



TORFICHEN WIND FARM: WINTERING BIRD SURVEYS 2022-23

Report to Renewable Energy Systems Ltd



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TORFICHEN PROPOSED WIND FARM: WINTERING BIRD SURVEYS 2022-23

INTRODUCTION

1. This report describes the wintering bird survey work carried out for the proposed Torfichen Wind Farm (hereafter referred to as the 'Proposed Development'). It provides a second wintering season's baseline data on the bird populations, activity and flight paths within the vicinity of the Proposed Development site, to inform subsequent ornithological impact assessment.
2. The surveys have been designed with reference to current NatureScot survey guidance on bird surveys for wind farms (SNH 2017). The surveys were undertaken by Stuart Piner, a highly experienced bird surveyor.

STUDY AREA

3. The site is located approximately 4 km south of Gorebridge and 9.5 km south-east of Penicuik, within the northern edge of the Moorfoot Hills in the Midlothian Council (MC) area. The wintering bird survey areas were chosen to include all areas within the possible zone of ornithological influence of the Proposed Development. This included the Proposed Development site, plus a 500 m buffer for the main winter walkover surveys (the core survey area, following NatureScot guidance, SNH 2017) and a 2 km buffer for the wider wintering waterfowl surveys (the wider survey area), where access/viewing was possible and where there was potentially suitable habitat (**Figure 1**). The main core survey area covered 18.5 km², and the wider survey area was 49.9 km². It comprised predominantly upland moorland habitat, currently used mainly for grazing sheep and deer, with agriculturally improved grassland on the lower ground in the northern part of the site. It lies mainly within the '*Border Hills*' NatureScot Natural Heritage Zone (NHZ20), though the northern edge of the survey area is within the '*Eastern Lowlands*' (NHZ16).

WINTERING BIRD SURVEY METHODS

4. The aim of the autumn/winter field survey work was to obtain data on the ornithological importance of the Proposed Development site and its surrounds at that time of year, and on the flight lines of key target species. It included walkover surveys of the site, wider area waterfowl surveys and vantage point (VP) surveys of bird flight activity. These followed the same survey methodologies used in the previous 2021-22 winter (Percival *et al.* 2022).





Autumn/Winter Walkover Surveys

5. Walkover mapping surveys of the wintering birds within the site and a 500 m buffer took place in accordance with NatureScot guidance (SNH 2017). The survey focused on key target species, which included all EU Birds Directive Annex 1 species, Wildlife & Countryside Act (1981) Schedule 1 species and Red-listed birds of Conservation Concern (Stanbury *et al.* 2021), as per NatureScot guidance (SNH 2017).
6. As well as counting and mapping each species, the behaviour of each flock was also recorded, e.g. feeding/roosting. The surveys included work at dawn and dusk to check the area specifically for roosting hen harriers and other important raptors. A total of seven surveys were undertaken at approximately monthly intervals between September 2022 and March 2023.

Waterfowl Feeding Distribution Surveys

7. Additional surveys were undertaken twice-monthly of all possible habitats that could be used by wintering waterfowl as feeding/roosting sites within 2 km of the site (to give contextual information about where goose feeding flocks were located, and provide further information on possible linkage to Special Protection Areas (SPAs)). The site lies within the potential SPA connectivity distance from the Gladhouse Reservoir and Fala Flow SPAs (for which pink-footed geese are a qualifying feature) and within a known goose-feeding area (Mitchell 2012, SNH 2016).
8. The counts were carried out as instantaneous 'look-see' counts, recording a snapshot of the birds present in each field/count sector when it was surveyed (Gilbert *et al.* 1998). One such count of each field was made each survey day, recording the numbers of all the key species present. Any additional records made outside this time were noted as supplementary records. These snapshot counts were organised to ensure that the full range of times of day was covered in each part of the survey area.

Vantage point surveys

9. VP surveys were carried out to determine bird flight activity within the Proposed Development site to assess collision risk. The surveys quantified the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height of each flock was recorded. Target species were the same as those for the walkover surveys.
10. The specific aim of the VP surveys was to collect data on key target species flight activity to enable estimates to be made of:
 - The time spent flying over the survey area;
 - The relative use made of different parts of the survey area; and
 - The proportion of flying time spent at different elevations above the ground.
11. Three VPs were used to cover the Proposed Development site. The computer-generated viewsheds (using Global Mapper v21) are shown in **Figure 1**. For each VP, a basic 36 hours' VP surveys during the autumn/winter from each VP were carried out (as set out in NatureScot guidance), spread evenly across the winter season. As the site lies within the potential SPA connectivity distance from the Gladhouse Reservoir and Fala Flow SPAs (for which pink-footed geese are a qualifying feature) and within a known goose feeding area (Mitchell 2012, SNH 2016), an additional six hours' VP per month for each VP was carried out in September-November and February-March to provide extra survey effort in the main goose





migration season, giving a total survey time of 72 hours per VP. Details of survey dates, times and conditions are given in **Appendix 1**.

12. All key target species flights (and any other species of specific nature conservation interest) were recorded, irrespective of their distance from the VP. Observations were carried out throughout daylight hours but not in periods of severely reduced visibility (<3 km).
13. During the VP surveys, all key target species flights were mapped and cross-referenced to a standard recording form using a numbering system, and the flight height of each was recorded. To estimate flight height as accurately as possible available reference structures (e.g. pylon lines) were used. Heights were estimated as accurately as possible and recorded as a raw estimate rather than being summarised into height classes. Below 10 m estimates were made to 1 m, between 10 m and 20 m to 2 m, between 20 m and 50 m to 5 m, and above 50 m to 10 m. When birds were observed over an extended period, estimates of flight height were recorded every 30 seconds. The activity during each flight was also recorded. Particular attention was paid to any observations of birds at rotor height.

WINTERING BIRD SURVEY RESULTS

Walkover Surveys

14. The bird populations found within the survey area during each of the monthly walkover surveys are summarised in **Table 1**. The Table shows the peak numbers recorded during each month and the overall peak counts. The peaks recorded in 2021-22 are given for comparison.

Table 1. Autumn/winter bird populations recorded in the Torfichen survey area during the September 2022 - March 2023 walkover surveys (monthly peak counts).

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2022-23	PEAK 2021-22
Pink-footed Goose	99	2555	0	0	0	0	0	2555	1270
Greylag Goose	32	4	54	0	40	0	6	54	120
Canada Goose	6	0	12	15	0	0	0	15	8
Barnacle Goose	0	0	0	0	0	0	0	0	1773
Teal	0	0	0	0	0	0	0	0	38
Mallard	0	0	0	0	0	8	6	8	1
Red Grouse	214	278	-	-	-	-	-	278	84
Black Grouse	0	0	0	0	0	1	0	1	9
Little Grebe	0	0	0	0	0	0	0	0	1
Hen Harrier	0	0	0	0	0	0	0	0	3
Goshawk	2	0	1	0	0	0	0	2	3
Sparrowhawk	0	0	0	0	0	0	0	0	1





Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Peak 2022-23	PEAK 2021-22
Buzzard	14	6	6	6	5	3	6	14	19
Kestrel	7	5	3	1	3	5	2	7	4
Merlin	0	0	0	0	0	0	0	0	1
Golden Plover	1	2	37	0	0	2	25	37	45
Lapwing	0	130	6	0	2	102	28	130	262
Jack Snipe	0	0	0	0	0	0	1	1	2
Snipe	3	41	24	1	4	9	14	41	22
Woodcock	0	0	0	6	3	4	0	6	3
Curlew	0	0	0	0	0	1	25	25	223
Common Gull	0	0	0	0	0	0	0	0	61
Lesser Black-backed Gull	0	0	0	0	0	0	0	0	1
Herring Gull	0	46	0	0	0	0	2	46	27
Black-headed Gull	0	5	0	0	0	0	0	5	4
Tawny Owl	0	0	0	0	0	0	0	0	1
Short-eared Owl	0	0	1	1	0	1	0	1	0

* Barnacle goose records were all of over-flying migrant flocks. Red grouse only surveyed on Sep and Oct visits.

Autumn/Winter Wider Area Waterfowl Survey Results

- The bird populations found within the survey area during each of the fortnightly goose distribution surveys are summarised in **Table 2**. The Table shows the numbers recorded during each survey and the overall peak counts. Pink-footed geese were the most abundant target species and were seen frequently during the surveys, with higher numbers in the second half of the survey period as was found in the previous winter (peak count 2,368, compared with 3,279 in 2021-22).



TORFICHEN WIND FARM: WINTERING BIRD SURVEYS 2022-23



Species	12/09/22	26/09/22	06/10/22	20/10/22	02/11/22	22/11/22	02/12/22	21/12/22	03/01/23	25/01/23	09/02/23	21/02/23	07/03/23	16/03/23	Peak 2022-23	Peak 2021-22
Little Grebe	15	29	2	10	7	1	6	1	5	2	0	1	0	2	29	12
Cormorant	6	15	9	2	19	39	20	0	1	25	21	1	17	16	39	23
Grey Heron	6	1	0	1	0	1	0	0	0	0	0	0	0	0	6	2
Goshawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sparrowhawk	0	0	0	2	0	0	1	0	0	0	0	0	0	0	2	2
Buzzard	3	1	2	2	0	4	3	1	0	1	1	1	2	4	4	6
Kestrel	1	0	0	1	0	1	0	1	1	2	2	0	0	0	2	3
Peregrine	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	1
Moorhen	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Coot	0	0	0	0	0	0	1	0	1	2	4	0	0	0	4	2
Oystercatcher	0	0	0	0	0	0	0	0	0	0	0	64	14	60	64	111
Ringed Plover	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	0
Golden Plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
Lapwing	0	151	156	165	0	60	0	0	0	8	135	29	105	97	165	276
Ruff	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Snipe	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Black-tailed Godwit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Whimbrel	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Curlew	0	0	0	0	0	0	0	0	0	0	0	39	163	87	163	264
Common Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

TORFICHEN WIND FARM: WINTERING BIRD SURVEYS 2022-23



Species	12/09/22	26/09/22	06/10/22	20/10/22	02/11/22	22/11/22	02/12/22	21/12/22	03/01/23	25/01/23	09/02/23	21/02/23	07/03/23	16/03/23	Peak 2022-23	Peak 2021-22
Green Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Redshank	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
Mediterranean Gull	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0
Common Gull	10	26	816	144	290	264	204	308	351	374	533	1080	343	423	1080	689
Lesser Black-backed Gull	6	5	30	10	2	1	5	0	0	0	0	20	0	14	30	50
Herring Gull	7	0	443	16	22	80	55	58	46	14	43	147	1	27	443	297
Great Black-backed Gull	0	0	0	0	0	0	0	0	0	0	1	0	2	0	2	21
Black-headed Gull	22	81	252	123	224	80	74	33	93	102	71	310	238	293	310	1121



Vantage Point Survey Results: Autumn/Winter 2021-22

16. The rates of bird flight movement observed across the survey area during the VP surveys in 2022-23 are summarised in **Table 3**. This gives the flight rate per hour recorded in each month and the total number of flights recorded. Pink-footed goose was the most frequently recorded target species, with movements between feeding areas and to/from their night roosts (including on Gladhouse Reservoir). Flight rates of other species were generally low, though did include records of several key raptors (red kite, hen harrier, goshawk, merlin, peregrine and short-eared owl) and occasional larger flocks of golden plover and lapwing. Further details of key species' flights are given in **Appendix 1**.
17. **Table 4** gives the results from the previous 2021-22 surveys for comparison. Similar levels of flight activity were recorded then too (Percival *et al.* 2022), though the brief period of barnacle goose migration over the site picked up in October 2021 was not recorded during the October 2022 VP surveys. Scarce raptors (particularly goshawk and hen harrier) were recorded less frequently in 2022-23.
18. **Tables 3 and 4** also give the percentage of flights of each species that were recorded at rotor height (between 30 m and 180 m above ground level). The percentage of flights at rotor height was generally similar between the two years.

Table 3. Bird flight rates recorded over the Torfichen survey area during the September 2022 - March 2023 vantage point surveys. N = 72 hours total observation from each of the three VPs.

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total over-flying	% at rotor height
Mute Swan	0	0	0.10	0	0	0	0	4	50%
Whooper Swan	0	0	0.29	0.15	0	0	0	15	67%
Pink-footed Goose	18.1	307.8	15.0	130.5	114.7	182.2	170.6	27666	83%
Greylag Goose	7.03	1.83	6.50	3.50	0.94	1.94	2.92	841	53%
Canada Goose	0.06	0	0	0	0	0.86	0	33	17%
Mallard	0	0.23	0.10	0	0	0.06	0.17	19	33%
Goosander	0.44	0	0	0	0	0	0	16	100%
Cormorant	0	0	0.02	0	0	0	0	1	100%
Grey Heron	0	0	0.02	0.05	0	0	0	2	100%
Red Kite	0.03	0	0	0.05	0	0	0	2	50%
Marsh Harrier	0.11	0	0	0	0	0	0	4	0%
Hen Harrier	0.36	0	0.07	0.15	0.13	0	0	21	0%
Goshawk	0.06	0	0.05	0	0.06	0	0.03	6	50%
Sparrowhawk	0.22	0.03	0.07	0.10	0	0.11	0	18	17%
Buzzard	2.36	0.63	0.79	0.55	0.81	1.67	2.06	295	38%
Kestrel	2.39	0.67	0.62	0.25	0.63	0.25	0.58	177	6%
Merlin	0	0.03	0	0	0	0	0	1	0%
Peregrine	0.11	0	0	0	0	0.03	0	5	40%
Golden Plover	0.08	4.30	11.83	8.85	2.50	1.47	2.28	981	74%
Lapwing	0	17.00	6.10	0	0	3.67	7.19	1157	15%





Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total over-flying	% at rotor height
Snipe	0.03	0.87	0.64	0.05	0	0	0.25	64	16%
Curlew	0	0	0	0	0	0	3.42	123	24%
Common Gull	0.06	0.70	2.62	13.60	5.94	6.86	1.25	792	32%
Lesser Black-backed Gull	0	0	0.17	0	0	0.03	0.17	14	44%
Herring Gull	0.08	4.43	3.45	2.20	1.13	3.08	0.36	467	46%
Great Black-backed Gull	0.03	0	0.02	0	0	0.28	0.06	14	27%
Black-headed Gull	0.03	0.03	0.76	0.90	0	0.03	11.64	472	68%
Short-eared Owl	0	0	0	0	0	0.03	0	1	0%

Table 4. Bird flight rates recorded over the Torfichen survey area during the September 2021 - March 2022 vantage point surveys. N = 72 hours total observation from each of the three VPs.

Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total over-flying	% at rotor height
Mute Swan	0	0.08	0	0	0	0	0	3	100%
Whooper Swan	0	0.44	0	0	0	0	0.94	50	100%
Pink-footed Goose	144.2	56.7	36.0	126.1	188.1	214.0	158.1	27809	77%
Greylag Goose	0.61	5.61	23.28	31.38	8.86	1.29	2.17	1828	74%
Canada Goose	0.17	0.14	3.11	2.62	3.24	0.49	0	247	38%
Barnacle Goose	0	15.4	0	0.07	0.05	0	0	558	63%
Teal	1.17	0	0	0	0	0	0	42	100%
Mallard	0	0.06	0	0	0	0.03	0.19	10	40%
Goldeneye	0	0.03	0	0	0	0	0	1	100%
Goosander	0.03	0	0	0	0	0	0	1	0%
Red Grouse	0	0.22	0	0	0	0	0.06	10	0%
Cormorant	0	0	0	0.07	0	0	0	1	100%
Grey Heron	0	0.03	0	0.14	0	0	0.06	5	60%
Red Kite	0.03	0	0.03	0	0	0	0.08	5	40%
Hen Harrier	0.58	0.06	0	0	0.05	0.16	0.17	36	6%
Goshawk	0.47	0.19	0.08	0	0.14	0.11	0.19	41	49%
Sparrowhawk	0.08	0	0.06	0.07	0.05	0.03	0.17	14	14%
Buzzard	1.19	1.22	0.72	0.28	1.43	1.04	1.78	249	35%
Osprey	0.03	0	0	0	0	0	0	1	100%
Kestrel	0.42	0.19	0.19	0	0	0.05	0.39	45	14%



Species	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total over-flying	% at rotor height
Merlin	0.08	0.03	0.03	0	0	0.08	0	8	25%
Peregrine	0.06	0	0.03	0.14	0	0.03	0.03	7	29%
Golden Plover	0.36	0.33	5.28	0	3.62	1.92	2.22	441	76%
Lapwing	2.11	28.0	0.53	4.55	0	17.5	12.6	2262	30%
Snipe	0.67	0.33	0	0	0	0	0.08	39	37%
Woodcock	0	0	0	0	0.05	0	0.17	7	0%
Curlew	0	0	0	0	0	0.03	13.4	482	53%
Common Gull	0.28	1.58	7.78	23.79	1.05	2.00	7.47	1056	37%
Lesser Black-backed Gull	0.97	0.08	0	0	0	0	0.42	53	42%
Herring Gull	7.08	7.47	2.78	2.76	0.19	0.25	0.97	712	29%
Great Black-backed Gull	0	0	0	0	0.24	0.19	0.08	15	60%
Black-headed Gull	0	0.31	0.25	2.14	0	0	24.2	921	80%
Short-eared Owl	0	0	0	0	0	0.05	0	2	0%

Conservation Evaluation of Wintering Bird Populations

19. The conservation value of the wintering bird populations was determined using the criteria specified in **Table 5** (from Percival 2007) and is summarised in **Table 6**. This includes the criteria adopted by NatureScot in the Guidelines for Selection of Biological Sites of Special Scientific Interest (SSSIs) (Drewitt *et al.* 2020), using 1% of the resource to define international and national importance (Frost *et al.* 2021). An additional category of regional importance was assigned for species approaching the threshold for national importance and those for which the survey area held a notable concentration in a county context. A further category of 'local importance' was used for species that did not reach regional importance but were still of some ecological value. This included all species on the red or amber lists of the 'Birds of Conservation Concern' (Stanbury *et al.* 2021) that did not reach national or regional importance at the development site. National (GB) and International wintering waterfowl baseline populations have been taken from the most recently published population figures (Frost *et al.* 2021) from the national Wetland Birds Survey and other species from Woodward *et al.* (2020). Regional (Natural Heritage Zone, NHZ) populations were taken from Wilson *et al.* (2015). The site lies mainly within the 'Border Hills' NatureScot Natural Heritage Zone (NHZ20), though the northern edge of the survey area is within the 'Eastern Lowlands' (NHZ16). In addition, listing on Annex 1 of the EU Birds Directive, Schedule 1 of the Wildlife and Countryside, UK Biodiversity Action Plan (BAP) priority species and Scottish BAP species were all considered in the evaluation process.



Table 5. Definition of terms relating to the sensitivity of the ornithological receptors at the site.

Conservation Value	Definition
VERY HIGH	Cited interest of SPAs, Special Areas of Conservation (SACs) and SSSIs. Cited means mentioned in the citation text for the site as a species for which the site is designated (SPAs/SACs) or notified (SSSIs).
HIGH	Other species that contribute to the integrity of a SPA or SSSI. A local population of more than 1% of the national population of a species. EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or W&C Act Schedule 1 species. Ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK).
MEDIUM	Regionally important population of a species, either because of population size or distributional context. UK BAP priority species (if not covered above).
LOW	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above. Scottish BAP species (if not covered above).

20. The conservation value of the wintering bird populations observed in the Torfichen survey area during the wintering bird surveys has been summarised in **Table 6** below. This included one very high sensitivity species (pink-footed goose – the birds seen are ecologically linked to the Gladhouse Reservoir SPA, and also the Fala Flow SPA), 16 high sensitivity species (whooper swan, barnacle goose, goldeneye, osprey, red kite, marsh harrier, hen harrier, goshawk, peregrine, merlin, golden plover, black-tailed godwit, ruff, whimbrel, green sandpiper and short-eared owl) that are EU Birds Directive Annex 1/Wildlife and Countryside Act Schedule 1 species, 17 medium sensitivity species (UK BAP priority/red-listed species of conservation concern and/or species present in regionally important numbers; mute swan, white-fronted goose, wigeon, teal, mallard, tufted duck, red grouse, black grouse, little grebe, cormorant, oystercatcher, lapwing, curlew, common gull, herring gull, great black-backed gull and black-headed gull), and 13 low sensitivity species.

Table 6. Conservation evaluation of the wintering bird populations in the Torfichen survey area, September– March 2021-22 and 2022-23.

Species	Peak 21-22	Peak 22-23	>1% region	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Mute Swan	57	35							Medium
Whooper Swan	3	7	✓	✓	✓	A		✓	High
Pink-footed Goose	3279	2555	✓			A			Very high





Species	Peak 21-22	Peak 22-23	>1% region	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
White-fronted Goose	0	1				R	✓	✓	Medium
Greylag Goose	349	337				A			Low
Canada Goose	132	138							Nil
Barnacle Goose	1773	105	✓	✓		A		✓	High
Shelduck	6	3				A			Low
Wigeon	154	87	✓			A			Medium
Teal	190	185	✓			A			Medium
Mallard	239	290	✓			A			Medium
Pintail	0	1				A			Low
Pochard	1	2				R		✓	Low
Tufted Duck	78	119	✓						Medium
Goldeneye	31	46			✓	R			High
Goosander	4	16							Nil
Red Grouse	84	278					✓		Medium
Black Grouse	9	1				R	✓	✓	Medium
Little Grebe	12	29							Medium
Cormorant	23	39							Medium
Grey Heron	2	6							Nil
Red Kite	1	1	✓	✓	✓			✓	High
Marsh Harrier	0	1	✓	✓	✓	A		✓	High
Hen Harrier	3	2	✓	✓	✓	R		✓	High
Goshawk	3	2	✓		✓				High
Sparrowhawk	2	2				A			Low
Buzzard	19	14							Nil
Osprey	1	0	✓	✓	✓	A		✓	High
Kestrel	4	7				A		✓	Low
Merlin	1	1	✓	✓	✓	R		✓	High
Peregrine	2	3	✓	✓	✓			✓	High
Moorhen	0	1				A			Low
Coot	2	4							Nil
Oystercatcher	111	64				A			Medium
Ringed Plover	0	2				R			Low
Golden Plover	45	60		✓				✓	High
Lapwing	276	165				R	✓	✓	Medium





Species	Peak 21-22	Peak 22-23	>1% region	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP priority sp	Scottish BAP sp	Conservation Value
Ruff	0	1		✓	✓	R		✓	High
Jack Snipe	2	1							Nil
Snipe	22	41				A			Low
Woodcock	3	6				R		✓	Low
Black-tailed Godwit	45	0	✓		✓	R	✓	✓	High
Curlew	264	163	✓			R	✓	✓	Medium
Whimbrel	0	1			✓	R			High
Common Sandpiper	1	0				A			Low
Green Sandpiper	1	0			✓	A		✓	High
Redshank	4	2				A			Low
Mediterranean Gull	0	1		✓	✓	A			High
Common Gull	689	1080				A			Medium
Lesser Black-backed Gull	50	30				A			Low
Herring Gull	297	443				R	✓	✓	Medium
Great Black-backed Gull	21	2				A			Medium
Black-headed Gull	1121	310				A			Medium
Tawny Owl	1	1				A			Low
Short-eared Owl	1	1	✓	✓		A		✓	High

21. The key autumn/wintering bird populations recorded were as follows:

- **Pink-footed goose** – the distribution of pink-footed geese observed during the winter surveys and the VP survey flight lines are shown in **Figure 2**. The main pink-footed goose feeding area was to the north-east of the Proposed Development, as it had been in 2021-22, though there were feeding flocks seen across most of the wider survey area to the north of the Proposed Development. There were, though, very few records within the wind farm site itself. There were regular flights over the site, including birds moving between feeding areas and to/from night roosts. Those roost flights included movements to/from Gladhouse Reservoir, though also to the east (in the direction of Fala Flow).
- Other high conservation value waterfowl:
 - **Whooper Swan** – the only record of birds on the ground were single birds on Gladhouse Reservoir on 20/10/22 and 22/11/22, and a group of five on the quarry pool on 22/11/22. In 2021-22 the only ground record was a family of two adults and one young during the waterfowl survey on 20/21/21. Only three flocks were seen





over-flying during the 2022-23 VP surveys, one of 5 and one of 7 on 22/11/22 and one of 3 on 2/12/22. In 2021-22 only two flocks were observed over-flying during the VP surveys (one of 16 on 13/10/21 and one of 34 on 8/3/22).

- **Barnacle Goose** – there were occasional records of single barnacle geese mixed in with the pink-footed goose flocks and a flock of 105 recorded on 2/12/22. In the 2021-22 surveys, 16 migrant flocks were observed during the 12/10/21 walkover survey (on a broad front across the whole survey area), and a further six migrant flocks during the VP surveys between the 11 and 13 October. Flock sizes varied between 10 and 260 birds (with an average of 125).
- **Goldeneye** – this species was seen in regionally important numbers on Gladhouse Reservoir (peak 31 in 2021-22 and 46 in 2022-23), but there were no records anywhere else.
- **Other wintering wildfowl** – Gladhouse Reservoir supported a range of regionally important wintering waterfowl populations, including **mute swan, wigeon, teal, mallard, tufted duck, little grebe** and **cormorant**. These species were, though, largely restricted to the reservoir.
- **Red and Black Grouse** – the distribution of these two species during the 2022-23 winter surveys is shown in **Figure 3**. Red grouse were widely distributed over the higher ground, whilst black grouse were mainly found around the same areas that they had been seen in the previous breeding season (around lek sites on the south-eastern edge of the survey area and in the western part).
- **Hen harrier** – this species was regularly seen hunting over the site through the winter, with 21 flights in total (see **Figure 4**). A total of 36 flights had been recorded in the previous winter. No evidence was found, though, of any night roosts in the survey area, most flights seen were below rotor height (so collision risk would be low), and there were no notable concentrations of flight activity.
- **Other scarce raptors and owls** – goshawk, red kite, marsh harrier, peregrine, merlin and short-eared owl were all recorded during the 2022-23 winter surveys, but only infrequently in low numbers (**Figure 5**). There was no indication that the survey area was important to any of these species at this time of year. Goshawk flight activity was much less than had been observed in the previous winter.
- **Golden Plover** – small numbers of golden plover were seen regularly through the 2022-23 winter, as they had been in 2021-22. The peak count was 60 (a peak of 190 had been seen in the previous winter, but this was a single flock over-flying with no other counts over 45), with most birds seen in the wider area rather than within the site itself and only low numbers observed over-flying (**Figure 6**).
- **Lapwing** – regularly present in the survey area in regionally important numbers, with most records from the wider area to the north-east of the site and to the west in the fields adjacent to Gladhouse Reservoir (**Figure 7**). Lapwing were also regularly observed over-flying during the VP surveys,
- **Curlew** – this species was recorded in regionally important numbers but only in March, so it is likely that these would have been spring migrants/early returning breeders. They were seen mostly in the fields in the wider area to the north of the site and to the west in the fields adjacent to Gladhouse Reservoir (**Figure 8**).
- **Gulls** – common (**Figure 9**), herring (**Figure 10**) and black-headed gulls (**Figure 11**) were all recorded within the survey area in regionally important numbers. All had broadly similar



distributions, mainly using the fields to the north of the proposed wind farm site in the wider survey area and Gladhouse Reservoir. All regularly over-flew the site.

CONCLUSIONS

22. The 2022-23 wintering bird surveys found a range of wintering bird populations of conservation importance using the survey area, similar to those recorded in the previous winter. The highest conservation importance was the wintering pink-footed goose population, for which there was a clear ecological link between the site and the Gladhouse Reservoir and Fala Flow SPAs. The wind farm ornithological assessment will require Habitats Regulations Assessment (including Appropriate Assessment).
23. Other wintering waterfowl of importance included migrant whooper swans and barnacle geese. However, the overall numbers of these species were low. Gladhouse Reservoir supports a range of regionally important waterfowl populations, but given the separation from the Proposed Development, these would be unlikely to be affected.
24. Red and black grouse were resident in the higher parts of the survey area, in similar areas to where they had been found during the previous breeding season surveys (Percival *et al.* 2021, 2022b). Design mitigation was recommended for black grouse (a 500 m buffer around each of the two lek sites) in that report, and that mitigation should reduce effects this species in winter too.
25. Hen harrier and goshawk were regularly seen hunting over the survey area, though no areas of particular importance were identified for either species. Collision risk modelling will help inform the impacts of the Proposed Development on these species, but no specific spatial constraints for them have been identified.
26. Other raptor species, including red kite, osprey, marsh harrier, peregrine, merlin and short-eared owl, were recorded in lower numbers and less frequently, so no design or other mitigation would be likely to be required for them at this stage.
27. Three wader species were recorded in regionally important numbers, golden plover and lapwing (which both occurred regularly through the winter) and curlew (which were seen only in March). The main areas used were outside the Proposed Development, so the main risk at this time of year would be collision (which will require collision risk modelling).
28. Four gull species occurred in regionally important numbers. As for the regionally important populations of waders, most were recorded outside the Proposed Development to the north in the wider area, so the main potential impact would be collision (requiring modelling to inform the assessment).

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Torfichen Wind Farm

FIGURE 1

Wintering Bird Survey Areas

- KEY:**
- Indicative turbine locations
 - Core walkover survey area
 - Waterfowl survey fields/sectors
 - Wider 2km buffer area
 - VP locations
 - VP1 viewed
 - VP2 viewed
 - VP3 viewed



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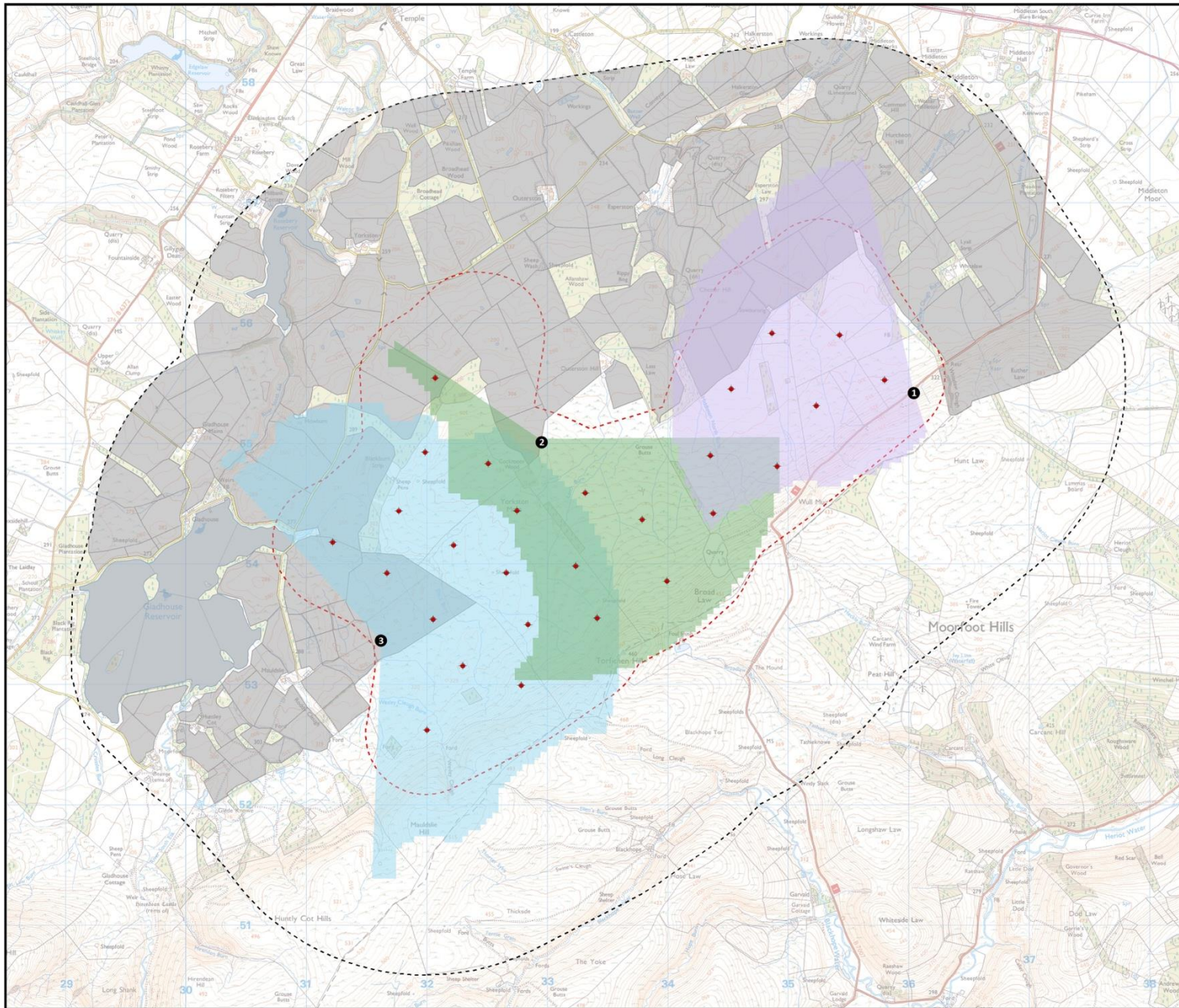
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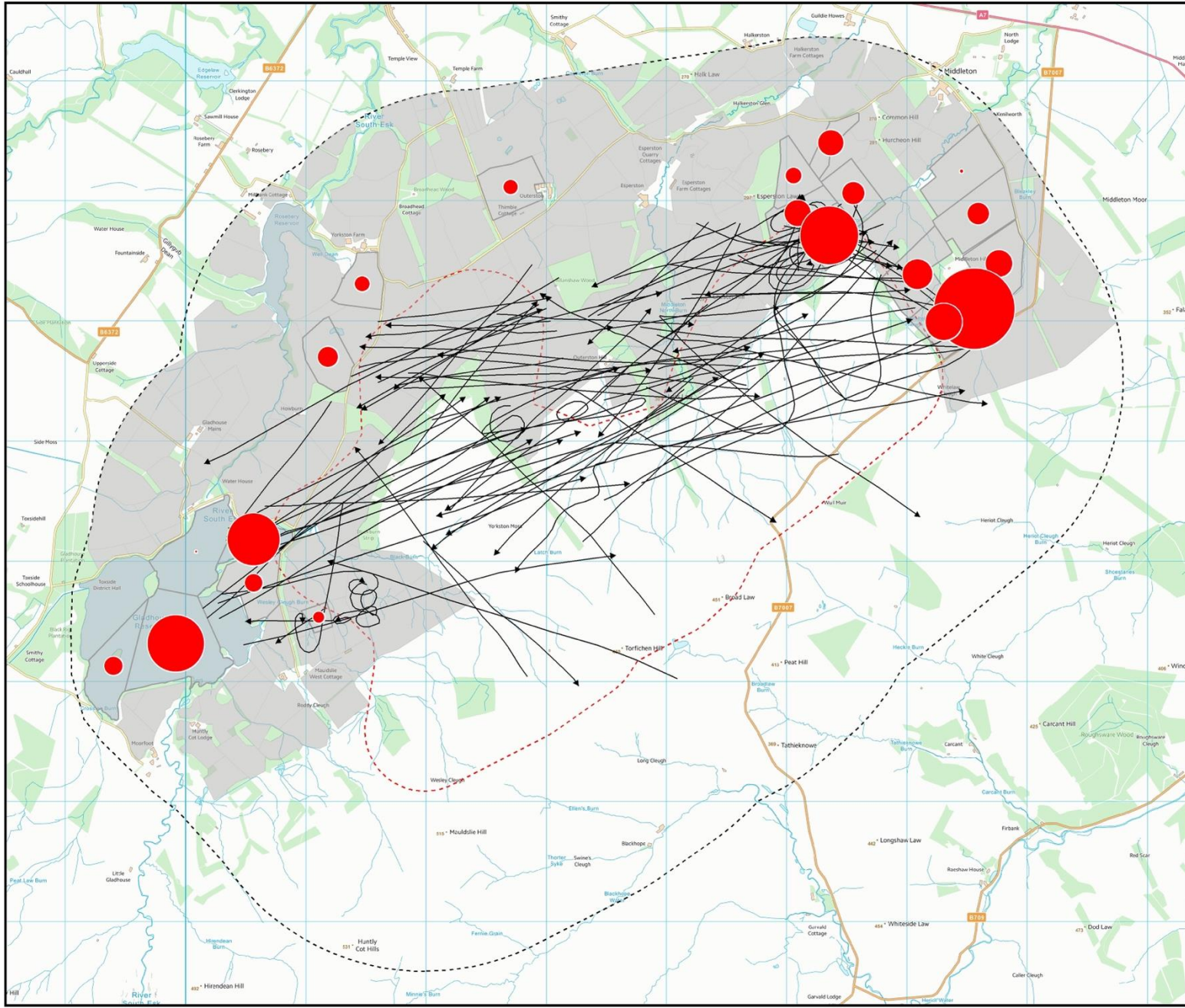
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**WINTERING BIRD
SURVEYS 2022-23**

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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 2

**Pink-footed goose field
peak counts and flight lines**

KEY:

- Flight Lines 2022-23
- - - Core walkover survey area
- - - Wider 2km buffer area
- Waterfowl survey area
- 1
- 10
- 1,000



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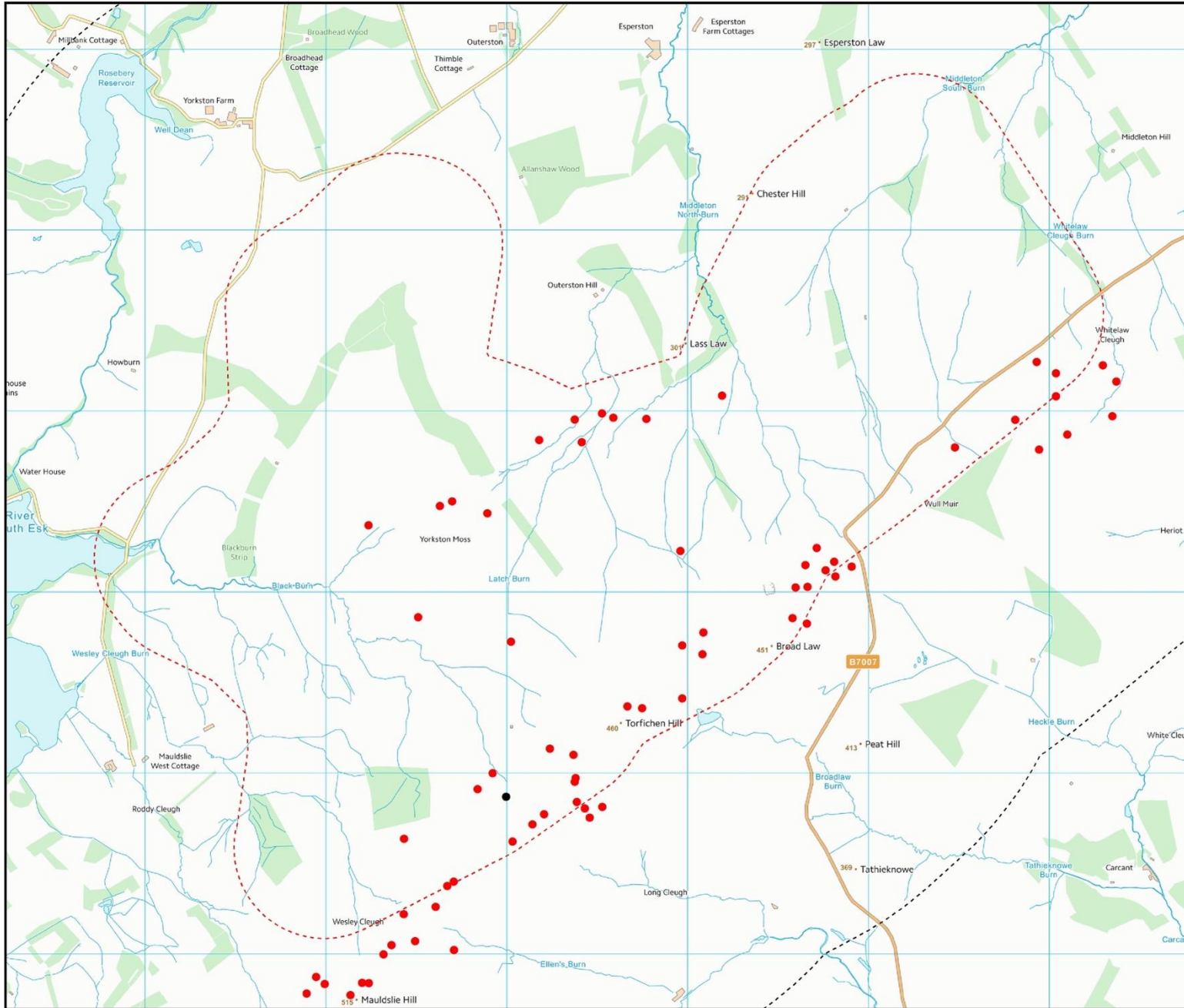
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FIGURE 3

**Red and Black Grouse
walkover survey records**

KEY:

- Core walkover survey area
- Wider 2km buffer area
- Black Grouse
- Red Grouse



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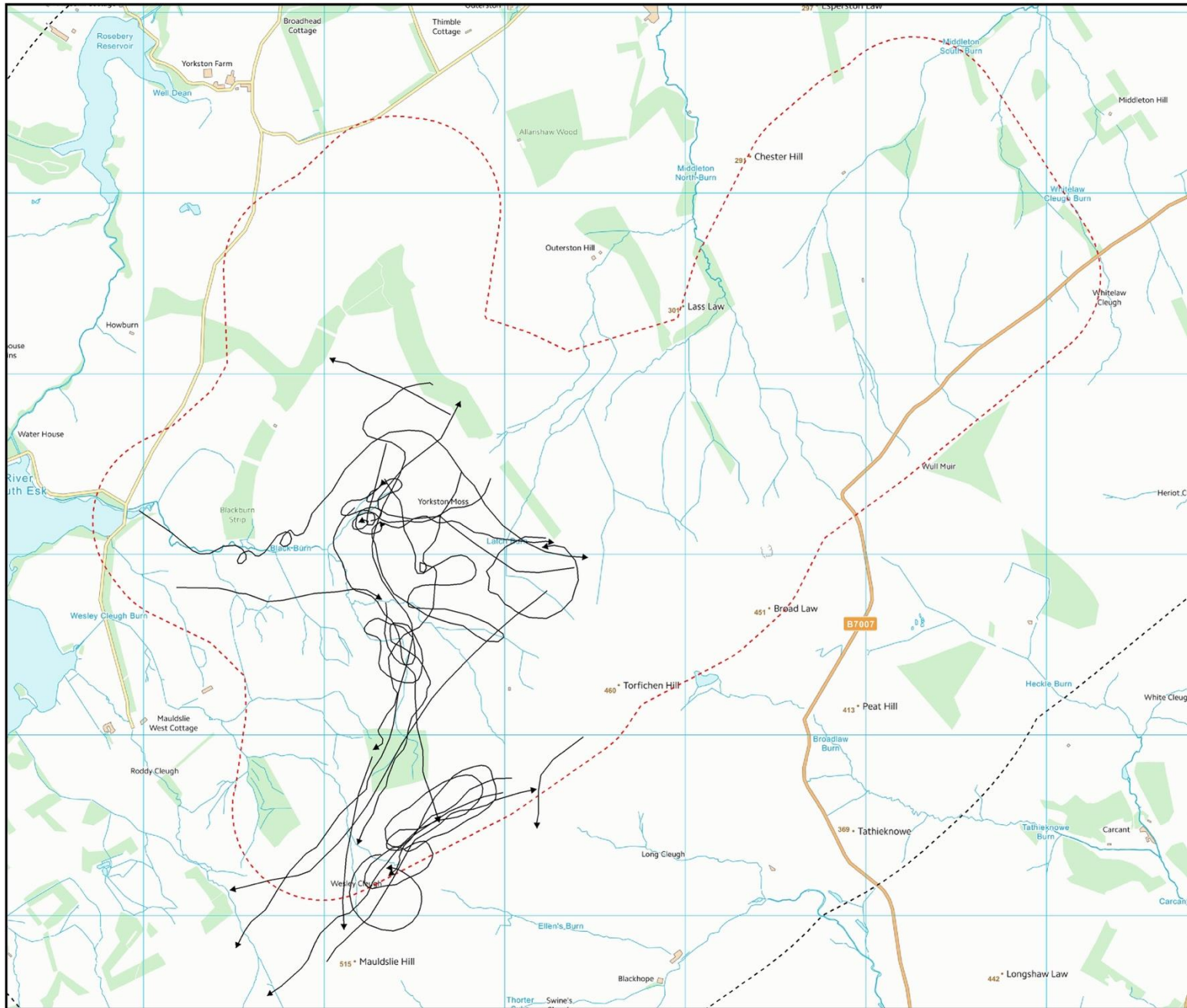
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Wintering Birds 2022-23**

FIGURE 4

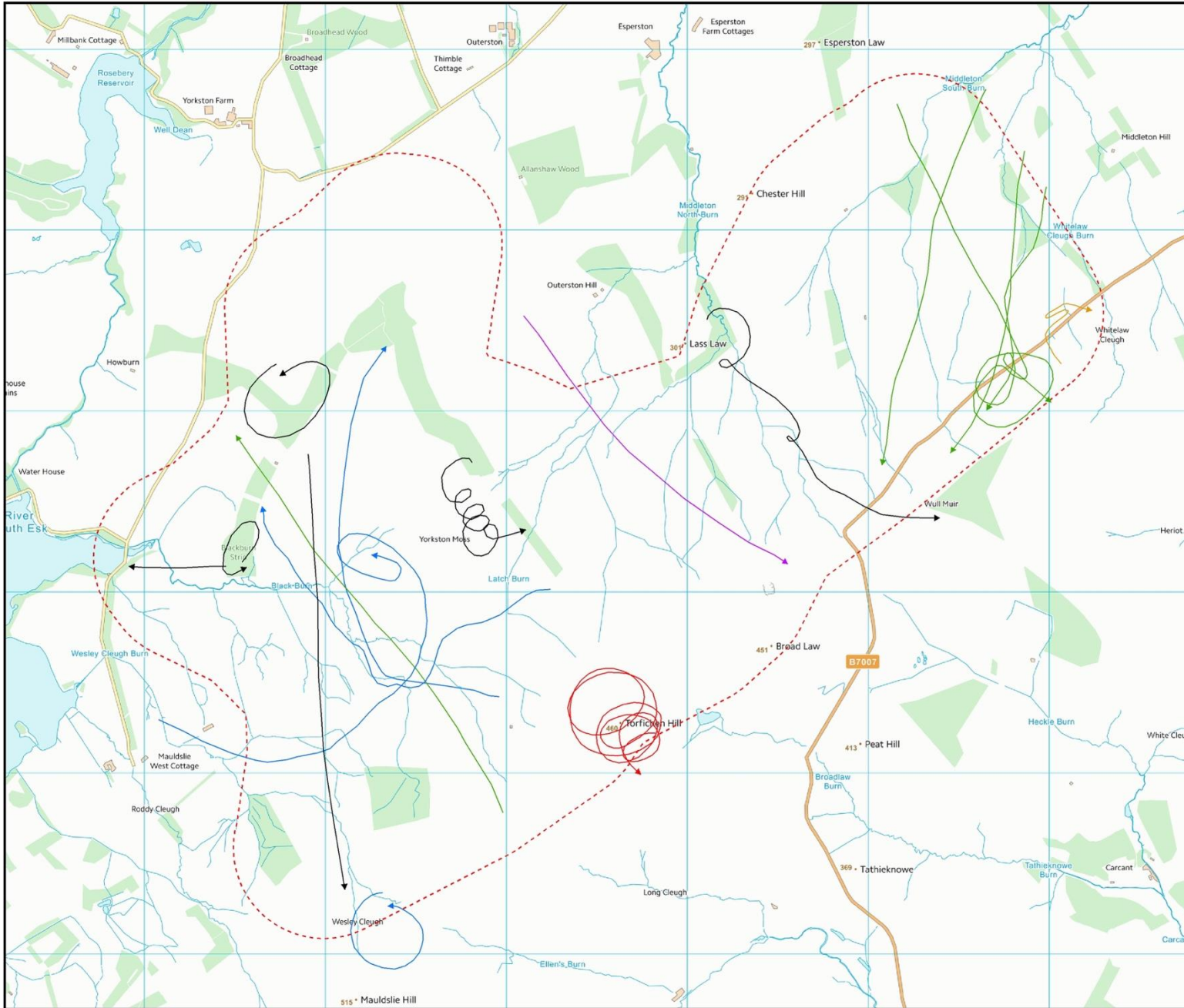
**Hen Harrier
Flight Lines**

KEY:

- Flight Lines 2022-23
- - - Core walkover survey area
- - - Wider 2km buffer area



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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 5

**Other scarce raptor
flight lines**

KEY:

Species

- Goshawk
- Red Kite
- Merlin
- Marsh Harrier
- Peregrine
- Short-eared Owl
- - - Core walkover survey area



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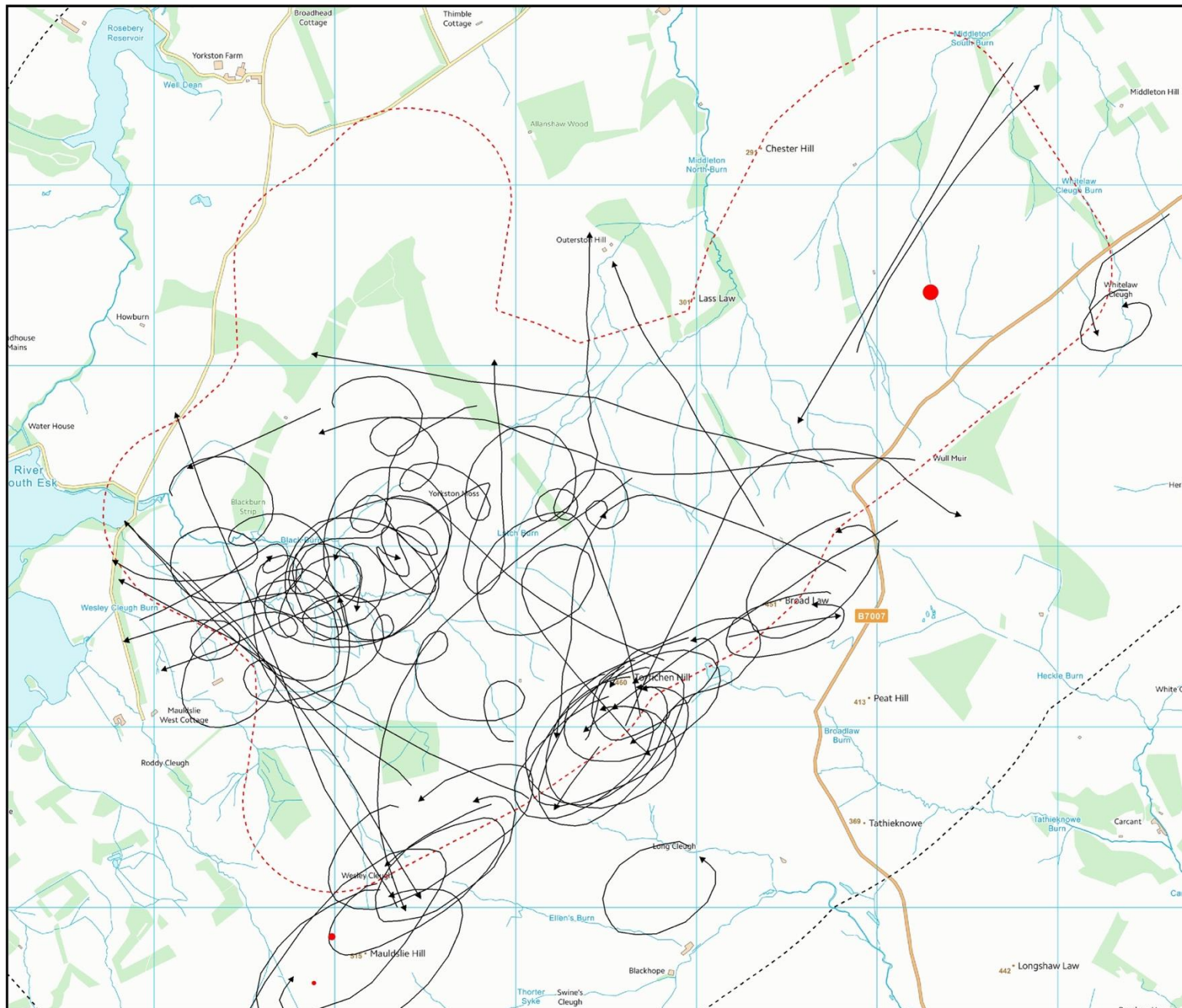
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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 6

**Golden Plover field
peak counts and flight lines**

KEY:

Flock

- 1
- 5
- 10

- Flight Lines 2022-23
- - - Core walkover survey area
- - - Wider 2km buffer area



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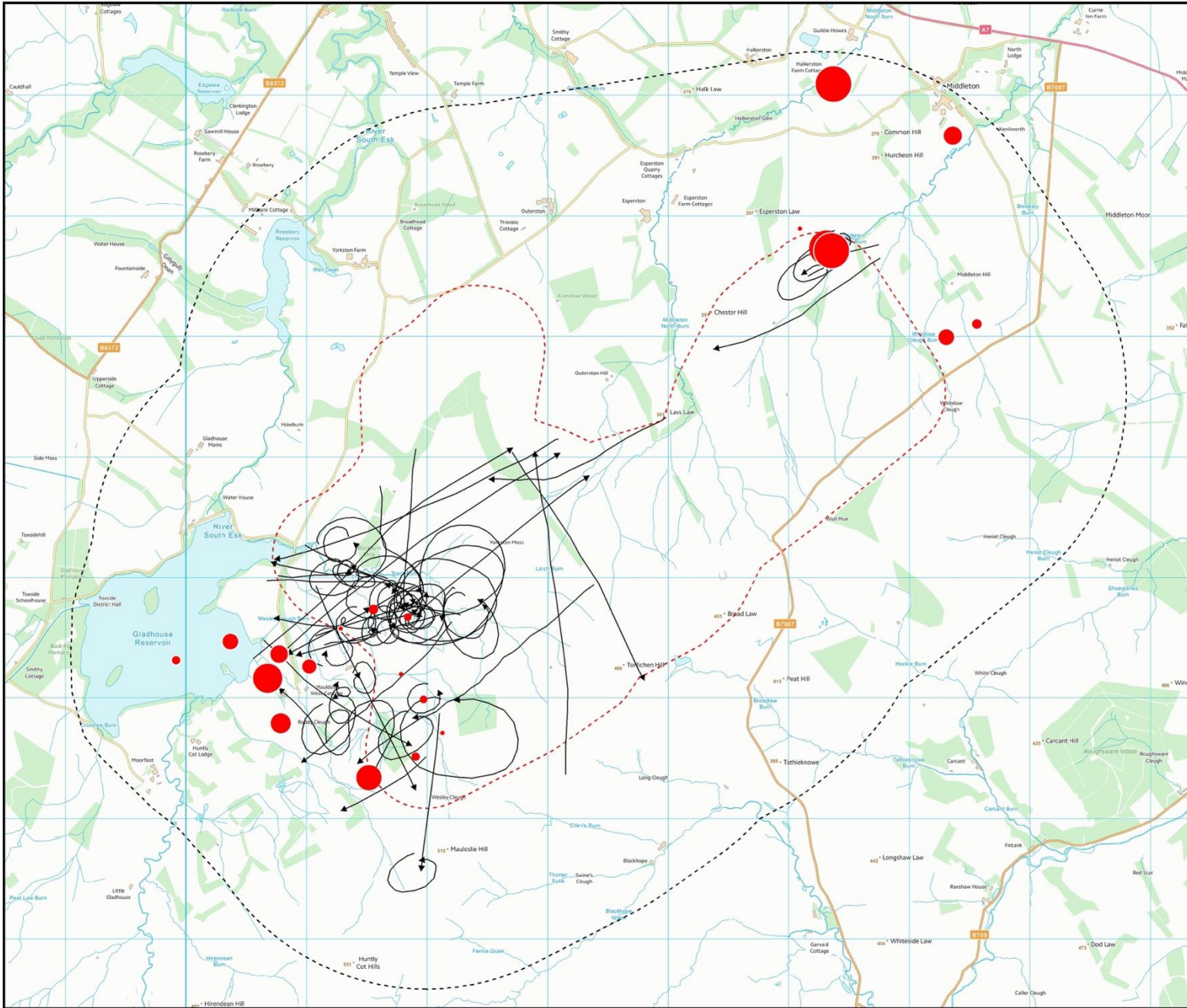
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Wintering Birds 2022-23**

FIGURE 7

**Lapwing field peak
counts and flight lines**

KEY:

- Flight Lines 2022-23
- Core walkover survey area
- Wider 2km buffer area
- 1
- 10
- 100



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FIGURE 8

Curlew field peak counts and flight lines

KEY:

- Flight Lines 2022-23
- Core walkover survey area
- - - Wider 2km buffer area
- 1
- 10
- 100



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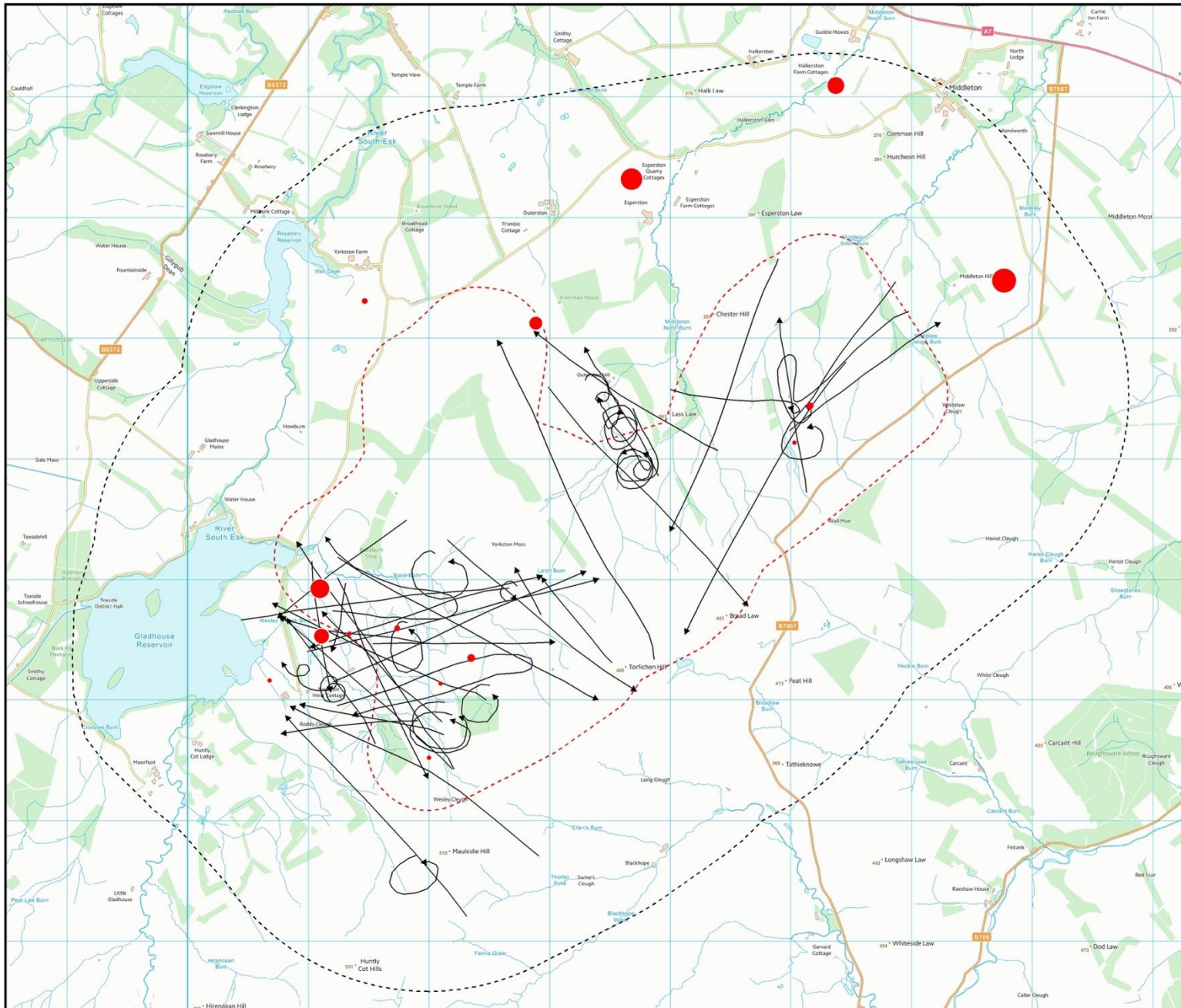
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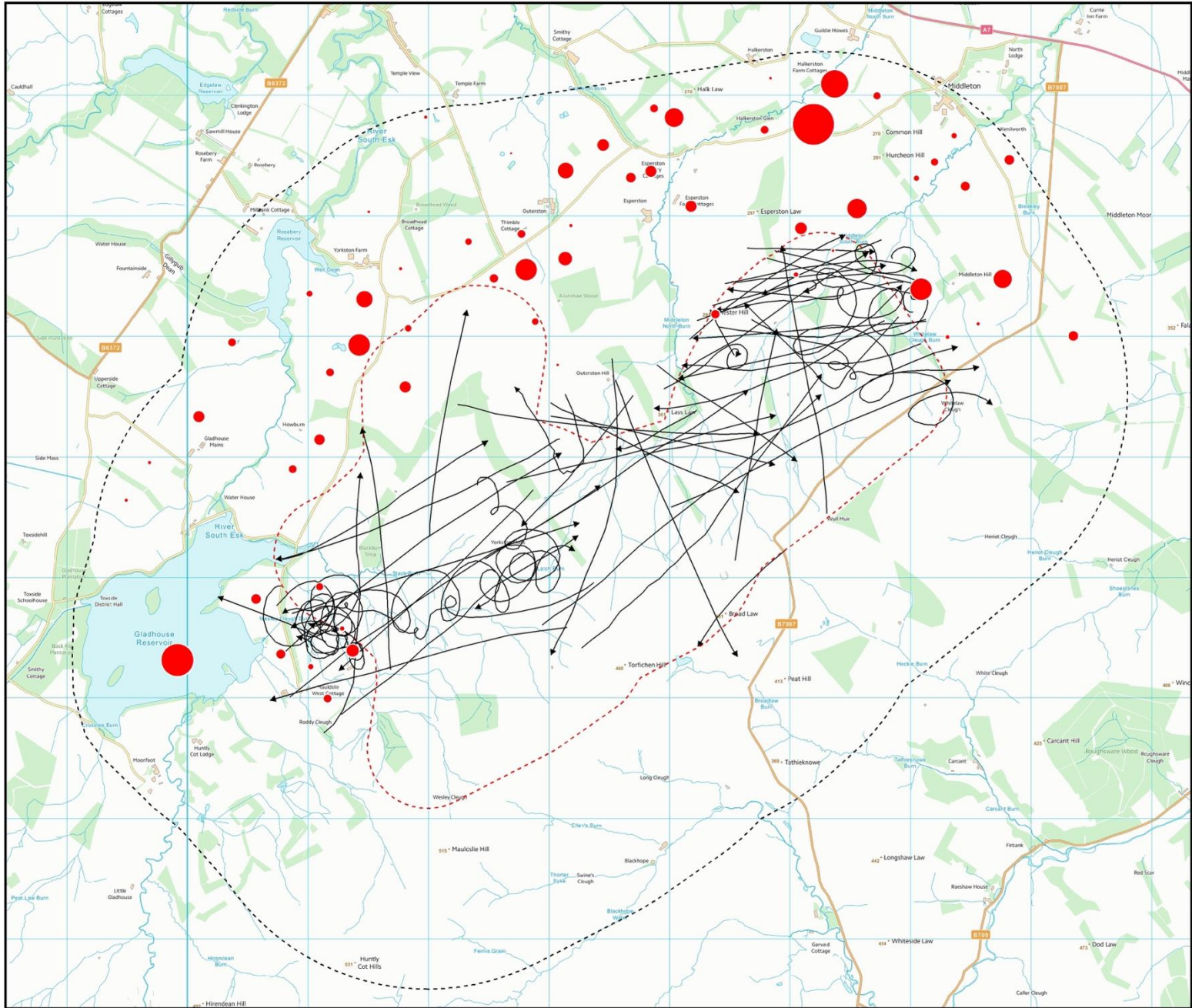
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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 9

Common Gull field peak counts and flight lines

KEY:

- Flight Lines 2022-23
- - - Core walkover survey area
- - - Wider 2km buffer area
- 1
- 10
- 1,000



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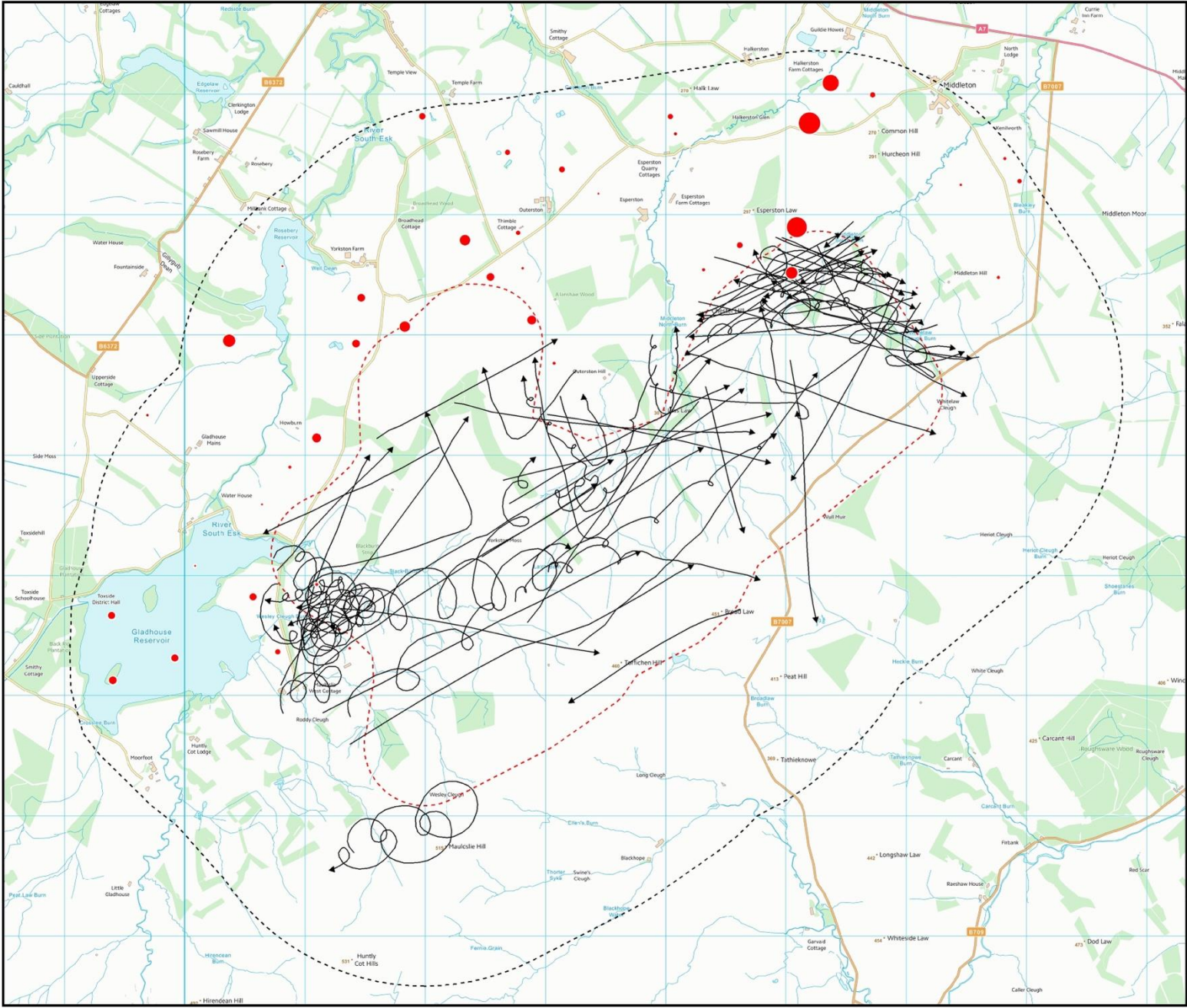
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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 10

Herring Gull field peak counts and flight lines

- KEY:**
- Flight Lines 2022-23
 - Core walkover survey area
 - Wider 2km buffer area
 - 1
 - 10
 - 100



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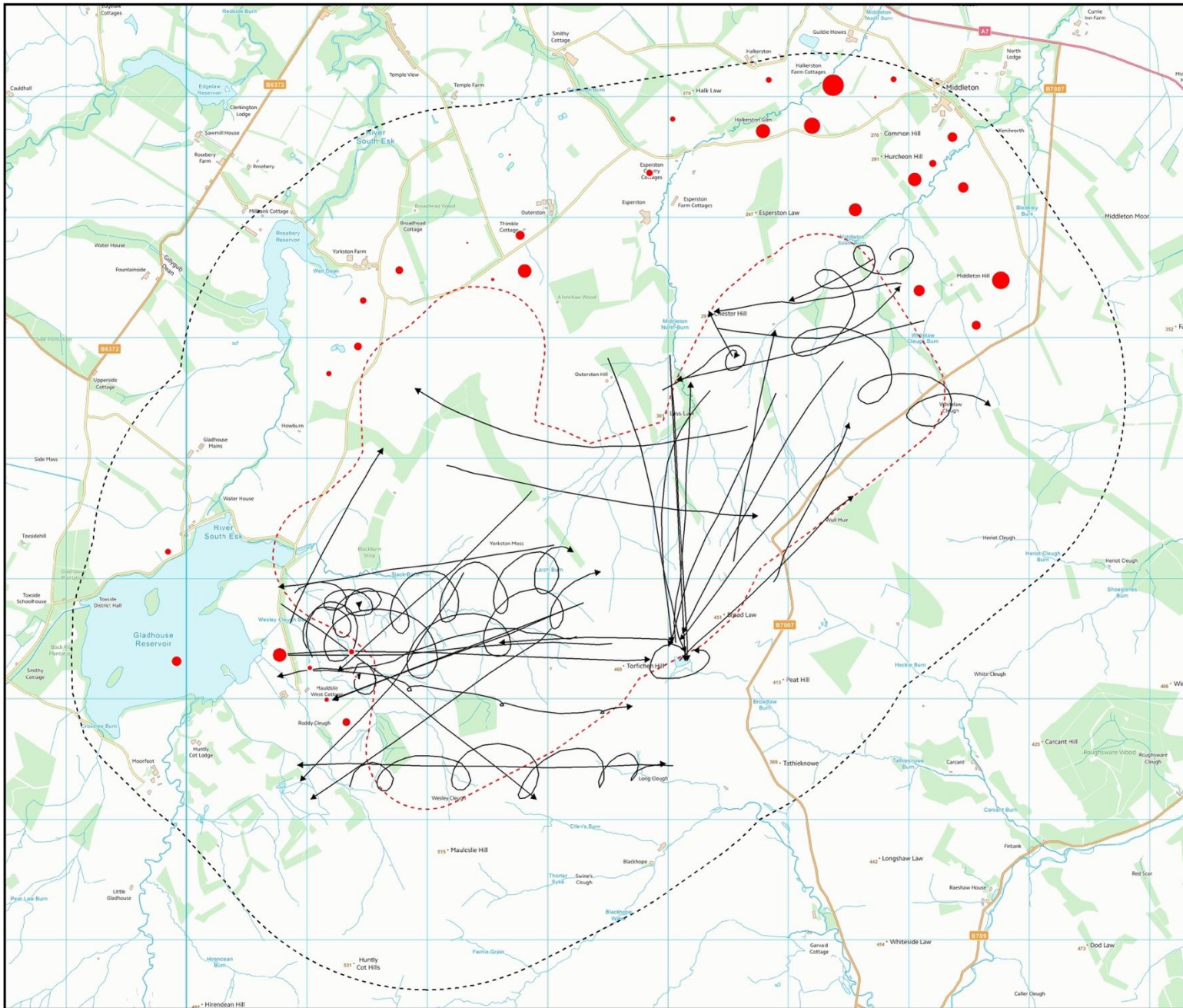
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**Torfichen Wind Farm:
Wintering Birds 2022-23**

FIGURE 11

Black-headed Gull field peak counts and flight lines

- KEY:**
- Flight Lines 2022-23
 - Core walkover survey area
 - Wider 2km buffer area
 - 1
 - 10
 - 100



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APPENDIX 1. VANTAGE POINT SURVEY DATA

Survey Information

TORFICHEN WIND FARM: WINTERING BIRD SURVEYS 2022-23

Date	Vantage Point No	Start time	Finish time	Weather	Observer
12/09/2022	1	07:30	10:30	6-8/8 cloud, 3 W wind, very good vis, brief periods of light drizzle	Stuart Piner
12/09/2022	1	11:00	14:00	8-4/8 cloud, 3-4 W wind, very good vis	Stuart Piner
12/09/2022	1	17:10	20:10	4-1/8 cloud, 4-3 W wind, very good vis	Stuart Piner
12/09/2022	1	17:40	18:10	4-1/8 cloud, 4-3 W wind, very good vis	Stuart Piner
13/09/2022	3	06:30	09:30	0-2/8 cloud, 3 W wind, excellent vis	Stuart Piner
13/09/2022	3	10:00	13:00	2-6/8 cloud, 3 W wind, excellent vis	Stuart Piner
13/09/2022	3	13:30	16:30	3-0/8 cloud, 3 W wind, excellent vis	Stuart Piner
19/09/2022	2	09:50	12:50	6-8/8 cloud, 0-1 W - NNW wind, very good vis	Stuart Piner
19/09/2022	2	13:20	16:20	8/8 cloud, 0 wind, very good vis	Stuart Piner
19/09/2022	2	16:50	19:50	8/8 cloud, 0-1 WSW wind, very good vis	Stuart Piner
20/09/2022	2	06:25	09:25	8/8 cloud, 1-2 WSW wind, very good vis, light rain	Stuart Piner
20/09/2022	1	15:10	16:10	8/8 cloud, 3 WSW wind, very good vis	Stuart Piner
20/09/2022	3	16:45	19:45	4-8/8 cloud, 1-2 variable wind, very good vis	Stuart Piner
21/09/2022	1	06:25	07:55	2-4/8 cloud, 3 SW wind, very good vis	Stuart Piner
04/10/2022	1	09:10	12:10	8/8 cloud, 4 SW wind, very good - 0k vis, rain showers	Stuart Piner
04/10/2022	1	12:40	15:40	8/8 cloud, 4 SW wind, very good vis, light rain showers	Stuart Piner
04/10/2022	1	16:10	19:10	7-8/8 cloud, 4-2 SW wind, very good vis	Stuart Piner
05/10/2022	2	12:40	15:40	8/8 cloud, 2-3 SW wind, very good vis, light showers	Stuart Piner
05/10/2022	2	16:10	19:10	3-5/8 cloud, 3-4 SW wind, very good vis, brief showers	Stuart Piner
06/10/2022	1	07:00	10:00	3-7/8 cloud, 4 SW wind, very good vis, brief showers	Stuart Piner
06/10/2022	1	13:00	16:00	4-8/8 cloud, 5 SW wind, very good vis, brief showers	Stuart Piner
11/10/2022	2	08:50	11:50	8-6/8 cloud, 2-3 SW wind, very good vis, brief showers	Stuart Piner
11/10/2022	2	12:20	15:20	7-8/8 cloud, 3 SW wind, very good vis	Stuart Piner
11/10/2022	2	15:50	18:50	7-8/8 cloud, 3 SW wind, very good vis	Stuart Piner
01/11/2022	2	07:00	10:00	6-8/8 cloud, 3 WSW wind, very good vis, brief light drizzle	Stuart Piner
01/11/2022	2	10:30	13:30	8/8 cloud, 3 WSW wind, very good vis, brief shower	Stuart Piner
01/11/2022	2	14:00	17:00	7-8/8 cloud, 3-4 WNW wind, very good vis	Stuart Piner
02/11/2022	1	06:45	09:45	8/8 cloud, 1-2 S wind, very good vis	Stuart Piner
02/11/2022	1	10:15	13:15	8/8 cloud, 3 S wind, very good vis, light rain	Stuart Piner
02/11/2022	1	16:05	17:05	8/8 cloud, 4-5 S wind, good vis	Stuart Piner
03/11/2022	1	16:00	17:00	0/8 cloud, 1-2 SW - W wind, very good vis	Stuart Piner
04/11/2022	1	06:45	09:45	4-1/8 cloud, 2-4 W wind, excellent vis	Stuart Piner
16/11/2022	3	07:00	10:00	6-2/8 cloud, 2-4 S wind, excellent vis	Stuart Piner
16/11/2022	3	10:30	13:30	6-8/8 cloud, 3-4 SE wind, very good vis	Stuart Piner
16/11/2022	3	14:00	16:30	8/8 cloud, 3-4 SE wind, very good vis	Stuart Piner
22/11/2022	3	07:15	10:15	7-3/8 cloud, 2-1 ENE wind, very good vis	Stuart Piner
22/11/2022	3	13:20	16:20	8-1/8 cloud, 0 wind, good vis	Stuart Piner
30/11/2022	3	08:00	11:00	4-1/8, 0 wind, good - excellent vis	Stuart Piner
30/11/2022	3	11:30	14:30	1-2/8, cloud 0, wind, excellent vis	Stuart Piner
30/11/2022	3	15:00	16:30	3-7/8 cloud, 0-1 SSW wind, very good vis	Stuart Piner
01/12/2022	1	07:40	10:40	8/8 cloud, 3 S wind, very good vis, light rain showers	Stuart Piner
01/12/2022	1	11:10	14:10	8/8 cloud, 3 S wind, very good vis, light rain showers	Stuart Piner
01/12/2022	3	14:45	16:15	8/8 cloud, 2-3 SW wind, very good vis	Stuart Piner
02/12/2022	3	07:30	10:30	8/8 cloud, 0-1 SSE wind, very good - good vis	Stuart Piner
02/12/2022	3	13:20	16:20	8/8 cloud, 2-3 SE wind, good - very good vis	Stuart Piner
19/12/2022	2	09:45	12:45	8/8 cloud, 4 S wind, good vis, drizzle at times	Stuart Piner
19/12/2022	2	13:15	16:15	8/8 cloud, 4-3 S - SSW wind, ok - good vis, steady rain then fine	Stuart Piner
21/12/2022	3	08:10	08:40	6/8 cloud, 4 SSW wind, very good vis	Stuart Piner
03/01/2023	1	12:00	15:00	8/8 cloud, 3-2 S wind, very good vis, light rain showers	Stuart Piner
03/01/2023	1	15:30	16:30	8/8 cloud, 1 S wind, ok vis, drizzle	Stuart Piner
04/01/2023	2	08:10	11:10	8/8 cloud, 5 W wind, very good - good vis, periods of steady rain	Stuart Piner
04/01/2023	2	11:40	14:40	8-7/8 cloud, 3-5 W wind, very good vis, light rain then fine	Stuart Piner
04/01/2023	3	15:20	16:20	8/8 cloud, 4 W wind, very good vis	Stuart Piner
05/01/2023	3	08:00	11:00	8/8 cloud, 3-4 S wind, very good vis	Stuart Piner
05/01/2023	3	11:30	13:30	8/8 cloud, 4 S wind, very good vis, light rain showers	Stuart Piner
01/02/2023	1	07:20	10:20	4-1/8 cloud, 4 W wind, excellent vis	Stuart Piner
01/02/2023	1	10:50	13:50	2-4/8 cloud, 4 W wind, excellent vis	Stuart Piner
01/02/2023	1	14:30	17:30	6-8/8 cloud, 4-2 W wind, very good - ok vis, fine then light rain	Stuart Piner
02/02/2023	2	07:20	10:20	8/8 cloud, 4 WSW wind, good vis - ok vis, brief periods of drizzle	Stuart Piner
02/02/2023	2	10:50	13:50	8/8 cloud, 4 WSW wind, ok - very good vis	Stuart Piner
02/02/2023	2	14:20	17:20	8/8 cloud, 4 WSW wind, good vis	Stuart Piner
03/02/2023	3	07:20	10:20	8/8 cloud, 3-4 WSW wind, very good vis	Stuart Piner
03/02/2023	3	10:50	13:50	8/8 cloud, 4 W wind, very good vis	Stuart Piner
03/02/2023	3	14:20	17:20	8/8 cloud, 3 W wind, ok - very good vis, short periods of light drizzle	Stuart Piner
09/02/2023	3	08:45	11:45	6-8/8 cloud, 5W wind, very good vis, brief drizzle	Stuart Piner
09/02/2023	1	14:15	17:15	6-8/8 cloud, 4-5 W wind, very good vis, brief light rain	Stuart Piner
21/02/2023	2	15:00	18:00	8/8 cloud, 4-2 SW wind, very good vis	Stuart Piner
03/03/2023	1	12:10	15:10	8/8 cloud, 1-2 NNE - N wind, very good vis	Stuart Piner
03/03/2023	1	15:40	18:10	8/8 cloud, 1 variable wind, very good vis	Stuart Piner
07/03/2023	3	08:30	11:30	2-0/8 cloud, 1 NE wind, excellent vis	Stuart Piner
07/03/2023	3	12:00	15:00	3-6/8 cloud, 1-2 variable, excellent vis	Stuart Piner
07/03/2023	1	18:00	19:00	0/8 cloud, 1 WNW wind, excellent vis	Stuart Piner
08/03/2023	2	06:45	09:45	0/8 cloud, 1-2 ENE wind, excellent vis	Stuart Piner
08/03/2023	2	15:20	18:20	2-6/8 cloud, 2-3 ENE wind, very good - ok vis, snow shower in last 30 mins	Stuart Piner
09/03/2023	1	06:00	09:00	2-5/8 cloud, 1-2 ENE wind, very good vis, brief snow shower	Stuart Piner
09/03/2023	1	09:30	12:00	6-8/8 cloud, 2 ENE wind, very good vis, brief period of ok vis during snow shower	Stuart Piner
16/03/2023	2	12:30	15:30	6-8/8 cloud, 1-3 SW wind, very good vis	Stuart Piner
16/03/2023	2	16:00	19:00	8/8 cloud, 2-3 SW wind, very good - good vis, brief period of drizzle	Stuart Piner
17/03/2023	3	05:45	08:45	4-6/8 cloud, 3-2 WSW wind, very good vis	Stuart Piner
17/03/2023	3	10:15	13:15	4-6/8 cloud, 2-3 SW wind, very good vis	Stuart Piner



Key Species Data

VP	Date	Time	Species	Count	Direction of flight	Flight height (m)	Activity	Time bird observed (sec)	Notes
1	12/09/2022	09:38	PE	1	SSW	21		100	adult male
1	12/09/2022	12:42	PE	1	SSW	15		150	juv 1cy
1	12/09/2022	17:54	PE	1	S	14		110	adult
3	13/09/2022	06:49	GI	1	circle SSE	45		210	flew to wood
3	13/09/2022	07:11	MR	1	WNW	3	hunt	330	juv 1cy
3	13/09/2022	07:27	HH	1	E	3	hunt	190	female, dropped
3	13/09/2022	07:37	HH	1	circle	4	hunt	660	female, same as 8
3	13/09/2022	09:11	HH	1	SW	8		60	female, imm
3	13/09/2022	10:44	PE	1	NW	60		150	juv
3	13/09/2022	10:55	HH	2	SW	5		480	
3	13/09/2022	11:08	HH	1	NE	5	hunt	330	ringtail
3	13/09/2022	11:16	HH	1		11	hunt	720	ringtail
3	13/09/2022	11:19	HH	1	SW	5	hunt	660	ringtail
3	13/09/2022	12:19	HH	1	SW	8	hunt	360	
3	13/09/2022	12:29	MR	1	SW	3	hunt	720	
3	13/09/2022	13:33	HH	1	SW	3	hunt	540	ringtail
3	13/09/2022	14:05	MR	1		15		960	juv, interacting with HH and BZ
3	13/09/2022	14:05	HH	1		15		960	ringtail, interacting with MR and BZ
2	19/09/2022	10:01	PG	16	NW	180		70	
2	19/09/2022	10:06	GI	1		125		300	
2	19/09/2022	10:12	GP	3	NE	135		180	
2	19/09/2022	10:21	PG	3	SE	95		150	
2	19/09/2022	11:01	PG	1	ESE	90		130	
2	19/09/2022	11:18	PG	45	NW	300		180	
2	19/09/2022	17:01	KT	1		85		360	
3	20/09/2022	16:46	PG	130	SW	25		60	landed on reservoir (out of buffer)
3	20/09/2022	16:54	PG	25	SW	25		60	
3	20/09/2022	18:52	HH	1	SSW	5	roost	70	ringtail
3	20/09/2022	18:58	MR	1	ESE	8	roost	270	juv, flushed HH (14)
3	20/09/2022	19:02	HH	1		3	roost	40	same as 14, flushed by MR then re-roosted
3	20/09/2022	19:19	PG	220					roosted on Gladhouse Reservoir arriving from north (off site)
3	20/09/2022	19:24	PG	65					roosted on Gladhouse Reservoir arriving from north (off site)
3	20/09/2022	19:28	PG	39		13	hunt	90	
3	20/09/2022	19:31	PG	39					roosted on Gladhouse Reservoir arriving from north (off site)
1	21/09/2022	08:01	PG	70	ESE	80		90	
1	04/10/2022	09:21	PG	300					NT 346 581
1	04/10/2022	13:12	PG	300					briefly lifted from field north of buffer (out with buffer area)
1	04/10/2022	14:35	PG	600					flew from fields north of buffer to fields closer to (but still outside) north buffer
1	04/10/2022	14:36	L	70		20		270	flushed
1	04/10/2022	14:46	L	70		10		90	flushed
1	04/10/2022	16:42	L	110		40		180	lingered over fields
1	04/10/2022	17:10	PG	16	SE	18		65	
1	04/10/2022	17:44	PG	23	SE	15		40	flew from field
1	04/10/2022	17:51	PG	205	SE	15		40	flew from field
1	04/10/2022	18:14	L	130		30		180	lingered over fields
1	04/10/2022	18:30	PG	45	SE	15		40	flew from field
1	04/10/2022	18:51	PG	67	SW	65	roost	150	flew from field
1	04/10/2022	18:56	PG	460	SW	45	roost	180	flew from field
1	04/10/2022	19:00	PG	370	SW	45	roost	180	flew from field
1	04/10/2022	19:07	PG	60	SW	35	roost	180	
1	04/10/2022	19:13	PG	400	SW	35	roost	180	very dark, after VP end
2	05/10/2022	14:00	PG	2	NE	28		20	
2	05/10/2022	15:07	PG	3	SW	18		170	
2	05/10/2022	17:07	PG	1	WSW	35		120	
2	05/10/2022	17:59	PG	3	WSW	30		120	
2	05/10/2022	18:55	PG	1600	SW	40	roost	420	arrived in one continuous stream
2	05/10/2022	18:55	PG	1800	SW	40	roost	420	arrived in one continuous stream
2	05/10/2022	18:56	PG	300	SW	50	roost	300	
2	05/10/2022	19:05	PG	280	SW	50	roost	300	
1	06/10/2022	08:07	GP	4	NE	40		30	rapid flight backed by wind
1	06/10/2022	08:23	PG	900	ENE	40	left roost	300	landed
1	06/10/2022	08:30	PG	12	E	40	left roost	240	landed
1	06/10/2022	08:32	PG	240	E	40	left roost	240	landed
1	06/10/2022	08:35	PG	59	ENE	50	left roost	180	landed



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1	06/10/2022	08:37	PG	170	ENE	60	left roost	180	landed
1	06/10/2022	09:16	PG	13	ENE	40	left roost	180	landed
1	06/10/2022	09:25	PG	650	NE	110	left roost	300	
1	06/10/2022	09:53	PG	12	ENE	110	left roost	180	
1	06/10/2022	09:53	PG	35	ENE	50	left roost	180	
1	06/10/2022	09:54	GP	6	SW	55		180	
1	06/10/2022	13:11	L	130		25		70	
1	06/10/2022	15:02	PG	5	E	40		45	
1	06/10/2022	15:06	PG	6	SE	30		210	
2	11/10/2022	08:53	PG	85	ESE	90		210	
2	11/10/2022	10:08	PG	15	WSW	90		120	
2	11/10/2022	10:16	GP	38		30		1200	same flock as detailed above
2	11/10/2022	11:19	GP	44		30		300	
2	11/10/2022	11:41	GP	25		45		540	until VP end
2	11/10/2022	13:07	ML	1	SE	8		85	female, imm
2	11/10/2022	14:11	GP	6	ENE	20		25	flushed by GJ
2	11/10/2022	14:20	GP	6		30		270	presumably same as 8
2	11/10/2022	15:10	PG	52	W	50		330	
2	11/10/2022	15:15	PG	86	SW	60		150	
2	11/10/2022	16:19	PG	25	SE	115		110	
2	11/10/2022	18:48	PG	35	SW	55	roost	120	
2	01/11/2022	07:24	GP	26	NE	175		170	
2	01/11/2022	08:40	GP	35	SW	110		110	
2	01/11/2022	09:47	PG	41	ENE	55		120	
2	01/11/2022	12:31	GP	9	W	38		210	
2	01/11/2022	13:14	GP	6	NW	80		150	
2	01/11/2022	15:38	GP	9	WNW	55		150	
2	01/11/2022	16:00	GP	24	NW	18		80	
1	02/11/2022	06:54	PG	110	ENE	90	left roost	180	
1	02/11/2022	08:02	GP	2	SW	28		40	
1	02/11/2022	09:10	PG	1	E	60		210	
1	04/11/2022	07:02	PG	140	NE	80	left roost	75	tailwind, landed at NT 375 578 (off site)
1	04/11/2022	07:05	PG	180	NE	80	left roost	100	tailwind, landed at NT 375 578 (off site)
1	04/11/2022	08:11	PG	65	SW	150		110	
1	04/11/2022	08:51	L	35	WSW	10		25	landed
3	16/11/2022	07:50	GP	25		70		1860	
3	16/11/2022	08:20	L	14	E	8		300	landed
3	16/11/2022	09:05	GI	1	W	2		40	adult female
3	16/11/2022	09:09	GP	13	circle SE	30		360	landed
3	16/11/2022	09:40	GP	8		85		960	
3	16/11/2022	11:21	GP	30		100		480	
3	16/11/2022	11:30	GP	9	NNW	125		210	
3	16/11/2022	11:55	GP	9	SW	150		160	
3	16/11/2022	12:19	GP	4	NW	40		330	landed after several attempts
3	16/11/2022	16:18	GP	30	SW	15		25	landed
3	22/11/2022	07:18	PG	65	ENE	50	left roost	210	
3	22/11/2022	07:20	PG	30	NE	40	left roost	180	
3	22/11/2022	07:36	GP	32		85		450	
3	22/11/2022	09:00	WS	5	SE	15		70	1 juv, landed on reservoir
3	22/11/2022	09:28	GI	1		13		95	landed in tree, adult female
3	22/11/2022	10:14	WS	7	NE	75		210	1 juv
3	22/11/2022	13:32	GP	7	NE	13		50	landed
3	22/11/2022	14:16	L	4	S	20		120	landed
3	22/11/2022	15:27	L	4	SW	8		70	flew from field
3	30/11/2022	08:11	L	26	SW	25		160	
3	30/11/2022	08:14	L	6	S	15		150	landed
3	30/11/2022	08:19	L	12	NNW	125		180	
3	30/11/2022	08:21	GP	10	NNW	300		220	
3	30/11/2022	08:34	L	29	NE	35		180	
3	30/11/2022	08:41	L	10	SE	70		270	
3	30/11/2022	08:50	GP	60		125		3060	
3	30/11/2022	09:11	GP	14		25		960	
3	30/11/2022	09:34	L	5	NE	15		130	flew from ground
3	30/11/2022	10:24	L	37	NE	45		180	
3	30/11/2022	11:43	L	45		25		660	landed
3	30/11/2022	11:43	GP	4		25		660	landed
3	30/11/2022	12:05	L	2	WSW	9		90	flew from ground
3	30/11/2022	12:16	HH	1	SSW	2	hunt	170	juv (1cy), landed on post
3	30/11/2022	12:35	HH	1	SSE	13	hunt	420	flew from post, mobbed K, landed on post
3	30/11/2022	12:36	GP	3	NE	25		90	flushed by HH
3	30/11/2022	12:46	L	27		20		420	landed
3	30/11/2022	12:46	GP	7		20		420	landed
3	30/11/2022	12:58	HH	1	SSW	5		110	flew from post
3	30/11/2022	14:08	GP	1	WSW	6		50	
3	30/11/2022	15:07	GP	60		85		105	
3	30/11/2022	16:03	GP	60		75		90	

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										yesterday so those probably roosted, elsewhere, and flight direction also suggests that
1	01/12/2022	07:45	PG	70 SE		125	left roost		210	
1	01/12/2022	07:46	PG	40 SE		125	left roost		210	
1	01/12/2022	07:47	PG	100 E		90	left roost		180	
1	01/12/2022	07:48	PG	130 SE		125	left roost		210	
1	01/12/2022	07:48	PG	3 E		90	left roost		180	
1	01/12/2022	07:50	PG	20 ESE		125	left roost		210	
1	01/12/2022	07:53	PG	260 SE		125	left roost		210	
1	01/12/2022	07:53	PG	9 E		90	left roost		180	
1	01/12/2022	07:53	PG	80 ESE		125	left roost		210	
1	01/12/2022	07:55	PG	28 ESE		125	left roost		210	
1	01/12/2022	07:55	PG	12 E		90	left roost		180	
1	01/12/2022	07:57	PG	140 SE		125	left roost		210	
1	01/12/2022	07:57	PG	8 WSW		70	left roost		240	
1	01/12/2022	08:00	PG	21 ESE		125	left roost		210	
1	01/12/2022	08:02	PG	3 E		90	left roost		180	
1	01/12/2022	08:04	PG	25 E		70	left roost		180	
1	01/12/2022	08:09	PG	65 ESE		150	left roost		210	
1	01/12/2022	08:10	PG	90 ESE		150	left roost		210	
1	01/12/2022	13:27	PG	3 ESE		90			270	
3	01/12/2022	15:01	GP	35		65			360	
3	02/12/2022	07:20	PG	100 E						before VP start, flew over site from Gladhouse roost (dark)
3	02/12/2022	07:36	PG	110 E		75	left roost		240	not observed any at roost during yesterday evenings VP, perhaps around after dark
3	02/12/2022	07:37	PG	130 ENE		70	left roost		240	not observed any at roost during yesterday evenings VP, perhaps around after dark
3	02/12/2022	07:42	PG	250 ENE		70	left roost		240	not observed any at roost during yesterday evenings VP, perhaps around after dark
3	02/12/2022	07:44	PG	310 E		75	left roost		240	not observed any at roost during yesterday evenings VP, perhaps around after dark
3	02/12/2022	07:49	PG	420 ENE		70	left roost		240	not observed any at roost during yesterday evenings VP, perhaps around after dark
3	02/12/2022	07:58	PG	56 NE		100	left roost		270	
3	02/12/2022	08:14	PG	1 ENE		45	left roost		210	
3	02/12/2022	08:29	PG	105		60	left roost		1860	
3	02/12/2022	08:55	WS	3 SW		55			360	adults
3	02/12/2022	09:02	GP	1 SW		50			180	
3	02/12/2022	09:05	HH	1 NW		3	hunt		100	ringtail
3	02/12/2022	09:10	GP	50		100			3000	
3	02/12/2022	09:24	PG	1 SW		55			150	
3	02/12/2022	09:47	HH	1		3	hunt		660	
3	02/12/2022	10:18	HH	1		3	hunt		720	until VP end
3	02/12/2022	13:48	GP	45		125			1200	
3	02/12/2022	15:11	KT	1		25			45	briefly on view
3	02/12/2022	15:17	GP	19		100			900	
3	02/12/2022	15:41	GP	27 NW		125			180	
2	19/12/2022	11:34	PG	20 ENE		55			220	
1	03/01/2023	13:11	PG	60 SE		8			30	flew between fields
1	03/01/2023	15:41	PG	900		15			110	brief flight above field then landed again - majority of flock
2	04/01/2023	08:23	PG	360 ENE		65	left roost		130	
2	04/01/2023	08:30	PG	40 ESE		45	left roost		70	
2	04/01/2023	08:32	PG	35 ESE		45	left roost		70	
2	04/01/2023	08:40	PG	43 ESE		45	left roost		70	
2	04/01/2023	08:41	PG	27 ESE		45	left roost		70	
2	04/01/2023	11:58	GI	1 SSE		40			150	adult female
2	04/01/2023	12:54	PG	1 E		95			70	
3	05/01/2023	08:28	PG	325 NE		60	left roost		110	
3	05/01/2023	08:42	PG	44 NE		35			110	
3	05/01/2023	10:32	HH	1 SE		8	hunt		540	ringtail
3	05/01/2023	12:11	HH	1 WSW		3	hunt		140	ringtail
3	05/01/2023	13:21	GP	40 SW					15	
1	01/02/2023	07:21	PG	450 ENE		30	left roost		120	landed
1	01/02/2023	07:23	PG	200 ENE		55	left roost		120	landed
1	01/02/2023	07:23	PG	80 ENE		115	left roost		120	
1	01/02/2023	07:29	PG	55 ENE		30	left roost		120	landed
1	01/02/2023	07:35	PG	30 ENE		40	left roost		120	landed
1	01/02/2023	07:37	PG	350 ENE		75	left roost		120	landed
1	01/02/2023	07:38	PG	350 ENE		75	left roost		120	landed
1	01/02/2023	07:38	PG	90 E		40	left roost		120	landed
1	01/02/2023	07:40	PG	40 E		75	left roost		120	landed
1	01/02/2023	07:41	PG	3 ENE		75	left roost		120	landed
1	01/02/2023	07:45	PG	42 E		40	left roost		120	landed
1	01/02/2023	07:47	PG	60 ENE		75	left roost		120	landed
1	01/02/2023	08:36	L	1 SW		20			240	
1	01/02/2023	09:13	PG	28 ESE		30			90	landed
1	01/02/2023	09:58	PE	1 SSE		47			175	adult
1	01/02/2023	10:04	GP	11		40			90	
1	01/02/2023	11:16	PG	1 SSW		35			330	
1	01/02/2023	16:58	SE	1 NNW		7	hunt		50	

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2	02/02/2023	07:31	PG	2 NE	70	left roost	90	
2	02/02/2023	07:37	PG	580 NE	50	left roost	60	
2	02/02/2023	07:39	PG	90 NE	50	left roost	60	
2	02/02/2023	07:40	PG	65 NE	50	left roost	60	
2	02/02/2023	07:41	PG	1 ENE	40	left roost	190	joined 3
2	02/02/2023	07:42	PG	3 ENE	45	left roost	90	
2	02/02/2023	07:43	PG	425 NE	50	left roost	60	
2	02/02/2023	07:44	PG	90 ENE	50	left roost	90	
2	02/02/2023	09:08	PG	3 SW	33		270	
2	02/02/2023	09:14	PG	16 NE	90		110	
2	02/02/2023	17:36	PG	1000 WNW	60	roost		after VP finish - difficult to see exact total as dark, but in excess of 1000
3	03/02/2023	07:26	L	20 ENE	3	left roost	40	landed
3	03/02/2023	07:34	PG	60 ENE	65	left roost	135	
3	03/02/2023	07:35	PG	54 ENE	65	left roost	135	
3	03/02/2023	07:36	PG	140 ENE	65	left roost	135	
3	03/02/2023	07:36	PG	30 ENE	50	left roost	150	
3	03/02/2023	07:36	PG	25 ENE	13	left roost	70	landed
3	03/02/2023	07:38	PG	110 ENE	65	left roost	135	
3	03/02/2023	07:40	PG	200 ENE	65	left roost	135	
3	03/02/2023	07:45	PG	30 ENE	100	left roost	140	
3	03/02/2023	07:46	PG	290 ENE	65	left roost	135	
3	03/02/2023	08:16	PG	25	5		80	same as 4
3	03/02/2023	09:37	L	26 circle	15		60	flew from field
3	03/02/2023	09:39	PG	25 W	15		45	flew from field
3	03/02/2023	11:52	L	1 SW	45		270	
3	03/02/2023	12:06	L	19 SW	28		90	
3	03/02/2023	12:41	L	44 NNE	23		150	
3	03/02/2023	17:24	PG	450 SW	50	roost	180	after VP finish - smaller numbers heard at 17:35 but too dark to count
3	09/02/2023	08:45	L	21	6		25	
3	09/02/2023	10:45	PG	3 circling	60		420	
1	09/02/2023	15:19	PG	54 SE	20		70	flew to larger flock
1	09/02/2023	15:40	PG	490 NW	20		130	flew between fields
1	09/02/2023	15:53	PG	30 ESE	20		100	landed
1	09/02/2023	16:37	PG	3 NE	10		15	
1	09/02/2023	16:45	PG	487	15		50	short flight above field
2	21/02/2023	15:46	GP	42	100		720	
1	03/03/2023	13:37	PG	135 SW	20		220	landed out of view behind wood
1	03/03/2023	14:01	CU	3 ESE	15		50	landed
1	03/03/2023	14:32	PG	36 NE	500	migrants	390	
1	03/03/2023	14:34	CU	18 SW	10		150	landed
1	03/03/2023	16:33	PG	29 ENE	75		160	landed to north of map (field 97)
1	03/03/2023	16:39	PG	135 N	15		40	flew from field and joined birds at 3
1	03/03/2023	16:58	PG	109 NE	30		180	landed 1 field 97
3	07/03/2023	08:33	CU	1 WNW	9		50	
3	07/03/2023	08:40	CU	1	10		35	
3	07/03/2023	08:44	CU	1 WSW	15		90	same as 3, flew
3	07/03/2023	08:46	PG	105 SSW	20		130	
3	07/03/2023	08:56	CU	1 ENE	13		90	landed
3	07/03/2023	08:57	L	3 E	10		420	landed
3	07/03/2023	09:03	L	19 SE	15		150	landed
3	07/03/2023	09:06	GP	6 circle	30		270	
3	07/03/2023	09:07	L	1	15		360	
3	07/03/2023	09:31	GI	1 S	13		140	adult male
3	07/03/2023	09:32	CU	1	10		110	
3	07/03/2023	09:38	L	20 circle NNE	25		70	landed
3	07/03/2023	09:38	CU	1 NW	30		70	
3	07/03/2023	10:08	L	2	15		180	
3	07/03/2023	11:04	CU	1 SSW	5		30	landed
3	07/03/2023	11:14	CU	1 NW	6		30	
3	07/03/2023	12:01	L	2	15		300	
3	07/03/2023	12:06	L	49 ENE	15		120	landed
3	07/03/2023	12:13	CU	2 NW	25		70	landed
3	07/03/2023	12:14	L	1	10		70	
3	07/03/2023	12:18	L	1	15		120	
3	07/03/2023	12:24	L	50	10		120	
3	07/03/2023	12:43	L	11 SE	13		90	landed
3	07/03/2023	13:04	PG	105 SW	15		40	flew between fields
3	07/03/2023	13:39	L	1 WNW	8		35	
3	07/03/2023	14:02	L	1	10		110	
3	07/03/2023	14:16	L	32 circle	15		70	
3	07/03/2023	14:55	CU	25 SSE	10		45	landed



TORFICHEN WIND FARM: WINTERING BIRD SURVEYS 2022-23

2	08/03/2023	06:47	CU	1 SSE	18	display	110	
2	08/03/2023	08:13	CU	3 SE	70		180	
2	08/03/2023	08:15	CU	1	13	display	3000	on and off field
2	08/03/2023	09:05	CU	1 NW	10		70	flew from ground
2	08/03/2023	09:10	CU	1 circle SSE	15		240	
2	08/03/2023	09:30	CU	1	15	display	900	until VP end, on and off
2	08/03/2023	09:39	CU	2 SE	250		150	
2	08/03/2023	09:39	CU	1 NNW	125		130	
2	08/03/2023	16:41	PG	33 ENE	125		90	
2	08/03/2023	16:48	PG	49 WSW	85		330	
2	08/03/2023	17:38	PG	145 WNW	135		140	
2	08/03/2023	17:42	PG	100 NW	45		150	landed just north of site
2	08/03/2023	17:56	PG	4 NW	70		330	
2	08/03/2023	17:58	PG	65 ENE	75		210	
1	09/03/2023	07:09	PG	6 ENE	135		210	
1	09/03/2023	07:37	CU	5 SW	25		150	
1	09/03/2023	07:37	CU	2 SSW	50		180	
1	09/03/2023	08:59	PG	64 SE	100		150	
1	09/03/2023	09:49	CU	3 NE	15		80	flew from ground
2	16/03/2023	12:31	CU	1	13	display	3600	on and off
2	16/03/2023	13:28	CU	1 SW	70		300	
2	16/03/2023	14:22	CU	2 NNW	70		150	
2	16/03/2023	14:55	L	1 SE	14		130	
2	16/03/2023	17:02	CU	2 NW	30		110	
2	16/03/2023	18:52	PG	2000 W	40		210	
2	16/03/2023	18:57	PG	110 WSW	60		240	
2	16/03/2023	19:09	PG	160 WNW	60		240	after VP finish
3	17/03/2023	05:55	PG	2000 NE	45	left roost	170	
3	17/03/2023	06:01	CU	2 circle NW	13		60	
3	17/03/2023	06:03	L	6	15	display	9720	on & off until VP end
3	17/03/2023	06:05	PG	120 NE	40	left roost	180	
3	17/03/2023	06:06	PG	50 NE	45	left roost	170	
3	17/03/2023	06:10	PG	550 NE	40	left roost	180	
3	17/03/2023	06:14	CU	1	15	display	9060	on & off until VP end
3	17/03/2023	06:22	CU	1	10	display	1260	
3	17/03/2023	06:25	PG	11 NE	30	left roost	180	
3	17/03/2023	06:31	L	2	8		45	
3	17/03/2023	06:34	PG	14 NE	40		180	
3	17/03/2023	06:35	CU	1 NW	75		120	
3	17/03/2023	06:40	L	12	20	display	7500	on & off until VP end
3	17/03/2023	06:43	CU	4 NE	45		120	
3	17/03/2023	06:44	CU	1 NW	25		120	
3	17/03/2023	06:45	CU	5 ENE	13		210	
3	17/03/2023	06:50	CU	1 SSE	23		120	
3	17/03/2023	06:53	CU	1 SE	90		150	
3	17/03/2023	06:58	L	2 SSE	60		120	
3	17/03/2023	07:10	CU	1 E	13		150	
3	17/03/2023	07:15	L	6	15	display	5400	on & off until VP end
3	17/03/2023	07:18	CU	6 ENE	28		180	
3	17/03/2023	07:20	CU	2 ENE	20		180	
3	17/03/2023	07:21	CU	3 NNW	6		120	
3	17/03/2023	07:22	CU	1 E	3		50	
3	17/03/2023	07:24	CU	1	10	display	1200	on & off
3	17/03/2023	08:00	CU	1 SE	23		90	
3	17/03/2023	08:14	GP	14 SW	30		210	landed
3	17/03/2023	08:15	CU	1 NW	15		90	
3	17/03/2023	08:21	GP	1 NW	100		120	
3	17/03/2023	08:23	L	13	10		90	flushed
3	17/03/2023	08:44	GP	1 circle NW	200		60	until VP end
3	17/03/2023	10:15	CU	1	15	display	10800	on & off until VP end
3	17/03/2023	10:16	L	12	15	display	10740	on & off until VP end
3	17/03/2023	10:20	L	4	10	display	10500	on & off until VP end
3	17/03/2023	10:29	PG	6 WNW	300		240	
3	17/03/2023	10:37	L	1 SW	20		150	
3	17/03/2023	10:39	CU	1	8	display	9360	on & off until VP end
3	17/03/2023	10:49	CU	1 NW	35		150	
3	17/03/2023	11:04	L	1 WSW	8		90	landed
3	17/03/2023	11:30	L	6	15	display	6300	until VP end, on & off
3	17/03/2023	11:58	CU	1 NW	60		120	
3	17/03/2023	12:20	GP	60	75		210	
3	17/03/2023	12:31	CU	1 WNW	8		50	
3	17/03/2023	12:46	CU	2 WSW	8		45	

