



FOOD AND FARMING GROUP
Veterinary Sciences Core team

EPIDEMIOLOGY REPORT

**HIGHLY PATHOGENIC AVIAN INFLUENZA H5N1 IN
WILD SWANS IN DORSET**

JANUARY 2008

Prepared by the National Emergency Epidemiology Group

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Suggested reference for this publication:

Defra, (2008). Highly pathogenic avian influenza – H5N1 in swans in Dorset. Epidemiology Report 1A Page Street, London, SW1P 4PQ, United Kingdom. Version 1, Released 29 January 2008.

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Executive Summary

1. Highly Pathogenic Avian Influenza (HPAI) was confirmed in Great Britain on 10 January 2008, when tests had shown that virus strain type H5N1 (HPAI H5N1), was present in the carcasses of three wild mute swans (*Cygnus olor*). These carcasses were collected on 7 January 2008 from the Fleet Reserve on the Dorset coast, and examined as part of Great Britain's avian influenza wild bird surveillance programme.
2. HPAI H5N1 was later detected in carcasses of three further mute swans collected from the same area. No infection has been identified in any other individual or species of wild bird in Great Britain since April 2006, when an infected whooper swan (*Cygnus cygnus*) was found dead, washed up in Cellardyke harbour in Scotland.
3. Analysis of the virus indicates that it is related to contemporary viruses from continental Europe and is most closely related to a cluster of isolates recovered in mid to late 2007 from wild and domestic birds in the Czech Republic, Romania and Poland.
4. Expert ornithological advice indicated that swans, or other wild birds, particularly wildfowl from the same population, would move within the Fleet, between the two Royal Society for the Protection of Birds (RSPB) reserves at Lodmoor and Radipole and up to 3km inland, and thus potentially place domestic poultry at risk of infection within this area. This led to the delineation of the Wild Bird Control Area (WBCA).
5. Wild bird surveillance has been increased in the area and apart from the swans reported above, no other evidence of avian influenza infection has been found in the wild bird populations.
6. This is a region of relatively few domestic poultry, and surveillance activities focussed on the domestic poultry within the WCBA are complete. No evidence of spread of HPAI H5N1 to the domestic poultry population has been found.
7. The source of infection for the swans has not been identified, however the most plausible hypothesis is that it was introduced by one of the migratory wild birds that make up part of the population on the Fleet during the winter.
8. The Health Protection Agency have been informed of the incident and have provided advice on the potential human health risk, which is not considered further in this report.

Clinical History

9. Highly Pathogenic Avian Influenza strain type H5N1 (HPAI H5N1) was confirmed to be present in the carcasses of three wild mute swans collected on 7 January 2008 and examined as part of Great Britain's AI wild bird surveillance programme. The swans were submitted to the programme by the Abbotsbury Swannery, Dorset. Swannery staff euthanased two of the birds on 27 and 31 December 2007 respectively. One had a leg injury and the other was emaciated. The third swan was found dead on 4 January 2008. The three birds were ringed and are therefore known to have hatched locally in 2006 and 2007. HPAI H5N1 has been found in three further swan carcasses submitted on 11, 14 and 21 January respectively. No clinical signs of avian

influenza (AI) had been observed in five of these birds, however nervous signs that would be consistent with AI infection were seen in the fifth bird found positive.

10. A large number of swans habitually come to the Swannery and small numbers die throughout the year. These deaths were not considered unusual, and were handled in the normal way, the carcasses being submitted at a convenient time for screening under the wild bird surveillance programme.

Investigations at the Swannery

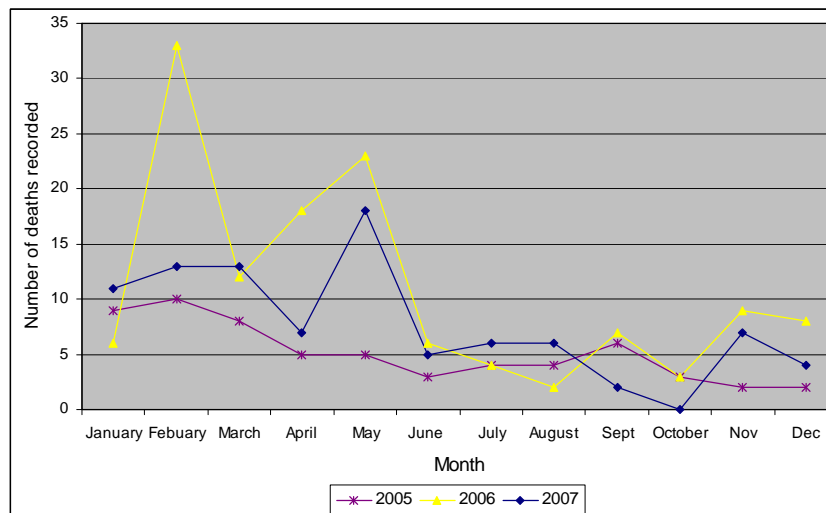
11. The Swannery was established by Benedictine Monks who first built a monastery at Abbotsbury during the 1040's and farmed the swans as a food source. The Swannery passed into the stewardship of Ilchester Estates (the current "owners" of the mute swan flock) in 1539. Today Abbotsbury Swannery is a reserve for free flying swans and wild birds and forms part of "The Fleet", an internationally important wetland, situated on the Dorset coast.
12. Over recent years, the Fleet and adjacent wetland reserves have supported the highest numbers of mute swans of any site in the UK, the average annual peak being of the order of 1,100 birds. Numbers peak in late summer and early autumn, with a decline then noted due to mortality and some local emigration. The western end of the Fleet, adjacent to the Abbotsbury Swannery, typically supports the majority of the mute swans on the Fleet between February and October, but there is a redistribution of many birds mid-winter to the area around Chickerell Hive Point, further east along the Fleet.
13. About 750 mute swans were counted on the Fleet in mid December 2007. Approximately 250 mute swans come to the Swannery feeding site each day at this time of year (Figure 1). Daily numbers are dependent on weather conditions; more being present in bad conditions. In the feeding area the swans are joined by other waterbirds, principally mallard, coot, tufted duck and pochard, which are inevitably in close contact. Other species are present in smaller numbers.

Figure 1: Main swan flock at Abbotsbury, 11 January 2008



14. Investigations on site on 11 and 12 January 2008 revealed no evidence of clinical disease among the wild birds present, and the staff, who have ready opportunity to observe the mute swans at very close quarters, have not recorded or reported increased morbidity. There has been no reported increase in morbidity or mortality in any species in the reserve.
15. Examination of swan mortality records held by the Swannery showed that the mortality pattern during the winter of 2007/08 was consistent with that in previous years, and there had been no increase in mortality in the preceding months (Figure 2).

Figure 2: Mute swan deaths recorded at Abbotsbury Swannery 2005 - 2007



16. Swannery staff and local wardens patrol the Swannery and the whole length of The Fleet, generally on a weekly basis, looking for dead birds eligible for laboratory examination for AI under the wild bird surveillance programme managed by Defra. Additional “ad-hoc” pickups are arranged if carcasses are reported by members of the public. Since confirmation of HPAI H5N1 on 10 January 2008 these patrols have been carried out almost daily. Only swan, goose and duck carcasses are eligible for collection. During this period no duck carcasses were found but there have been 14 swan (12 mute, 2 unspecified) and 1 goose carcass submissions. All carcasses found are reported to Defra to arrange collection.

Analysis of the virus

17. The European Union (EU) and World Animal Health Organisation (OIE) International Reference Laboratory for AI at the Veterinary Laboratories Agency (VLA) at Weybridge identified the presence of HPAI H5N1 in the six mute swan carcasses using molecular and conventional virological methods.
18. Genetic analysis of four of the viruses recovered places these isolates in a cluster with others recovered in mid to late 2007 from the Czech Republic, Romania and Poland. Nucleotide sequence comparisons identify a Czech Republic isolate with the closest similarities with these isolates, ranging from 98.7% to 99.4%. The genetic relatedness at the nucleotide level between the four UK mute swan isolates analysed fully to date is 99.3% to

99.8%. Similarities between these isolates from the outbreak of HPAI H5N1 in turkeys in England in November 2007 is 99.2% to 99.3%. Analysis of the remaining two virus isolates continues and will be reported separately.

19. In summary the viruses from the swans are closely related to each other, and more closely related to viruses from Europe than to those recovered from the recent outbreak in turkeys in Suffolk.

Potential for HPAI H5N1 in wild swans to become a risk to domestic animals

Wild Bird Ecology (further detail provided in Annex 2)

20. The wetlands in this area are effectively one continuous habitat with free movement throughout the system. The wild bird population can therefore be considered as a single population for disease transmission. Data from the Wetland Bird Survey (WeBS) carried out in partnership by a number of organisations (British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB), UK Joint Nature Conservation Committee (JNCC) and Wildfowl & Wetlands Trust (WWT)) showed that between 2001 and 2006/07 the peak numbers of waterbirds recorded as wintering at the Fleet and the Wey are typically recorded in November, December and January and have averaged 15,472 birds, although this figure does not include the large nocturnal gull roost offshore involving upwards of 15,000 birds.
21. Since 2001/02 ninety-three species of waterbird have been recorded during counts at Fleet and Wey. These include two species of swan, 12 species of geese, 20 species of duck, 25 species of waders and nine species of gull. Mute swan numbers typically peak between October and February with the average winter peak for the past five years being 1,093.
22. The Abbotsbury Swans have been the subject of a detailed study for many years and there is a very good knowledge about their movements. Birds breeding at Abbotsbury move very little indeed. However the breeding population is augmented by birds from the surrounding counties in late summer and early autumn. These birds drift back to their breeding areas through the winter. There is no evidence of movements into the area in winter. The mute swans at Abbotsbury include some birds which are sedentary but there are also movements within the Fleet. The swans mix freely with pochard, tufted duck, moorhen, coot, mallard and Canada goose in particular. (Figure 3).

Figure 3. Mute swans, Coots, Mallards, Pochards, Tufted Ducks and a Spoonbill, Abbotsbury, 11 January 2008



Potential for exposure of domestic animals to the infected wild bird population

23. Large populations of a variety of species of gulls are present in the area, and based on expert knowledge, are considered to be the most mobile of the species present, and therefore, if infected, the species most likely to carry infection longer distances from the wetland reserve. Most of the gull species present were concentrated in Weymouth Bay rather than Abbotsbury. Of the gull species, both Herring and Great Black-backed Gulls will often scavenge corpses and so could move the disease around locally (by mechanical transfer or by becoming infected). These species however, were not seen in great numbers with the swans so the risk of spread by this method is not considered to be significant.
24. Advice was sought from the Ornithological Expert Panel (OEP), which comprises a group of specialists in wild bird ecology drawn from all major ornithological organisations, and ornithological experts from Defra and the Devolved Administrations. The OEP indicated that the inland area is relatively dry as a result of which this wetland area is fairly isolated. Most of the wildfowl are unlikely to move inland to feed as the land is rolling hills rather than lowland pasture which would attract grazing wildfowl. The location and behaviour of gull populations suggest that some gull movements inland do occur but the main roosts are at sea. Expert opinion indicates that the likelihood of longer distance (>3km) transfer of infection inland is low.

25. On confirmation of disease by the Chief Veterinary Officer, a Wild Bird Control Area (WBCA) and Wild Bird Monitoring Area (WBMA) were declared under



26.

The Avian Influenza (H5N1 in Wild Birds)(England) Order 2006. This came into force at 1500hrs on 10 January 2008. In defining these areas the expertise and recommendations of the OEP (as described above) were taken into account. The OEP considered the current likely flight range of the swans and other wildfowl on the Fleet, and carried out field studies to validate these assumptions and to assess gull distribution and movements. The WBCA and WBMA were delineated accordingly and are shown on the map at Figure 4.

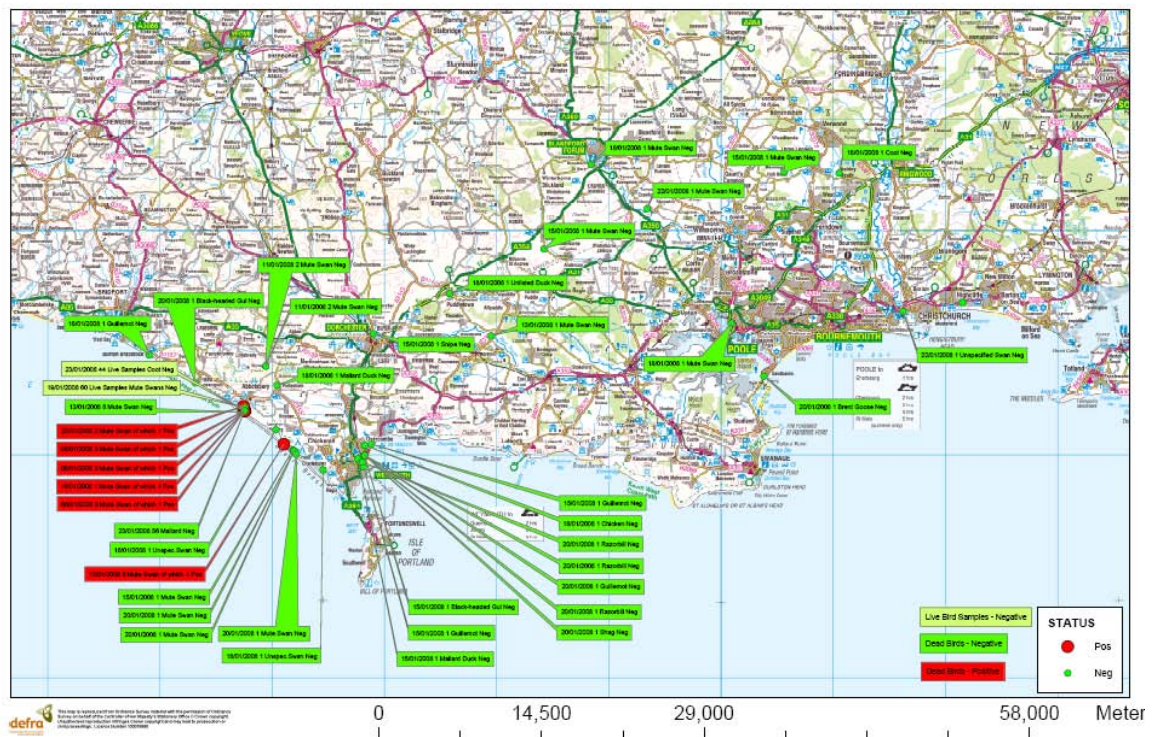
Figure 4. Location of wild bird Monitoring and control areas

Level of infection in the wild bird population

Wild bird surveillance

27. Defra sponsors ongoing AI wild bird surveillance in partnership with a number of non-governmental organisations in order to improve the chance of detection of wild birds infected with AI. This surveillance takes the form of routine patrols at defined sites to find and test dead birds of epidemiologically important species, and a mechanism to collect and test a proportion of dead birds that fulfil the eligibility criteria for potential infection with AI.
28. Warden patrols of the water bodies in the wild bird monitoring areas have been increased in order to improve the chance of detecting sick and dead birds in the infected population. Any carcasses found have been reported and those eligible submitted for testing through the routine surveillance programme, and public reporting of birds continues.
29. Since 27 December 2007 a total of 62 eligible carcasses have been recovered from the Fleet and Wey reserve, of which 49 were suitable for testing. Tests have been completed on all of these, of which 6 mute swan carcasses were positive for HPAI H5N1, as described in the first section of this report. The geographical distribution of the carcasses found between 12 – 20 January is shown in the map below (Figure 5).

Figure 5. Distribution and results of AI analysis of wild bird carcasses found near The Fleet, 27 December 2007 – 24 January 2008. Red flag = positive for HPAI H5N1



Produced by Taunton GIS 28/01/2008; Ref:GIS/42/Ai/0047

30. The majority of the carcasses that were unsuitable for testing (8 of 13) due to poor preservation (autolysis or predation) were mute swans and 2 were swans that could not be identified due to the extent of predation. If by chance all of these were infected with HPAI H5N1, the estimated level of clinical infection in the mute swan population would increase from 0.8% to 2.1%. This could marginally increase the risk of exposure of domestic poultry to an infected swan, however the evidence from the surveillance (reported below) shows that whatever the true incidence in the swan population, transmission to domestic poultry in the local area has not occurred.

Additional Surveillance at the Swannery

31. Additional surveillance has been instigated at the Swannery with two objectives:

- (a) to test the assumption that infected swans will express clinical disease
- (b) to assess whether infection has spread to other closely associated water birds that are less likely to express clinical disease.

32. The evidence indicates that the swan population was infected by mid-December. If sub-clinical infection is a normal outcome of exposure, then as these swans congregate in close proximity with each other repeatedly due to being fed together at the Swannery, it is likely that infection would have spread through a substantial number of them, most likely to over 5% of them.

33. Therefore random sampling and testing of 60 apparently healthy swans was carried out, this number enabling the detection of at least one infected swan if at least 5% of that population are infected.
34. Laboratory tests for the presence of influenza A viruses in the apparently healthy swans have proved negative, which provides some supporting evidence for the assumption that, if infected, mute swans will express clinical disease, and as such act as effective sentinel species for the presence of HPAI H5N1.
35. On land, the predominant species that mix with the swans at Abbotsbury, and from which faeces can be collected for analysis, are coot and mallard. There is no practical way to statistically measure the presence or level of infection in such populations, however, sampling of a number of birds in close proximity with the swans could help to indicate if infection is widely present. One hundred separately collected faecal samples from the coot (44) and mallard (56) populations that mix with the swans have been tested for the presence of AI virus with negative results.
36. In summary, investigation of this incident and the observational evidence that describes the frequency of detection of HPAI H5N1 in wild birds in Europe and elsewhere, together with the very low frequency of incursion into the domestic poultry compartment, suggests that either infection of wild birds is rare, or that transmission of infection to domestic poultry is an equally rare event.

IMPACT OF HPAI H5N1 IN SWANS

Risk of spread to domestic animals

Domestic poultry population at risk of infection

37. Domestic poultry at greatest risk from the presence of infection in the swans are those likely to be exposed to the wild bird population that contains the swans. Domestic poultry exposure to infection from the swans may therefore occur either through the close sharing of the environment, or by direct contact.
38. Investigations at the Swannery established that 4 members of staff kept domestic poultry. All have been visited and examined for evidence of HPAI with negative results.
39. The review of the wild bird population described above defined this area in which proximity to the swan population is a risk factor; this is designated the Wild Bird Control Area (WBCA).
40. This is a region of England containing a relatively low density of domestic poultry, as can be seen from the maps at Annex 1, derived from information captured in the Great Britain Poultry Register (GBPR) and other Defra databases, supplemented by the premises in the WBCA found during foot patrols undertaken by Animal Health to identify all premises keeping poultry.

41. These maps show that the area has, overall, a low density of domestic poultry, and among these a low density of duck and geese. However, the proportion of poultry kept outdoors is near the middle of the range, in terms of density of outdoor poultry in different parts of GB. This may place this population at greater risk of exposure to wild birds than those elsewhere in the country. However these risk factors also suggest that hidden disease in domestic ducks and geese is less likely in this area.
42. The foot patrols were completed on 23 January and a total of 230 premises that keep domestic poultry were identified in the WBCA, with a total of 5149 birds. Approximately three-quarters of these premises keep their birds outdoors and about 40% keep waterfowl. Those with waterfowl were approximately evenly distributed between those with waterfowl only or waterfowl kept separated from other poultry, and those with waterfowl mixing freely with other susceptible stock (the latter did not require sampling as any infection would have caused clinical signs in the other more susceptible poultry).
43. The majority of the premises in the WBCA (211 of the 230) keep less than 50 birds.

Surveillance to determine if spread to domestic poultry has occurred

Wild Bird Control Area

44. In order to determine the possible spread of infection within the area, surveillance in domestic poultry has been designed to answer the question of whether HPAI H5N1 may be present in the domestic poultry in the WBCA as a result of spread from the infected swans.
45. The surveillance design is based upon the assumptions that infection results in clinical disease in domestic poultry other than ducks and geese, and that the latter species may be infected without showing signs of disease. Therefore, during all visits clinical inspection to look for the presence of clinical disease in the birds, and a check of production records (if available) has been undertaken. Where only water birds are present, additional investigation of sufficient ducks and geese to detect a 5% prevalence of infection in each separately kept group has been conducted by the collection and laboratory testing of oro-pharyngeal swabs.
46. All areas of the WBCA were considered to be at equal risk of infection from the wild bird population on the Fleet so surveillance was not targeted in one area but was spread throughout the area each day. Surveillance of poultry premises in the WBCA commenced on 11 January 2008 and was completed on 23 January 2008. No clinical signs, or historical evidence of disease have been found at any of the premises visited, and no AI virus has been detected in any of the birds sampled.

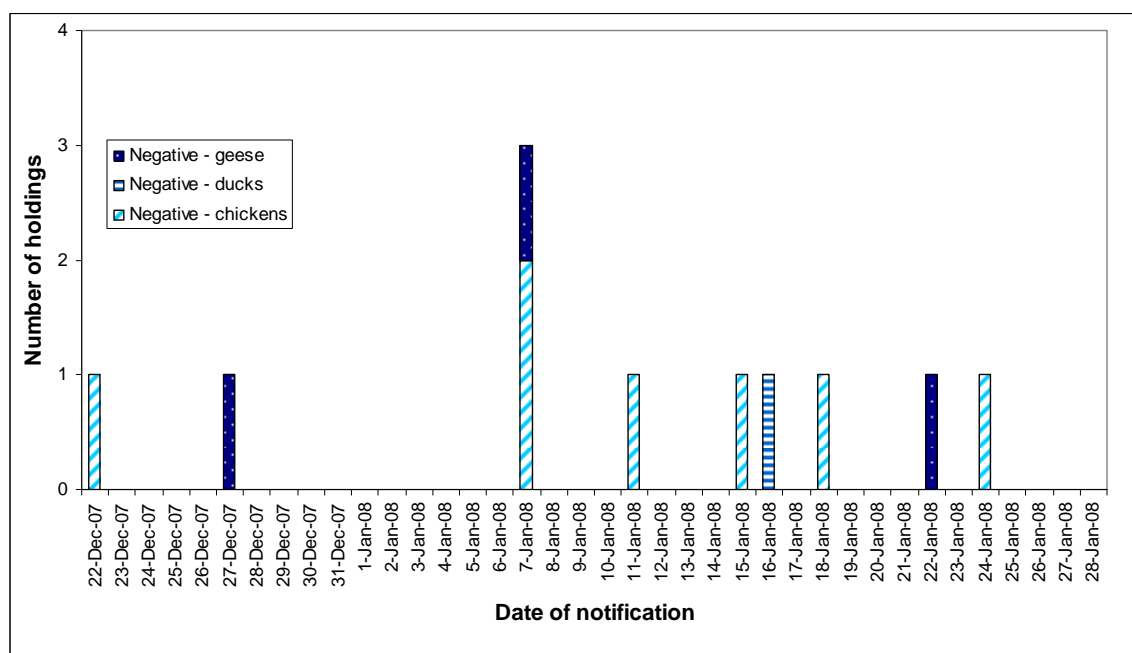
Wild Bird Monitoring Area

47. Based upon an assessment of the risk of further spread, active surveillance activities in domestic poultry have not been extended to the WBMA. Consequently, patrol visits have not been undertaken within the WBMA.
48. Fifty-four premises have been identified within the WBMA using Defra-held data sources, including the GBPR. Of these, at least 28 keep more than 50 birds. Further premises keeping domestic poultry will be present within the WBMA, however these are likely to keep fewer than 50 birds each and thus be of limited risk of disseminating disease further.

Rest of Great Britain

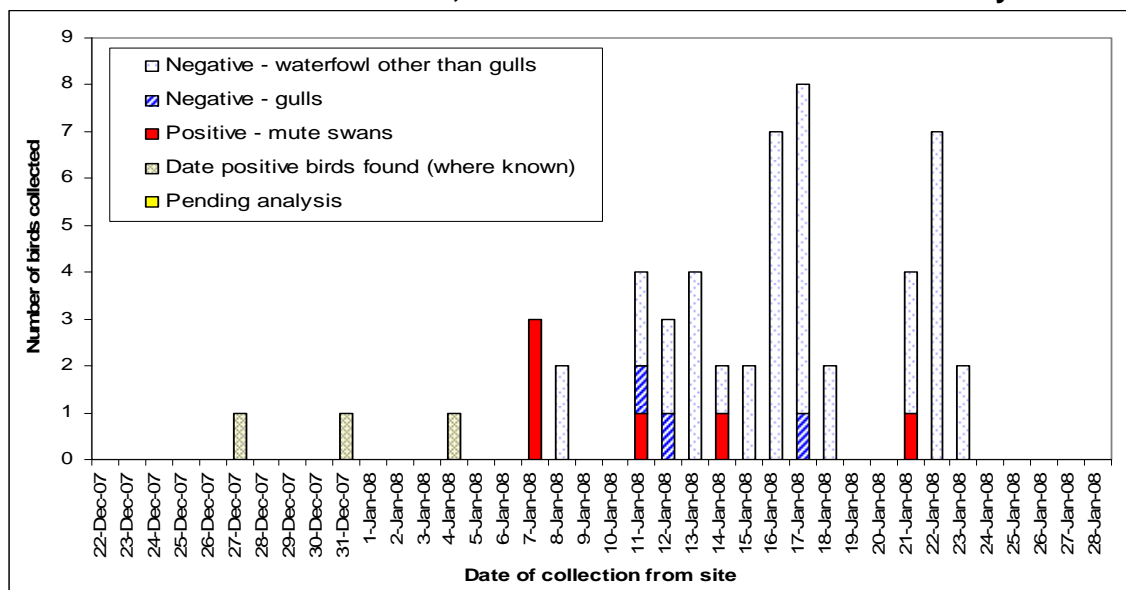
49. Eleven suspect cases of avian influenza in domestic poultry have been investigated throughout Great Britain since 22 December 2007, and avian influenza has been ruled out as the cause of the clinical disease seen. The temporal distribution of the reports is shown in Figure 6.

Figure 6. Number and status of cases of suspect avian influenza in domestic poultry in Great Britain, 22 December 2007 to 28 January 2008.



50. During the same period, wildfowl species submitted as part of surveillance include mute swan, mallard duck, coot, brent goose, unidentified swan species, and unlisted duck. Black-headed gull represented the only gull species submitted for analysis. Other wild bird species submitted for analysis included guillemot, shag, razorbill, teal and snipe.
51. In total, 49 birds from Dorset have been submitted for analysis, with no results pending, as of midday 28 January 2008.

Figure 7. Number and status of wild bird carcasses submitted for surveillance for avian influenza in Dorset, 22 December 2007 to 28 January 2008.



Risks to other species

52. There is some evidence that carnivores can be infected with H5N1 if they eat the carcasses of infected birds. However, where natural infections of wild carnivores have occurred, this has been associated with a high prevalence of infection in domestic poultry or large 'die offs' in wild birds.
53. There is no evidence of a high level of infection of HPAI causing wild bird mortality in this area. This low level of infection, and the increased awareness together with the increased number of patrols and the collection system for wild bird carcasses will minimise the number of potentially infected carcasses available to wildlife or domestic carnivores, and it is unlikely that infection of carnivores will have occurred to any significant extent.

Hypotheses for Source of HPAIH5N1 in the Abbotsbury swans

54. Possible sources of infection for the swans include:
- Infected wild migratory bird
 - Infected domestic poultry waste product, from the GB or overseas
 - Contaminated feed
 - Infected domestic poultry in GB

Source investigations

Infected wild migratory bird

55. Closely related HPAI H5N1 viruses were detected in the latter half of 2007 in wild birds in the Czech Republic, Germany and France. Although wild bird surveillance is such that it can only describe where infection is, rather than where it is not, this finding confirms that very similar viruses are circulating in Europe.

56. The review of the risks of wild bird introduction to Great Britain in the document 'Highly pathogenic avian influenza – H5N1: Recent developments in the EU and the likelihood of the introduction into Great Britain by wild birds' (Defra, 2007), which was released on 12 July 2007 indicated there was a low risk of introduction. The review concentrated on certain species and explored the risk of movements from the Czech Republic (CR).
57. A number of species, including mallard, pochard and black-headed gulls, that are also found in large numbers on The Fleet were indicated to be in large numbers in CR and highly likely to occur in Great Britain. Similar movements are likely to take place from other countries in this part of Europe. Although the months of arrival are in the autumn, so some time before the estimated date of infection of the swans, this provides some circumstantial evidence that infection could have come from Europe.
58. Introduction by an infected migratory bird remains the most likely explanation as to the source of infection for the Abbotsbury swans. The migratory wild bird population is large and mobile, and therefore detection of a low level of infection in it is challenging. Such infection has not been detected, however other potential sources have been investigated (see below) and found to be less plausible.

Infected domestic poultry waste product, from the GB or overseas

59. The possibility of infection being introduced into the area by activities around poultry slaughterhouses or poultry processing premises was considered. No such registered premises were identified in the WBMA or the WBCA. Similarly local records show that there are no unregistered processors in the area.
60. Premises in the South Dorset area handling domestic waste for disposal and others handling International Catering Waste at local ports and airports were considered as possible hazards. These premises are visited on a regular basis by Animal Health to check on compliance with relevant legislation which includes keeping waste inaccessible to wild birds. Recent reports indicated full compliance, making this route of introduction of disease to wild birds unlikely.

Contaminated feed

61. The swans are fed grain (wheat) on a daily basis. During recent months this has been sourced from a single, local farm, harvested in 2007. The feed supplier used no ingredients of imported origin in any other products held on site.

Infected domestic poultry in Great Britain

62. No cases of HPAI H5N1 have been detected in Great Britain since the outbreak in turkeys in Suffolk in November 2007. There are no links between the incident in the swans and that outbreak, and the virus is less similar to the one recovered then, than to isolates from Europe. Surveillance and heightened awareness in the area and throughout GB has failed to disclose HPAI H5N1 in any other species.
63. Large numbers of game birds and some wildfowl were released into the area for sporting purposes during the summer of 2007. No illness or increased

mortality had been reported during the shooting season. In addition, the origin of these birds was investigated and was found not to include any area where there had been outbreaks of HPAI H5N1 so they were ruled out as a potential source.

Summary of the epidemiology

64. HPAI H5N1 infection appears to be confined to the mute swan population located on the Fleet wetland reserve. The evidence suggests that the virus has been present in this population at a very low level, with the incidence detected to date being 0.8%. Further cases are likely to be detected if they occur, as the infection commonly causes disease and death in this species.
65. There is no evidence of spread from the swans into any other population, in particular to the domestic poultry most likely to have been exposed to the infected population, suggesting that this would be an unlikely or rare event. The source of infection for the mute swan population remains undetermined.

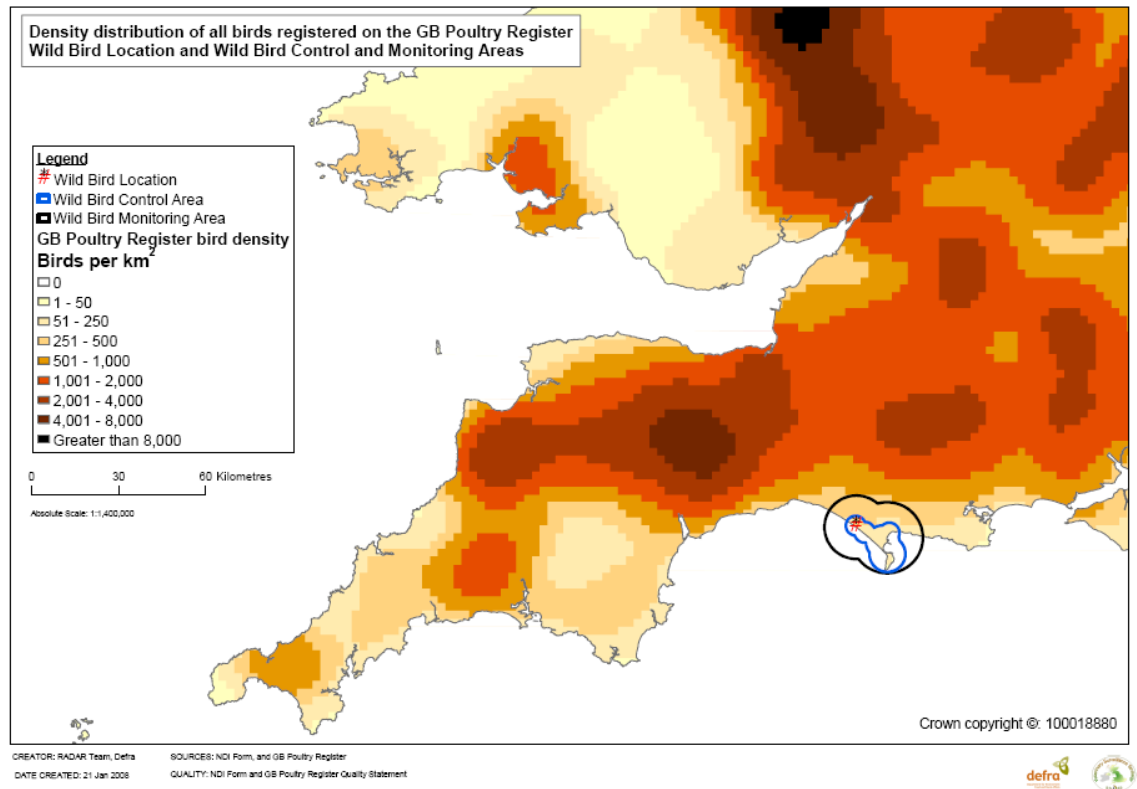
Acknowledgements

66. The National Emergency Epidemiology Group would like to thank the members of Ornithological Expert Panel (OEP) for their expert advice. The OEP consists of representatives from the following organisations (in alphabetical order): British Trust for Ornithology (BTO), Countryside Council for Wales (CCW), Natural England (NE), Royal Society for the Protection of Birds (RSPB), Scottish Government (SG), Scottish Natural Heritage (SNH), UK Joint Nature Conservation Committee (JNCC) and Wildfowl & Wetlands Trust (WWT). Thanks are also extended to the ornithologists that supported the BTO undertaking their field assessment work and providing the photographs. We would also like to thank the many staff of Defra, Animal Health and VLA who worked with us on the investigation.

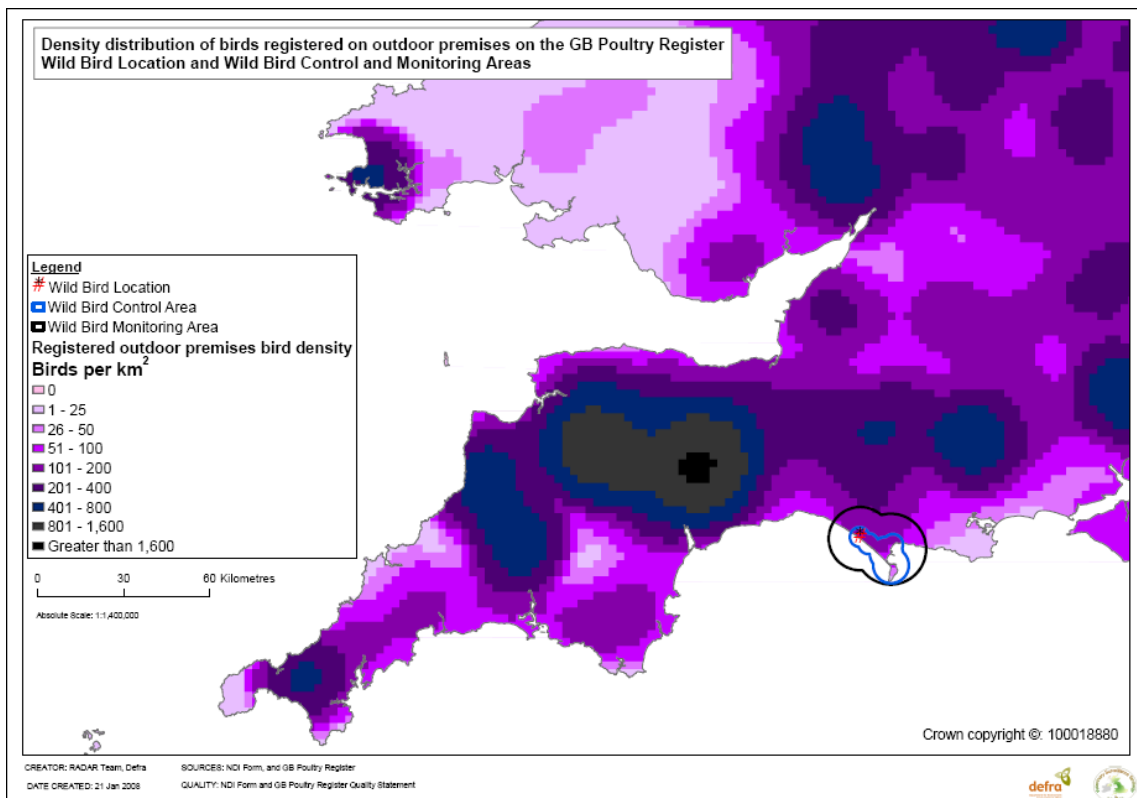
National Emergency Epidemiology Group
28 January 2008

Annex 1: Maps to show the density of all poultry in south west England, and the density of those kept outdoors, and of domestic ducks and geese

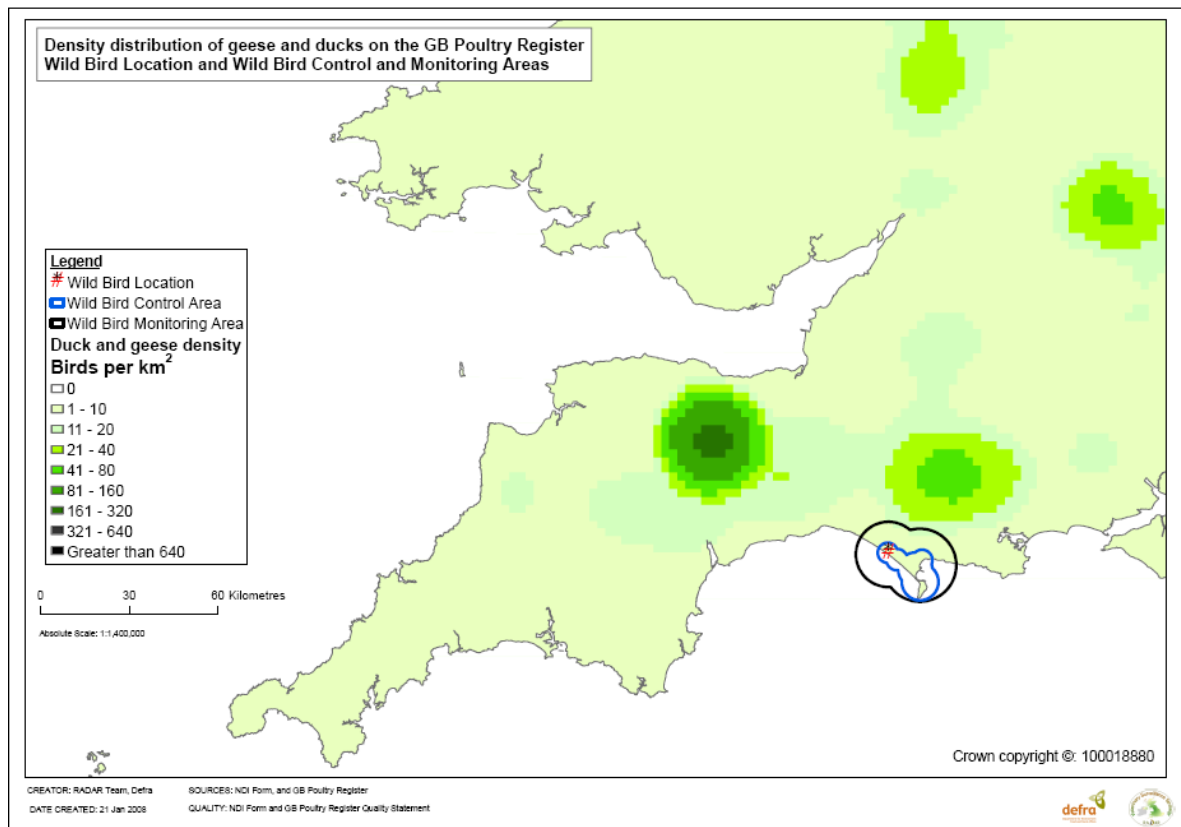
(a) Density distribution of all poultry



(b) Density distribution of domestic poultry kept outdoors



(b) Density distribution of domestic geese and ducks



Annex 2: Detailed description of wild birds in the Fleet

The wetlands in this area are effectively one continuous habitat with free movement throughout the system. The wild bird population should therefore be treated as a single population for disease transmission. Data from the Wetland Bird Survey (WeBS) showed that between 2001/02 and 2006/07 the peak number of waterbirds wintering at the Fleet and Wey have averaged 15,472 (although this does not include the gulls making use of nocturnal roosts in the area, likely to involve upwards of 15,000 birds). Peak numbers are typically recorded in November, December and January. The majority of waterbirds in the Fleet and Wey area are typically recorded in the Chesil Fleet. Peak numbers at each of the four sections typically surpass those at Radipole, Lodmoor and Portland Harbour.

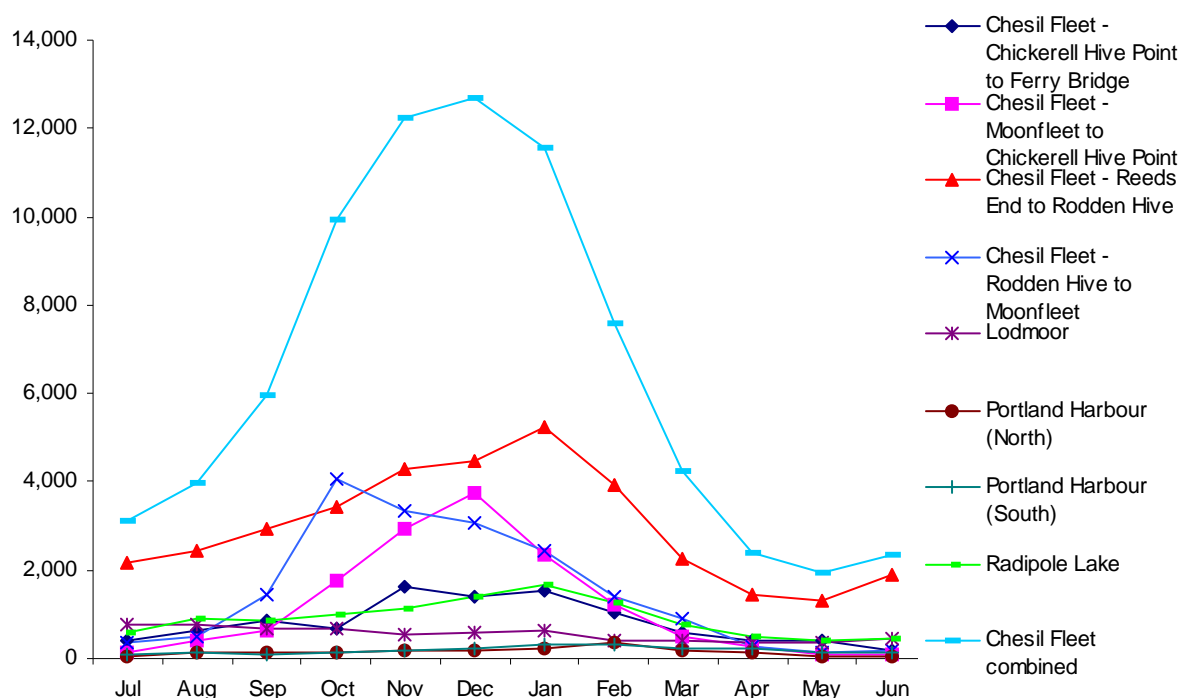


Figure 1. Average monthly counts of total waterbirds in areas of Fleet & Wey

Species composition

Since 2001/02 93 species of waterbird have been recorded during counts at Fleet and Wey. These include two species of swan, 12 species of geese, 20 species of duck, 25 species of waders and nine species of gull.

Swans

Mute Swan numbers typically peak between October and February with the average winter peak for the past five years being 1,093. The vast majority of Mute Swans recorded at Fleet and Wey occur along the Chesil Fleet with smaller numbers at Radipole and Lodmoor and none in Portland Harbour. The Abbotsbury Swans have been the subject of a detailed study for many years and there is a good general picture about their movements. Birds breeding at Abbotsbury move very little indeed. However the breeding population is augmented by birds from the surrounding counties in late summer and early

autumn. These birds drift back to their breeding areas through the winter. There is no evidence of movements into the area in winter. The Mute Swans at Abbotsbury include some birds which are sedentary but there are also movements within the Fleet. The swans mix freely with Pochard, Tufted Duck, Moorhen, Coot, Mallard and Canada Goose in particular.

Other Waterfowl Summary

Data from the BTO Ringing Scheme were used to assess the risk of each species transmitting HPAI H5N1

Species	Migratory	Local Movements	Relative risk of virus transmission
Coot	Some from continent join resident population	Mainly locally but bad weather causes longer distance movement	Medium
Canada Geese	No	Very sedentary in winter some movements to Dorset valleys	Low
Mallard	Some migration into Britain from central Europe. Movement from Eastern UK to Southern UK.	Mainly local Dorset population few longer distances	Medium
Pintail	Highly migratory from Northern Europe	Can move long distances in response to cold weather	High
Pochard	Mainly migratory from central Europe		High
Shoveler	Mainly migratory from across Europe	Move south and west with cold weather	High
Teal	Migrate from northern Europe	Mainly local once arrived but long distance movement if bad weather	High
Tufted Duck	Substantial resident population but increased numbers from continent in winter	Considerable amount of local movement	Medium
Wigeon	Majority migrate to UK from Iceland and Northern Europe	Considerable local movement	High

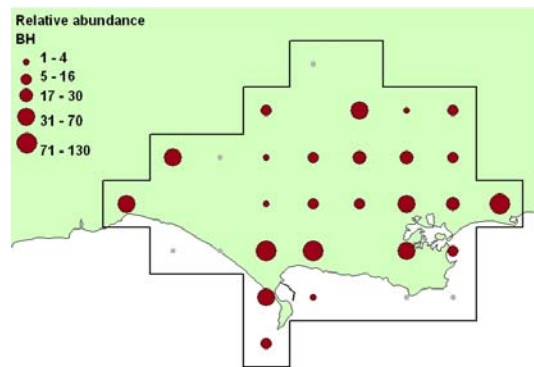
Gull Populations

Large populations of a variety of species of gulls are present in the area. Great black-backed gulls are the species which mixed more closely with the swans and ducks at the swannery. This species will often scavenge corpses so could move the disease around locally (by passive transfer or by becoming infected). This species was one of several which was noted in the vicinity of the swannery, with ca 500 black-headed gulls roosting on the fleet at Abbotsbury; however, the majority of gulls roost on the sea. The numbers of gulls using Weymouth Bay is far in excess of those roosting at Abbotsbury.

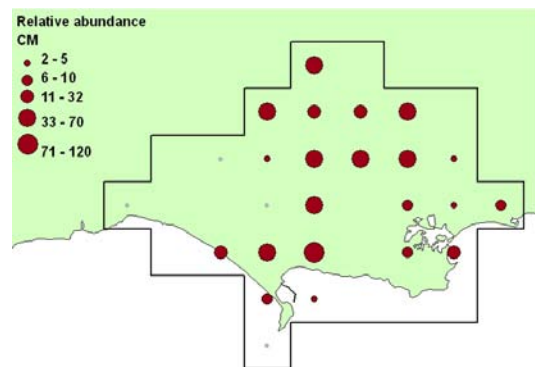
There is substantial movement of gulls inland during the daytime however these are primarily black-headed and common gulls.

Fig 2. Relative abundance and distribution maps for selected species. Scaled symbols indicate relative abundance where counts were available for a 10-km square. Grey dots indicate 10-km squares where no counts were available but the species was recorded as present. Data from the BTO/RSPB BirdTrack scheme and provisional data from The Bird Atlas 2007-2011.

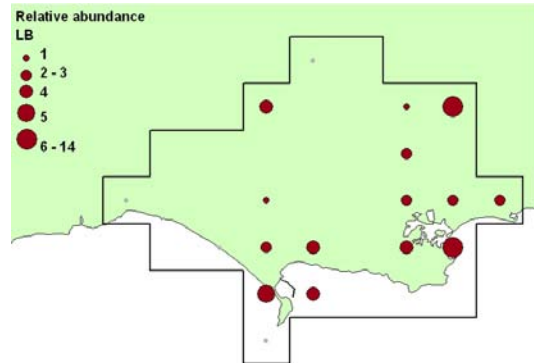
Black-headed Gull



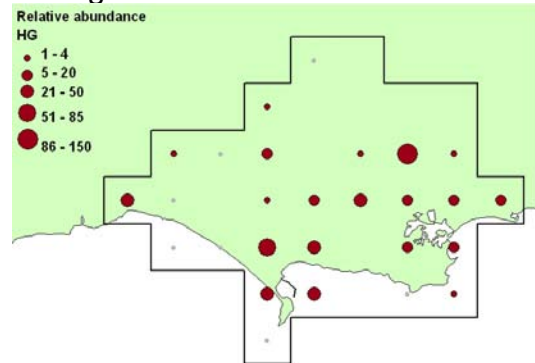
Common Gull



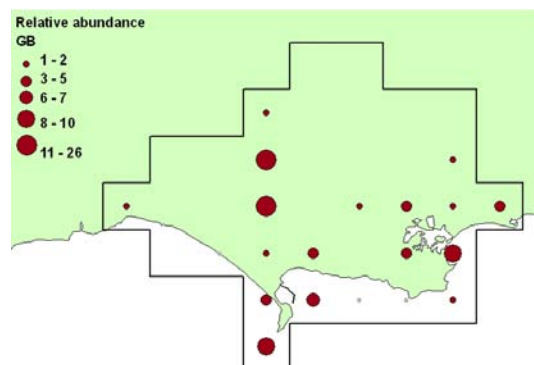
Lesser Black-backed Gull



Herring Gull



Great Black-backed Gull



Inland movement of birds

The inland area is relatively dry meaning that this wetland area is fairly isolated. Most waterbirds from the Fleet are unlikely to move inland to feed as the land is rolling hills rather than lowland pasture which would attract grazing waterfowl. The location and behaviour of gull populations suggest that gull movements inland do occur, although the main roosts are at sea. This information contributed to the definition of the wild bird control and monitoring zones.

Wild bird surveillance

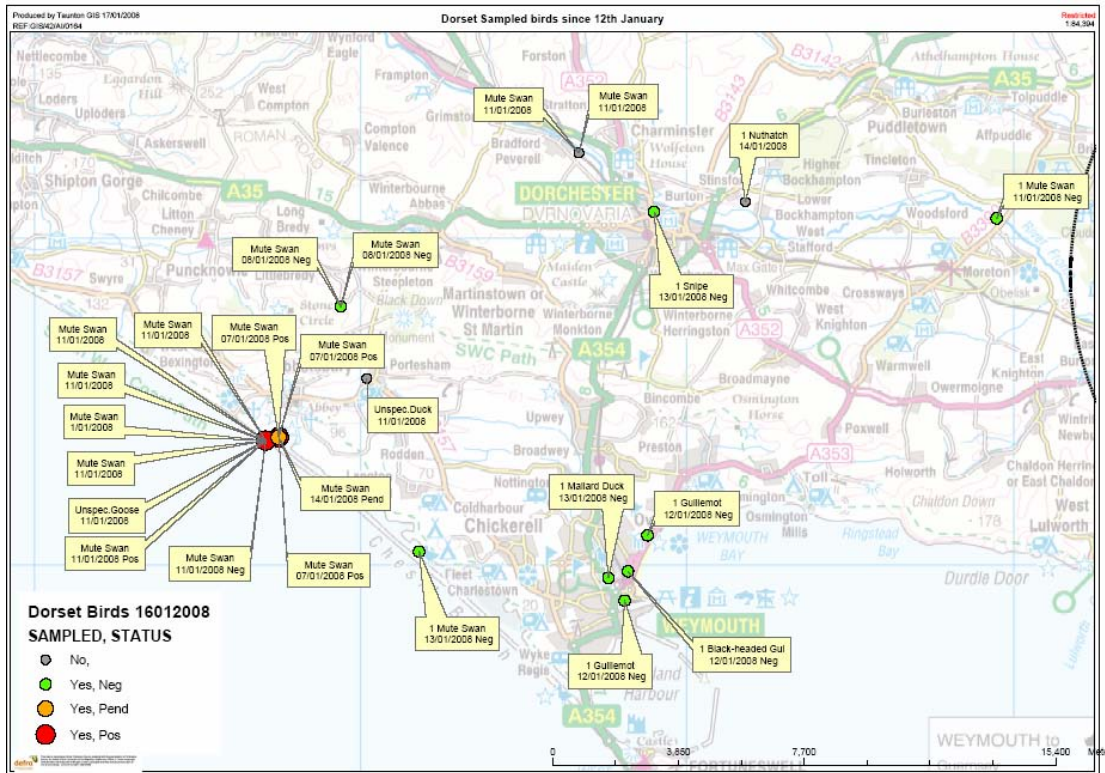
Warden patrols of the water bodies in the wild bird monitoring areas have been increased in order to monitor populations for sick and dead birds. Any carcasses found have been reported and submitted for testing through the routine surveillance programme. Public reporting of birds continues.

Species	No. of carcasses eligible for collection	No. of collected carcasses suitable for testing	No. of carcasses with results pending	No. carcasses tested negative for Avian Influenza	No. of carcasses tested positive for avian influenza
Black-headed Gull	3	3	1	2	0
Chicken	1	1	0	1	0
Coot	1	1	0	1	0
Guillemot	4	4	1	3	0
Mallard Duck	2	2	0	2	0
Mute Swan	24	17	3	9	5
Nuthatch	1	0	0	0	0
Razorbill	3	3	3	0	0
Shag	1	1	1	0	0
Snipe	1	1	0	1	0
Unlisted Duck	1	1	0	1	0
Unspec.Duck	1	0	0	0	0
Unspec.Goose	2	1	1	0	0
Unspec.Swan	3	2	0	2	0
Total	48	37	10*	22	5

* 10 birds are awaiting receipt at Weybridge, expected 21/01/08

Positive Cases

Subtype	Pathogenicity	Species	Map Ref	Lab Ref
H5N1	HP	Mute Swan	SY575839	21-B0071-01-08
H5N1	HP	Mute Swan	SY575839	21-B0071-01-08
H5N1	HP	Mute Swan	SY575839	21-B0071-01-08
H5N1	HP	Mute Swan	SY571838	21-B0160-01-08
H5N1	HP	Mute Swan	SY575839	21-B0202-01-08
H5N1	HP	Mute Swan	SY574839	21-B0351-01-08



Surveillance in wild birds 12th -17th January 2008

Oiled birds from shipwreck

Due to a recent shipwreck oiled birds are being reported. The relevant non-governmental organisations and Natural England are collecting and treating affected birds. These are most likely to be sea birds such as guillemots they are not high priority species and would have limited contact with waterfowl in the wetland habitats. However, dead birds are being submitted through the routine surveillance networks.

Wild Bird Exposure Assessment

The following tree diagram provides a simplified overview of the possible outcomes of wild bird exposure to virus.

