



CONVENTION ON MIGRATORY SPECIES

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GUIDELINES TO PREVENT THE RISK OF POISONING OF MIGRATORY BIRDS

SHORT VERSION

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1. Introduction

Poisoning is a significant global problem affecting a wide range of migratory bird species across almost all habitats. Birds may be exposed to multiple sources of poisoning in their ranges causing lethal and sub-lethal effects, such as a loss of migratory orientation, reduced reproductive output and increased risk of predation, with birds of prey being one of the most vulnerable to poisoning. These impacts include poisoning from:

- feeding on rodents and insects exposed to pesticides (particularly, second-generation anticoagulant rodenticides and the insecticides carbamates and organophosphates);
- poison-baits used to control predators and protect game estates, and harvesting;
- feeding on domestic livestock carcasses treated with veterinary pharmaceuticals (particularly, non-steroidal anti-inflammatory drugs); and
- ingestion of lead ammunition and/or fishing weights directly from the environment or within prey or carrion.

Further information about the effects on birds is found in the CMS Review of Ecological Effects of Poisoning (2014). Globally, most of the drivers resulting in exposure of birds to toxic substances are related to three main activities: (1) agricultural protection of crops and livestock from predators, pests, and diseases; (2) hunting and fishing; and (3) harvesting birds with poison-baits for consumption, eg, traditional medicine.

In 2011, the Convention on Migratory Species (CMS) recognized this problem and adopted Resolution 10.26 at the 10th Conference of the Parties. This Resolution established a Working Group to advise the CMS Scientific Council on the impacts of poisoning on migratory birds, efforts made to tackle the problem and to produce guidelines on the most effective ways to prevent poisoning.

The work of the Working Group has been coordinated on behalf of CMS by Symone Krimowa, employed by the RSPB with funding from the UK Government (Defra) and the CMS African-Eurasian Raptor Memorandum of Understanding. The Working Group met in Tunisia on the 27-31 May 2013 (with funding from the Swiss Government and the European Science Foundation). This technical workshop developed draft global Guidelines for submission to the Scientific Council.

These Guidelines to Prevent Poisoning of Migratory Birds have been developed for adoption by the Conference of the Parties in November 2014. Thereafter, once adopted it is the responsibility of individual states to transpose the guidelines into their own policy systems. There are a number of non-legislative recommendations that can be utilised by the agricultural sector, hunting/fishing communities and other stakeholders in addition to voluntary compliance with the legislative recommendations in advance of their adoption.

The recommendations cover five priority poisoning areas: insecticides, rodenticides, poison-baits, veterinary pharmaceuticals, lead ammunition and fishing weights. Key recommendations are listed below for each poisoning type and priority recommendations are highlighted in the draft Resolution. Further detailed recommendations are included in the full CMS Guidelines report (2014) and background on the ecological impact is covered in the CMS Review of Ecological Effects of Poisoning (2014).

2. Recommendations to prevent risk to birds from insecticides used to protect crops

2.1. Identify local risk hot spots and work with local stakeholders to reduce risk

The risk of pesticide poisoning for migratory birds is greater in those species that have breeding and wintering areas and stopover sites in agricultural areas where pesticides (particularly carbamates and organophosphates) are used. As a result, poisoning hotspots within breeding, wintering and stopover sites need to be identified and addressed by working with local stakeholders.

Risk models exist to identify pesticide uses that present a high risk of acute intoxication and these should be applied more broadly. Better identification of likely risk from insecticides to migratory birds and hotspot risk areas could be achieved by conducting studies in which habitat (initially focusing on the habitat of threatened species and areas of high bird concentration) and areas of pesticide use are overlaid.

Hot spots can be prioritised for encouraging change in pesticide usage by working with local stakeholders, particularly pesticide users in those high-risk regions. Advice to local stakeholders on how to limit risky pesticide usage could include integrated pest management strategies (see below), bird-friendly crops, and changes to pesticide application timing and methods.

2.2. Include migratory bird criteria in the Rotterdam Convention to reduce risk of imports of products highly toxic to birds

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade regulates the international trade of chemicals, which currently includes 32 pesticides. Mandatory consideration of effects of pesticides on birds (e.g. migratory bird criteria) could achieve better informed decision-making, particularly when:

(1) national governments are deciding whether to allow the import of pesticides:

Risks to birds should be made a mandatory and more prominent component of the guidance so that countries can assess the likelihood of risks to birds in their own region. This information is highly influential because many countries do not carry out their own risk assessments but follow international guidance.

(2) the Convention is deciding whether to regulate additional pesticides:

The Convention also contains a mechanism for evaluating and regulating additional chemicals (making them subject to the import consent procedure). The review includes ecotoxicological properties of the pesticide formulation, environmental incidents in other States and the existence of environmental restrictions or environmental guidelines in other states.

For both processes, the weight each factor is given when assessing whether to import or regulate the chemical is unknown. CMS, and other stakeholders, such as the Partners in Flight Group, should work with the Rotterdam Secretariat to develop decision-making criteria that include mandatory consideration of the risk to birds when assessing proposals. This criterion should also be given an effective weight relative to the other decision-making criteria.

2.3. Substitute (remove from the market and replace with environmentally safe alternatives) substances of high risk to birds and incentivize alternatives, such as integrated pest management; introduce mandatory evaluation mechanisms for existing and new products

Substances of high risk to birds, i.e., resulting in lethal or sublethal effects with the potential to contribute to population declines, should be immediately removed from the market and replaced with environmentally safe products.

A pesticide regulatory system should incorporate consideration of effects on birds so as to: (1) ensure substances of high risk to birds are not permitted for use in activities that could result in exposure of migratory bird populations – preventative; and (2) allow for removal of substances if evidence indicates risks to birds from their use – evaluative. These Guidelines focus on the latter, although the risk assessment process for new products also needs further development in both developed and less-developed regions.

Regulatory systems should be made more responsive to new information (eg, regular evidence-based reviews) so that if evidence of risk to birds is discovered post-approval, it can be used to review the approval of the substance and, if necessary, remove certain labelled uses.

National legislative mechanisms should include a mandatory review/evaluation process with criteria to adjust labelled/approved uses, if evidence shows it is necessary to do so. To ensure a re-evaluation process is triggered when risks to birds may occur, a monitoring system needs to be put in place. Monitoring of insecticide use and recording of effects on birds should be part of the required mitigation plan at the stage of the original approval of the product's use.

2.4. Adopt integrated pest management at national level and provide incentives for farmers, such as certification schemes and public support

Integrated Pest Management (IPM) is a sustainable approach to crop production and protection that combines different management strategies and practices to grow healthy crops and prevent the use of pesticides, thereby limiting the risk of poisoning of non-target species, including birds. Studies have shown that IPM systems yield greater biodiversity and reduce pesticide use by at least 20% compared with conventional farming. Therefore, many countries should initiate IPM programmes.

Implementation of IPM has been slow compared with approaches associated with individual field-based, market driven (and industry promoted) management. Barriers to adopting IPM are prevalent and include difficulties in stakeholders learning how to use new technologies and decision-making tools, as well as absorbing the transition and possibly higher running costs compared with conventional methods. Additional reasons for the low uptake of IPM are that the benefits of IPM may not be as immediate as conventional agriculture and they occur over the long-term, benefitting both individual farmers and the community.

Incentives are needed to encourage current users of substances of risk to birds, particularly in agricultural crops (food and non-food crops), to move to an IPM approach, and could include:

- **Certification:**

Certification will give producers of food and non-food crops access to a national or international third-party certification system for goods produced and protected using IPM. This will provide consumers with information to identify goods in the marketplace that are produced under IPM standards. It has been shown that consumers often prefer products with sustainable labels, thereby, potentially increasing attractiveness of the IPM-farmers' products. The use of third-party labelling can encourage a move towards environmentally-friendly consumption patterns and also induce governments to increase environmental standards for products through current regulatory systems.

- **Public support:**

All governments provide some public support to their domestic agriculture and rural sector, which provides an opportunity to re-target this support to sustainable practices, such as IPM. Public support, particularly government-funded programmes, to encourage farmers to adopt IPM strategies is an important tool to increase the use of IPM. Conservation-focussed government subsidies are popular in Europe, the United States and Canada, and IPM should be integrated or given further emphasis in these programmes, and some countries even have legal obligations to carry out IPM practices (eg, Sustainable Pesticide Directive in the European Union). Some of the schemes have been designed to address the loss of farmland birds, and this could provide seamless integration of IPM to prevent risks of pesticides to birds.

3. Recommendations to prevent risk from rodenticides used to protect crops

3.1. Use best practice to prevent and manage rodent irruptions without use of second generation anticoagulant rodenticides

Recommendation one: second generation anticoagulant rodenticides (SGAR) should not be used for rodent outbreaks, and instead preventative rodent damage measures should be used. Preventative measures could include e.g. synchronous planting of crops and good field sanitation to limit resource availability/length of planting season. If SGARs are used, then they should be deployed in a manner to prevent harm – see Recommendation two below.

Recommendation two: Unavoidable treatment of rodent irruptions with rodenticides should be completed using best practice guidelines to limit risks to birds, particularly birds of prey, from rodenticide use. Best practice guidelines should be developed by users, regulators, and other stakeholders, and encompass:

- treatment options, eg, timing of rodent management – if done at tillering stage it can have better results than if done later in crop growth,
- mitigation techniques to prevent risk when SGARs are used, and
- monitoring and evaluation of outcomes, and
- information shared/education with agricultural community.

The best practice guidelines should also be followed when using any substances, not limited to anticoagulant rodenticides, of risk to birds to treat rodent outbreaks.

3.2.Restrict/ban second generation anticoagulant rodenticide use in open agricultural fields

The likelihood of exposure to SGARs used in open-field agriculture is high for birds where these substances are applied. In many non-temperate areas, rodents are not resistant to the first generation anticoagulant rodenticides. Less toxic and persistent first-generation anticoagulant rodenticides (FGARs) can be effective in these areas, while minimizing the risk to birds. To identify whether FGARs would be an effective alternative to the more toxic SGARs, new tools are available to test for FGAR resistance making it easier to switch to FG ARs in areas lacking resistance.

In resistant open-agriculture areas, alternatives to SGARs should be explored and introduced where appropriate, including trapping of pests, integrated pest management strategies, and crop rotation. Combined research and development with research agencies and industry can mitigate the risk of rodent irruptions, particularly through education of researchers (who communicate with growers) and growers with practical, available for immediate use, farm strategies. Alternatives to anticoagulant rodenticides will not only limit risks to non-target wildlife, but will also limit the spread of resistant rat populations.

Eradications of invasive rodent species, particularly in island ecosystems, also use anticoagulant rodenticides, but these have limited impact on non-targets when using best practice. For the continued use of SGARs in conservation programmes underway in open field agricultural areas, best practice guidelines should be followed.¹

3.3.Stop permanent baiting: apply rodenticides only when infestations are present followed by bait removal

Permanent baiting, rather than only using rodenticides when infestations are present, is a likely cause of non-target wildlife exposure to rodenticides, particularly to SGARs, which are widely applied in this way. Many professional pest controllers use permanent baiting with anticoagulant rodenticides as standard procedure. Best practice guidelines on rodenticide use should be adopted instead, which:

- discourage the use of rodenticides as monitoring tools (i.e. to detect rodent presence), and
- encourage programme baiting, in which rodenticides are applied only when infestations are present, followed by bait removal.

However, there are often issues with user awareness and implementation of best practice. This indicates that efforts need to be made to raise user awareness of best practice guidelines, including working with pest control companies and food suppliers (which often dictate pest control policies) to change standard business models.

Regulatory changes may also be necessary to prevent permanent baiting being used as a routine practice, such as changes to label requirements and monitoring users' compliance with label requirements.

¹ Best practice guidance is available through many sources, including the Pacific Invasives Initiative: <http://www.pacificinvasivesinitiative.org/rk/index.html>.

4. Recommendations to prevent risk from poison-baits used for predator control and harvesting

The use of poison-baits is driven by the need for predator control and as a means for harvesting birds for human consumption and traditional medicine. Predator control using poison-baits occurs on a global scale, particularly in areas with livestock farming and game management.

Predatory and scavenging bird species are at risk of poisoning from poison-baits targeting them directly, and also from baits targeting mammalian species. The effects on species other than birds of prey are not always known and further research is needed to understand this. Many bird of prey populations are in decline as a result of illegal poison-baits, especially vultures.

To prevent the use of poison-baits, a number of steps are necessary to accurately identify why poison-baits are being used, resolve the conflict between people and wildlife, educate communities with best practice alternatives, and establish effective enforcement mechanisms. Each step is discussed below in more detail.

4.1. Identify drivers of the problem and publish regular reports on poisoning incidents

The key issue to resolving the conflict between humans and wildlife is to understand the drivers of using poison-baits. Understanding the nature of the conflict/issue that is leading to the poisoning occurring is essential to address the problem successfully. This is likely to vary significantly by region and industry in terms of what the key predators are and the livestock at risk of predation, and/or the economic value of the species being harvested using poison-baits. An initial assessment of the problem can be gained by consulting communities and those likely to encounter conflicts with predators, such as the agricultural sector.

Compilation of information on poisoning incidents, for both predator control and harvesting (misuse and abuse situations), is needed to understand the extent and trends in occurrence of the problem. To facilitate monitoring, data collection should be done in a standard format jointly by government and non-government parties. The results should be reported regularly and made publicly available.

4.2. Resolve human-wildlife conflict using multi-stakeholder fora

Working with the community, industry and enforcement agencies is necessary to resolve the conflict of poison-bait use. Often the focus of the conflict is related to effective predation management and many resources are available on wildlife conflict resolution. In order to achieve cooperative collaboration, it is critical that farmers and pastoralists be offered alternative, practical, non-poison methods for livestock protection, such as livestock guarding dogs, predator-proof enclosures, collars, lights, and other methods (see Box 1).

The successful resolution of human-wildlife conflicts also requires the participation of local communities and other stakeholder groups in formulating management decisions. Both social and economic factors drive predator control, and therefore these factors need to be incorporated when making decisions to mitigate the human-predator conflict.

4.3. Education: develop and disseminate good practice for predator control and enforcement

Educating individuals, in combination with conflict resolution measures, about the law and the consequences of poison-baits can help to protect natural resources by (a) making potential poison-bait users truly aware of the conservation impacts of their actions as well as of the potential legal penalties for misuse and abuse and can deter them from committing the crime; and (b) informing the general public of the law and the environmental costs of poison-baits can encourage the public to report illegal poison-baits to the police or local conservation authorities. The ultimate goal is to make the use of poison-baits culturally and socially unacceptable. This needs high-level political support to advocate the unacceptability to society.

There is no single best practice that can address all the conservation challenges of poison-baiting; instead, effective action requires multiple combinations of several practices. These include the articulation of damage and conflict prevention actions, loss compensation measures, targeted awareness campaigns and stakeholder involvement – practices that several projects have demonstrated as being the most effective ways of reducing coexistence conflicts between humans and large carnivores and, ultimately, improving species conservation status (see Figure 1).

Box 1: Key elements of good practice for predator control

- Work with both the agrochemical industry, farmers and the hunting community;
- Publicise the law and consequences of enforcement;
- Promote practical, non-toxic and non-lethal, predation reduction methods;
- Encourage the use of web-based information, such as www.wildlifepoisoningprevention.co.za;
- Encourage farmers to apply systems thinking/cause and effect analysis of conflicts and resultant actions;
- Increase small game/quality of habitat in areas where the loss of a native game species is driving poisoning. This can be done through agricultural subsidies;
- Livestock protection: use preventative predator measures;
- Exclusive authorization of selective predator control techniques for the targeted game species when managing hunting estates or livestock exploitations;
- Farmer funded insurance/compensation schemes can be considered where damage occurs from predators, such as wolves and lions and needs to be rapidly paid and adequately cover the loss;
- Provide official agriculture insurance aimed at protecting livestock and crops from predators and other species causing damage;
- Raise community awareness and increase monitoring effectiveness by educating the public about signs of wildlife poisoning and how to report suspected incidents;
- Create dog patrols instructed in the search for and location of poisoned baits;
- Establish official ranger teams and environmental bodies specializing in the investigation and prosecution of illegal poisoning;
- Reporting: require veterinarians to report suspected wildlife poisoning incidents to wildlife enforcement agencies;
- Enforcement: prosecute perpetrators of illegal poisoning.

Often the pesticide regulatory system uses prosecution as the only deterrent for poison-bait related crimes. Wildlife law enforcement agents that are investigating illegal poisoning have difficulty convincing some prosecutors to accept these cases and some judges are reluctant to impose penalties for the offences. Reluctance to prosecute and impose penalties may stem from a lack of knowledge about the extent and magnitude of these crimes, insufficient experience with wildlife statutes and case law, and lack of interest in pursuing crimes associated with minimal penalties. Many of these issues could be addressed by education programmes targeting judges and prosecutors

working in “poison-bait” affected regions, which has been successful in the European context. It is also beneficial to provide capacity building of enforcement officials (eg, specialized training and equipment, and facilities).

4.4. Create enforcement legislation with effective deterrent mechanisms and infringement penalties

A national strategy building on the recommendations herein should be developed in each relevant country and focus on implementation of the recommendations. Central governments should coordinate the development of the national strategy with all relevant stakeholders, and ensure it is reviewed regularly. Preference should be given to supplementing any existing relevant legislation.

The Strategy should include best practice recommendations (see above) and be created with community input (including local and regional authority representatives, if applicable, who could be responsible for implementation and enforcement of the strategy’s principles and objectives). Transparency and community involvement is essential to raise awareness and to ensure the plans are endorsed by the community (which leads to better entrenchment and support) and to cover the key issues of concern to that particular region.

Furthermore, if there is sufficient variation within countries, the development of regional action plans may be appropriate, eg, particularly for countries where poison-baits are used for both harvesting for human use and predator control.

4.4.1. Enhance enforcement and deterrence mechanisms

A key obstacle preventing the illegal use of poison-baits is ineffective enforcement of the law often related to inadequate monitoring and surveillance of poisoning incidents, and minimal investigation of complaints. There is a strong relationship between deterrence and enforcement whereby the lack of enforcement detracts from the deterrent effect of existing policies. Much of the problem stems from wildlife crime’s position in the crime agenda – it is generally given a low priority by enforcement agencies and there is a lack of political impetus to push it further up the agenda – much of which could be improved through better enforcement and awareness, which are discussed below. Obtaining high-level political support should be given a priority in implementing these guidelines. This can also be improved through education, particularly raising the profile of the issue with enforcement agencies, judiciaries and communities.

Recommendations to improve the deterrence and enforcement mechanisms for the wide-range of poison-bait offenders are discussed below.

- ***Strengthen infringement penalties to effective rates and reduce access to government subsidies for landowners***

Enforcement should be equipped with strong infringement penalties. Some European countries have reduced poisoning incidents through more stringent penalties. There is significant variation of infringement penalties even between European countries, which could be improved by setting penalties at rates shown to be effective.

Linking enforcement action to other sanctions can be a very powerful way to create a deterrent effect. In Scotland, a reduction in Single Farm Payment subsidies has been made on a number of occasions following pesticide offences. These operate on a reduced civil burden of proof (eg, “more likely than not” versus “beyond a reasonable doubt” in criminal cases). In Spain, in all criminal

prosecutions for wildlife poisoning, compensation for animals killed is considered and, in some cases, it includes expenses generated by the investigation of the crime (e.g. toxicological analyses). This compensation is requested as civil liability within the criminal process, without a specific civil action case.

- ***Suspend/withdraw hunting licenses for persons and areas where illegal poison-bait activity occurs***

A potentially effective deterrent to illegal poisoning for predator control on hunting estates is to withdraw permission to hunt on an area of land for a set period of time where there has been a conviction for the illegal use of poison baits. For this to work, some form of licensing system needs to be in place for hunting estates. For commercial shoots, this could be a licence to sell hunting rights to the land. For individual shoots, it could be that hunting licences could be withdrawn or suspended.

The suspension of hunting licences could be at the hunter level, i.e. strict liability of anyone hunting in the vicinity of detected poison-baits, and/or a blanket suspension of hunting licences over a specific region where poison-baits have been found (without having to prove that any person in particular placed the bait). The establishment of this policy would probably incentivize hunters to question whether poison-baits are used in the area before hunting (rather than risk losing their licence to hunt, e.g. for the season or longer).

A similar scenario is likely to occur for hunting operators (eg, tourism hunting). If hunting licences are suspended in the regions where they operate, they would be unlikely to support or participate in the practice of poison-baiting and less likely to willingly operate in areas where poison-baits are used. Both hunters and hunting operators may be more likely to report poison-bait incidents to ensure they can continue to hunt in those areas without risking their hunting licences.

- ***Establish sentencing guidelines to ensure consistent and effective outcomes***

Sentencing guidelines for wildlife crime, particularly for the use of illegal poison-baits and possession of illegal toxic substances, are essential for effective enforcement. Inconsistent legal outcomes undermine the credibility of the judicial system and suggest the seriousness of wildlife crime is not recognized, thereby defeating the deterrent effect. In some areas, sentencing guidelines are outdated and need to reflect current costs and inflationary adjustments need to be made to fines.

- ***Increase capacity and capability for enforcement with focused resourcing***

Without proper funding, effective enforcement measures are unlikely to take place. The lack of funding is one of the key elements affecting successful enforcement. This includes insufficient numbers of personnel as well as a lack of basic material resources, such as vehicles and other necessary equipment (eg, for collecting and transporting evidence). It may further result in a lack of data collection, access to forensic analysis and more advanced assistive technology, such as surveillance equipment. Under-resourcing can also manifest as insufficient training for enforcement agents, prosecutors and the judiciary thus reducing their capacity to enforce legislation effectively and sentence appropriately. Increasing capacity and capability for enforcement should be a high priority to ensure the measures put in place are effectively carried out.

- ***Introduce vicarious liability for landowners***

Vicarious liability was introduced in Scotland in 2011 to prevent the occurrence of poison-baits used to control birds of prey and other predators near areas managed for game hunting. Vicarious liability

imposes criminal liability on persons whose employee/agent/contractor commits an offence (unless they can show they were unaware of the offence and had exercised due diligence to ensure the employee obeyed the law).

In practical terms, vicarious liability would encourage landowners to make it clear to their employees and contractors that poison-baits affecting protected wildlife are unacceptable and to check that such practices were not occurring on their land. Vicarious liability should be introduced, if possible, especially in areas where there is an issue of game managers or livestock managers using illegal poison-baits for predator control. It may also apply in areas where private land is used by poison-baiters in harvesting birds for human consumption/traditional medicine.

4.5.Restrict access to highly toxic substances through stronger enforcement of supply chain

Often illegal substances are stockpiled by poison-bait users and farmers who originally had legal use of these substances, such as carbofuran and other highly toxic carbamates. The stores of highly toxic and illegal substances are often accessible for use in poison-baits. To limit accessibility to these substances, there are a number of steps to take, including removal of grace periods, alignment of removal policies, and user/buyer restriction to certified professionals only, each of which are discussed below.

- ***Remove grace periods for banned products***

Regulation of substances whose approval is not renewed, should be designed to ensure that existing supplies of the substance are removed and access limited. After a revocation has been issued and the grace period elapsed, the fate of remaining stocks can become ambiguous. In the European Union, plant protection products must now be removed from the market immediately (rather than a six-month grace period for the sale and distribution (retailers) and maximum of one year for the disposal, storage, and use of existing stocks for end-users), if they are removed for environmental reasons. Immediate removal without grace periods is recommended for the substances commonly used in illegal poison-baits.

- ***Establish consistent product removal policies between countries***

Limiting discrepancy in how removed products are treated between countries (particularly in neighbouring regions where poison-baits are an issue) can limit the opportunity for poison-baiters to access stockpiles in regions where long grace periods are in place.

In some cases, the cost of hazardous waste disposal of the substance on end-users could be mitigated by offering government or manufacturer supported take-back of the remaining product. Industry could serve as the foundation for an overarching returns industry—by its expansion into a larger, comprehensive disposal/recycling programme that accommodates the consumer sector.

Furthermore, monitoring of pesticide storage (including appropriate labelling) and establishment of sanctions for possession of removed products are effective deterrence mechanisms.

- ***Restrict users and buyers to certified professionals***

The adoption of Directive 2009/128/EC and its implementation in the European Union prevents (if implemented correctly) the purchase of pesticides by any individual and its use for purposes other than those for which they were manufactured. The Directive allows the use of certain pesticides only by professionals that have been certified, including those farmers that are authorized to use the

pesticide for those particular uses. Without this authorization, it is not possible to buy or use most pesticides. These measures establish traceability of pesticides and restrict their marketing and use allowing law enforcement a better monitoring of substances used in poisoning cases. Similar legislation should be adopted in regions outside the European Union with poison-bait problems.

5. Recommendations to prevent risk from veterinary pharmaceuticals used to treat livestock

NSAIDs are used to treat domestic livestock for inflammation and pain relief. Diclofenac, a previously popular NSAID for veterinary care of cattle in India, Pakistan, Bangladesh and Nepal, is toxic to a number of vulture species. It resulted in the poisoning of scavenging vultures throughout these four countries by contaminating domestic livestock carcasses available to vultures. Prior to the ban of diclofenac in these countries, the drug was prevalent in livestock carcasses and caused substantial population declines of three *Gyps* vulture species in South Asia. The use of diclofenac in regions outside South Asia may pose a risk of poisoning to other old world vultures.

5.1. Enhance surveillance of ungulate carcasses in high risk areas for diclofenac use and develop vulture safe zones

To fully enforce the veterinary diclofenac regulation in South Asia, governments should be responsible for monitoring ungulate carcasses to evaluate the effectiveness of the ban. This will also provide information on where to focus enforcement efforts.

In high risk areas with ongoing diclofenac use, Vulture Safe Zones should be introduced. Vulture Safe Zones have been developed in some key areas surrounding vulture colonies, with a focus on breeding sites, in South Asia. The aim is to secure a 100 km diameter diclofenac-free (and other harmful NSAIDs) area, which is the average range size of a colony. Actions within Vulture Safe Zones include working with local communities and governments to remove stocks of diclofenac, advocacy programmes and monitoring of potential diclofenac users and suppliers (farmers, veterinarians and pharmacies), and providing safe diclofenac-free food for vultures.

Presently, there are seven provisional safe zones across Nepal, India and Pakistan but none in the high-risk area of Bangladesh. The seven provisional zones do not yet encompass all three of the endangered vulture species, and therefore, additional safe zones need to be created in these species' breeding areas in South Asia. Further, all zones are provisional – meaning that diclofenac has not been completely removed from any of the safe zones. Independent monitoring of these zones should be introduced to accurately assess how the zones are influencing vulture population levels.

5.2. Raise stakeholder awareness on alternatives to diclofenac; promote product stewardship and voluntary withdrawal of NSAIDs toxic to scavenging birds

An education programme should include the value of vultures to the community, but also highlight the current reasons for decline and how people can address the issue, such as ensuring cattle are treated with meloxicam, hiring licensed veterinarians where possible and by appropriately disposing of fallen cattle that have recently been treated with veterinary drugs.

- *Educate professionals (livestock veterinarians, pharmacies—veterinary and human) about the use of alternatives to harmful NSAIDs for treating cattle and other domestic ungulates*

All relevant parties should work with the Veterinary Council of India, responsible for regulating the veterinary practice, and the equivalent bodies in the other high risk countries in South Asia to cover the risk of diclofenac to scavenging bird species and available alternatives in its education standards (including, continuing education of existing professionals) and also to develop policy for veterinarian illegal use of diclofenac (eg, loss of veterinary privileges and/or revocation of veterinary license).

- *Liaise with manufacturers to promote voluntary withdrawal of NSAIDs toxic to birds in high risk areas and encourage voluntary safety-testing for new/existing NSAIDs on scavenging bird species*

Corporate social responsibility (CSR) within the pharmaceutical manufacturing industry should be aligned to consider the effects of their products on the environment, including preventing harm to wildlife (during the development phase) and being responsive to concerns about existing products on the market. Further efforts are needed to change CSR programmes to prevent risks of veterinary products on scavenging bird species, including removal of products toxic to scavenging birds in high-risk areas and using safety-testing for new/existing NSAIDs to assess risks to scavenging bird species.

- *Work with manufacturers to raise awareness through product stewardship*

Stewardship with veterinary pharmaceutical companies can play an important role in minimising the environmental impact of NSAIDs. One of many possible approaches to fostering stewardship programmes with veterinary pharmaceutical companies would be to offer patent extensions to companies that develop comprehensive stewardship programs tailored for particular veterinary pharmaceuticals, especially ecologically-safe alternatives to diclofenac and other NSAIDs of risk to birds. Precedent for this resides in what was the US Food and Drug Administration's Paediatric Rule, which offers six-month patent extensions for doing research that defines safe dosages for children.

Industries can also adopt voluntary codes of practice and these codes can be used to develop a new public identity based on, for example, responsibility and sustainability. This way forward may be particularly attractive for the pharmaceutical industry in India and other countries, which have been in the public spotlight for their role in environmental pollution. Voluntary codes of practice for the veterinary pharmaceutical industry to ensure NSAIDs (and other drugs) are safety-tested for wildlife if wildlife are likely to be exposed to those drugs, could be combined with other incentives such as patent extensions (above).

Trade associations are also a source of encouragement for product stewardship. They can change behaviour through establishing environmental objectives in codes of practice for member firms. Most trade association codes have common objectives, such as continuous improvement in environmental performance, pollution prevention, product stewardship, and community participation, and call on firms to publicly report environmental performance. Product stewardship guidelines require members to ensure that their products are distributed and used without damaging the environment. Public reporting of environmental performance increases transparency and is one of several steps needed to reduce harm to ecosystems from pharmaceuticals. The reporting of safety-test results for NSAIDs (and other veterinary pharmaceuticals) may provide the necessary public involvement for companies to change testing practices to benefit wildlife and ecosystems.

5.3. Introduce mandatory safety-testing of NSAIDs that pose a risk to scavenging birds, including multi-species testing using in-vitro and read-across methods, with burden of proof on applicant; VICH/OECD to evaluate and provide guidance on wider risks of veterinary pharmaceuticals to scavenging birds

Safety-testing of all veterinary NSAIDs that could be used to treat animals that may become food for scavenger bird species should be introduced as mandatory. This includes safety testing of substances that are currently on the market as well as new substances. Mandatory safety-testing of risks to these species will reduce the likelihood of exposure to substances that are highly toxic to birds. Particular focus should be on South Asia where there have been dramatic declines associated with the use of veterinary pharmaceuticals. However, mandatory safety-testing should be introduced in all areas where birds of prey, especially old world vultures, are concentrated and rely on domestic ungulate food sources.

The regulatory approval given by the governments in South Asia of diclofenac was a result of an assessment error – arising from the fact that the assessments relied on acute, single species testing. In this case, single species testing is not appropriate given the effects of certain NSAIDs on vultures, and other species. Safety-testing of new and existing NSAIDs for veterinary treatment of cattle should be revised to include multiple species testing by the applicant.

The burden of proof can be changed to rest with the applicant or manufacturer to show that an NSAID is safe for vultures and other scavenger raptors through independent safety testing. Only those NSAIDs, such as meloxicam, that have been shown to be safe should be approved for veterinary purposes in areas of (1) high vulture and other scavenger raptor concentration; and (2) where domestic livestock are the principal food source of vultures and other scavenger raptors. This approach has been used in the European Union for antibiotic growth promoters in livestock, which takes a precautionary approach to veterinary chemical approval (compared to the US, which uses a conservative burden of proof).

This approach is likely to be supported at the international-level by VICH (International Cooperation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products). VICH is a trilateral programme between the European Union, Japan and the USA; and, countries such as Australia, Canada and New Zealand act as observers. The potential risks of veterinary medicinal product residues in livestock carcasses on scavenging bird species should also be evaluated by VICH (Phase II: Ecotoxicity Testing) and/or by the Organisation for Economic Cooperation and Development.

Ecological risk assessments extrapolate the toxic responses of laboratory test species to all species representing that group, eg, vultures, in the environment. Accurate extrapolation is key and the development of new in-vitro tests and read-across methods play a significant role in ensuring the accuracy of predicting how species will respond to exposure to veterinary pharmaceuticals. This is particularly relevant for *Gyps* vultures, and other endangered species, where testing on birds is unavailable due to their threatened conservation status. The use and further development of these methods is critical for successful risk assessment of veterinary pharmaceuticals for scavenging birds.

5.4. Develop methods to reduce likelihood of illegal use of human pharmaceuticals

Diclofenac has been banned for veterinary use in Nepal, India and Pakistan since 2006, and in Bangladesh from 2010; however, illegal use is occurring, through the use of human prescribed diclofenac on domestic ungulates. A number of ways to reduce the likelihood of illegal use of NSAIDs are recommended below.

- ***Reduce diclofenac vial size to single dose (3ml) in India, Nepal, Bangladesh and Pakistan***

Recommended diclofenac dosage amounts for cattle in India and Pakistan were 1.0mg per kg and 2.5mg per kg, respectively. The dosage amounts are significantly higher for domestic ungulates than humans. Presently, vials as large as 30ml are produced for human treatment. These guidelines recommend restricting human diclofenac vial size to 3ml in the four high-risk countries where veterinary diclofenac is illegal: India, Nepal, Bangladesh, and Pakistan. By reducing vials to 3ml, the administration to cattle becomes less convenient as many vials would be required for a single treatment.

- ***Include “not for veterinary use” on labels of human diclofenac***

Changing the labels of human diclofenac to include “not for veterinary use” may be an effective way to prevent the illegal use of human diclofenac for veterinary purposes. This addition could raise awareness of the issue with both human and veterinary pharmacies, as well as veterinarians.

- ***Introduce mandatory reporting for pharmacies to third-party regulatory body and require pharmacies to record sale and purchaser details***

In India, prescriptions are required to purchase diclofenac and the consequences of selling diclofenac without a prescription are for the pharmacist to lose their licence to practise. However, in practice, it is rare for a pharmacist to lose their licence.

One step further is needed to prevent the risk of veterinarians (licensed and unlicensed) purchasing diclofenac: the introduction of mandatory reporting to a third-party regulatory body, eg, in India, the state’s Drug Controlling Authority. In addition to the regular recording of all prescription sales, reporting of frequent purchasers and high volume sales by the pharmacy to the regulatory body may reduce the likelihood of illegal sales. It also removes the burden from the pharmacy of having to refuse sales. However, it relies on both the pharmacy reporting high volume sales (of which they are likely to make higher profits from) and on the regulatory agency contacting the purchaser and investigating the reasons for purchase.

- ***Require identification to purchase human diclofenac***

In Canada, the prescription status changes for veterinary drugs that are known to be diverted to human uses. This could be used for the reverse situation with human drugs that are known to be diverted to illegal veterinary use. In this case, requiring identification, e.g. driver’s licence, to purchase large vials (30ml) of human diclofenac may help reduce illegal purchasing for veterinary purposes.

- ***Increase supply and availability of “safe” veterinary products and provide subsidies to those unable to afford veterinary care***

Government veterinary centres are given an annual quota of veterinary medicine, which may not be enough to cover demand. There is also a lack of government veterinary facilities in many regions in

India. Both of these factors may increase the possibility of the illegal use of diclofenac, eg, by lack of (1) available alternatives on hand to purchase; and (2) licensed veterinarians (leading to the potential use of unlicensed veterinarians). Annual quotas for veterinary medicines should be tailored to particular regions and based on the number of livestock in the area. Government veterinary centres should be redistributed to poorer regions and targeted subsidies given to those unable to afford licensed veterinary care.

6. Recommendations to prevent risk from lead ammunition and fishing weights

6.1. Create legislative processes to immediately substitute lead ammunition and fishing weights with non-toxic alternatives

Given the rapid progression and advanced development of non-toxic alternatives to lead ammunition (non-toxic alternatives are readily available for shot and most calibre bullets) and fishing weights, legislation should immediately be adopted to substitute lead ammunition and fishing weights for non-toxic alternatives. To reduce problems with monitoring, compliance and enforcement, such processes should not be partially restrictive, and should involve restriction on both sale and possession of lead ammunition.

6.2. Create legislative processes to facilitate remediation of lead ammunition-contaminated environments

National regulators should introduce requirements for remediation activities to reduce lead contamination from ammunition in both wetland and terrestrial environments.

6.3. Promote lead ammunition-free wildlife management

Natural resource managers including conservation organizations and government agencies using ammunition for wildlife management and control of pest and invasive species should, with immediate effect, become lead ammunition-free thus leading the way for other bodies and organizations to do likewise.

6.4. Raise awareness of lead poisoning; promote leadership from ammunition users on non-toxic alternatives and best practice

Raise awareness and create supporting resources to encourage immediate substitution of lead ammunition and fishing weights with non-toxic alternatives, including a collaborative website run by MEAs, shooters/hunters/fishers, land managers and wildlife and conservation organizations with information on:

- best practice for hunting and angling to reduce risks of lead poisoning to wildlife (e.g. shooting to prevent crippling and non-retrieval of wildlife);
- the negative impacts of lead poisoning on birds and also how public opinion is affected;
- misperceptions within the shooting community on the non-toxic alternatives;
- the benefits of non-toxic alternatives leading to lower mortality in quarry species populations due to lead poisoning, hence to a higher harvest potential;
- the potential human health risks of consuming game contaminated with lead ammunition for children, pregnant women and those adults who are likely to consume large quantities of game meat.

Shooting and angling organizations and associations including tourism operators, military, sports shooters, hunters and fishers should be encouraged to: provide leadership on the issue; raise awareness of the problem; promote the non-toxic alternatives; and support immediate substitution of lead ammunition and fishing weights.

Manufacturers and traders of non-toxic ammunition and fishing weights should be encouraged to actively promote these products.

6.5. Promote lead ammunition-free sites of importance to migratory birds

Awareness raising initiatives should be developed at key sites for migratory waterbirds, such as Ramsar Sites, for the substitution of lead for non-toxic alternatives for all shooting activities being undertaken in these areas. Similar initiatives should be also developed at bottlenecks where raptors funnel and stopover during migration and at breeding/wintering grounds where vulnerable species occur in high numbers.