



Wildlife Disease & Contaminant Monitoring & Surveillance Network

WILDCOMS (Wildlife Disease & Contaminant Monitoring and Surveillance network)¹

Annual Report- 2013-2014

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Executive Summary

This is the third and final annual report from WILDCOMS, a Natural Environment Research Council collaborative Knowledge Exchange network between ten UK surveillance schemes that monitor disease and contaminants in wild vertebrates. The overall aim of the WILDCOMS network is to foster and facilitate knowledge exchange, harmonisation towards best practice and productive collaboration between: (i) partner organisations; (ii) surveillance schemes and end-users. WILDCOMS aims to facilitate development of a more cost-effective and integrated evidence base for assessing environmental disease and contaminant risk that will benefit end-users and underpin regulatory policy.

This report describes the activities of the WILDCOMS network in the third year (2013-14) including an update in the communication tools (wiki, website, quarterly and annual reports for stakeholders) and activities, such as articles in specialised “in-house” publications of key stakeholders and presentations at national and international conferences. This report also describes the development of the inventory on “Specimen archiving” and the recording of the sharing activities across all partners’ schemes as well as between the partners and other organisations.

WILDCOMS has met the original goals set out in the grant proposal that was supported by NERC funding. WILDCOMS has established itself as a Knowledge Exchange network with a website that has up to 2000 visits per month and a mailing list of 484 stakeholders to date. The establishment of the network has facilitated greater collaboration and sharing of resources between WILDCOMS partners and has become a point of contact for organisations seeking advice in a wide range of wildlife pollution and disease issues.

We have had very successful meetings with stakeholders in England (2012) and Scotland (2013). The funding for WILDCOMS has ceased, but the network will continue to run, albeit with a limited range of activities.

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1. Introduction

Disease and contaminants can pose major risks to wildlife and human populations. Disease is a natural factor that affects wildlife, but some diseases warrant particular attention because they cause major mortalities that lead to population crashes, threaten wildlife species of high conservation concern, or pose a potential threat to Man. Environmental contaminants can also pose a risk to wildlife. This has been repeatedly demonstrated in the past, such as the catastrophic impact of organochlorine pesticides on predatory bird and mammal populations and the effects of diclofenac on vultures in south-east Asia.

In the UK, various surveillance schemes monitor disease and contaminants in vertebrates. **WILDCOMS** is a collaborative network formed between such schemes with the following aims:

- (i) to provide a focal point for disease and contaminant monitoring in wild vertebrates;
- (ii) to provide an integrated overview of the health status of UK wild vertebrates;
- (iii) to facilitate collaboration between WILDCOMS network partners;
- (iv) to facilitate identification of disease and contaminants of emerging concern.

The overall aim of the WILDCOMS network is to foster and facilitate knowledge exchange, harmonisation towards best practice and productive collaboration between: (i) partner organisations; (ii) surveillance schemes and end-users. It facilitates development of a more cost-effective and integrated evidence base for assessing environmental disease and contaminant risk that can benefit end-users and underpin regulatory policy.

The specific objectives were to: 1) develop and maintain a sustainable WILDCOMS network; 2) increase effectiveness of information integration, sharing and dissemination across partner schemes, and between schemes and national and international stakeholders; 3) increase harmonisation, collaboration and efficiency of resource utilisation between schemes.

The WILDCOMS network was established and maintained until December 2014 by a Natural Environment Research Council (NERC) Knowledge Exchange (KE) Grant (NE/I021063/1).

The original project grant outlined four Work Packages (WPs) and the milestones for each WP are outlined in a Gantt chart (Fig 1). This annual on-line report briefly describes the activities and outputs for WILDCOMS that have been achieved during the third year (2013-14) of the lifetime of the NERC KE grant. These are grouped by WP.

Financial year	2011-2012				2012-2013				2013-2014			
Calendar year	2011		2012		2013		2014					
start date: July 1st 2011	Project Yr 1				Proect Year 2				Project Year 3			
within year quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP1. Developing the network												
WILDCOMS advisory group formed	█											
start-up meeting	█											
Web site maintenance and expansion	█	█	█	█	█	█	█	█	█	█	█	█
Telecon review of progress			█		█				█		█	
WILDCOMS Partners Meetings		█		█		█		█		█		█
Stakeholder's Forum												█
ID & incorporate new members				█	█	█	█	█	█	█	█	█
Develop sustainable funding models							█					
Bids for further funding					█	█	█	█	█	█	█	█
WP2 Communication strategy												
Web domain established	█											
Wiki established	█											
Establish web site & initial pages	█	█										
Web site maintenance and expansion		█	█	█	█	█	█	█	█	█	█	█
Formulate comms strategy	█	█										
Quarterly reports	█	█	█		█	█	█		█	█	█	
Annual reports				█				█				█
Web site maintenace			█	█	█	█	█	█	█	█	█	█
WP3. Best practice guidelines and operational harmonisation												
3.1: Sample collection and processing		█	█	█								
3.2 Autopsy methods and recording				█	█	█	█					
3.3 Specimen archiving and inventory						█	█	█				
Review of WP3 and implmentation of recommendations											█	█
WP4. European linkages												
Target conferences for WILDCOMS	█		█		█				█			
Attend EURAPMON steering committees				█				█				█
Attend EURAPMON workshops			█			█					█	

Figure 1. Gantt chart for WILDCOMS

2. Operating the WILDCOMS network – WP 1

2.1. WILDCOMS advisory group

As agreed during the second year of the project, the Advisory Group (AG) has a less formal and more *ad hoc* approach, with relevant individuals being invited to participate at appropriate meetings. However, Jennifer Best (SEPA) continued in the capacity of chairperson.

2.2. Partners meetings

The schemes involved in the WILDCOMS and participating in the partners meeting were the original 9 founder ones and also *The National Fish Tissue Archive Scheme* that joined WILDCOMS during this year.

The schemes which are part of the WILDCOMS network are:

- Predatory Bird Monitoring Scheme (PBMS)- run by the Centre for Ecology & Hydrology (CEH)
- The Wildlife Incident Investigation Scheme (WIIS)- run by the Food and Environment Research Agency (Fera)
- Wildlife Incident Investigation Scheme (WIIS) Scotland- run by Science and Advice for Scottish Agriculture (SASA)
- Diseases of Wildlife Scheme- run by the Animal Health and Veterinary Laboratories Agency (AHVLA)
- Clean Seas Environment Monitoring Programme- coordinated by the Centre for Environment, Fisheries and Aquaculture (CEFAS)
- Cardiff University Otter Monitoring Project (CUOP)- run by Cardiff University
- Disease Risk Analysis and Health Surveillance Programme- run by Institute of Zoology (IoZ)
- UK Cetacean Strandings Investigation Programme- run by Institute of Zoology (IoZ)
- Scottish Environment Protection Agency (SEPA) Lipophilic Monitoring Network- run by the Scottish Environment Protection Agency (SEPA)
- The National Fish Tissue Archive

The network held Partners Meetings in London in November 2012 and September 2013, and in Cardiff in December 2014. In the last meeting, we discussed the possibility of further widen the network to new schemes- there has been interest from two further schemes although they have yet to formally join the WILDCOMS network. Current WILDCOMS partners agreed that they would be open to new relevant schemes joining the network.

2.3. Stakeholders' Forum

The overall aim of the stakeholders' forum is to facilitate knowledge exchange between WILDCOMS partners and a wide range of stakeholders and, as a consequence, refine WILDCOMS activities to ensure the network remains relevant to changing pressures and stakeholder priorities.

The WILDCOMS network has agreed that stakeholders meetings (one per year) should be held in London, Wales and Scotland, to maximise attendance of stakeholders from national and devolved regional bodies. These meetings are smaller than originally conceived in the grant proposal but feedback from the Advisory Group strongly emphasised that smaller, more focused, meetings would be more effective and relevant for regulators and policymakers.

The first full stakeholders' meeting was held in London in November 2012. This meeting was attended by one or more representatives from the Pesticides Forum, Environment Agency, various departments from within the Department for the Environment, Food and Rural Affairs, the Animal Health Veterinary Laboratories Agency and Natural England. The second full stakeholders' meeting was held in Edinburgh in November 2013. This meeting was attended by one or more representatives from the Scottish Environment Protection Agency (SEPA), Scottish Society for the Prevention of Cruelty to Animals (Scottish SPCA), The British association for Shooting & Conservation (BASC-Scotland), the Wildlife Management Branch of Scottish Government and Scottish Natural Heritage (SNH). The meetings were successful in raising awareness of the individual monitoring schemes and the WILDCOMS network with stakeholders and in gathering feedback from stakeholders as to the best way to disseminate information to them quickly and efficiently. It also facilitated the network to achieve some of its outputs, such as inclusion in Defra Evidence Strategy.

The third stakeholders meeting was planned for December 2014 in Cardiff. In Wales, two major organisations, Welsh Government and the Natural Research for Wales, are relevant stakeholders to the WILDCOMS. Given that only one representative of each organisation was able to attend the meeting, it was not considered effective to hold this meeting in that format. It was subsequently decided that WILDCOMS discussions with the Welsh stakeholders will occur around an annual meeting of the Cardiff University Otter Project in late 2015/early 2016.

3. Development and delivery of a communication plan – WP2

This WP has two key communication tools and a three part communication plan.

3.1. Key tools for the WILDCOMS network communication

3.1.1. Website (<http://www.wildcoms.org.uk/>)

The WILDCOMS website provides an overview of the role of disease and contaminant surveillance in the UK, describes the WILDCOMS network and activities, has links to the partners' schemes, and is used to disseminate WILDCOMS publications and outputs, including the Quarterly Reports (QR) (see [Section 3.2.1.](#))

The web pages set up in the first year have been maintained and updated regularly with news and activities from the WILDCOMS partner schemes, as well as other relevant information.

As can be seen in Fig. 2, the number of visitors to the site varies daily and the highest daily number to date is 600.

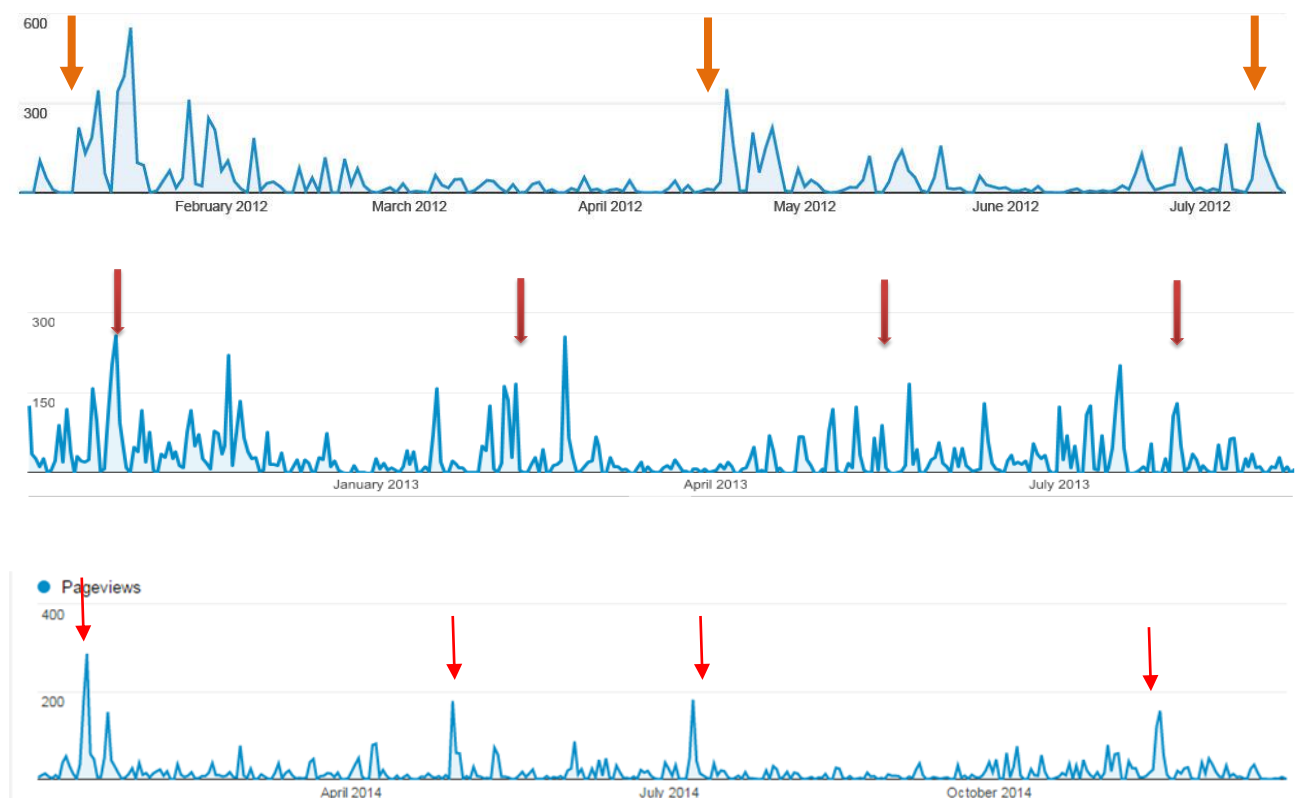


Figure 2. Daily number of visitors to the WILDCOMS website. Arrows indicate approximate date of QR publication.

Overall, the number of visitors to the website in 2014 has been broadly similar to that observed in the previous two years (Fig. 3). The relatively high variability between months in 2014 appeared to be related to the publication of the quarterly newsletter (see Section 3.2.1), with high numbers of website hits after the publication of a newsletter (Fig. 2). The data on total page-views suggests that the amount of traffic to the WILDCOMS website has remained broadly steady across the three years.

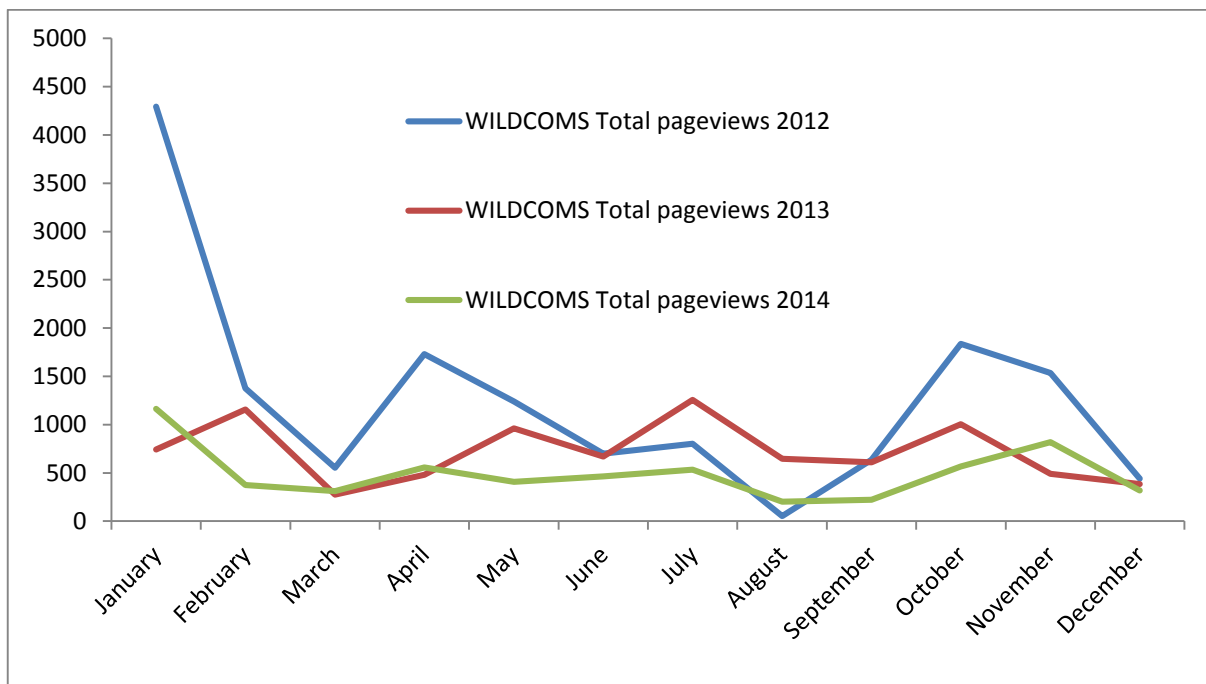


Figure 3. Total page-views per month for the WILDCOMS website in 2012, 2013 and 2014.

3.1.2. Wiki

The wiki is hosted by CEH, and is a web-based area that allows partners’ collaboration on WPs and other projects.

3.2. Three part communication plan

3.2.1. Reports

In the proposal for WILDCOMS, two types of reports were planned: a quarterly report (QR) and an annual report.

The quarterly report (QR) consists of: i) a “spotlight” that focuses on a specific area or topic and brings together information from multiple schemes to present a more holistic overview; ii) news from the partner schemes; iii) news of WILDCOMS activities and events. The QR is intended to be

relatively short so it can be rapidly assimilated by its readership. It can be read on-line or a pdf version can be downloaded and/or printed. An example is given in Fig. 4.

Over the duration of the last three years, we have published twelve QRs on the website, as agreed in the original grant proposal funded by NERC. The “spotlights” have been on “PCBs”, “Emerging hazards and risks”, “Wildlife and Zoonoses”, “Rodenticides”, “Summary of the existing practices of the partner schemes in WILDCOMS”, “Mercury (Hg)”, “Monitoring activities in Scotland”, “Citizen Science”, “Lead”, “Wildlife Crime”, “Policy relevance of the WILDCOMS monitoring schemes” and “Monitoring Activities in Wales”.

WILDCOMS
Wildlife Disease & Contaminant Monitoring & Surveillance Network

NEWSLETTER: Number 11
Summer SPOTLIGHT 2014
Policy relevance of the WILDCOMS monitoring schemes

Predatory Bird Monitoring Scheme (PBMS) contaminant monitoring covers marine, freshwater and terrestrial habitats at a UK scale. Our work provides underpinning scientific evidence that informs various national and international directives and policy initiatives. For example, our monitoring of Second Generation Anticoagulant Rodenticides (SGARs) provides the scientific evidence to evaluate the risk that SGARs pose to wildlife and the effect of national mitigation measures that may be required as part of product authorisation under the [Biocidal Product Regulation \(BPR, Regulation \(EU\) 528/2012\)](#). PBMS monitoring of a range of legacy and emerging persistent organic pollutants provides evidence of the effectiveness of the [REACH directive \(EC No 1907/2006\)](#) and [OSPAR convention](#) in controlling or banning emissions to the environment of harmful chemicals, while PBMS monitoring of mercury in aerially wildlife species is a key means by which the impact in Britain of the United Nations Environment Programme (UNEP) [Minamata Convention on Mercury](#) can be assessed. Further details on the policy relevance of PBMS monitoring is described on the [PBMS Policy Relevance webpage](#).

The Clean Seas Environmental Monitoring Programme (CSEMP), previously known as the National Monitoring Plan (NMP) and the National Marine Monitoring Programme (NMMPP), was initiated in the late 1980s to ensure that marine monitoring in the UK was undertaken in a co-ordinated way. The Programme aims to detect long-term trends in the quality of the marine environment by collecting high quality, standardised data while supporting research and development needs, to ensure that the UK meets temporal trend monitoring requirements for the Co-ordinated Environmental Monitoring Programme (CEMP) of the [Coastal and Ports Commission \(COPAC\)](#) and supports compliance with EC Directives such as the [Marine Strategy Framework Directive](#) and the [Water Framework Directive](#). Most samples for the Programme are collected during an annual multidisciplinary cruise in June/July, using [Research Vessels \(R/Vs\)](#). Fish, benthos, sediment and water samples are taken from a number of fixed and random stations in intermediate and open sea areas around England and Wales. Additional opportunistic samples are also collected to fulfil a multitude of monitoring commitments e.g. zooplankton, biodiversity, marine litter, etc.

The Scottish Environment Protection Agency (SEPA) Lipophilic Strategy monitors lipophilic (fat-loving) chemicals in the freshwater aquatic environment via sediment and freshwater fish. The need to monitor certain pollutants in sediment and biota is recognised under the [Water Framework Directive \(2000/60/EC \(WFD\)\)](#) and its daughter directive [2008/105/EC \(Environmental Quality Standards Directive\)](#). The aims of the strategy include: to deliver environmental data that will ensure Scotland complies with the specific monitoring requirements of primary legislative drivers; to facilitate compliance assessment for chemical substances for which biota standards are set and so allow assessment of water body chemical status under the WFD; to inform state of environment reporting for Scotland's freshwater environments; to detect temporal and spatial trends of contaminant concentrations and contribute to the assessment of WFD no deterioration objective. Data generated through the biota and sediment monitoring network in the Lipophilic Strategy provides vital information on the

state of Scotland's freshwater environment which is not currently provided by SEPA's water monitoring programme. The information complements other monitoring strategies and so leads to a holistic view of Scotland's environmental status with respect to chemicals.

The Disease Risk Analysis and Health Surveillance Programme (DRAHS) carry out disease risk analysis and health surveillance for wild animal translocations in England and through this enable Natural England to meet International Union for the Conservation of Nature, Species Survival Commission guidelines on the translocation of living organisms. For over ten years, we have carried out disease risk analysis prior to new translocations and ensured that the risk from disease has been considered before animals have been translocated for the first time. The results of post-release health monitoring are used to inform disease risk analysis and ensure mitigation measures are improved for future translocations. Species translocations that have been investigated through disease risk analysis include the red-bellied ant (Formica rufibarbis), short-haired bumblebee *Bombus subterraneus*, pool frog (Pelophylax lessonae), sand lizard (Lacerta agilis), adder (Vipera berus), smooth snake (Coronella austriaca), ootid burrowing (Emberiza citrinus) and white-tailed sea eagle (Haliaeetus albicilla).

DRAHS have used their experience in monitoring disease in translocated populations to develop an advanced method of disease risk analysis appropriate for free-living wild animal translocations ([Graham and Nisbet-Graham 2012](#)).

Cardiff University Otter Project (CUOP) is a UK wide scheme monitoring otter populations and their health, and uses the otter as a sentinel for the health of the wider environment. CUOP is the only UK scheme monitoring a freshwater mammal, and provides a unique 20 year archive of data and samples. The European otter is listed under Appendix II of the [Bern Convention](#), and Annex II and IV of the [EC Habitats Directive](#), which have strict legislative obligations to monitor and protect the otter. CUOP helps fulfil monitoring obligations, and works closely with other organisations (e.g. Trunk Roads Agencies) to guide the implementation of protection against roads, which remains the most significant recorded cause of death.

In conjunction with another WILDCOMS partner (PBMS), CUOP monitors a range of legacy and emerging chemical pollutants in the freshwater environment, providing evidence of the effectiveness of the [REACH directive \(EC No 1907/2006\)](#) and helping inform river basin management of chemical water under the [Water Framework Directive](#). Monitoring of lead (Pb) levels has provided clear evidence of the successful implementation of [Directive 99/79/EC](#) of the European Parliament, banning the marketing of leaded petrol.

The National Fish Tissue Archive collects samples that can be used to test for compliance with new environmental quality standards. The Priority Substances Directive under the [Water Framework Directive](#) (European Union, 2000) was updated last year (European Union, 2013). The previous version (European Union, 2000) focused on monitoring pollution only in the water phase with the exception of three chemicals (mercury, hexachlorobenzene and heptachlorobenzene), for which monitoring of river otter than water was recommended. The 2013 update essentially makes biota monitoring compulsory, adding a further eight biota standards to the existing three and specifying fish as the organism to be studied.

In the UK there is currently no routine monitoring of fish for chemical pollutants, however, annual samples of fish have been collected by the National Fish Tissue Archive from a number of sites since 2007 (ongoing). Over time these can be used to measure current pollution and to establish trends. Demonstrating improving trends, where standards have been failed, is an important part of the Water Framework Directive. In a recent study from the Fish Tissue Archive [Lipinski](#)

et al., 2013), 79 % of the fish samples analysed failed the EU environmental quality standard (EQS) for mercury of 20 µg/kg fresh weight, although concentrations were lower than in many other studies from the literature. The EQS for PCBs has been set so low that every fish exceeded by orders of magnitude.

The **Wildlife Incident Investigation Scheme (WIS)** is a monitoring tool to inform the pesticide approval process, which is managed by the Chemicals Regulation Directorate within the HSE. It reports on incidents that might involve pesticides and the death or illness of wildlife, pets or beneficial invertebrates, such as honeybees and bumblebees within the UK. The WIS will also identify and profile those who deliberately or recklessly misuse and abuse pesticides. The work of the [WIS](#) in the Past and [WIS](#) provide the analytical evidence for WIS and their results can be found [here](#) and are due to be updated during July 2014. The work of these organisations on WIS pre-date pesticide legislation, but was initially formally recognised within [The Food and Environment Protection Act 1985](#) and [The Control of Pesticides Regulations 1986](#) (as amended). However, nearly all plant protection products are now covered by [European Legislation \(Regulation \(EC\) No 1107/2009](#), which is implemented in the UK by [The Plant Protection Products Regulations 2011](#). The results of these schemes also include mortality and exposure incidents with anticoagulant rodenticides which are covered by the [Biocidal Product Regulation \(BPR, Regulation \(EU\) 528/2012\)](#). The WIS and PBMS provide the UK with a unique evidence base to establish and monitor effectiveness of any mitigation measures that may be required within this regulation.

Scheme News

DRAHS have contributed to a publication on the identity of coxidian parasites in red and grey squirrels and their geographical distribution. Coxidia are known to be pathogenic (disease-inducing) in red squirrels ([Zell et al., 2014](#)).

Several WILDCOMS schemes worked with [Project Squirrel](#) at an event at the Natural History Museum in London, as part of [University Week](#). The week-long event aimed to highlight the relevance of university research to the public, and showcased a wide diversity of exhibits. Are you a #iplatlaspotter? described how reports of wildlife road kill by the public can be used to quantify environmental contaminants – linking to WILDCOMS schemes – while also helping monitor invertebrates, and helping conserve rare species. For a flavour of the wide diversity of research showcased at the event, see a [video](#), or read a [post](#) about the event and the importance of both public engagement and government funding for research, by Nicola Dandridge, Chief Executive of Universities UK.

The PBMS was involved in compiling a Europe-wide inventory of monitoring programmes that measure contaminant residues in birds of prey ([Graham-Rambler et al., 2014](#)). This work was part of the European Science Foundation Research Network Programme (EURAPMON) and the inventory can be downloaded from the [EURAPMON website](#).

WILDCOMS news

WILDCOMS was highlighted in the new [Cetbs evidence strategy 'Meets the most of our evidence: A strategy for Defra and its network'](#), published in June. The WILDCOMS case study is on page 14.

A workshop on [pollinating of African vulture populations](#) was held recently in Spain. For information please see the [WILDCOMS website news item](#).

CONTACT US: If you would like to see a specific topic in the "spotlight" section of the WILDCOMS quarterly bulletin, or would like to contact us about other WILDCOMS related matters, please e-mail the WILDCOMS coordinator, Dr Clive Peirce [clive@wildcoms.ac.uk](#)

Figure 4. Example of a Quarterly report

When a new QR is published on the WILDCOMS website, an e-mail alert is sent to stakeholders that include a wide range of governmental and non-governmental organisations, academics and other interested parties (Fig 5). The alert list currently comprises of 484 individuals, an increase of around 25% in the last year which was on top of a 30% increase in the previous year. This rise, has been spread across all sectors, but in the last year it appears to have been particularly from individuals working in governmental agencies (Fig 5). About a fifth of those new subscribers have requested to receive the e-mail alert while the remainder have been identified by the WILDCOMS partners as individuals that are interested in their activities. All recipients of the alert are given the choice to opt out from receiving future alerts but only five individuals have chosen this option to date. Our stakeholder listing has been shared - with their permission - with Defra's [GB Wildlife Disease Surveillance Network](#) to facilitate the outreach of that network.

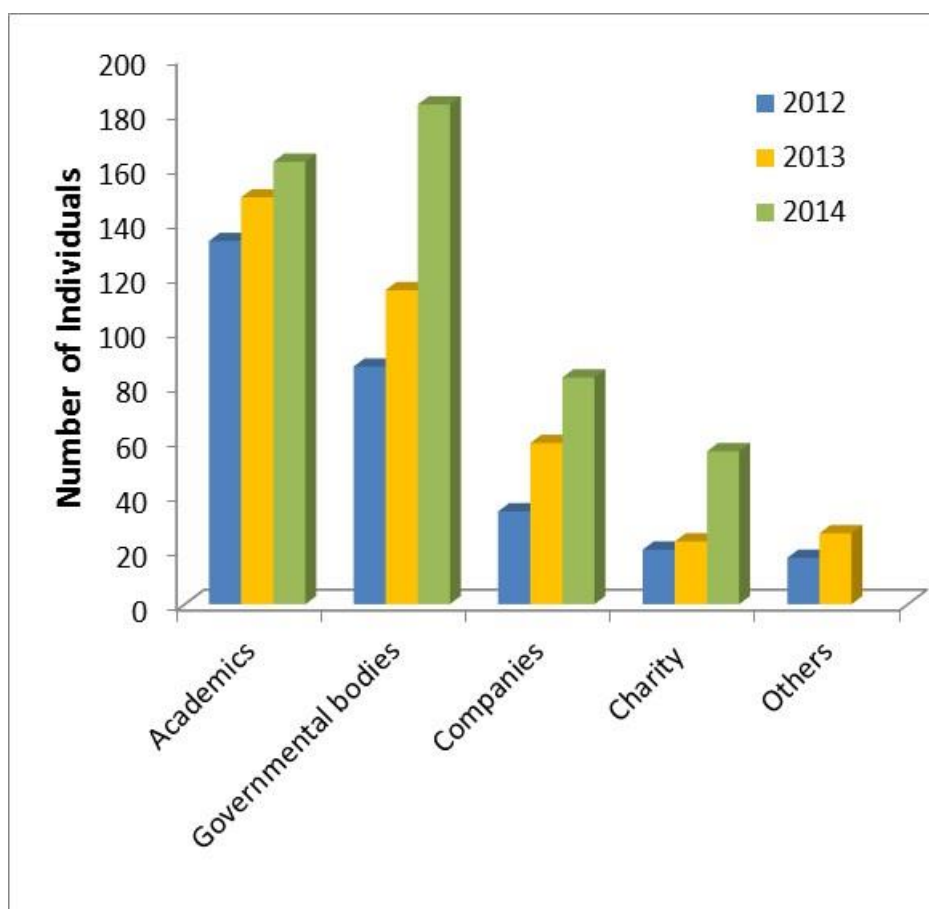


Figure 5. Distribution of organisations to which the newsletter alerts is sent.

The website statistics suggest that publication of the quarterly newsletters increases the number of visitors to the site (in average around 200 extra views on day of publication). This is an identical pattern to that observed in 2012 (not in 2013).

[Annual reports](#) synthesise WILDCOMS activities and outputs for each year. The current report is the third annual WILDCOMS report. Annual reports are all available for download from the WILDCOMS website and are archived in the NERC Open Research Archive ([NORA](#)) which facilitates access using standard bibliographic searching methods. We have three reports available from the network.

3.2.2. Trade magazines and press releases

This part of the communication plan deals with WILDCOMS communications and outputs which are presented in trade magazines and press releases. The aim is to widen the range of people and sectors of activity that are aware of the WILDCOMS network and may want to interact with partner schemes. The overall target outlined in the original grant proposal was five articles for in-house or trade journals over three years. We have reached the target with, an article entitled "[Corpses needed for environmental assessment](#)" published on the NERC's [Planet Earth Online](#) and an online

article was published in Defra's Landscape publication in October 2012, entitled ["Wild things: new partnership creates a "one-stop-shop" for monitoring disease among wildlife"](#). Articles on WILDCOMS have also been published by the British Ecological Society Bulletin (Chadwick, E., Pereira, G. & Shore R. 2012. WILDCOMS- A disease monitoring network. *Bulletin of the British Ecological Society* 43(4) 44-45), and by the [British Society for Parasitology](#). An article about WILDCOMS was published in the International Innovation Journal ([pg 92-94](#)), and SEPAView published an article entitled "[Working together through WILDCOMS](#)".

3.2.3. *National conferences and meetings*

This task was designed to widen dissemination about WILDCOMS through presentation of posters and oral presentations at national conferences and meetings. It was agreed at the WILDCOMS start-up meeting that, for logistical ease, this task would be incorporated into WP4.

4. Increased operational harmonisation – WP3

This WP focused on increasing harmonisation, collaboration and efficiency of resource utilisation. This is related primarily to operations common to partners' schemes, namely "sample collection and processing" (WP3.1 on the Gantt chart), "necropsies and recording" (WP3.2) and "specimen archiving" (WP3.3). Each task comprised: (i) review and description of existing practices; (ii) recommendations on best practice where appropriate; (iii) quantification of current sharing between schemes, of samples, methods and data; (iv) recommendations as to how collaboration can be increased and activities rationalised to eliminate duplication or overlap.

In the first year, our main aim was to compile an inventory between WILDCOMS partners of "sample collection and processing" (WP3.1) in the second year we focused on the compilation of an inventory of "necropsies and recording" (WP3.2). This information was published in the website and reported in some details in the first and second year's annual report, respectively.

This last year we compiled an inventory related to "specimen archiving" (WP3.3). This information has been gathered into an Excel workbook that can now be accessed and downloaded from the WILDCOMS website where it is held under the "Project Outputs" tab. The inventory contains data concerning the species, organs, etc, data each scheme archives as well as information on the number of historical archived samples, starting date of archives and the planned storage time. This inventory provides an important database of sample repository in the UK.

In this final year we also collated information to quantify the current sharing between the WILDCOMS partners as well as collaboration occurring between the partners and other external organisations. The internal as well as the external collaborations have occurred at least in part because of the existence of the network. This information can also be downloaded from the WILDCOMS website under the "Project Outputs".

Fifteen new collaborations between schemes have been recorded in the last year. Some of these are linked to increase sample sharing to maximise analyses and data sharing and to reduce costs. One example where there was major progress in 2013-14 and beyond is on contaminant and pesticide exposure (particularly exposure to second generation anticoagulant rodenticides – SGARS) in red kites (*Milvus milvus*) –this is described more fully in Section 6.5. Another notable collaboration in 2013-14 year was the joint participation of several WILDCOMS partners in a KE exercise at the Natural History Museum in London (9-13th June 2014), during the Universities week. The schemes had a stand, led by the CUOP, which highlighted citizen science with interactive wildlife maps, exhibits of wings and bones from predatory birds, an otter jigsaw, a touch table and other information

We also document information about 17 collaborations that WILDCOMS partner schemes have developed with various external collaborators. These collaborations mainly focus on provision of samples and data sharing.

5. National and European Knowledge Exchange – WP4

WP4 was originally conceived as being the lead for extending and adapting the WILDCOMS network to a European scale. This remained an objective throughout the last three years but this WP has also incorporated responsibility for knowledge exchange at a national level, as achieved through presentations and posters at national conferences.

The activities in this WP have focussed on two areas: i) presentations at key national and European meetings and ii) extension of WILDCOMS to the European scale.

5.1. Presentations at national and European conferences

Poster and oral presentations have been presented at nine meetings (five national, four European) (Table 1) by various WILDCOMS partners and the WILDCOMS coordinator. We have not presented the WILDCOMS work at recent conferences because the most appropriate meetings were targeted in the first couple years of the project.

Table 1. List of conferences where WILDCOMS work was presented.

National	European / International
<i>The Clean and Safe Seas Evidence Group (CSSEG)- Oral presentation in January 2011</i>	<i>SETAC (Society of environmental toxicology and chemistry) world meeting in Berlin- Poster presentation in May 2012</i>
<i>SEPA- Oral presentation in January 2012</i>	<i>OSPAR – Oral presentation in December 2011</i>
<i>Aspects of Wildlife Crime and Conservation, University of Chester- Oral presentation in March 2012</i>	<i>American Society for Mass Spectrometry - 2012</i>
<i>58th Spring Conference & AGM of the Mammal Society- Oral presentation in April 2012</i>	<i>European Wildlife Disease Association - Joint 61st International WDA & 10th Biennial EWDA Conference- Convergence in Wildlife Health Lyon, France- Poster presentation in May 2012</i>
<i>GB Wildlife Disease Surveillance Partnership- Oral presentation in June 2012</i>	

5.2. Extending WILDCOMS to the European scale

In the first year report we discussed the engagement of WILDCOMS with the European Network [“Research and Monitoring for and with Raptors in Europe” \(EURAPMON\)](#). WILDCOMS has facilitated the development of inventories by EURAPMON. The templates created by WILDCOMS to collate

information regarding activities of partner schemes were adopted and adapted by EURAPMON to gather information on monitoring chemicals in raptors across Europe; this inventory was published in 2014².

EURAPMON is seeking ways to gain future funding to develop a sustainable European network for contaminant monitoring in raptors and WILDCOMS is well positioned to help coordinate UK monitoring schemes in this endeavour.

² Gómez-Ramírez P., **et al.**, 2014. An overview of existing raptor contaminant monitoring activities in Europe. *Environment International* **67** 12-21. DOI: [10.1016/j.envint.2014.02.004](https://doi.org/10.1016/j.envint.2014.02.004)

6. Network Impact

The WILDCOMS network was in part formed to fulfil a need highlighted by the UK government, for strategic approaches for early detection of threats to wildlife and humans. The expectation was that WILDCOMS would facilitate sharing of skills, expertise, knowledge, samples and data to avoid duplication of effort and costs and so to maximise outputs from the existent resources. Given that we are reaching the end of the NERC proposal, and three years since the Network formation, we evaluated the achievements in relation to the initial predicted benefits. These points were discussed in the last partners meeting.

6.1. New collaborations and research arising from the links between partners

- New collaborations occurred during the last three years. Many of these were captured in sharing activities (described in section 4). These include exchange of samples, of data and of methods for autopsy as well as chemical analyses.
- Existing collaborations were also strengthened during the last three years.
- Participation in the WILDCOMS network has been cited as part of project proposals to strength them when seeking funding and to demonstrate value for money.
- The QR also increased the knowledge among the partners regarding their activities and commonalities.

6.2. Better informed regulators and policy makers

- There was a wide-ranging engagement between partner schemes and stakeholders, some of which was attained during the stakeholders meetings. However partner schemes were of the opinion that this engagement has to continue to be pursued to ensure that the policy makers continue to be well informed.
- The new engagement with the stakeholders has led, in certain schemes, to increase in their funding.
- QR have been used to provide stakeholders with reminders of how the schemes collaborate, their research and also their new publications, etc.

Evidence of the impact of WILDCOMS is its inclusion in Defra's 2014 evidence strategy "[Making the most of our evidence: A strategy for Defra and its network](#)" the PBMS has been highlighted by Defra as one of the indicator tools in the [UK National Action Plan for the Sustainable Use of Pesticides \(Plant Protection Products\)](#).

6.3. A recognised forum for discussion

In various instances WILDCOMS has helped locate suitable experts to provide stakeholders about various contaminant and disease issues. WILDCOMS also has been able to disseminate information about relevant events and outputs from various organisations. More than 30 news items were posted on the WILDCOMS website in 2014.

6.4. Potential benefits for industrial end users including potential for averting costs

Changes in restrictions of use for second-generation anticoagulant rodenticides are coming into force in the UK in 2015 together with an industry-led stewardship scheme. Monitoring of exposure and/or mortality incidents in wildlife associated with these compounds is currently conducted by four WILDCOMS partners, [WIIS](#) and [AHVLA](#) (for England and Wales), [WIIS-Scotland](#), and the [PBMS](#). WILDCOMS has facilitated coordination between these partners in terms of outlining how their existing monitoring activities for rodenticides in wildlife can be linked to assess the effects of the changes in use. A briefing document from the partners was sent to the Health & Safety Executive, the regulatory body for rodenticides, and to the Campaign for Responsible Rodenticide Use (CRRU), an industry consortium that is leading the development of the stewardship consortium. WILDCOMS will continue to facilitate the collaboration between its partner organisations to ensure that the fullest available information on SGAR non-target exposure and poisoning is available to the Health & Safety Executive, the regulatory agency that will provide oversight of Rodenticide Stewardship.

6.5 Better long term management and sharing of data and best practices

Sharing of information between partners about procedures and best practice is evidenced by the collation of information about sample collection, necropsies and archiving that has been described in Section 4.

WILDCOMS has also provided the impetus for coordinating the sharing of data and management of data, particularly with regards to the exposure to of red kites to second generation anticoagulant rodenticides (SGARs). The red kite is a charismatic species that has been subject to a widescale reintroduction programme in England and Scotland. Red kite carcasses that are found in England and Wales are now processed through a coordinated approach between three WILDCOMS partners. The carcasses undergo pathological investigations and necropsy at the Institute of Zoology (Disease Risk Analysis and Health Surveillance Programme). Livers from kites suspected of having been poisoned are sent to the WIIS for pesticide screening and inclusion in WIIS data and reporting while livers from birds not suspected of having been poisoned are sent to the PBMS for inclusion in ongoing monitoring of SGAR and Pb exposure. Kites from Scotland are collected, processed and examined by WIIS-Scotland, a fourth WILDCOMS partner. Although sharing of effort and samples maximises the usefulness of the samples and reduces overall cost of processing samples, it raises an issue that data on SGAR exposure is dispersed across four WILDCOMS partner schemes. This presents a barrier to developing a holistic understanding of the risks to this species from these compounds. To overcome this, the four WILDCOMS partners developed a database into which data from the respective partners is shared and pooled-population of the database was completed towards the end of 2014. A presentation of the initial analysis of the new shared dataset was given at the workshop on [Health and disease in translocated wild animals](#) at the Institute of Zoology, London, in May 2015 and a paper is in preparation for submission to a peer-reviewed journal later in 2015 for publication. WILDCOMS will also facilitate meetings with key stakeholders to agree the

best means of making the data on contamination more widely available and ensure it maintains its relevance to key stakeholders.

6.6 Rationalisation of resources - improving effectiveness within the public sector

This has been largely achieved through greater sharing and utilisation of samples. Examples include:

- Sharing of red kite samples (see section 6.5).
- Samples from birds of prey submitted to the PBMS for contaminant monitoring are now shared with the The Animal and Plant Health Agency (APHA), formerly Animal Health and Veterinary Laboratories Agency (AHVLA), for screening of West Nile Virus (WNV) in birds.
- CUOP and the PBMS share analytical resources and samples to better assess the threat from current and emerging compounds in fresh waters using otters as a sentinel.
- The APHA Diseases of Wildlife Scheme and the WIIS are sharing samples for monitoring and archiving by the PBMS. The PBMS and WIIS-Scotland likewise have an agreed system whereby they can make available samples collected by each schemes so that they can be utilised and analysed by the other.
- The PBMS has been providing predatory bird samples to the Institute of Zoology for trichomoniasis screening.

7. Moving Forward

The NERC KE grant that was used to establish WILDCOMS finished in December 2014 but the WILDCOMS partners continue to run the network because of the mutual benefits it affords for cooperation and collaboration, and ability to engage in a more holistic way with stakeholders. The network will work on a reduced budget, scaling back some of its activities, and network partners will meet their own participation costs. The activities that WILDCOMS will maintain are:

- a. WILDCOMS website – the website would be maintained by CEH with input from the partner schemes.
- b. WILDCOMS newsletter- Information for the newsletter will be collated by different individuals. This will rotate regularly.
- c. Annual meeting and annual telecoms – Partners agreed to rotate the chairperson annually and this person would be responsible to run the meetings.
- d. Stakeholder engagement activities– these will be linked to events run by individual partner schemes. Other WILDCOMS partners will attend these meetings as appropriate and engage with relevant stakeholders. The WILDCOMS network will be highlighted in these meetings to ensure that it continues maintain its profile and ability to promote engagement with stakeholders.

8. Conclusion

Overall, WILDCOMS met the goals set out in the original proposal supported by NERC. It has established a successful active network between national disease and contaminant surveillance monitoring schemes. The network has enhanced closer collaboration, including resource and data sharing, between partner schemes. This has ensured that the schemes remain cost-effective. The establishment of various communication materials, tools and activities has improved engagement of the partner schemes with a wide range stakeholders, and helped ensure that the partner schemes deliver more holistic monitoring and information on disease and contaminant risk to UK wildlife. The WILDCOMS network and its reach to stakeholders both continue to grow nationally and internationally. The network aims to continue this trajectory in coming years.