HPAI-lessons learned from the field: Wadden Sea World Heritage Site

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United Nations Educational, Scientific and Cultural Organization
The Wadden Sea World Heritage Site since 2009
WADDEN SEA WORLD HERITAGE
THE WADDEN SEA FLYWAY INITIATIVE
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HPAI outbreak summer 2022

Large outbreak in **colonially** breeding birds in **coastal areas**.

Sandwich terns among the most affected species:

~17.000 birds found dead in colonies

Estimated: 17% mortality among adults (likely higher)

Minimal breeding success

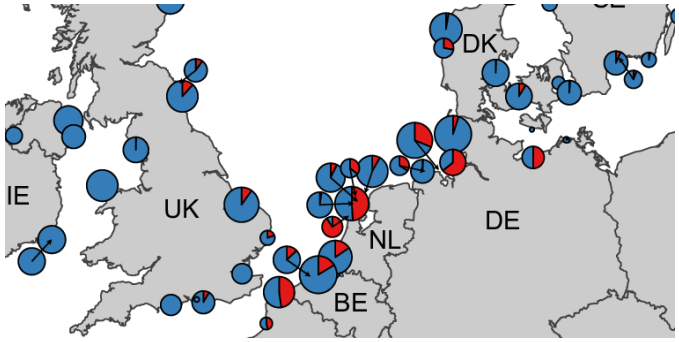
HPAI – responses

2022 Early **exchange** among researchers and site managers.

Reactive

Workshop with experts from 9 affected countries to assess scale of the outbreak.

-> Knief et al. 2024



2023 Joint ecological **risk assessment** with virologists, veterinarians, ornithologists and site managers.

Proactive

→ Identify **exposure and risk pathways** to contain future outbreaks of HPAI in Sandwich terns.

Risk questions

1) What is the likelihood of at least one breeding colony of sandwich terns (ST) in the Wadden Sea being exposed to HPAIV H5 through **direct contact with infected wild birds** between April and July this year?

2) … through **indirect contact** (contaminated products/ equipment) … ?

3) … through **contaminated environmental substrates** … ?

Interdisciplinary risk assessment

Pathways for **entry** into a ST breeding colony

Pathways for **exposure** within the ST breeding colony

Likelihood of occurrence

Origin	Entry		
	Factor	**Explanation**	**Likelihood**
Conspecifics	Infected Sandwich tern from wintering ground	Infected sandwich terns migrate to the colony	Low (2)
	Infected Sandwich tern from another colony	Infected sandwich tern from another colony (prospecting behaviour)	Very high (5)

Identification of highest risks

Origin	Entry		Exposure		Risk (score)
	Factor	Likelihood	Factor	Likelihood	
Conspecifics	Migrating bird (infected)	Low (2)	Sick bird	Very high (5)	Medium (3)
			Dead bird	Very high (5)	Medium (3)
	Visiting bird (infected)	Very high (5)	Sick bird	Very high (5)	Very high (5)
			Dead bird	Very high (5)	Very high (5)

Other **potentially high-risk** factors for ST:

- Heterospecifics, e.g. Black headed gulls (RQ1)
- Scientific equipment used during outbreaks (RQ2)
- Freshwater bodies / Faeces (RQ3)

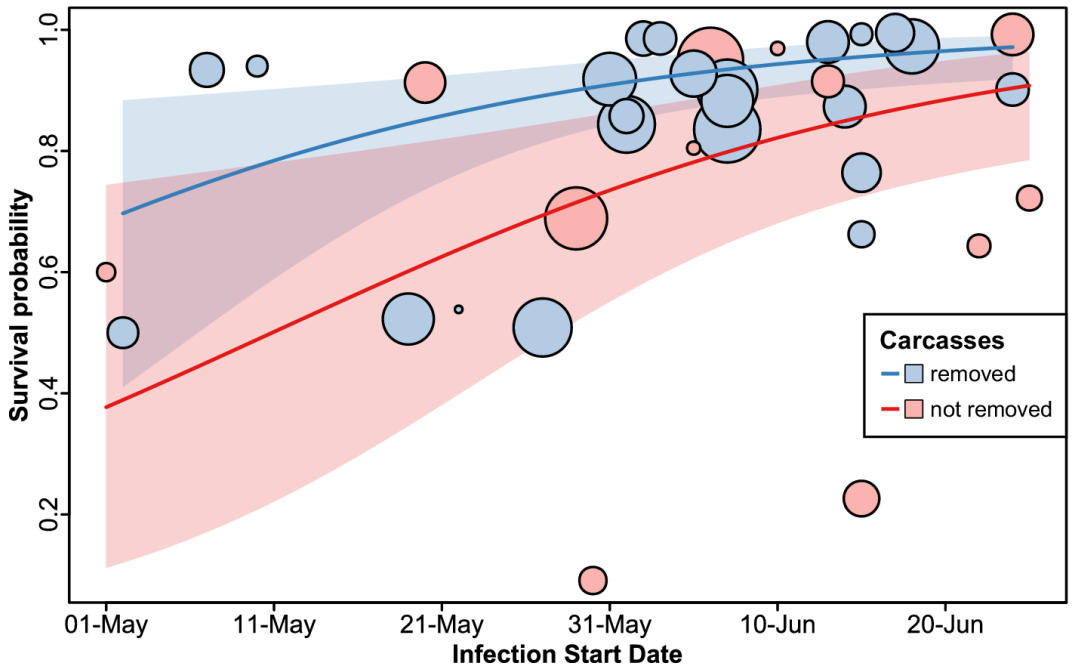
Measures based on assessment

1) Prevent birds from breeding
2) Increase number of alternative sites and attract birds to sites
3) Remove carcasses
4) Establish compartments in the colony
5) Removing sick birds
6) Exchange about planned measures

Other important steps to consider (health and safety, data collection)

Bregnballe et al. 2023

Example: carcass removal in 2022



Knief et al. 2024

Mortality rates were 15% lower in sandwich tern colonies where carcasses were removed.

BUT: may not always be effective and biosecurity measures needed

Risk assessment and management

Species dependent: work with experts on the ecological and behavioural characteristics of the affected species.

Example: Open backyard chicken farms

Species	Entry		Exposure		Risk score
BHG	Direct contact with infected poultry at feeders	Medium (3)	depending on distance to colony and number of birds visiting farms	Medium (3)	Medium (3)
ST	Potential contact with infectious faeces unknowlingly spread by farmers/toursist, bridge species foraging at farms	Very low (1)	Exposure risk depends on the number/behaviour of bridge species, proximity of farm to colonies	Low (2)	Low (2)

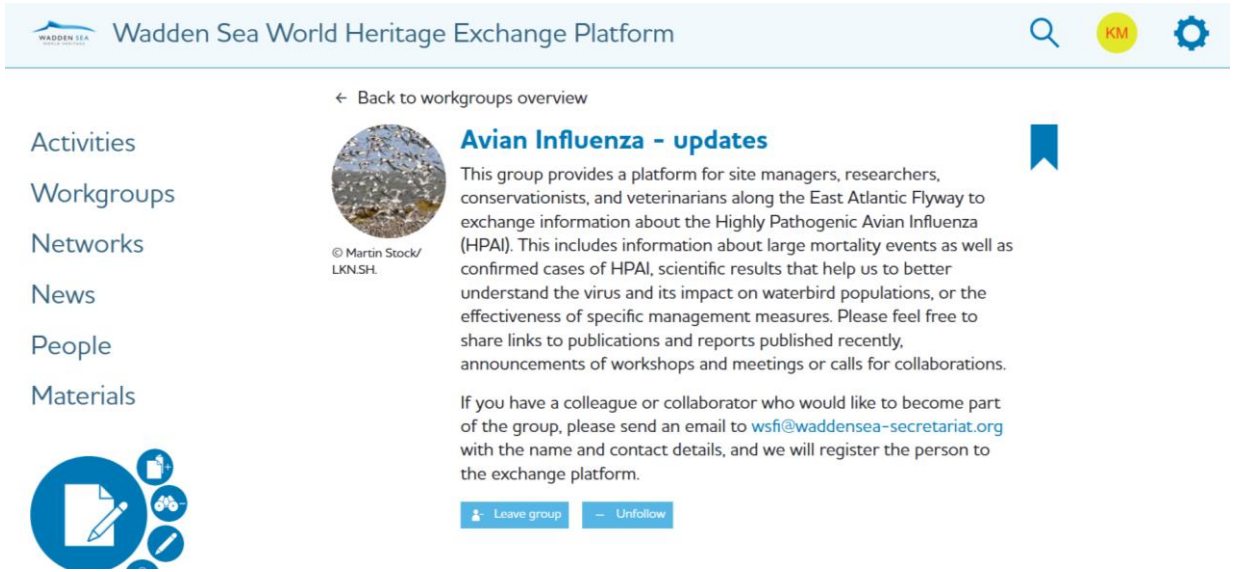
Site specific: different regulations and human behaviour

New information -> update risk assessment

Current steps in the Wadden Sea

Explore population consequences for sandwich terns (Leyer 2024)

Exchange of information: ‚Avian Influenza' working group for partners along the East Atlantic Flyway



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