Animal & Plant Health Agency

Scientific opinion on the incursion of High Pathogenicity Avian Influenza (HPAI) H5N1 into housed or not housed poultry flocks and captive birds

Date: June 2023 (an update to the March 2023 report)

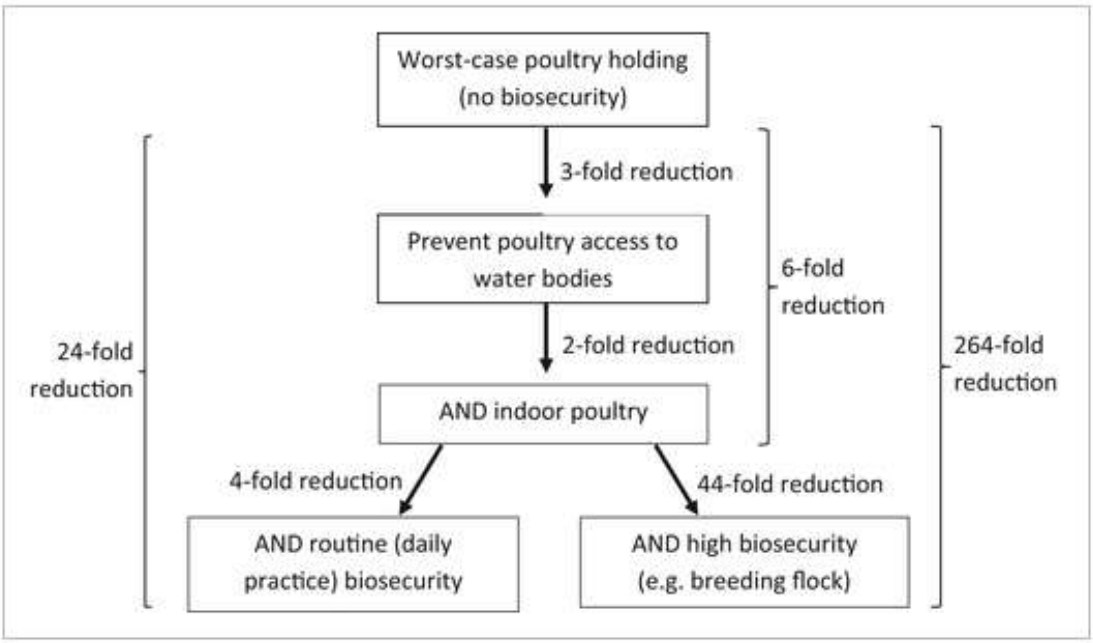
Overview

The scientific opinion on the incursion of high pathogenicity avian influenza (HPAI) H5N1 into housed and non-housed birds (domestic poultry and captive birds) in Great Britain (England, Scotland and Wales) from direct and indirect contact with wild birds in winter 2022 to 2023 is updated here to accommodate the wild bird cases and poultry outbreak reports to 30 June 2023. This scientific opinion was previously updated on 31 March 2023. The epidemic curve for the 2022 to 2023 season started earlier in the autumn of 2022 in Great Britain than in previous years with much higher numbers of reports in poultry, captive birds and found dead wild birds in early autumn. This is consistent with the virus circulating over the summer of 2022 in wild birds including a number of seabirds species, which likely provided a reservoir of infection for resident wild waterbirds in the early autumn of 2022 as they gathered at their wintering sites. A housing order came into force across the whole of England on 7 November 2022 and then across Wales on 2 December 2022. Previous versions of this report focussed on the effect of the housing order, which was lifted in England and Wales on 18 April 2023 following a reduction in the number of Infected Premises (IPs) reported, reduced infection pressure from wild birds following outward migration of wintering ducks, geese and swans and increased daylight hours and temperature which are less favourable for virus survivability in the environment. Currently an Avian Influenza Protection Zone (AIPZ) is still in place across the Great Britain. This report focusses on the factors supporting lowering the risk of exposure to poultry with suboptimal biosecurity from medium to low at the end of June 2023 in the face of multiple wild bird events.

The European Food Safety Authority (EFSA) in 2017 used expert opinion to assess the effectiveness of various biosecurity measures in preventing outbreaks.

As can be seen in Figure 1 from the EFSA (2017) expert opinion below, preventing access to waterbodies was thought to lead to a threefold reduction in incursions and when combined with housing an overall 6-fold reduction would be achieved. Where housing was combined with other biosecurity measures the risk of incursion could be reduced further.

Figure 1: Risk reductions from EFSA (2017) showing the estimated effect of implementing stepwise biosecurity measures on the protection of poultry holdings from avian influenza incursions



Housing orders have been put in place across Great Britain four times since 2016 (in the 2016 to 2017, 2020 to 2021,2021 to 2022 and 2022 to 2023 seasons) as a preventative measure to the estimated increased risk to poultry from wild birds. EFSA (2017) used expert opinion as there was insufficient published evidence to assess the efficacy of housing or biosecurity on the prevention of HPAI. The opinion concluded that housing as a standalone measure (that is in the absence of other biosecurity measures such as foot dips, cleaning equipment, preventing access to wild birds and rodent control) is likely to reduce the number of outbreaks and estimated a two-fold reduction in risk but would not prevent all outbreaks. It recommended that a suite of biosecurity measures should be implemented, alongside appropriate training. Nevertheless, the paper did highlight that outdoor poultry holdings bear an increased risk of avian influenza incursions and the applicable biosecurity measures are more limited where birds are not confined to housing.

Here the current (29 June 2023) HPAI risk levels in Great Britain are communicated, based on current control measures and the estimated infection pressure for different areas of Great Britain based on likely wild bird abundance. The key points relating to the current situation are:

1. The outbreak in 2021 to 2022 was unprecedented with HPAI H5N1 being identified in wild birds and holdings with kept poultry in Great Britain over the summer months of 2022. As such the risk levels in the 2021 to 2022 season never dropped below low for poultry (with high uncertainty for premises with poor biosecurity and

low uncertainty for premises with stringent biosecurity), or below medium for wild birds.

2. In the 2021 to 2022 season (1 October 2021 to 30 September 2022) there were 152 infected premises (IPs).
3. HPAI H5 wild bird detections continued across Great Britain throughout the summer and into the 2022 to 2023 season.
4. Since the start of the 2022 to 2023 season (1 October 2022 to 30 June 2023), there have been 185 confirmed IPs, with 155 in England, 22 in Scotland and 8 in Wales.
5. Following the high number of HPAI detections in wild birds and IPs in October 2022, the risk level was increased to VERY HIGH for wild birds on 21 October 2022 and the risk levels to poultry were increased to HIGH (with low uncertainty) where biosecurity is sub-optimal and increased to MEDIUM (with high uncertainty) where biosecurity is stringent (practicing the highest standards of biosecurity) on 14 October 2022.
6. Avian Influenza Prevention Zones (AIPZs) were declared in England, Scotland, Wales, and Northern Ireland on 17 October 2022. The AIPZ requires keepers and personnel working with poultry to take additional biosecurity measures. The AIPZ in England is additional to the AIPZ which was declared in Norfolk, Suffolk and parts of Essex on 27 September 2022, following an increase in the number of HPAI IPs with domestic poultry in the region and additional housing measures came into force for Norfolk, Suffolk, and parts of Essex on 12 October 2022, followed by the whole of England on 7 November 2022 and Wales on 2 December 2022. This means that all bird keepers in these countries (whether they have pet birds, commercial flocks or just a few birds in a backyard flock) are required by law to take a range of biosecurity precautions, including housing their birds (except in very specific circumstances).
7. The housing orders in England and Wales were lifted on 18 April 2023 following a reduction in the number of Infected Premises (IPs) reported, reduced infection pressure from wild birds following outward migration and increased daylight hours and temperature which are less favourable for virus survivability in the environment. An Avian Influenza Protection Zone (AIPZ) is still in place across Great Britain (as of 30 June 2023, lifted 4 July 2023)
8. There are a number of risk pathways for the introduction of HPAI from wild birds to domestic birds. Transmission between infected wild birds and kept birds can occur as a result of direct transmission where the virus spreads from one bird to another or indirect transmission (wild birds contaminate objects and the environment which kept birds then come into contact with).
9. Spread of HPAI between premises when disease control measures and keeper awareness are high has been rare in the UK, throughout previous and the current season.
10. Since 1 October 2022, infection in resident wild bird species including waterfowl and gulls (such as mute swans, Canada geese, greylag geese and black-headed gulls) has continued to be reported, as well as infection in a smaller number of migratory waterbird species (mainly whooper swans, pink-footed geese and

barnacle geese). Pheasants and several raptor species including common buzzard and sparrowhawk have also been reported.

11. Since 1 October 22 and as of 30 June 2023 there have been 1,148 HPAI H5 detections in found dead wild birds across Great Britain, including 45 wild bird species (listed in Appendix A), in 80 counties. Most of the findings were in England (946) with 134 wild bird cases located in Scotland and 68 wild bird cases located in Wales.
12. The number of reported wild bird cases testing positive has fluctuated between 20 and 30 positive cases per week since late April, following a dip in the first week of April of 4 positive cases. Since the beginning of March with the threshold for collecting and testing swans, geese, gulls and birds of prey found at the same site in England was set at one dead bird (previously 3), though Scotland and Wales have kept their threshold at 1 dead bird (swans, geese, gulls and birds of prey) throughout the season. Since March, Black-headed gulls have been the predominant wild bird species in which HPAI has been confirmed, with 164 positive cases detected, and multiple mass mortality events. Therefore, the risk in wild birds is still considered **HIGH**.
13. HPAI H5N1 also continues to be reported in wild birds and poultry across northern Europe in the Spring and Summer of 2023. However, unlike in the autumn months, detections of HPAI in wild birds in Europe at this time of year (end of June) are of less relevance to risks to Great Britain because migratory ducks, geese and swans have not yet started to return from Europe to their wintering sites. Across Europe, mass mortalities of Black-headed Gulls have been reported in multiple locations since January 2023, and this species accounted for over 50% of reports in wild birds since March 2023.
14. The rate of poultry IPs is roughly 1 every fortnight between March and June 2023 representing sporadic cases, with only one outbreak since week 21 (late May). This is markedly down from the 27 and 26 IPs in the second and third weeks of October 2022, respectively (Figure 6). The risk level for poultry has not been in line with wild bird risk in recent months due to HPAI being predominantly present in Black-headed gulls, which have been nesting with co-habiting species such as Terns which have also been reported with HPAI H5. The nesting and aggregating behaviour of these birds means they have largely not been in contact with poultry, although this is likely to change once they disperse from their breeding grounds, particularly for outdoor premises (Ornithological Expert Panel, May 2023).
15. The risk levels for Great Britain are **HIGH** for wild birds, **LOW** for poultry (with high uncertainty) where biosecurity is sub-optimal and **LOW** for poultry (with low uncertainty) where biosecurity is stringent (practicing the highest standards of biosecurity).

Introduction

This scientific opinion is aimed to assess the risk of HPAI in wild birds and poultry in Great Britain currently and communicate our results which support lowering the risk of exposure to poultry with poor biosecurity from medium to low at the end of June 2023 in the face of multiple wild bird events, and to aid policy decisions.

In an unprecedented 2021 to 2022 season, HPAI H5N1 persisted in Great Britain over the summer months of 2022, with the virus maintained in breeding wild birds (including colony breeding seabird populations and gulls). In early autumn 2022, detections shifted to resident waterbirds (Canada geese, greylag geese, mute swans and gulls) prior to the arrival of the autumn migratory waterbirds. Farmland and woodland bird species were also affected including 60 common buzzards and 44 pheasants. The arrival of the migratory waterbirds during November and December did not seem to markedly increase the number of wild bird detections with most cases still in the resident species, although it should be noted that in England on the 12 December 2022, the surveillance threshold for swans and geese was increased, so that a submission would only be made if five dead birds were found, where as previously the threshold had been three dead birds, and this change is likely to have reduced the number of wild waterbird submissions. This has since been changed from five to three in January 2023 and from three to one in March 2023 to increase the sensitivity of detections in wild birds. Scotland and Wales have kept their threshold at 1 dead bird (swans, geese, gulls and birds of prey) throughout the season. Based on reports from the dead wild bird surveillance scheme in October 2022, it appeared that the wild bird risk and infection pressure on poultry in Great Britain had increased such that the national risk level for HPAI H5 in wild birds was raised to **very high**. Also in October 2022, the risk to poultry with sub-optimal biosecurity was raised to **high** with **low uncertainty** and the risk for poultry with stringent biosecurity was raised to **medium** with **high uncertainty**, following an increase in the number of Infected Premises (IPs). Subsequently, with the availability of more data showing that the rate of IPs with stringent biosecurity was not increasing, uncertainty in the medium risk for poultry with stringent biosecurity was lowered to **low uncertainty** (January 2023).

Following the winter months, the national risk level for HPAI H5 in wild birds was reduced to **high** in March 2023, as there was a downward trend in reported cases over a four-week period, coupled with outward bird migration. By the end of March 2023, the risk in poultry for HPAI H5 was considered **medium** with **high** uncertainty in premises with suboptimal biosecurity, and **low** with **high** uncertainty in premises with stringent biosecurity. Though there was no change to the risk levels in poultry through April and May 2023, uncertainty continued to decrease following a decreasing trend in IPs and no apparent onward infection pressure to poultry from the increased number of confirmations of HPAI H5 circulating in black headed gulls. As a result of more weeks with sporadic IPs, increasing hours of daylight and high temperatures, risk of HPAI H5 in poultry was lowered to **low** with **high** uncertainty in premises with suboptimal biosecurity on 21 June 2023, despite ongoing reports in nesting black headed gulls. The risk to poultry premises with stringent biosecurity was considered to be **low** with **low** uncertainty at this time.

The housing orders in England and Wales were lifted on 18 April 2023 following a reduction in the number of Infected Premises (IPs) reported, reduced infection pressure from wild birds following outward migration and increased daylight hours and temperature which are less favourable for virus survivability in the environment. At the time of writing (30 June 2023) An Avian Influenza Protection Zone (AIPZ) is still in place across Great Britain, to be lifted on 4 July 2023.

Scientific opinion

The aim of this scientific opinion was to assess whether the continued implementation of housing of poultry was likely to reduce the number of outbreaks in Great Britain in April 2023 to aid policy decisions.

Following the lifting of housing orders in April 2023, this June 2023 update is to communicate the current risk levels in wild birds and poultry to assist with policy decisions regarding the AIPZ.

Hazard identification

The hazard identified is the high pathogenicity avian influenza (HPAI) virus H5N1 subtype, as this is the only subtype isolated from the UK during the current season which started on 1 October 2022. Indeed, apart from where the virus has been untyped, all the wild bird cases in Europe since 1 October 2022 have been H5N1 with the exception of H5N5 in a great black-backed gull and a glaucous gull in Norway.

Risk question:

“What is the risk of incursion of HPAI H5N1 into domestic poultry and captive birds in England, Scotland, and Wales in July 2023 from direct and indirect contact with wild birds?”

Terminology related to the assessed level of risk

For the purpose of the report, the following terminology will apply (WOAH, 2021):

- **Negligible**: event is so rare that it does not merit consideration
- **Very low**: event is very rare but cannot be excluded
- **Low**: event is rare but does occur
- **Medium**: event occurs regularly
- **High**: event occurs very often
- **Very High**: event occurs almost certainly

Assumptions and uncertainties in H5N1 transmission in wild birds in Great Britain over the winter 2022 to summer 2023

1. The migratory wild birds (ducks, geese and swans) that over-wintered in Great Britain have departed. This assumption has been taken into account in the reduction in the wild bird risk level from **very high** to **high** in March 2023.
2. The role of black-headed gulls in maintaining infection at breeding sites and possibly serving as a source of infection to poultry within Great Britain following the dispersal from their breeding sites at the end of July through to August is currently an unknown. However expert ornithological opinion (OEP, May 2023) is that contacts with poultry is likely, particularly for outdoor premises. As the gulls disperse, the long hours of daylight and higher temperatures over the summer will provide less favourable environmental conditions for HPAI virus survival.
3. The possibility that disease is further maintained throughout the summer by infection of other resident bird species including wading bird species that share the scrape habitats with them, other larger gull species and seabirds such as terns, gannets and auks. The role of black headed gulls in the epidemiology of HPAI is not well understood and is an unprecedented situation for Great Britain. There have been multiple HPAI H5 positive mass die-offs of black-headed gulls between March and June 2023, at both inland and coastal locations in Great Britain (Figure 8). This is similar to what has been observed in Europe, where multiple die-offs involving black headed gulls have been reported (WOAH, WAHIS data) (Table 1). It is unknown if dispersal from breeding sites will translate in to an increased risk to poultry, though this does not appear to be the case in Europe where cases of HPAI along with nesting and dispersing behaviours in black-headed gulls have been several weeks ahead of cases in Great Britain (Figure 2).
4. The 2022 to 2023 season is epidemiologically distinct from previous years not only because HPAI was present in resident birds in Great Britain before the migratory wild waterbirds arrived, but also because the majority of wild bird cases (irrespective of surveillance threshold) over the autumn and winter were in species resident to Great Britain (mute swans, Canada Geese and greylag geese with some raptor species and pheasants). The increase in wild bird cases in autumn 2022 started some four weeks earlier than in autumn 2021 with high numbers of cases in wild birds (35 to 61 per week) reported each week in October 2022. Despite the high numbers of wild bird cases recorded weekly over the autumn months in 2022 and into December 2022 there was a progressive fall in the number of wild bird cases recorded each week from early January 2023. To some extent in January, this decline may have reflected the reduced reporting of waterbird species and difficulties in recovering carcasses due to limited accessibility during the cold weather which froze many inland waters. However, the trend continued through February and March 2023. In contrast wild bird cases did not fall significantly in January 2022. Since March, wild bird cases have not continued to decline, with an increase of reporting in black-headed gulls and tern species, and the number of reports is similar to that seen in January (Figure 6). The progression and

epidemiology of the current outbreak are different from previous years, and it is not clear for example what effect the movements of wild birds away from their breeding sites will have on the risk. It is anticipated that the higher temperatures and longer day lengths over summer will reduce the risk of transmission to wild birds from environmental contamination, though if HPAI was to circulate in nesting seabird colonies over summer as was observed last year, the close proximity and wild bird density in these habitats could overcome the less favourable environmental conditions for virus survival. This assumption has been taken into account in the current wild bird risk level which is at **high**. However, black-headed gulls will disperse to locations and roost sites bringing them into closer contact with other wild bird species which could also impact the risk in wild birds.

5. Maintenance of infection in resident waterbirds may be more important for the transmission of this virus in the 2022 to 2023 season than in previous years when migratory duck, geese and swan species played the role of introducing HPAIV into Great Britain. Other wild birds may also have a role in maintaining transmission. The role of pheasants is not clear, with 47 cases reported this season to 30 June 2023. The 21 sparrowhawk and 6 kestrel cases were also detected, a possible hypothesis for this is that H5N1 may also be in the resident wild bird passerine population, as they make up the main source of sparrowhawk's diet (particularly male sparrowhawks). It is interesting to note that cases in passerine species have been recorded in Europe with a house sparrow and a tree sparrow in Slovenia and a goldfinch in France. In the current 2022 to 2023 season in Great Britain, HPAI H5 has been confirmed in 1 carrion crow, 4 reports in an unspecified crow species, and a reed warbler. The current passive surveillance and reduced sensitivities for passerines limit our knowledge of their role within the current epizootic. So far this season 198 cases of H5N1 have been reported in black-headed gulls in Great Britain (to 30 June 2023). This compares to 4,565 cases in Europe between 01 January 2023 and 23 June 2023 (Table 1). The current **high** risk level for wild birds takes into account the presence of virus in resident birds including black-headed gulls.
6. The patterns of movement of gulls are more complex than waterfowl. It is noted that a large number (Table 1) of H5N1 cases in black-headed gulls have been reported across the whole of Europe, but particularly in Belgium, Switzerland, Netherlands, Italy and France this year. This has not occurred in previous years. Some gull species (but not all) aggregate at night-roosts (usually large waterbodies such as reservoirs) but forage and loaf across the wider landscape, often in wet pasture or tilled fields, exploiting opportunities on farms and also at anthropogenic sites where food may abundant (sewage treatment facilities, landfill sites, food production facilities, commercial and tourist sites). Therefore, these should not be ignored as potential sites of concern where in proximity to poultry farms, particularly as black-headed gulls form these types of roosts which could bring them into close contact with poultry when they disperse.
7. To date this season, 265 cases of HPAI H5N1 have been reported in gull species in Great Britain, including 198 black-headed gulls and 43 herring gulls. This is consistent with the increased number of wild bird cases in 2022 to 2023 compared

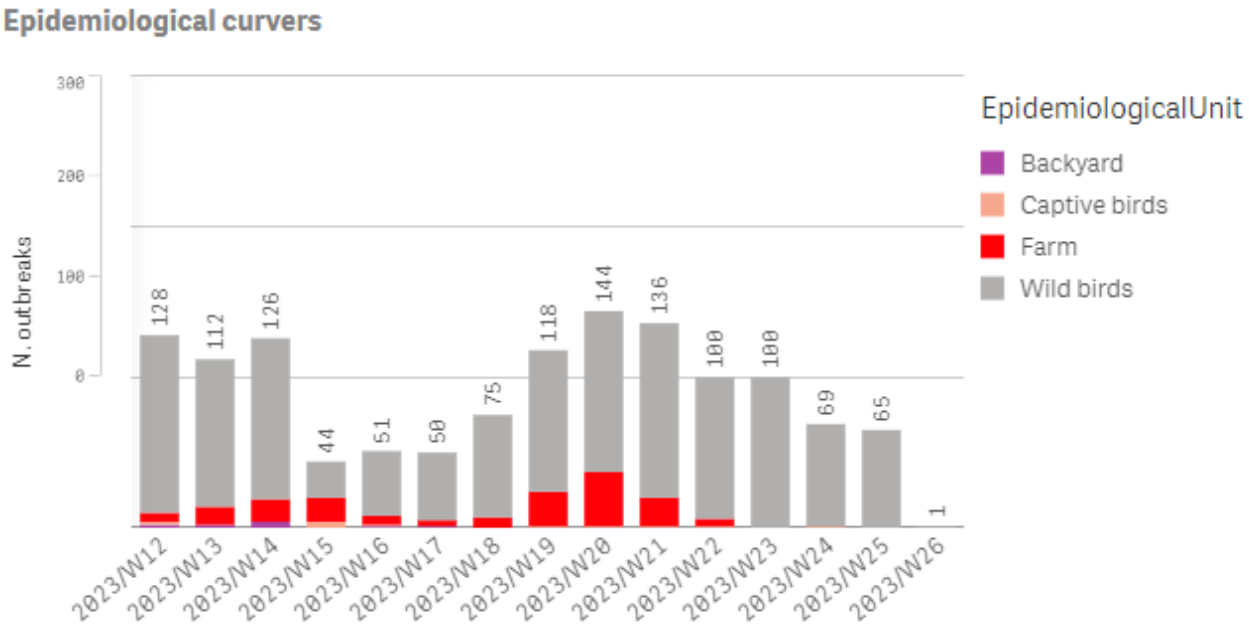
to previous seasons, with the exception of the 2021 to 2022 summer where HPAI H5 was circulating in seabird colonies.

8. There is geographical variation in risk across Great Britain, due to the varying demographics of wild birds and poultry.
9. The evidence for the economic and welfare benefits and dis-benefits of housing birds is not part of this scientific opinion.

Table 1: Black-headed gull cases in Europe from 01 January 2023 to 30 March 2023 (WOAH, WAHIS data)

Country	January	February	March	April	May	June	Total
Austria	1	9	14		22	13	59
Belgium	49	109	2	5	31	6	202
Czech Republic				22	20		42
Denmark					14		14
Estonia					2		2
Finland						10	10
France	150	640	561	49	6	1110	2516
Hungary				1	50	8	59
Ireland	2	1	3	2			8
Italy		32	265	22		3	322
Latvia					41	48	89
Lithuania				8	16	43	67
Luxembourg						1	1
Netherlands			102	29			131
Poland		1	4		251	29	285
Serbia			6		4		10
Slovenia			5		172	98	275
Spain	1	3	15	32		2	53
Sweden					1	4	5
Switzerland	1	24	105	1	23		154
Grand Total	**204**	**819**	**1082**	**171**	**653**	**1375**	**4304**

Figure 2: Number of outbreaks per week in Europe according to IZSVe (EURL Avian Flu Data Portal (izsvenezie.it)) with cases in wild birds and outbreaks in poultry showing a downward trend through June 2023



Entry assessment

Probability that HPAI H5 is present in Great Britain currently

The 2022 to 2023 season began officially in Great Britain on 1 October 2022. Figure 3 shows that the number of IPs started to increase in the first week of October with not only a higher peak compared to autumn 2021 but also a longitudinal shift in the peak by about one month reflecting the presence of virus in resident wild birds over the summer. Since 1 October 2022 and as of 30 June 2023, there have been 185 confirmed Infected Premises (IPs) in Great Britain, with 155 in England, 8 in Wales and 22 in Scotland (Figure 4) and (Figure 4). The rate of poultry IPs is roughly 1 every fortnight between March and June 2023 representing sporadic cases, with only one outbreak since week 21 (late May). This is markedly down from the 27 and 26 IPs in the second and third weeks of October 2022, respectively (Figure 6).

Figure 3: Cumulative plot showing the number of infected premises in Great Britain in the 2020 to 2021, 2021 to 2022 and 2022 to 2023 seasons. Each season starts on the 1 October. The solid lines represent all Great Britain (red is 2020 to 2021 season, green is 2021 to 2022 season, blue is 2022 to 2023 season). The blue short, dashed line represents East Anglia in 2022 to 2023 and the blue long dashed line represents Scotland in 2022 to 2023. Circles and circles with crosses represent the start and end of an AIPZ respectively, while squares and squares with crosses represent the start and end of a housing order respectively. Please note the start of the housing order in the 2022 to 2023 season is for England only, with Wales implementing a housing order 4 weeks later and Scotland not implementing a housing order during the 2022 to 2023 season.

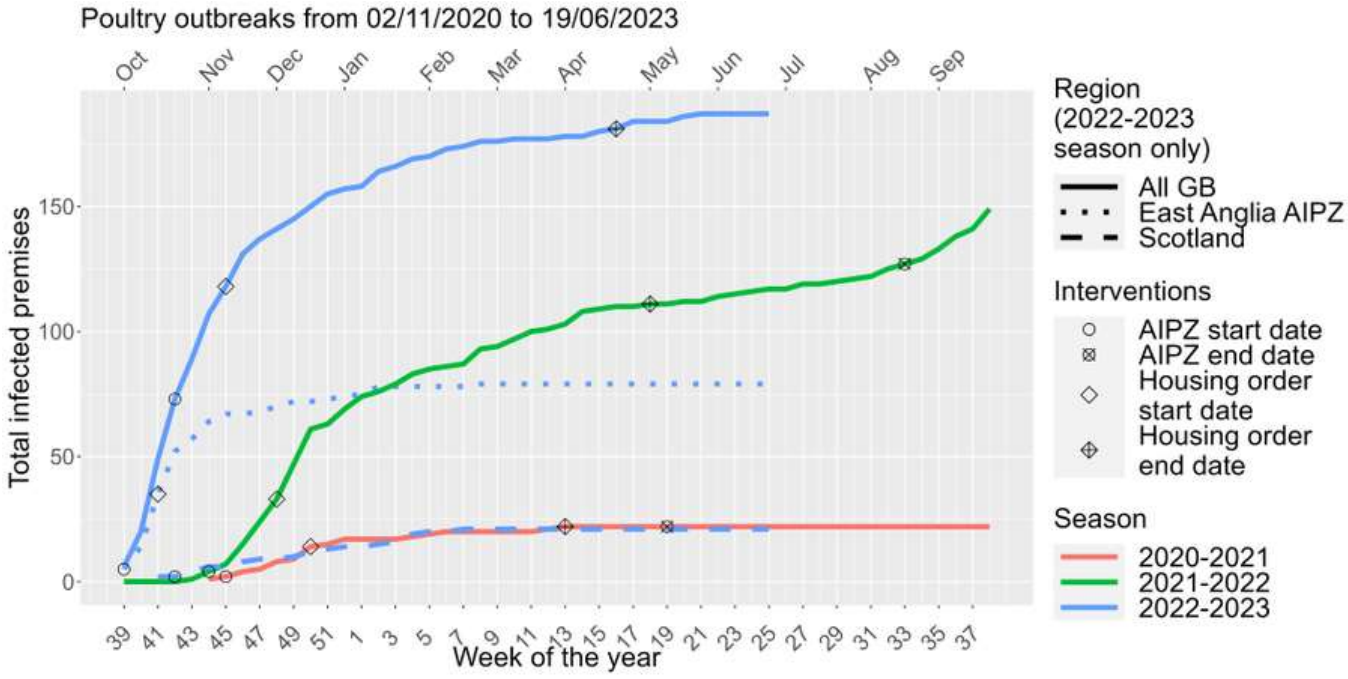
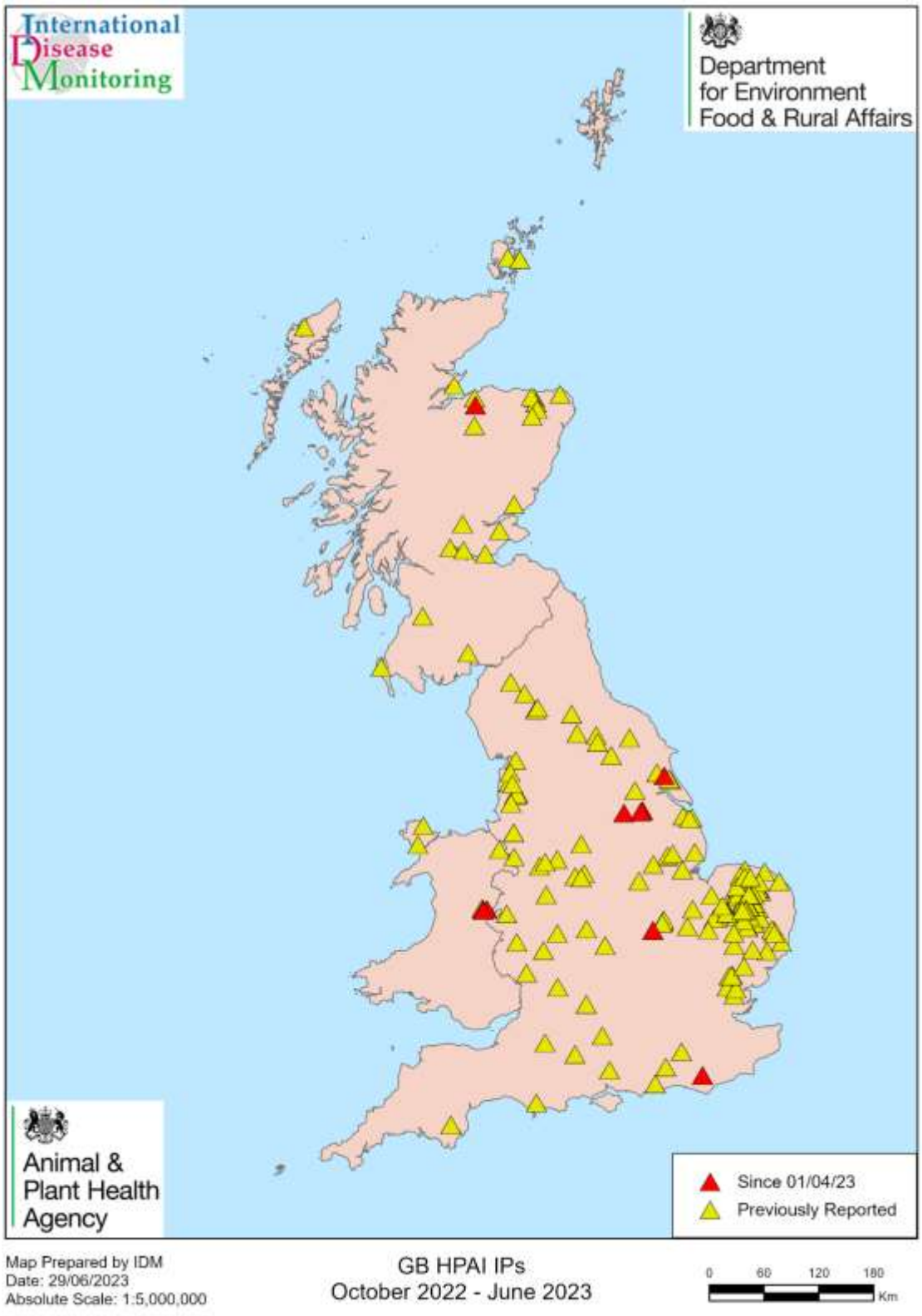


Figure 4: Outbreaks of HPAI H5N1 in domestic poultry and captive birds (as of 29 June 2023) in Great Britain from 1 October 2022. Outbreaks of HPAI H5N1 in domestic poultry and captive birds (as of 29 June 2023) in Great Britain from 1 October 2022. IPs are across all administrations in Great Britain, with the majority of IPs in England with clusters in Suffolk and Norfolk, followed by Scotland with IPs as far north as Orkney Islands and the lowest number of IPs in Wales.



The wild waterfowl population (both resident and migratory) in Great Britain is relatively well understood. Several non-governmental organisations (NGOs) conduct regular surveys for the wild waterfowl at known wintering sites across Great Britain. In particular, the British Trust for Ornithology (BTO), The Joint Nature Conservation Councils (JNCC), the Royal Society for the Protection of Birds (RSPB) and the Wildfowl and Wetlands Trust (WWT) carry out counts of wild birds. There are 53 sites counted each with at least 20,000 birds wintering year after year across Great Britain, though this represents only a portion of wintering sites used by waterfowl in Great Britain.

Expert ornithological opinion in January 2023 considered that there have been no major differences in the populations of migratory wild waterbirds, the location of the large assemblages or the timing of arrivals of migratory waterbird populations compared to previous years. In terms of migration, the wild migratory waterfowl started arriving as usual in Great Britain from Northern Europe in late August and September with numbers peaking in December and January. While some species, such as swans, will be site loyal from one year to the next, others will be less so, and there will be some mixing between species including resident and migratory waterbirds in the large aggregation sites. Outward migration started in mid March with nearly all migratory waterbirds departed by early May and most by mid April.

There is a system for wild bird passive surveillance in the Great Britain, whereby found dead birds from target species are reported either by wardens at reserves and wetland sites, or by the public and then submitted for testing at the National Reference Laboratory (NRL). It is important to note that this system of passive surveillance does not provide complete knowledge of the population. Not all infected birds will die, and the detection of dead birds will vary depending on the species of bird that die (smaller birds are less likely to be noticed than large birds), the location (detection is less likely in remote areas) and the level of awareness of the people who find the dead birds (trained wardens are more likely to report than members of the general public). Once positive birds have been reported at a site, more findings may not be tested until two weeks have passed. Since 1 October 22 and as of 29 June 2023 there have been 1,148 HPAI H5 detections in wild birds (Figure 5) with the majority confirmed as H5N1, and a few where the neuraminidase subtype is still being characterised. Of these, 259 HPAI H5 detections in wild birds occurred since 1 April 2023. The number of wild bird cases, both reported and testing positive has fluctuated between 20 and 30 positive cases per week since late April, following a dip in the first week of April of 4 positive cases (Figure 6). The threshold for birds of prey, gulls, swans and geese found at the same site in Great Britain is at one dead bird, and at 5 or more dead wilds of any other species (at the same location at the same time). Since March, Black-headed gulls have been the predominant wild bird species in which HPAI has been confirmed (Figure 7), with 164 positive cases detected, and multiple mass mortality events.

The risk level for poultry has not been in line with wild bird risk in recent months (Figure 6) due to HPAI being predominantly present in Black-headed gulls, which have been nesting with spill-over into co-habiting species such as Terns. The nesting and aggregating

behaviour of these birds means they have largely not been in contact with poultry, although this could change once they disperse from their breeding grounds.

Figure 5: Map showing HPAI H5 cases in wild birds (as of 29 June 2023), in Great Britain from 1 October 2022. Cases are across the whole of Great Britain, with the majority in England then Scotland and Wales

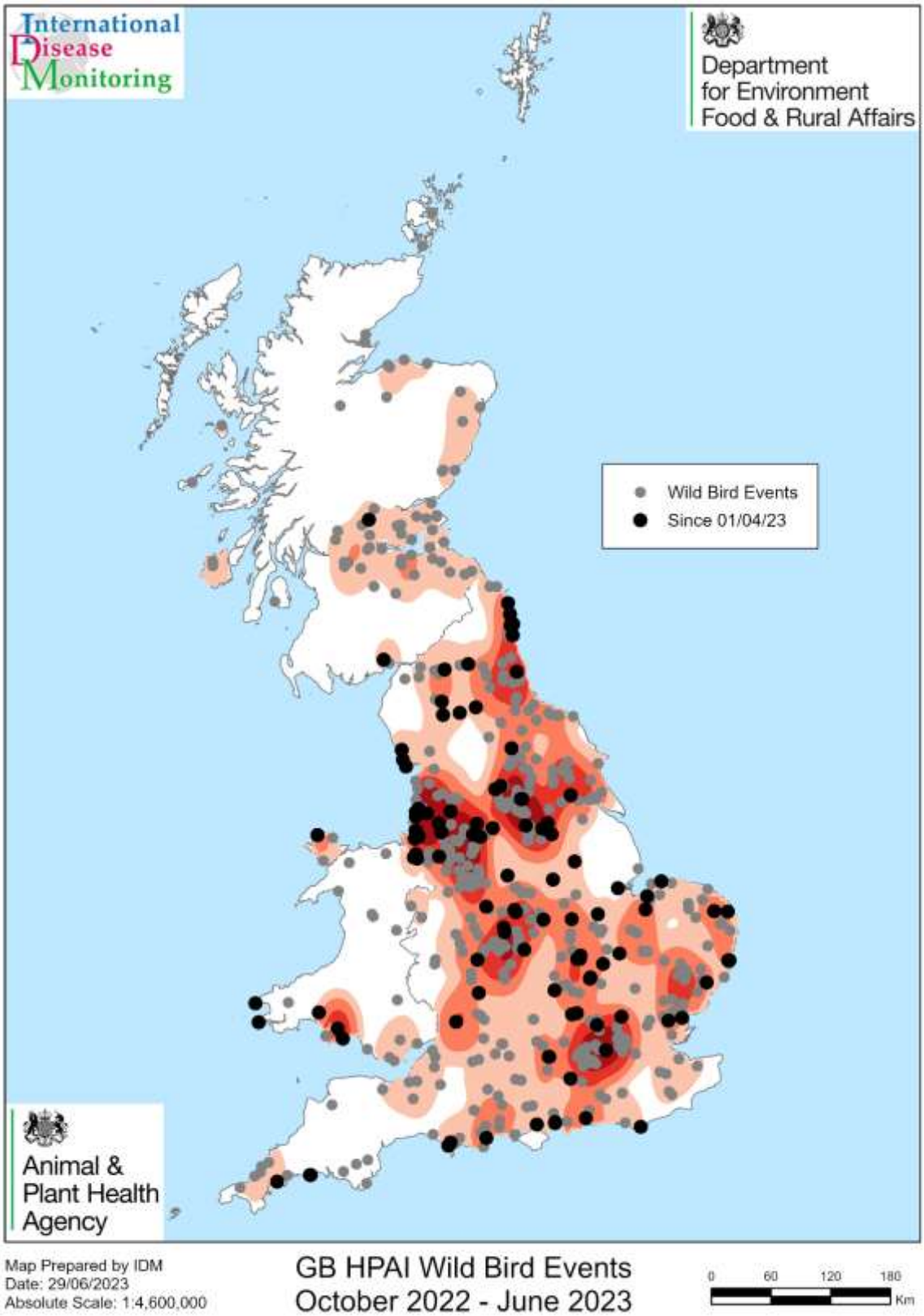
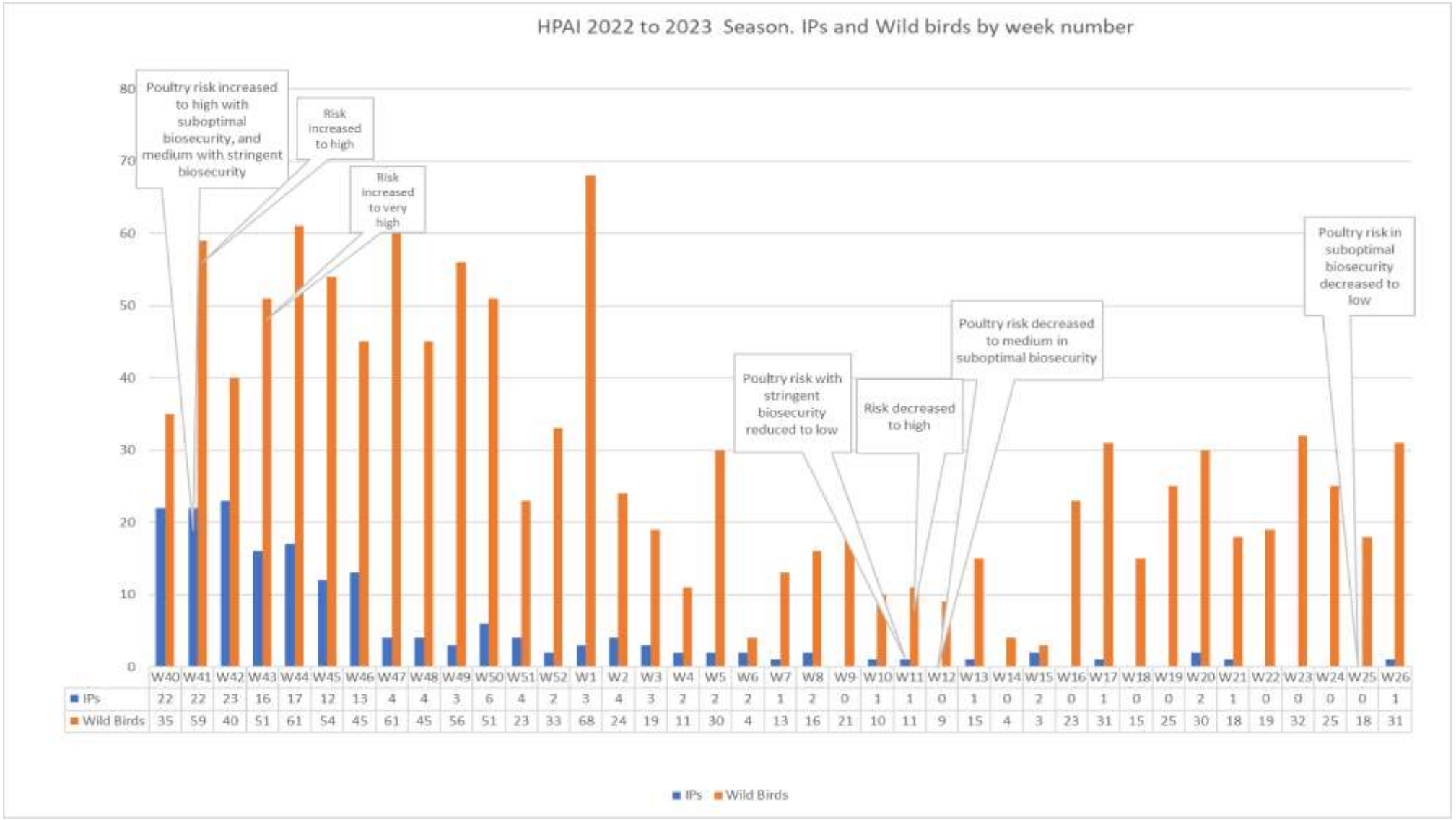
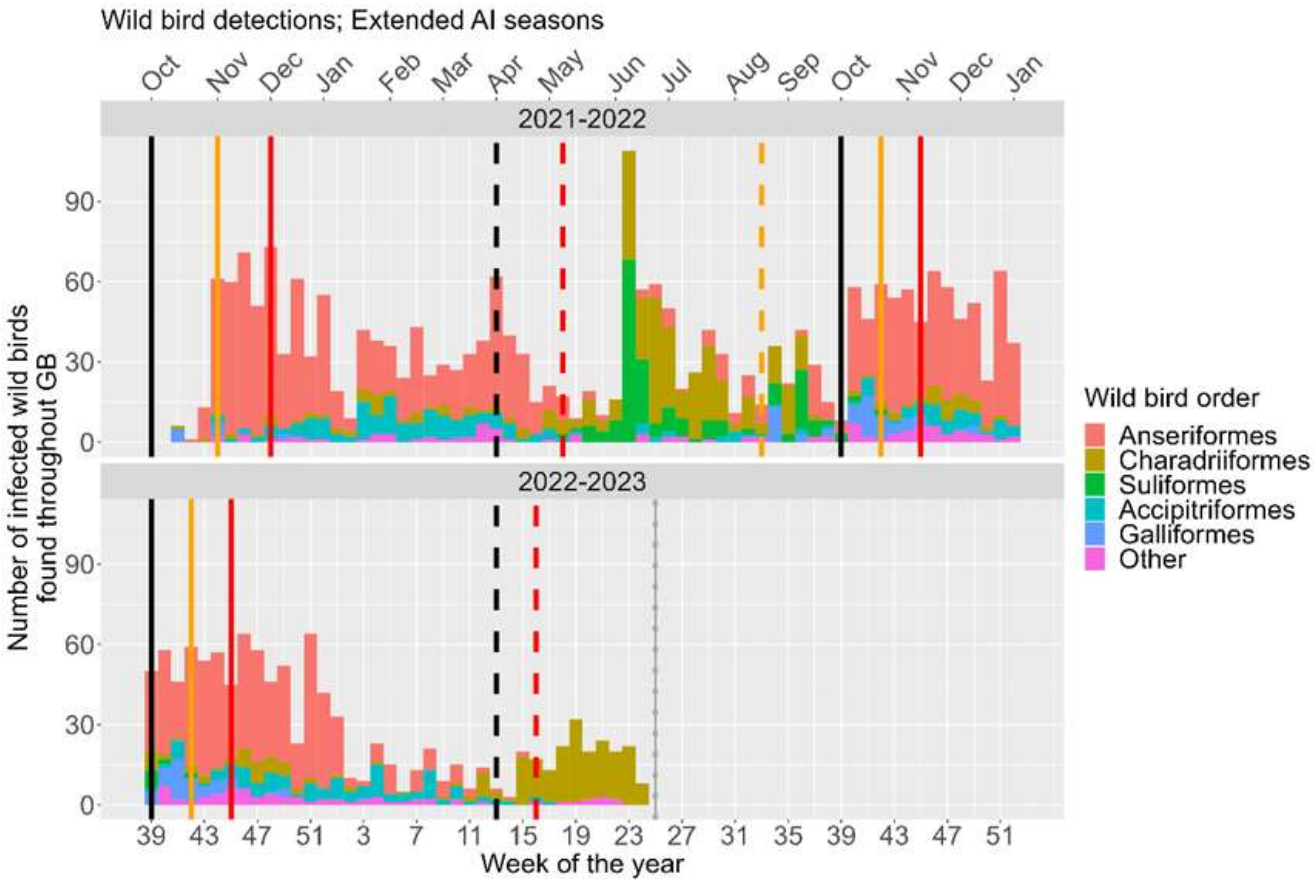


Figure 6: Plot showing IPs and wild bird cases of HPAI over the 2022 to 2023 season, with changes in risk levels indicated.



	W40	W41	W42	W43	W44	W45	W46	W47	W48	W49	W50	W51	W52	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	W25	W26
IPs	22	22	23	16	17	12	13	4	4	3	6	4	2	3	4	3	2	2	2	1	2	0	1	1	0	1	0	2	0	1	0	0	2	1	0	0	0	0	1
Wild Birds	35	59	40	51	61	54	45	61	45	56	51	23	33	68	24	19	11	30	4	13	16	21	10	11	9	15	4	3	23	31	15	25	30	18	19	32	25	18	31

Figure 7: Numbers of wild birds found to be infected with HPAIV between October 2021 and the 22 June 2023, coloured by order. Black lines indicate the start (solid lines) and end (dashed lines) of the "winter season" (October to March). Yellow lines indicate the start (solid) and end (dashed) of AIPZ control measures. Red lines indicate the start (solid) and end (dashed) of widespread housing order control measures.



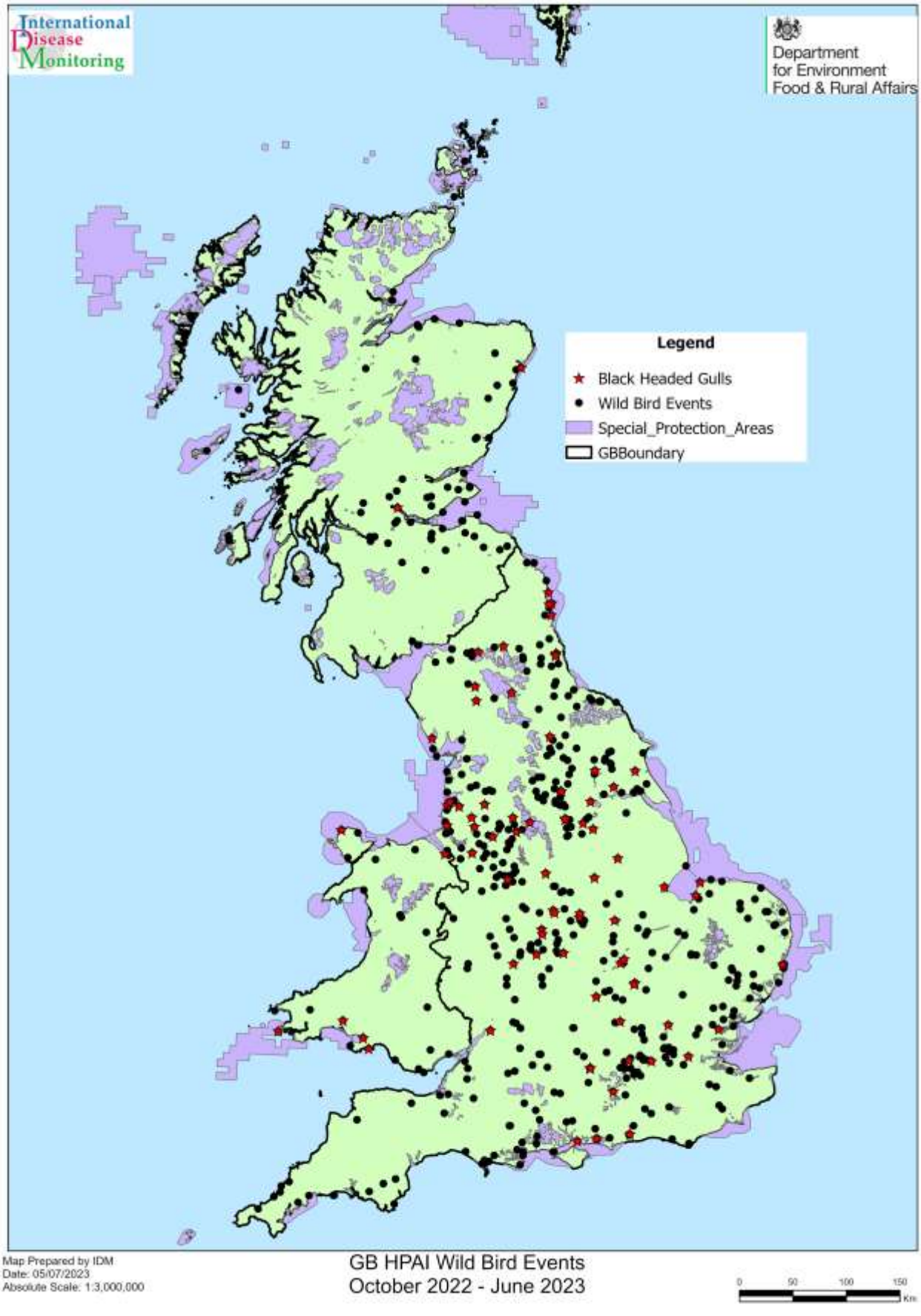
Across Europe since 01 October 2023, HPAI H5N1 infection has been detected in multiple species of wild bird with 9,913 cases in total and 1,314 outbreaks in poultry according to data from the World Organisation for Animal Health. According to the EU reference laboratory, Istituto Zooprofilattico Sperimentale delle Venezie (IZSUM), weekly results plotted for the EU27 and other reporting countries show the number of poultry outbreaks falling from a peak of around 70 in week 48 of 2022 to around 25 in week 2 of 2023 and remaining around this weekly number until June 2023 (Avian influenza in Europe: updates | EURL avian influenza Newcastle disease (izsvenezie.com)).The number of wild bird detections according to IZSVe increased markedly in early 2023 compared to the end of 2022, to a peak of around 200 weekly cases in February, though any changes in surveillance which may impact the number of wild birds tested is unknown. In May and June 2023 there were around 100 wild bird cases per week across Europe and this has remained stable since March. Although strong peaks in cases often occur in wild birds in northern Europe in January to February, the reason for the strong peak this year is increasingly due to the number of back-headed gulls which peaked at between 68 and 101 cases across Europe in weeks 6 to 11. Since all the migratory waterbirds have departed from Great Britain, the details of cases currently in Europe are of less relevance to Great Britain compared to in the autumn. The possibility of a cold spell in Western Europe

bringing more ducks, geese and swans currently wintering in the Netherlands into Great Britain can be dismissed at this time of year (late June). Therefore, discussions on the species of wild bird infected both in Great Britain and in Europe and their potential impact on the entry of the virus are less important at this stage of the season compared to in the autumn.

The breeding sites for black-headed gulls are occupied in March through to July and they nest in colonies around lakes (Olsen 2013) where the nests can be very close to each other but also more spread out than other seabird species such as auks and gannets. They predate chicks of other nesting birds around the wetland sites, along with other larger gulls such as lesser black-backed gulls, and they are highly aggressive, so there is high rate of black-headed gull to black-headed gull and black-headed gull to other bird species contacts.

The current virus strain is likely to continue to circulate in wild birds in Great Britain in July. It is therefore considered that the likelihood of there being infected wild bird species present in Great Britain currently (late June 2023) is **HIGH**, and it is expected that more HPAI H5 cases in wild birds will be detected in the next month (July 2023). During May and June 2023, there have been a number of mass mortality events detected in black headed gulls in England and Wales at both coastal and inland sites during their nesting period (Figure 8). From mid-July through August, the black headed gull colonies will fledge and disperse, and foraging behaviour is expected to change which may result in more contact opportunities between this species and other wild birds (including sea birds) and poultry.

Figure 8: Map showing wild bird cases of HPAI H5 in Great Britain from October 2022 to June 2023 with black-headed gull cases indicated as starts at multiple inland and coastal sites since March 2023



Summary

Since 1 October 22 and as of 30 June 2023 there have been 1,148 HPAI H5 detections in wild birds (Figure 5) with the majority confirmed as H5N1, and a few where the neuraminidase subtype is still being characterised. Of these, 259 HPAI H5 detections in wild birds occurred since 1 April 2023. The number of reported wild bird cases testing positive has fluctuated between 20 and 30 positive cases per week since late April, following a dip in the first week of April of 4 positive cases. The number of wild bird cases of HPAI H5N1 has remained relatively high week on week since the dip in early April 2023. The weekly number of cases has fluctuated between 20 and 30 positive wild birds since mid-April, with the majority of cases in black-headed gulls and, recently, terns. The wild bird risk level in Great Britain is therefore considered to be **HIGH** (late June 2023) and there is considerable uncertainty around the effect of the dispersal of black-headed gulls on the level of risk in the coming weeks, as they move to other locations in Great Britain and form mixed species roosts. However, the higher temperatures and ultraviolet light intensity expected over the summer is likely to reduce virus survival in the environment. Migratory water birds are not expected to start arriving until Autumn, but there are some species that will be moving from northern Europe to Great Britain over summer, such as Kittiwakes, and residential species that will be moving within Great Britain such as Curlews moving from uplands. While black-headed gulls are aggregated at their breeding grounds, they do not appear to have had an impact on the risk level or number of outbreaks in poultry, although these gulls are gregarious and may interact with poultry and other wild bird species as they disperse to other locations.

Effective and well-maintained housing reduces the probability of poultry exposure to wild birds and their excretions, but does not completely prevent transmission of the virus, as HPAI virus could still be carried into poultry houses on clothing, footwear, feed, and bedding. Plotting the number of IPs over previous seasons following the introduction of a housing order shows a decrease in the rate of IPs after housing is introduced (and allowing for an incubation period for two weeks) (Figure 3) though it is difficult to attribute with any degree of certainty what proportion of this (if any) is due to housing birds rather than other factors such as waterfowl migration patterns and the implementation of mandatory, complementary biosecurity measures as part of the housing order. It is not possible to assess the impact of housing as a protective measure because it would require epidemiological investigations that are not possible during control of a notifiable disease. These are currently being analysed ahead of autumn 2023 waterbird migration.

The poultry risk levels have fallen despite as continued high level of wild bird risk, since disease has been maintained in species that have apparently little contact with poultry during the breeding season, namely black-headed gulls and terns (though as the black-headed gulls disperse, it is likely that contacts with poultry will increase). This is borne out by the reduction in the number of IPs in recent weeks. Given the infection pressure from wild birds being predominately at gull and tern breeding sites, less favourable environmental conditions for virus survivability, and the sporadic numbers of infected poultry premises and backyard flocks over the last two months, we consider the likelihood

of infected premises being detected in the next month in Great Britain to be to **LOW** (rare but does occur) **with high uncertainty** where biosecurity is suboptimal and there are biosecurity breaches, and **LOW** (rare but does occur) **with low uncertainty** where stringent biosecurity is applied. This takes into consideration the Avian Influenza Protection Zone (AIPZ) and assumes that bird keepers are taking the additional biosecurity measures required, though there is likely to be variability with compliance, this is not possible to collect and assess.

As the most likely contact of poultry with wild birds will be in those areas where there are high concentrations of wild birds, where there are no large aggregations of wild birds, the risk is lower for this particular pathway, but there are still other pathways which could lead to the introduction of any notifiable avian disease.

Conclusions

The risk of HPAI H5N1 incursion into poultry premises depends on the level of biosecurity present. There are multiple pathways through which poultry could be exposed to HPAI virus and these may not be prevented when housing is used as a control measure in the absence of any other biosecurity.

The EFSA (2017) opinion concluded that once virus is introduced to a wild bird population, a critical population size is required before virus amplification and further wild bird-associated geographical spread of the virus can take place. Therefore, there is an increased likelihood of incursion into poultry farms most closely located to large gatherings of wild birds (including but not exclusively waterfowl), particularly during the waterbird migration season. Once the migratory birds leave (from late March onwards) the risk of poultry outbreaks in Europe and Great Britain usually reduces but in cases where non-migratory birds are still testing positive, there will be a continual risk, as was observed in summer 2022 in gannets, and this summer in gulls. As has been observed in previous HPAI seasons in Great Britain the risk was anticipated to decrease through spring and into summer because the large gatherings of wintering resident birds will have dispersed to their breeding sites, the migratory waterbirds will have departed, and the warmer temperatures and longer day lengths will reduce virus survival in the environment. The sustained transmission of HPAI H5N1 in breeding seabirds as was observed over the summer months of 2022 in Great Britain and northern Europe was unprecedented, and it now clear that disease has been maintained in black-headed gulls in summer 2023, with spill over into some co-located seabirds such as terns.

Outbreaks in poultry in Great Britain are now at very low levels with one every few weeks (late June 2023) and significantly down from the peak of 27 IPs in the second week of October 2022. It remains to be seen how the changing behaviour and dispersal of black-headed gulls, and other wild bird species that share roosting sites, impacts the ability of the disease to be maintained in wild birds and the onward risk to poultry.

The EFSA 2017 expert opinion suggests that following stepwise biosecurity measures, and after preventing poultry access to water bodies, housing leads to a two-fold reduction in risk, which is significant in terms of the number of outbreaks potentially prevented given the number of premises with poultry in Great Britain and the large number of outbreaks (169 to 31 March 2023) so far reported in the 2022 to 2023 season. Due to the additive nature of the 2017 EFSA expert opinion, the effect of housing may be underestimated because it also includes removing access of poultry to ponds which may have an additional three-fold effect, giving an overall six-fold reduction in risk (Figure 1). In terms of reducing the overall number of IPs, housing is likely to be most effective before the peak of the epizootic, with a law of diminishing returns at the later stages when housing may prevent only a few additional IPs. The behavioural impact of announcing a housing order is not fully understood, for some it may send a message to poultry keepers that the risk has increased significantly, increasing the uptake of daily routine biosecurity measures. Conversely, others may become lax in other biosecurity measures if housing is believed to be a panacea. As such, this needs to be followed up with clear communications on the importance of biosecurity measures and training as a whole (as suggested is most effective in the EFSA 2017 expert elicitation).

It should be noted that there are studies and expert opinion assessments which confirm that housing is only part of the biosecurity continuum (EFSA, 2017). Housing, in addition to directly reducing contact with wild birds, also enables the application of more stringent biosecurity measures. For example, a foot bath and change of clothes is likely to be more effective at mitigating indirect transmission when birds are housed, compared to when poultry are let out and wild birds can also access the range. If stringent biosecurity is applied, the risk to poultry is substantially reduced and housing of poultry will further reduce that risk.

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Appendix A

Table 2 Number of HPAI H5N1 positive wild bird cases between October 2022 and June 2023

Species	England	Scotland	Wales	Total
Black Swan	1			1
Canada Goose	174		3	177
Great White Egret	1			1
Grey Heron	1			1
Greylag Goose	112	4	5	121
Herring Gull	31	10	2	43
Kestrel	6			6
Mute Swan	143	14	10	167
Pink footed goose	27	23		50
Unspecified Goose	5	4		9
Unspecified Swan	2			2
Whooper swan	15	2		17
Common Buzzard	77	10	4	91
Red Kite	3			3
Pheasant	31	4	9	44
Curlew	1			1
Barnacle goose	3	19		22
Mallard duck	6		2	8
Unspecified duck	2			2
Black Headed Gull	174	5	19	198
Sparrowhawk	19	2		21
Goshawk	1			1
Guillemot		1	1	2
Wood Pigeon	5			5
Hen Harrier		1	1	2
White Fronted Goose		2		2

Species	England	Scotland	Wales	Total
Moorhen			1	1
Unspecified Gull	1	9		10
Common Gull	2	5		7
Tawny Owl	7	1		8
Gannet	7		2	9
Great Black Backed Gull	1			1
Arctic Tern			1	1
Common Tern	19		2	21
Sandwich Tern	6	4	2	12
Carrion Crow	1			1
Unspecified crow			1	1
Razorbill	1			1
Little Egret	1			1
Rock Dove	10			10
Fulmar		1		1
Lesser black-backed gull	1	2	2	5
Crow	1			1
Pintail duck	1			1
Osprey		1		1
Peregrine	19			19
Unspecified Tern		3		3
Unidentified Avian	2			2
Barn Owl	2	1		3
Red Legged Partridge	1			1
Goosander	1			1
Red Breasted Goose	2			2
Fantail Dove	1			1
Red-throated Diver		1		1

Species	England	Scotland	Wales	Total
Unspecified Bird of Prey	5		1	6
Other Crow	2			2
Unlisted Goose	3			3
Unspecified Pheasant	3			3
Shoveler	1			1
Greater Spotted Woodpecker	1			1
Dove Pigeon	1			1
Unspecified Heron		1		1
Ringed Plover		1		1
Unknown Buzzard		3		3
Teal	1			1
Reed Warbler	1			1
Mediterranean Gull	1			1
Total	**946**	**134**	**68**	**1148**