Wildlife Disease & Contaminant Monitoring & Surveillance Network

WILDCOMS newsletter number 30: Autumn 2021 www.wildcoms.org.uk

The WILDCOMS newsletter (produced 3 or 4 times a year) reports recent newsworthy items, publications from member partners and items of interest about wildlife ecology from the UK and overseas.

WILDCOMS Scheme news

GB Wildlife Disease Surveillance Partnership - reports are published quarterly.

To access the latest reports see: *https://www.gov.uk/government/publications/wildlife-gb-disease-surveillance-and-emerging-threats-reports*.

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).

Wildlife Incident Investigation Scheme (WIIS)

WIIS makes enquiries into the death or illness of wildlife, pets and beneficial invertebrates that may have resulted from pesticide poisoning. The scheme has two objectives:

1. To provide information to the regulator on hazards to wildlife and companion animals (usually cats and dogs) and beneficial invertebrates (honeybees, bumble bees and earthworms) from pesticide use;
2. To enforce the correct use of pesticides, identifying and penalising those who deliberately or recklessly misuse and abuse pesticides.

Quarterly data for WIIS is available on the *HSE pesticides website* and this currently includes the investigations up to about March 2021.

The laboratory work to support WIIS in England and Wales has continued throughout the COVID pandemic. Submissions have arrived at *Fera Science Ltd* for testing via a virtual Natural England input to cases and wider collaboration with other organisations such as the Police, RSPB, Private veterinary practices and courier services. Unfortunately, many of the cases continue to involve the illegal use of pesticides, for example see *here*.

There has been a substantial increase in the number of cases investigated by WIIS, particularly in England, throughout 2020 to 2021. Initial indications are that this increase has not been due to an increase in the number of abuse cases, but reflects an increase in the number of cases involving anticoagulant rodenticides. Anticoagulant rodenticides have a stewardship regime (*UK Rodenticides Stewardship Regime*) and coordinated data (from WIIS and *PBMS*) for species

that are vulnerable to this exposure, such as red kites, are reported annually *here*. Anticoagulant rodenticide data are also included in the *25-year Environment plan*.

The WIIS relies on members of the public and other interested organisations to find and report suspicious incidents that usually involve the death of one or more animals. Anyone using anticoagulant rodenticides, should follow the *Campaign for Responsible Rodenticide Use (CRRU) Code of Best Practice*. There is a Freephone number (0800 321600) to report suspicious incidents to WIIS. Anyone who has information relating to bird of prey persecution should report it to their local police force by calling 101, or to Crimestoppers anonymously on 0800 555111.

Pesticide and rodenticide monitoring of terrestrial mammals - filling the data gap.

Last year we reported on an exciting collaboration to enhance monitoring of chemical residues in terrestrial mammals that has been made possible by funding from Defra. This involves partners in WILDCOMS: *Fera Science Ltd* (*WIIS*-England and Wales); the *Institute of Zoology* (*Garden Wildlife Health* (*GWH*) project) and the *Animal & Plant Health Agency* (*APHA*). This project has screened 100 liver samples from hedgehogs and 100 liver samples from foxes for pesticides and anticoagulant rodenticides. The aim is to provide baseline monitoring data for these species and to further compare the findings with available toxicological data from other species, such as predatory birds. It is planned to assess the likely significance and potential impact of any detected pesticide or rodenticide exposure to wild mammal health. We will also explore whether trends in detected levels of exposure indicate that stewardship actions, restrictions on use and other authorisation changes have had a positive impact on these species. Filling these data gaps might also be of importance from a biodiversity perspective as hedgehog populations in England have declined significantly in recent decades and although the possible causes for this are not yet fully understood, they may be due to a combination of factors. This project aims to provide the data required to examine if one or more of a range of pesticides may be contributing to hedgehog population changes.

This project demonstrates the value of archived material from the GWH project for hedgehogs and of using samples that are collected as part of a disease surveillance programme for *Echinococcus multilocularis* (a *notifiable animal disease*) for foxes. There have been challenges in undertaking this work during a pandemic, but the results should be available soon and will be disseminated as widely as possible. There is likely to be much interest in the outcome of this work from a range of parties, for example, pesticide and rodenticide manufacturers, professional and amateur users of these products, conservation NGO's, wildlife rehabilitators and the general public.

WIIS-Scotland

The results for incidents from quarter 2 of 2021 have been added to the *SASA website* and can be found *here*.

Cetacean Strandings Investigation Programme (CSIP) – new contract (2021-2031)

CSIP has been awarded a new ten-year contract with Defra and Welsh Government. The CSIP has been investigating strandings and the threats marine species face in UK waters under contract to UK Government since 1990 and this represents the longest-term contract that it has been granted to date. The new period of funding will run from April 2021 through to March 2031 and tasks the CSIP with continued investigation of stranded cetaceans, marine turtles and some large-bodied shark species around the coast of England and Wales. Separate funding arrangements are in place for the strandings scheme in Scotland (*https://strandings.org*).

Coordinated by ZSL (Zoological Society of London) along with current partner organisations the Natural History Museum, Marine Environmental Monitoring, Cornwall Wildlife Trust Marine Strandings Network and Cornwall Marine Pathology Team, the CSIP has recorded data on more than 17,000 cetacean strandings in the UK since its inception in 1990, conducted over 4,500 post-mortem examinations and maintains an internationally important tissue archive from a wide range of vulnerable marine species.

Image: Common dolphin necropsy at ZSL (courtesy of Greg Norman) and Sperm whale stranding, Northumberland (drone image, courtesy of Rob Deaville).

CSIP PhD success: Persistent Organic Pollutants – Assessing the Threat to Cetaceans.

Rosie Williams (image left) recently completed her PhD with the Cetacean Strandings Investigation Programme (CSIP). The project used data collected as part of pathological examinations, carried out on stranded animals, to understand the impacts of environmental contaminants on cetaceans. Cetaceans are a sentinel group for assessing ocean and human health as they are long-lived coastal residents that feed at a high trophic level, often sharing their food sources with humans. The project combined biological data (e.g., age, sex, health status) with tissue concentrations of persistent organic pollutants to assess the ecotoxicological status of cetaceans in several ways including: assessing the spatiotemporal trends of pollutant burdens and investigating relationships between burdens and indices of health (e.g., immune and reproductive system suppression). The project also assessed the potential toxicity of contaminants to prioritise those of most concern and assess their impact in relation to other anthropogenic stressors.

Images below also provided by CSIP: Left Harbour porpoise, Seaford and right Porpoise at Aberaeronfor (courtesy of Rob Penrose).

See Rosie's Publications: *Williams et al., 2020*A, *Williams et al., 2020*B, *Williams et al., 2021*.

Predatory Bird Monitoring Scheme (PBMS)

A new, interactive map of bird submissions has been produced that links directly to the *Predatory Bird Monitoring Scheme* (PBMS) database.

When a member of the public finds a dead bird of prey, they can contact the PBMS and ask for a submission pack. This contains everything they need to send the bird away to be logged on the PBMS database and a post mortem carried out to determine how it died – this process is termed a 'bird submission'.

The *interactive map* allows users to examine any bird submission made since 1990 and search for birds against different criteria, such as geographical location, gender and age. There is also an option to display the bird data as polychlorinated biphenyl (PCB) concentrations (where birds have been analysed for PCBs).

The PBMS are grateful to Michael Tso, from the Environmental Data Science group at Lancaster, who carried out the work for the PBMS under *UK-SCAPE* funding.

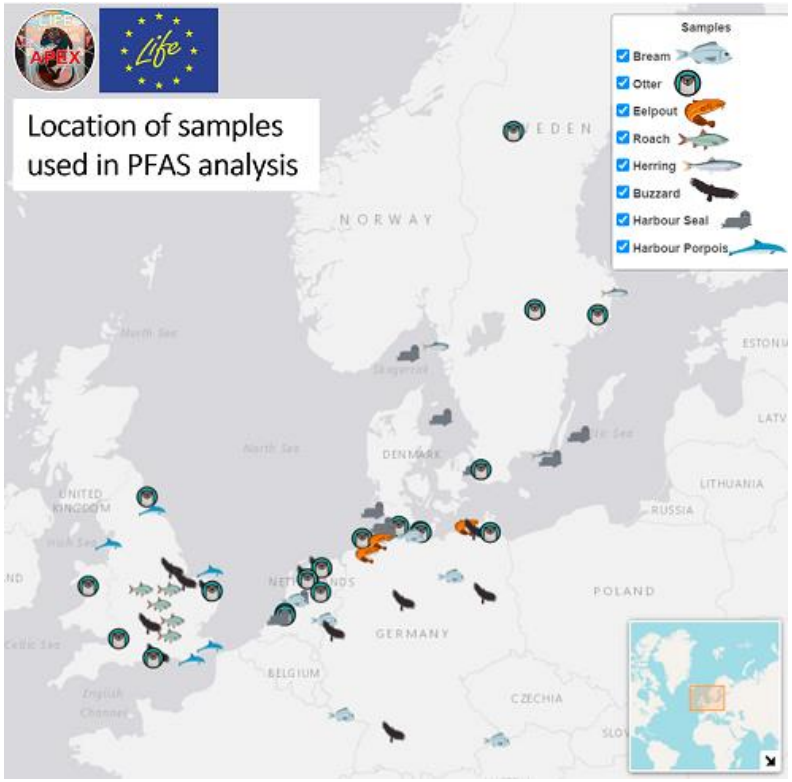
Cardiff University Otter Project

PhD Opportunity: Antibiotic-resistant bacteria are projected to become one of the greatest emerging challenges to healthcare and agriculture settings worldwide. See: *To join the otter project team to take up an exciting opportunity for research in this area*. Otter image courtesy of Cardiff Otter Project *https://www.cardiff.ac.uk/otter-project*

Recent publication involving samples from Cardiff University Otter Project and the Predatory Bird Monitoring Scheme: Determination of 56 per- and polyfluoroalkyl substances in top predators and their prey from Northern Europe by LC-MS/MS.

The Otter Project is involved in a large European collaborative project (*LIFE APEX*) which is looking at how contaminant data from apex predators can be used in chemicals monitoring and management.

The project has collected common buzzards, harbour porpoises, grey and harbour seals, and Eurasian otters from across Europe, thereby examining the chemical contaminant concentrations in terrestrial, marine and freshwater environments. Being at the top of their respective food chains these apex predators accumulate the highest concentrations of contaminants through biomagnification up the food chain, and potentially show detectable concentrations of trace contaminants which might go undetected at lower trophic levels (or in abiotic samples). The animals can be used as effective sentinels (indicators) of the relative contaminant levels in the area where they have lived, and we can use this data to examine how environmental levels have changed over time, or how they differ in different parts of Europe or with different land use.



The project has analysed for a wide range of contaminants such as PCBs, pesticides, PBDEs (flame retardants), PFAS, pharmaceuticals and mercury. This publication focused on the analysis of PFAS (per- and polyfluoroalkyl substances) in the apex predators plus prey species (freshwater and marine fish) from the UK, Sweden, Germany and the Netherlands. PFAS are a large family of chemicals used in many consumer projects for their oil and water repelling properties; they have been used in firefighting foam, food packaging, non-stick cookware, waterproof clothing, stain resistant products and paints, amongst other things. Studies have shown PFAS to be detrimental to health in humans and wildlife. PFAS are also known as 'forever chemicals' because they are extremely persistent in the environment, the carbon-hydrogen bonds which all PFAS possess are very strong and therefore the compounds resist degradation. Our study showed a number of these PFAS to be ubiquitous across all species analysed and at relatively high concentrations, highlighting the widespread nature of PFAS in terrestrial, marine and freshwater environments and the potential risk to wildlife. As was expected, concentrations of PFAS were higher in the apex predators than in the fish, due to the biomagnification. Freshwater species had the highest concentrations (freshwater fish had higher concentrations than marine fish, and otters had higher concentrations than buzzards, porpoises, or seals). This is probably due to freshwater species being in closer proximity to anthropogenic sources of PFAS. The use of PFOS and PFOA, two of the most commonly detected PFAS, has now been restricted under the Stockholm Convention (PFOS added in 2009 and PFOA in 2019). Despite this, PFOS was still detected at the highest concentrations due to its extreme persistence and bioaccumulative potential. Other substances which have been used as replacements for PFOS and PFOA in products were also detected; for example, F-53B was detected in an otter from the UK. F-53B is used in the electroplating industry, but it has been suggested that it is only used in China. It's occurrence in a UK otter highlights a need for tighter controls and further investigation. Although research on PFAS replacements remains limited, there are suggestions that they present risks similar to those of the chemicals that they are replacing. The results of the study highlight the importance of PFAS monitoring and a tighter global approach to controls, in order to reduce health risks of both wildlife and humans. See below: *Androulakakis et al., 2021*.

More information on the LIFE APEX Project can be found on the website (*https://lifeapex.eu/*) and twitter (@LIFEAPEX1)

Newsletters from projects that involve WILDCOMS schemes

- *European Raptor Biomonitoring Facility* (for pan-European monitoring in raptors) newsletter 3: *https://erbfacility.eu/sites/default/files/uploads/ERBF%20Newsletter%20September2021.pdf*.
- *LIFE APEX* Project (Systematic use of contaminant data from apex predators and their prey in chemicals management) newsletter 6: *https://lifeapex.eu/dissemination/*

Questionnaire on Non-Steroidal Anti-inflammatory Drugs (NSAIDs)

The common and widespread veterinary use of diclofenac in past decades was the main cause of catastrophic declines in vulture populations across South Asia. However, diclofenac is not the only vulture-toxic Non-Steroidal Anti-inflammatory Drug (NSAID) in use and therefore, killing vultures and other sensitive species. NSAIDs are being licensed and used as veterinary medicines in many other countries in Asia, Europe and Africa and may be having an impact on raptors.

To gather information on this issue, the Working Group on NSAIDs, set up by the Raptors MOU Technical Advisory Group would like you to complete a questionnaire relating to the use of NSAIDs in your country. The aim of the survey is to gather information about the implementation of specific aspects of *CMS Resolution 11.15 (Rev.COP13)* on preventing poisoning of migratory birds, including the status of and process regarding the licensing of NSAIDs for veterinary use that may be, or are known to be, lethal for vultures and some other species of scavenging birds. Access the questionnaire here: *https://forms.gle/WbyMLm6XxVNa7T5G7* by **30 November 2021**.

Overseas feature – PBMS team and Chernobyl, Ukraine

Scientists are sometimes offered research opportunities in interesting places. In 2018 Predatory Bird Monitoring Scheme (PBMS) team members were invited to assist with project work inside the Chernobyl Exclusion Zone by radioecological experts from the *UKCEH Radioecology team*, *Salford University School of Science, Engineering and Environment* and the *Chornobyl Center for Nuclear Safety, Ukraine*. The first paper (see *Antwis et al, 2021* below) resulting from the trip focused on the impacts of radiation exposure on the bacterial and fungal microbiome of small mammals. Gut microbiome is important for animal health (e.g. effecting immune response and food digestion). Associations between radiation exposure and microbiome composition of gut samples were not robust against geographical variation, although families of bacteria (Lachnospiraceae and Muribaculaceae) and fungi (Steccherinaceae and Strophariaceae) that may serve as biomarkers of radiation exposure were identified in the guts of bank voles. See also *https://twitter.com/radioecology*. Image: Chernobyl nuclear reactor #4 following the accident in 1986.

Recent publications from the WILDCOMS schemes

Androulakakis et al., 2021. **Determination of 56 per- and polyfluoroalkyl substances in top predators and their prey from Northern Europe by LC-MS/MS**. Chemosphere, Volume 287, Part 2, 131775. *https://doi.org/10.1016/j.chemosphere.2021.131775*

Antwis et al., 2021. **Impacts of radiation exposure on the bacterial and fungal microbiome of small mammals in the Chernobyl Exclusion Zone.** Journal of Animal Ecology 90, (9) p. 2172-2187. *https://doi.org/10.1111/1365-2656.13507*

Botterell et al., 2020. **Long-term insights into marine turtle sightings, strandings and captures around the UK and Ireland (1910–2018)**. Journal of the Marine Biological Association of the United Kingdom, 100(6), 869-877. *https://doi.org/10.1017/S0025315420000843*

Ceccolini et al., 2021. **Systemic Erysipelothrix rhusiopathiae in seven free-ranging delphinids stranded in England and Wales.** Dis Aquat Organ. 145:173-184. *https://doi.org/10.3354/dao03609*

Duff et al., 2020. **Rabbit haemorrhagic disease: a re-emerging threat to lagomorphs**. Veterinary record, 187, 3, 106-107. *http://dx.doi.org/10.1136/vr.m3131*

Duff et al., 2020. **Suspected collision trauma deaths in pied wagtails.** Veterinary Record 186 (18) 609-610. *http://dx.doi.org/10.1136/vr.m2272*

Duff et al., 2021. **Botulism and Bisgaard taxon implicated in Arctic tern deaths in the UK**. Veterinary Record 189 (2) 77-78. *https://doi.org/10.1002/vetr.755*

Dulsat-Masvidal et al., 2021. **A review of constraints and solutions for collecting raptor samples and contextual data for a European raptor biomonitoring facility**. Science of the Total Environment, 793, 148599. *https://doi.org/10.1016/j.scitotenv.2021.148599*

Everest et al., 2021. **Disease monitoring and surveillance: case studies in the applied conservation of fragmented red squirrel (*Sciurus vulgaris*) populations in England and Wales**. Mammalian Biology. *https://doi.org/10.1007/s42991-021-00157-8*

Everest et al., 2021. **Diseases of Wildlife Scheme: Red Squirrel Investigations, in Saving the Red Squirrel: Landscape Scale Recovery.** Red Squirrel Survival Trust. *https://www.rsst.org.uk/wp-content/uploads/2021/03/SavingRS2021Final.pdf*

Kean et al., 2021. **Persistent pollutants exceed toxic thresholds in a freshwater top predator decades after legislative control**. Environmental Pollution, 272, 116415. 11, pp. *https://doi.org/10.1016/j.envpol.2020.116415*

Leslie et al., 2021. **Decabromodiphenylether trends in the European environment: bird eggs, sewage sludge and surficial sediments**. Science of the Total Environment, 774, 145174. *https://doi.org/10.1016/j.scitotenv.2021.145174*

McGowen et al., 2020. **Phylogenomic Resolution of the Cetacean Tree of Life Using Target Sequence Capture**. Systematic Biology, 69:3, 479–501, *https://doi.org/10.1093/sysbio/syz068*
Murphy et al., 2020**. Spatio-temporal variability of harbour porpoise life history parameters in English and Welsh waters.** Frontiers in Marine Science. 7, 502352. *https://doi.org/10.3389/fmars.2020.502352*
Pereira et al., 2021. **Contrasting long term temporal trends in perfluoroalkyl substances (PFAS) in eggs of the northern gannet (*Morus bassanus*) from two UK colonies**. Science of the Total Environment 754, 141900. *https://doi.org/10.1016/j.scitotenv.2020.141900*
Roos et al., 2021. **Annual abundance of common kestrels (*Falco tinnunculus*) is negatively associated with second generation anticoagulant rodenticides**. Ecotoxicology 30(4), 560-574. *https://doi.org/10.1007/s10646-021-02374-w*
IJsseldijk et al., 2020. **Spatiotemporal mortality and demographic trends in a small cetacean: Strandings to inform conservation management.** Biological Conservation, 249, 108733. *https://doi.org/10.1016/j.biocon.2020.108733*
Wessels et al., 2021. **Novel Presentation of DMV-Associated Encephalitis in a Long-Finned Pilot Whale (*Globicephala melas*).** Journal of Comparative Pathology 183, 51-56. *https://doi.org/10.1016/j.jcpa.2021.01.004*
Williams et al., 2020A. **Levels of polychlorinated biphenyls are still associated with toxic effects in harbour porpoises (*Phocoena phocoena*) despite having fallen below proposed toxicity thresholds**. Environmental Science and Technology 54(4), 2277-2286*. https://doi.org/10.1021/acs.est.9b05453*
Williams et al., 2020B. **Juvenile harbor porpoises in the UK are exposed to a more neurotoxic mixture of polychlorinated biphenyls than adults.** Science of The Total Environment, 708, 134835. *https://doi.org/10.1016/j.scitotenv.2019.134835*
Williams et al., 2021. **Polychlorinated biphenyls are associated with reduced testes weights in harbour porpoises (*Phocoena phocoena*).** Environment International, 150, 106303. *https://doi.org/10.1016/j.envint.2020.106303*

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