



Surveillance of unprecedented wildlife mortality due to HPAIV infections 2021-2022

Pacific wildlife health network – 3rd meeting, Oct 2022

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Monitoring and surveillance of unprecedented wildlife mortality due to HPAIV infections 2021-2022

1. HPAIV - unprecedented wildlife mortality in the UK
(due to an infectious agent)

2. HPAIV - ND v OH
(importance of Notifiable Disease + One Health in HPAIV)





Why is HPAIV so important?

- Always 'new and emerging' – RNA virus
- Potential for zoonotic disease
- Threat to farm animals
- Wildlife remain a constant reservoir
- Global movement of the virus, migrating wild birds
- Tending to be more important each year

• Outbreak Figures – July 2022

Domestic poultry

September 2022 - 149 outbreaks =
(largest outbreak ever recorded)

2021 - 26 outbreaks

2017 - 13 outbreaks

£

Wild birds

Barnacle geese HPAIV H5N1

Barnacle geese, Gt Britain - 57 confirmed deaths

Barnacle geese, Solway - 45 confirmed deaths

Barnacle carcasses counted - 750 dead

Ring recoveries - 40

Solway flock size - 40,000 geese

Solway flock 'missing' - 10,000 geese



The Svalbard barnacle goose (*Branta leucopsis*)

IUCN – Least Concern

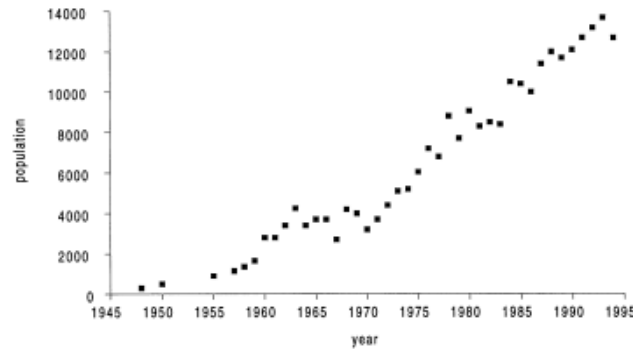
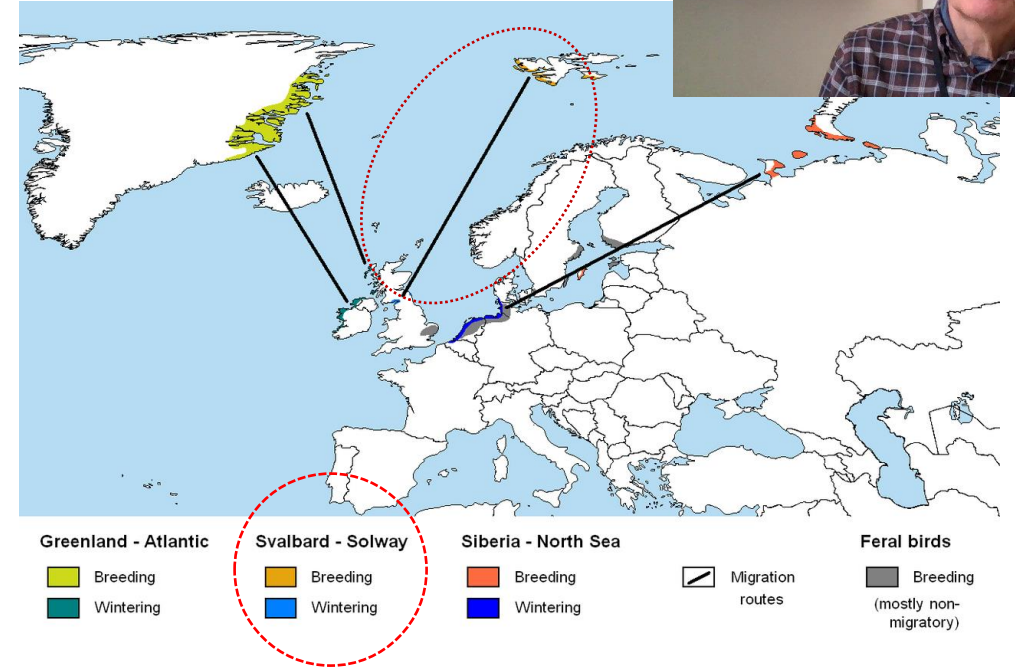


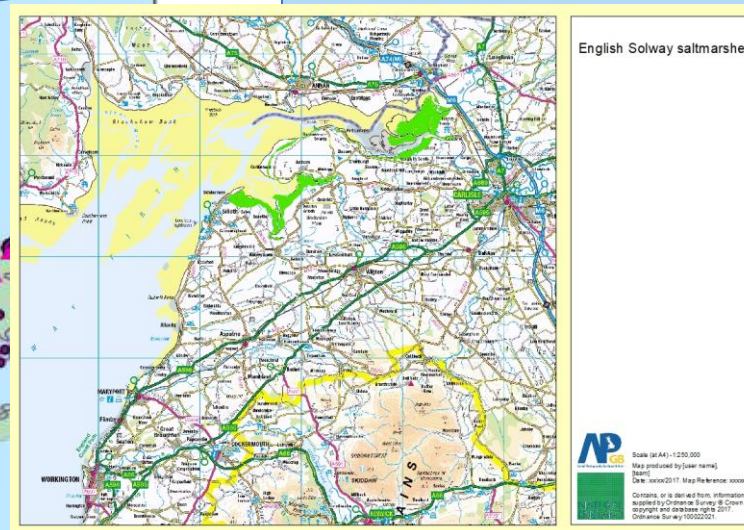
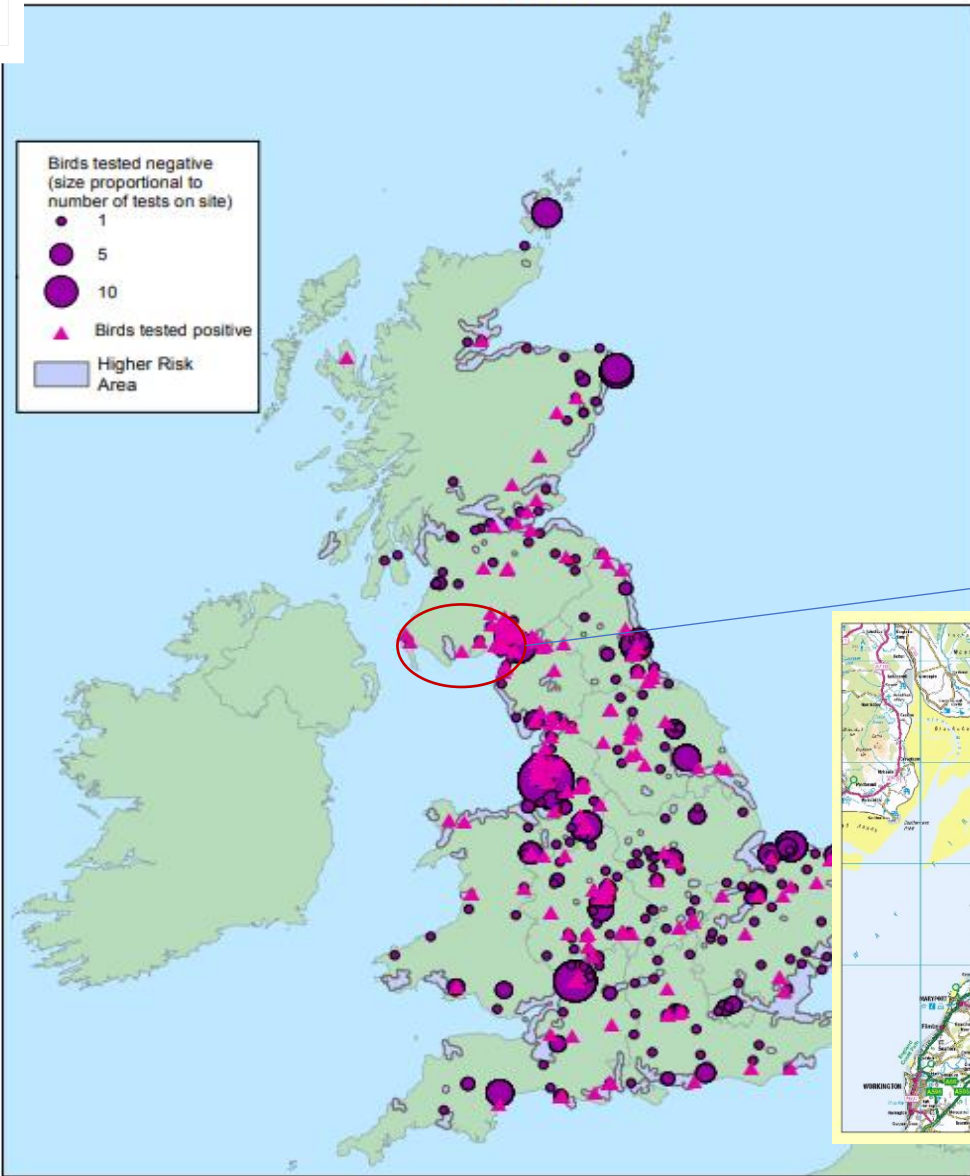
Fig. 1. Barnacle Goose population: numbers over-wintering at Caerlaverock.



Distribution map of *Branta leucopsis*.

Sources: Balmer, D., et al. (2013). Bird Atlas 2007-11. BTO. Feige, N., et al. (2008). Newly established breeding sites of the Barnacle Goose *Branta leucopsis* in North-western Europe – an overview of breeding habitats and colony development. *Vogelwelt* 129: 244–252. Snow, D. W., & Perrins, C. M. (1998). *The Birds of the Western Palearctic*, concise ed. Oxford.

Wild bird submissions and cases positive for HPAI H5N1 Winter 2021



Solway salt marshes England and Scotland used by Svalbard barnacle geese each winter



HPAIV H5N1 in barnacle geese, Nov 2021-June 2022, Solway Firth England and Scotland.

1. strand line mortality

2. dense flocking

3. disappearing carcasses

Processing HPAIV wild birds at APHA



BOX 1: PROGRESS OF A TYPICAL WILD BIRD MORTALITY INCIDENT INVESTIGATION

- Member of public or bird reserve warden reports dead wild birds to the Defra helpline by telephone
- Details of the incident are recorded: species/location/contacts/history
- Helpline staff assess the report in relation to the current policy regarding the need for screening
- Dead bird collection contractors are notified and requested to collect and deliver carcasses to the nearest Veterinary Investigation Centre (VIC)/Disease Surveillance Centre (DSC) within two working days of notification. Details of the case are sent to the VIC/DSC
- Trained collectors deliver birds double-bagged to the VIC/DSC (access available 24 hours a day)
- Veterinary Investigation Officers examine the bird(s) in a microbiological safety cabinet to confirm species and assess state of preservation
- Cloacal and oropharyngeal swab samples are collected and sent to APHA- Weybridge for avian influenza virus (AIV) screening
- Carcasses are rebagged and stored in a dedicated cold store pending results of virology
- Diagnostic postmortem examination is undertaken if AIV is not detected, the carcass is suitable and significant mortality has occurred
- APHA laboratory reports are sent to the person making the first report of the wild bird deaths

Surveillance Focus

Investigations associated with the 2020/21 highly pathogenic avian influenza epizootic in wild birds in Great Britain

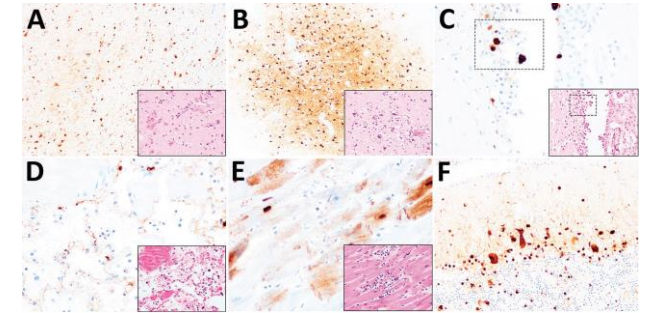
This focus article has been prepared by Paul Duff, Paul Holmes, James Aegerter, Cat Man, Ed Fullick, Scott Reid, Fabian Lean, Alex Núñez, Rowena Hansen, Joanna Tye, Lévon Stephan and Ian Brown of the APHA and Caroline Robinson of SRUC.

- Phone Helpline
- Dead birds collected (Agency)
- Delivery to APHA laboratory
- Swabbing in CL3
- Virology at APHA
- Diagnostic PM if AIV negative
- Reports to reporters

HPAIV investigations, other species

HPAIV 20/21 confirmed in -

red fox (*Vulpes vulpes*),
European polecat (*Mustela putorius*),
Eurasian otter (*Lutra lutra*),
European badger (*Meles meles*),
Eurasian lynx (*Lynx lynx*),
harbour seal (*Phoca vitulina*), and
grey seal (*Halichoerus grypus*)



ewda-network@googlegroups.com on behalf of Thijs Kuiken <t.kuiken@erasmusmc.nl>

To: EWDA wildlife health network

> Emerg Infect Dis. 2021 Nov;27(11):2856-2863. doi: 10.3201/eid2711.211225.

Encephalitis and Death in Wild Mammals at a Rehabilitation Center after Infection with Highly Pathogenic Avian Influenza A(H5N8) Virus, United Kingdom

Tobias Floyd, Ashley C Banyard, Fabian Z X Lean, Alexander M P Byrne, Edward Fullick, Elliot Whittard, Benjamin C Mollett, Steve Bexton, Vanessa Swinson, Michele Macrelli, Nicola S Lewis, Scott M Reid, Alejandro Núñez, J Paul Duff, Rowena Hansen, Ian H Brown

PMID: 34670647 PMCID: PMC8544989 DOI: 10.3201/eid2711.211225

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Wildlife mass mortality incidents investigated by Diseases of Wildlife Scheme 1998-2022,
 = single location, 1(-2) causes, mortality > 100 deaths, defined time periods.

| Date; duration in months | Location | Species | Cause / suspected cause | mortality | ref |
|--------------------------|---------------------|------------------------------|-------------------------------|---------------|-----------------|
| 2021-22; 3 | Solway | Barnacle goose | HPAIV H5N1 | <u>10,000</u> | In progress |
| 2018; 3 | NE English Coast | Arctic tern | Suspected Bisgaard + botulism | 1,900 | Duff et al 2022 |
| 2016; 3 | Wales (coast) | Arctic tern | Suspected Bisgaard + botulism | 800 | Duff et al 2022 |
| 2013; 1 | English Channel | Seabirds esp. Guillemots | Polyisobutylene (PIB), at sea | 4,000 | RSPB; BBC 2013 |
| 2010; 1 | Scottish island | Common toad | Predation otter | 125 | WQR |
| 2010: 1 | England | Black headed Gulls | Unknown – roof roost | 100 + | WQR |
| 2009; 2 | East England | Gull sp. | botulism | 220 | WQR |
| 2007; 1 day | N England | Starling | Drowned in severe rain storm | 706 | WQR |
| 2007; 12 | 2 London Parks | Waterbirds esp. ducks | botulism | 600 | WQR |
| 2007; 1 | South England coast | 5 seabird species, esp. auks | SS Napoli, oil pollution | 1000+ | WQR |
| 2005; 1 | North England | 3 gull species | Botulism | 937 | |
| 2003; 2 | England midlands | Canada geese | Lead poisoning | 102 | WQR |
| 1999; 24 | NE Coast of England | kittiwakes | phytotoxins | 110 | Coulson, 2011 |

WQR = APHA Wildlife Quarterly Reports;

<https://www.gov.uk/government/publications/wildlife-gb-disease-surveillance-and-emerging-threats-reports>

HPAIV, barnacle geese, Solway – regular visits in PPE, Dye spraying 750 geese in 5 visits Clinical course - mid November 2021 – mid Feb 2022 – **3 months**



HPAIV, barnacle geese, Solway; escalation,

issues

and mitigation

Mass mortality of barnacle geese (*Branta leucopsis*) on the Solway Firth (England and Scotland) November-December 2021

Paul Duff (APHA DoWS), Bart Donato (Natural England), Frank Mawby (retired English Nature) [Photos](#) courtesy of the three authors.

Objective of this report

1. To provide observations on geese and geese mortality due to highly pathogenic avian influenza virus (HPAIV: H5N1) infection in November and December 2021 by ecologists along the 61 km length of the Solway Firth coast and salt marsh (England and Scotland).
2. To provide colleagues in Animal Health with insight on the effects of HPAIV on wild waterbirds during winter 2021 at this estuarine site.

Summary

- This is an area of international importance for waterbirds particularly for over wintering barnacle geese from Svalbard.
- 4000 fewer birds than the original total of 40,000 are now present.
- It is possible that 10% may have died in the past 3 weeks and with mortality continuing, this figure is likely to increase.
- The barnacle geese, and their carcasses, may act as a source of 'viral infection pressure', for other wildlife.

Solway Firth

Is an area of international importance for waterbirds. Barnacle geese are currently not globally threatened. The Svalbard population recovered from a minimum of about 400 birds a century ago and the entire population of 40,000 birds today winters on the Solway where they are a feature of the Solway Firth SPA (Special Protection Area) and SSSI (Site of Special Scientific Interest) designations. There are international obligations to protect the population under the Birds Directive, Berne Convention.

Photo 1, December 2021. A flock of barnacle geese over the Solway saltmarshes.

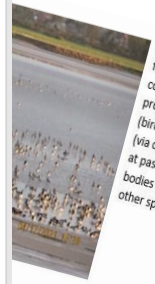


Photo 2, December 2021. Barnacle geese feed, roost and fly in dense flocks often comprising thousands of birds. This provides many opportunities for direct (bird to bird, usually by aerosol) or indirect (via contaminated water, mud, fomites or at pasture) viral transmission. These bodies of water are also used by many other species of waterbirds.

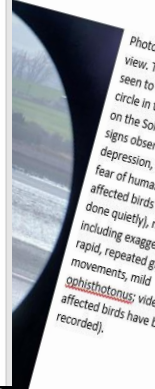


Photo 3, December 2021. Scope view. This barnacle goose was seen to drop from a flock, and circle in the air before landing on the Solway mudflats. Clinical signs observed include depression, apparent lack of fear of humans (approaching affected birds is possible, if done quietly), nervous signs including exaggerated and very rapid, repeated ground feeding movements, mild oedematosus; videos of affected birds have been recorded).



mage in the area with

5. Solway Area of Outstanding Natural Beauty
visage on wild waterbirds and HPAIV, have
at several nature reserves and
along the coast. Note the clear
to the Delta register number. This
rise to well meaning but ill-
public (see photo 8) to
vols.



Mass mortality of barnacle geese (*Branta leucopsis*) on the Solway Firth (England and Scotland) November-December 2021

Paul Duff (APHA DoWS), Bart Donato (Natural England), Frank Mawby (retired English Nature)





Animal &
Plant Health
Agency



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Trending..... observations

- We are poorly sighted on the HPAIV risks to wild birds
- Lab confirmed HPAIV cases gives little idea of total mortality
- Wild bird migration patterns are very variable, in timing and geography
- Can affected wild birds be managed?
- Wild bird populations acquiring 'herd (flock) immunity' - is this the best conservation approach?



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2022 Pacific wildlife health network

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trending..... provisional conclusions

- New challenges in addressing notifiable disease in wildlife
- Is the One Health approach practical?
- Monitor early
- Network with ecologists
- Dissemination of ecological data back to government
- Publish – to provide awareness for the future
- Otherwise may be left with just feathers



wild bird carcasses disappear fast!

Feathers on branches from dead HPAIV geese, Solway, UK 2022





Acknowledgements

- Thanks to APHA colleagues and Defra
- To ecologist colleagues
- Acknowledging national wildlife disease surveillance (England and Wales) developed since (1998) by a team – Paul Holmes and Alex Barlow, DoWS colleagues for 24 years. The APHA WEG team now is led by



- HPAIV investigations during 21/22 by the **APHA Wildlife Expert Group** – Cat Man (lead), Paul Holmes, James Aegerter, Ed Fullick and Elkie Hector

DOWS - Paul Holmes, Paul Duff, Alex Barlow and a swan,
20th anniversary of APHA DoWS, Dec 2018

