



Wildlife Disease & Contaminant Monitoring & Surveillance Network

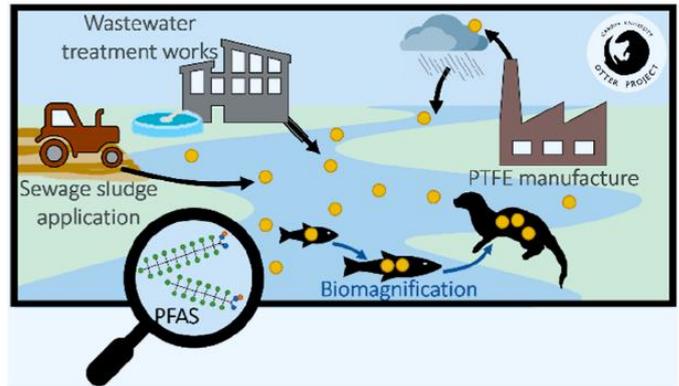
WILDCOMS newsletter number 34: Autumn 2024 www.wildcoms.org.uk

The WILDCOMS newsletter reports recent newsworthy items, publications from member partners and items of interest about wildlife ecology from the UK and overseas. WILDCOMS is funded by NERC UKRI and delivered under the National Capability Programme.

Spotlight on Per- and polyfluoroalkyl substances (PFAS)

Replacement 'forever chemicals' present in otters from England by Emily O'Rourke (Cardiff University)

Per- and polyfluoroalkyl substances (PFASs), or 'forever chemicals', are a large family of synthetic chemicals used for their resistance to oil, water, and heat. Since the 1940s, PFASs have been widely used across various industries, but their persistence in the environment has raised significant concerns. Our previous research (O'Rourke et al., 2022) examined the spatial variation of PFAS concentrations in 50 carcasses of the Eurasian otter (*Lutra lutra*) collected between 2007 and 2009 across England and Wales. Results indicated that **wastewater treatment processes are a key source of PFASs to freshwaters**, with higher PFAS concentrations in otters near larger treatment plants and arable land where sewage sludge may have been applied. We also found a strong association between perfluorooctanoic acid (PFOA) concentrations and proximity to a factory that used PFOA in polytetrafluoroethylene (PTFE) manufacture.



Above: Graphical Abstract of O'Rourke et al. (2022)

Our follow-up study (O'Rourke et al., 2024) demonstrated that such a clear spatial association might remain for many years due to PFOA's extreme persistence in the environment. Evidence suggests that **PFOAs gradually migrate through soil to groundwater and become less bioavailable, but this timeframe is unknown**. Biomonitoring of otters will provide a valuable case study to determine how long associations with industrial point sources remain after cessation of use.

While the older and now regulated PFASs (such as perfluorooctane sulfonic acid (PFOS) and PFOA) remain present at the highest concentrations in the otters, the study also detected newer 'replacement' PFASs. Replacement PFASs have been produced to replace regulated PFASs and are marketed as less bioaccumulative. However, **the detection of replacement PFASs in a top predator raises questions about their environmental behaviour, toxicity, and bioaccumulation**. Our findings highlight the need for more research and the potential need for regulation.

More information on the study can be found in the press release: ['Forever chemicals' found in English otters](#).

This study was conducted using otters found dead in England, with funding from the Environment Agency. Additionally, otter samples and data are now routinely analysed and reported as part of the ['H4 Indicator Programme'](#). This indicator forms part of the government's 25-Year Environment Programme, and samples from otters are helping track pollution of the environment with a cocktail of chemicals in terrestrial, freshwater and marine environments. However, this routine monitoring is restricted to England. PFAS data in otters from Wales and Scotland are limited and not up to date; we are working with the Welsh Government and Natural Resources Wales to expand monitoring efforts in Wales and hope to establish a similar collaboration with the Scottish Government and Scottish Environment Protection Agency.

Cardiff Otter Project

The Otter Project is a UK national scheme collecting otters found dead in England, Scotland, and Wales to investigate contaminants, disease, and population biology. We collaborate with researchers from other institutions and disciplines to maximise the usage of the otter archive. We are keen to collaborate, sharing data and samples and also encourage potential postgraduate researchers to approach us with research ideas.

Please see more information on [our Otter Project website](#).

Predatory Bird Monitoring Scheme (PBMS)

New PBMS website open

The Predatory Bird Monitoring Scheme (PBMS), a long-term monitoring system designed to measure various chemical contaminants in wildlife based on predatory birds, has **recently renovated its [website](#)**, improving user experience for access from mobile phones, allowing better engagement with the public.



Predatory Bird
Monitoring Scheme



UK Centre for
Ecology & Hydrology

Given that support from the public is vital for this citizen science scheme, the PBMS Team expects **more people to discover this new website and recognise our science and engagement for environmental health**.

PBMS features in UKCEH podcast

A recent podcast of UK Centre for Ecology and Hydrology (UKCEH) '[Counting the Earth](#)', featured the work of PBMS on PFASs, '[forever chemicals](#)' that can pose serious environmental and health risks. Podcast co-hosts, award-winning science journalist Sue Nelson and UKCEH's Alice Hope, braved the icy freezers of the Predatory Bird Monitoring Scheme (PBMS) in Lancaster to meet the Principal Investigator of PBMS, UKCEH ecotoxicologist Lee Walker, and discovered how studying dead birds like buzzards and barn owls can offer critical clues about how these chemicals accumulate in wildlife.

PBMS hosts Malaysian elephant workshop

The PBMS teams and UKCEH colleagues welcomed a delegation from Malaysia to UKCEH Lancaster on the 9th and 10th of October to discuss a recent increase in elephant mortalities in Bornean Malaysia.

Concerns have been raised about whether chemical exposure resulting from oil palm production may be contributing to these elephant deaths. To start to address these concerns, the workshop brought together experts from UKCEH (ecotoxicology and wildlife monitoring), Sabah Wildlife Department, conservation organisation Seratu Aatai, University of Malaysia, Malaysian Palm Oil Green Conservation Foundation (MPOGCF), Malaysian Palm Oil Board (MPOB) and oil palm producers Ikkhas Group of Companies.

Lee Walker, the PI of the PBMS, explains: "The workshop discussed the currently available information and data to assess the chemical risk to Elephants but most importantly identified where data gaps are and how they might be addressed."



"It was a pleasure working with our Malaysian friends over the two days of the workshop. Hopefully, **this is the start of a collaboration that will help identify why these Elephants are dying while also improving our understanding of how and what chemical contaminants are released from oil palm production and their environmental fate.**"

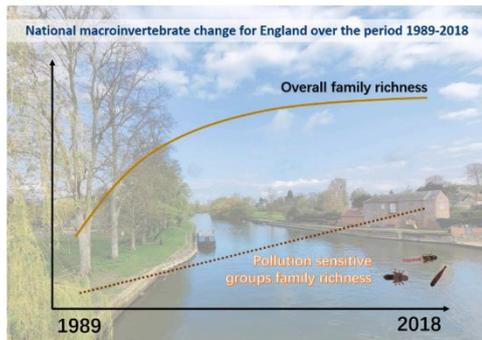
Above & Left: Workshop delegates met and discussed available contaminant residue data in Elephants at UKCEH Lancaster

[National Fish Tissue Archive](#)

Open data product on UK freshwater river macroinvertebrates

We are excited to share our open data product on freshwater macroinvertebrates: Bachiller-Jareno, N. et al., 2024. [Macroinvertebrate taxonomic abundance, water quality, river flow, air temperature and environmental site descriptors from English rivers, 1965-2018](#). NERC EDS Environmental Information Data Centre.

This data product combines macroinvertebrate taxonomic abundance for 1519 monitoring sites across English rivers for the period between 1965 and 2018 with various variables, such as concentrations of 41 water quality determinants, river flow measurements, and air temperature derived values. It also includes sewage effluent exposure, habitat quality, land cover in the upstream catchment, and other physical parameters measured at the sampling point, such as altitude, slope, distance from source, width and depth of the channel, and type of substrate.



It allows all those interested in the fate of macroinvertebrates over time in English rivers to use the dataset for a broad spectrum of environmental research and modelling analyses. The initial results from the ChemPop project research on rivers have been recently published (Qu et al., 2023). We hope to continue to exploit the data and produce more publications on the relationships between biodiversity and the trends in other stressors like chemicals in freshwater ecosystems.

Left: Graphical Abstract of Qu et al. (2023)

[WIIS-Scotland](#)

Second generation anticoagulant rodenticide (SGAR) residues in red foxes and buzzards in Scotland

Monitoring SGAR residues in Scottish wildlife has become a routine part of the Wildlife Incident Investigation Scheme in Scotland as it has become apparent many scavenging species are at risk of exposure to rodenticides used in pest management. New rules on the use and sale of anticoagulant rodenticide products were introduced in 2016 with the aim of reducing the risk to non-target species as part of an industry led stewardship scheme. Scientists at SASA (Science & Advice for Scottish Agriculture) have considered whether these new rules have had the desired effect by measuring SGAR residue levels in liver tissue from 406 red foxes (*Vulpes vulpes*) and 790 buzzards (*Buteo buteo*) collected pre- and post-stewardship (Campbell et al., 2024a; George et al., 2024). The results show that **there have been no significant reductions in SGAR contamination in red foxes or buzzards** and that **the rate of brodifacoum exposure increased in each species post-stewardship**. These findings suggests that the rule changes have not yet had the desired effect of reducing wildlife exposure to anticoagulant rodenticides.



Above: Common buzzard (*buteo buteo*)

The results from WIIS-Scotland are published quarterly. **The results for incidents from the first half of 2024** can be viewed on the [WIIS Quarterly Reports webpage](#). SASA staff continue to survey rodenticide usage on behalf of the Scottish Government.

Two recent reports: Rodenticides on Grassland and Fodder Farms 2021 (Reay, et al., 2023) and **Rodenticides on Arable Farms 2022** (Campbell et al., 2024b) can be accessed on our [Pesticide Usage Survey Report webpage](#). The next in the series of rodenticide use by Scottish local authorities is due to be published in March 2025 and will be available on the Pesticide Usage Survey Reports page of the SASA website.



[Zoological Society of London \(ZSL\)](#)

Disease Risk Analysis and Health Surveillance Project

The Disease Risk Analysis and Health Surveillance (DRAHS) team at ZSL has had a busy fieldwork season with the team providing disease risk management and post release health surveillance for a large number of translocation projects across England including the wart-biter cricket (*Decticus verrucivorus*), chequered skipper butterfly (*Carterocephalus palaemon*), white-tailed sea eagle (*Haliaeetus albicilla*), hazel dormouse (*Muscardinus avellanarius*), pool frog (*Pelophylax lessonae*), sand lizard (*Lacerta agilis*), smooth snake (*Coronella austriaca*), corncrake (*Crex crex*), curlew (*Numenius arquata*), hen harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), beaver (*Castor fiber*) and red kites (*Milvus milvus*).



Left: A juvenile corncrake, which has been bred in captivity, undergoing a pre-release health examination prior to release in Norfolk as part of the corncrake reintroduction project.



Left: A red kite undergoing a final health check before being translocated to Spain as part of the Life Eurokite programme.

Right: A hazel dormouse undergoing a visual health check during this year's dormouse reintroduction. The dormouse was being weighed for the final time, before the soft release cages at the reintroduction site were opened and the dormouse was free to leave and explore its new woodland habitat.



Left: A free-living smooth snake undergoing a health examination as part of an investigation on a suspected disease outbreak in the smooth snake population in Surrey.

Disease surveillance on birds of prey in England

Like many other organisations, our team has been impacted by controls on the avian influenza (AI) because wildlife officers, field workers, and members of the public submit birds found dead such as red kites, hen harriers and white-tailed sea eagles (*Haliaeetus albicilla*) to us for post-mortem examination. Since 2021, when the number of positive cases in which highly pathogenic influenza virus (HPAIV) rose markedly and impacted many populations of birds, our disease investigations on bird species have been delayed and hampered in order to ensure submitters and staff are safe. Since then, the risk from HPAIV has reduced, and **the government advice allows for continued work on these species. However, submissions of birds of prey from members of the public, specifically red kites across England, has remained very low and receiving these specimens is vital for our ongoing work.** We have monitored the health of populations involved in conservation translocations in England for over 30 years and have long-term databases on each species. Samples from the birds are available to other members of WILDCOMS for analysis of, for example, chemical contaminants. **Members of the public, citizen scientists, and other parties interested in wildlife health can submit red kites, hen harriers or white-tailed sea eagles found dead to our team by contacting us at drahs@zsl.org, and you can find out more about our wildlife health monitoring on [our webpage](#).**

Recent news on disease surveillance

Our team performs post-mortem examinations and disease screening on smooth snake carcasses as part of our post-release health surveillance for this species. Recently, **we detected an adenovirus in a smooth snake carcass found in Dorset using PCR, which we believe is the first time that an adenovirus has been detected in a smooth snake**. Two adenoviruses have previously been detected in a free-living common lizard (*Zootoca vivipara*) from Hampshire and free-living sand lizards (*Lacerta agilis agilis*) from Wales (Donald et al., 2021). The site where this smooth snake was found is reported to be home to all six of the native UK reptiles, including common lizards and sand lizards. It is currently unknown whether adenoviruses are part of the commensal flora of free-living reptiles in the UK or whether these findings represent the introduction of a novel virus from exotic, captive reptiles, but we are pursuing further identification of the adenovirus to investigate. Adenoviruses have been detected in a range of reptiles overseas including snakes, lizards, and other reptiles, and can be associated with morbidity and mortality (Donald et al., 2021). Reptiles infected with adenovirus may exhibit lethargy, respiratory infections, oesophagitis, gastroenteritis, hepatitis, splenitis, or neurological abnormalities (Ariel, 2011). It is not clear whether the adenovirus detected was responsible for clinical signs or death in this smooth snake because of the degree of autolysis; however, **adenoviruses have been identified as high-risk hazards in smooth snakes, which may have significant consequences for the population** (Masters & Sainsbury, 2011).

REFERENCES:

Ariel, E., 2011. Viruses in reptiles. *Veterinary Research*. 42:100.

Donald, H.C.F. et al., 2021. Two novel adenoviruses in free-living British lizards. *EcoHealth*. 18, 297-300.

Masters, M. & Sainsbury, A., 2011. Disease risk analysis for the wild to wild translocation of the smooth snake (*Coronella austriaca*) within the UK. London: Institute of Zoology.

Disease Risk Analysis workshops



We carry out disease risk analysis (DRA) to identify and assess, in any given conservation translocation, threats from disease which could potentially have a detrimental effect on translocated animals, recipient populations as well as the wider ecosystem (including domestic animals and humans). Our actions aim at preventing the co-introduction of novel parasites, which could have a catastrophic effect on immunologically naïve populations. Our team has been busy running DRA workshops across the world to give conservation practitioners the opportunity to gain an understanding of how the DRA method is applied, possible pitfalls, and how to address them by tackling real conservation translocation scenarios drawn from ongoing conservation projects.



Recent workshops have been successfully delivered at the 7th European Congress of Conservation Biology in Bologna, Italy in June, the joint American Association of Zoo Veterinarians and European Association of Zoo and Wildlife Veterinarians conference in Toronto, Canada in September and at the Zoological Society of London in October.

Left: DRAHS running a DRA workshop at the joint AAZV/EAZWV conference in Toronto

Recent publications news from ZSL

- Common et al (2024) presented reference ranges for haematology and plasma biochemistry in nestling red kites. The study consisted of individuals involved in an ongoing translocation project between England and Spain. **All red kite samples were examined by veterinary surgeons and found to be clinically healthy**. Biochemical reference intervals were comparable to published values for other Accipitridae, but haematological differences were noted. PCV (packed cell volume) was generally lower than had previously been reported for Accipitridae of a similar age, and the WBC (white blood cell) counts up to three-times higher.

It is hypothesized that these differences reflect species variations or the effects of the stress of recent capture on the immune system of the red kites. It is hoped that **the reference ranges provided by this study will be useful for conservation interventions involving red kites in future**, as they are considered to be representative of free-living nestling red kites under short-term human care.

- Bourn et al. (2024) reported on the reintroduction of the chequered skipper butterfly that had been extinct in England since 1976. Since 2018, 128 chequered skipper butterflies have been translocated over five years from Belgium into suitable managed woodland in England. The translocation method, health of individuals, and post-release monitoring results are presented. Results of health examinations demonstrated that **translocated individuals were healthy**, and post-release monitoring suggests that **the population has successfully established at the first release site**. The paper provides evidence that **rigorous scientific research and carefully implemented translocations can enable the chequered skipper to thrive in England once again**.
- Gibson et al. (2024) investigated the cause of death in seven free-living hazel dormice in England and identified a virus closely related to a wood mouse encephalomyocarditis virus-2 (EMCV-2). Lung tissues from 35 out of 44 hazel dormice were positive for EMCV-2 RNA using RT-qPCR and Sanger sequencing methods developed in the study. Histopathology of available formalin-fixed tissues for nine hazel dormice were examined, and three of them had interstitial pneumonia and mild lymphoplasmacytic myocarditis. However, lesions could not be definitively attributed to EMCV-2. The paper reports **the first detection of EMCV-2 in hazel dormice** and suggests **EMCV-2 is likely endemic in the free-living population in England**.
- Vecchiato et al. (2024) observed that among 142 red kite carcasses collected as a part of long-term surveillance of the population in England, **three kites showed pathological lesions in association with the patagial wing tag**. Marking devices provide important information on free-living populations of wild animals and can be used for monitoring species in many kinds of research studies. Red kites have been marked with patagial wing tags in England during the reintroduction project started in the 1990s. **The finding highlights the need to monitor the effects of marking devices on free-living birds through continued studies**.

Join our team!



We are currently recruiting for a Wildlife Veterinarian and Research Associate (maternity leave) to join the DRAHS team to work on investigating the impact of interventions, such as conservation translocations, on the health of populations through disease risk analysis, wildlife disease surveillance, pathological studies and clinical investigations, in partnership with Natural England.

Please see more information on our [website](https://careers.zsl.org/) and keep an eye out for future roles within DRAHS on the ZSL website at <https://careers.zsl.org/>.

[GB Wildlife Disease Surveillance Partnership](#)

The GB Wildlife Disease Surveillance Partnership is made up of the following organisations: Animal and Plant Health Agency (APHA), Scotland's Rural College (SRUC), Institute of Zoology (IoZ), National Wildlife Management Centre of APHA (formerly part of FERA), The Centre for Environment, Fisheries and Aquaculture Science (CEFAS), The Wildfowl and Wetlands Trust (WWT), Natural England (NE) and Forestry England (FE).

The GB Wildlife Disease Surveillance Partnership quarterly publishes reports. The latest reports are accessible on the [GOV.UK website](#).

[Garden Wildlife Health \(GWH\)](#)

GWH focuses on garden birds, amphibians, reptiles, and hedgehogs. For this, they count on the help of the public to submit reports of sick or dead wildlife of these species and to submit samples for analysis.

To report death or illness in garden wildlife, visit our [website](#).



GWH have produced a wealth of advice on creating a healthy environment for your garden. See [Amphibians](#), [Birds](#), [Hedgehogs](#), [Reptiles](#) and [Wildlife friendly gardening](#).

Recent WILDCOMS and featured publications

- Animal and Plant Health Agency, 2024.** [Quarterly GB wildlife surveillance and emerging threats report: July to December 2022](#). Animal & Plant Health Agency report.
- Animal and Plant Health Agency, 2024.** [Quarterly GB wildlife surveillance and emerging threats report: January to June 2023](#). Animal & Plant Health Agency report.
- Animal and Plant Health Agency, 2024.** [Quarterly GB wildlife surveillance and emerging threats report: July to December 2023](#). Animal & Plant Health Agency report.
- Bean, T.G. et al., 2024.** [Do pharmaceuticals in the environment pose a risk to wildlife?](#) Environmental Toxicology and Chemistry. 43(3), 595-610.
- Bourn, N.A.D. et al., 2024.** [The history, science and preliminary results from the reintroduction of the Chequered Skipper, *Carterocephalus palaemon* into Rockingham Forest, England](#). Journal of Insect Conservation. 28, 1063-1078.
- Campbell, S. et al., 2024.** [Pesticide Usage in Scotland: Rodenticides on Arable Farms 2022](#). SASA Pesticide usage survey report.
- Campbell, S. et al., 2024.** [Impact of changes in governance for anticoagulant rodenticide use on non-target exposure in red foxes \(*Vulpes vulpes*\)](#). Environmental Chemistry and Ecotoxicology. 6, 65-70.
- Common, S.M., et al., 2024.** [Haematological and biochemistry reference ranges in nestling red kites \(*Milvus milvus*\) in short-term Human care in England](#). Journal of Zoo and Wildlife Medicine. 55(3), 719-723
- George, S. et al, 2024.** [Anticoagulant rodenticide exposure in common buzzards: Impact of new rules for rodenticide use](#). Science of The Total Environment. 944, 173832.
- Gibson, L. et al., 2024.** [Prevalence and Molecular Analysis of Encephalomyocarditis Virus-2 in the Hazel Dormouse](#). EcoHealth. 21, 112–122
- O'Rourke, E. et al., 2024.** [Persistence of PFOA pollution at a PTFE production site and occurrence of replacement PFASs in English freshwaters revealed by sentinel species, the Eurasian otter \(*Lutra lutra*\)](#). Environmental Science & Technology. 58(23), 10195-10206.
- Ozaki, S. et al., 2023.** [Second generation anticoagulant rodenticide residues in barn owls 2022](#). UKCEH report.
- Ozaki, S. et al., 2024.** [Second generation anticoagulant rodenticide residues in red kites 2021](#). UKCEH report.
- Ozaki, S. et al., 2024.** [Second generation anticoagulant rodenticide residues in red kites 2022](#). UKCEH report.
- Ozaki, S. et al., 2024.** [Significant turning point: common buzzard \(*Buteo buteo*\) exposure to second-generation anticoagulant rodenticides in the United Kingdom](#). Environmental Science & Technology. 58(14), 6093-6104.
- Qu, Y. et al., 2023.** [Significant improvement in freshwater invertebrate biodiversity in all types of English rivers over the past 30 years](#). Science of The Total Environment. 905, 167144.
- Reay, G. et al., 2023.** [Pesticide Usage in Scotland: Rodenticides on Grassland and Fodder Farms 2021](#). SASA Pesticide usage survey report.
- Vecchiato, M. et al., 2024.** [Health effects of patagial wing tags on red kites \(*Milvus milvus*\) in UK](#). Journal of Wildlife Diseases. 60(3), 714-720.

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