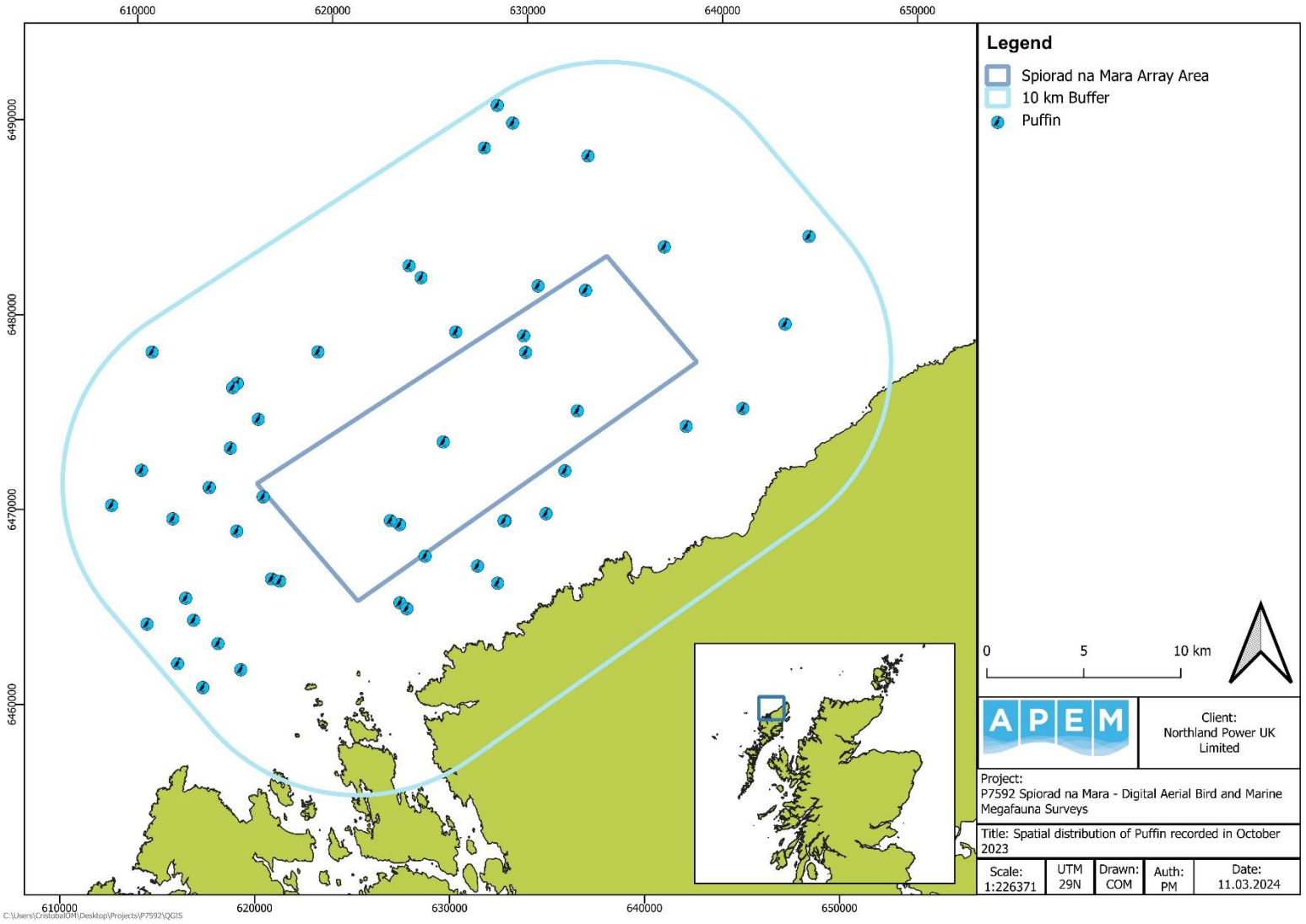


Figure 251 Distribution of puffin in October 2023
*Note that individuals in close proximity may appear overlaying.

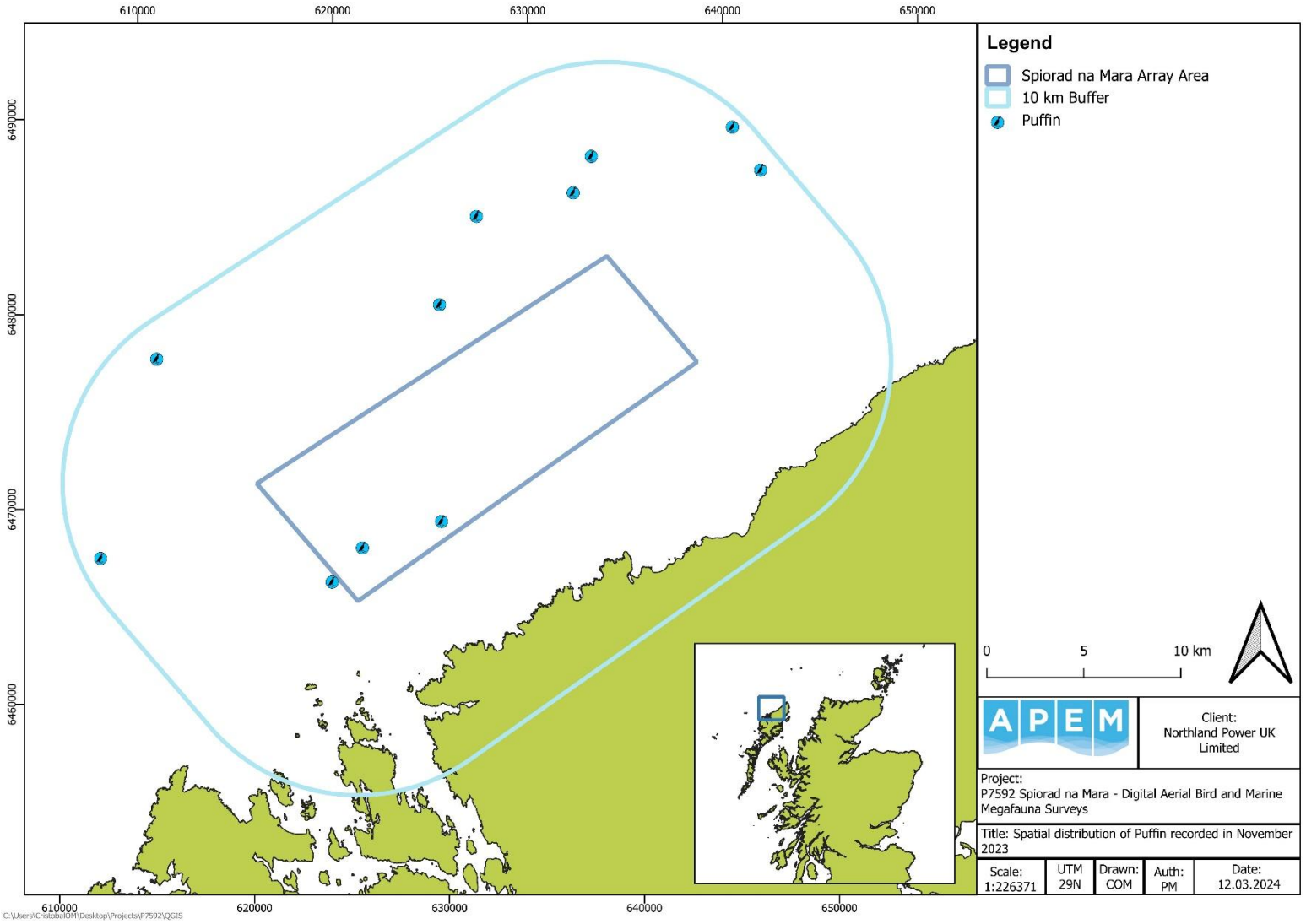


Figure 252 Distribution of puffin in November 2023
*Note that individuals in close proximity may appear overlaying.

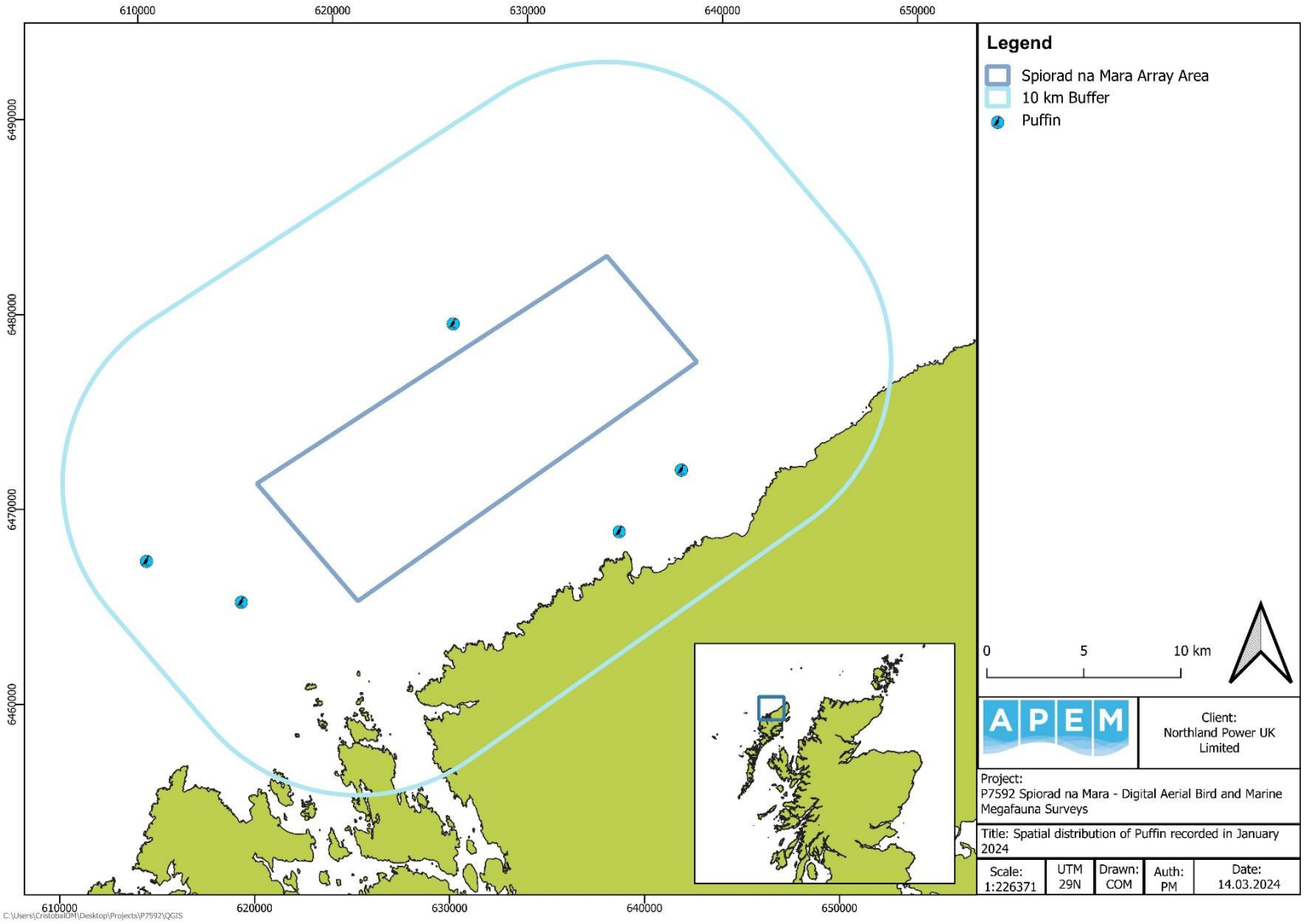


Figure 253 Distribution of puffin in January 2024
*Note that individuals in close proximity may appear overlaying.

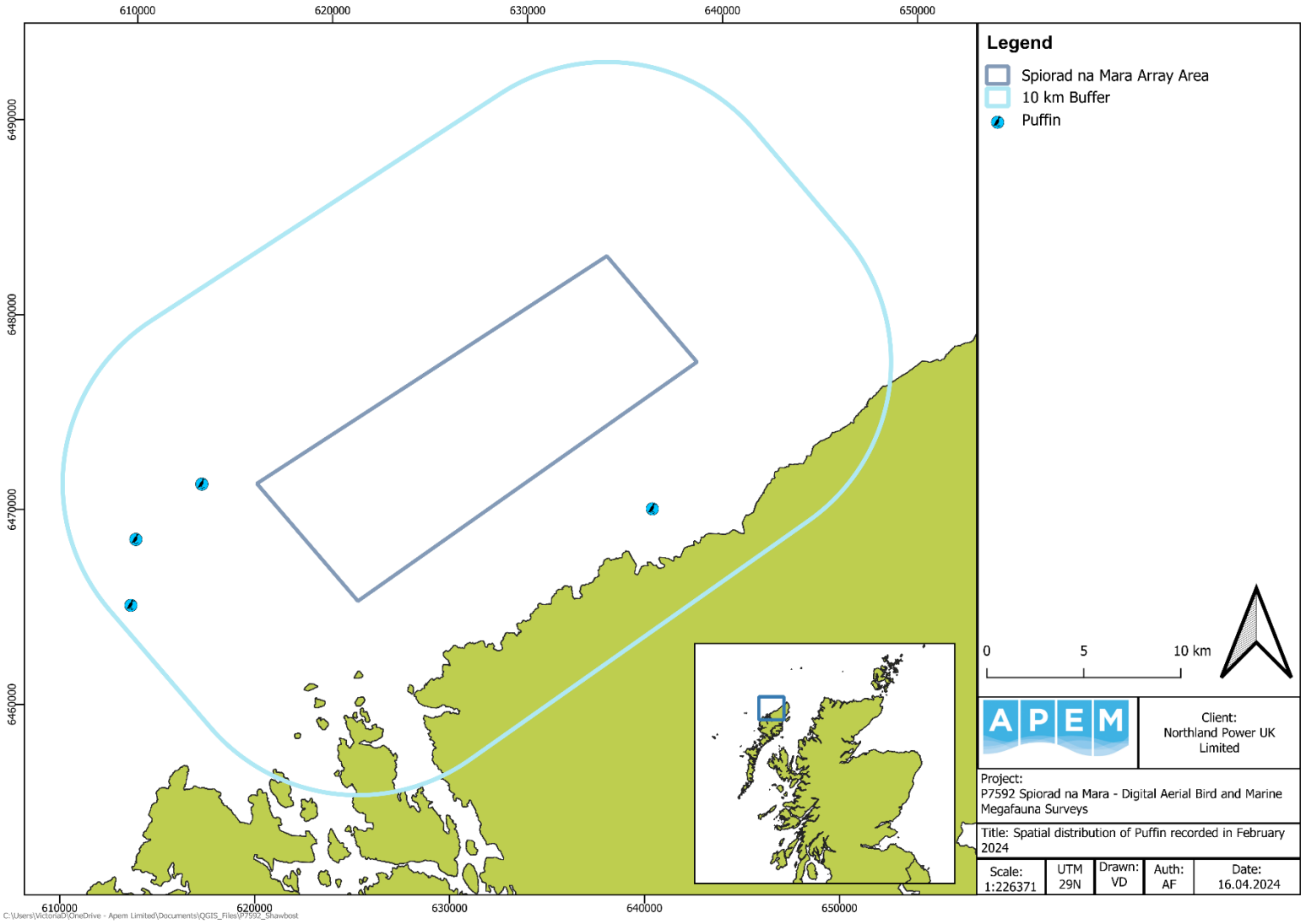


Figure 254 Distribution of puffin in February 2024
*Note that individuals in close proximity may appear overlaying.

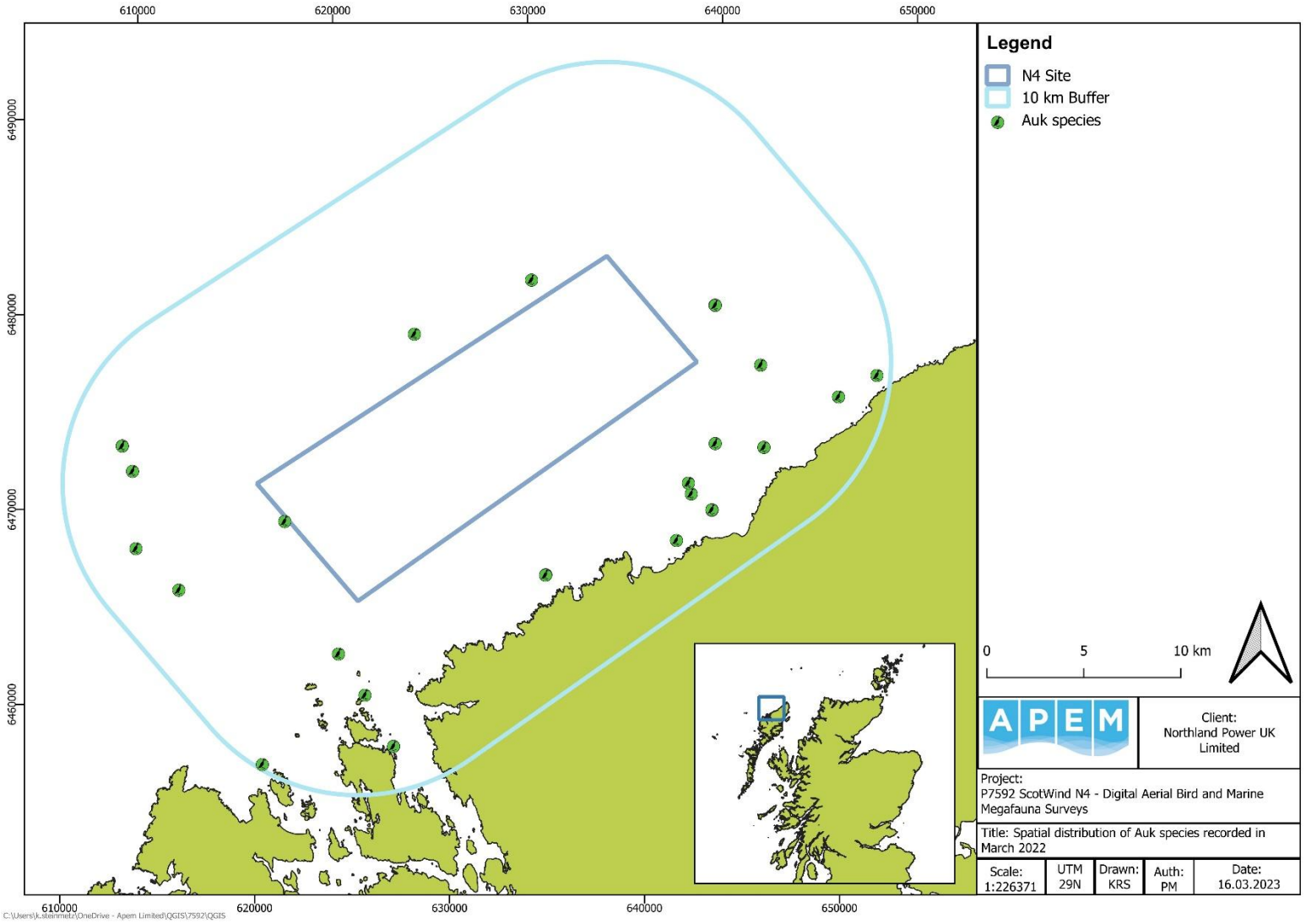


Figure 255 Distribution of auk species in March 2022
*Note that individuals in close proximity may appear overlaying.

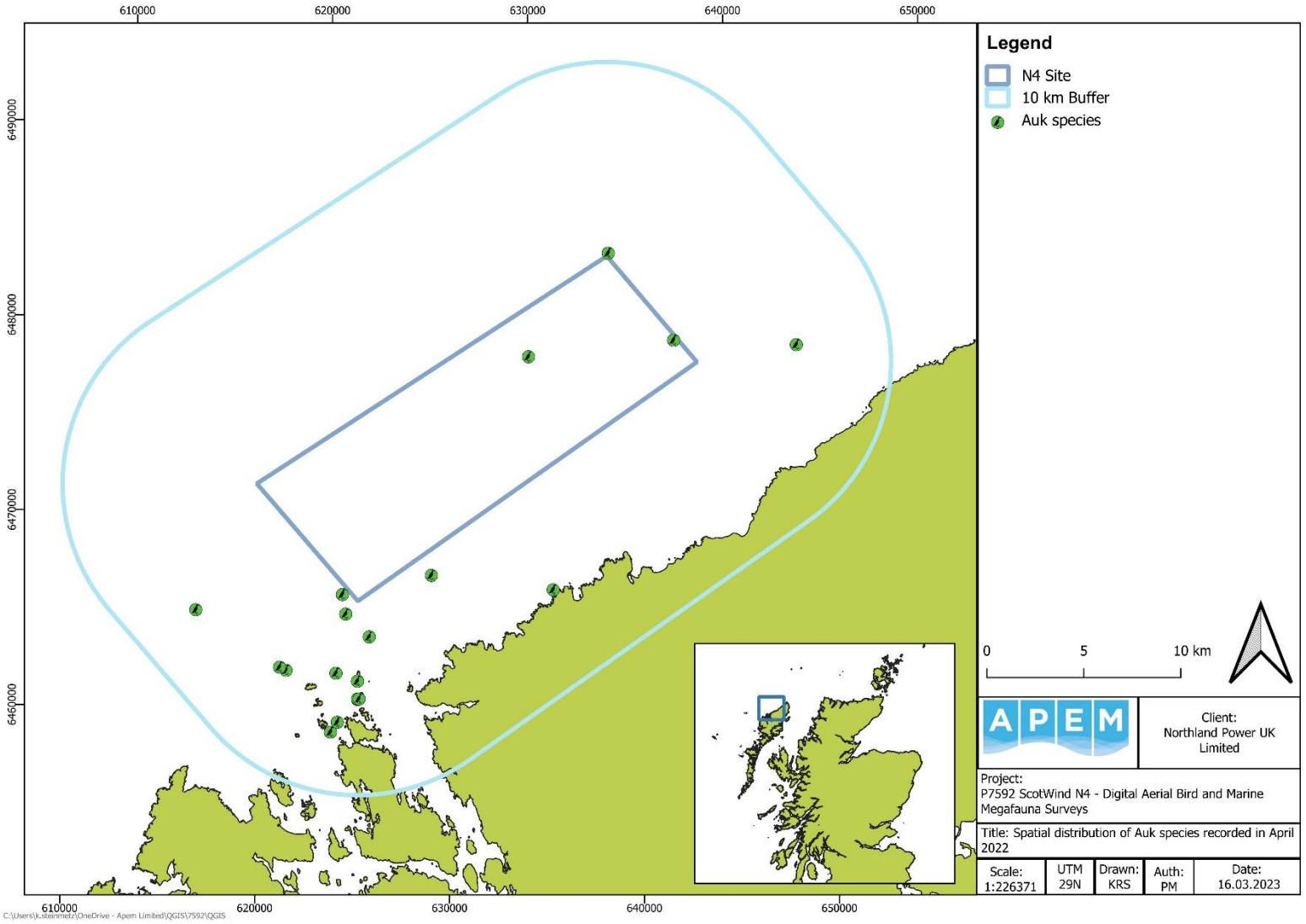


Figure 256 Distribution of auk species in April 2022

*Note that individuals in close proximity may appear overlaying.

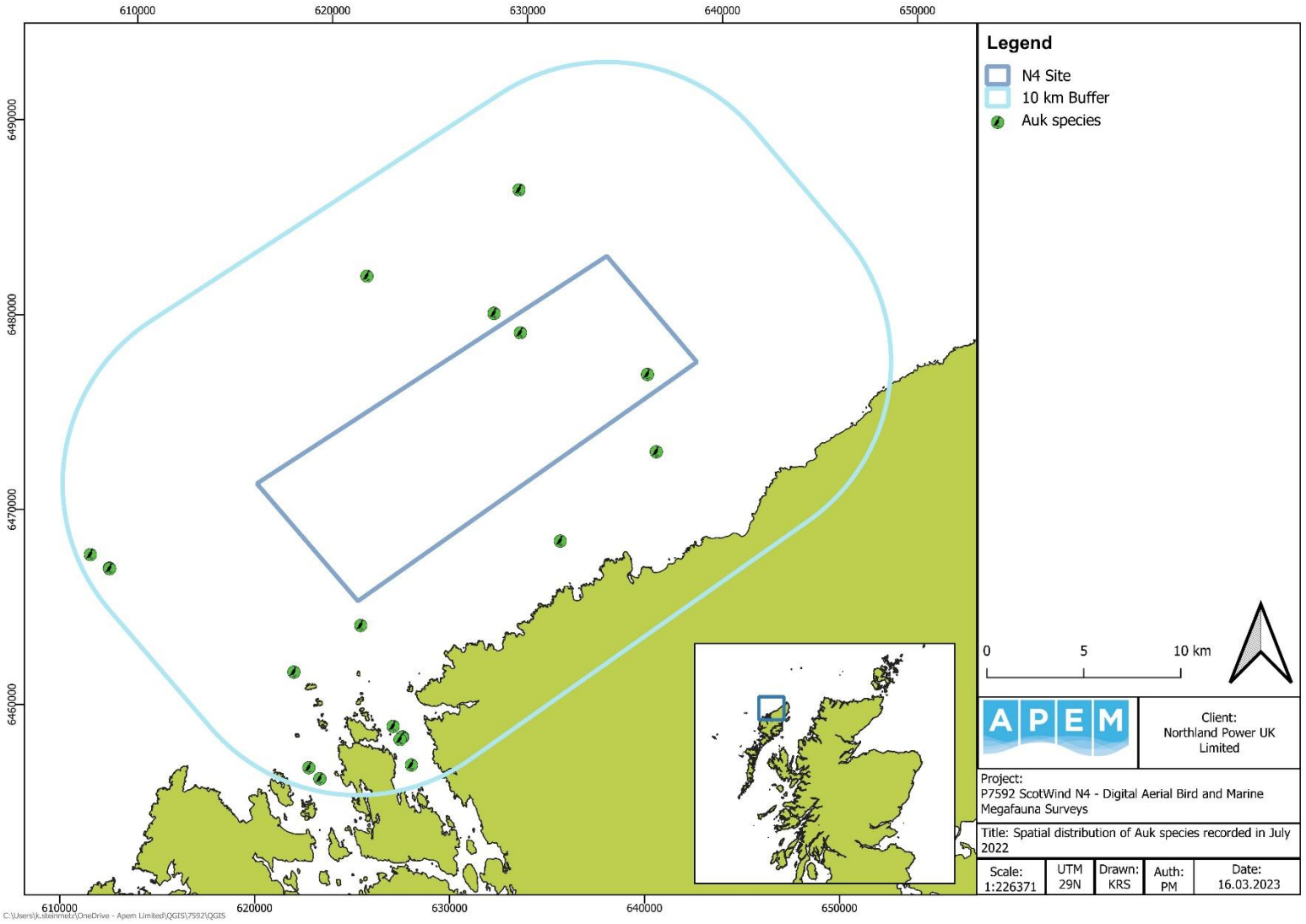


Figure 257 Distribution of auk species in July 2022
*Note that individuals in close proximity may appear overlaying.

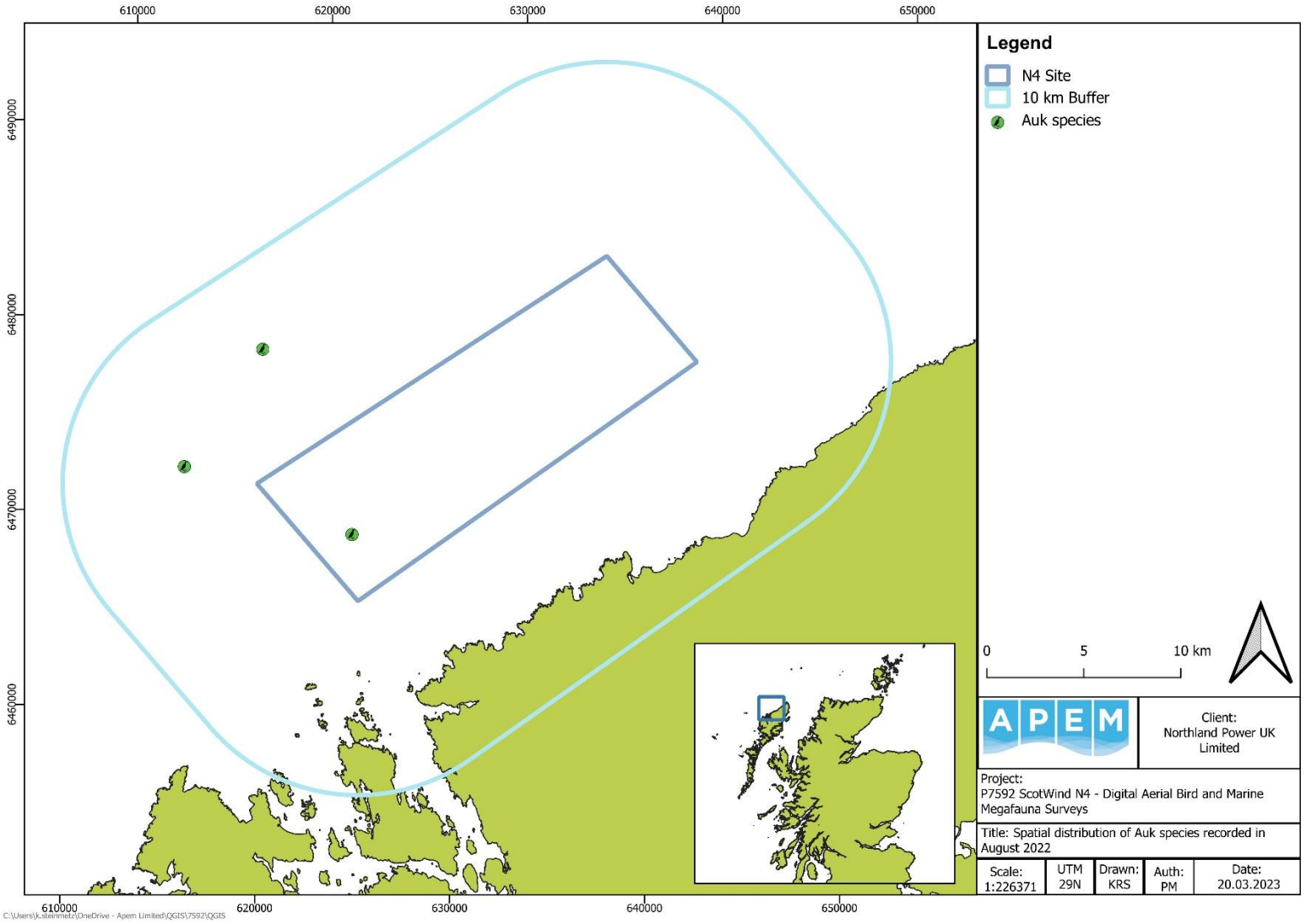


Figure 258 Distribution of auk species in August 2022

*Note that individuals in close proximity may appear overlaying.

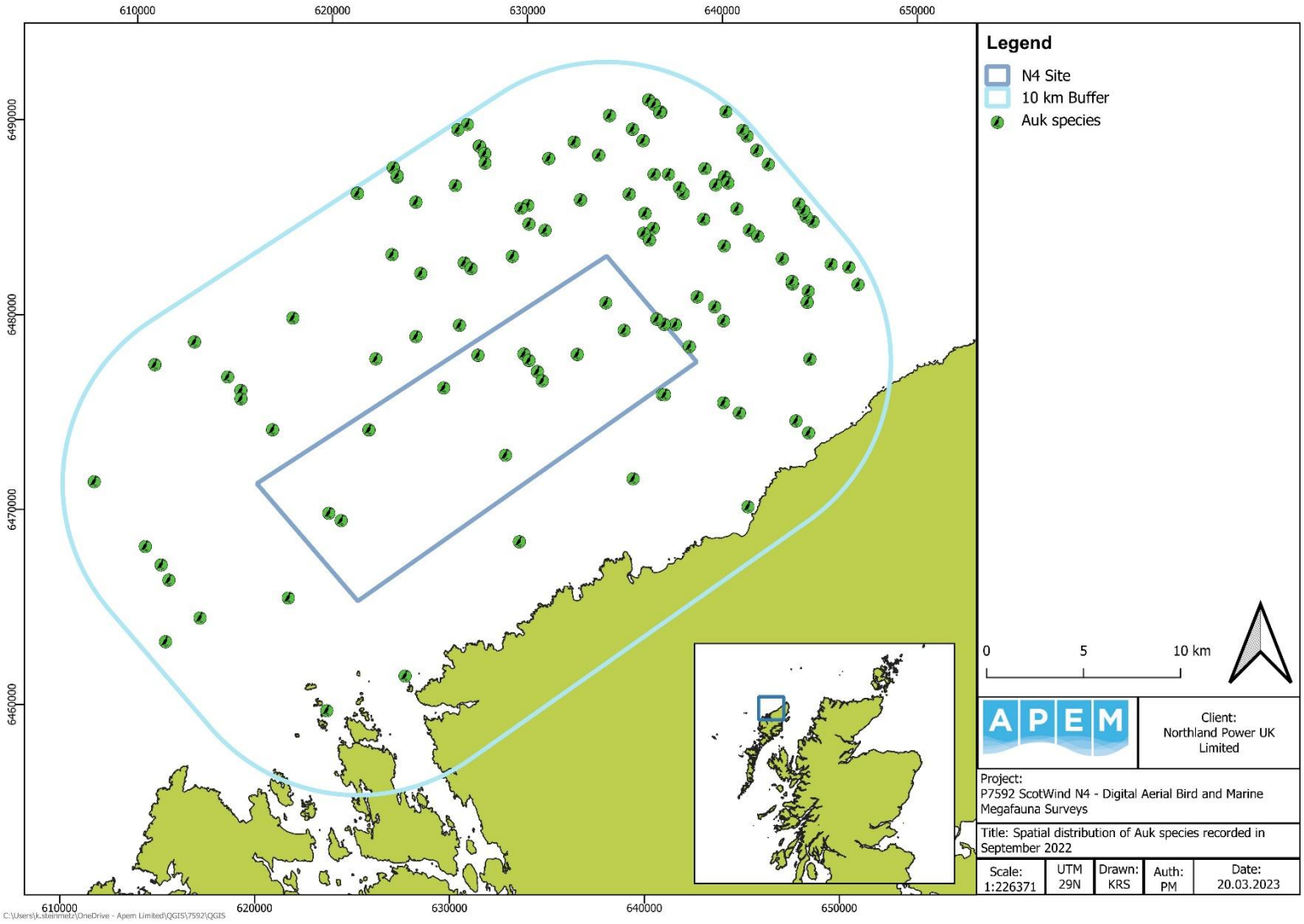


Figure 259 Distribution of auk species in September 2022

*Note that individuals in close proximity may appear overlaying.

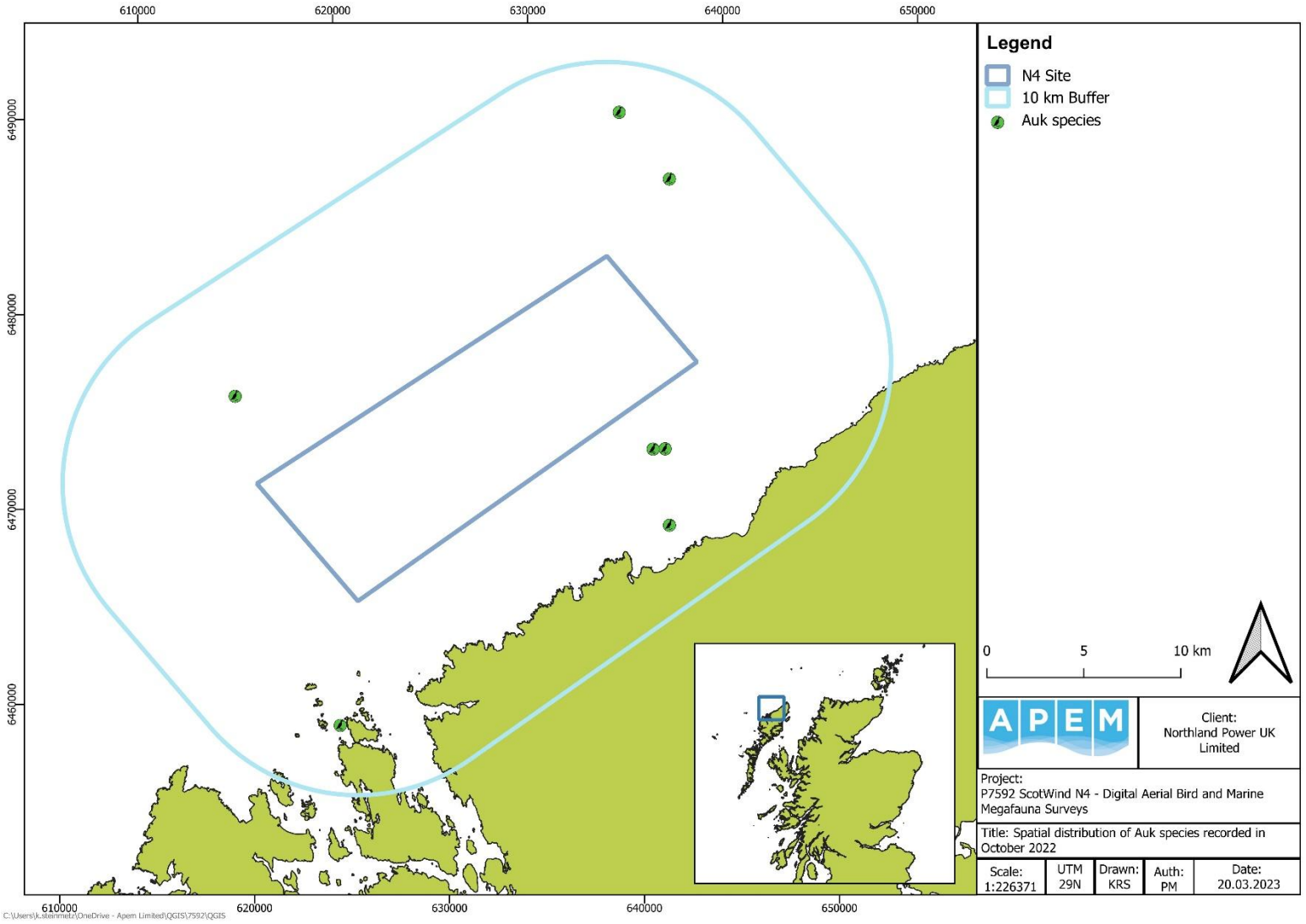


Figure 260 Distribution of auk species in October 2022

*Note that individuals in close proximity may appear overlaying.

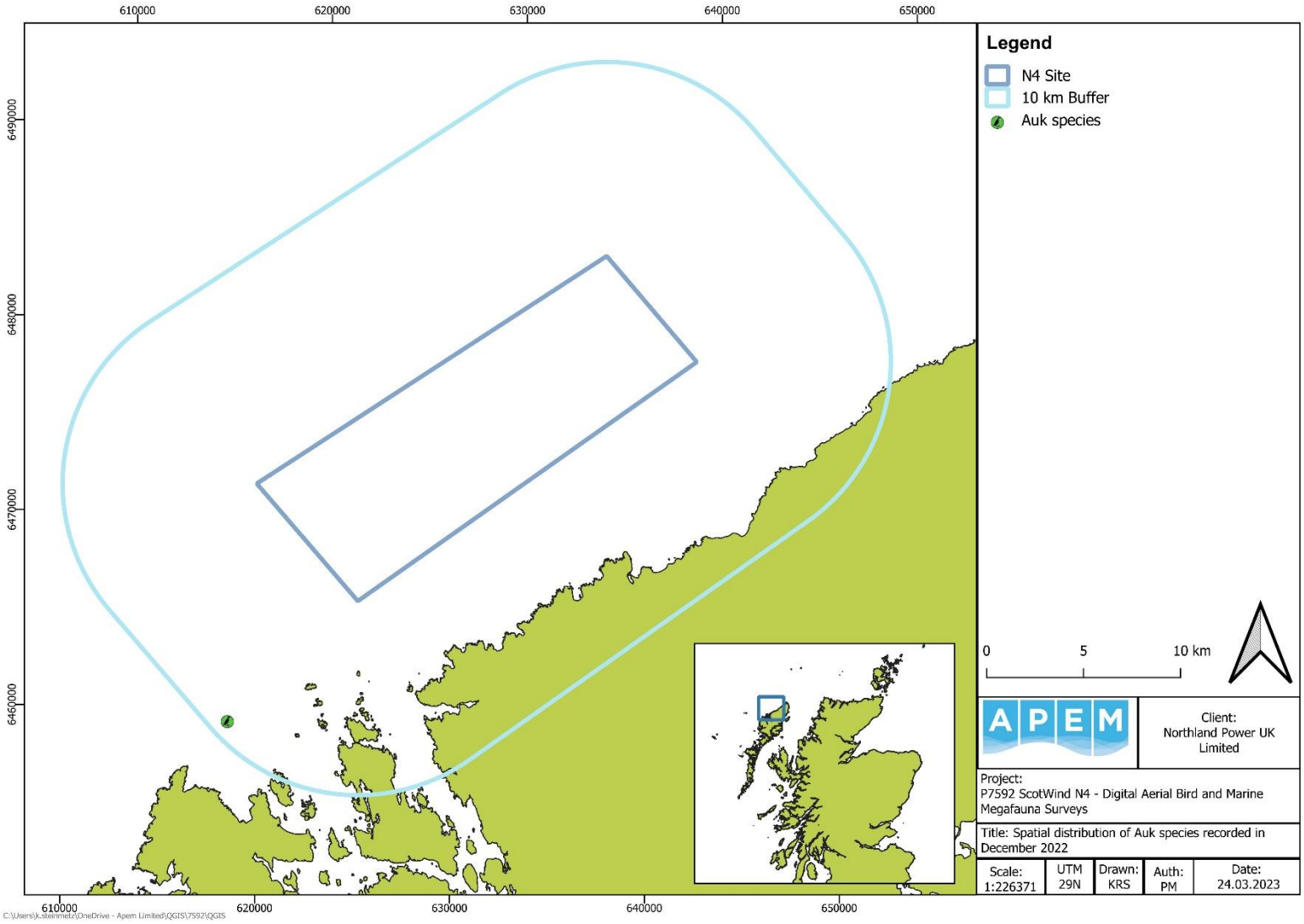


Figure 261 Distribution of auk species in December 2022

*Note that individuals in close proximity may appear overlaying.

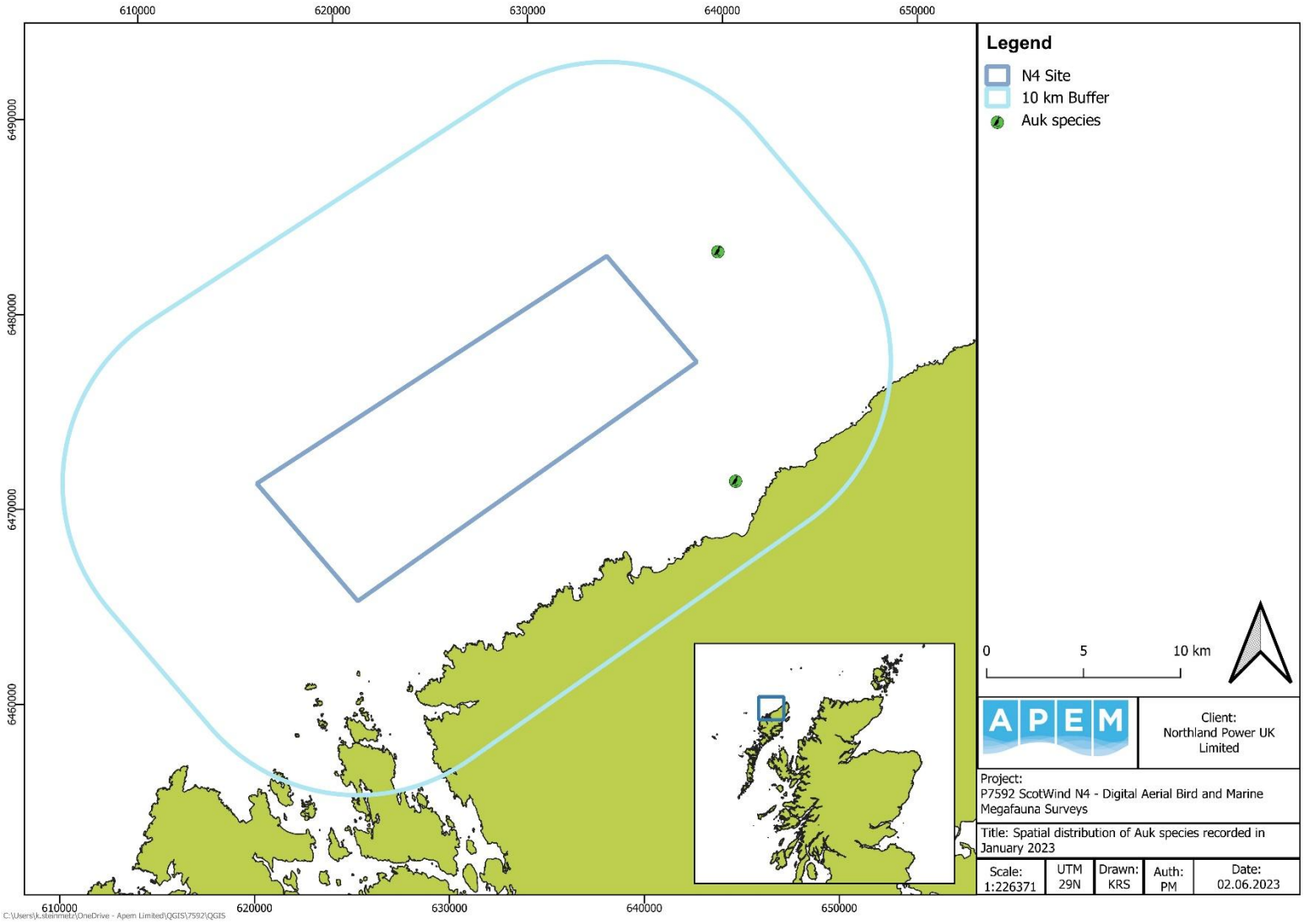


Figure 262 Distribution of auk species in January 2023

*Note that individuals in close proximity may appear overlaying.

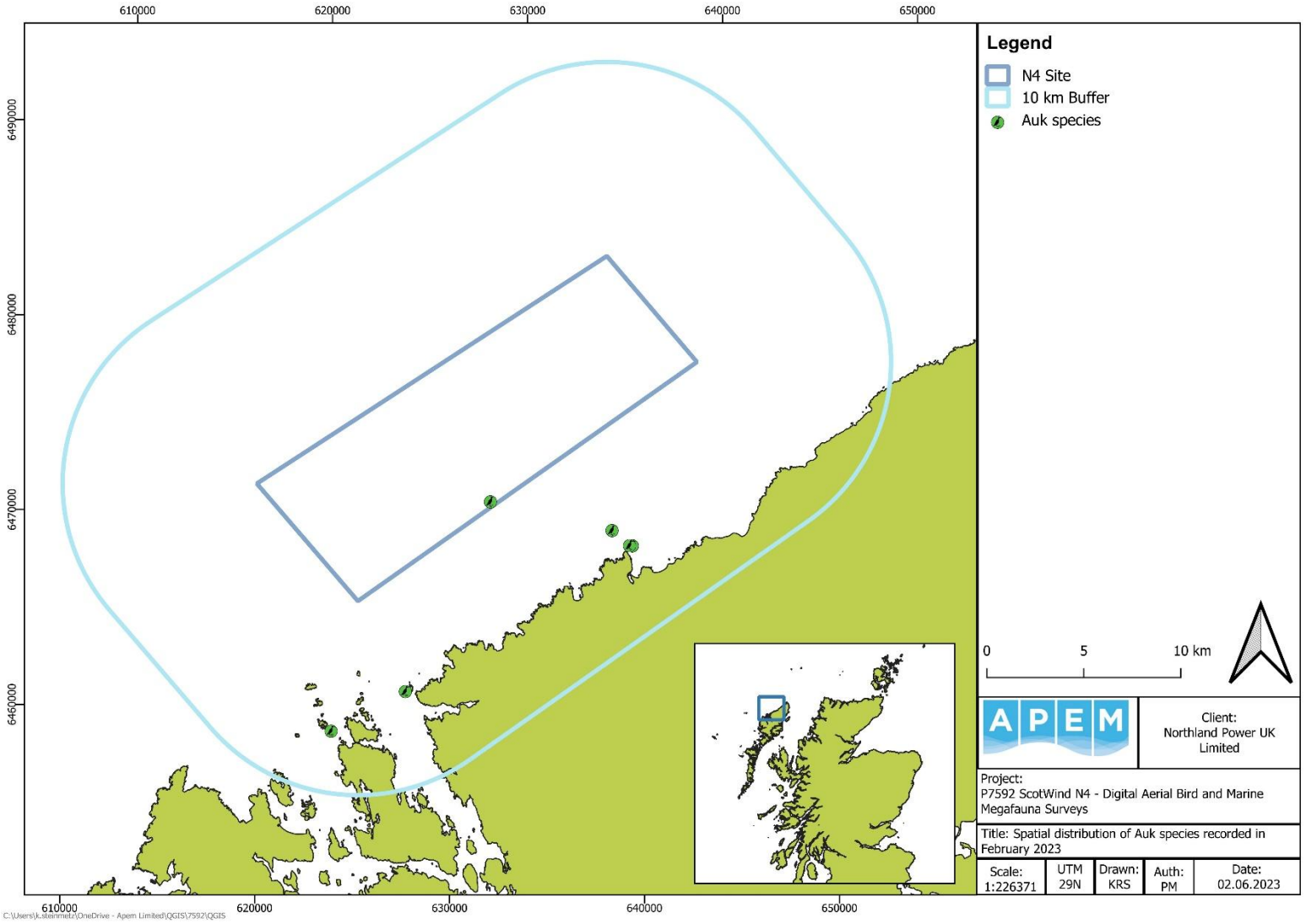


Figure 263 Distribution of auk species in February 2023

*Note that individuals in close proximity may appear overlaying.

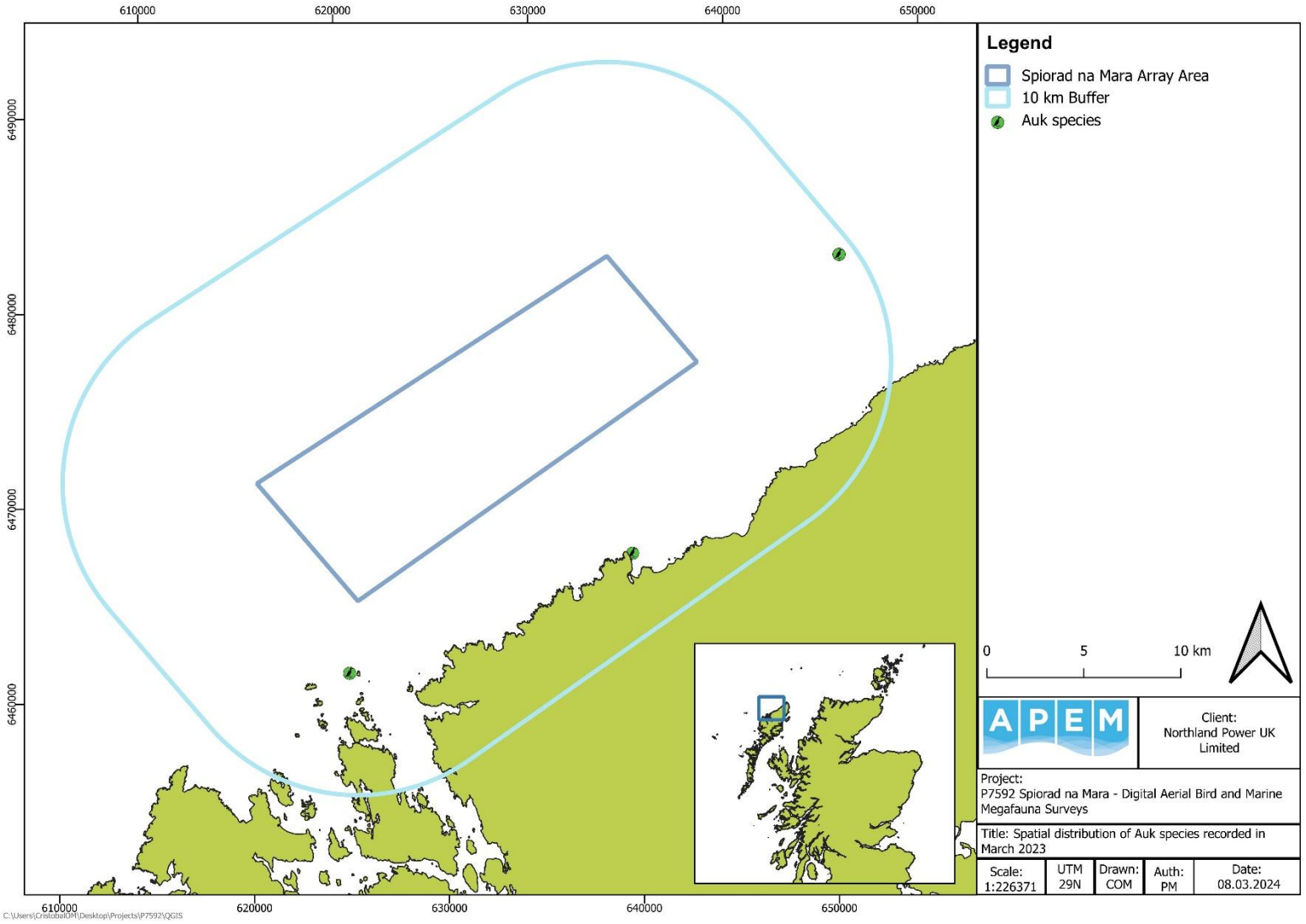


Figure 264 Distribution of auk species in March 2023

*Note that individuals in close proximity may appear overlaying.

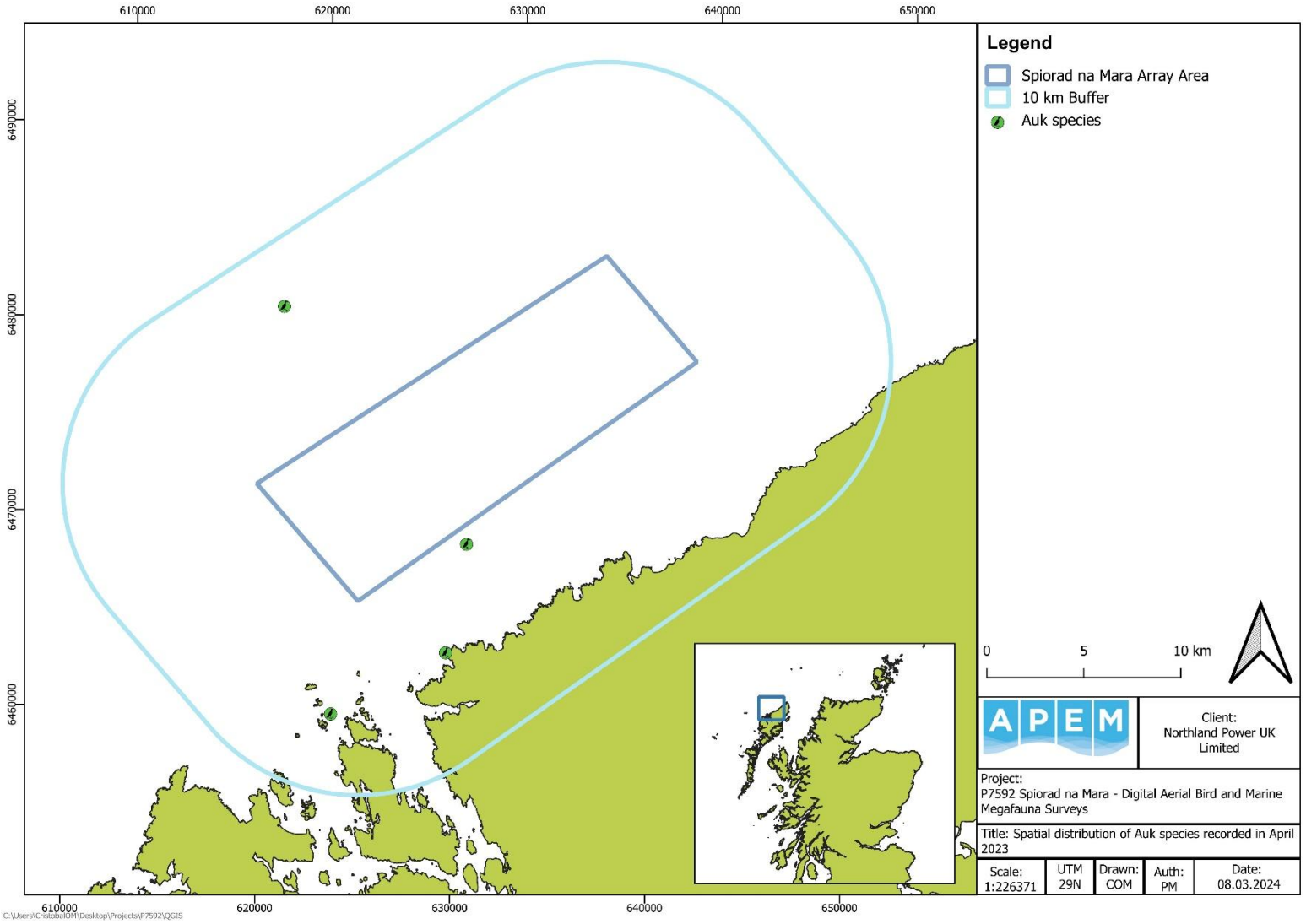


Figure 265 Distribution of auk species in April 2023

*Note that individuals in close proximity may appear overlaying.

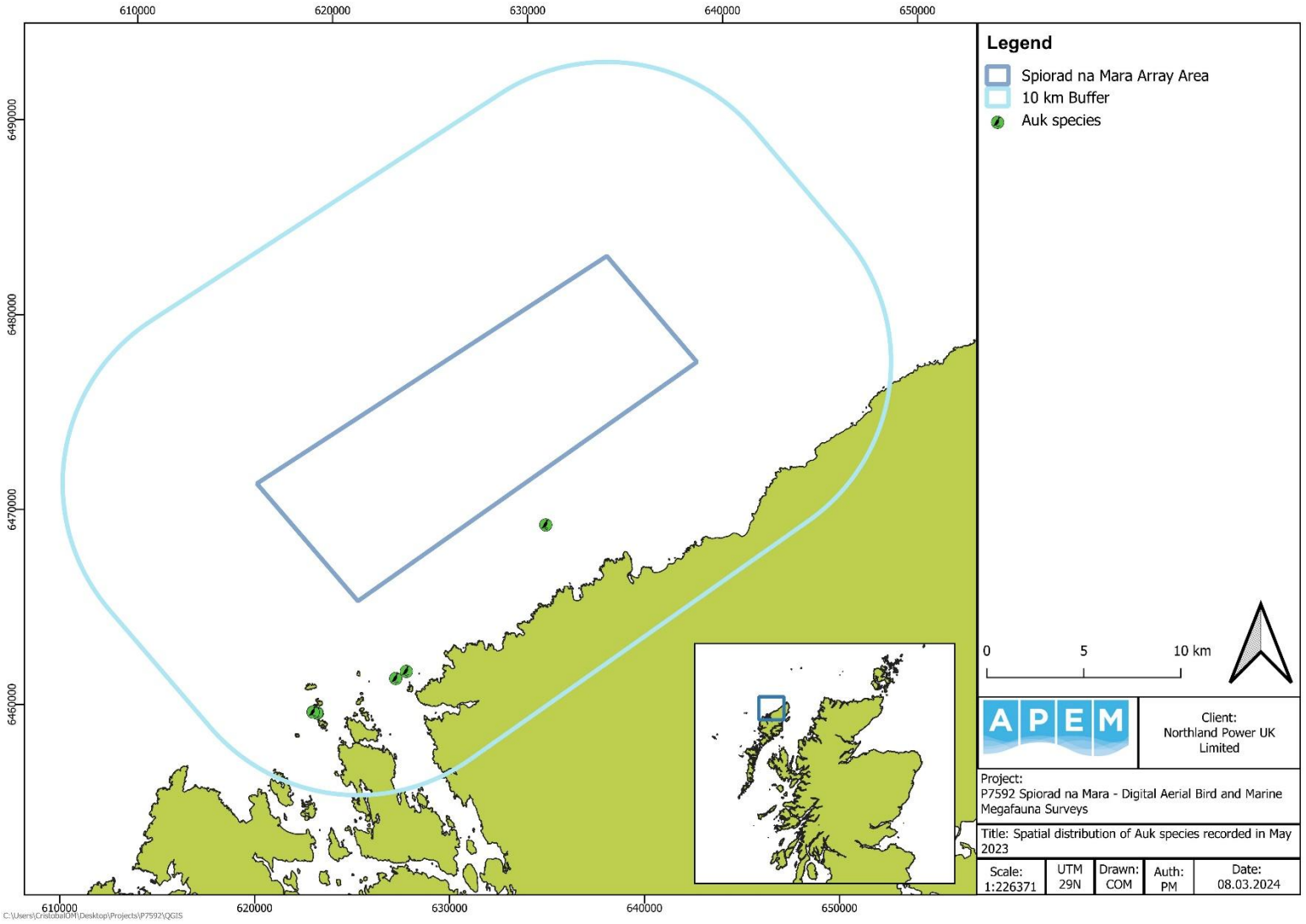


Figure 266 Distribution of auk species in May 2023
*Note that individuals in close proximity may appear overlaying.

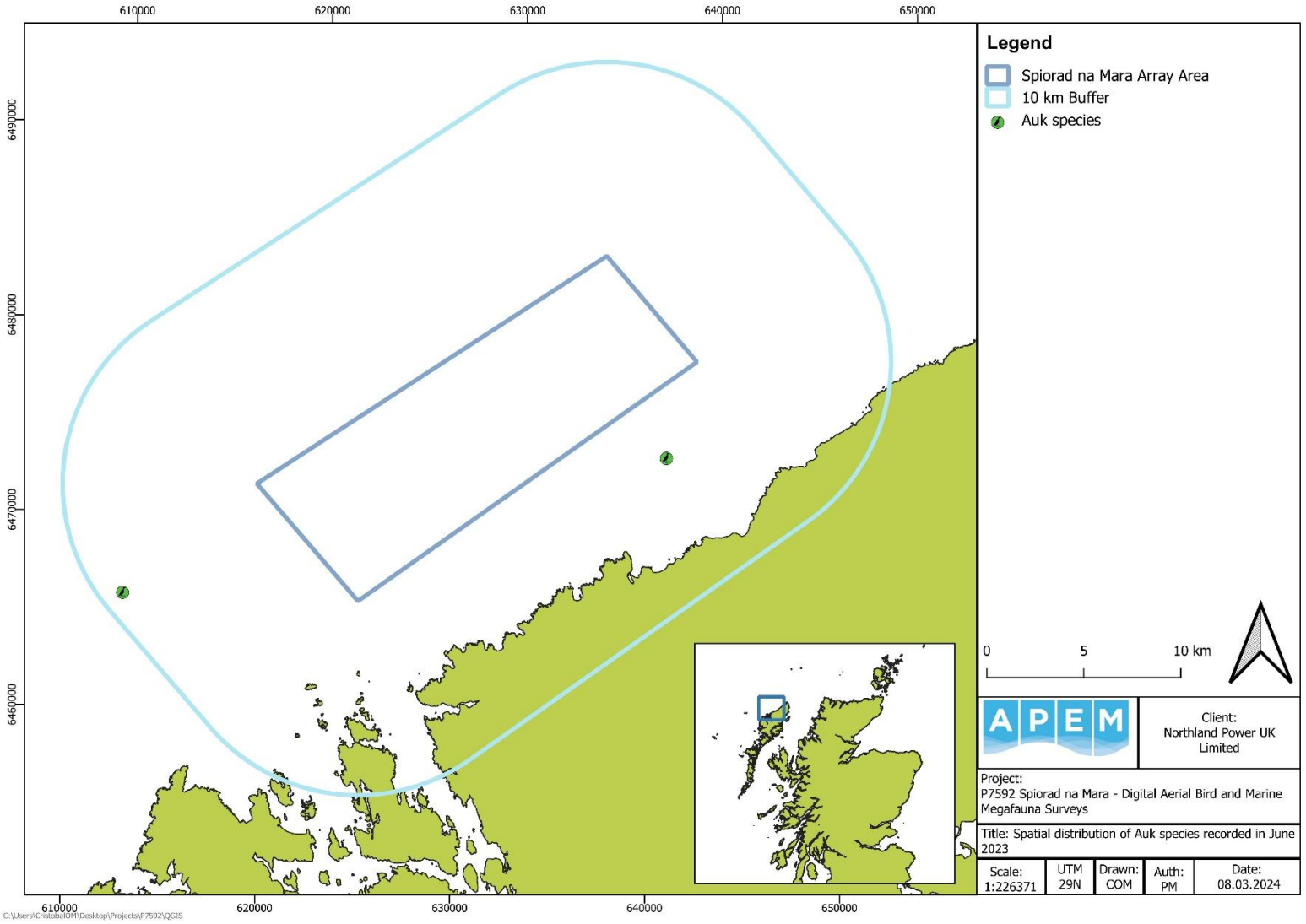


Figure 267 Distribution of auk species in June 2023

*Note that individuals in close proximity may appear overlaying.

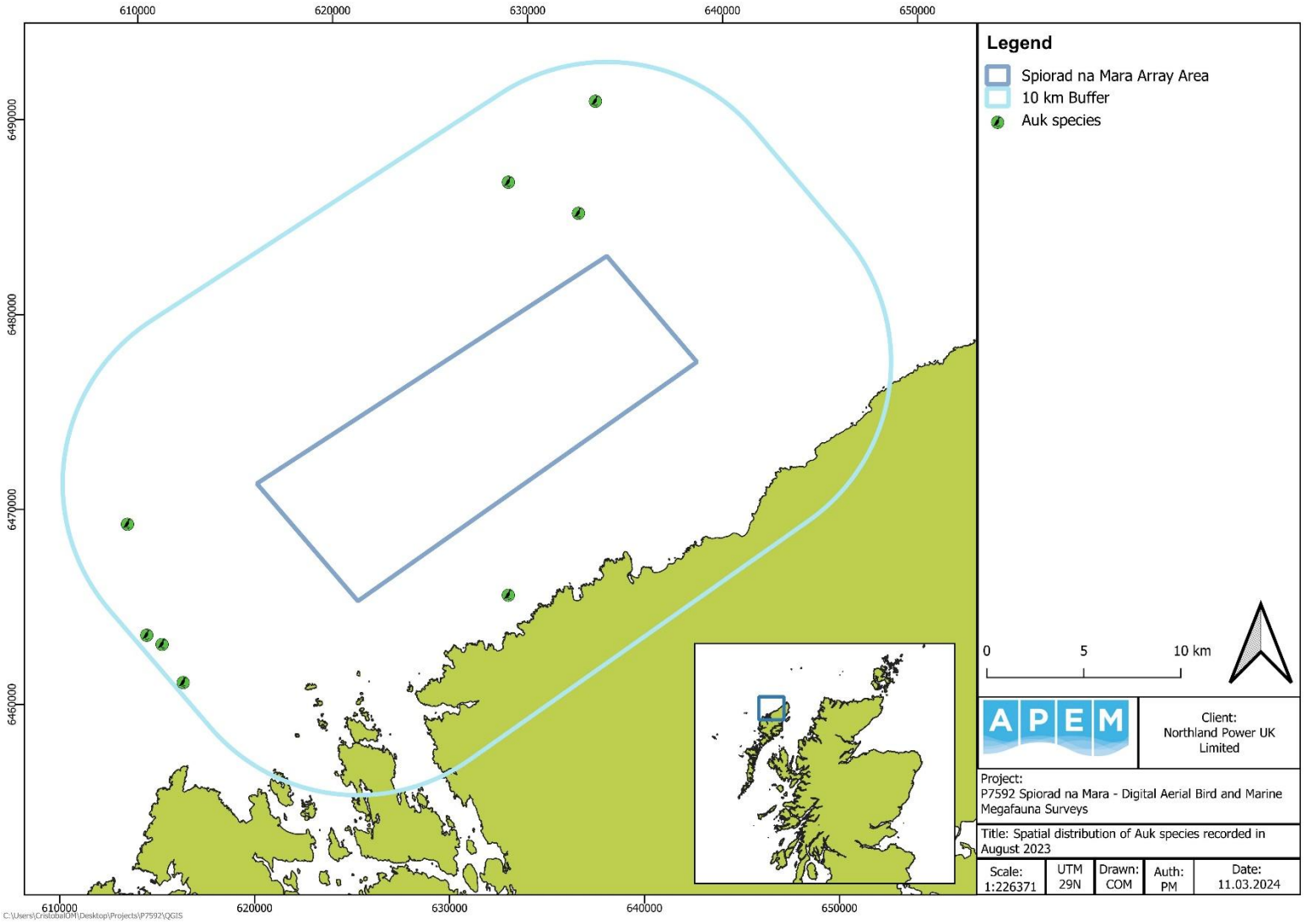


Figure 268 Distribution of auk species in August 2023

*Note that individuals in close proximity may appear overlaying.

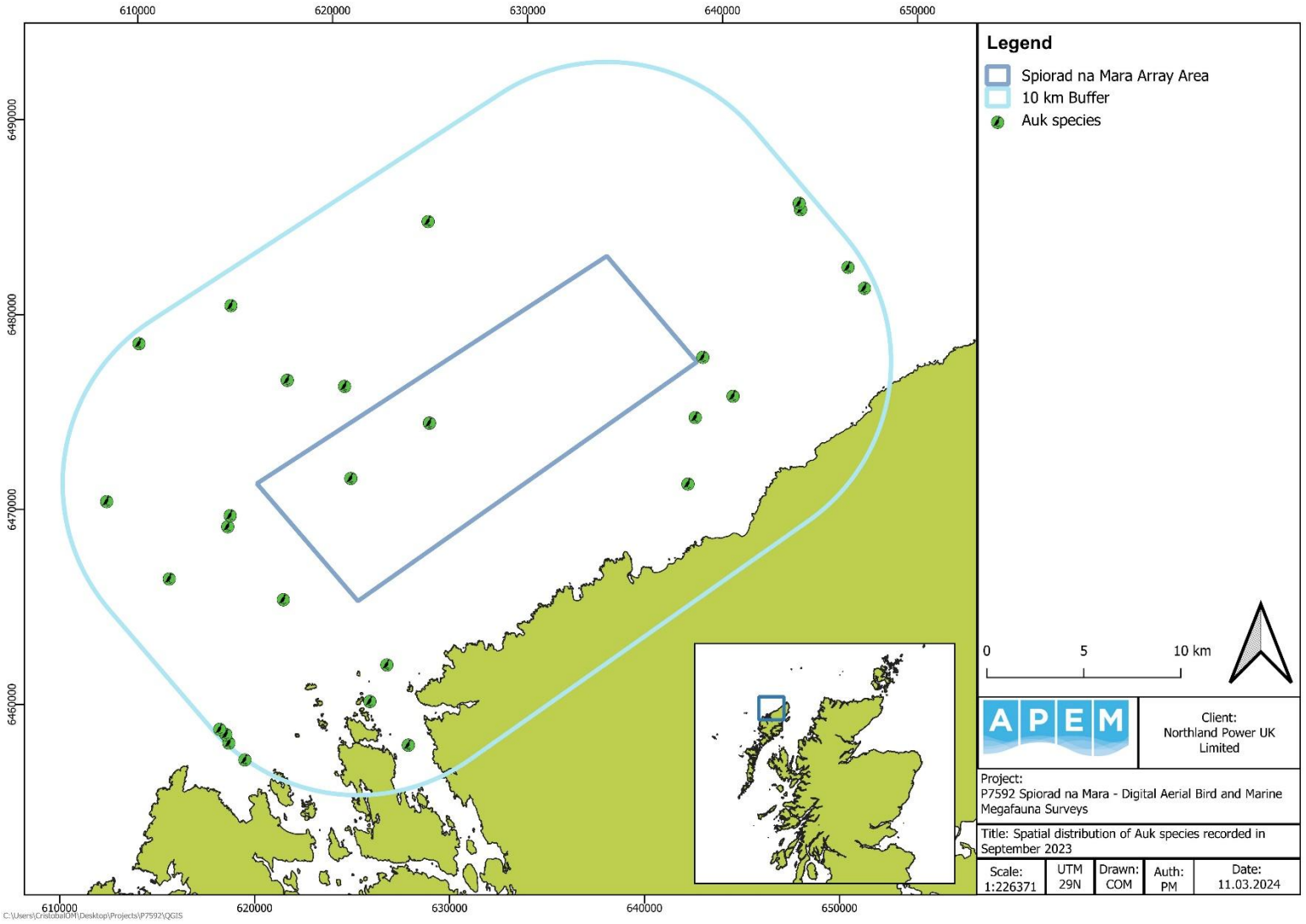


Figure 269 Distribution of auk species in September 2023

*Note that individuals in close proximity may appear overlaying.

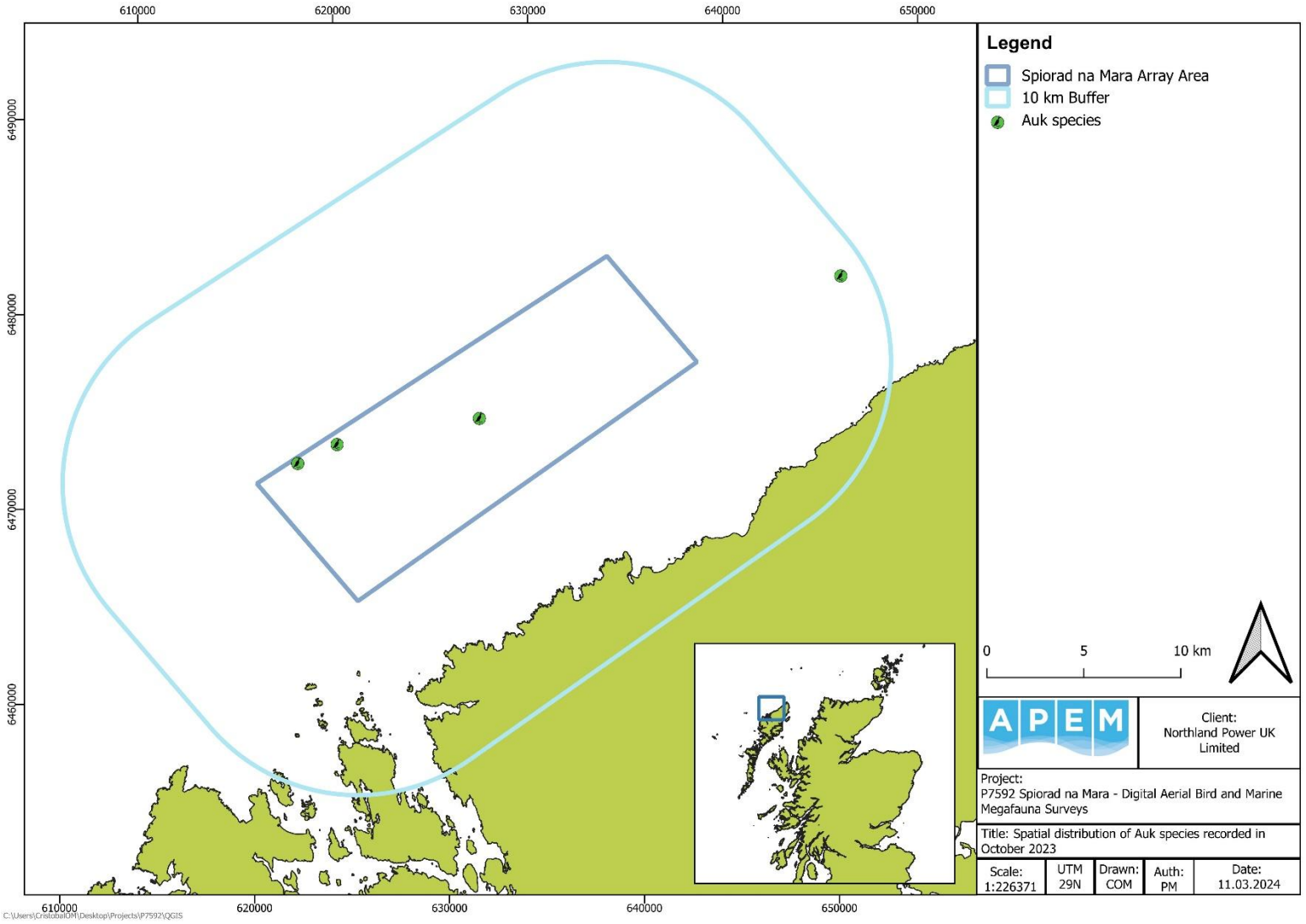


Figure 270 Distribution of auk species in October 2023

*Note that individuals in close proximity may appear overlaying.

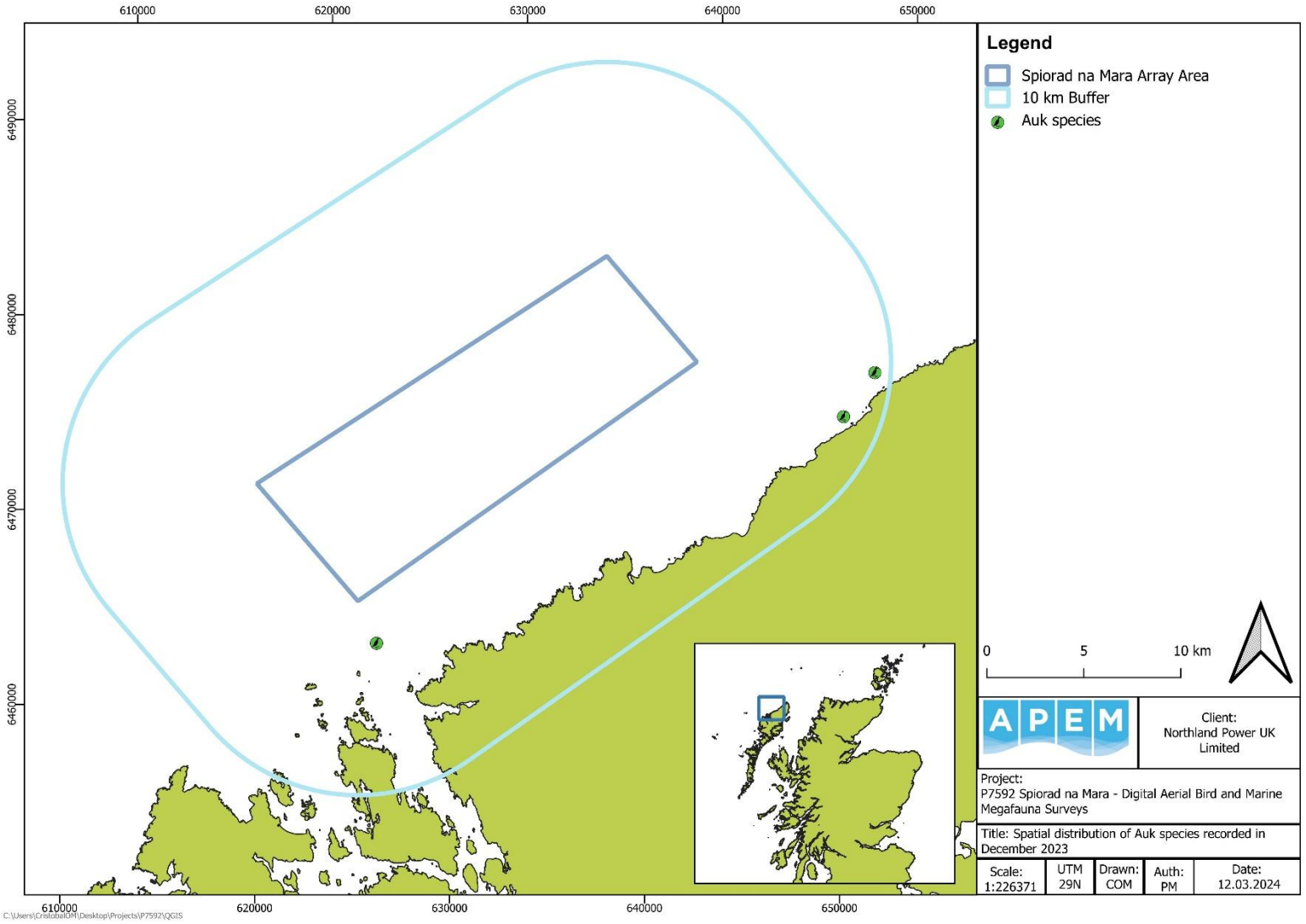


Figure 271 Distribution of auk species in December 2023

*Note that individuals in close proximity may appear overlaying.

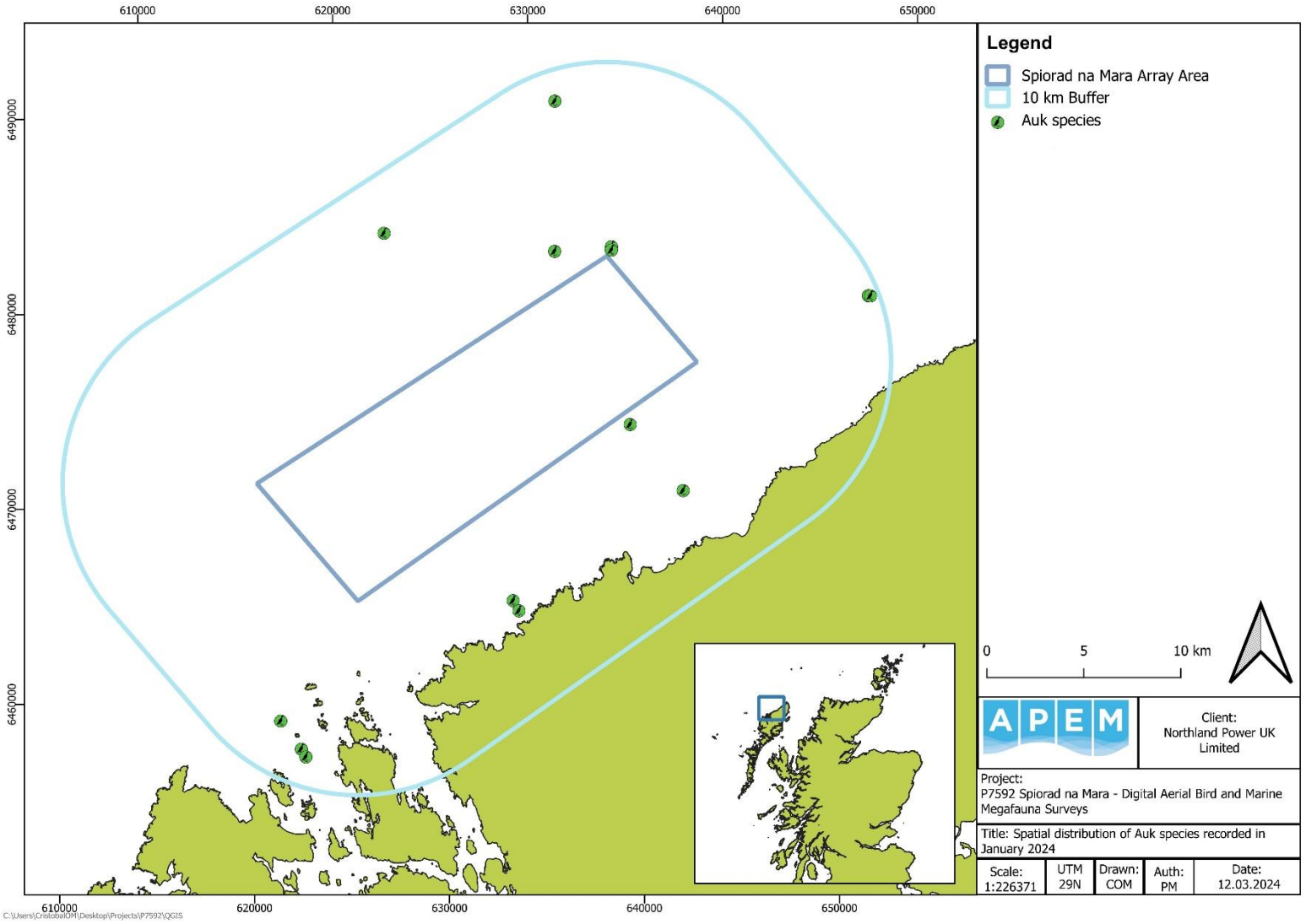


Figure 272 Distribution of auk species in January 2024

*Note that individuals in close proximity may appear overlaying.

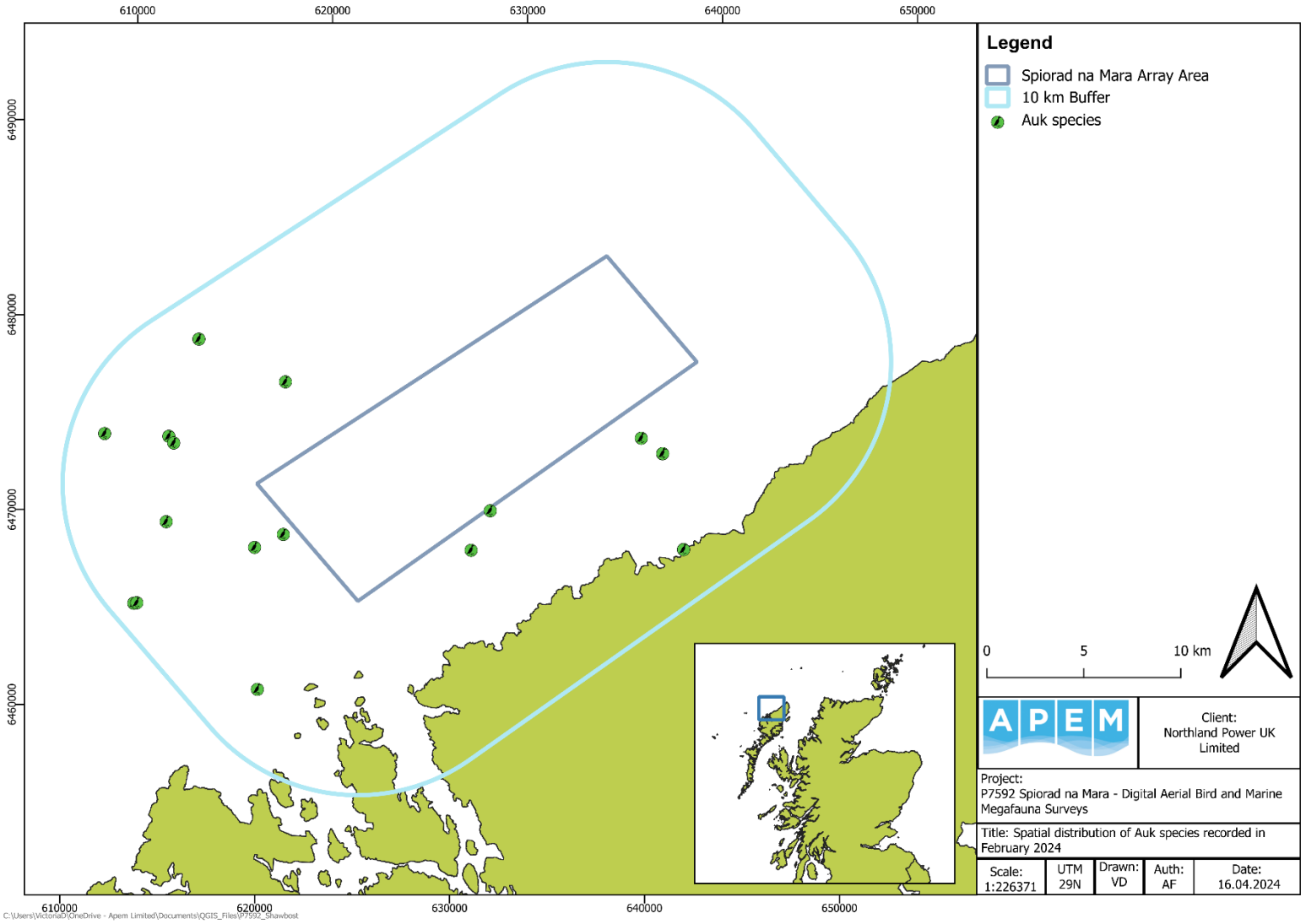


Figure 273 Distribution of auk species in February 2024

*Note that individuals in close proximity may appear overlaying.

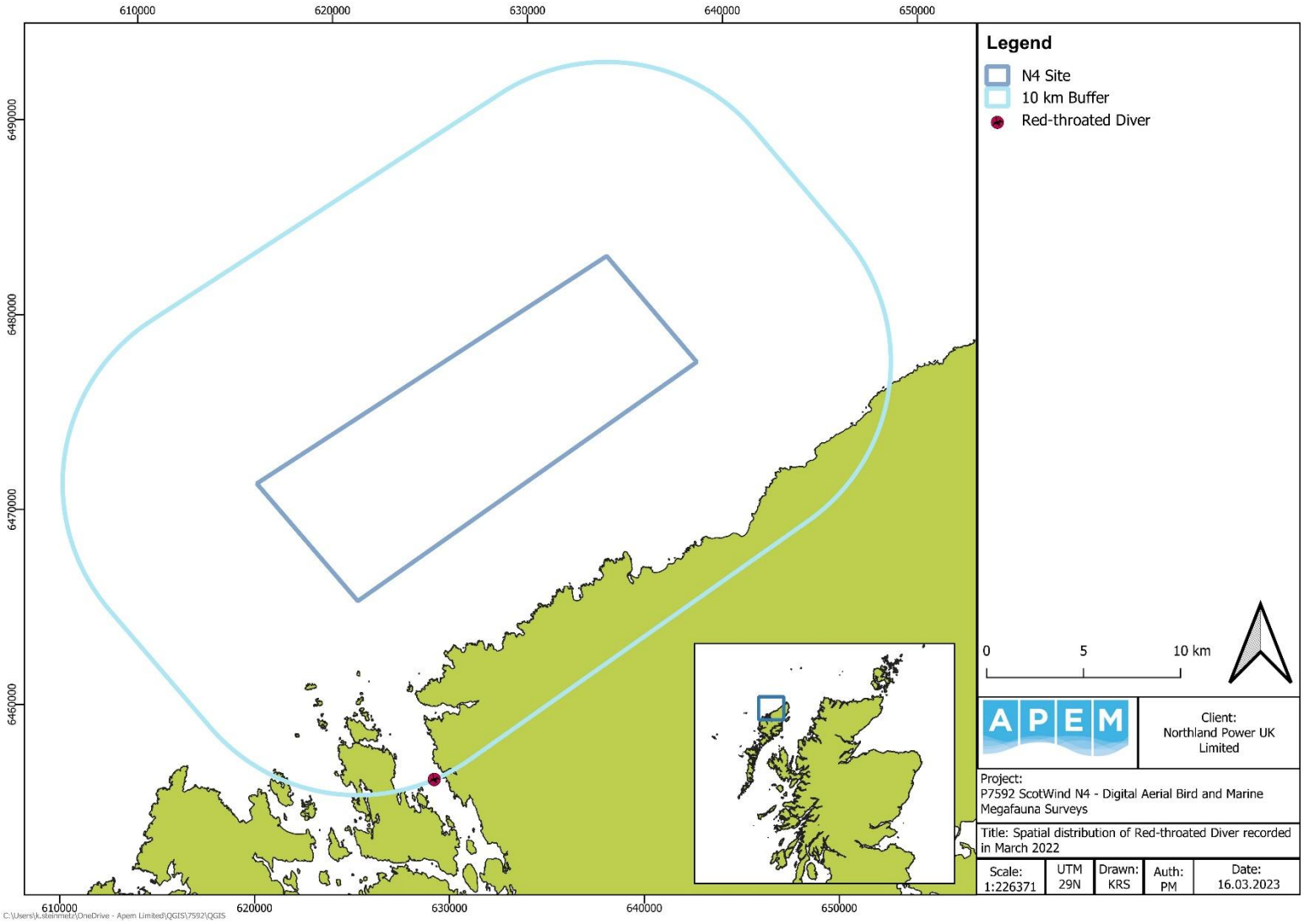


Figure 274 Distribution of red-throated diver in March 2022

*Note that individuals in close proximity may appear overlaying.

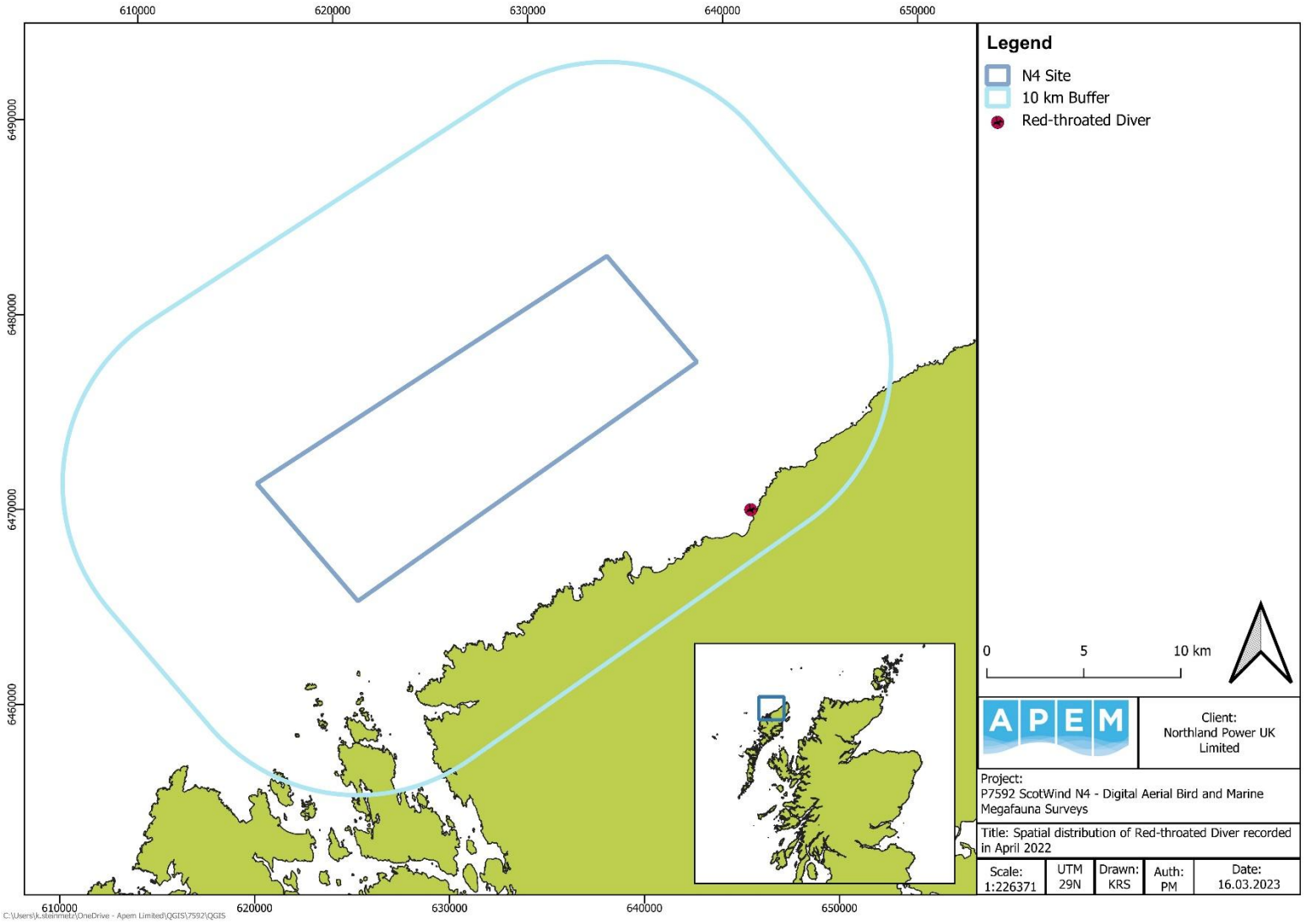


Figure 275 Distribution of red-throated diver in April 2022
*Note that individuals in close proximity may appear overlaying.

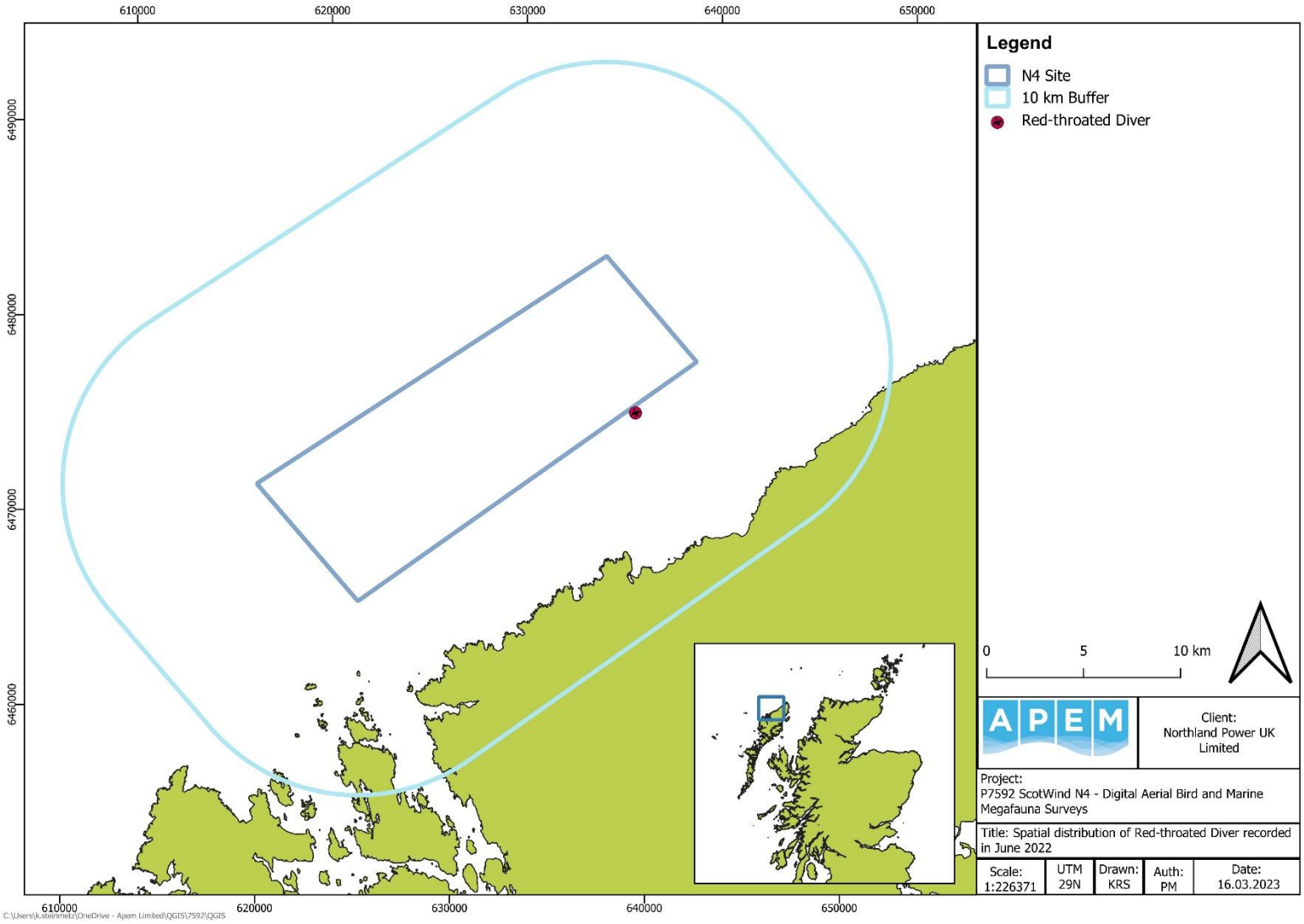


Figure 276 Distribution of red-throated diver in June 2022
*Note that individuals in close proximity may appear overlaying.

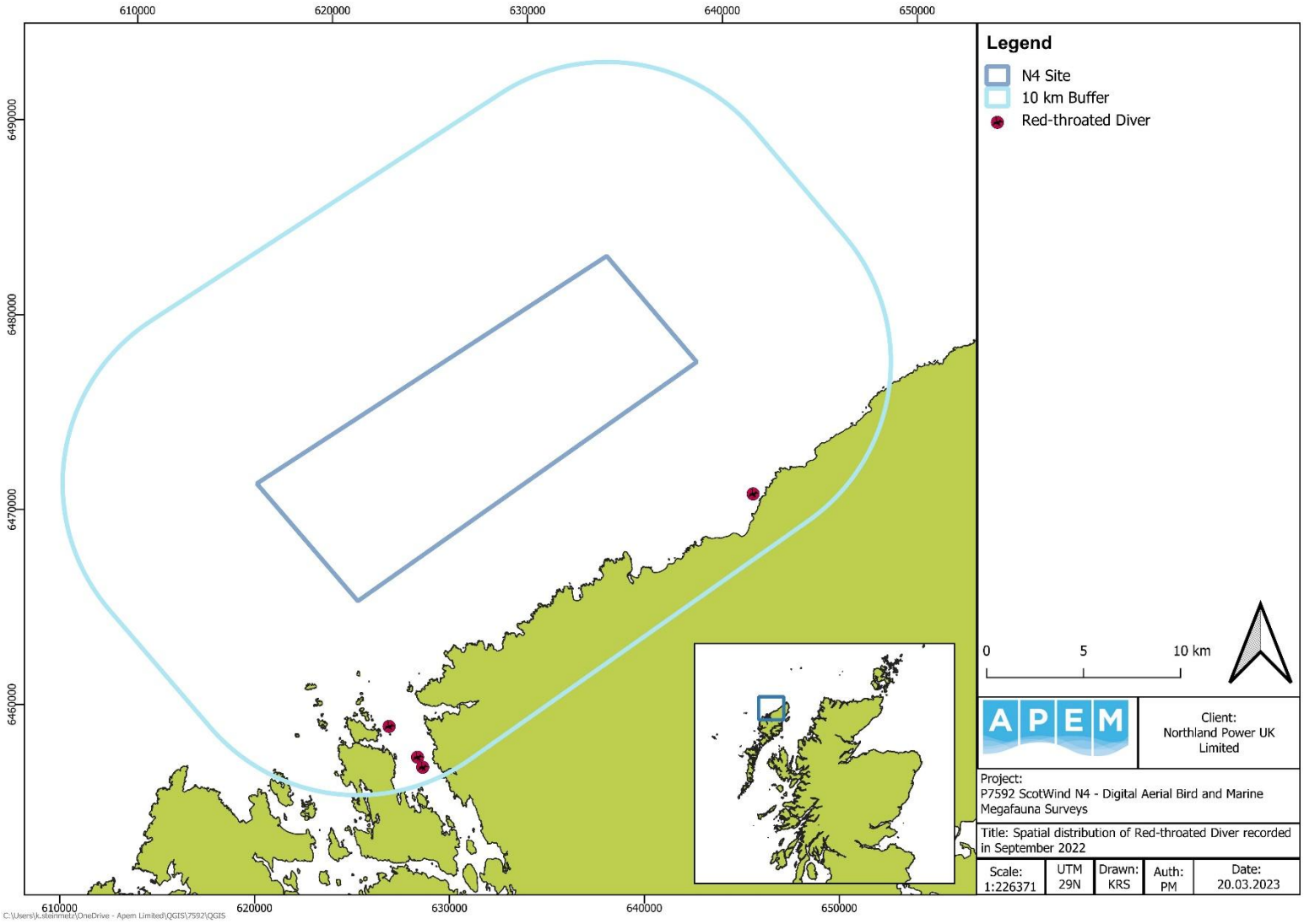


Figure 277 Distribution of red-throated diver in September 2022

*Note that individuals in close proximity may appear overlaying.

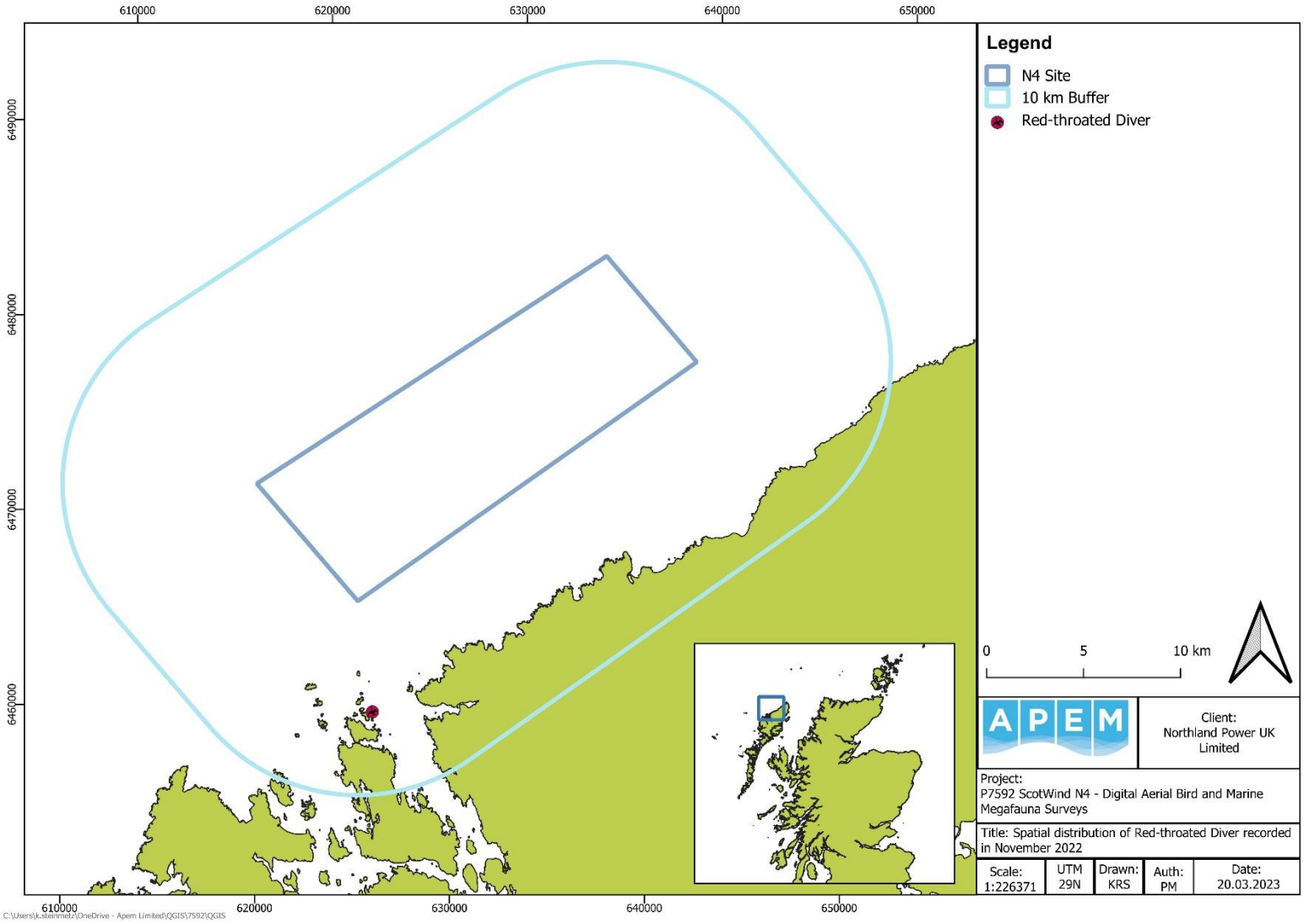


Figure 278 Distribution of red-throated diver in November 2022

*Note that individuals in close proximity may appear overlaying.

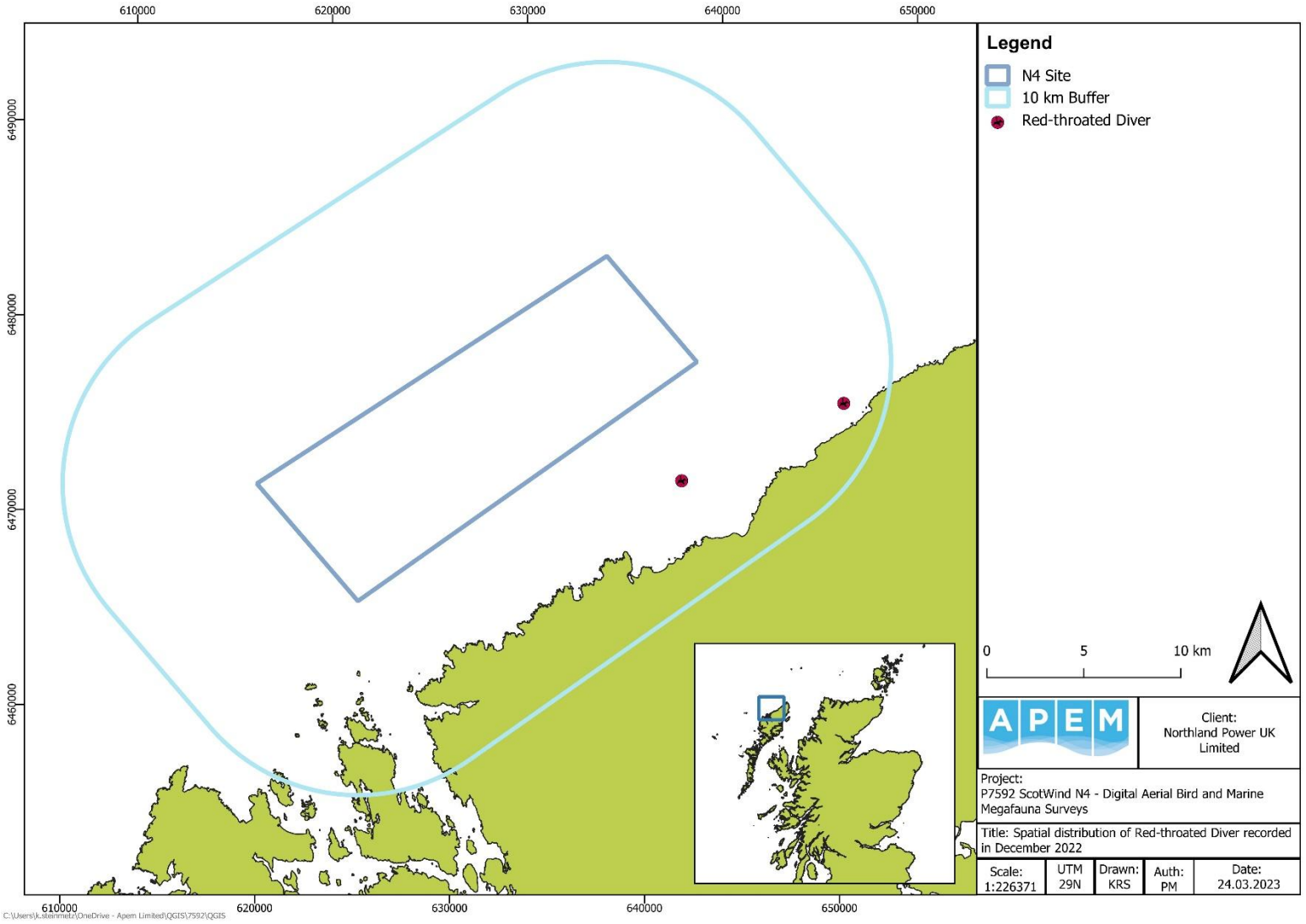


Figure 279 Distribution of red-throated diver in December 2022
*Note that individuals in close proximity may appear overlaying.

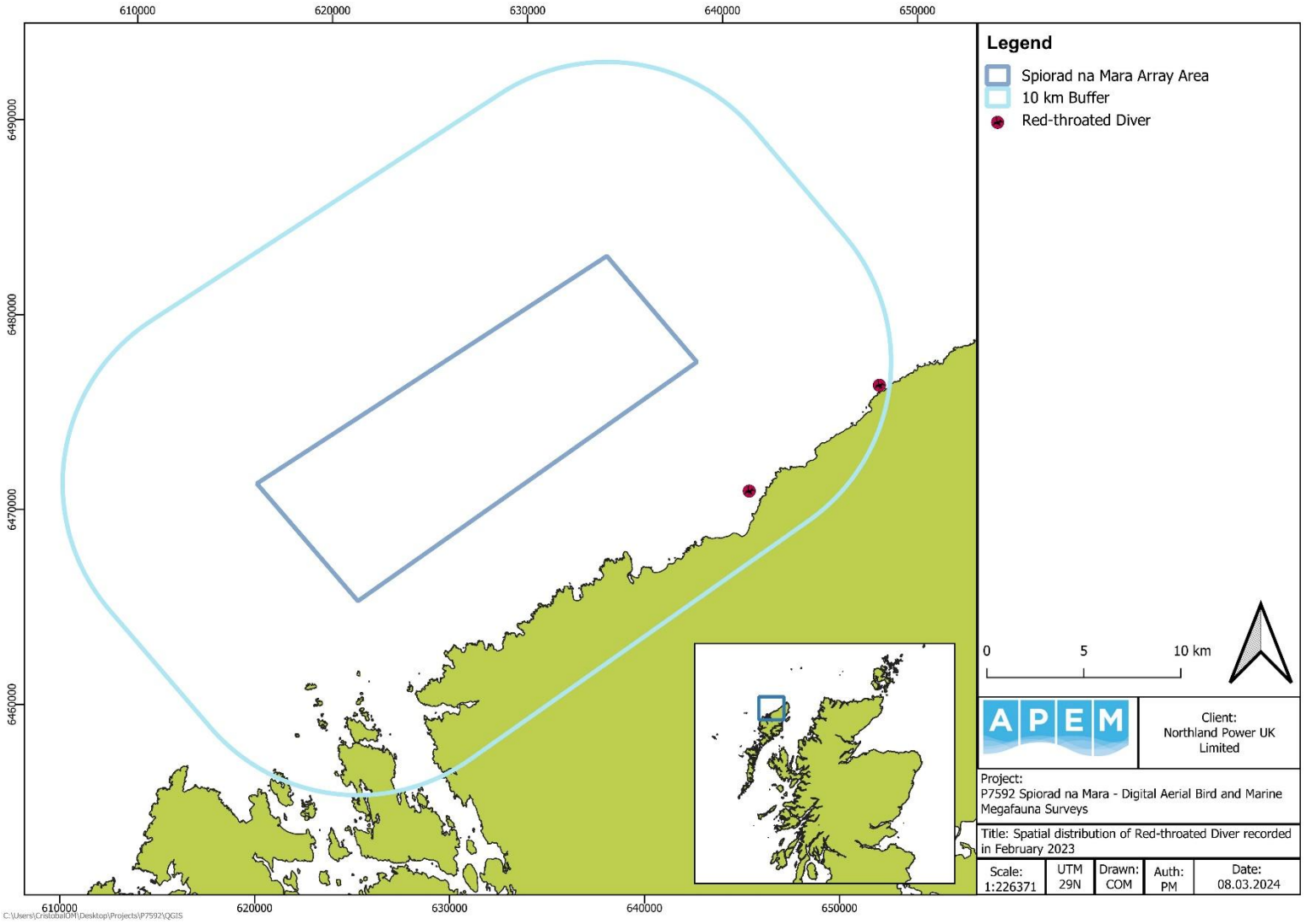


Figure 280 Distribution of red-throated diver in February 2023

*Note that individuals in close proximity may appear overlaying.

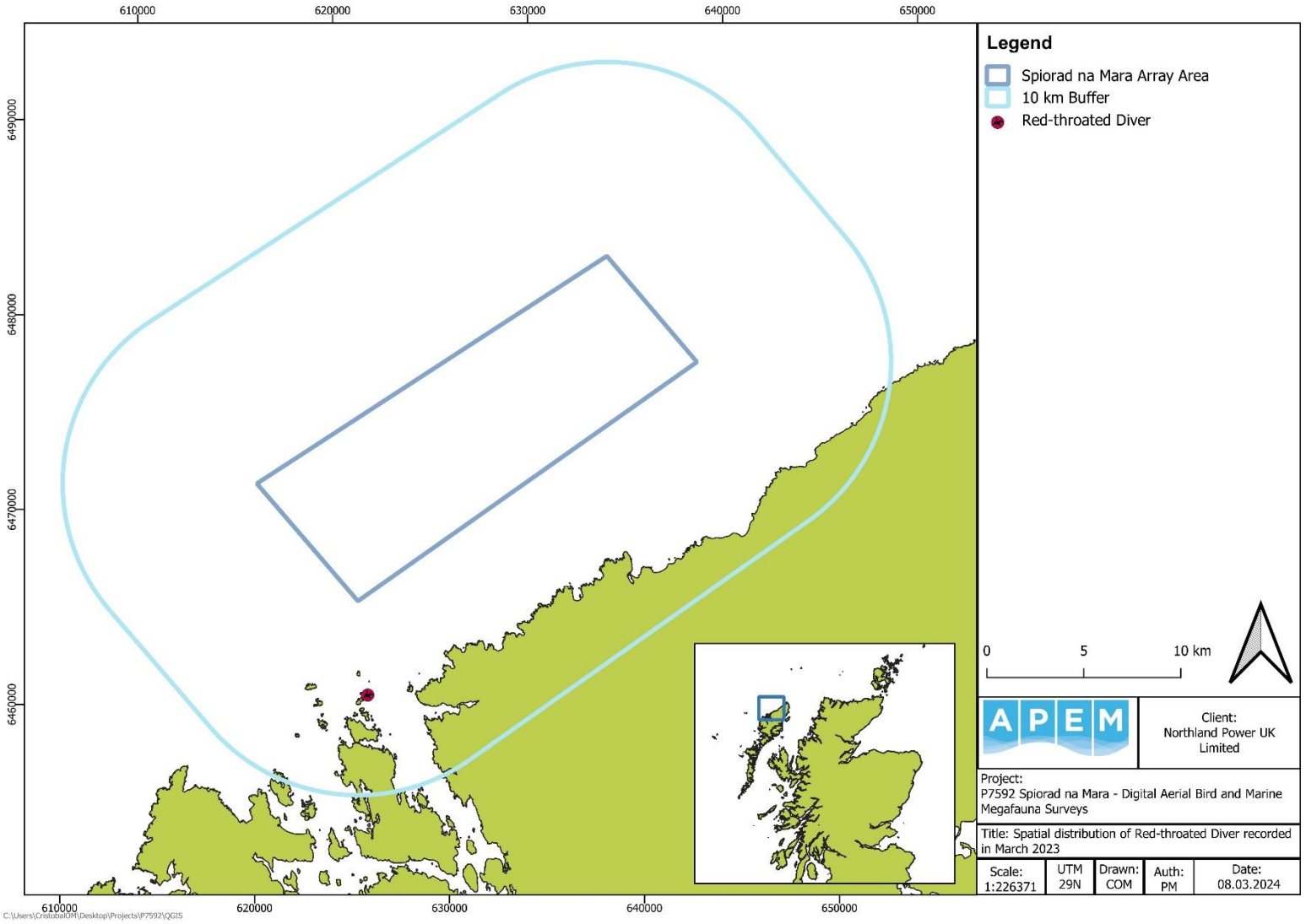


Figure 281 Distribution of red-throated diver in March 2023

*Note that individuals in close proximity may appear overlaying.

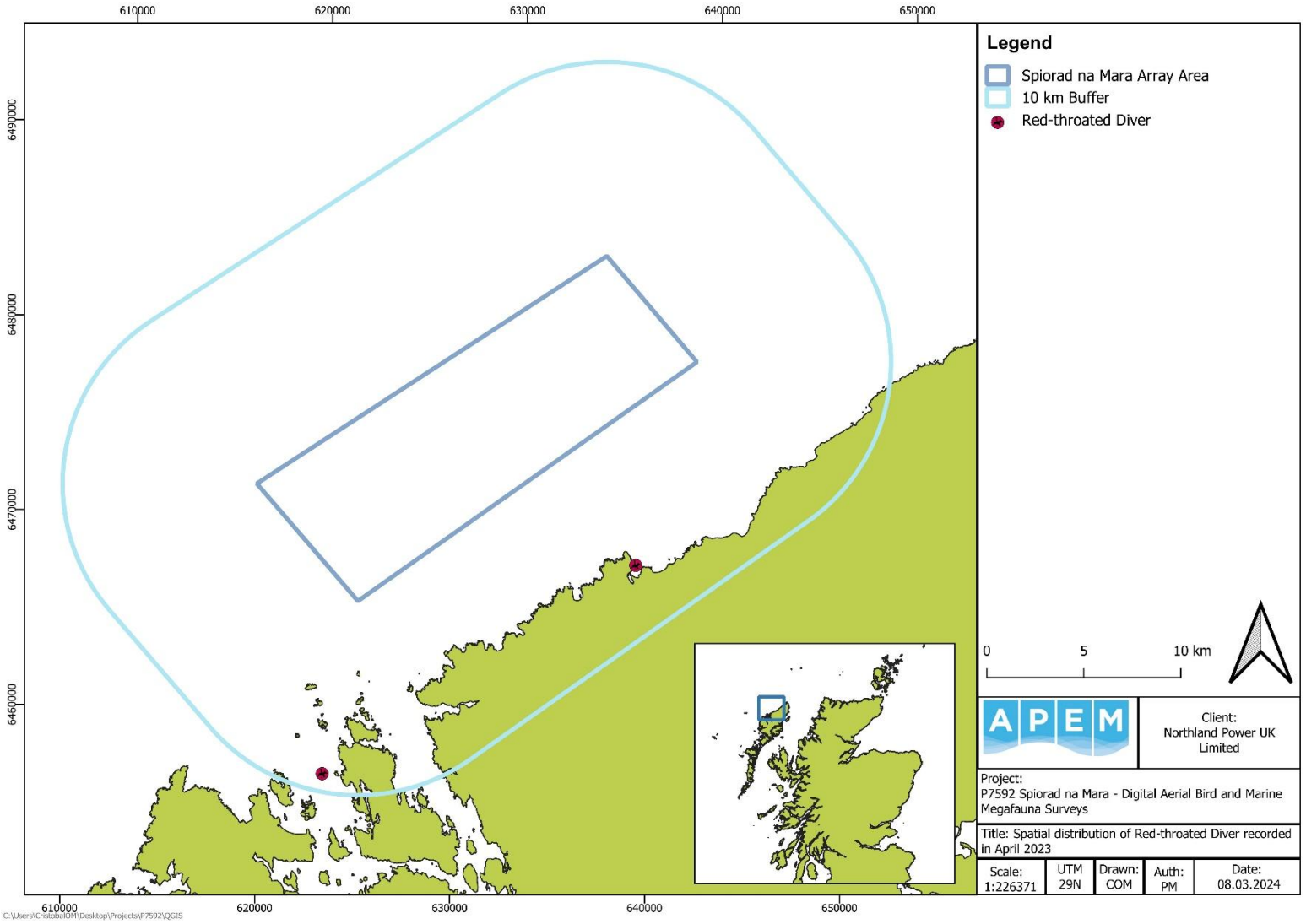


Figure 282 Distribution of red-throated diver in April 2023

*Note that individuals in close proximity may appear overlaying.

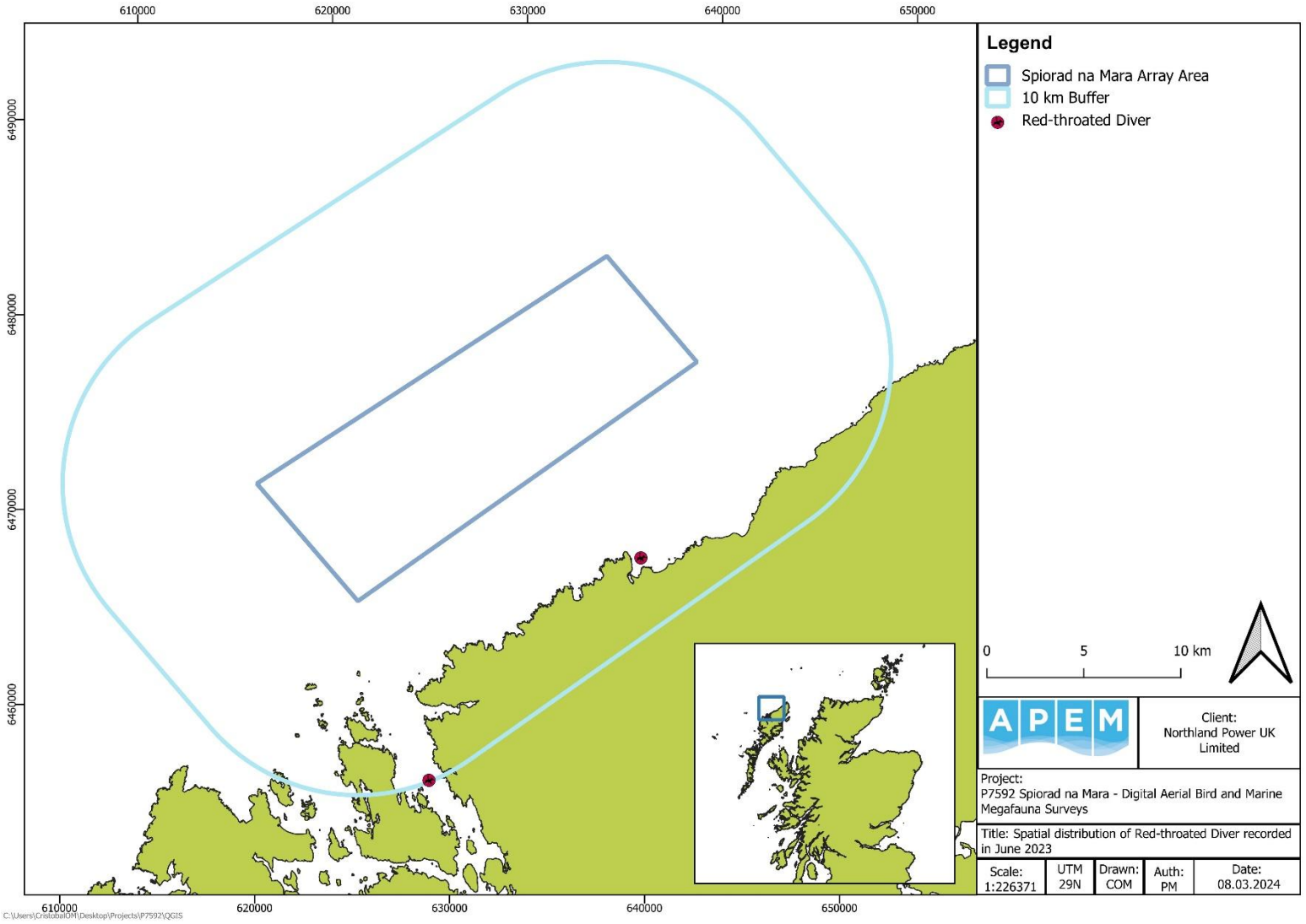


Figure 283 Distribution of red-throated diver in June 2023

*Note that individuals in close proximity may appear overlaying.

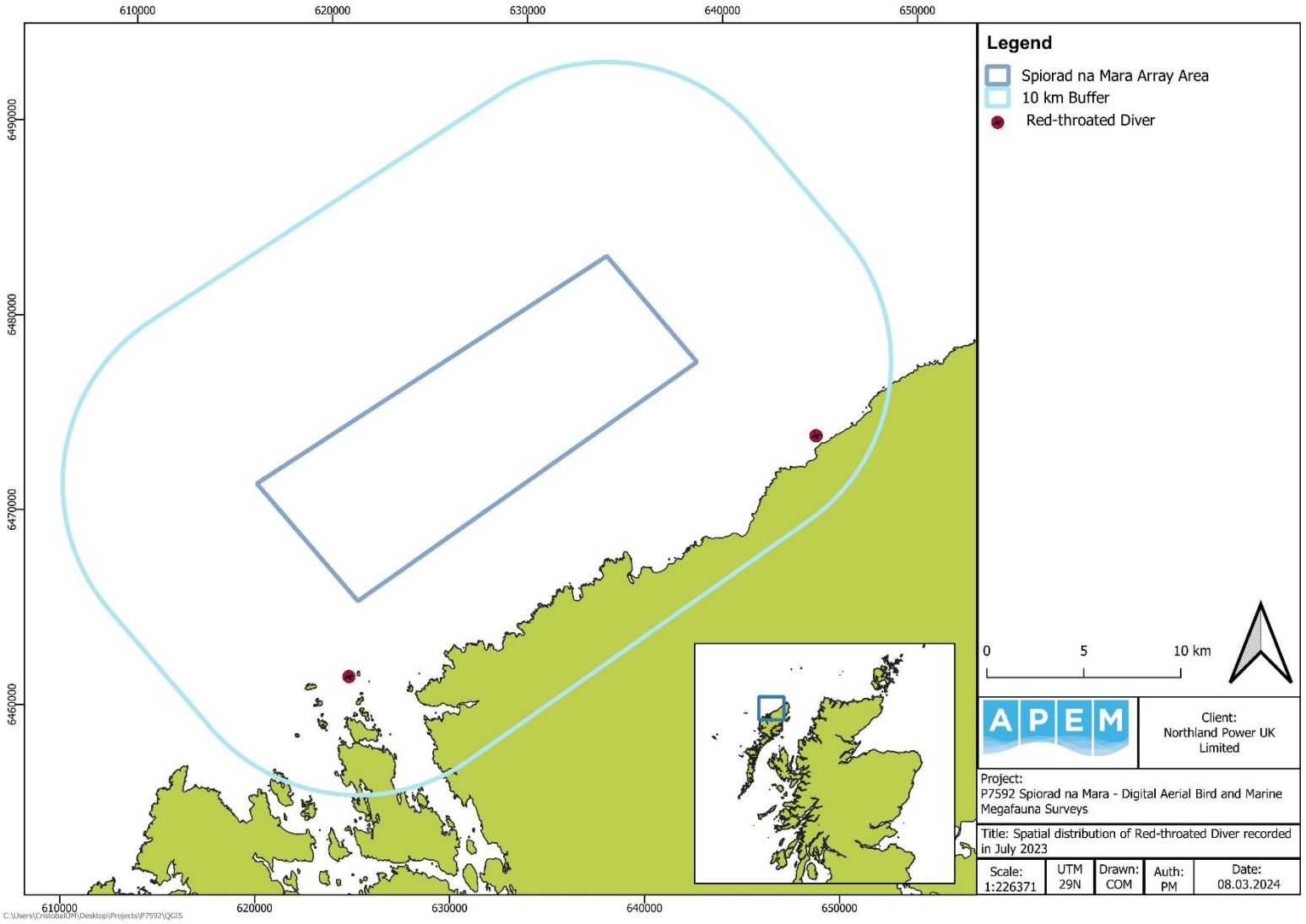


Figure 284 Distribution of red-throated diver in July 2023

*Note that individuals in close proximity may appear overlaying.

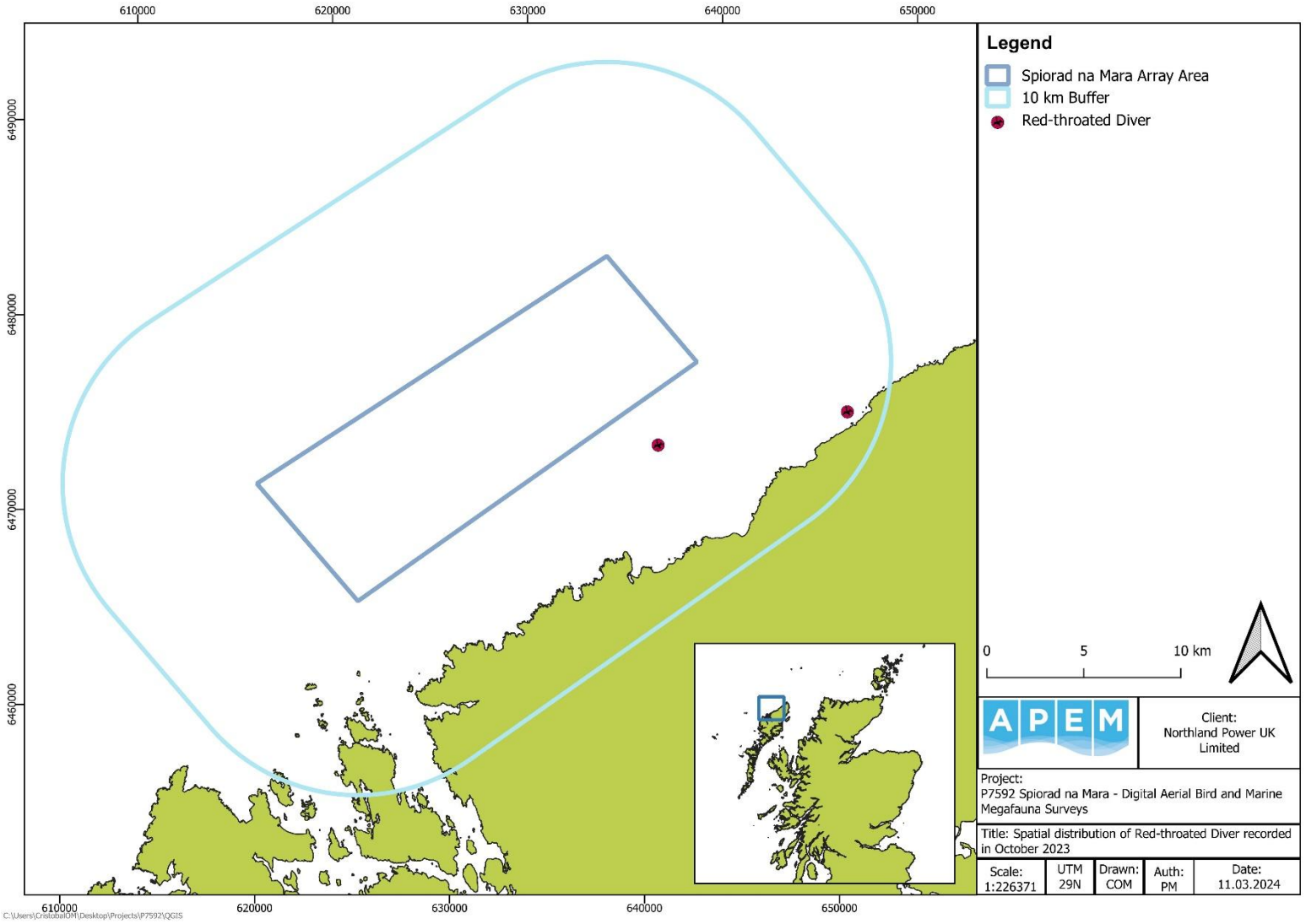


Figure 285 Distribution of red-throated diver in October 2023

*Note that individuals in close proximity may appear overlaying.

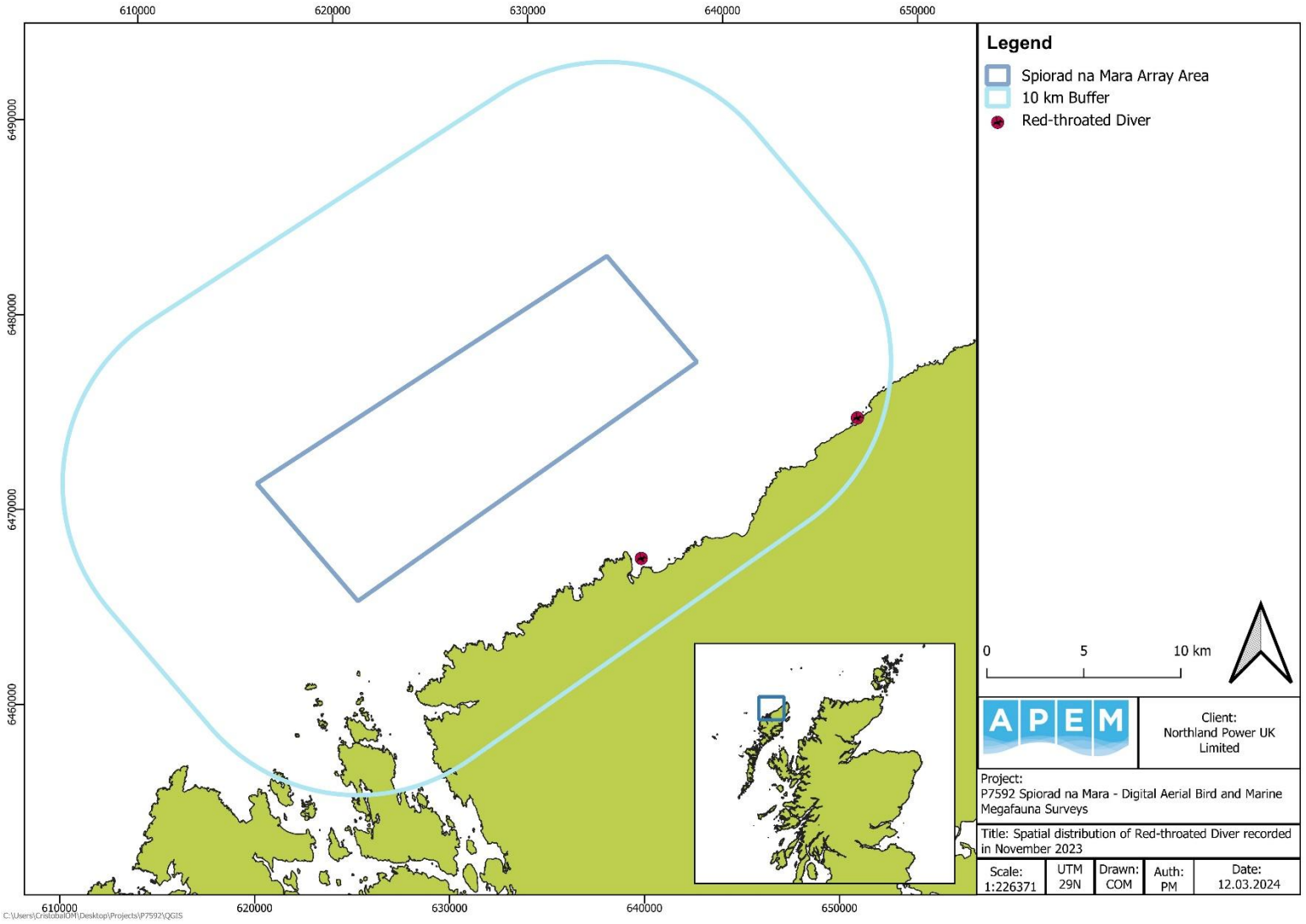


Figure 286 Distribution of red-throated diver in November 2023

*Note that individuals in close proximity may appear overlaying.

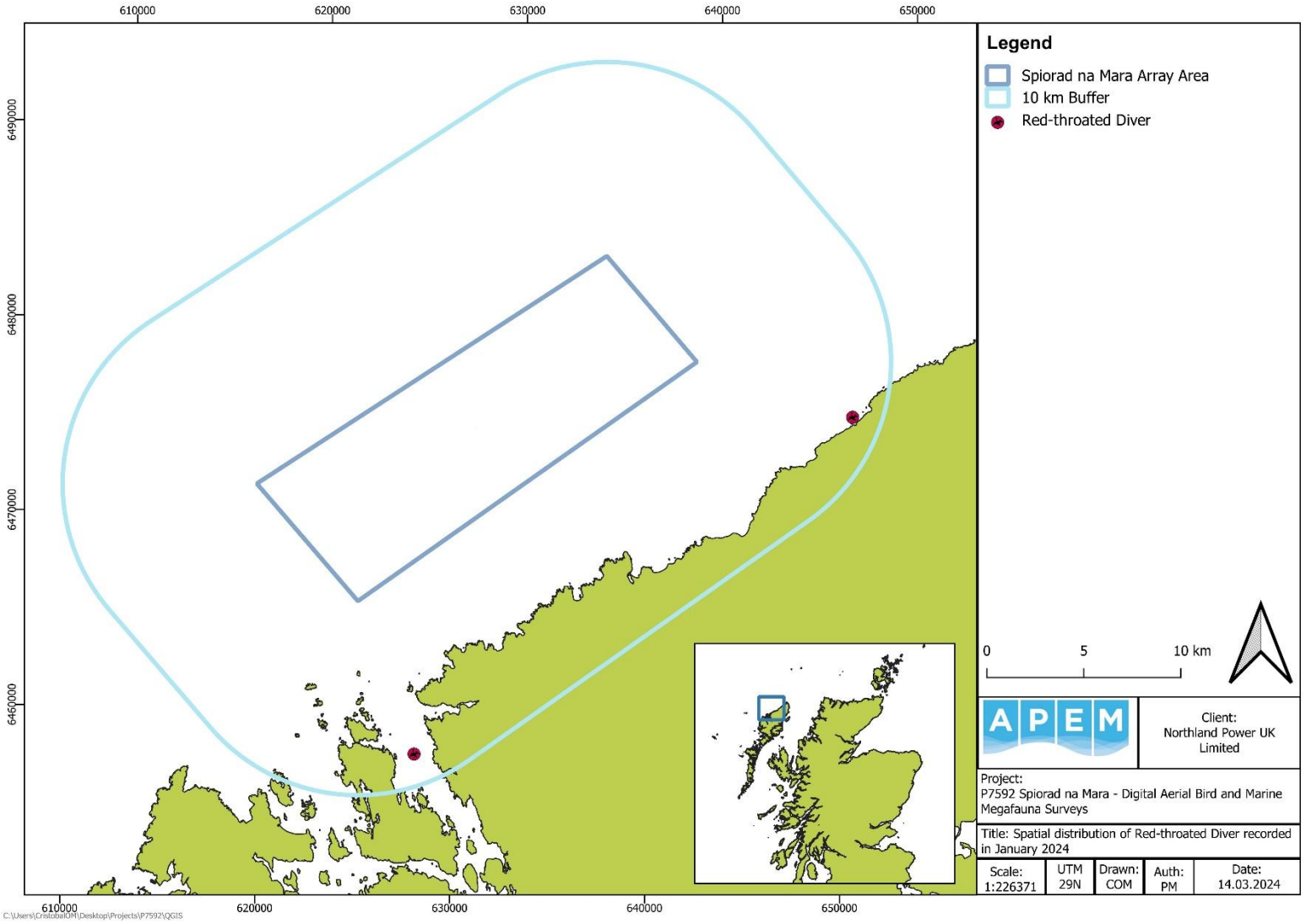


Figure 287 Distribution of red-throated diver in January 2024

*Note that individuals in close proximity may appear overlaying.

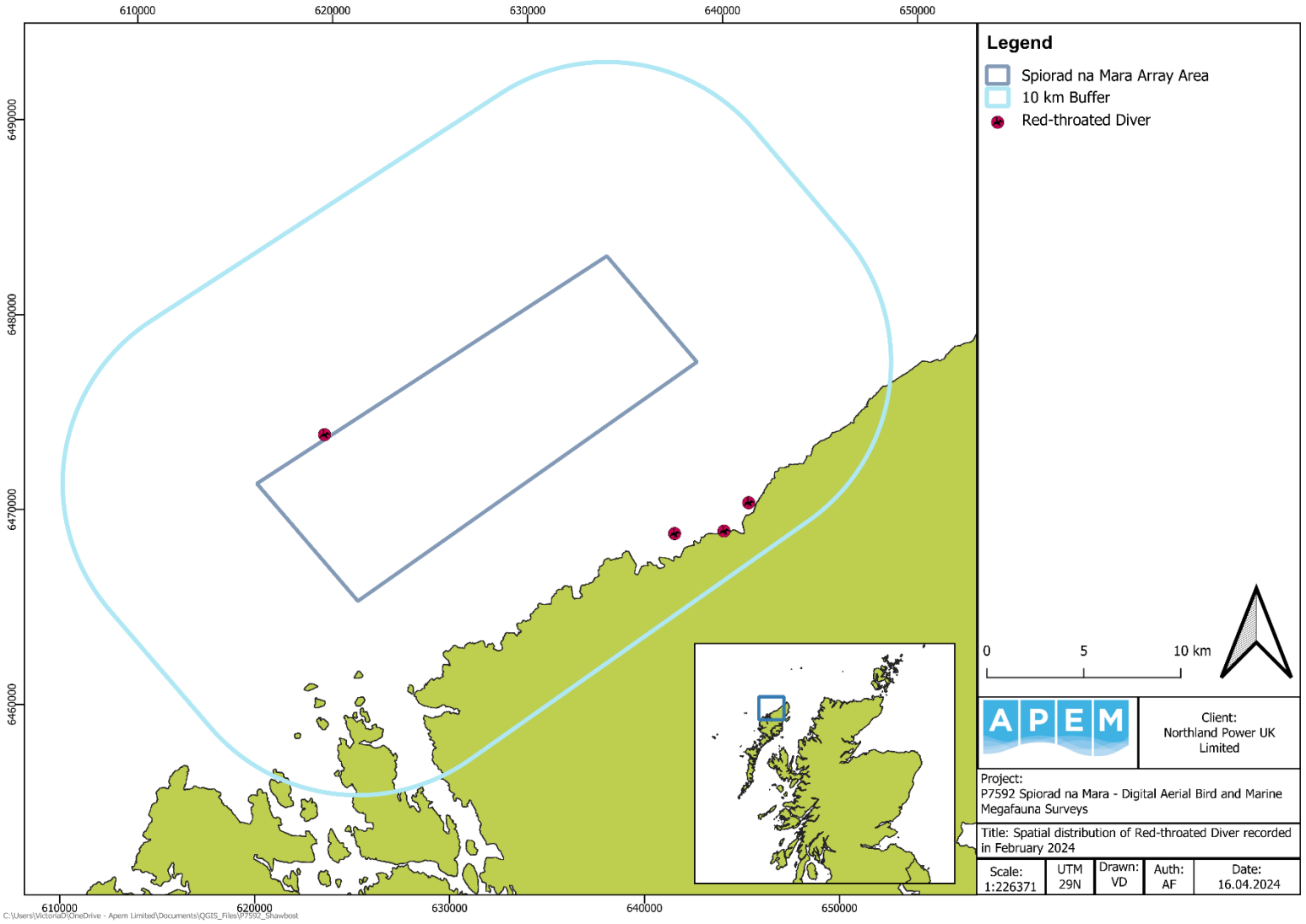


Figure 288 Distribution of red-throated diver in February 2024

*Note that individuals in close proximity may appear overlaying.

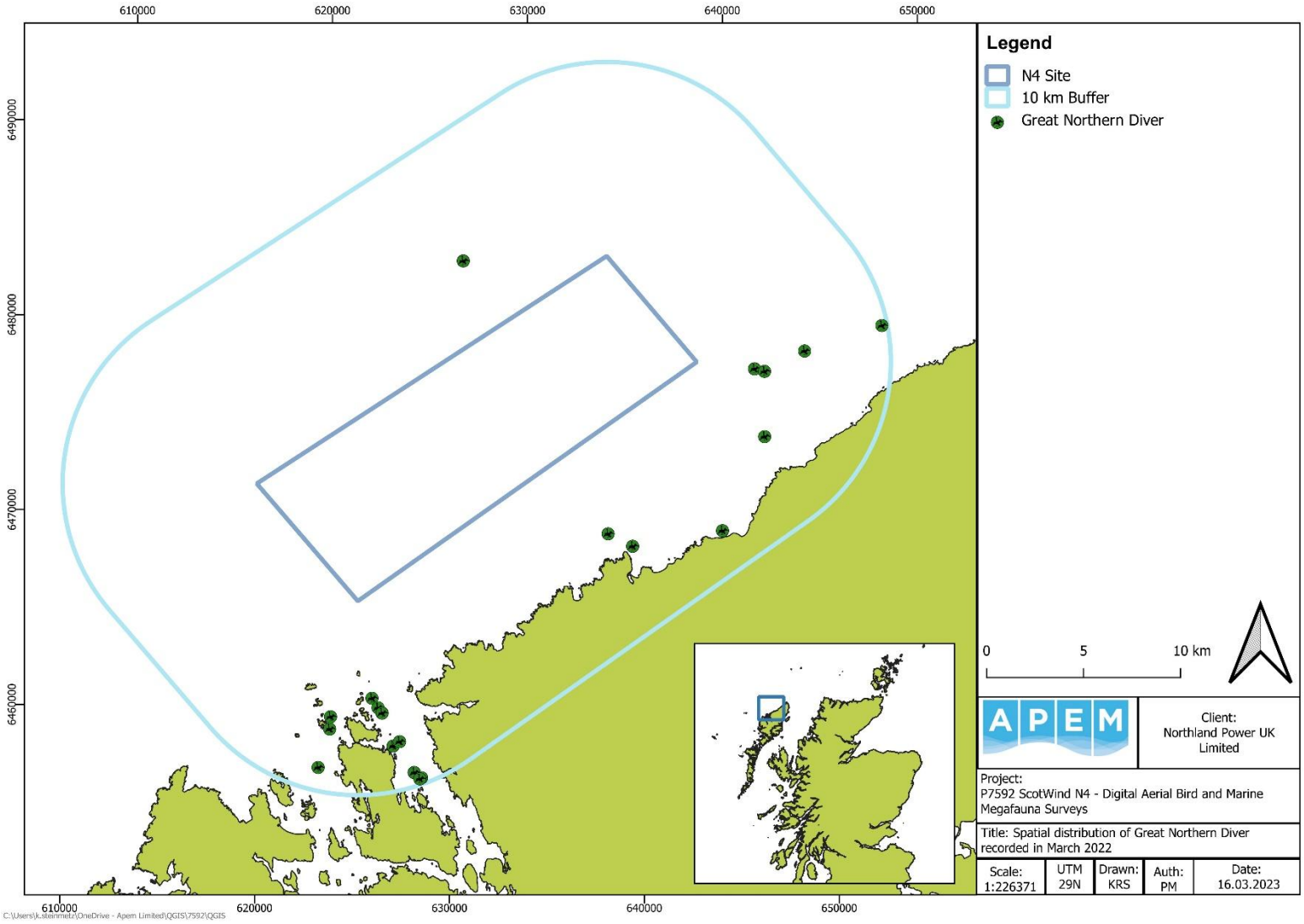


Figure 289 Distribution of great northern diver in March 2022

*Note that individuals in close proximity may appear overlaying.

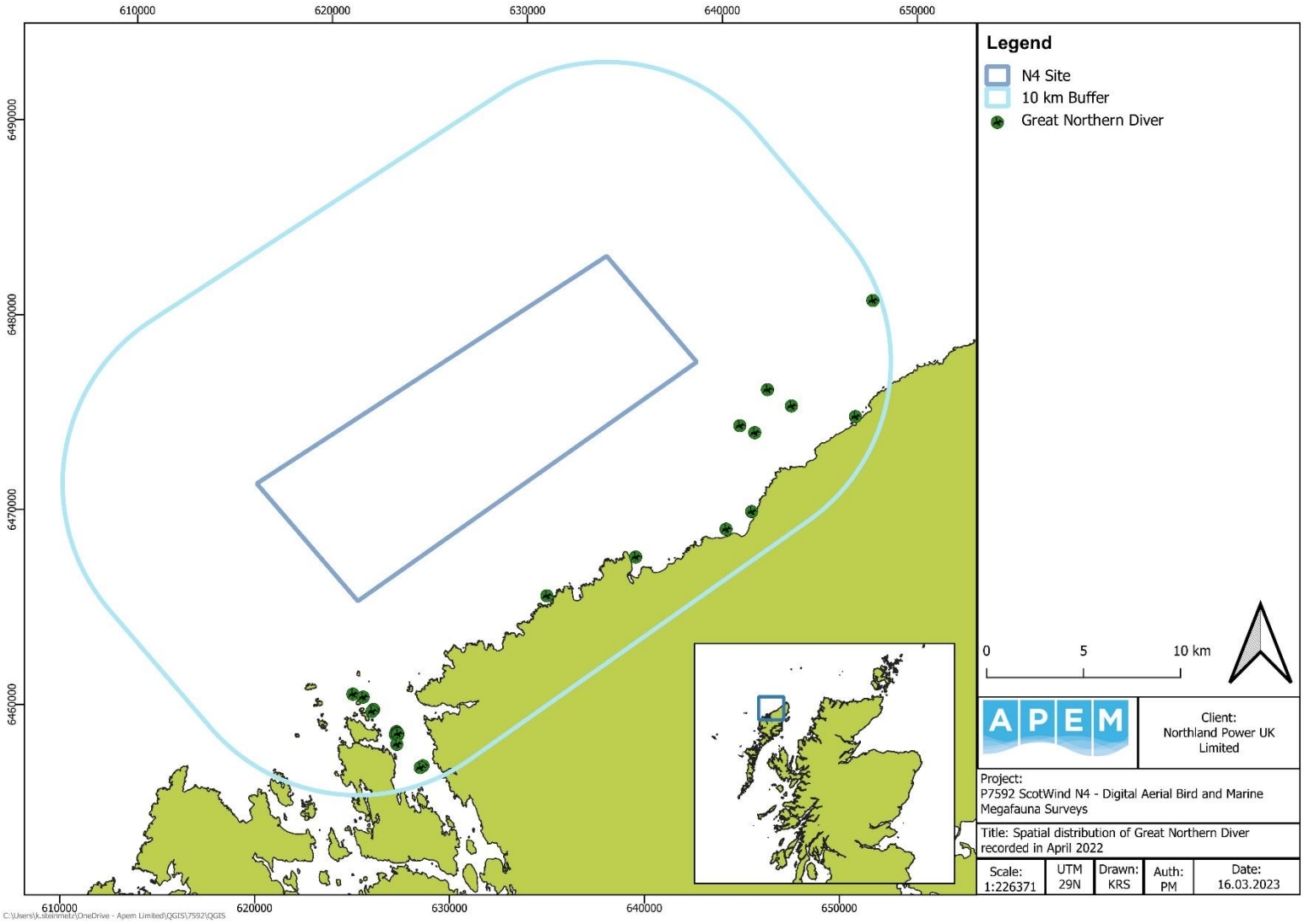


Figure 290 Distribution of great northern diver in April 2022
*Note that individuals in close proximity may appear overlaying.

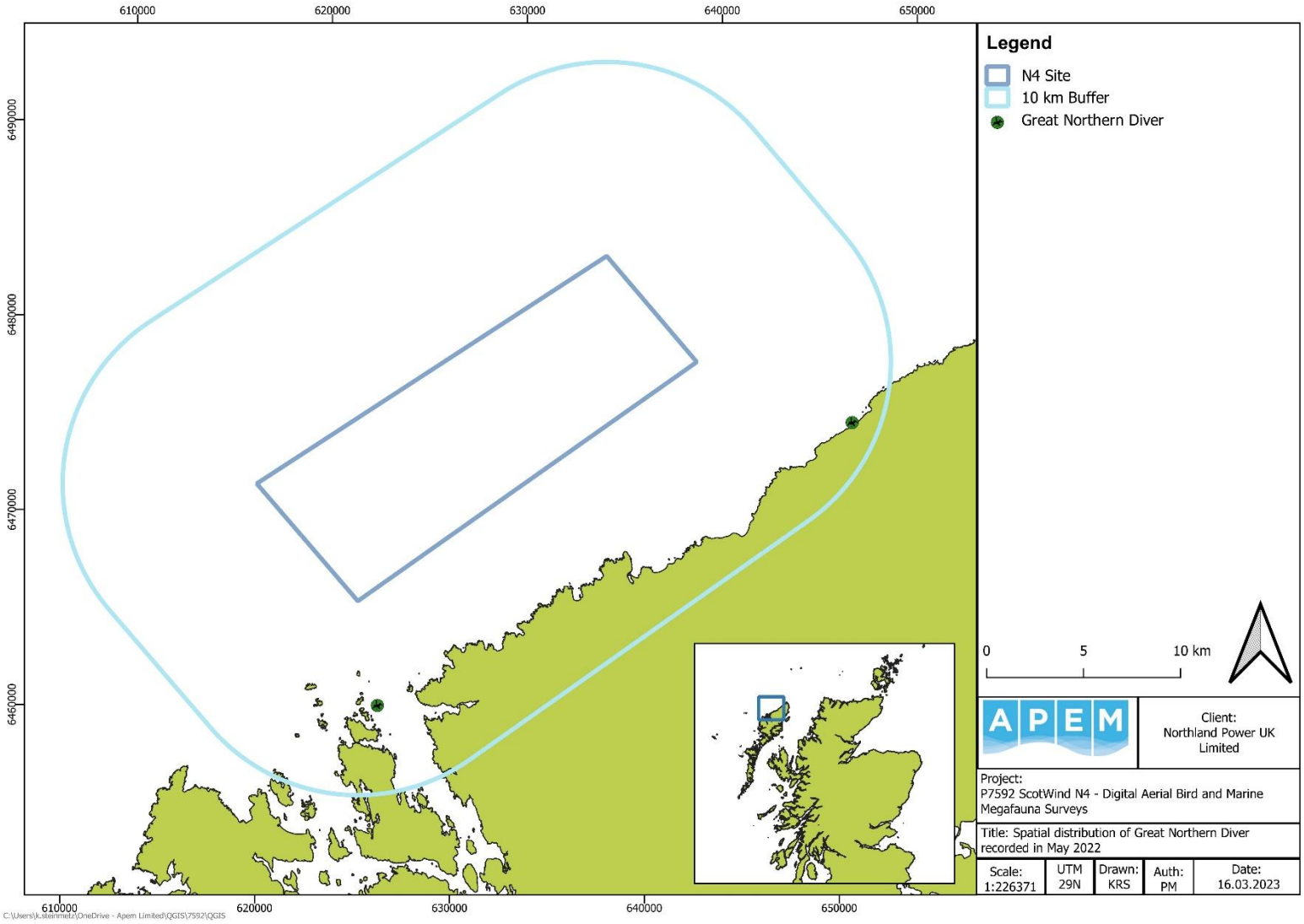


Figure 291 Distribution of great northern diver in May 2022

*Note that individuals in close proximity may appear overlaying.

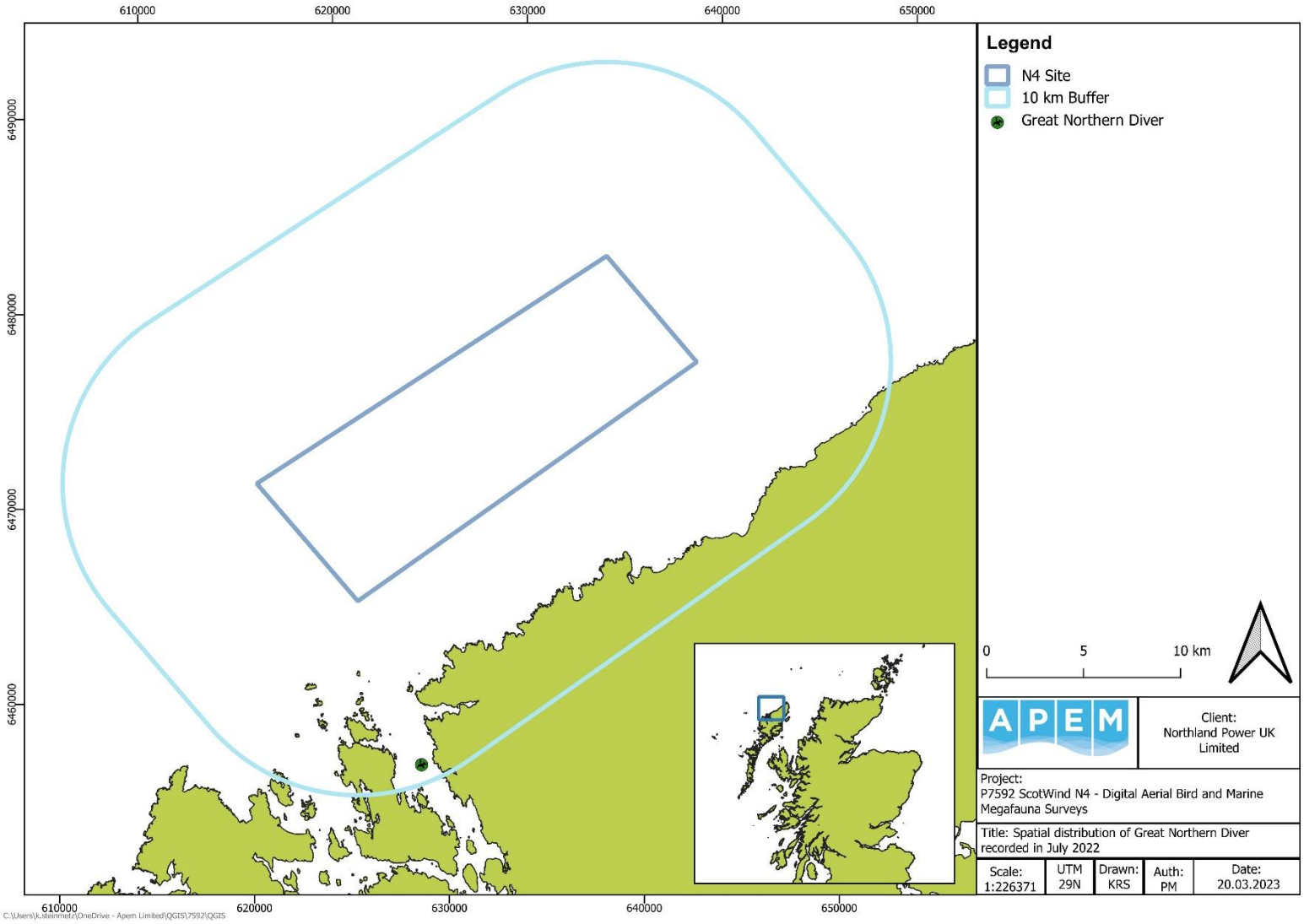


Figure 292 Distribution of great northern diver in July 2022
*Note that individuals in close proximity may appear overlaying.

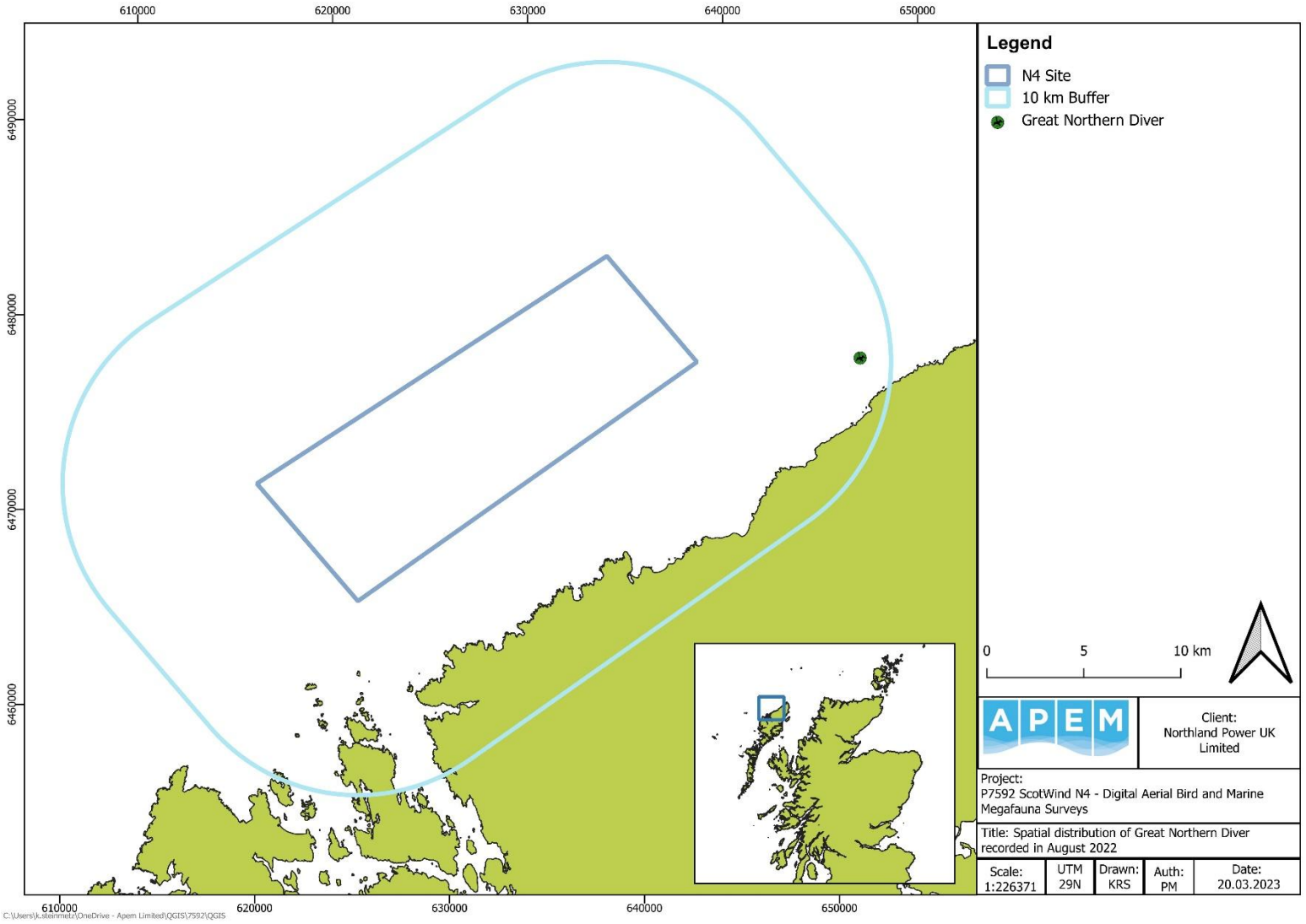


Figure 293 Distribution of great northern diver in August 2022

*Note that individuals in close proximity may appear overlaying.

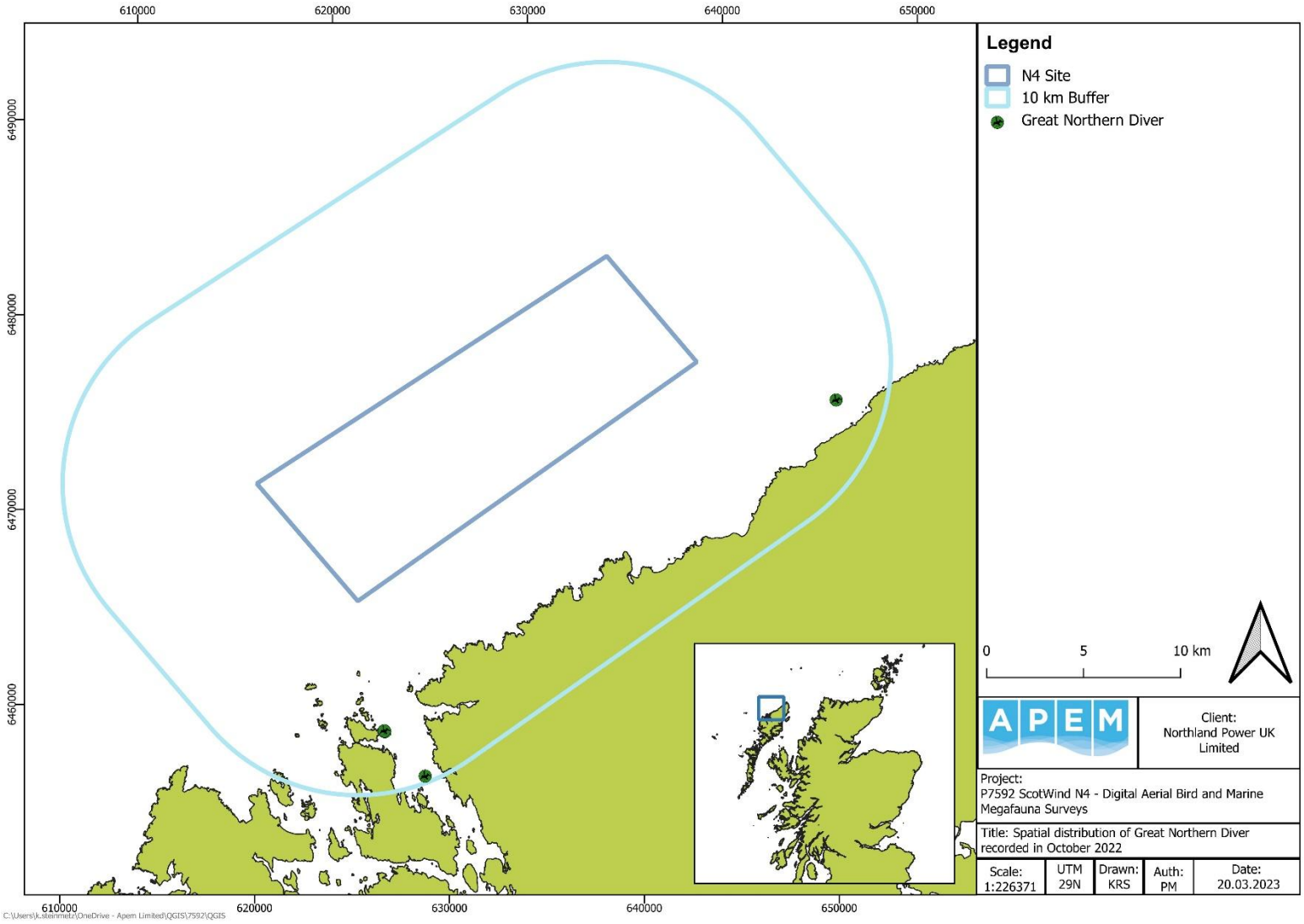


Figure 294 Distribution of great northern diver in October 2022

*Note that individuals in close proximity may appear overlaying.

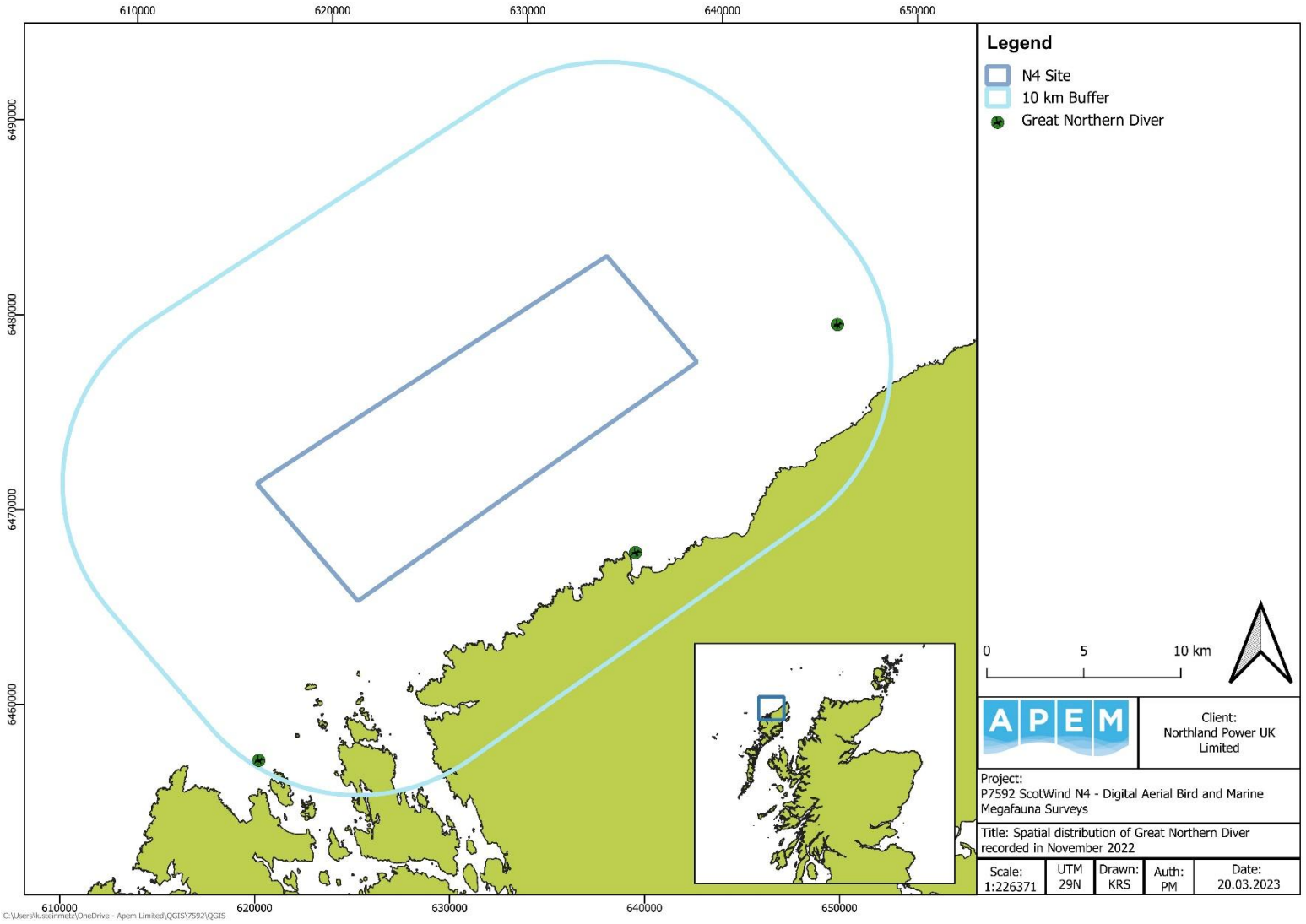


Figure 295 Distribution of great northern diver in November 2022

*Note that individuals in close proximity may appear overlaying.

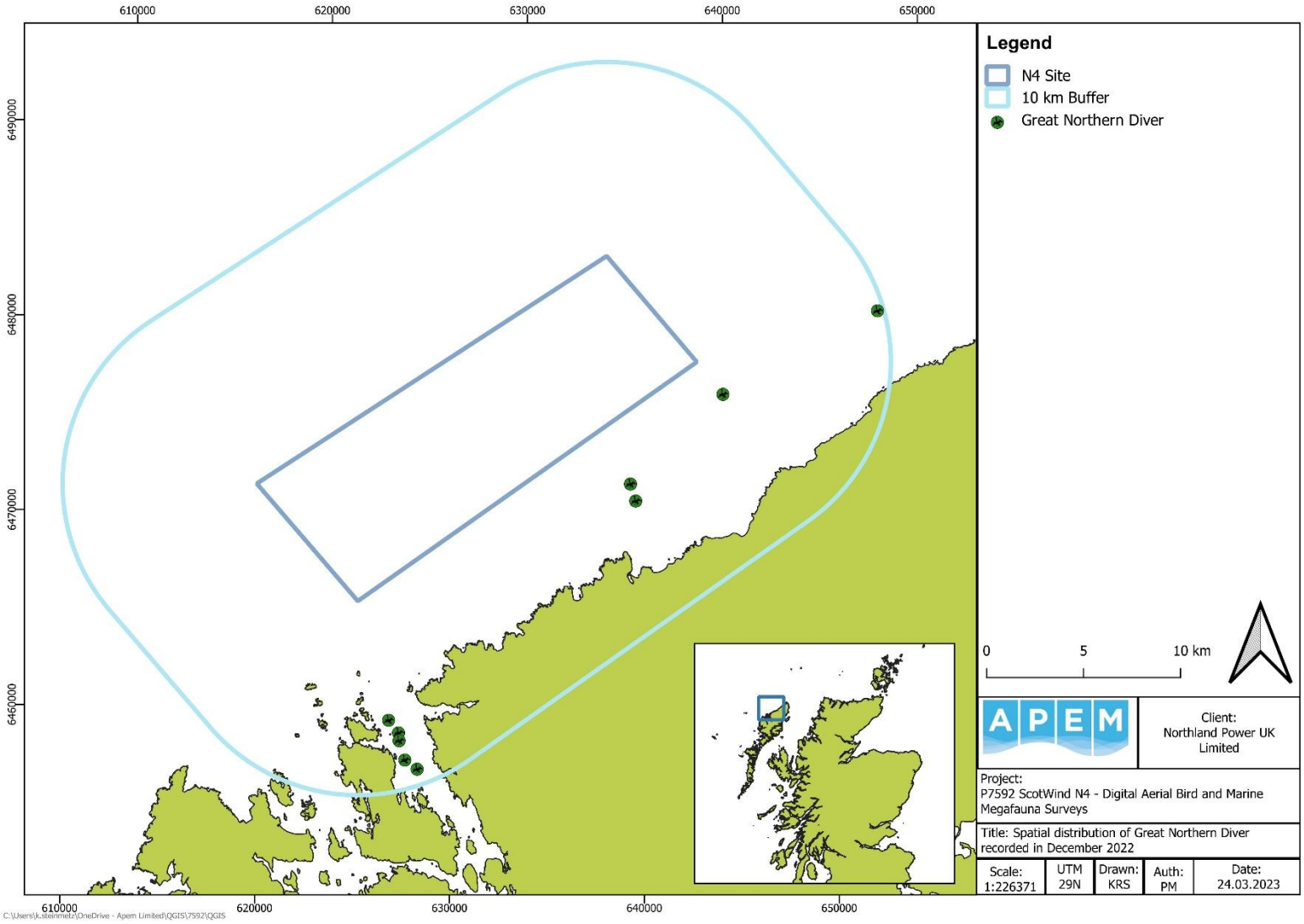


Figure 296 Distribution of great northern diver in December 2022

*Note that individuals in close proximity may appear overlaying.

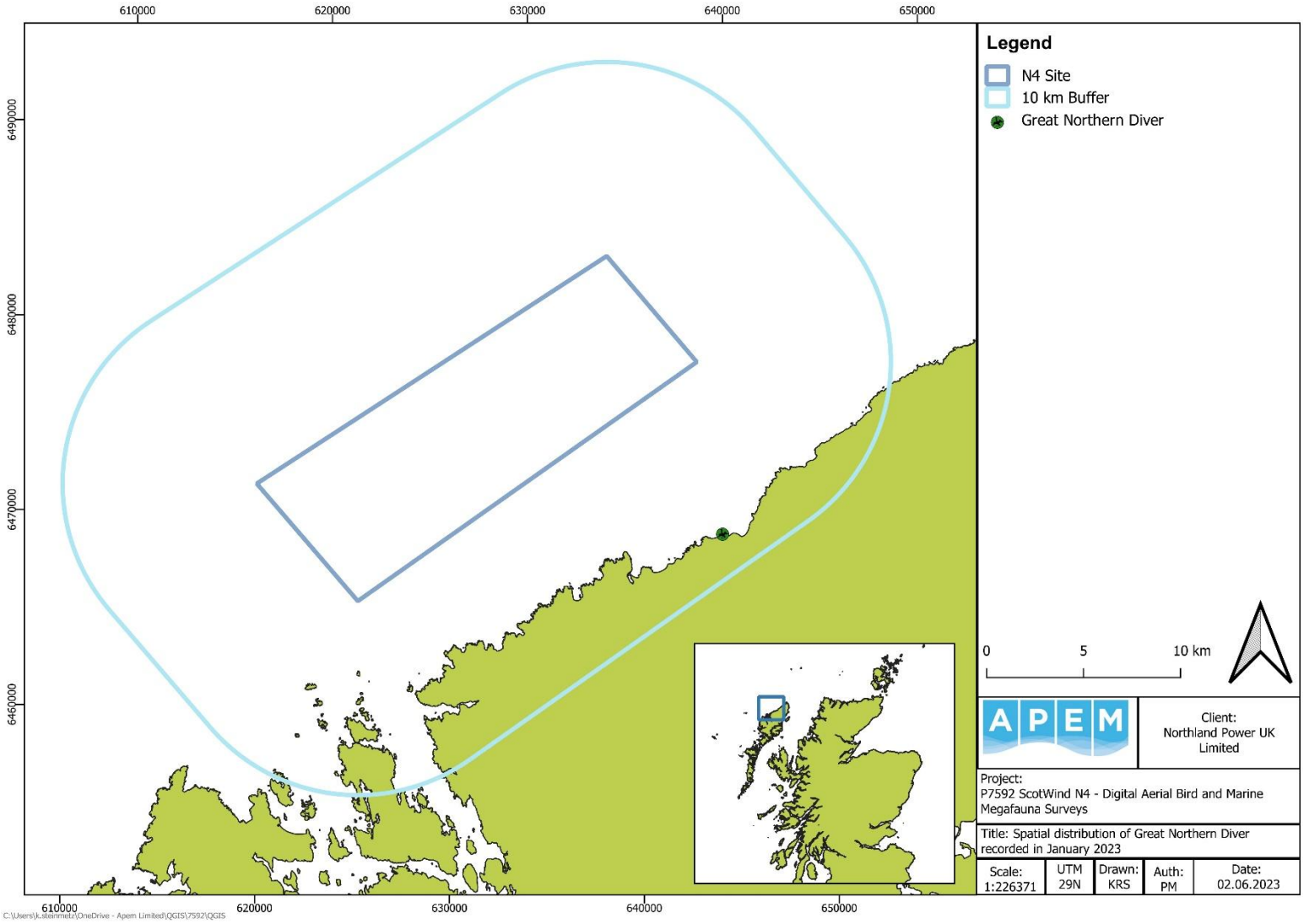


Figure 297 Distribution of great northern diver in January 2023

*Note that individuals in close proximity may appear overlaying.

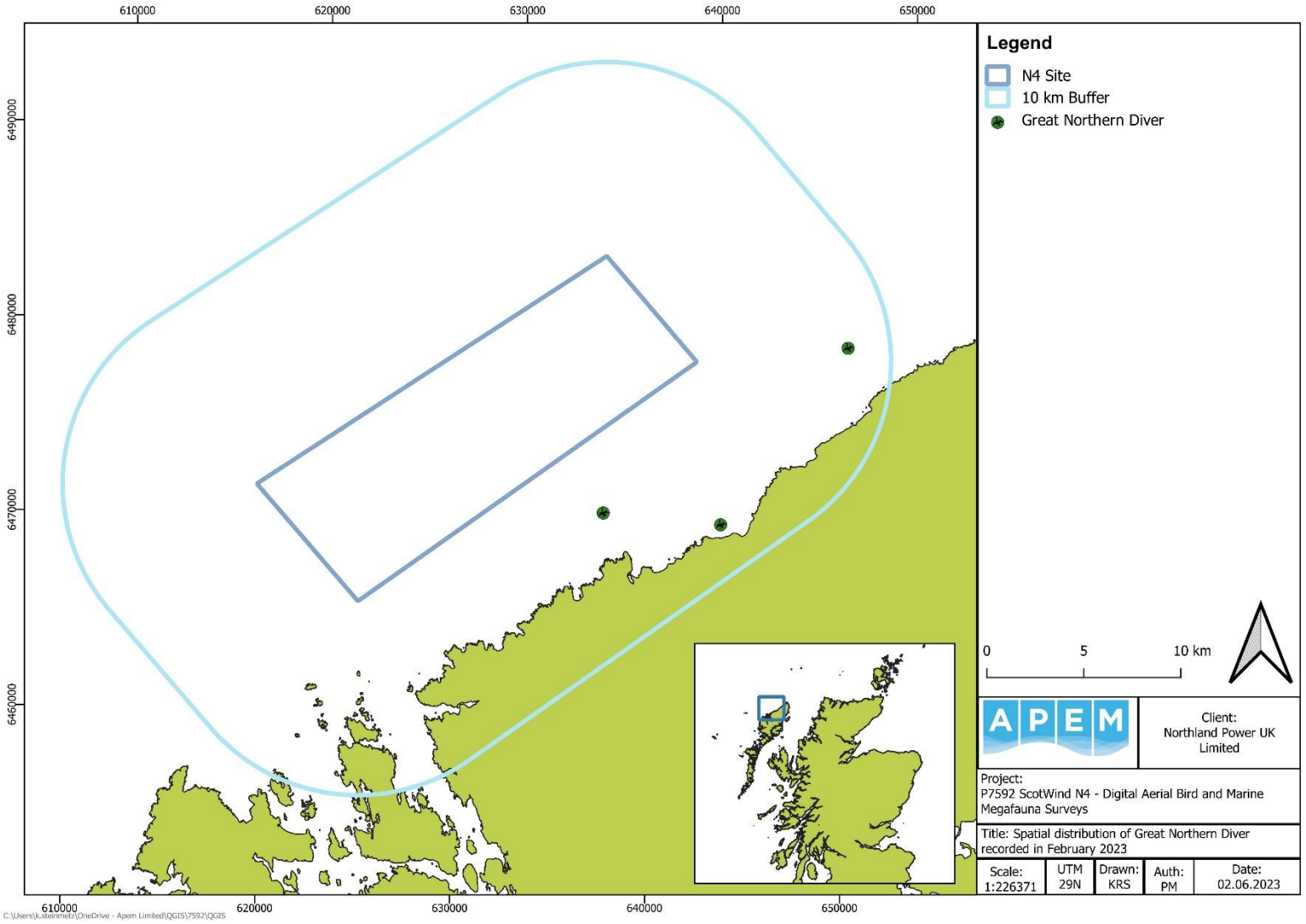


Figure 298 Distribution of great northern diver in February 2023

*Note that individuals in close proximity may appear overlaying.

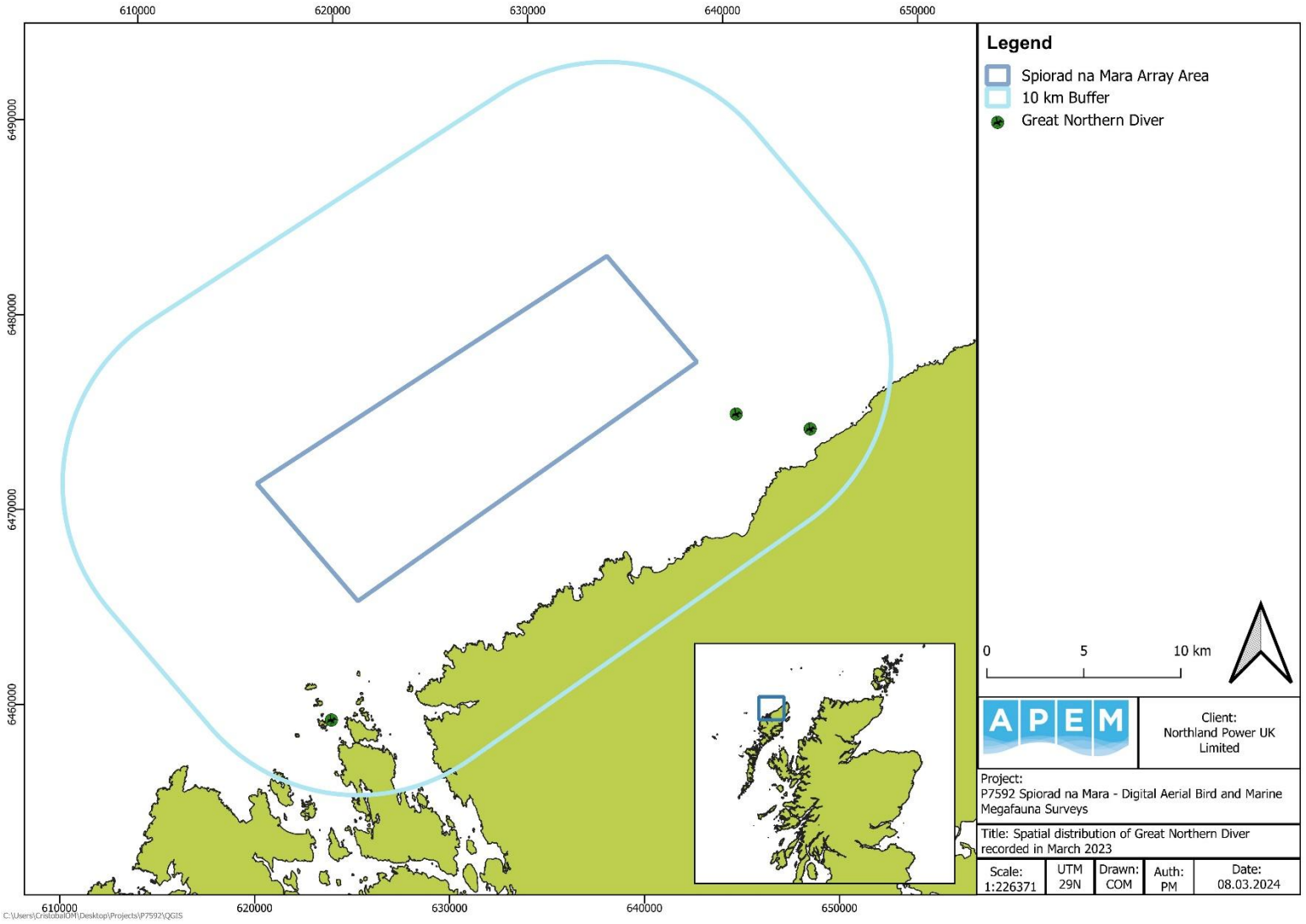


Figure 299 Distribution of great northern diver in March 2023

*Note that individuals in close proximity may appear overlaying.

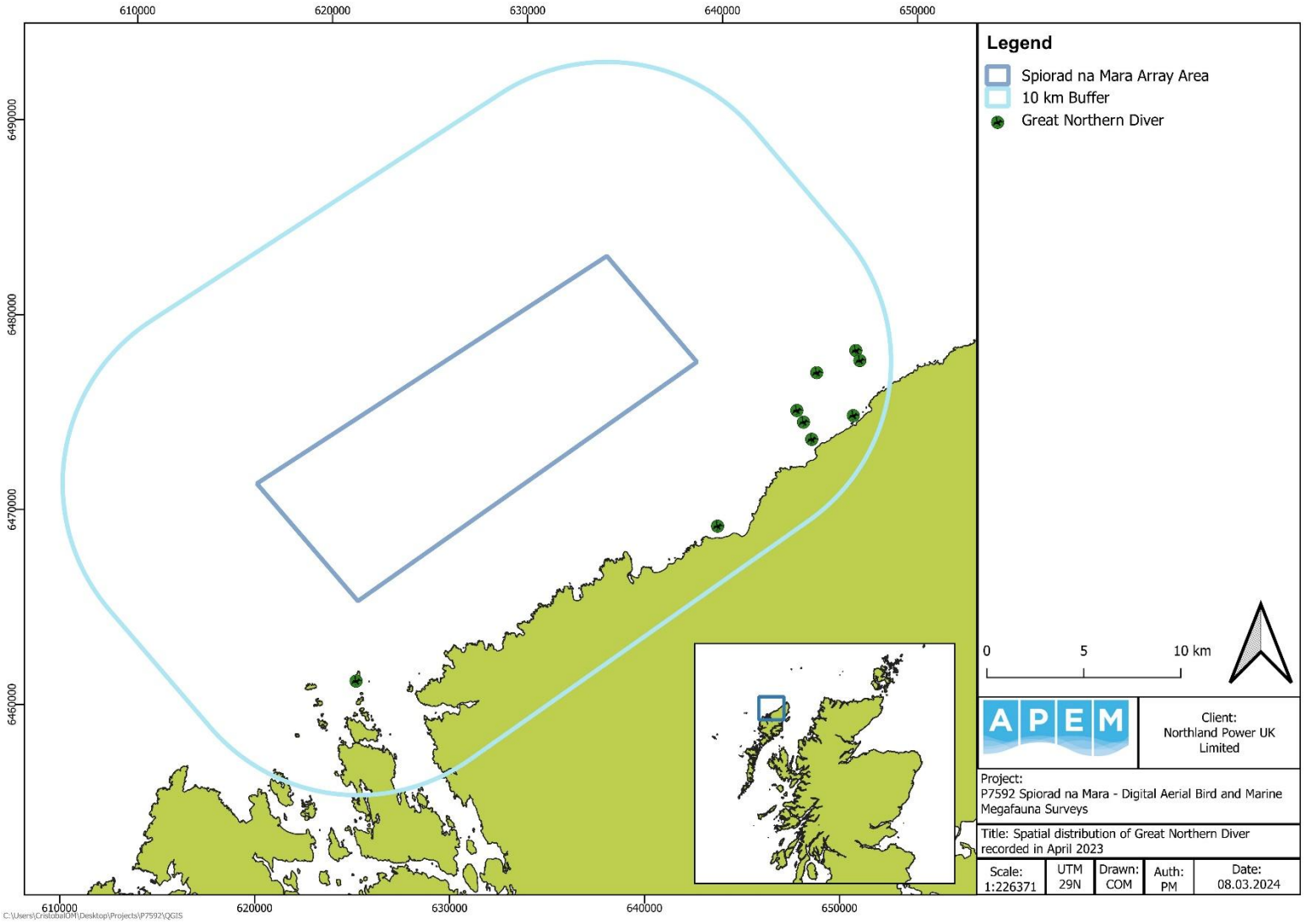


Figure 300 Distribution of great northern diver in April 2023

*Note that individuals in close proximity may appear overlaying.

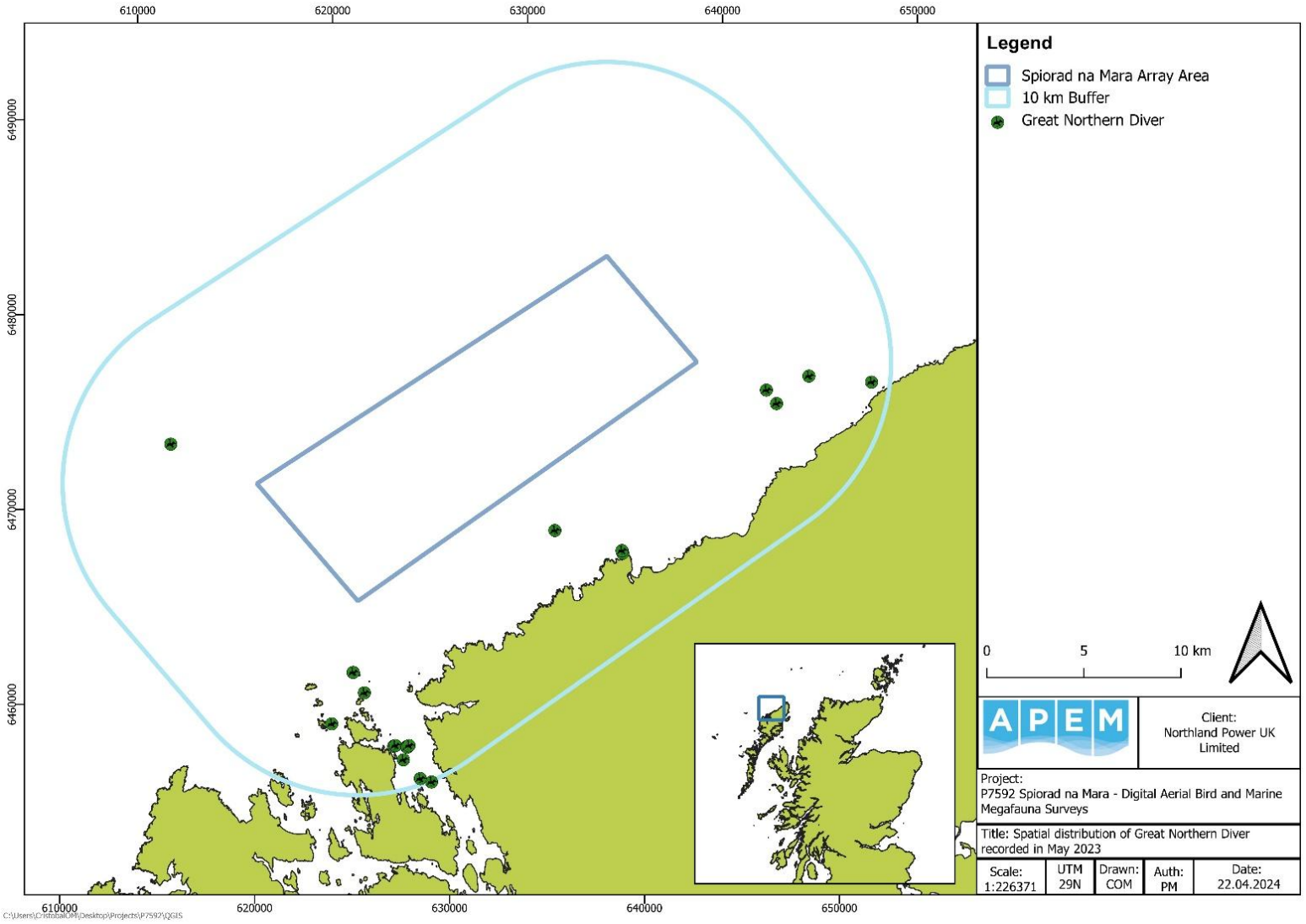


Figure 301 Distribution of great northern diver in May 2023

*Note that individuals in close proximity may appear overlaying.

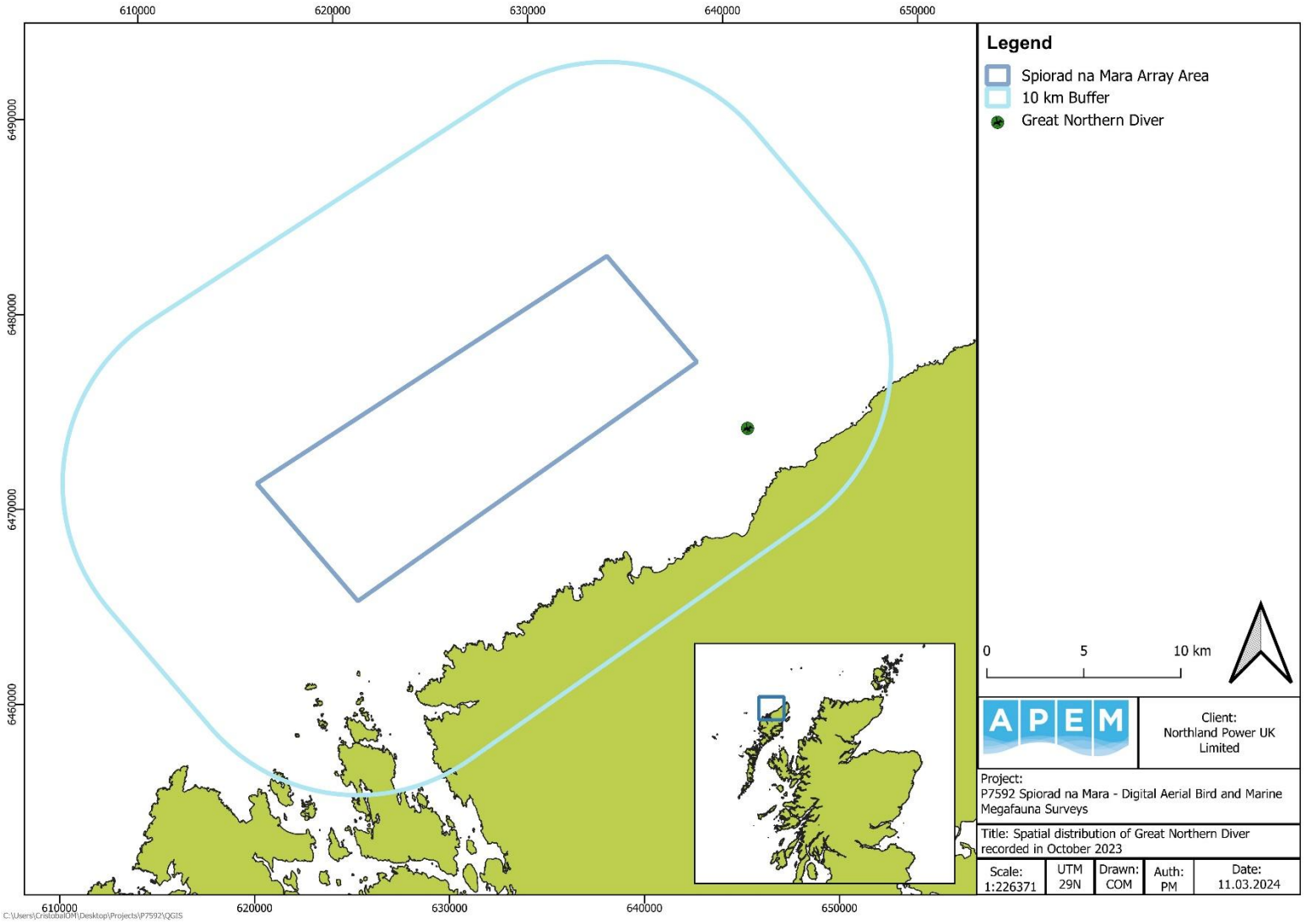


Figure 302 Distribution of great northern diver in October 2023

*Note that individuals in close proximity may appear overlaying.

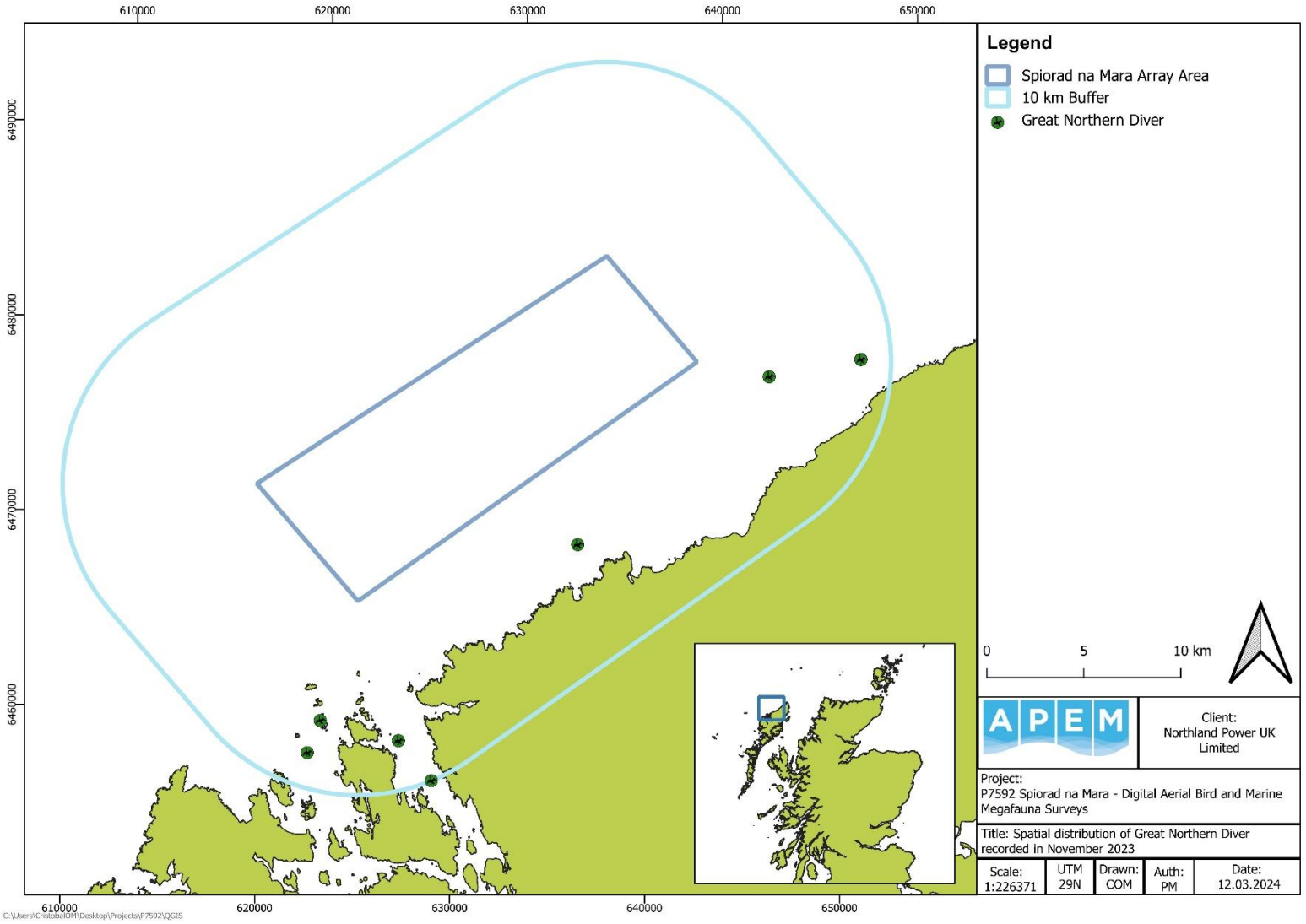


Figure 303 Distribution of great northern diver in November 2023

*Note that individuals in close proximity may appear overlaying.

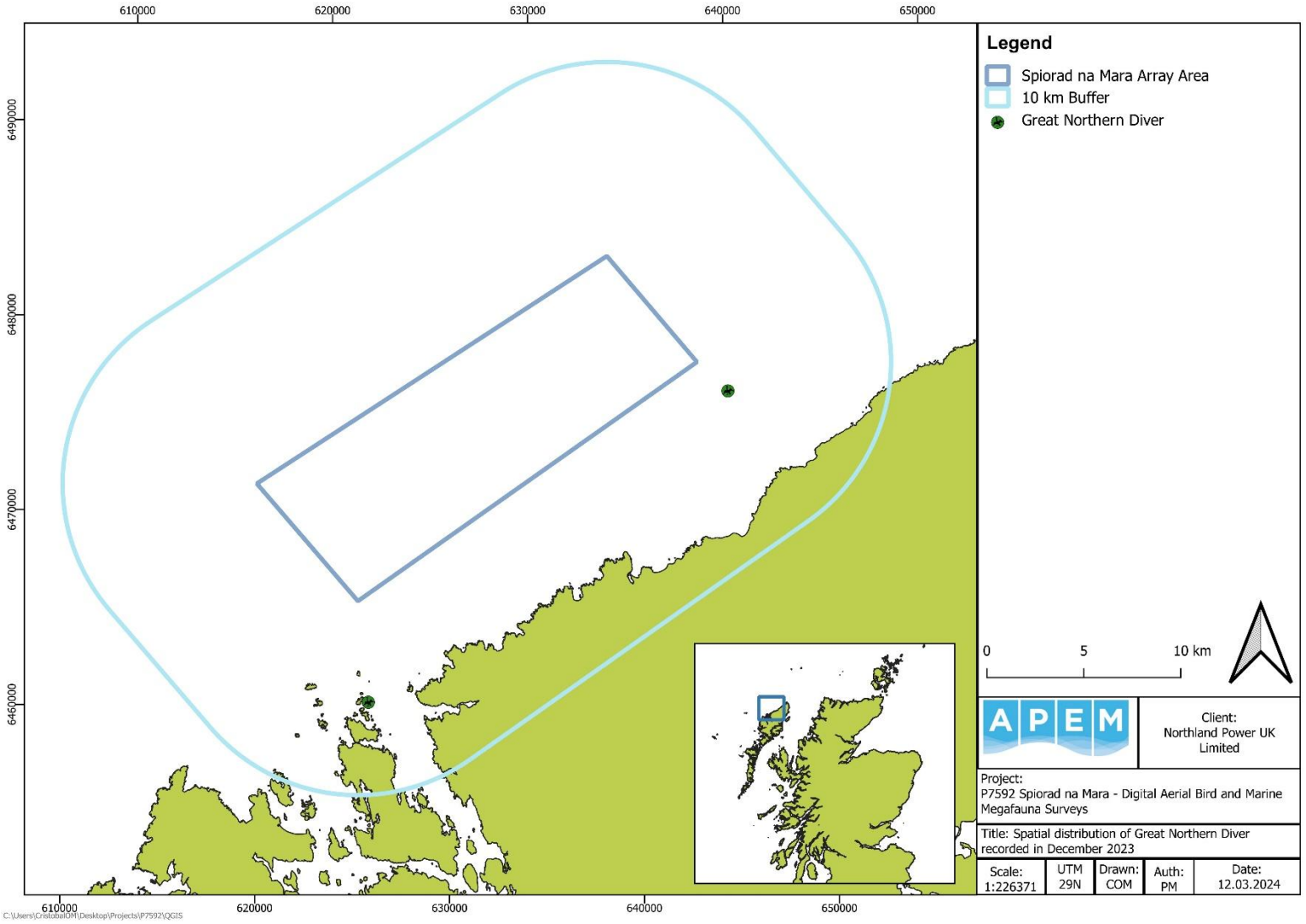


Figure 304 Distribution of great northern diver in December 2023

*Note that individuals in close proximity may appear overlaying.

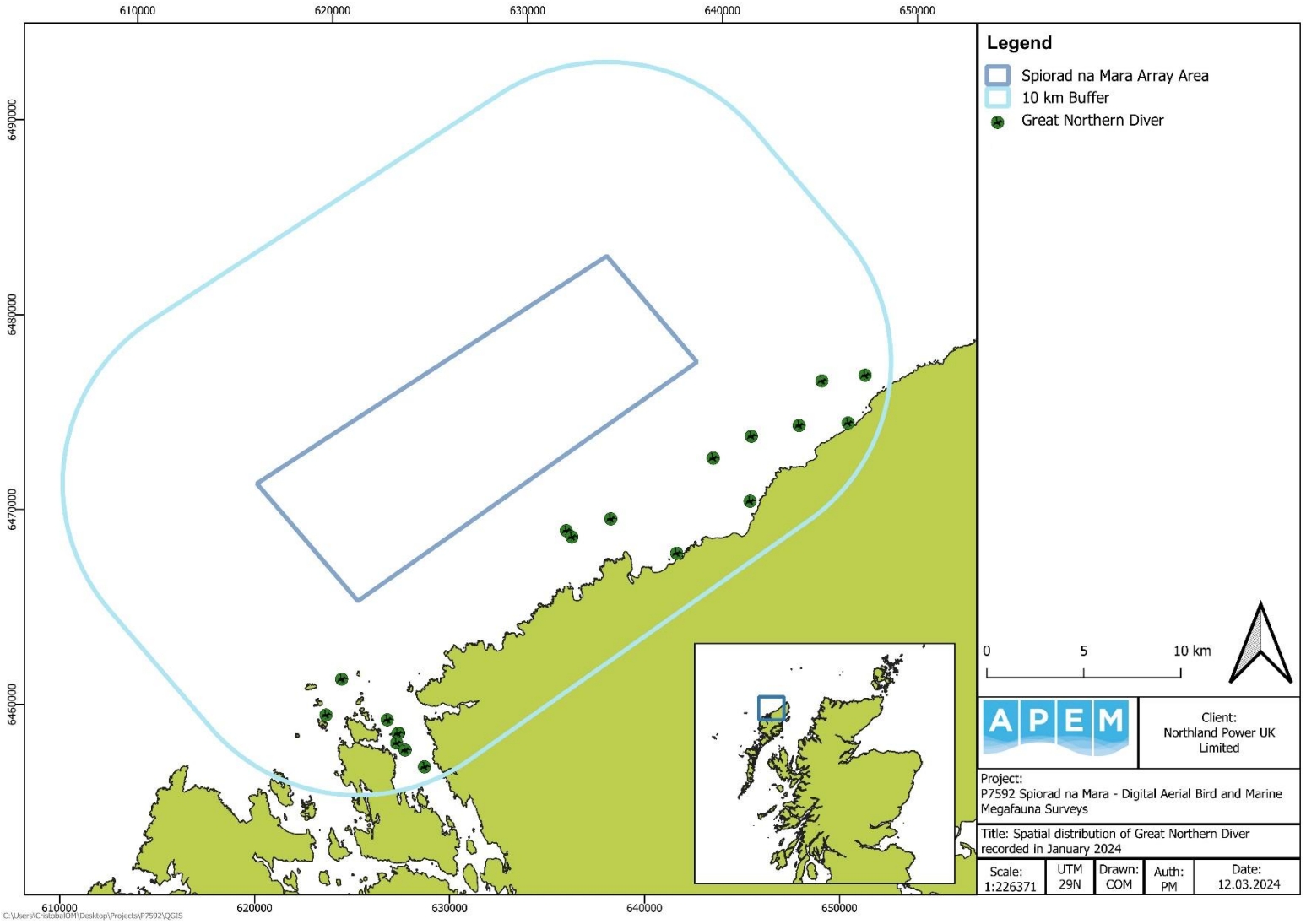


Figure 305 Distribution of great northern diver in January 2024

*Note that individuals in close proximity may appear overlaying.

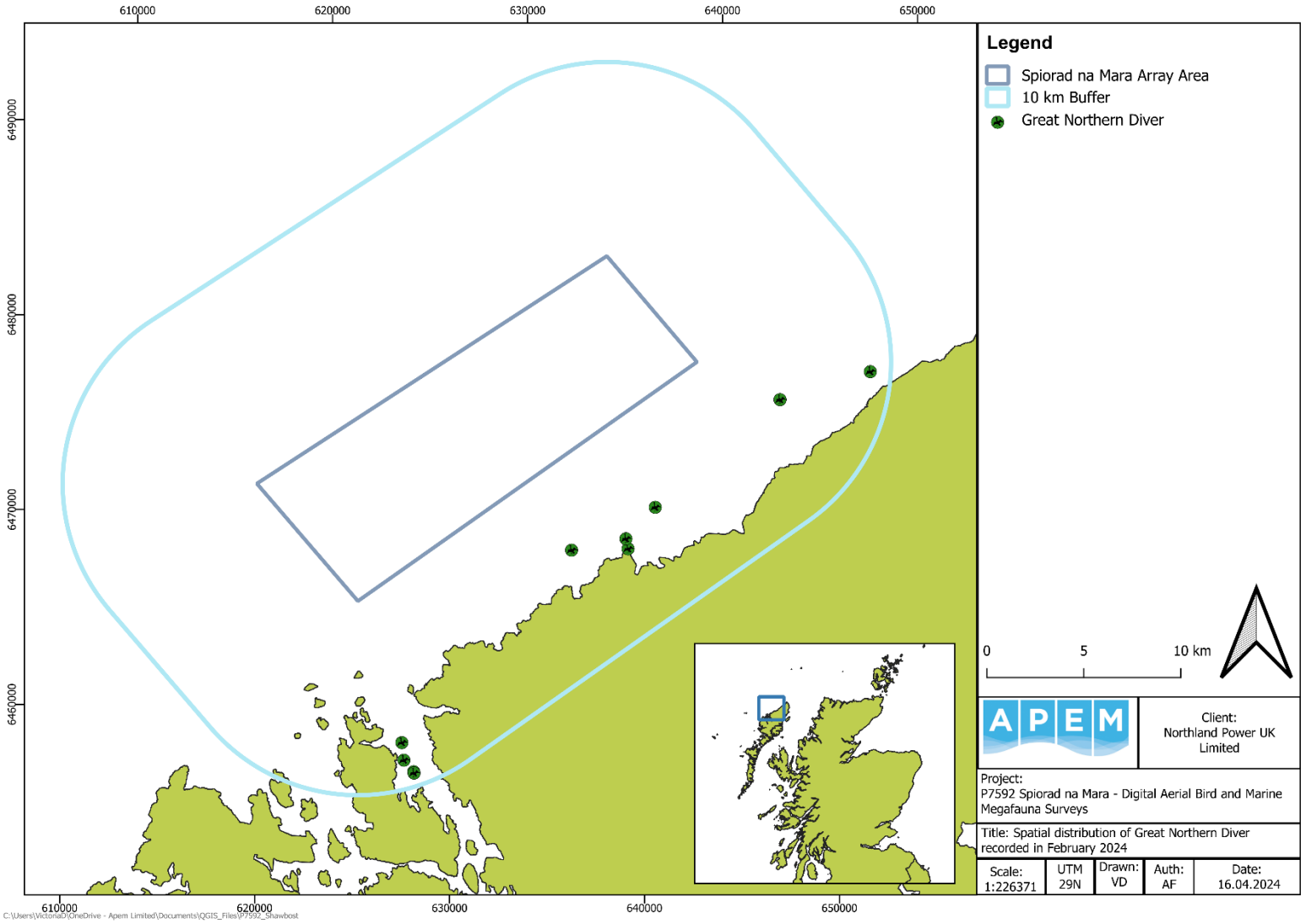


Figure 306 Distribution of great northern diver in February 2024

*Note that individuals in close proximity may appear overlaying.

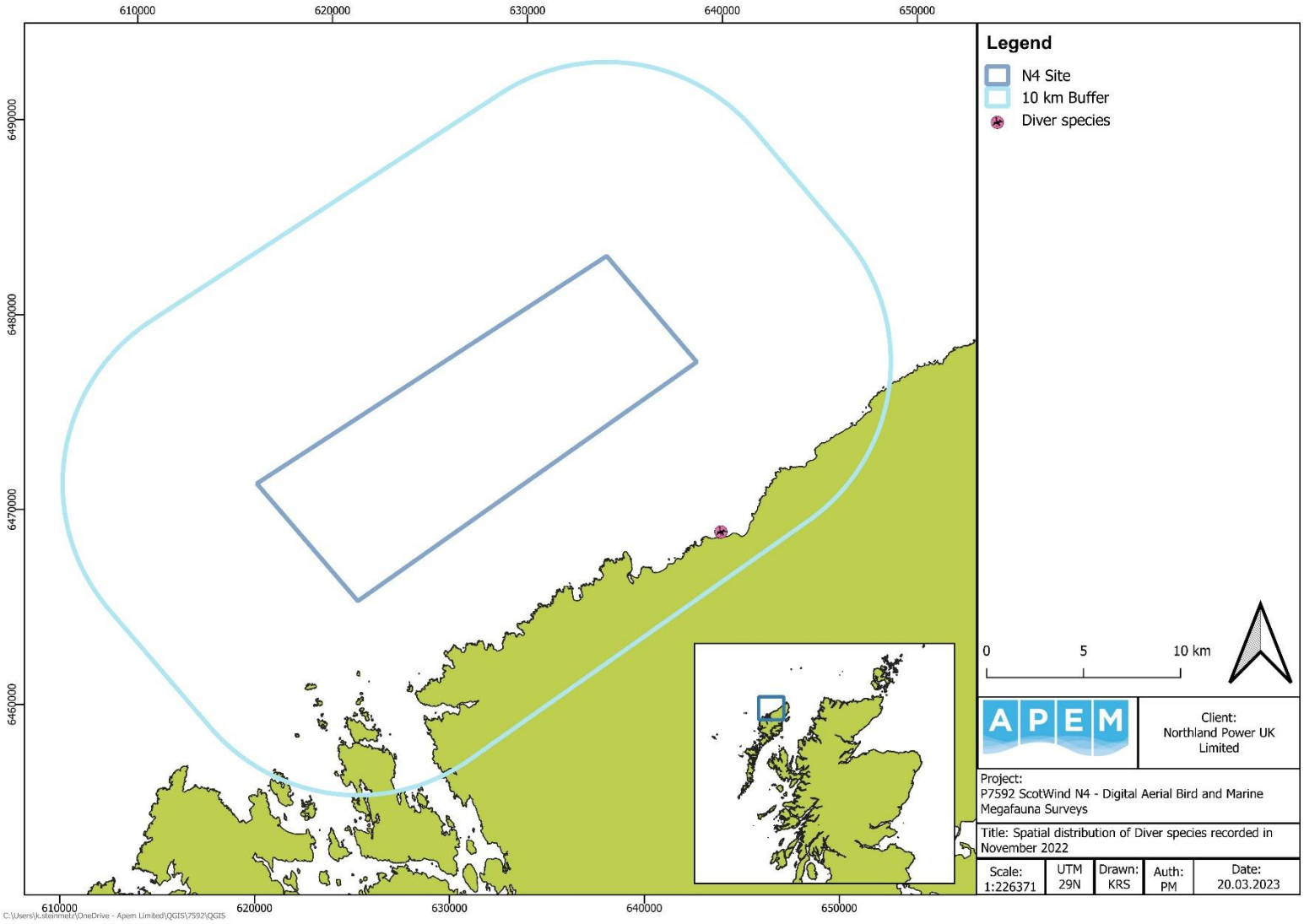


Figure 307 Distribution of diver species in November 2022

*Note that individuals in close proximity may appear overlaying.

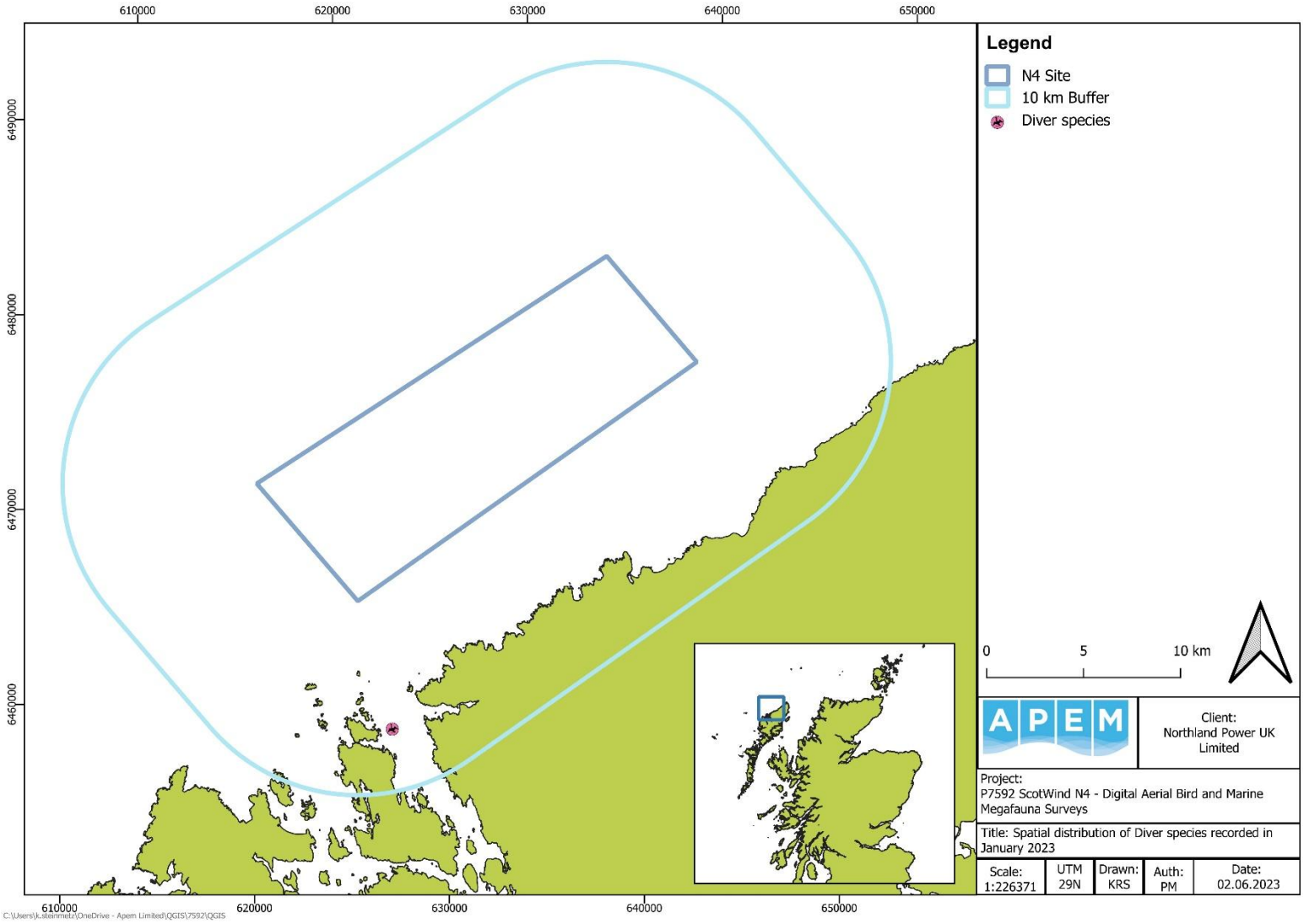


Figure 308 Distribution of diver species in January 2023

*Note that individuals in close proximity may appear overlaying.

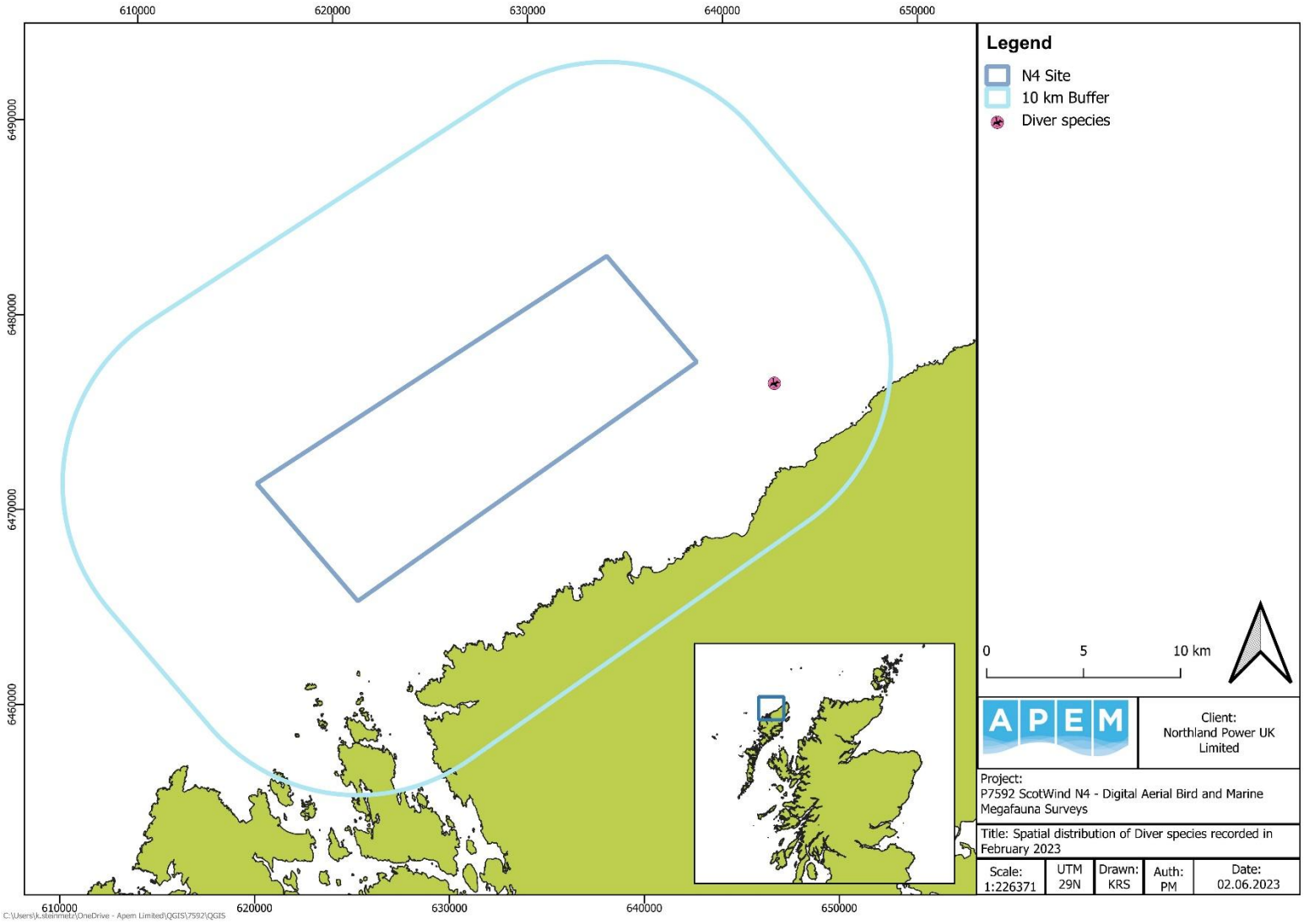


Figure 309 Distribution of diver species in February 2023

*Note that individuals in close proximity may appear overlaying.

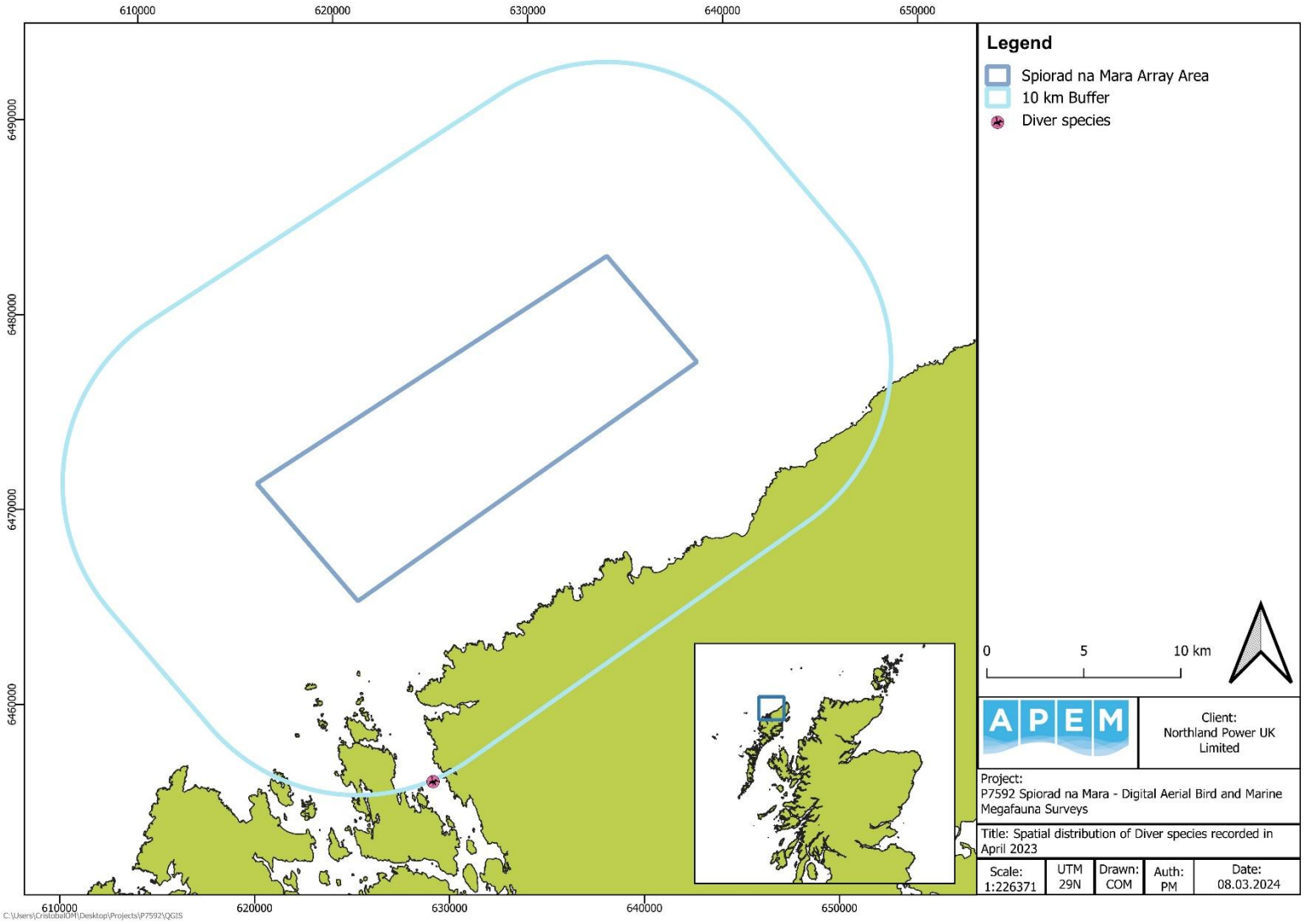


Figure 310 Distribution of diver species in April 2023

*Note that individuals in close proximity may appear overlaying.

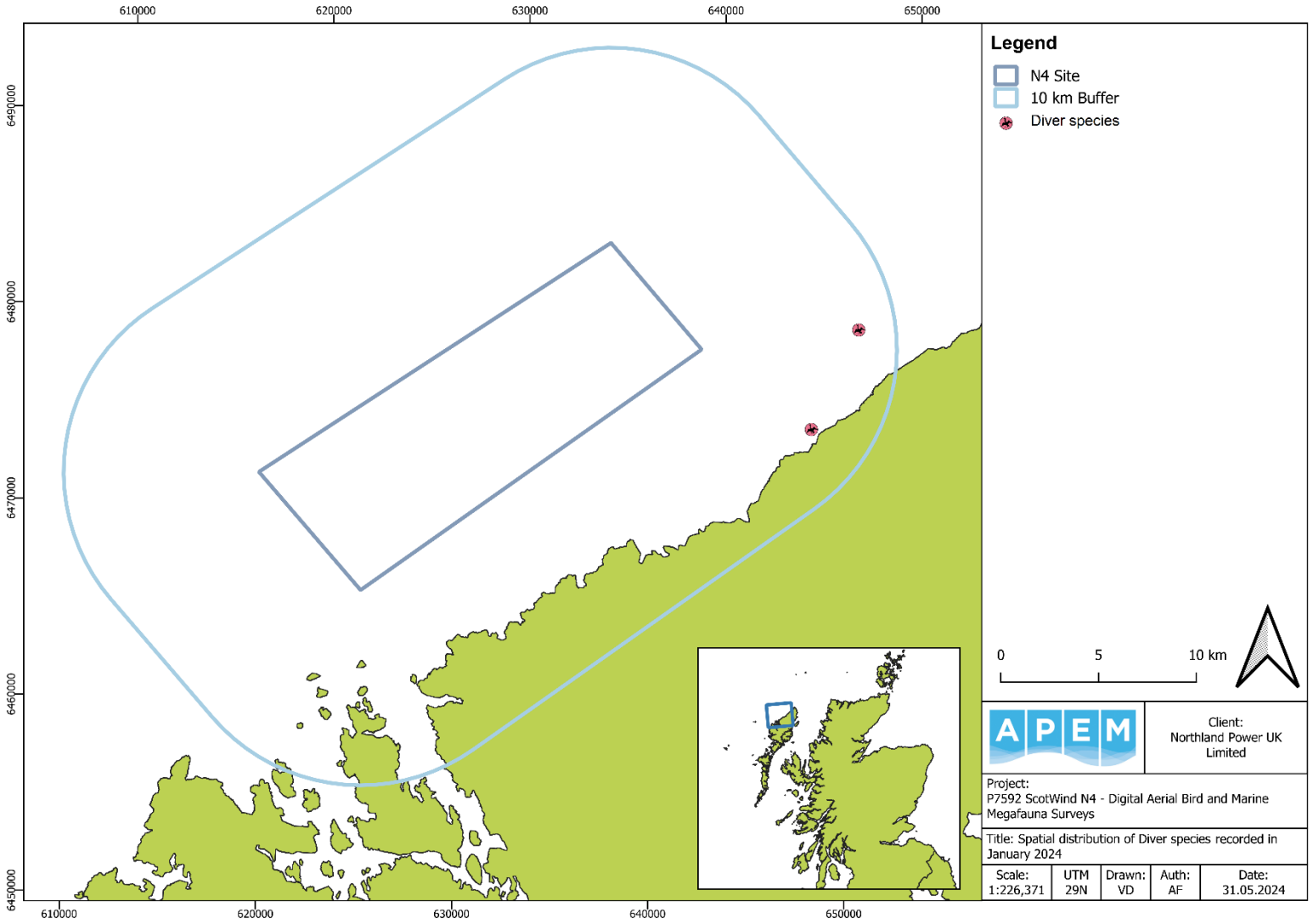


Figure 311 Distribution of diver species in January 2024

*Note that individuals in close proximity may appear overlaying.

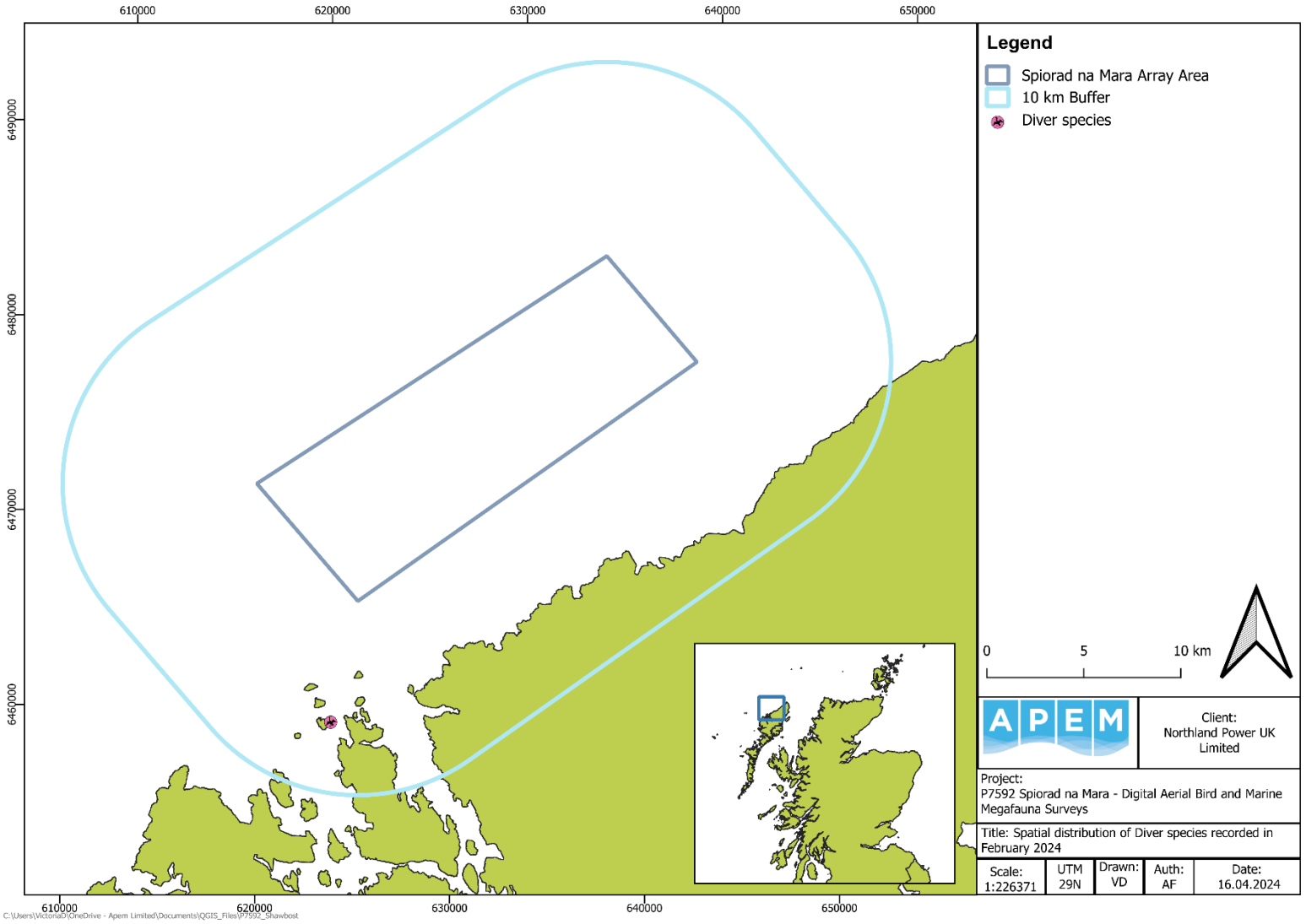


Figure 312 Distribution of diver species in February 2024

*Note that individuals in close proximity may appear overlaying.

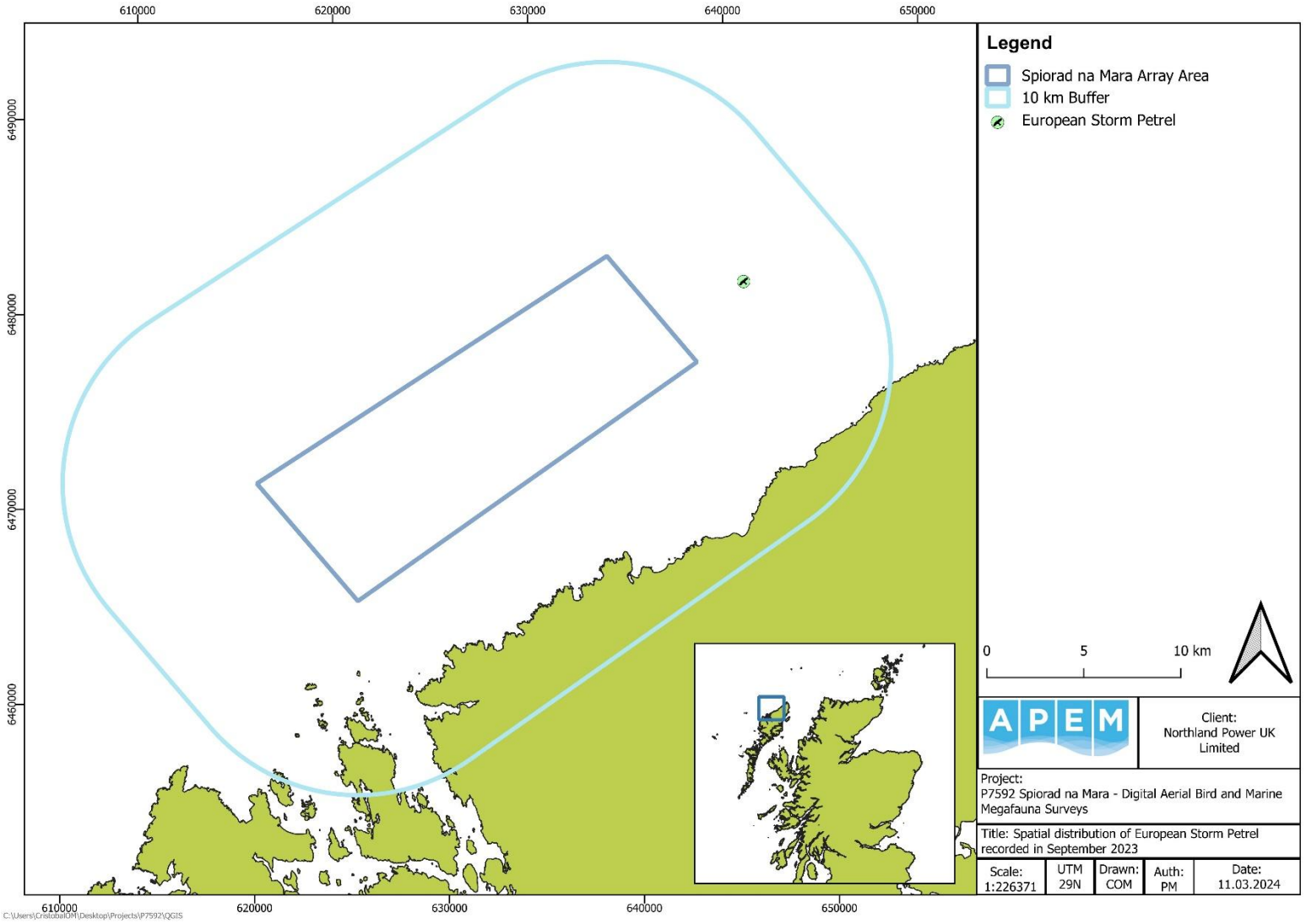


Figure 313 Distribution of European storm petrel in September 2023

*Note that individuals in close proximity may appear overlaying.

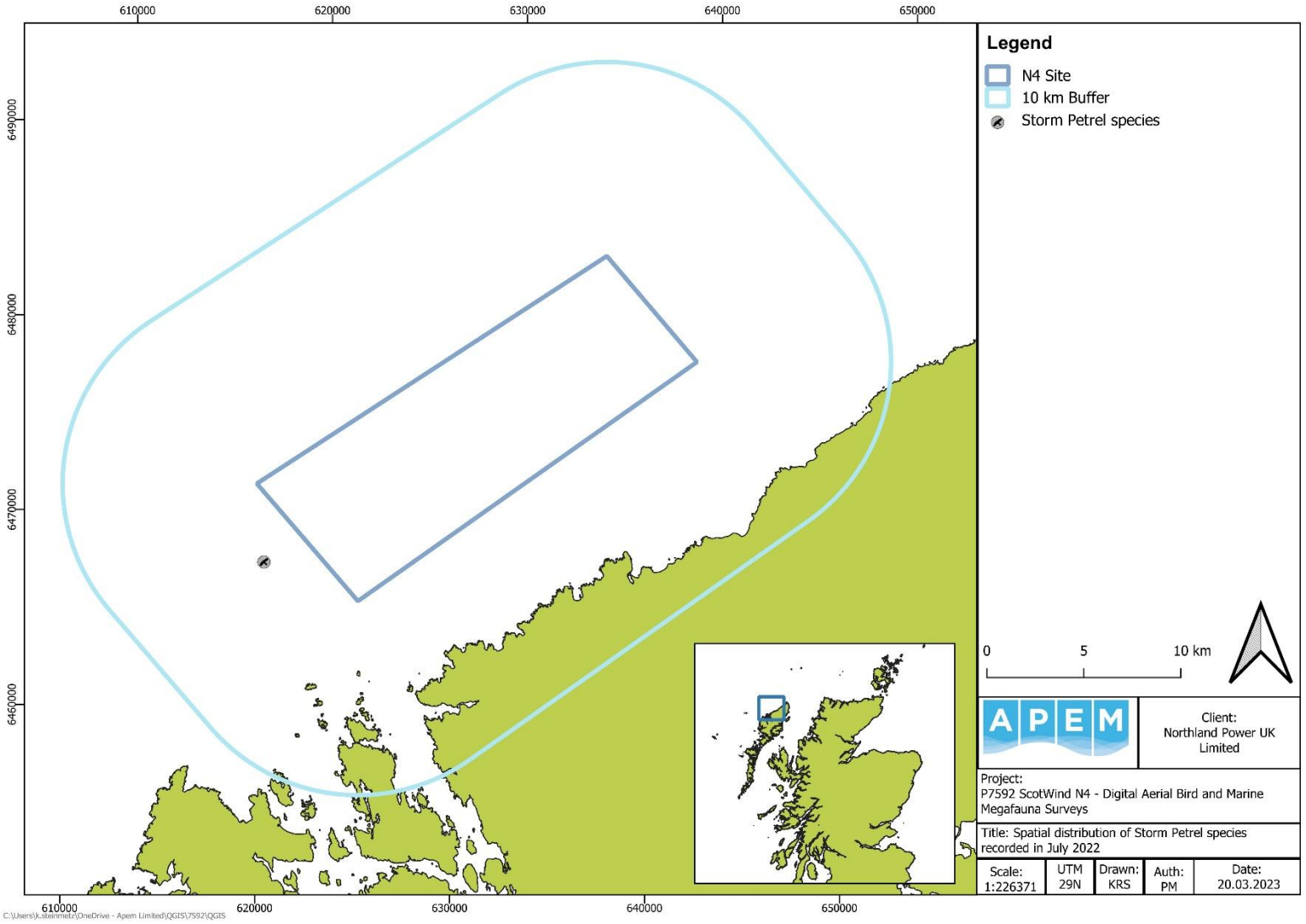


Figure 314 Distribution of storm petrel species in July 2022
*Note that individuals in close proximity may appear overlaying.

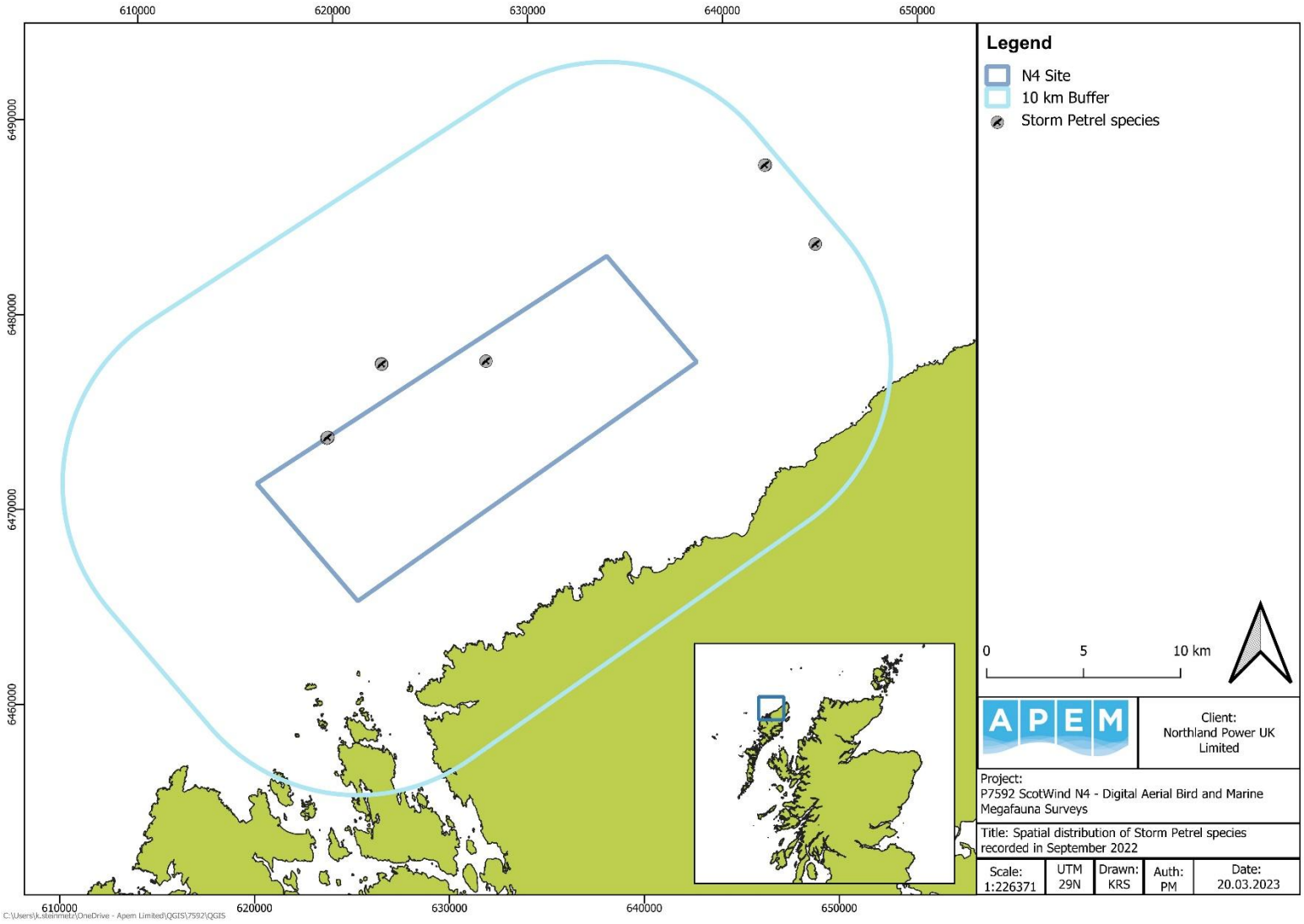


Figure 315 Distribution of storm petrel species in September 2022
*Note that individuals in close proximity may appear overlaying.

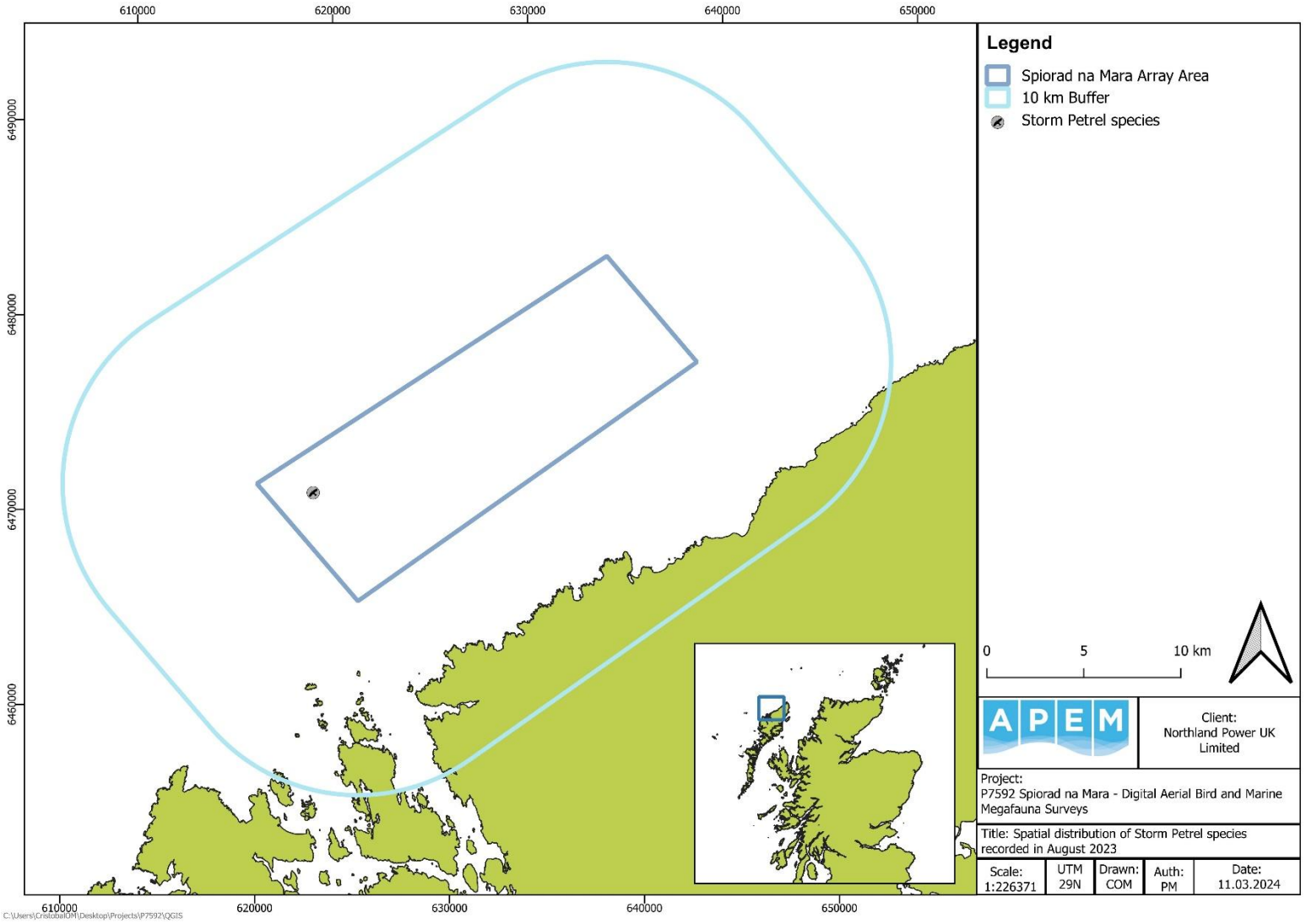


Figure 316 Distribution of storm petrel species in August 2023

*Note that individuals in close proximity may appear overlaying.

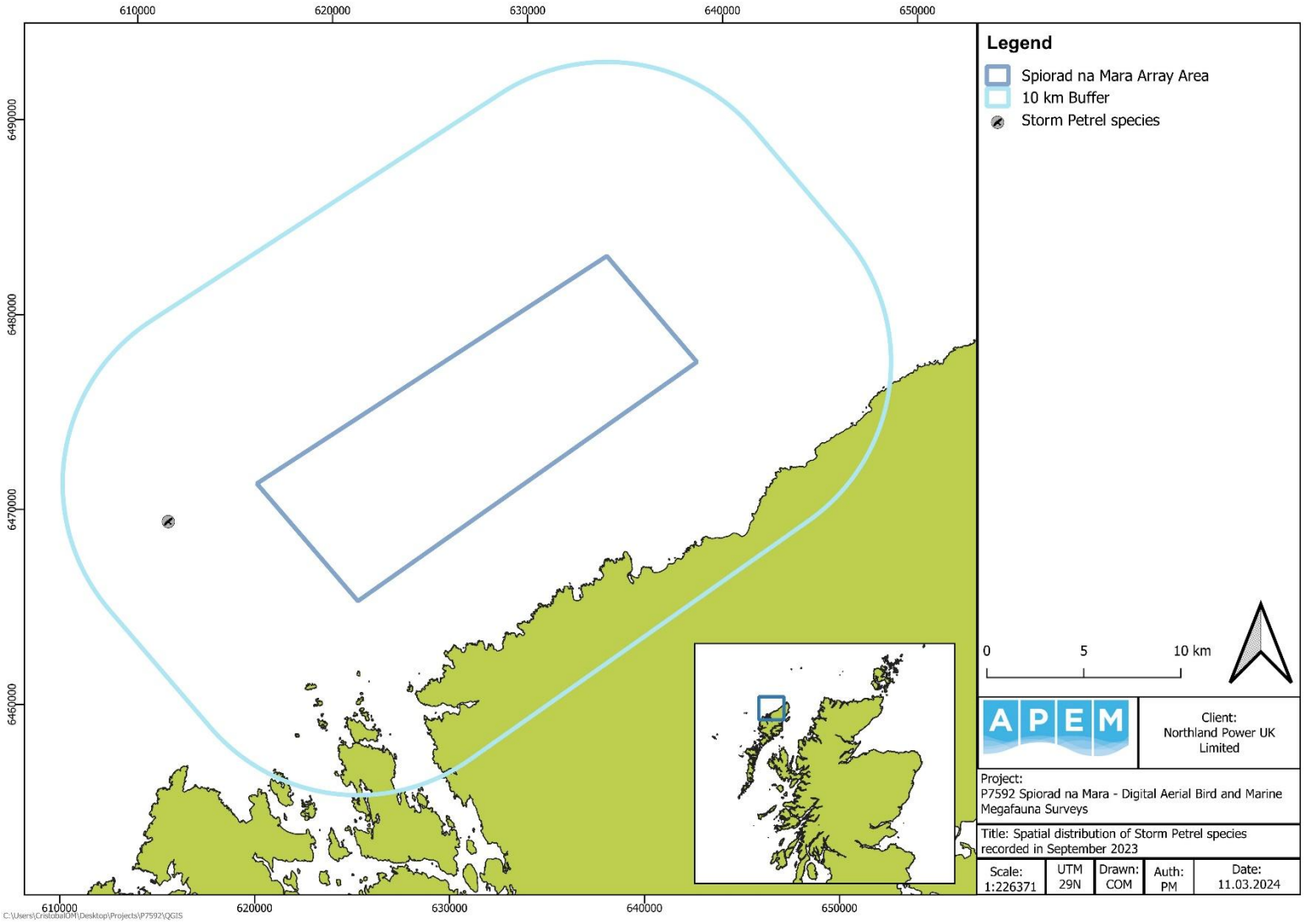


Figure 317 Distribution of storm petrel species in September 2023

*Note that individuals in close proximity may appear overlaying.

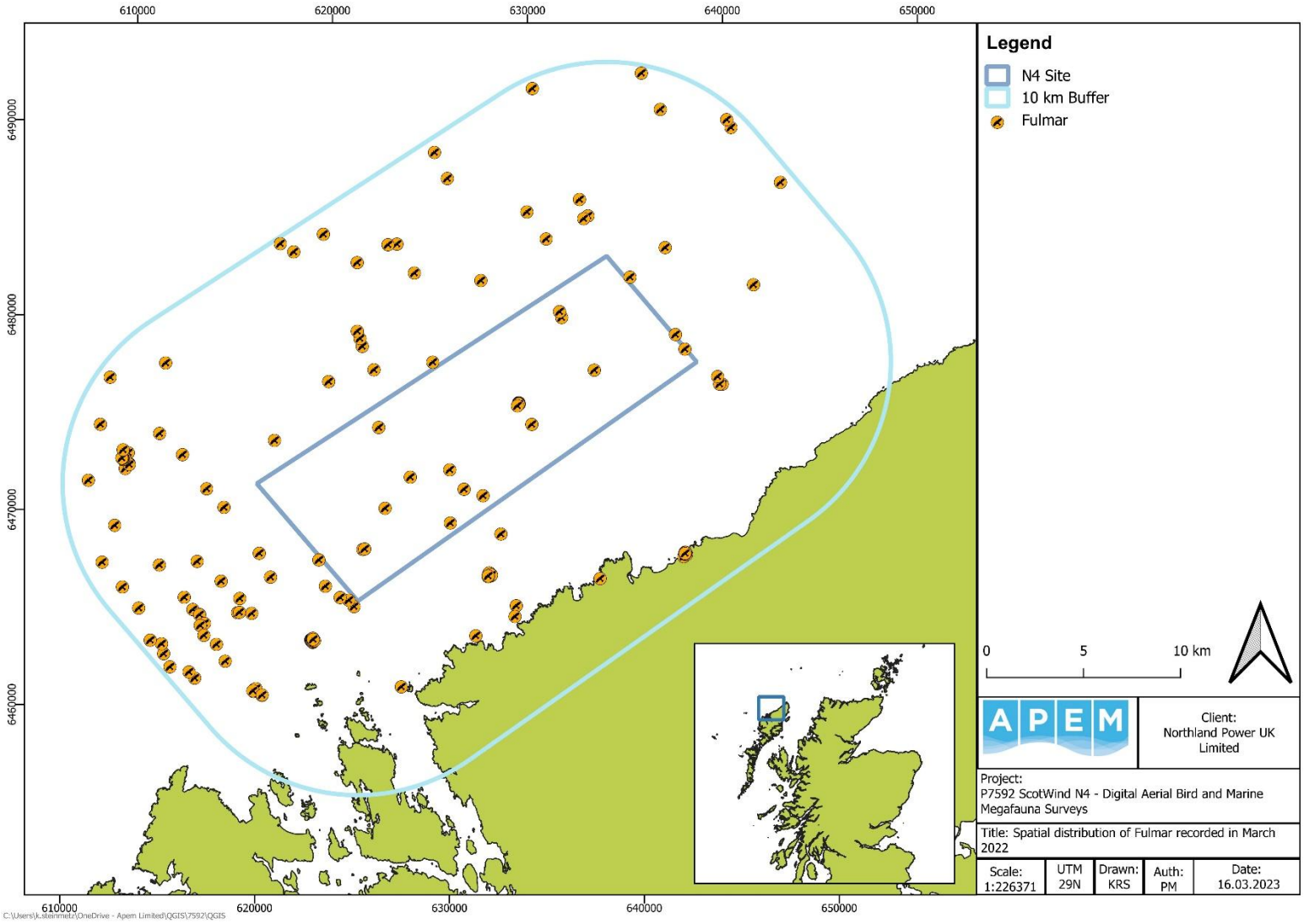


Figure 318 Distribution of fulmar in March 2022
*Note that individuals in close proximity may appear overlaying.

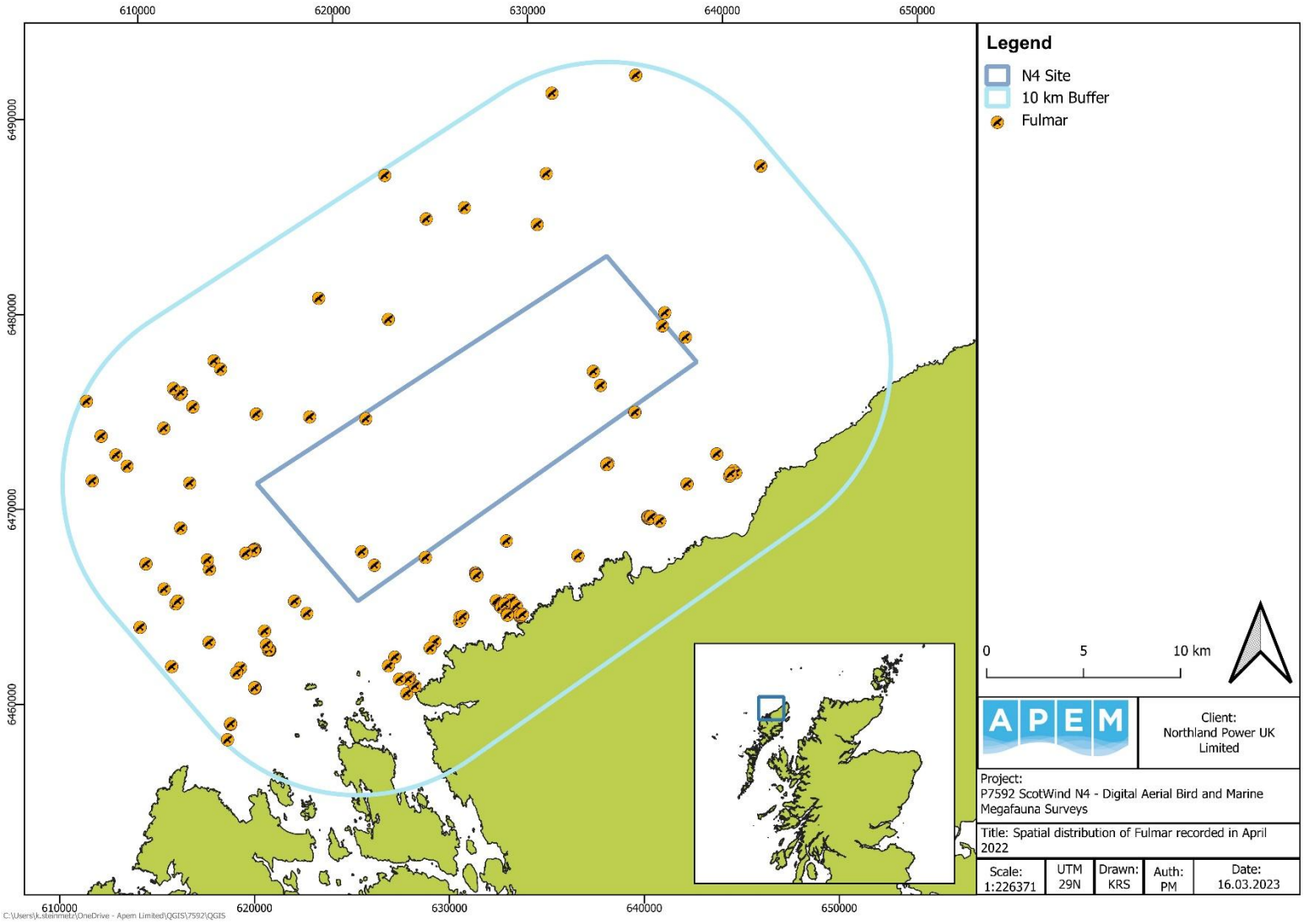


Figure 319 Distribution of fulmar in April 2022
*Note that individuals in close proximity may appear overlaying.

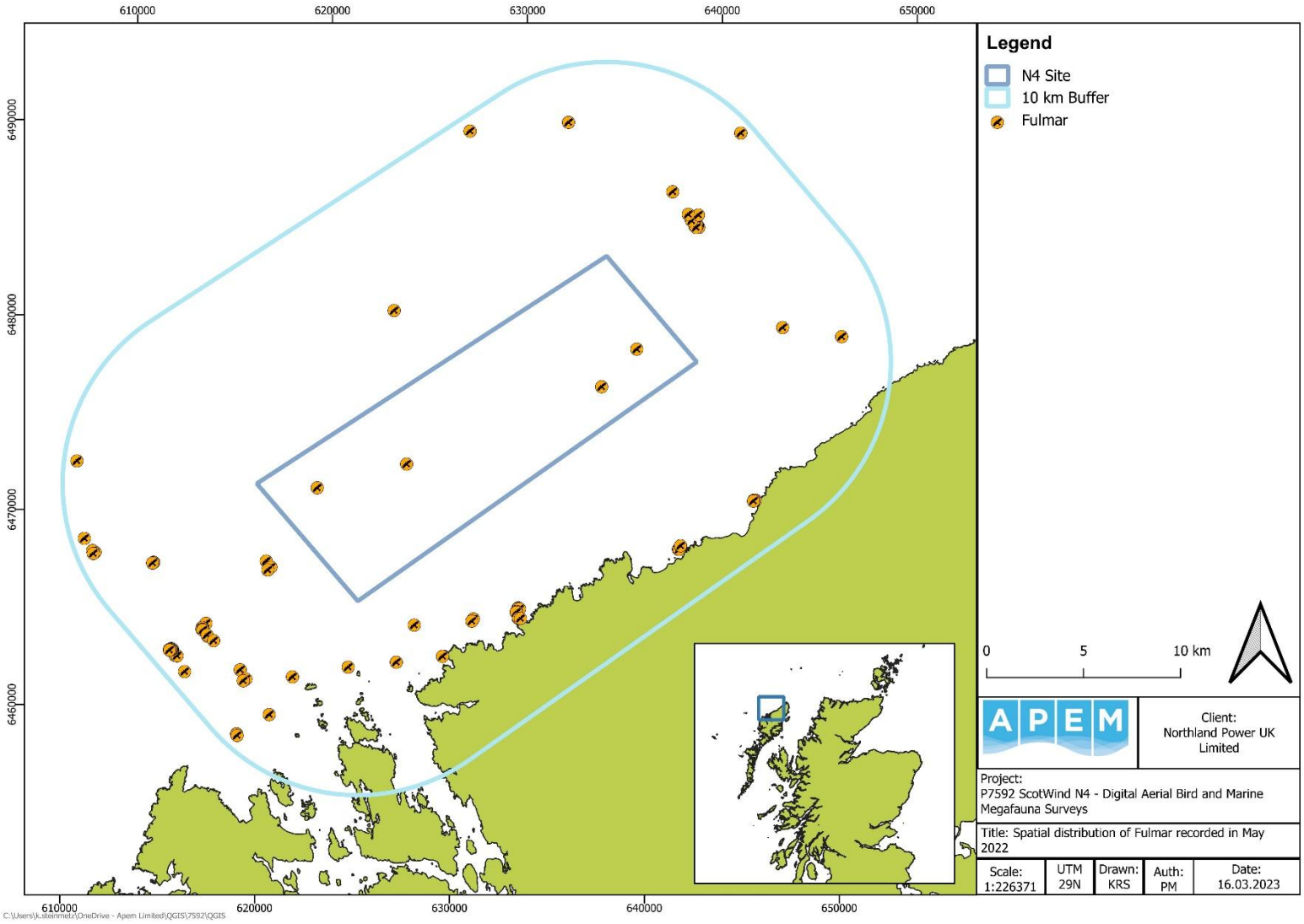


Figure 320 Distribution of fulmar in May 2022
*Note that individuals in close proximity may appear overlaying.

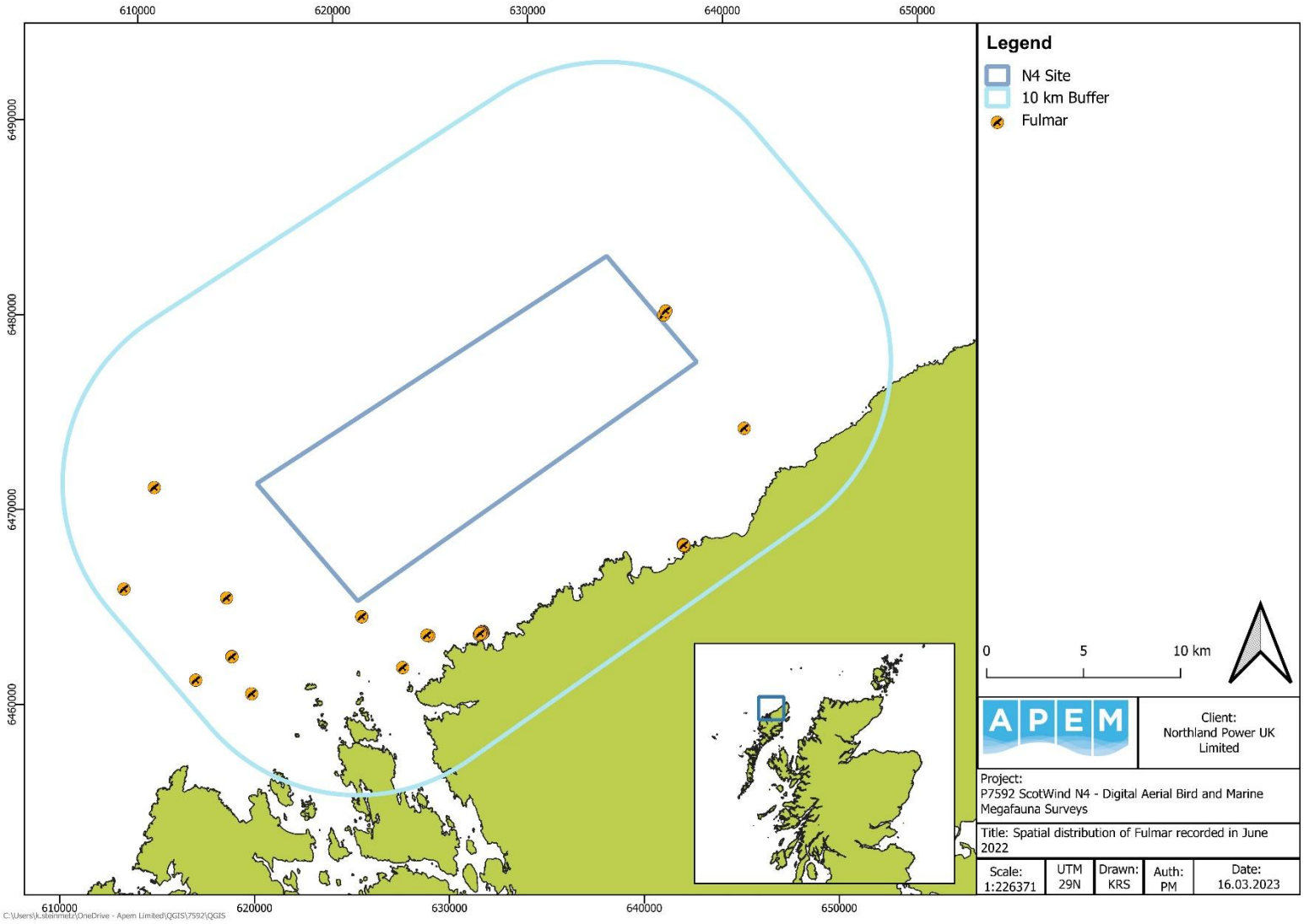


Figure 321 Distribution of fulmar in June 2022
*Note that individuals in close proximity may appear overlaying.

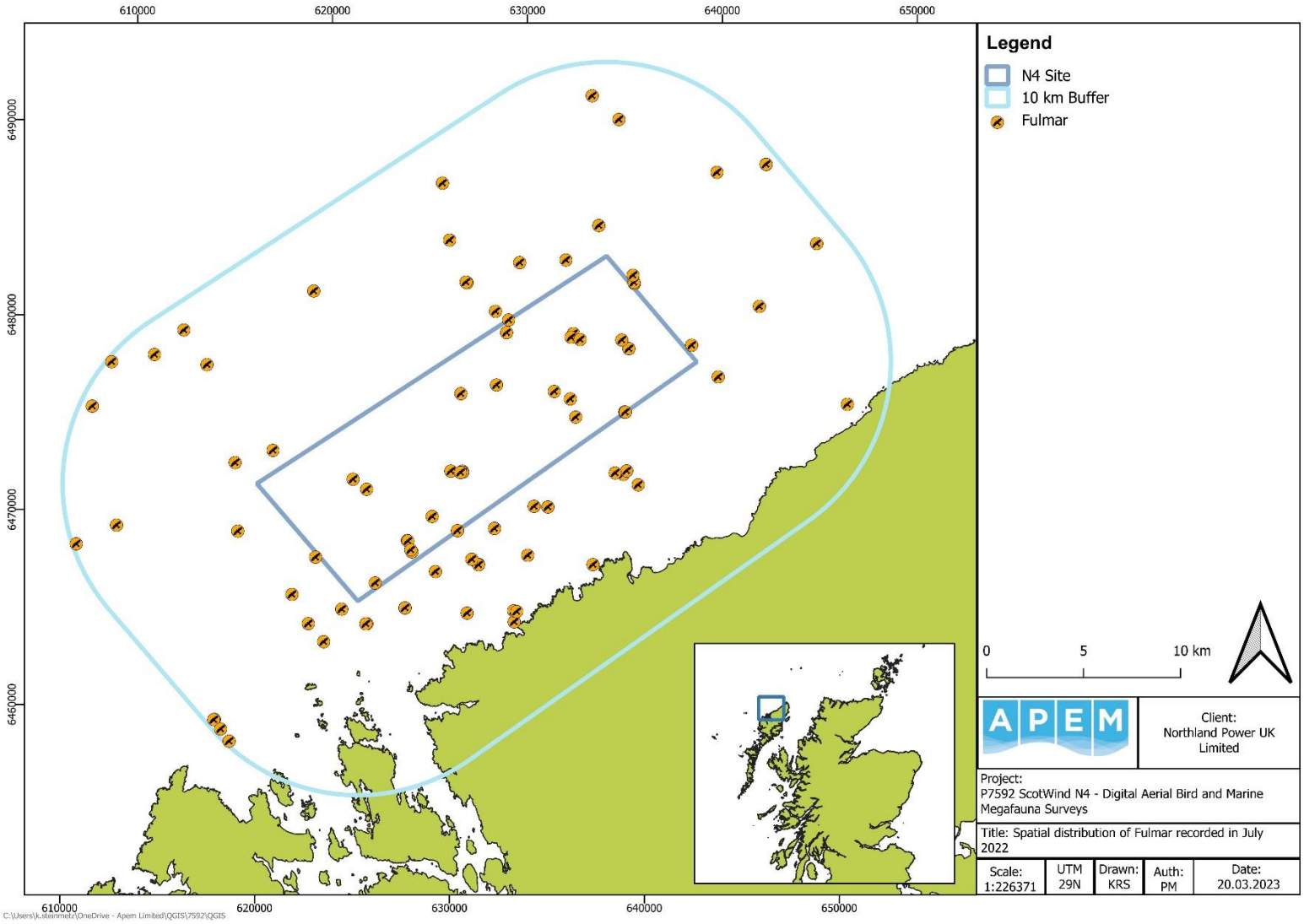


Figure 322 Distribution of fulmar in July 2022
*Note that individuals in close proximity may appear overlaying.

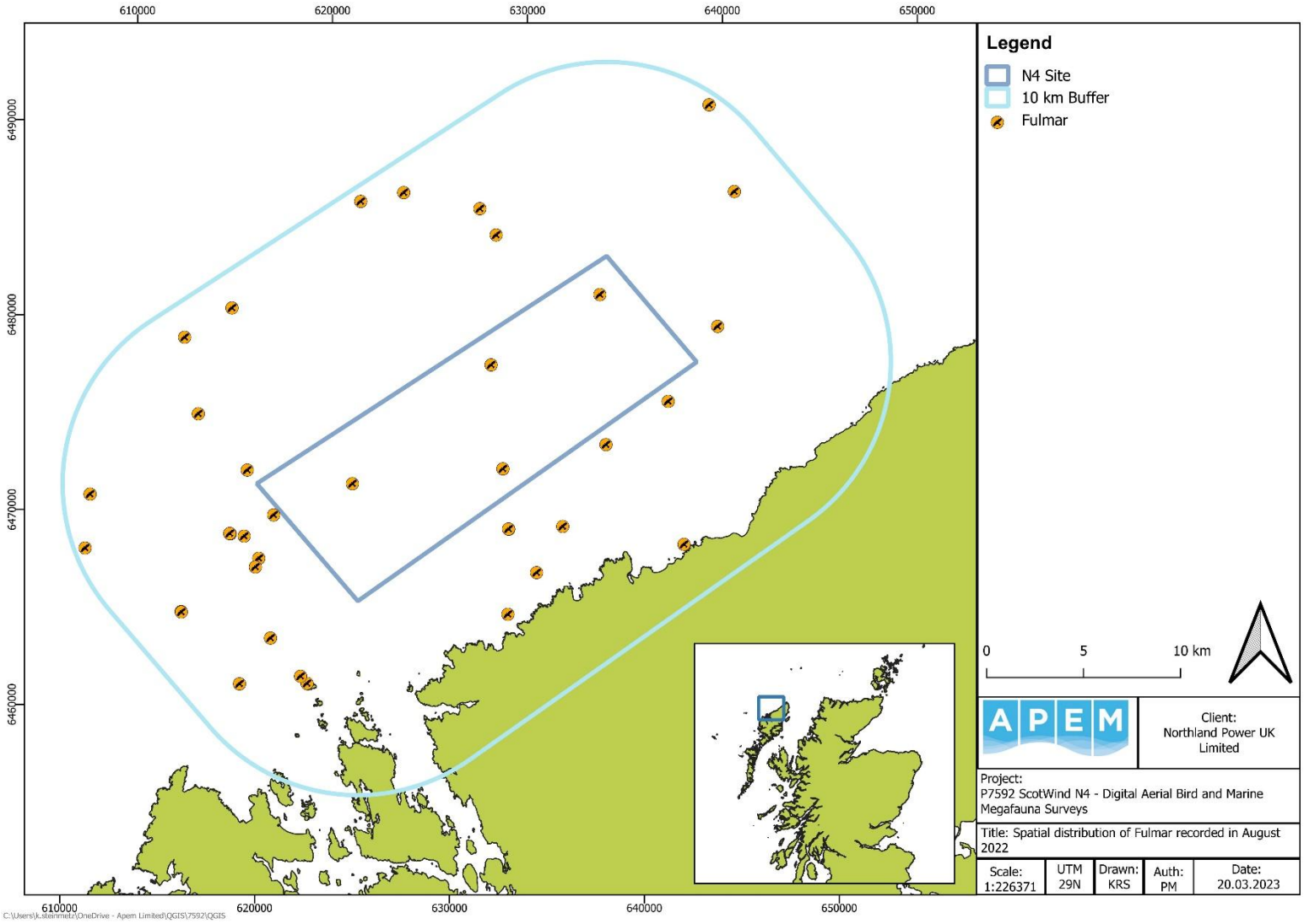


Figure 323 Distribution of fulmar in August 2022
*Note that individuals in close proximity may appear overlaying.

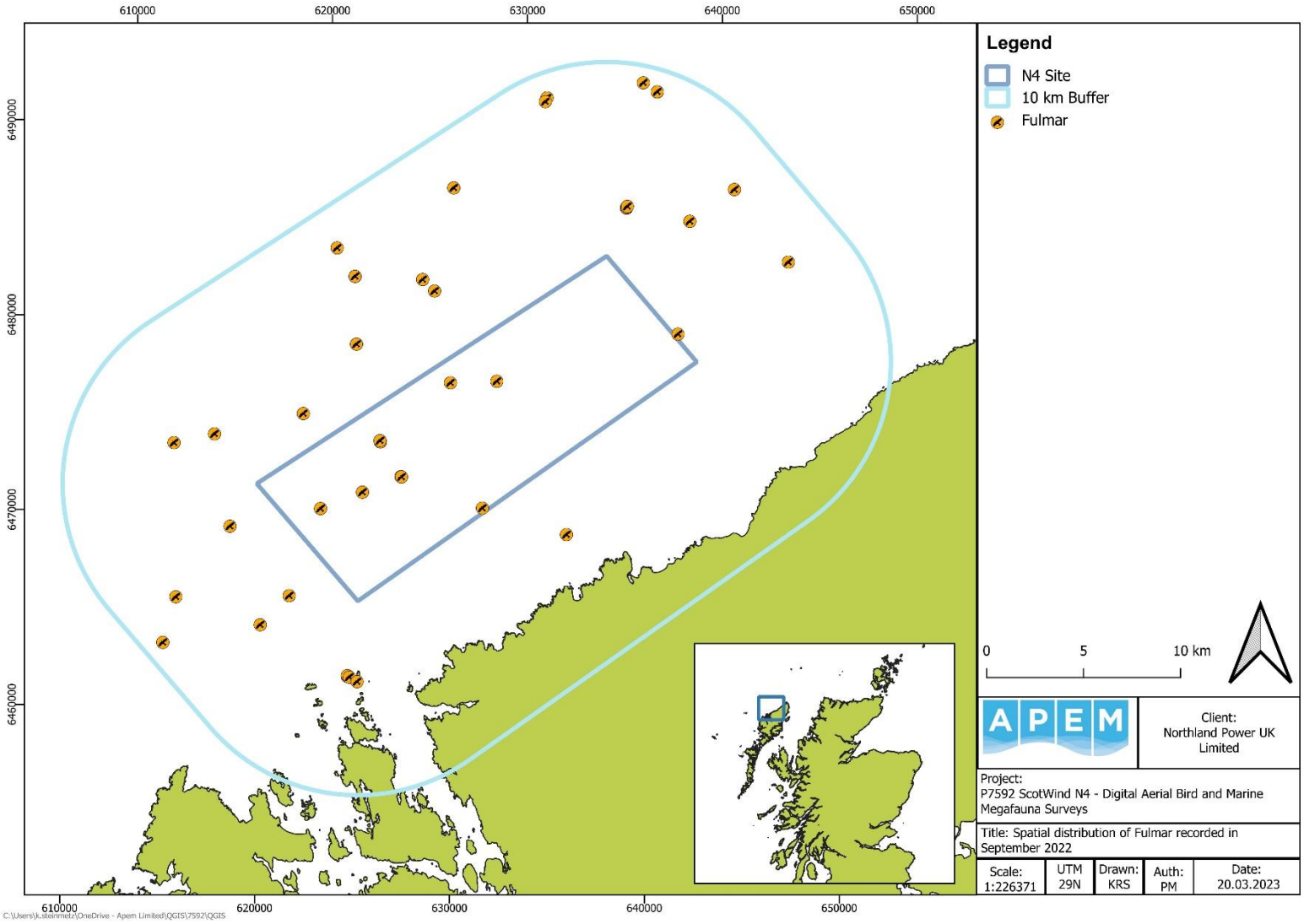


Figure 324 Distribution of fulmar in September 2022
*Note that individuals in close proximity may appear overlaying.

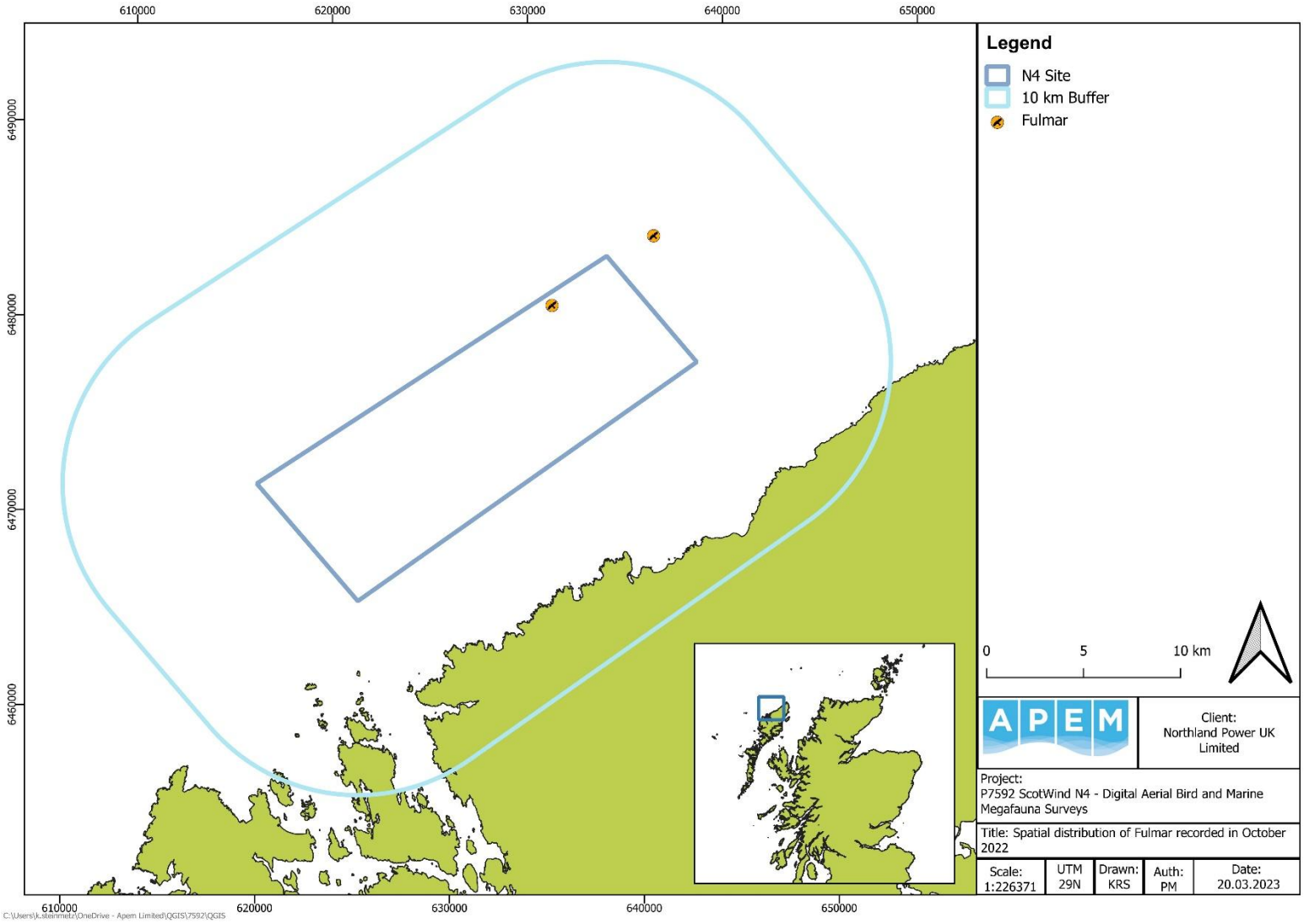


Figure 325 Distribution of fulmar in October 2022
*Note that individuals in close proximity may appear overlaying.

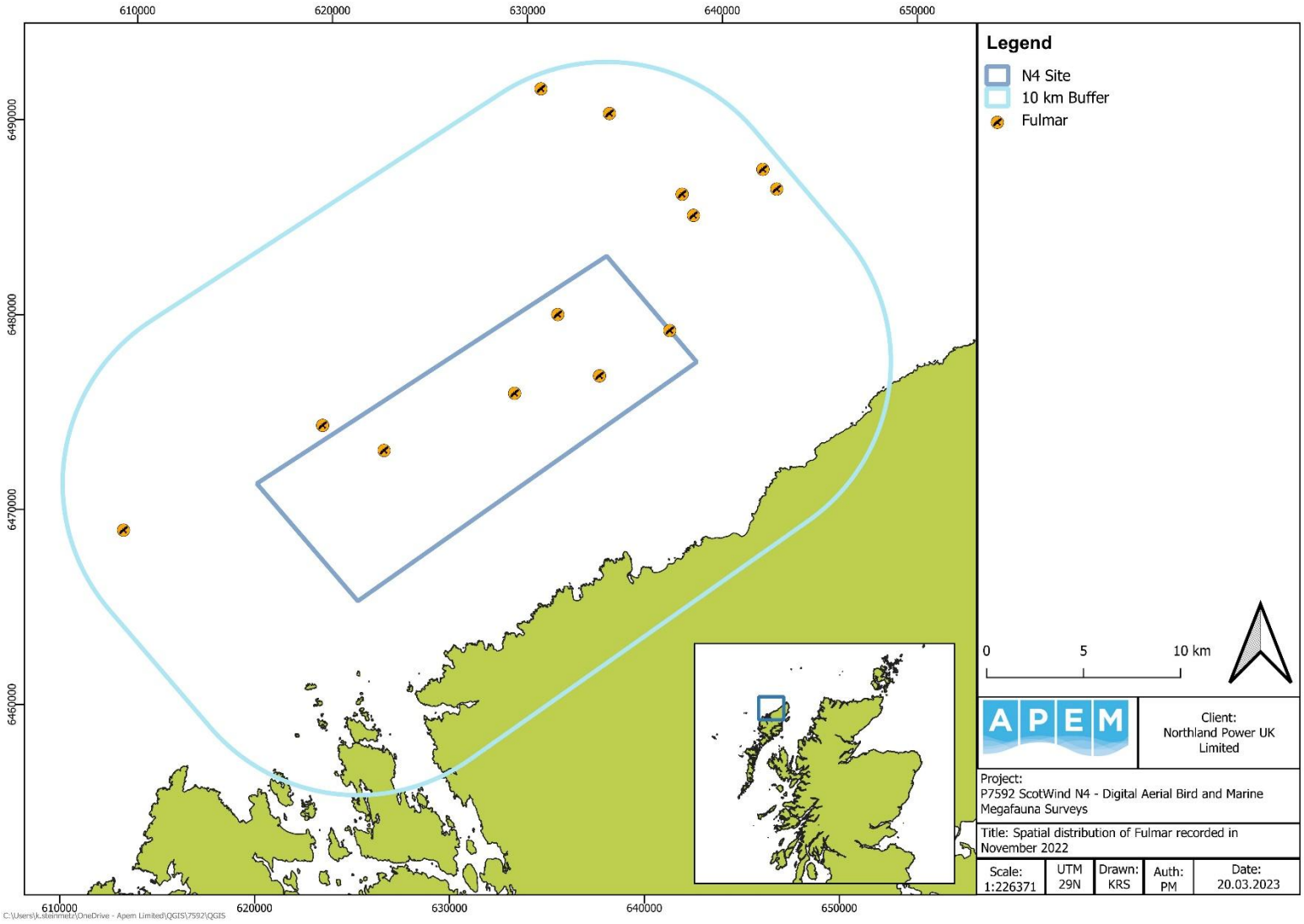


Figure 326 Distribution of fulmar in November 2022

*Note that individuals in close proximity may appear overlaying.

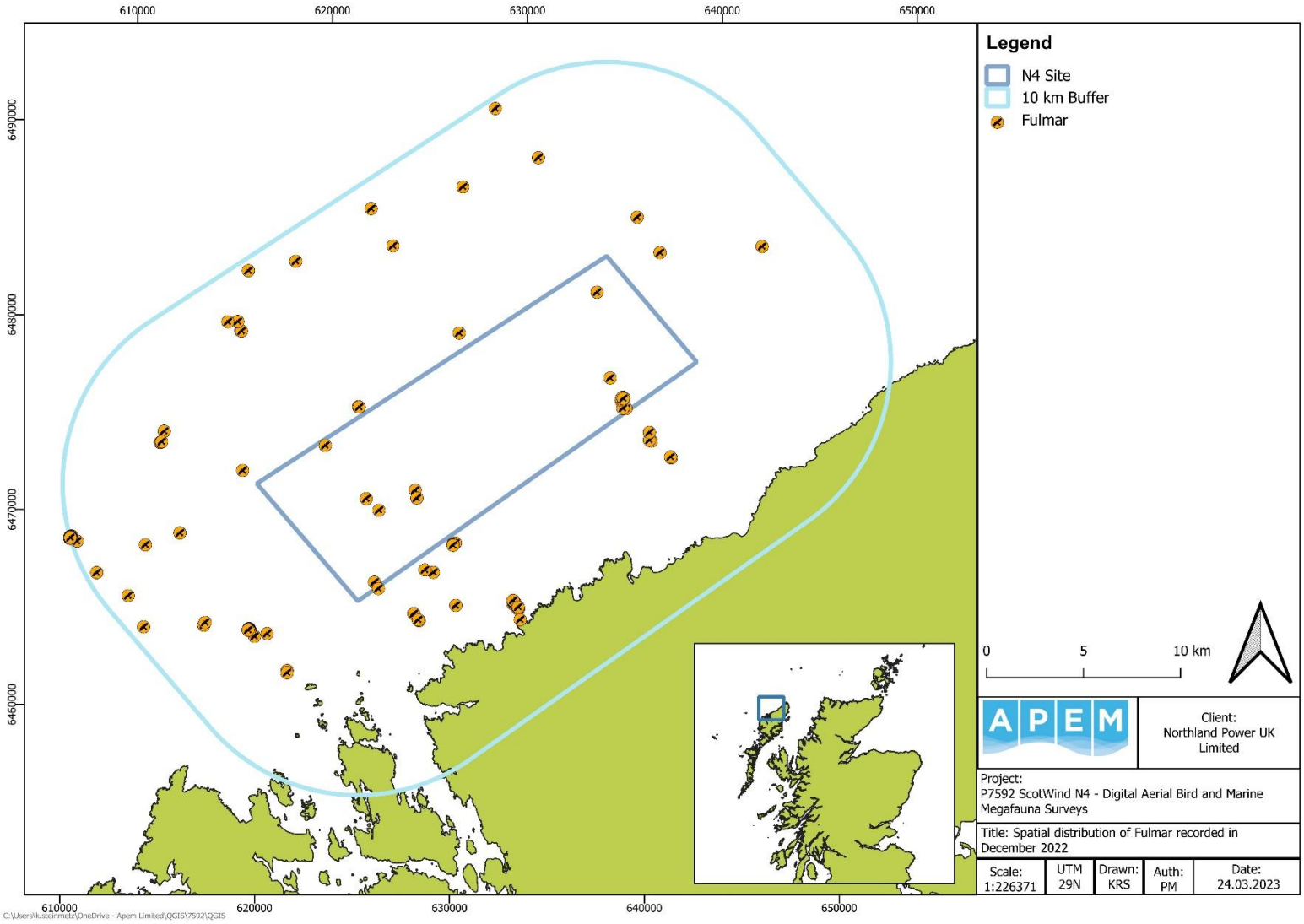


Figure 327 Distribution of fulmar in December 2022

*Note that individuals in close proximity may appear overlaying.

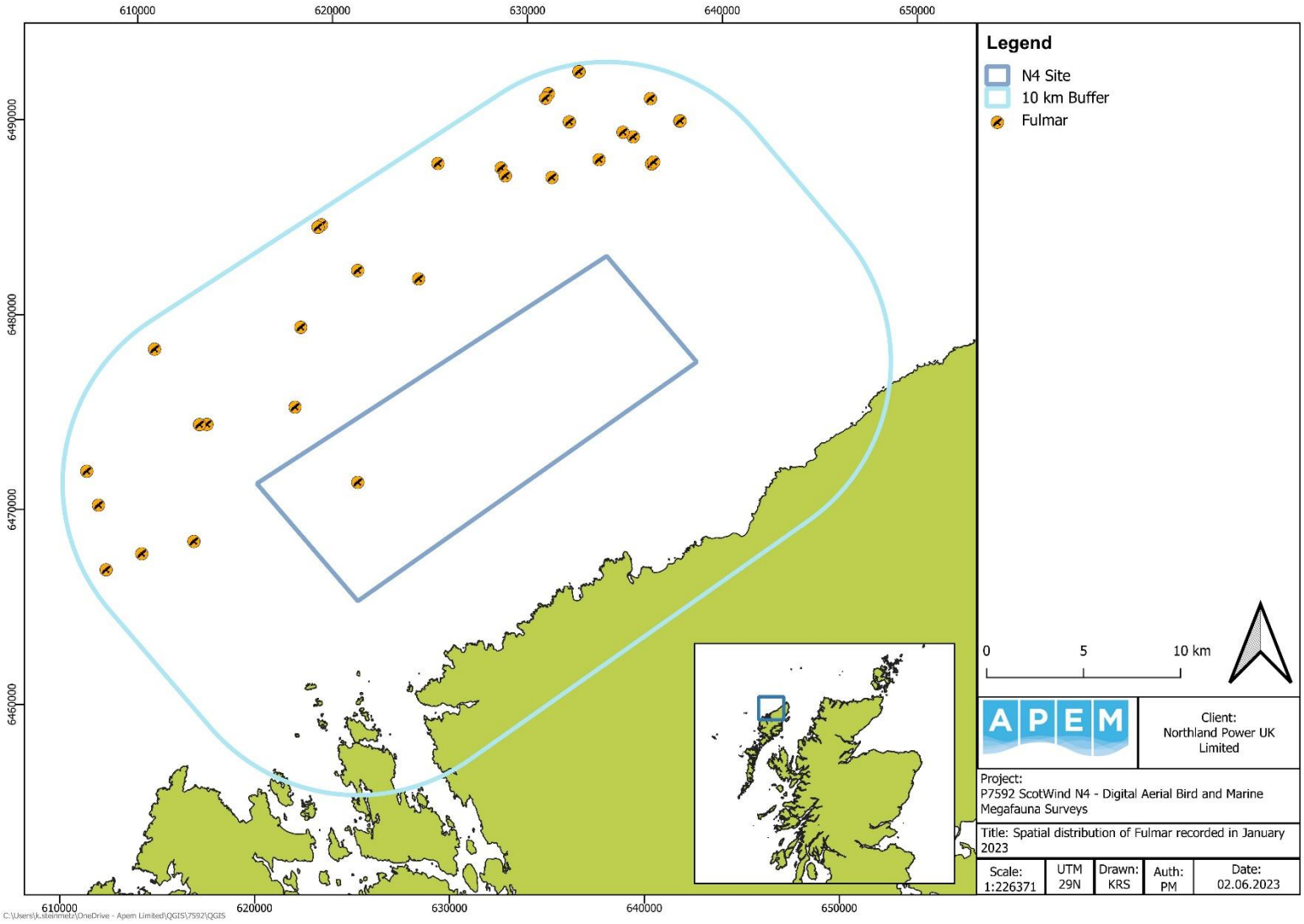


Figure 328 Distribution of fulmar in January 2023
*Note that individuals in close proximity may appear overlaying.

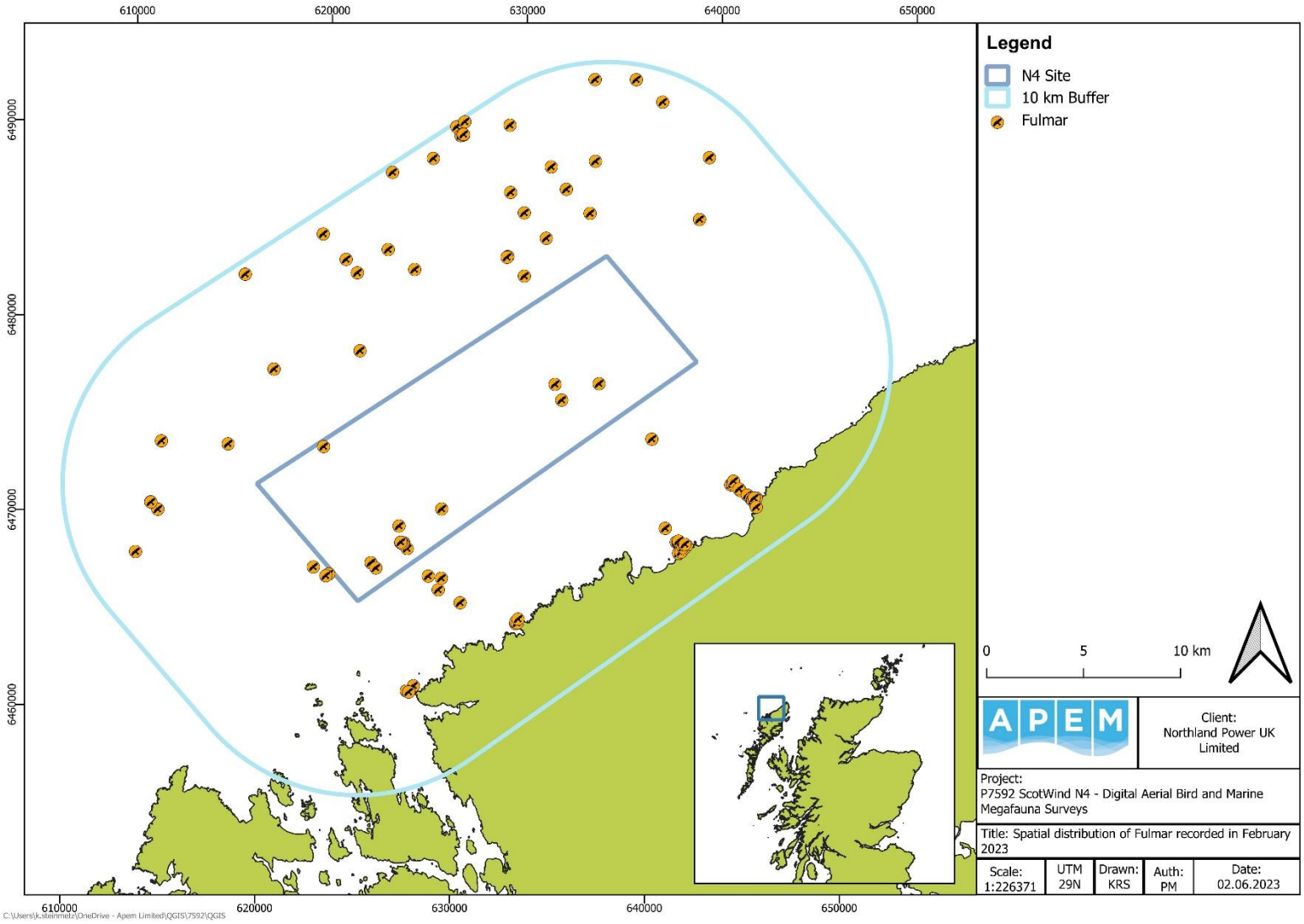


Figure 329 Distribution of fulmar in February 2023
*Note that individuals in close proximity may appear overlaying.

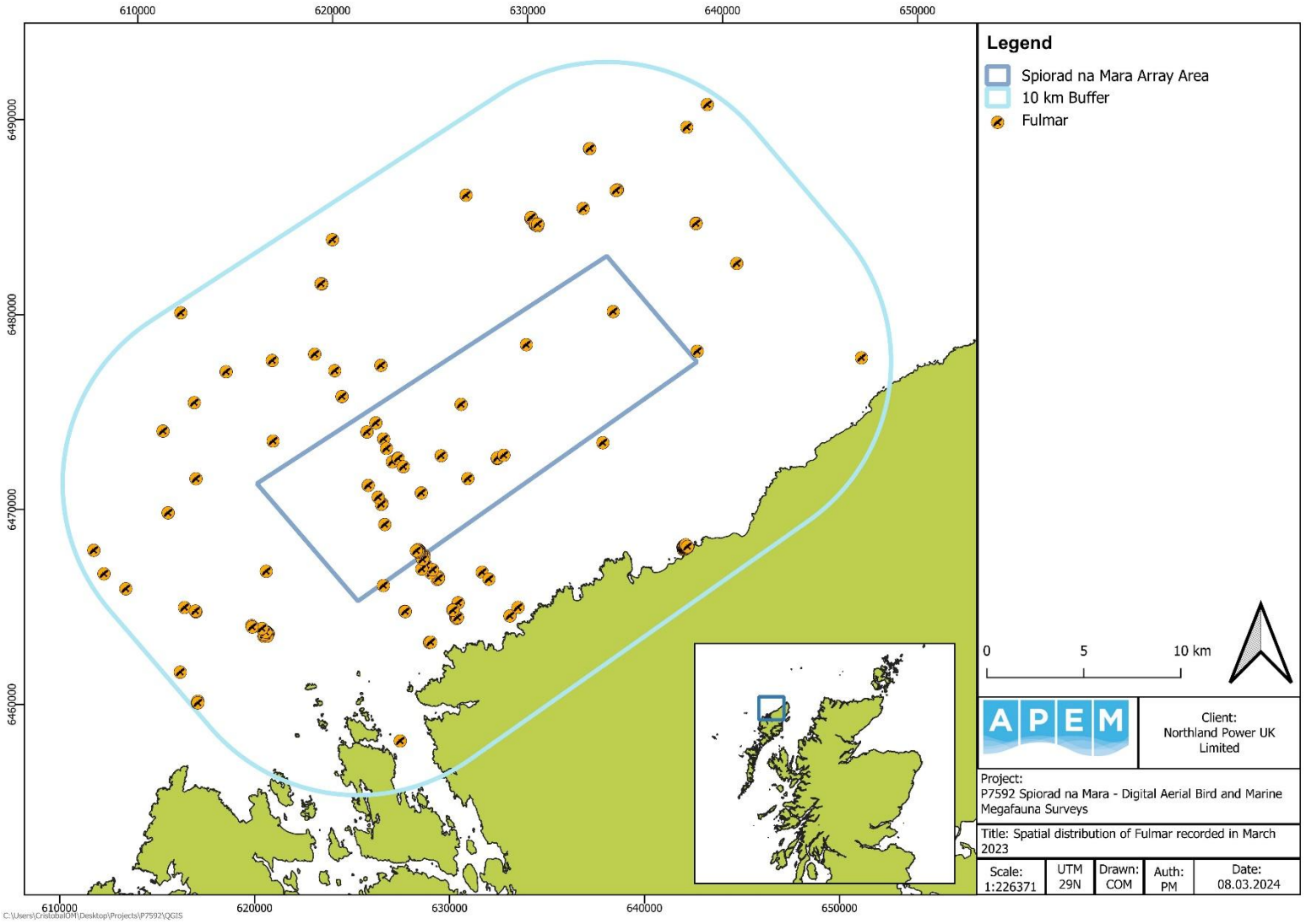


Figure 330 Distribution of fulmar in March 2023
*Note that individuals in close proximity may appear overlaying.

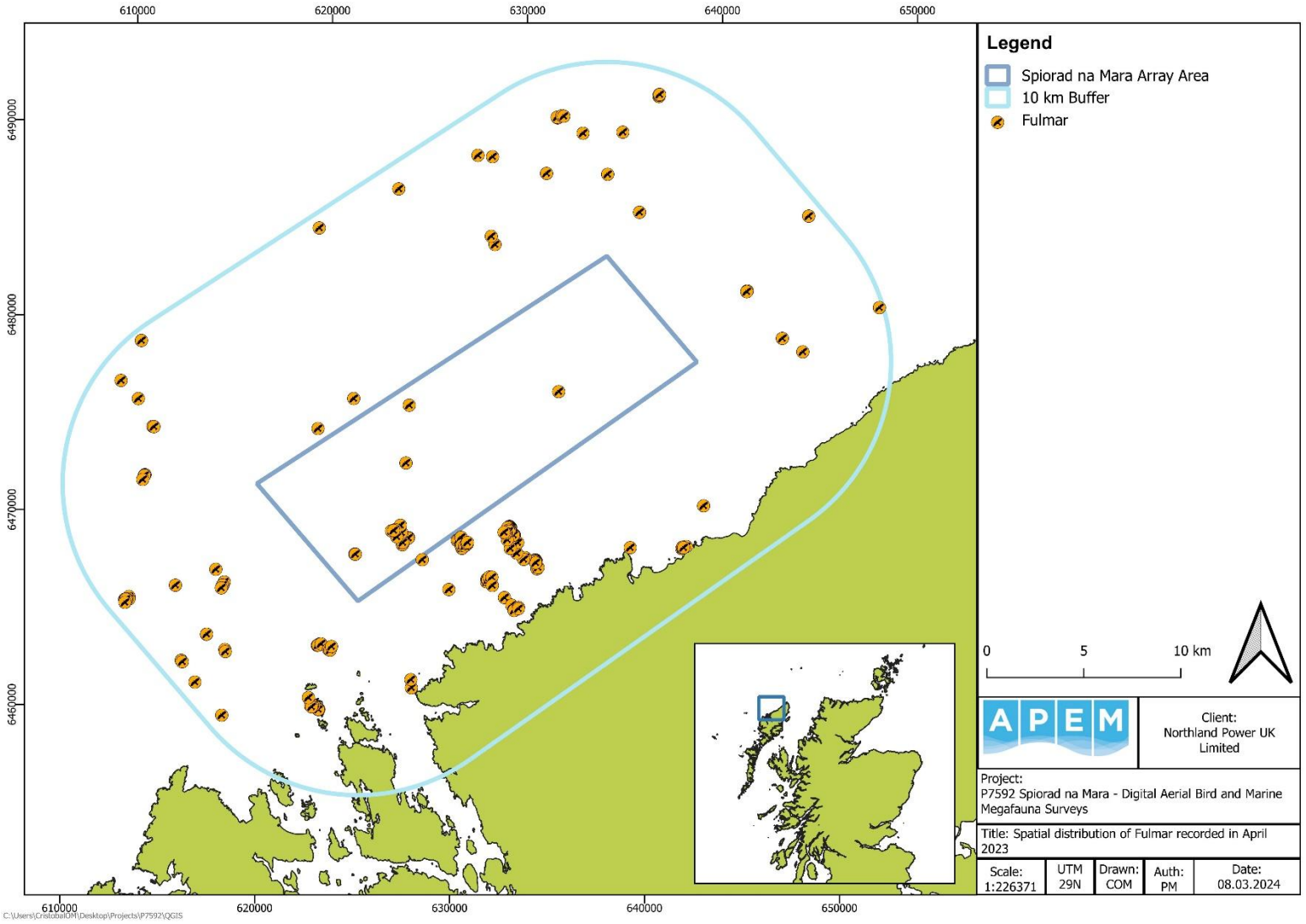


Figure 331 Distribution of fulmar in April 2023
*Note that individuals in close proximity may appear overlaying.

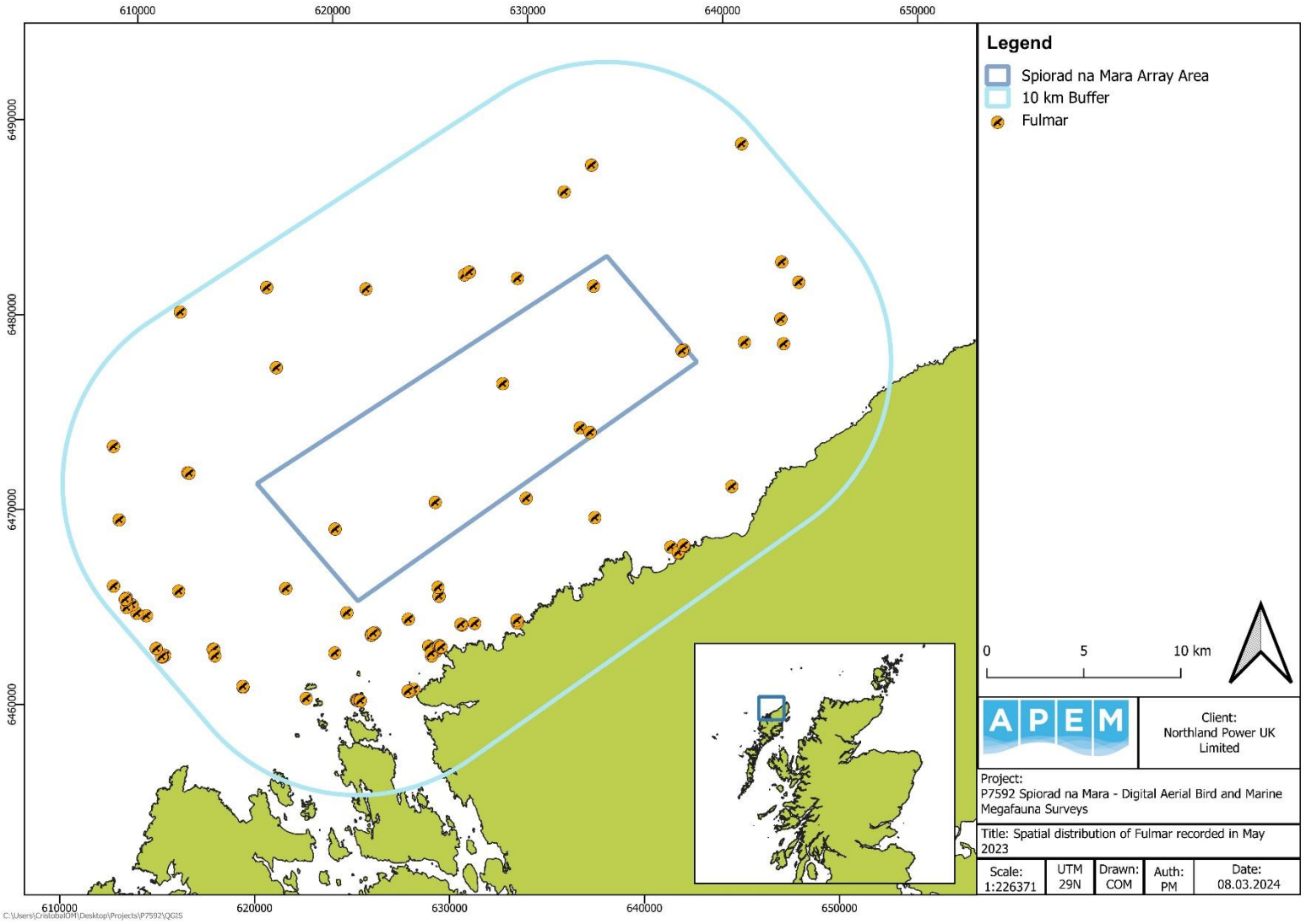


Figure 332 Distribution of fulmar in May 2023
*Note that individuals in close proximity may appear overlaying.

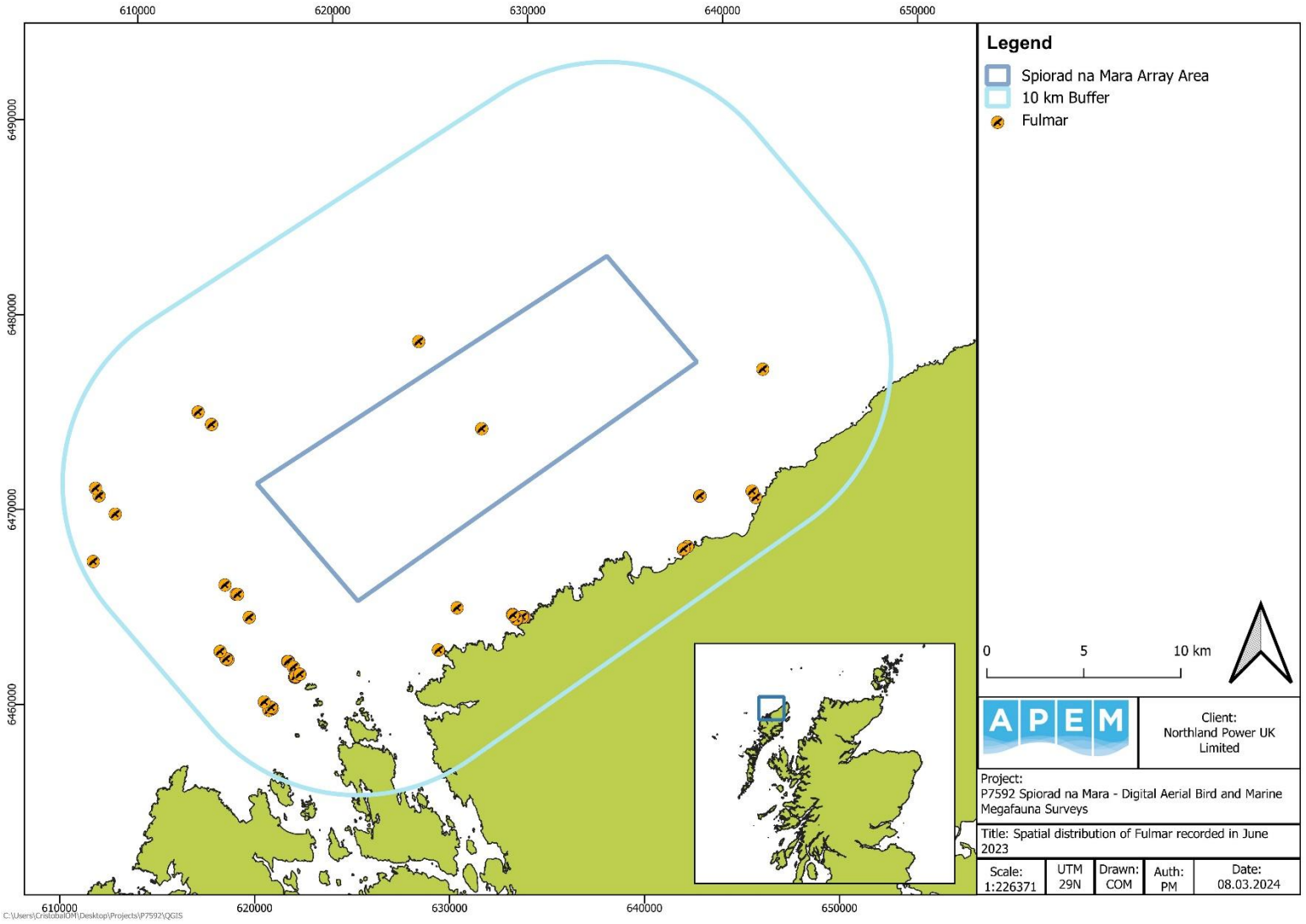


Figure 333 Distribution of fulmar in June 2023
*Note that individuals in close proximity may appear overlaying.

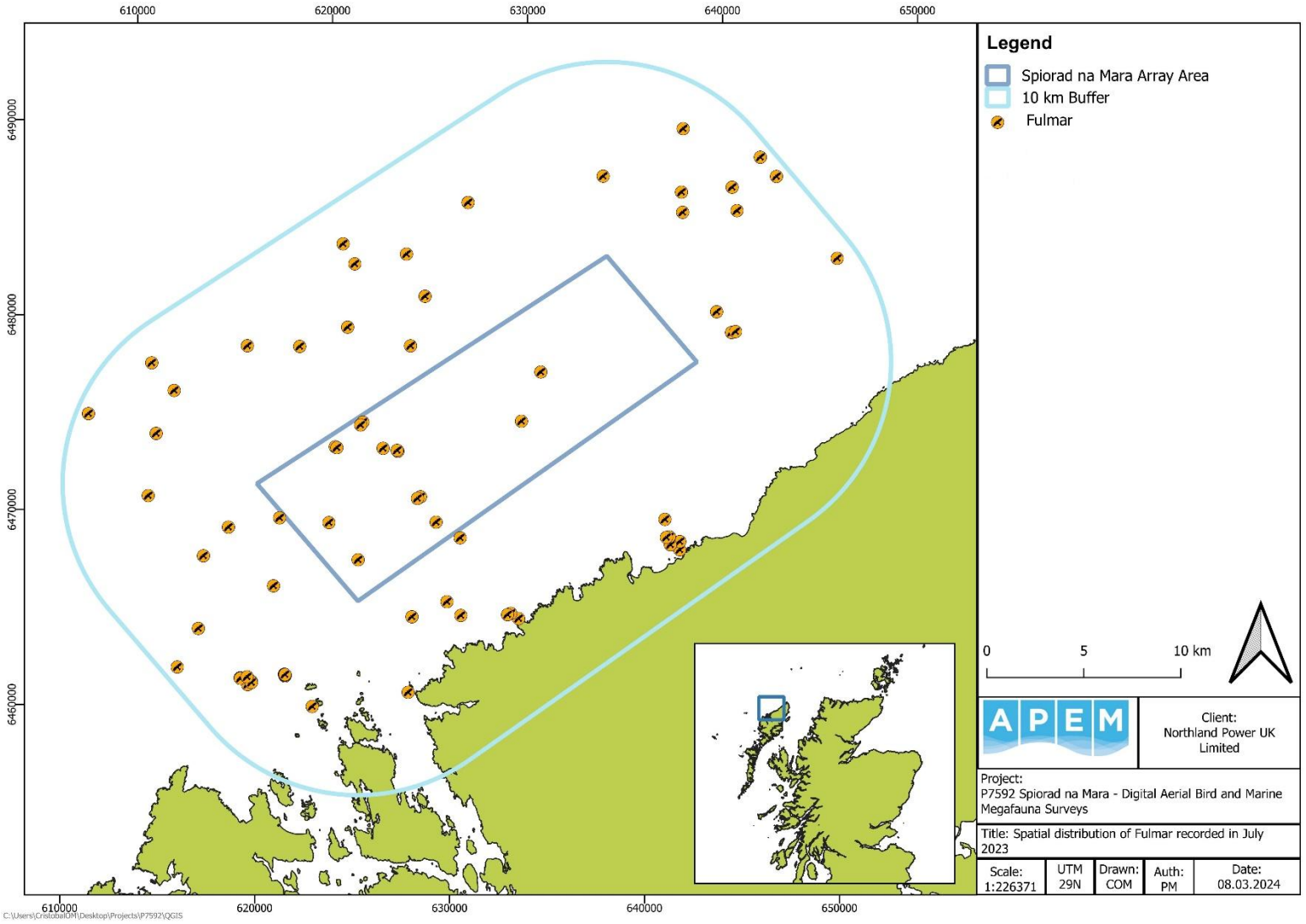


Figure 334 Distribution of fulmar in July 2023
*Note that individuals in close proximity may appear overlaying.

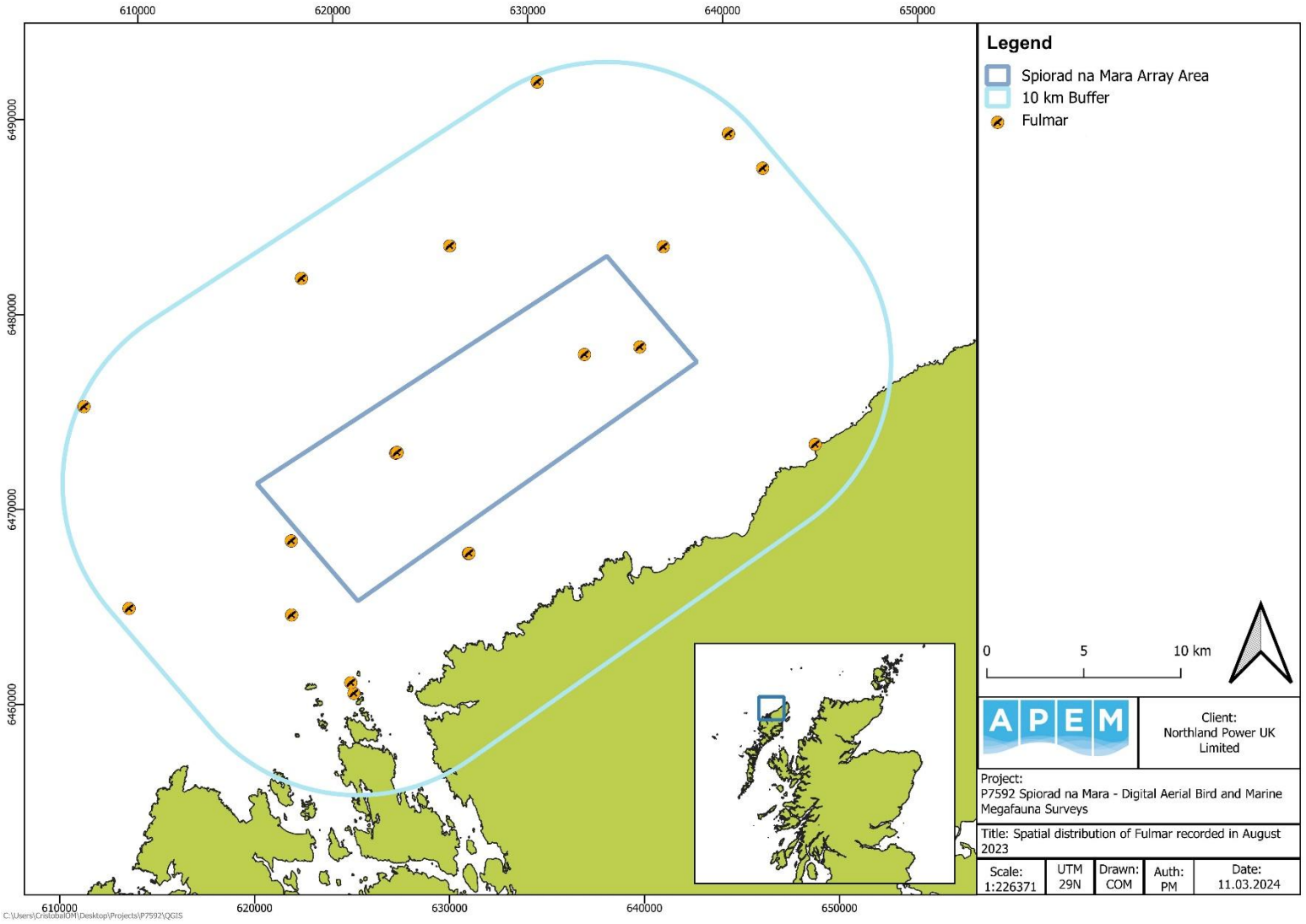


Figure 335 Distribution of fulmar in August 2023
*Note that individuals in close proximity may appear overlaying.

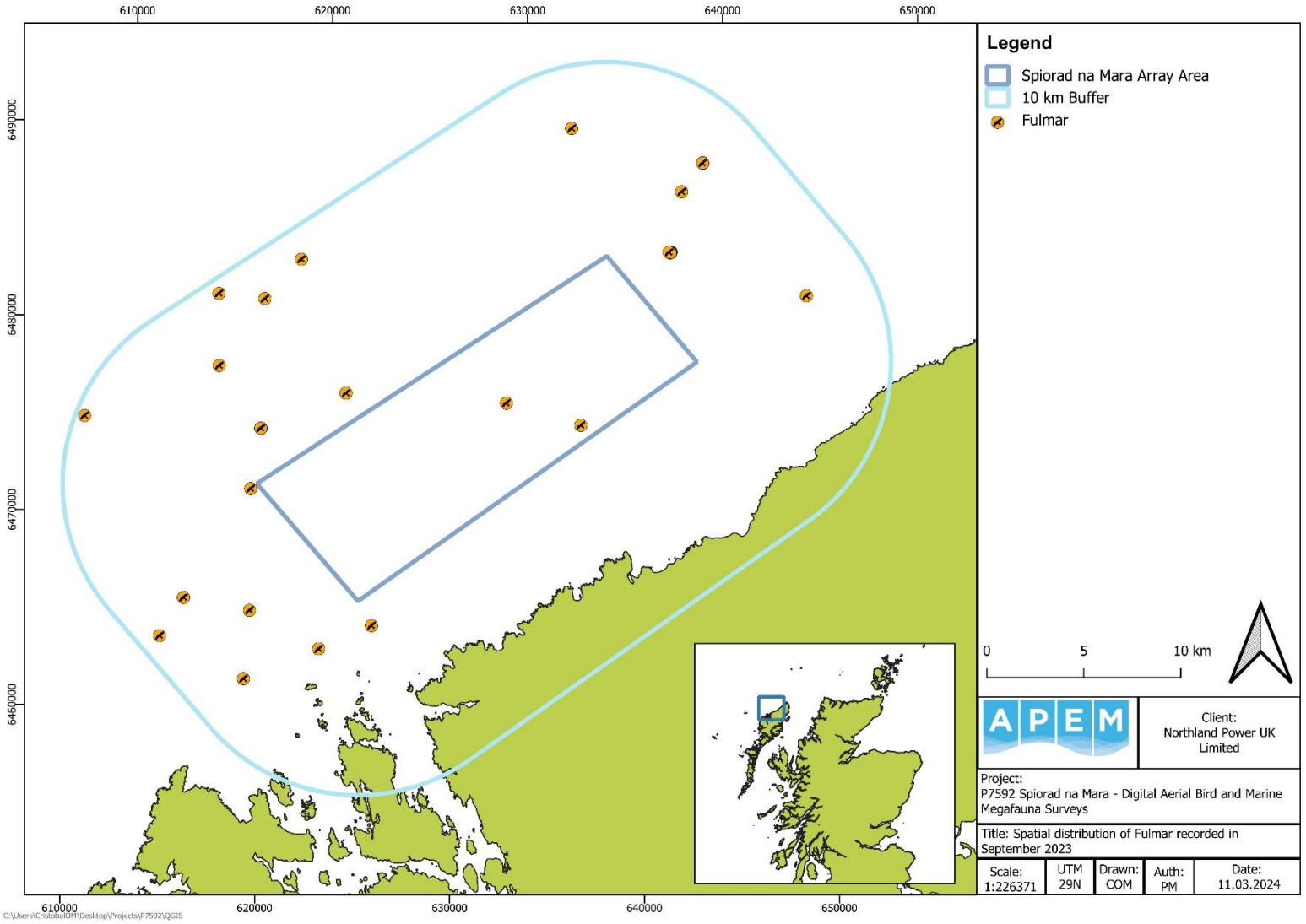


Figure 336 Distribution of fulmar in September 2023

*Note that individuals in close proximity may appear overlaying.

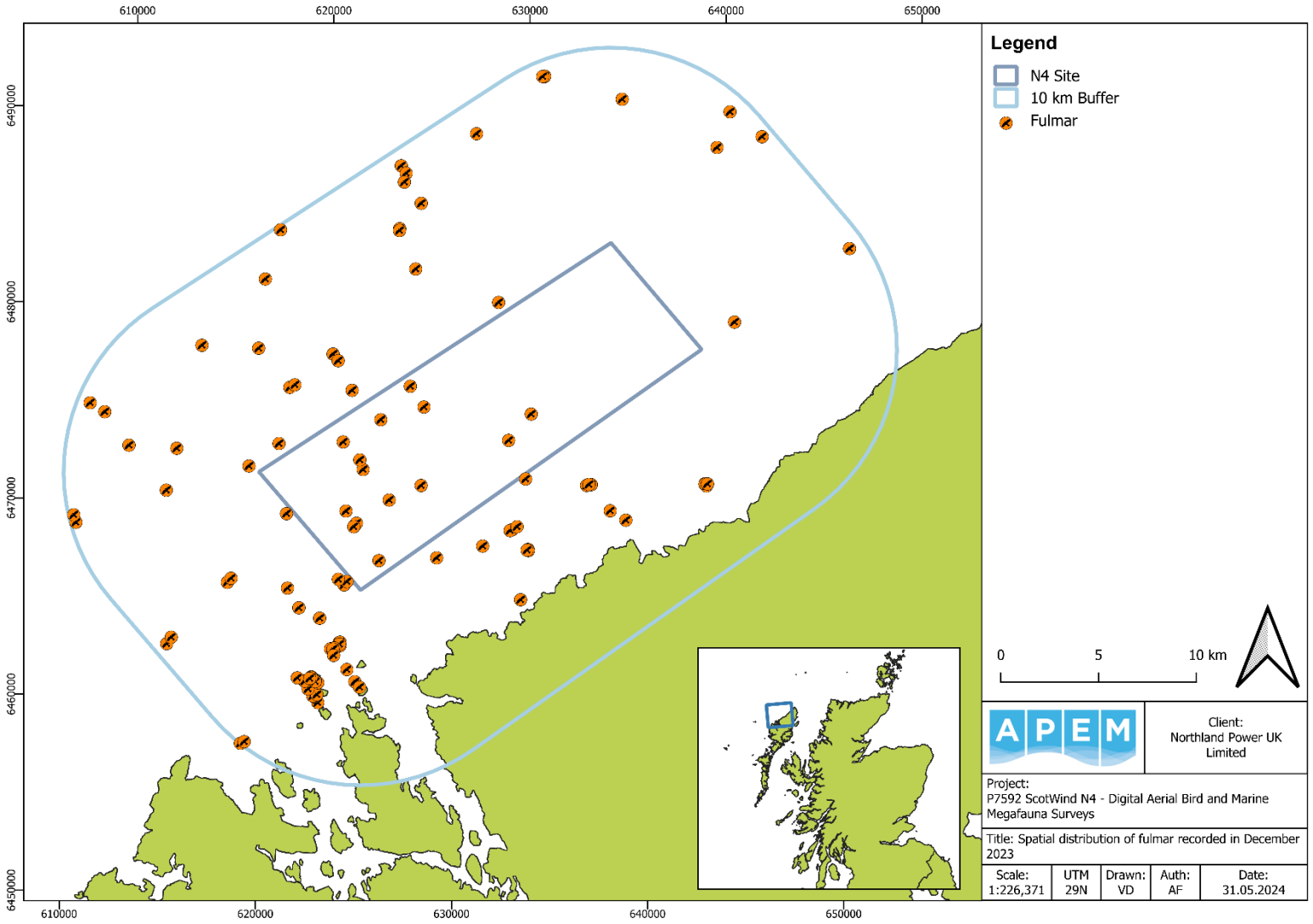


Figure 337 Distribution of fulmar in December 2023
*Note that individuals in close proximity may appear overlaying.

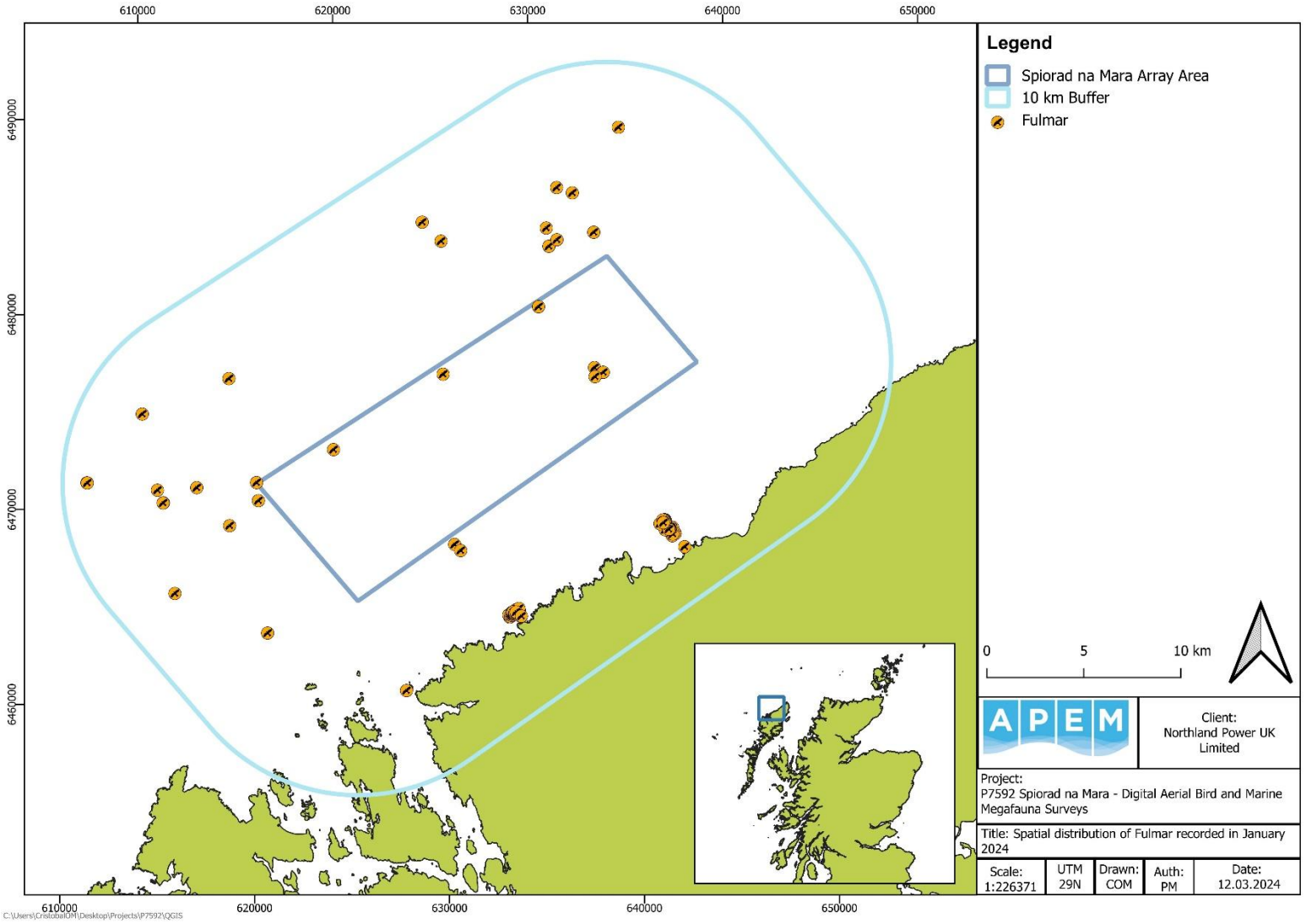


Figure 338 Distribution of fulmar in January 2024
*Note that individuals in close proximity may appear overlaying.

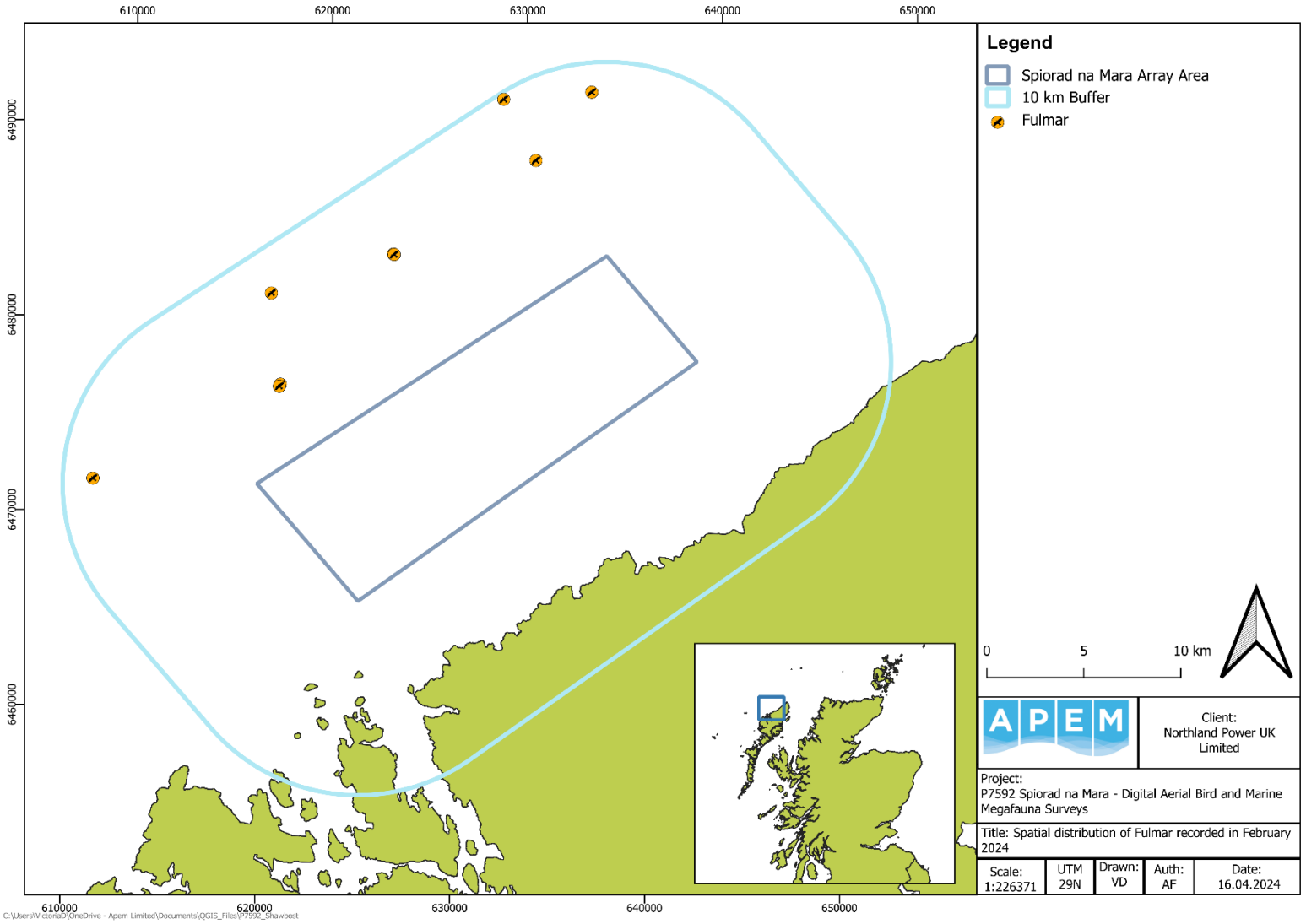


Figure 339 Distribution of fulmar in February 2024
*Note that individuals in close proximity may appear overlaying.

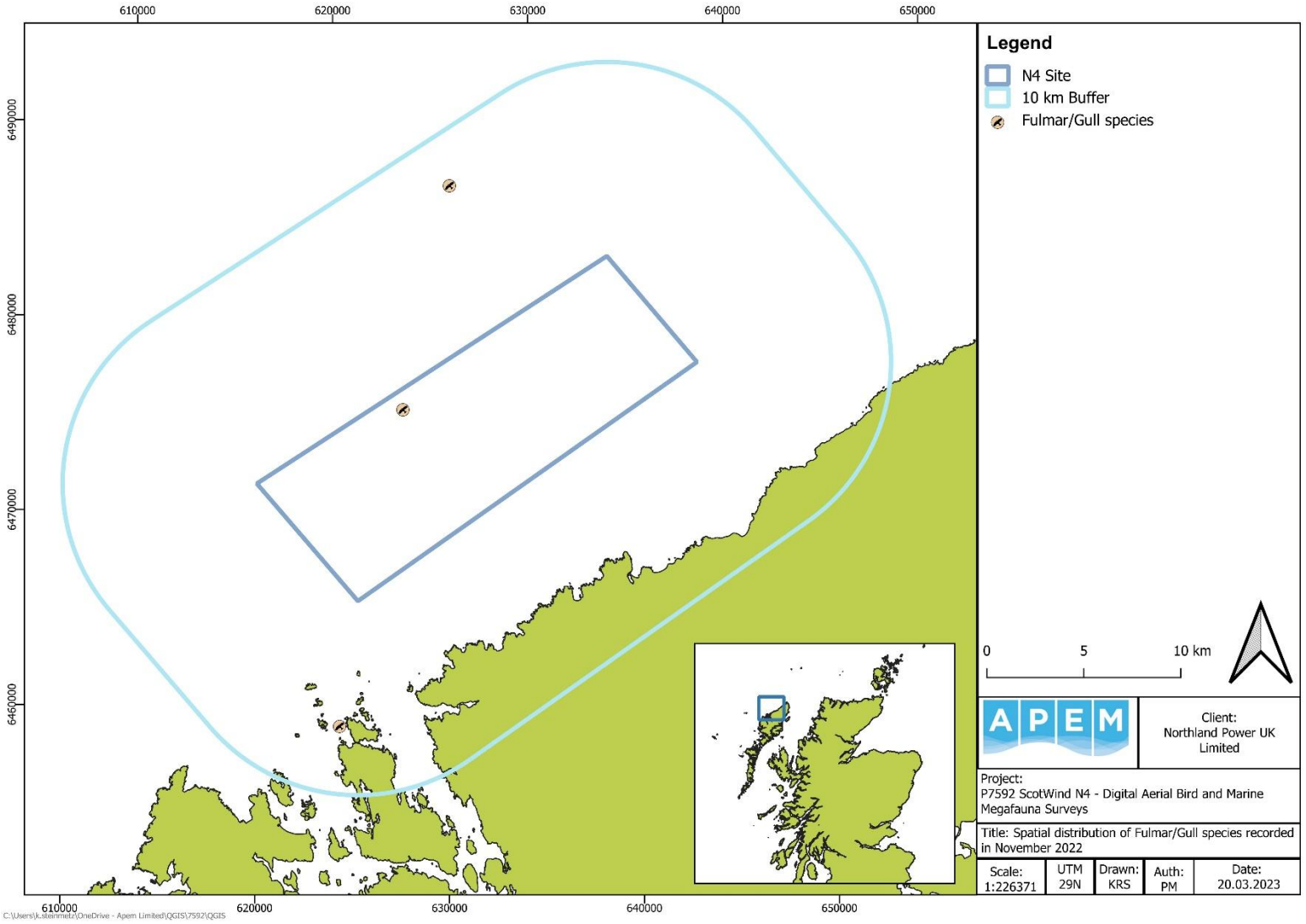


Figure 340 Distribution of fulmar / gull species in November 2022

*Note that individuals in close proximity may appear overlaying.

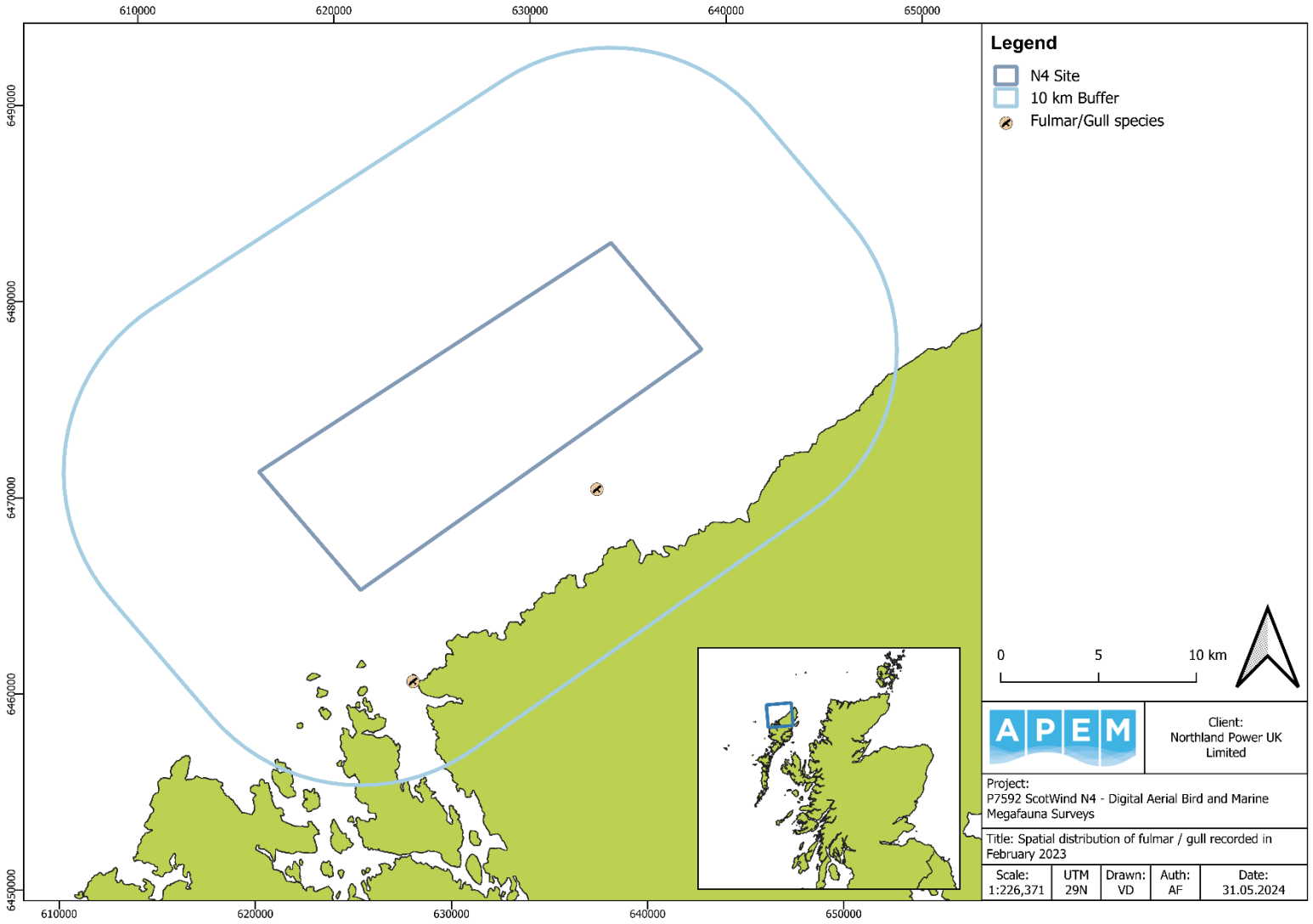


Figure 341 Distribution of fulmar / gull species in February 2023

*Note that individuals in close proximity may appear overlaying.

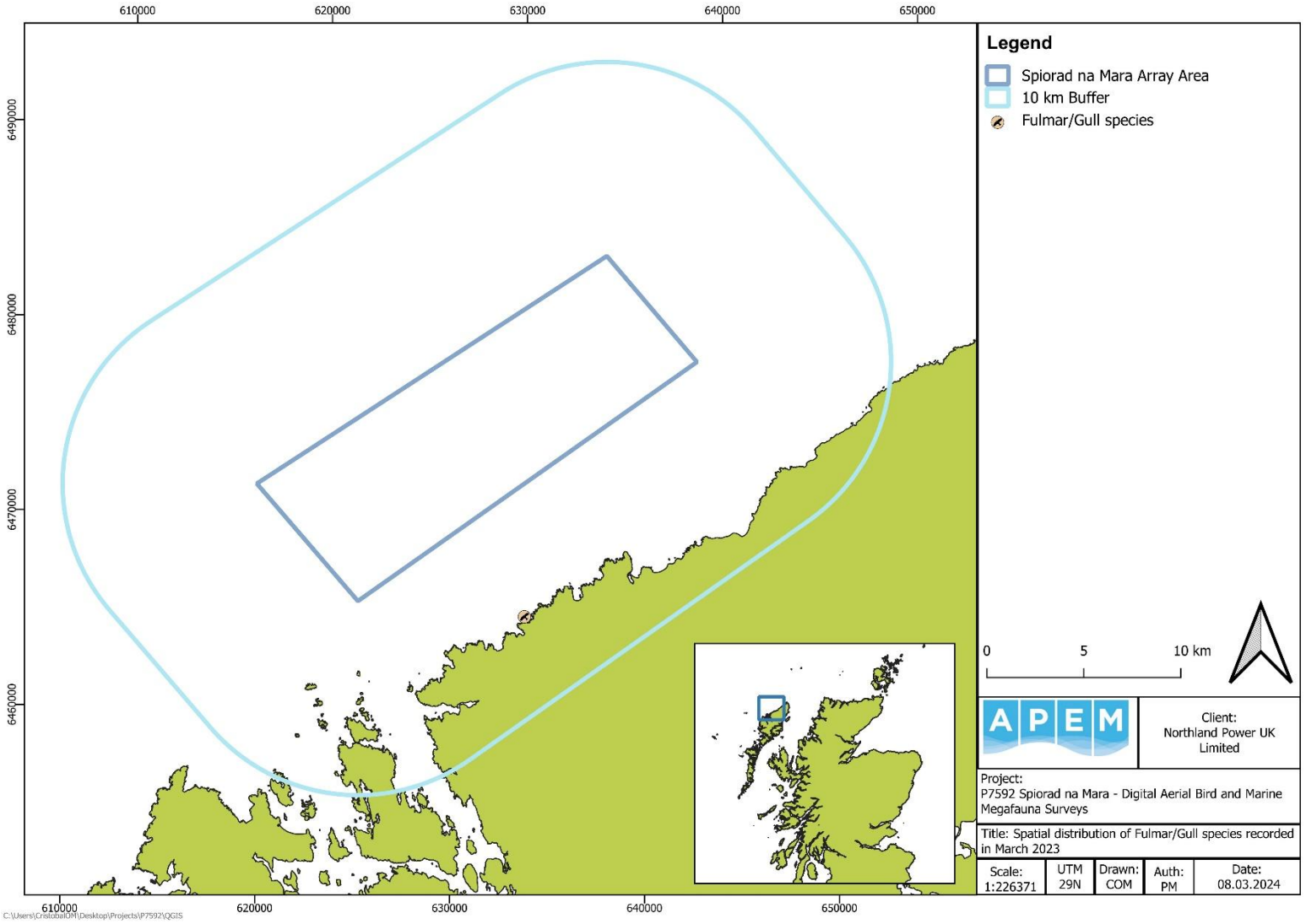


Figure 342 Distribution of fulmar / gull species in March 2023

*Note that individuals in close proximity may appear overlaying.

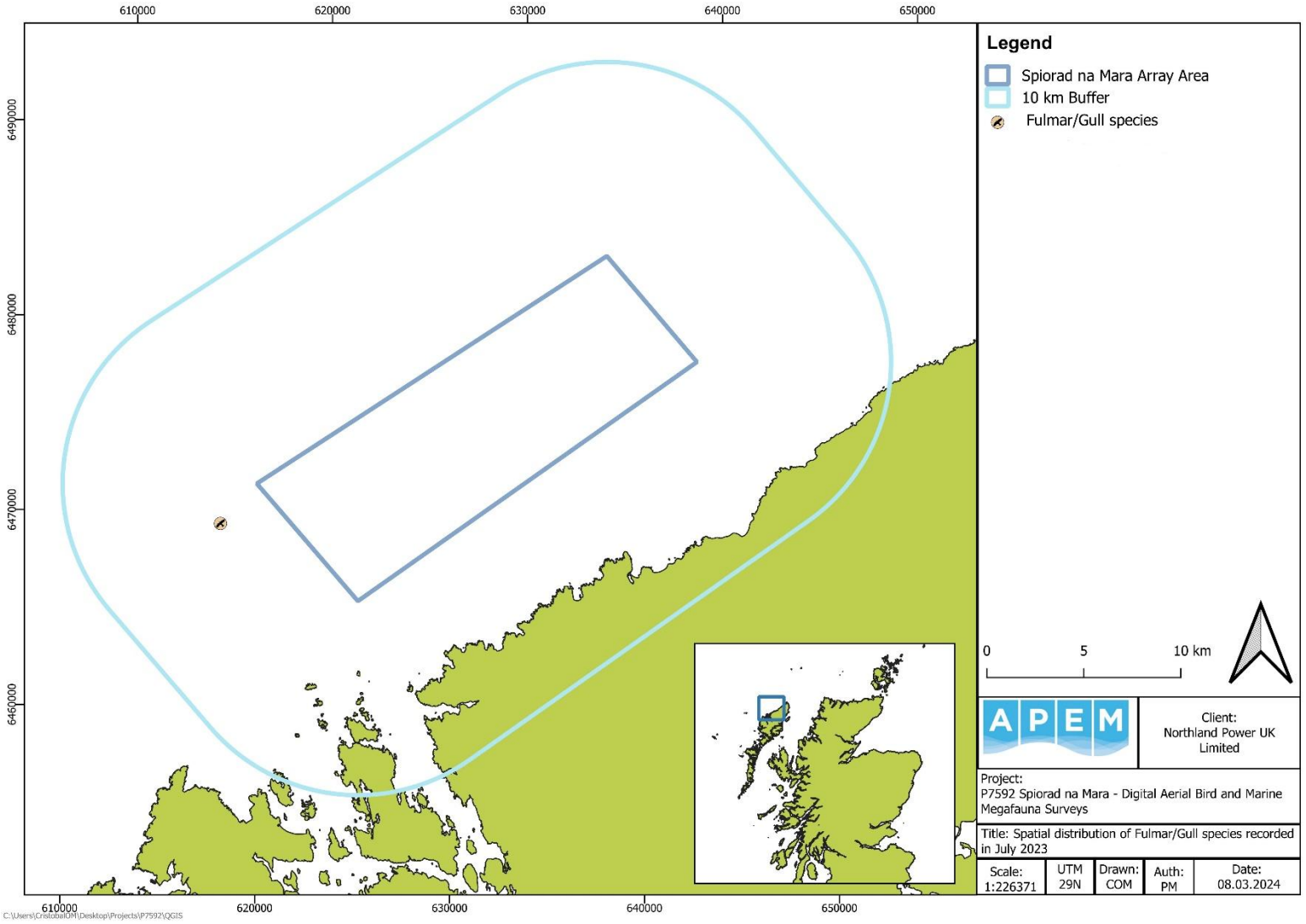


Figure 343 Distribution of fulmar / gull species in July 2023

*Note that individuals in close proximity may appear overlaying.

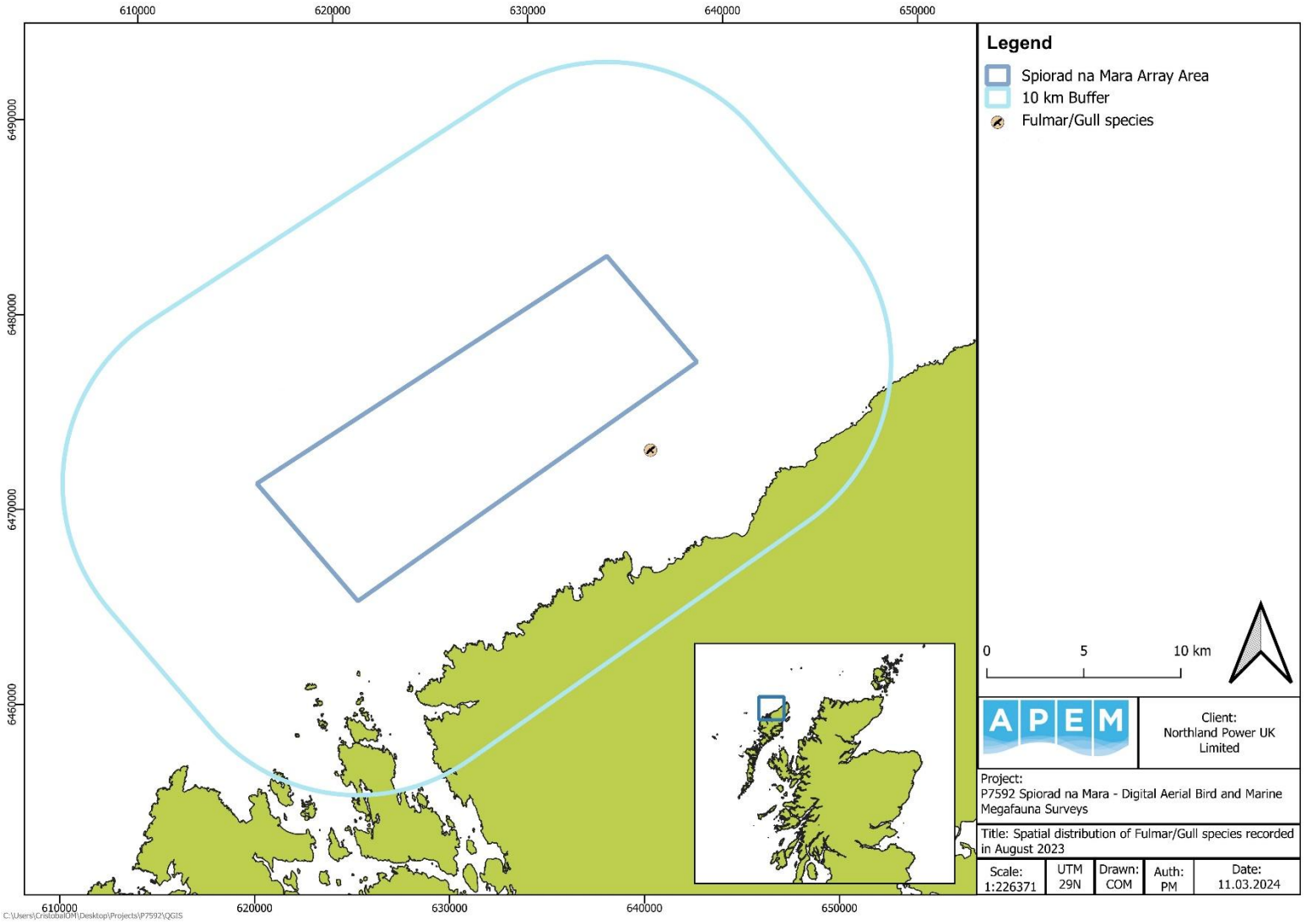


Figure 344 Distribution of fulmar / gull species in August 2023

*Note that individuals in close proximity may appear overlaying.

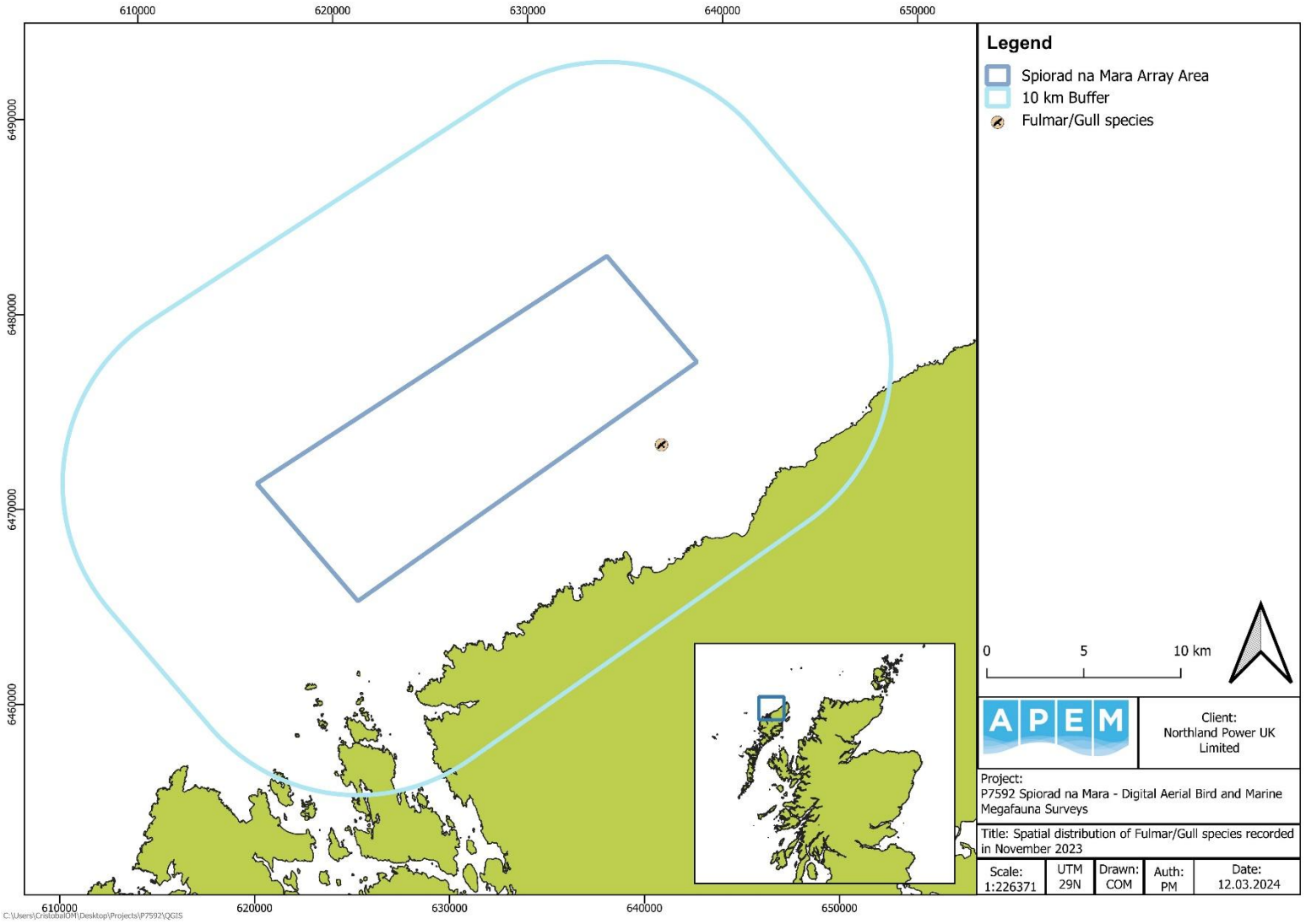


Figure 345 Distribution of fulmar / gull species in November 2023

*Note that individuals in close proximity may appear overlaying.

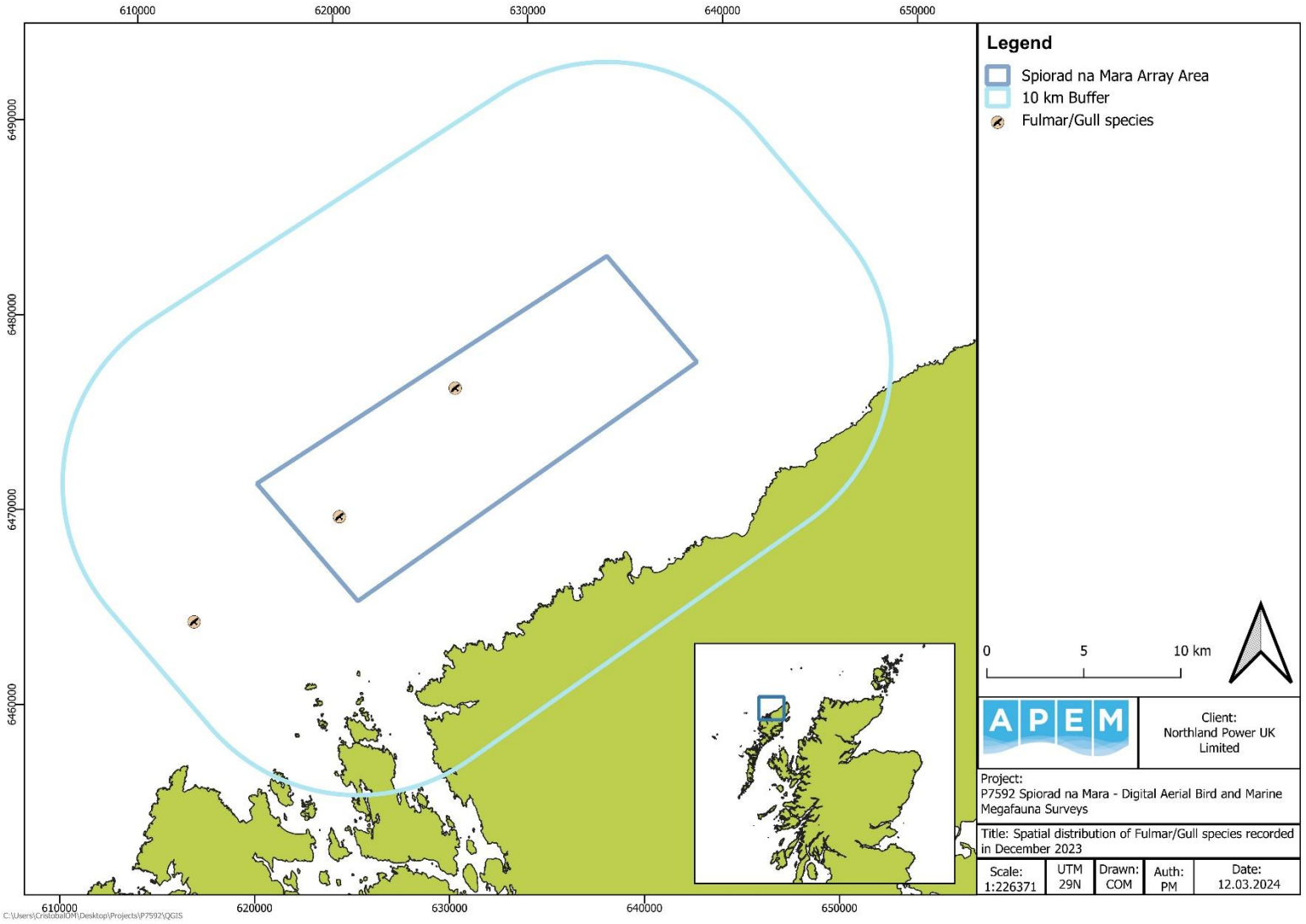


Figure 346 Distribution of fulmar / gull species in December 2023

*Note that individuals in close proximity may appear overlaying.

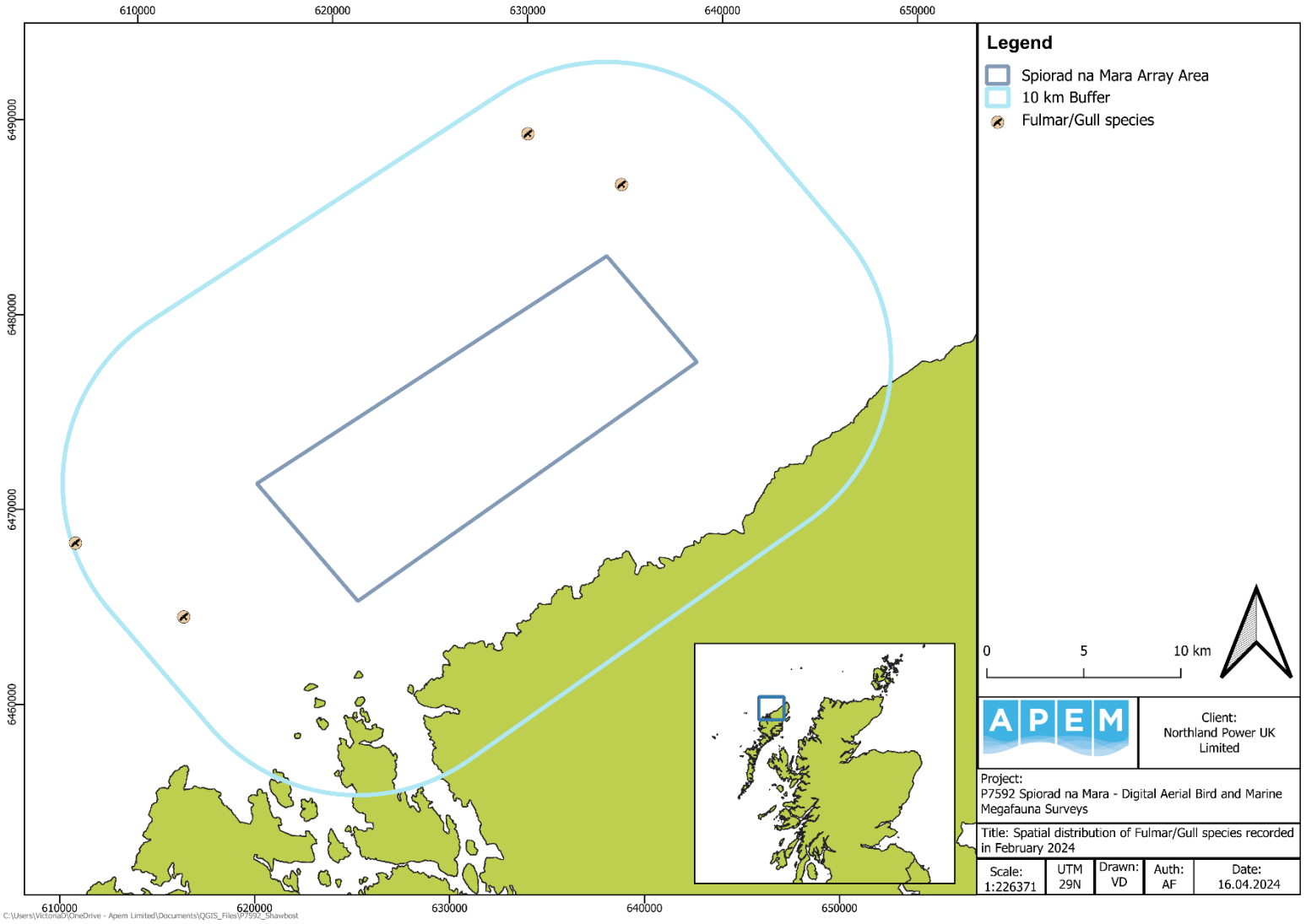


Figure 347 Distribution of fulmar / gull species in February 2024

*Note that individuals in close proximity may appear overlaying.

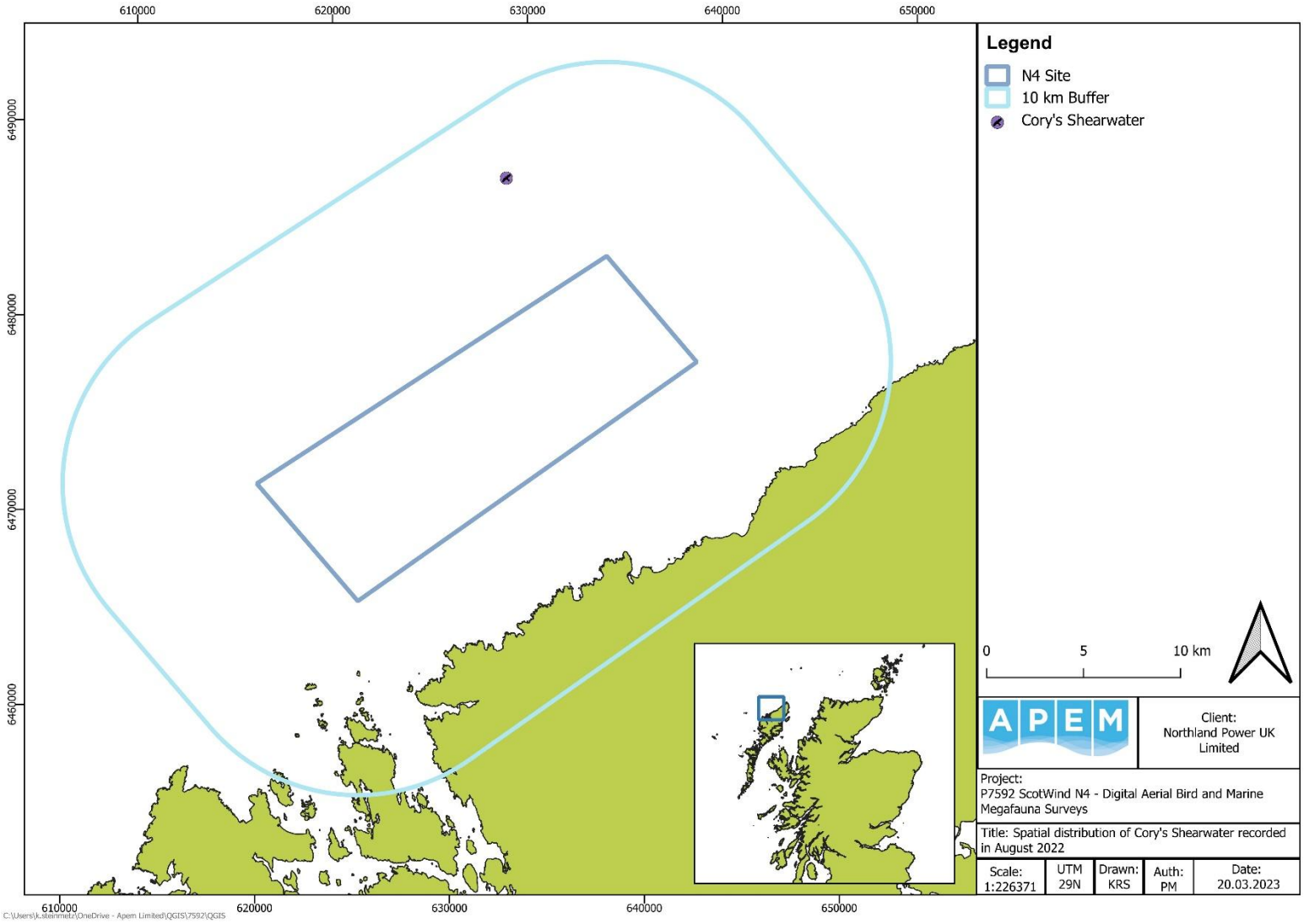


Figure 348 Distribution of Cory's shearwater in August 2022
*Note that individuals in close proximity may appear overlaying.

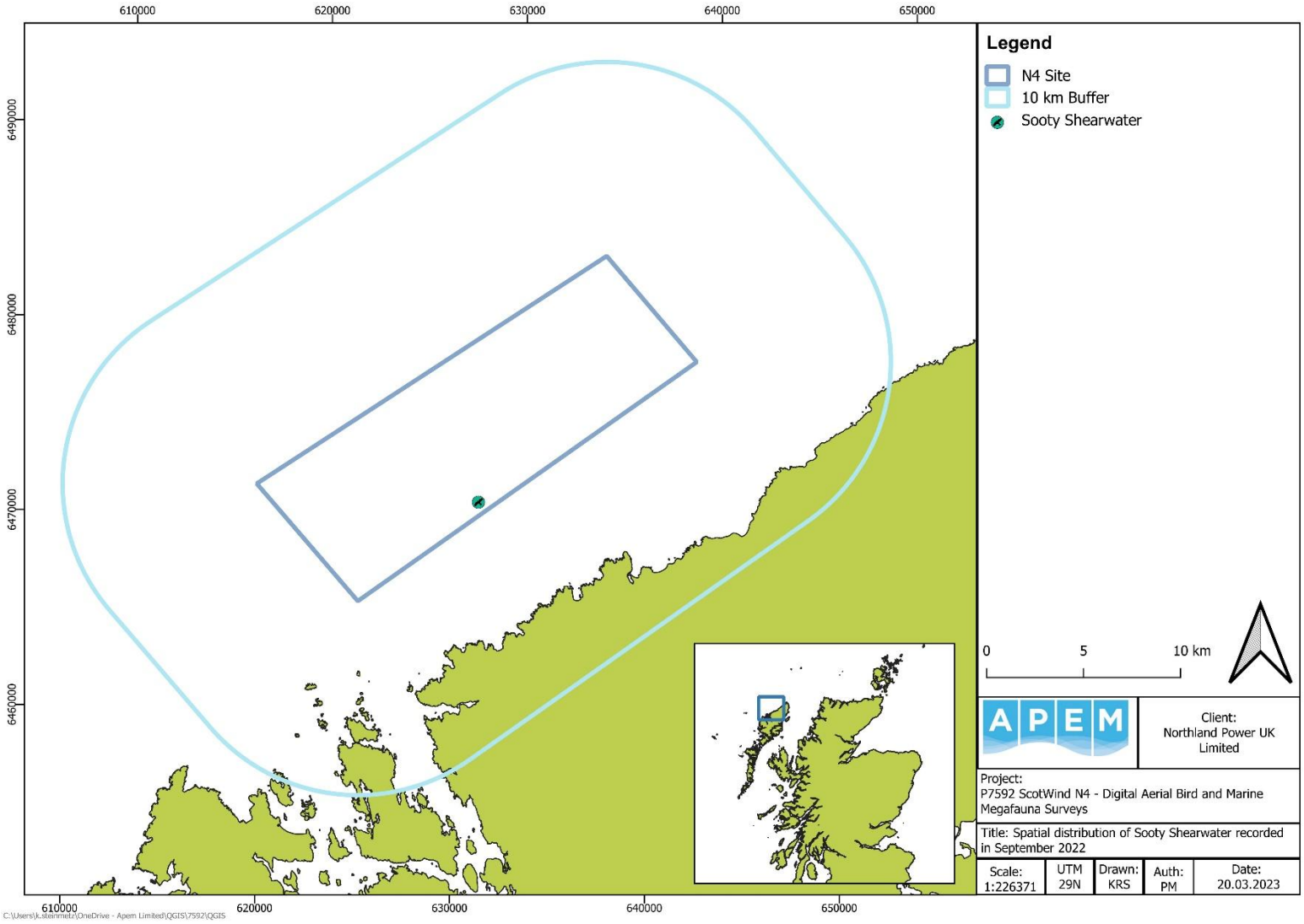


Figure 349 Distribution of sooty shearwater in September 2022
*Note that individuals in close proximity may appear overlaying.

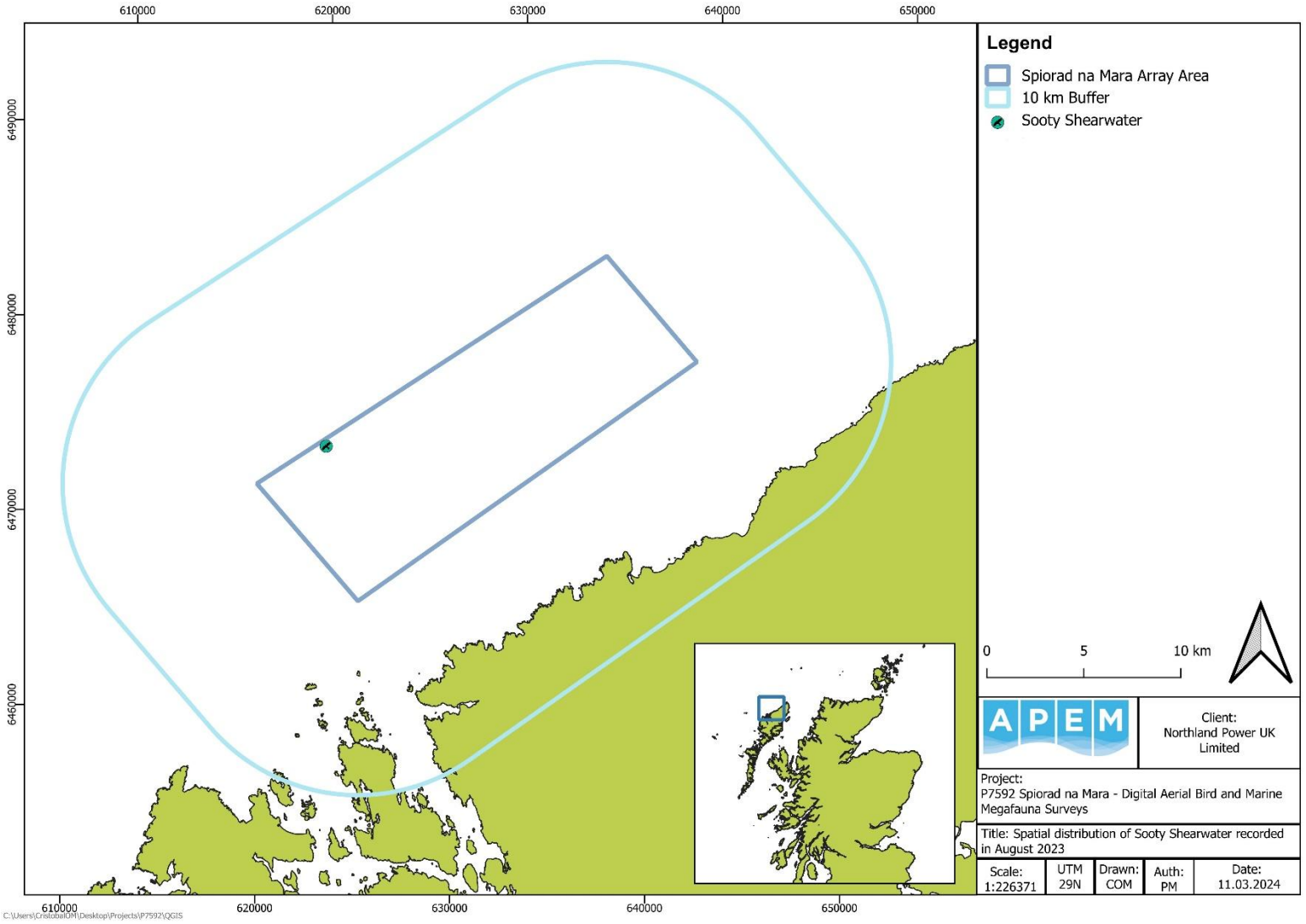


Figure 350 Distribution of sooty shearwater in August 2023

*Note that individuals in close proximity may appear overlaying.

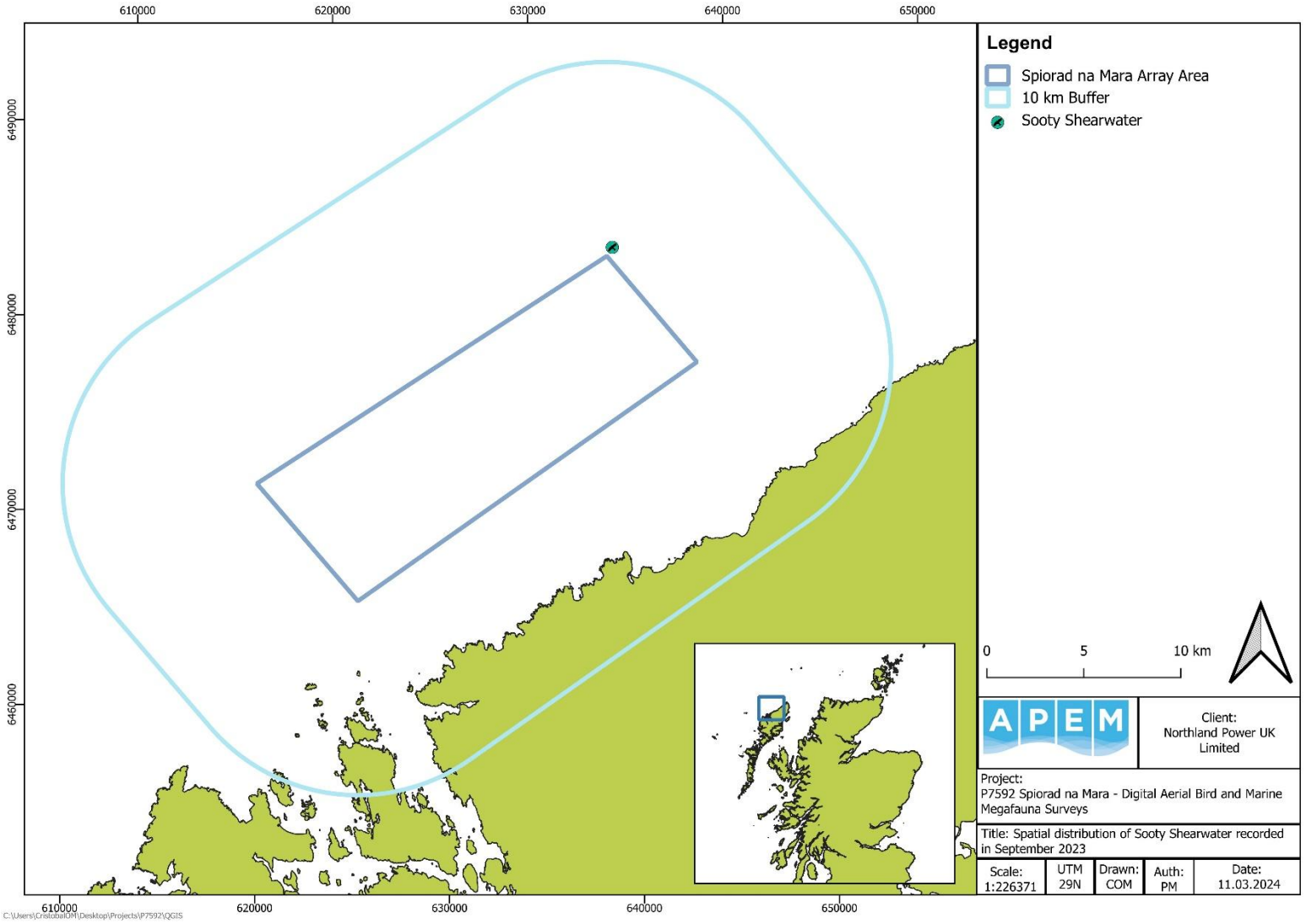


Figure 351 Distribution of sooty shearwater in September 2023

*Note that individuals in close proximity may appear overlaying.

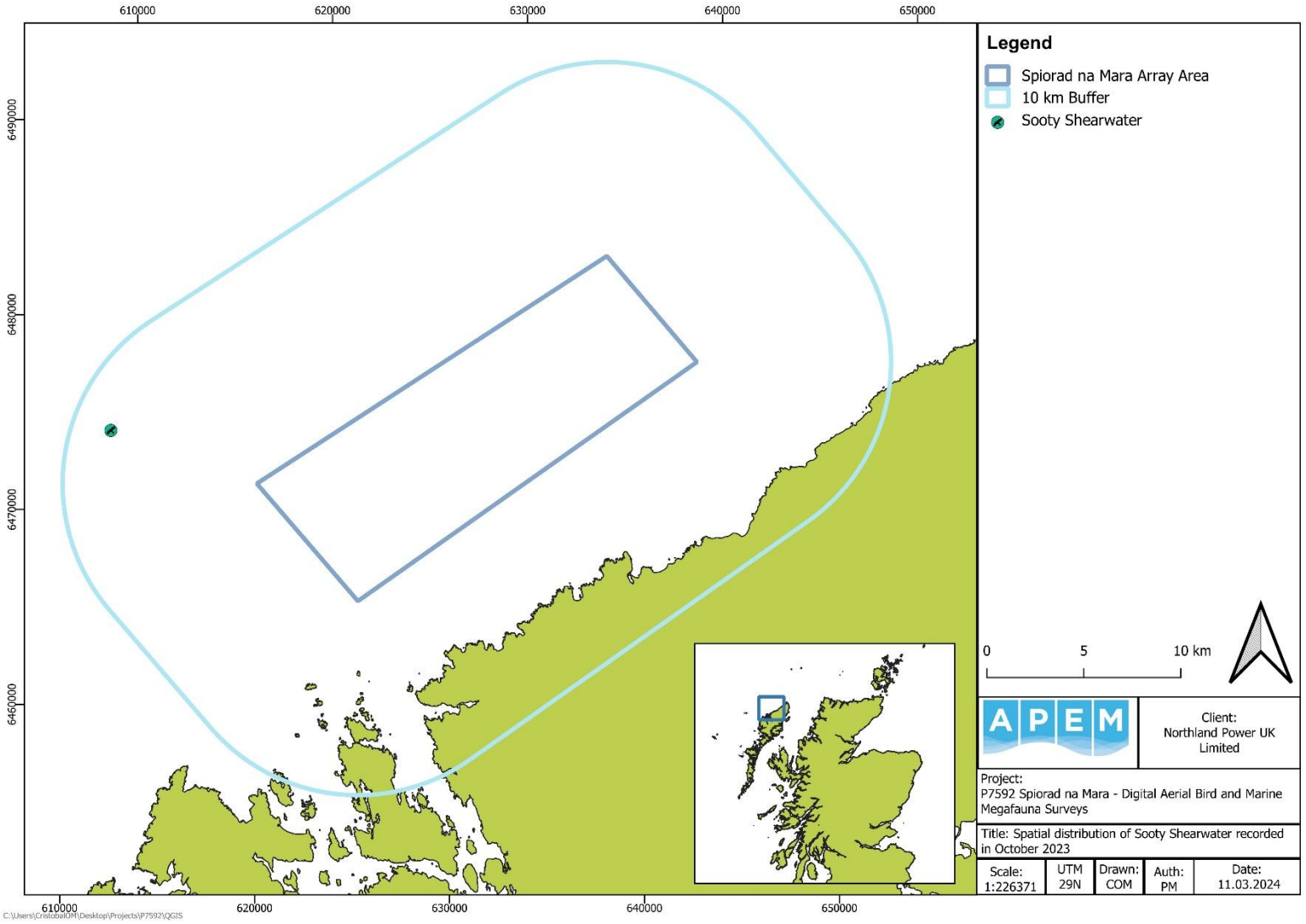


Figure 352 Distribution of sooty shearwater in October 2023

*Note that individuals in close proximity may appear overlaying.

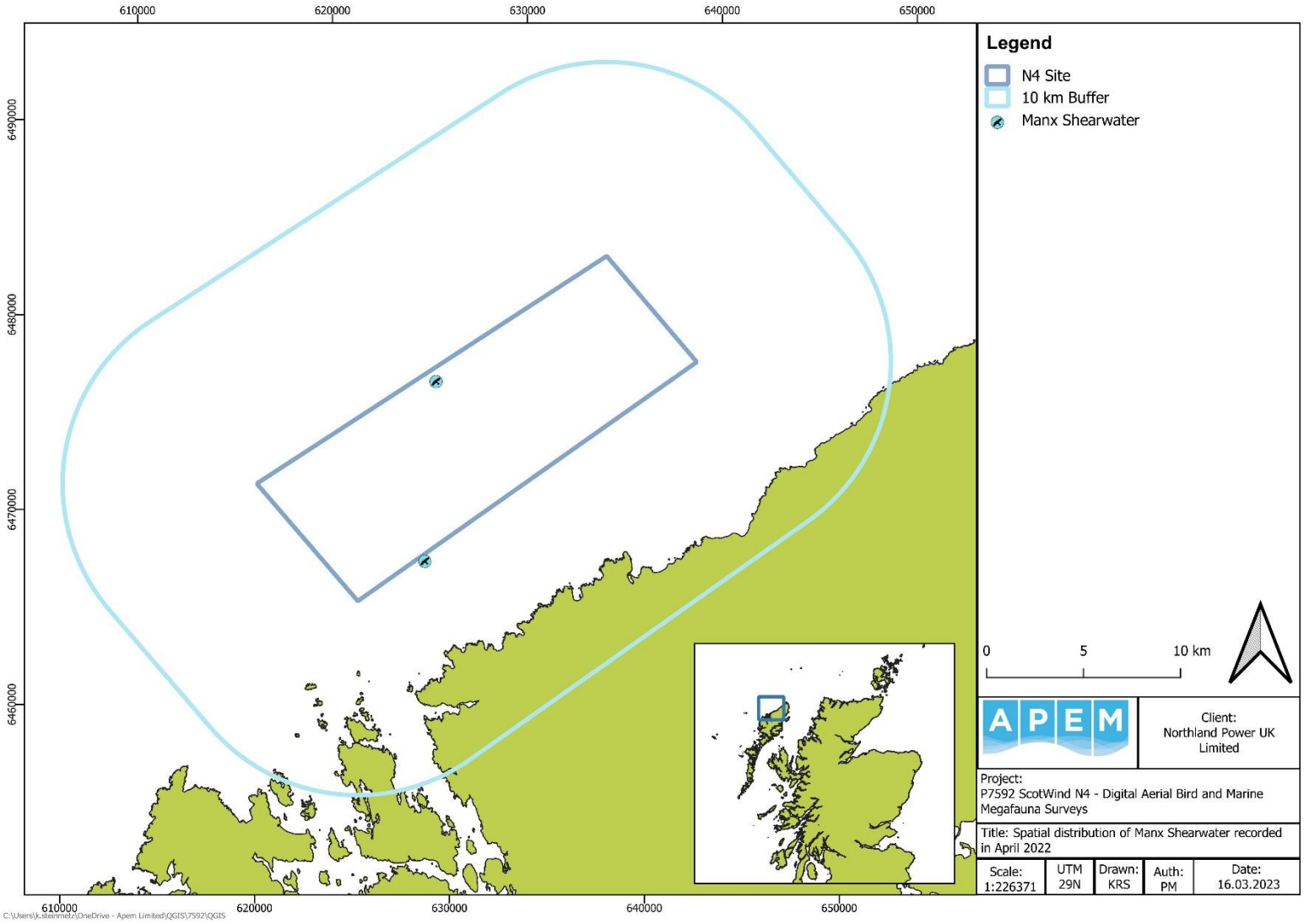


Figure 353 Distribution of Manx shearwater in April 2022
*Note that individuals in close proximity may appear overlaying.

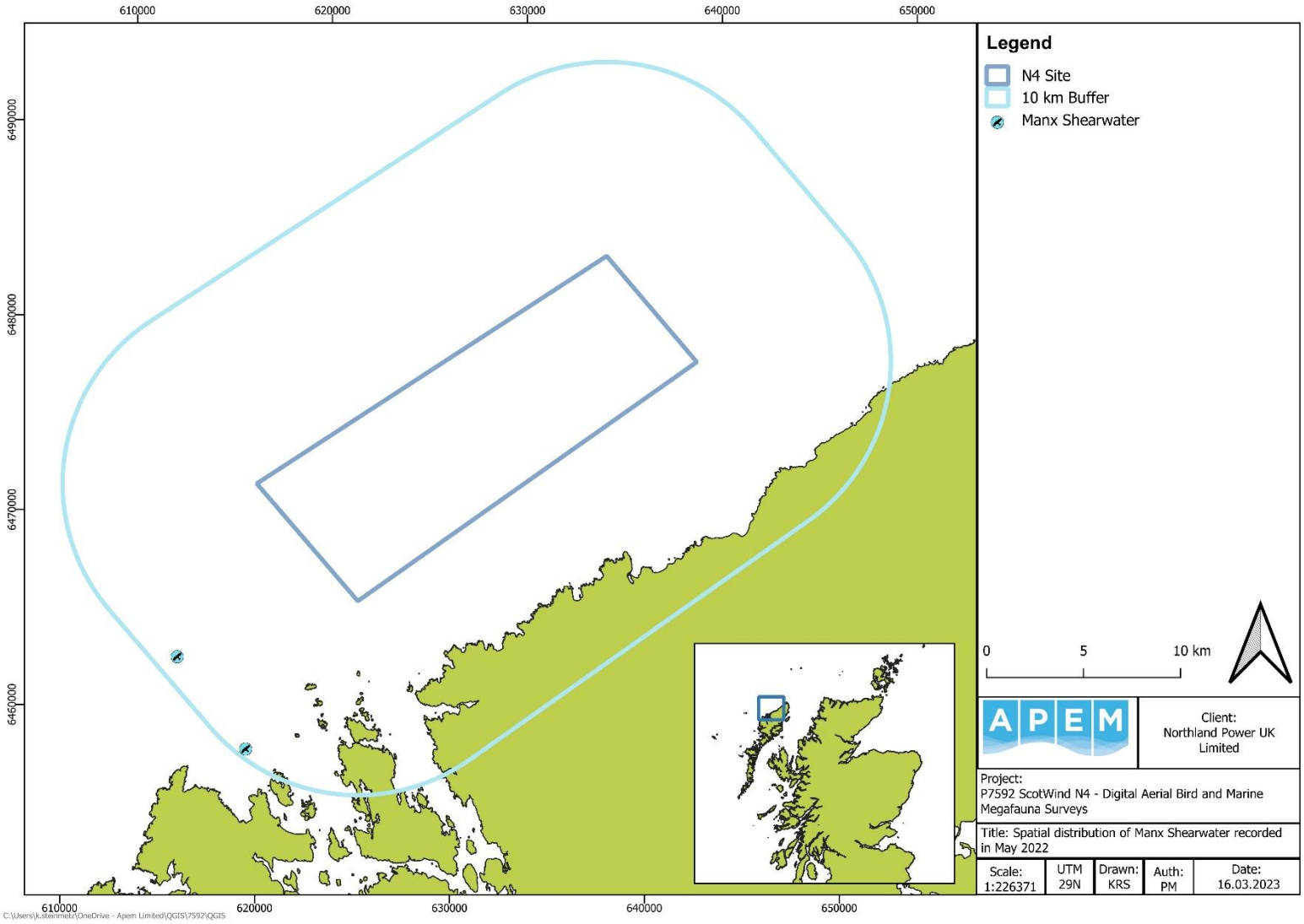


Figure 354 Distribution of Manx shearwater in May 2022
*Note that individuals in close proximity may appear overlaying.

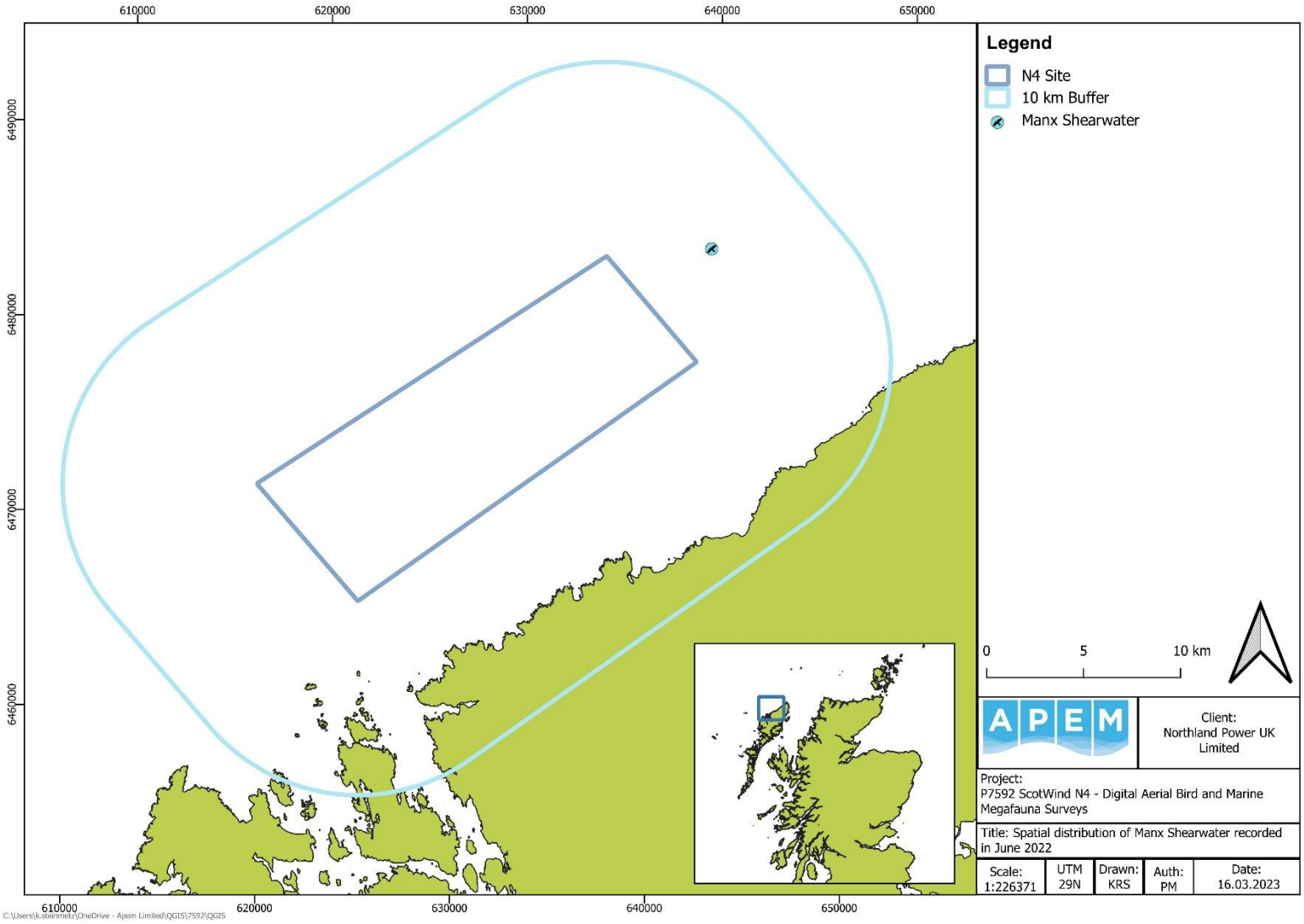


Figure 355 Distribution of Manx shearwater in June 2022
*Note that individuals in close proximity may appear overlaying.

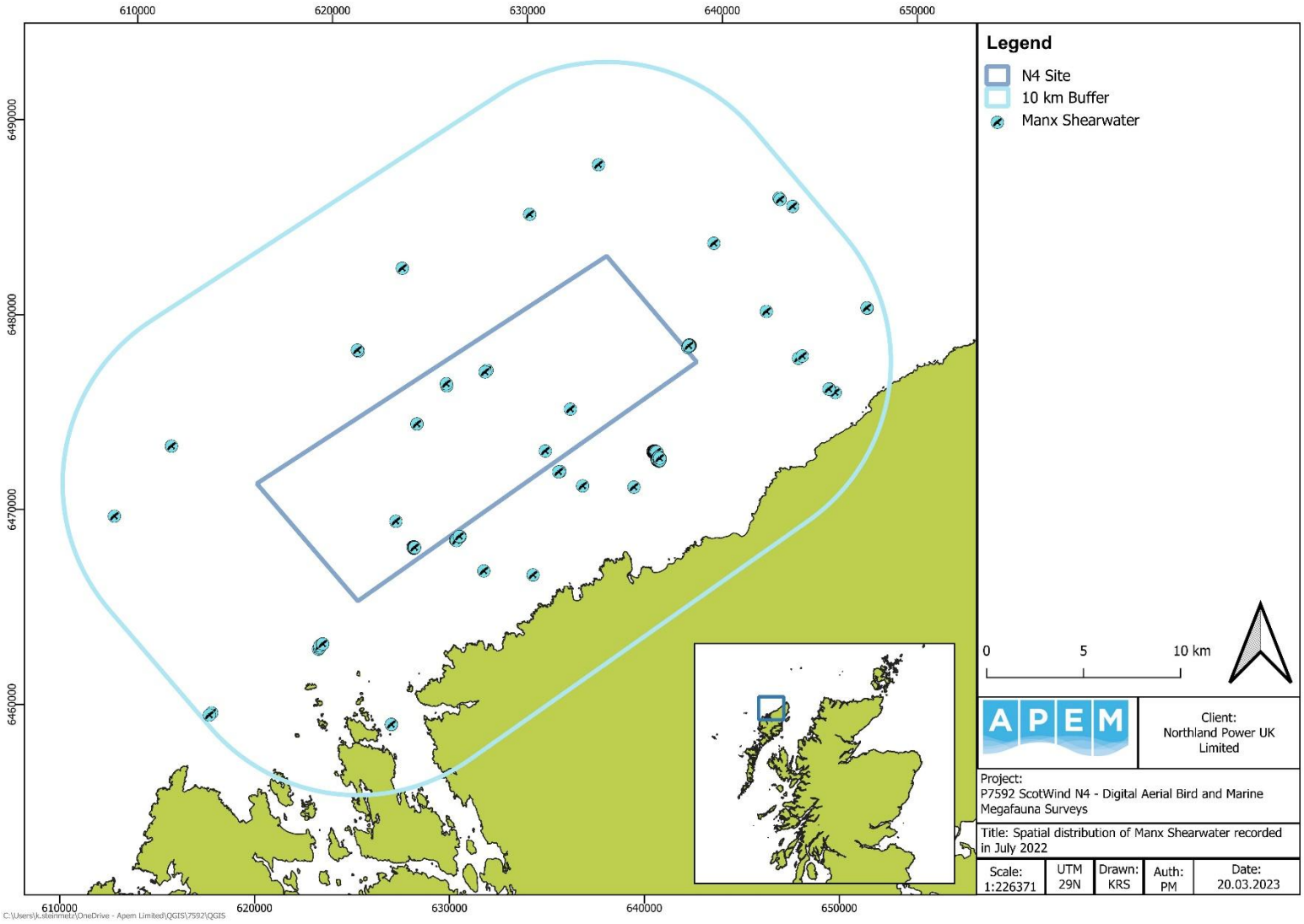


Figure 356 Distribution of Manx shearwater in July 2022
*Note that individuals in close proximity may appear overlaying.

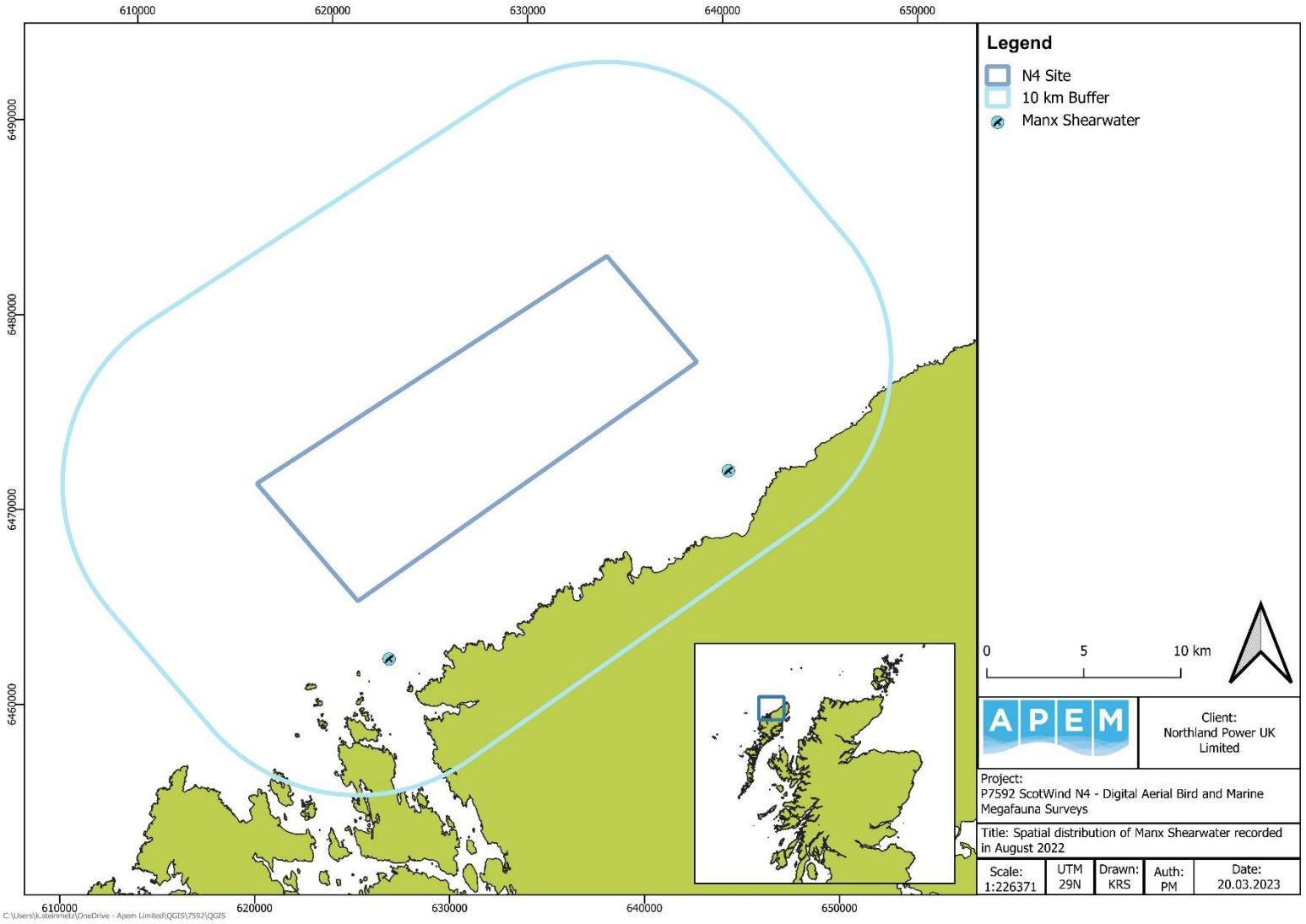


Figure 357 Distribution of Manx shearwater in August 2022
*Note that individuals in close proximity may appear overlaying.

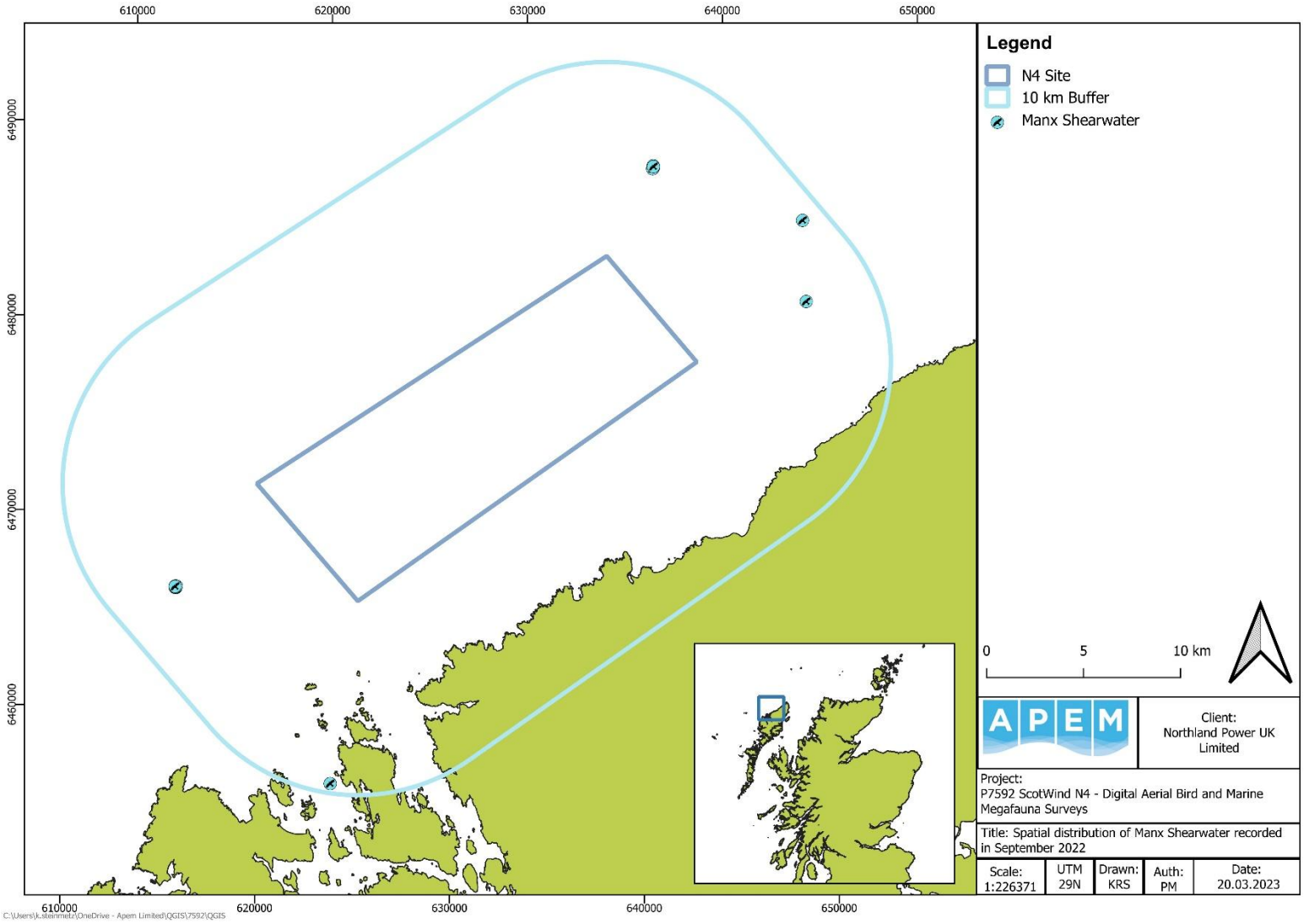


Figure 358 Distribution of Manx shearwater in September 2022
*Note that individuals in close proximity may appear overlaying.

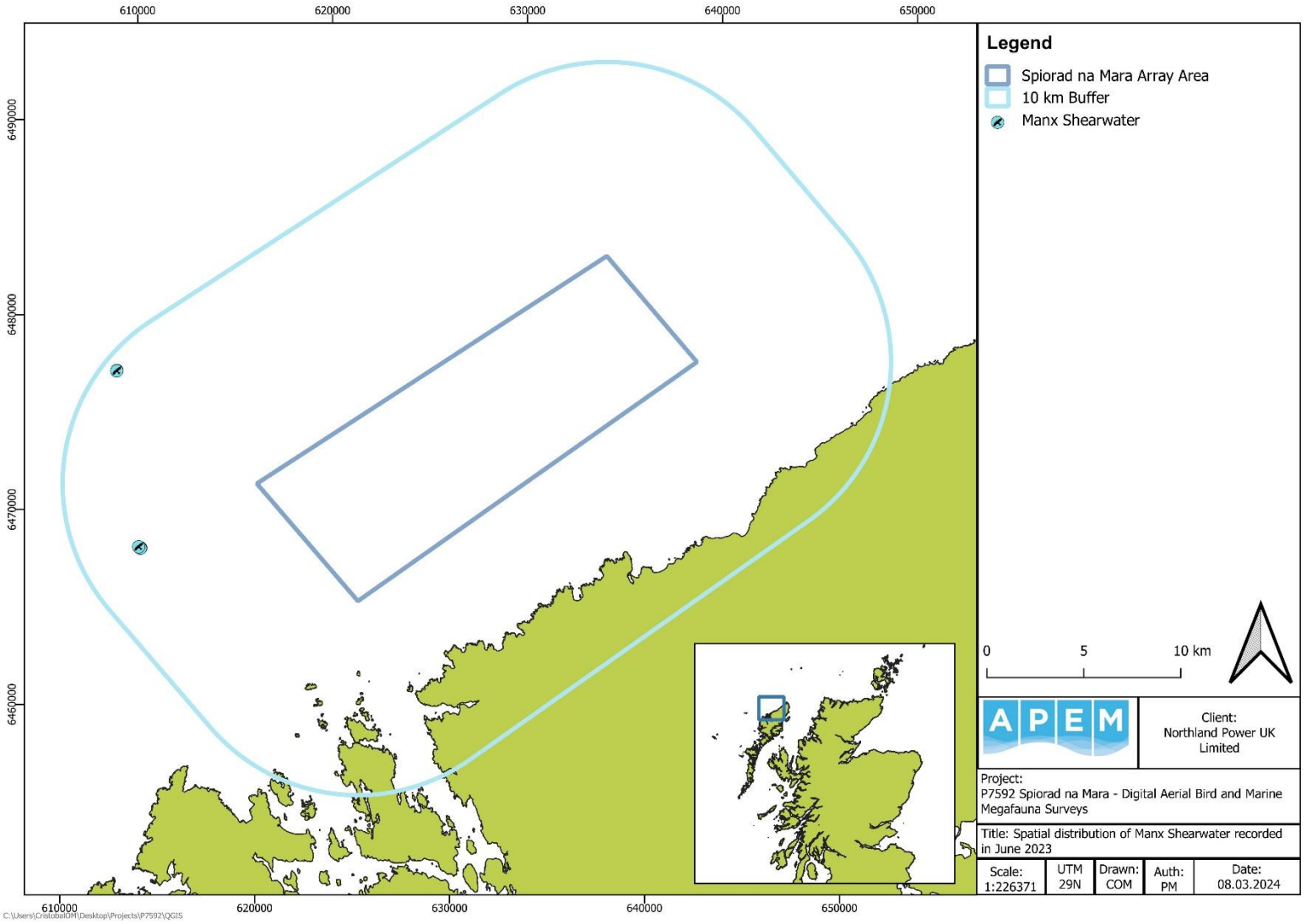


Figure 359 Distribution of Manx shearwater in June 2023

*Note that individuals in close proximity may appear overlaying.

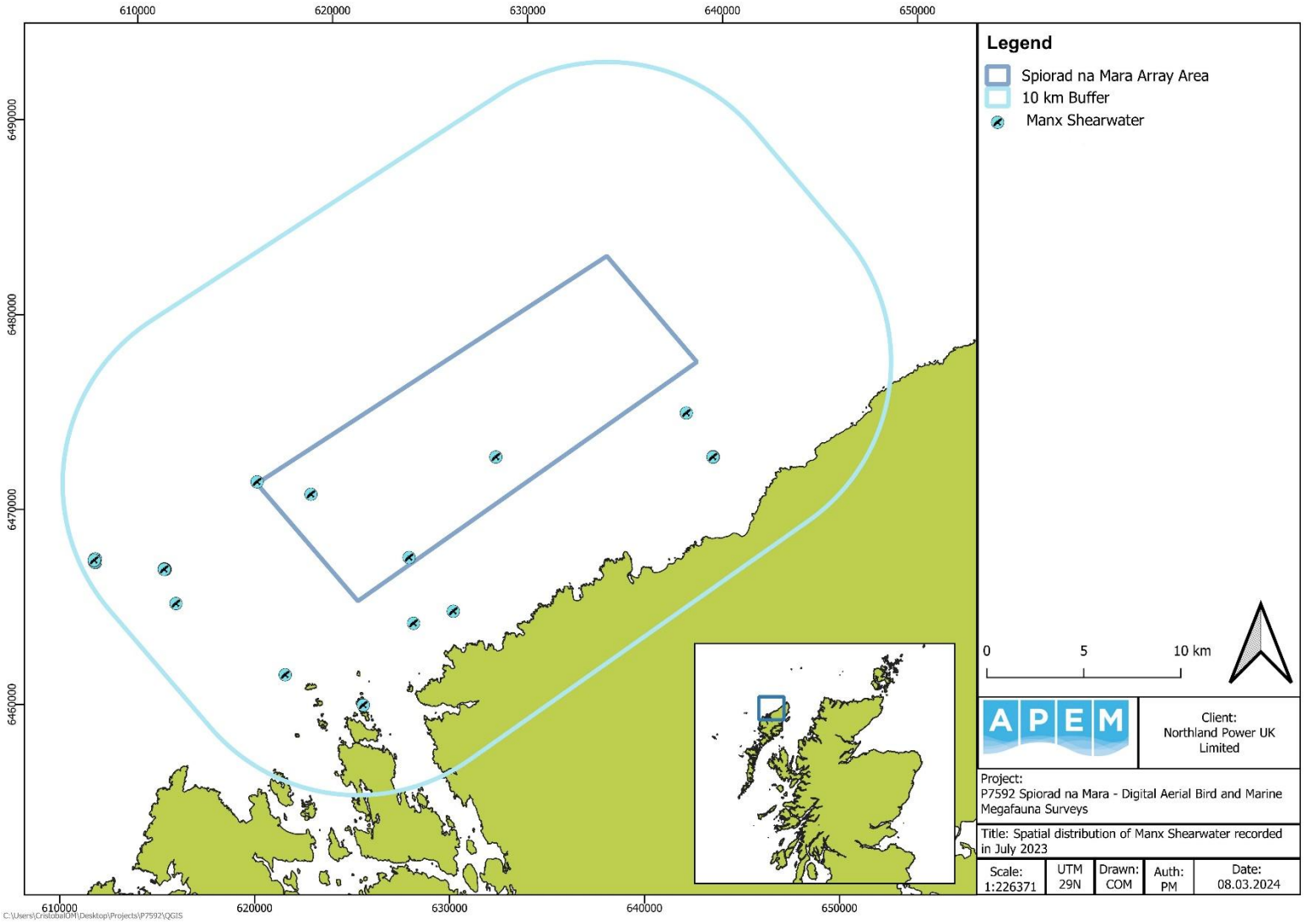


Figure 360 Distribution of Manx shearwater in July 2023

*Note that individuals in close proximity may appear overlaying.

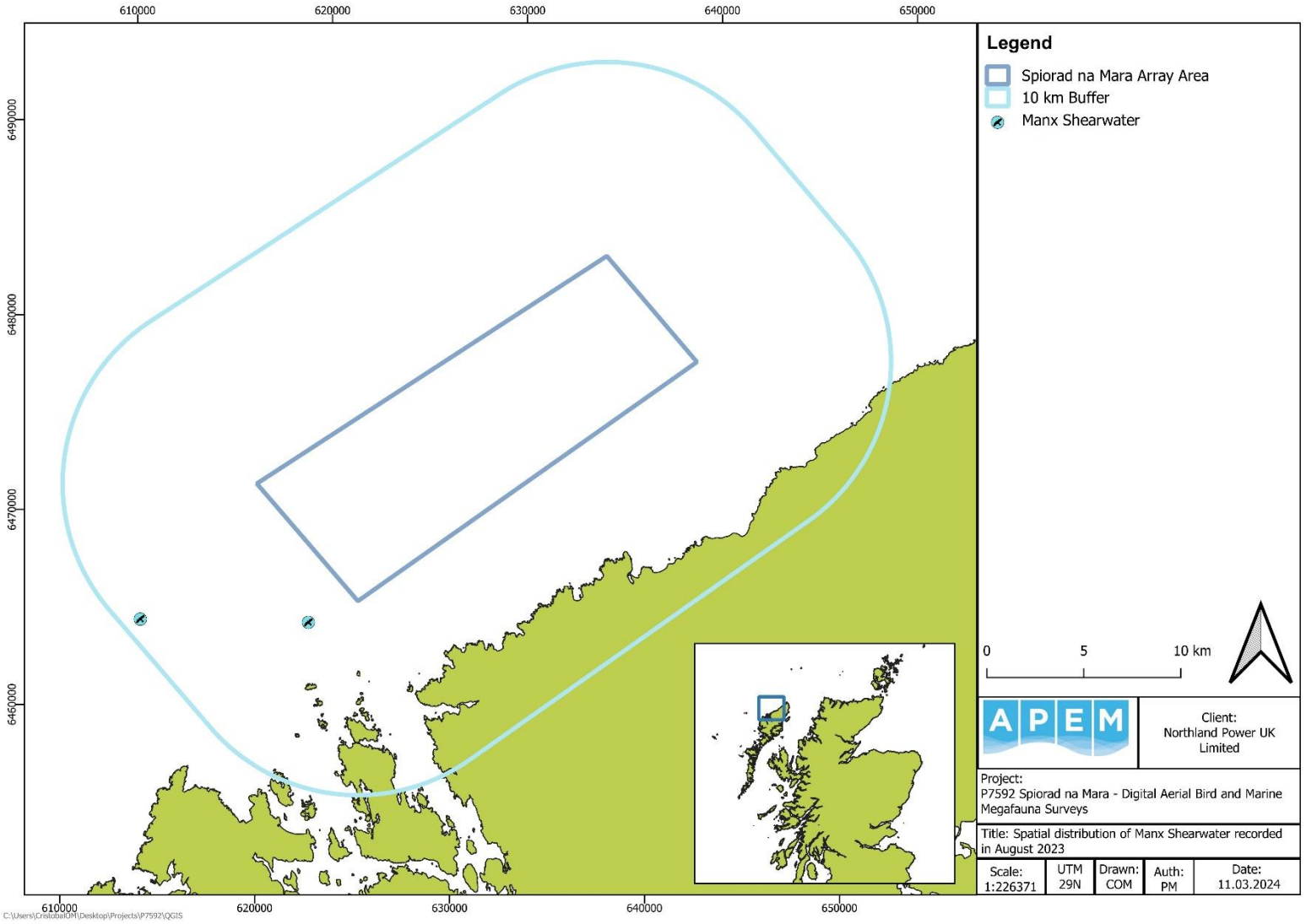


Figure 361 Distribution of Manx shearwater in August 2023

*Note that individuals in close proximity may appear overlaying.

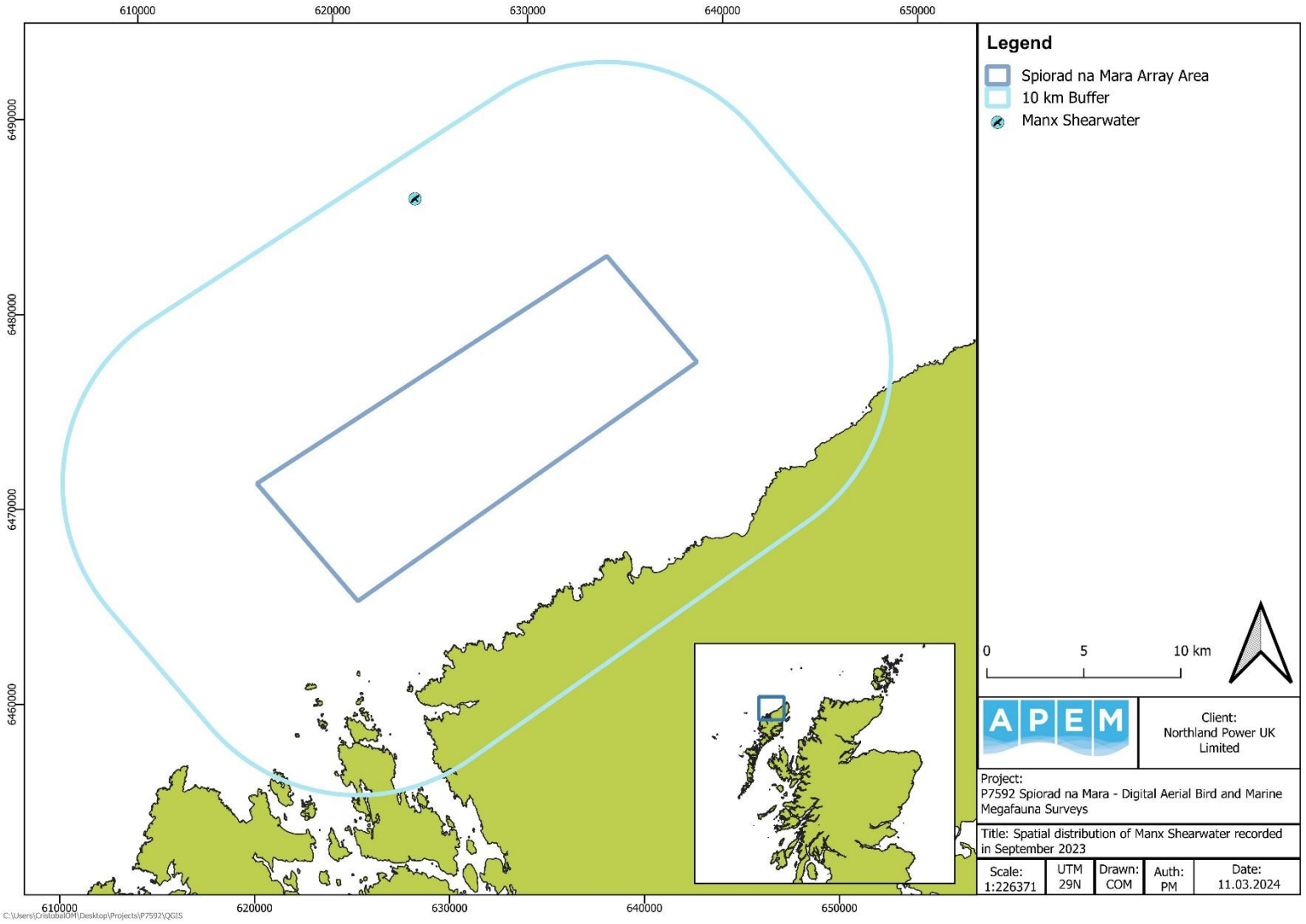


Figure 362 Distribution of Manx shearwater in September 2023

*Note that individuals in close proximity may appear overlaying.

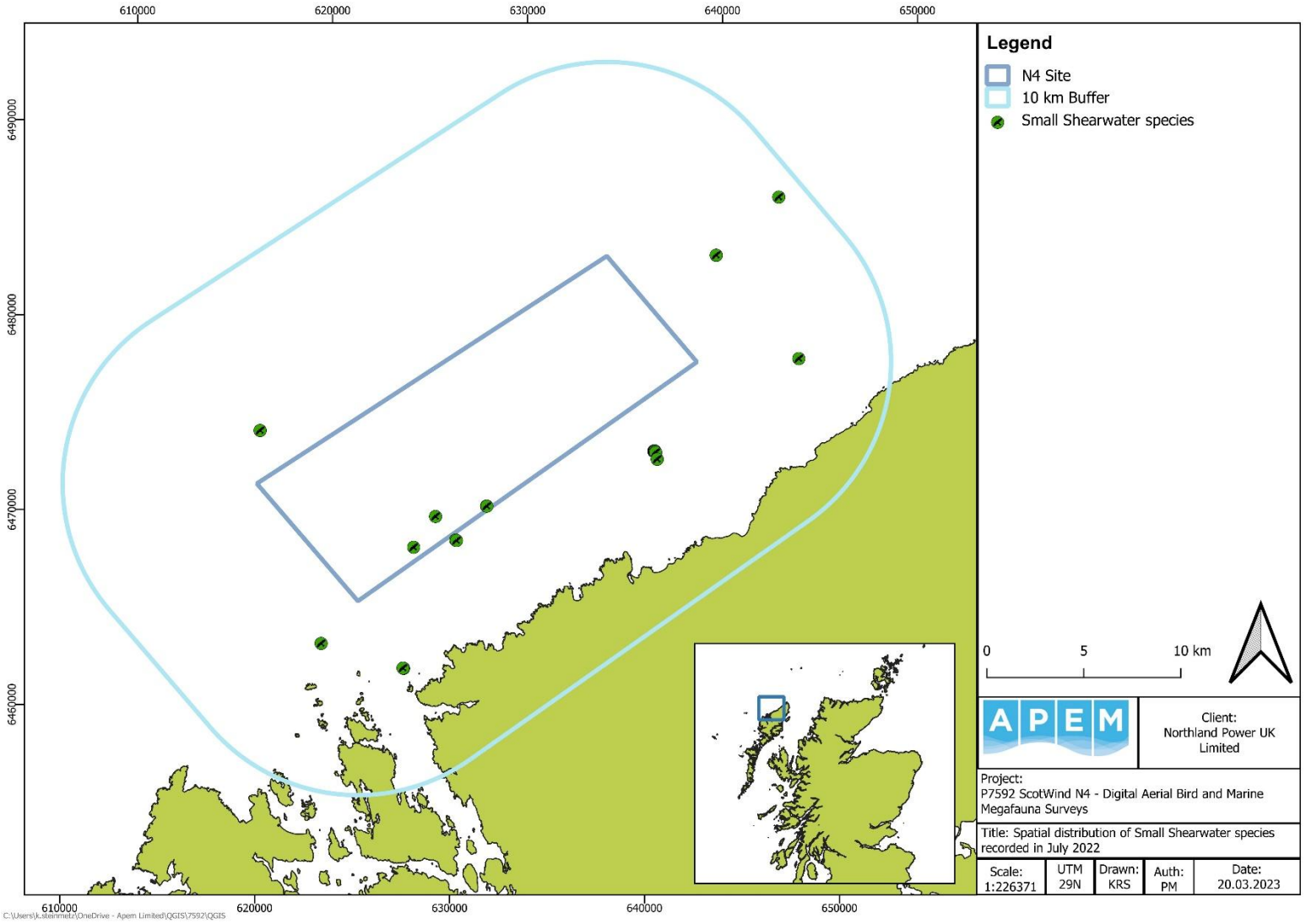


Figure 363 Distribution of small shearwater species in July 2022

*Note that individuals in close proximity may appear overlaying.

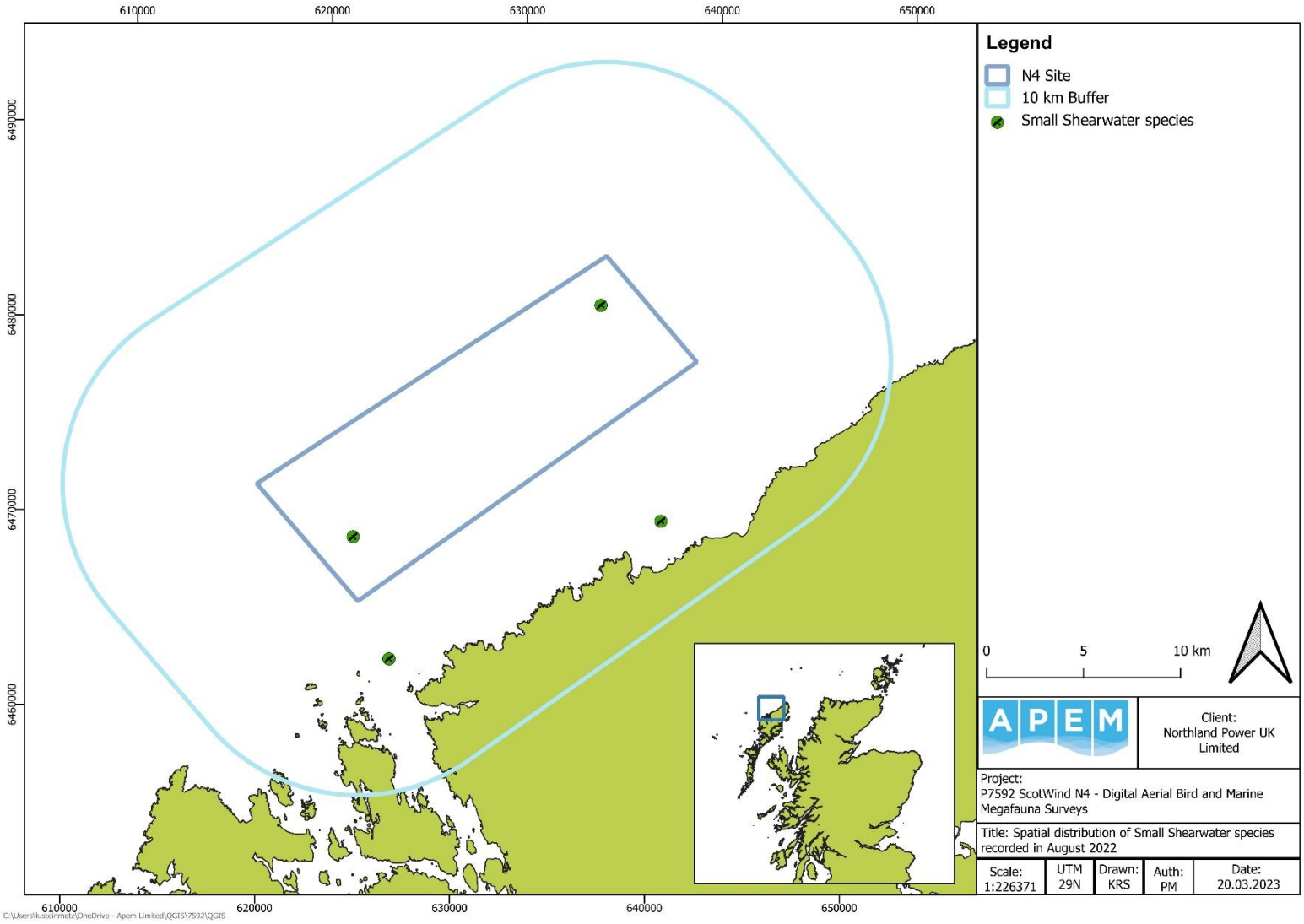


Figure 364 Distribution of small shearwater species in August 2022

*Note that individuals in close proximity may appear overlaying.

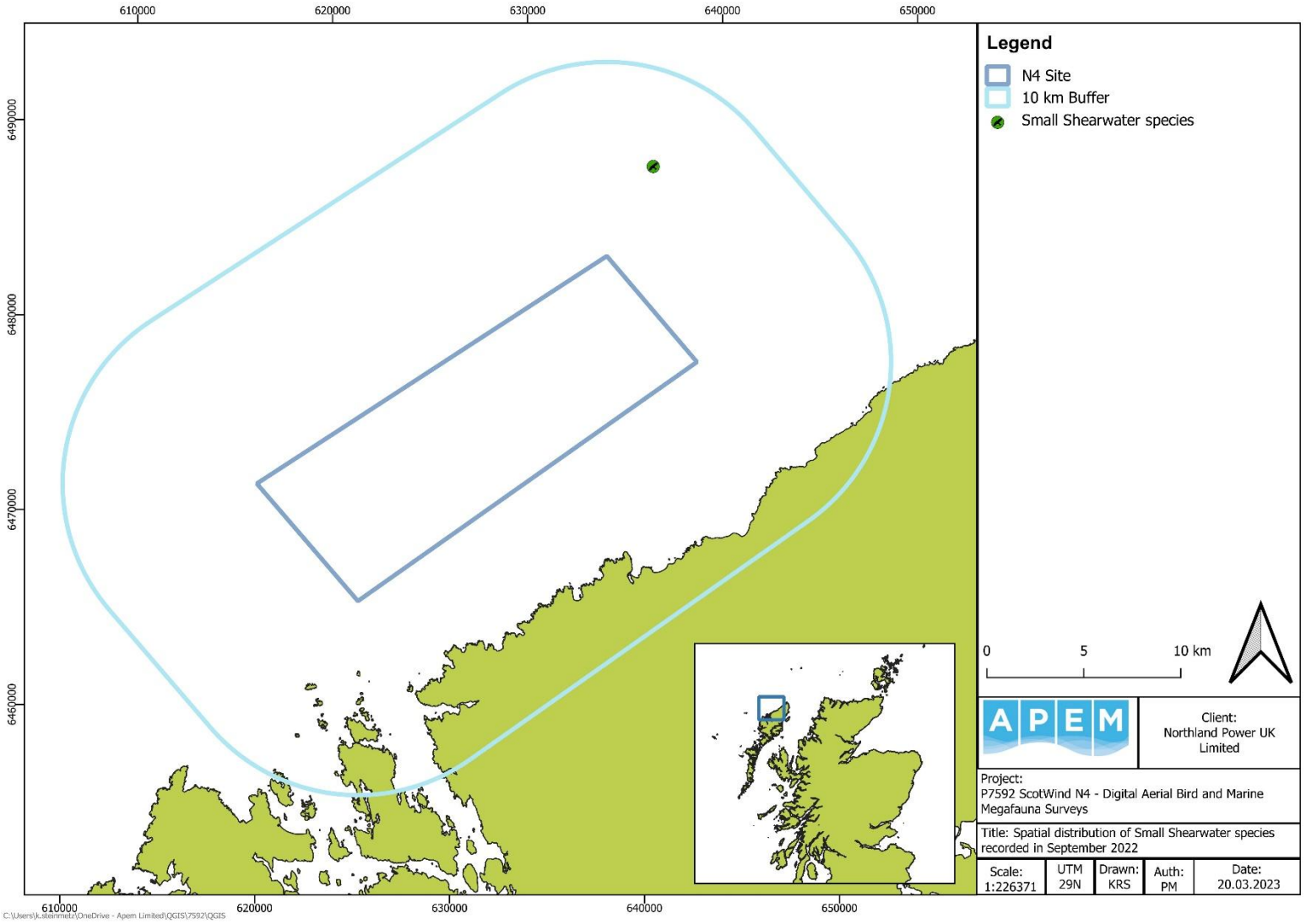


Figure 365 Distribution of small shearwater species in September 2022
*Note that individuals in close proximity may appear overlaying.

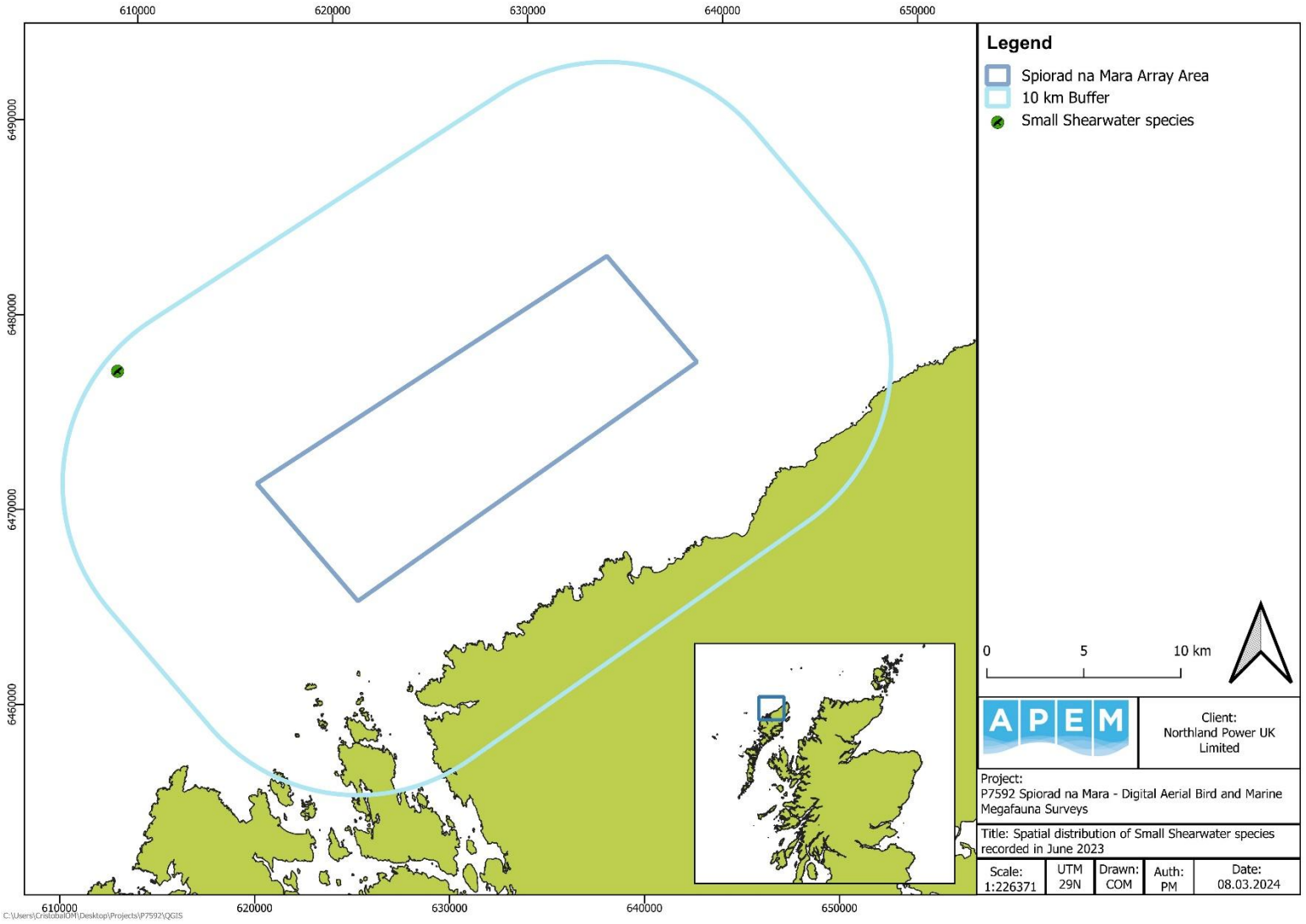


Figure 366 Distribution of small shearwater species in June 2023

*Note that individuals in close proximity may appear overlaying.

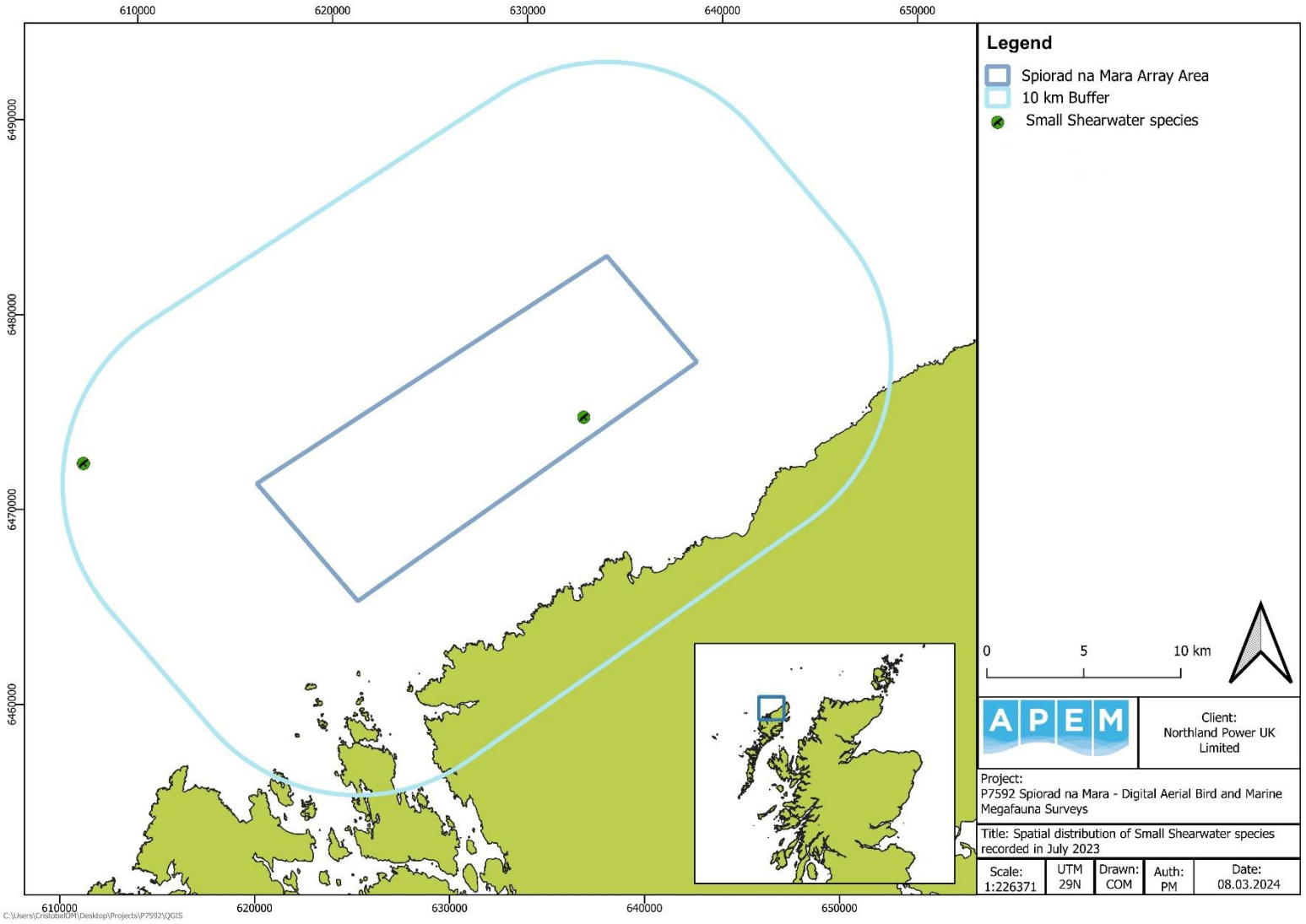


Figure 367 Distribution of small shearwater species in July 2023

*Note that individuals in close proximity may appear overlaying.

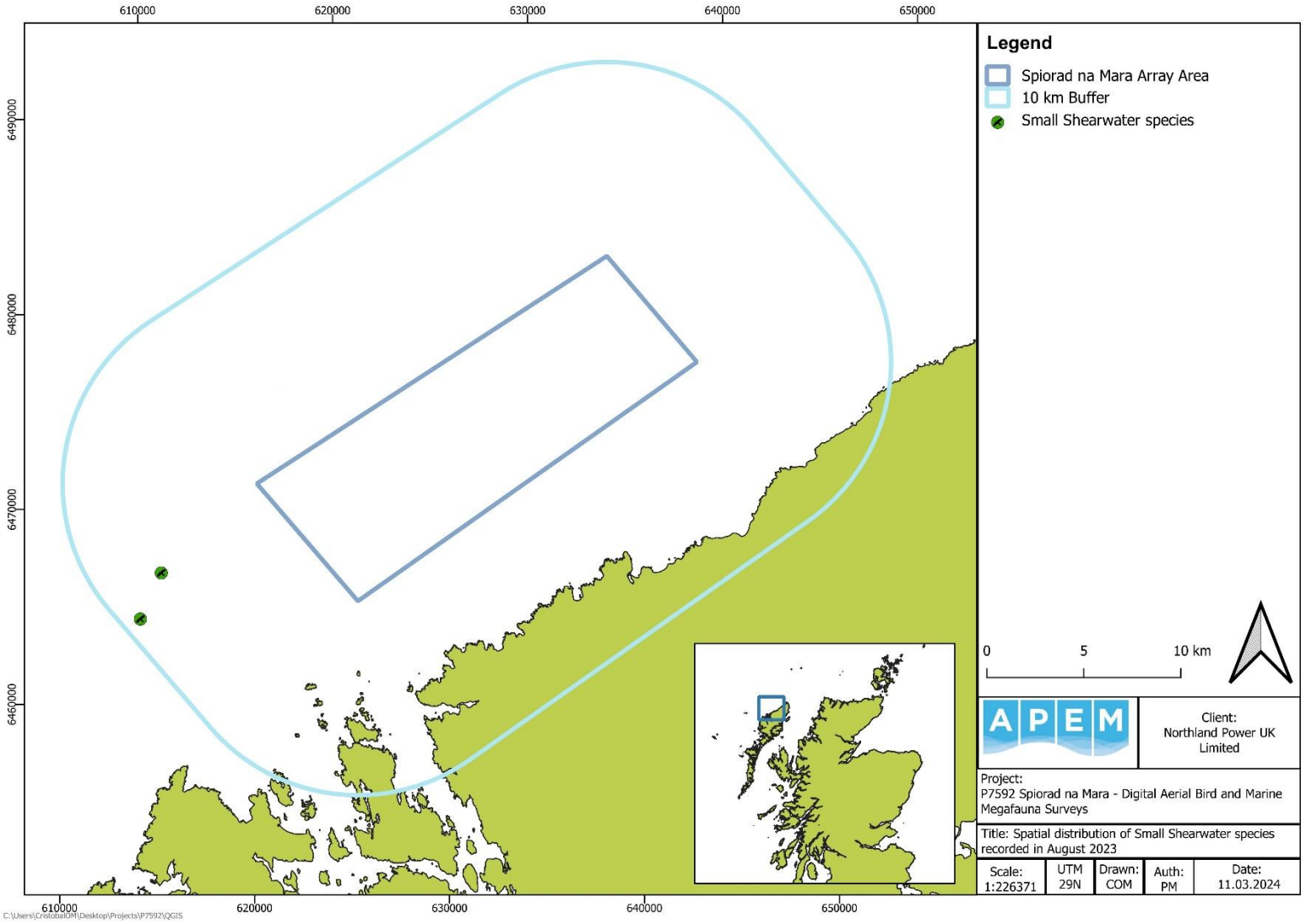


Figure 368 Distribution of small shearwater species in August 2023

*Note that individuals in close proximity may appear overlaying.

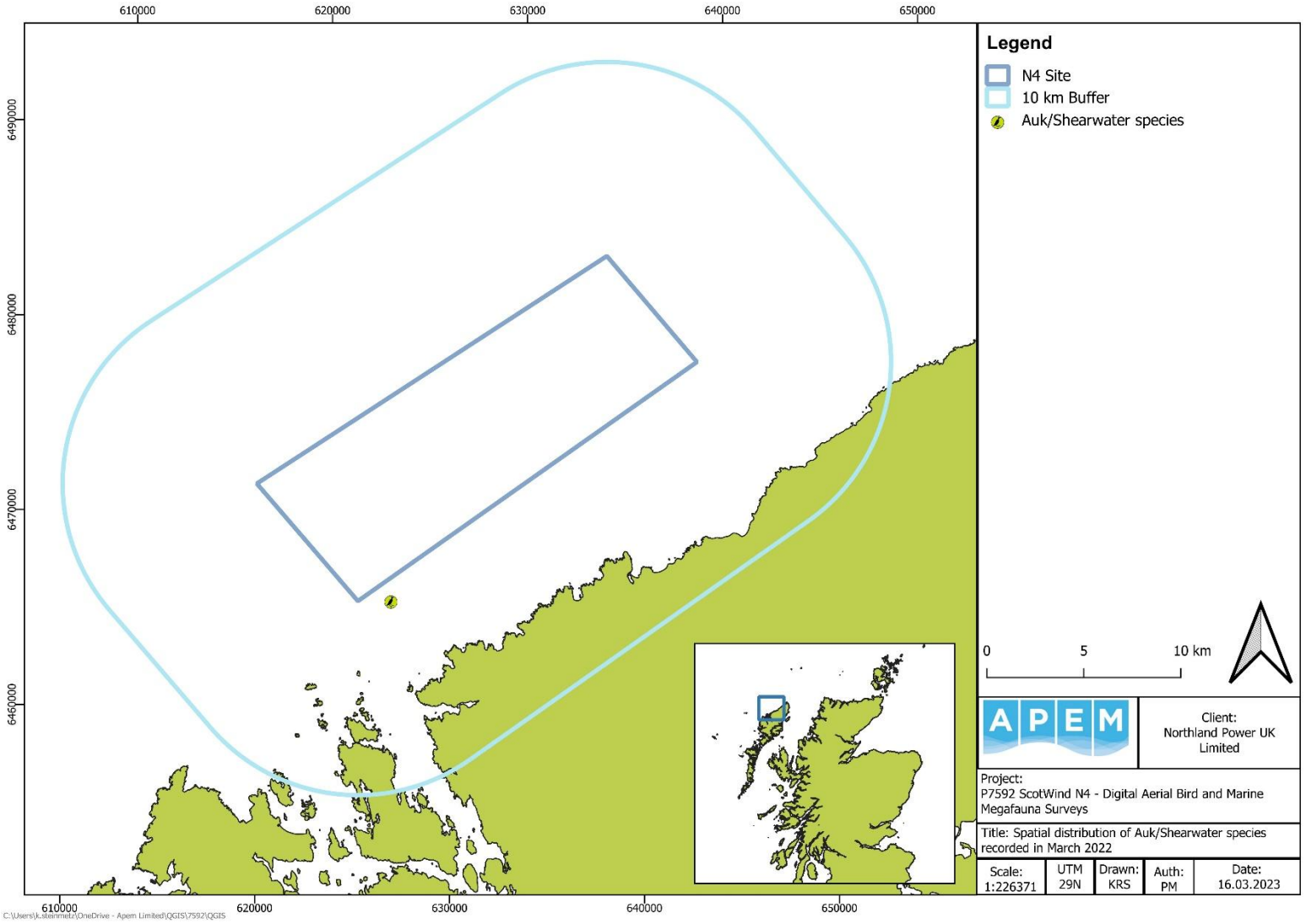


Figure 369 Distribution of auk / shearwater species in March 2022

*Note that individuals in close proximity may appear overlaying.

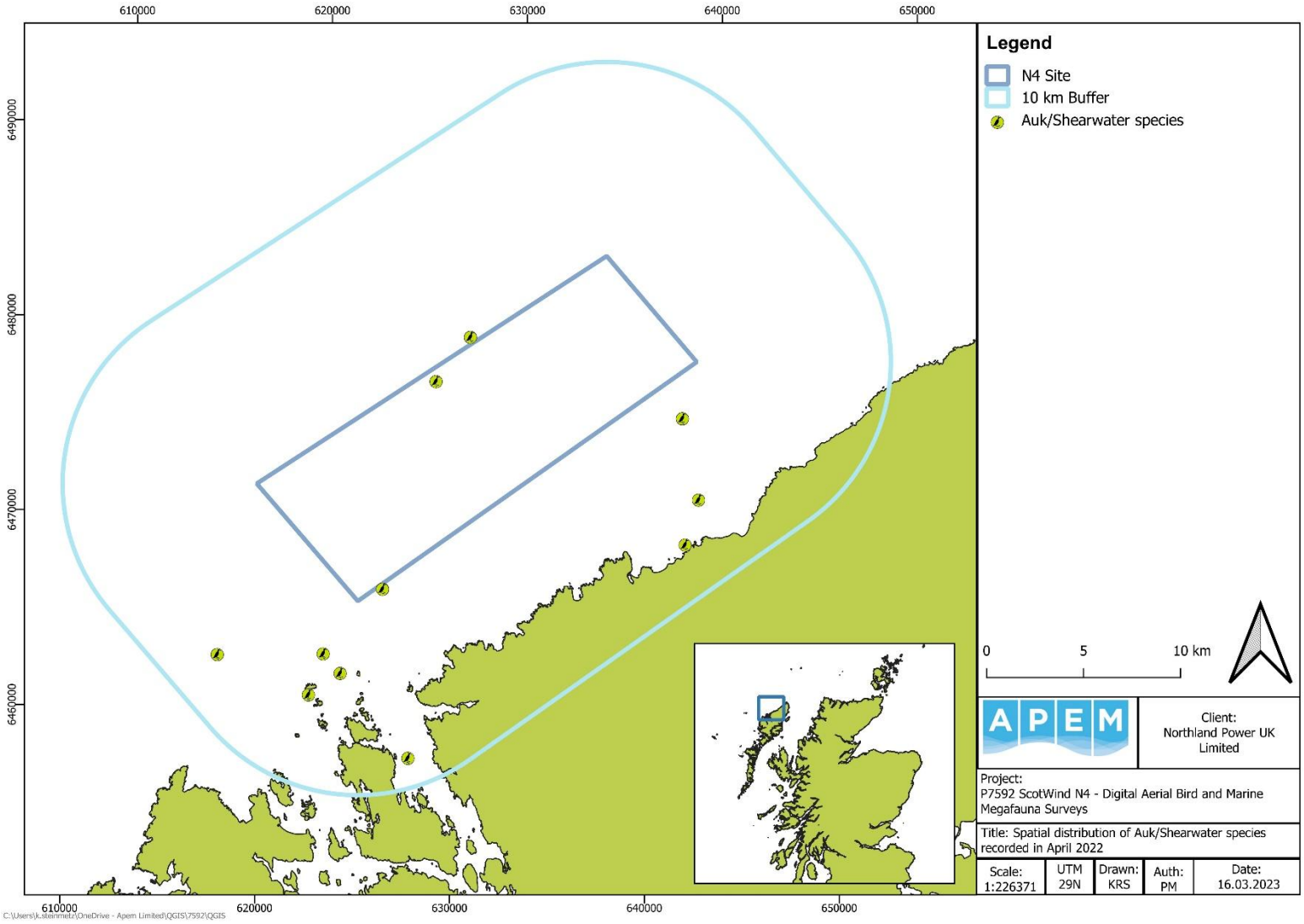


Figure 370 Distribution of auk / shearwater species in April 2022

*Note that individuals in close proximity may appear overlaying.

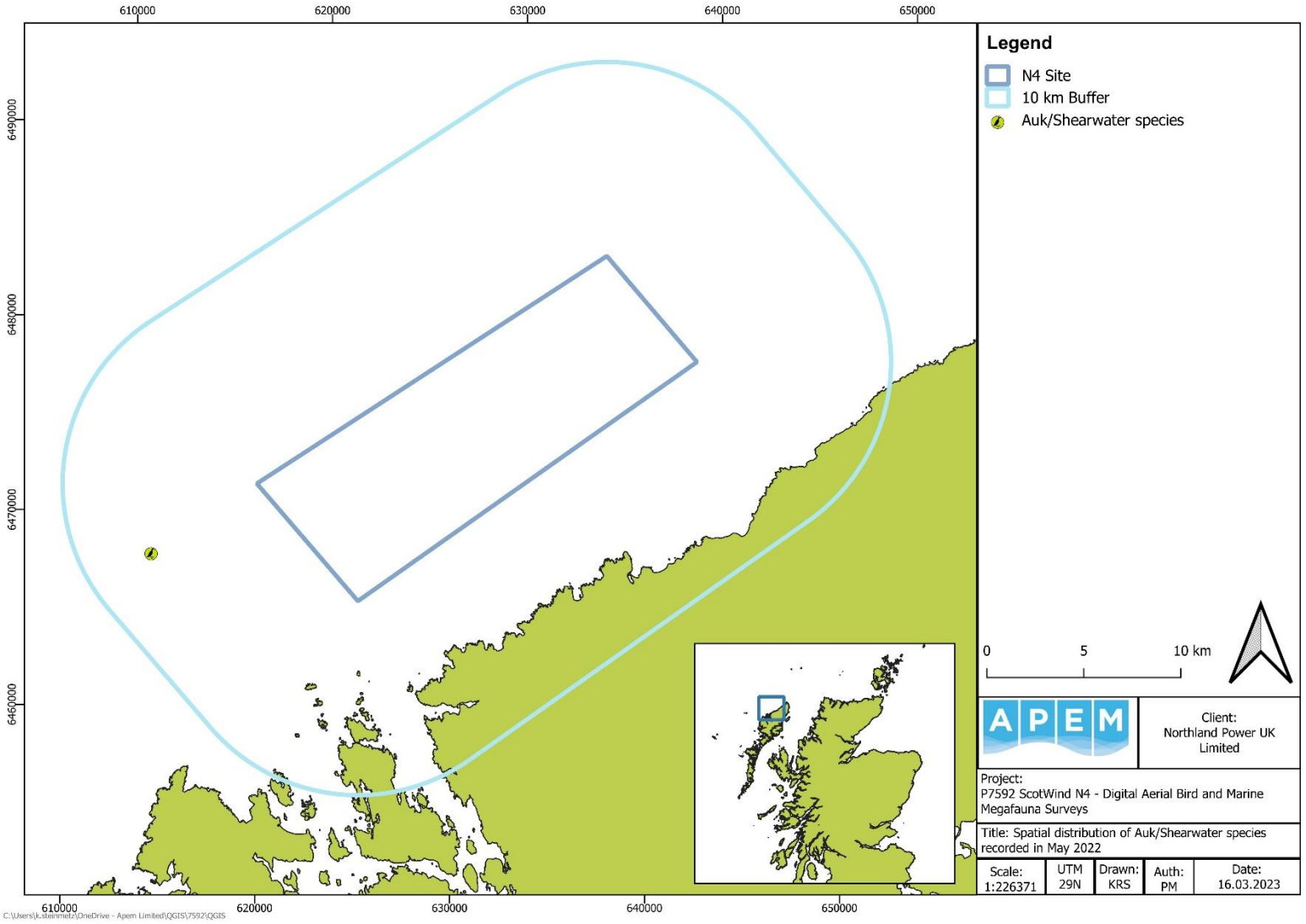


Figure 371 Distribution of auk / shearwater species in May 2022

*Note that individuals in close proximity may appear overlaying.

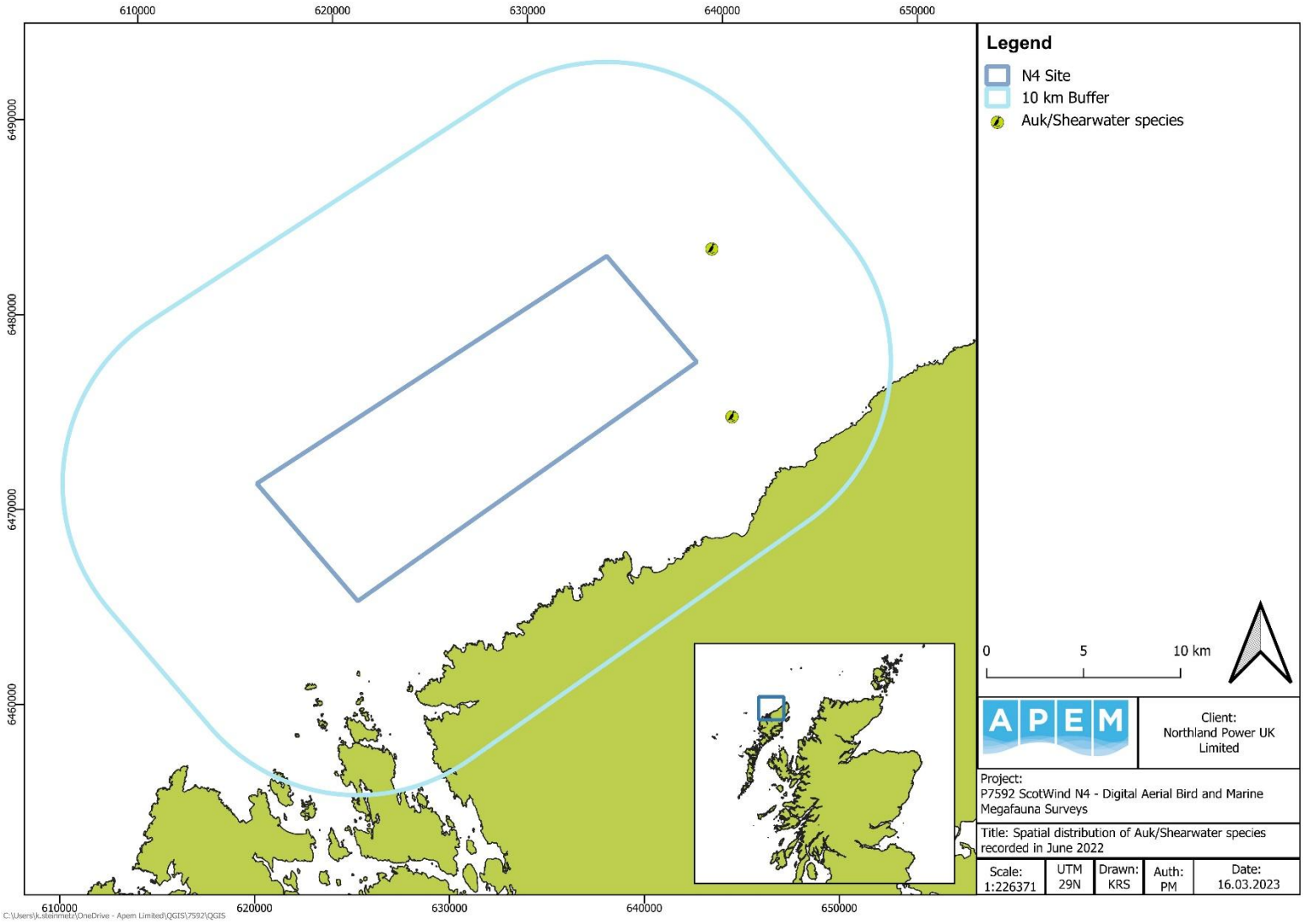


Figure 372 Distribution of auk / shearwater species in June 2022

*Note that individuals in close proximity may appear overlaying.

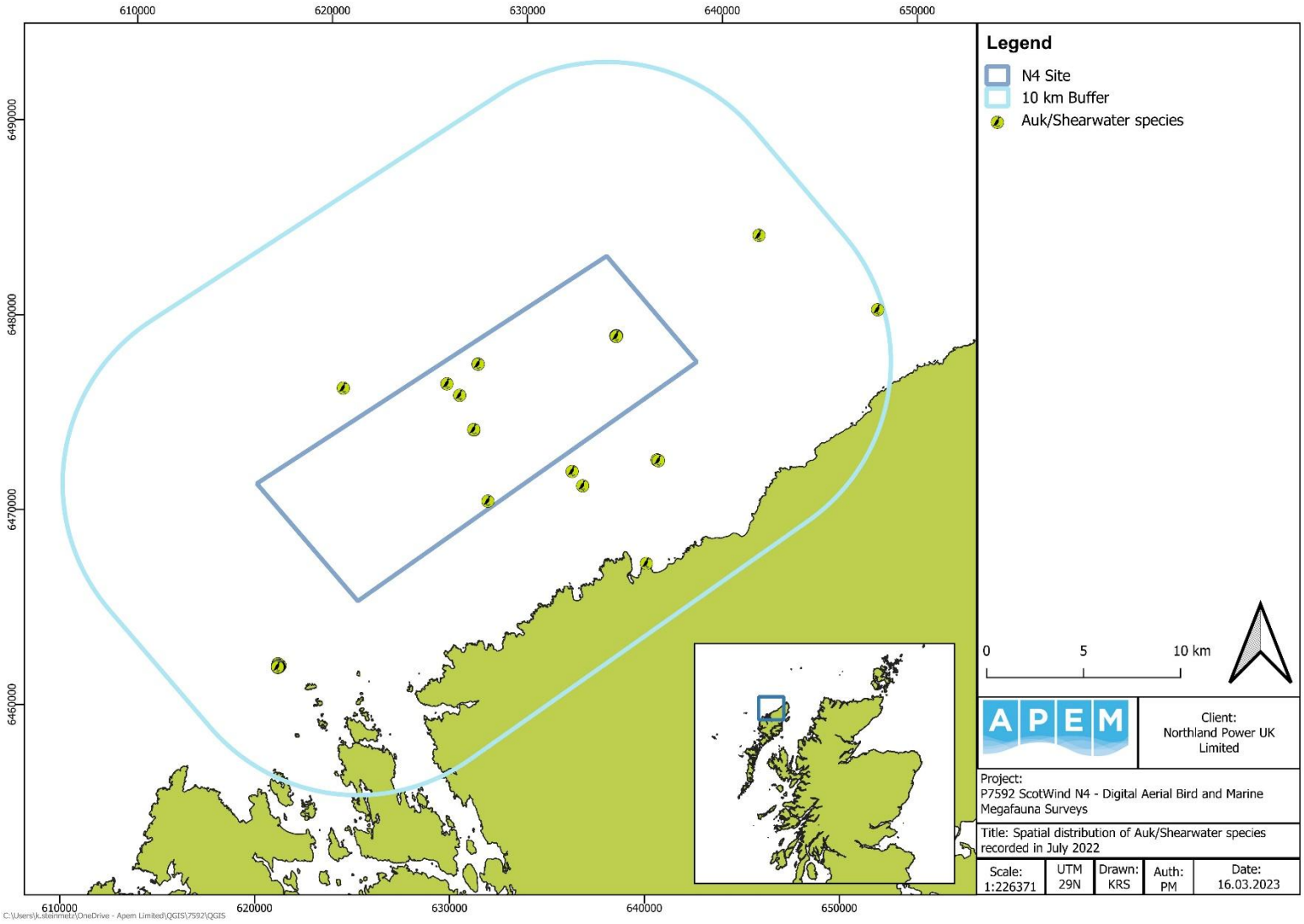


Figure 373 Distribution of auk / shearwater species in July 2022

*Note that individuals in close proximity may appear overlaying.

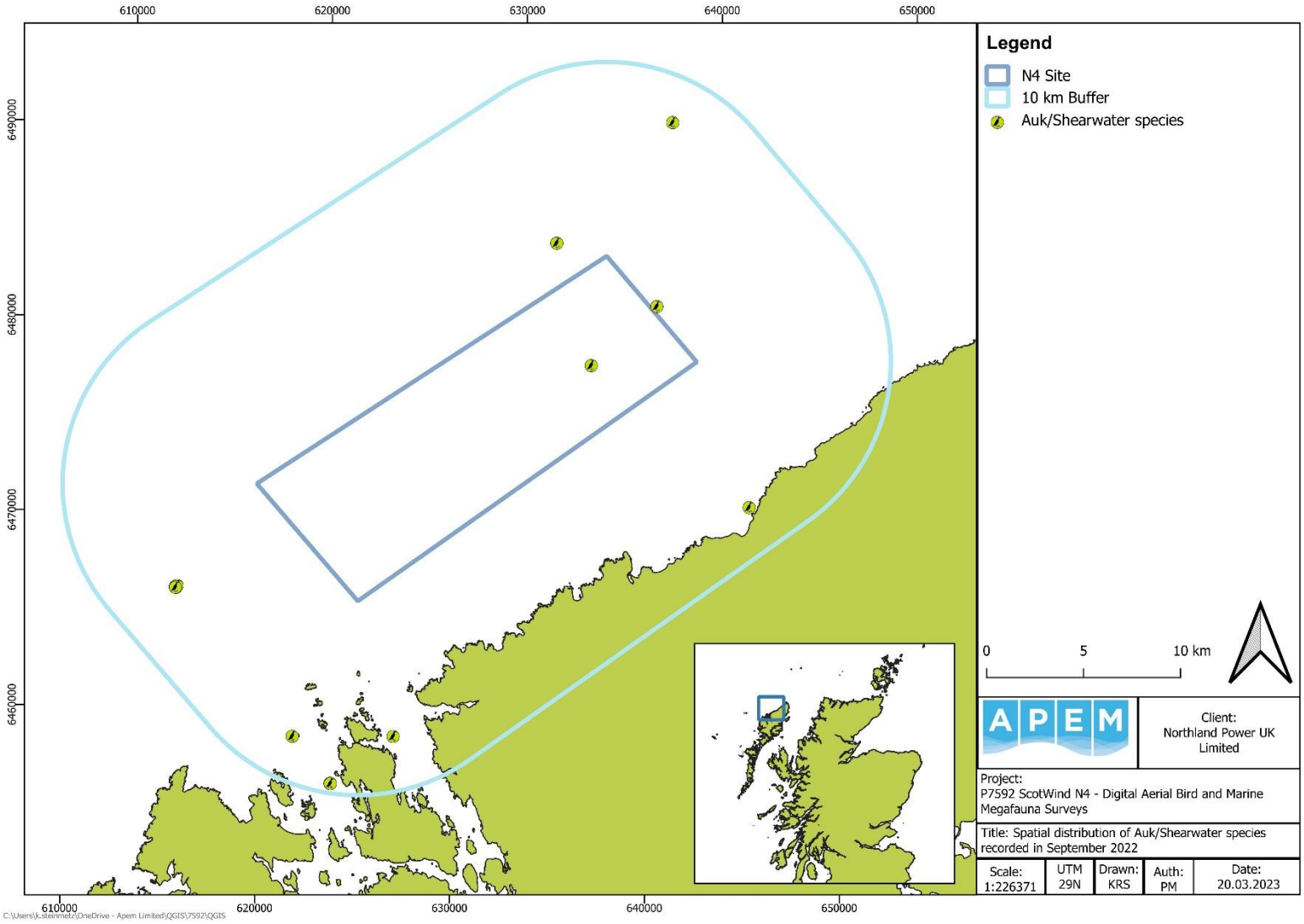


Figure 374 Distribution of auk / shearwater species in September 2022
*Note that individuals in close proximity may appear overlaying.

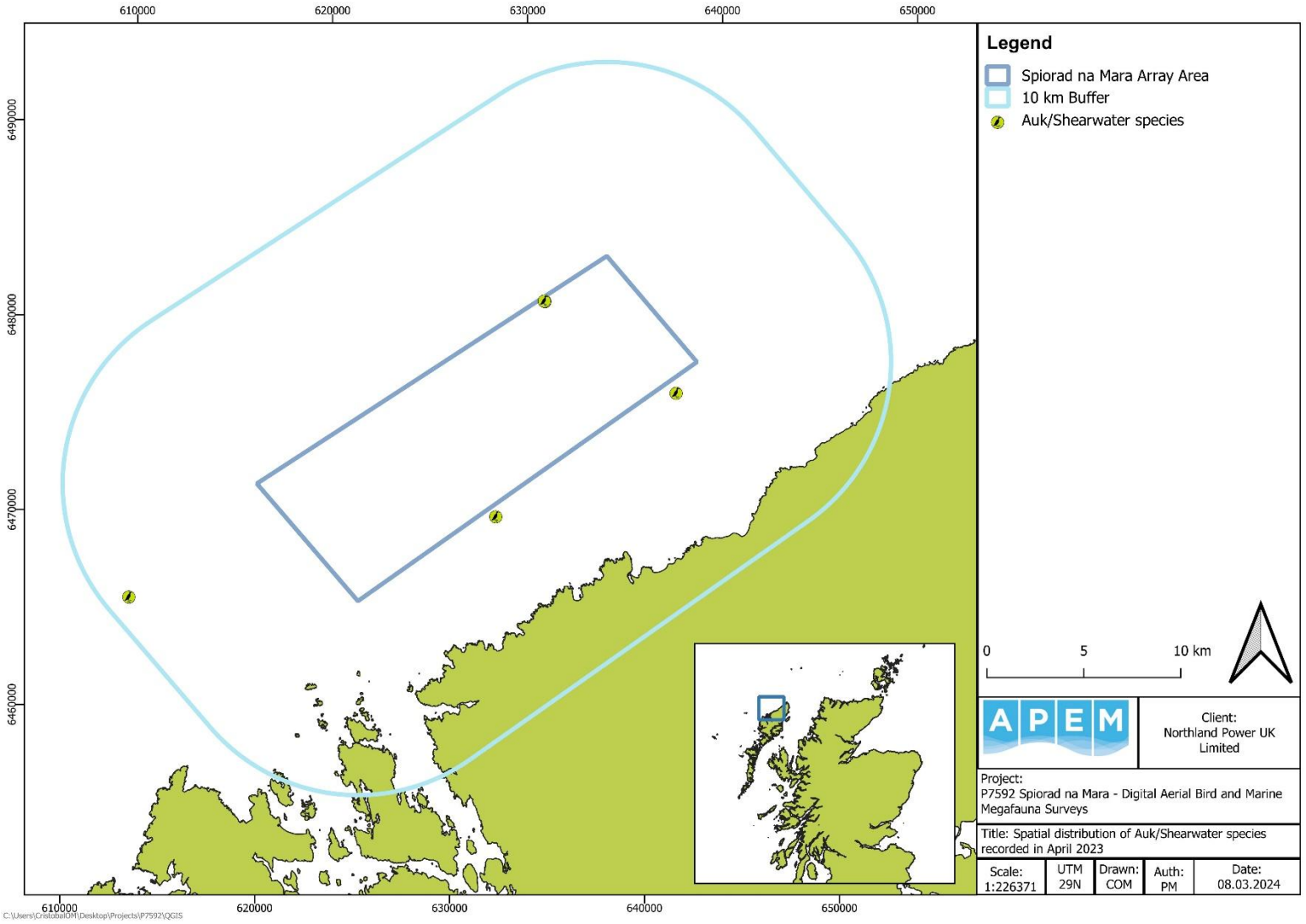


Figure 375 Distribution of auk / shearwater species in April 2023

*Note that individuals in close proximity may appear overlaying.

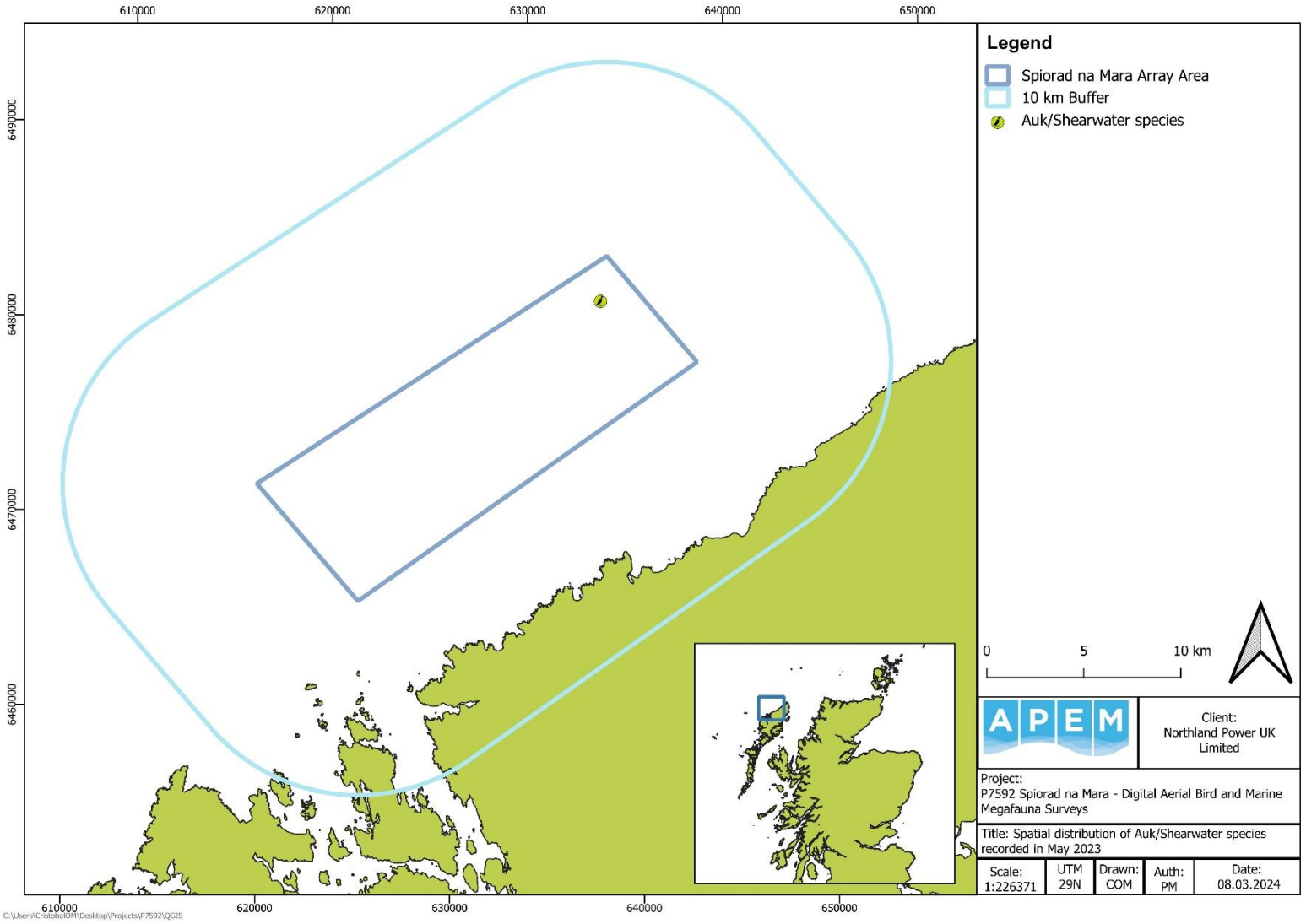


Figure 376 Distribution of auk / shearwater species in May 2023

*Note that individuals in close proximity may appear overlaying.

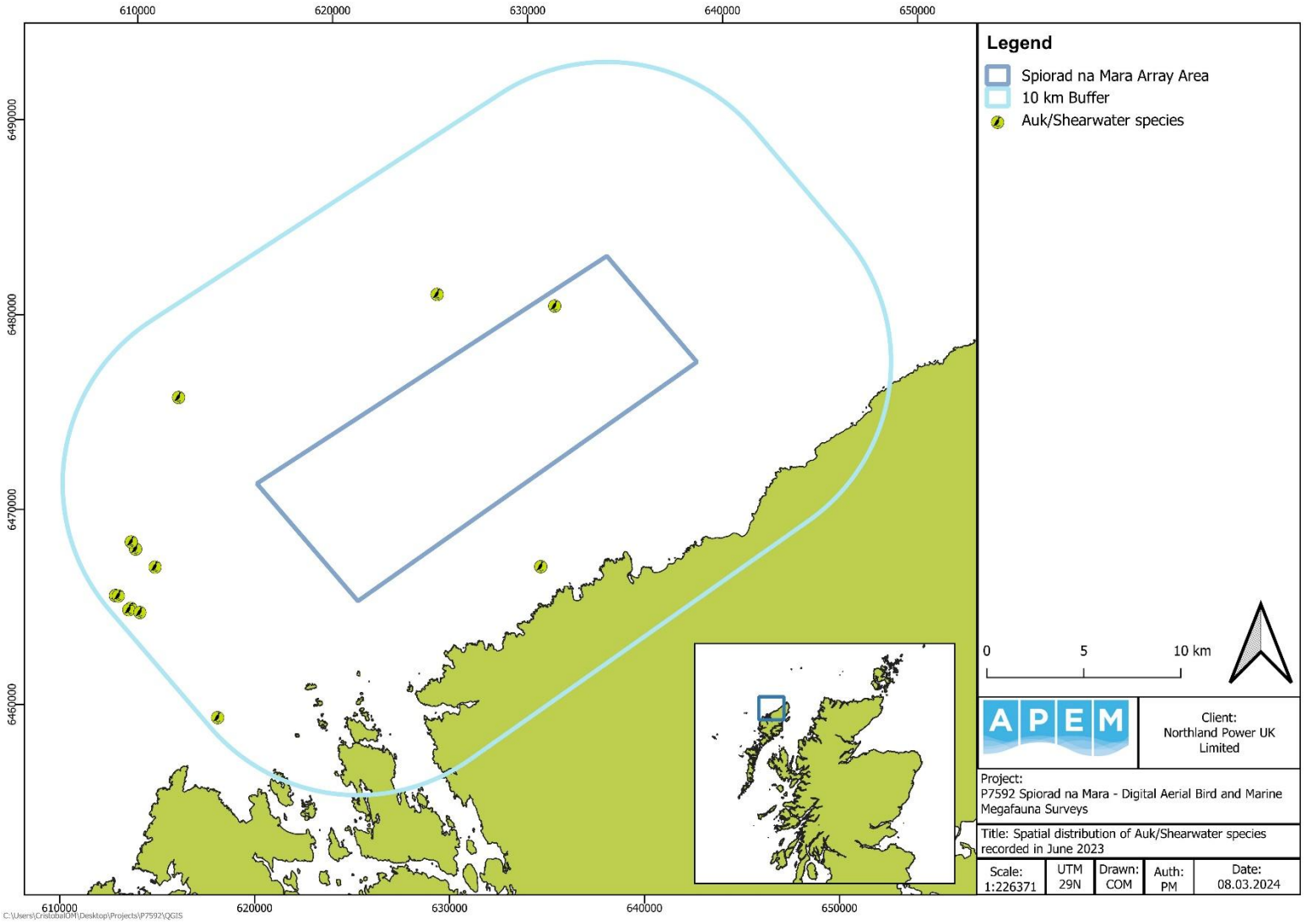


Figure 377 Distribution of auk / shearwater species in June 2023

*Note that individuals in close proximity may appear overlaying.

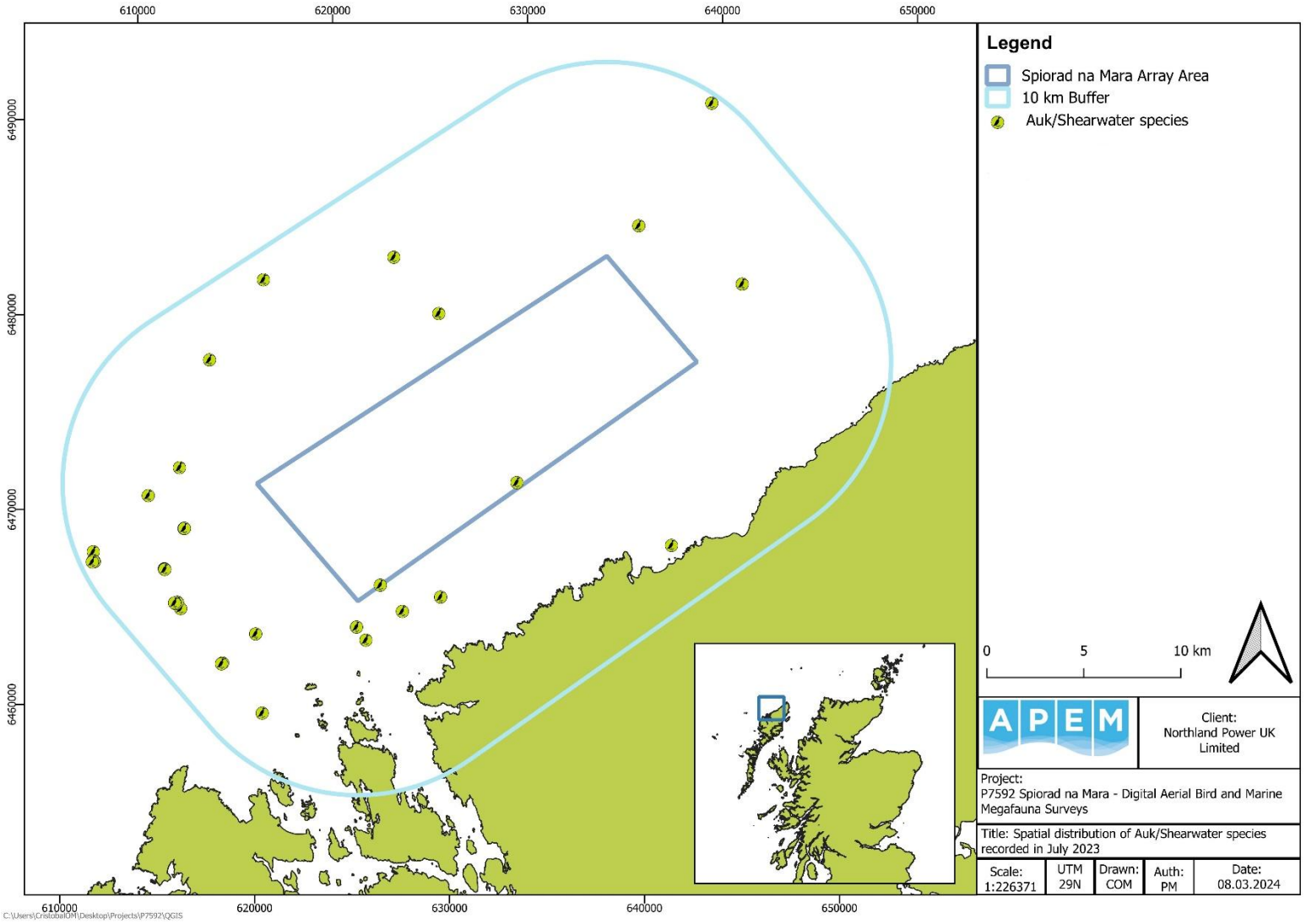


Figure 378 Distribution of auk / shearwater species in July 2023

*Note that individuals in close proximity may appear overlaying.

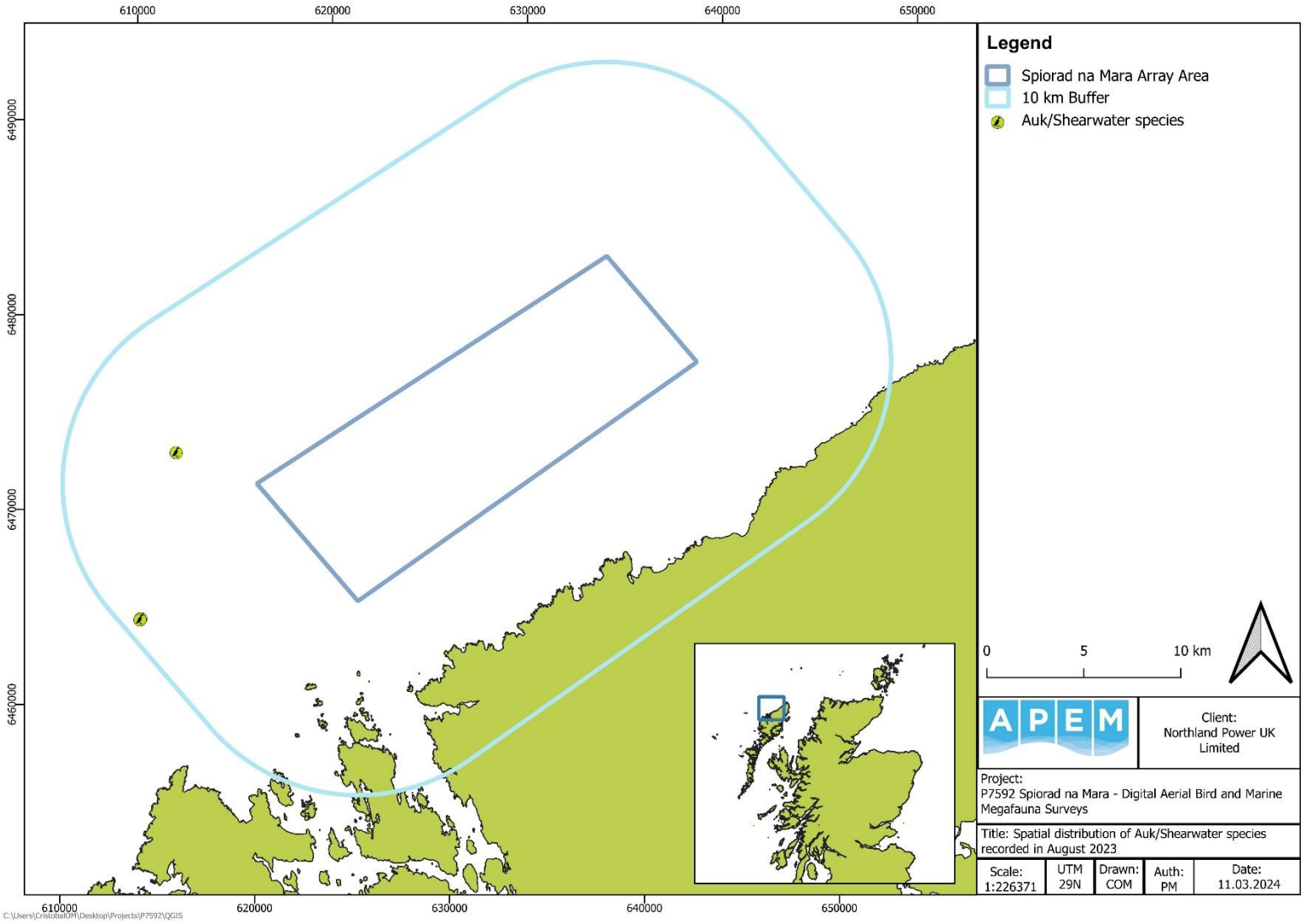


Figure 379 Distribution of auk / shearwater species in August 2023
*Note that individuals in close proximity may appear overlaying>

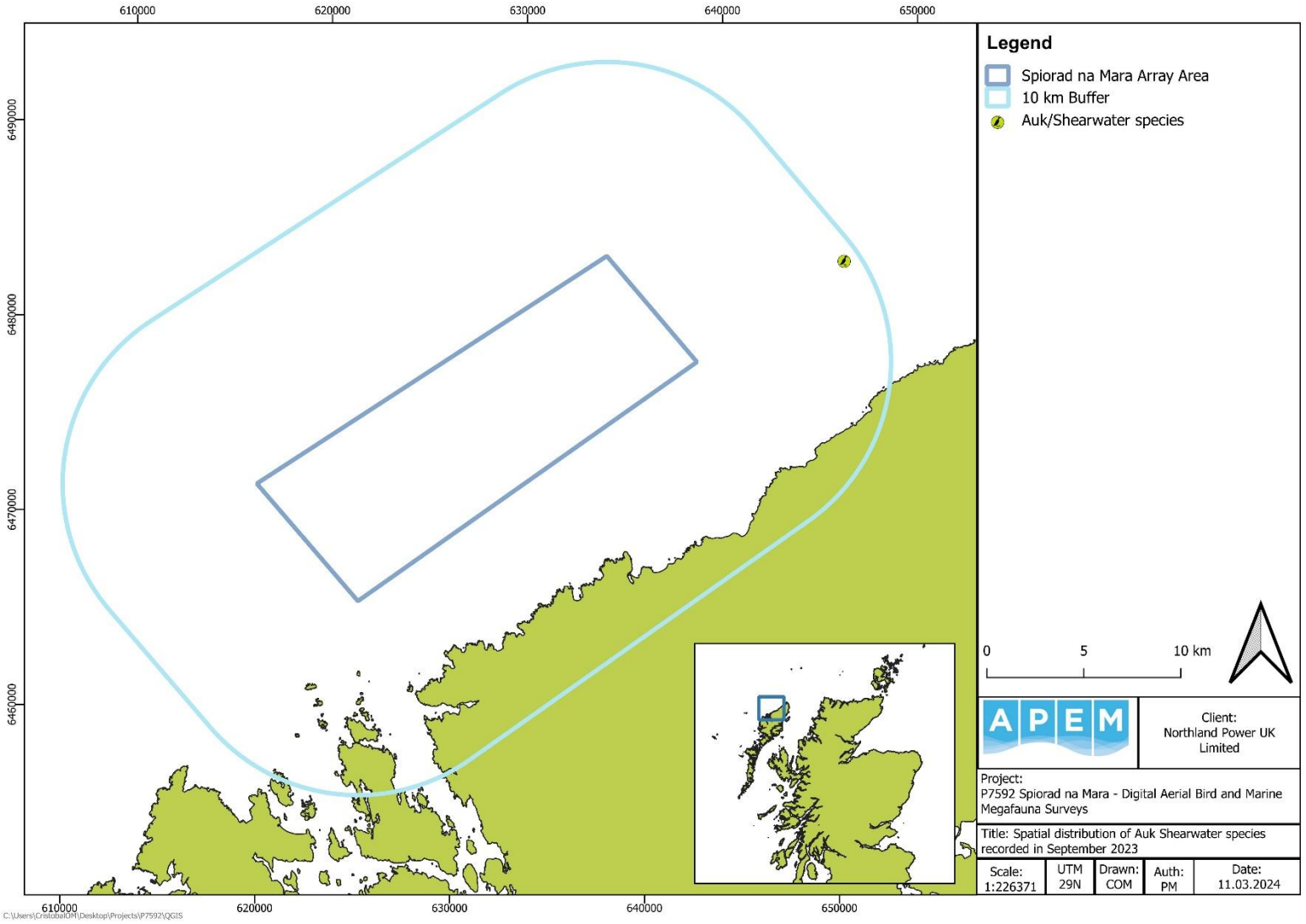


Figure 380 Distribution of auk / shearwater species in September 2023
*Note that individuals in close proximity may appear overlaying.

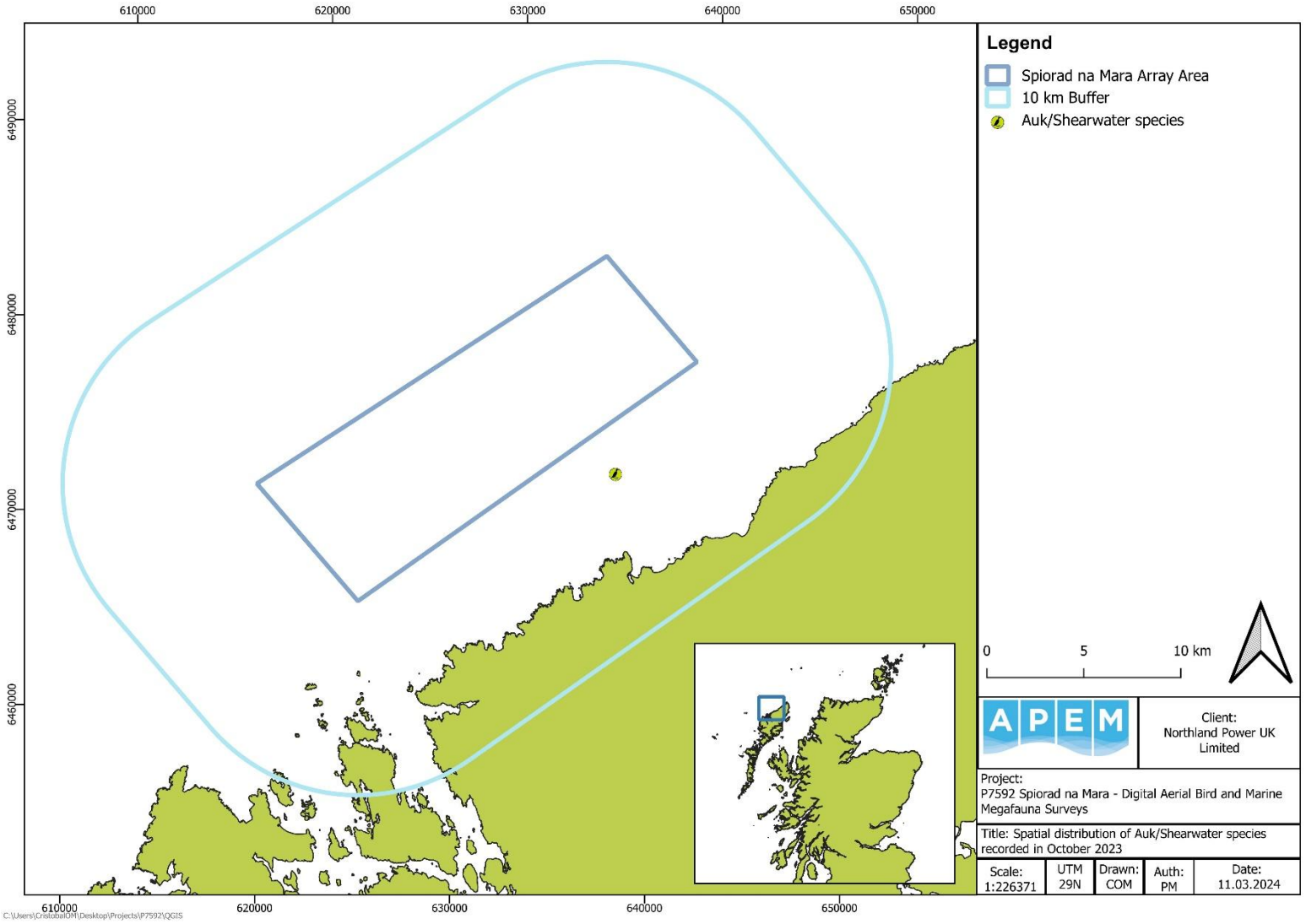


Figure 381 Distribution of auk / shearwater species in October 2023

*Note that individuals in close proximity may appear overlaying.

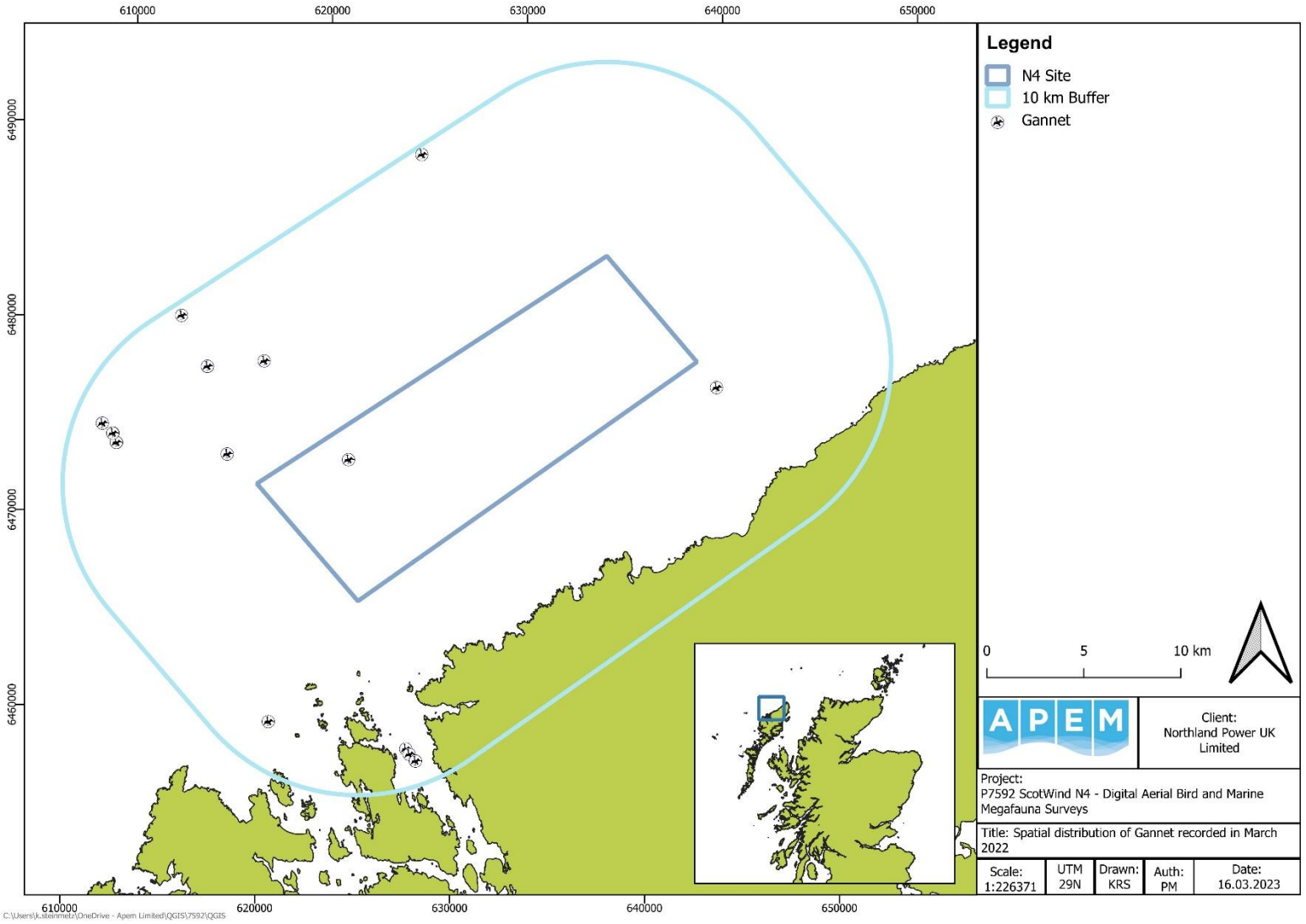


Figure 382 Distribution of gannet in March 2022
*Note that individuals in close proximity may appear overlaying.

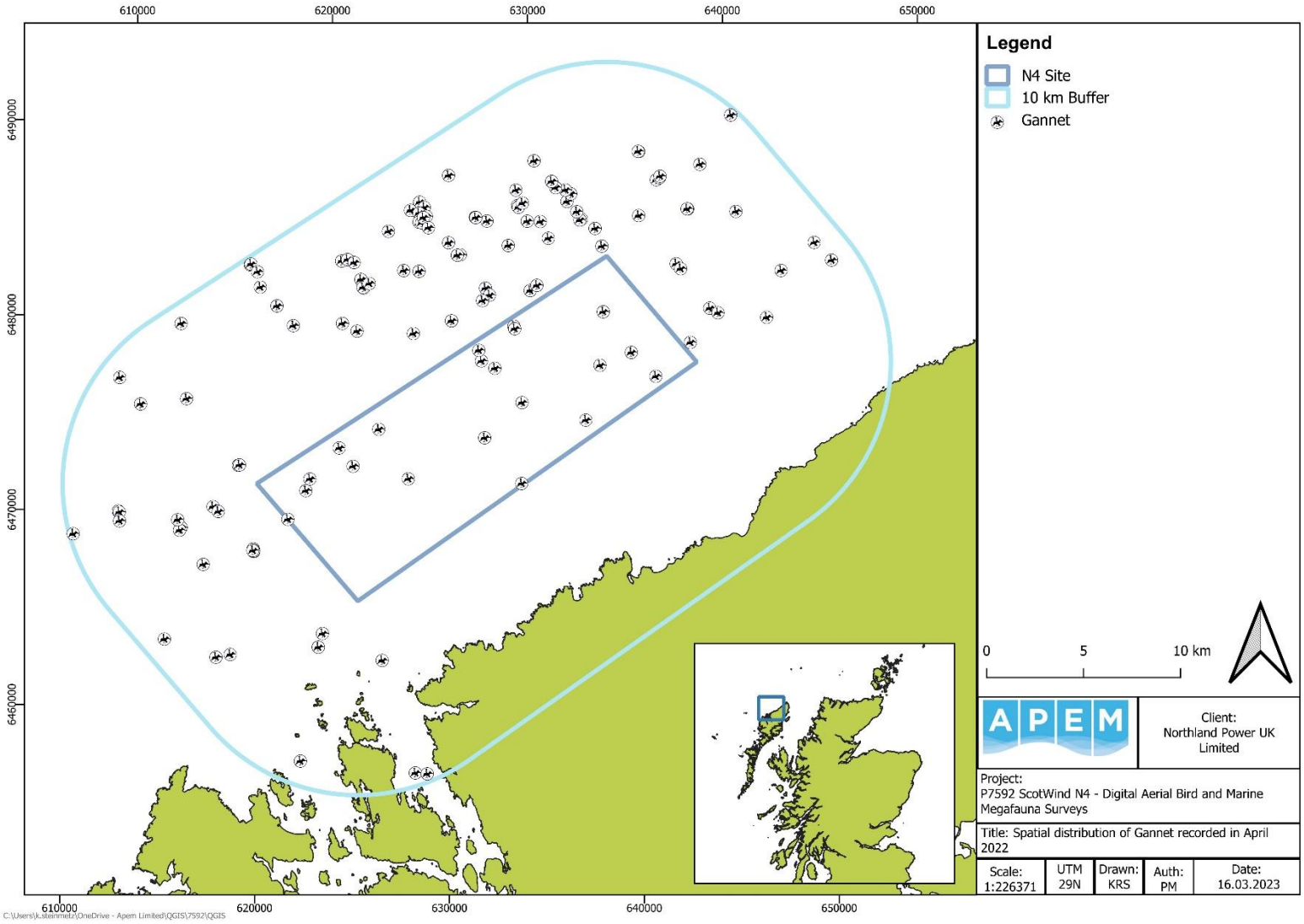


Figure 383 Distribution of gannet in April 2022
*Note that individuals in close proximity may appear overlaying.

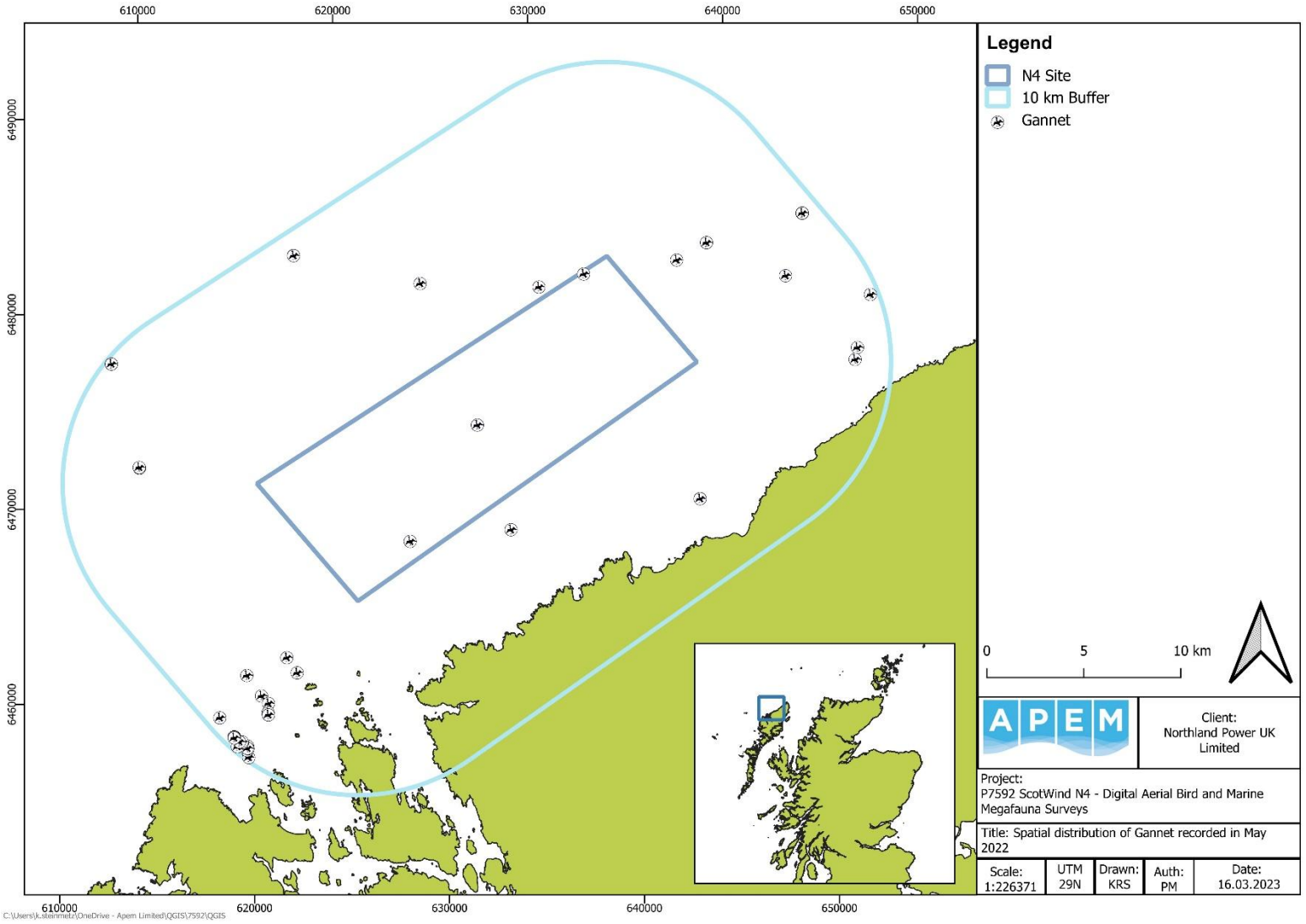


Figure 384 Distribution of gannet in May 2022
*Note that individuals in close proximity may appear overlaying.

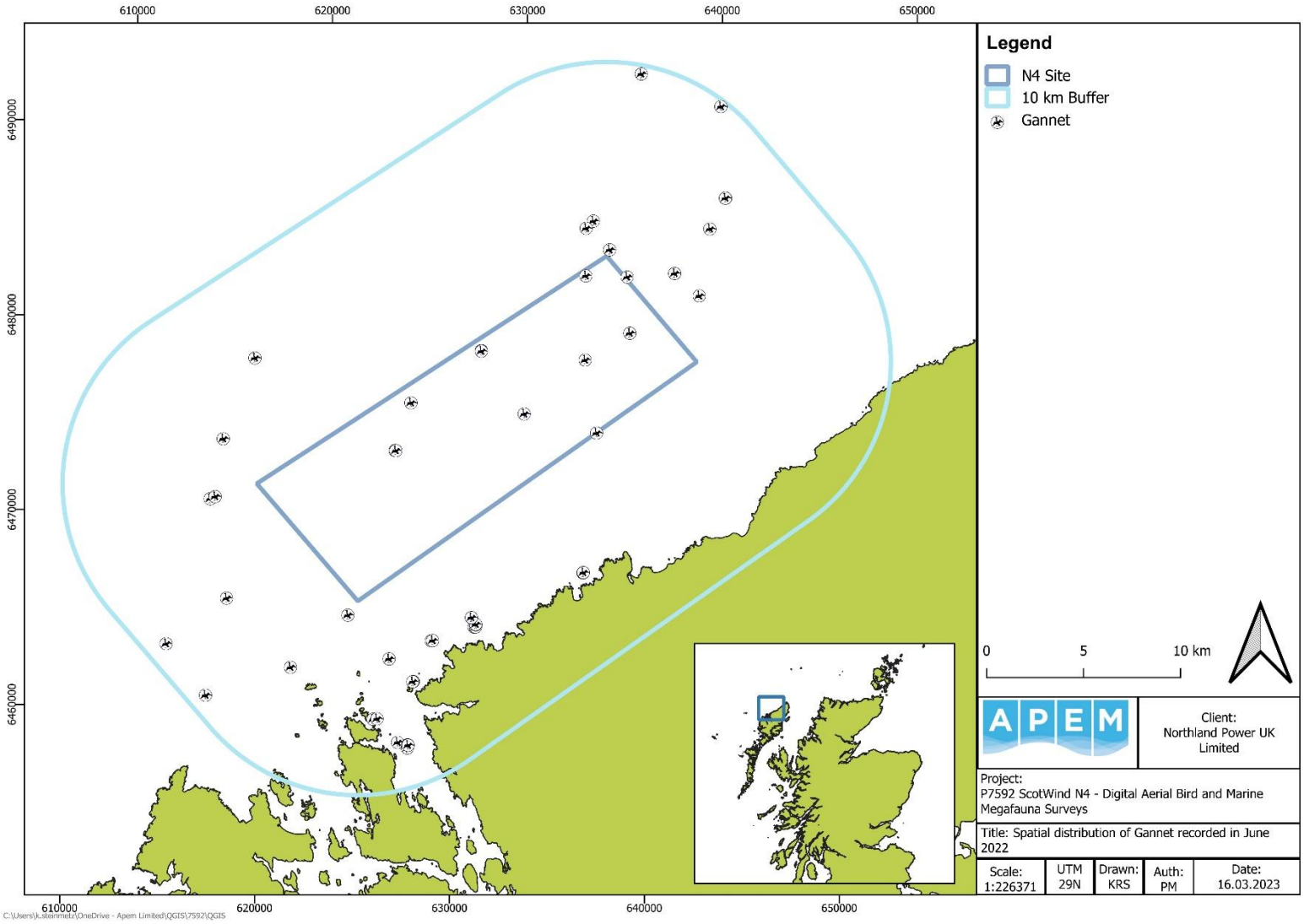


Figure 385 Distribution of gannet in June 2022
*Note that individuals in close proximity may appear overlaying.

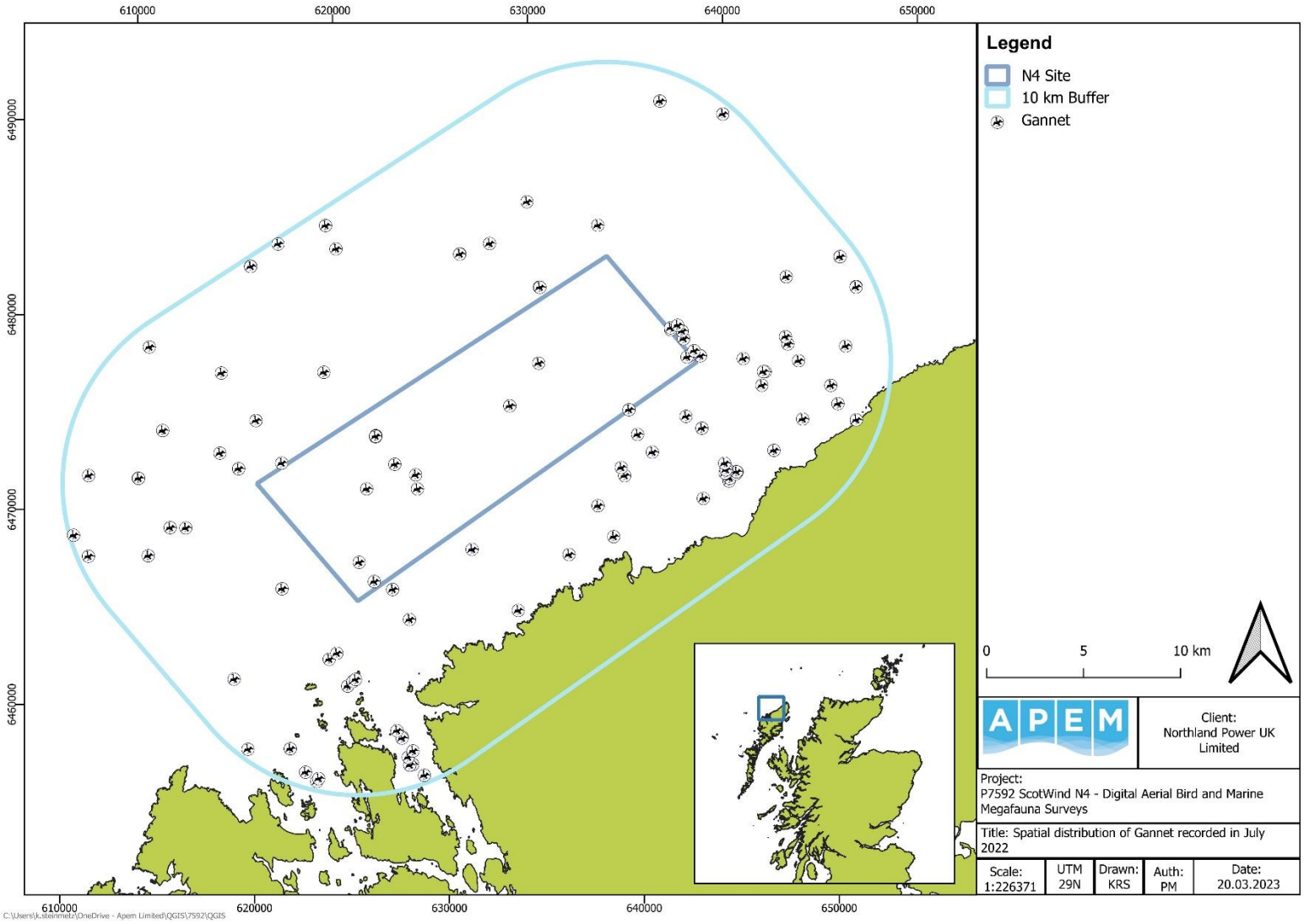


Figure 386 Distribution of gannet in July 2022
*Note that individuals in close proximity may appear overlaying.

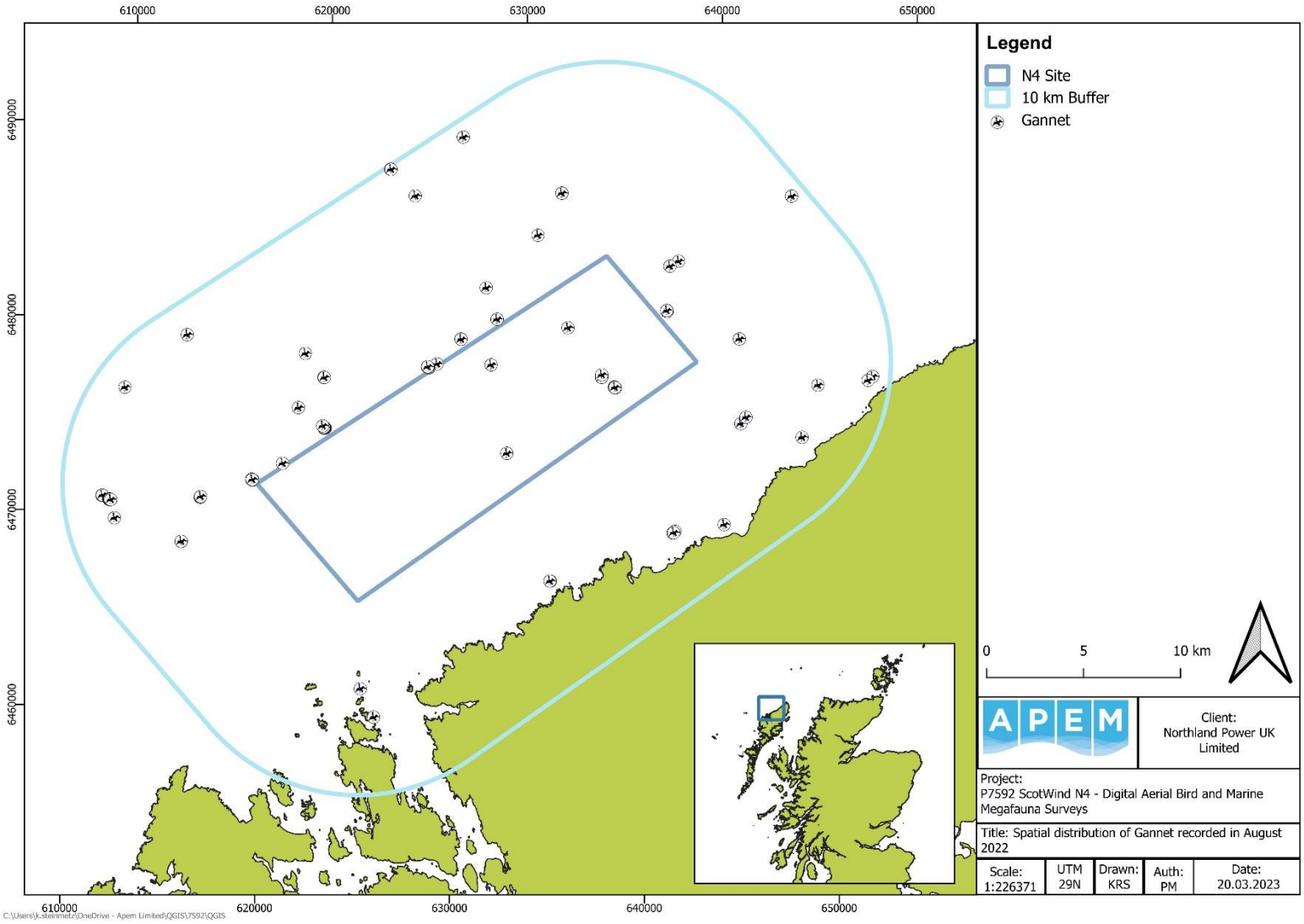


Figure 387 Distribution of gannet in August 2022
*Note that individuals in close proximity may appear overlaying.

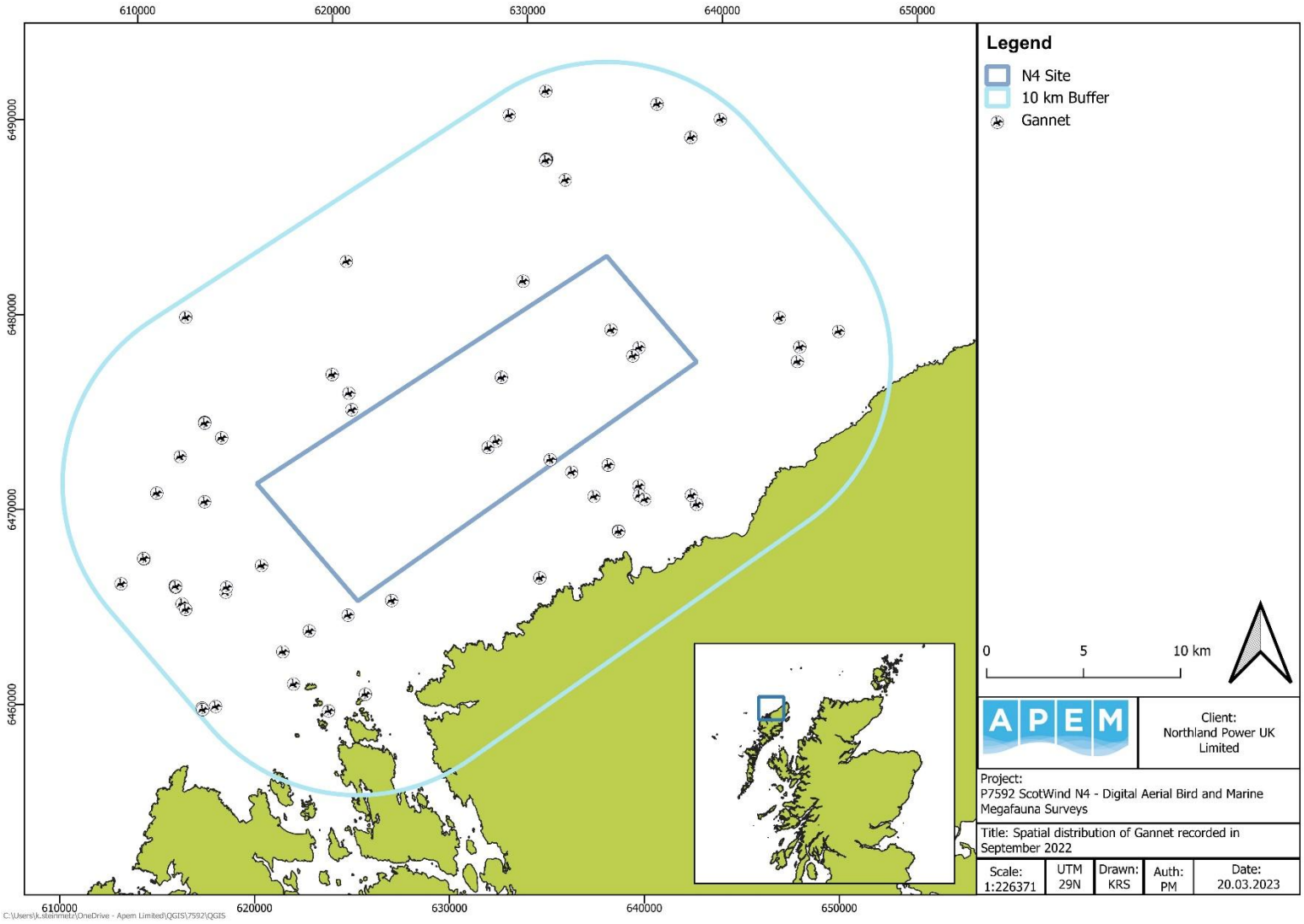


Figure 388 Distribution of gannet in September 2022
*Note that individuals in close proximity may appear overlaying.

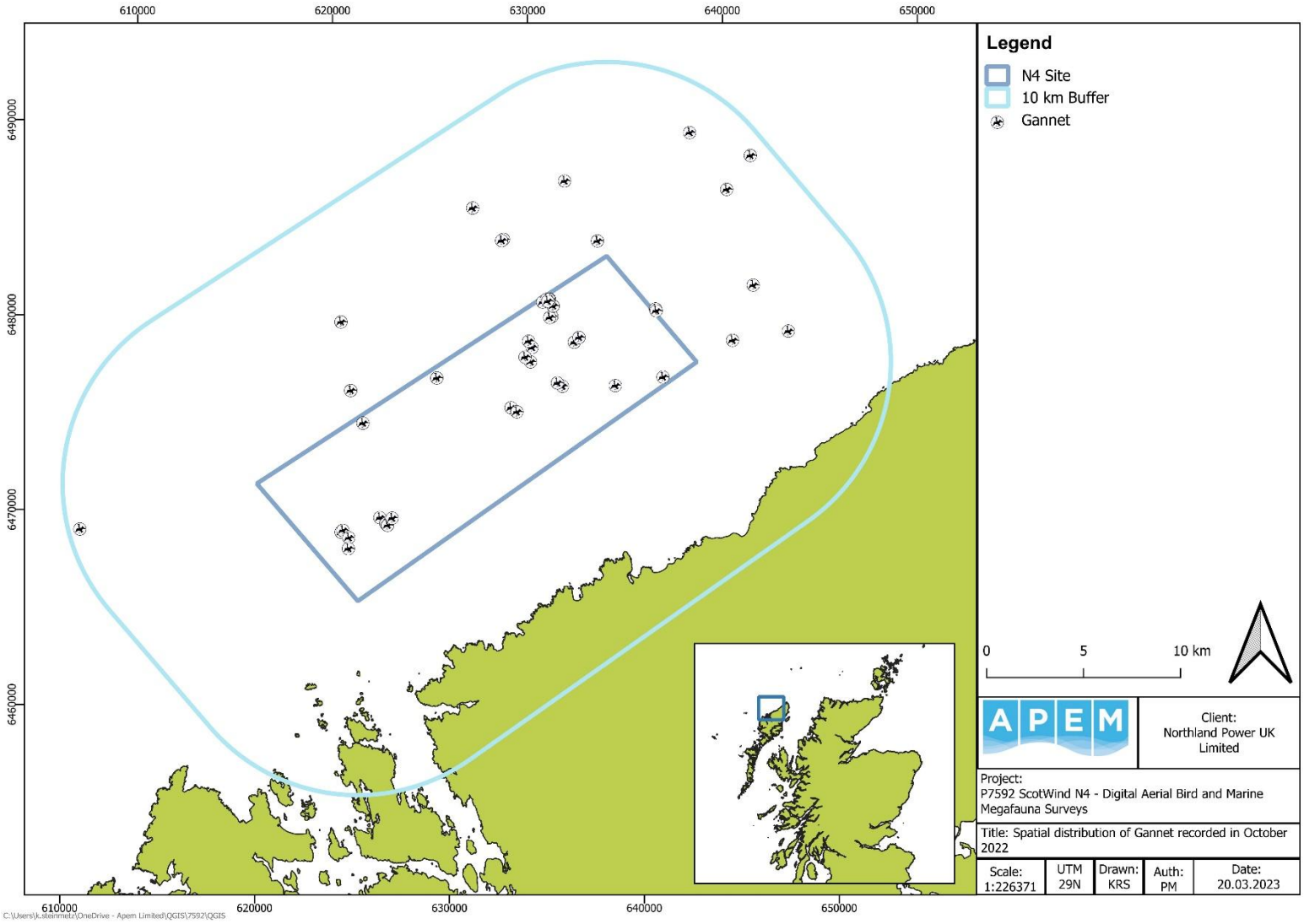


Figure 389 Distribution of gannet in October 2022
*Note that individuals in close proximity may appear overlaying.

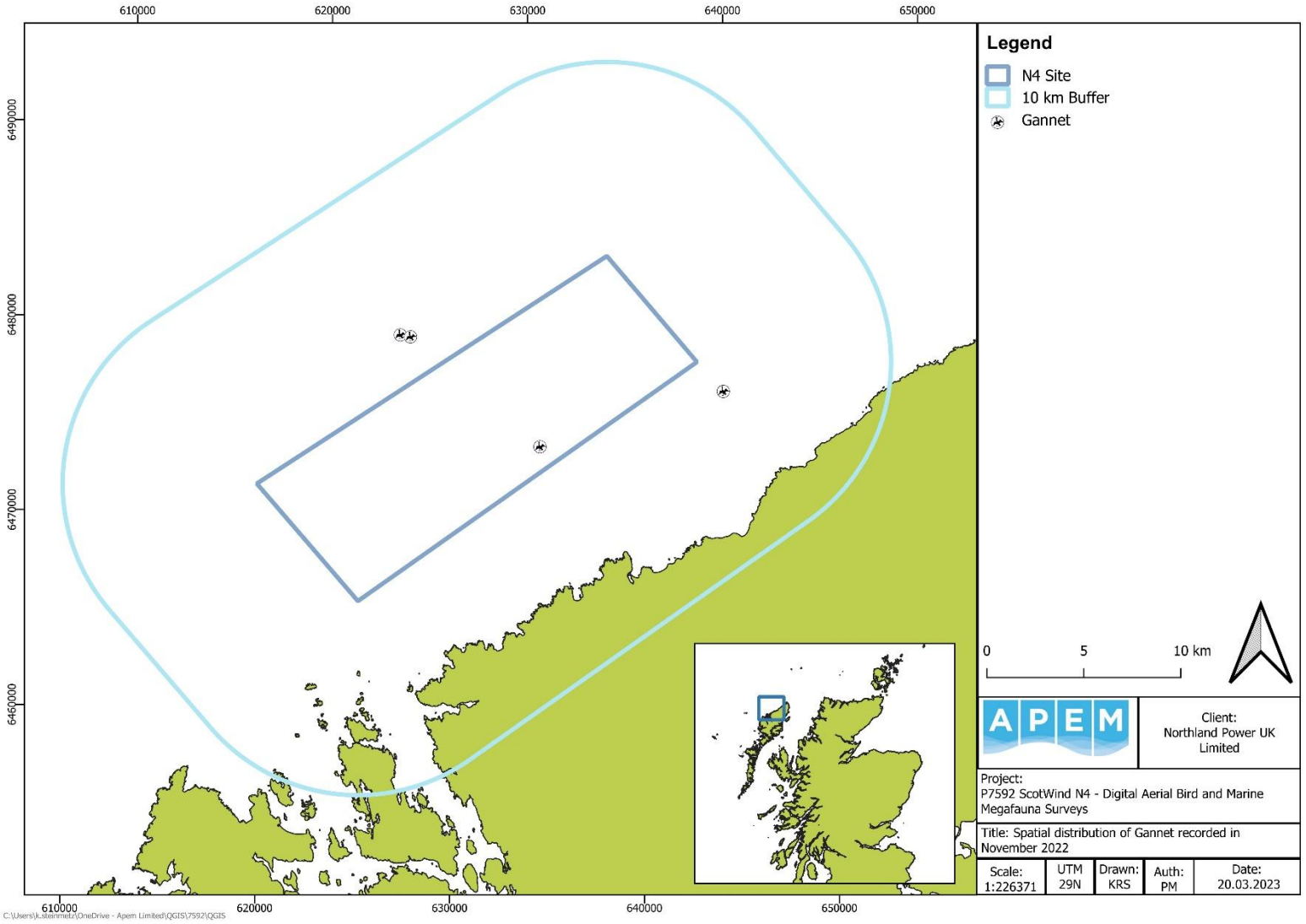


Figure 390 Distribution of gannet in November 2022
*Note that individuals in close proximity may appear overlaying.

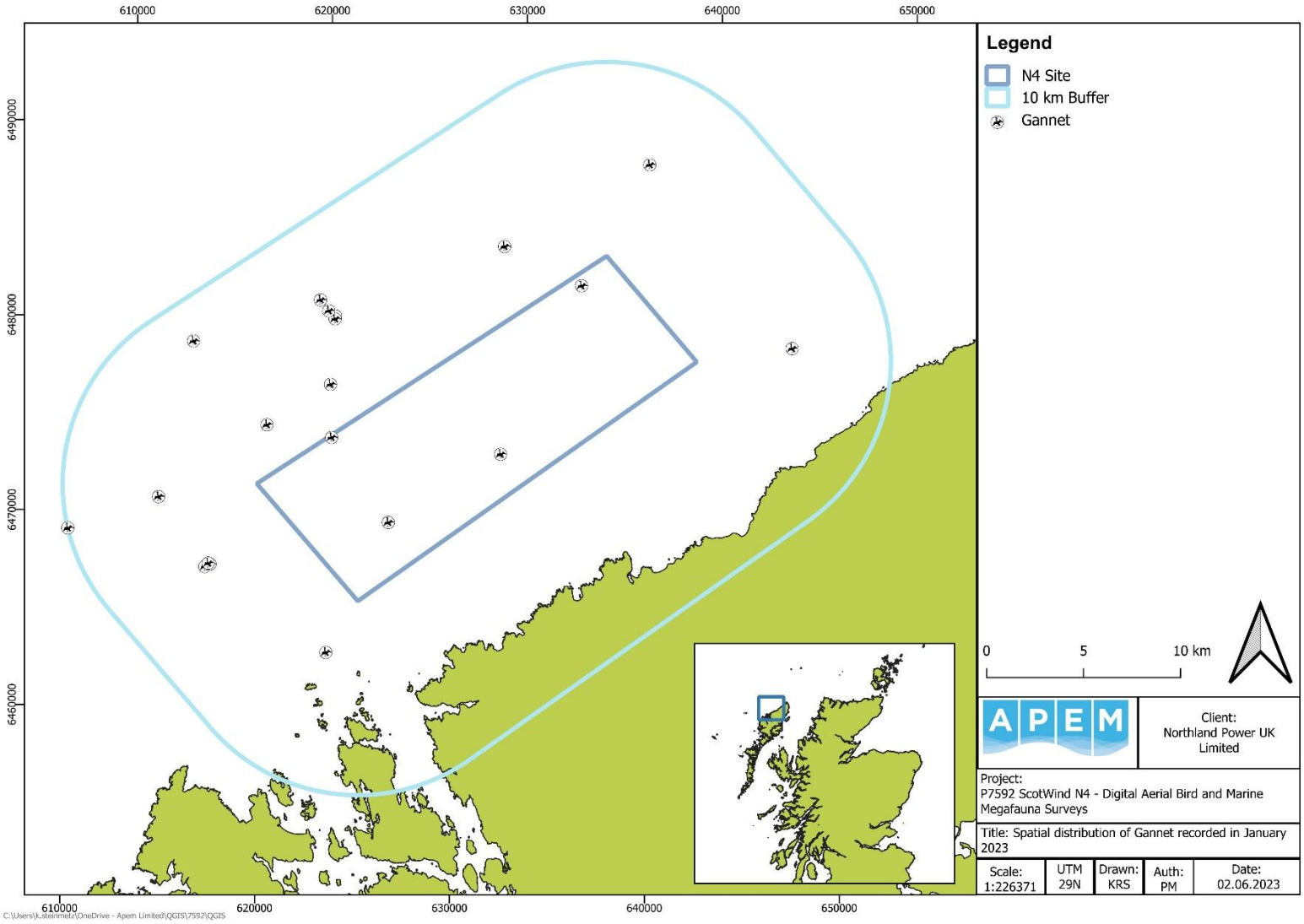


Figure 391 Distribution of gannet in January 2023
*Note that individuals in close proximity may appear overlaying.

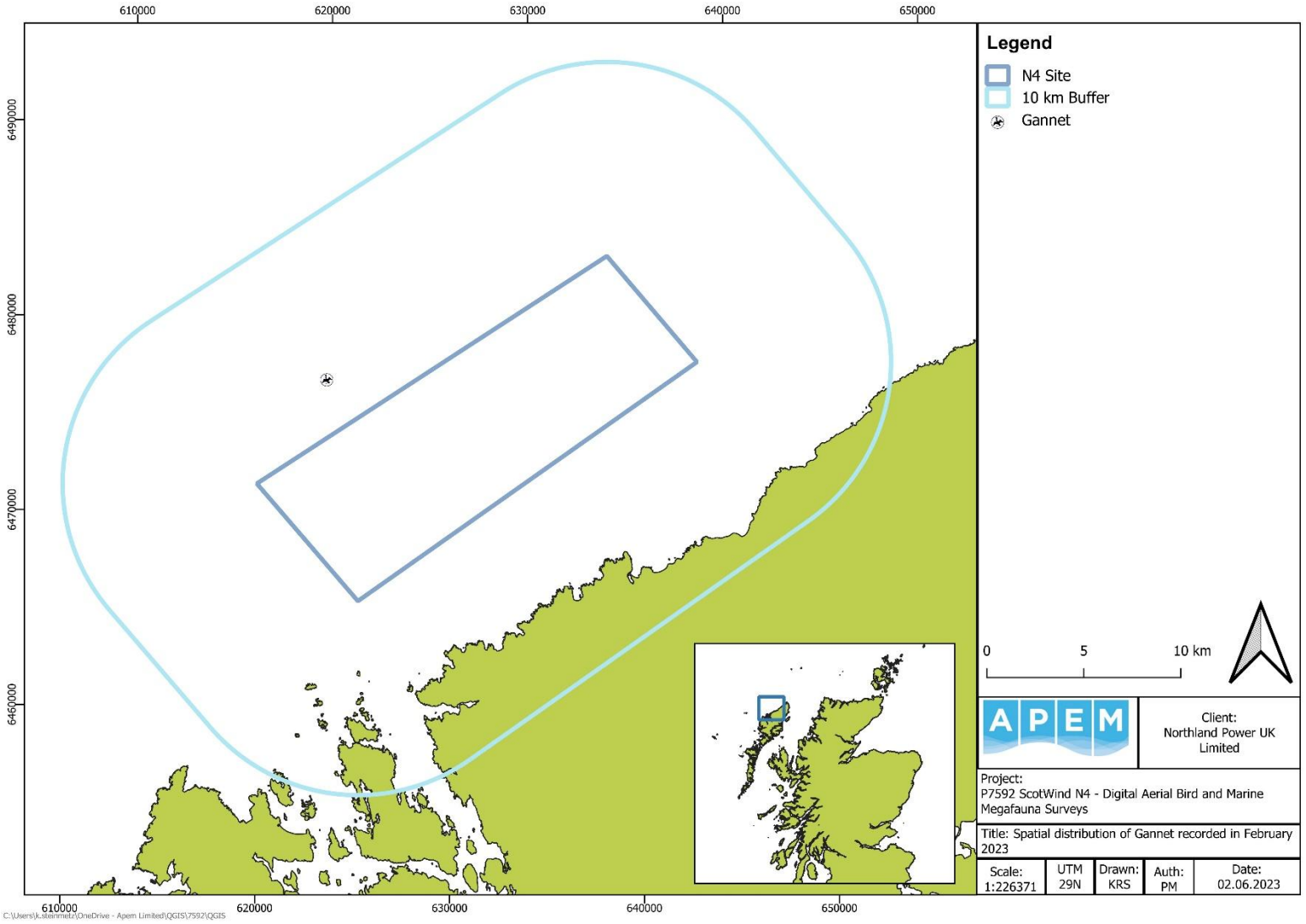


Figure 392 Distribution of gannet in February 2023
*Note that individuals in close proximity may appear overlaying.

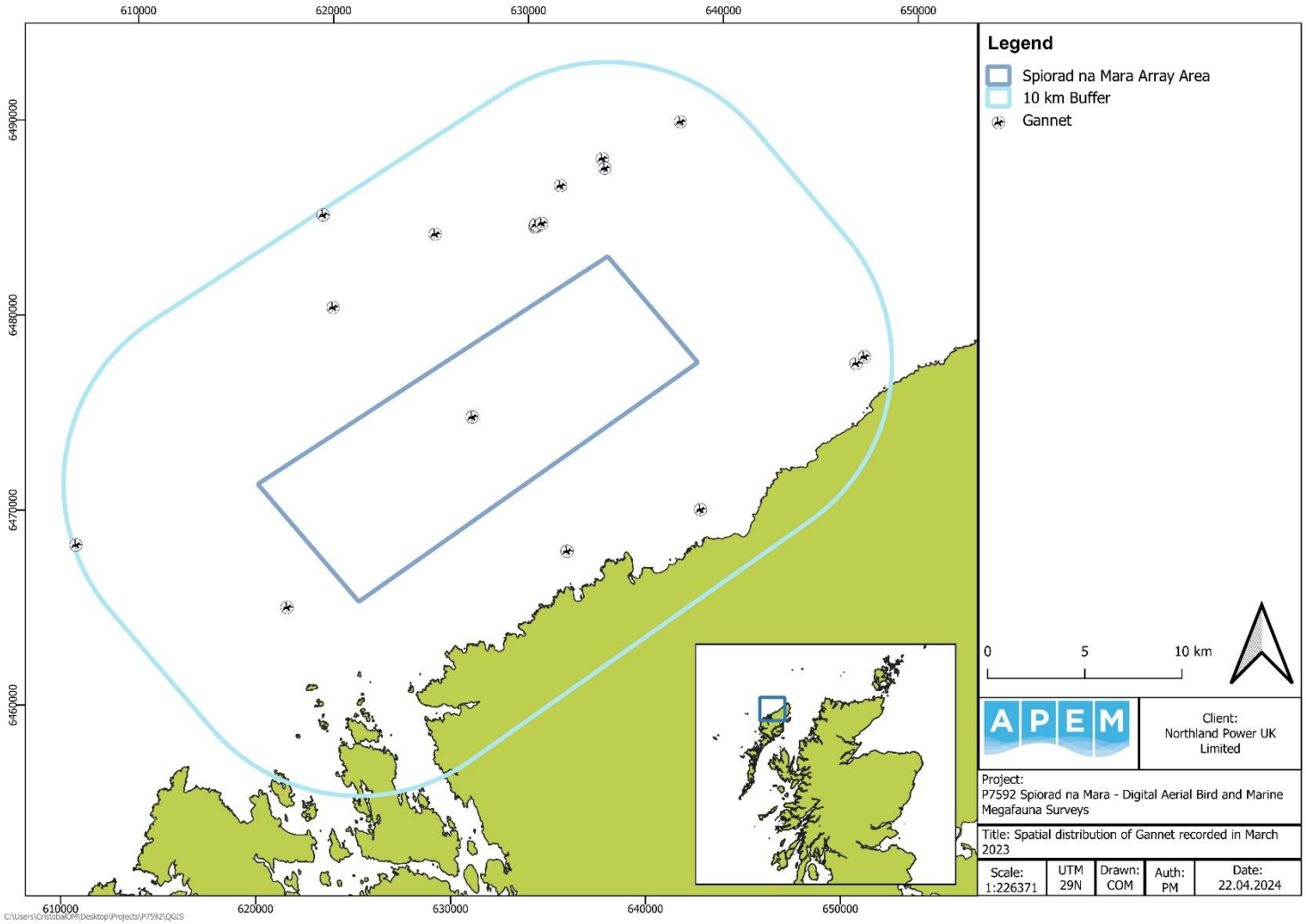


Figure 393 Distribution of gannet in March 2023
*Note that individuals in close proximity may appear overlaying.

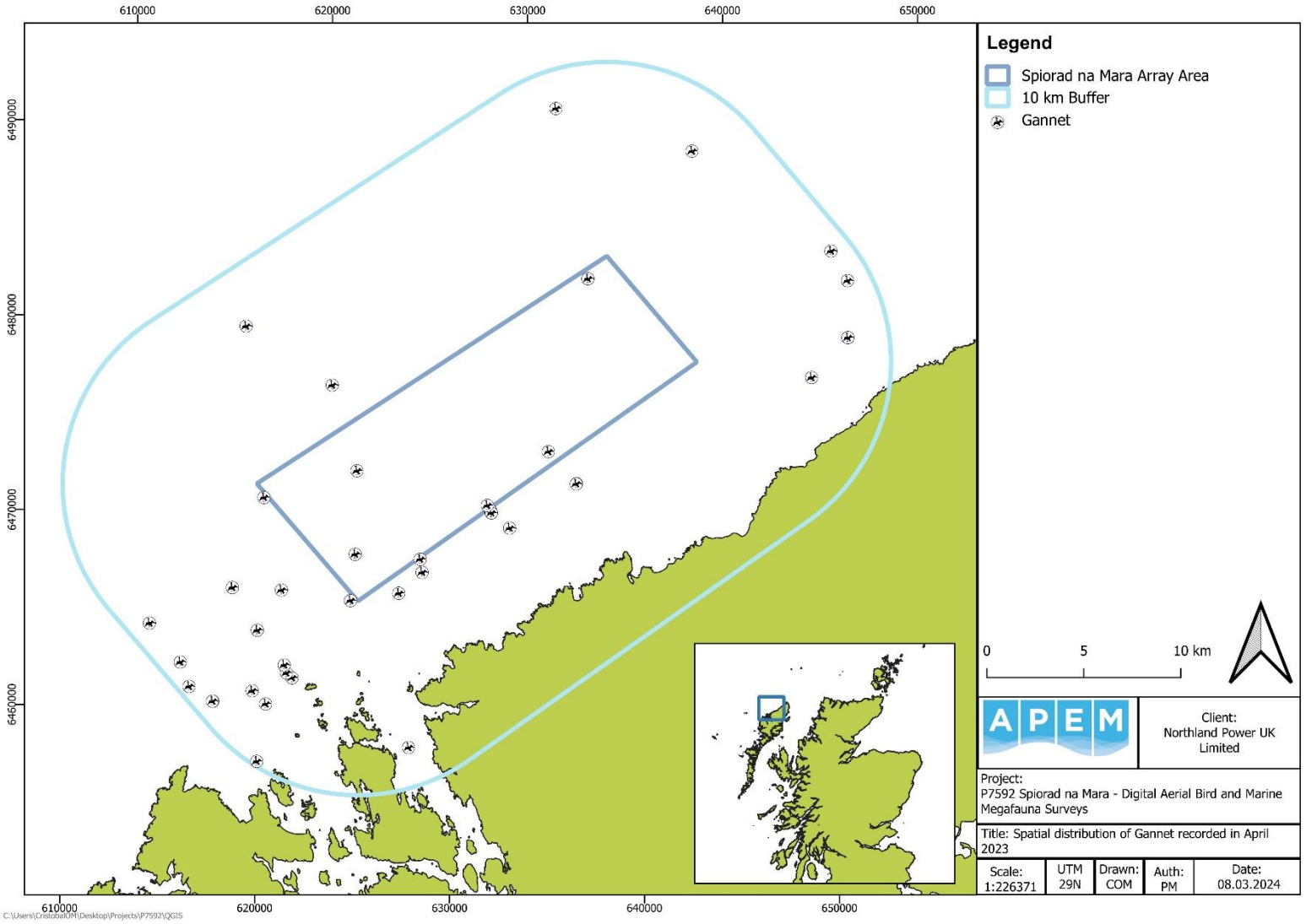


Figure 394 Distribution of gannet in April 2023
*Note that individuals in close proximity may appear overlaying.

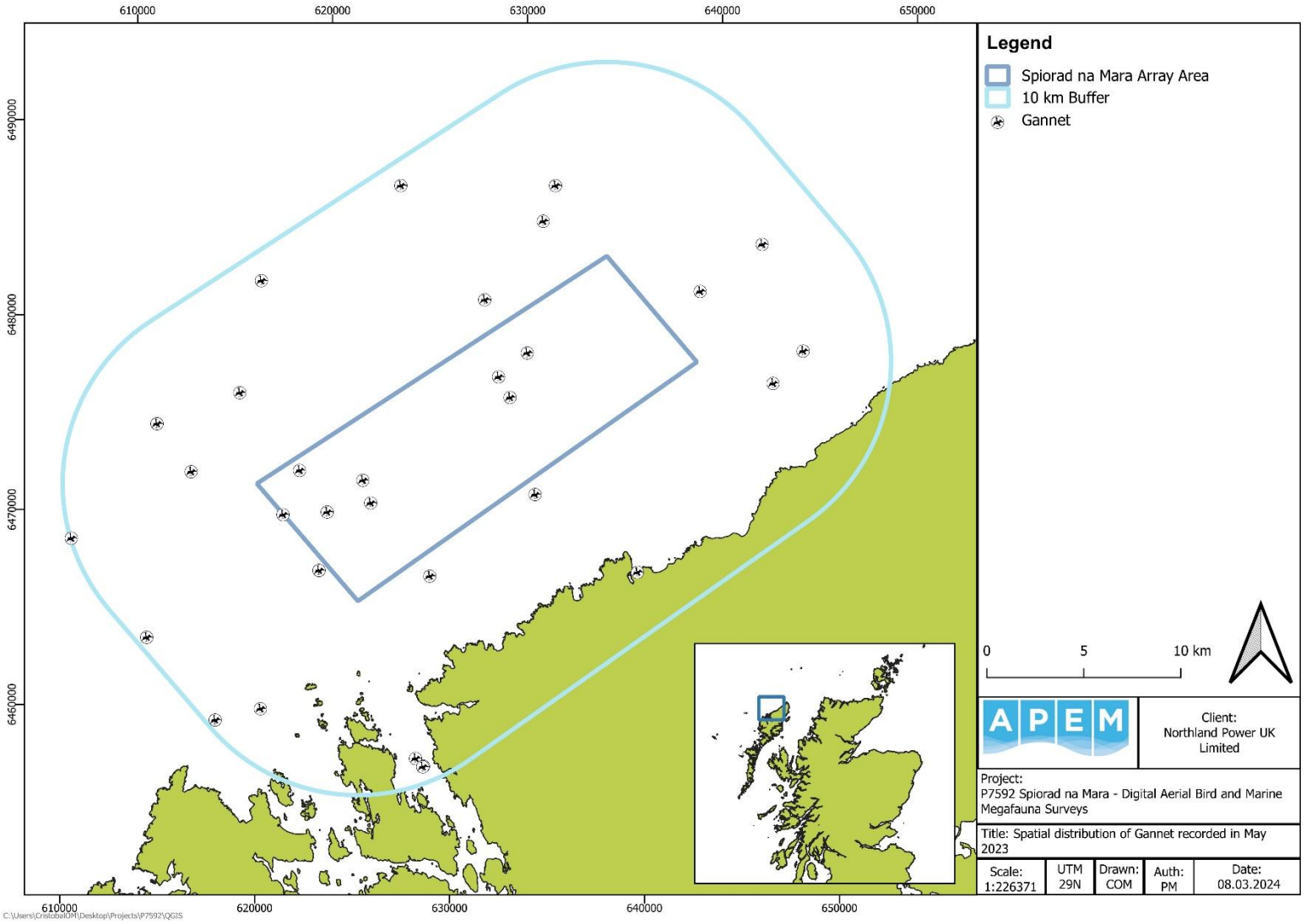


Figure 395 Distribution of gannet in May 2023
*Note that individuals in close proximity may appear overlaying.

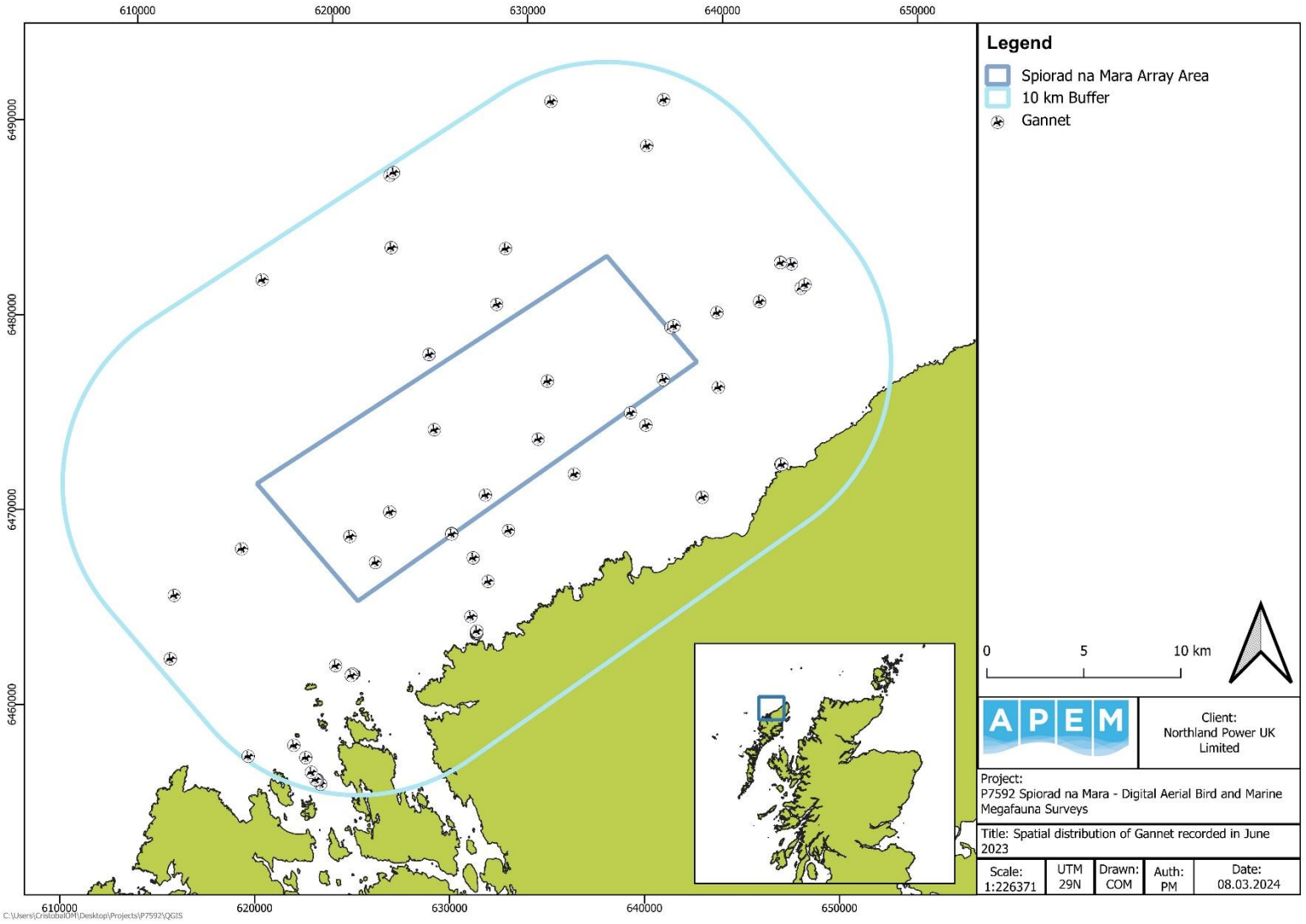


Figure 396 Distribution of gannet in June 2023
*Note that individuals in close proximity may appear overlaying.

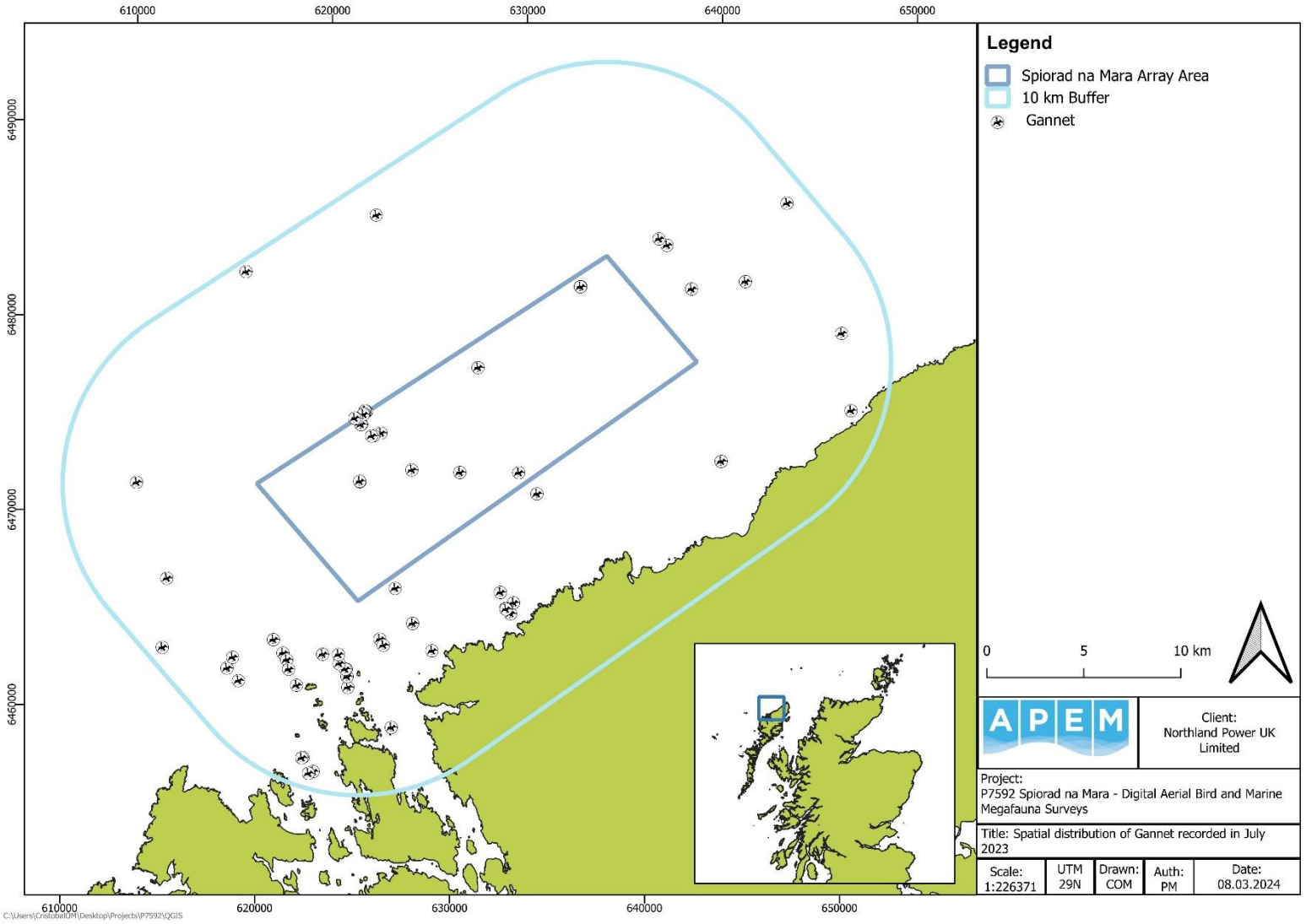


Figure 397 Distribution of gannet in July 2023
*Note that individuals in close proximity may appear overlaying.

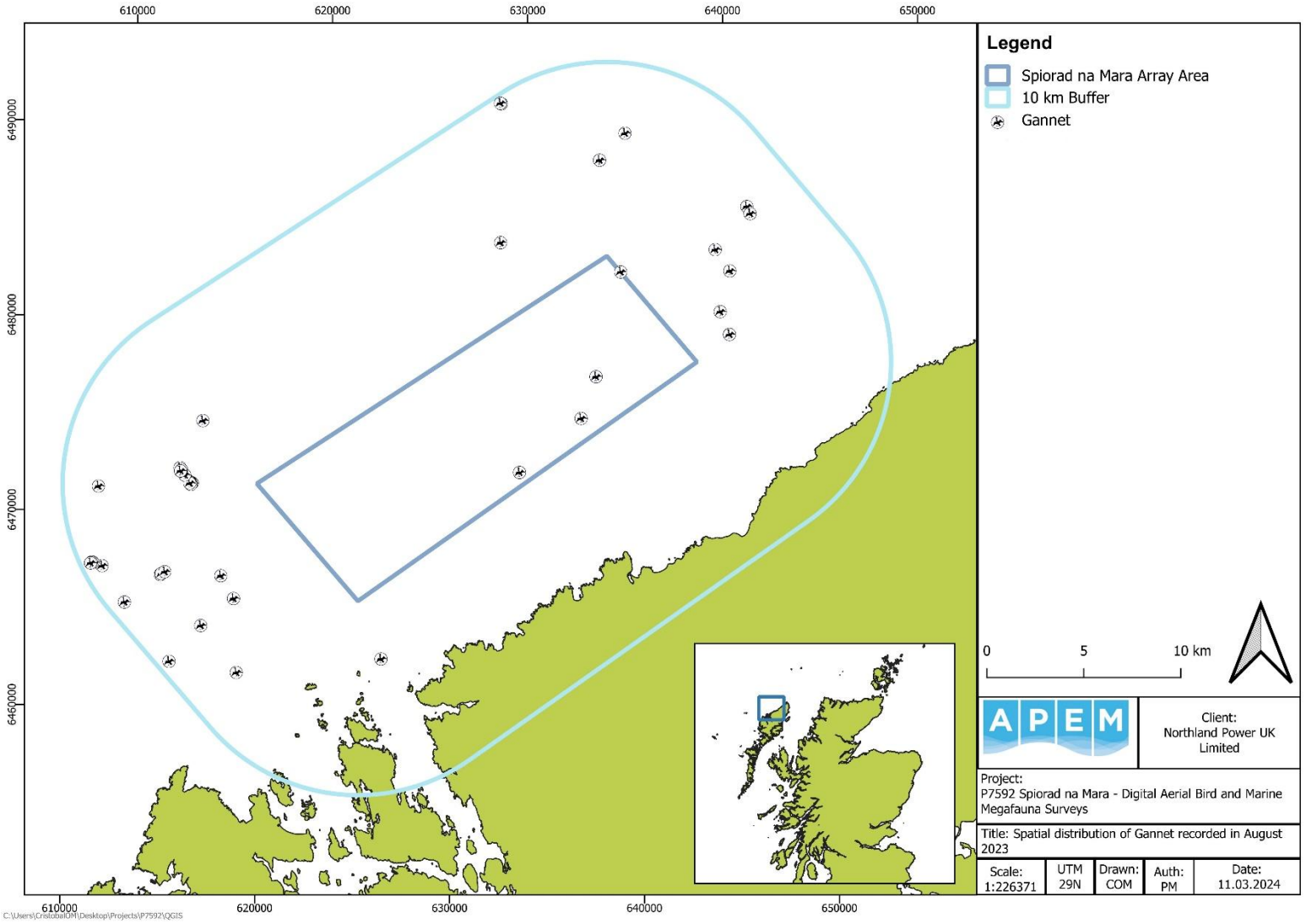


Figure 398 Distribution of gannet in August 2023
*Note that individuals in close proximity may appear overlaying.

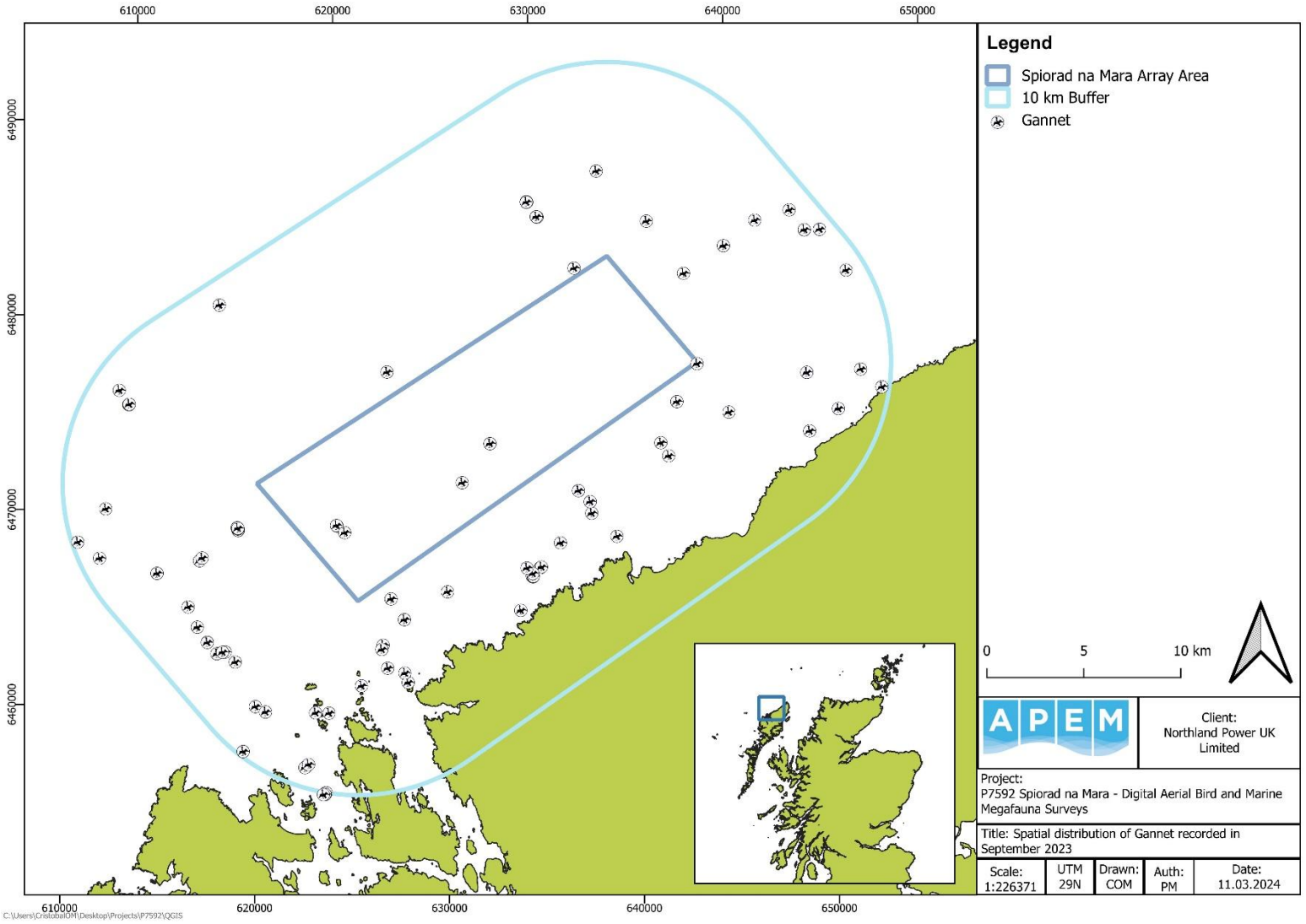


Figure 399 Distribution of gannet in September 2023
*Note that individuals in close proximity may appear overlaying.

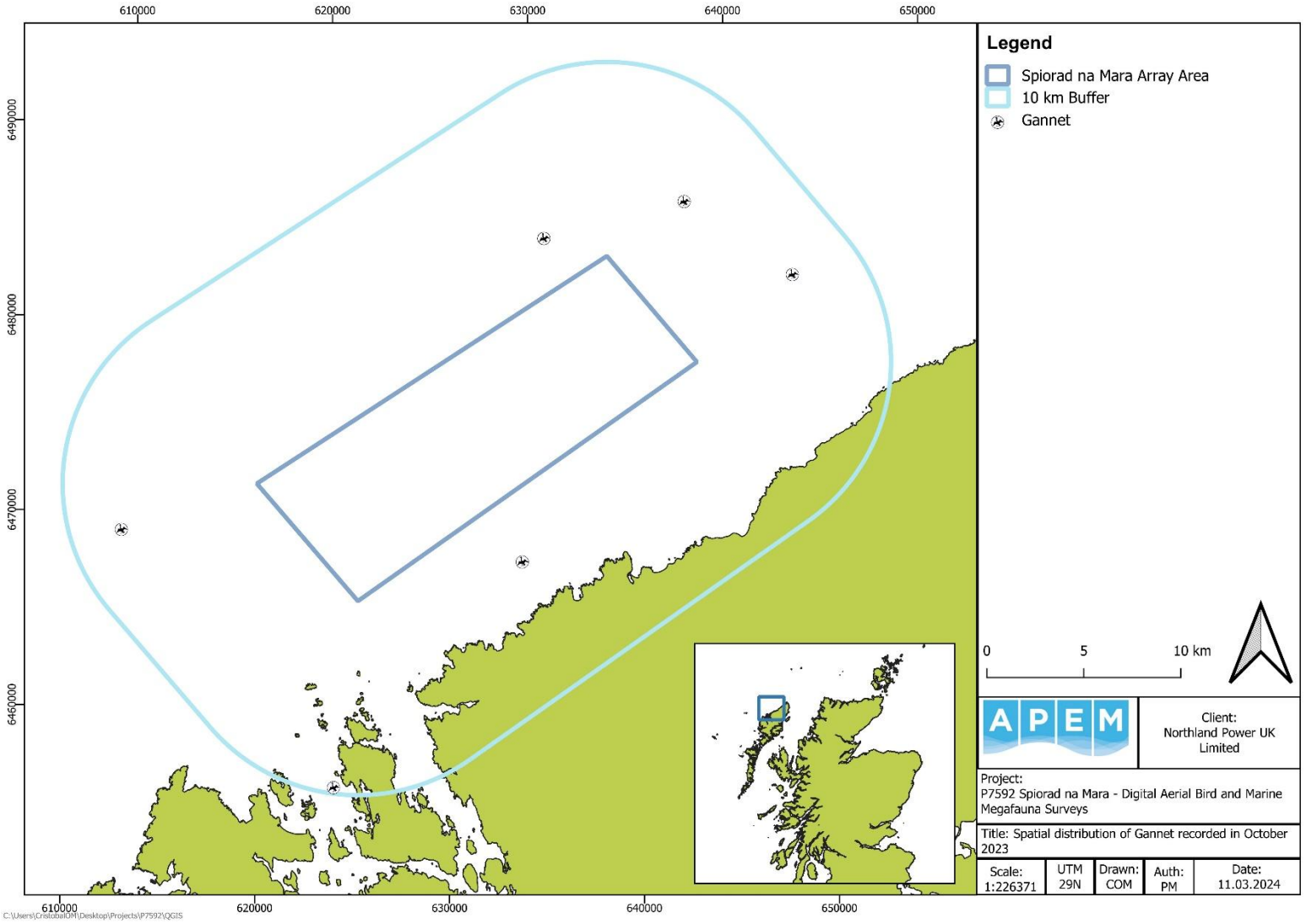


Figure 400 Distribution of gannet in October 2023
*Note that individuals in close proximity may appear overlaying.

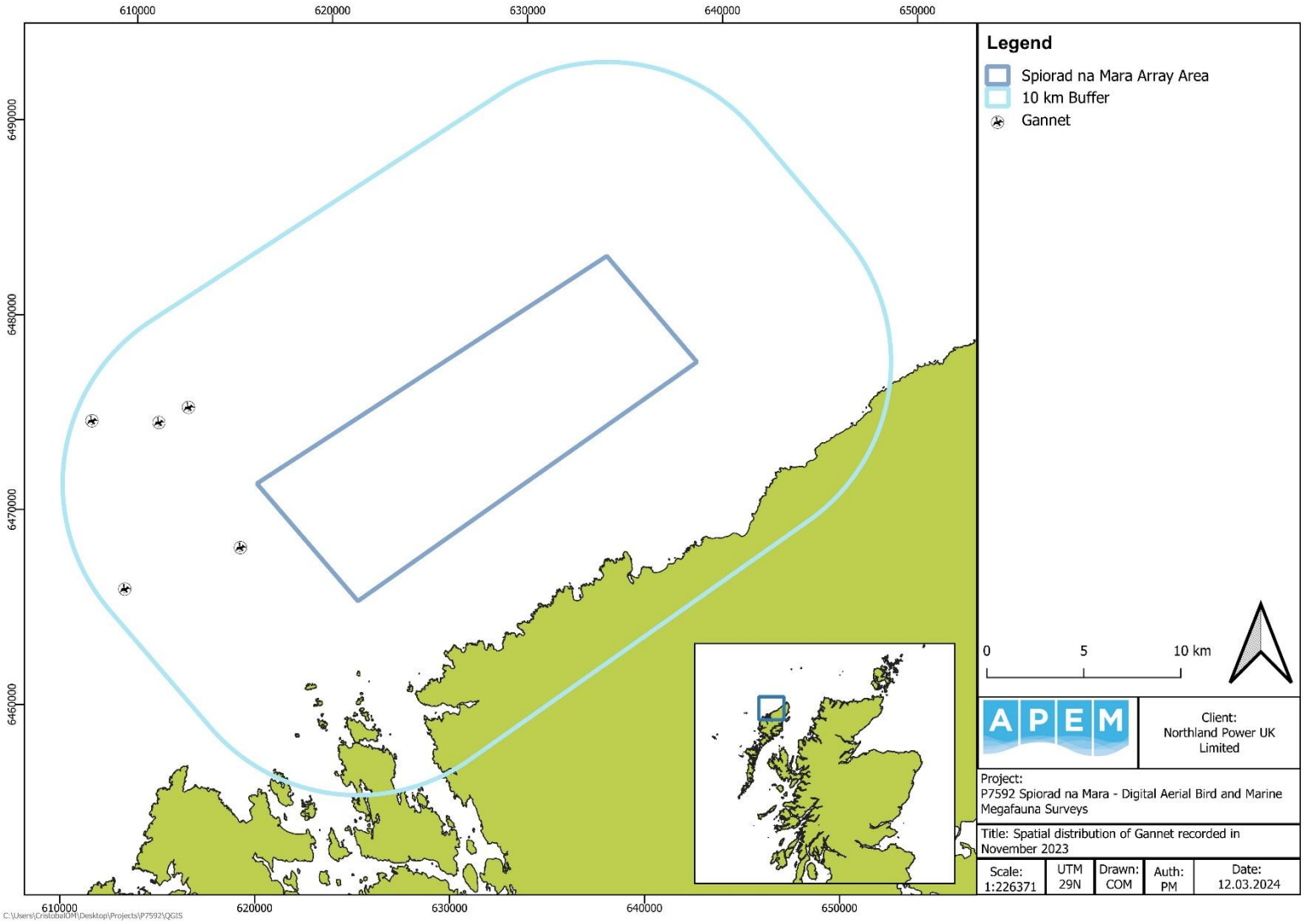


Figure 401 Distribution of gannet in November 2023

*Note that individuals in close proximity may appear overlaying.

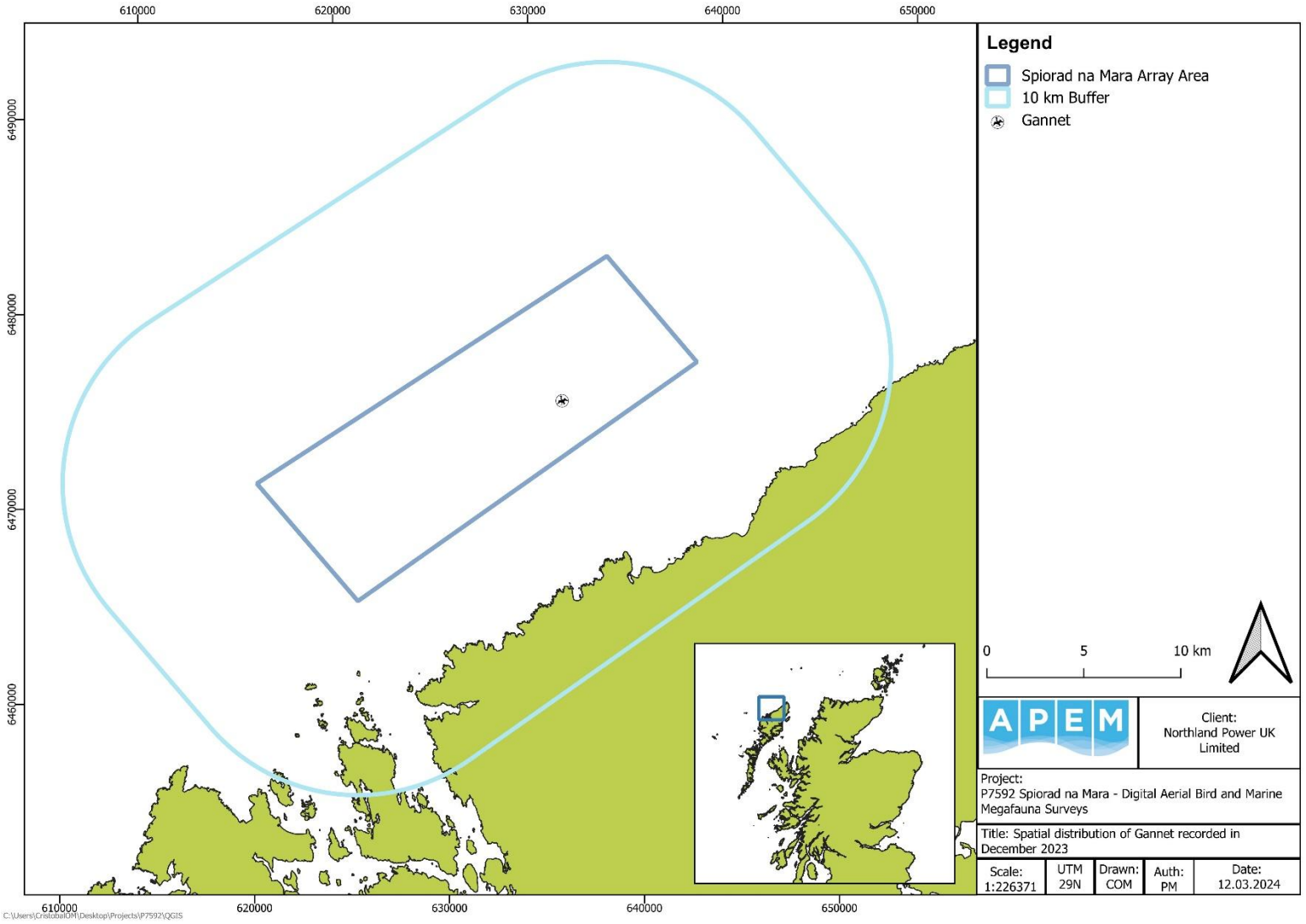


Figure 402 Distribution of gannet in December 2023

*Note that individuals in close proximity may appear overlaying.

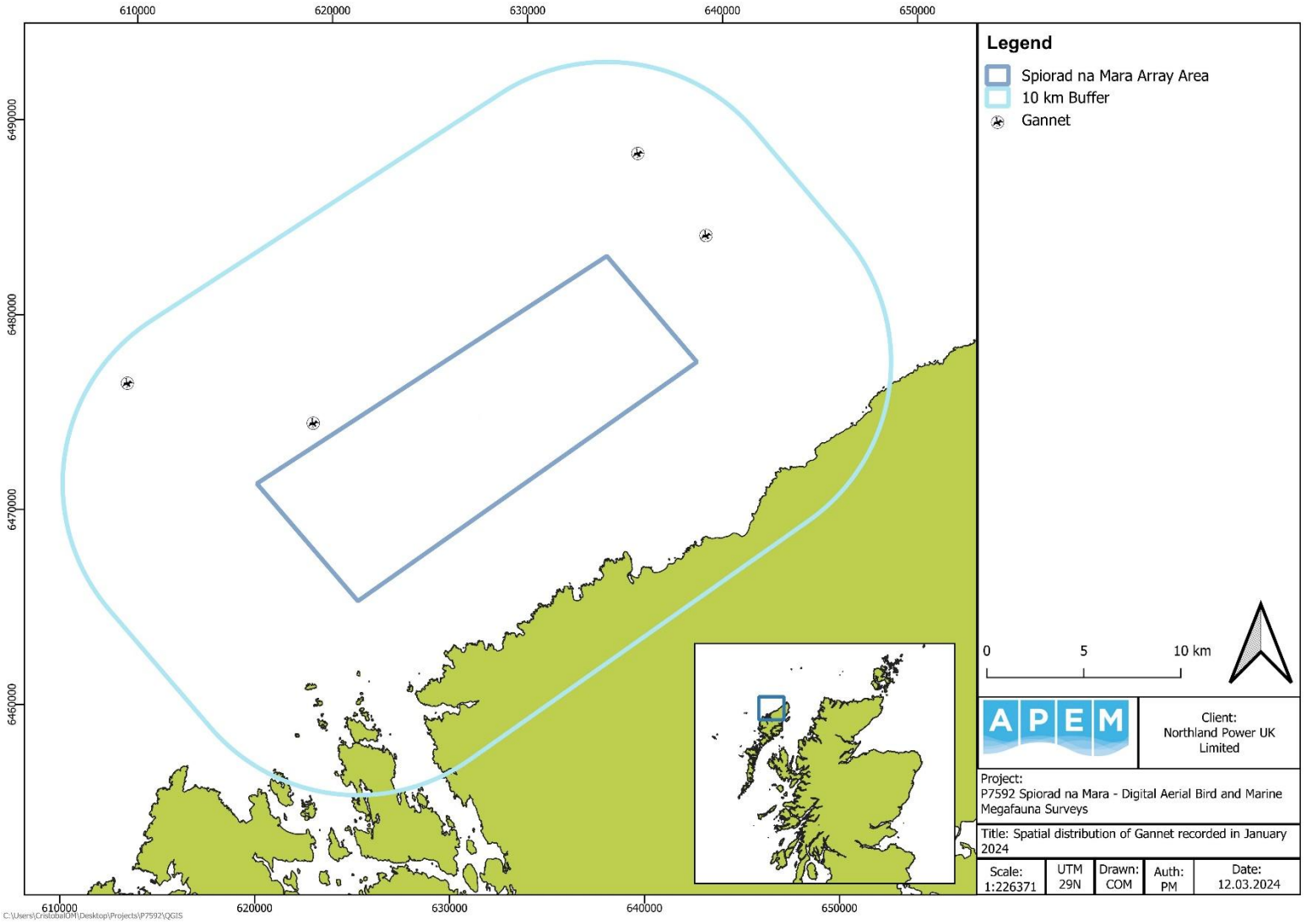


Figure 403 Distribution of gannet in January 2024
*Note that individuals in close proximity may appear overlaying.

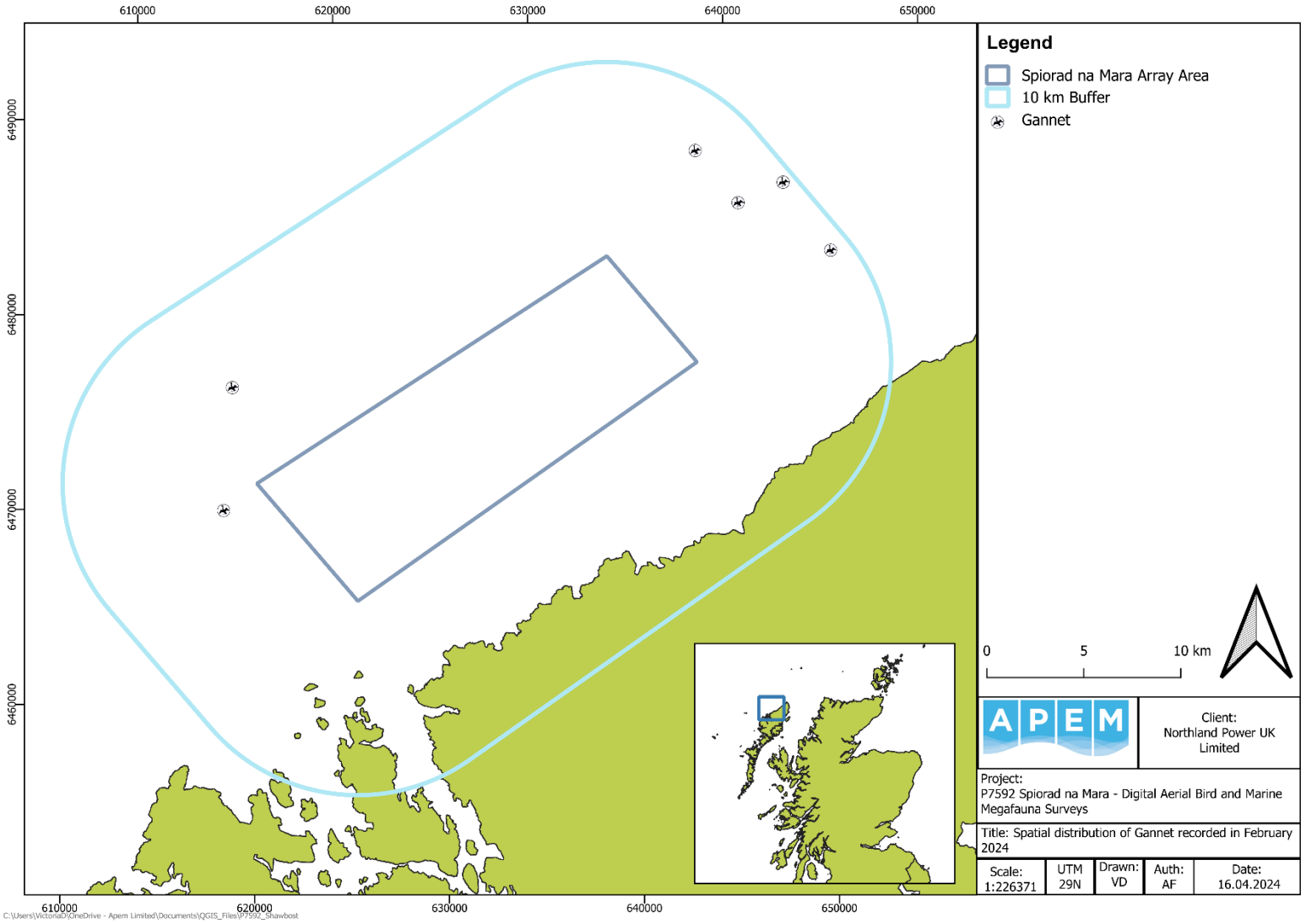


Figure 404 Distribution of gannet in February 2024
*Note that individuals in close proximity may appear overlaying.

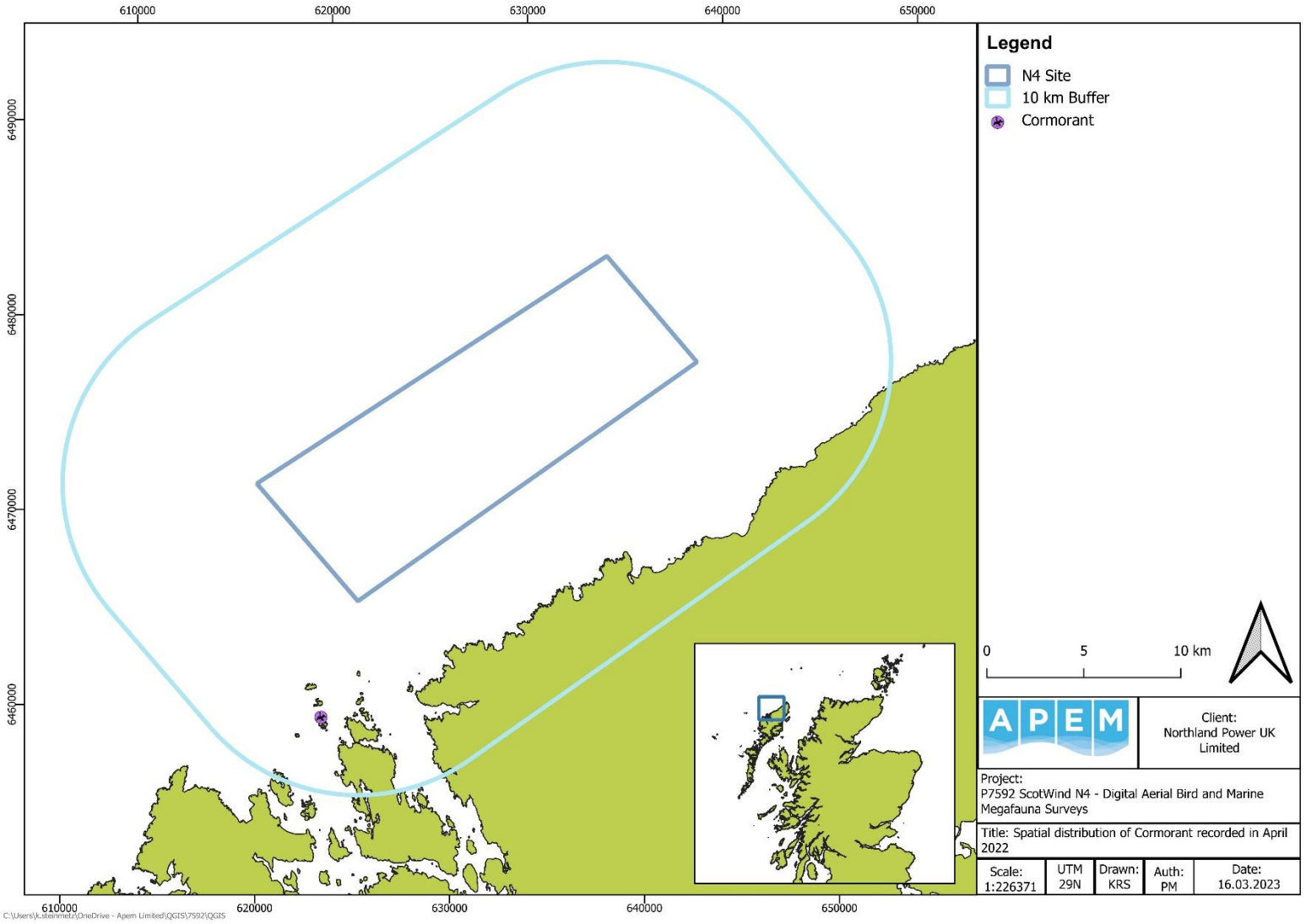


Figure 405 Distribution of cormorant in April 2022
*Note that individuals in close proximity may appear overlaying.

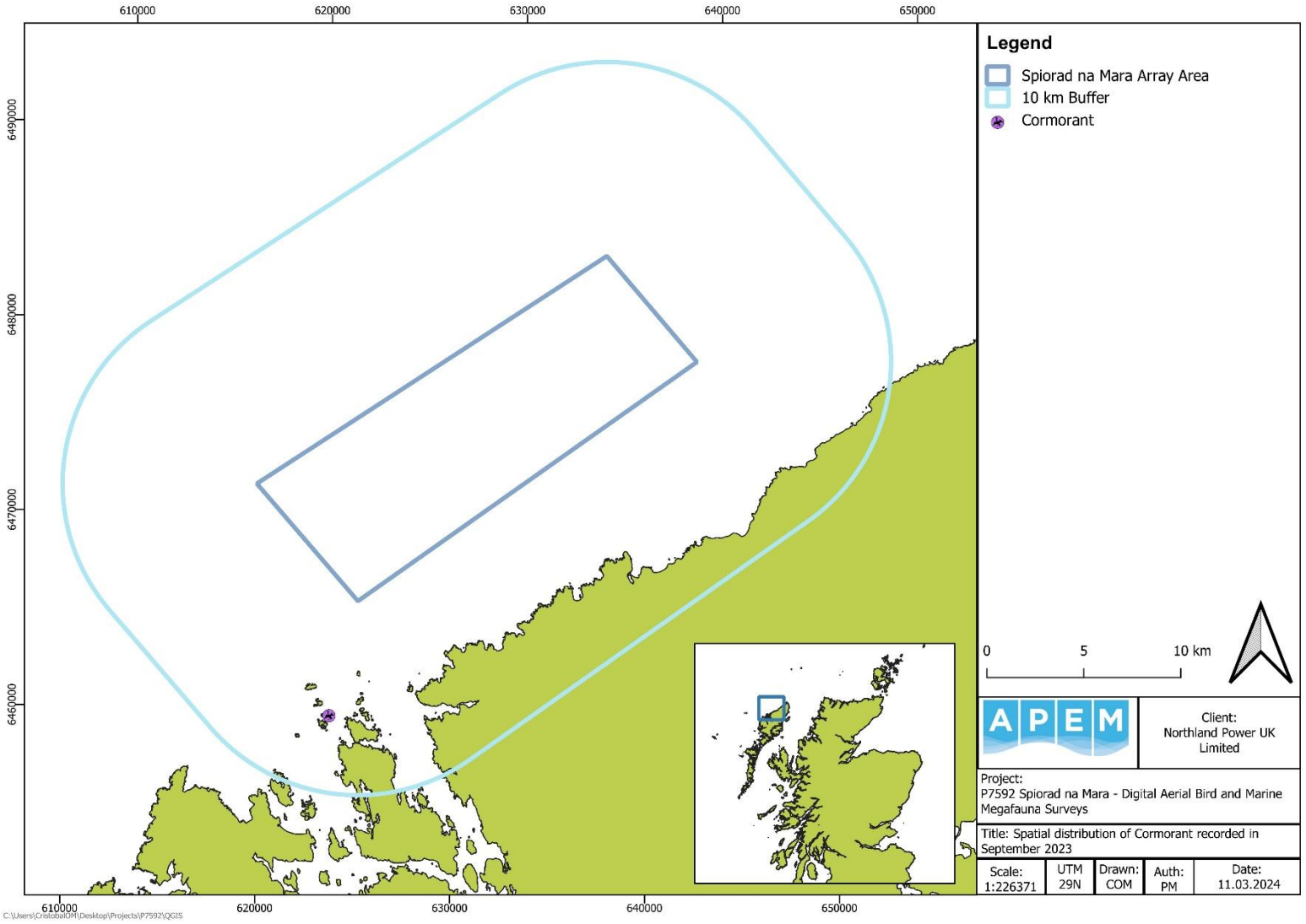


Figure 406 Distribution of cormorant in September 2023

*Note that individuals in close proximity may appear overlaying.

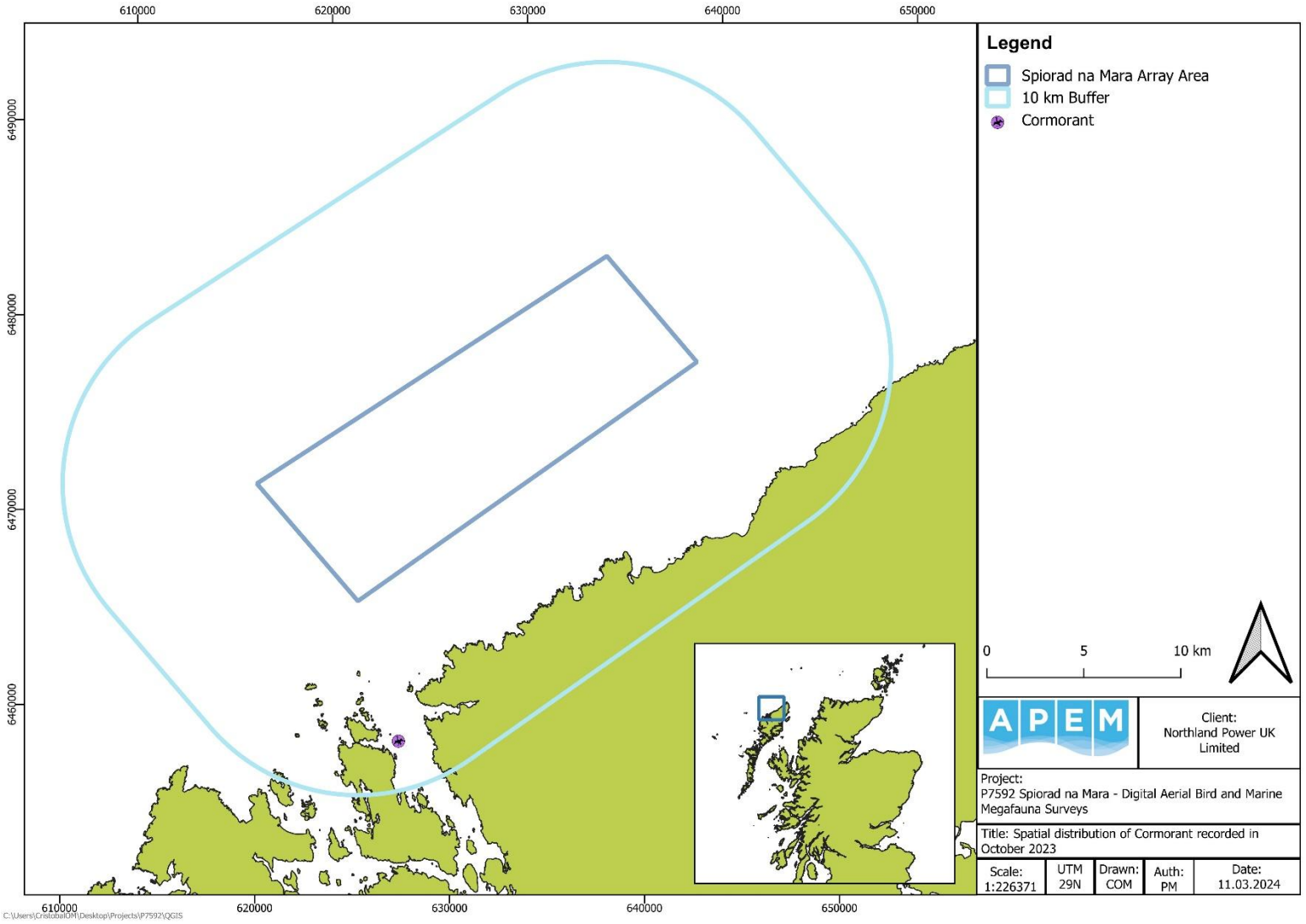


Figure 407 Distribution of cormorant in October 2023

*Note that individuals in close proximity may appear overlaying.

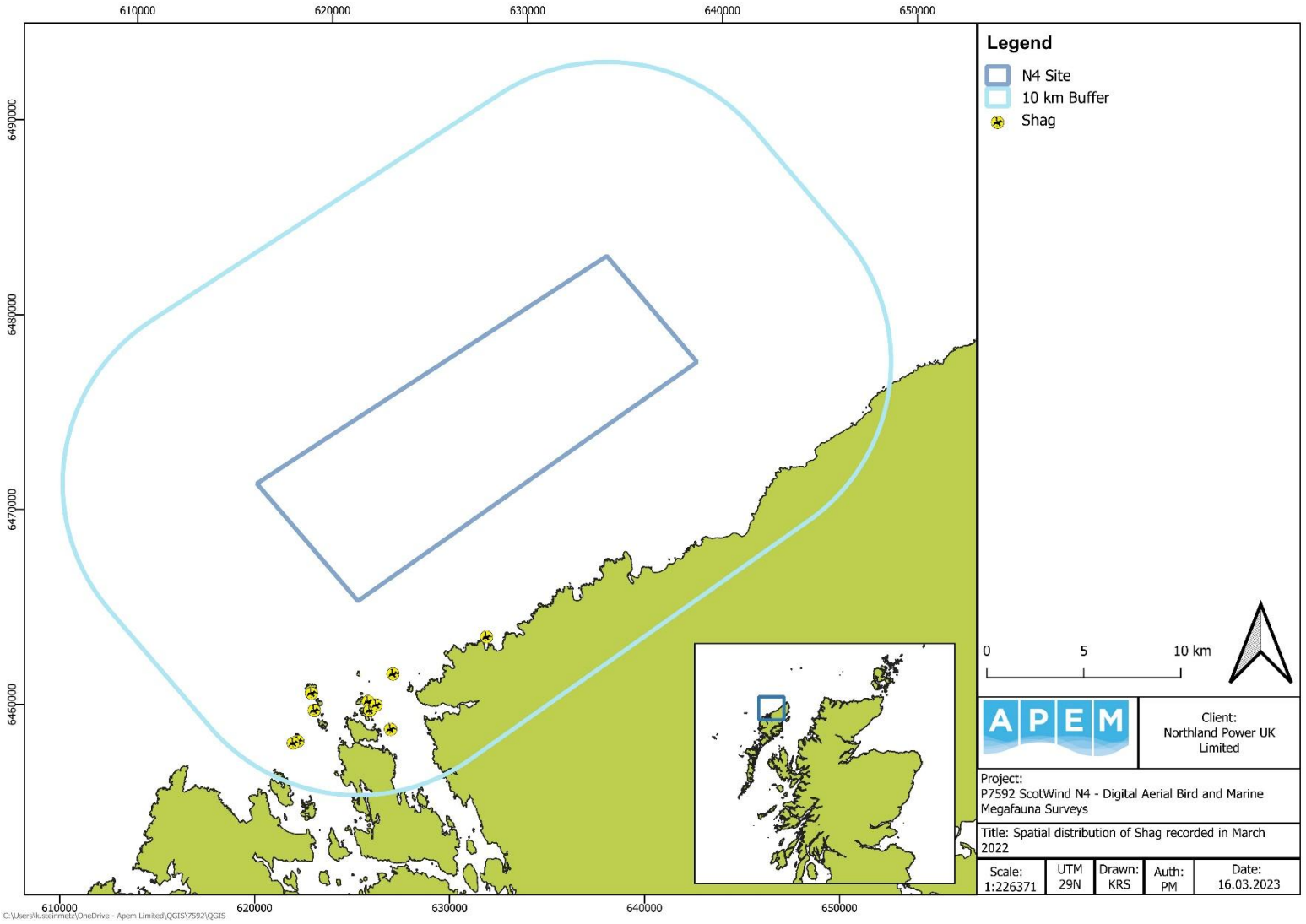


Figure 408 Distribution of shag in March 2022
*Note that individuals in close proximity may appear overlaying.

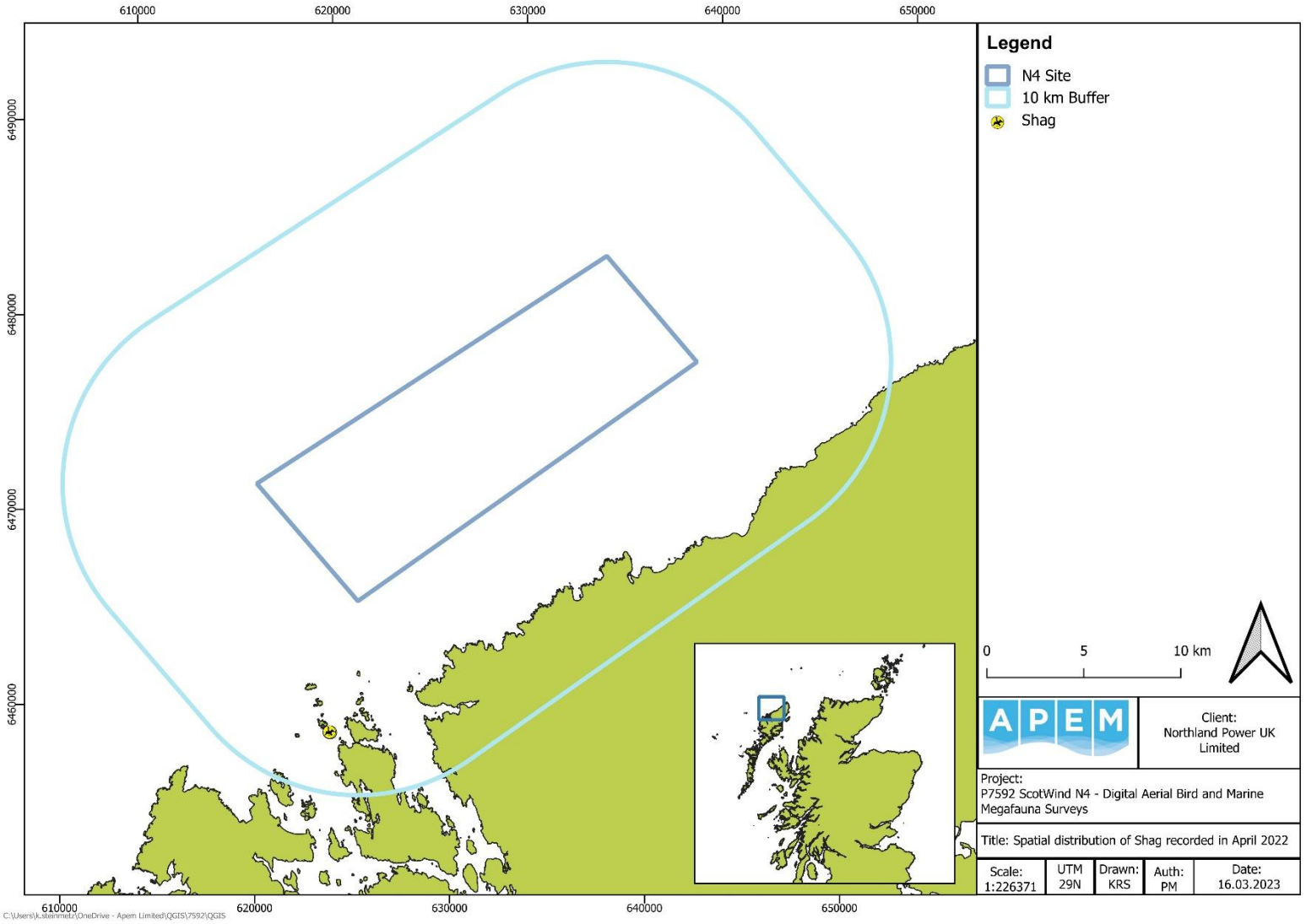


Figure 409 Distribution of shag in April 2022
*Note that individuals in close proximity may appear overlaying.

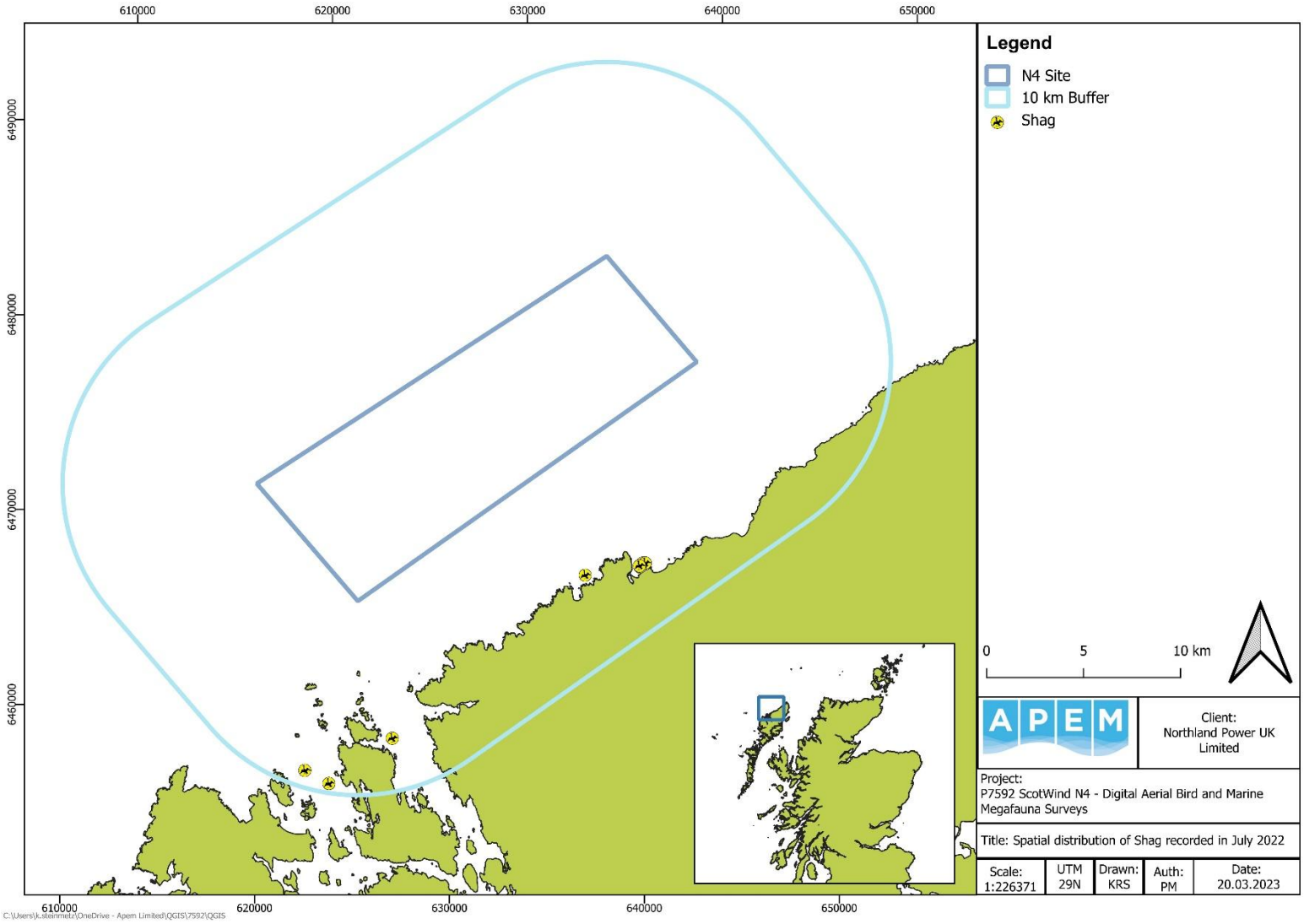


Figure 410 Distribution of shag in July 2022
*Note that individuals in close proximity may appear overlaying.

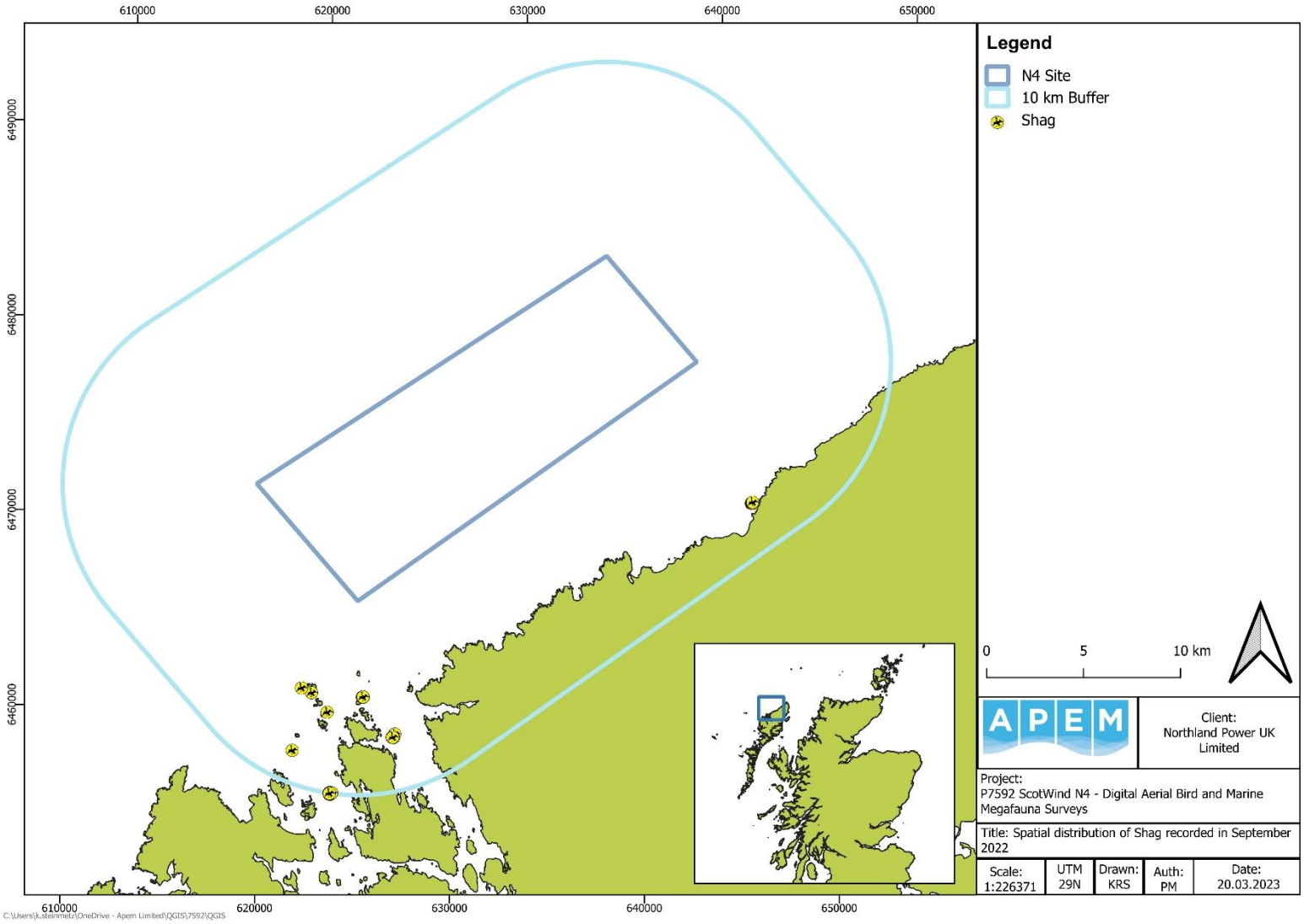


Figure 411 Distribution of shag in September 2022
*Note that individuals in close proximity may appear overlaying.

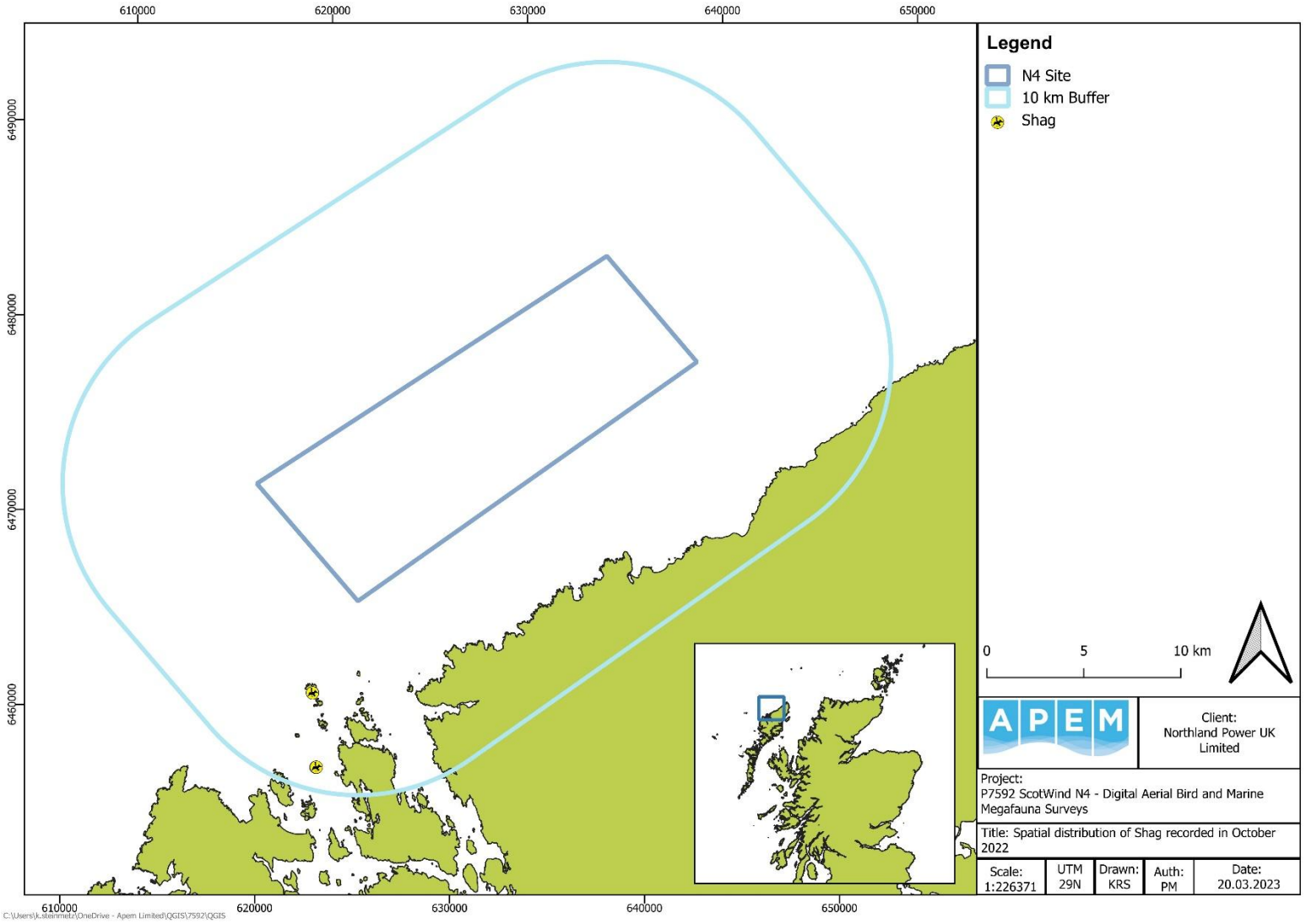


Figure 412 Distribution of shag in October 2022
*Note that individuals in close proximity may appear overlaying.

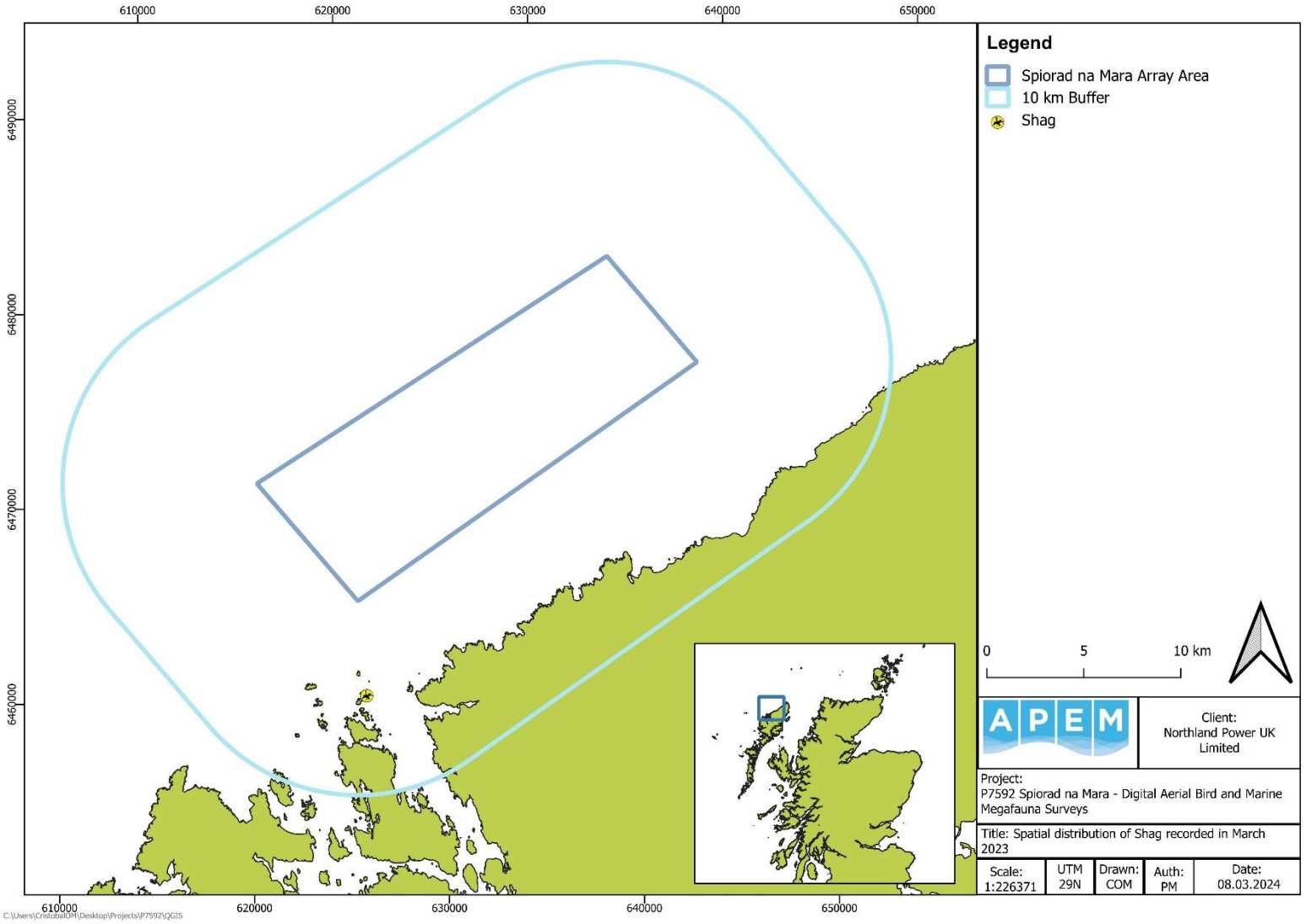


Figure 413 Distribution of shag in March 2023
*Note that individuals in close proximity may appear overlaying.

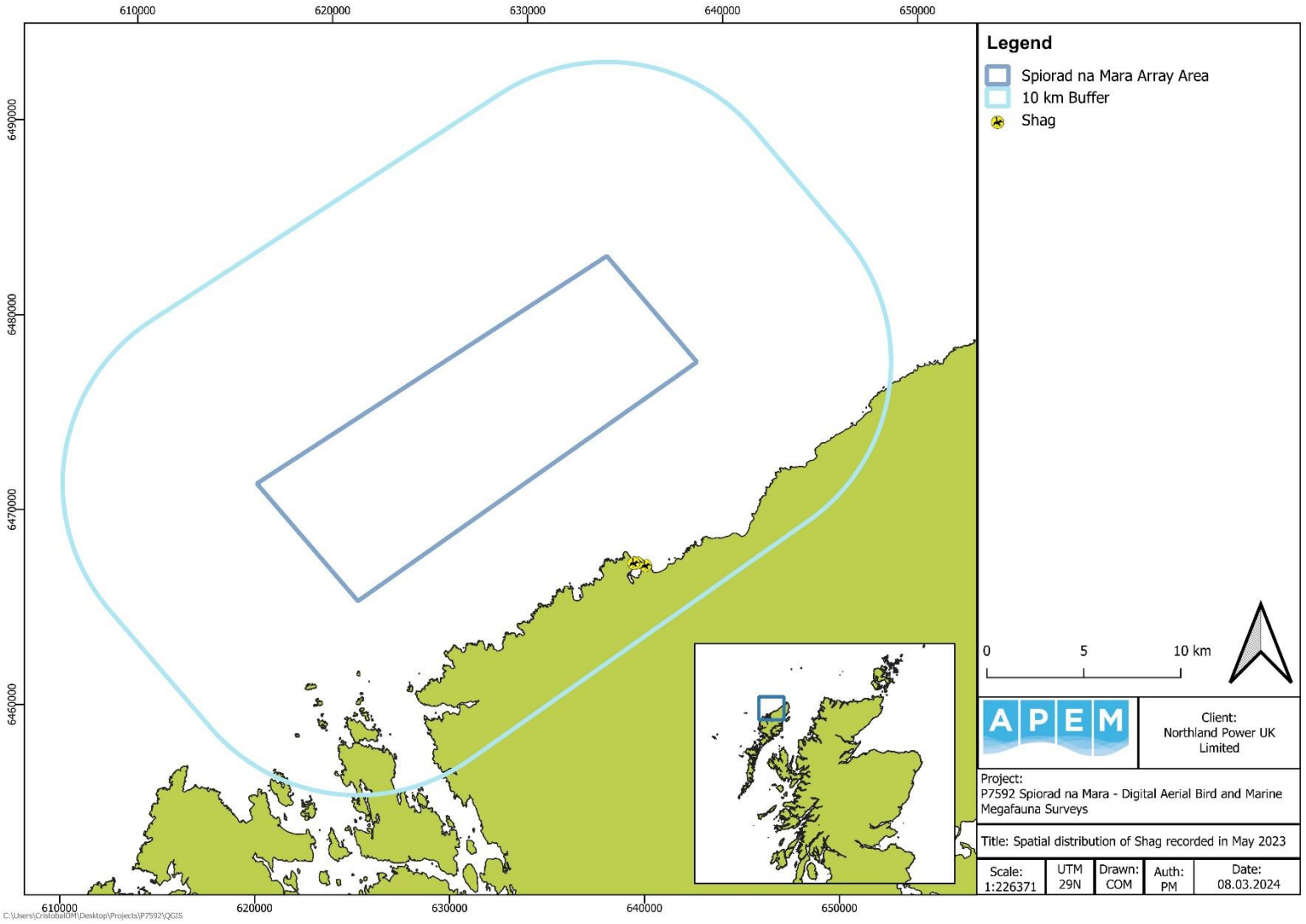


Figure 414 Distribution of shag in May 2023
*Note that individuals in close proximity may appear overlaying.

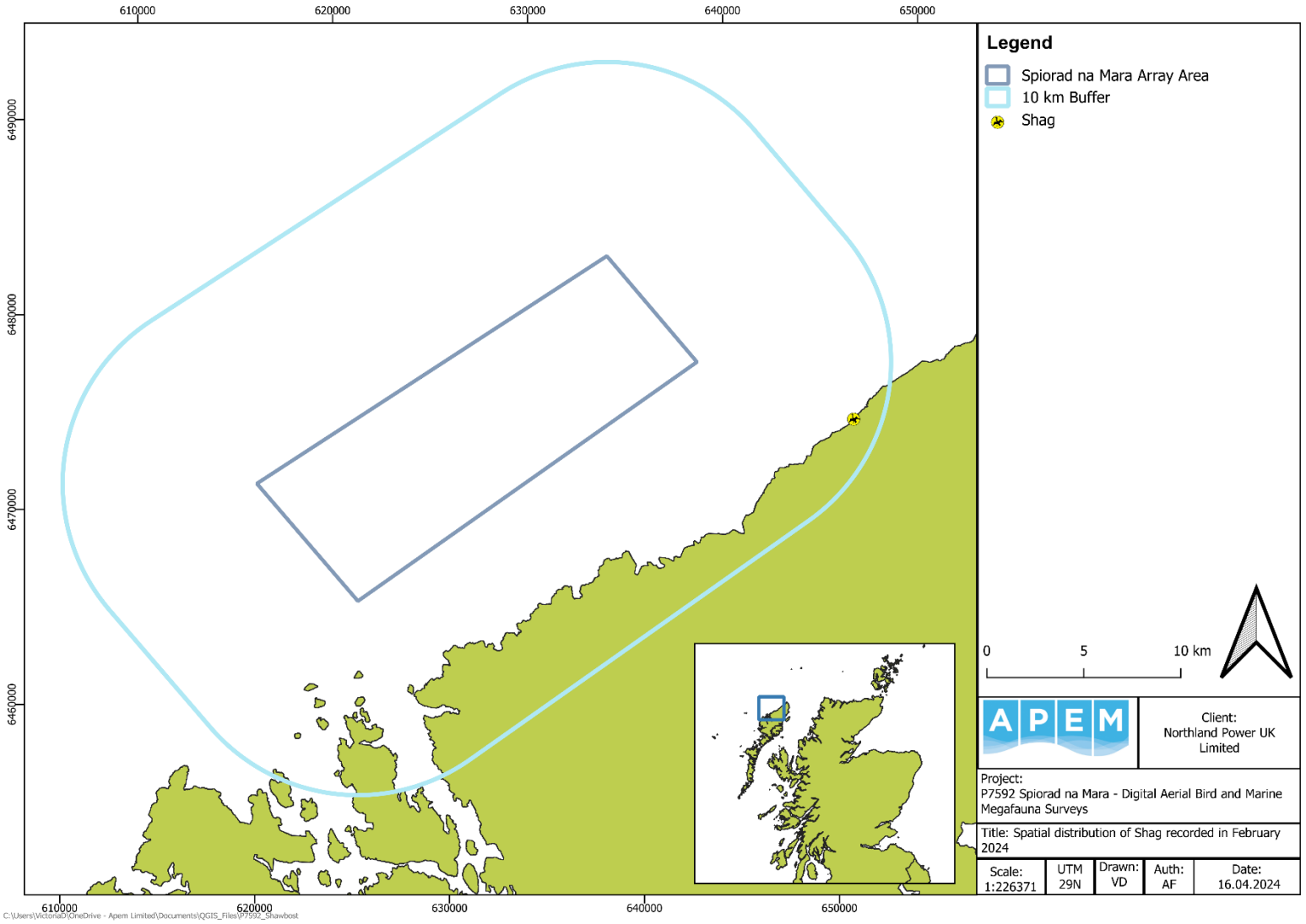


Figure 415 Distribution of shag in February 2024
*Note that individuals in close proximity may appear overlaying.

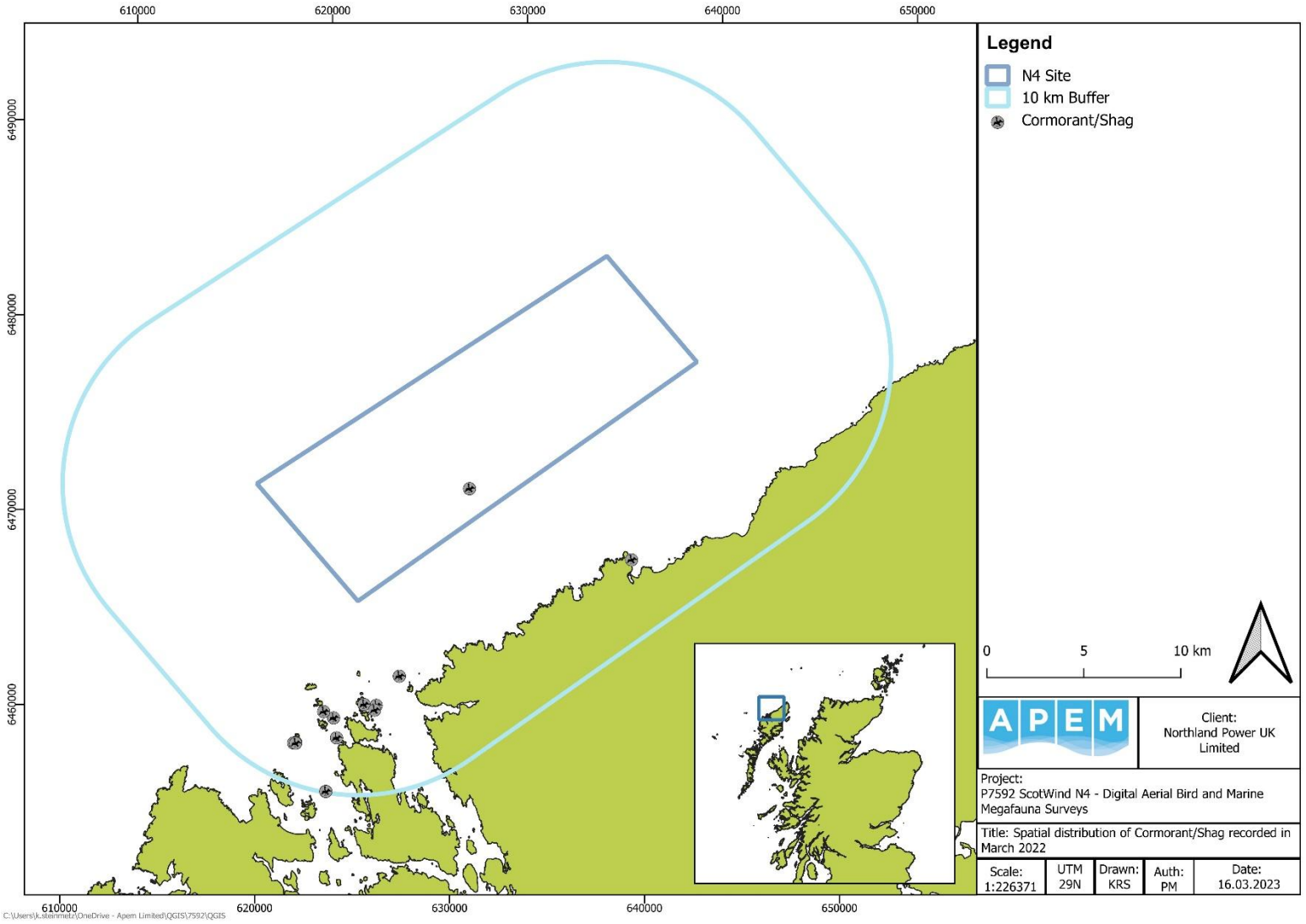


Figure 416 Distribution of cormorant / shag in March 2022

*Note that individuals in close proximity may appear overlaying.

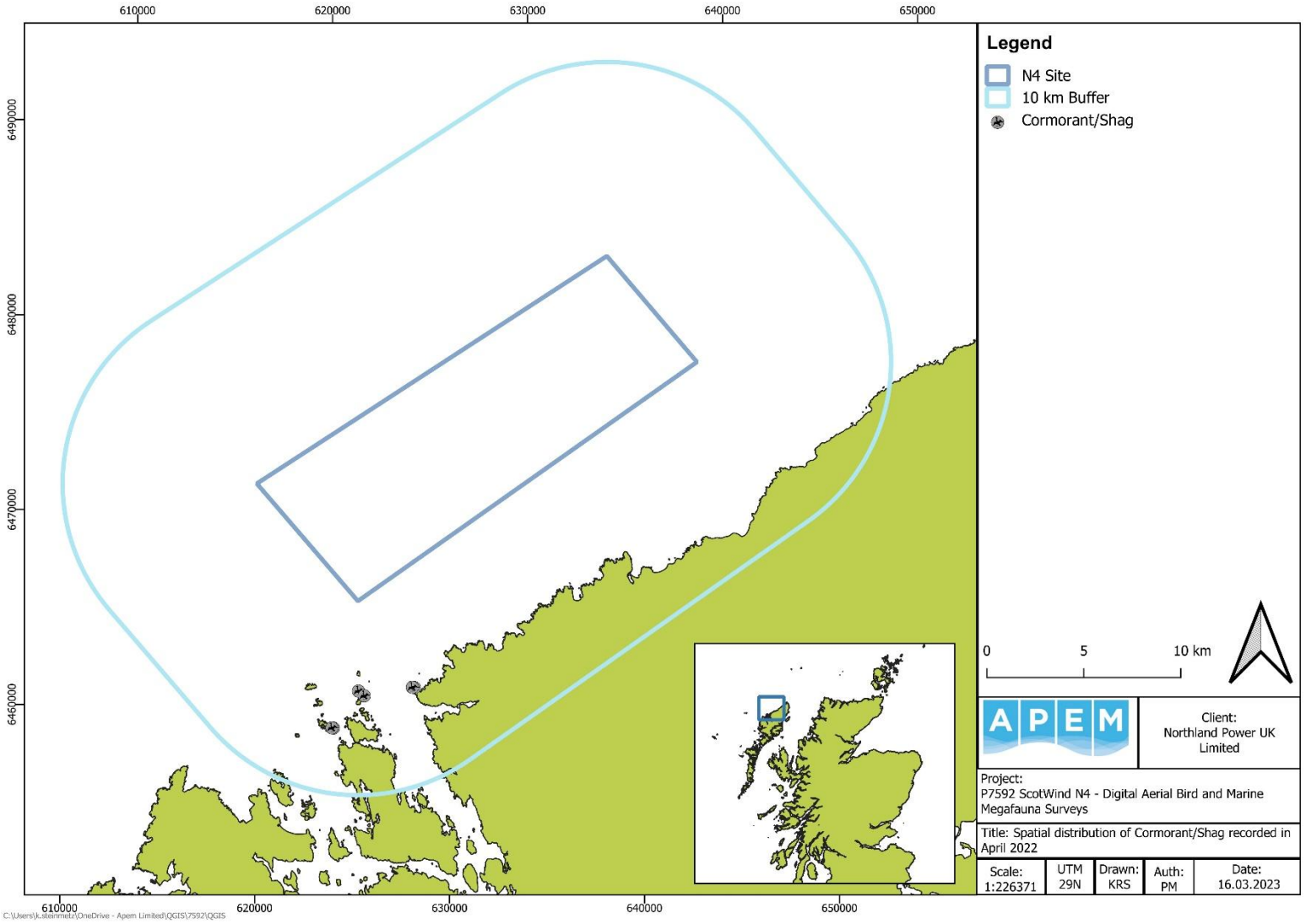


Figure 417 Distribution of cormorant / shag in April 2022

*Note that individuals in close proximity may appear overlaying.

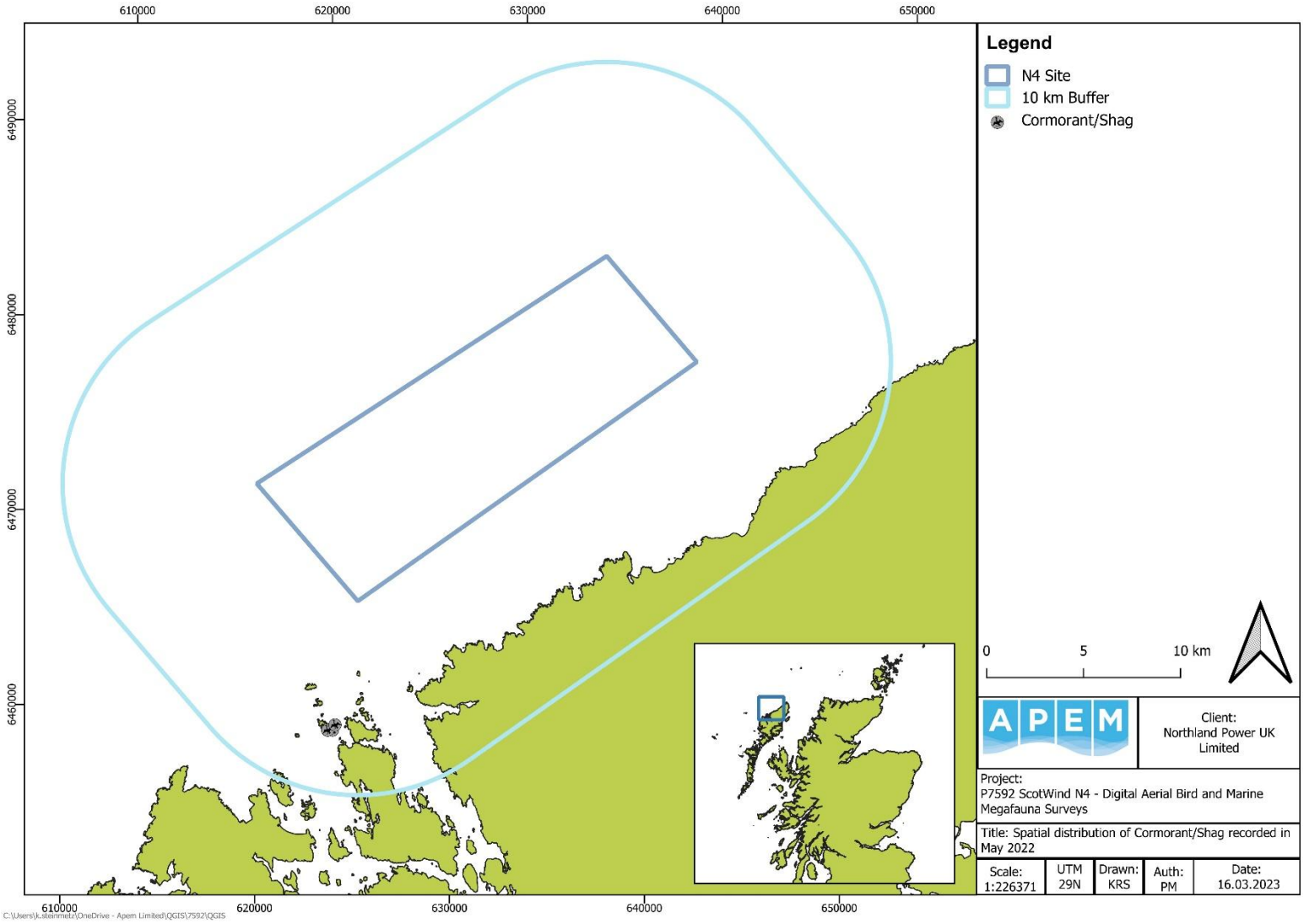


Figure 418 Distribution of cormorant / shag in May 2022

*Note that individuals in close proximity may appear overlaying.

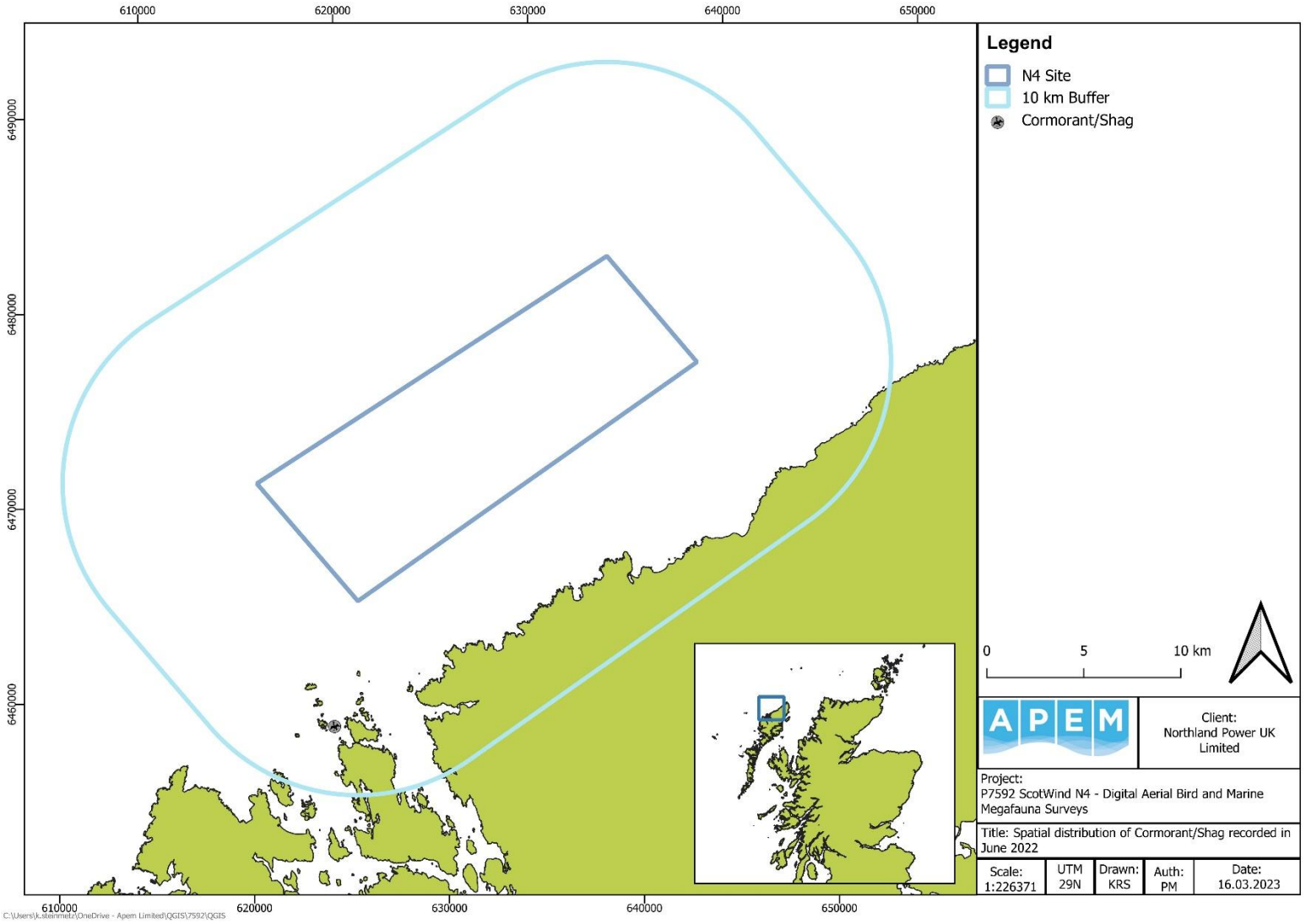


Figure 419 Distribution of cormorant / shag in June 2022

*Note that individuals in close proximity may appear overlaying.

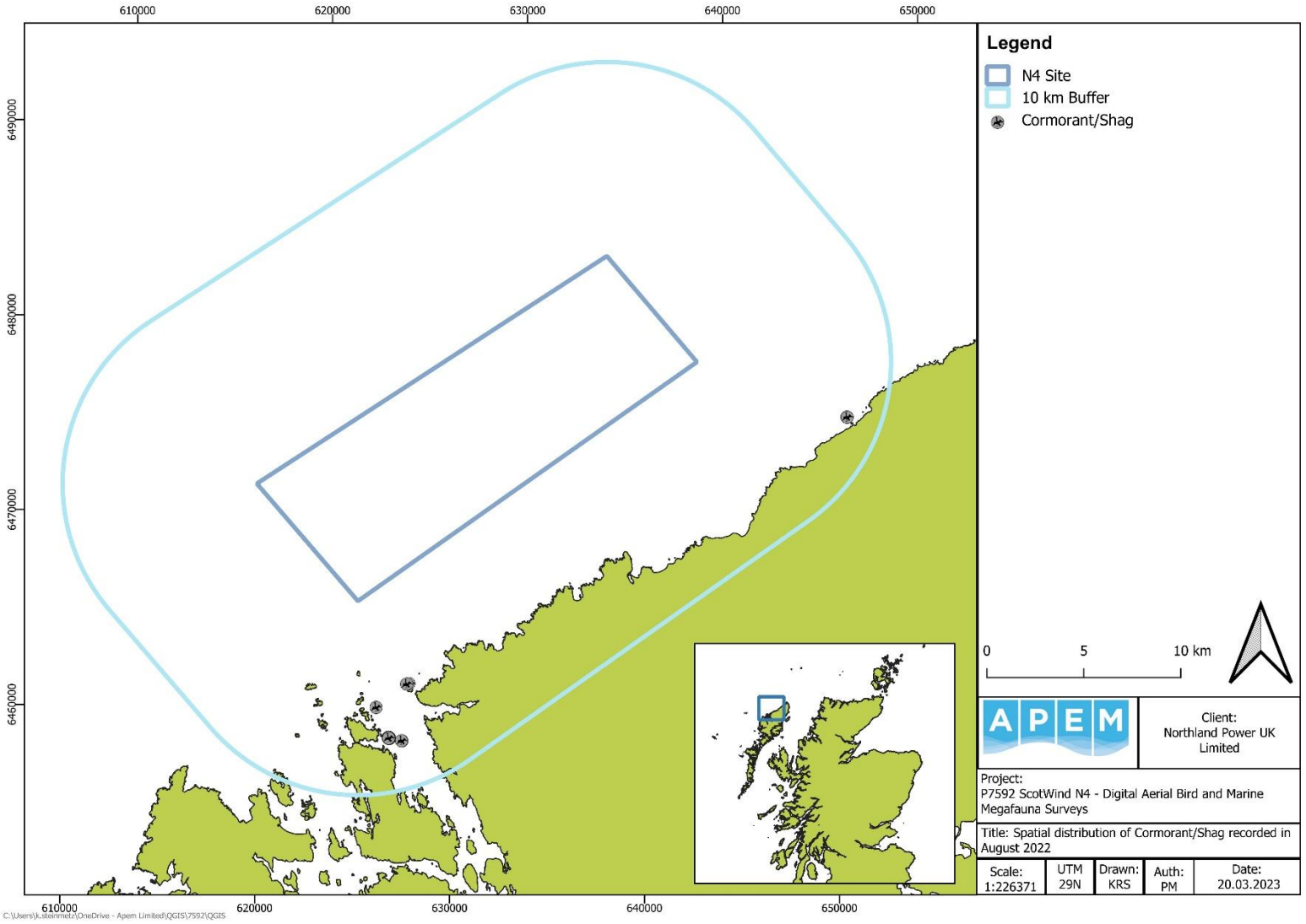


Figure 420 Distribution of cormorant / shag in August 2022

*Note that individuals in close proximity may appear overlaying.

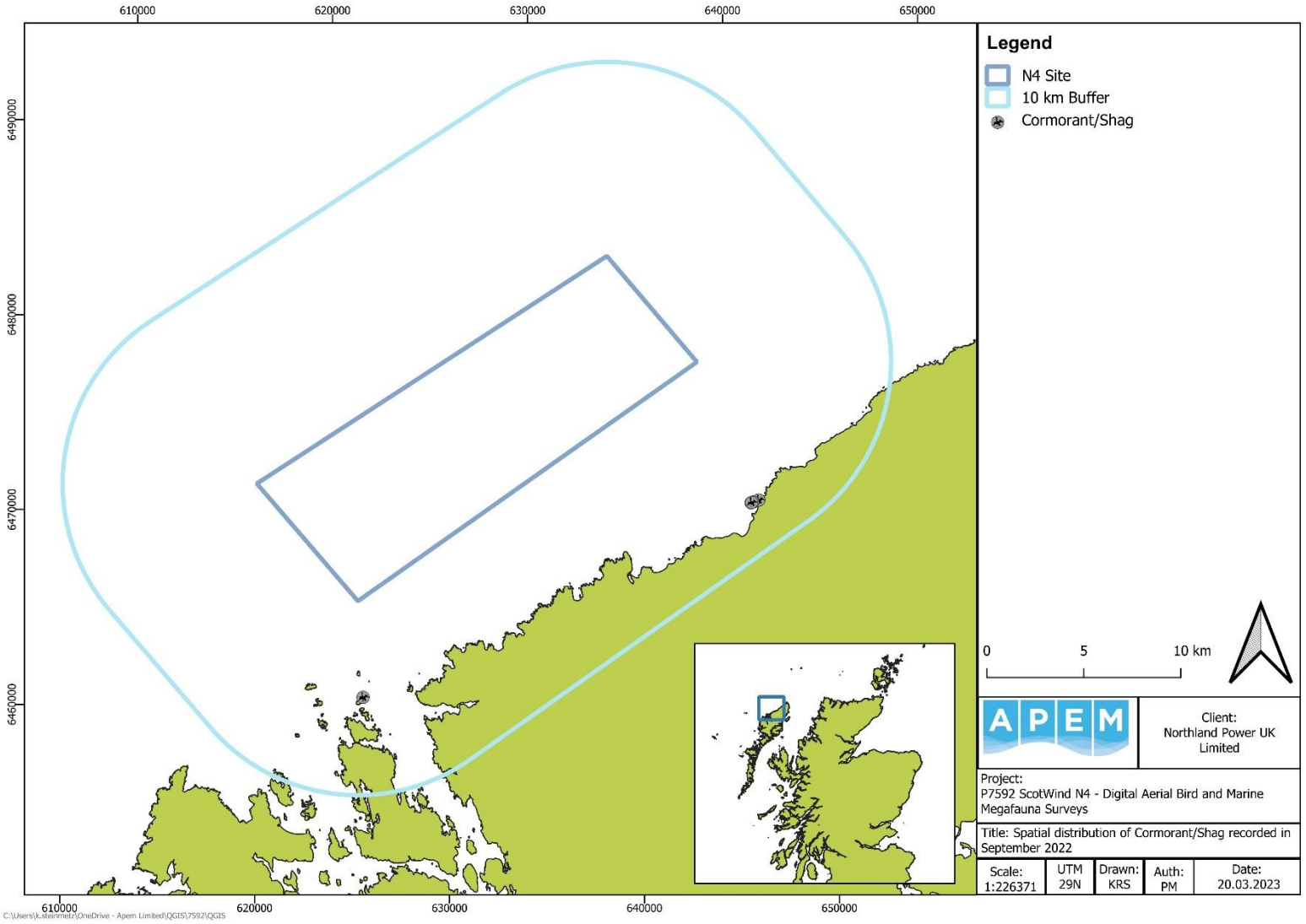


Figure 421 Distribution of cormorant / shag in September 2022
*Note that individuals in close proximity may appear overlaying.

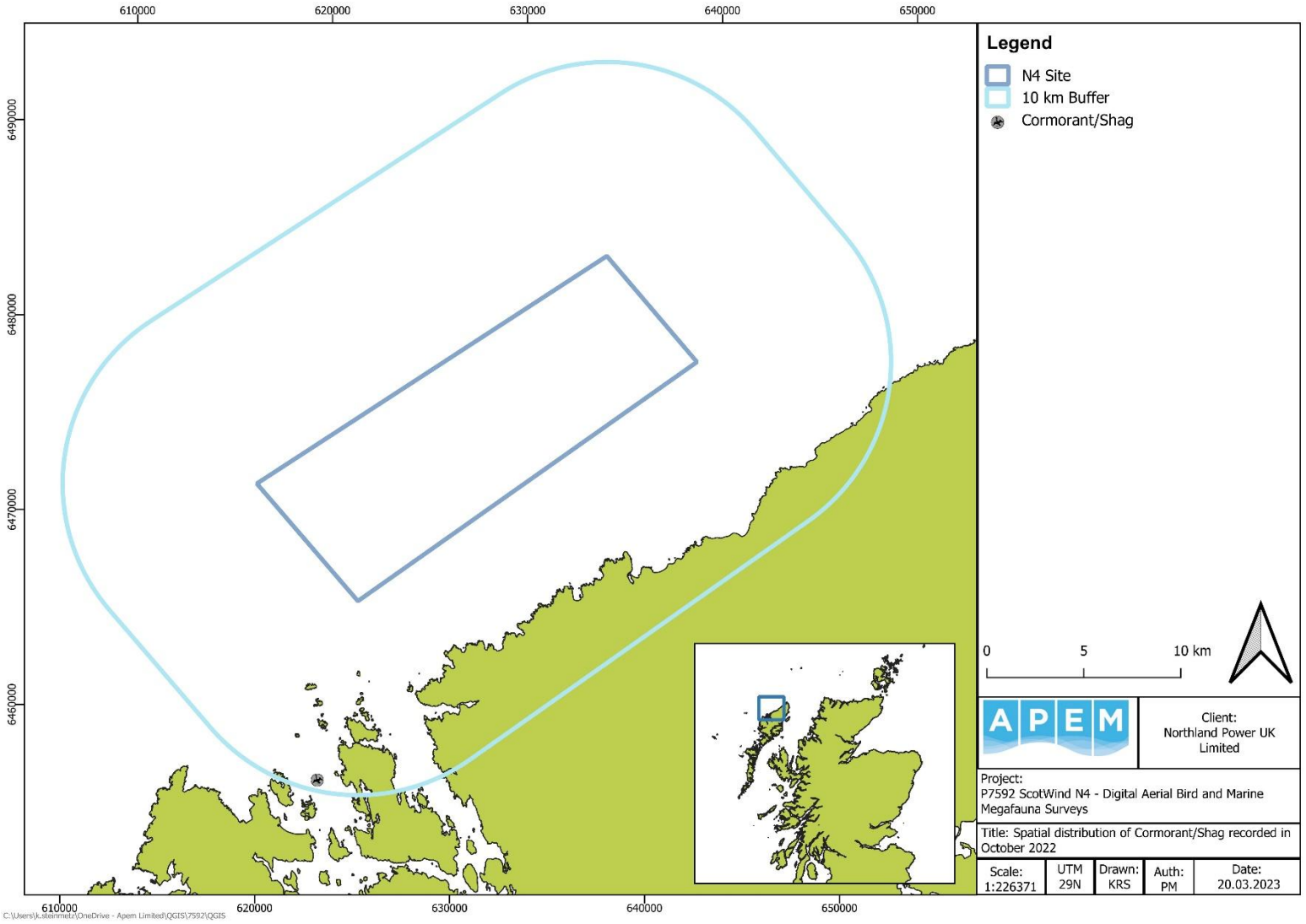


Figure 422 Distribution of cormorant / shag in October 2022
*Note that individuals in close proximity may appear overlaying.

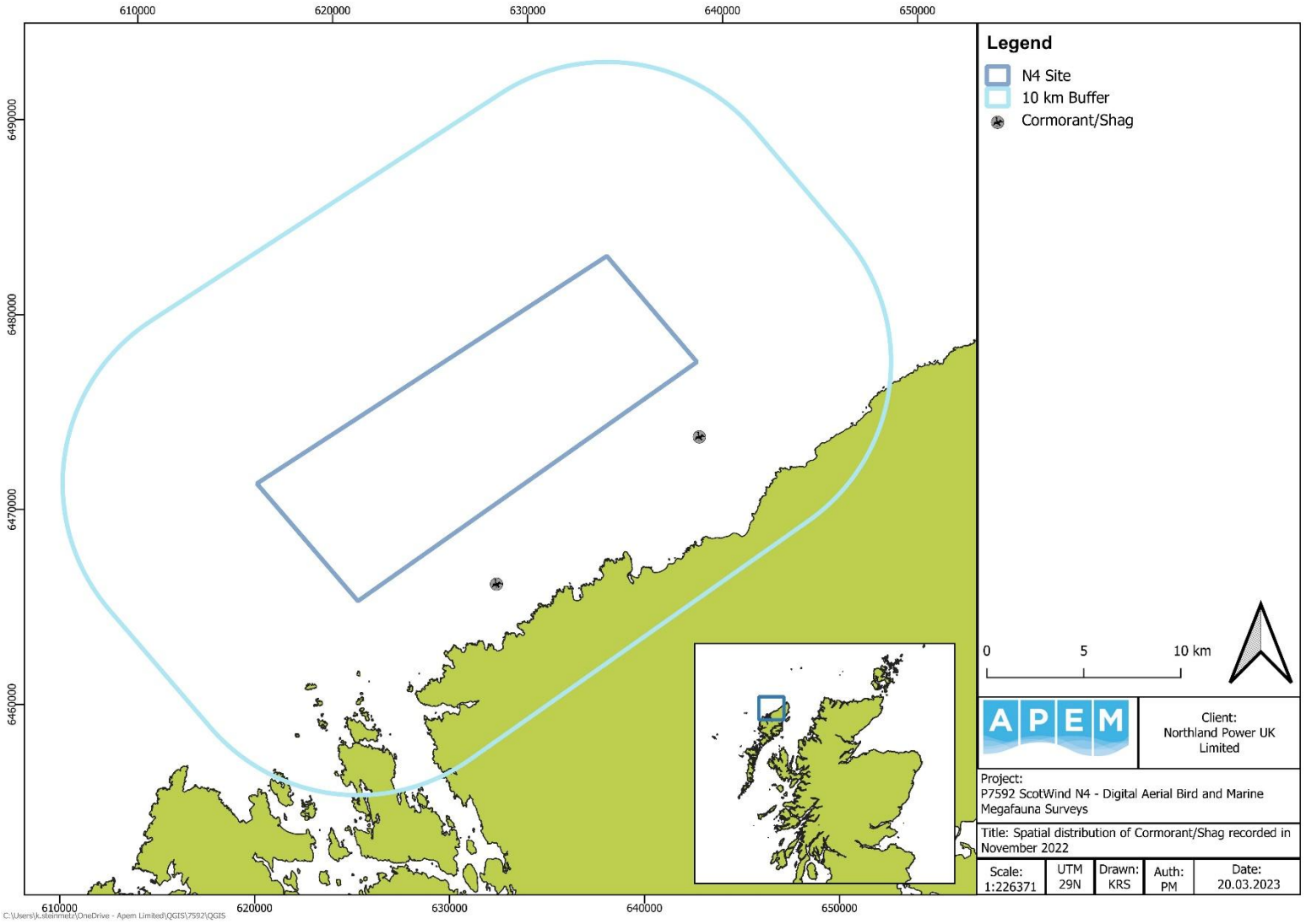


Figure 423 Distribution of cormorant / shag in November 2022

*Note that individuals in close proximity may appear overlaying.

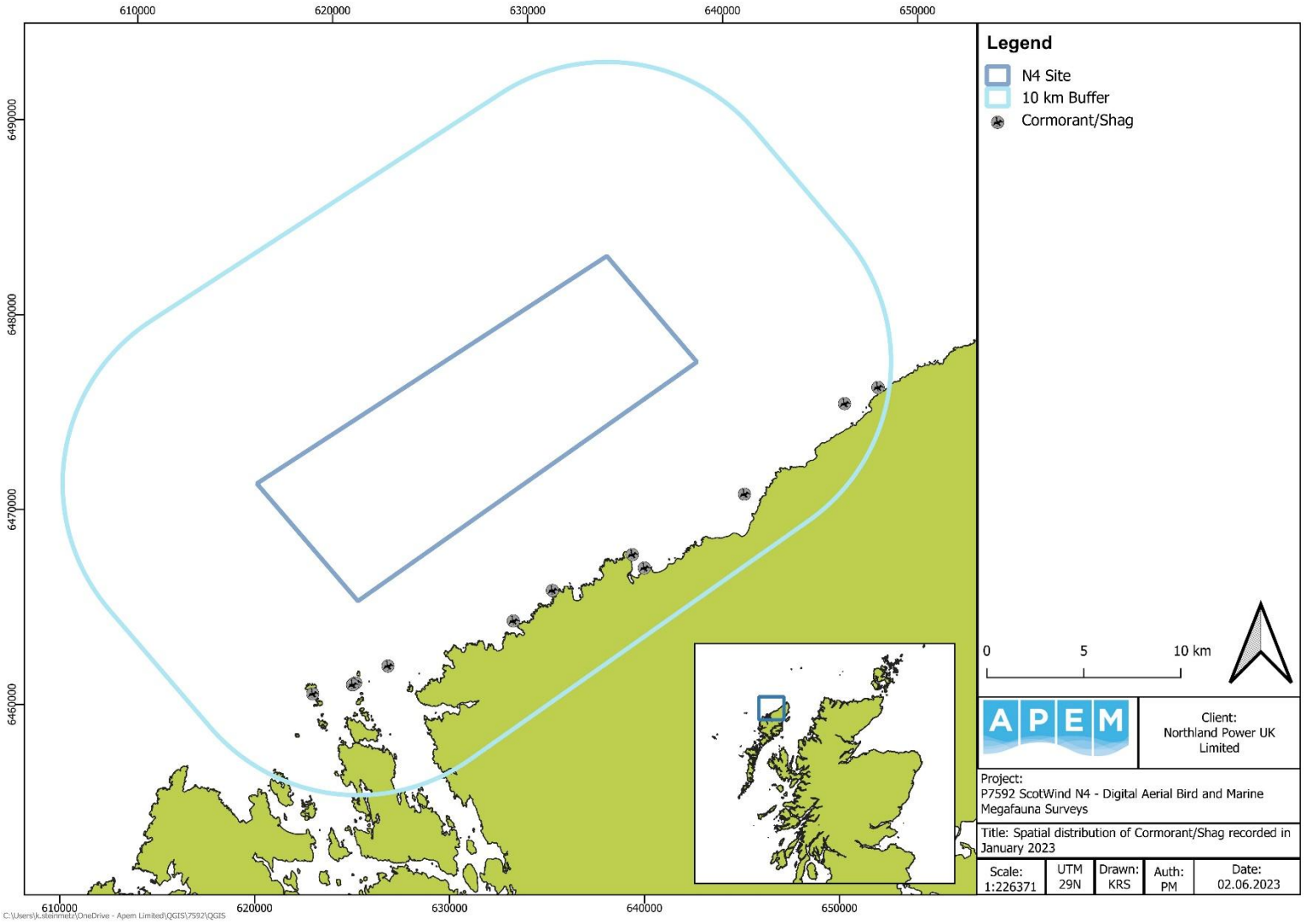


Figure 424 Distribution of cormorant / shag in January 2023
*Note that individuals in close proximity may appear overlaying.

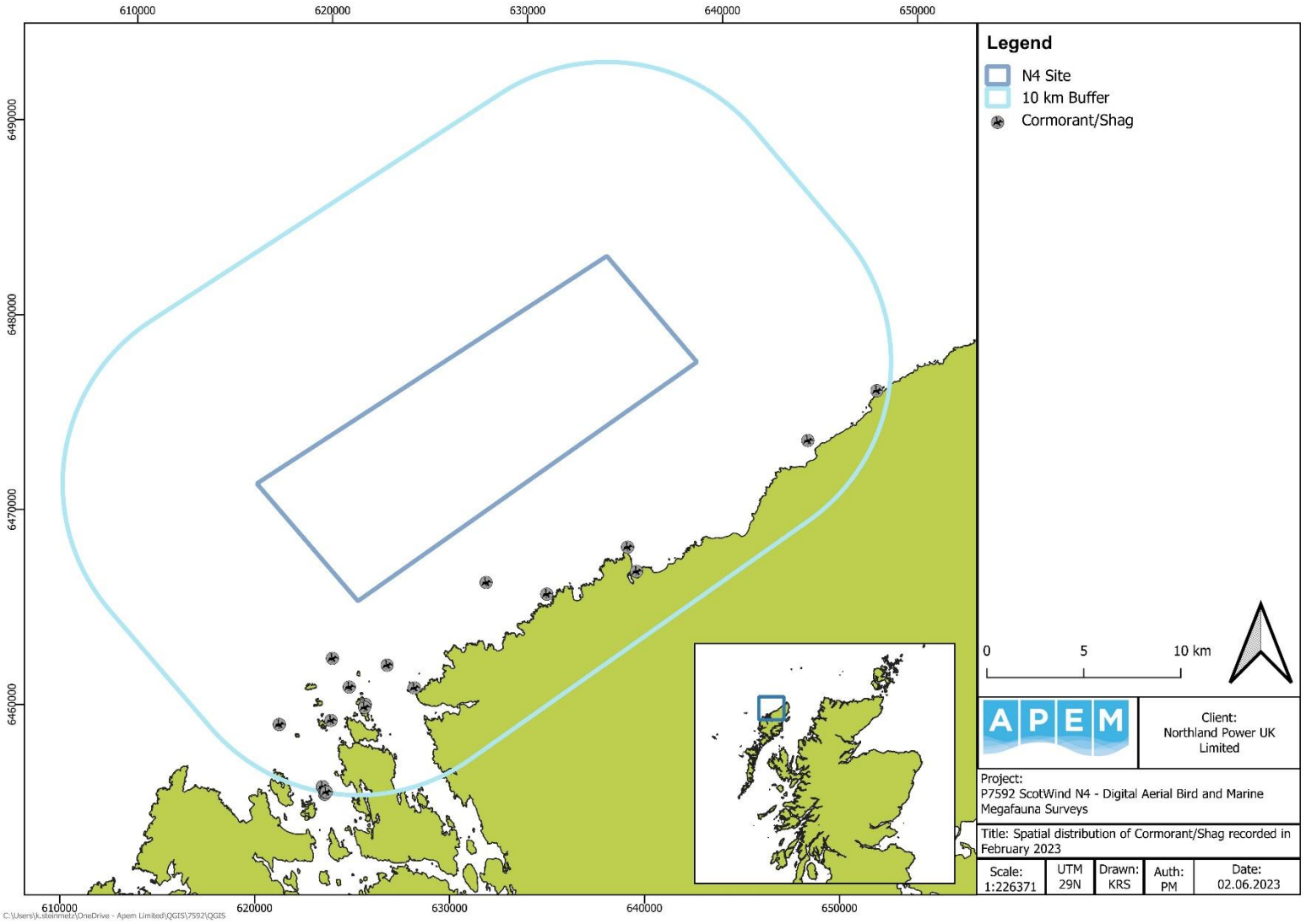


Figure 425 Distribution of cormorant / shag in February 2023
*Note that individuals in close proximity may appear overlaying.

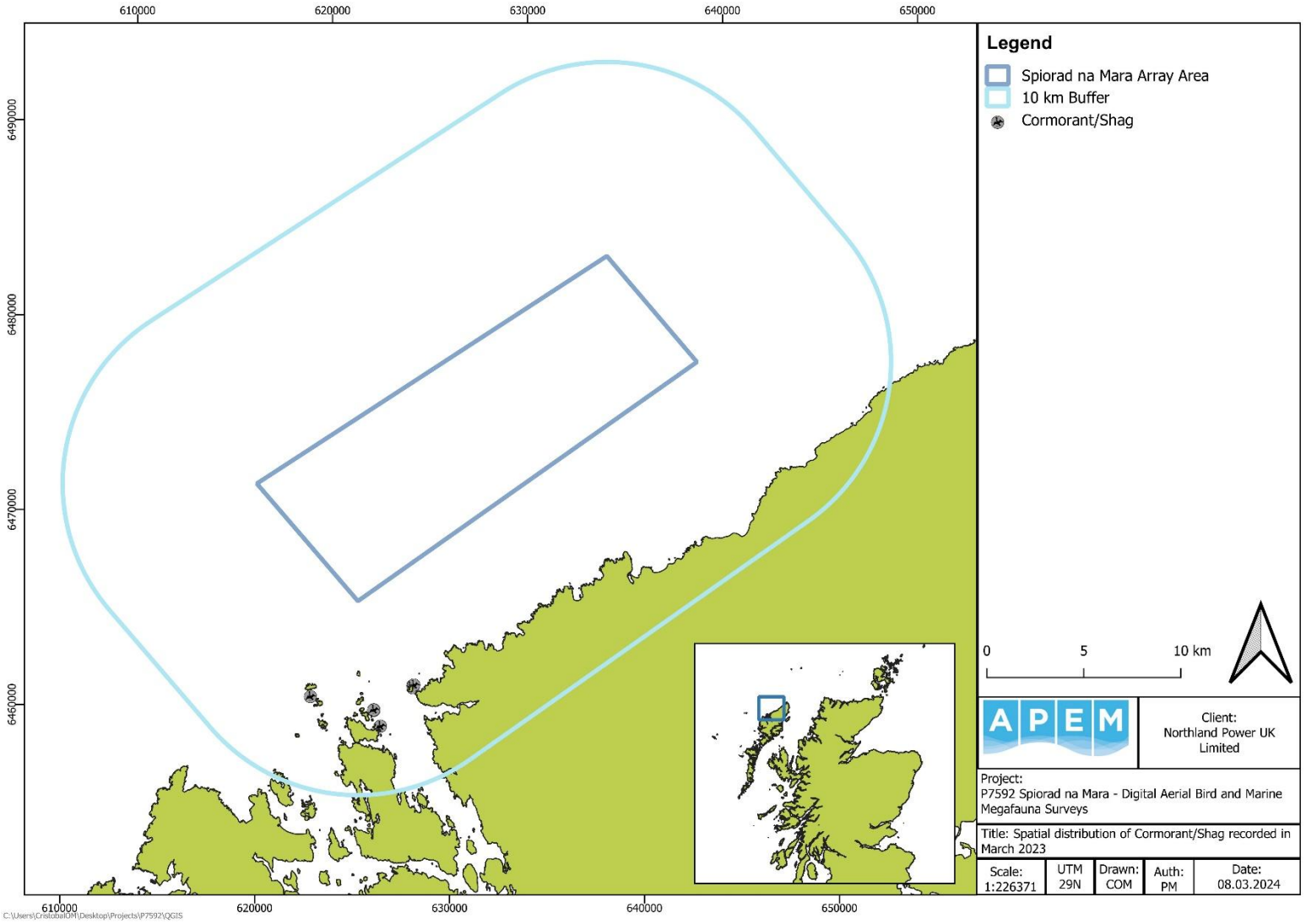


Figure 426 Distribution of cormorant / shag in March 2023

*Note that individuals in close proximity may appear overlaying.

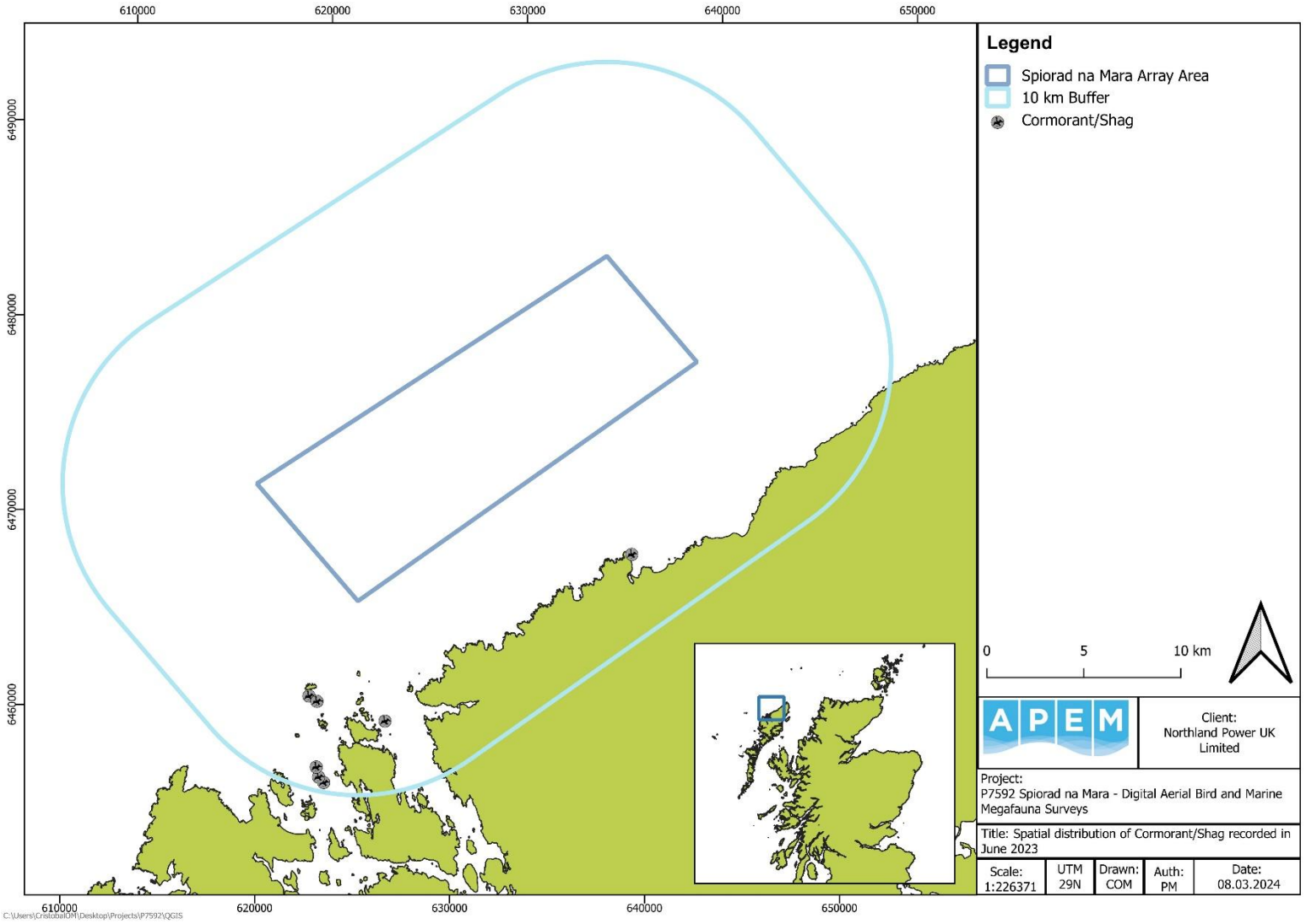


Figure 427 Distribution of cormorant / shag in June 2023

*Note that individuals in close proximity may appear overlaying.

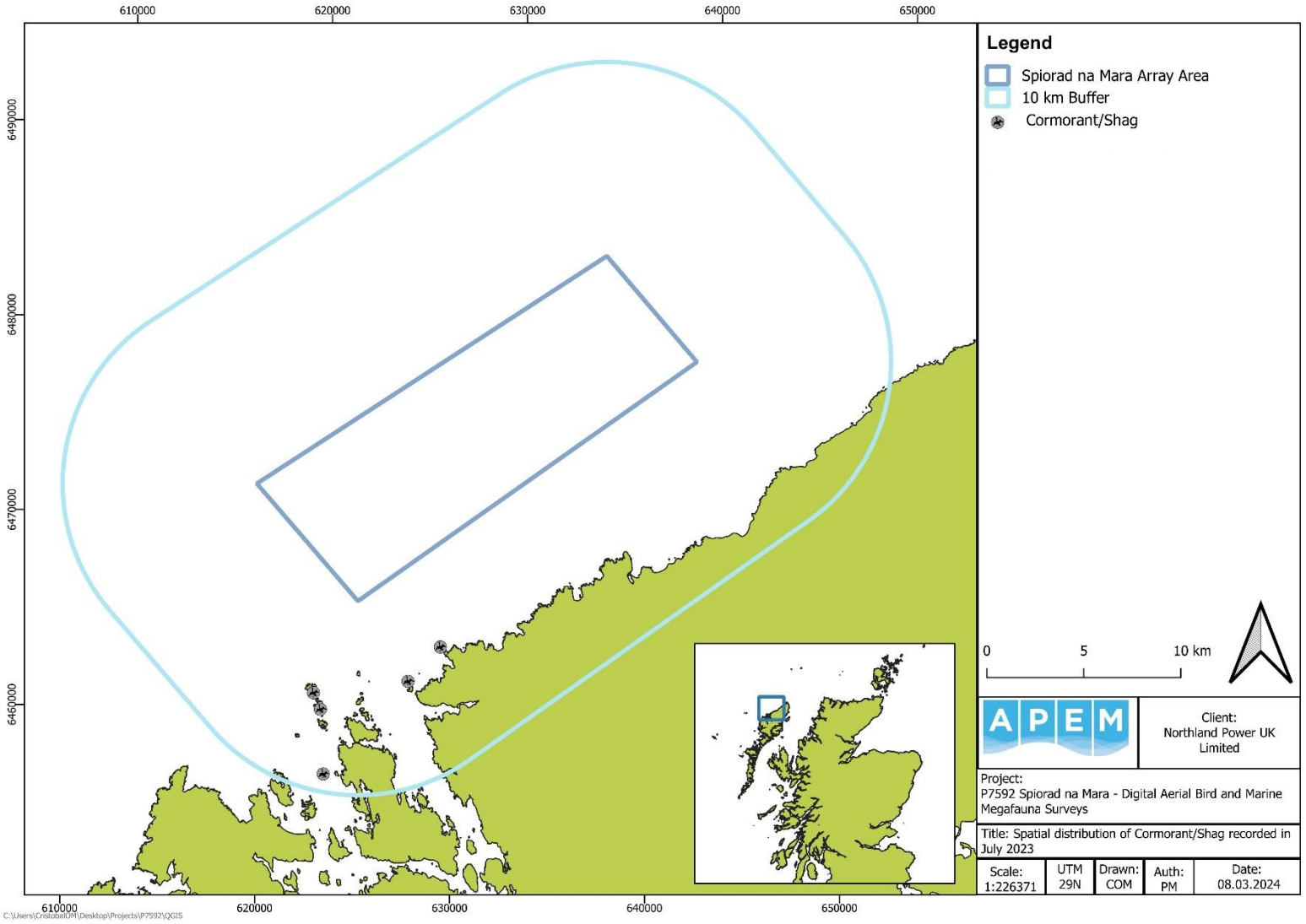


Figure 428 Distribution of cormorant / shag in July 2023

*Note that individuals in close proximity may appear overlaying.

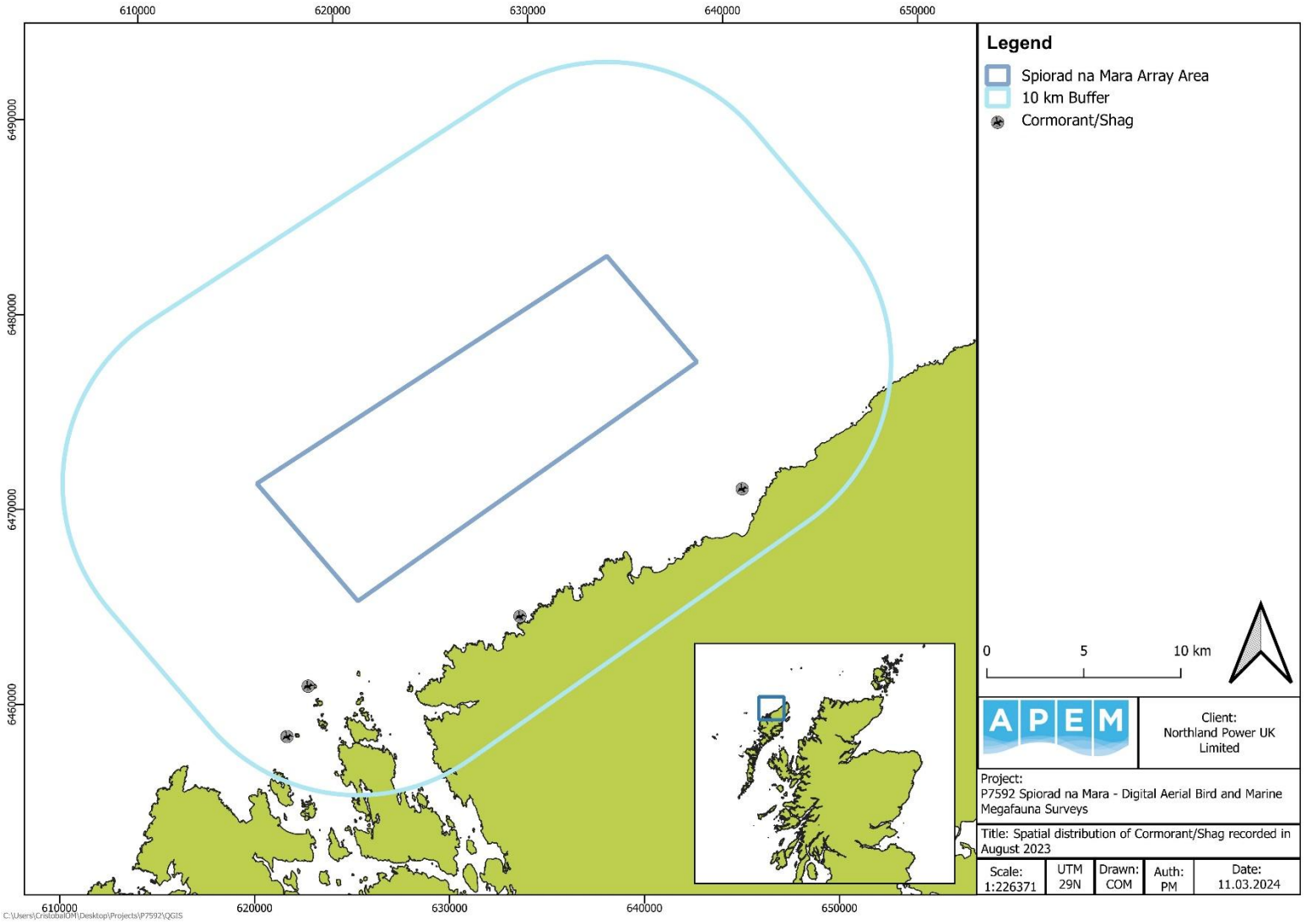


Figure 429 Distribution of cormorant / shag in August 2023

*Note that individuals in close proximity may appear overlaying.

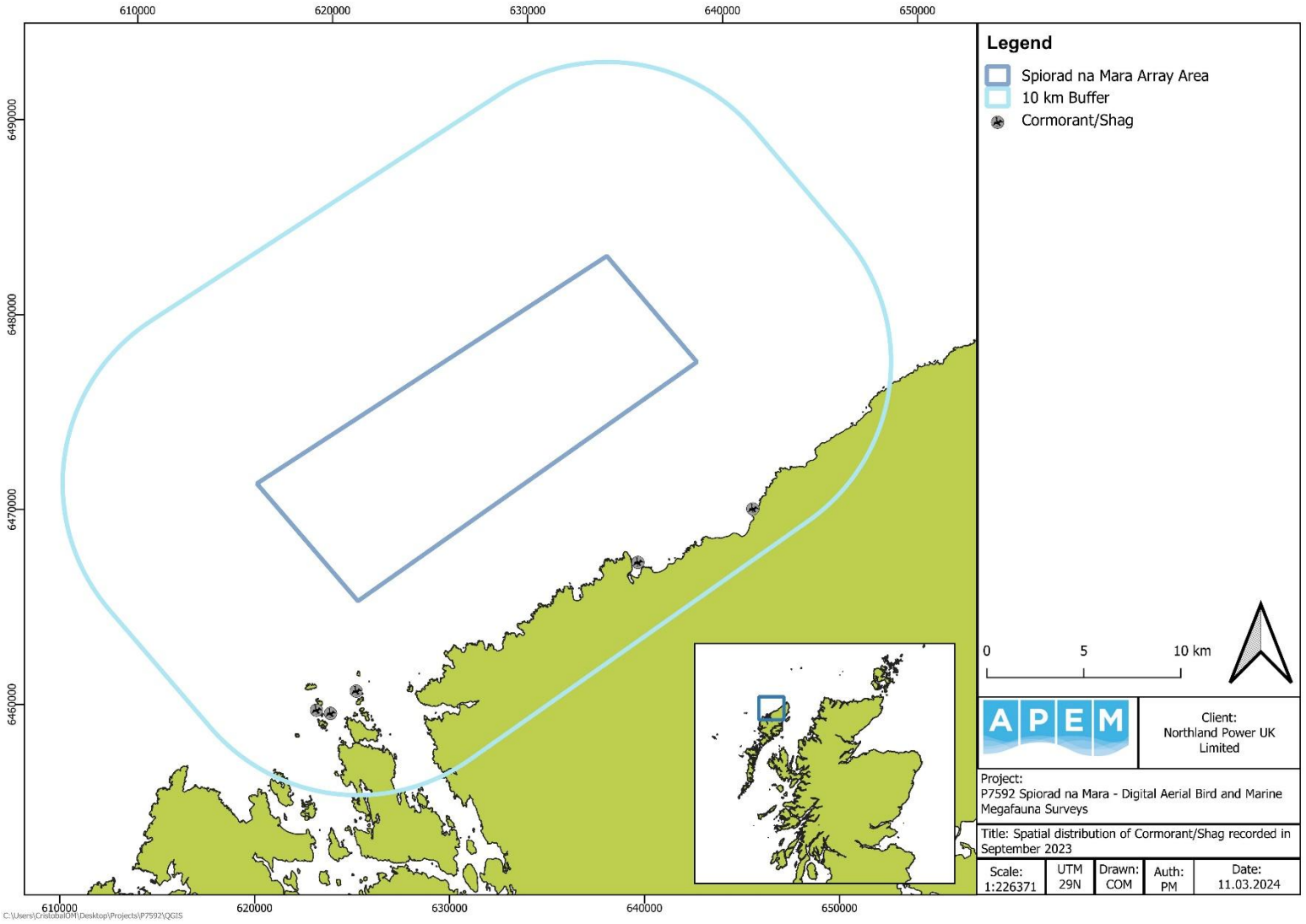


Figure 430 Distribution of cormorant / shag in September 2023

*Note that individuals in close proximity may appear overlaying.

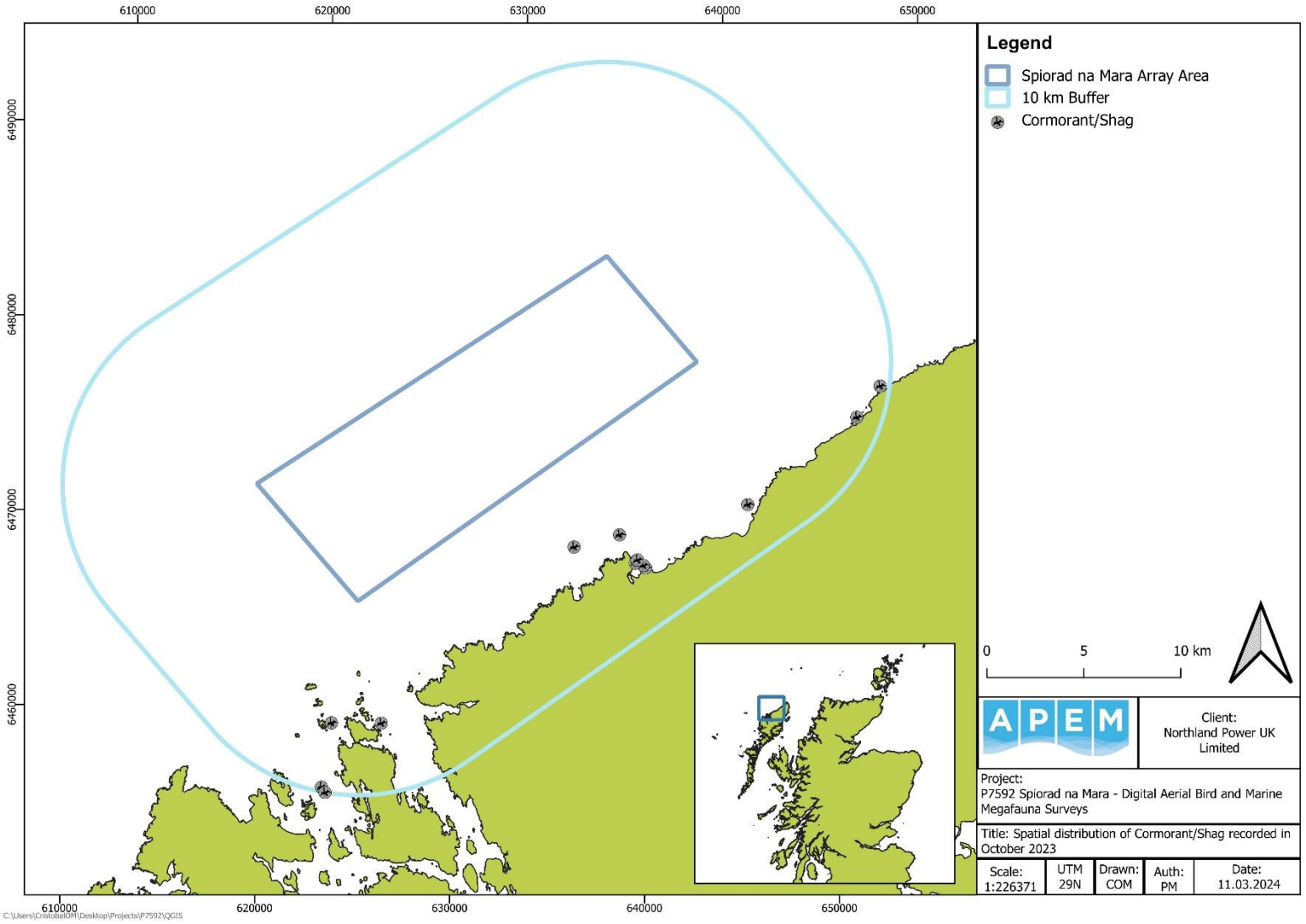


Figure 431 Distribution of cormorant / shag in October 2023

*Note that individuals in close proximity may appear overlaying.

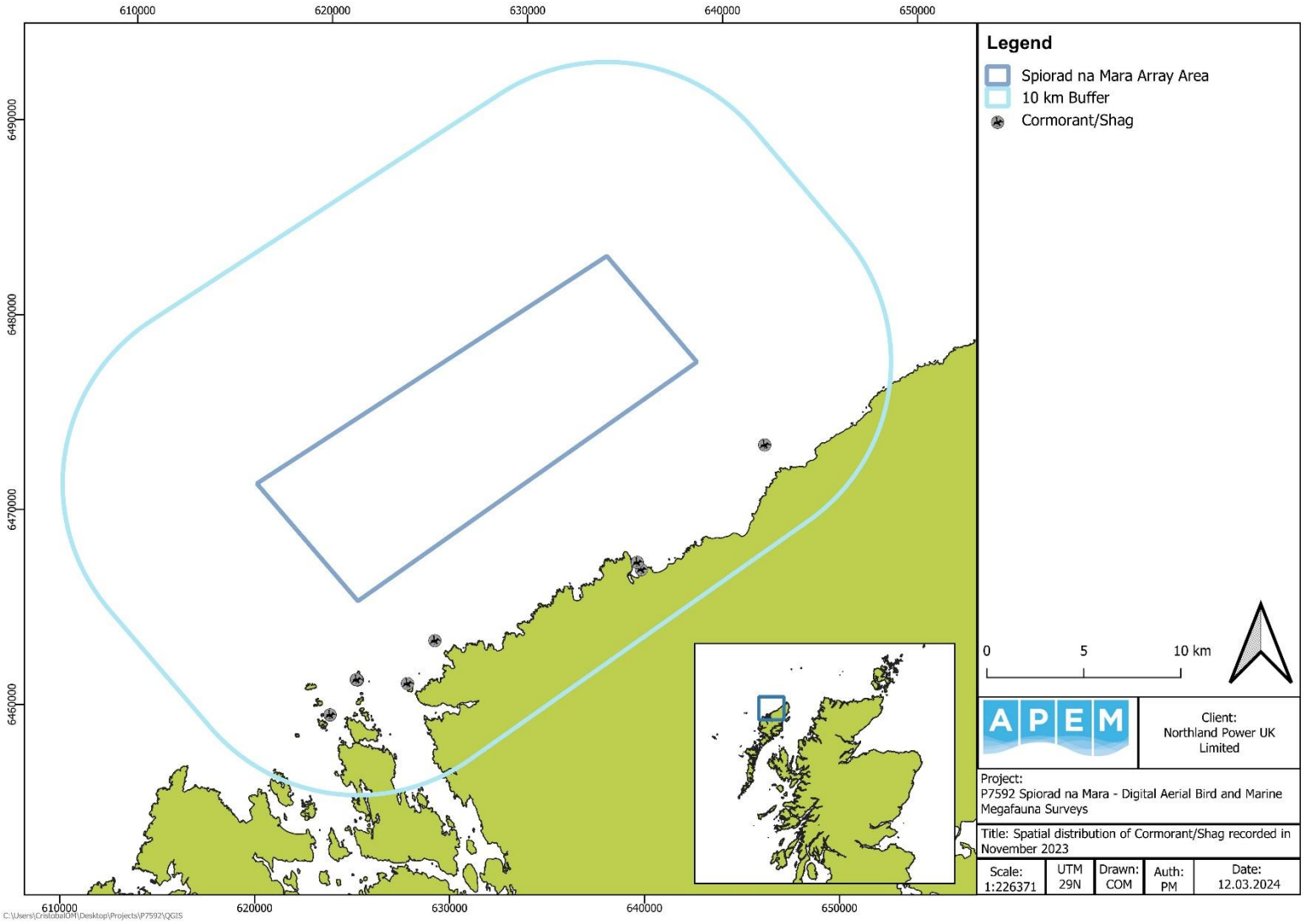


Figure 432 Distribution of cormorant / shag in November 2023

*Note that individuals in close proximity may appear overlaying.

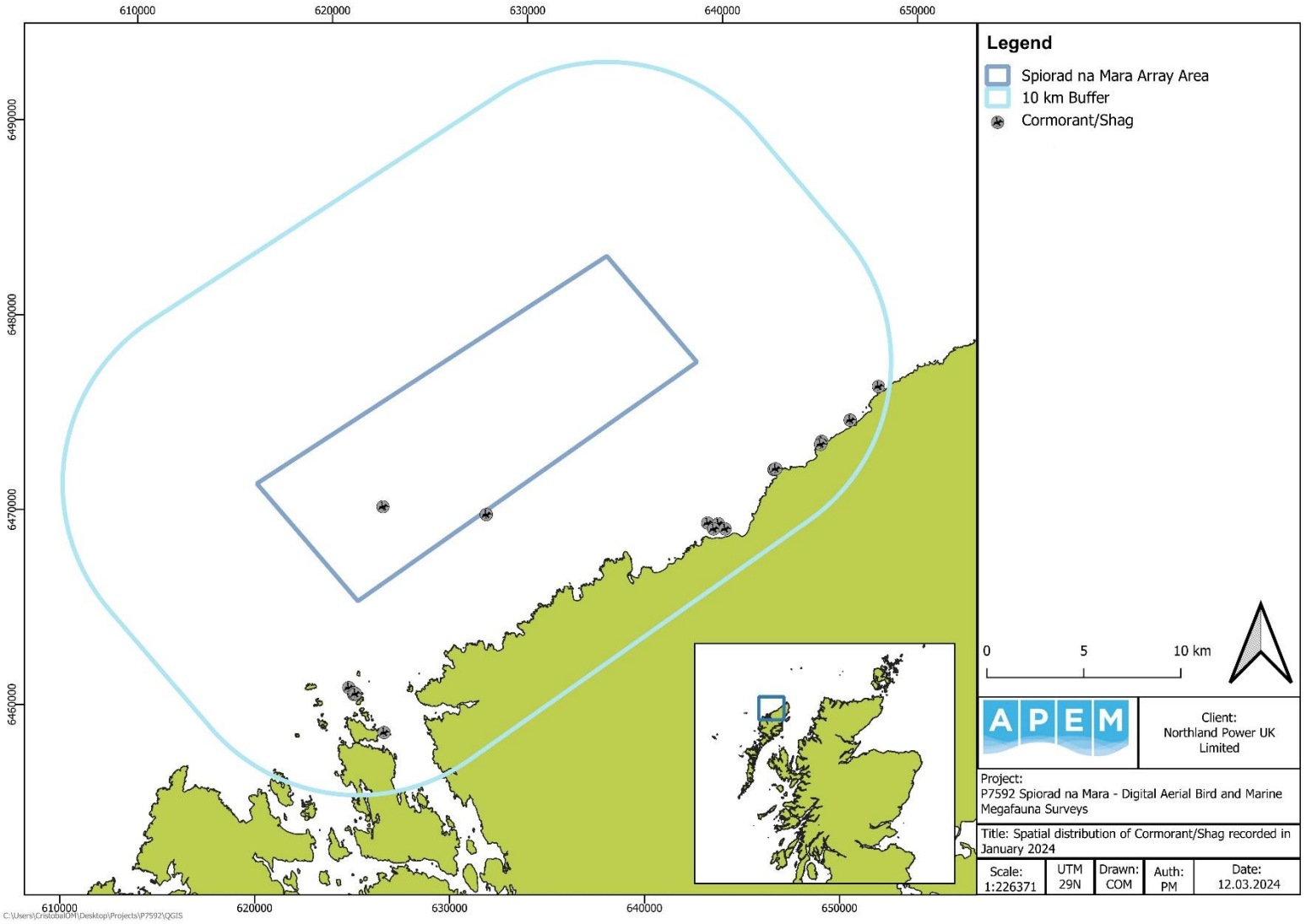


Figure 433 Distribution of cormorant / shag in January 2024

*Note that individuals in close proximity may appear overlaying.

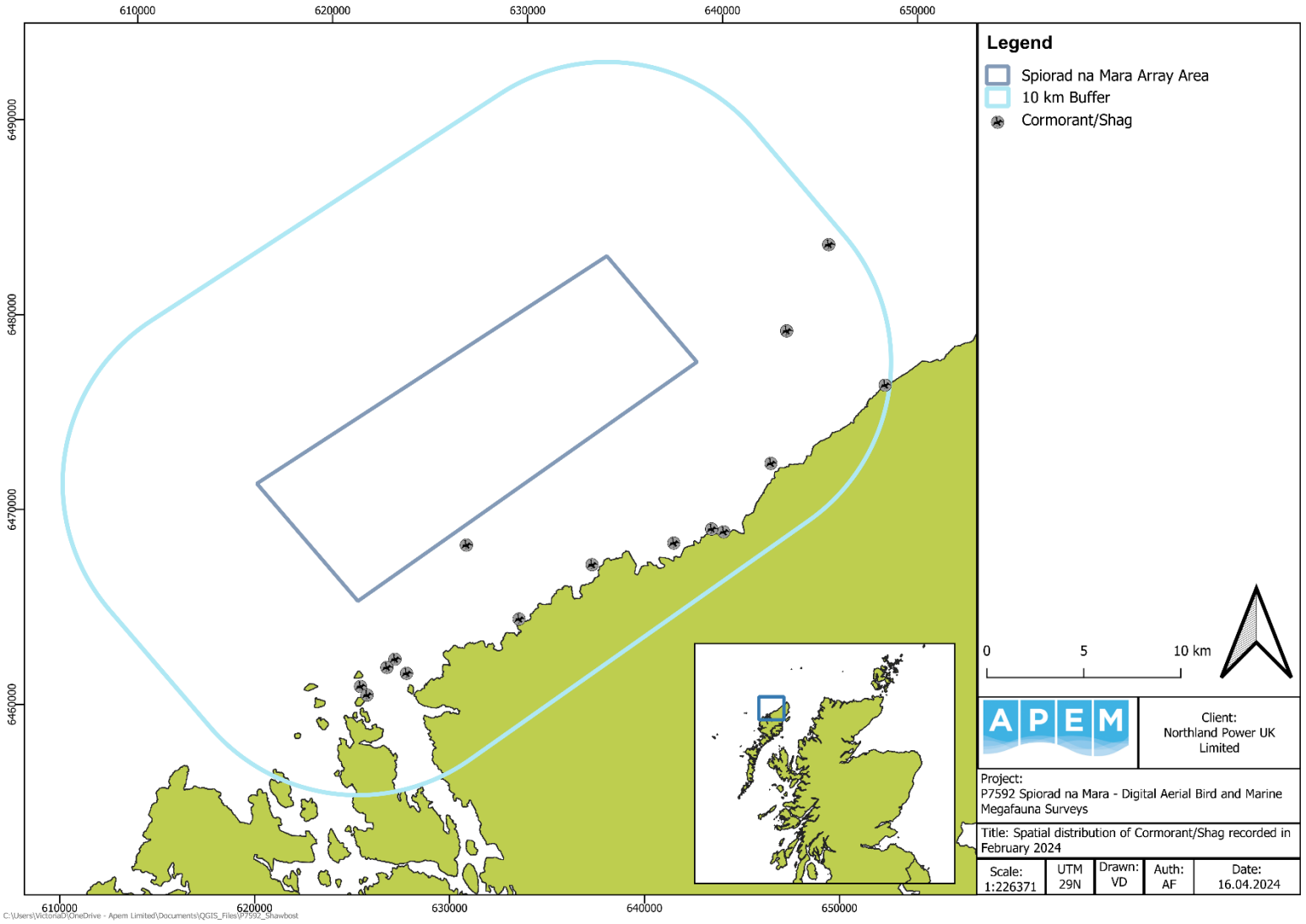


Figure 434 Distribution of cormorant / shag in February 2024

*Note that individuals in close proximity may appear overlaying.

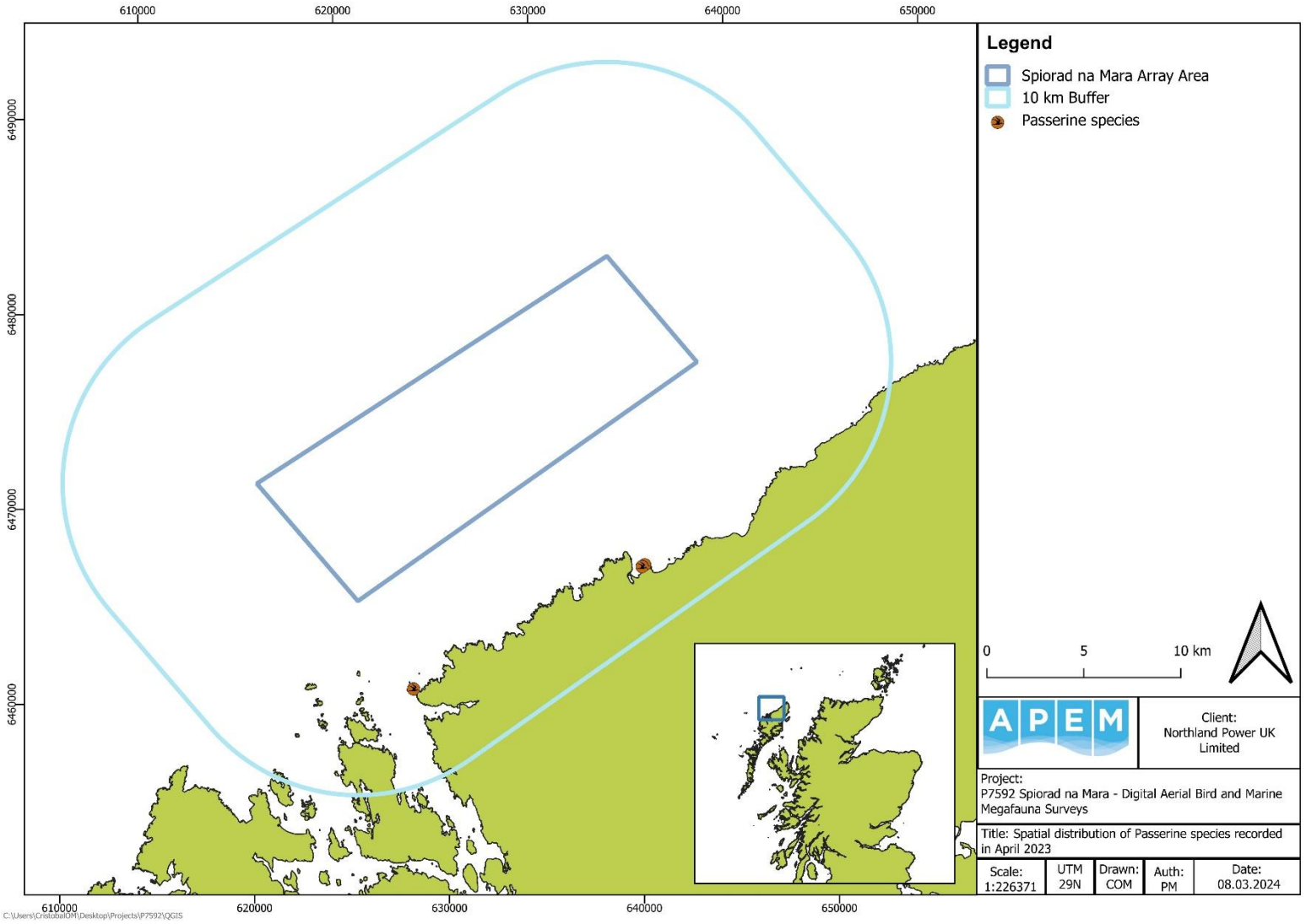


Figure 435 Distribution of passerine species in April 2023

*Note that individuals in close proximity may appear overlaying.

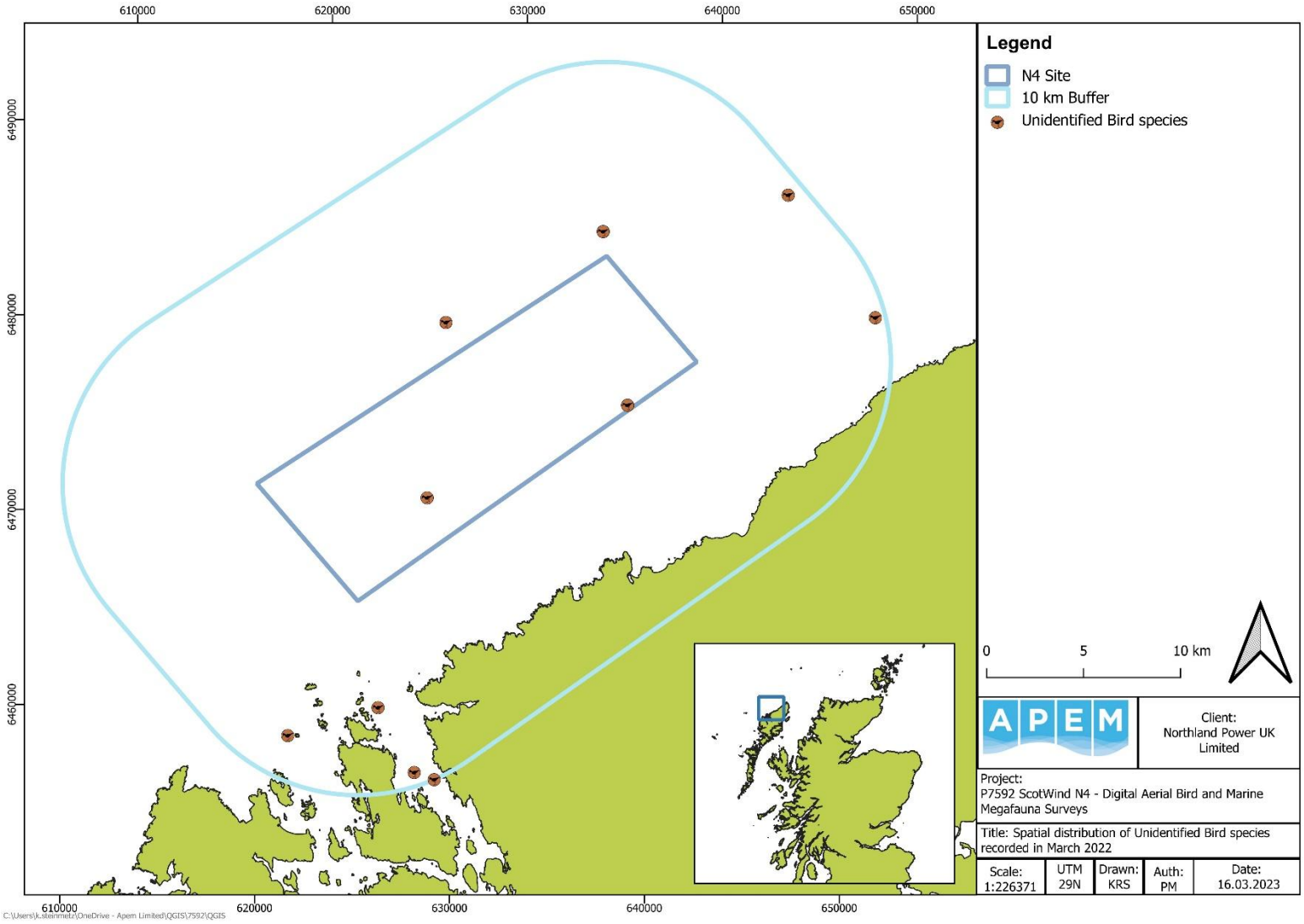


Figure 436 Distribution of unidentified bird species in March 2022

*Note that individuals in close proximity may appear overlaying.

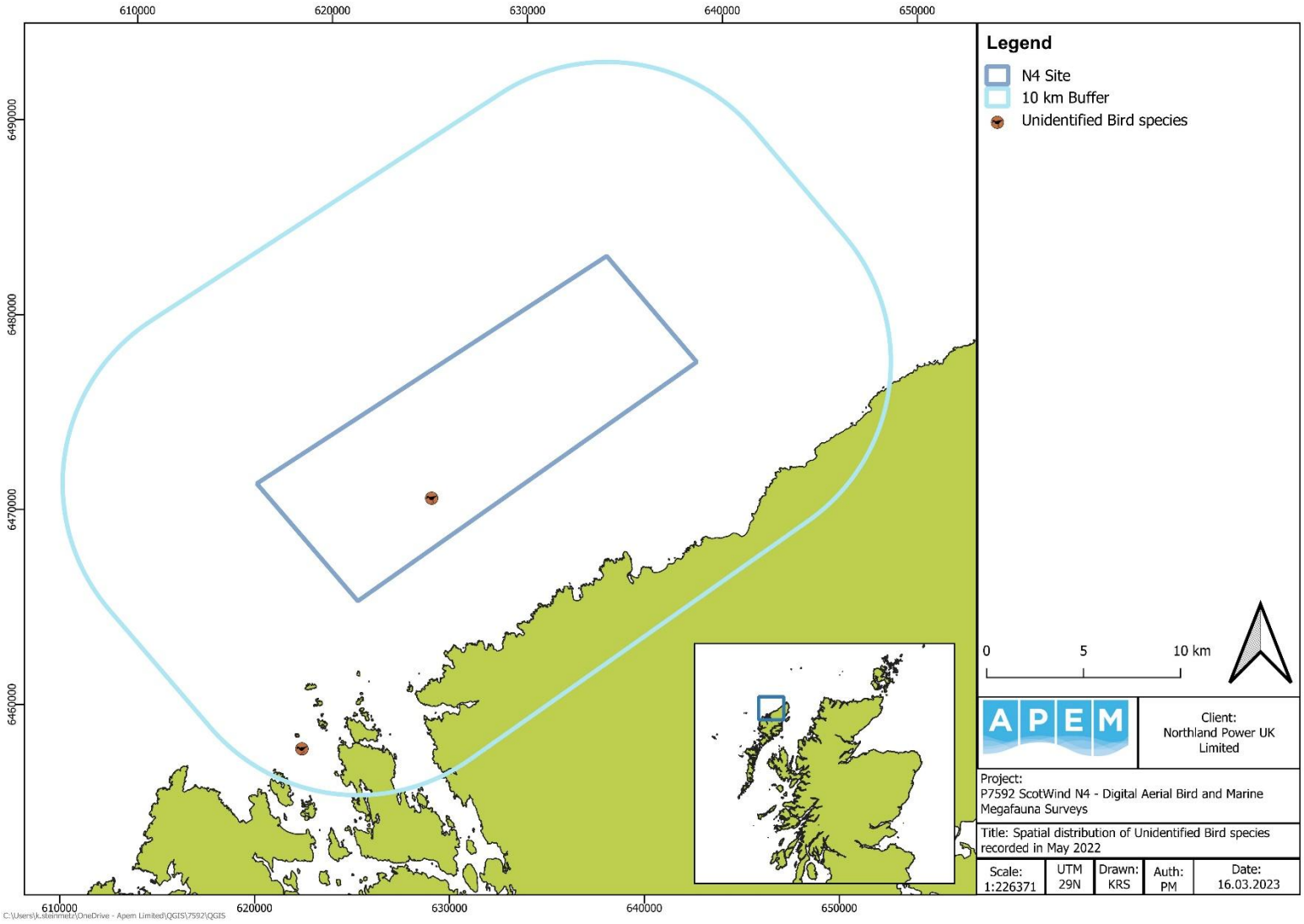


Figure 437 Distribution of unidentified bird species in May 2022

*Note that individuals in close proximity may appear overlaying.

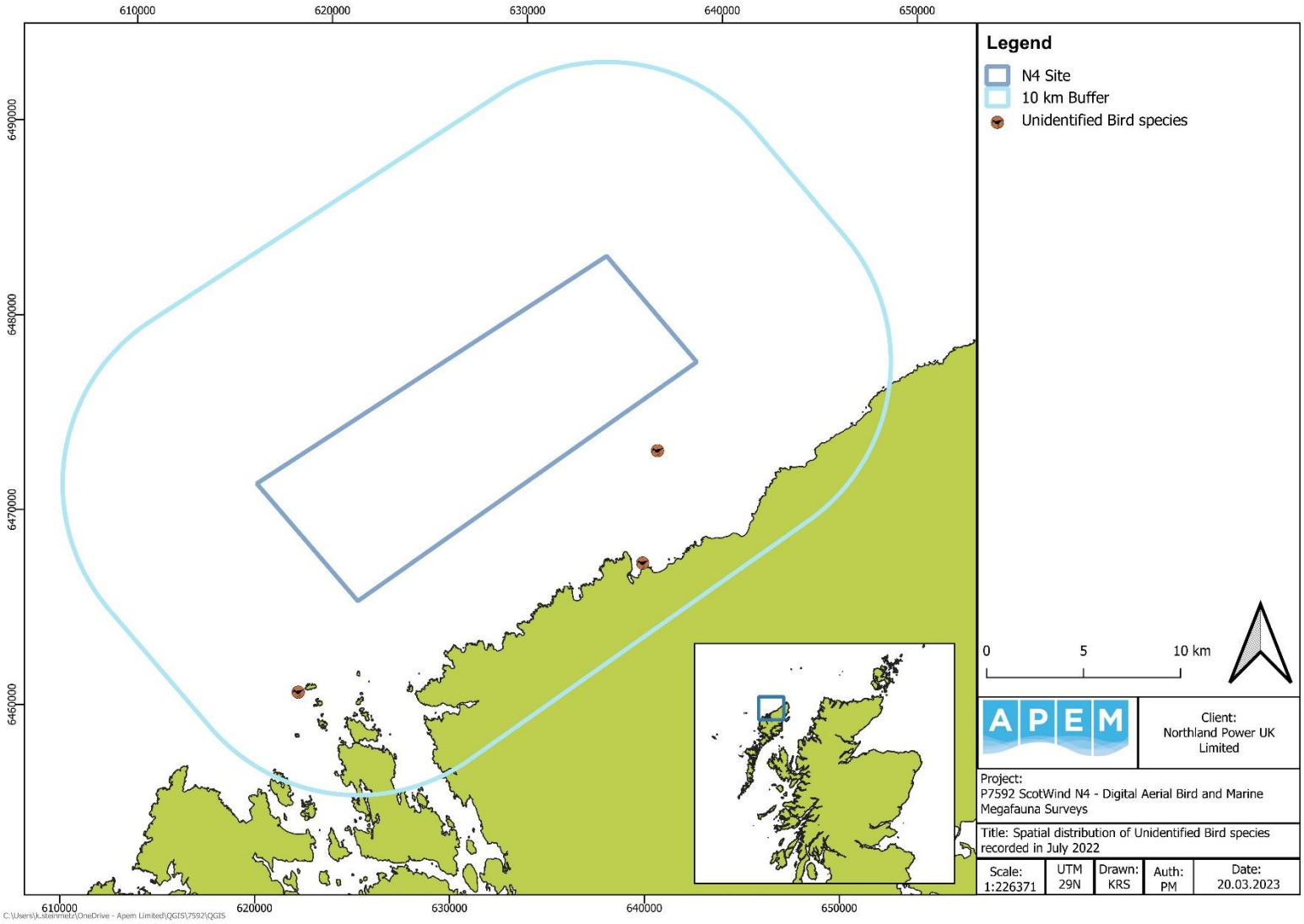


Figure 438 Distribution of unidentified bird species in July 2022

*Note that individuals in close proximity may appear overlaying.

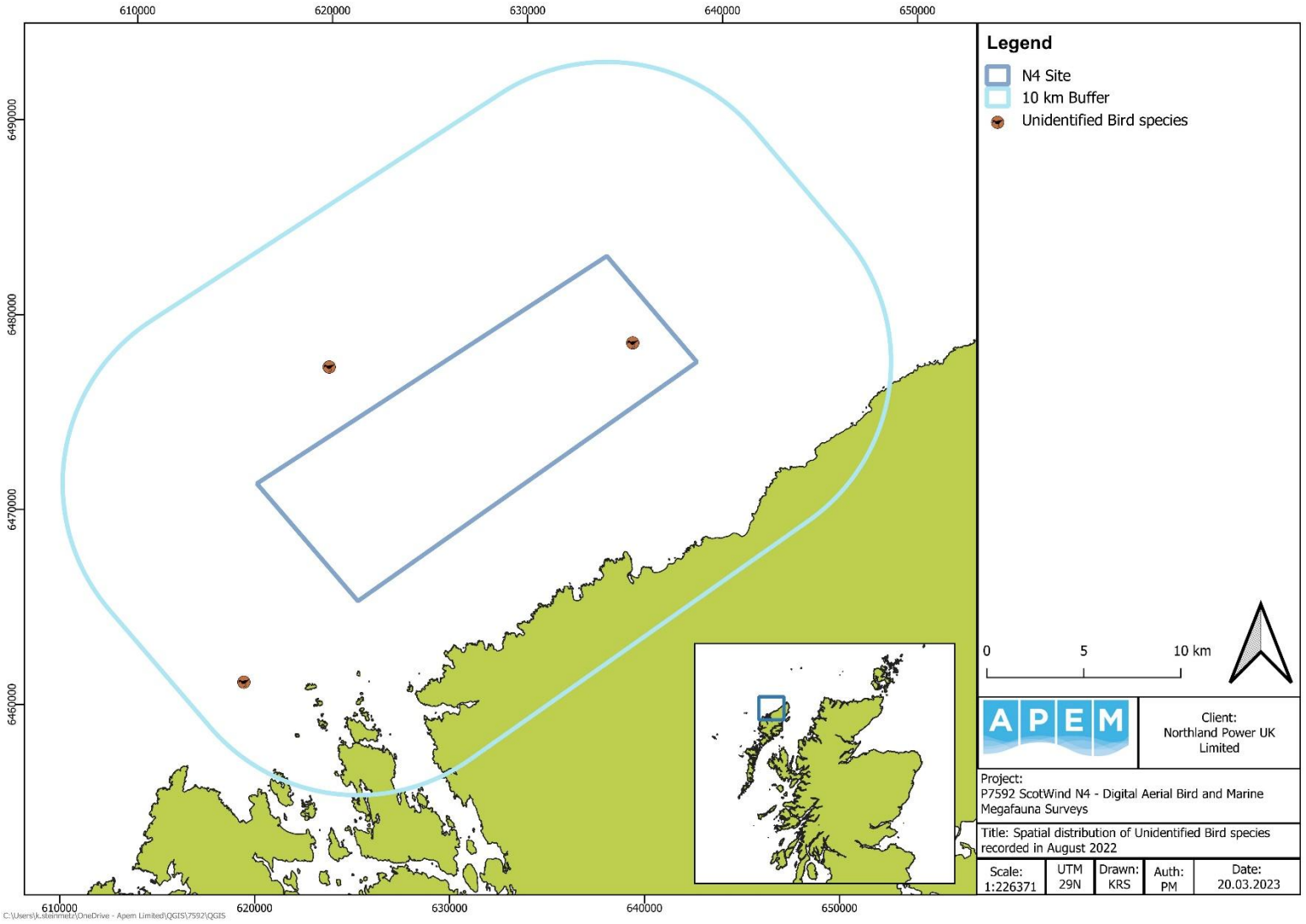


Figure 439 Distribution of unidentified bird species in August 2022
*Note that individuals in close proximity may appear overlaying.

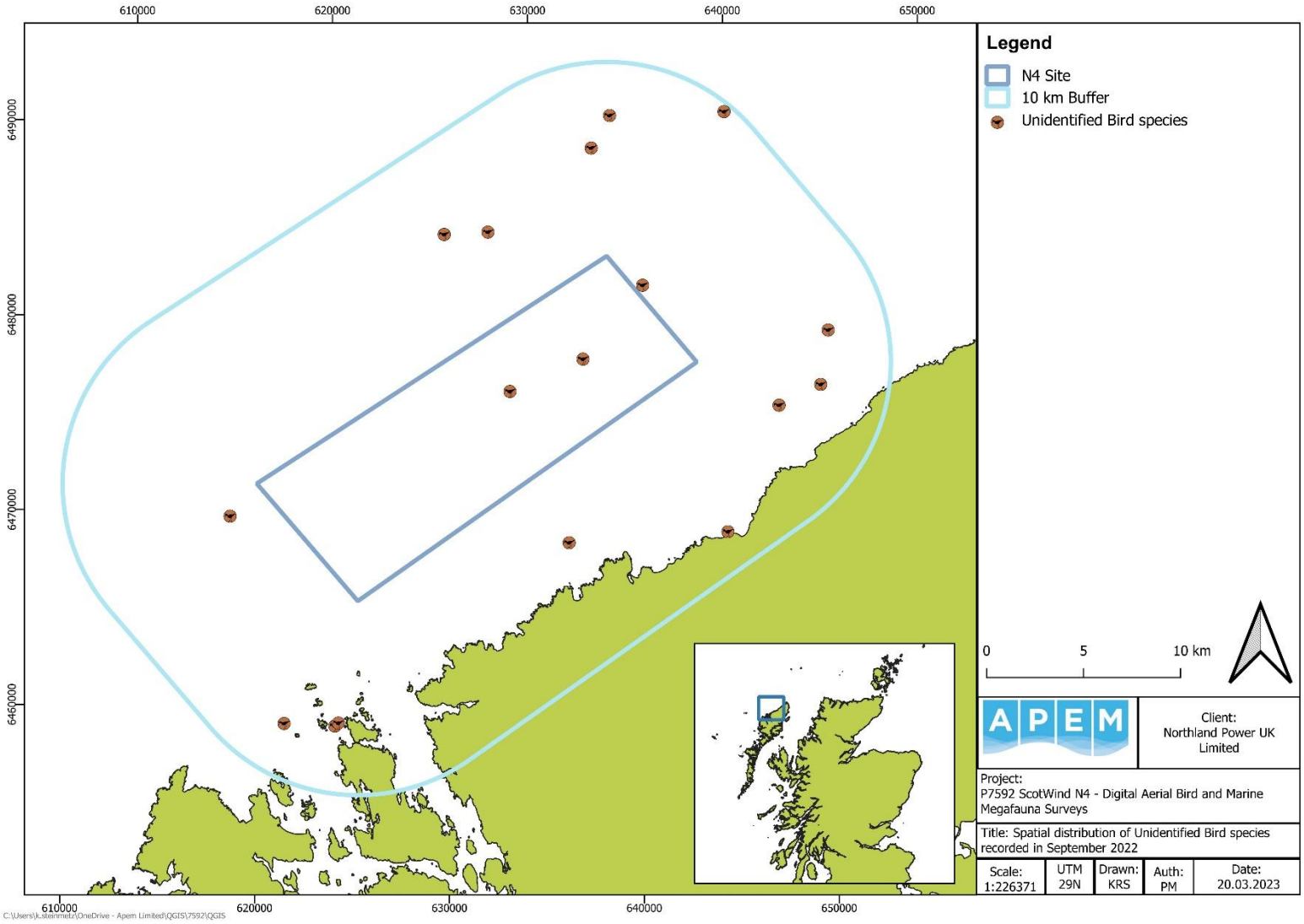


Figure 440 Distribution of unidentified bird species in September 2022
*Note that individuals in close proximity may appear overlaying.

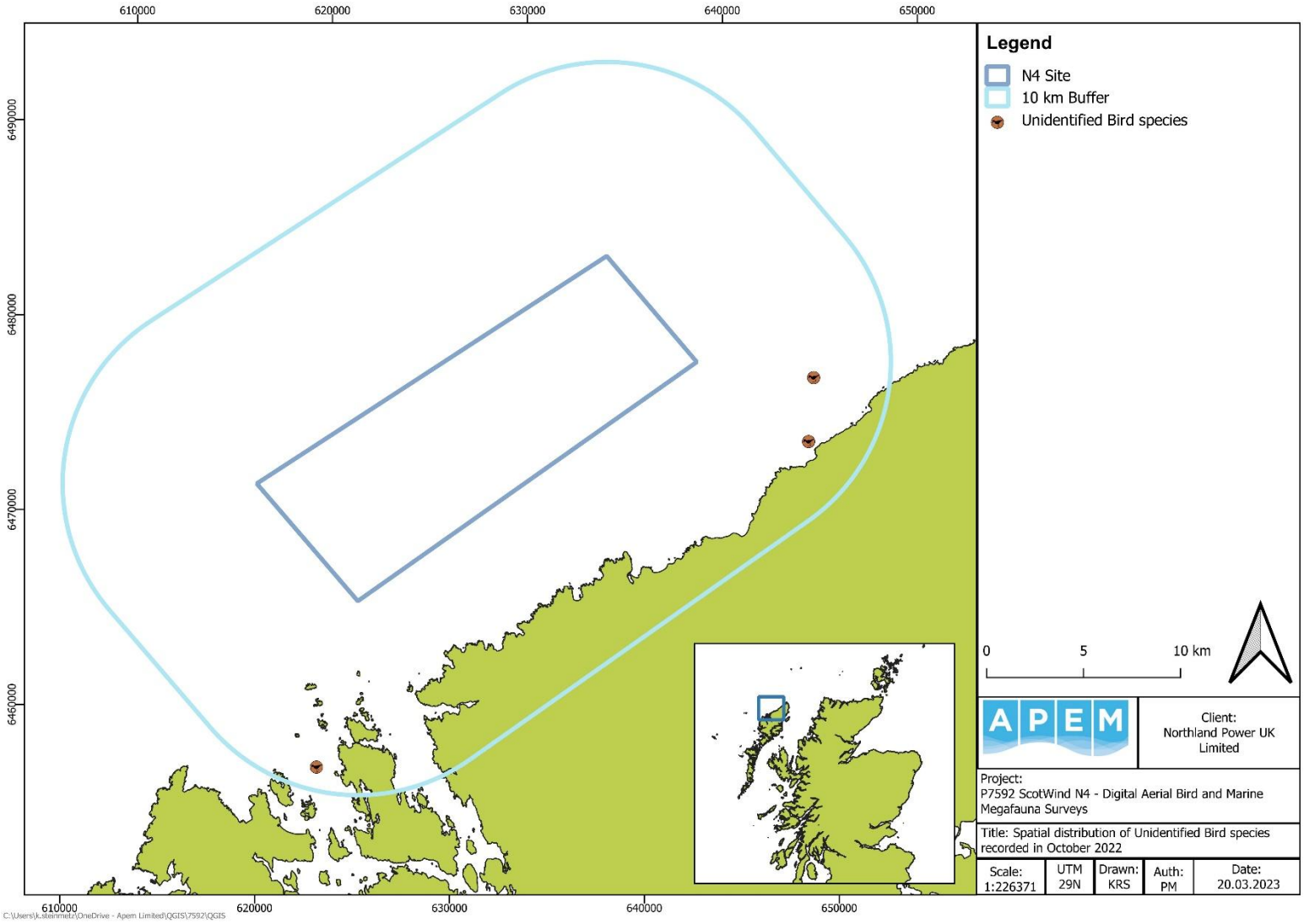


Figure 441 Distribution of unidentified bird species in October 2022
*Note that individuals in close proximity may appear overlaying.

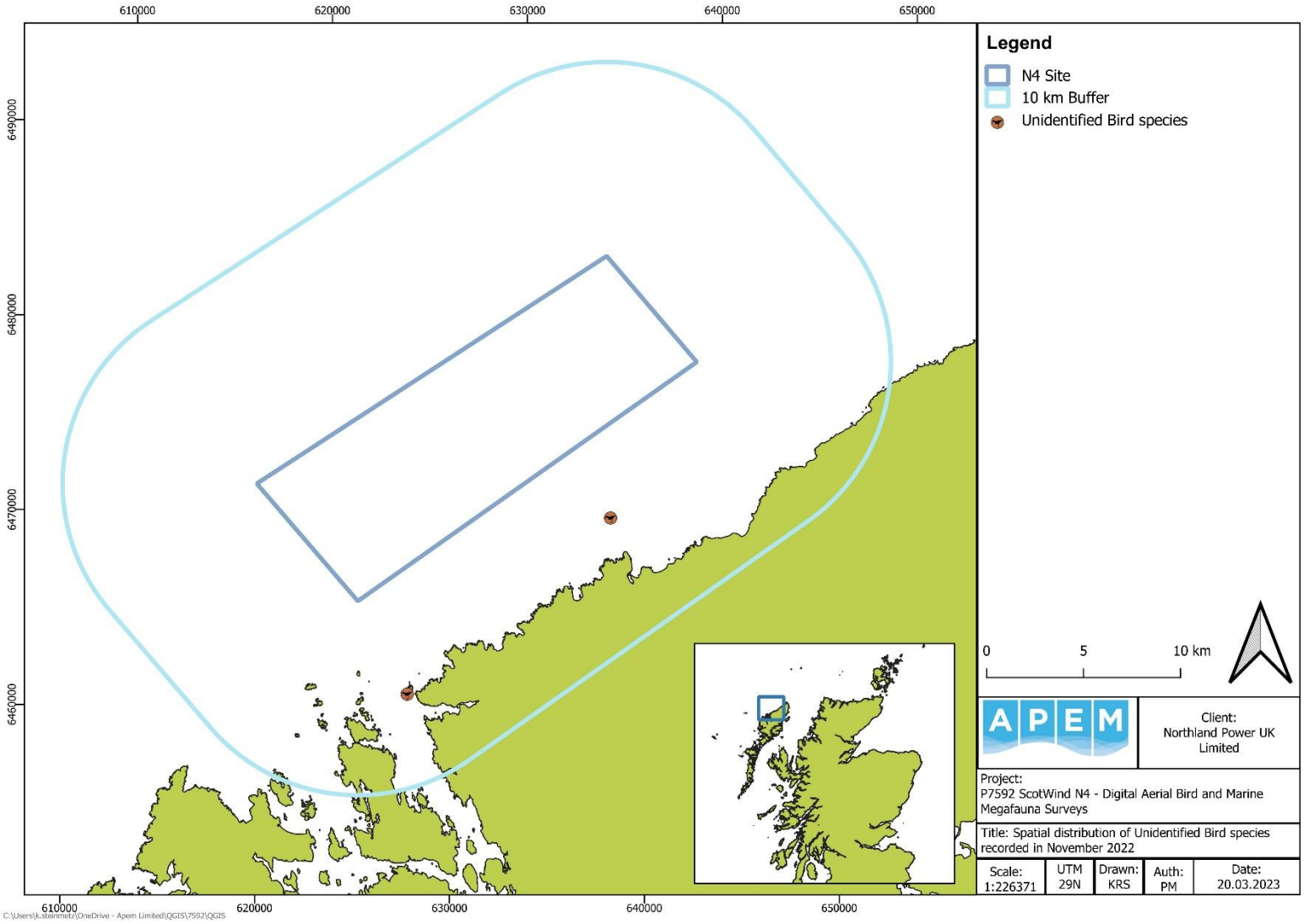


Figure 442 Distribution of unidentified bird species in November 2022
*Note that individuals in close proximity may appear overlaying.

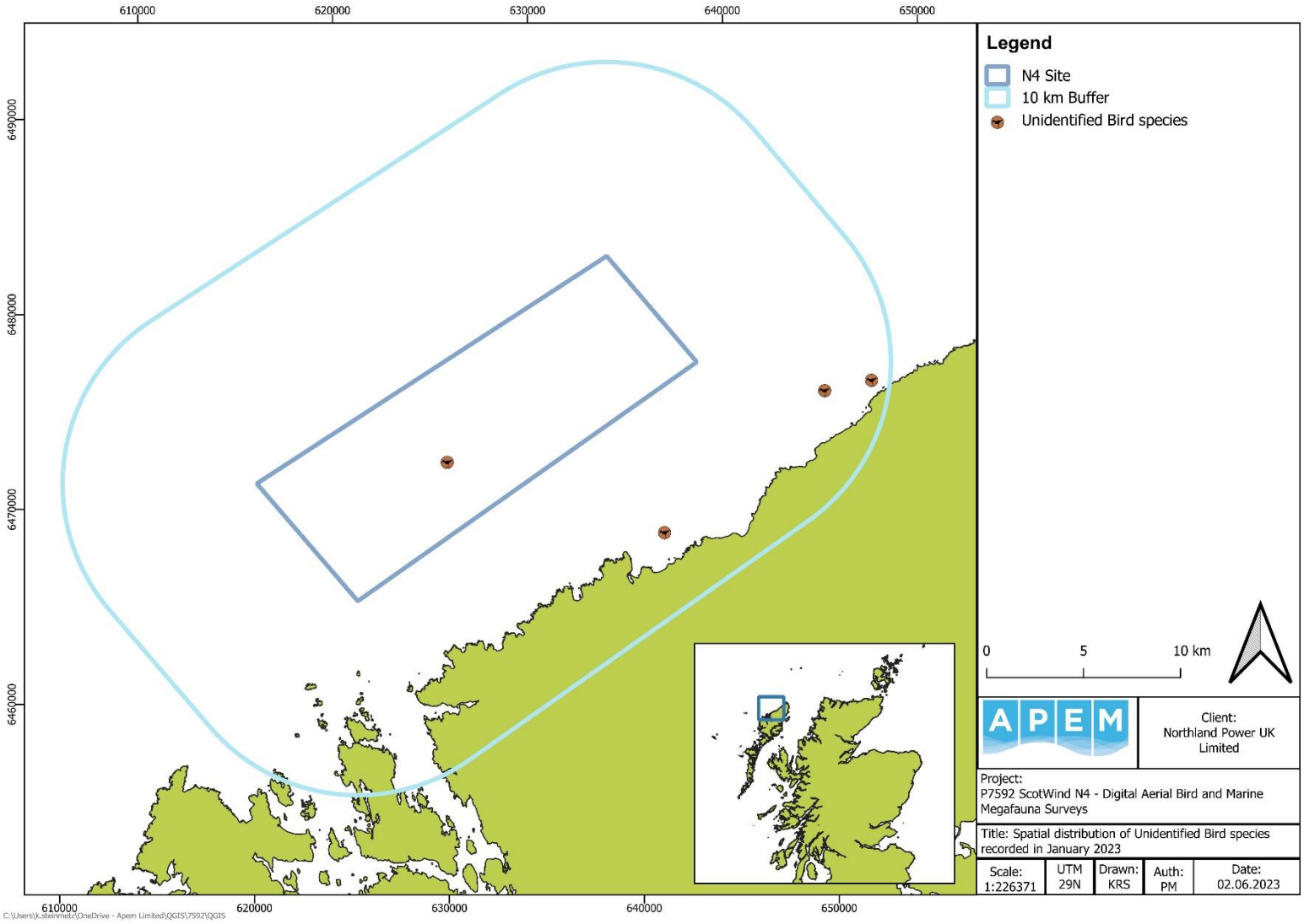


Figure 443 Distribution of unidentified bird species in January 2023
*Note that individuals in close proximity may appear overlaying.

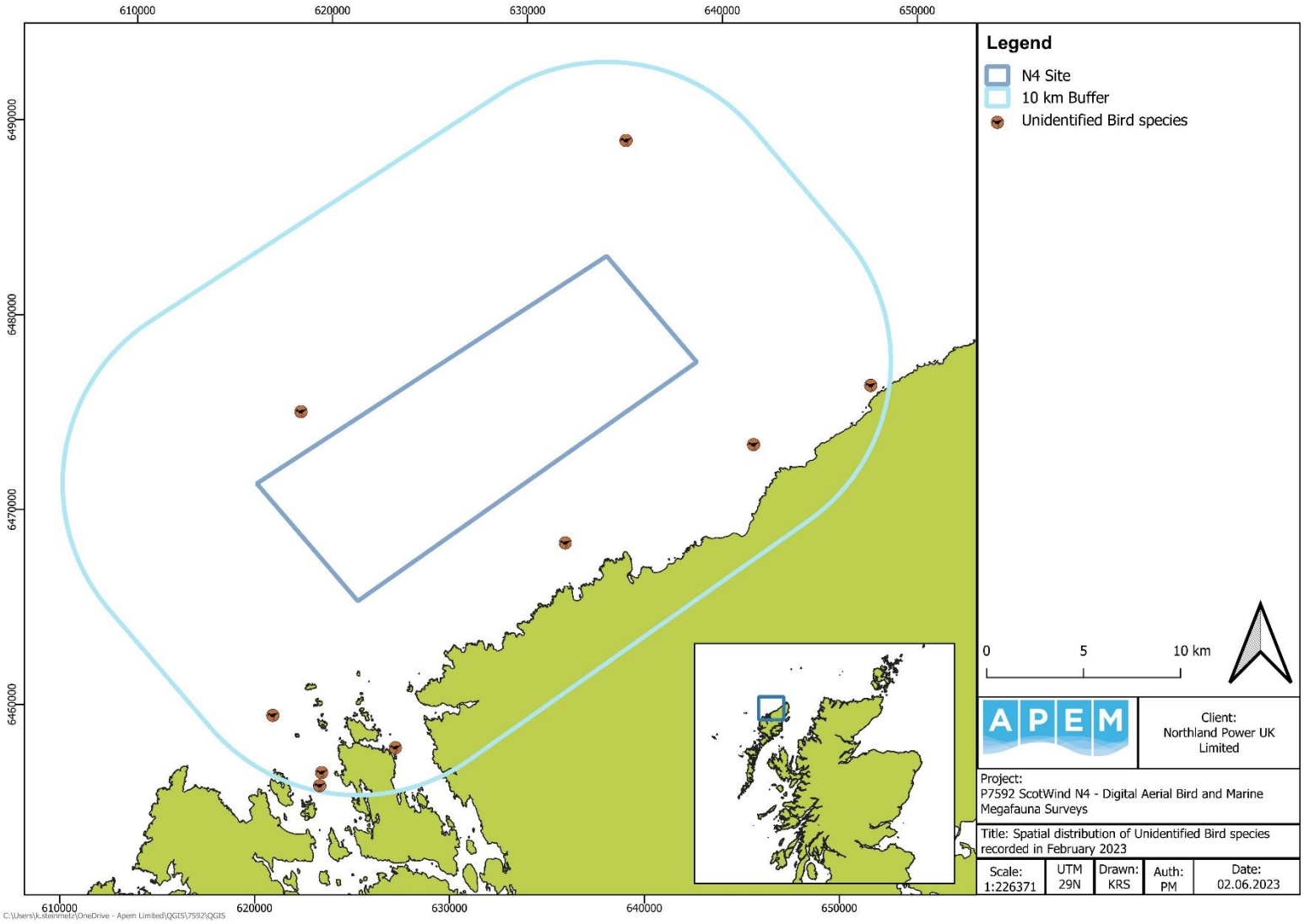


Figure 444 Distribution of unidentified bird species in February 2023
*Note that individuals in close proximity may appear overlaying.

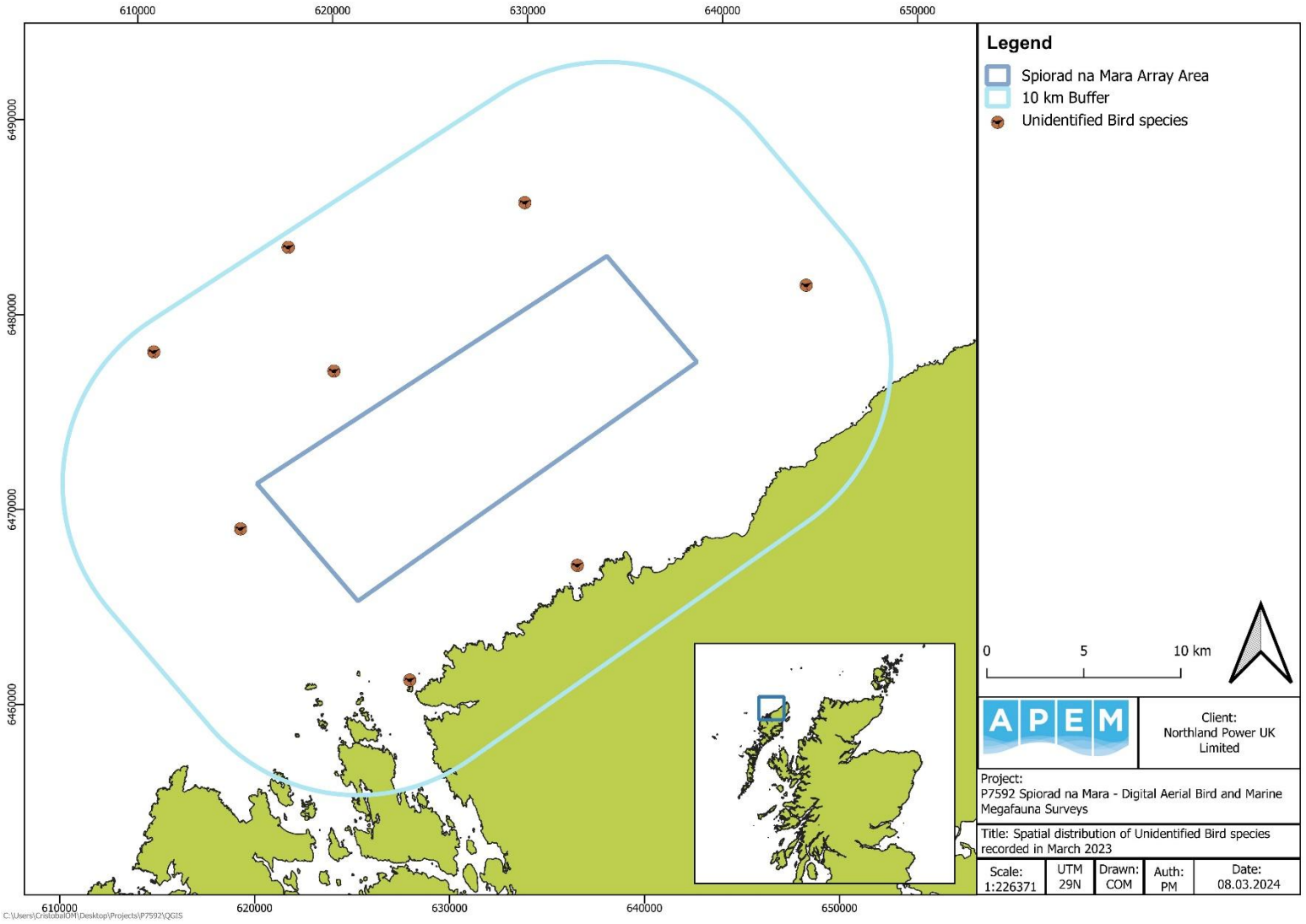


Figure 445 Distribution of unidentified bird species in March 2023

*Note that individuals in close proximity may appear overlaying.

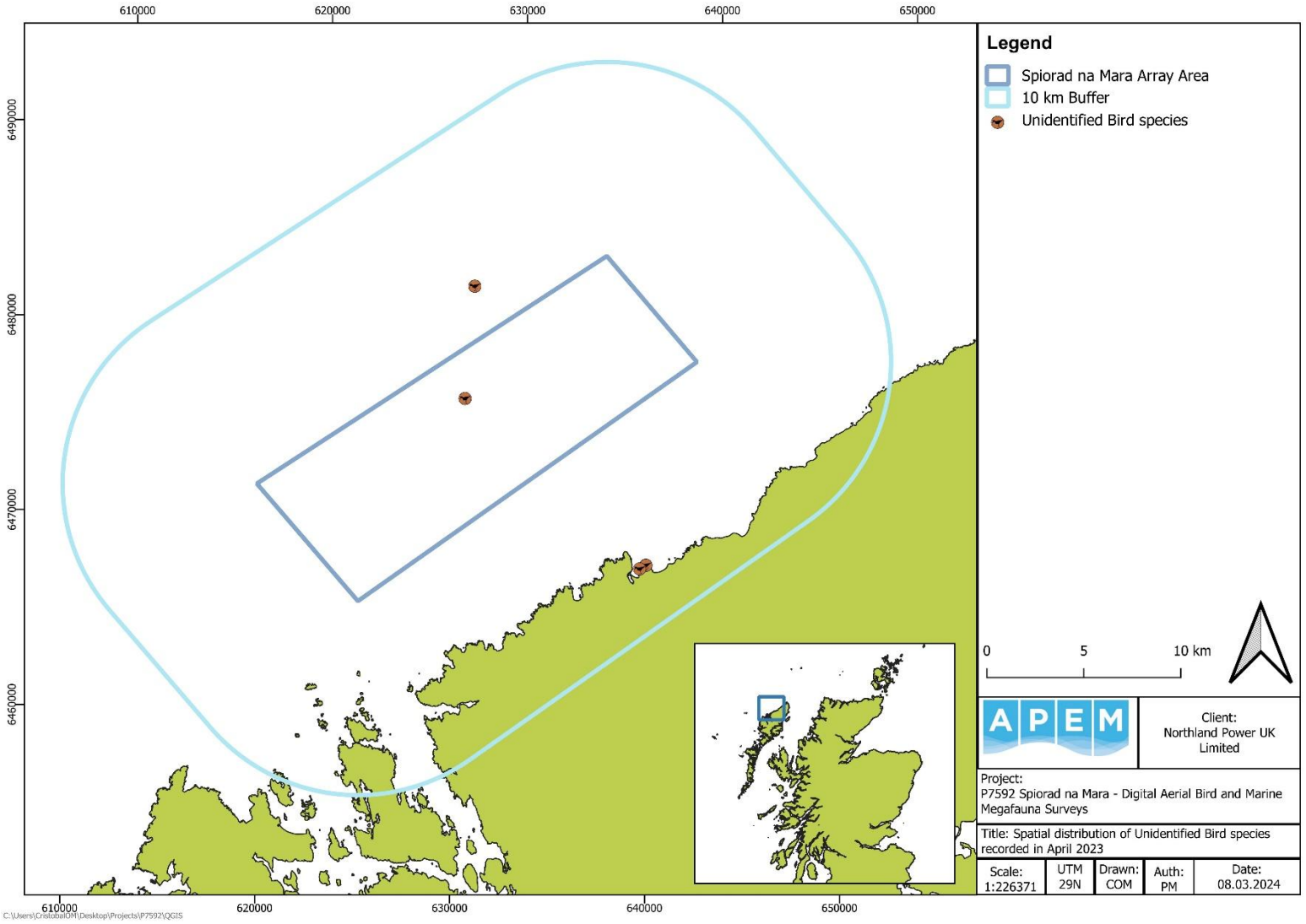


Figure 446 Distribution of unidentified bird species in April 2023

*Note that individuals in close proximity may appear overlaying.

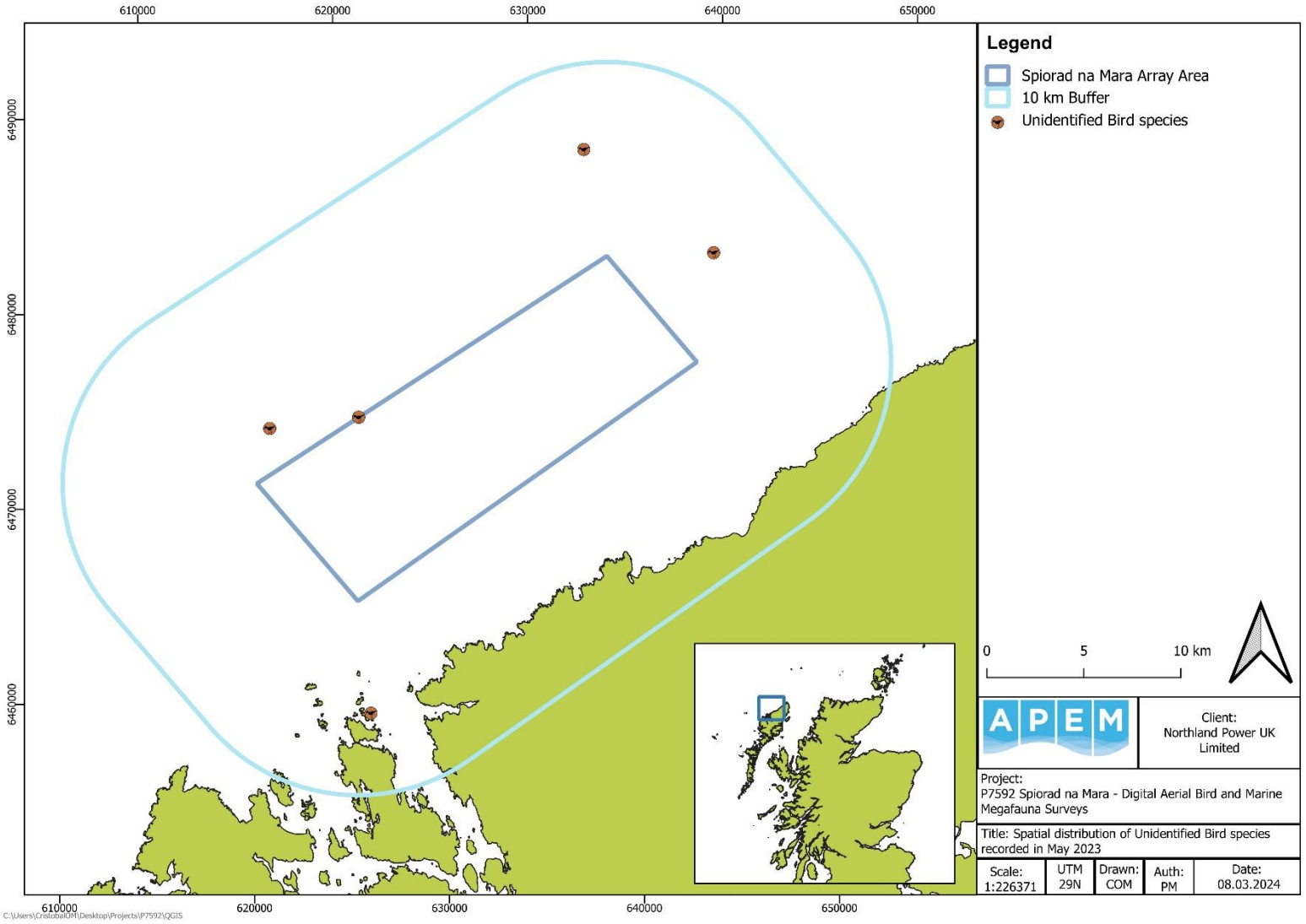


Figure 447 Distribution of unidentified bird species in May 2023

*Note that individuals in close proximity may appear overlaying.

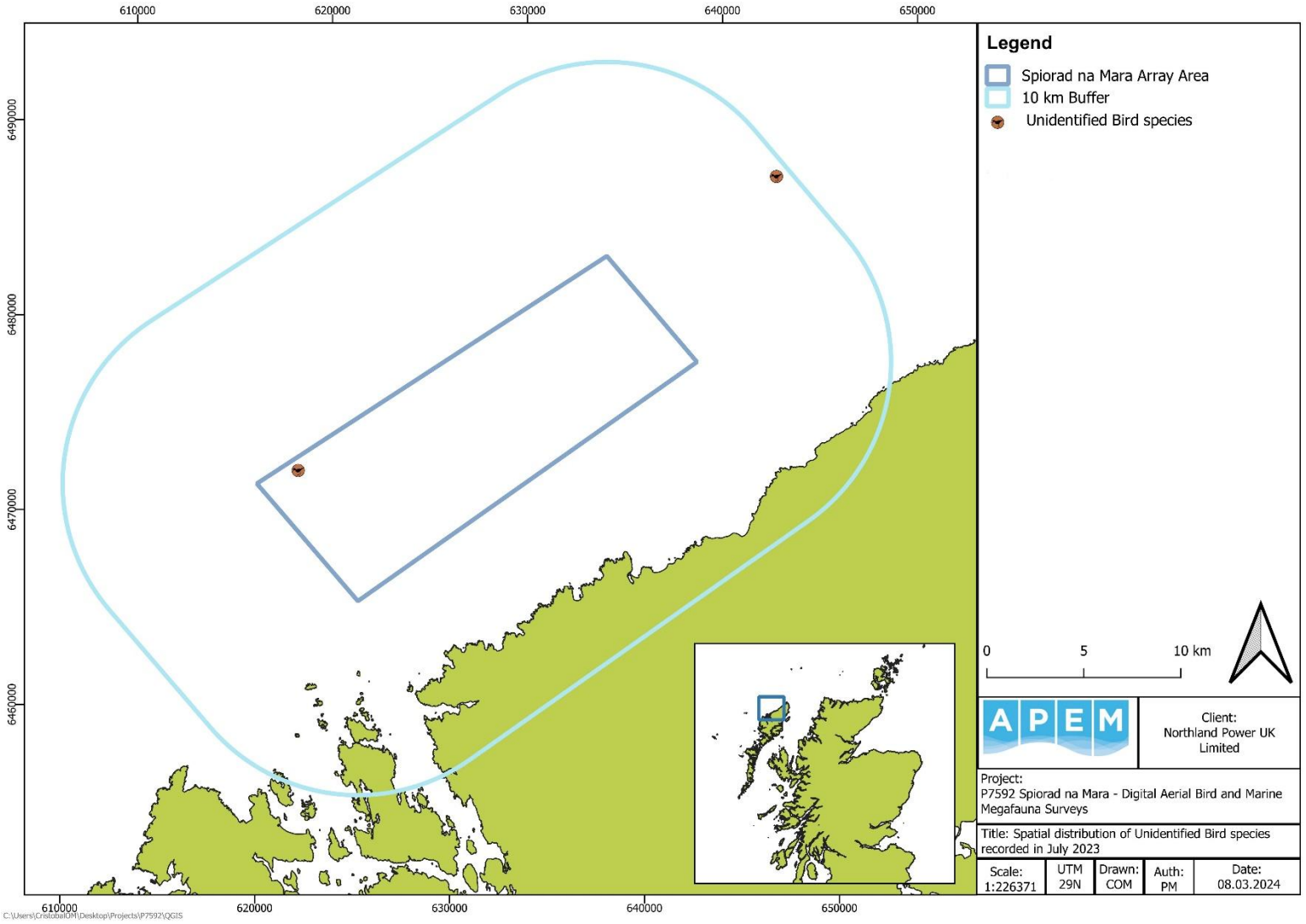


Figure 448 Distribution of unidentified bird species in July 2023

*Note that individuals in close proximity may appear overlaying.

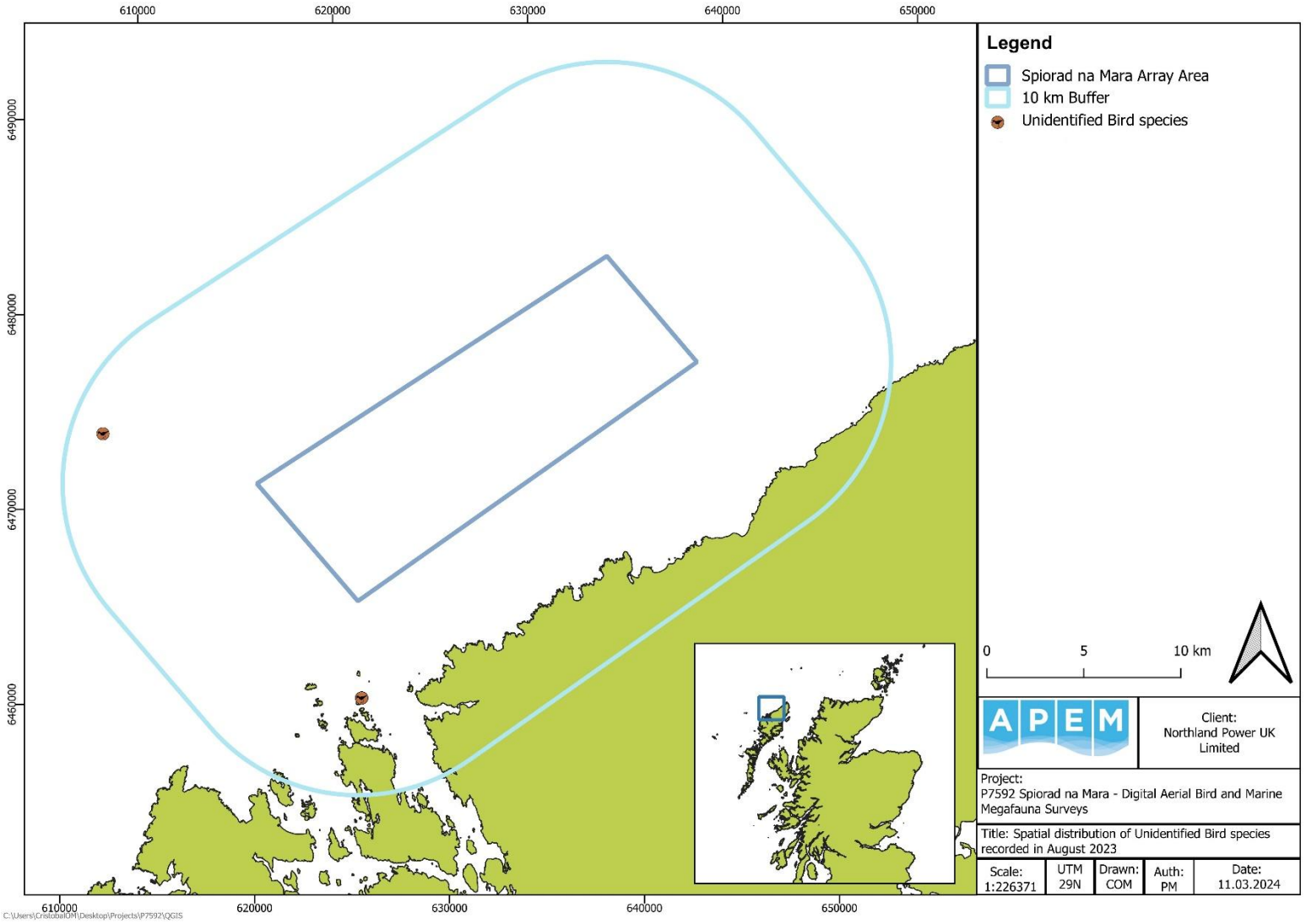


Figure 449 Distribution of unidentified bird species in August 2023

*Note that individuals in close proximity may appear overlaying.

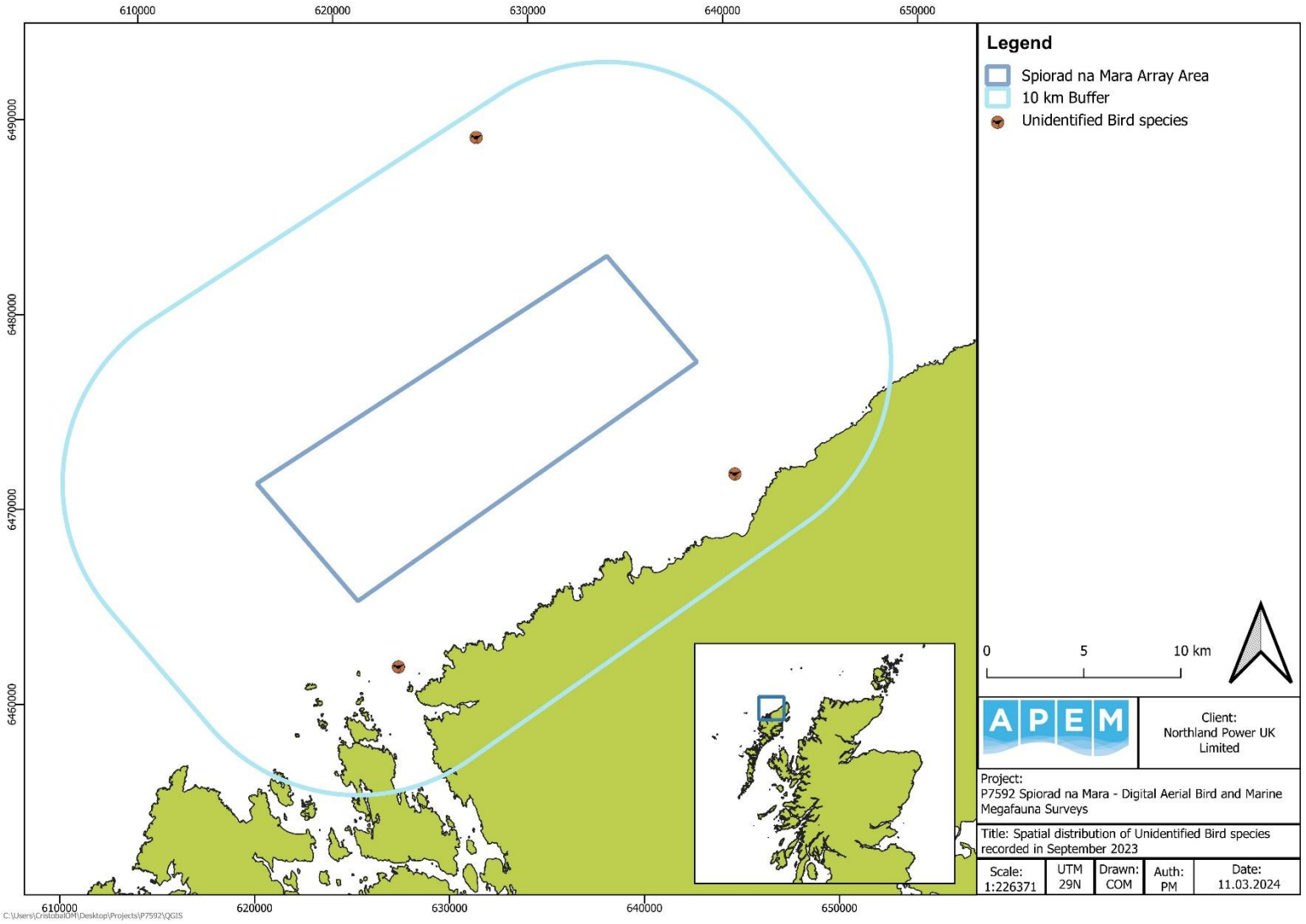


Figure 450 Distribution of unidentified bird species in September 2023
*Note that individuals in close proximity may appear overlaying.

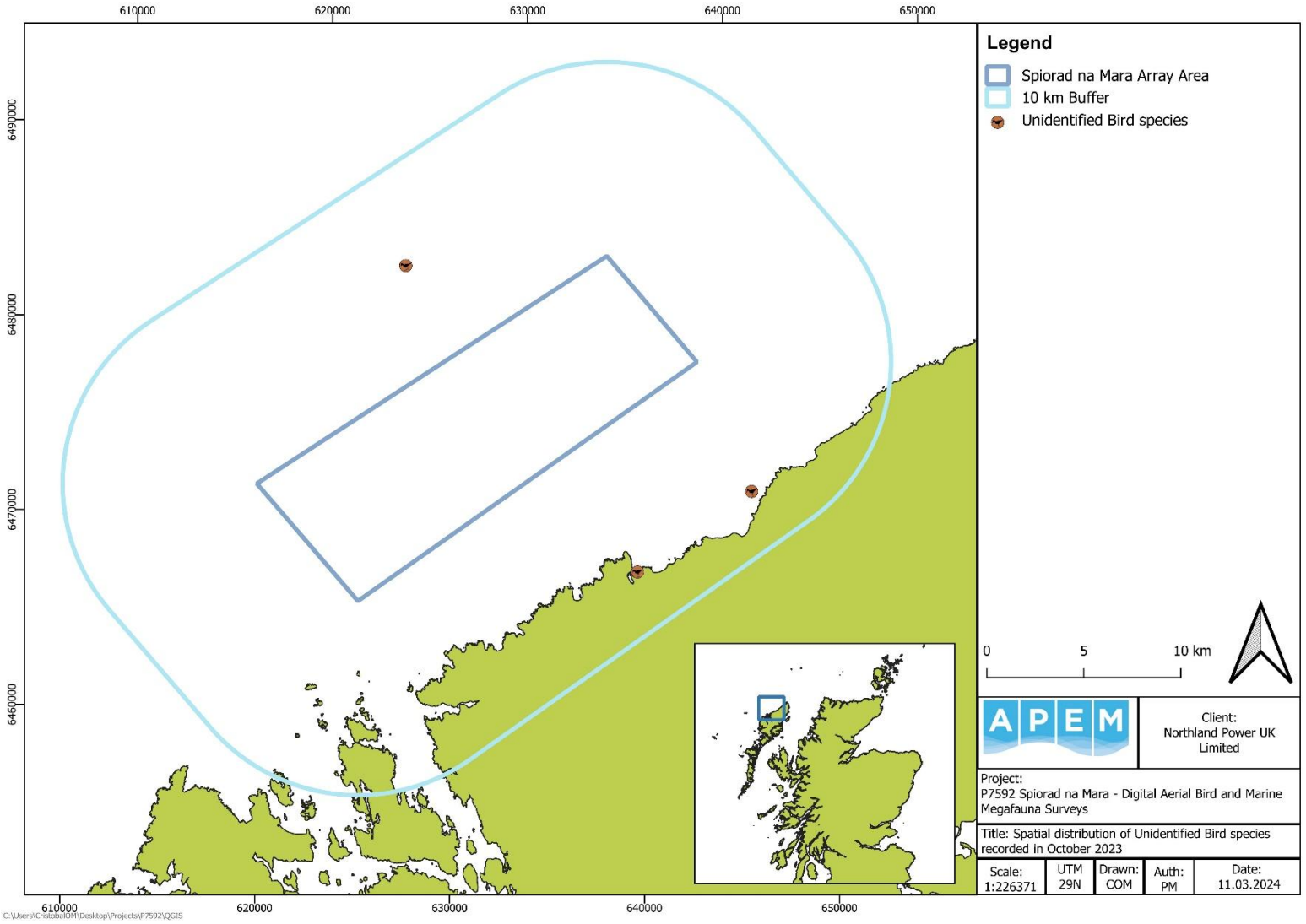


Figure 451 Distribution of unidentified bird species in October 2023

*Note that individuals in close proximity may appear overlaying.

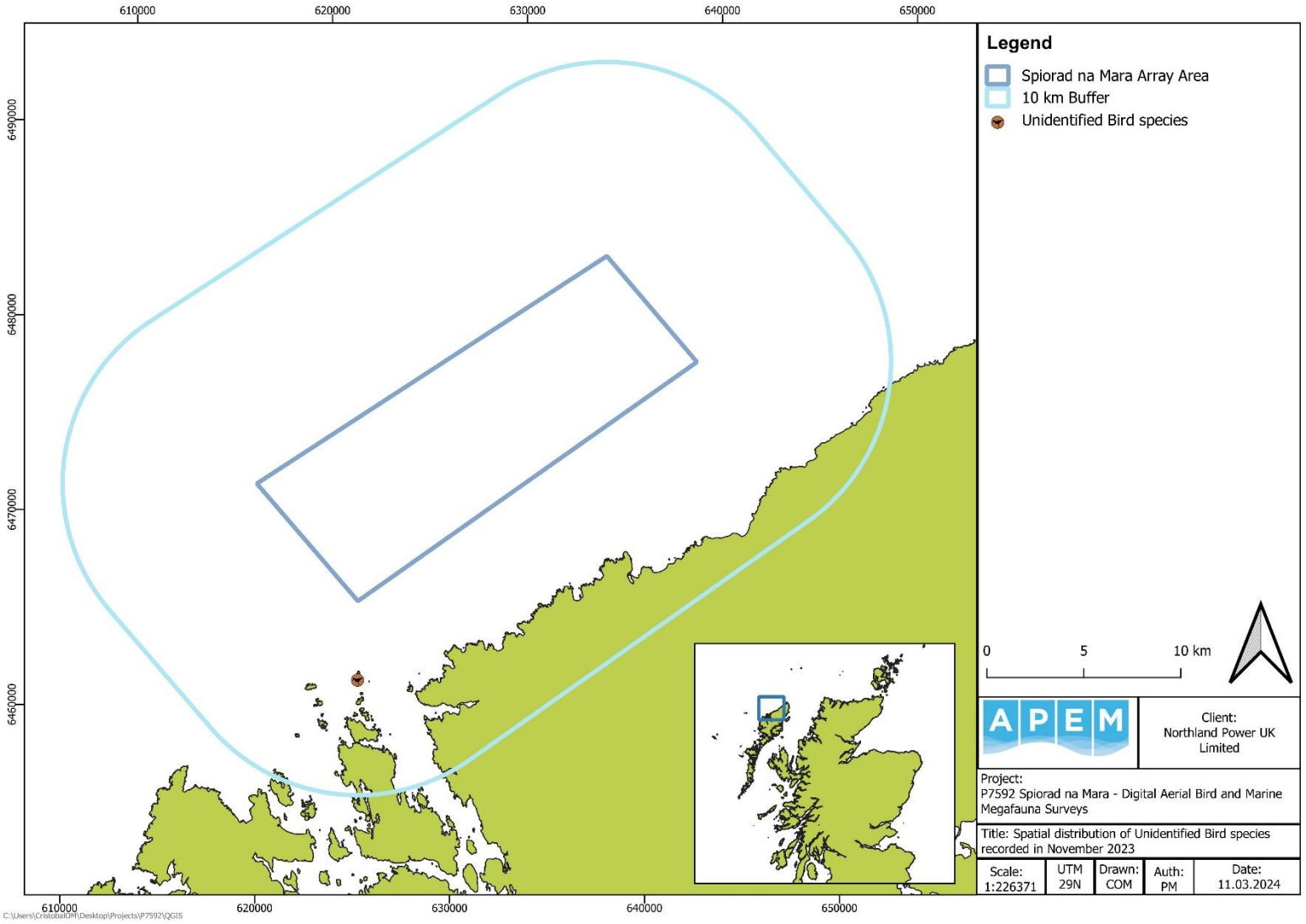


Figure 452 Distribution of unidentified bird species in November 2023
*Note that individuals in close proximity may appear overlaying.

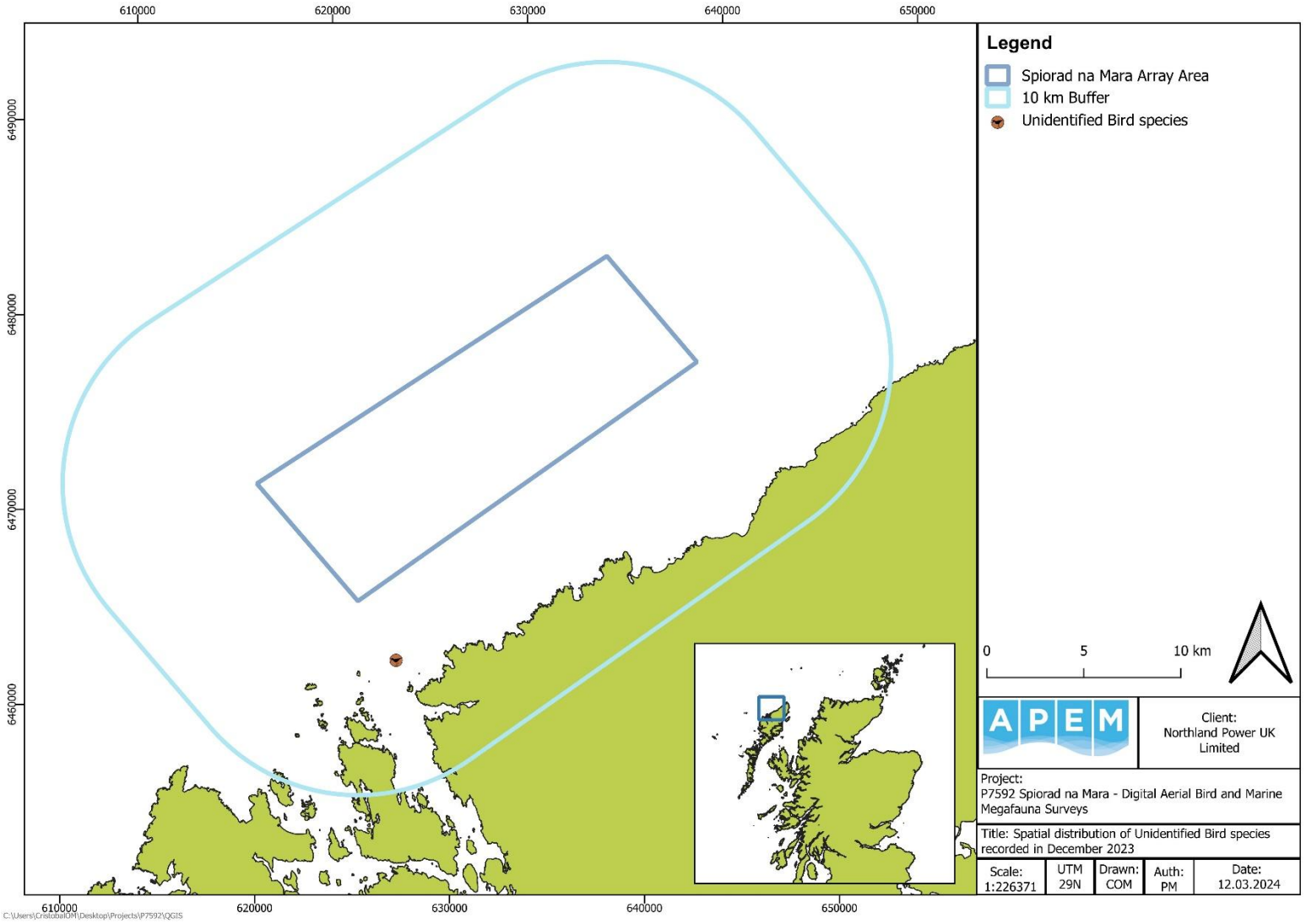


Figure 453 Distribution of unidentified bird species in December 2023
*Note that individuals in close proximity may appear overlaying.

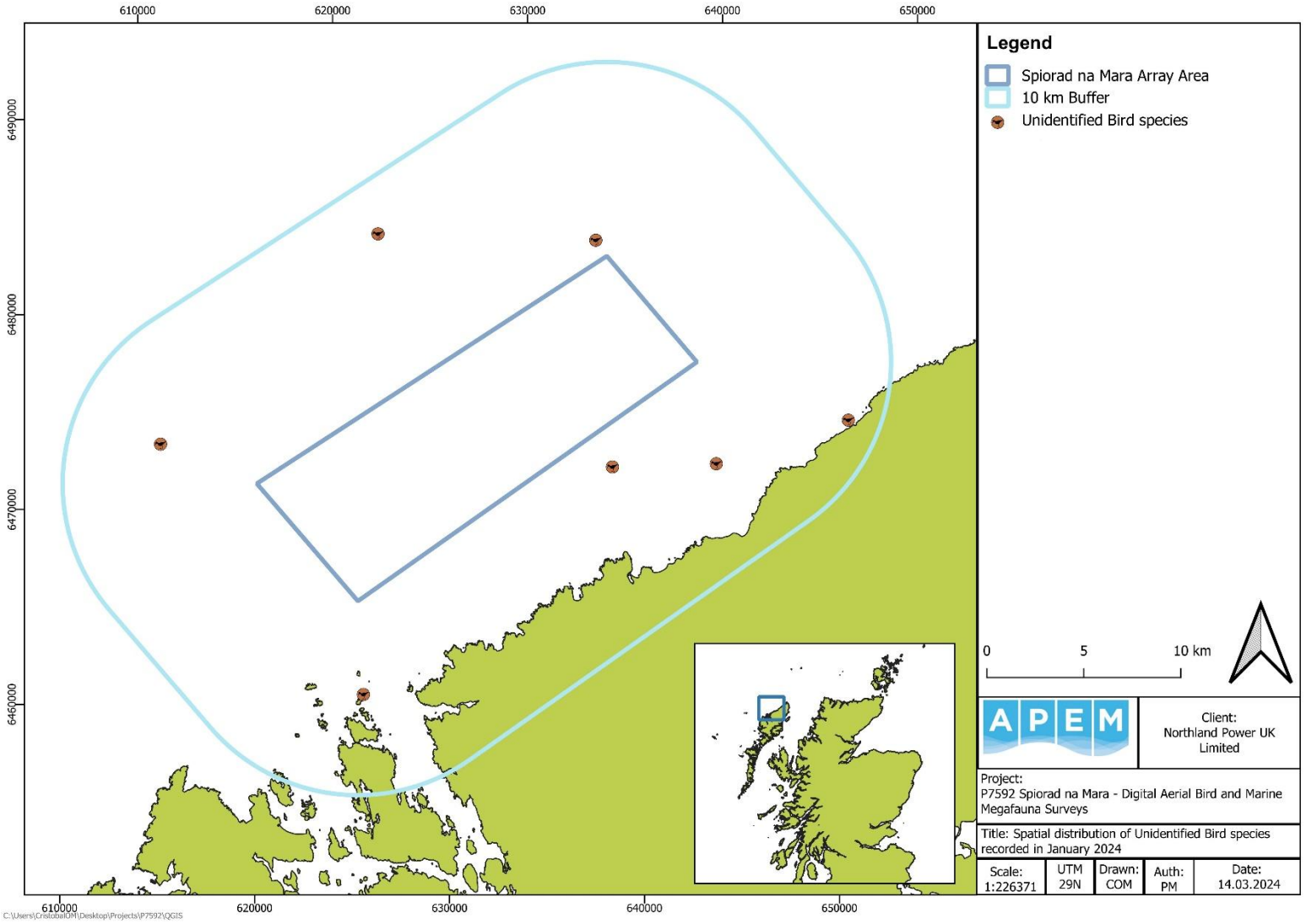


Figure 454 Distribution of unidentified bird species in January 2024

*Note that individuals in close proximity may appear overlaying.

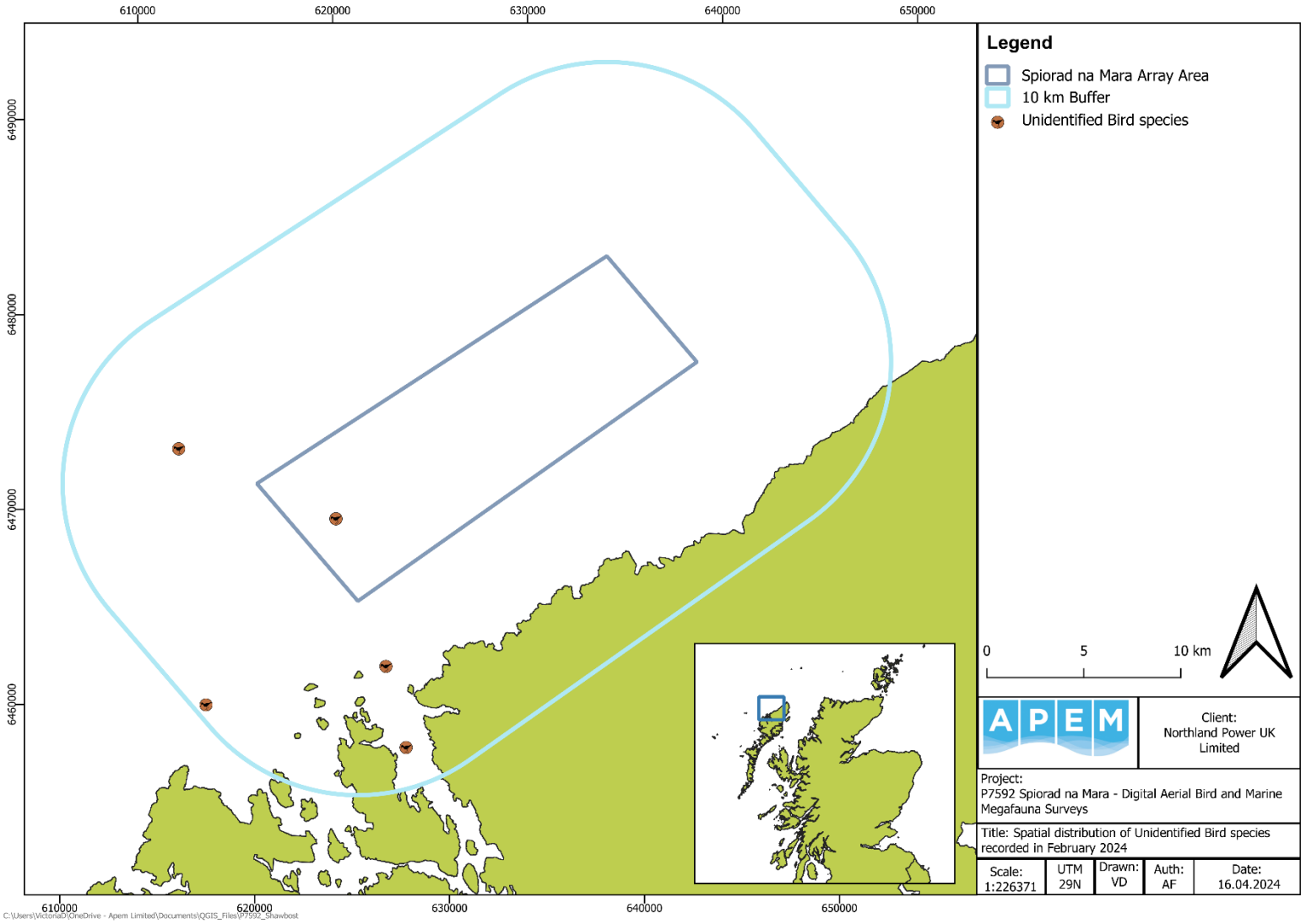


Figure 455 Distribution of unidentified bird species in February 2024

*Note that individuals in close proximity may appear overlaying.

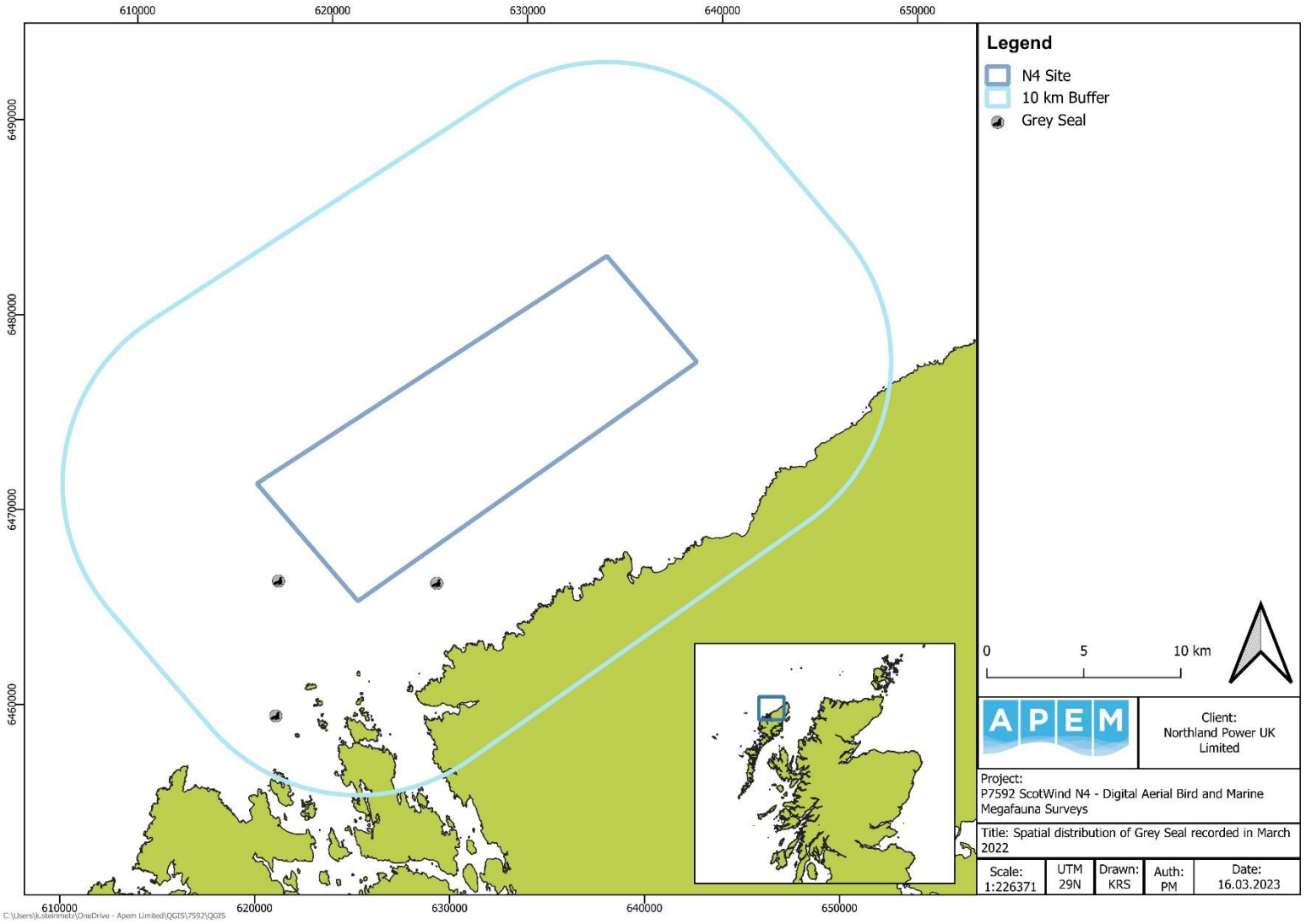


Figure 456 Distribution of grey seal in March 2022
*Note that individuals in close proximity may appear overlaying.

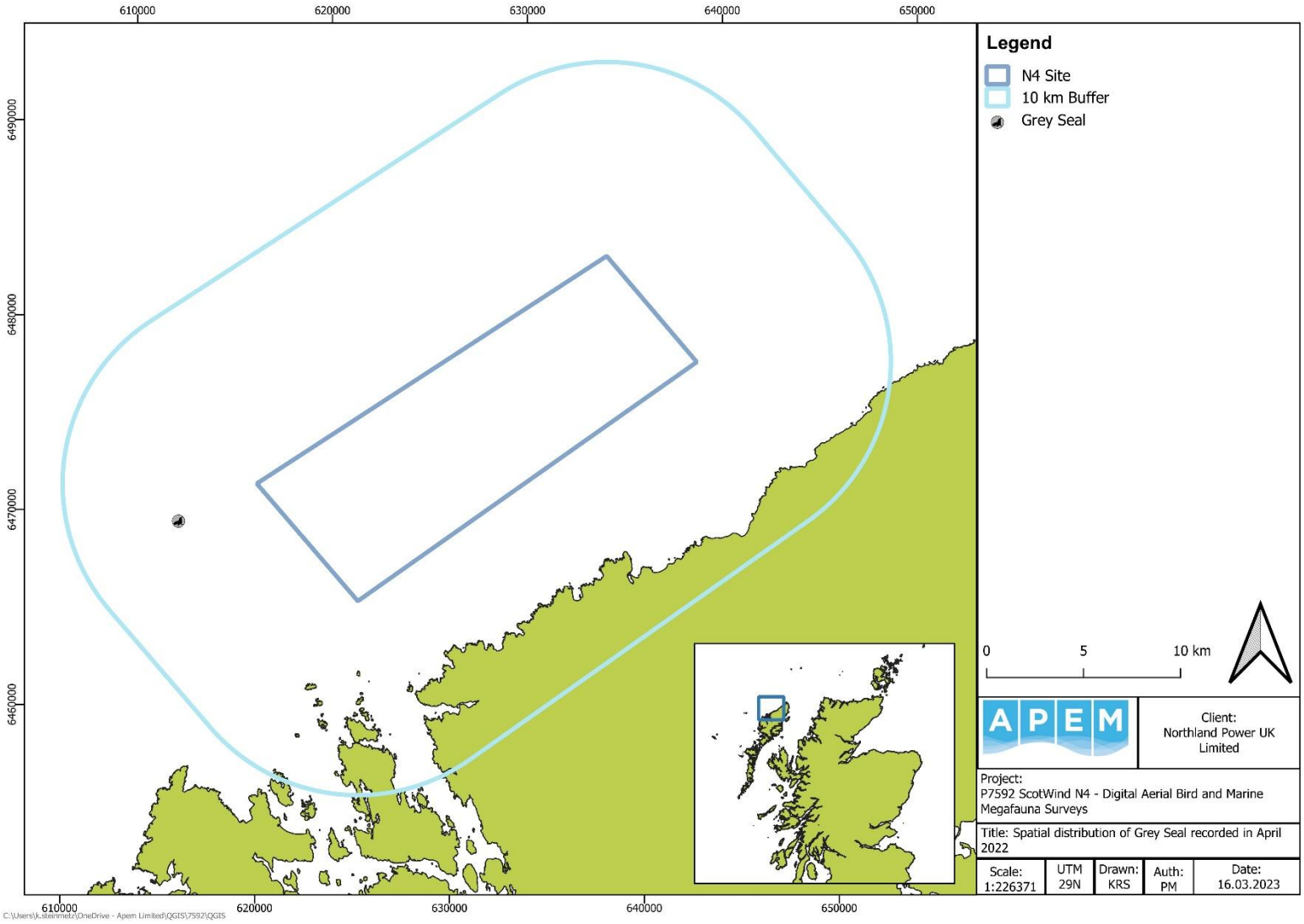


Figure 457 Distribution of grey seal in April 2022
*Note that individuals in close proximity may appear overlaying.

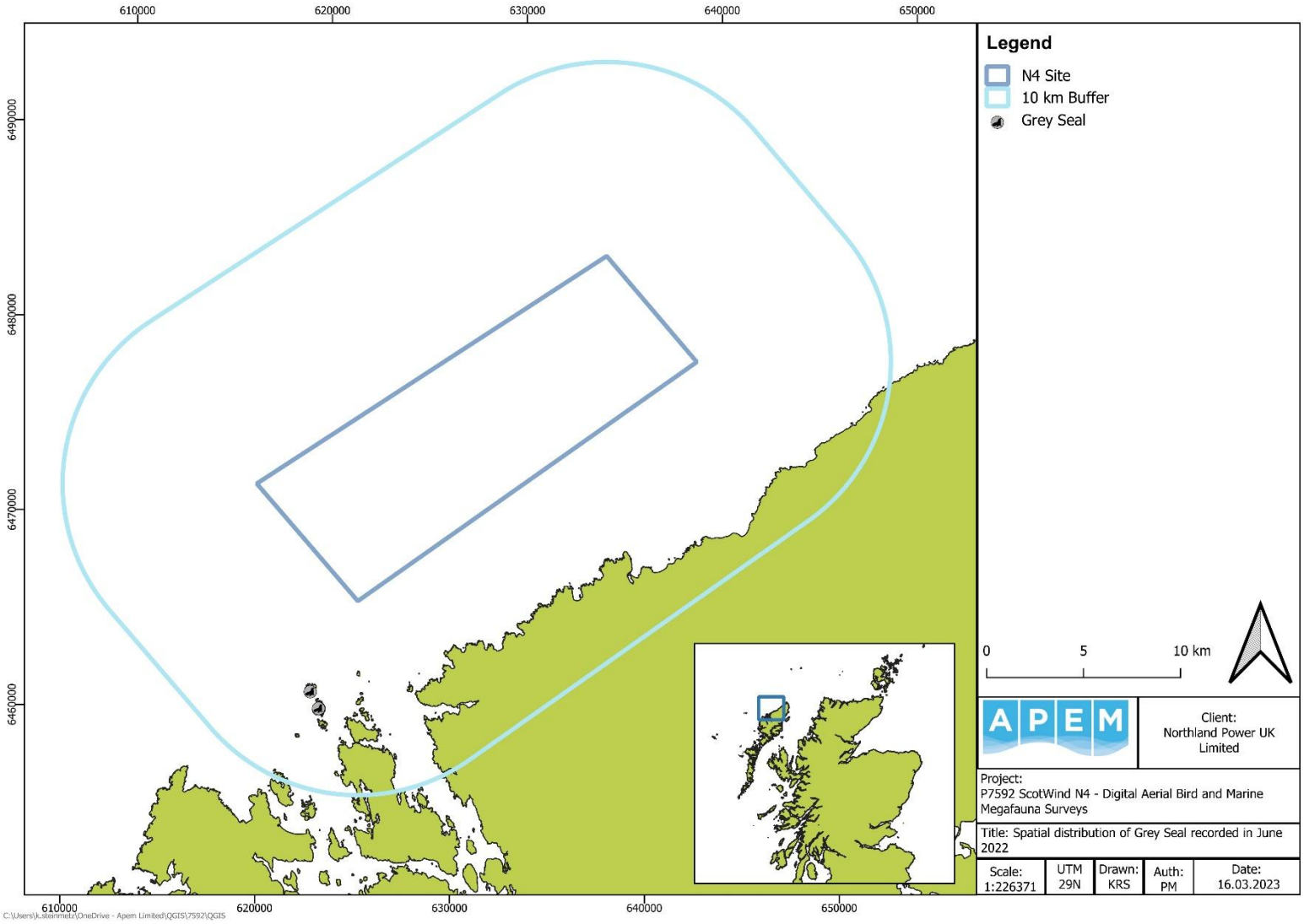


Figure 458 Distribution of grey seal in June 2022
*Note that individuals in close proximity may appear overlaying.

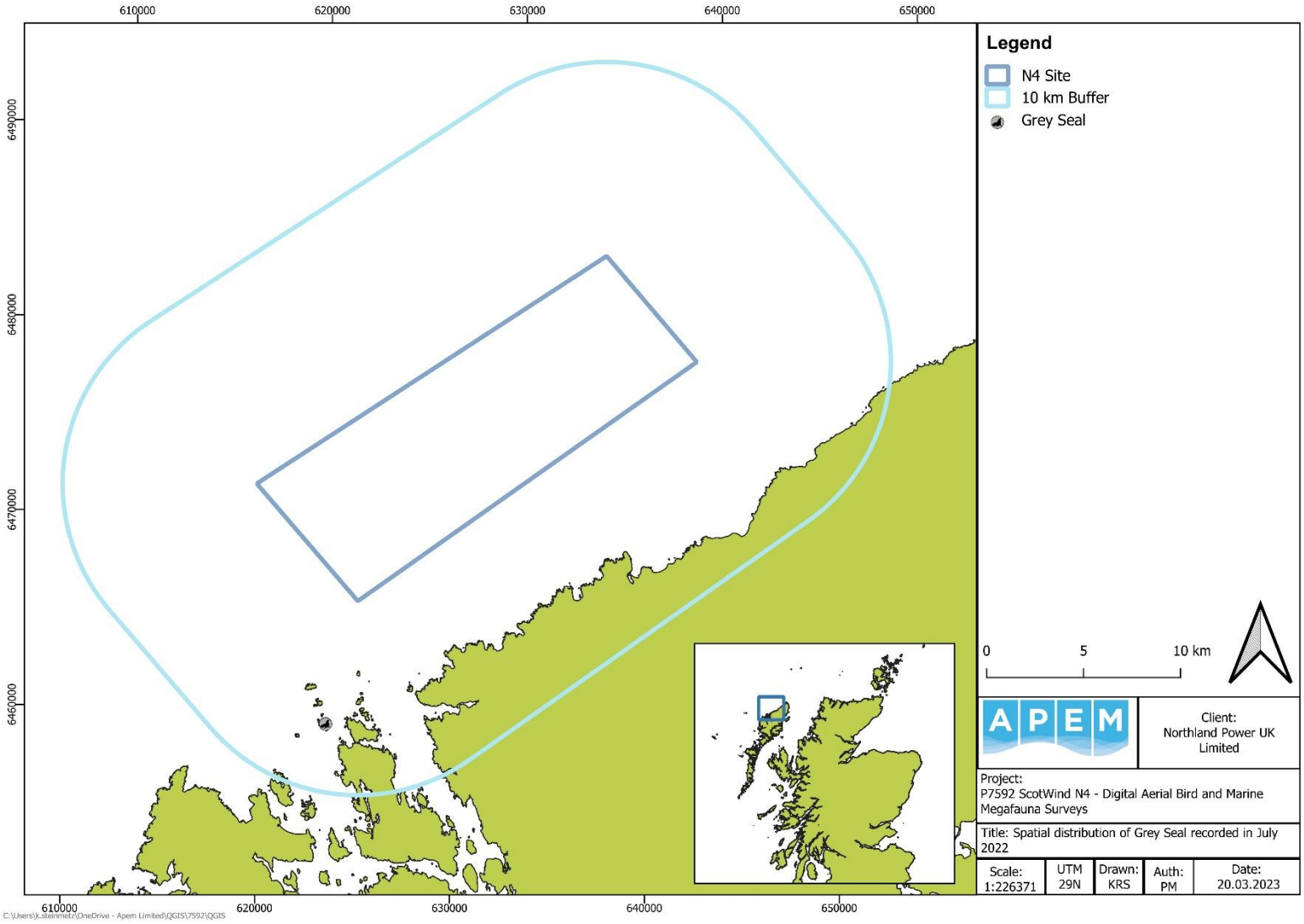


Figure 459 Distribution of grey seal in July 2022
*Note that individuals in close proximity may appear overlaying.

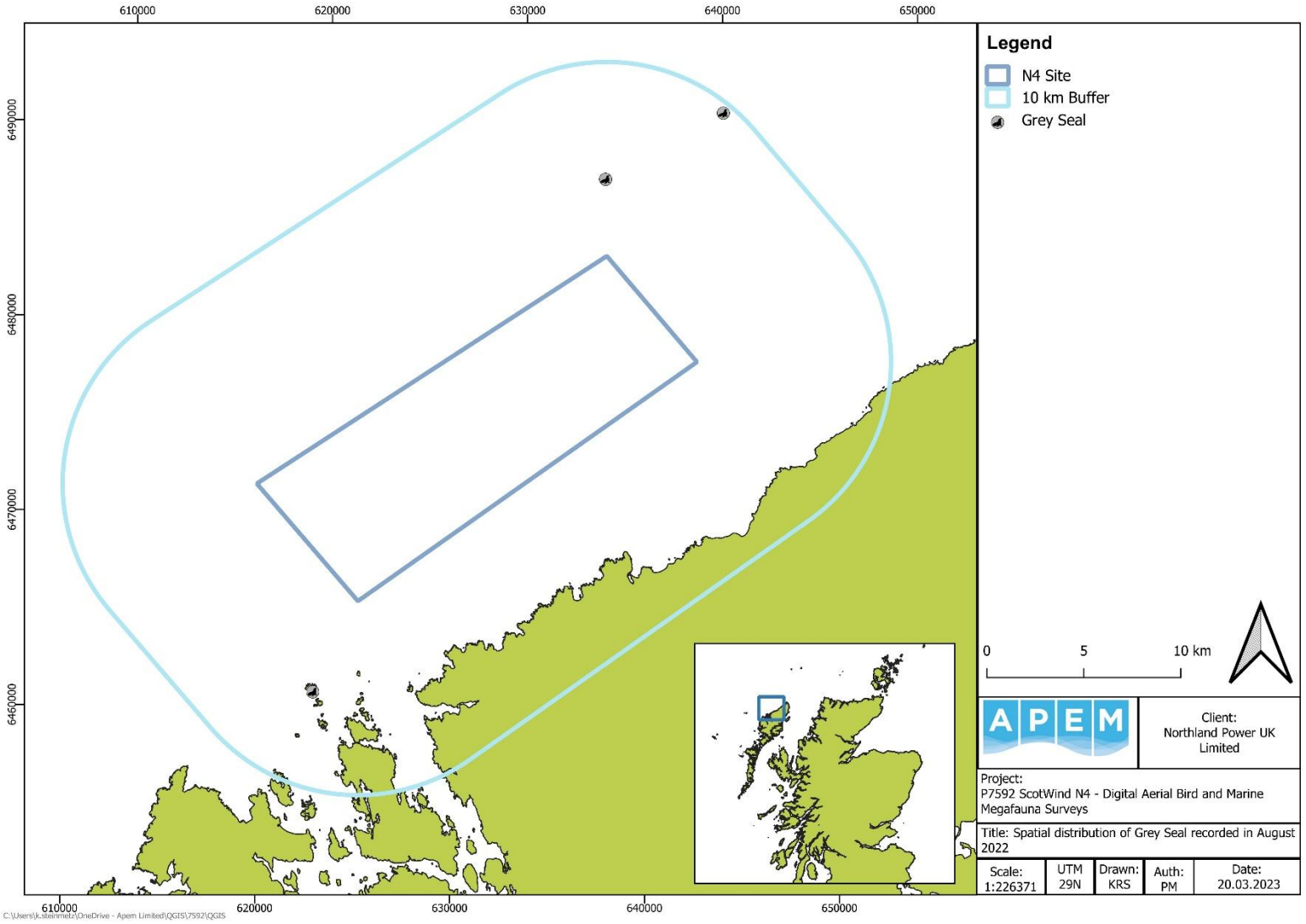


Figure 460 Distribution of grey seal in August 2022
*Note that individuals in close proximity may appear overlaying.

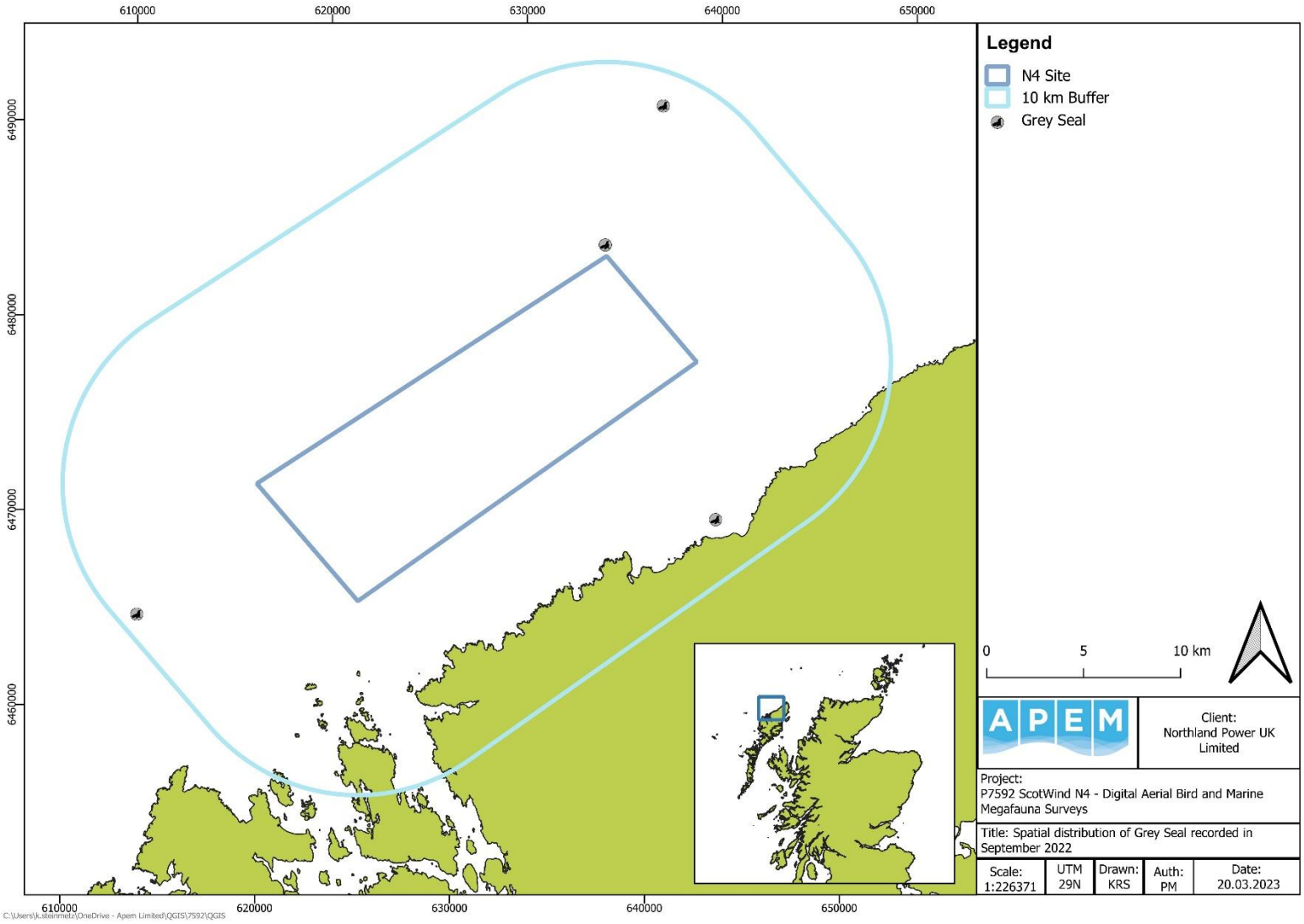


Figure 461 Distribution of grey seal in September 2022

*Note that individuals in close proximity may appear overlaying.

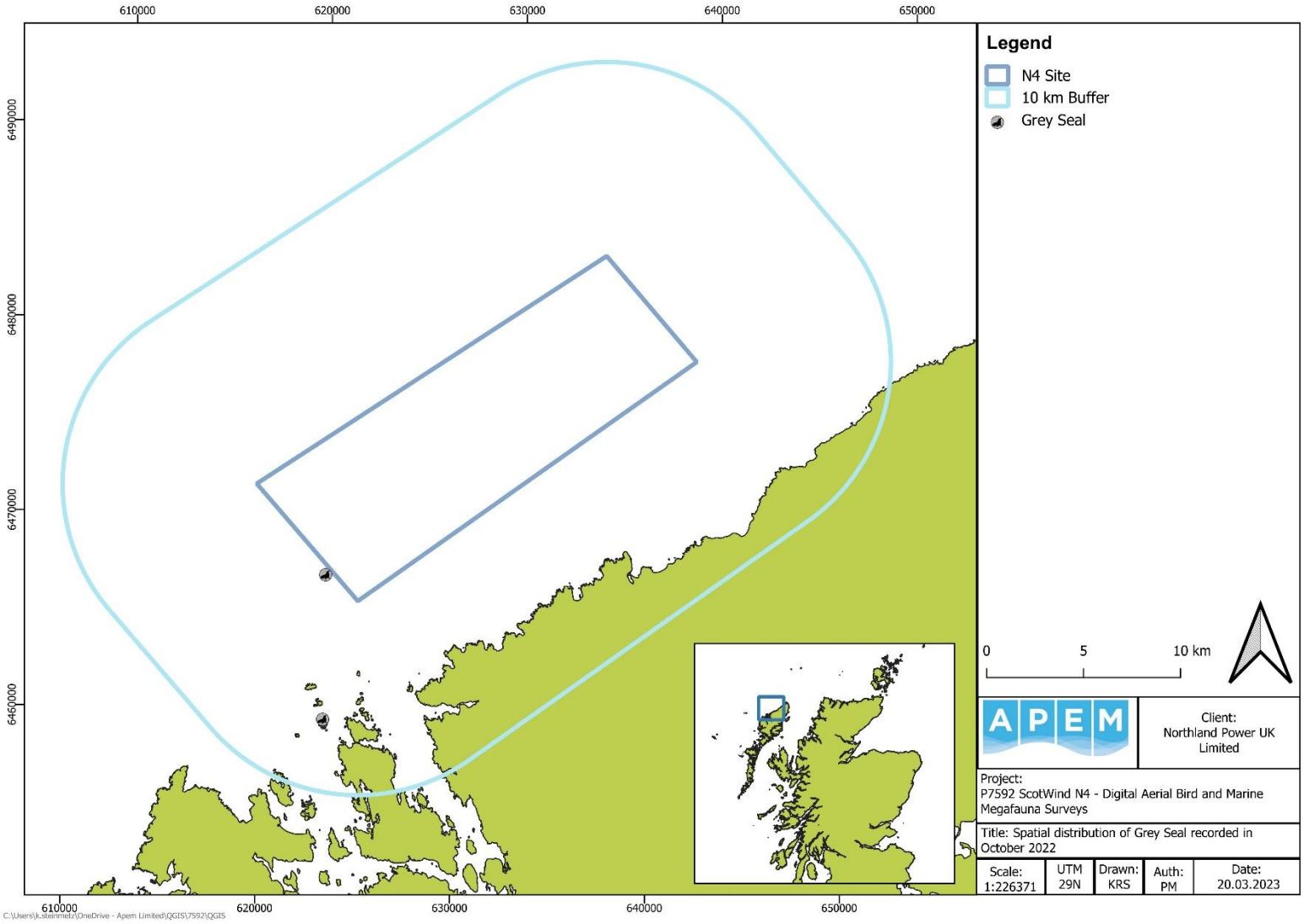


Figure 462 Distribution of grey seal in October 2022
*Note that individuals in close proximity may appear overlaying.

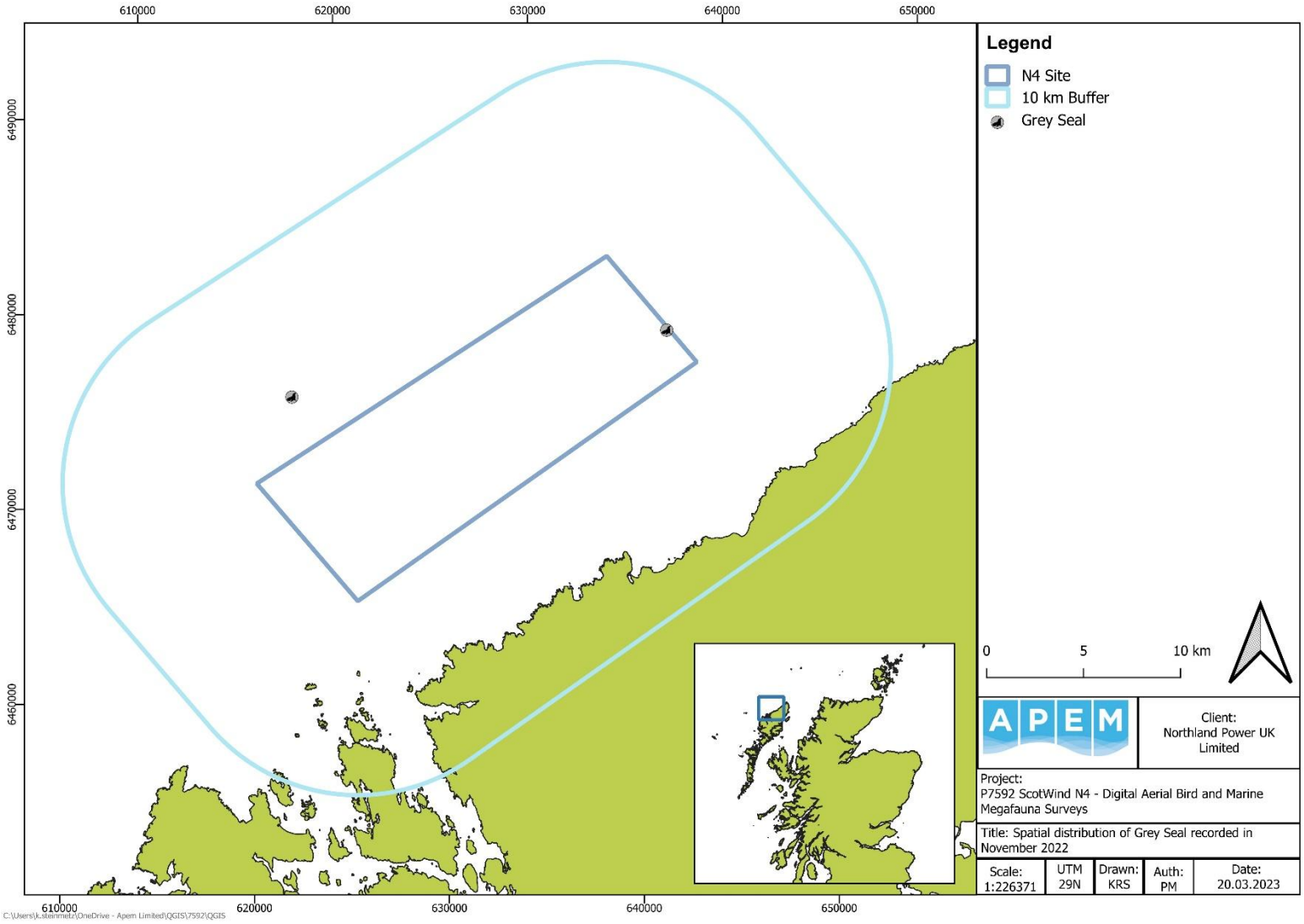


Figure 463 Distribution of grey seal in November 2022

*Note that individuals in close proximity may appear overlaying.

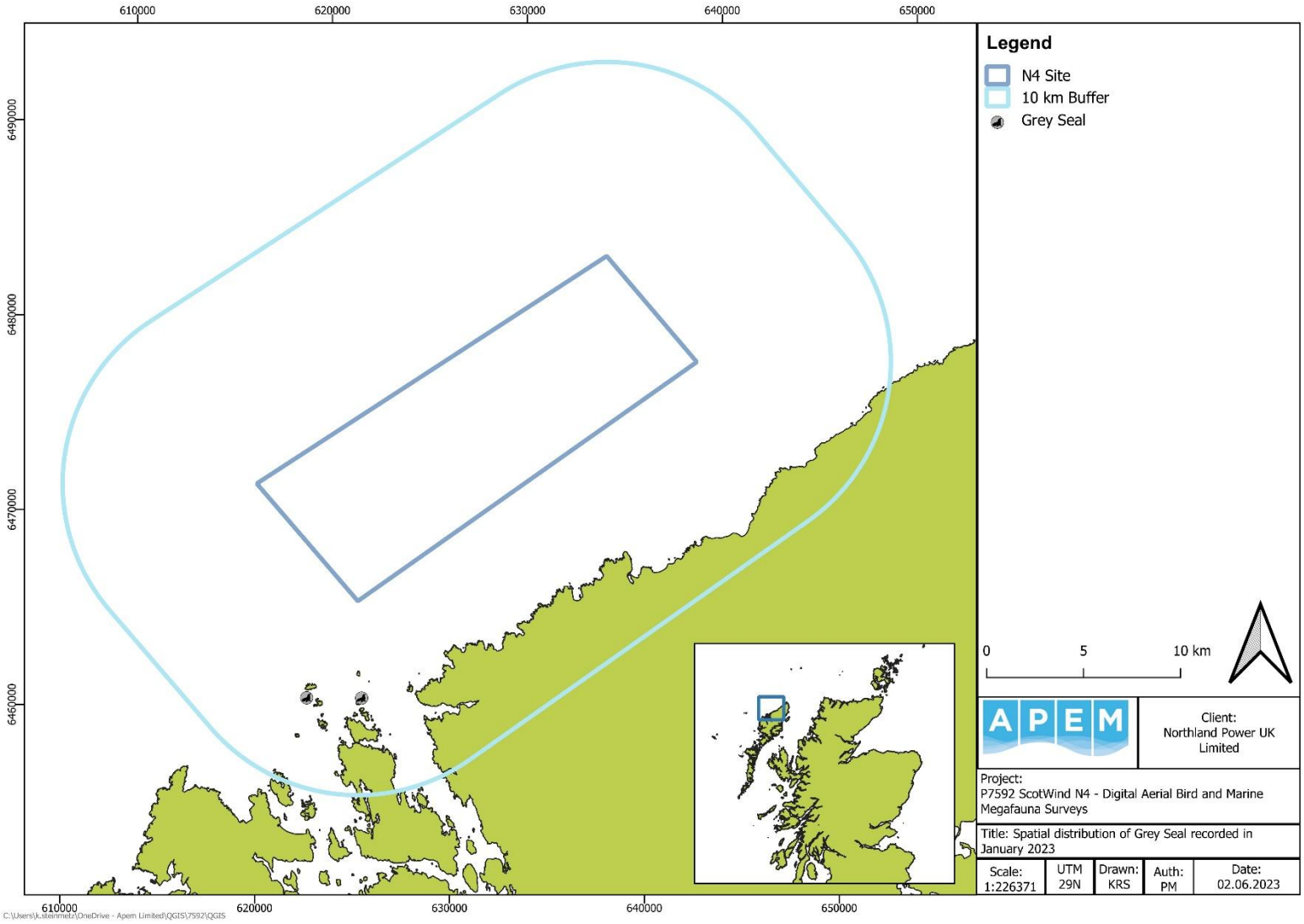


Figure 464 Distribution of grey seal in January 2023
*Note that individuals in close proximity may appear overlaying.

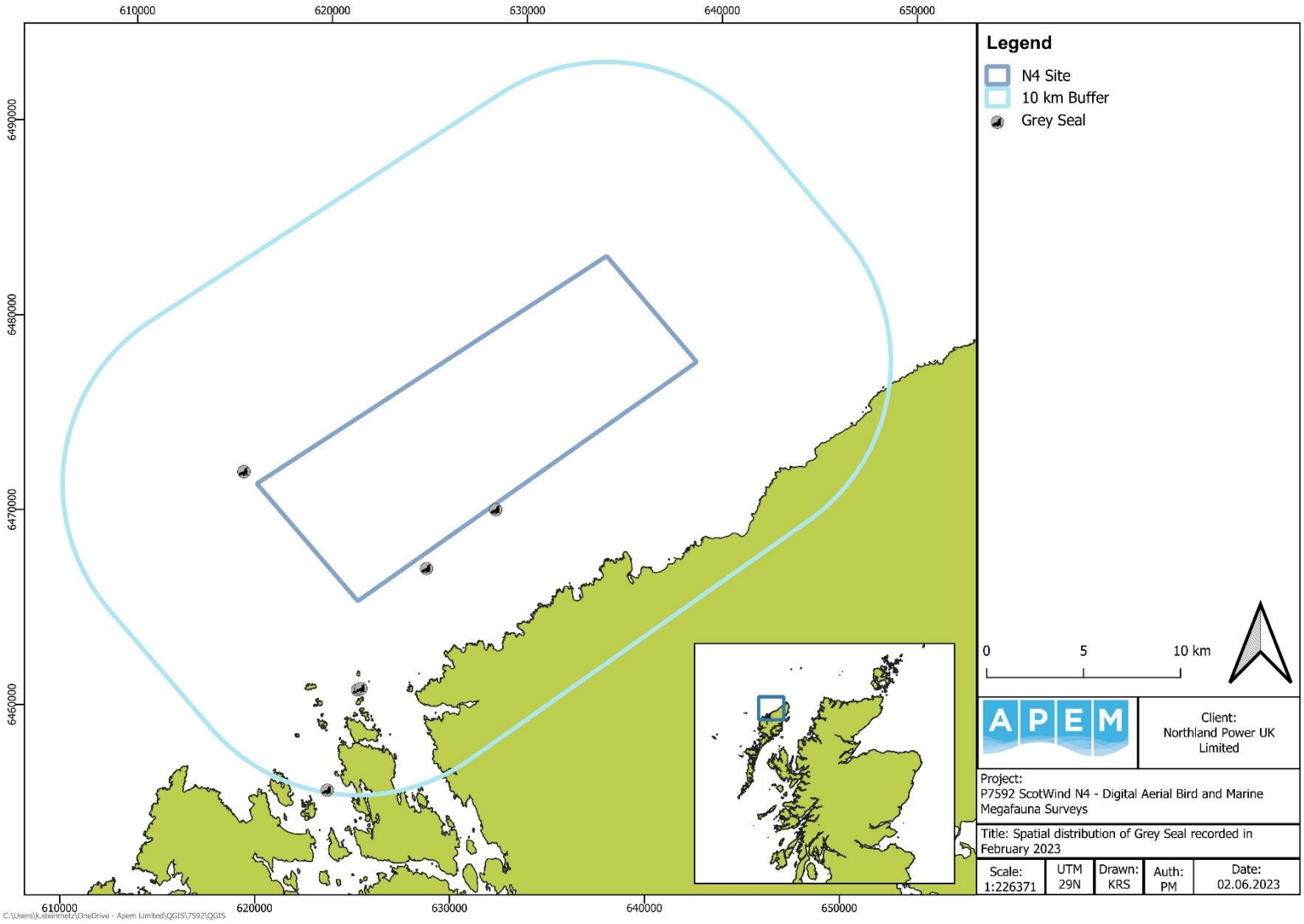


Figure 465 Distribution of grey seal in February 2023
*Note that individuals in close proximity may appear overlaying.

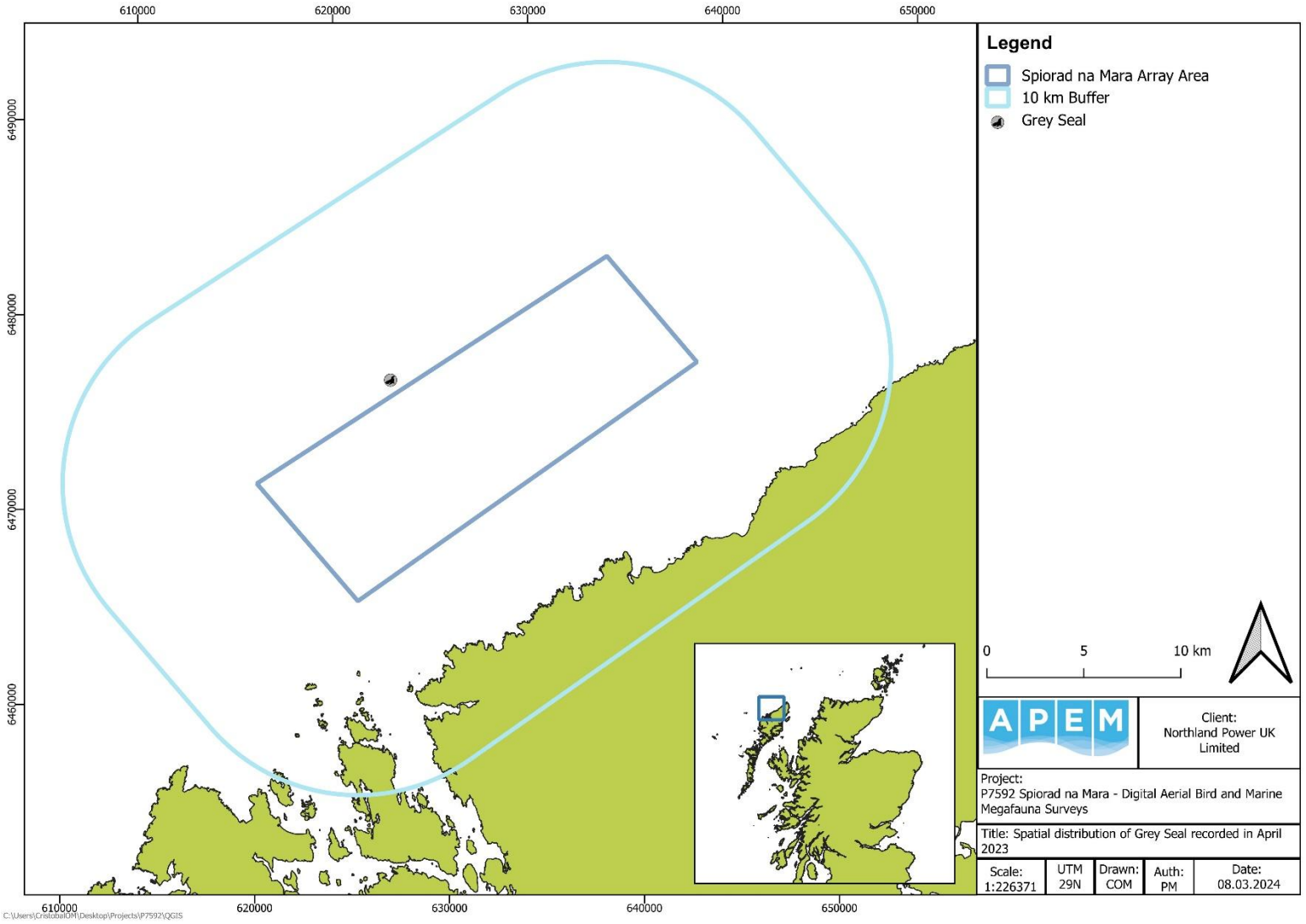


Figure 466 Distribution of grey seal in April 2023
*Note that individuals in close proximity may appear overlaying.

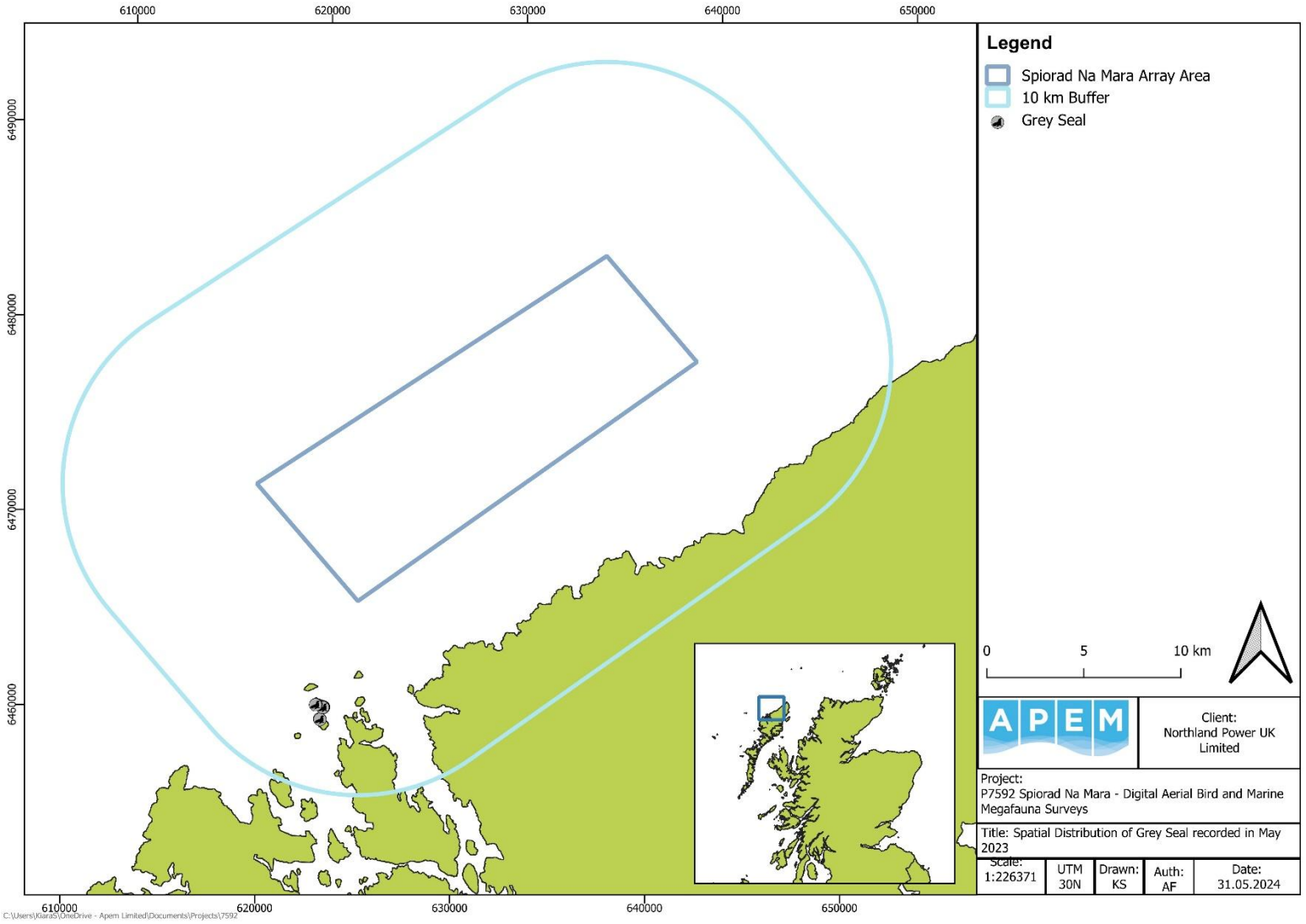


Figure 467 Distribution of grey seal in May 2023
*Note that individuals in close proximity may appear overlaying.

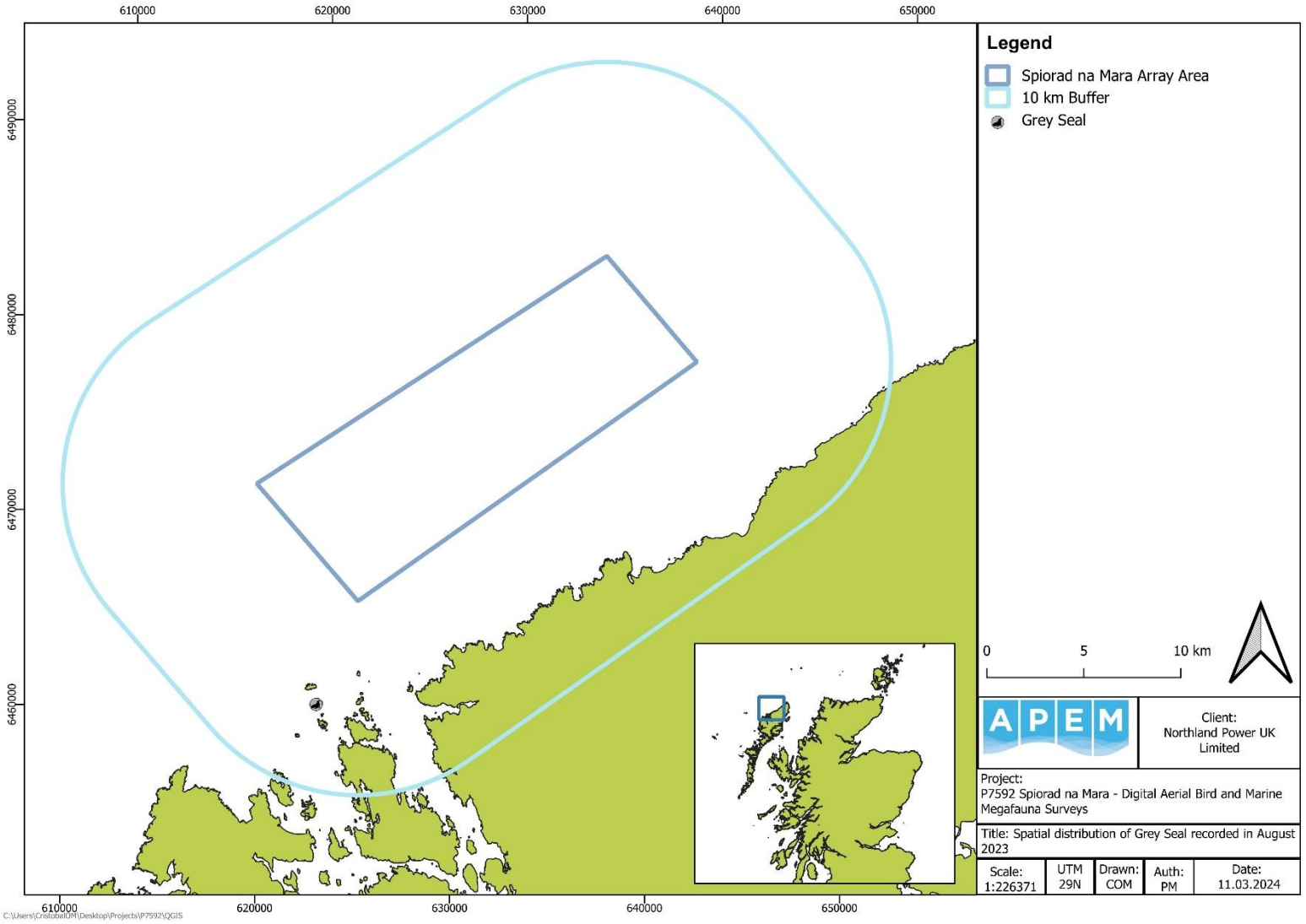


Figure 468 Distribution of grey seal in August 2023
*Note that individuals in close proximity may appear overlaying.

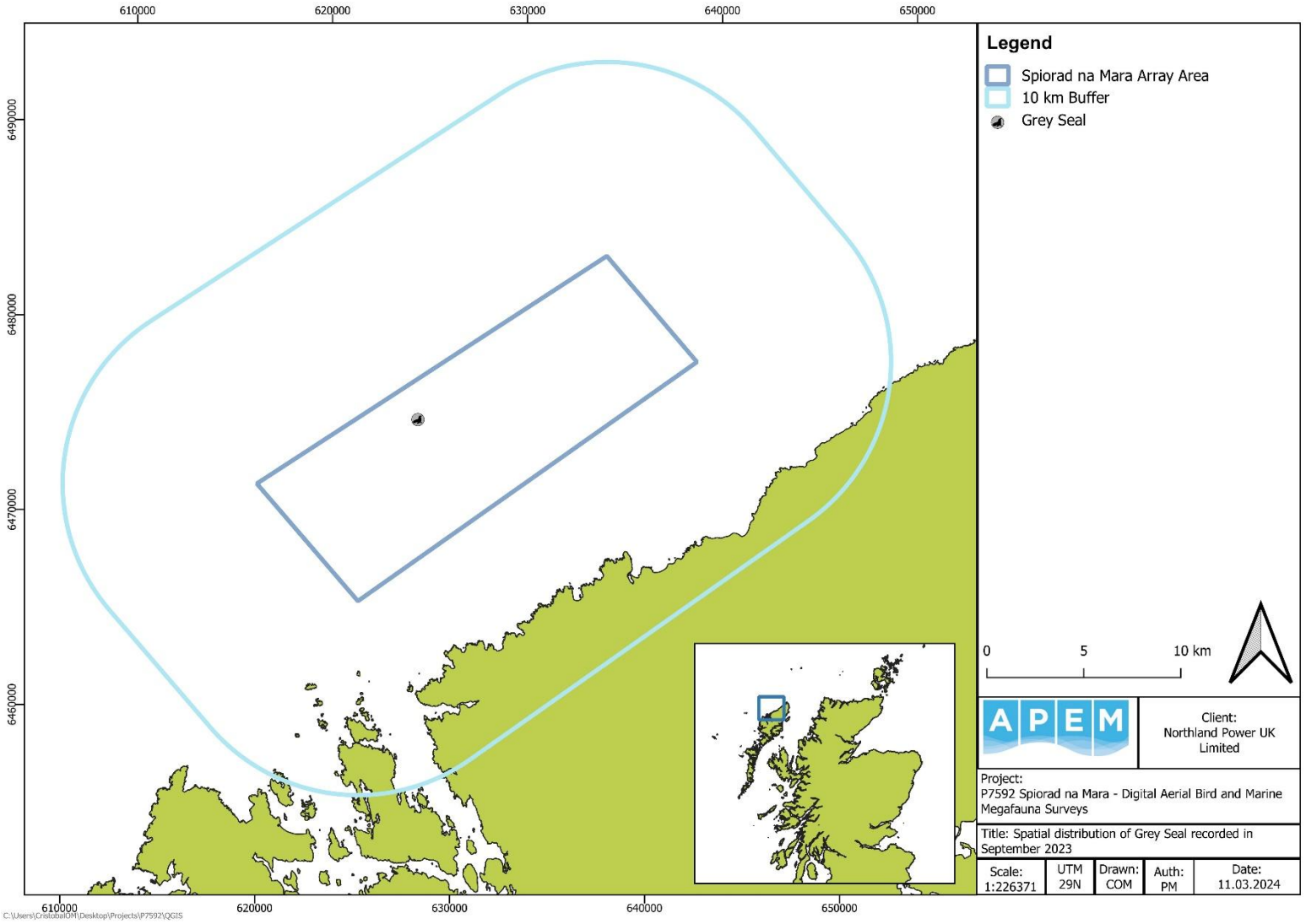


Figure 469 Distribution of grey seal in September 2023

*Note that individuals in close proximity may appear overlaying.

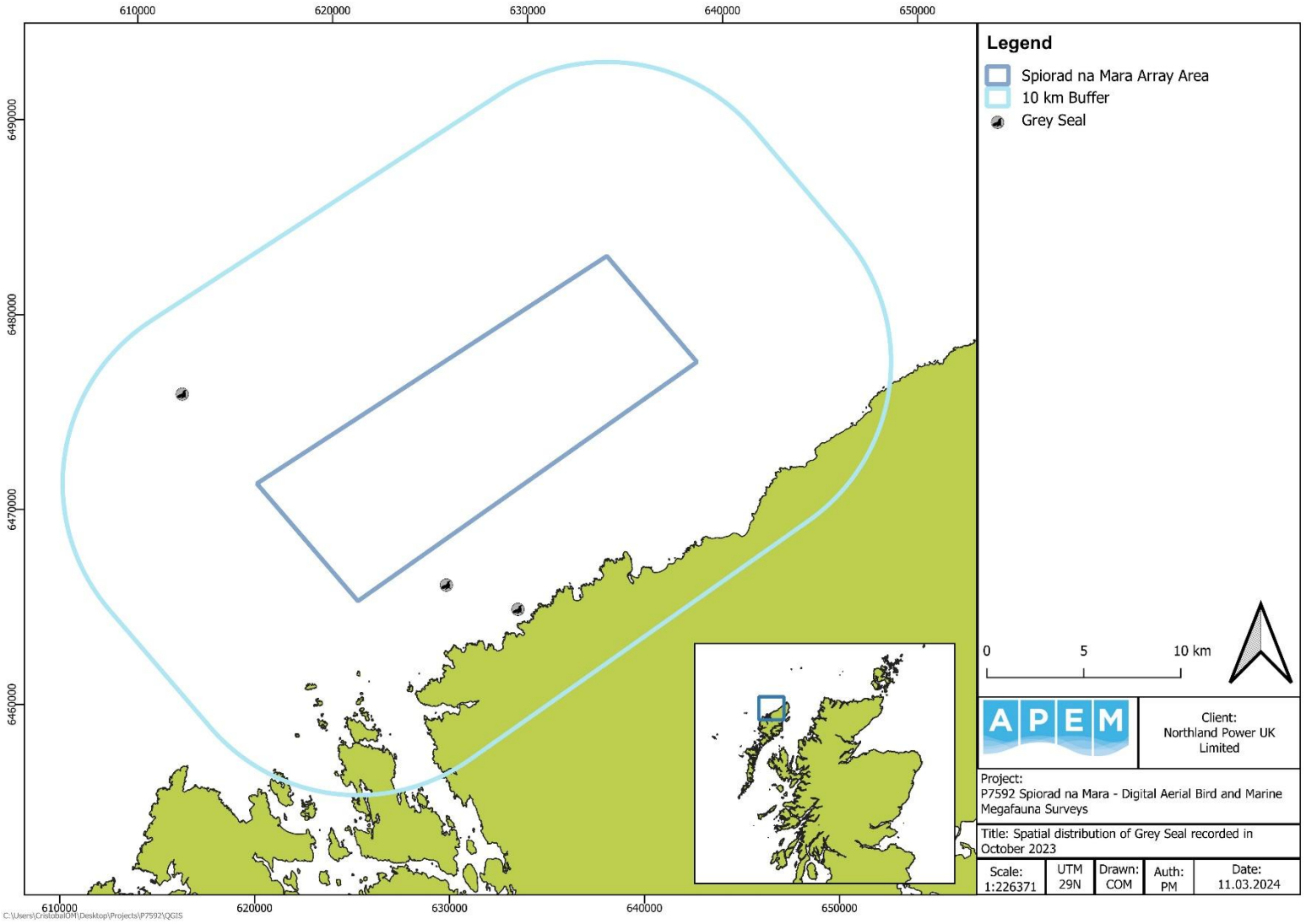


Figure 470 Distribution of grey seal in October 2023
*Note that individuals in close proximity may appear overlaying.

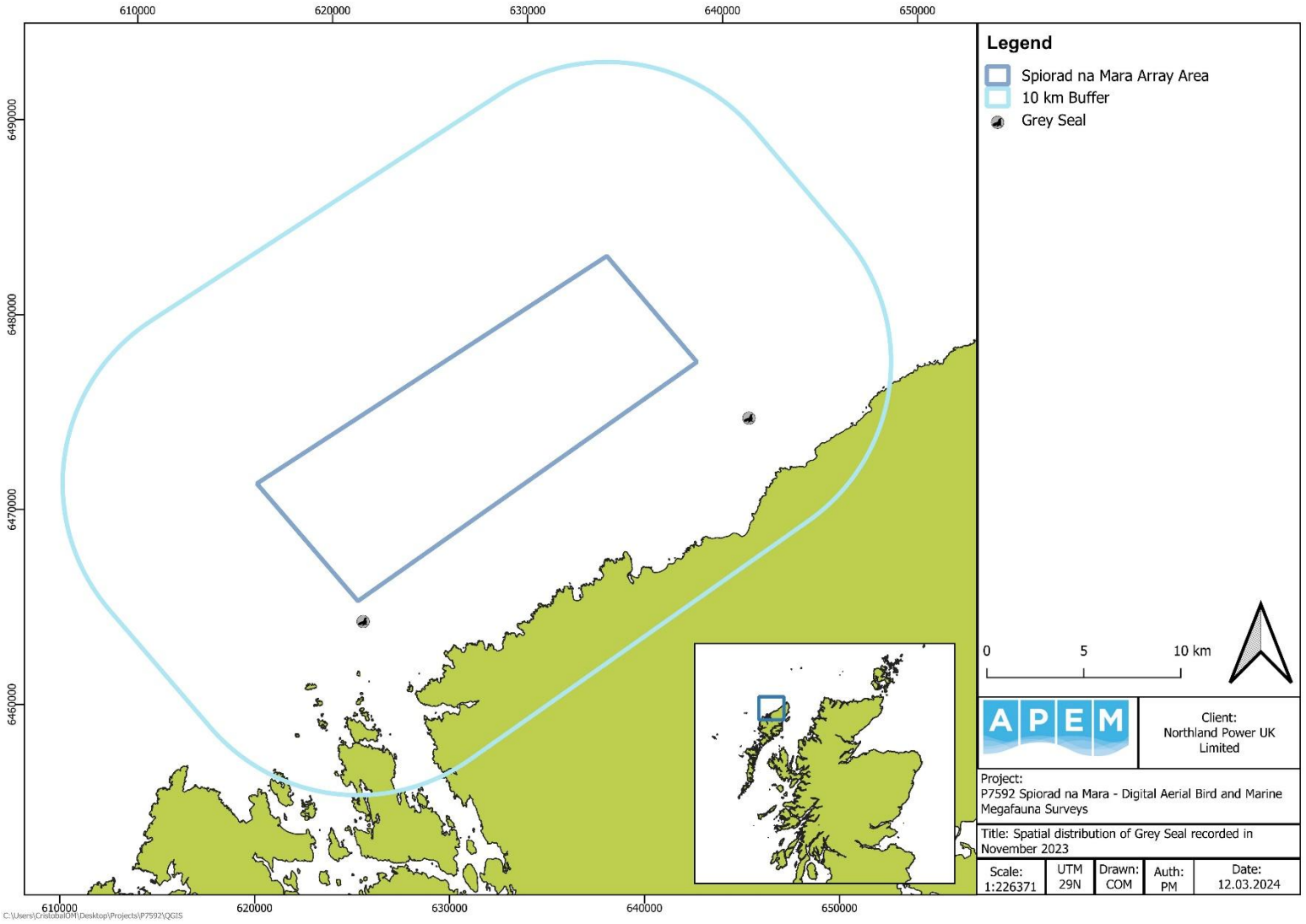


Figure 471 Distribution of grey seal in November 2023

*Note that individuals in close proximity may appear overlaying.

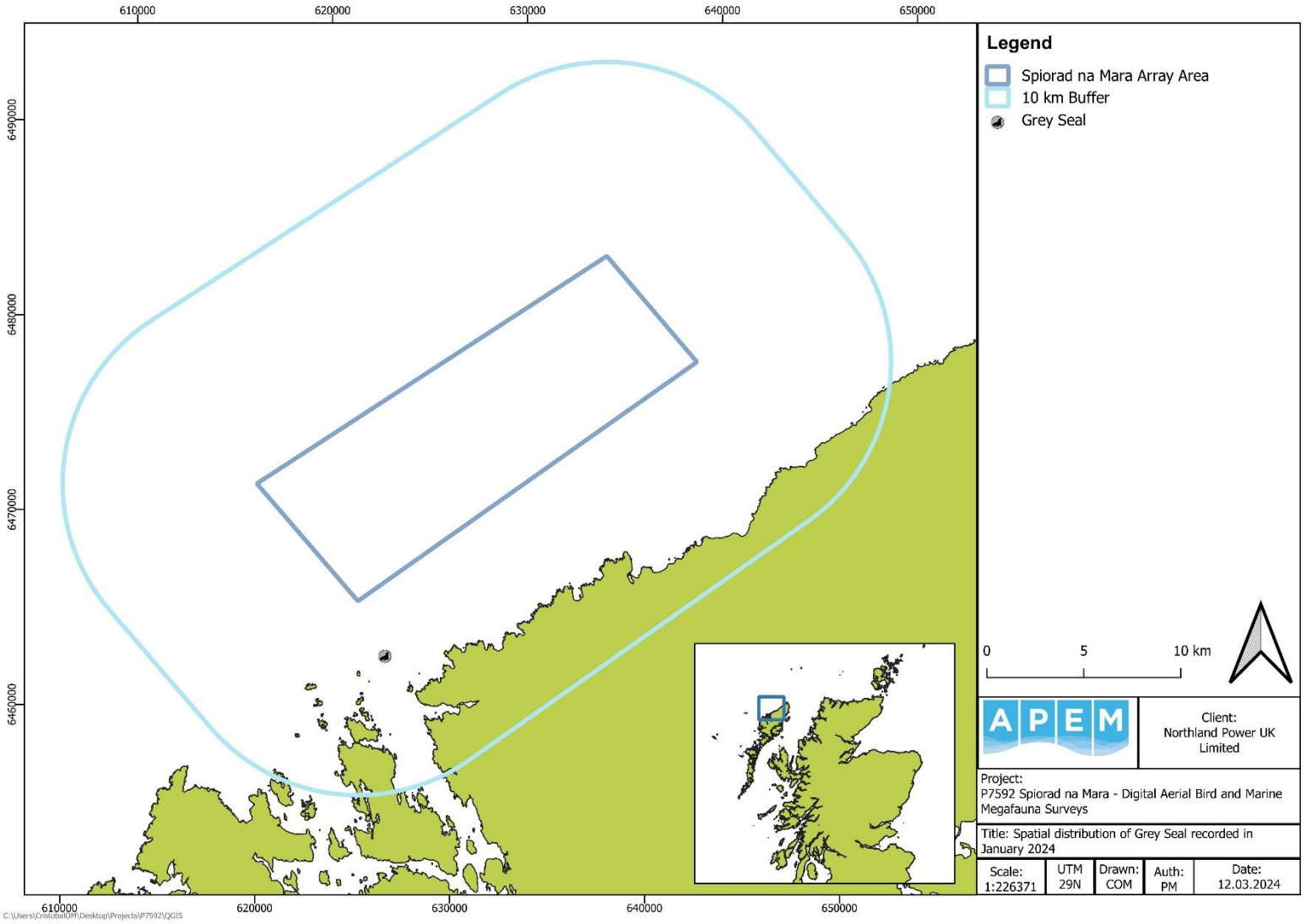


Figure 472 Distribution of grey seal in January 2024
*Note that individuals in close proximity may appear overlaying.

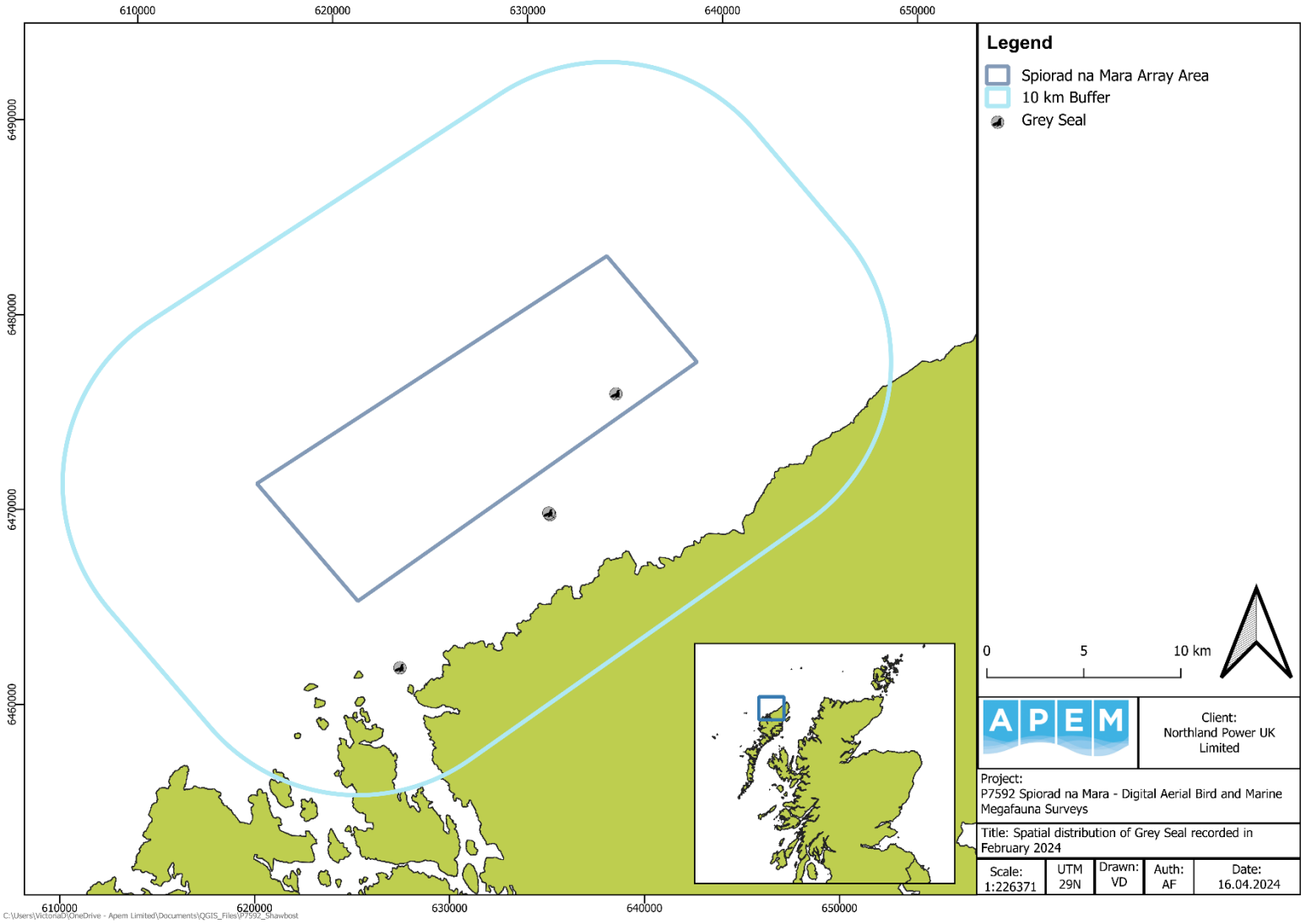


Figure 473 Distribution of grey seal in February 2024
*Note that individuals in close proximity may appear overlaying.

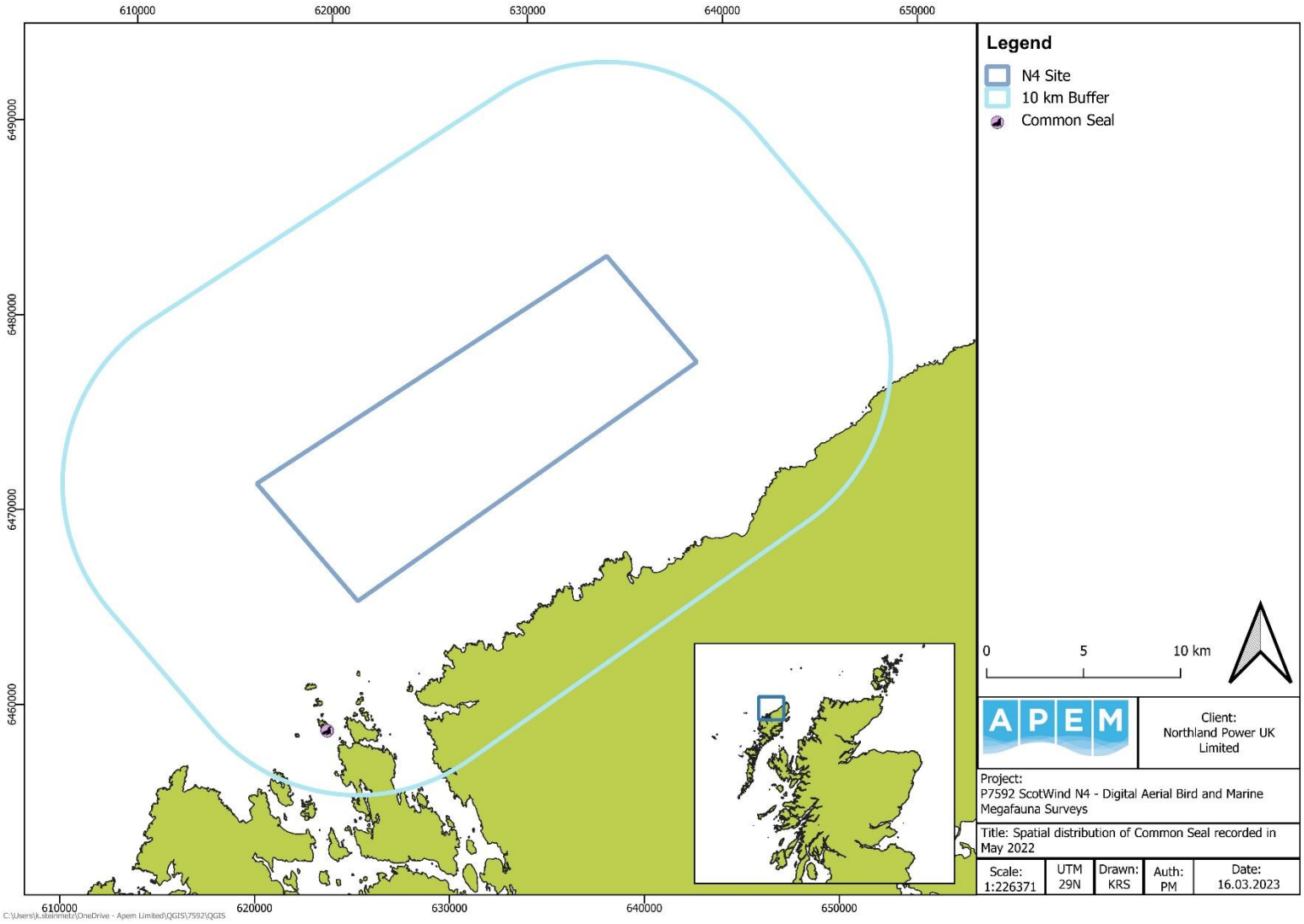


Figure 474 Distribution of common seal in May 2022

*Note that individuals in close proximity may appear overlaying.

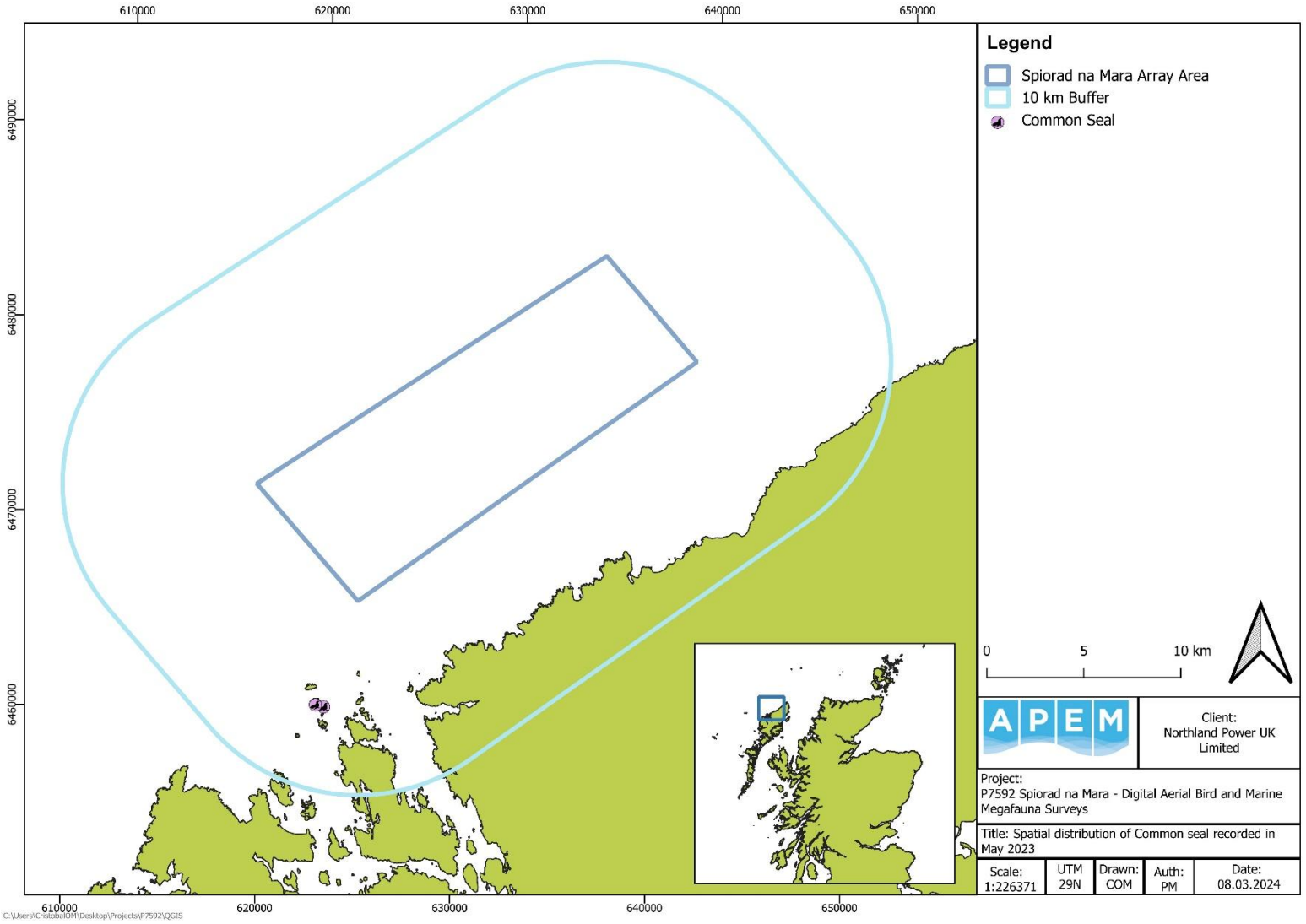


Figure 475 Distribution of common seal in May 2023

*Note that individuals in close proximity may appear overlaying.

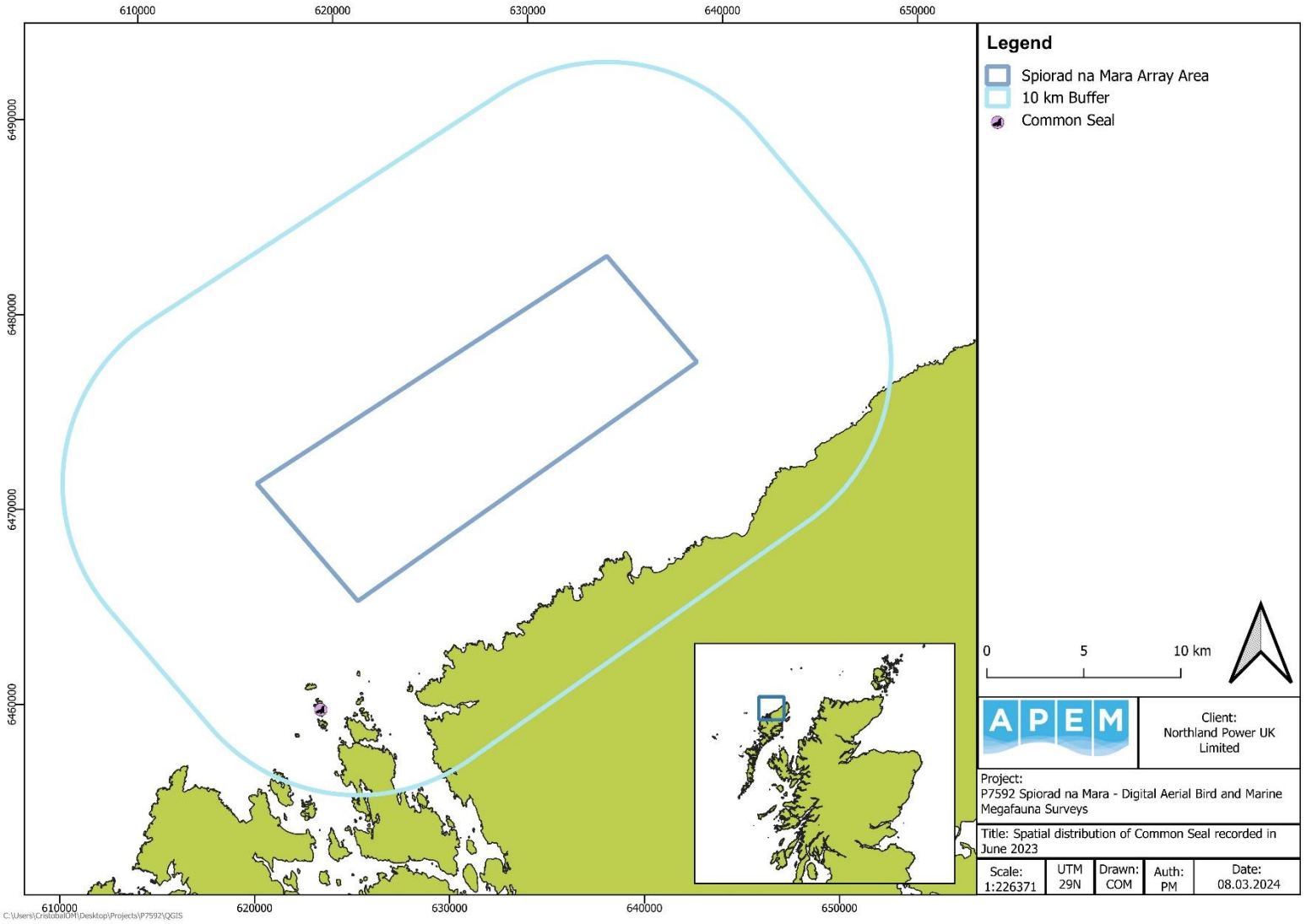


Figure 476 Distribution of common seal in June 2023

*Note that individuals in close proximity may appear overlaying.

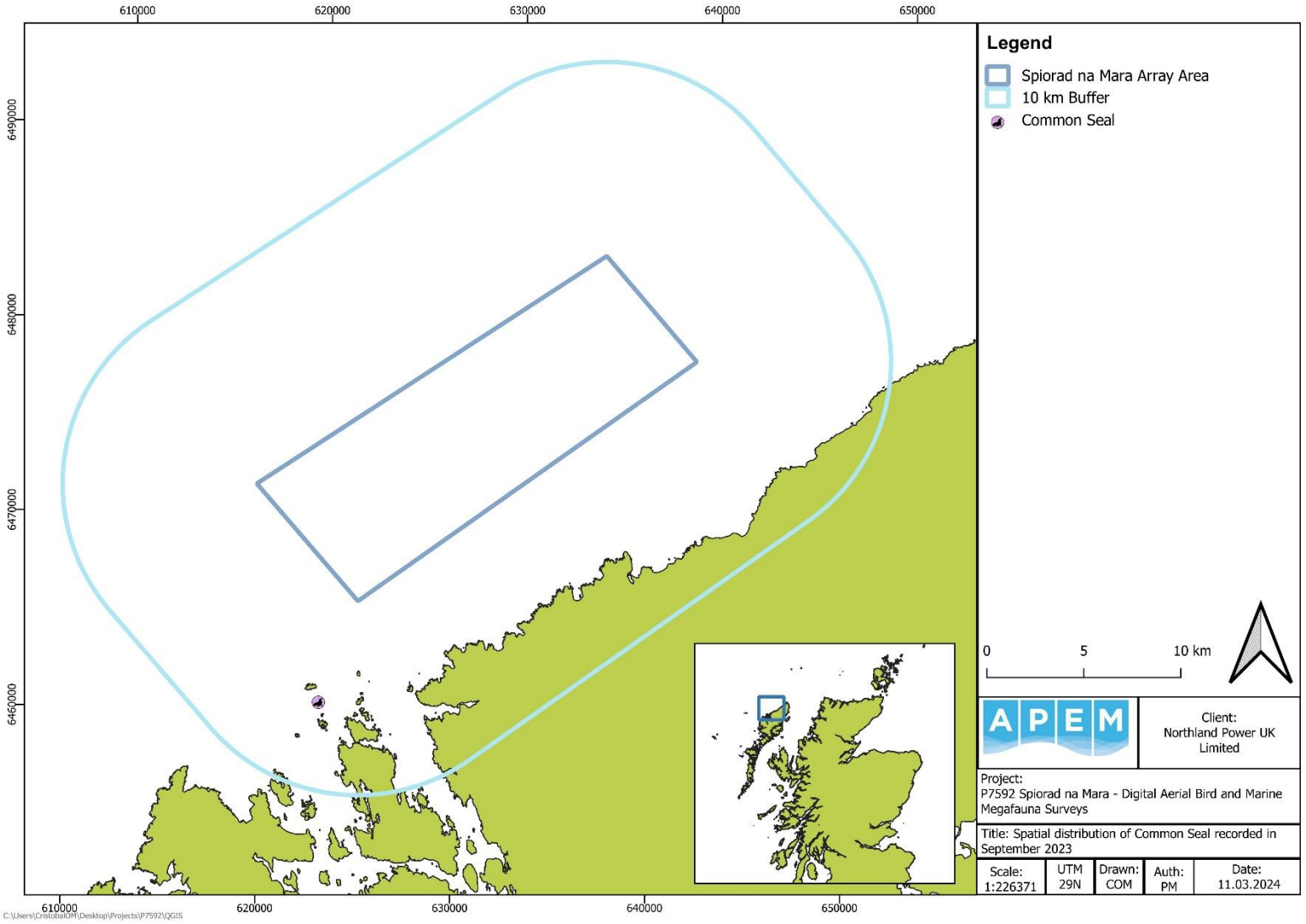


Figure 477 Distribution of common seal in September 2023

*Note that individuals in close proximity may appear overlaying.

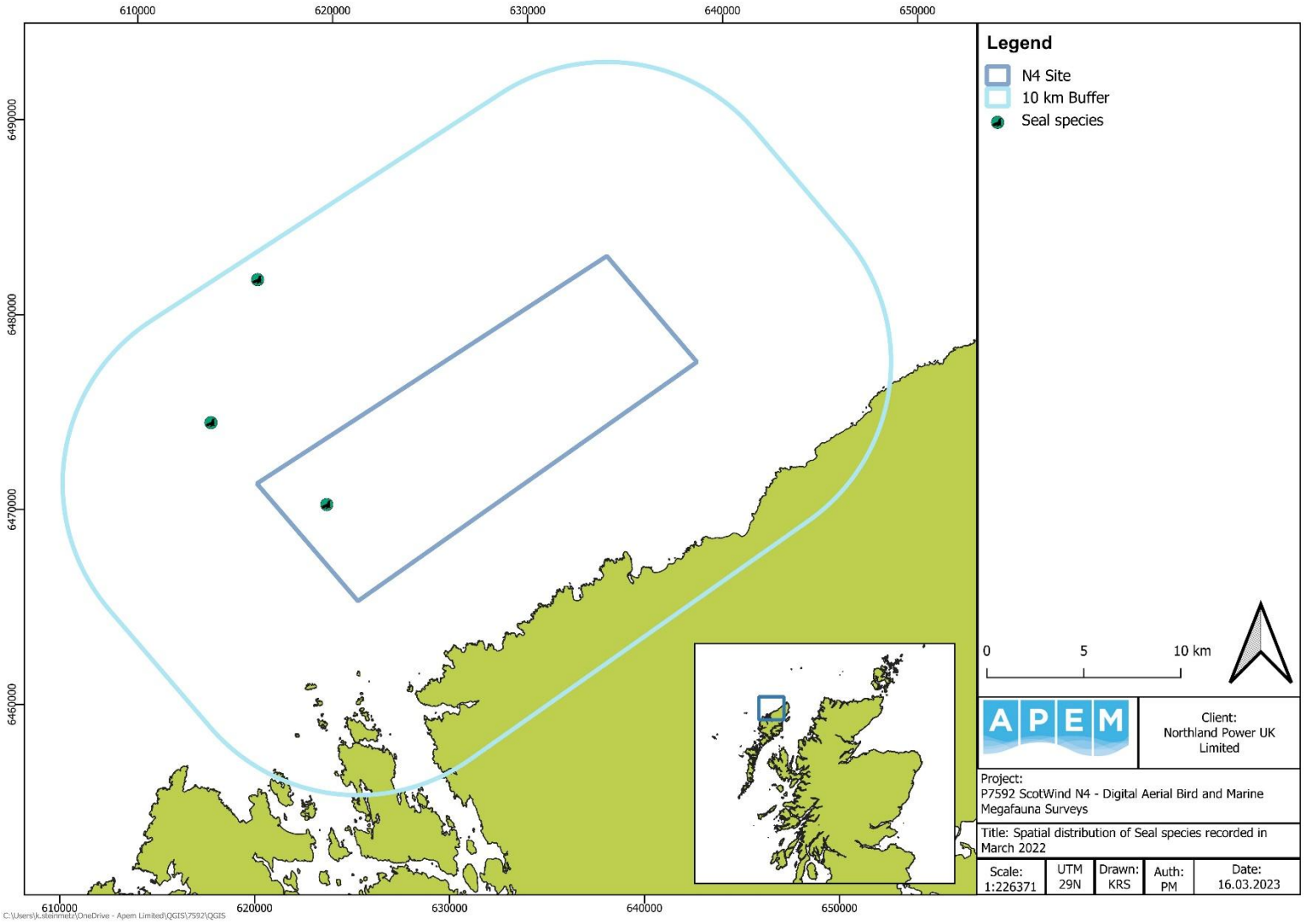


Figure 478 Distribution of seal species in March 2022

*Note that individuals in close proximity may appear overlaying.

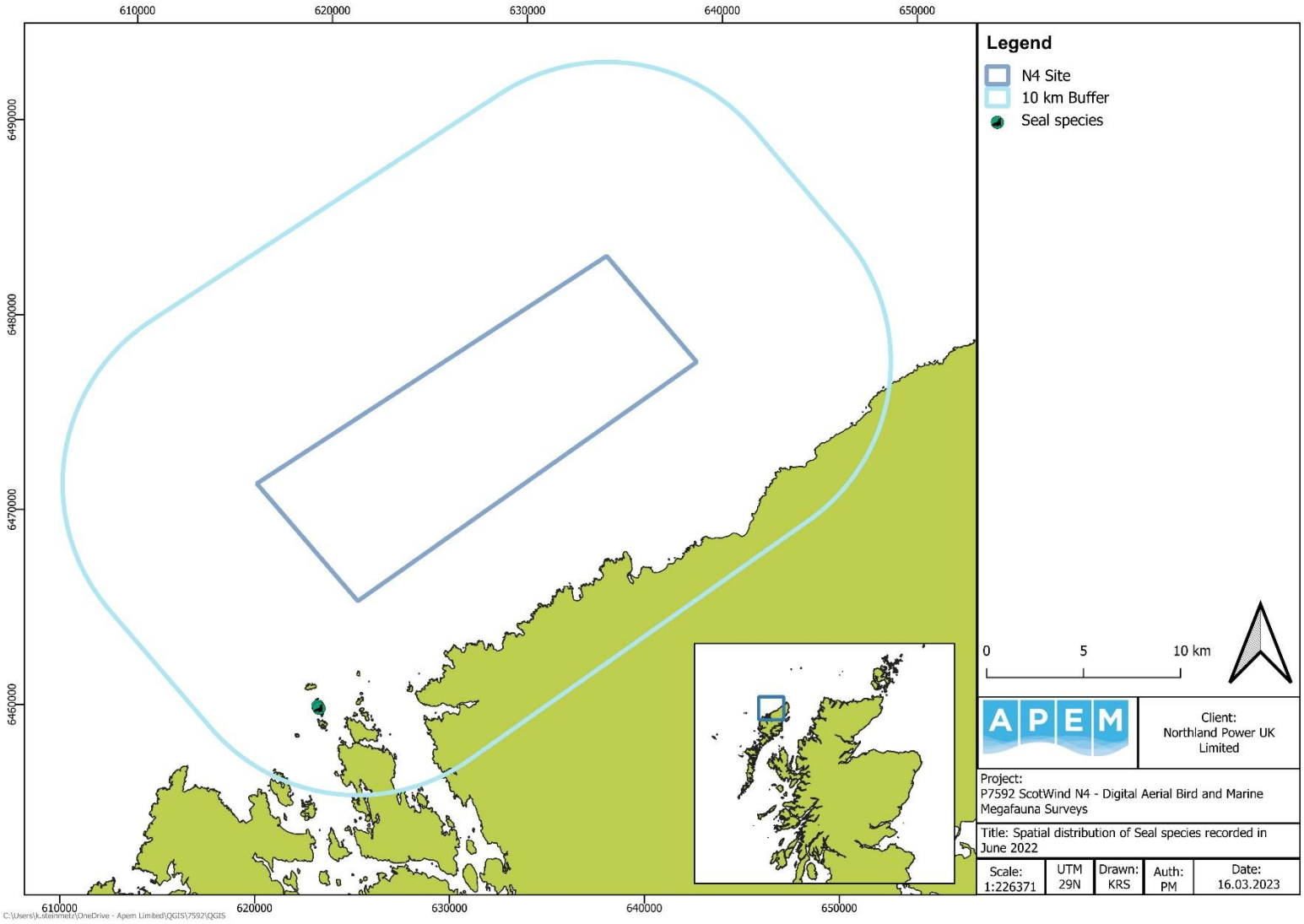


Figure 479 Distribution of seal species in June 2022

*Note that individuals in close proximity may appear overlaying.

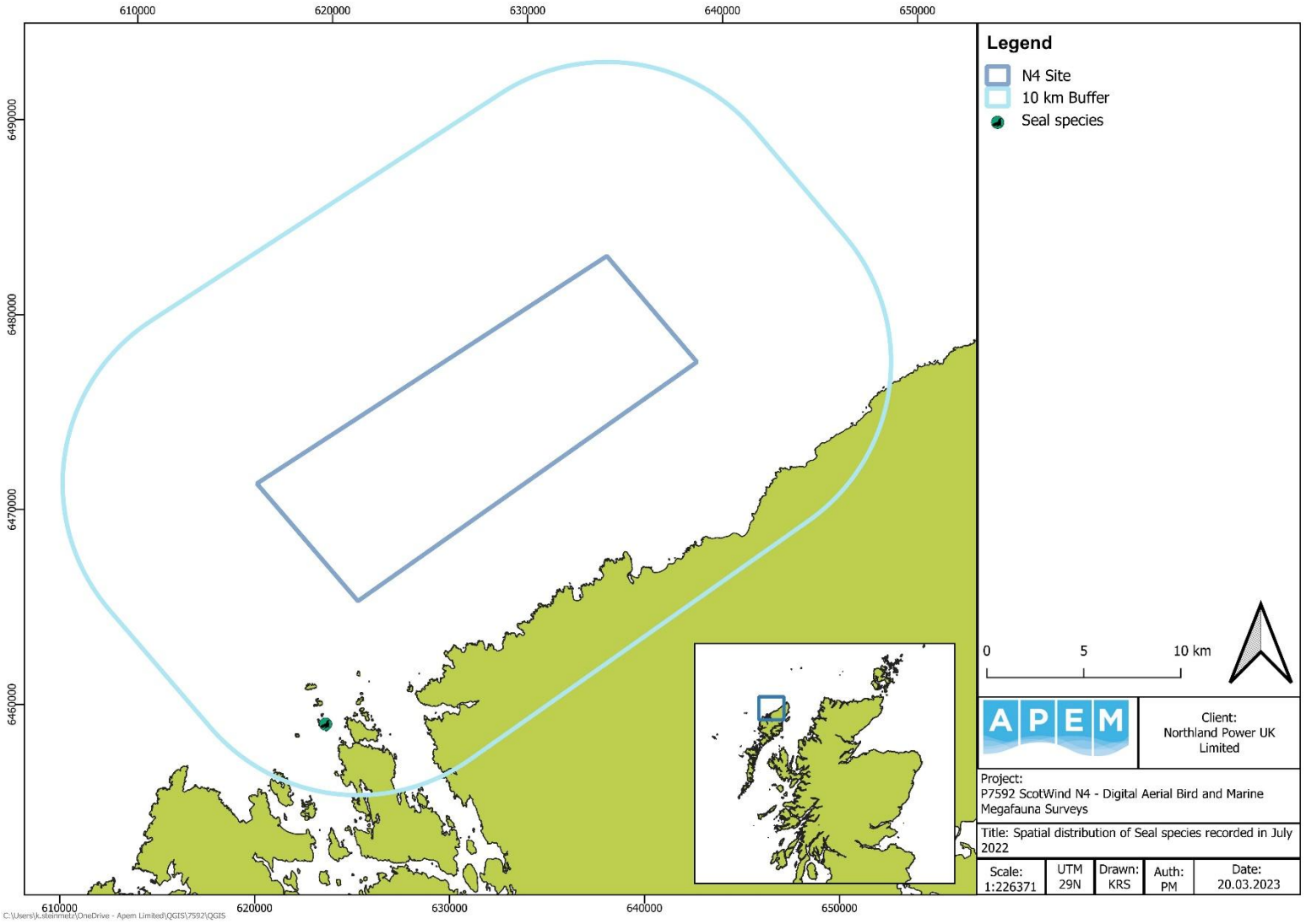


Figure 480 Distribution of seal species in July 2022

*Note that individuals in close proximity may appear overlaying.

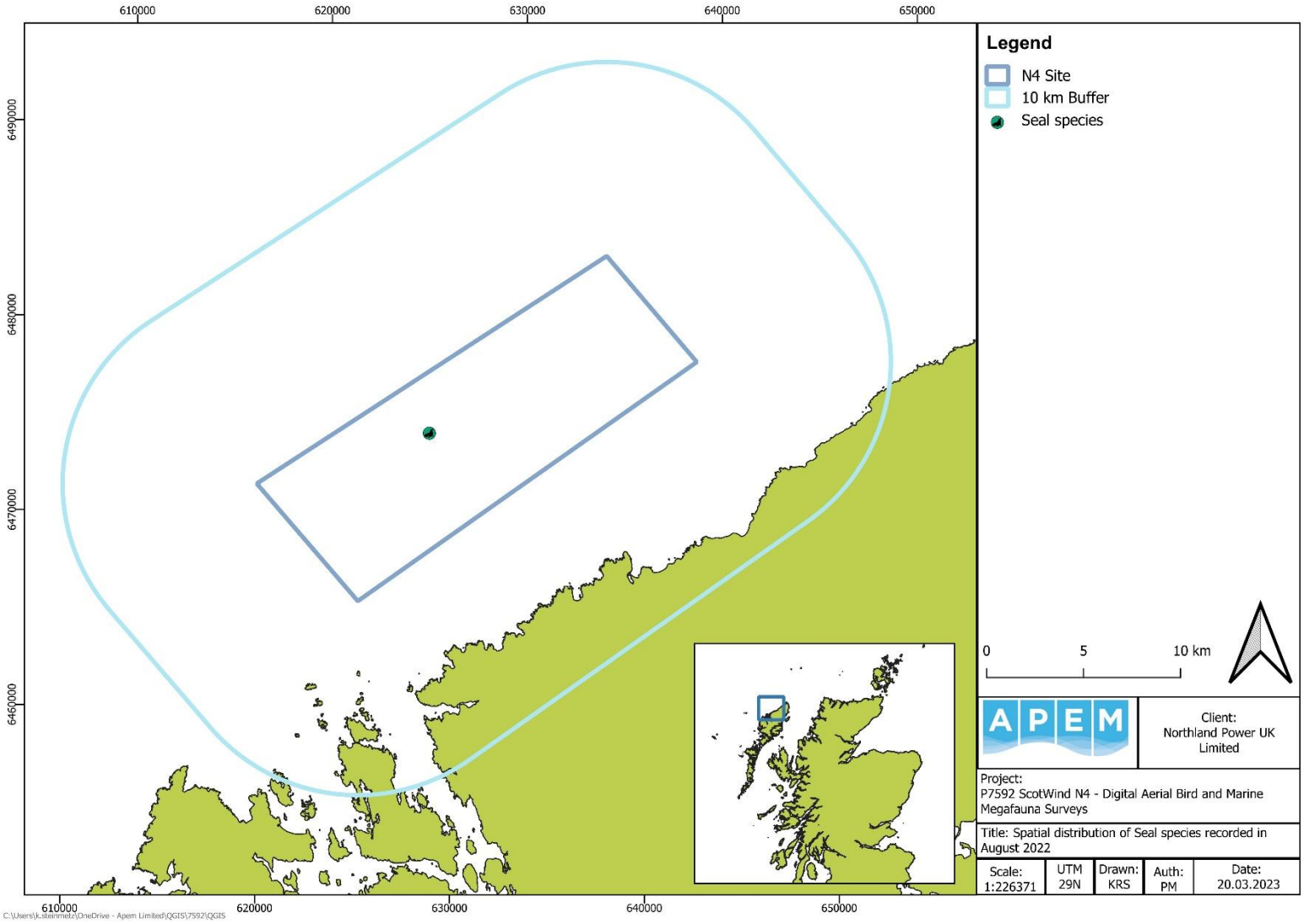


Figure 481 Distribution of seal species in August 2022

*Note that individuals in close proximity may appear overlaying.

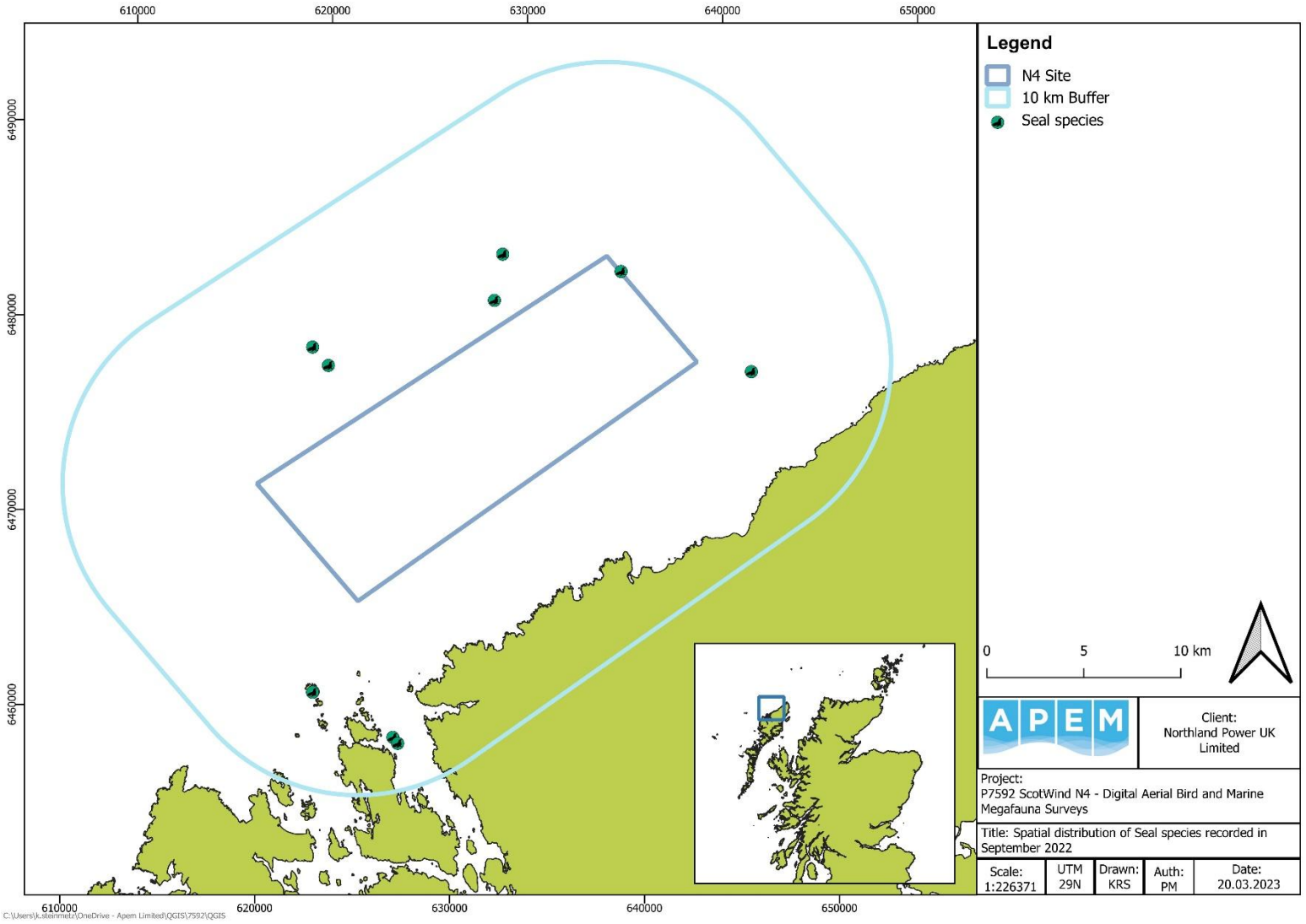


Figure 482 Distribution of seal species in September 2022

*Note that individuals in close proximity may appear overlaying.

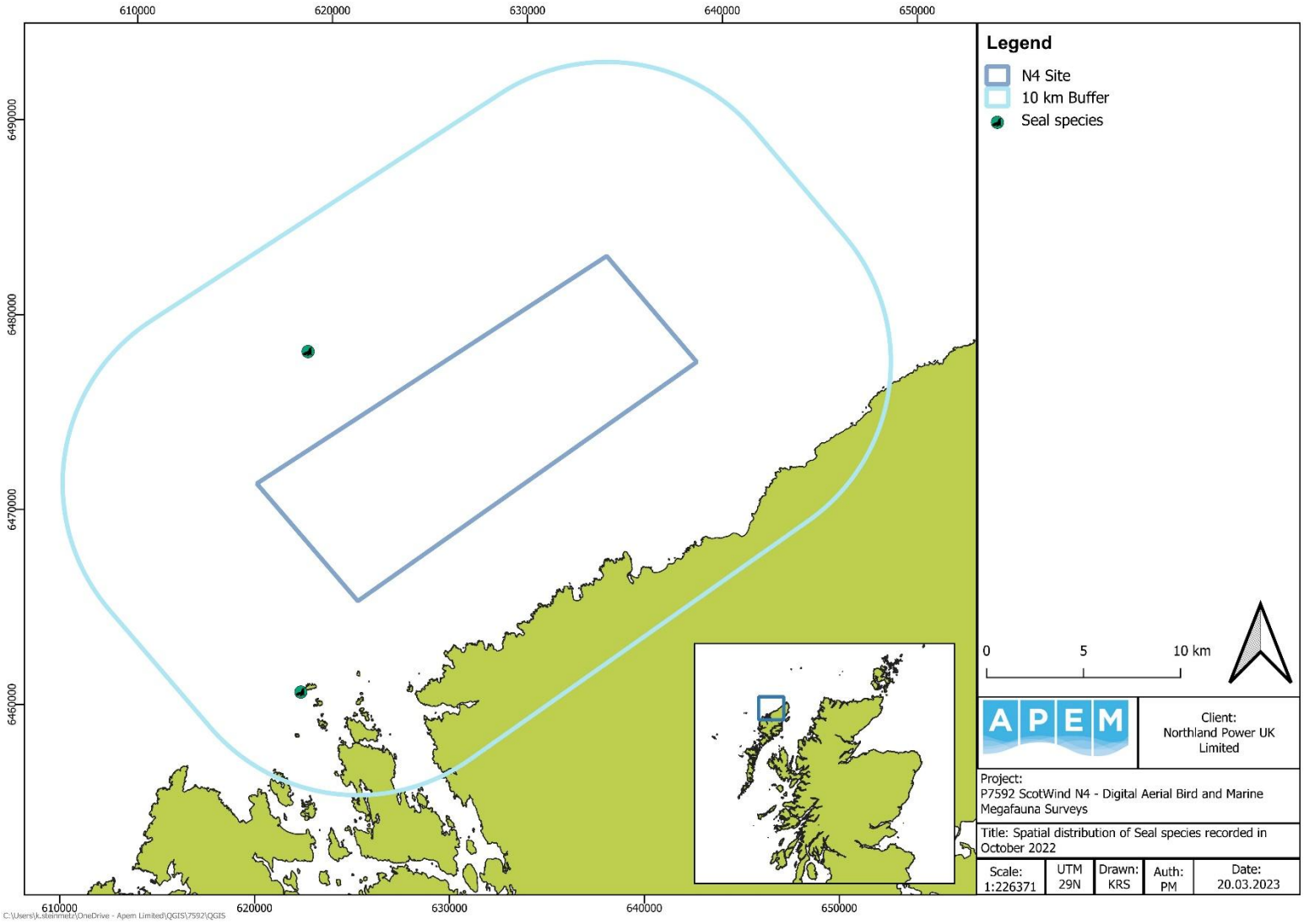


Figure 483 Distribution of seal species in October 2022

*Note that individuals in close proximity may appear overlaying.

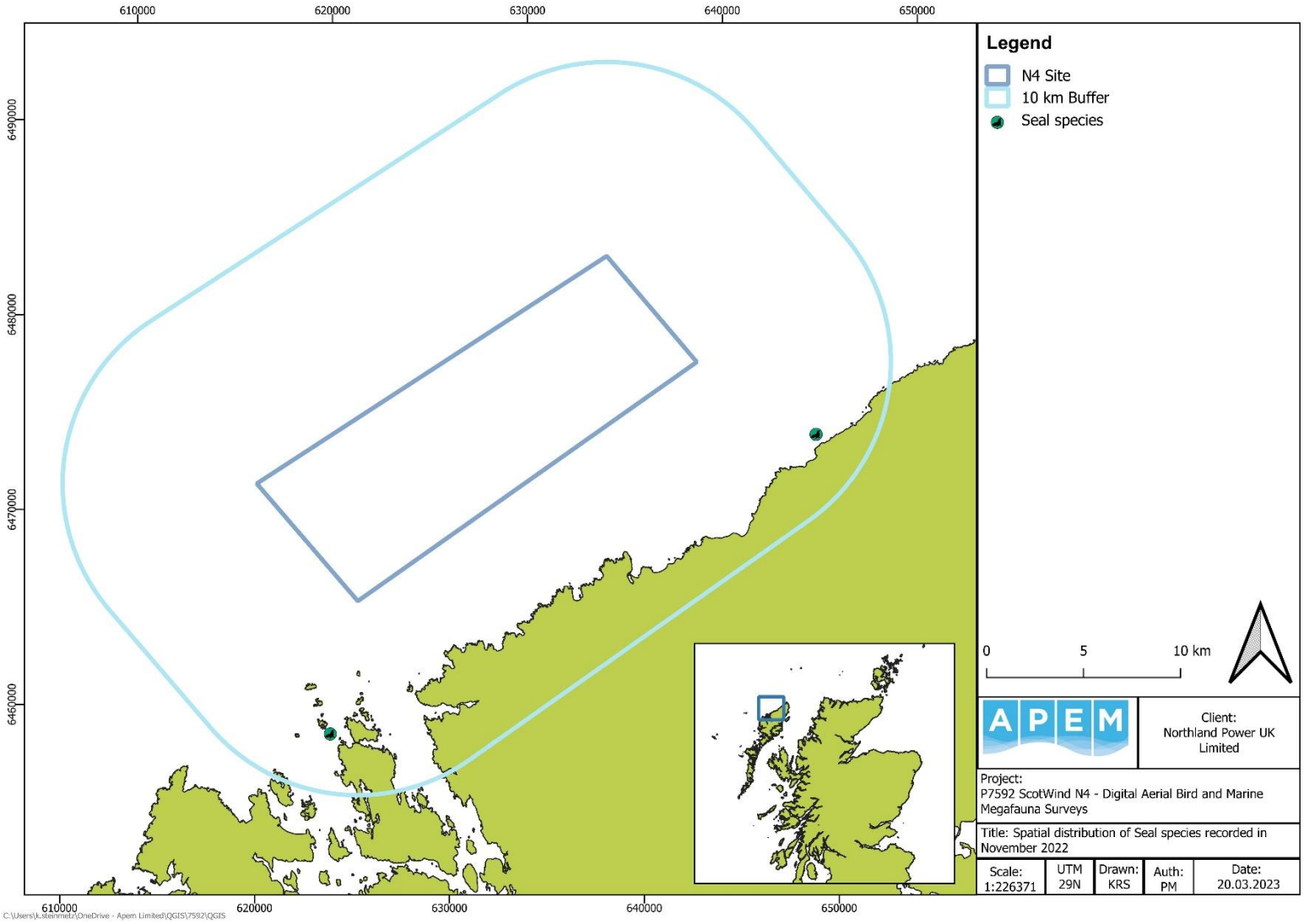


Figure 484 Distribution of seal species in November 2022

*Note that individuals in close proximity may appear overlaying.

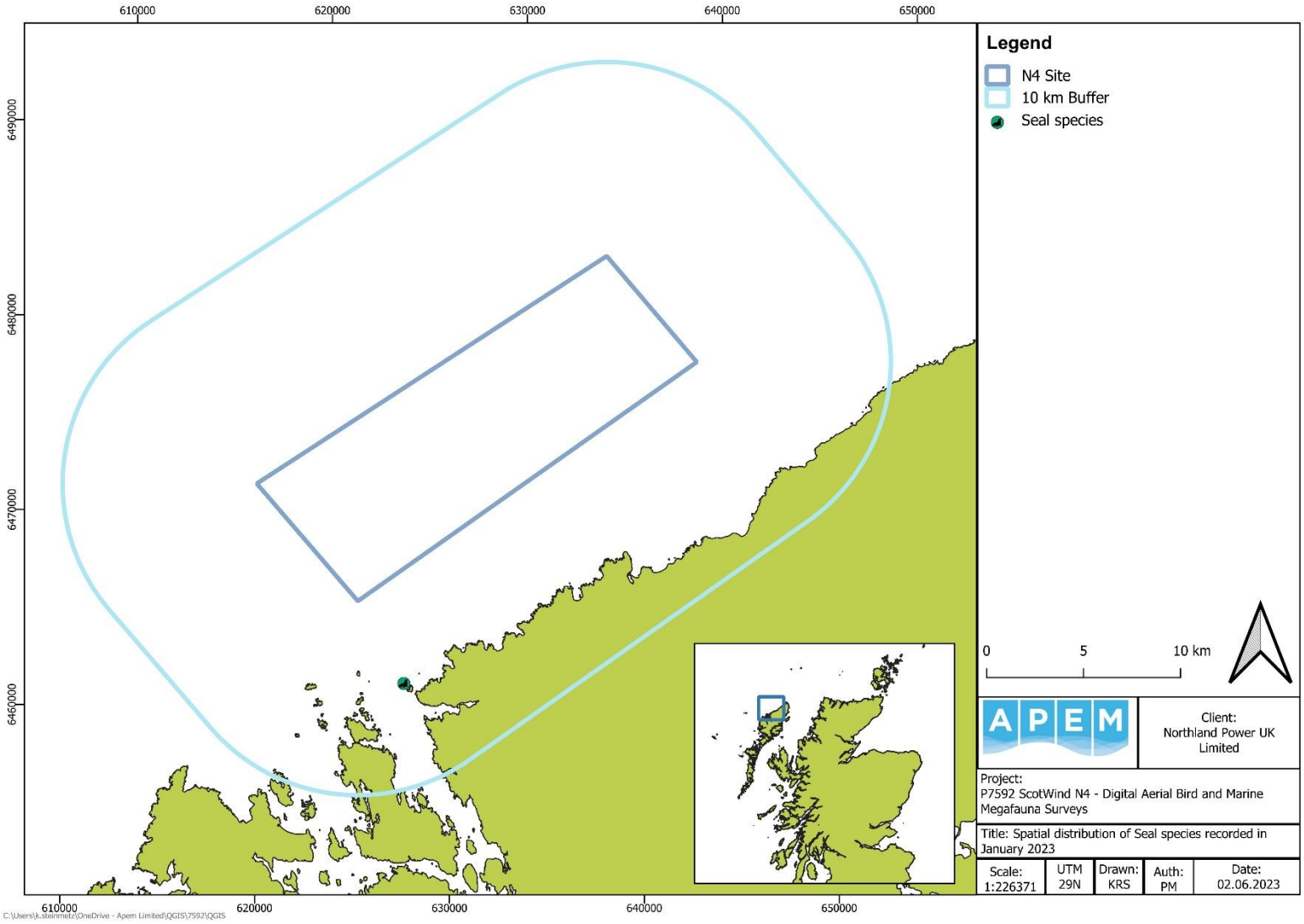


Figure 485 Distribution of seal species in January 2023
*Note that individuals in close proximity may appear overlaying.

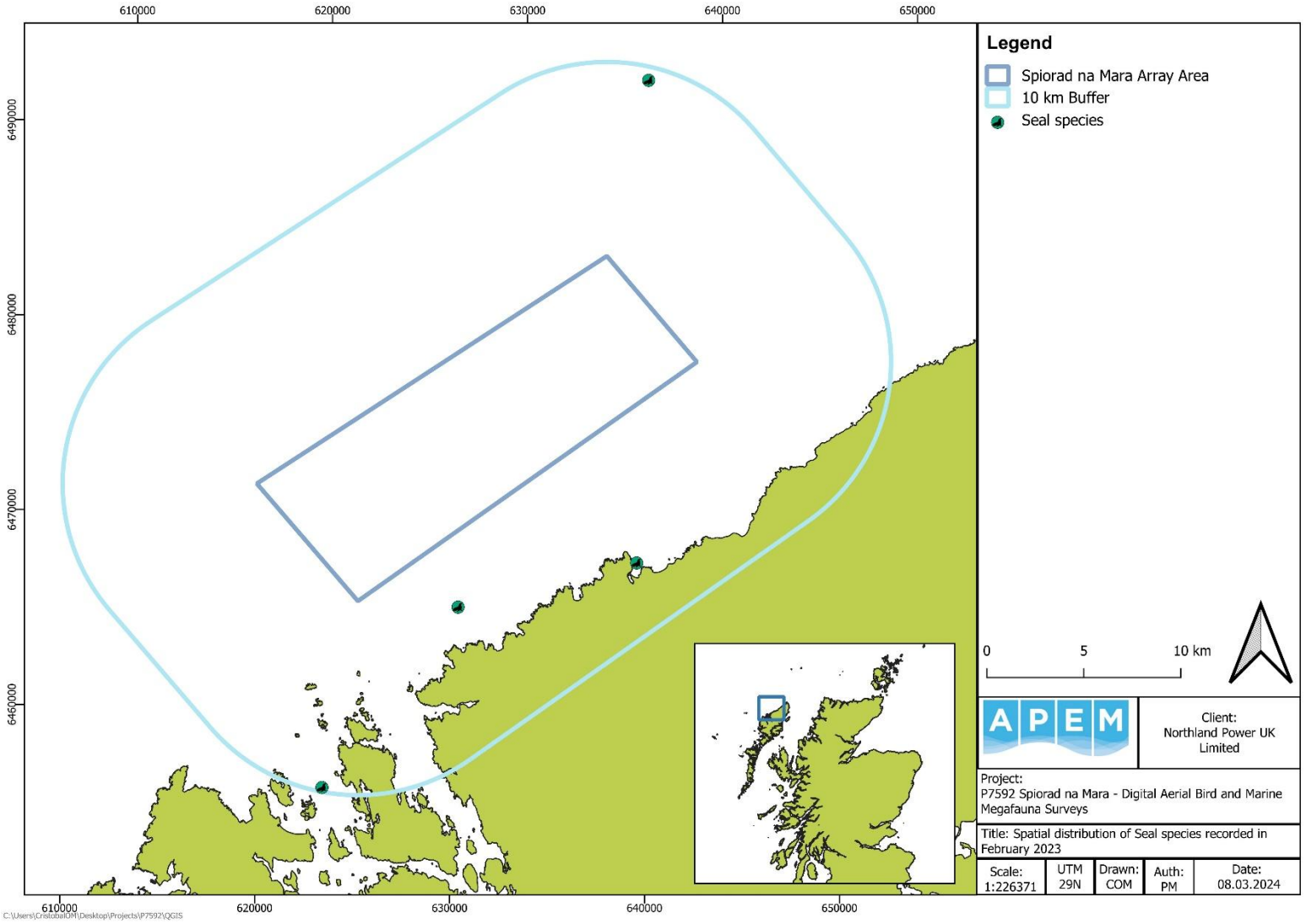


Figure 486 Distribution of seal species in February 2023

*Note that individuals in close proximity may appear overlaying.

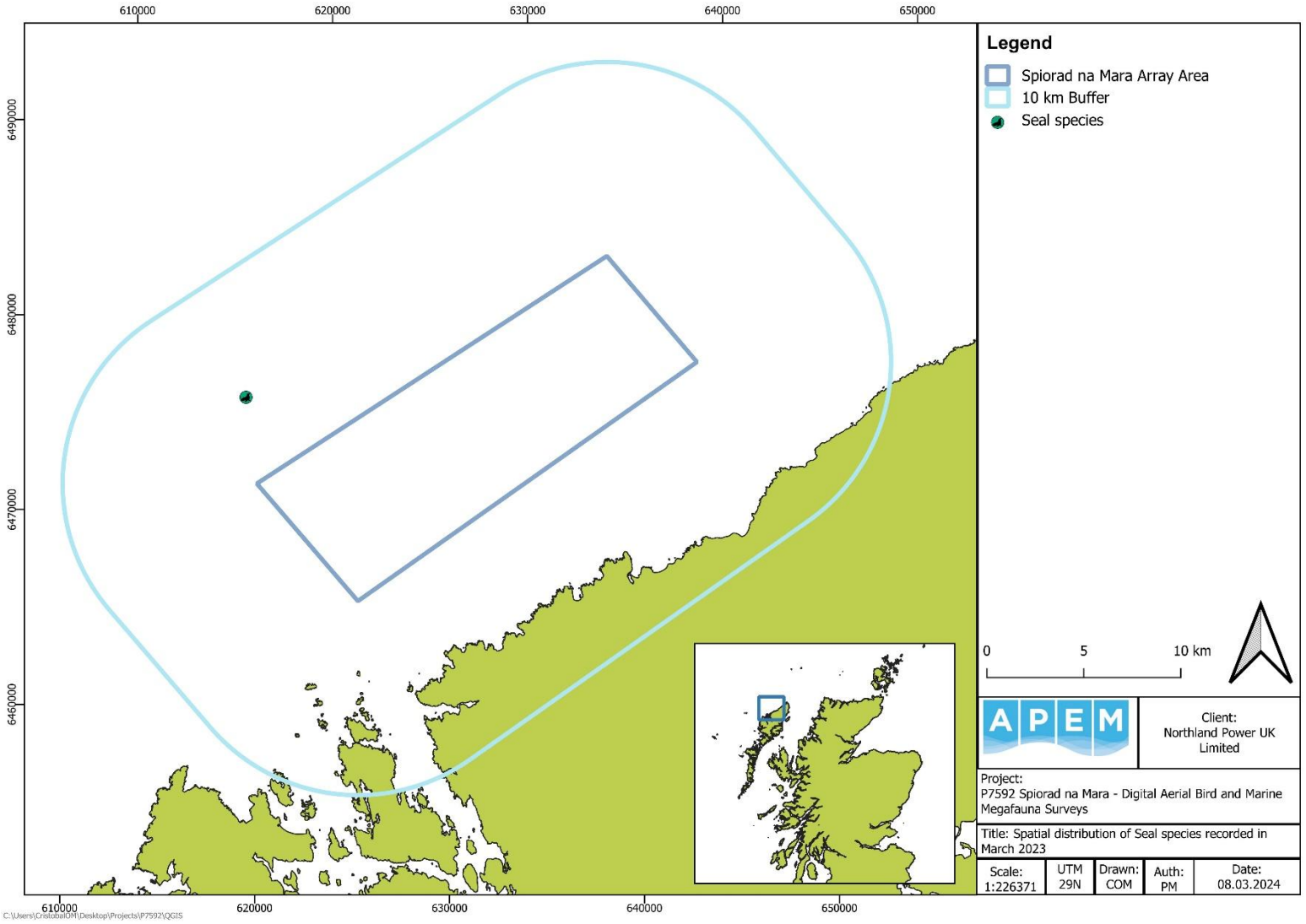


Figure 487 Distribution of seal species in March 2023

*Note that individuals in close proximity may appear overlaying.

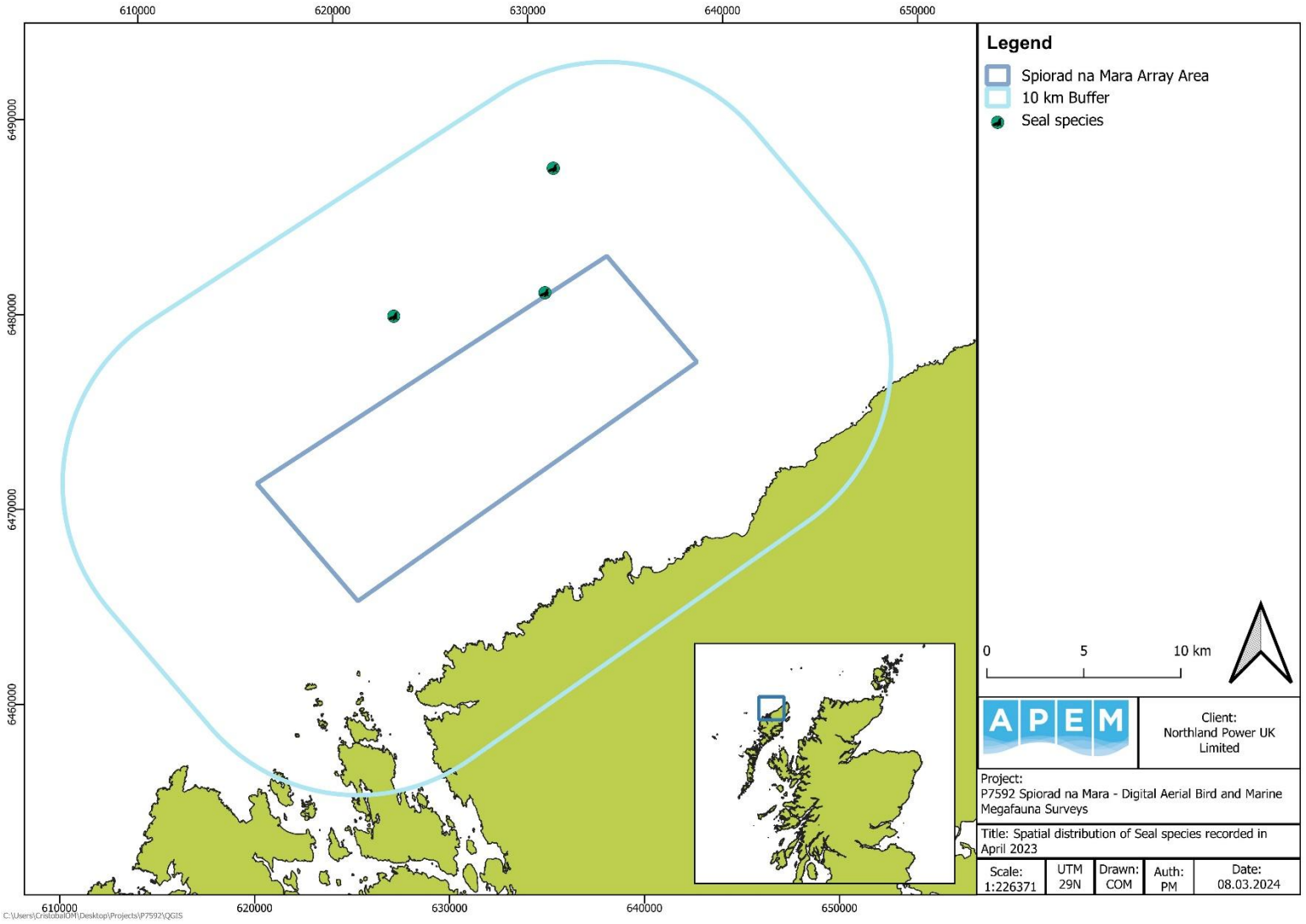


Figure 488 Distribution of seal species in April 2023

*Note that individuals in close proximity may appear overlaying.

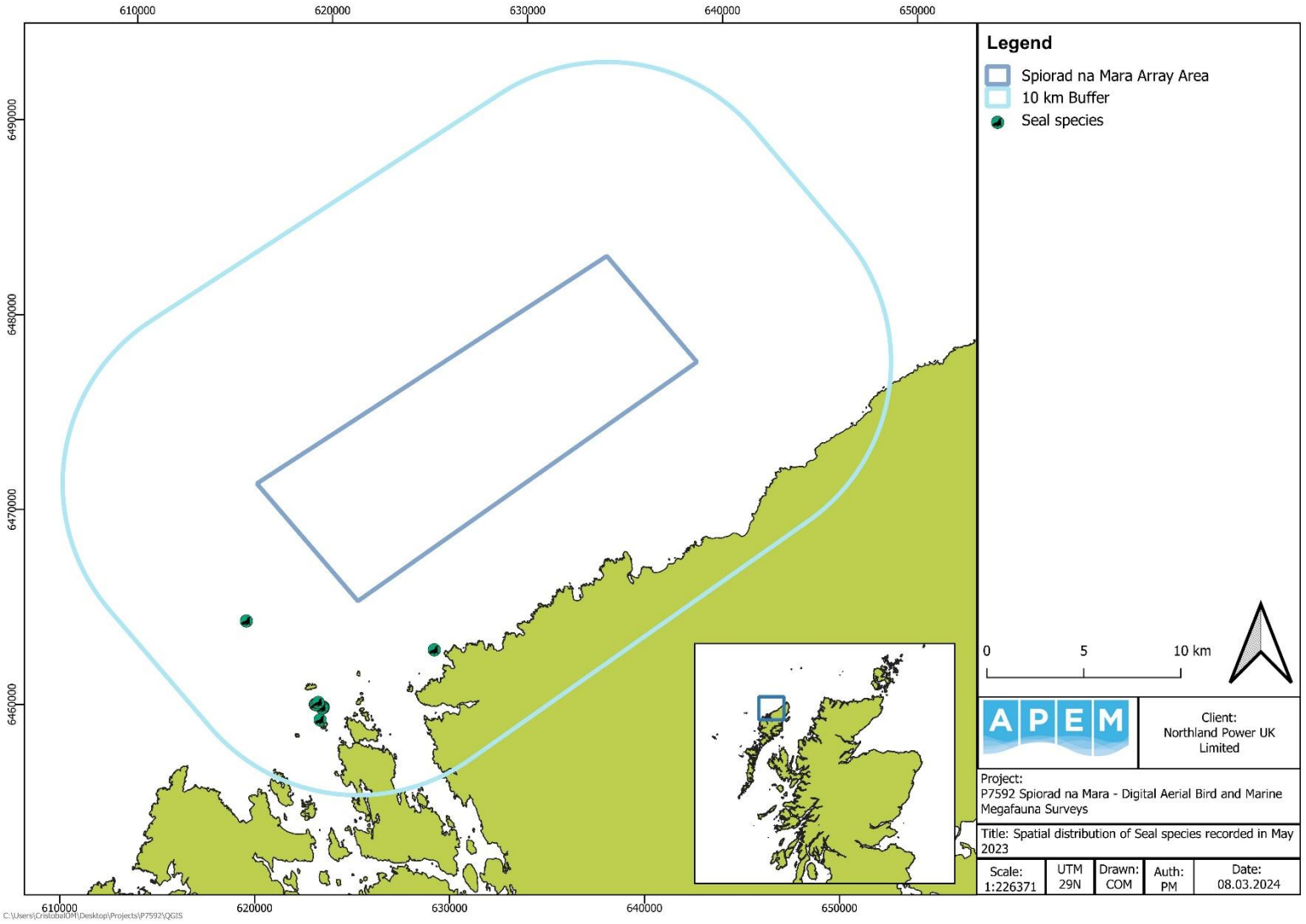


Figure 489 Distribution of seal species in May 2023

*Note that individuals in close proximity may appear overlaying.

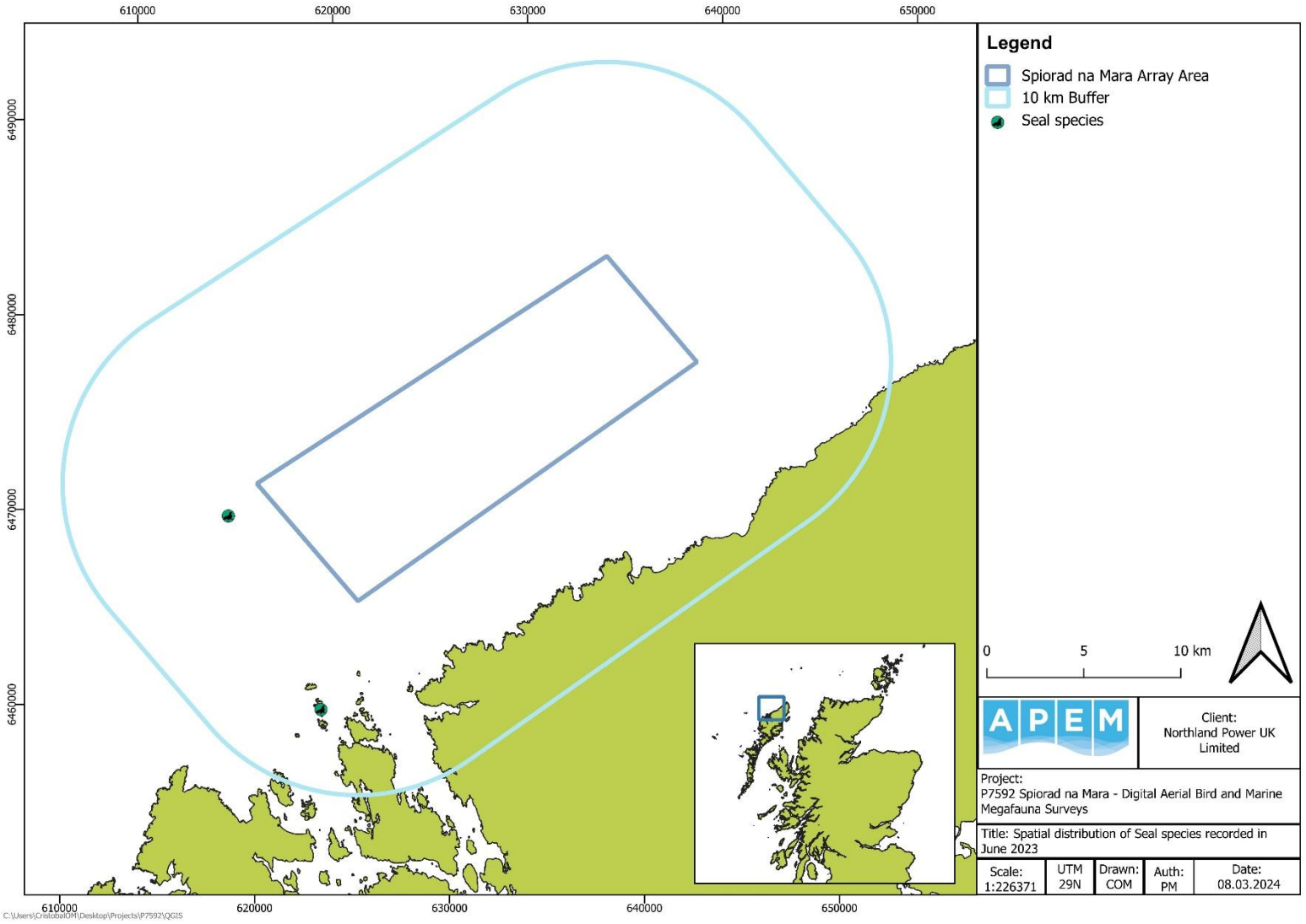


Figure 490 Distribution of seal species in June 2023

*Note that individuals in close proximity may appear overlaying.

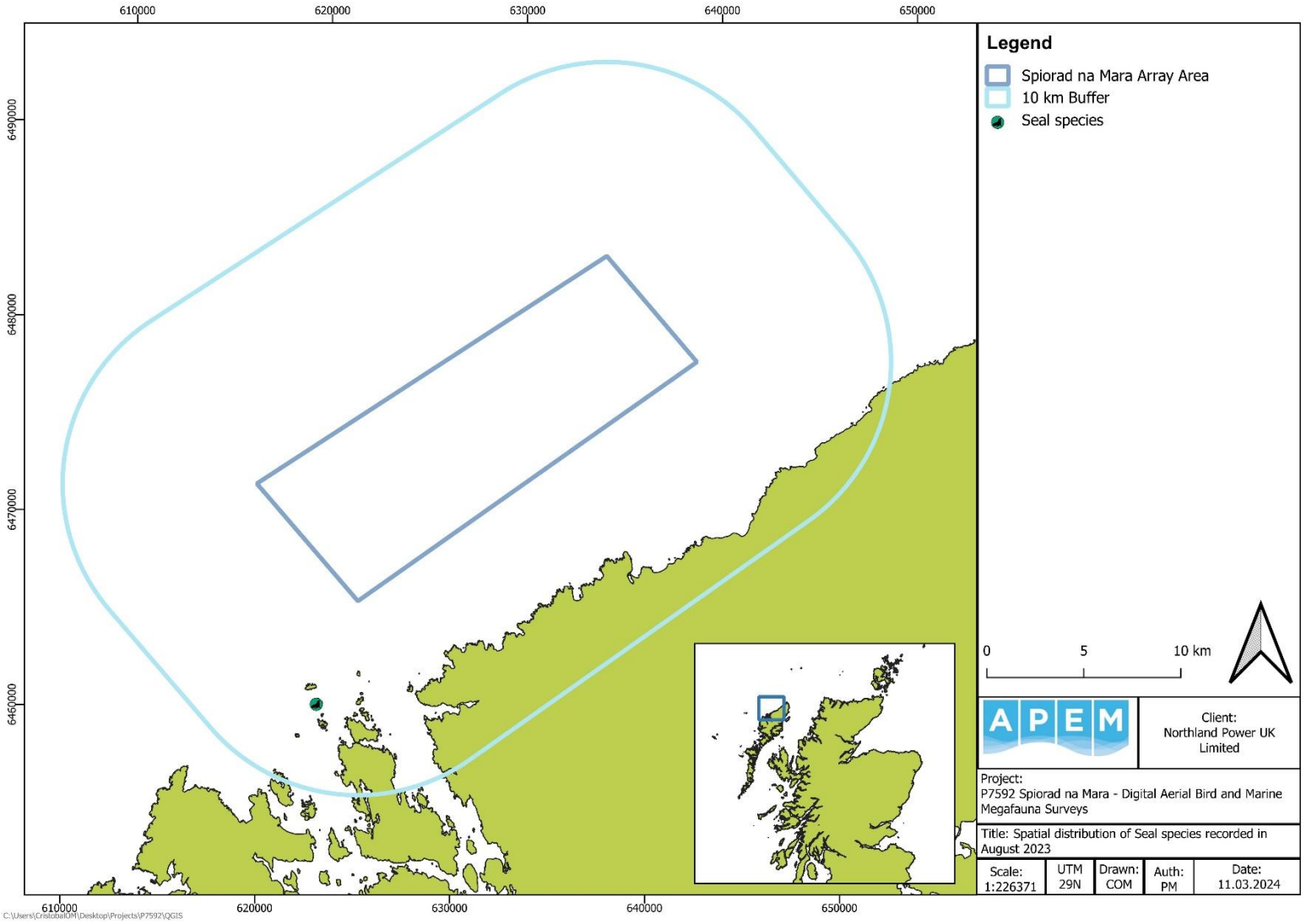


Figure 491 Distribution of seal species in August 2023

*Note that individuals in close proximity may appear overlaying.

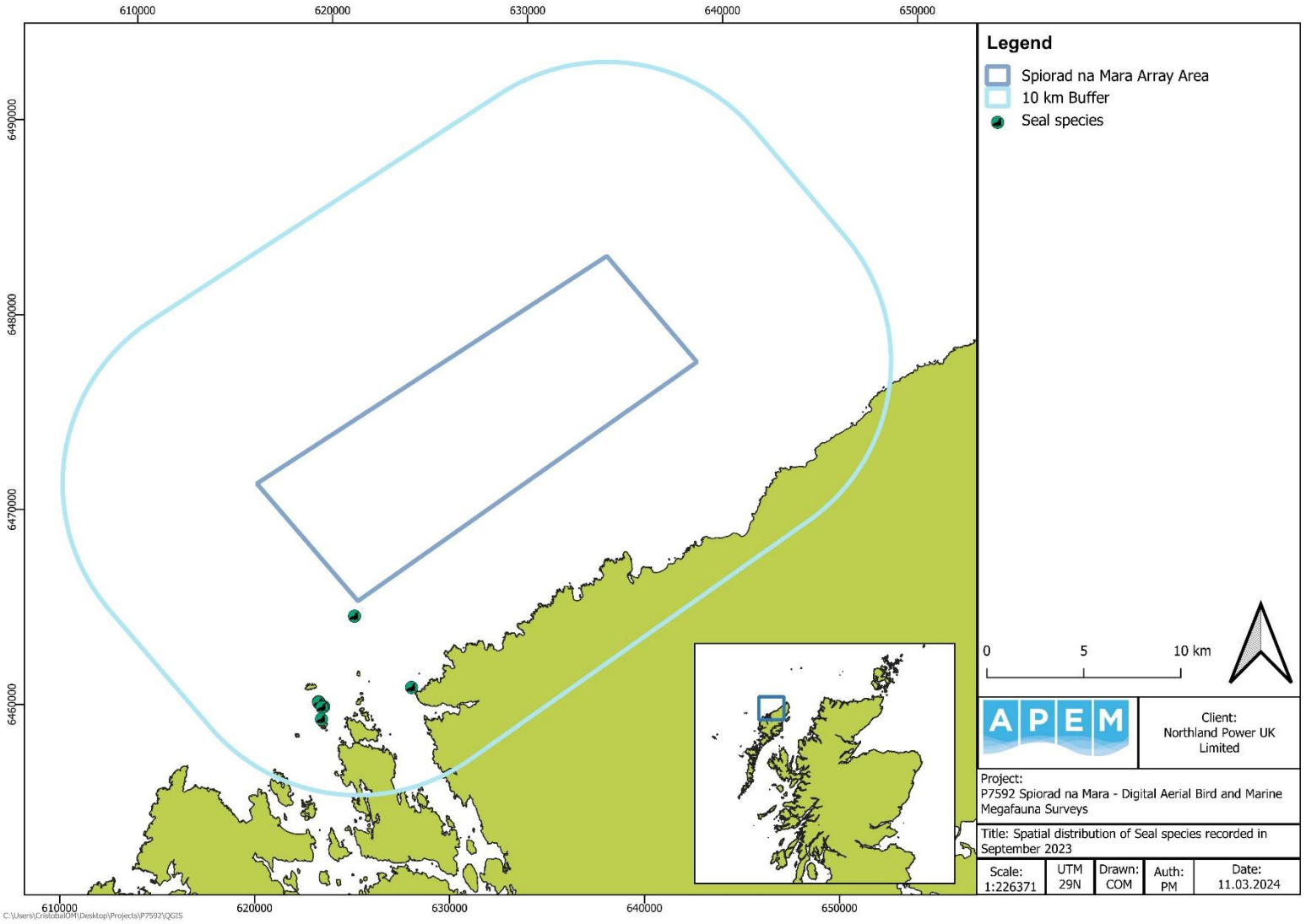


Figure 492 Distribution of seal species in September 2023

*Note that individuals in close proximity may appear overlaying.

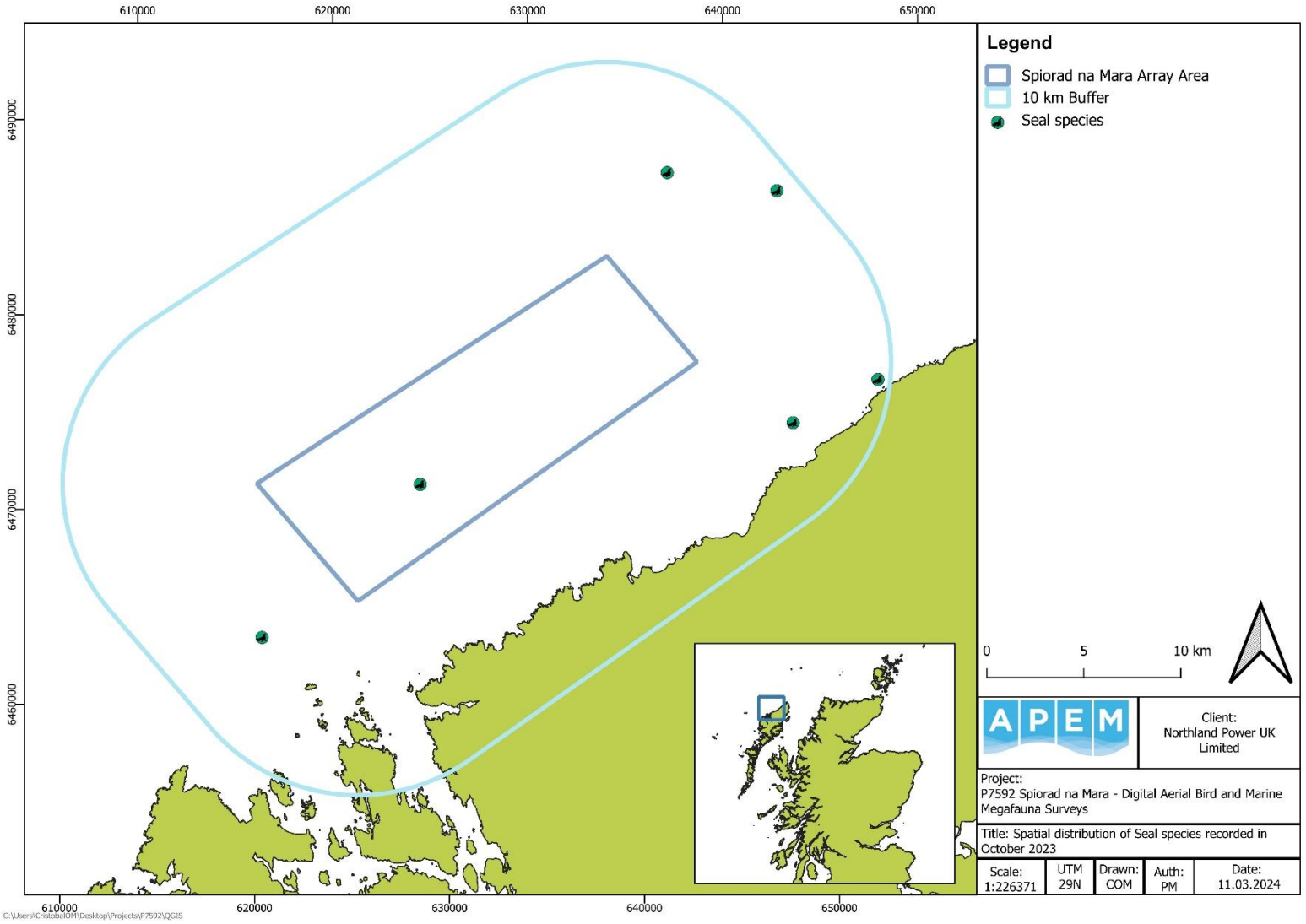


Figure 493 Distribution of seal species in October 2023

*Note that individuals in close proximity may appear overlaying.

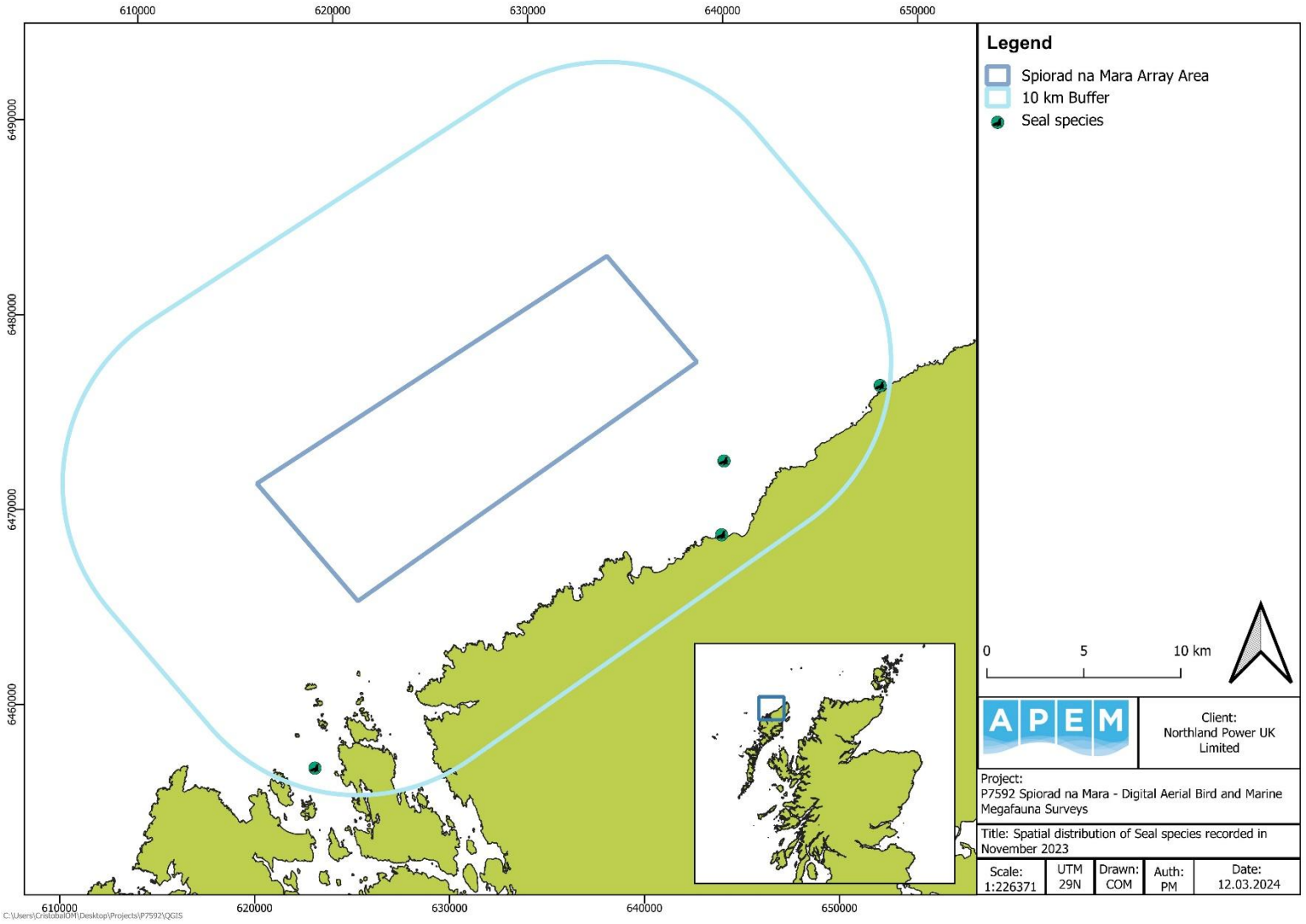


Figure 494 Distribution of seal species in November 2023

*Note that individuals in close proximity may appear overlaying.

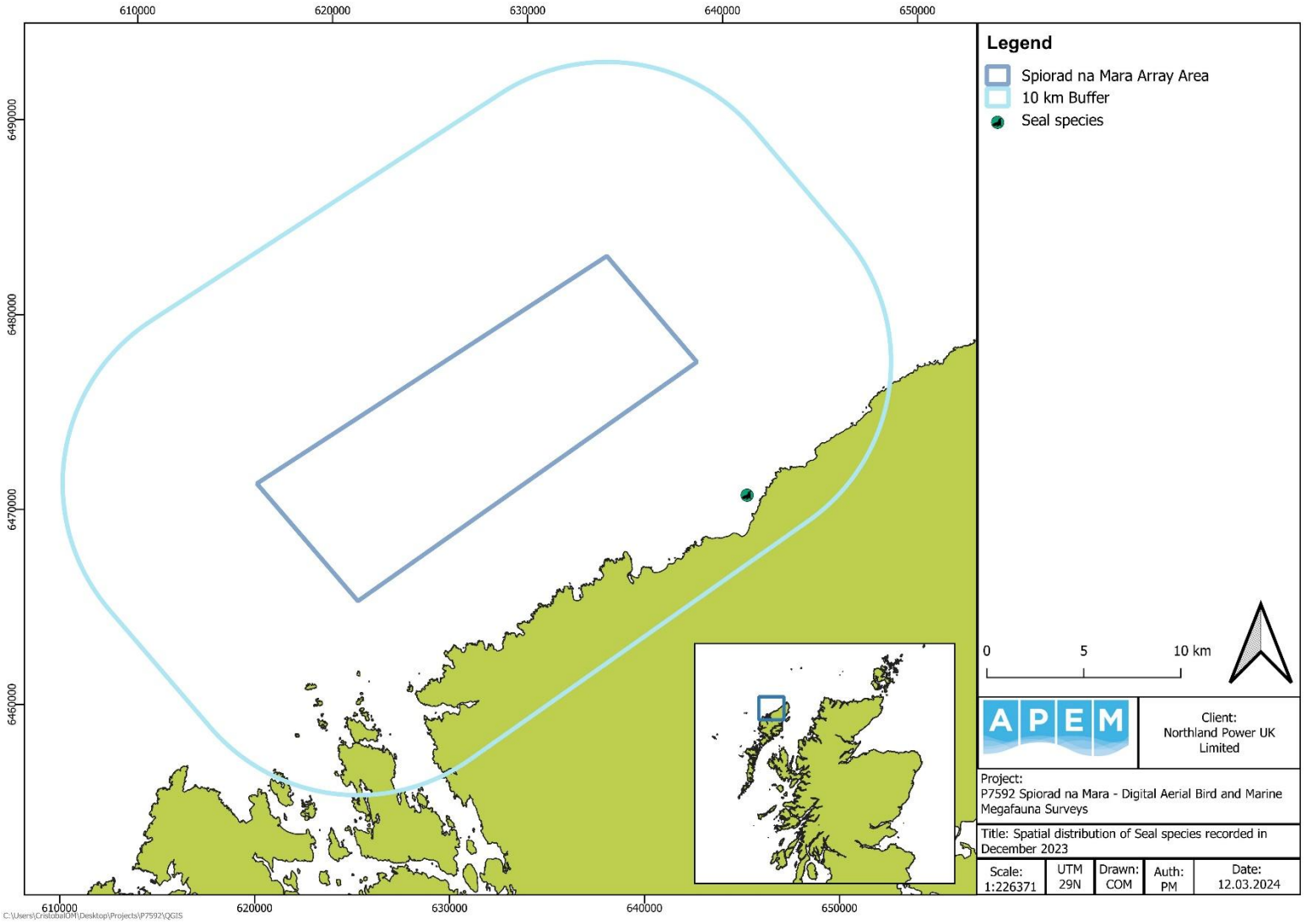


Figure 495 Distribution of seal species in December 2023

*Note that individuals in close proximity may appear overlaying.

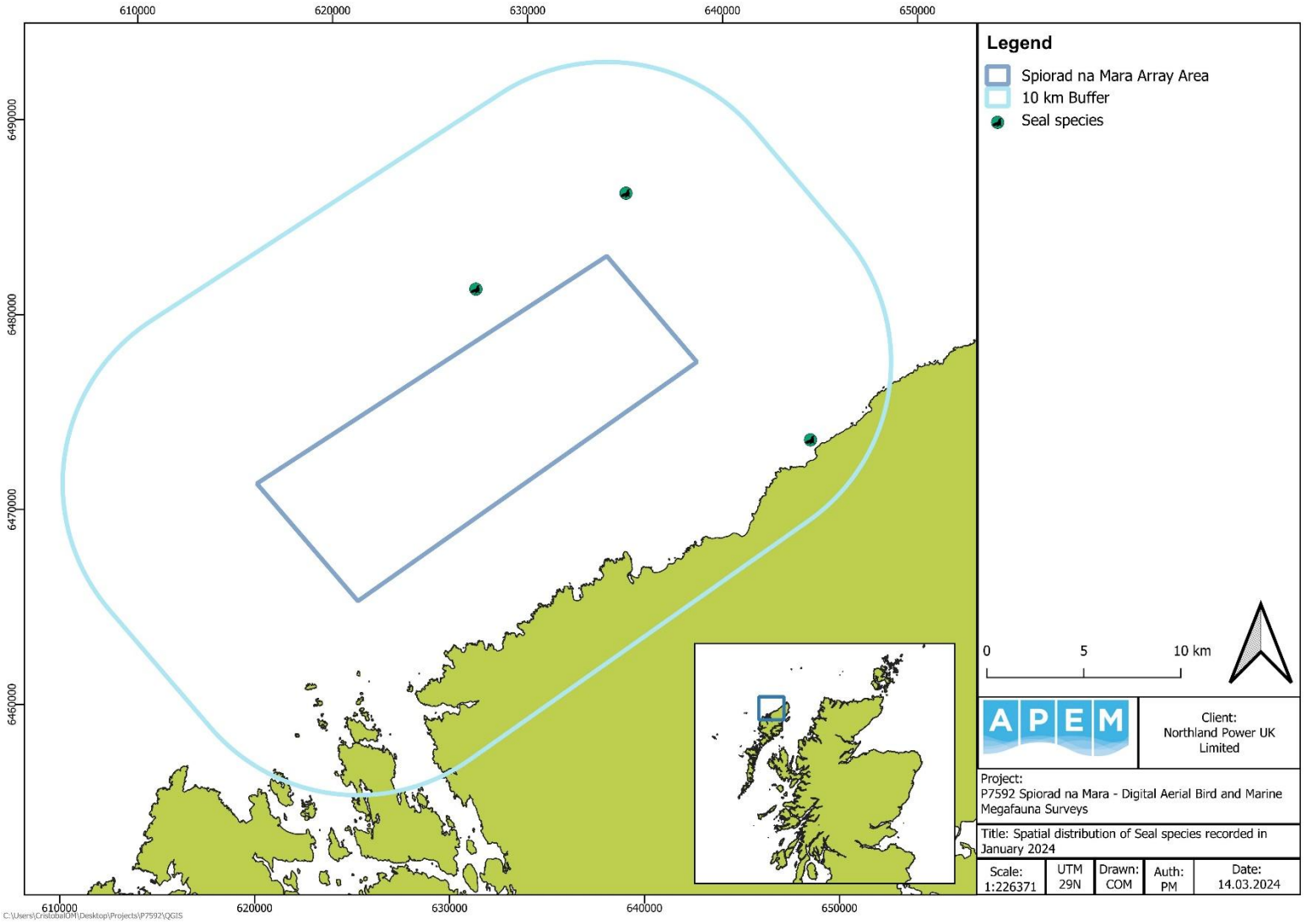


Figure 496 Distribution of seal species in January 2024

*Note that individuals in close proximity may appear overlaying.

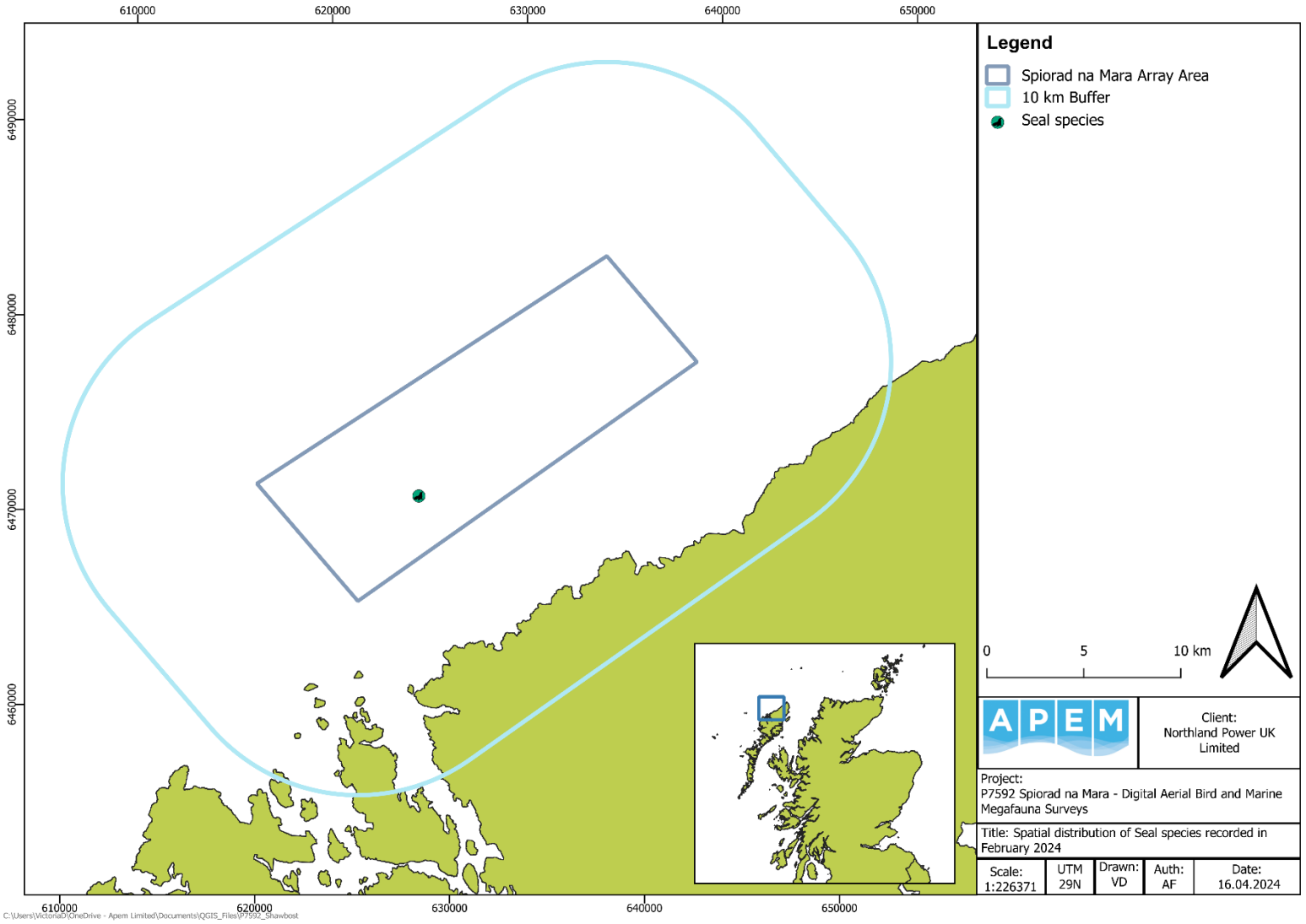


Figure 497 Distribution of seal species in February 2024

*Note that individuals in close proximity may appear overlaying.

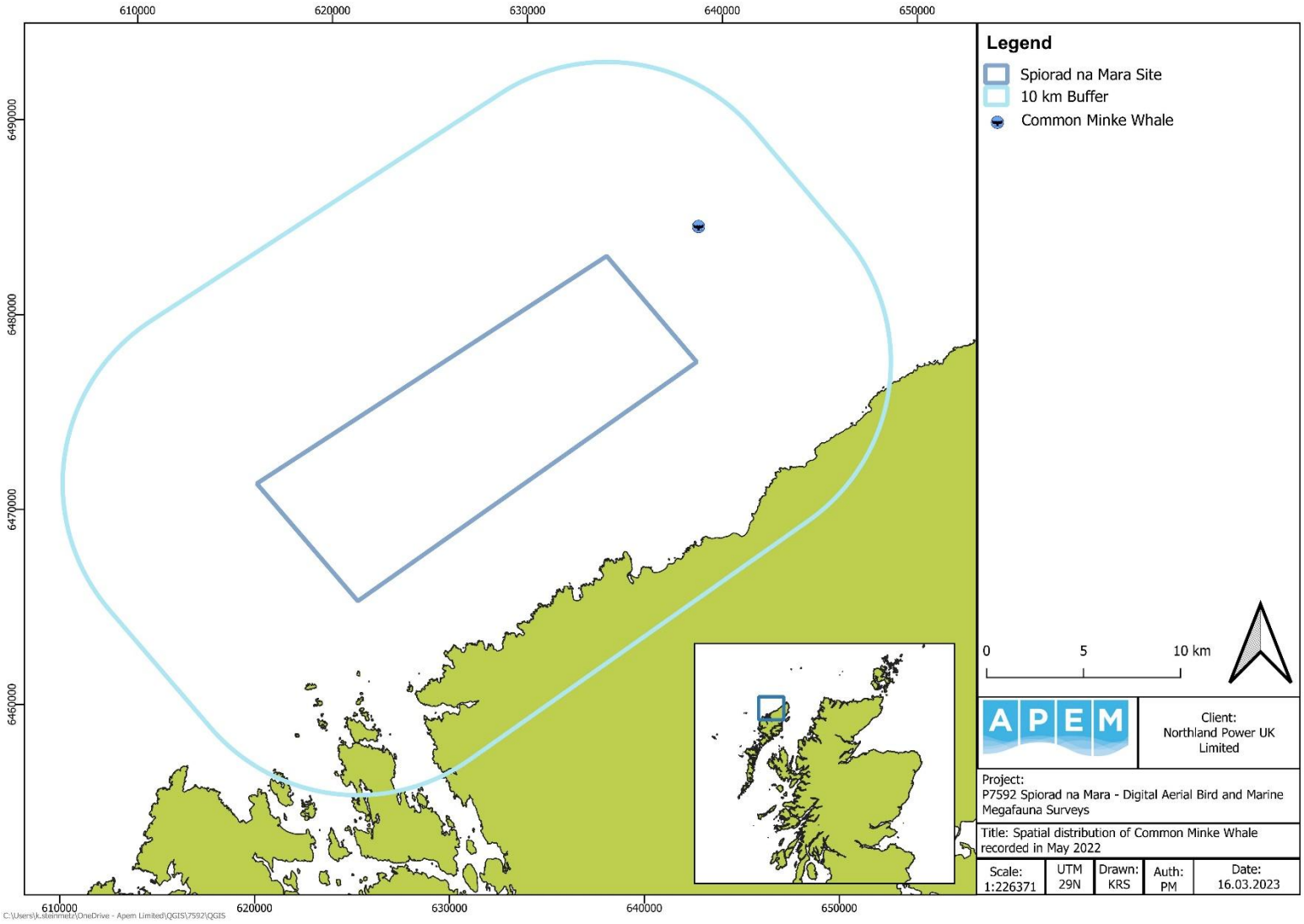


Figure 498 Distribution of minke whale in May 2022
*Note that individuals in close proximity may appear overlaying

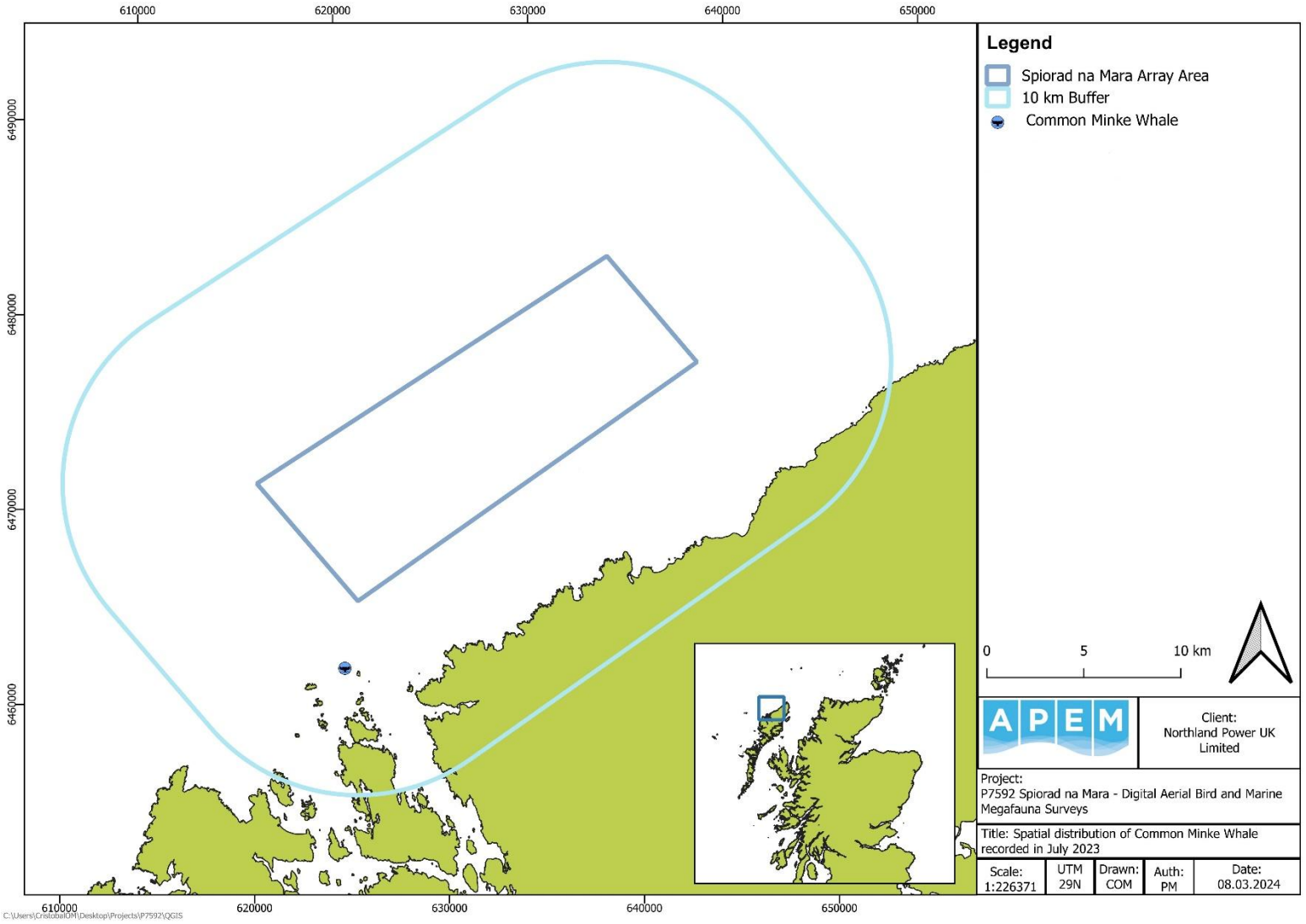


Figure 499 Distribution of minke whale in July 2023
*Note that individuals in close proximity may appear overlaying

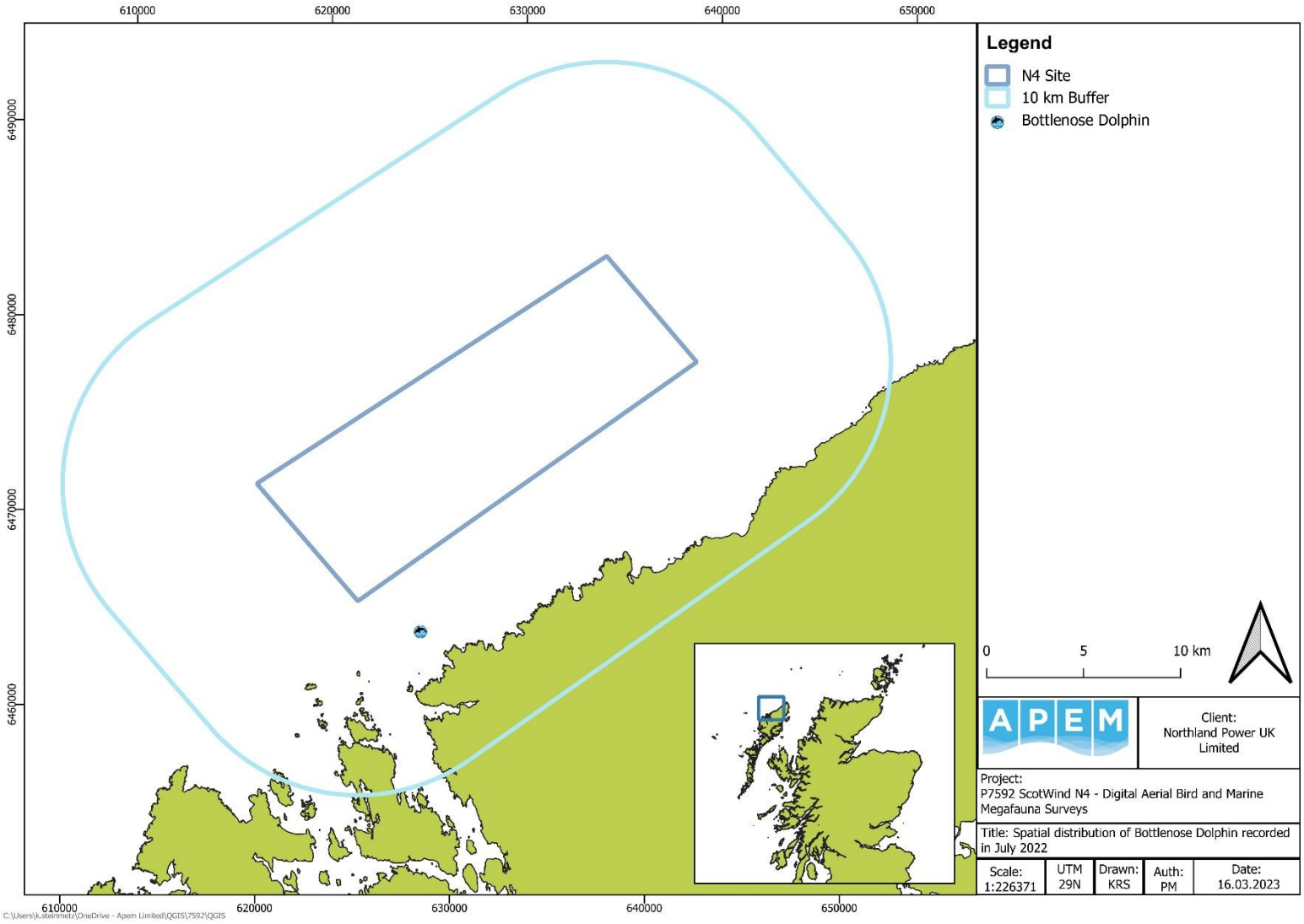


Figure 500 Distribution of bottlenose dolphin in July 2022
*Note that individuals in close proximity may appear overlaying

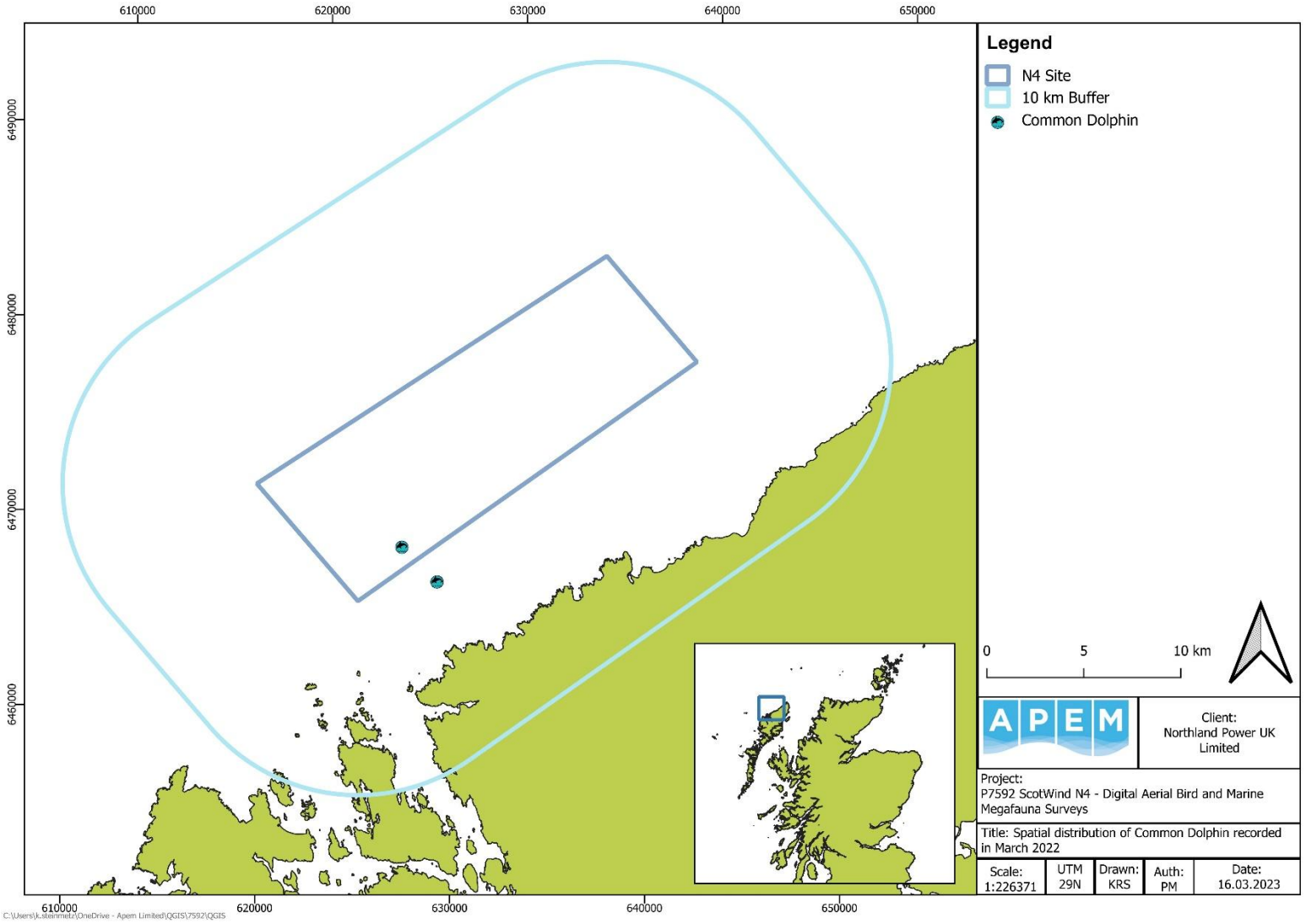


Figure 501 Distribution of common dolphin in March 2022
*Note that individuals in close proximity may appear overlaying.

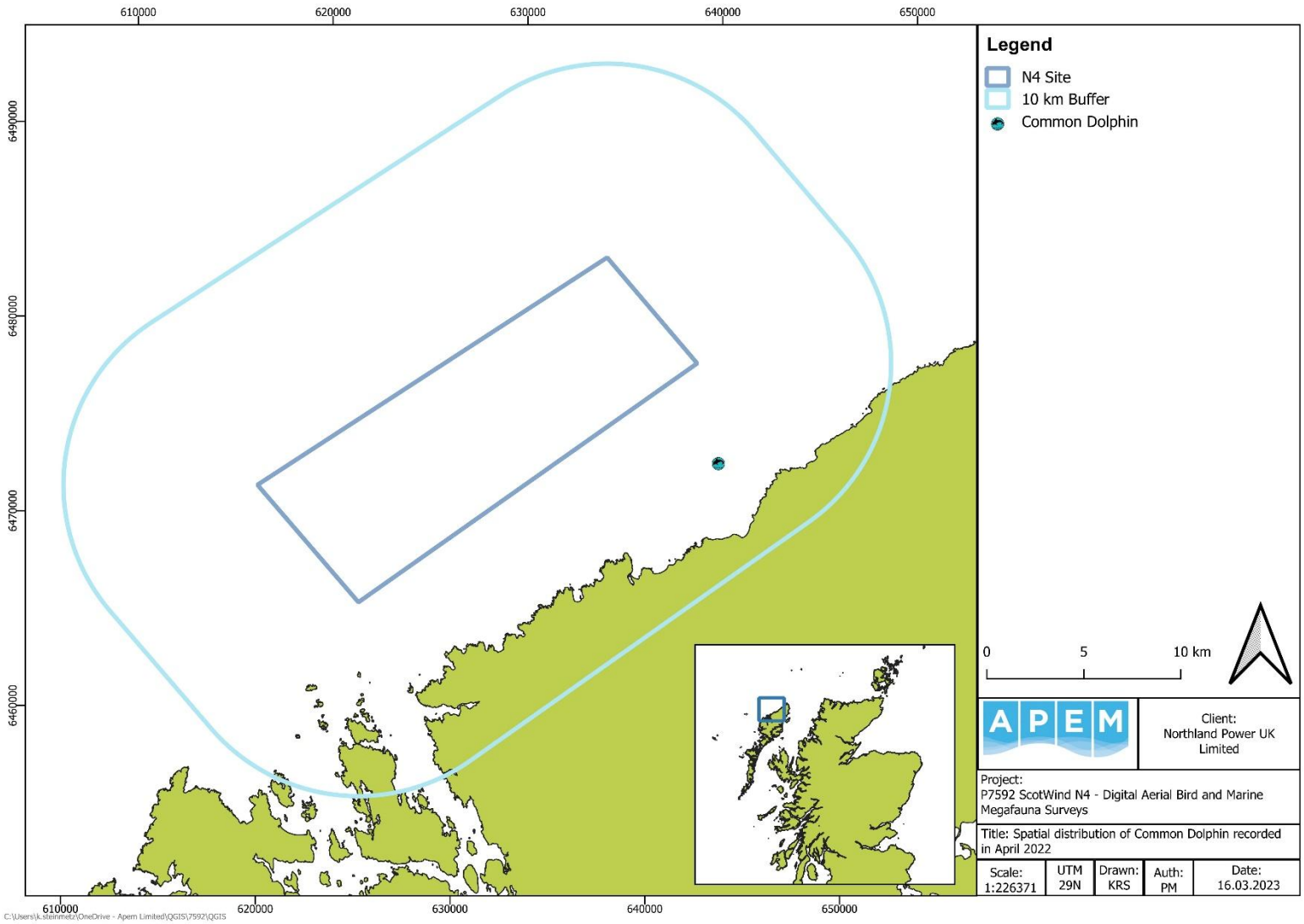


Figure 502 Distribution of common dolphin in April 2022

*Note that individuals in close proximity may appear overlaying.

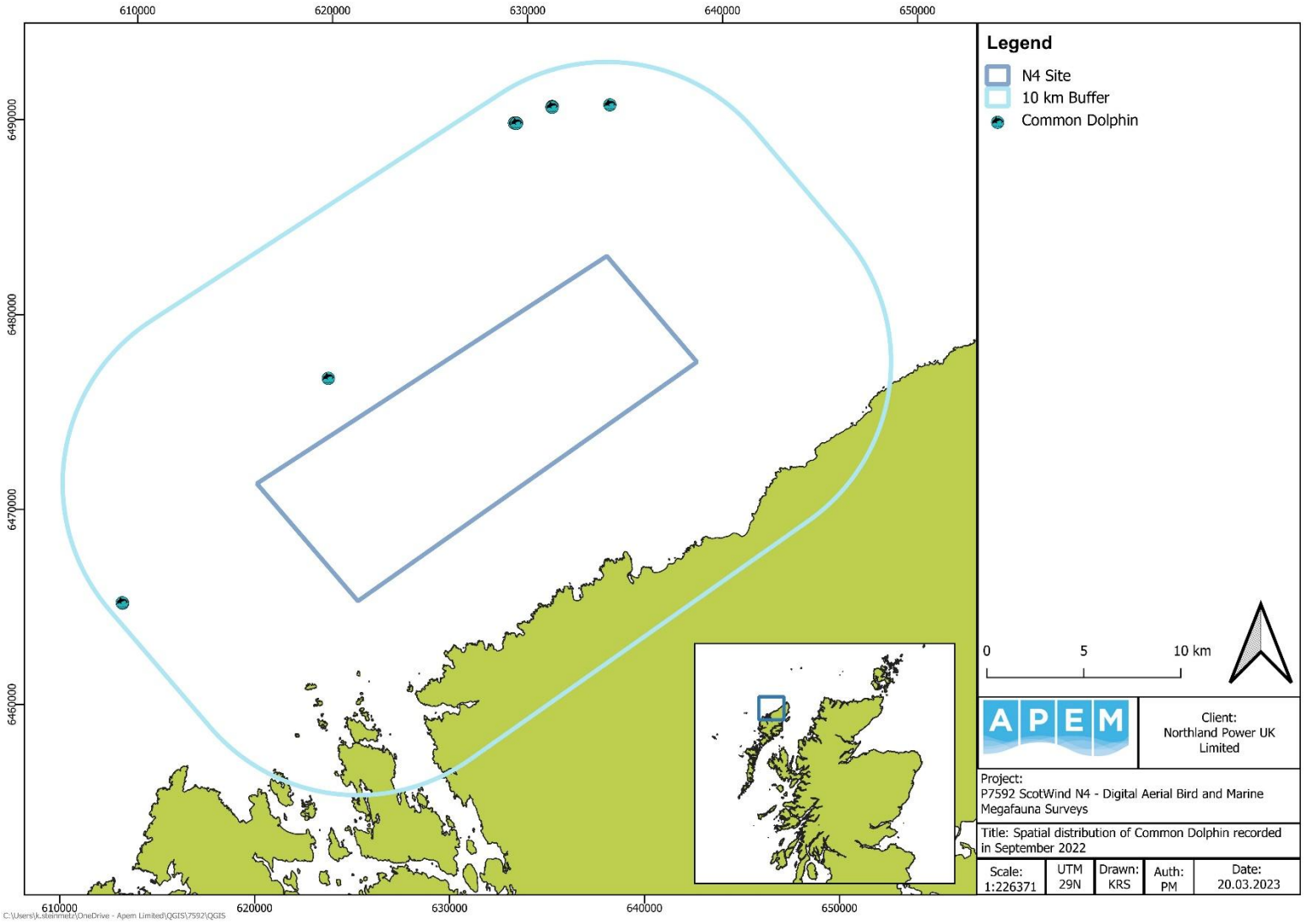


Figure 503 Distribution of common dolphin in September 2022
*Note that individuals in close proximity may appear overlaying.

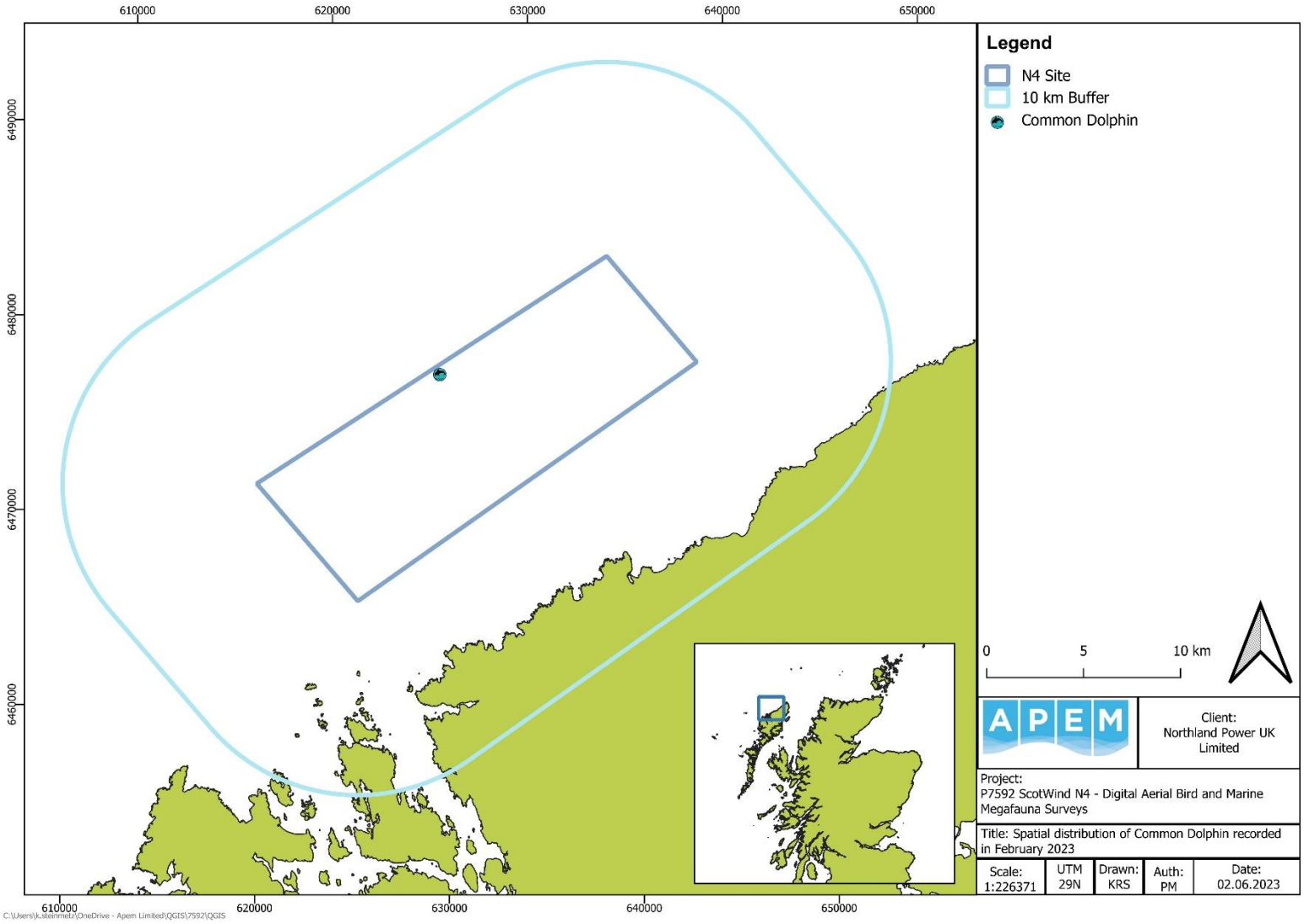


Figure 504 Distribution of common dolphin in February 2023
*Note that individuals in close proximity may appear overlaying.

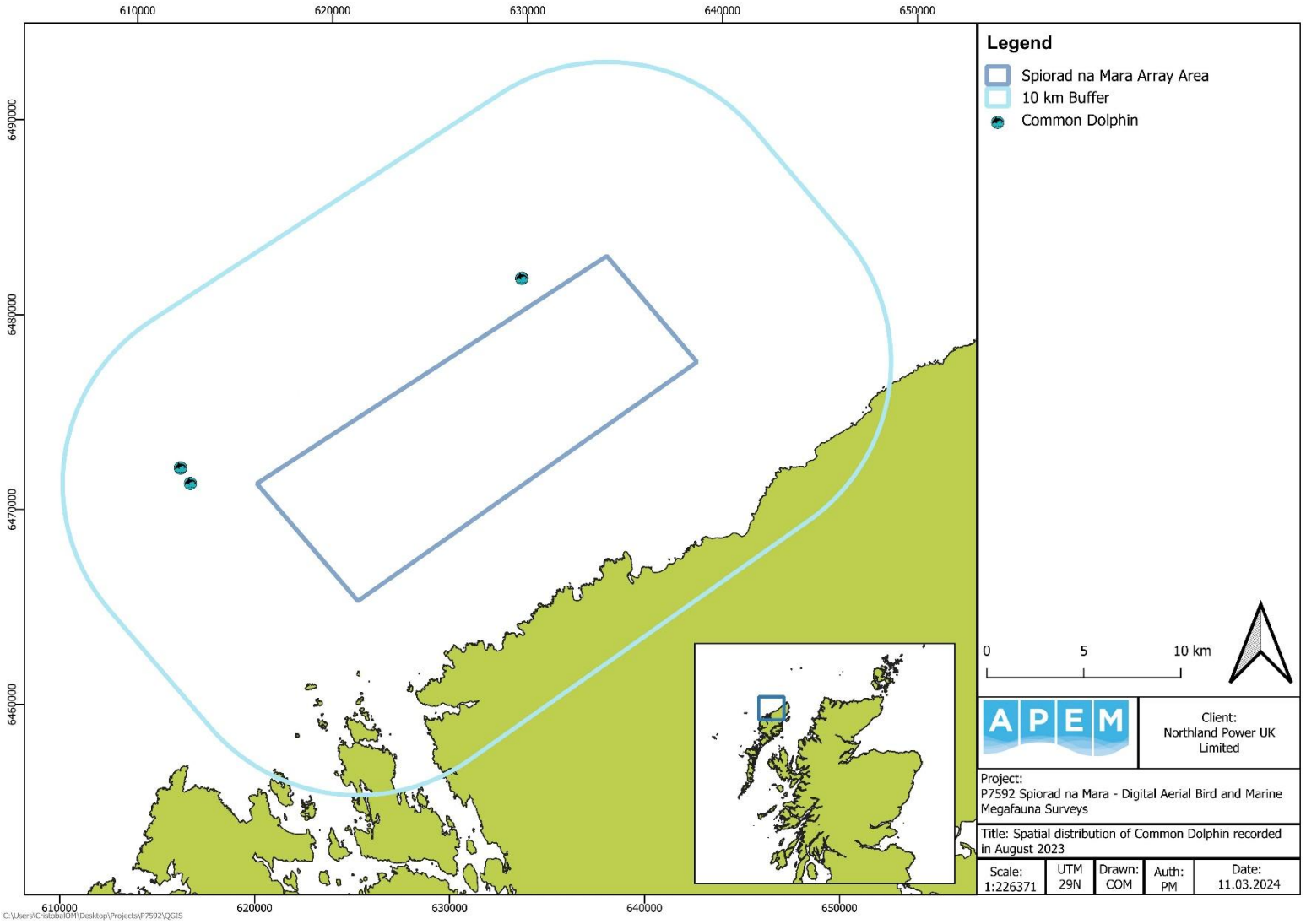


Figure 505 Distribution of common dolphin in August 2023
*Note that individuals in close proximity may appear overlaying.

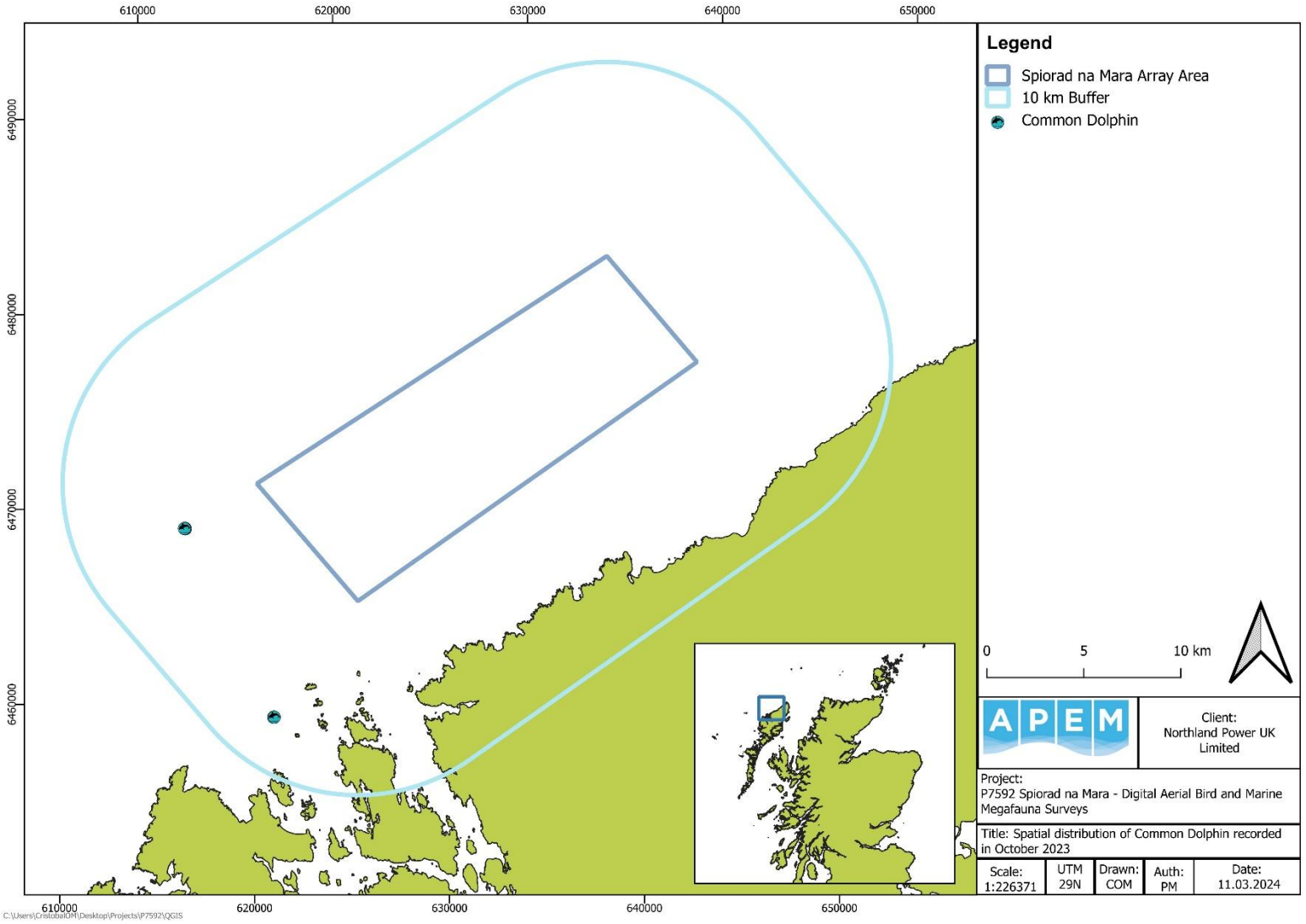


Figure 506 Distribution of common dolphin in October 2023

*Note that individuals in close proximity may appear overlaying.

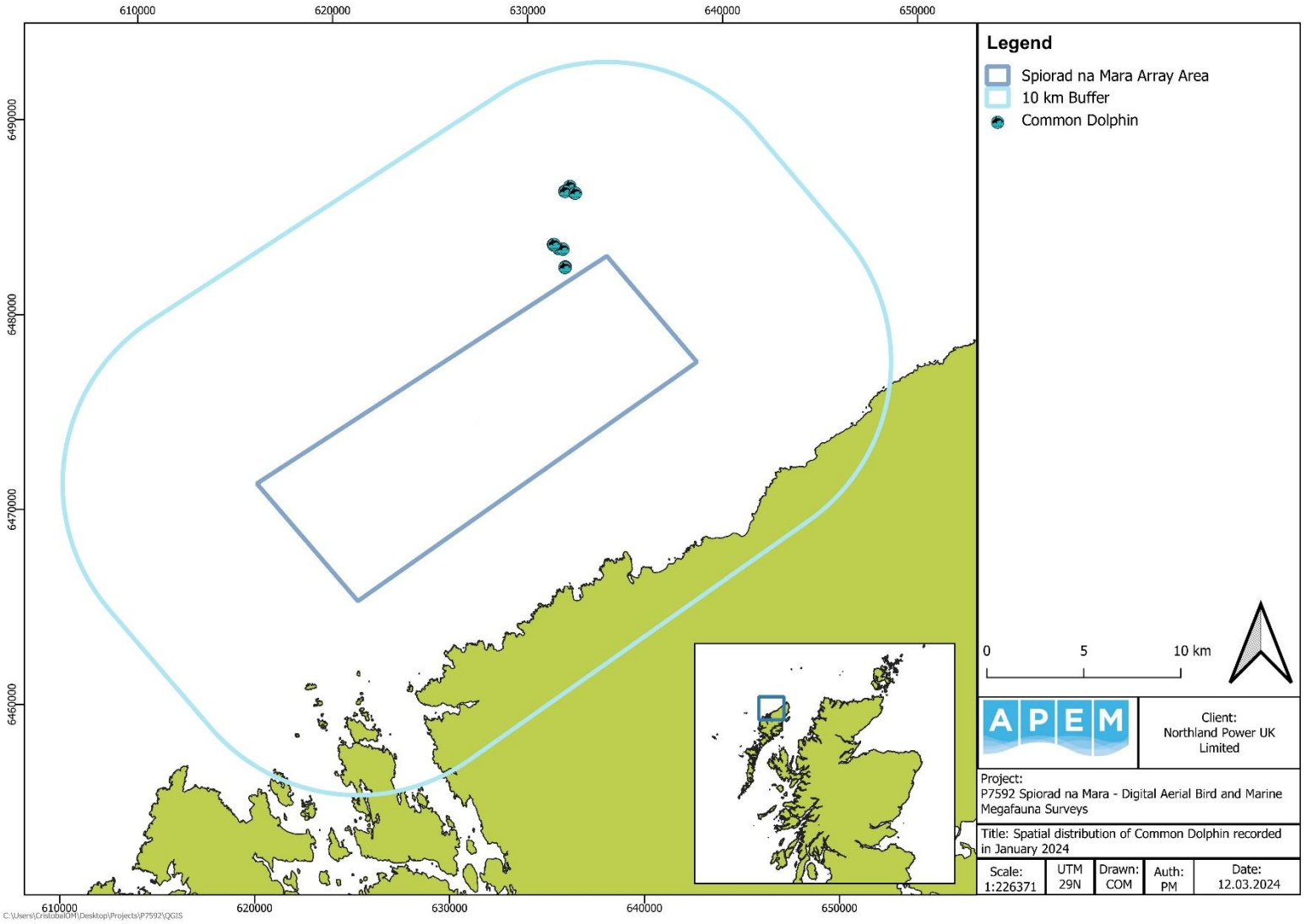


Figure 507 Distribution of common dolphin in January 2024
*Note that individuals in close proximity may appear overlaying.

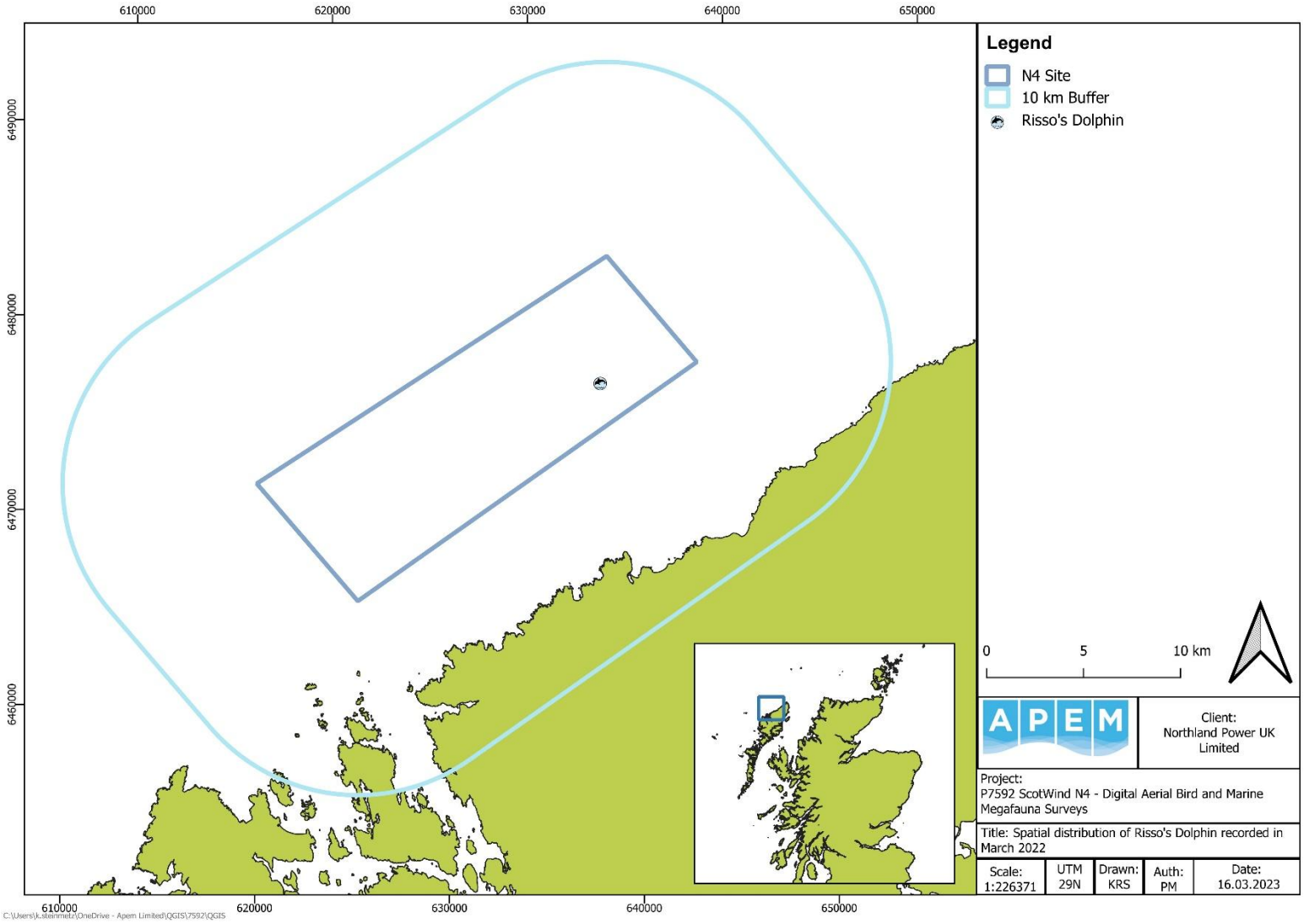


Figure 508 Distribution of Risso's dolphin in March 2022
*Note that individuals in close proximity may appear overlaying

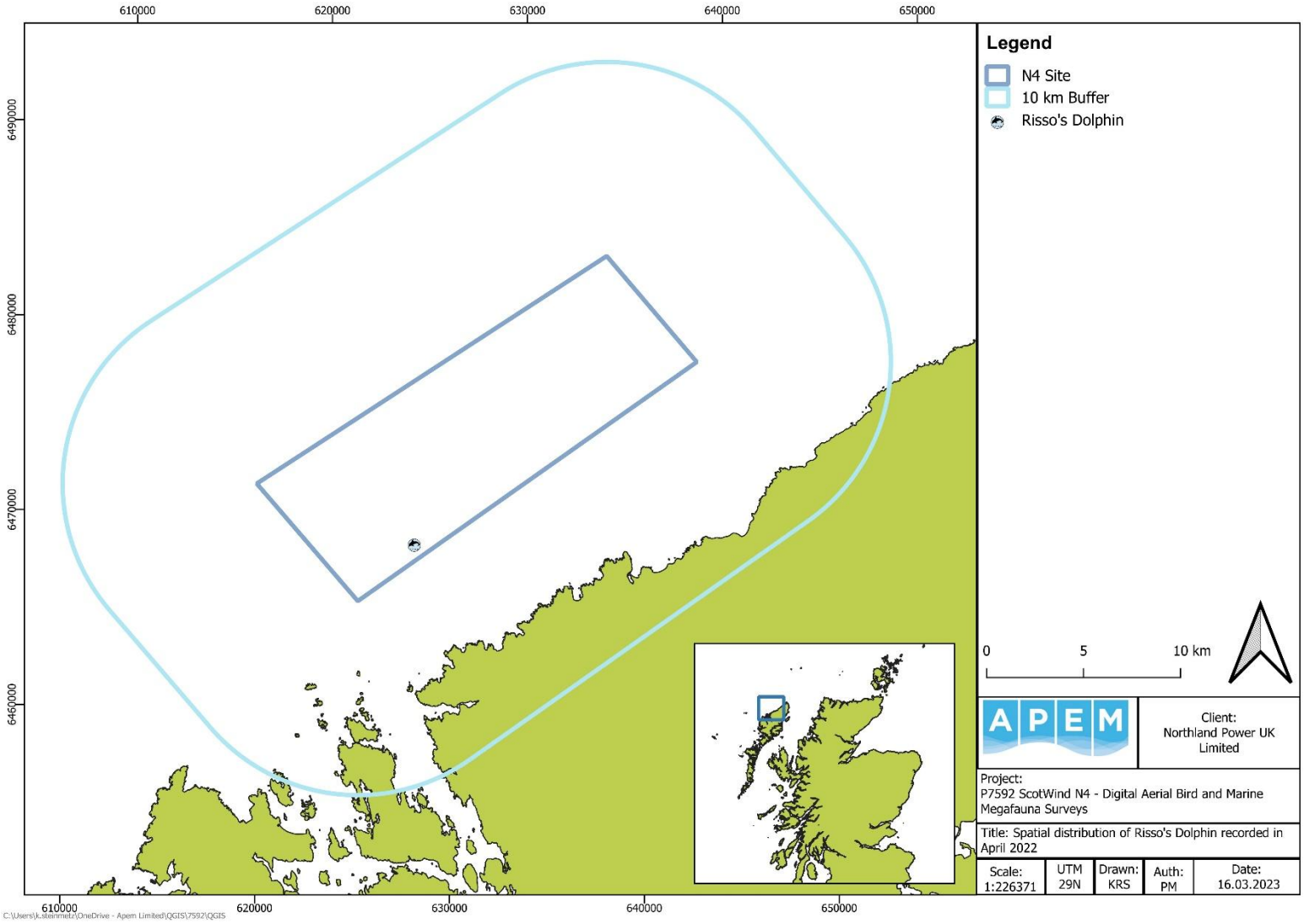


Figure 509 Distribution of Risso's dolphin in April 2022

*Note that individuals in close proximity may appear overlaying.

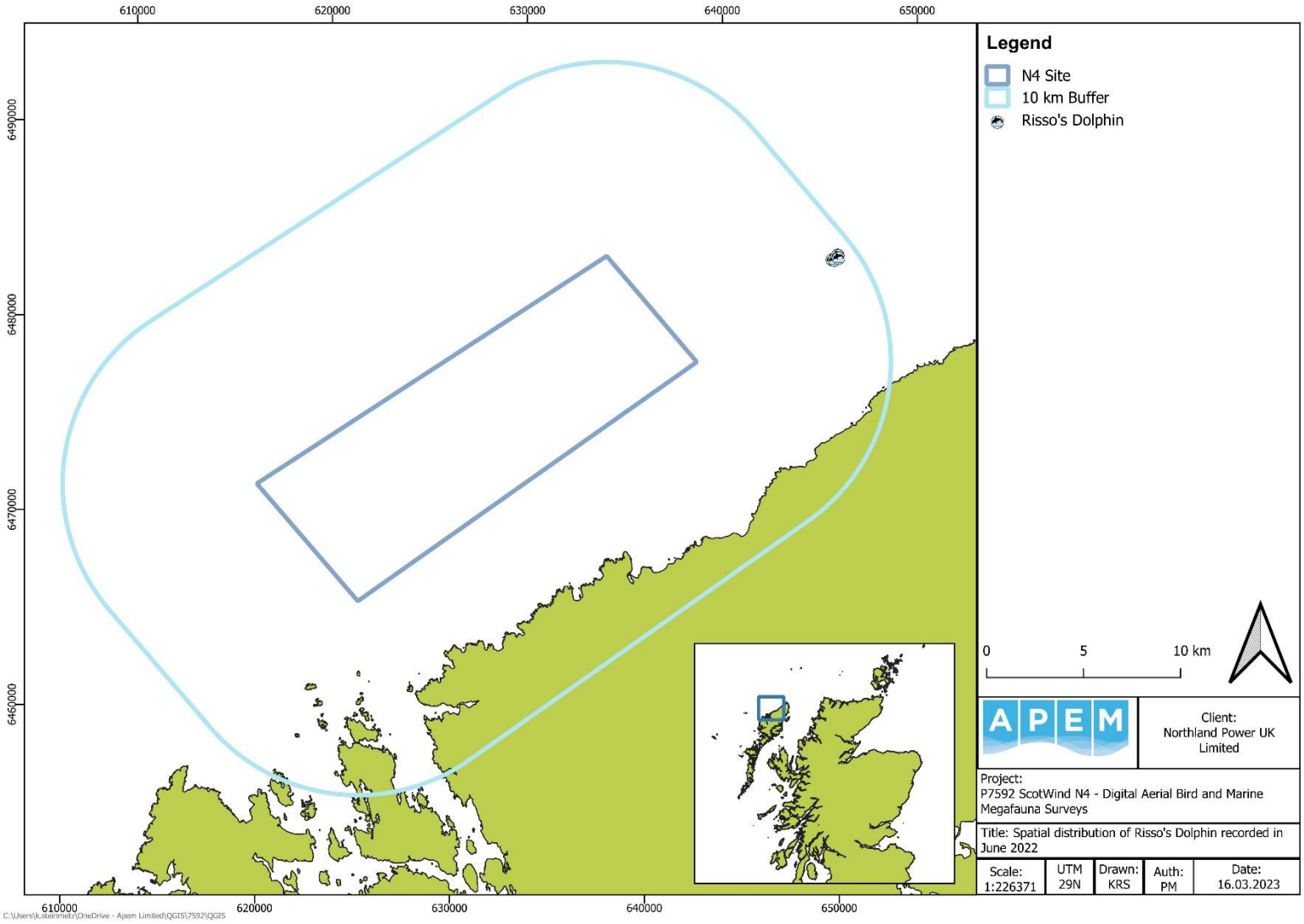


Figure 510 Distribution of Risso's dolphin in June 2022

*Note that individuals in close proximity may appear overlaying.

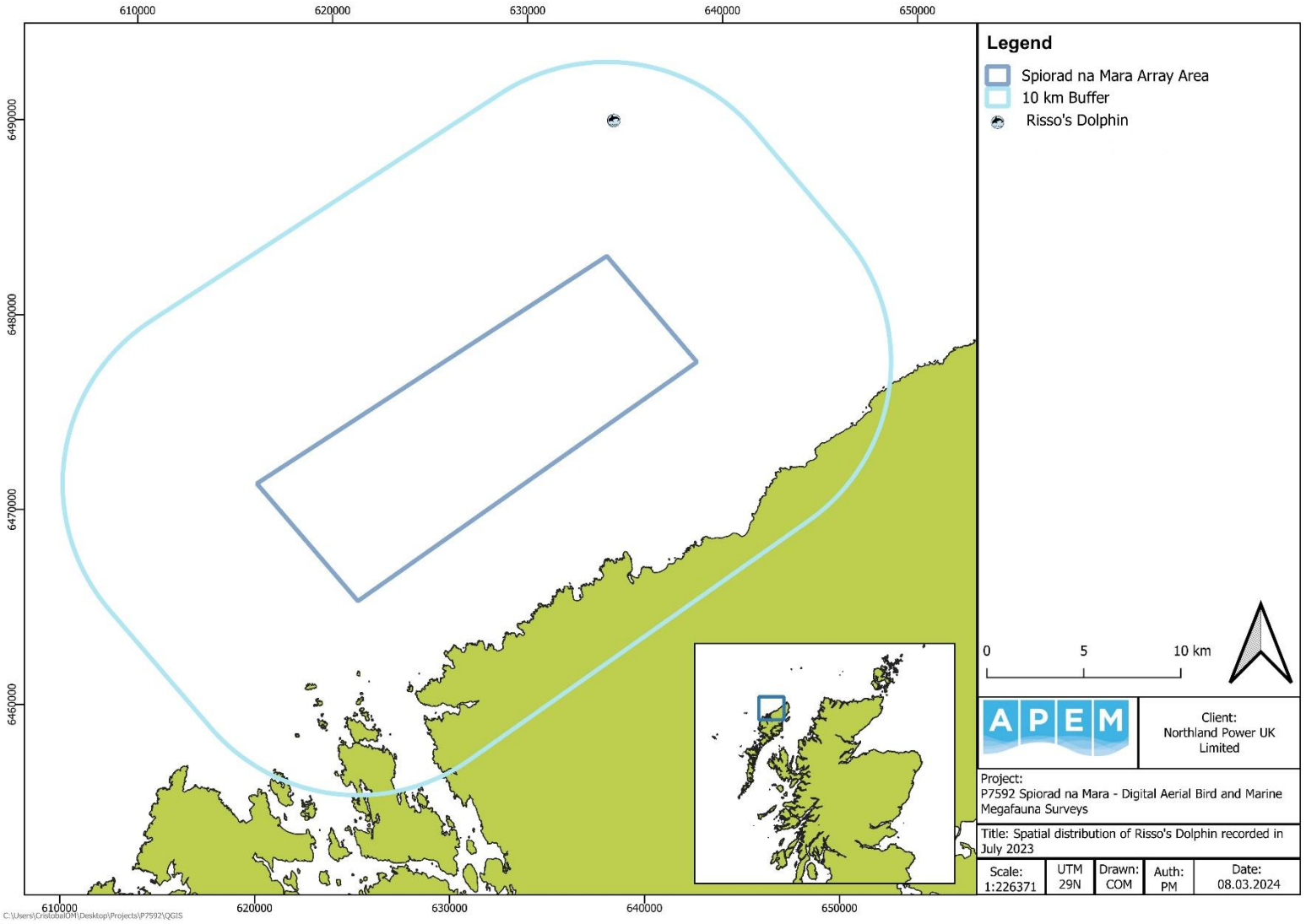


Figure 511 Distribution of Risso's dolphin in July 2023

*Note that individuals in close proximity may appear overlaying.

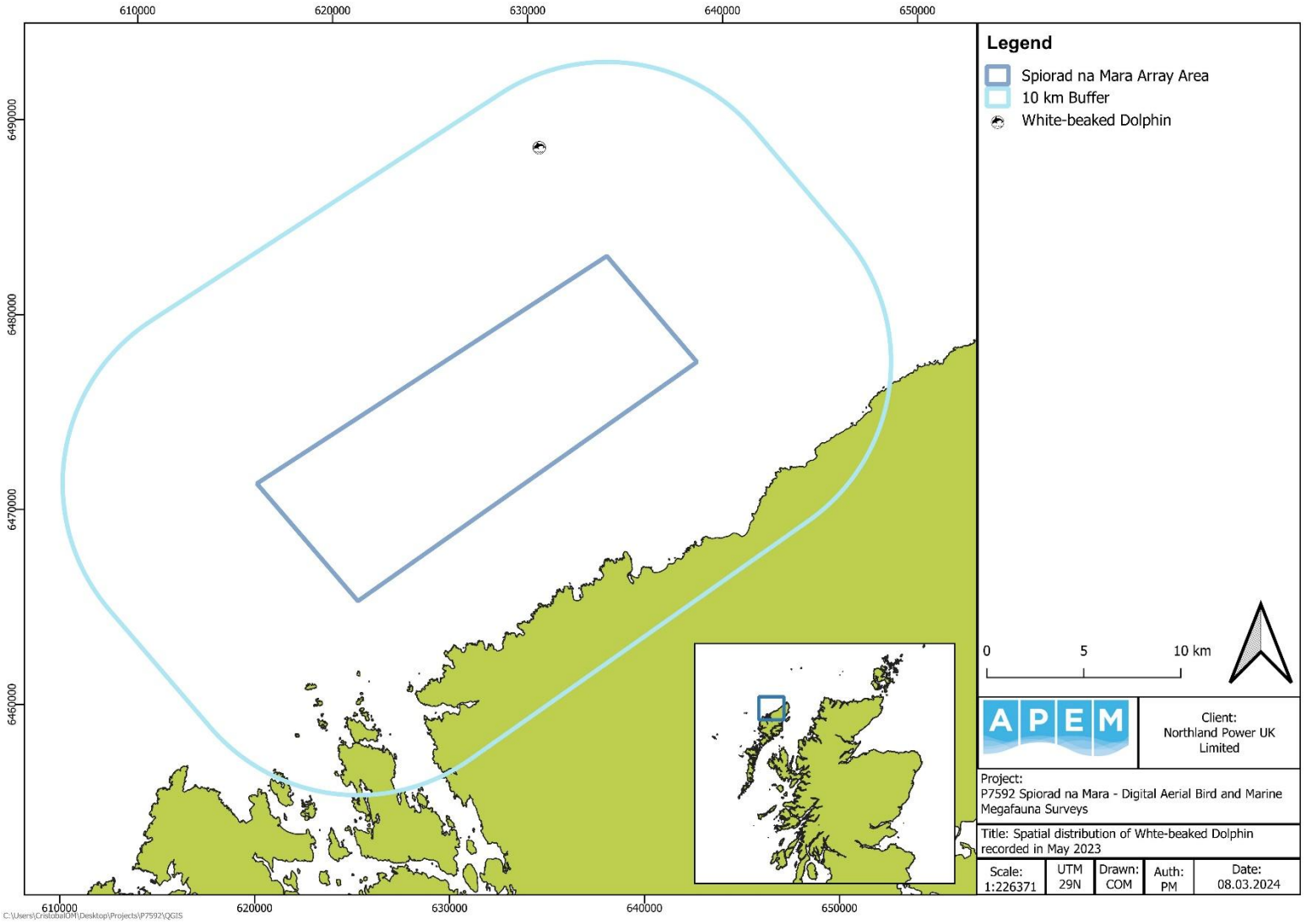


Figure 512 Distribution of white-beaked dolphin in May 2023
*Note that individuals in close proximity may appear overlaying

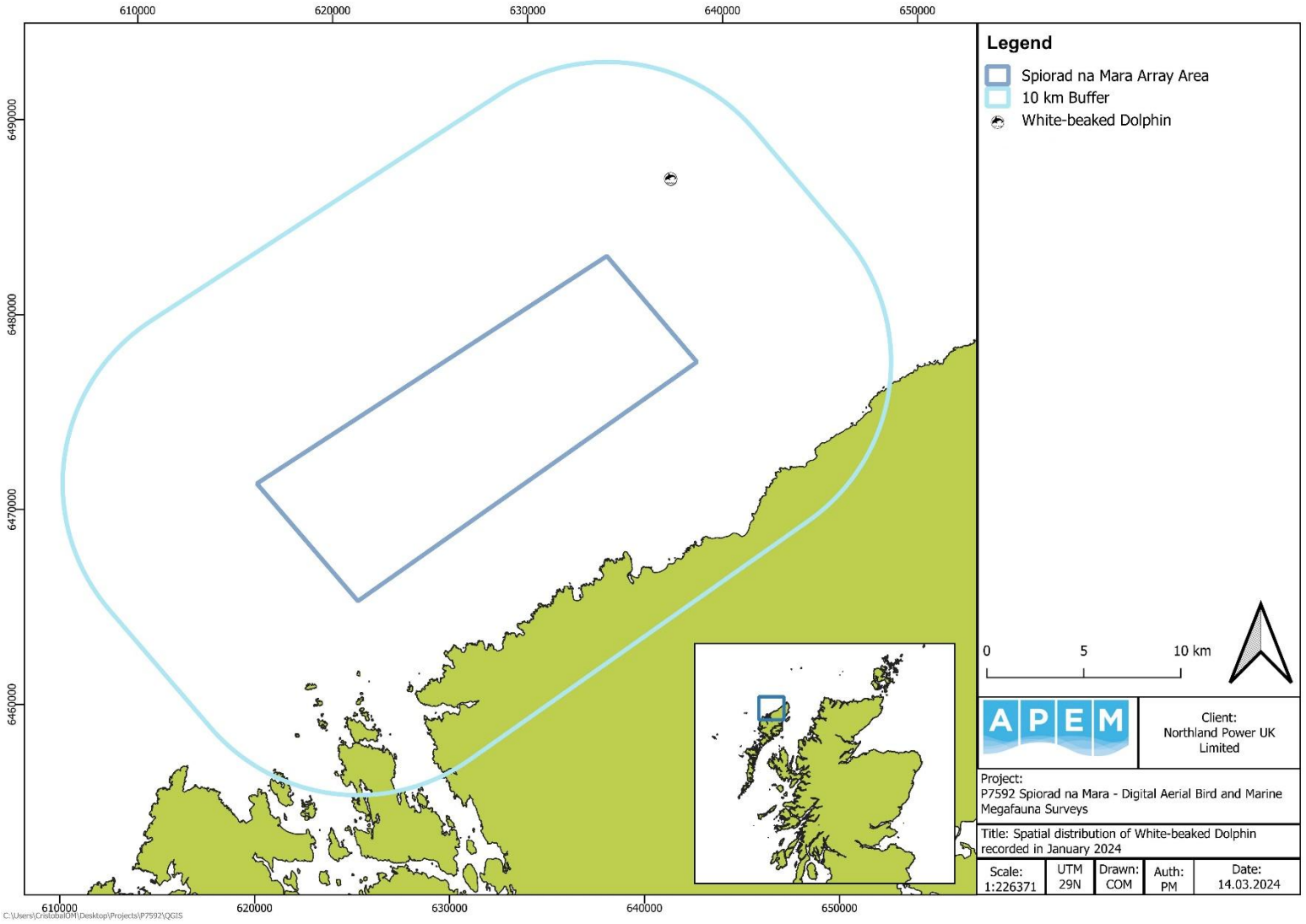


Figure 513 Distribution of white-beaked dolphin in January 2024

*Note that individuals in close proximity may appear overlaying.

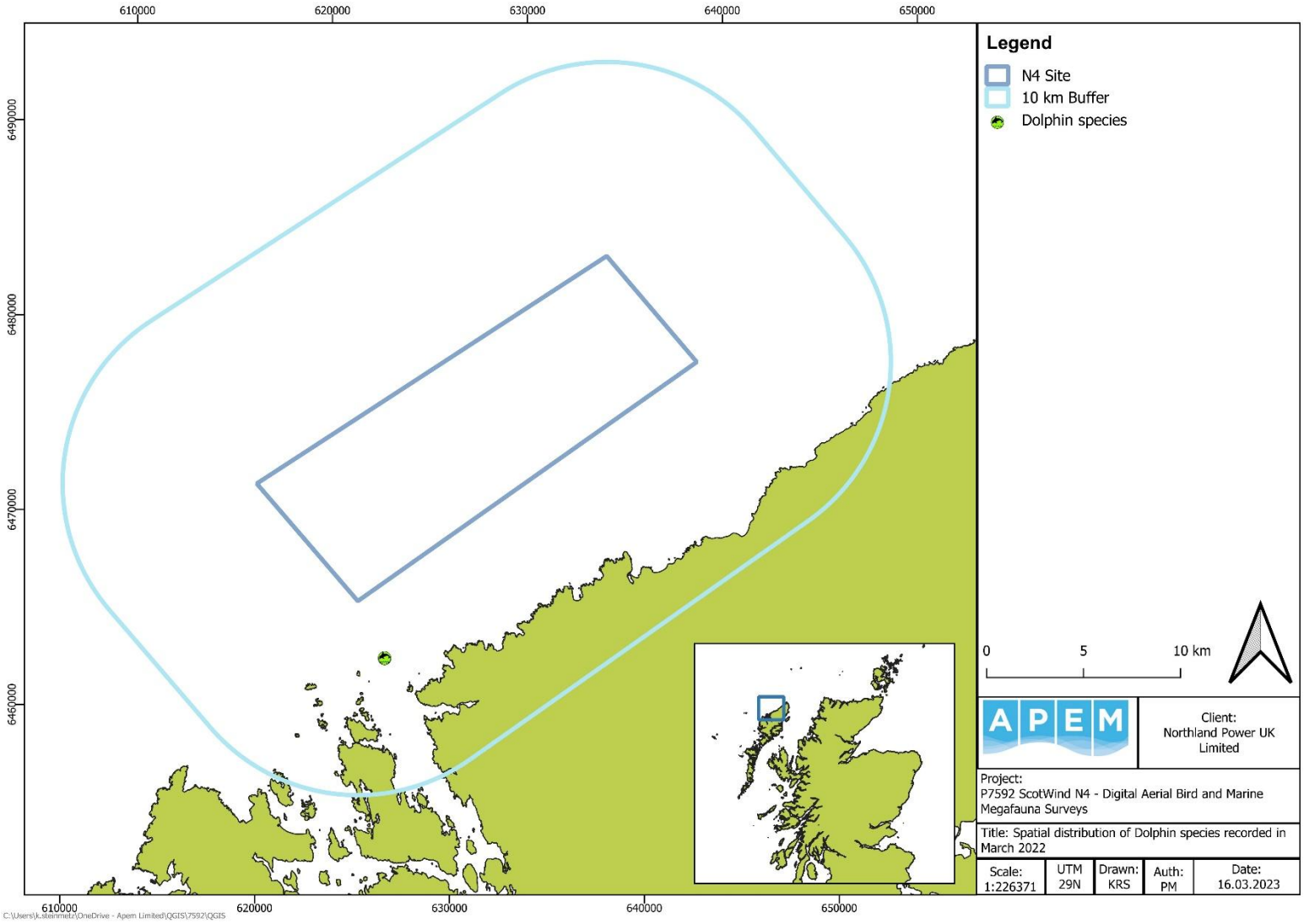


Figure 514 Distribution of dolphin species in March 2022

*Note that individuals in close proximity may appear overlaying.

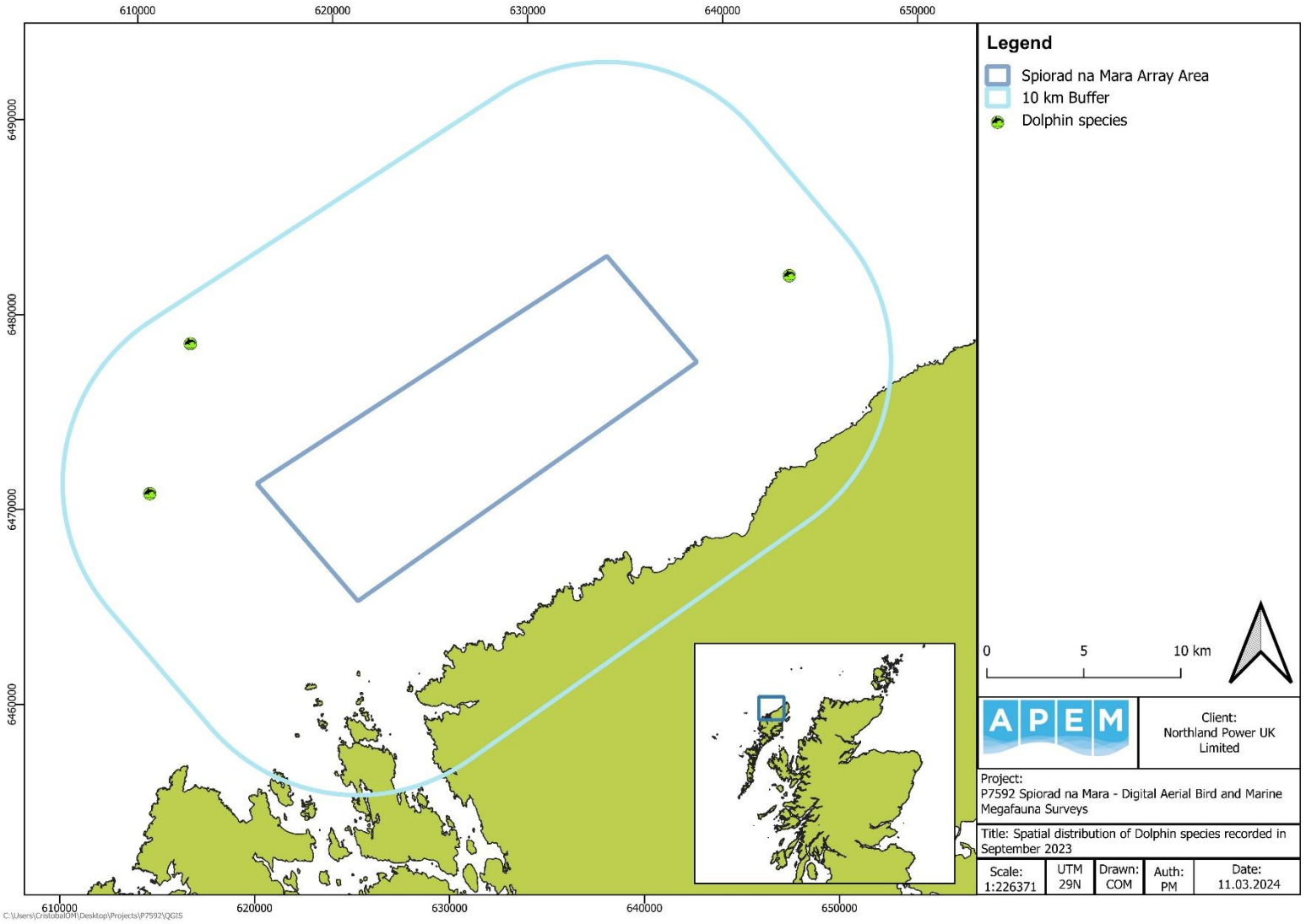


Figure 515 Distribution of dolphin species in September 2023

*Note that individuals in close proximity may appear overlaying.

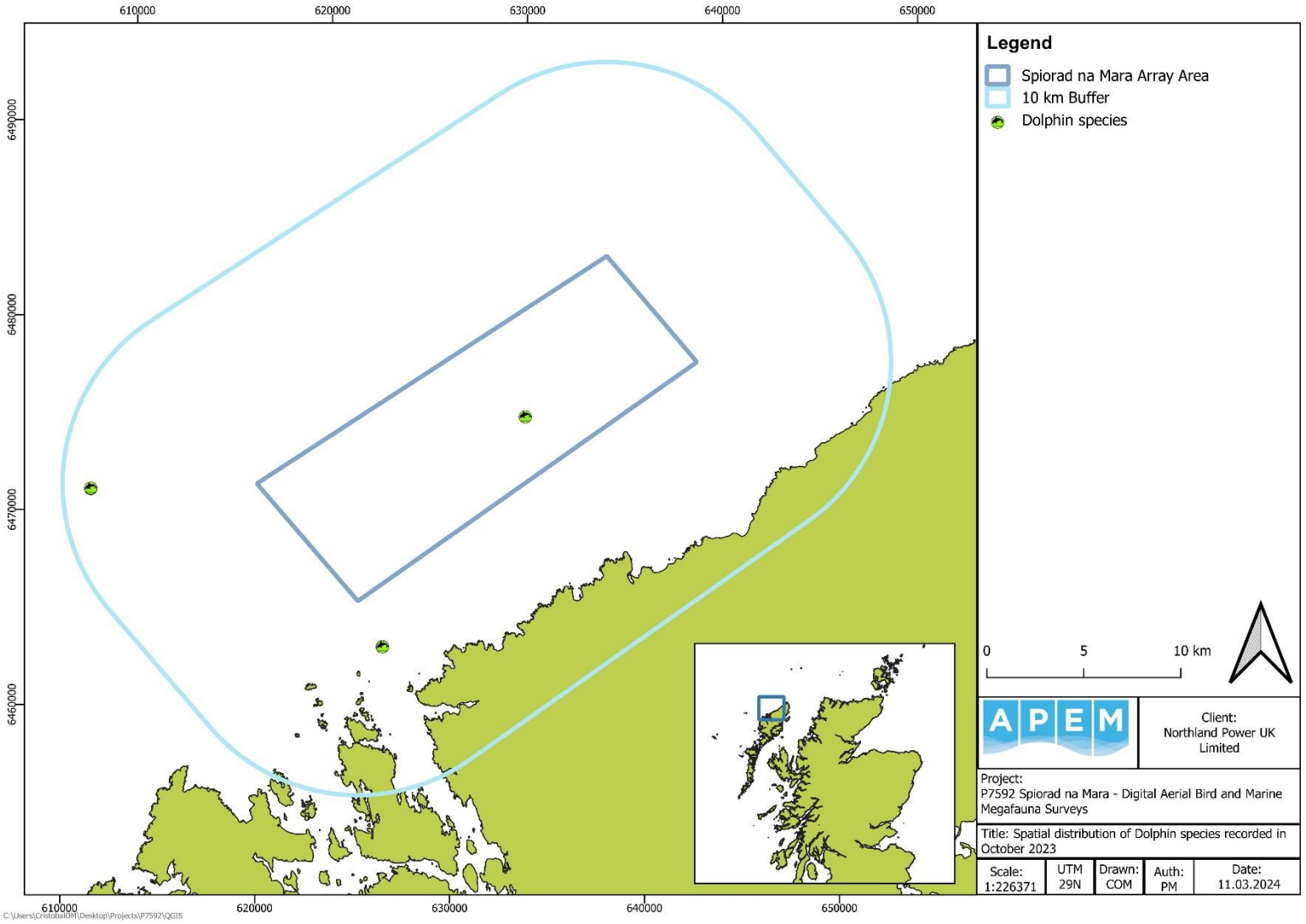


Figure 516 Distribution of dolphin species in October 2023

*Note that individuals in close proximity may appear overlaying.

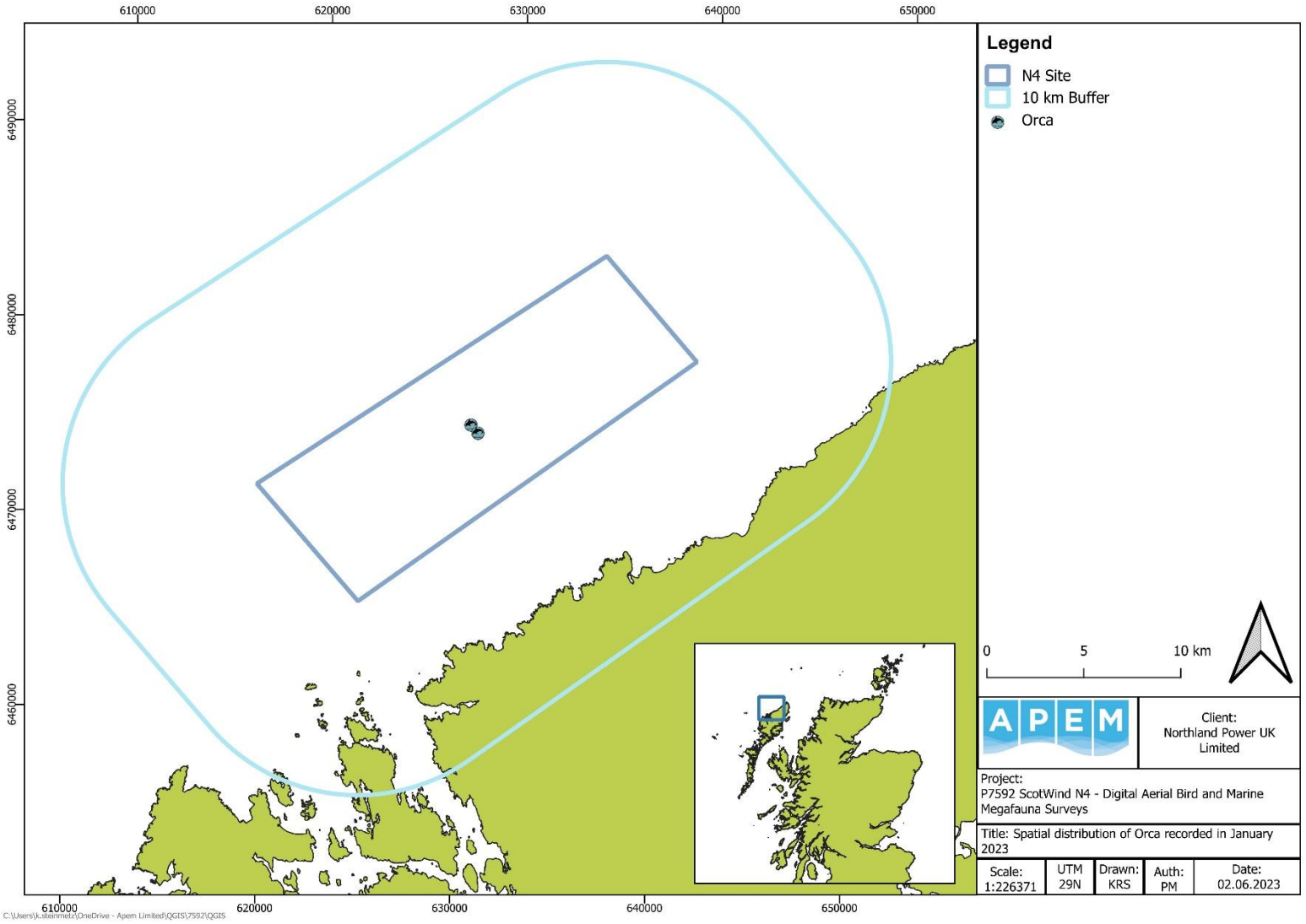


Figure 517 Distribution of orca in January 2023
*Note that individuals in close proximity may appear overlaying.

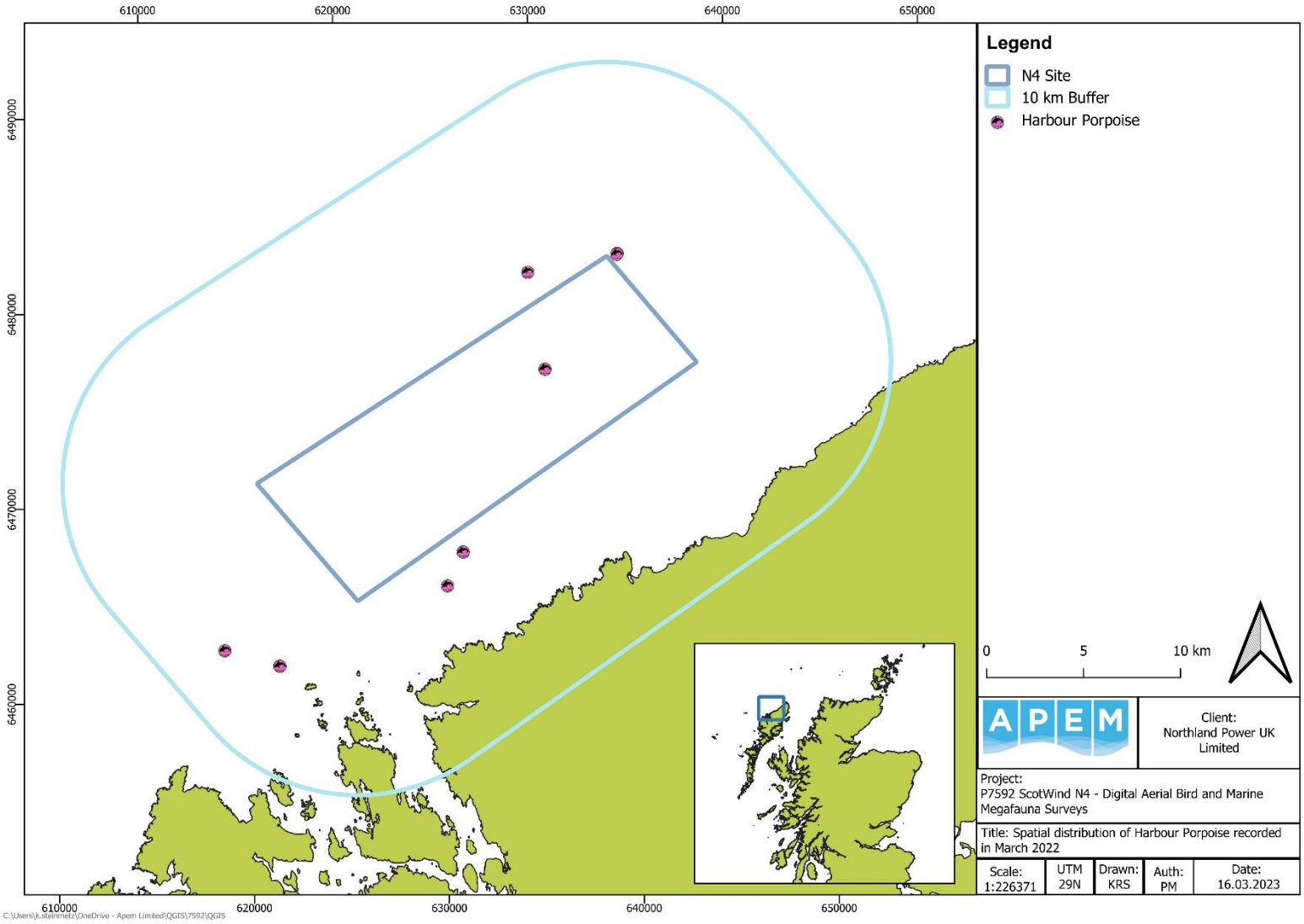


Figure 518 Distribution of harbour porpoise in March 2022
*Note that individuals in close proximity may appear overlaying.

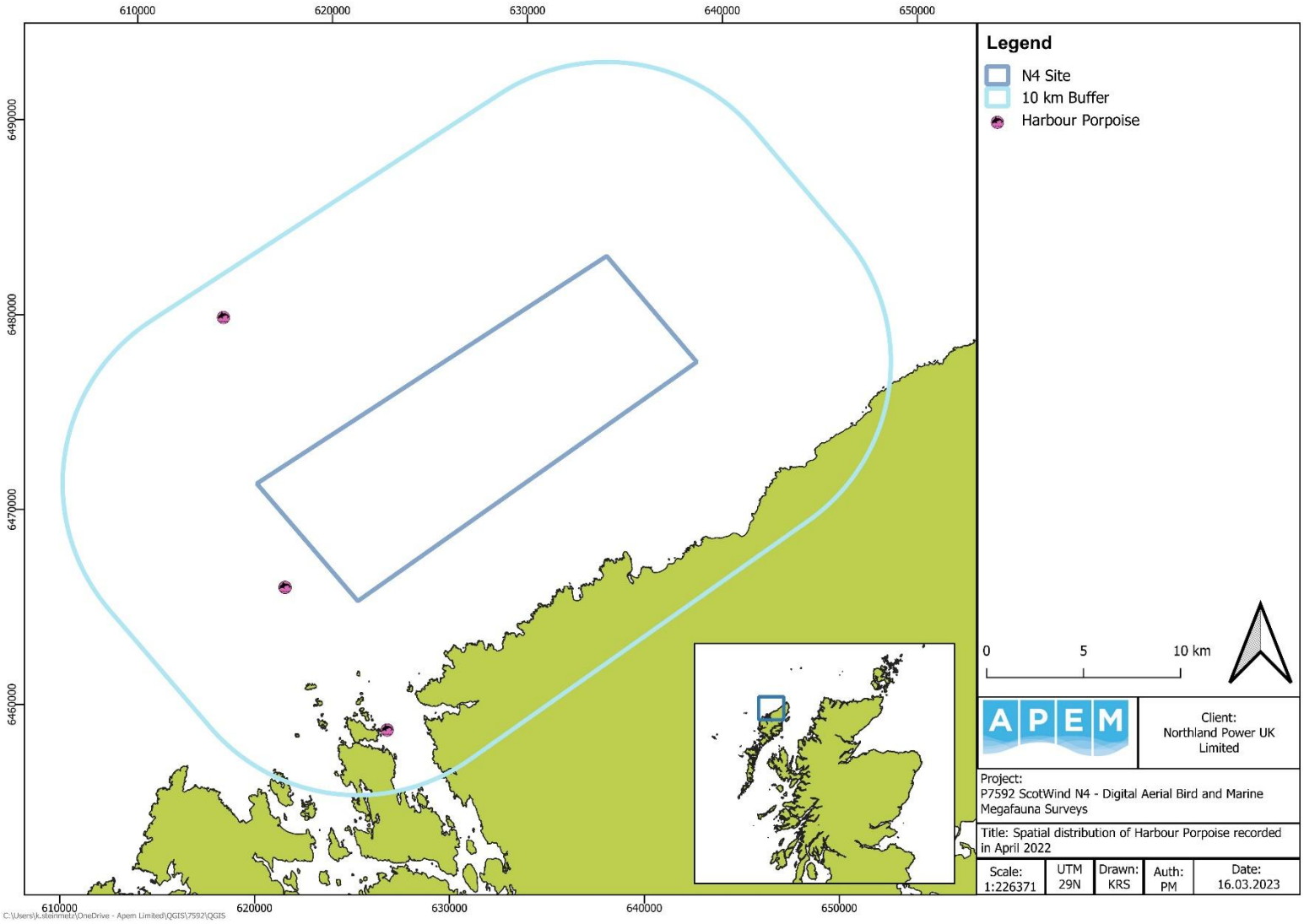


Figure 519 Distribution of harbour porpoise in April 2022
*Note that individuals in close proximity may appear overlaying.

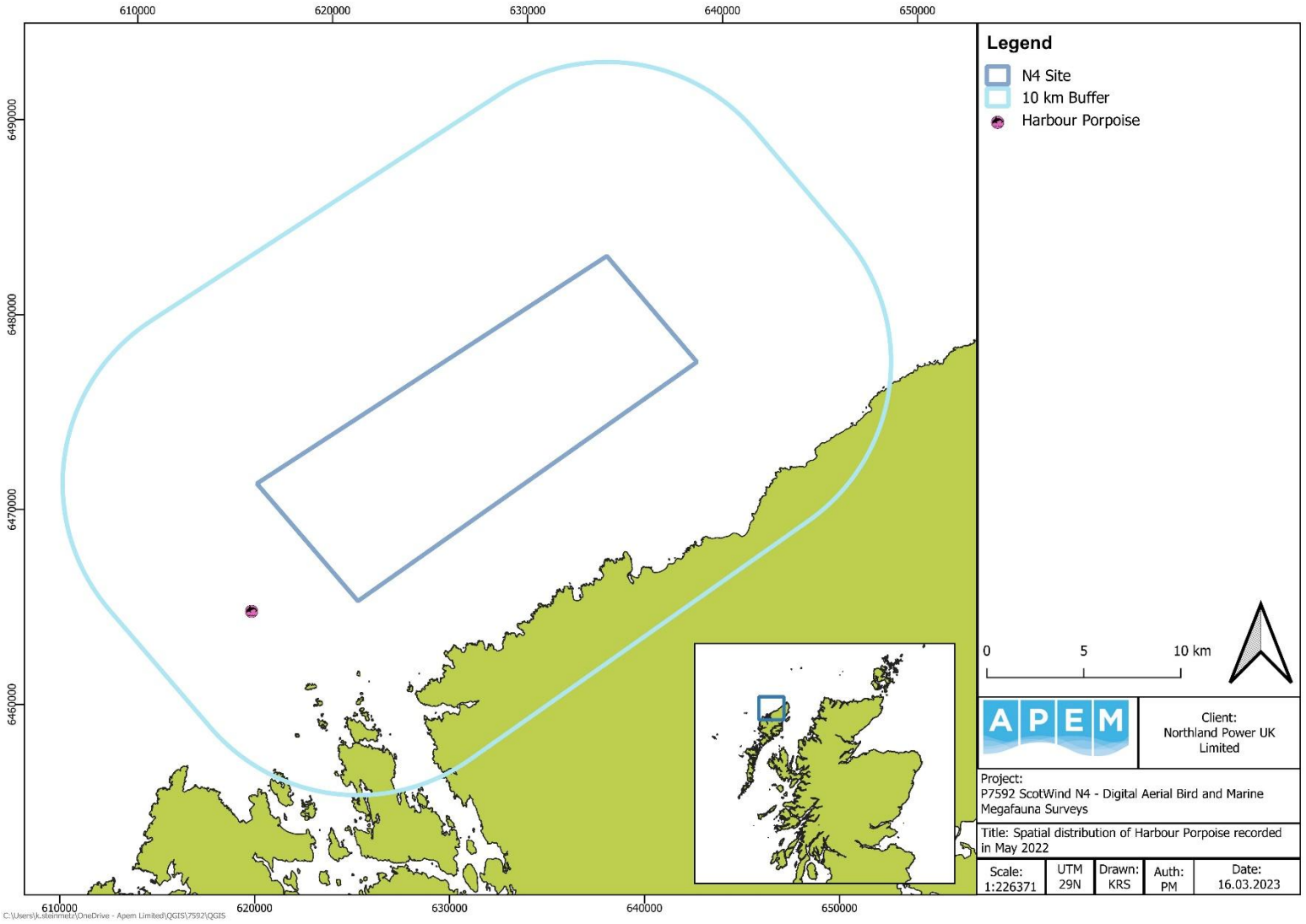


Figure 520 Distribution of harbour porpoise in May 2022
*Note that individuals in close proximity may appear overlaying.

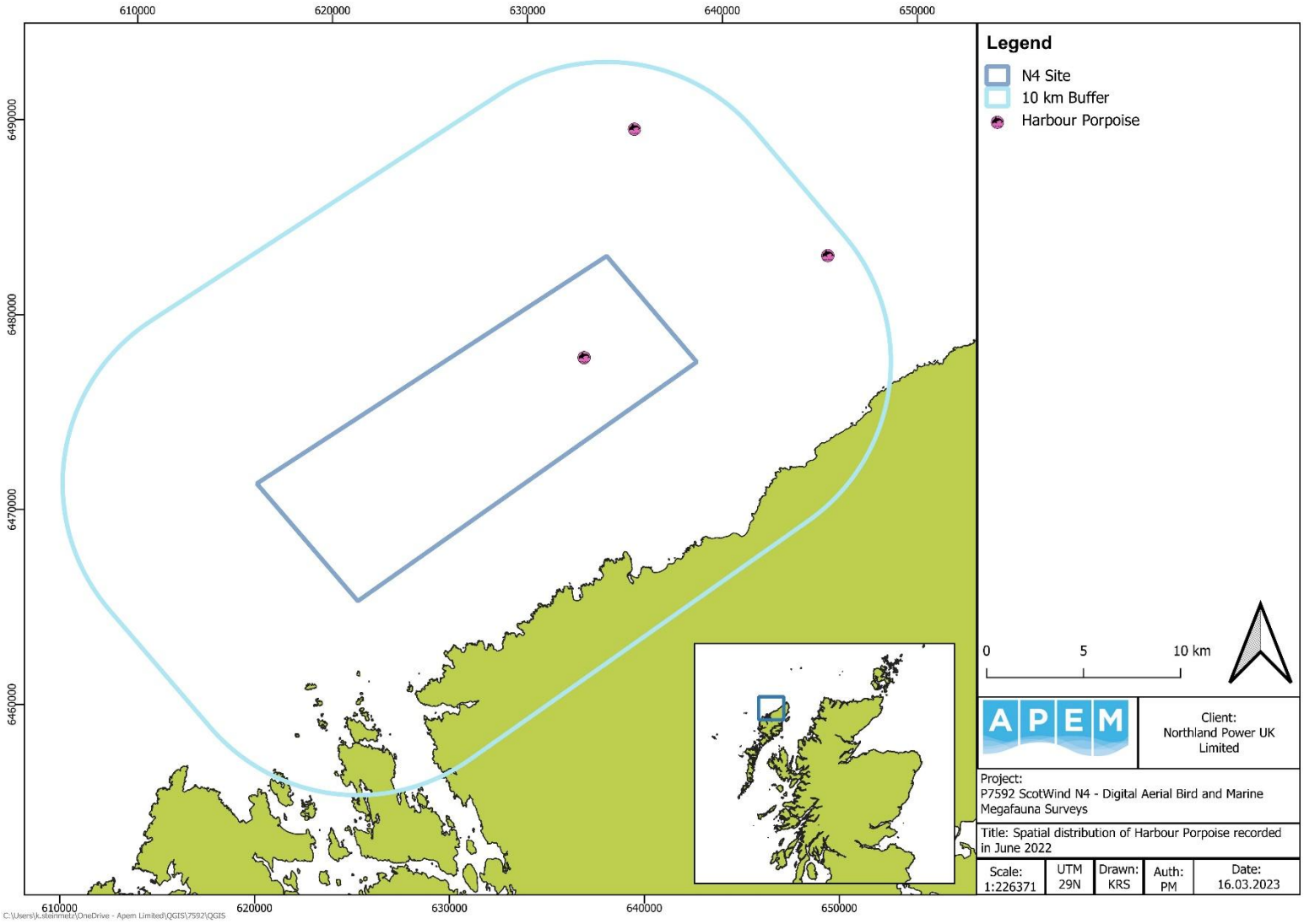


Figure 521 Distribution of harbour porpoise in June 2022
*Note that individuals in close proximity may appear overlaying.

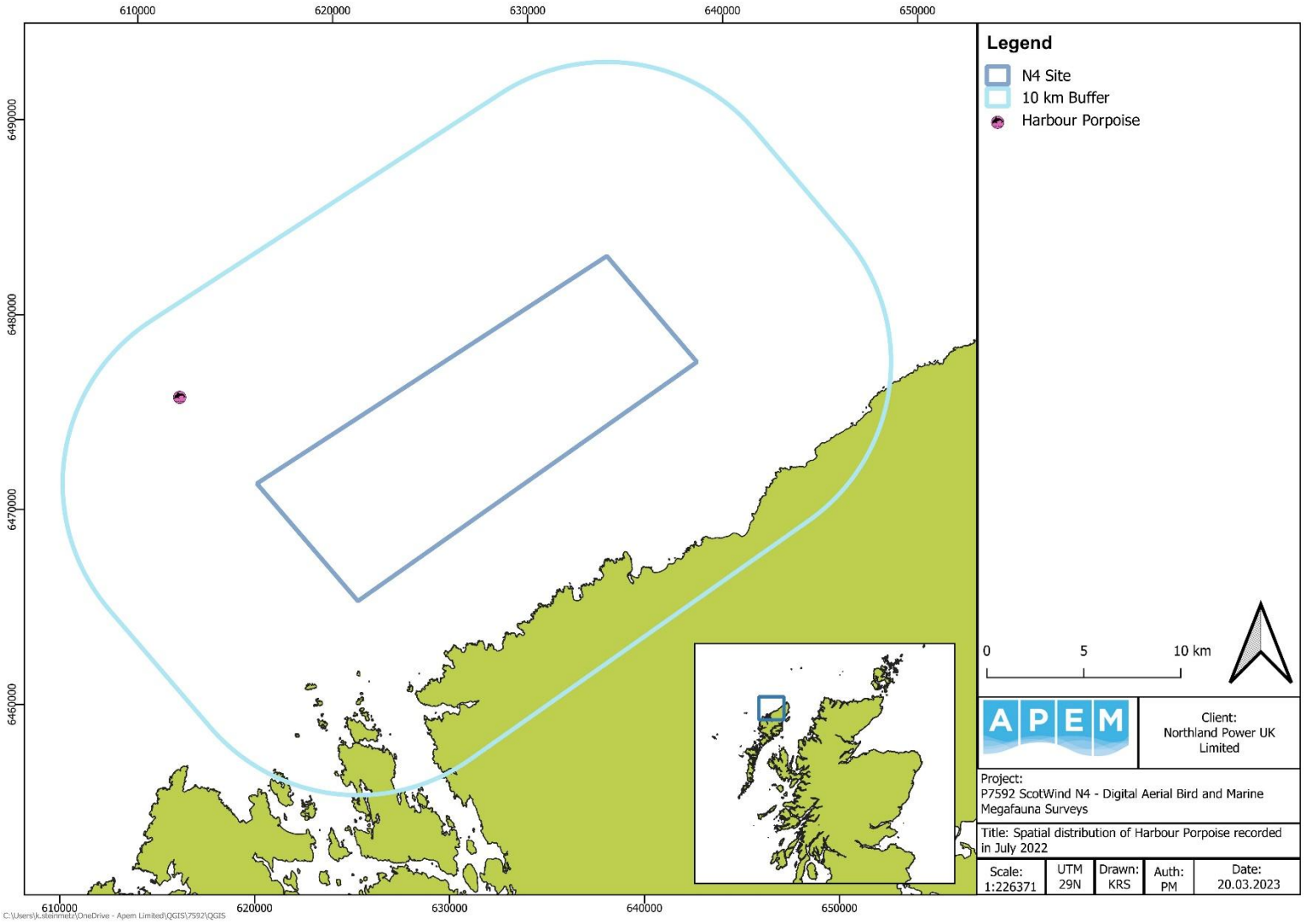


Figure 522 Distribution of harbour porpoise in July 2022
*Note that individuals in close proximity may appear overlaying.

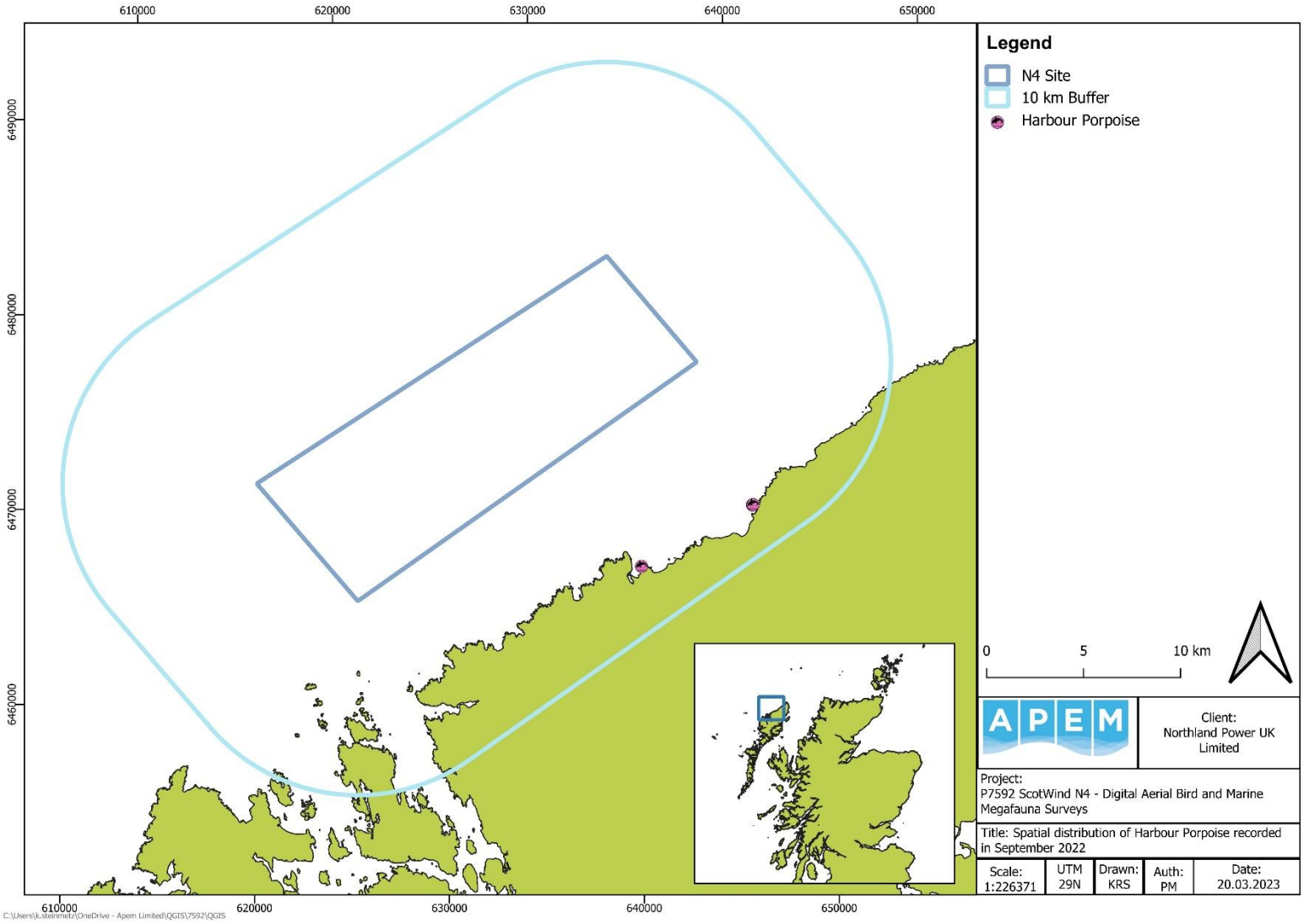


Figure 523 Distribution of harbour porpoise in September 2022
*Note that individuals in close proximity may appear overlaying.

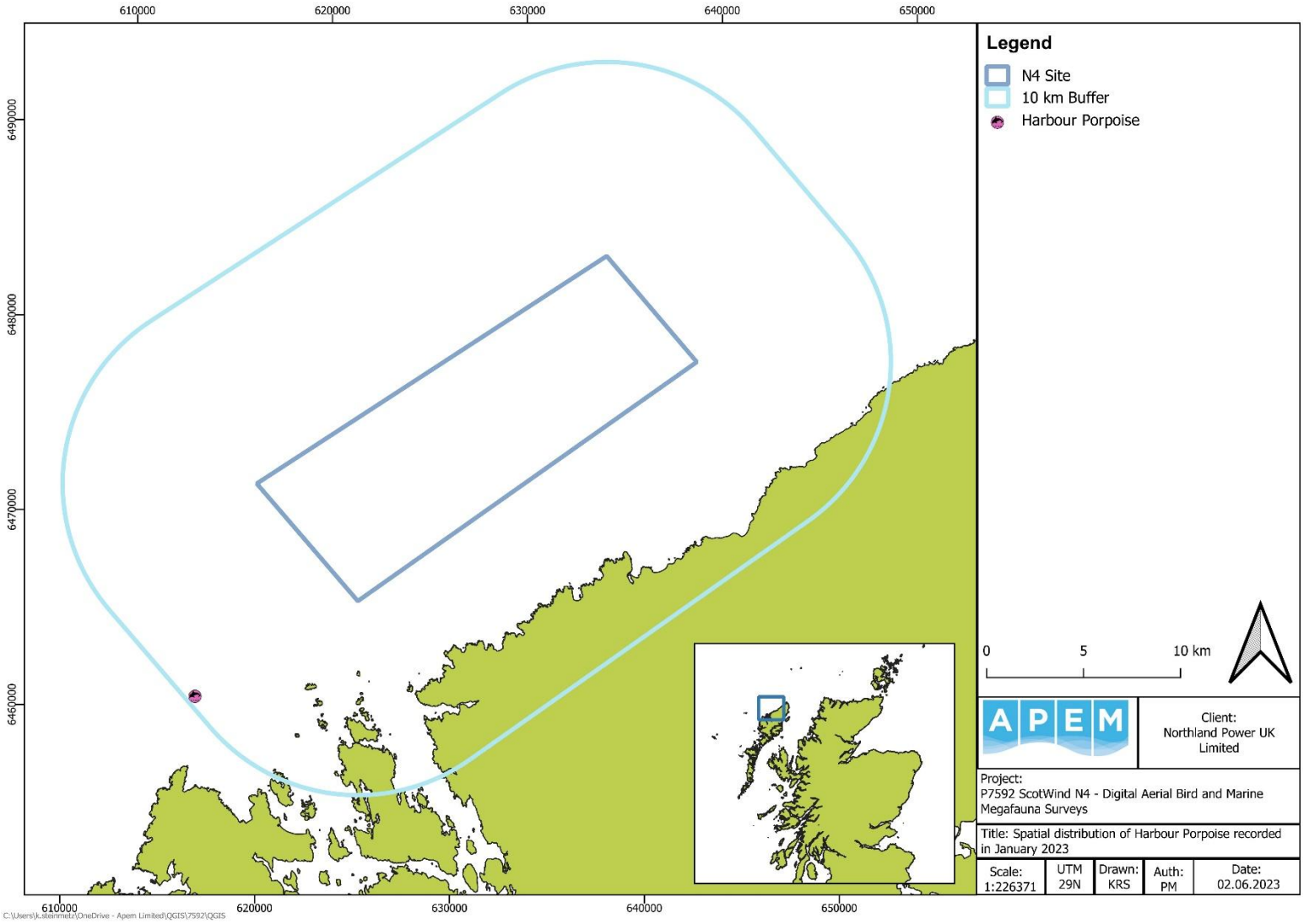


Figure 524 Distribution of harbour porpoise in January 2023
*Note that individuals in close proximity may appear overlaying.

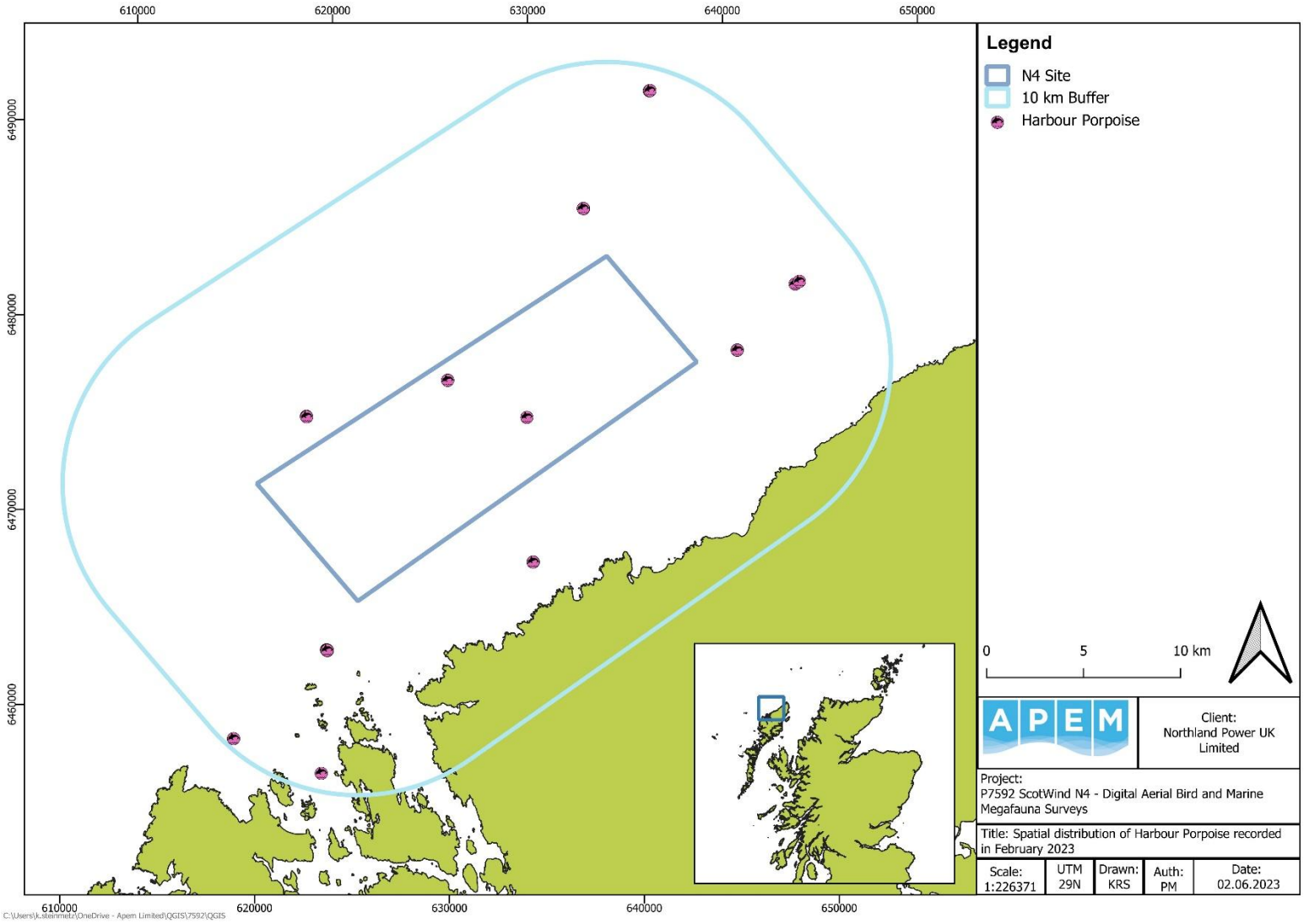


Figure 525 Distribution of harbour porpoise in February 2023
*Note that individuals in close proximity may appear overlaying.

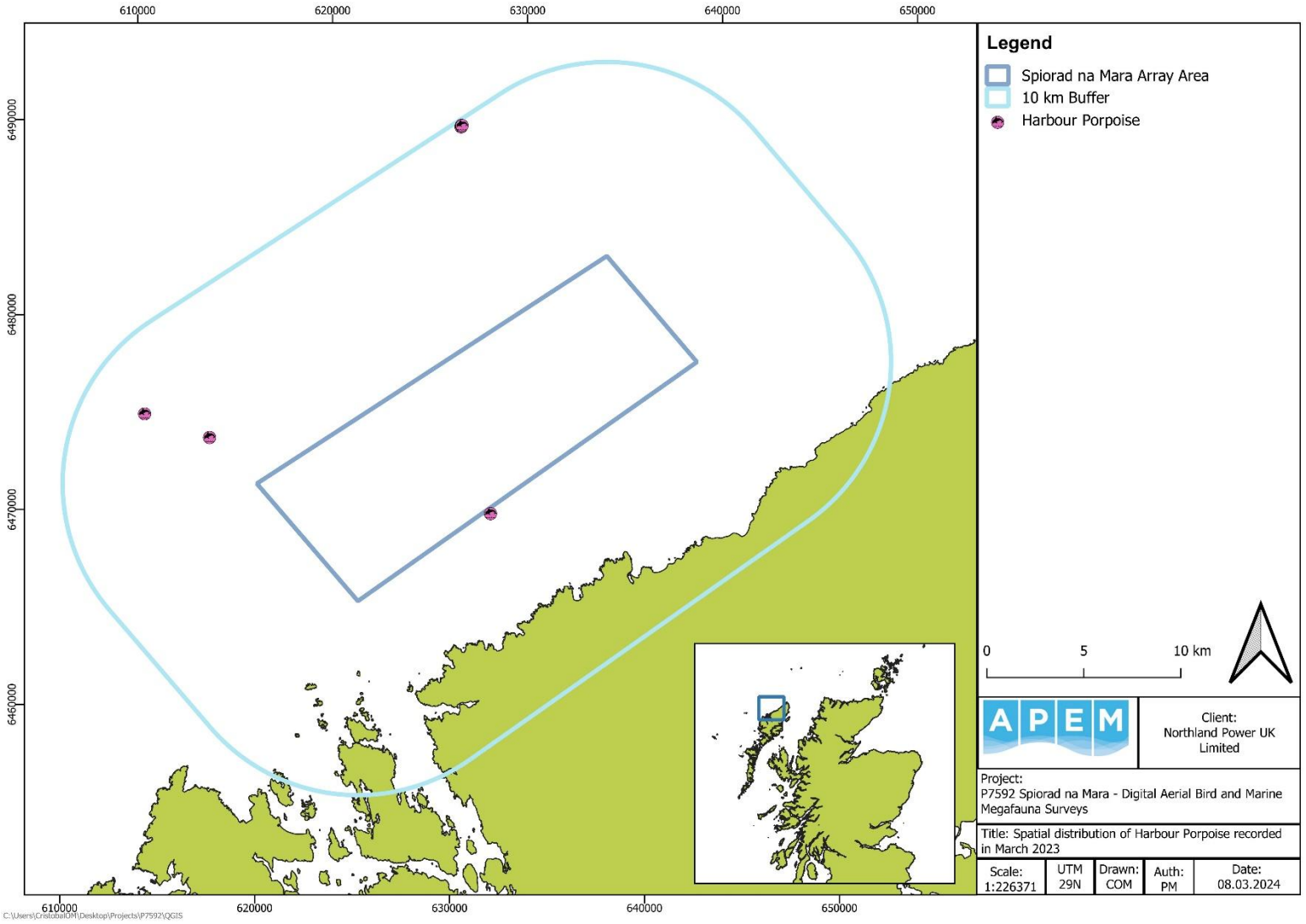


Figure 526 Distribution of harbour porpoise in March 2023

*Note that individuals in close proximity may appear overlaying.

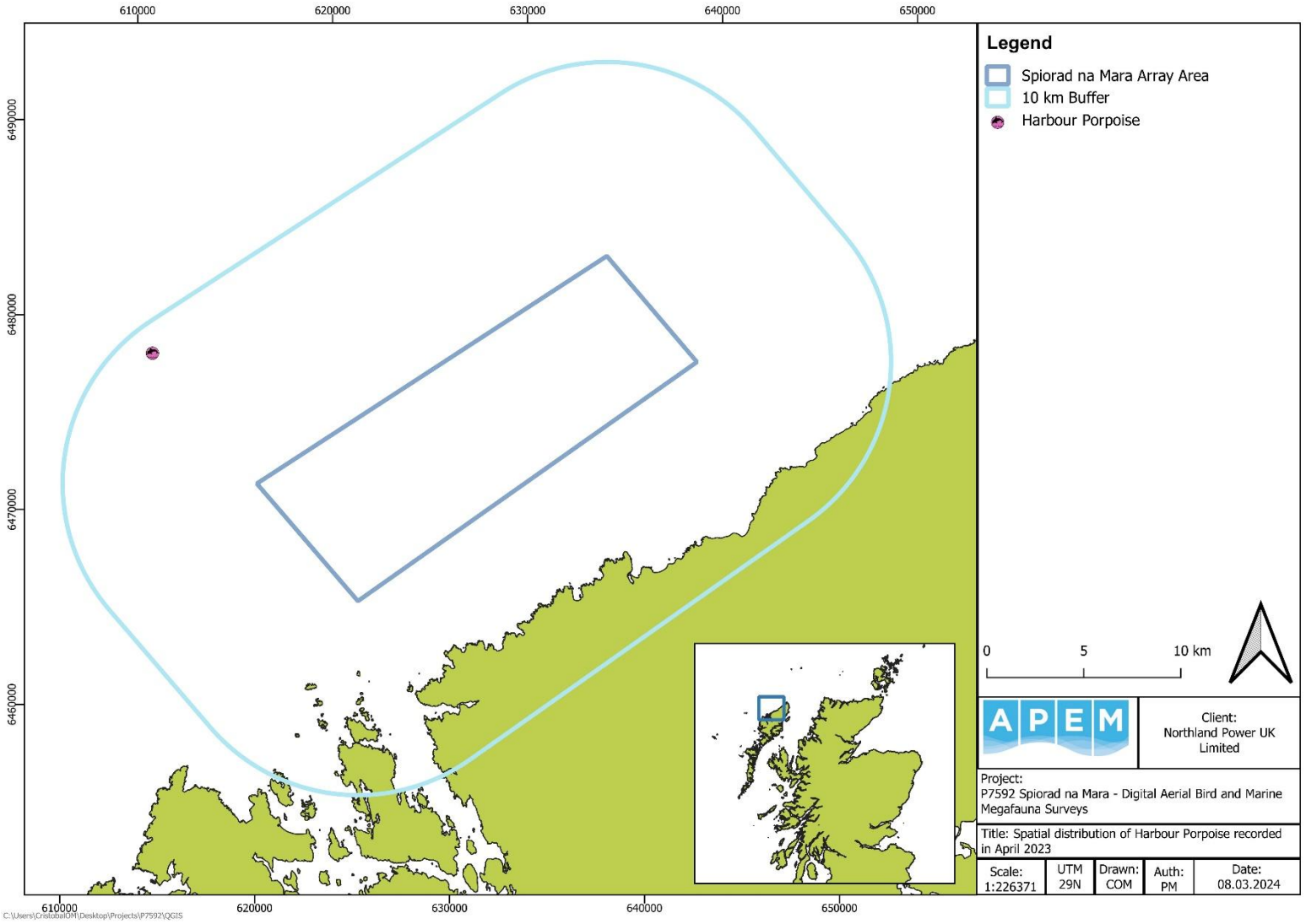


Figure 527 Distribution of harbour porpoise in April 2023
*Note that individuals in close proximity may appear overlaying.

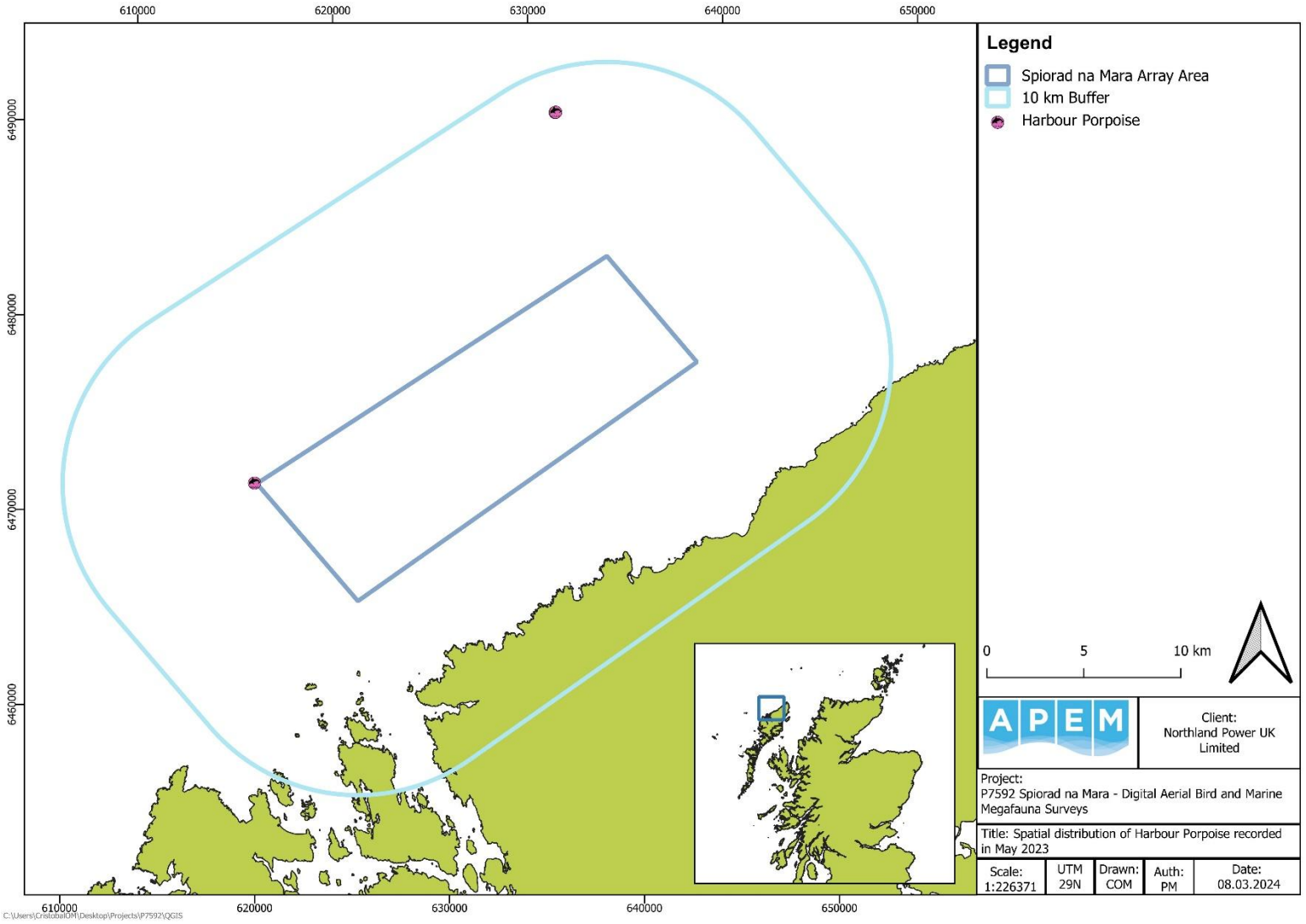


Figure 528 Distribution of harbour porpoise in May 2023

*Note that individuals in close proximity may appear overlaying.

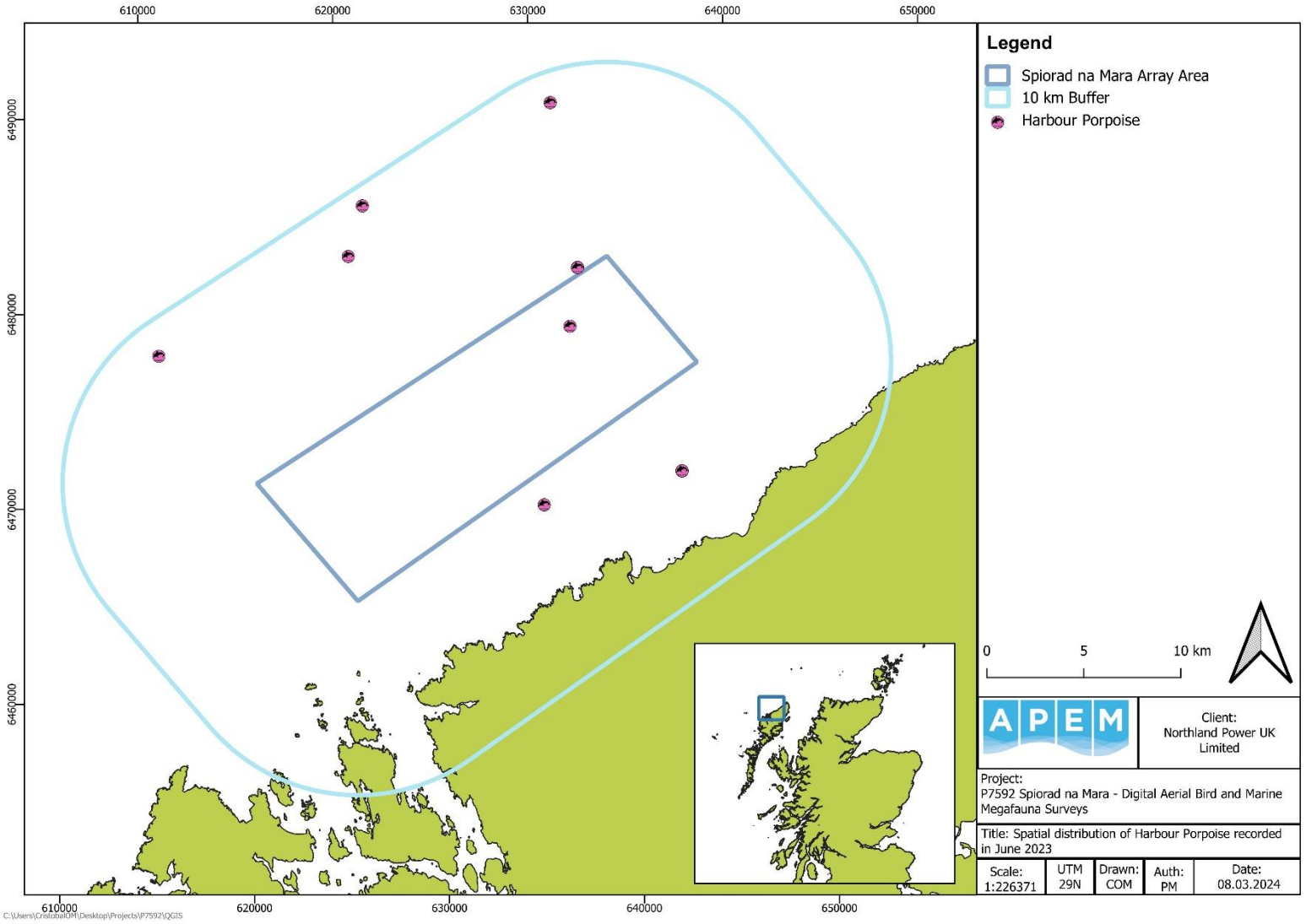


Figure 529 Distribution of harbour porpoise in June 2023

*Note that individuals in close proximity may appear overlaying.

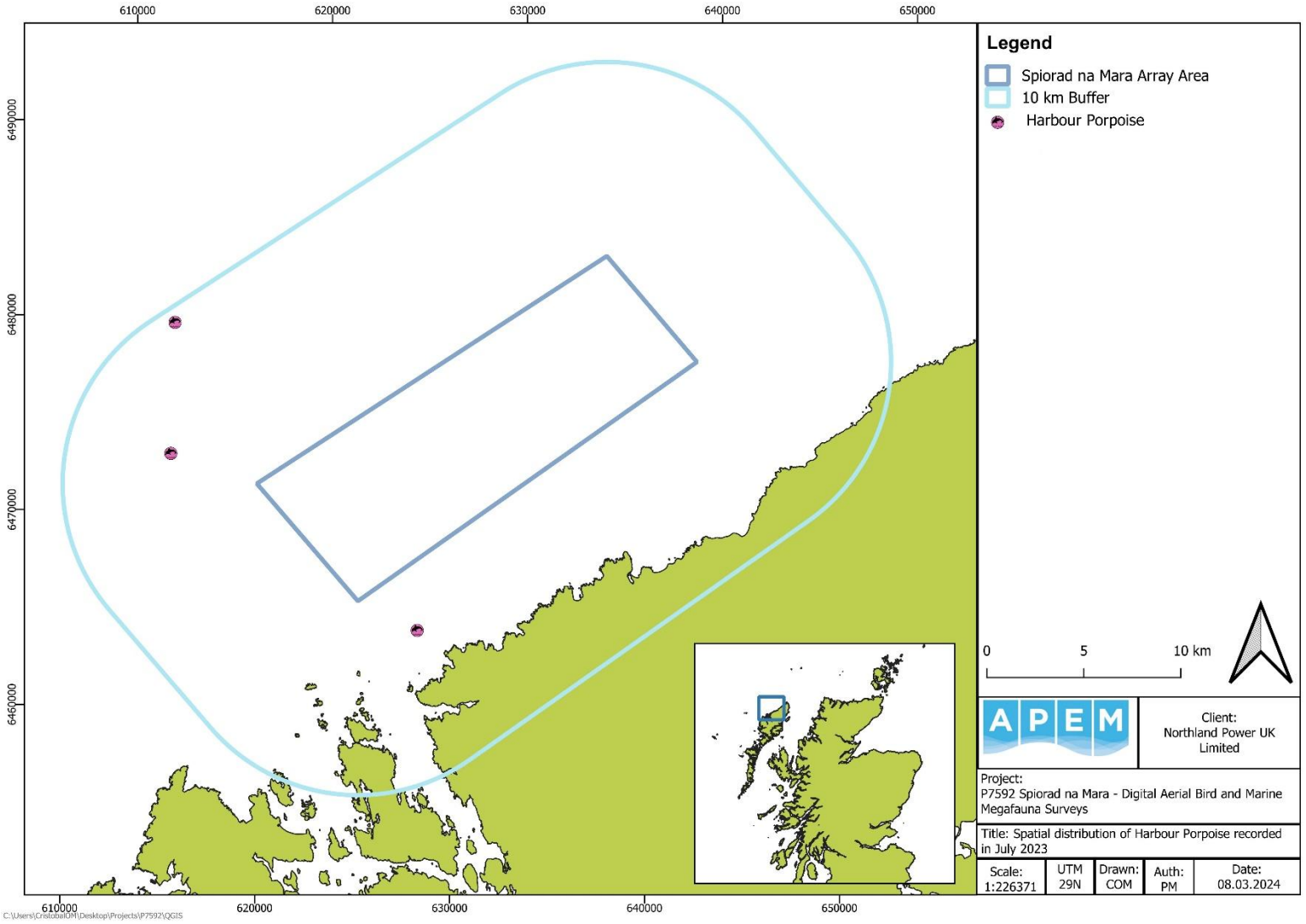


Figure 530 Distribution of harbour porpoise in July 2023

*Note that individuals in close proximity may appear overlaying.

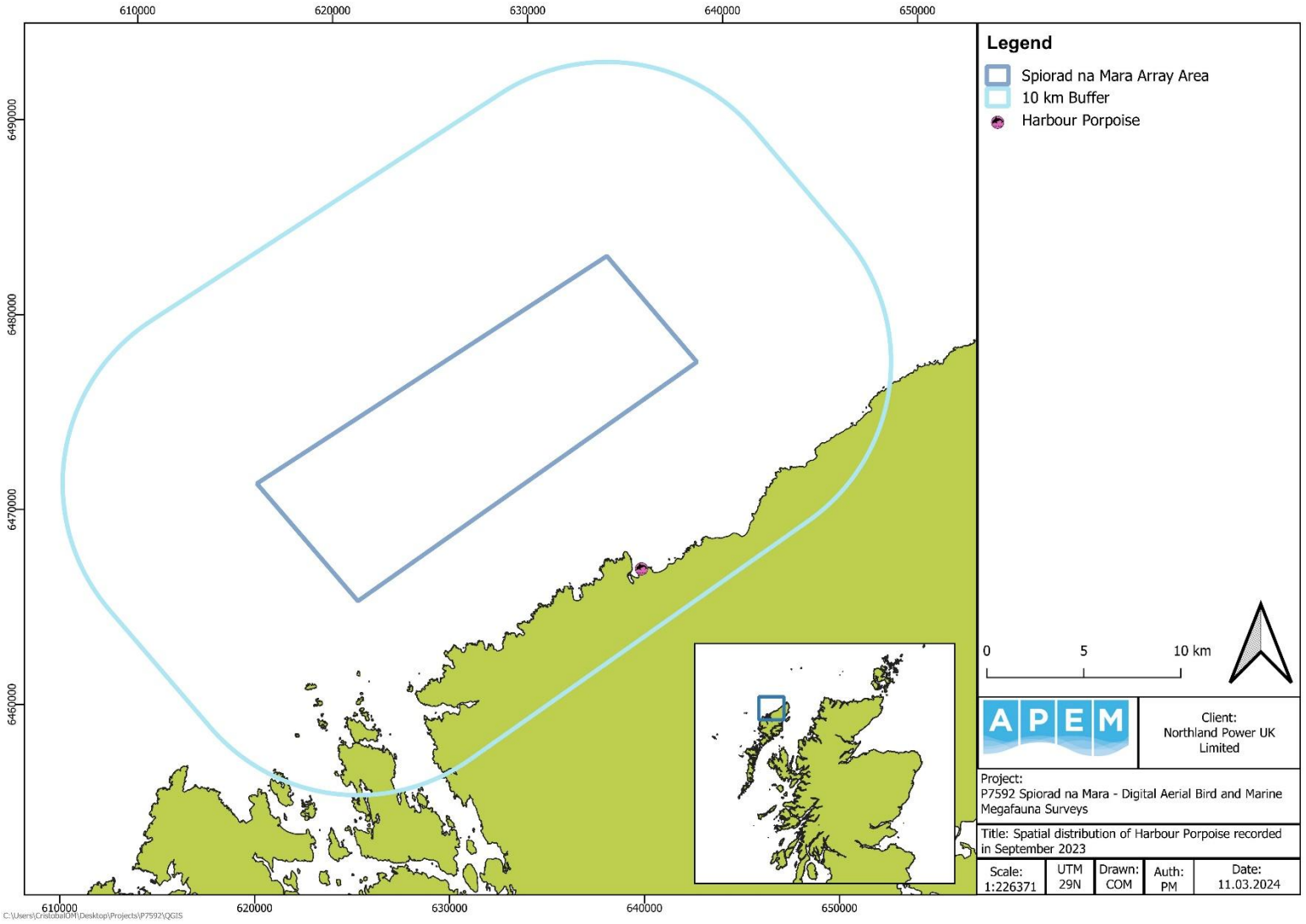


Figure 531 Distribution of harbour porpoise in September 2023

*Note that individuals in close proximity may appear overlaying.

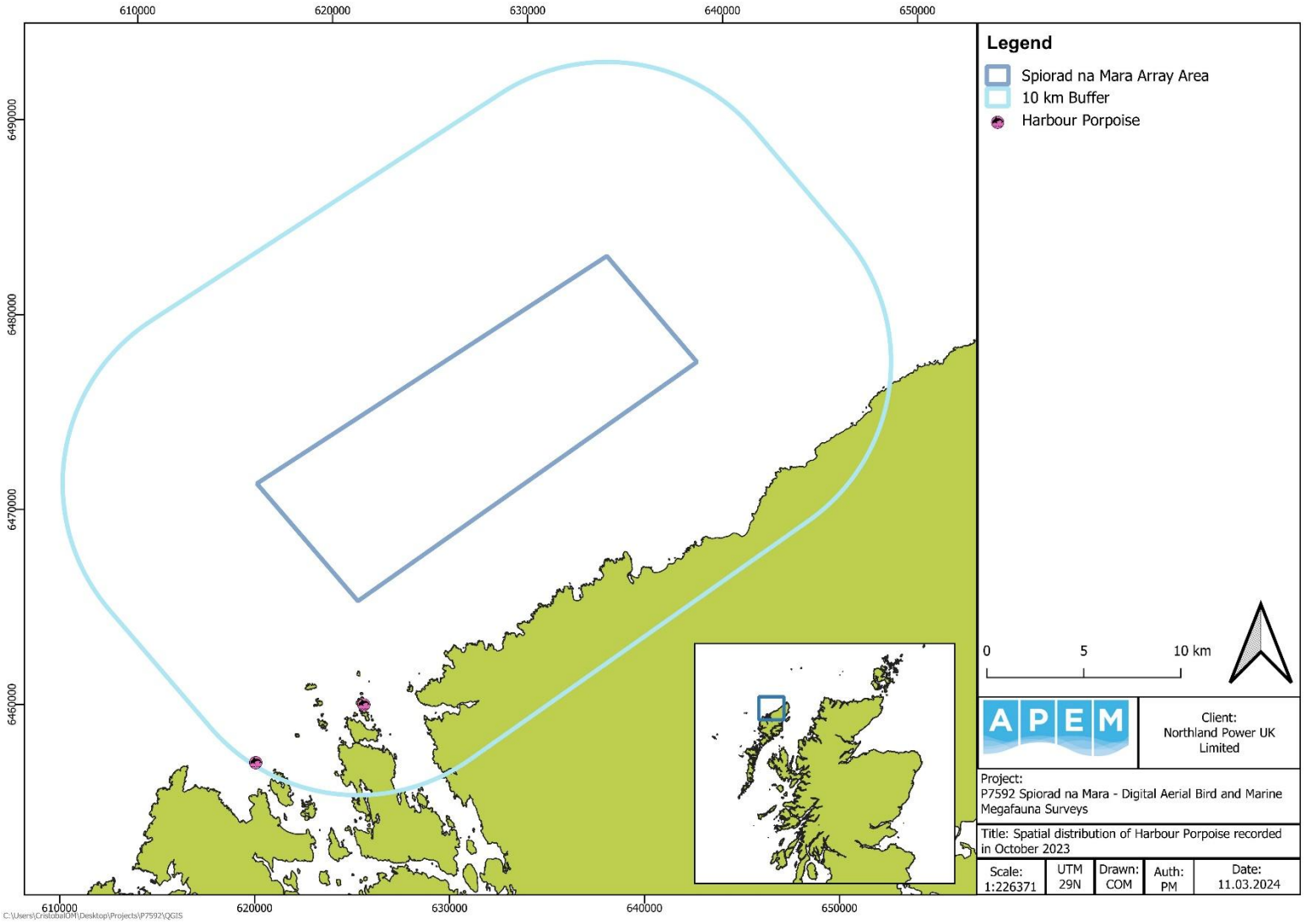


Figure 532 Distribution of harbour porpoise in October 2023

*Note that individuals in close proximity may appear overlaying.

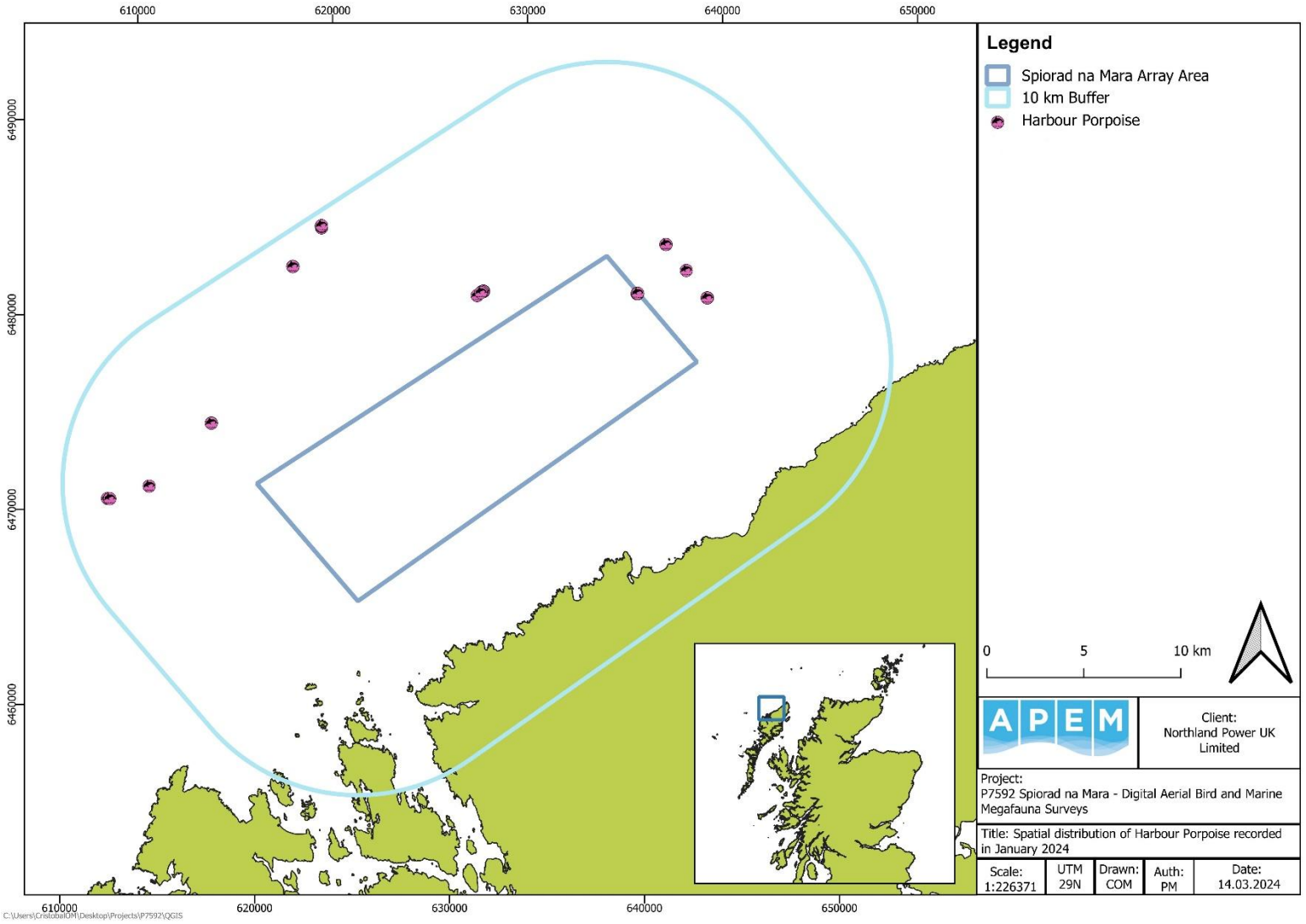


Figure 533 Distribution of harbour porpoise in January 2024

*Note that individuals in close proximity may appear overlaying.

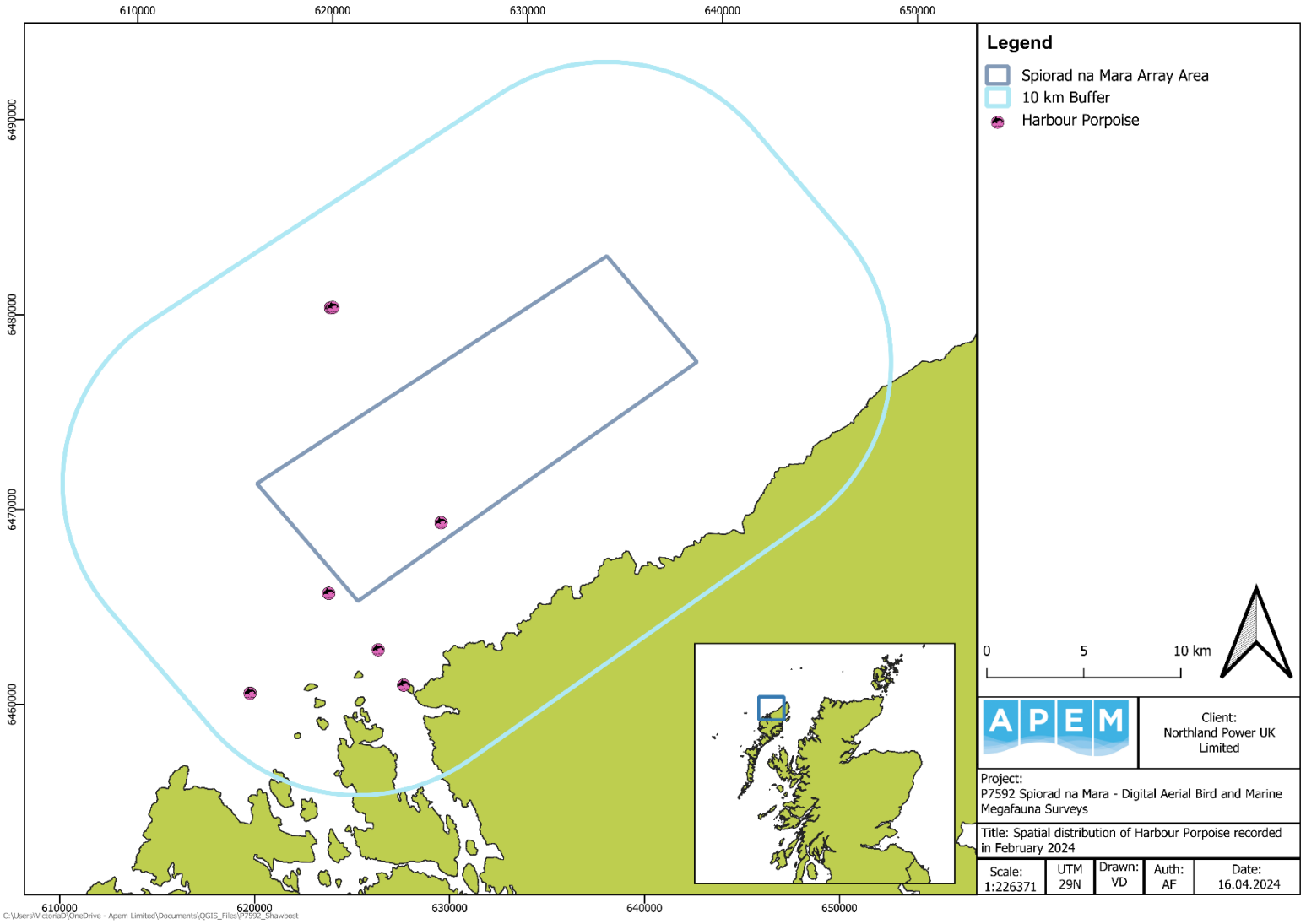


Figure 534 Distribution of harbour porpoise in February 2024

*Note that individuals in close proximity may appear overlaying.

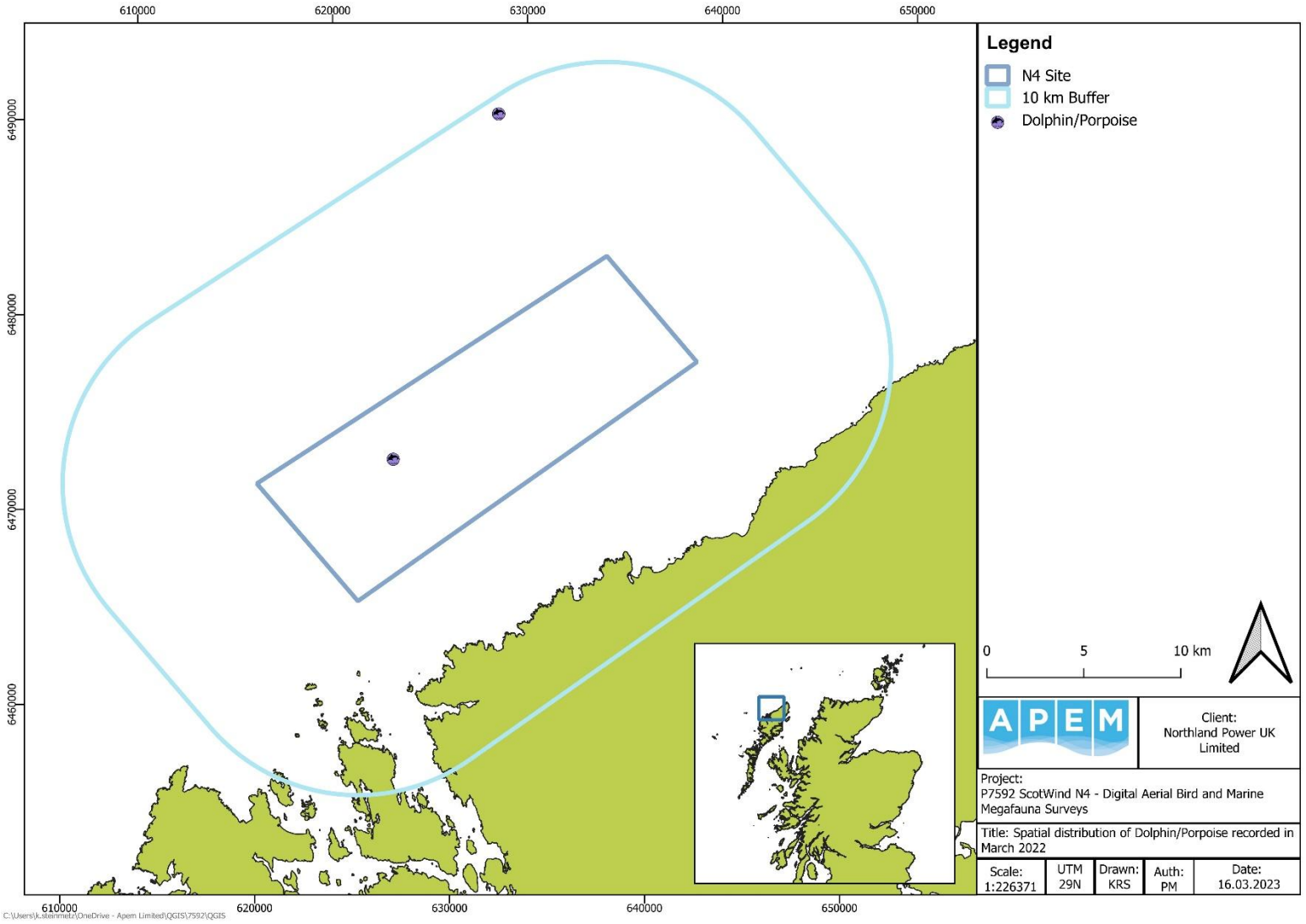


Figure 535 Distribution of dolphin / porpoise species in March 2022

*Note that individuals in close proximity may appear overlaying.

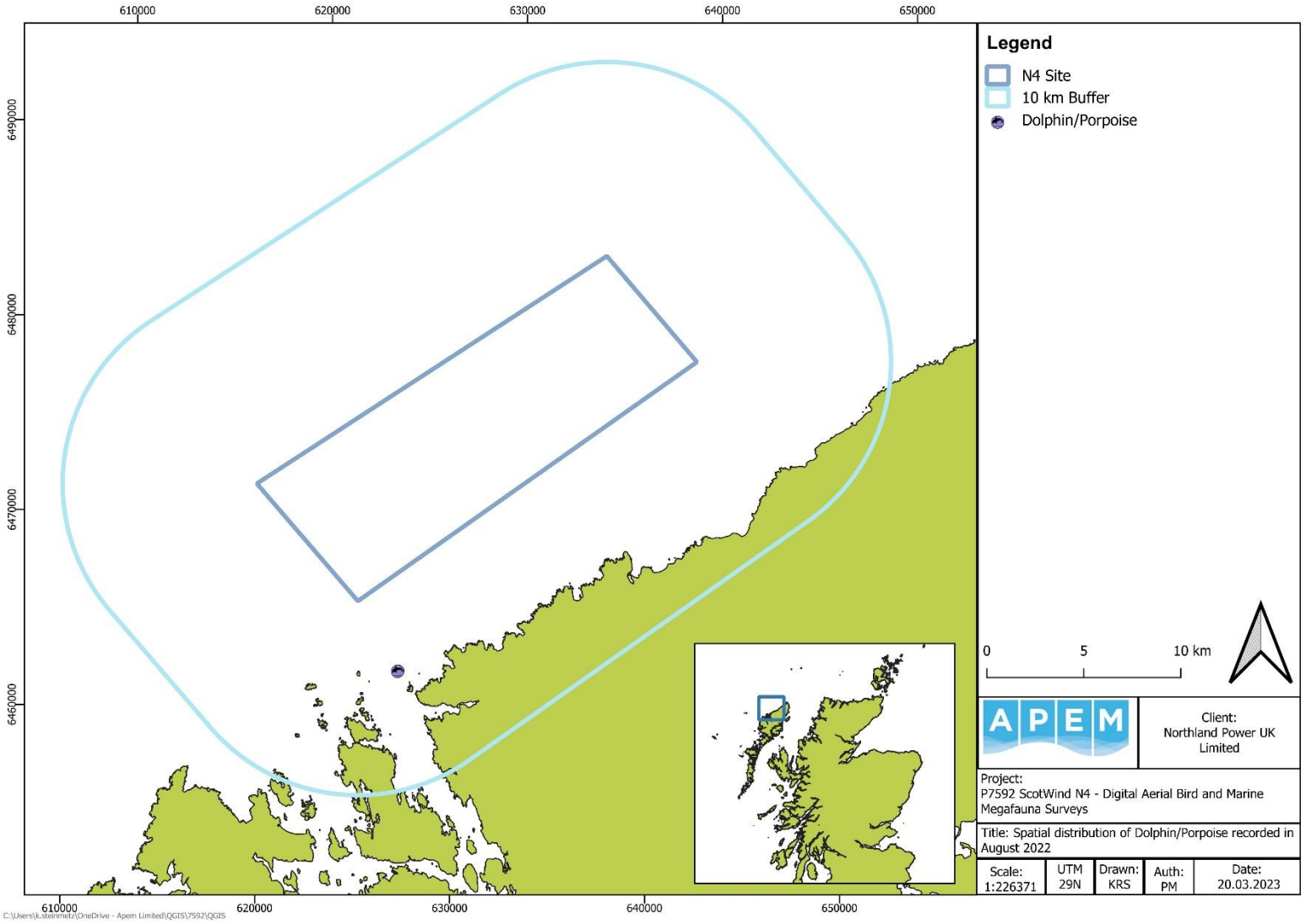


Figure 536 Distribution of dolphin / porpoise species in August 2022
*Note that individuals in close proximity may appear overlaying.

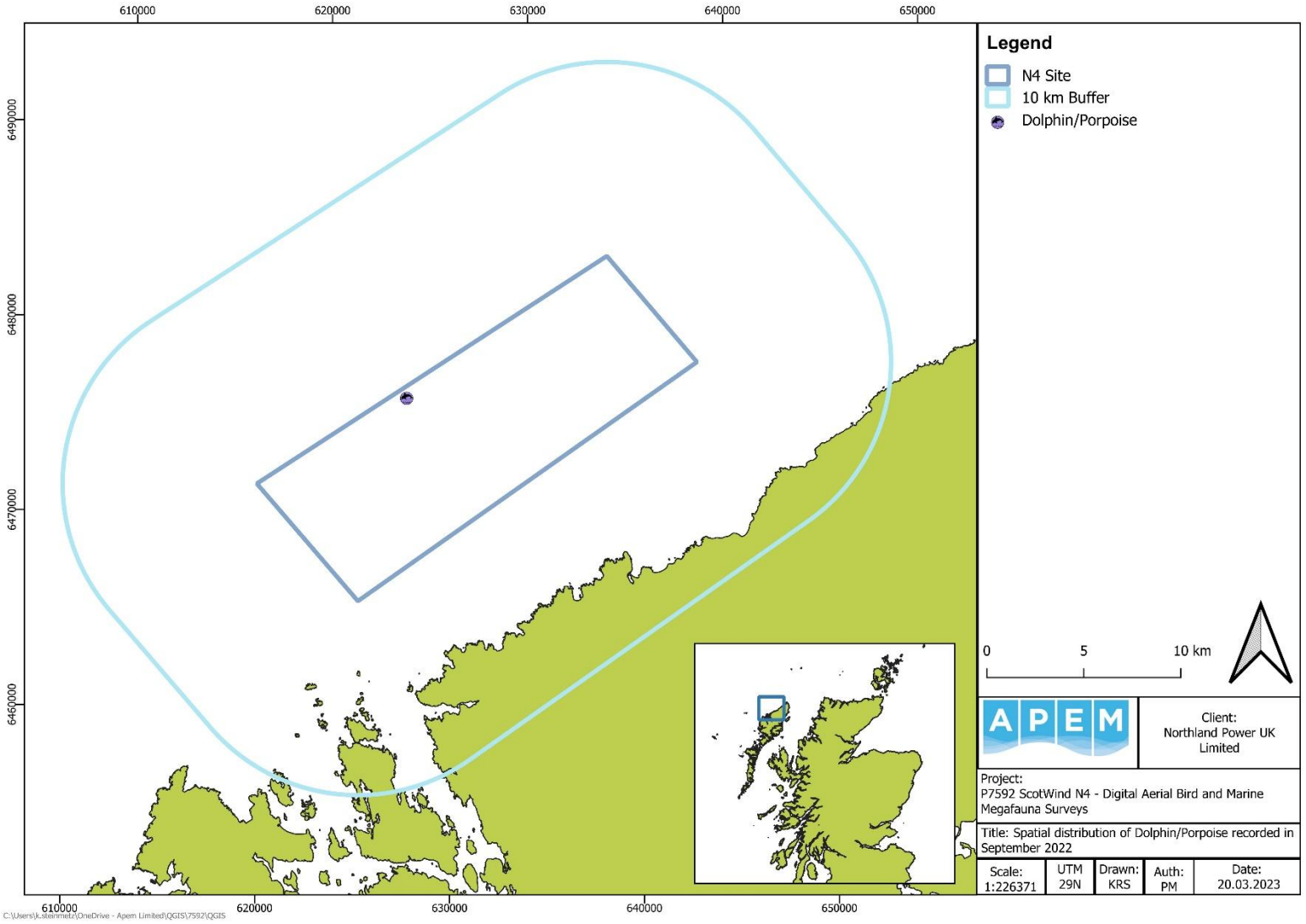


Figure 537 Distribution of dolphin / porpoise species in September 2022
*Note that individuals in close proximity may appear overlaying.

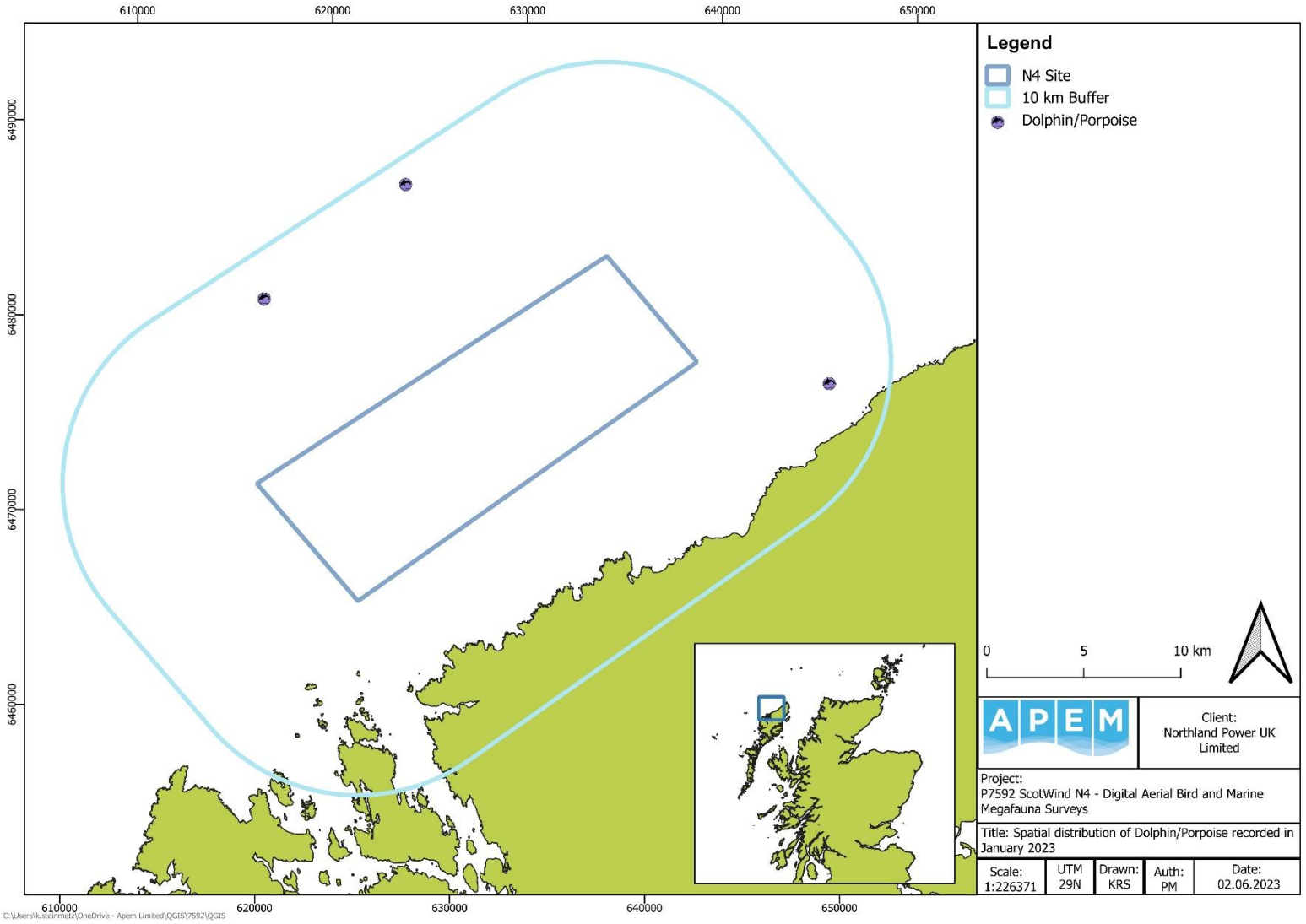


Figure 538 Distribution of dolphin / porpoise species in January 2023
*Note that individuals in close proximity may appear overlaying.

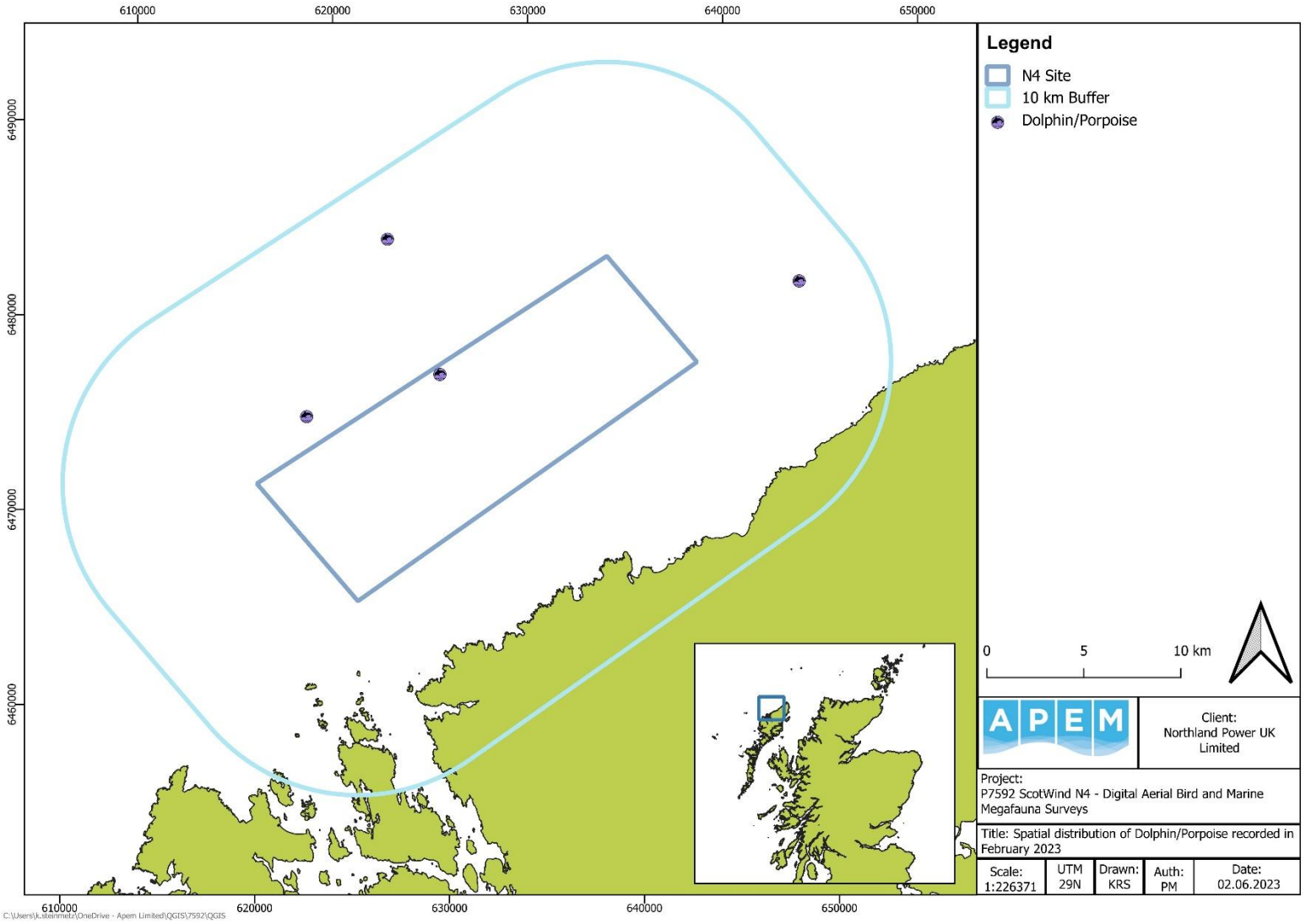


Figure 539 Distribution of dolphin / porpoise species in February 2023
*Note that individuals in close proximity may appear overlaying.

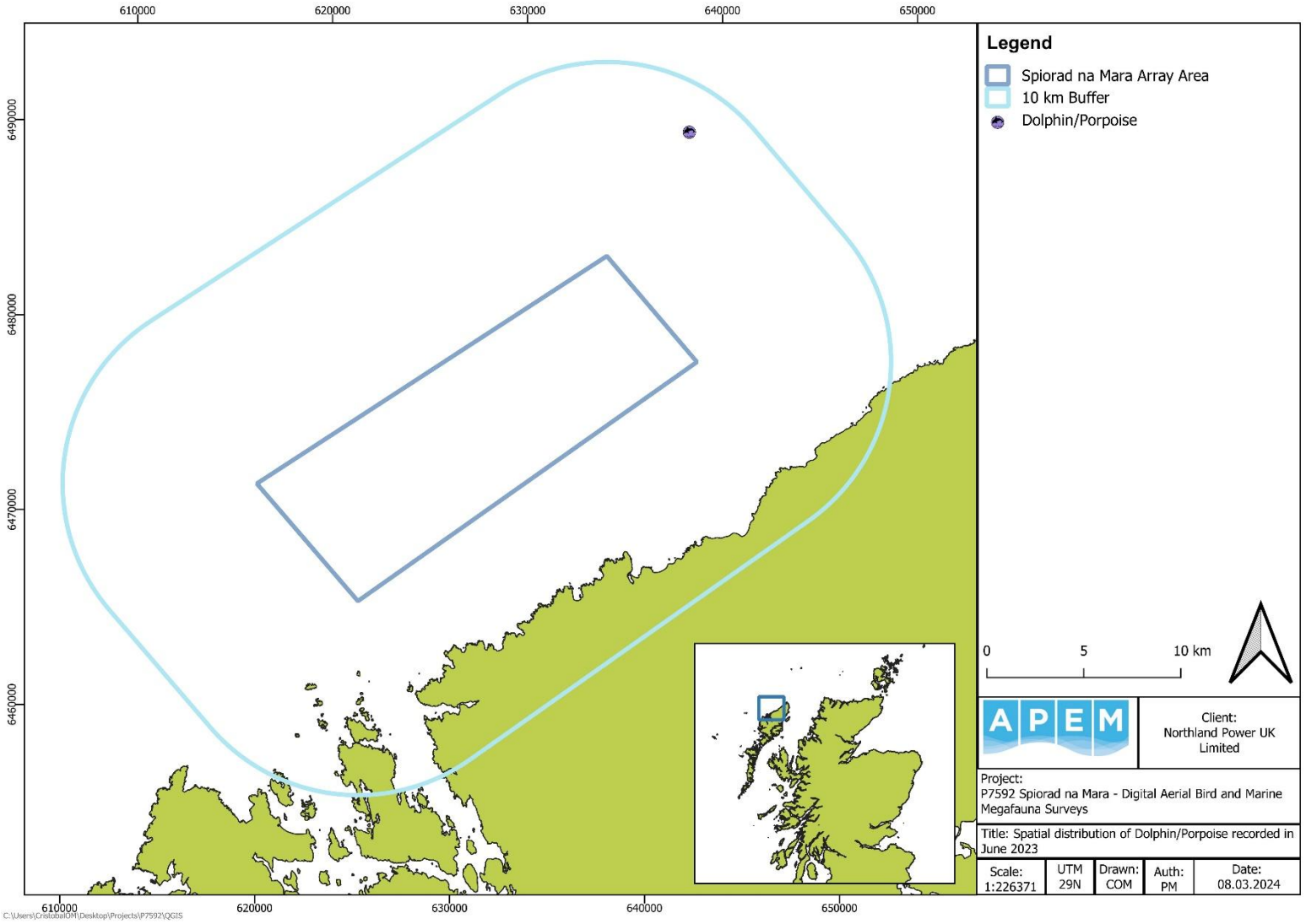


Figure 540 Distribution of dolphin / porpoise species in June 2023

*Note that individuals in close proximity may appear overlaying.

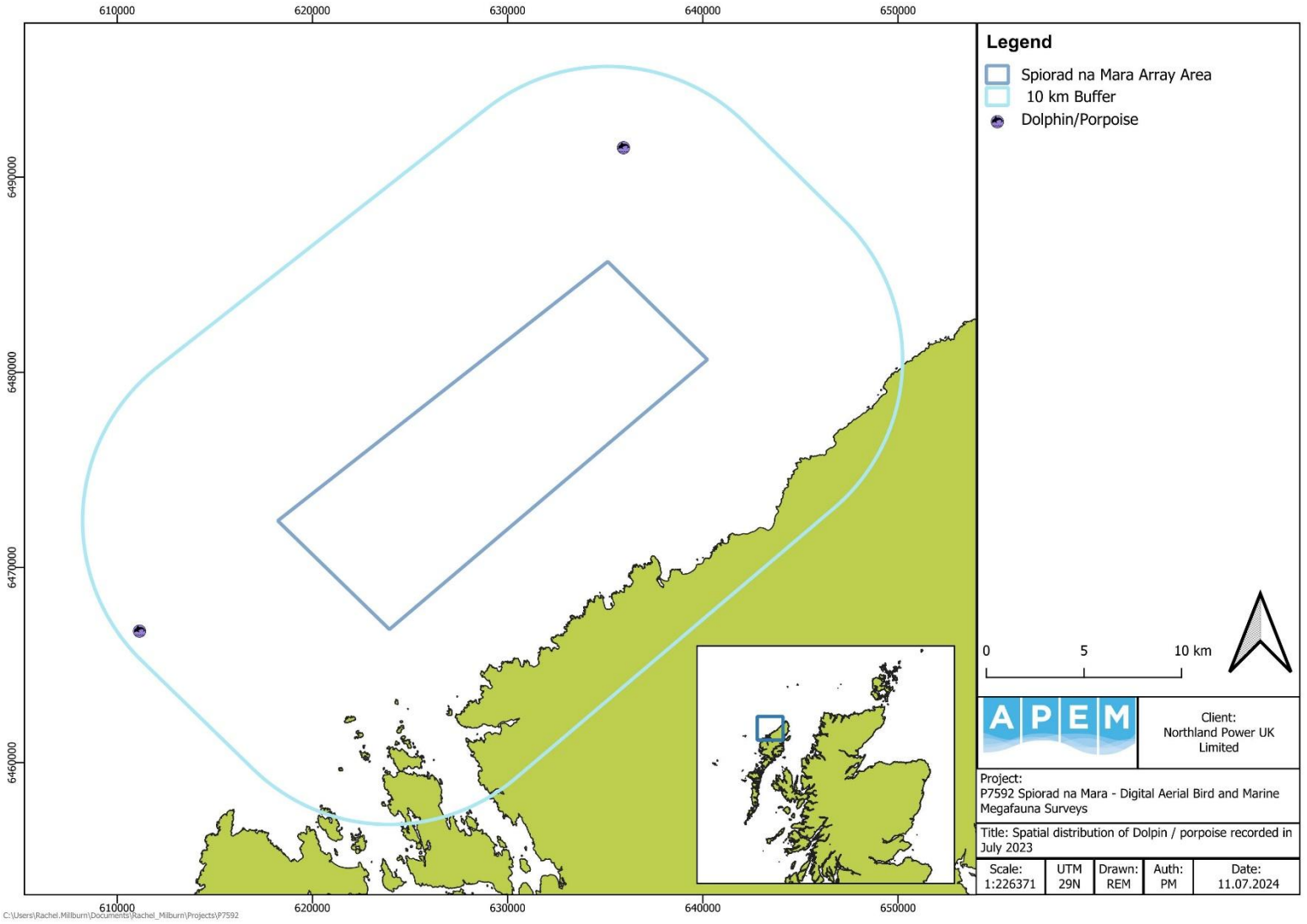


Figure 541 Distribution of dolphin / porpoise species in July 2023

*Note that individuals in close proximity may appear overlaying.

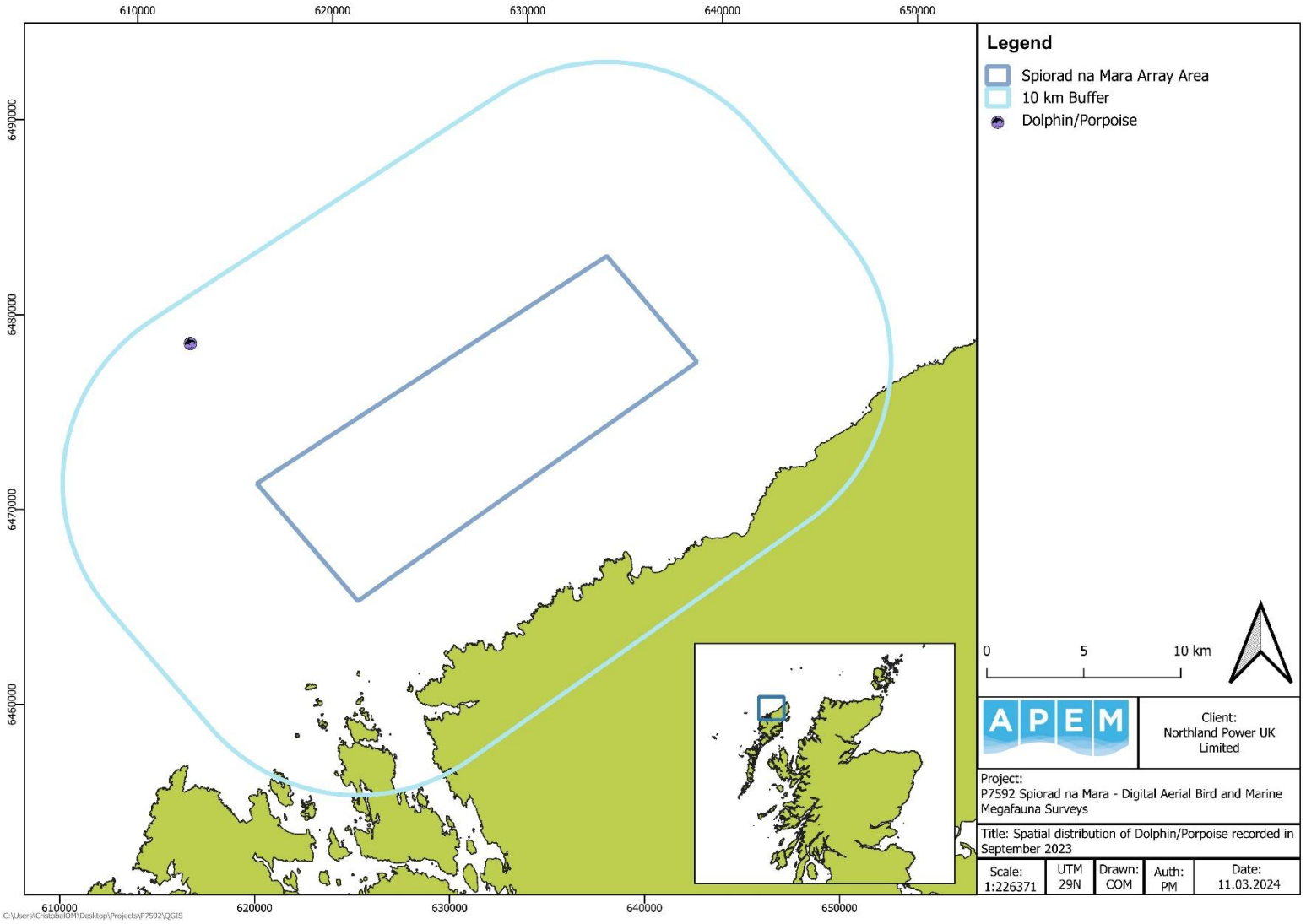


Figure 542 Distribution of dolphin / porpoise species in September 2023
*Note that individuals in close proximity may appear overlaying.

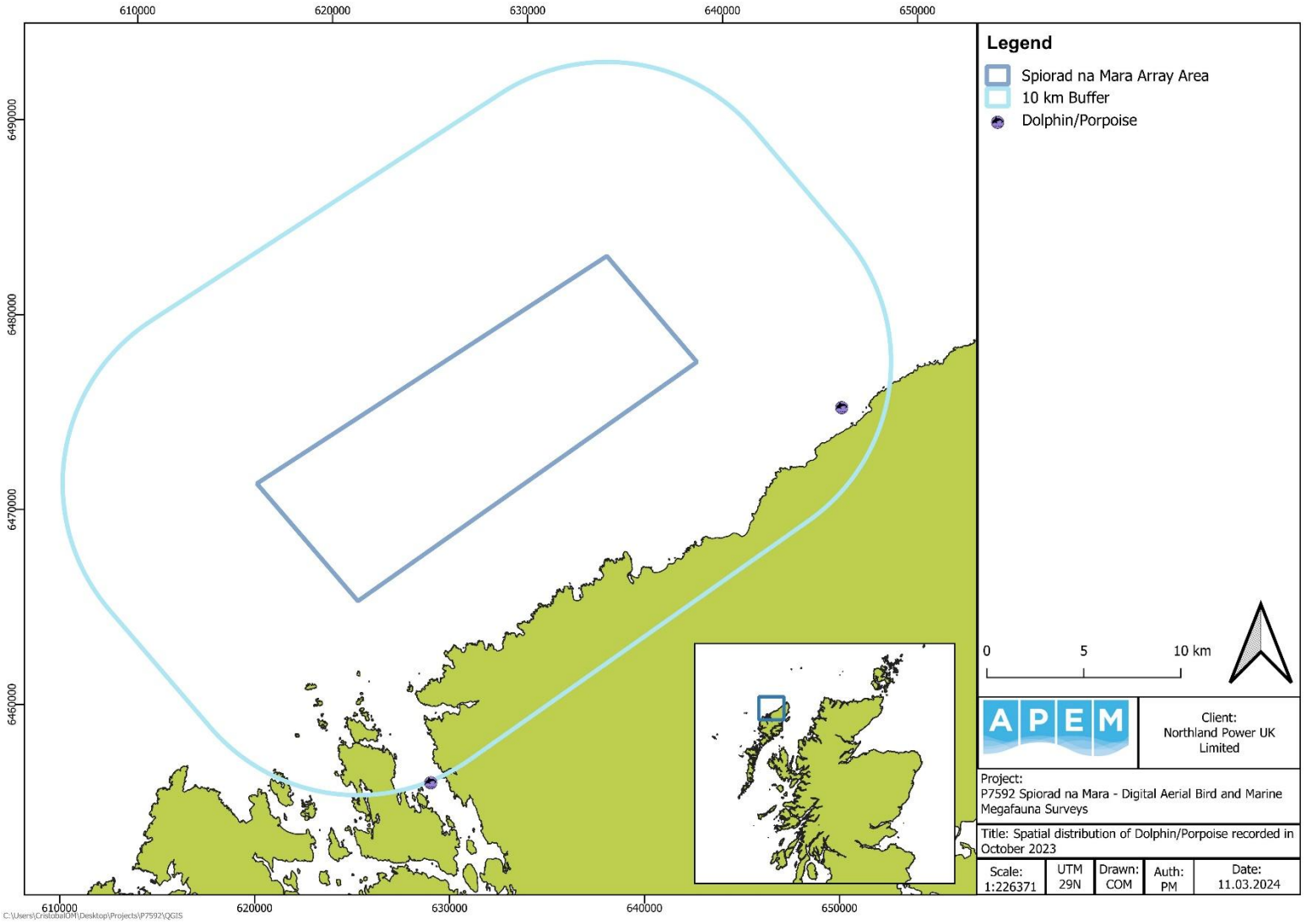


Figure 543 Distribution of dolphin / porpoise species in October 2023
*Note that individuals in close proximity may appear overlaying.

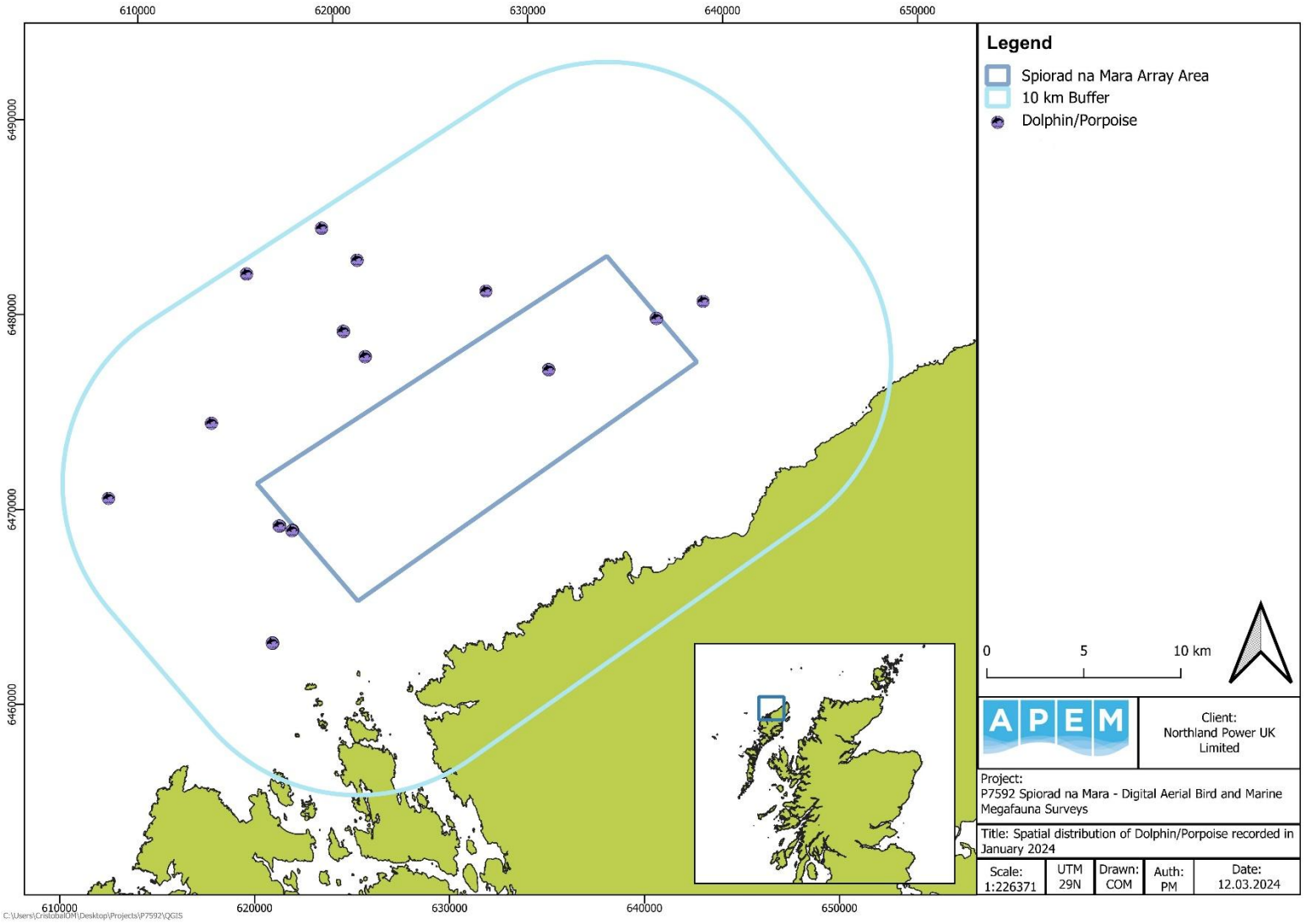


Figure 544 Distribution of dolphin / porpoise species in January 2024
*Note that individuals in close proximity may appear overlaying.

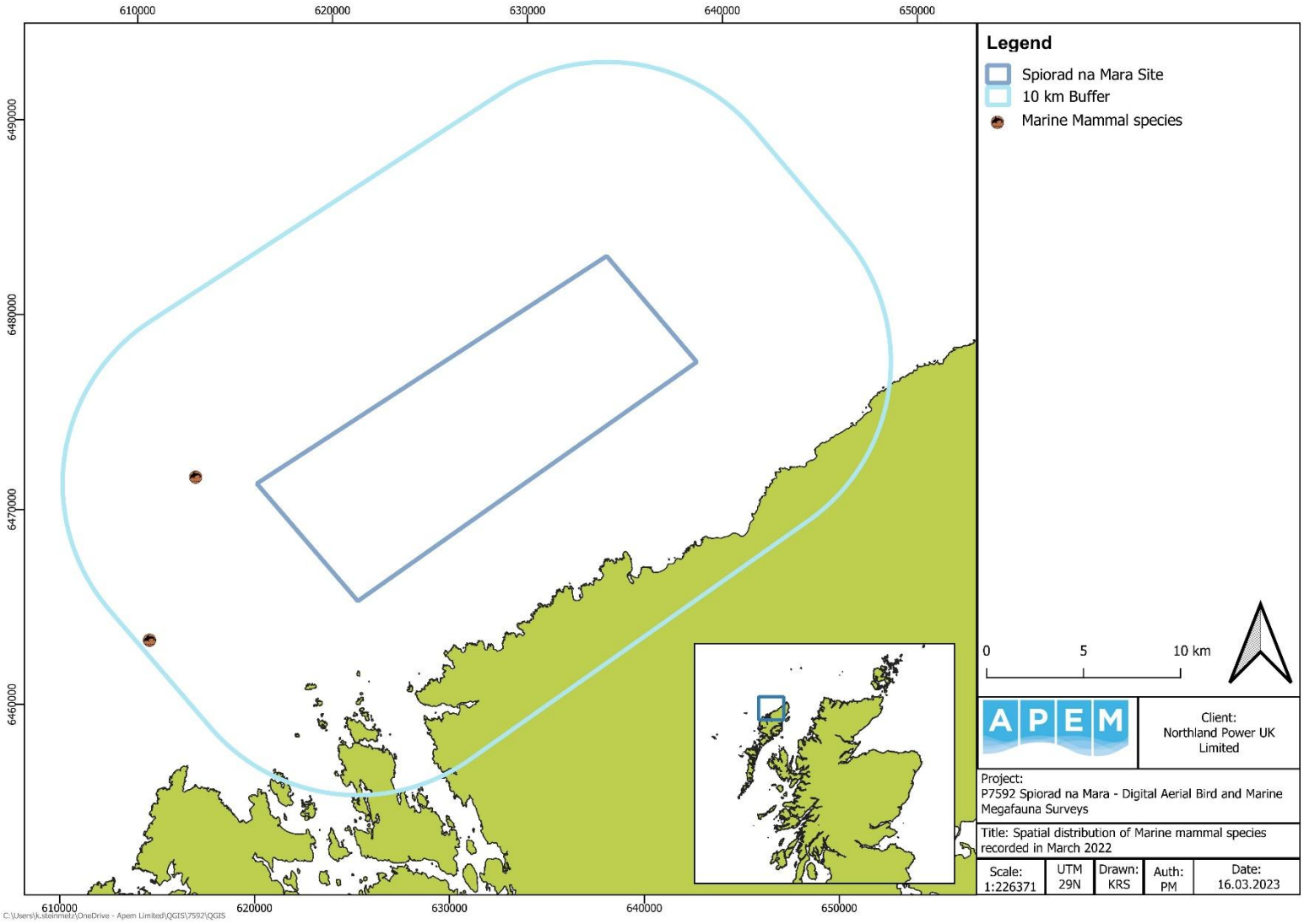


Figure 545 Distribution of marine mammal species in March 2022

*Note that individuals in close proximity may appear overlaying.

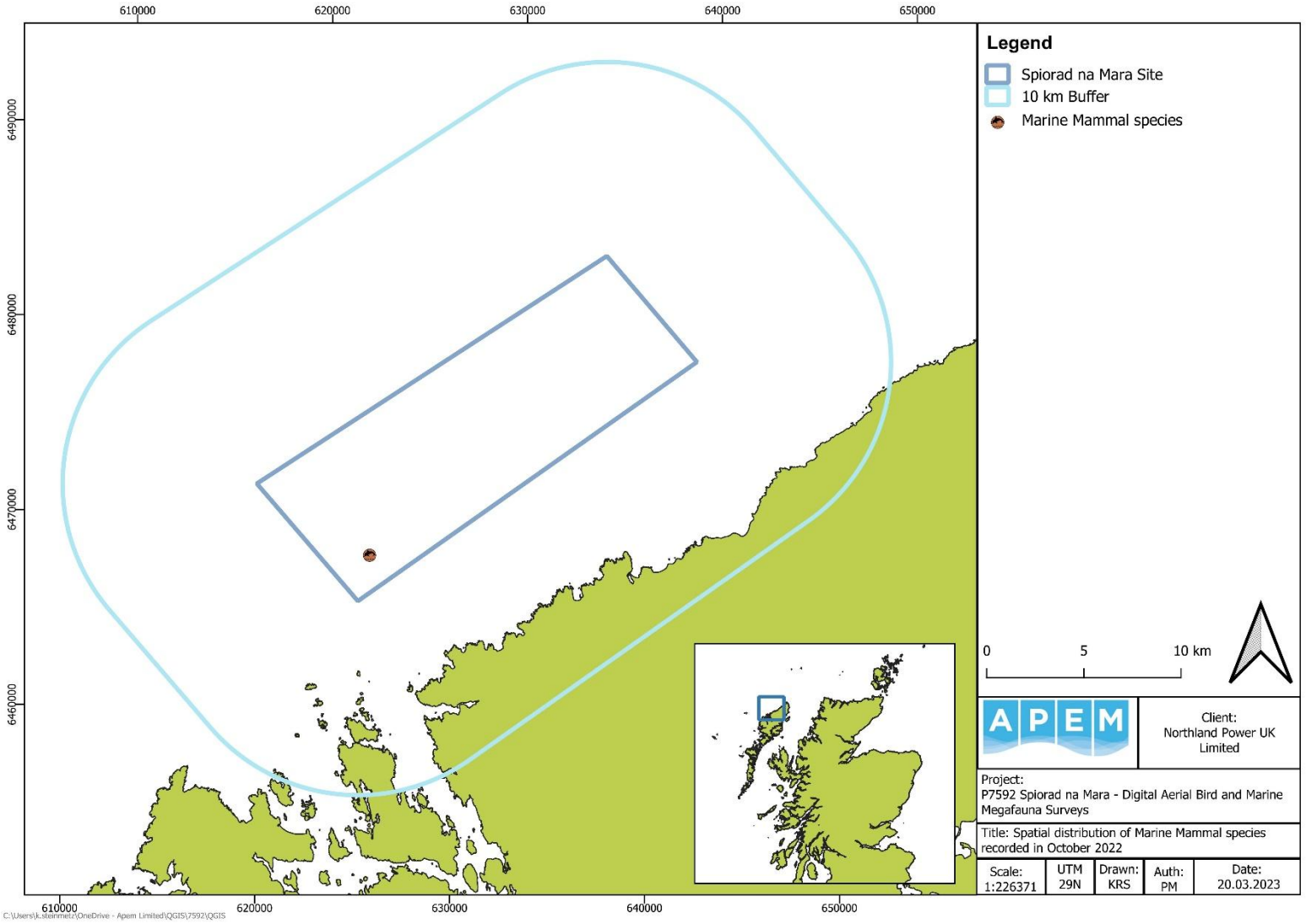


Figure 546 Distribution of marine mammal species in October 2022

*Note that individuals in close proximity may appear overlaying.

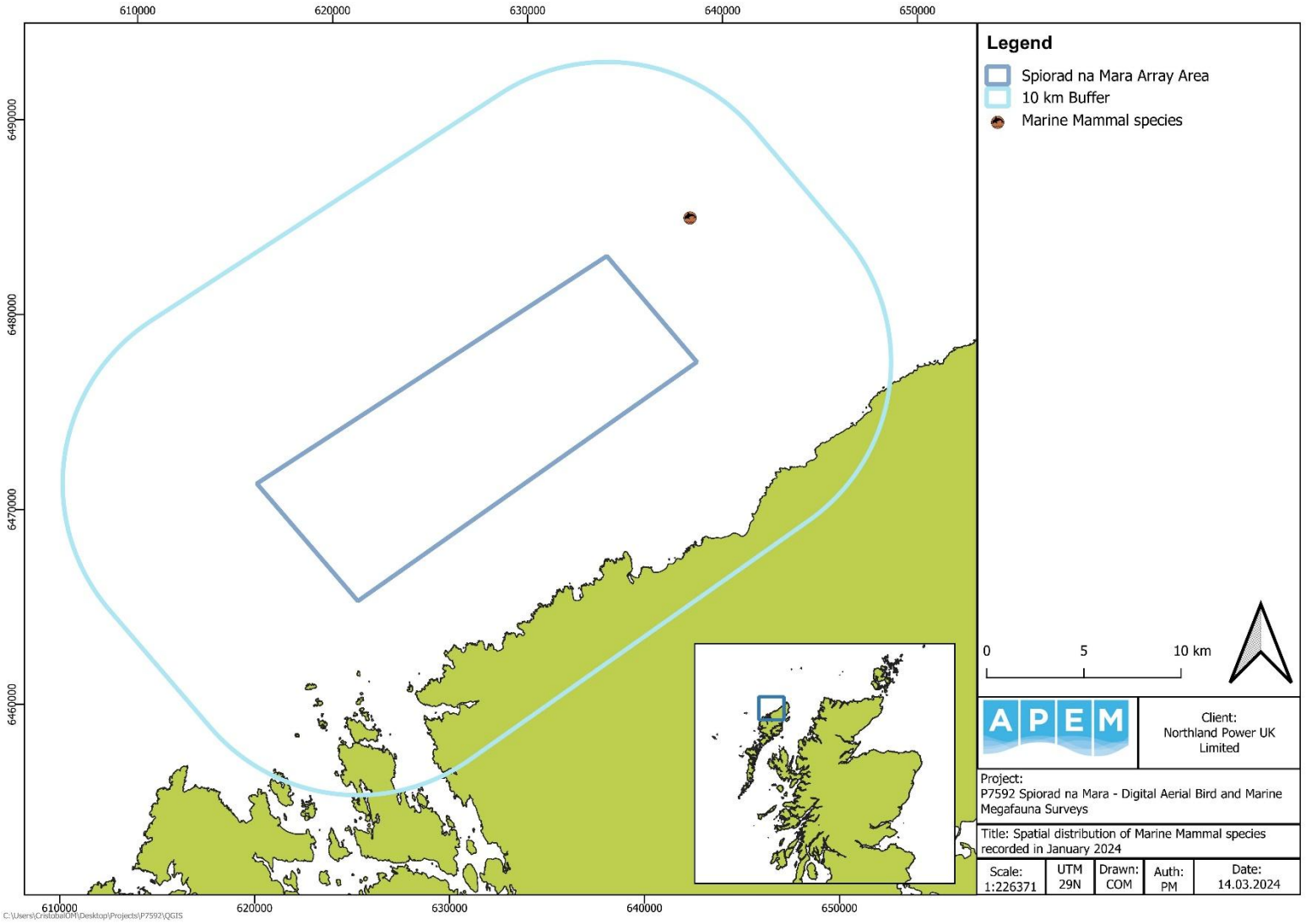


Figure 547 Distribution of marine mammal species in January 2024

*Note that individuals in close proximity may appear overlaying.

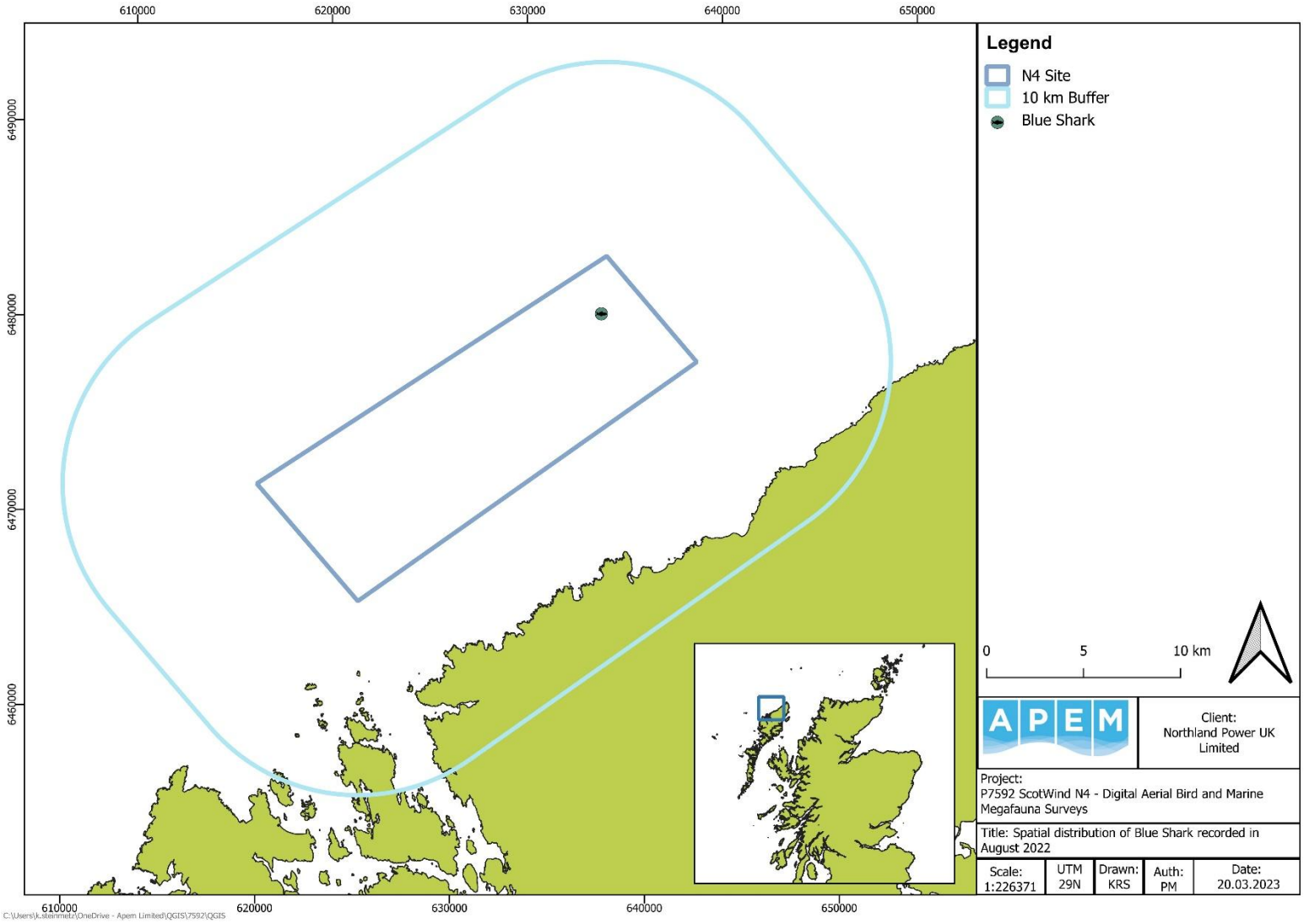


Figure 548 Distribution of blue shark in August 2022
*Note that individuals in close proximity may appear overlaying.

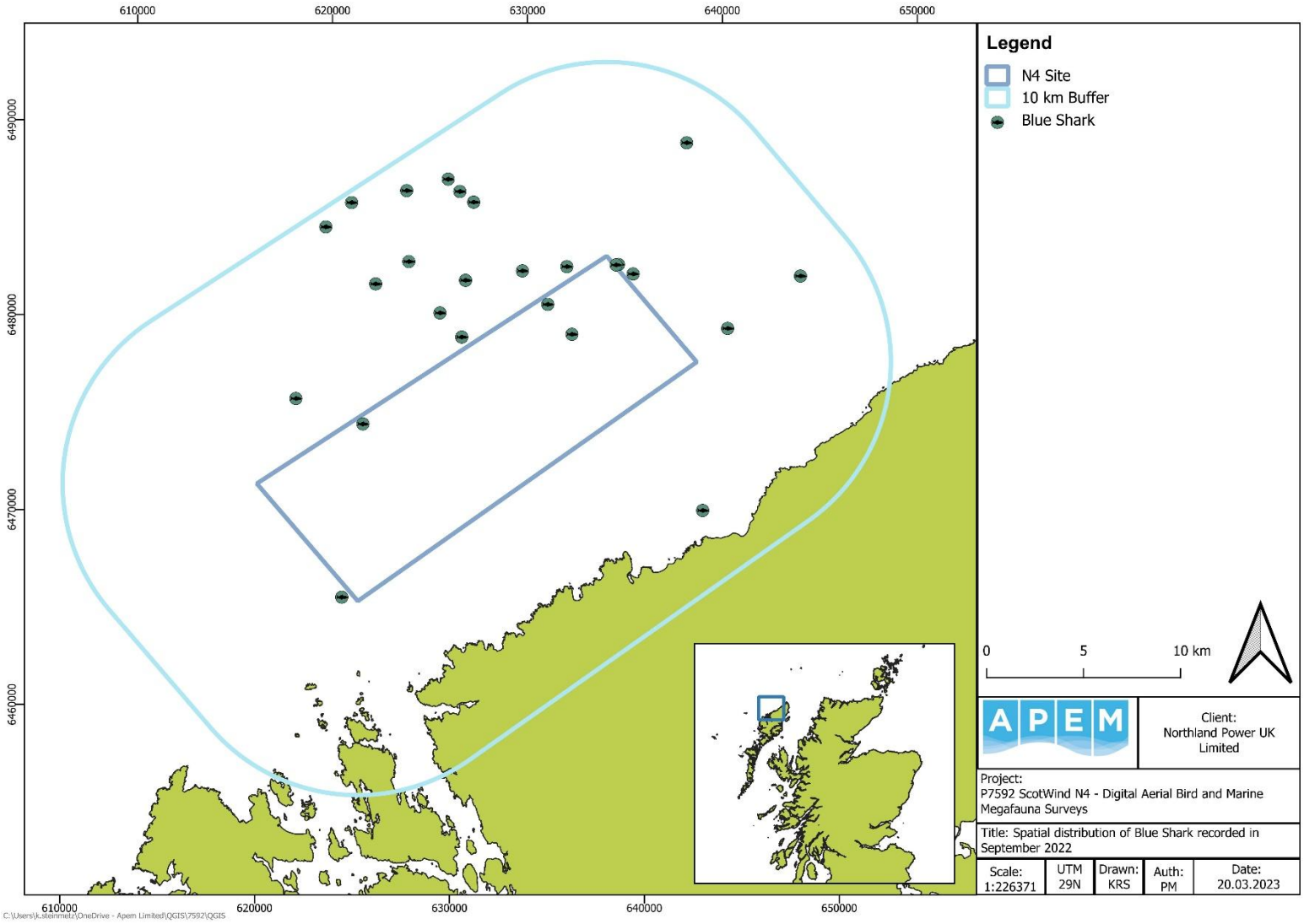


Figure 549 Distribution of blue shark in September 2022

*Note that individuals in close proximity may appear overlaying.

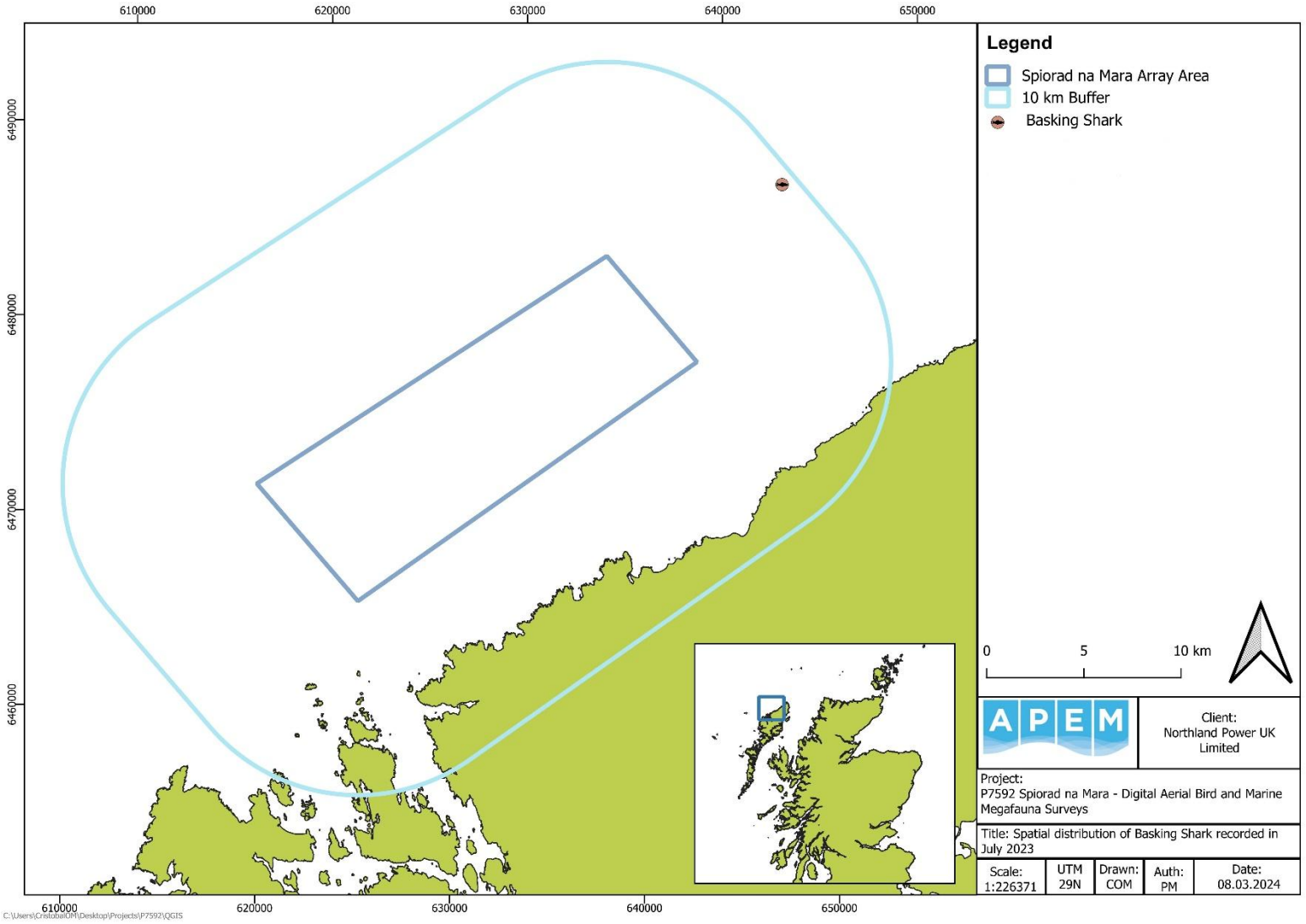


Figure 550 Distribution of basking shark in July 2023

*Note that individuals in close proximity may appear overlaying.

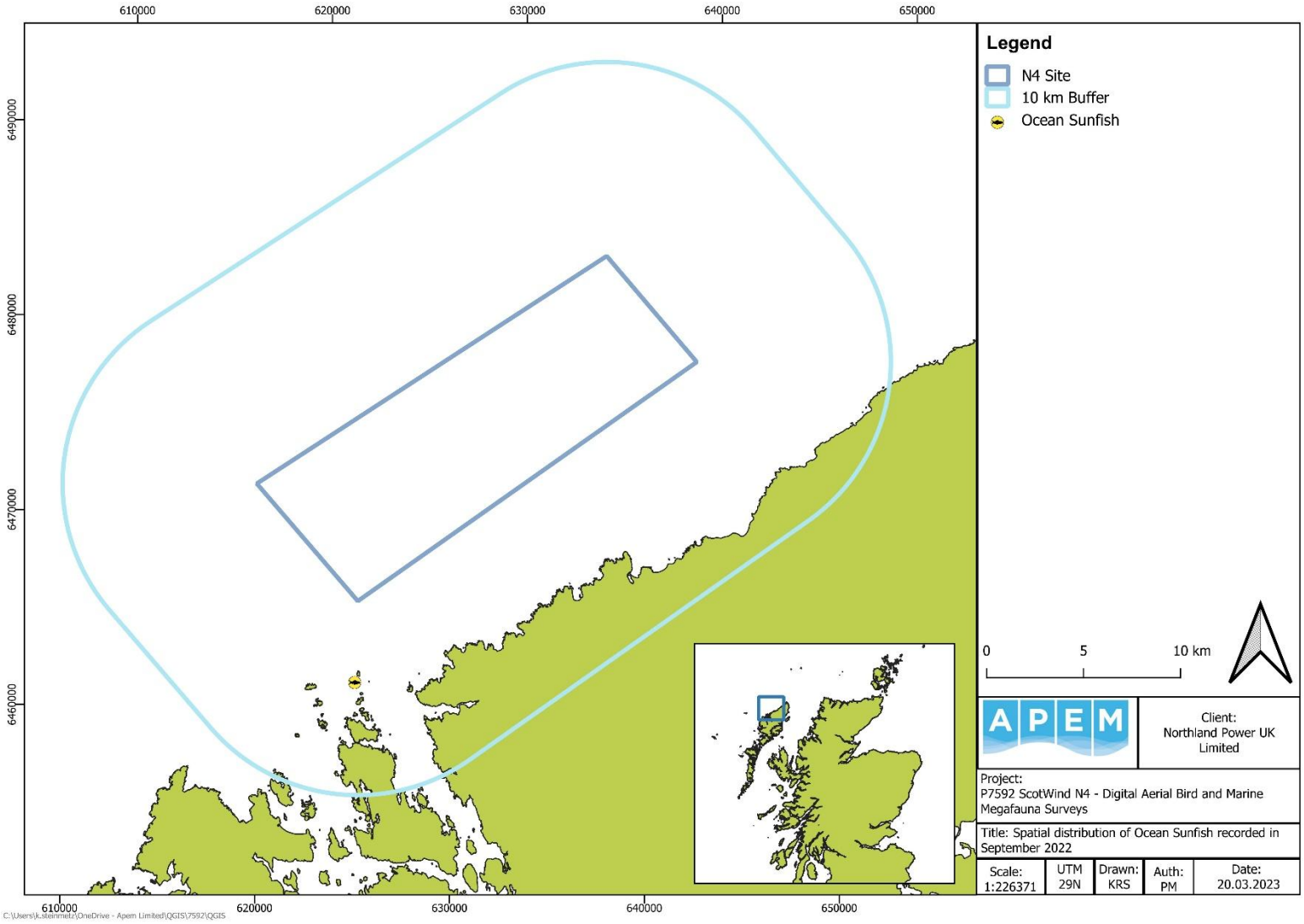


Figure 551 Distribution of ocean sunfish in September 2022
*Note that individuals in close proximity may appear overlaying.

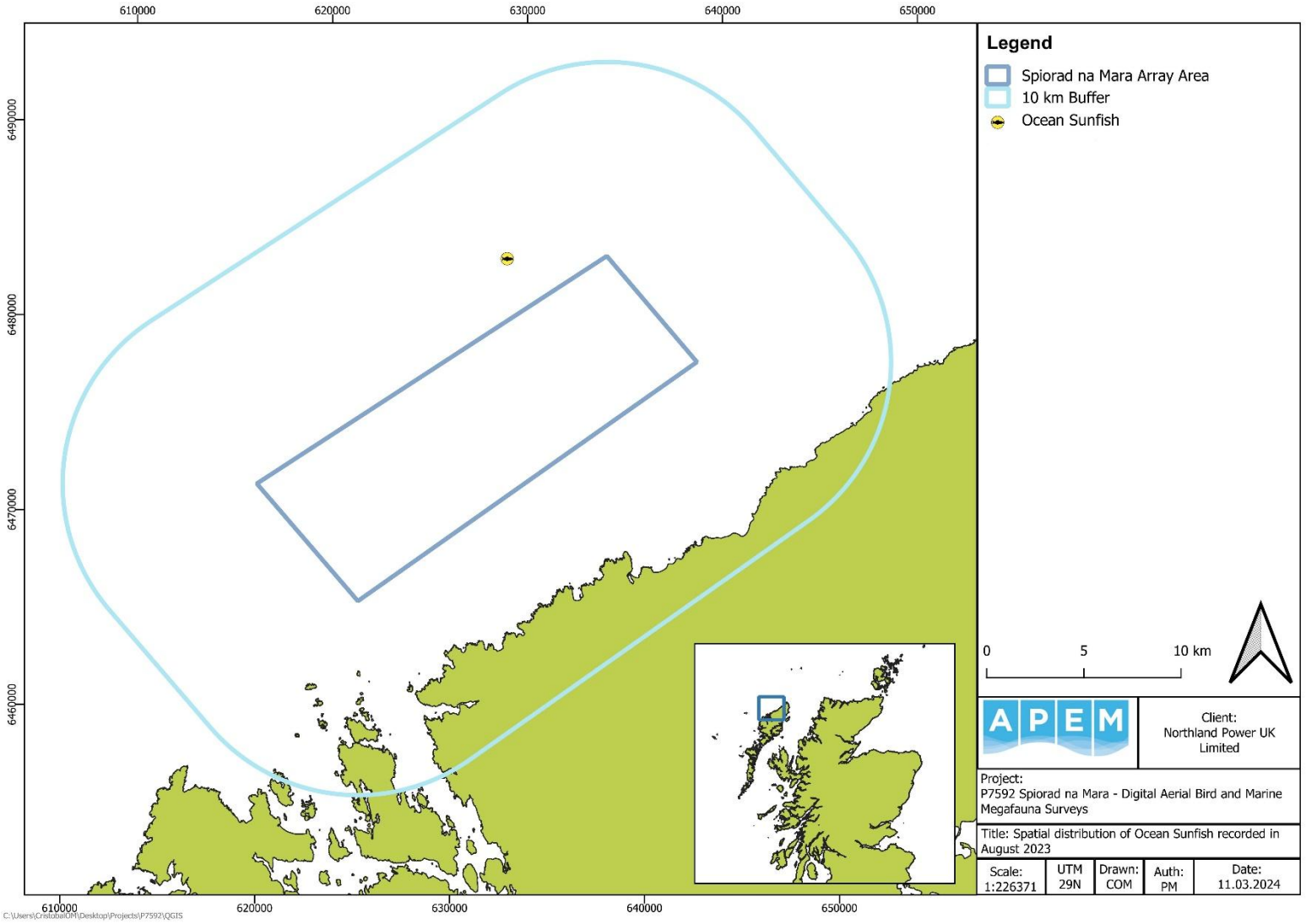


Figure 552 Distribution of ocean sunfish in August 2023

*Note that individuals in close proximity may appear overlaying.

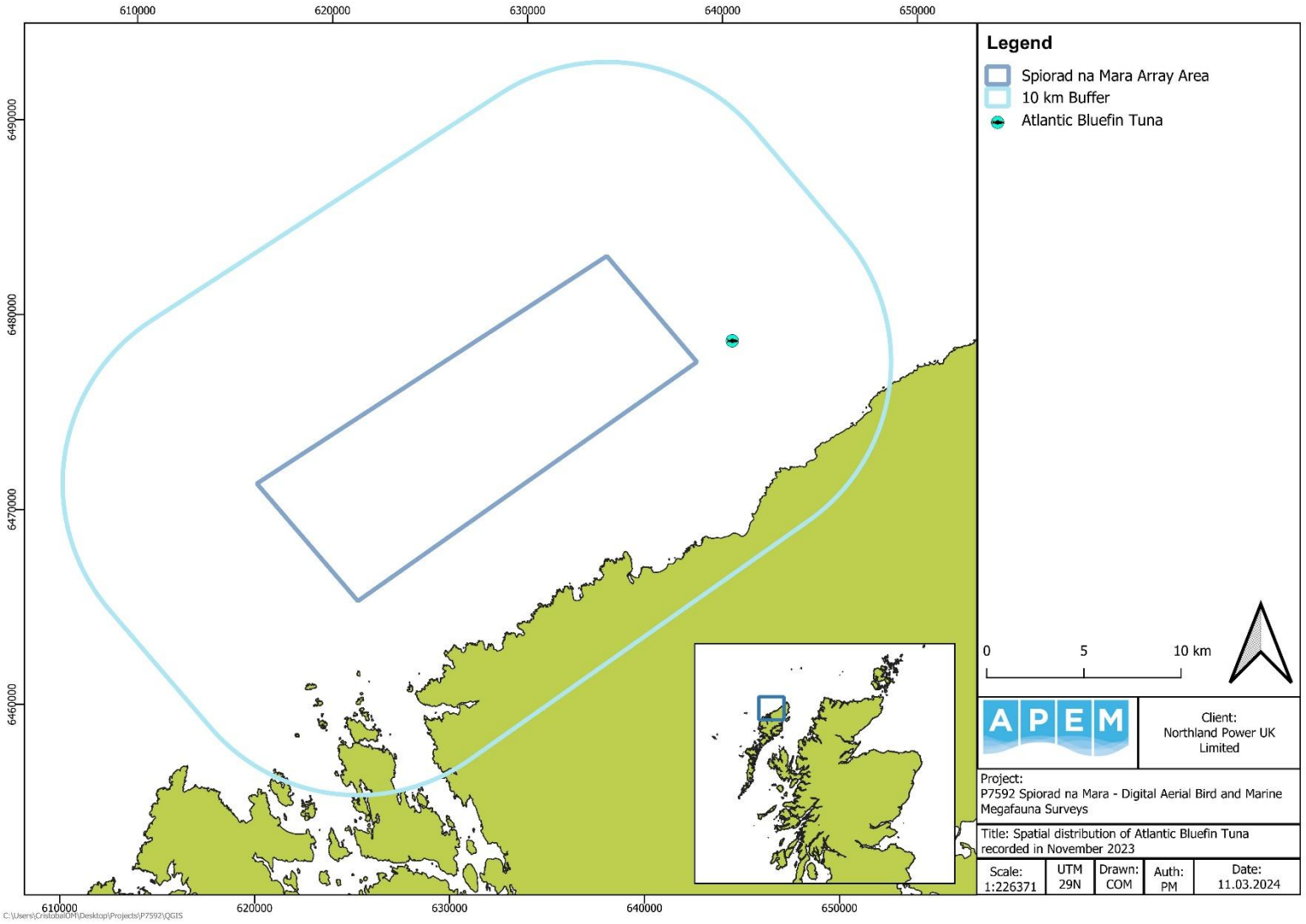


Figure 553 Distribution of Atlantic bluefin tuna in November 2023

*Note that individuals in close proximity may appear overlaying.

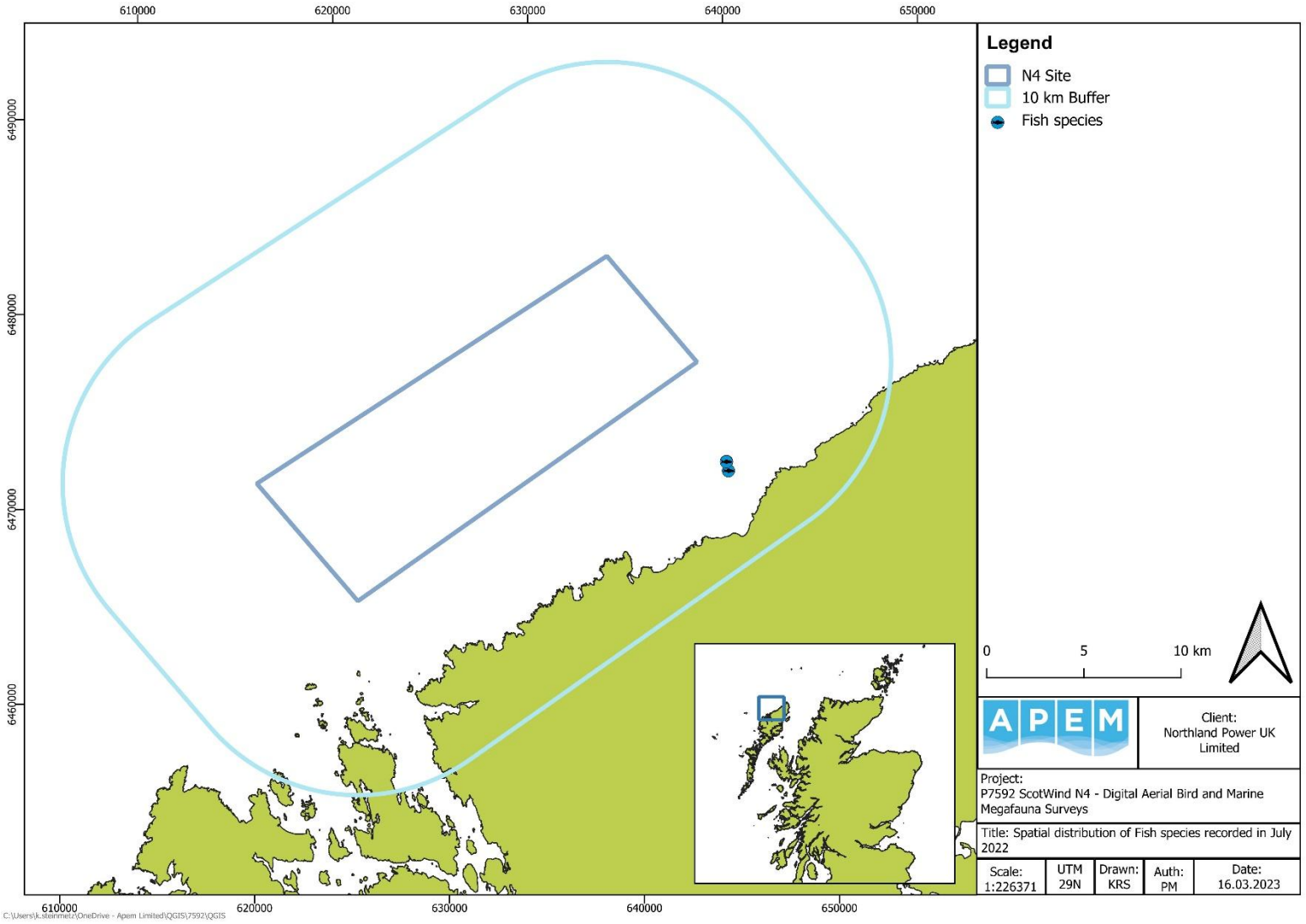


Figure 554 Distribution of fish species in July 2022
*Note that individuals in close proximity may appear overlaying.

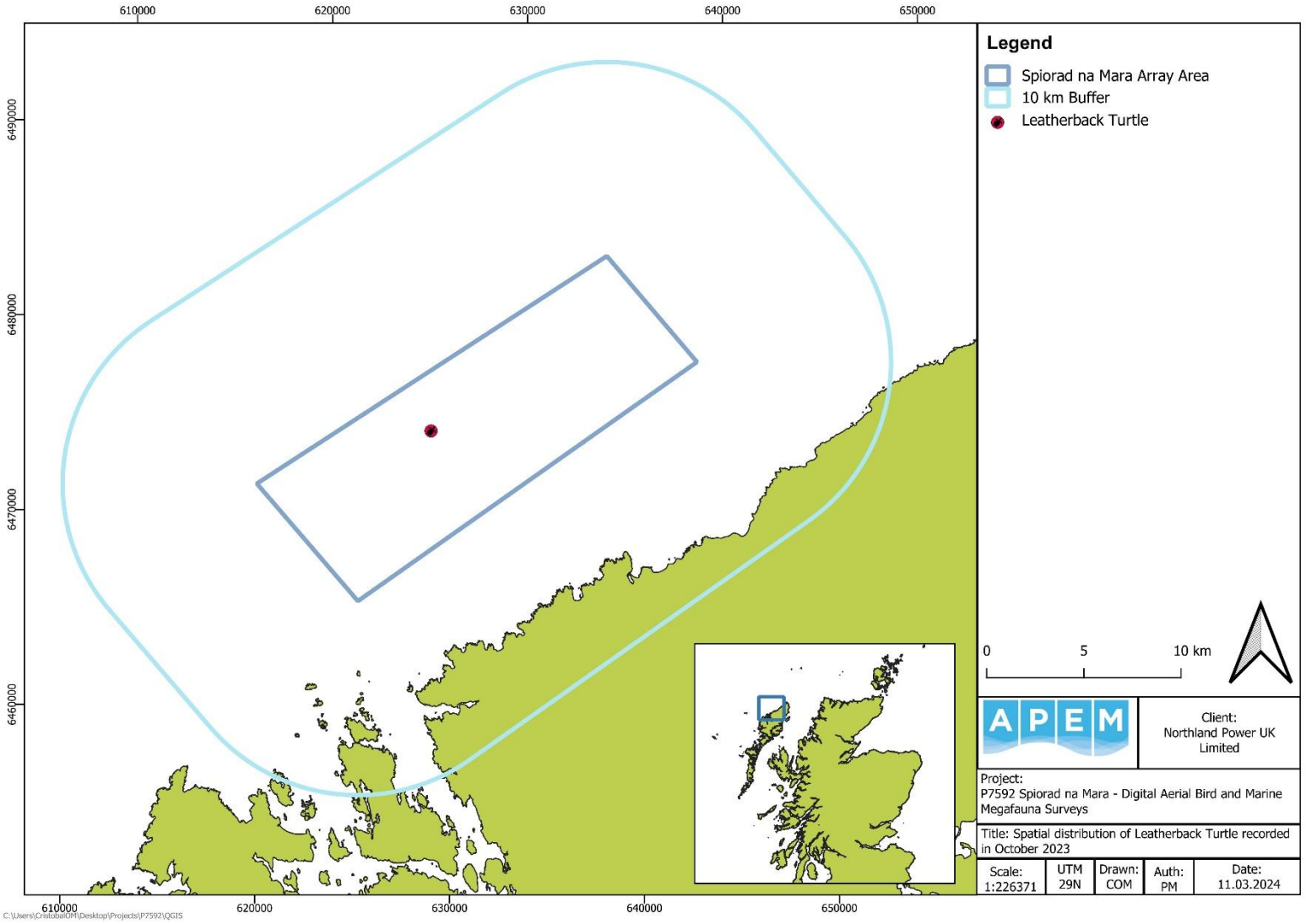


Figure 555 Distribution of leatherback turtle in October 2023

*Note that individuals in close proximity may appear overlaying.

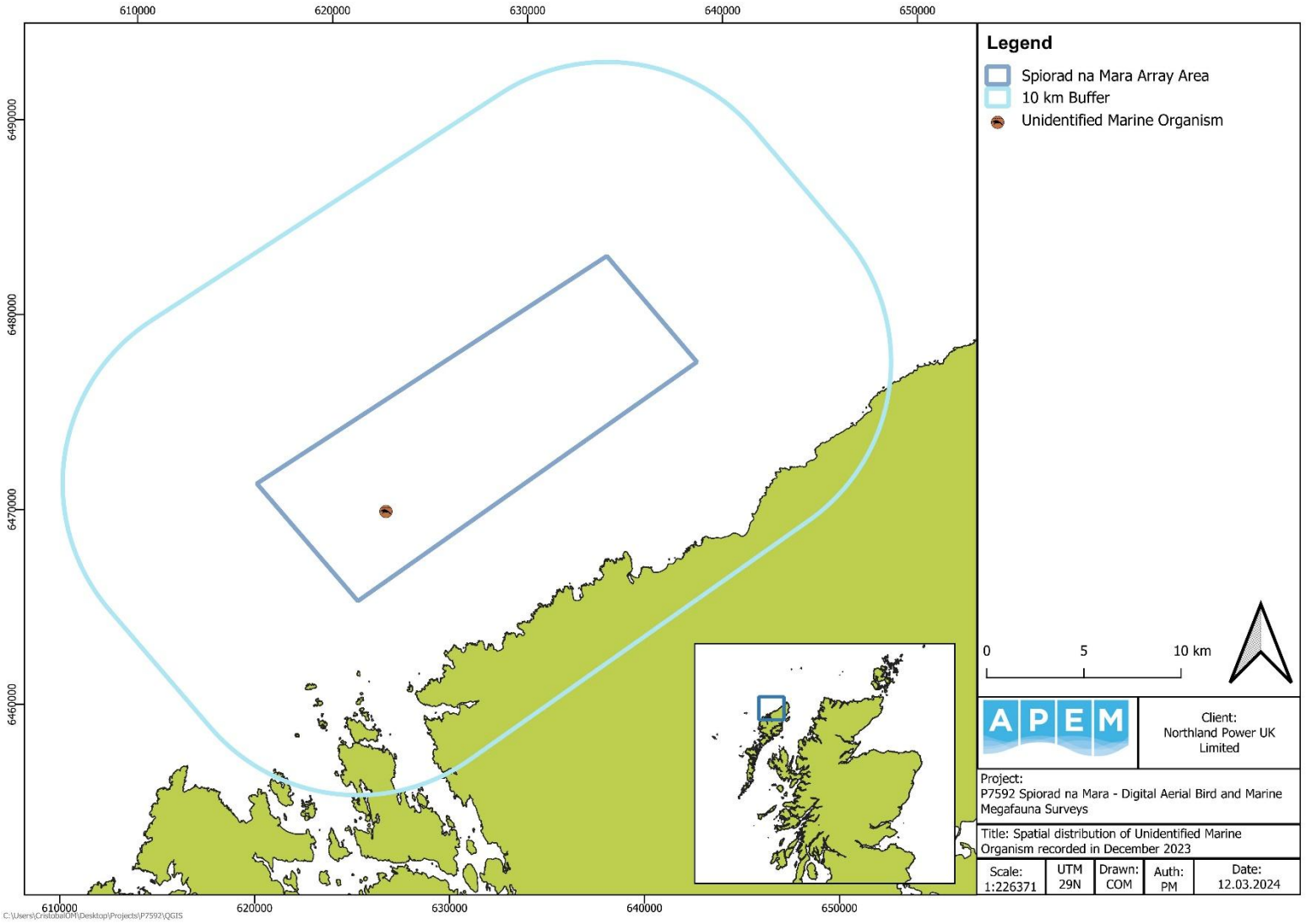


Figure 556 Distribution of unidentified marine organism in December 2023
*Note that individuals in close proximity may appear overlaying.